K/ETO - 162

MARTIN MARIETTA

Flow Boiling Test of GDP Replacement Coolants

Compiled by

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Prepared by
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Oak Ridge, Tennessee 37830
for the
UNITED STATES ENRICHMENT CORPORATION
under Contract No. USECHQ-93-C-0001

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INTRODUCTION

This report contains the works done by the Cudo Technologies, Ltd. in Lexington, Kentucky under the contract #11K-NR559. The tests were a part of the CFC Replacement Program to identify and test alternate coolants to replace CFC-114 being used in the uranium enrichment processes at both Paducah, Kentucky and Portsmouth, Ohio. Two coolants identified as possible replacement coolants were C_4F_{10} and C_4F_8 and tests were conducted to determine boiling heat transfer coefficients and pressure drop through a 10 foot test section which simulates an average length of the coolers used in the enrichment process. The study consisted of constructing a flow boiling test loop and conducting flow boiling tests with CFC-114, C_4F_{10}, C_4F_8 and mixture of CFC-114 and C_4F_{10} at three different weight ratios. This report consists of the final reports from Cudo Technologies, Ltd. and is divided into four sections.

Section 1	Design of test apparatus and test criteria
Section 2	Results of tests with CFC-114, C4F10, C4F8
Section 3	Results of test with mixtures of CFC-114 and C4F10
Section 4	Test data

SUMMARY

The coolants tested, C_4F_{10} and C_4F_8, were selected based on their compatibility with the uranium hexafluoride process gas and how well the boiling temperature and vapor pressure matched that of CFC-114. However, the heat of vaporization of both coolants is lower than that of CFC-114 requiring larger coolant mass flow than CFC-114 to remove the same amount of heat. The vapor pressure of these coolants is higher than CFC-114 within the cascade operational range, and each coolant can be used as a replacement coolant with some limitation at 3,300 hp operation. The results of the CFC-114/C_4F_{10} mixture tests show boiling heat transfer coefficient degraded to a minimum value with about 25% C_4F_{10} weight mixture in CFC-114 and the degree of degradation is about 20% from that of CFC-114 boiling heat transfer coefficient.

Section 1

Design, Construction, and Testing of an Experiment to Measure the Flow Boiling Heat Transfer and Pressure Drop in a Vertical Tube

K/ETO-162

Flow and Pool Boiling Heat Transfer Testing of GDP Replacement Coolants

Enrichment Technical Support Department

Uranium Enrichment Organization
Martin Marietta Utility Services, Inc.

K/ETO-162

Flow and Pool Boiling Heat Transfer Testing of GDP Replacement Coolants

Enrichment Technical Support

May 1995

Prepared by the
MARTIN MARIETTA UTILITY SERVICES, INC.
Oak Ridge, Tennessee 37830
for the
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under contract No. USECHQ-93-C-0001

Design, Construction and Testing of an Experiment to Measure the Flow Boiling Heat Transfer and Pressure Drop in a Vertical Tube

by

Cudo Technologies, Ltd.
P.O. Box 185, Lexington, KY 40584

Contract # 11K-NR559
Report # MMES-CTL-NR559-1

Martin R. Pais, PhD
Principal Investigator

Ming Jr Chang, PhD

Maninder S. Sehmbey

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Nomenclature

C	Specific heat
D	Diameter
G	Mass flux
h	Heat-transfer coefficient
i	Latent heat of vaporization
I	Current
k	Thermal conductivity
L	Length of tube
m	Mass flow rate
n	Constant
P	Pressure
Pr	Prandtl number
q	Heat flux
Q	Heat input
R	Roughness
Re	Reynolds number
S	Correction factor
T	Temperature
V	Voltage
x	Quality of vapor
z	Location in vertical direction

Superscripts

a-i	Constants
A	Area
B	Constant
"	Heat flux indicator

Subscripts

a,q	Roughness descriptive
c	Convective
co	Coolant
f	Liquid/fluid
fg	Of vaporization
g	Gas/vapor
m	mean
nb	Nucleate boiling
p	Constant pressure
sat	Saturated
sub	Sub-cooled
w	Wall

Greek

μ	Kinematic viscosity
Δ	Difference
ρ	Density
σ	Surface tension

ABSTRACT

This study involves the design, construction and calibration of a flow boiling heat transfer measurement system to study flow boiling from the internal surface of a vertical cylindrical tube. The system is designed to operate over a wide saturation temperature range of 50 °F to 250 °F, pressure range of 14 to 350 psig, a heat flux range of 0 to 60,000 btu/hr.ft^2 and a mass flux of 0 to 1.4e6 lbm/hr.ft^2. Optical access for flow visualization is incorporated into the design. The test section is a 10 foot long, 0.78" ID instrumented copper tube divided into 10 zones in the longitudinal direction. Facilities to measure temperature, pressure and flow rate within each zone and at various locations in the system are provided.

INTRODUCTION

In several proposed cooling applications, the use of fully fluorinated carbon compounds is being seriously considered. This is because the common refrigerants in use today (chlorofluorocarbons, CFCs) have been linked to the depletion of ozone in the stratosphere. The current world plan ironed out by the Montreal Protocol calls for a total ban of all CFCs by the year 2000. The USA has unilaterally called for a ban on all CFCs by 1995. This demands that replacement refrigerant fluids be sought and tested which will not only satisfy the tougher environmental standards but also, more importantly, provide satisfactory cooling capacities within the current existing installations.

Two fluids have been selected as promising replacements for CFC-114 in the uranium enrichment facilities. They are perfluorobutane C_4F_{10} and perfluorocyclobutane C_4F_8. These fluids:

- are very inert,
- have thermophysical properties that are comparable to the currently used refrigerants, and
- can be manufactured with currently available technology.

If the two coolants stated above can be used in the heat exchangers directly as replacements, then:

- a new cooling system will not have to be designed and built.
- large savings in new installation costs will be realized.
- time will be saved in switch-over to the new coolant.

The proposed effort has a direct relationship with the cooling of uranium-enrichment-plant heat exchanger systems. It is also of interest in the cooling of high-power electronic chips for terrestrial applications and in the refrigeration industry.

Despite the significant advantages of using current installations, the direct use of such replacement fluorocarbons may have some drawbacks that must be checked. The heat transfer capability of the fluid is dependent on a number of parameters [1-4]. Depending on the operating temperatures, pressures and heat loads envisaged, conditions within the heat exchanger system can be reached which can be deleterious to the process.

To date, an extensive literature search fails to reveal any information on the heat transfer characteristics of perfluorobutane and perfluorocyclobutane. Experimentally correlated constitutive equations for boiling and two-phase phenomena appropriate to these particular fluids do not currently exist. Some flow boiling studies have been found [5-11] which have enabled us to estimate the heat transfer rate for the fluids in question. However, these estimates must be certified. Knowledge of the conditions and heat transfer rates is required for the safe design and operation of

systems cooled by pressurized or boiling liquid coolants. The critical heat flux (CHF) also is a major parameter in the design of units cooled by forced convective boiling for transient and accidental analysis.

Most refrigerants of the fluoro/chloro-carbon series have excellent wetting properties, enhancing evaporation and condensation. However, higher wetting also increases the superheat temperatures for the onset of boiling, these temperature overshoots can sometimes be as high as 55 °F [1]. The contact angle plays an important part in the nucleation process [12-14]. Specifically, the dynamic contact angle is a strong superheat controlling factor. Therefore, depending on the wetting characteristics of these liquids under various conditions imposed by the thermal and fluid fields and the surface roughness [15-19], situations can arise which are detrimental to the operation.

TECHNICAL OBJECTIVES

The overall objective of this proposed study is to develop a method of measuring the heat-transfer coefficient and pressure drop on the internal surface of a cylindrical pipe under conditions of uniform heat flux in flow boiling in a vertical orientation with respect to gravity.

The overall objective of the total research effort is to:

A. Design and build an experimental setup to:

1. Measure the boiling heat-transfer coefficient on the internal surface of a tube under conditions of:
   a) flow and free convective boiling,
   b) different angles of inclination with respect to gravity,
   c) uniform heat flux, and
   d) different surface roughness conditions.
2. Measure the two-phase flow pressure drop.
3. Measure the critical heat flux.
4. Measure the surface temperature distribution.
5. Measure the flow temperature distribution.
6. Measure and define the surface roughness conditions.
7. Maintain the desired saturation conditions.
8. Provide a means for flow visualization.

B. Compare the results with the currently existing R-114 data from the Oak Ridge Gaseous Diffusion Plant (ORGDP) [7].

C. Compare existing or determine a new correlation for:
1. the heat flux,
2. the CHF, and
3. the pressure drop.

The specific objective of this study is to:

A: Design a well instrumented experimental setup to:
1. Measure the boiling heat-transfer coefficient on the internal surface of a 0.785" I.D., 1.75" O.D., 120" long copper tube.
2. Measure the two-phase flow pressure drop at five locations.
3. Measure the critical heat flux under conditions of:
   a) flow boiling,
   b) vertical orientation, i.e., the axis of the tube will be held in the direction of gravity,
   c) uniform heat flux within the ten 11-1/2" heat zones,
   d) predefined surface roughness on a copper wall.
4. Provide the following capabilities:
   a) fluid boiling temperature of 100 °F to 250 °F
   b) fluid mass flux of 0.1e6 to 1.1e6 lbm/hr.ft^2
   c) test section exit quality of 0 to 1
   d) heat flux maximum of 3,000 to 60,000 Btu/hr.ft^2 per zone
   f) tube saturated length to diameter ratio L/D = 30 to 150
5. Overall system conditions to be measured include:
   a) surface temperature distribution
   b) fluid temperature distribution
   c) pressure at 6 equally spaced locations along the 120" test section with one location at the entrance and one at the exit. An absolute pressure is measured at the test section entrance and the remaining five pressures are determined differentially with respect to the inlet reading.
   d) heat flux into each region
   e) provide a means for exit flow visualization

B: Run tests using:
1. CFC-114 to confirm and check for repeatability with the (ORGDP) data [7].
2. C_4F_8
3. C_4F_{10}
4. non-azeotropic mixtures of the above three liquids

TECHNICAL APPROACH

Theory

Consider a vertical tube heated uniformly over its length. A sub-cooled liquid enters at the base of the tube at a flow rate such that on exiting the tube at the top all the liquid has changed phase to vapor. Figures 1 [1] and 2 illustrate the different regimes of heat transfer encountered over the length of the tube.

Region A: *Single phase heat transfer to the liquid phase.* Here the wall temperature is lower than that required for nucleation [1,3,4] and the liquid being sub-cooled is heated up to the saturation temperature. The heat-transfer coefficient is relatively constant, changing only slightly due to the influence of

temperature on the liquid thermophysical properties. Both the liquid and wall temperatures increase linearly.

Region B: *Sub-cooled nucleate boiling.* As the flow moves downstream the wall temperature rises above saturation temperature, i.e., the degree of superheat, ΔT_{sat} (= $T_w - T_{sat}$) is positive. When some critical value of temperature is reached within the sublayer that is well above that of the saturation temperature [1,3,4] ebullition commences. ΔT_{sat}, the temperature difference between the wall and the saturation temperature depends on the interaction of the surface tension at the liquid-vapor-solid interface with roughness [15,16,20]. The conditions at the wall support nucleation although the main liquid flow field is below saturation, i.e., ΔT_{sub} (= $T_{sat} - T_f$) is positive [21,22]. Sub-cooled boiling is characterized by the formation of vapor at the heating surface in the form of vapor bubbles at preferred nucleation points. The bubbles condense in the cold liquid away from the heated surface with the result that no net vapor is produced. Thermocapillary, turbulent, and convective heat transport dominate the flow of heat from the condensing bubble and wall surfaces [21,23]. At the onset of nucleation, bubbles form on the surface which maintain the wall temperature constant. However, the fluid being sub-cooled increases in temperature linearly up to Region C. The heat flux being constant, the heat-transfer coefficient increases linearly with length.

Region C: *Saturated nucleate boiling.* This region begins when the average bulk liquid temperature is equal to the saturation temperature. The primary mode of heat transfer is within the layer adjacent to the wall and is by conduction and convection. The intermittent generation of bubbles on the surface increases the heat transfer rate via two mechanisms. The latent heat of vaporization in the bubbles carries heat away from the wall. As the individual bubbles leave the wall, they rupture the laminar sublayer, thus reducing the resistance to heat flow by introducing added turbulence at the wall surface. This stage is appropriately termed nucleate boiling. This region is defined from the point at which the liquid reaches the saturation temperature, i.e., the liquid mixed-mean-enthalpy equals that of the saturated liquid. As the liquid flows downstream vapor bubbles become a non-condensible part of the flow field. The heat transfer is characterized by the liquid-vapor quality,

$$x(z) = \text{mass flow of vapor/total mass flow} \qquad (1)$$

Figure 2 shows the change in the quality 'x' as the flow moves down the tube.

Region D: *Slug flow.* The bubbles become larger and more numerous coalescing to form one large bubble that can sometimes be almost as large as the diameter of the pipe. The liquid flow is contained in liquid '*slugs*' which separates successive gas bubbles.

In regions C & D, the ΔT_{sat} and hence, the heat-transfer coefficient remain constant.

Region E: *Annular flow*. The bubble bursts and a thin liquid film forms on the pipe wall with a continuous central vapor core. Heat is transferred by conduction and convection through the liquid film, the effective thermal conductivity of the film being high enough to allow direct evaporation from the liquid-core vapor interface. No nucleation occurs within the film.

Region F: *Annular flow with entrainment*. Owing to the increase in the vapor velocity, large amplitude waves are whipped up on the surface of the liquid film that continuously break up ejecting droplets into the vapor core flow field. Hence, this is truly a two-phase convective region. Because of the reducing thickness of the liquid film, the heat-transfer coefficient begins to increase.

Region G: *Drop Flow*. Here the liquid film on the tube wall is completely depleted. The wall temperature shows a significant rise. The heat-transfer coefficient is suddenly reduced from a very high value in the two-phase forced convective region to a value near to that expected for heat transfer by forced convection to a dry saturated vapor. In this liquid deficient region the vapor velocity increases and the heat-transfer coefficient rises correspondingly.

Region H: *Dry saturated vapor*. The liquid exiting the tube is of $x = 1$ quality. This is a single-phase vapor region. The heat-transfer coefficient levels out to that corresponding to the convective heat transfer to a single-phase vapor flow [24]. The regions G and H are associated with the condition of dryout that essentially limits the amount of evaporation that can be supported by a tube with a particular heat flux.

The above processes occur when the heat flux at the walls is kept relatively low. However, if the heat flux is gradually increased, the regions move closer together, the regions G & H becoming extended. Finally, a point is reached when a sudden deterioration in the cooling process takes place. The above occurs before the two-phase forced convective region is initiated and while bubble nucleation is still taking place. This condition is called the critical heat flux (CHF) and is associated with a rapid rise in surface temperature from a temperature close to the saturation value. It represents a situation in which there is a more or less a sudden decrease in the value of the heat-transfer coefficient of one or two orders of magnitude as compared with the values obtained in the nucleate boiling and two-phase forced convective regions. This decrease is a consequence of the fact that the heat transfer surface is no longer completely wetted by the liquid phase. Vapor now completely or partially blankets the surface creating an insulating layer between the wall and the liquid (in the center of the tube). Hence, the heat transfer is no longer directly to a

highly conducting liquid but through a poorly conducting gas/vapor to a liquid.

Effect of Roughness

Roughness has been shown to have a controlling effect on nucleation under pool boiling conditions [15]. The effect of surface roughness has been studied by Weatherhead [22] and Chirkin [25] who noted that the critical heat flux is lowered for polished surfaces and ascribed the decrease to the lack of nucleation sites. Contrary to the above, De Bartoli [26] and Aladyev [27] report no influence of roughness on the CHF for surfaces in the 0.7 to 4 μm roughness range.

Correlations

The Heat-Transfer Coefficient: References [1,2,5-10,28] represent a few examples of the numerous investigations into the theory of boiling. While theoretical investigations have led to a better understanding of the basic physics underlying boiling, the correlations used to model boiling heat transfer [2,5-10] stem in large part from the appropriate parameterization of experimental observations.

The theory of nucleation and the solid-liquid-vapor relationship of boiling is addressed in references [1,3,4,28-33]. These authors attempt to explain how the surface temperature for nucleation relates to the composition of the solid surface.

The thermodynamic conditions under which boiling, nucleate or film, take place are well documented for a number of common liquids [34]. However, scarcely any data is available on the effect of the fluid's flow field on boiling. Several empirical theories [1,4] have been developed which can predict the thermal properties of the boiling flow field; however, they have been determined for specific cases, and general application would be questionable.

For fluid mechanics problems involving numerical modeling of two-phase flow, several authors have addressed the problem of optimum equations needed for predicting the flow field. Concerning this question, three particularly illustrative sources are Chawla [33], Ishii [35] and Bergles [36]. These articles contain a theoretical discussion as well as some specific constitutive equations.

DESIGN OF FLOW BOILING EXPERIMENTAL SETUP

Experimental Arrangement

Figures 3 and 4 illustrate the flow boiling system capable of operating at pressures from 0 to 350 psig and temperatures ranging from 50 °F to 300 °F. The system consists of fourteen major components, namely:

1. Storage tank
2. Pumps
3. Flow straightener
4. Instrumented vertical tube
5. Heaters, power supply and power measurement systems
6. Temperature measurement and control systems
7. Pressure measurement system
8. Flow visualization zone
9. Vapor-liquid separator
10. Condenser
11. Flow meters
12. Valves
13. Level gages
14. Chiller system

In the following sections each of the individual components will be described in detail.

1. Storage Tank

The storage tank was designed to provide sufficient head for the pumps to operate without cavitation. The total volume of the storage tank is approximately 15.6 gallons. This volume was sufficient to allow the tank to be at least a third full at all times during the test. The tank design is shown in figure 5. The tank is provided with a heat exchanger which can be used to sub-cool the liquid. This heat exchanger is a 30 foot coil of 1/2" copper tubing connected to the chiller. The tank is also provided with a 5 kW heater wrapped around the outer wall at the bottom. The combination of the heater and sub-cooler is used to control the temperature of the coolant inside the tank. The whole tank is insulated with a thick layer of fiberglass insulation to reduce the heat loss to the environment.

2. Pumps

The two pumps used in the test loop are identical magnetic clutch canister gear pumps (9 teeth in rotor, 7 teeth in idler). The variable speed pump has a variable speed motor with an electronic speed controller. The speed of the pump can be varied semi-continuously between 0 and 1750 RPM. The fixed speed pump operates at 1750 RPM. The performance curve for both the pumps is shown in figure 6.

3. Flow straightener

The flow straightener shown in figures 7 to 10 is used to provide a uniform velocity profile to the flow and eliminate the eddies and turbulence caused by the bends and valves between the pump and the straightener. The flow, on entering from the bottom of the straightener, passes through an aluminum honeycomb that straightens the flow and then through a reducer which accelerates the flow into the test section entrance. The mating flanges between the flow straightener and the test section ensure that the flow is undisturbed by the joint between the two.

4. Instrumented vertical tube

The test section is primarily a 0.785" ID & 1.75" OD copper tube about 10 feet in length. At each end of the test section is a welded copper flange for mating with the other parts of the setup. Figure 11 shows the overall dimensions of the test section. The test section is divided into ten zones, each 11.5" long and separated from the adjacent zones by a 0.5" wide groove shown in figure 12. Figures 13, 14, and 15 show the details of the thermocouple wells and pressure taps in each zone, and the corresponding cross-section views are shown in figures 16, 17 and 18. Zone 1 (the first zone at the bottom) and zone 10 (the last zone at the top) are welded to copper flanges, figure 19, which in conjunction with the carbon steel slip-on flanges, figure 20, are used to connect the test section to the flow straightener (for zone 1) and the flow visualizer (for zone 10). Figure 20 shows the end zones with the welded flanges and the slip-on flanges. As can be seen from the previous figure, due to the addition and welding of the end flanges, the end zones turn out to be slightly longer compared to the other zones (11.8" long as compared to 11.5").

5. Heaters, power supply, and power measurement systems

Each zone of the test section is wrapped with heaters capable of providing over 60,000 Btu/hr.ft^2 to the outer surface of the tube. The heater arrangement, as shown in figure 21, consists of two nichrome wires (80% Ni/20% Cr, AWG 20) each 30 ft long connected in parallel and wound helically around each zone. The nichrome wires were insulated with a sleeve of fiberglass capable of withstanding temperatures up to 900 °F. Initially it was felt that wrapping the insulated nichrome wires tightly around the zones would provide enough heat transfer area for the heater to remain below this temperature. However, from initial tests it was ascertained that some form of heat spreader would be needed to obtain the highest heat flux at reasonably low heater temperatures. For this purpose a high temperature, high expansion magnesia (MgO, k = 40 Btu.in/hr.ft^2.°F) cement was coated around the zones, the insulated heater wires were then wrapped around the coated zone and then again covered with two thick layers (≈ 1.5 mm) of the cement. This arrangement provided a good insulation between the zone and the heater wire and also increased the heat transfer from the heater wires.

The heater arrangement and the test section was thermally insulated from the environment by three layers of high temperature Fiberfrax^r insulation (k = 0.65 Btu.in/hr.ft^2.°F @ 500 °F) in 3/8" diameter rope form and an aluminum foil radiation heat shield.

To reduce electrical and induction noise on the various transducers the direction of current flow was reversed in every zone to counteract induction as much as possible. All supply wiring was run through grounded metal conduits.

Depending on the level of heat flux desired, a control signal from the potentiometer is applied to the phase-angle SCR power supply, see figure 22. The SCR power supply regulates the power to the heaters by varying the phase angle on each AC cycle proportional to the control signal. This method of applying power provides a continuous uniform heat flux with fine control. The temperature controller, as shown in figure 22, monitors the temperature of the outer heater surface. In the event of an overshoot in the temperature of the surface, an alarm disconnects the power to the heaters via relays. The power to the heaters along with the temperatures are continuously indicated by the panel meters and recorded by the data acquisition system. All process parameters are displayed and stored on the PC.

By measuring the voltage across and the current flowing through the heater (the power transducer does this), the total heat input into the heater is given by,

$$Q = V \times I - \text{Losses} \qquad \text{Watts}$$

The losses include,

$$\text{Losses} = \text{Conduction losses to end plate} + \text{ambient}$$

The losses to the ambient were calibrated as described in *Heat Loss*.

6. Temperature measurement and control systems

Wall temperatures are measured by five thermocouples imbedded into threaded holes in the wall of each zone of the tube (see figures 13 to 18). Each thermocouple was set up to be coaxial with a screw which was threaded into the hole, see figure 23. The bottom of the hole was filled with a highly conductive Omegatherm paste for improving thermal contact. In addition, one thermocouple was positioned so as to be within the flow field to measure the in-stream flow temperature.

All the thermocouples were of type E stainless steel sheathed (1/16" OD) with ungrounded junctions. The thermocouple extension wires were teflon insulated, twisted-pair cable (8 pairs to a cable) made of thermocouple grade wire. Twisted-pair cables were selected to reduce noise in the signal. The specifications on thermocouples are given below.

Type: E
Sheath: Stainless steel, 1/16" OD 3.5 to 4.5" long
Limits of Error: 3 °F or 0.75 % (whichever is greater)
Manufacturer: Omega Engineering, CT.

Using the temperature controller in conjunction with another thermocouple affixed to the outer heater wall, the temperatures of the heater wires are monitored. In the event of a sudden

temperature rise (such as at CHF), the controller alarm will disconnect the power to the heater, see figure 22. The power control to the heaters is set up to provide the capability of either maintaining a constant temperature or a constant heat flux on each zone.

Each thermocouple was calibrated using a standard platinum thermistor over the temperature range 100 °F to 350 °F in approximately 25 °F temperature intervals. The thermocouples were calibrated with the same wire, connecting harness and data acquisition cards in place as used in the actual experiment. Hence, any uncertainty due to electrical contacts is removed. The uncertainty in the temperature measurement was reduced to ±1 °F.

7. Pressure measurement system

As shown in figures 3, 11-18, the ten zones are identical as far as the location of thermocouples is concerned. However, the pressure taps are located in zones 1, 3, 5, 7, 9 & 10 such that the distance between two consecutive taps is 2' except for the tap in zone 10 which is at a distance of 22.5" from that in zone 8.

Seven pressure transducers were positioned along the length of the tube. One at the entrance of the tube and one at the exit that gave the absolute pressures. Additionally, five transducers were placed equidistantly within the test section to provide the differential pressure relative to the inlet pressure. The differential pressure transducers provide the pressure drop information along the length of the tube.

Two types of pressure transducers were used in the experiment. The first were gage pressure transducers connected to the first and the last pressure port in the test section. These were the model #PX906-500GV manufactured by Omega with the following specifications:

Range: 0-500 psig
Accuracy: 0.4%
Zero balance: 3%
Output: 20 mV full scale
Excitation: 10 V dc
Sensitivity: 2 mV/V

The second type of pressure transducer was used for measuring the pressure drop along the length of the test section. For this purpose 5 differential pressure transducers, model # DP-30-0003-111, manufactured by Celesco Transducer Products, CA were selected. Following are the specifications for these transducers:

Range: 0-3 psid
Accuracy: 0.5% F.S.
Repeatability: 0.1% F.S.

Each of the differential pressure transducers were calibrated periodically (after change of each liquid) over a range of 0 to 5 psi using a dead weight tester. The absolute pressure transducer was calibrated by Omega.

8. Flow visualization section

The flow visualization zone follows zone 10 at the exit or top of the test section, see figures 24 to 26. The flow visualizer is a pyrex glass tube with an internal diameter of 0.787" ±0.005". The pyrex tube is held between two flanges, see figures 25 and 26. The lower flange mates to the test section exit flange and ensures a smooth transition from the test section to the view port. The O-rings around the glass tube provide an axial seal for the fluid. The pyrex tube is rated at 350 psig.

9. Vapor-liquid separator

The separator is essentially a cyclone separator, in which the liquid-vapor mixture is coarsely separated using gravitational and centrifugal forces. The liquid-vapor mixture enters a large chamber where the liquid settles to the bottom due to gravity. The vapor with fine entrained liquid droplets then moves toward the elevated vapor exit passing through swirler-vanes which induce a circumferential velocity on the flow. This circumferential motion produces the centrifugal force that throws the heavier droplets outward and allows the vapor to move toward the center where the vapor exit is located. Figure 27 shows the separator design in detail. The separator is also wrapped with a heater and insulated with fiberglass insulation to minimize heat loss and prevent condensation in the separator.

10. Condenser

The condenser was designed as a shell and tube type with a capacity of 150,000 Btu/hr at a condensate temperature of 98.6 °F, antifreeze inlet temperature of 25 °F, and antifreeze flow rate of 25 gpm. The capacity increases as the saturation temperature of the coolant rises. The capacity of the condenser is limited only by the temperature and flow rate of the antifreeze. The details of the condenser are shown in figures 28 to 33. The details of the tube bundle are as follows:

Tube bundle
- No. of tubes: 7
- Length of each tube: 16 feet
- No. of passes: 2
- Tube specification: 1/2" nominal, type K copper tube

11. Flow meters

The flow meter locations are shown in figure 3. The three flow meters used in the test loop are identical. The flow meters are model # FTB-102 turbine meters sold by Omega with the following specifications:

Flow range: 0.75 - 7.5 gpm
Temperature range: -450 to 450 °F
Output: pulse output with a minimum amplitude of 30 mv
Accuracy: 0.5 % of reading
Repeatability: 0.1 % of reading
End connections: 1/2" NPT male
Max. pressure drop: 5 psid

The turbine flow meters were installed with a straight length of at least 8" upstream and 3" downstream as per the specifications of the manufacturer. The flow meter assembly had an internal diameter of 0.54" which resulted in a substantial pressure drop. Also, to prevent cavitation on the impeller vanes, sub-cooled conditions had to be maintained at the inlet.

The flow meter used to measure the coolant mixture flow rate was a model # FTB4607 from Omega. The accuracy of this flow meter is 1.5% of the reading and its operating range is from 0.22 to 20 gpm.

The flow meters at the exit of the separator and condenser did not operate in a continuous fashion but rather in an intermittent way. This is because the turbine flow meters used require a threshold impulse to start. This required the liquid level to build up in the separator and condenser lines before the meter would register a reading. Once the turbine started, the liquid would run through in a short period and the process would repeat itself. Therefore, determination of the exit quality in a continuous fashion was not possible.

For flows below 1 gpm three rotameters were installed in parallel with the turbine meters with valves to isolate either one if necessary. The rotameters were Omega series FL-1502A with the following specifications:

Flow range: 0.145 - 1.45 gpm
Temperature range: 40 to 200 °F
Pressure: 300 psig maximum
Output: Visual fused scale on rotameter glass tube
Accuracy: 1 % of full scale
Repeatability: 0.5 % of full scale
End connections: 1/2" NPT male
Max. pressure drop: 14" of water

12. Valves

Valves used in the setup were manual ball valves of various sizes depending on the piping. This facilitated isolation of various regions of the flow loop for maintenance and checking purposes.

13. Level gauges

Clear nylon tube level gages were constructed using compression fittings connected to the top and bottom of the storage tank,

separator, and condenser to determine the liquid level in the components.

14. Chiller system

The chiller system is used for supplying antifreeze to the condenser and the storage tank. As shown in figure 4 the system consists of a 7 ton refrigeration unit, a 1000 gallon tank (with evaporator coils connected to the refrigeration unit) and a 750 gallon tank for additional antifreeze storage. The refrigeration unit removes the heat from the antifreeze mixture in the larger tank via the evaporator. The chilled antifreeze solution is pumped to the condenser and storage tank heat exchangers. The cold antifreeze mixture picks up the heat in these two heat exchangers and is returned to the smaller tank. The smaller tank is also connected to the larger tank. The two tanks contain plastic bottles filled with water which act as heat sinks. The system was generally maintained below 30 °F before starting the test, hence the water bottles were in frozen condition. During the test, the hot antifreeze mixture returning from the condenser and the storage tank melts the ice in the bottles and is restored to near 30 °F.

During the initial cool-down of the antifreeze solution, the variable speed gear pump is turned on, the valve connecting the pumps to the smaller tank is kept open, and the valve leading to the test loop is left closed. This allows the antifreeze to circulate between the two chiller tanks and aids in the freezing of the water bottles in both of the tanks. The chiller system was successfully used for continuous tests lasting over 120 hours at a time.

Roughness measurement

The 10-foot copper tube was supplied by Martin Marietta Utility Services, Inc. (MMUS). The inner surface was successively cleaned using 400 grit sand paper, acetone, and methanol. Also supplied was a part of the test section used by Jallouk [7] in his experiments. The roughness profiles of Jallouk's [7] test section and the present one were measured using a Surtronic 3P profilometer (made by Rank Taylor-Hobson); figures 34 and 35 show sample roughness profiles and table 1 shows the values of commonly used roughness parameter R_a and R_q. R_a is defined as the arithmetic mean of the departure of the roughness profile from the mean line.

$$R_a = \frac{1}{L}\int_0^L |y(x)|\,dx$$

R_q is defined as the root-mean-square average of the departure of the roughness profile from the mean line.

$$R_q = \sqrt{\frac{1}{L}\int_0^L y(x)^2\,dx}$$

Here L is the scan length, y the roughness profile in the direction parallel to the tube axis.

As shown in table 1, three scans were carried out for each tube. The third scan for each tube is presented in figures 34 and 35. The results show a marked difference in the roughness of the two test section tubes; moreover, the results of the old test section, see figure 35, show a large variance. This is due to the fact that the old test section had a thick layer of oxide like deposits on the inside that made it impossible to determine its original roughness; any attempt to remove the oxide layer would inevitably result in a change in the original roughness of the surface. Therefore it is not possible to compare the roughness of the present test section with the previous one.

Since the purpose of this study is to simulate flow boiling conditions encountered in actual practice, it would be more appropriate to compare the roughness of the test section with that of a commercially available copper tube. This was carried out by measuring the internal roughness of a piece of 1/2" outer diameter copper tubing commonly used in the refrigeration industry; the results are presented in figure 36 and table 1. It can be seen that the roughness values of the new test section and the commercial tube are comparable. Thus the test section can be assumed to be an appropriate representation of the real situation.

Table 1 Roughness Values

Material	R_a µin	R_q µin
New test section (figure 34)		
1st scan	12.0	15.1
2nd scan	13.1	17.7
3rd scan	15.7	20.4
Jallouk [7] (figure 35)		
1st scan	29.9	37.7
2nd scan	59.3	85.2
3rd scan	52.9	76.1
Commercial 1/2" copper tubing (figure 36)		
1st scan	10.4	15.2
2nd scan	14.7	21.5
3rd scan	15.6	21.8

System Operation

Cleaning and charging the system

Initially, after it was assembled, the system was pressure tested with water to 350 psig. No leaks were detected. The water was drained and a solution of degreaser/rust-inhibitor was pumped

through the system for a number of hours. The system was then drained and flushed repeatedly with water and finally drained again. Next, the system was heated and compressed air was passed through for a period of four days to remove as much moisture as possible. Then, a new desiccant filter was installed in-line and the system was evacuated and filled with about ten gallons of CFC-114. Any leaks detected with a halogen monitor were fixed. The CFC-114 was circulated through the system for two hours. The CFC-114 was emptied, a new filter was installed and the system was evacuated again prior to filling with a fresh supply of CFC-114.

Calibration

In the design of this experiment the number of devices to be measured included over eighty thermocouples, seven pressure transducers, six flow meters, and ten power transducers. To expedite on-site data analysis a PC-based data acquisition was used to measure, perform the necessary calculations, display system conditions and store the data. To reduce the uncertainty in the overall measurement, the devices were calibrated using standards in conjunction with the data acquisition.

Differential and absolute pressure transducers

The pressure transducer calibration control panel (PDCCP), see figure 37 offers an easily accessible port to conveniently calibrate the differential (DP) and absolute (AP) pressure transducers. This panel comprises of a set of two- and three-way valves that control the flow through the transducers and facilitate the access of any one or all of the transducers to the pressure dead weight tester. Hence, the transducers can be calibrated in-situ at any time.

Turbine flow meters

The turbine flow meter calibration was provided by the manufacturer. This calibration exists in the form of a linear equation that is given in table 2. The voltage reading from the flow meter is substituted into the equation to be converted into the flow rate.

Table 2: Flow meter calibration values

Flow Meter	A
1	16.721
2	26.93
3	35.926

The equation for the flow rate is:

$$F = \frac{A \times v}{1000}$$

where, v is the voltage reading in millivolts (hence, the term 1000) from the flow meter and F is the flow rate in gpm.

Heat input

The heat input, Q_{in}, was measured by a power transducer, see figure 22, and calibrated using a Yokogawa 3-phase power meter. The input range is 0 to 4000 watts with an output at the data acquisition of 0 to 4.5 volts. The input power, in watts, was measured with the power meter while the output was measured with the data acquisition unit. Therefore, for a given reading of power in watts that is supplied to the heater, there was a corresponding value in volts at the data acquisition unit. The two values were correlated using a linear regression scheme. This curve presented an equation with which to calculate the heat flux at any voltage. The following table 3 provides the two parameters for each zone of the tube:

Table 3: Heat Flux Calibration Values

Zone	A	B
1	.78724	-3.06
2	.78436	-2.09
3	.78106	-2.53
4	.78631	-1.76
5	.78426	-0.97
6	.78328	-1.22
7	.8014	0.27
8	.791	-4.5
9	.78561	-0.56
10	.78749	-0.86

Using the voltage that is read from the data acquisition as v in millivolts, the following equation can be used with the respective values for A and B substituted to arrive at the total heat flux, Q in Watts, into the particular zone,

$$Q = A \times v + B$$

Heat loss

After the heat input calibration procedure was completed, the heat loss calibration was performed. The test section was isolated from the rest of the system and only the copper tube was heated. A vacuum was pulled on the tube so as to eliminate any heat losses due to convection within the tube. This is done so that any heat lost from the heaters is due solely to convection and radiation to the surrounding ambient and through conduction to the adjoining zones within the tube.

The heat loss calibration was performed in the following manner. The test tube was heated so as to attain an isothermal temperature

field over the entire length of the tube. This was possible by setting the temperature controllers on the power control panel, see figure 22, to the desired temperature. Then the temperature controller while monitoring the temperature of its zone adjusts the power controller to apply the necessary heat flux so as to satisfy the temperature condition. To measure this heat loss, the heat input to each zone is merely recorded. This heat flux is the actual heat loss from each zone. This is true because for isothermal conditions the only escape for the heat is through convection and radiation to the ambient. The temperature of the tube being isothermal no heat can be conducted to the adjoining zones, except at the ends of the tube. At the end zones the heat losses noted are much higher. The above calibration process was performed for a number of wall temperatures in the range 75 °F to 350 °F in approximate steps of 25 °F.

The difference in wall and ambient temperatures ΔT ($= T_{wall} - T_{atm}$) versus heat loss is used to arrive at a heat-transfer coefficient, h. Then in the actual flow boiling tests, the heat loss incurred can be calculated from the value of the measured ΔT and the respective h for the zone. The value of T_{wall} is taken as the average temperature over the zone.

Temperature

Approximately eighty type-E thermocouples were used in the experiment. All the thermocouples were of the 1/16" stainless steel sheathed ungrounded type. The temperature differences ΔT expected in the experiment were in the range of 4 °F to 20 °F. In order to reduce the uncertainty in the measurement and results it was necessary to calibrate the entire lot of thermocouples in conjunction with their connectors and the data acquisition. In order to calibrate the thermocouples, a constant temperature bath of FC-70 (approximately one gallon, boiling point: 419 °F) was used. This particular inert ozone-safe freon was chosen for its high boiling point, but any similar liquid may be used, even well ventilated motor oil. The calibration unit consists of an integral heater-chiller with a stirrer which is submerged into the FC-70 bath. The temperature of the bath is maintained at a preset value by a temperature controller which monitors a RTD immersed in the bath. A separate calibrated platinum resistor allowed measurement of the temperature within ± 0.05 °F.

The four data acquisition cards are visible from the back of the data acquisition cabinet (see figures 38 and 39). On each of these cards are three sets of seven thermocouples, one set for each zone, for a total of ten zones. The bottom card, card #4, has only one set of seven thermocouples attached, the tenth set. All of the wires and barrier strips used to connect the thermocouples on the test section to their corresponding location on the data acquisition cabinet were in their proper place at the time of the calibration. All of these connections were intact and had not changed at the time of the disassembly of the system. Calibrating

the thermocouples with all connections made and everything properly installed, eliminated any errors due to varying junction compensation.

Once all of this was done, the actual calibration could begin. Only one data acquisition card was calibrated at a time to keep the FC-70 bath from becoming too crowded. Only the first six thermocouples in each set of seven were calibrated, thus there were eighteen thermocouples in the bath. The calibrated platinum resistor was bundled along with the 18 thermocouples and submerged in the bath. Care was taken to align the tip of the thermocouples with the platinum resistor so as to assure that the temperature measured by all the devices were from the same region in the bath.

The temperature was set at 100 °F and allowed to reach steady state (this took about 1.5 hours). After the fluid temperature held steady, +/- 0.05 °F, for approximately 15 minutes the temperature of the platinum resistor, the cold junction, as well as an average of 100 readings from each of the thermocouples were recorded. The above procedure was repeated for increments of approximately 25 °F. Once 350 °F was completed, the thermocouples were removed, the FC-70 bath was cooled to 100 °F and the 18 thermocouples on the next card were inserted into the bath. This procedure was followed for all the thermocouples. Hence, a table of standard platinum RTD temperatures versus thermocouple temperatures was created.

When the flow boiling test was run at a later time, the temperature readings from the data acquisition were interpolated with the table data to give the corrected temperatures. During the calibration with the data acquisition it was observed that the cold junction compensation at the barrier strip of the card was not sufficient. This is because the cold junction temperature was measured at the center of the card, but our measurements indicated that a temperature gradient existed in the barrier strip of the card. Hence, to reduce this temperature gradient a fan was installed so as to blow air over and through the data acquisition system. This reduced the error significantly. The calibration was then performed with the fan in place. From our analysis of the data the uncertainty in the measured temperature is not more than ± 1 °F.

Experimental Procedure

The variable flow pump is started and the flow rate adjusted to the desired predetermined value. The pre-heater is powered to control the inlet coolant entry temperature. The antifreeze is circulated through the cooling coils in the condenser at a flow rate such that the saturation pressure at the inlet is maintained at the desired value. Excessive cooling may cause a low pressure at the pump inlet and lead to cavitation. Too little cooling will cause the pressure to rise and force the liquid at the inlet to the

test section to be sub-cooled. A heater on the storage tank in conjunction with a cooling coil in the storage tank is used as an accessory control for inlet temperature and pressure, see figure 5.

The heaters are turned on and the power is ramped up in steps to the desired heat flux, making certain that steady state conditions are reached on the surface of the heater. The data acquisition is set up to measure the heat input and temperature of the heaters. With this information the heat loss from the test section to the ambient and end-plates is calculated from the earlier heat loss calibration. The balance of the heat is necessarily taken up by the fluid. Both the heat loss and the heat flux into each zone are displayed simultaneously by the data acquisition. Hence, it is possible to determine and set in real time the heat flux conditions. Steady-state thermal flow field conditions are determined by monitoring the temperatures of the various regions of the system. When the temperature transients die down (1 °F or less change over a 5 minute period), the system can be assumed to be in thermal equilibrium. At this juncture the:

a) temperatures at various locations
b) system pressure and region differential pressures
c) power input to the heaters
d) flow meter readings
e) flow field observations

are noted down and collected by the data acquisition unit.

The above process is followed for a step-wise increase in heat flux until CHF conditions are imminent. At this juncture the heat flux is further increased so as to span the L/D ratios for the CHF study. In regions where CHF occurs the heat flux is reduced so as to maintain the wall temperatures approximately equal to the upstream zone to reduce any heat losses. This is because at CHF the heat-transfer coefficient drops significantly and the wall temperature rises correspondingly. To prevent too high a temperature in the particular zone the heat flux must be dropped.

At the end of the experimentation all heaters are turned off. The antifreeze is pumped through the heat exchanger in the storage tank. This creates a low pressure zone in the storage tank (by condensing the vapor). This induces all the vapor and the liquid in the rest of the loop to collect in the storage tank. Once the system has cooled down, all power to the loop is disconnected and the storage tank is isolated from the rest of the system by closing the valves. Small leaks do exist in the flow loop and isolation reduces loss of freon over periods of no operation.

For each fluid at a predetermined boiling temperature and mass flux, the zone heat flux is gradually increased, (i.e. constant heat flux was applied to successive zones in the direction of flow) until CHF conditions are reached in the exit heat zone. This was evidenced by a sharp rise in wall temperature at the last heated zone. As the critical condition was reached, the electrical power

input to that particular zone was cut off or reduced.

In all runs undertaken, the flow at the inlet was slightly sub-cooled, the saturation temperature was maintained constant, and the surface heat flux was varied. The range of different coolant flow rates was then repeated at this surface heat flux. Once the surface heat fluxes between 5000 and 35000 Btu/hr/ft^2 were covered, a new saturation temperature was set and the entire procedure repeated. Thus, essentially, the coolant flow rate was the parameter most frequently varied, the surface heat flux the second most frequently varied, and the saturation temperature the least frequently varied. (Owing to the thermal mass of the fluid in the system, approximately 150 lbs, change in saturation conditions needed about three hours to reach steady state).

During the above tests the saturation temperature and pressure of the system are maintained steady at the predefined values. For each saturation temperature and each mass flow rate setting, the run provided data of the form:

1) Surface superheat temperature versus heat flux
2) Saturation temperature conditions
3) Pressure drop profile
4) Flow field observations
5) Pressure at the inlet of the test section
6) Pressure drop along the test section with intervals of 2, 4, 6, 8 and 9.88 ft from the inlet
7) Room temperature
8) Wall and in-stream temperatures in each of the 10 zones
9) Gross heat input, heat loss and heat flux to each of the 10 zones
10) Coolant flow rate and temperature at inlet of the test section
11) Water flow rate and temperatures at inlet and outlet of the condenser

CONCLUSIONS

A flow boiling heat transfer measurement system to study flow boiling from the internal surface of a vertical cylindrical tube was designed, fabricated and constructed. The system is capable of operating over a wide saturation temperature range of 50 °F to 250 °F, pressure range of 14 to 350 psig, a heat flux range of 0 to 60,000 btu/hr.ft^2 and a mass flux of 0 to 1.4e6 lbm/hr.ft^2. Optical access for flow visualization is incorporated into the design. The test section is a 10 foot long, 0.78" ID instrumented copper tube divided into 10 zones in the longitudinal direction. Facilities to measure temperature, pressure and flow rate within each region and at various locations in the system are provided.

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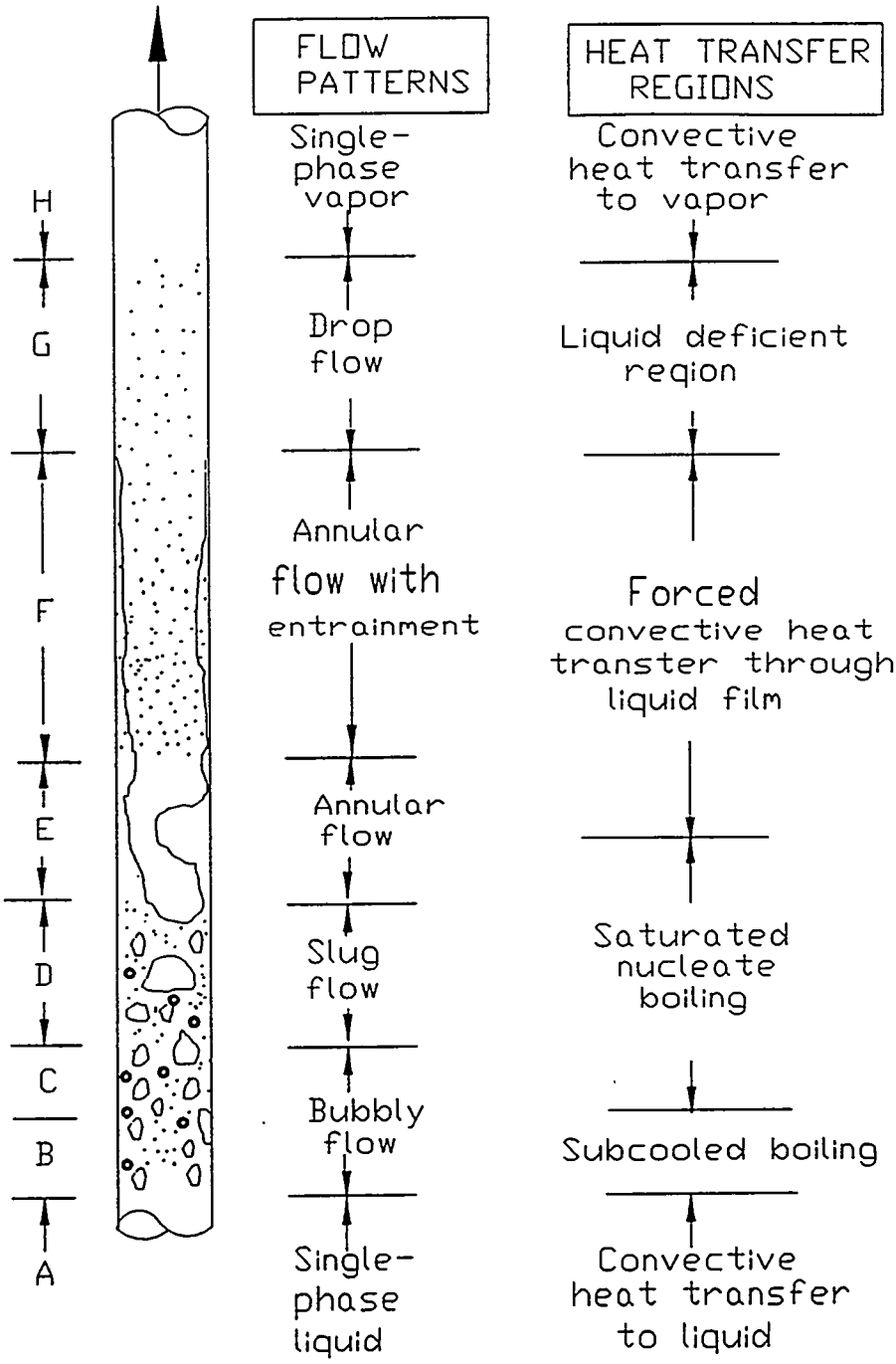
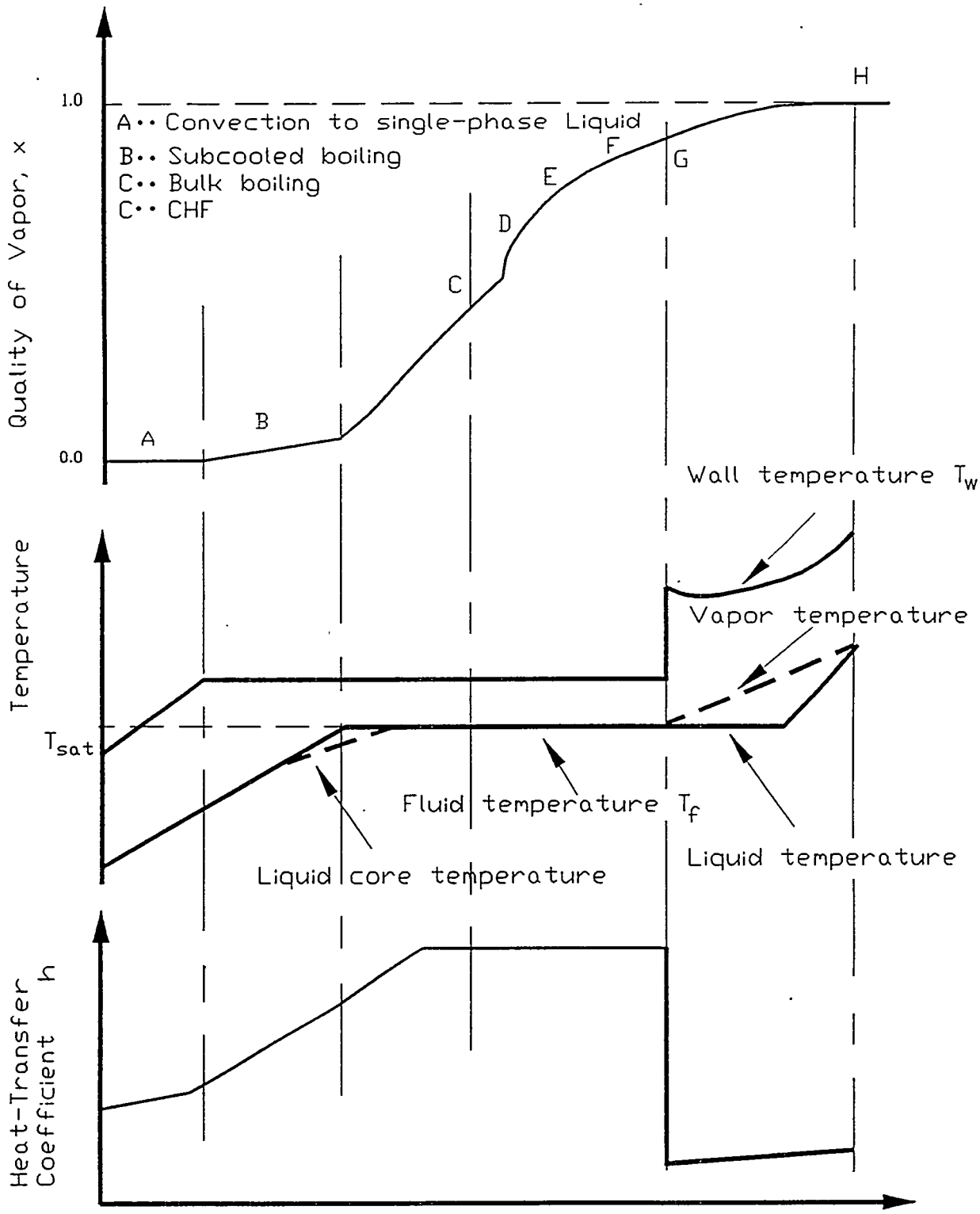
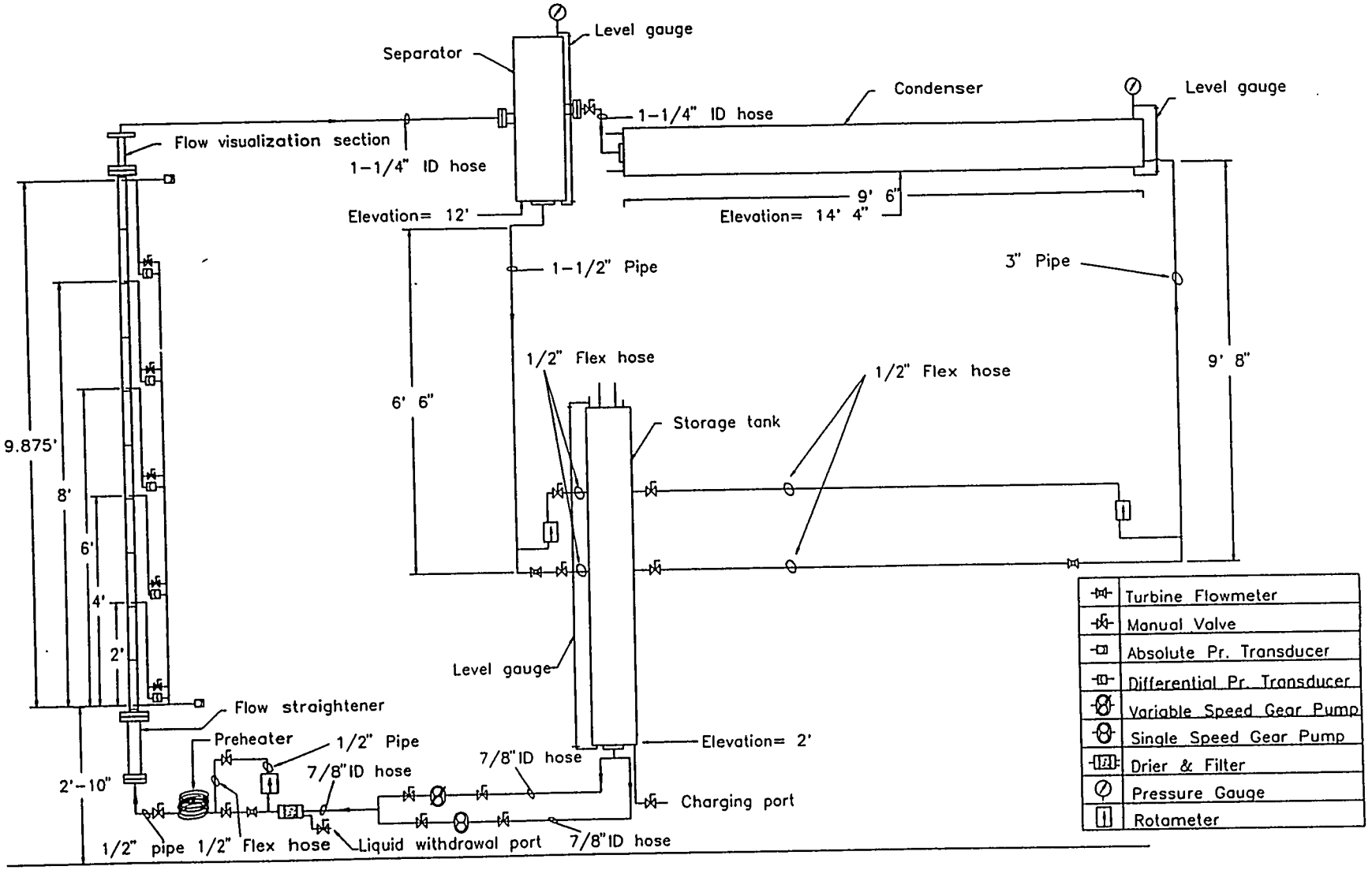

FLOW PATTERNS
HEAT TRANSFER REGIONS
H
G
F
E
D
C
B
A
Single-phase vapor
Drop flow
Annular flow with entrainment
Annular flow
Slug flow
Bubbly flow
Single-phase liquid
Convective heat transfer to vapor
Liquid deficient region
Forced convective heat transter through liquid film
Saturated nucleate boiling
Subcooled boiling
Convective heat transfer to liquid

FIGURE 1



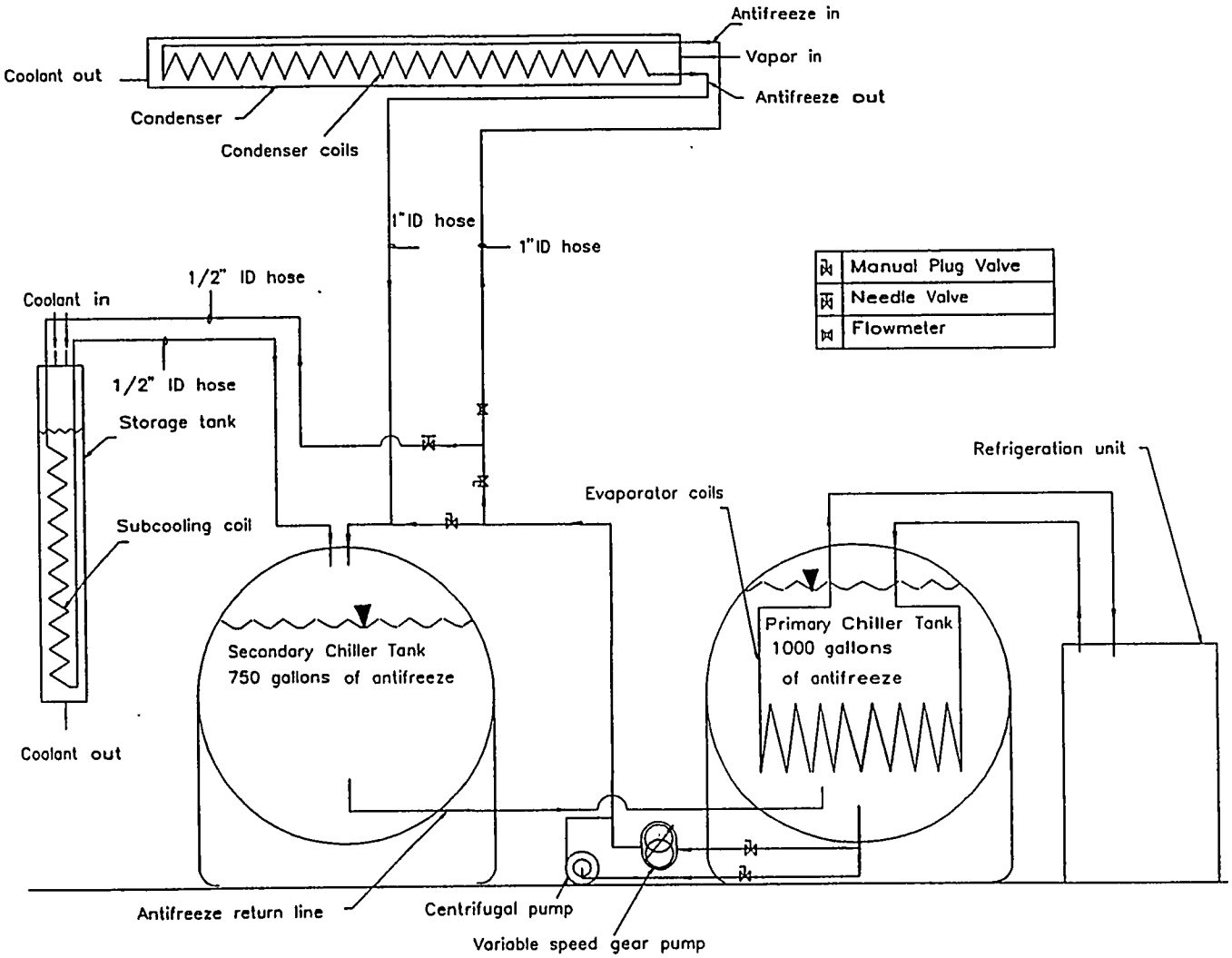
TUBE LENGTH

FIGURE 2



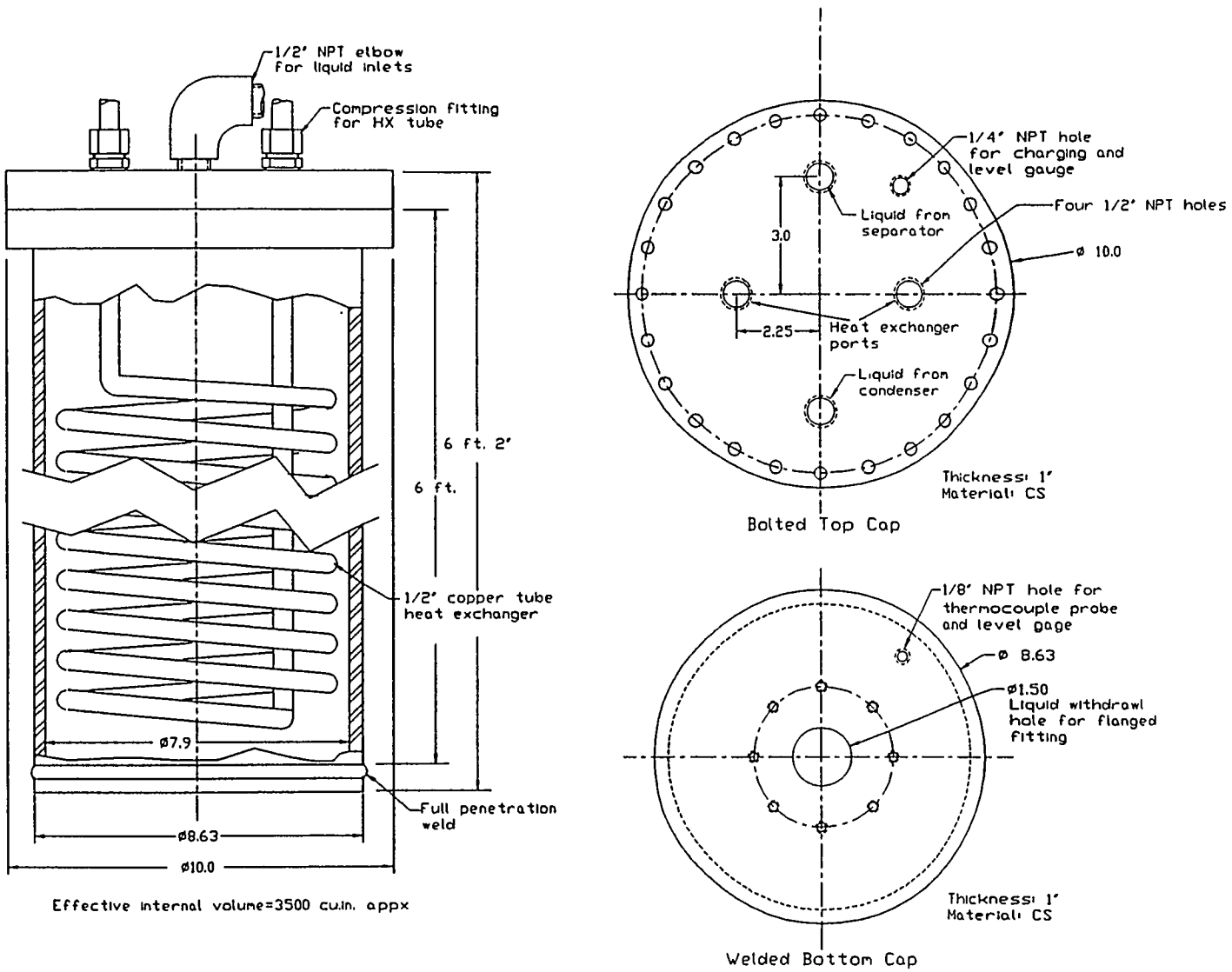
TEST FLUID LOOP

FIGURE 3



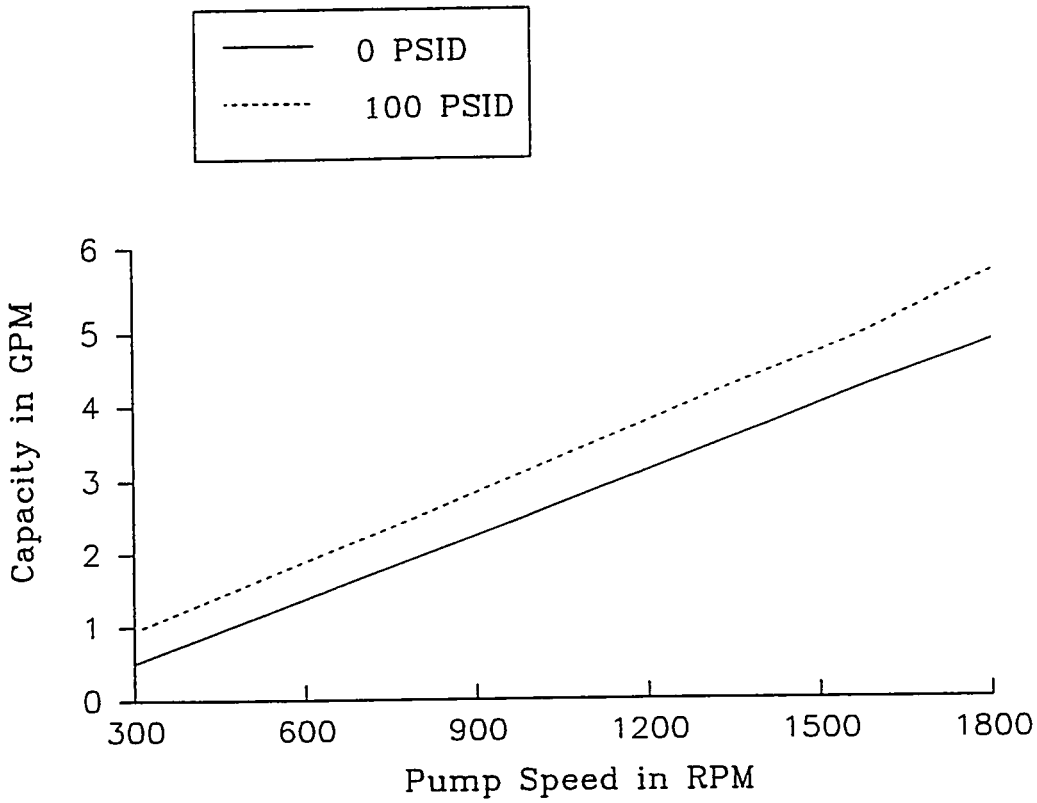
CHILLER SYSTEM

FIGURE 4



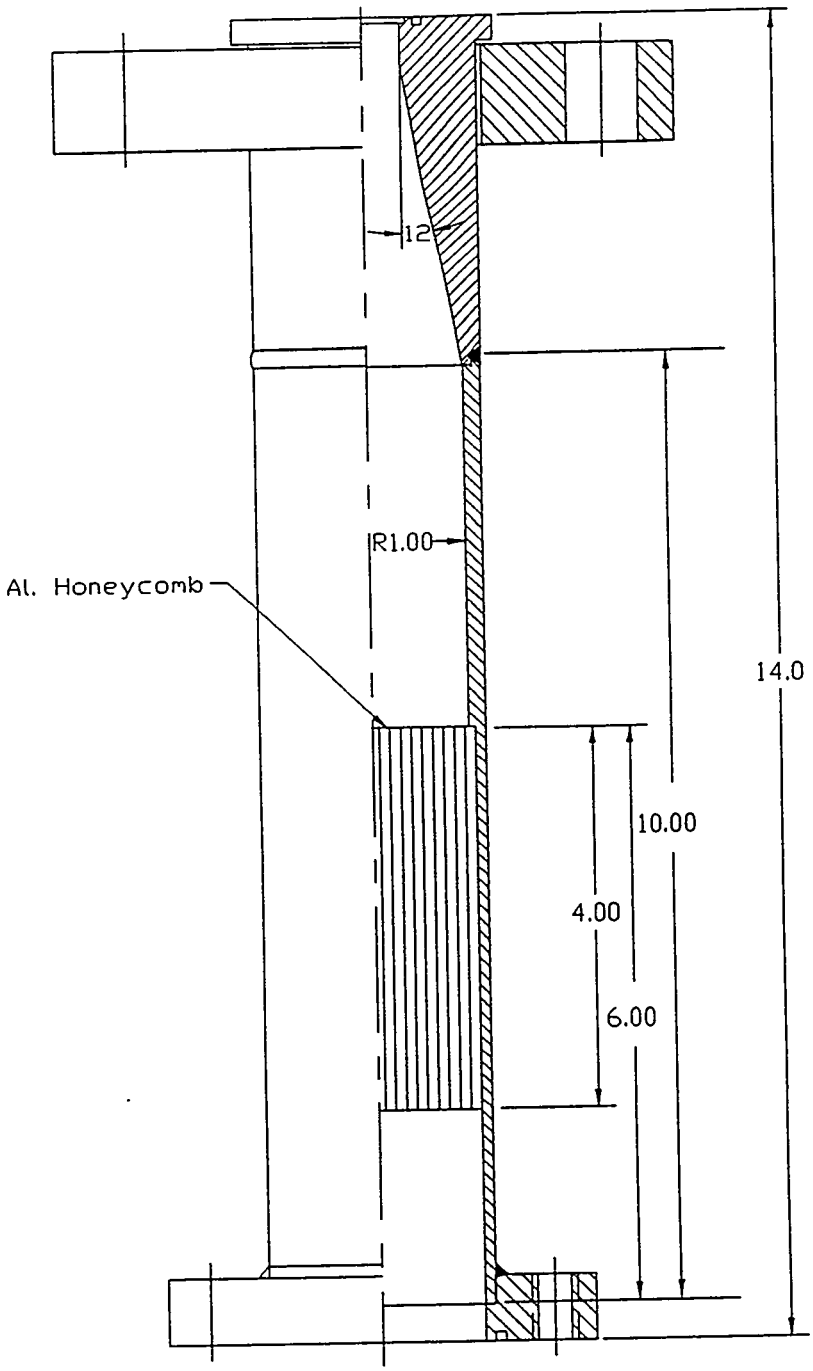
STORAGE TANK- ASSEMBLY AND CAPS

FIGURE 5



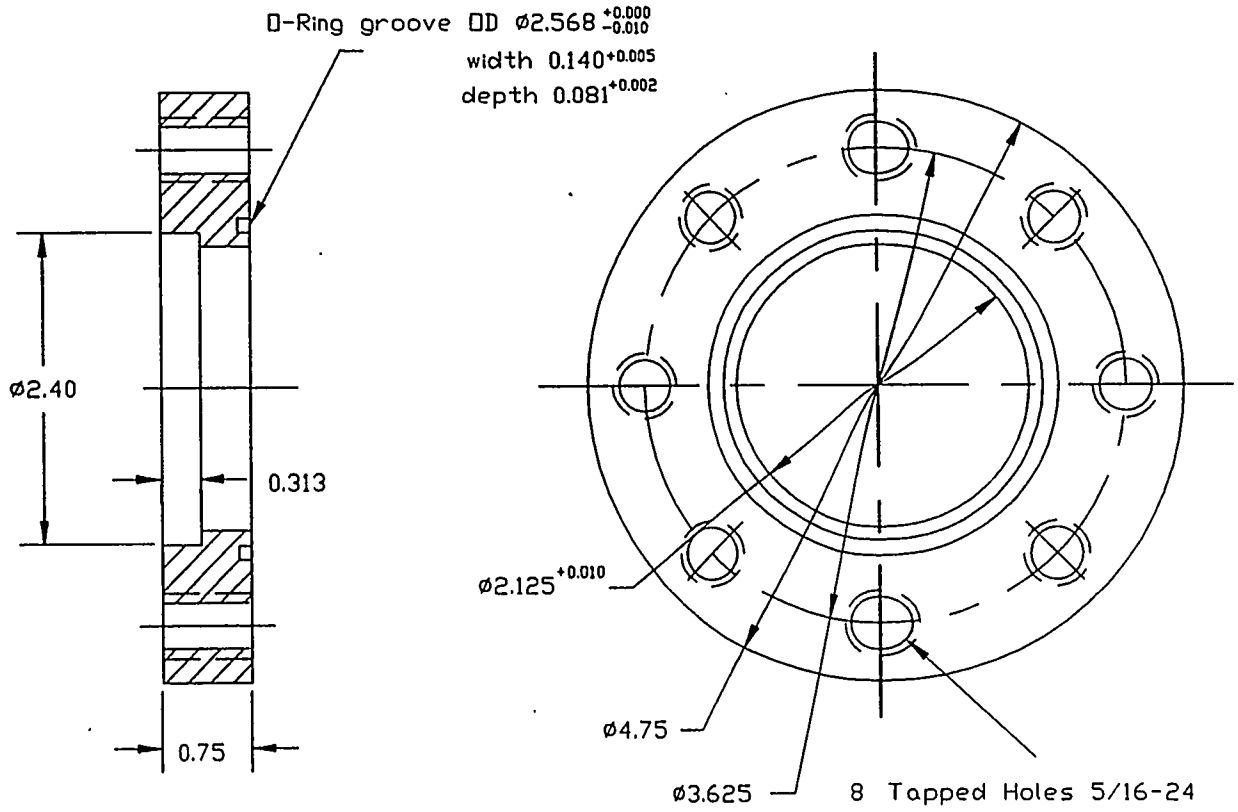
PUMP CAPACITY VS. SPEED

FIGURE 6



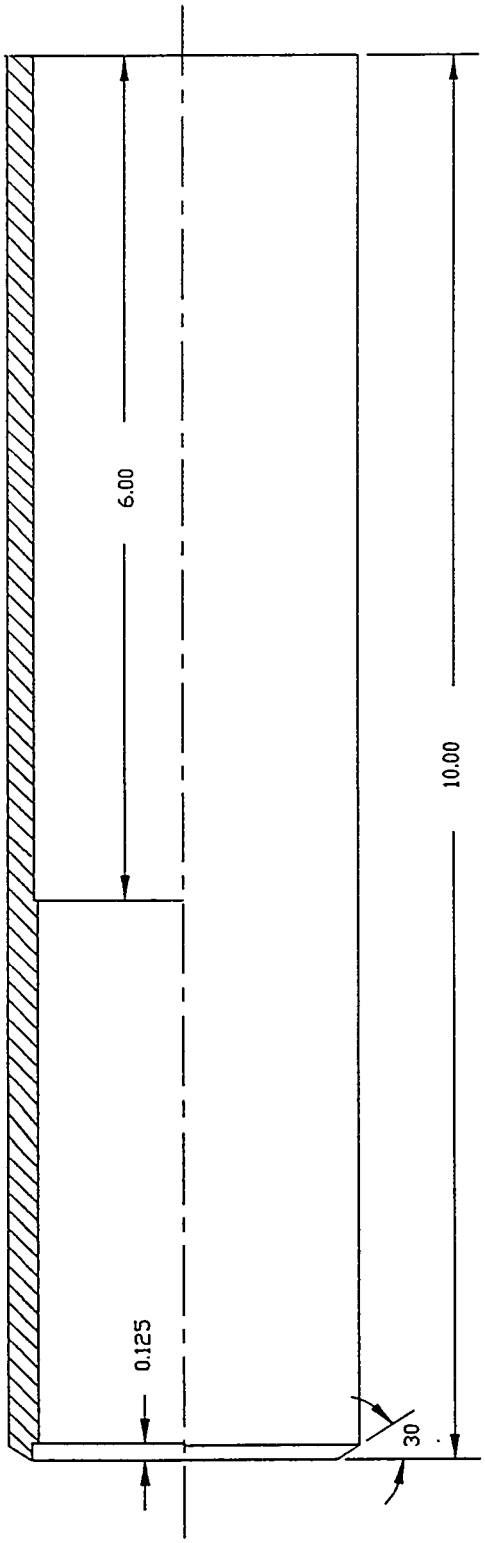
STRAIGHTENER

FIGURE 7



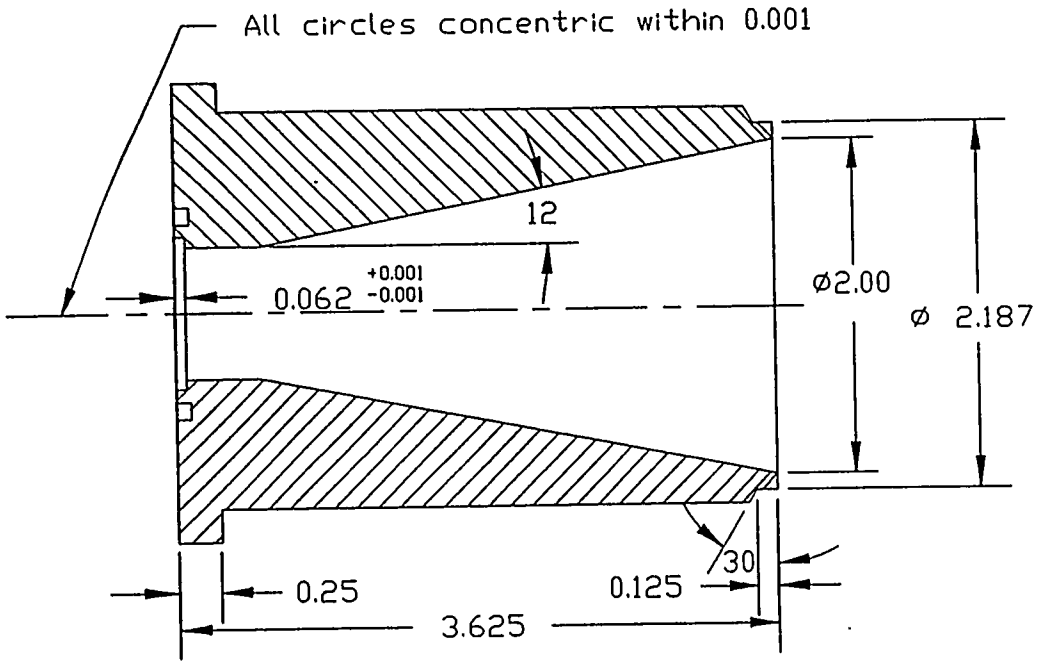
LOWER FLANGE FOR STRAIGHTENER

FIGURE 8



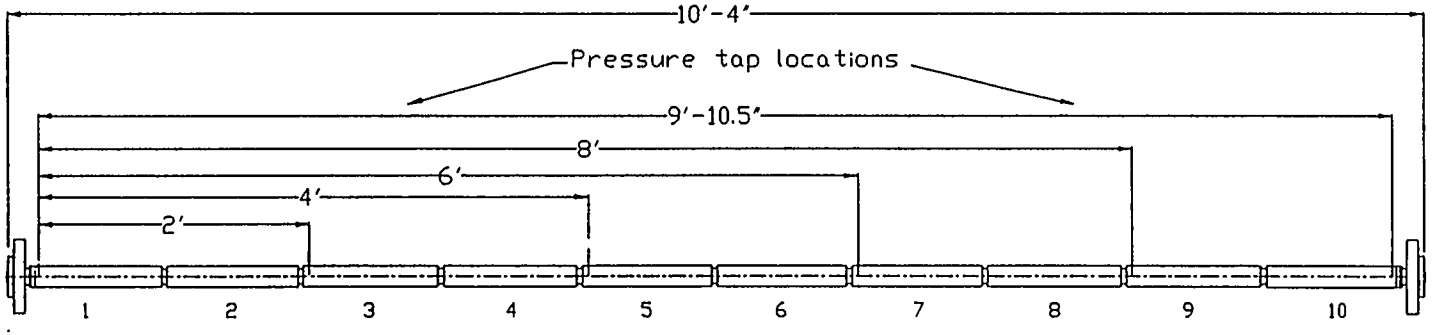
STRAIGHTENER BODY

FIGURE 9



STRAIGHTENER TAPERED TUBE

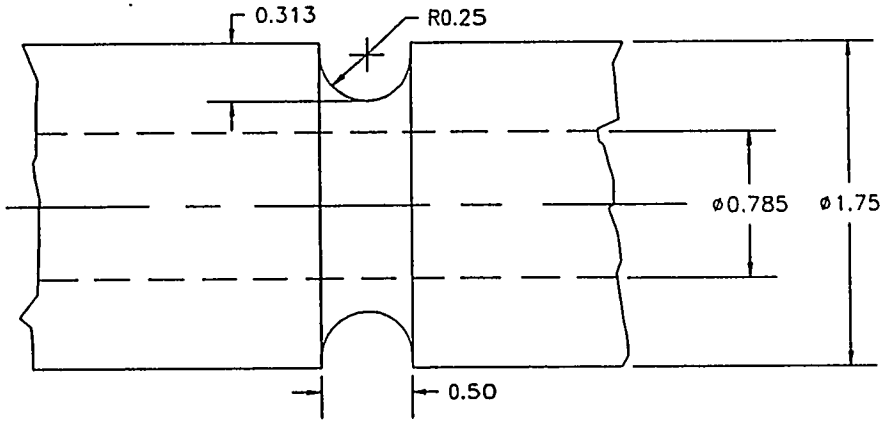
FIGURE 10



Note: The end zones, 1 & 10 are 11.8" long with a welded flange all the other zones are 11.5" long. The grooves separating the zones from each other are 0.5" wide.

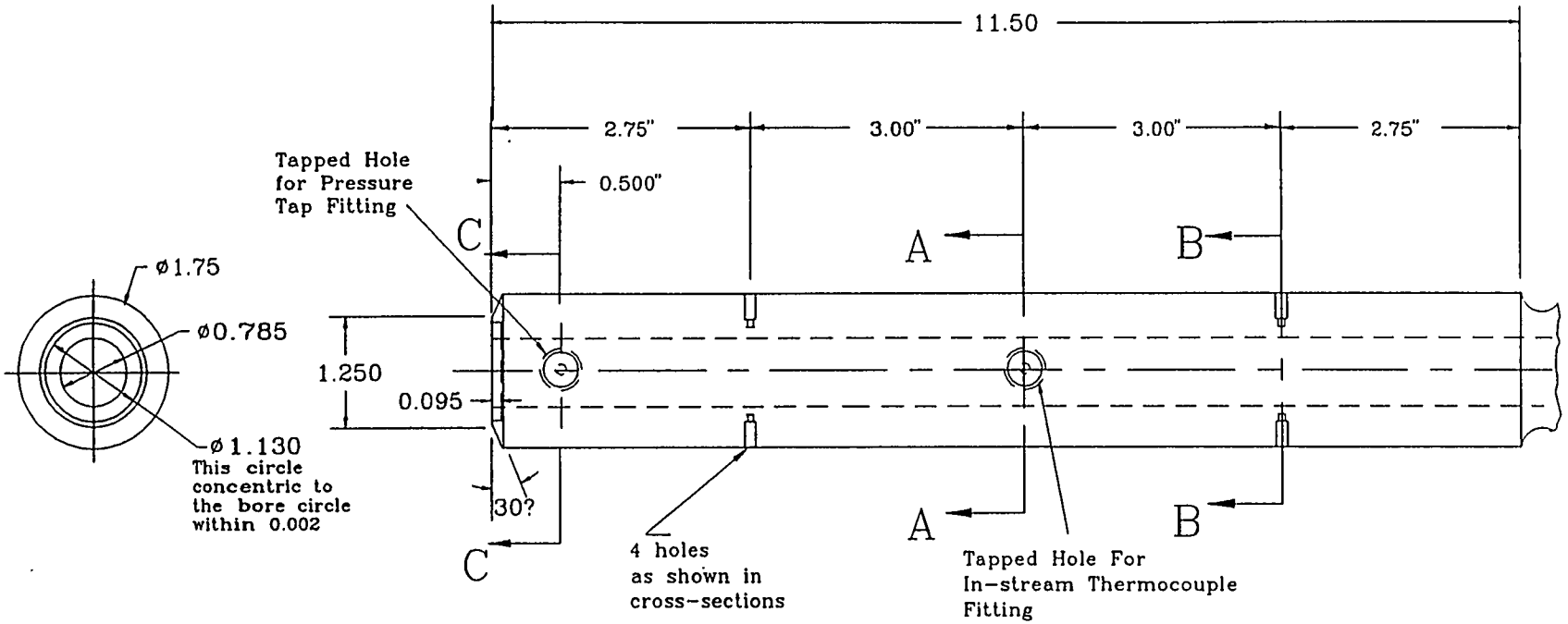
TEST SECTION

FIGURE 11



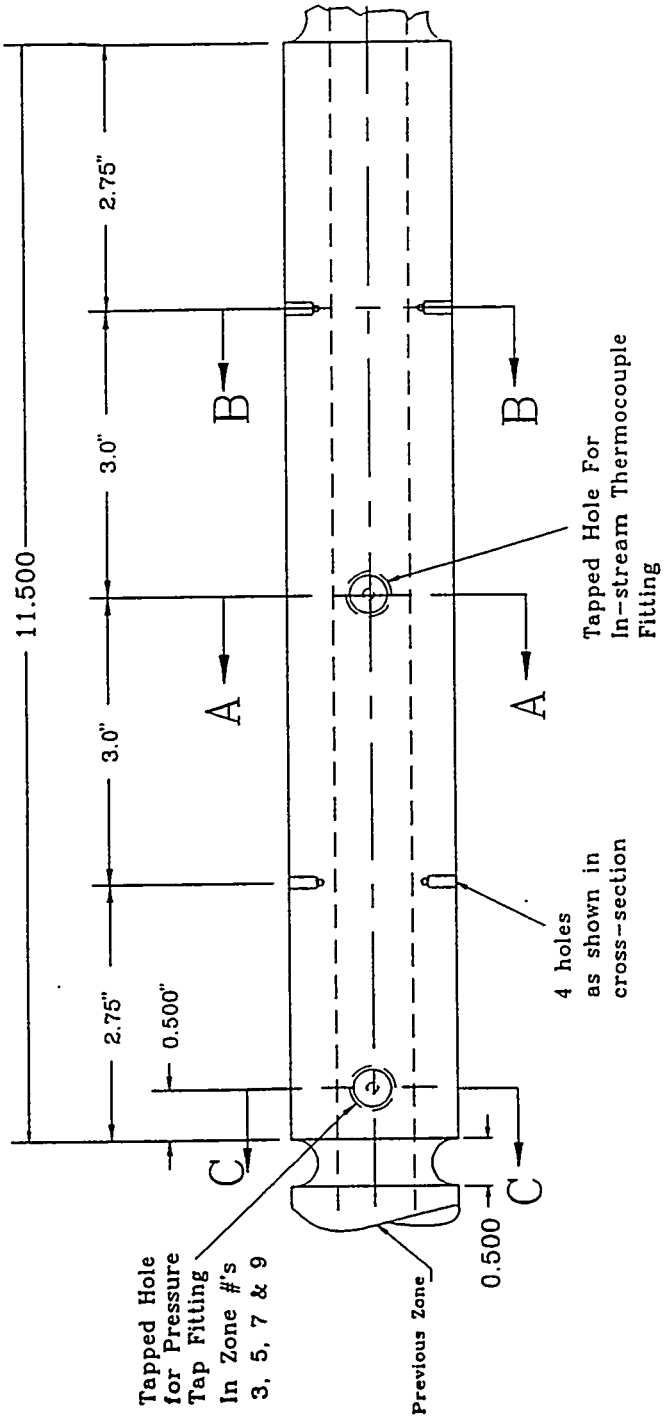
DETAILS OF GROOVE BETWEEN HEATED ZONES

FIGURE 12



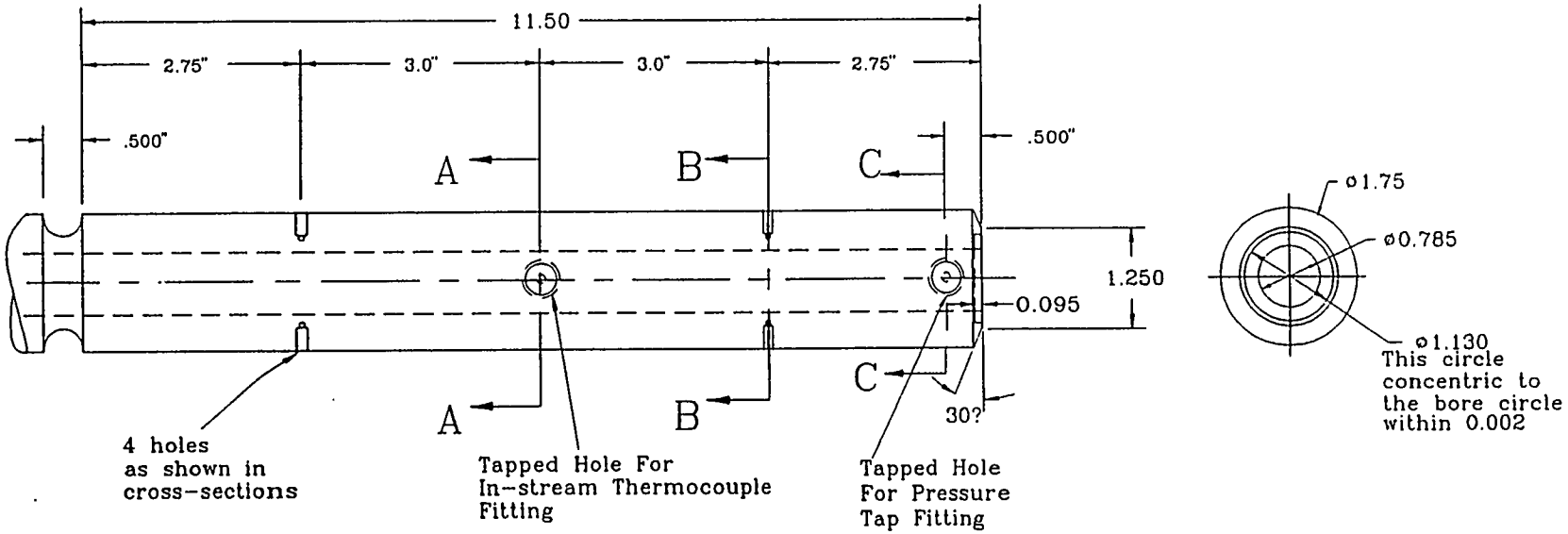
DETAILS OF ZONE # 1 (BEFORE WELDING END-FLANGE)

FIGURE 13



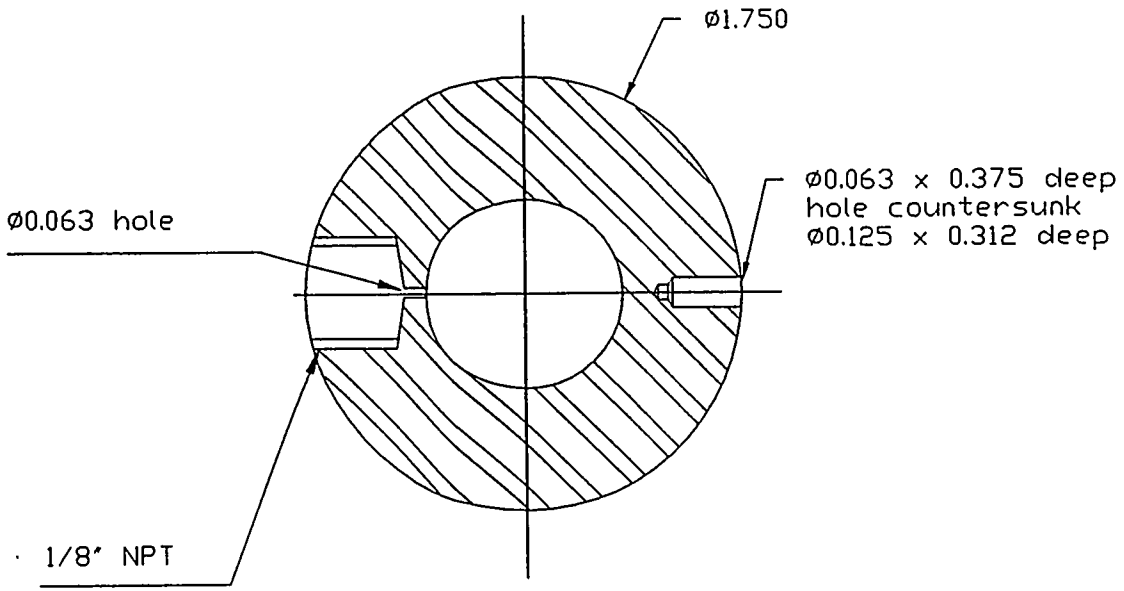
DETAILS OF ZONE 2 THRU 9

FIGURE 14



DETAILS OF ZONE # 10

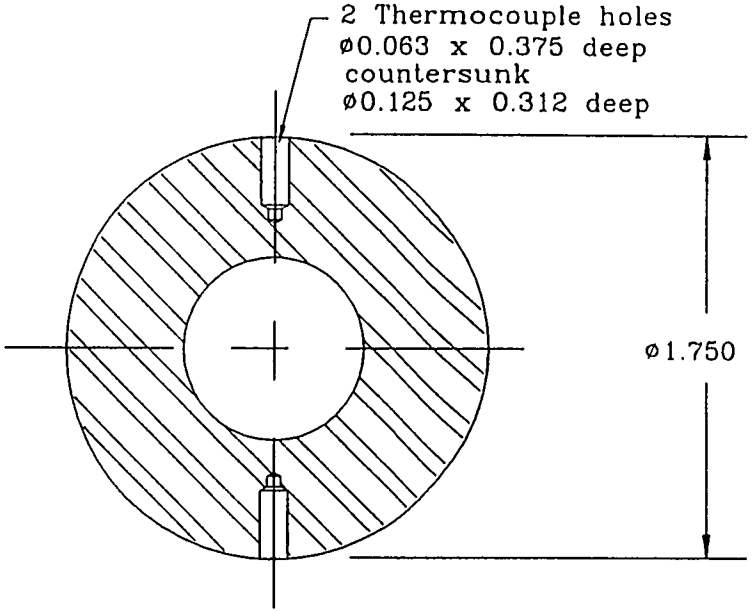
FIGURE 15



Section A-A

TUBE CROSS-SECTION SHOWING
IN-STREAM & OKAY TC HOLES

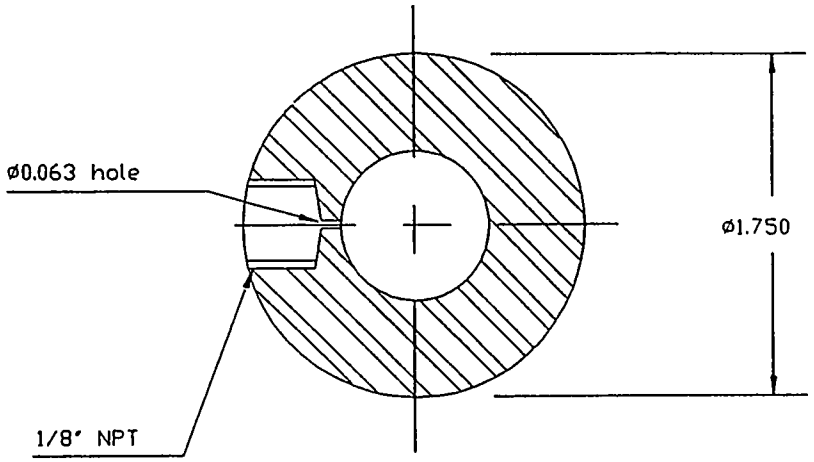
FIGURE 16



Section B–B

TUBE CROSS-SECTION SHOWING
WALL TC WELLS

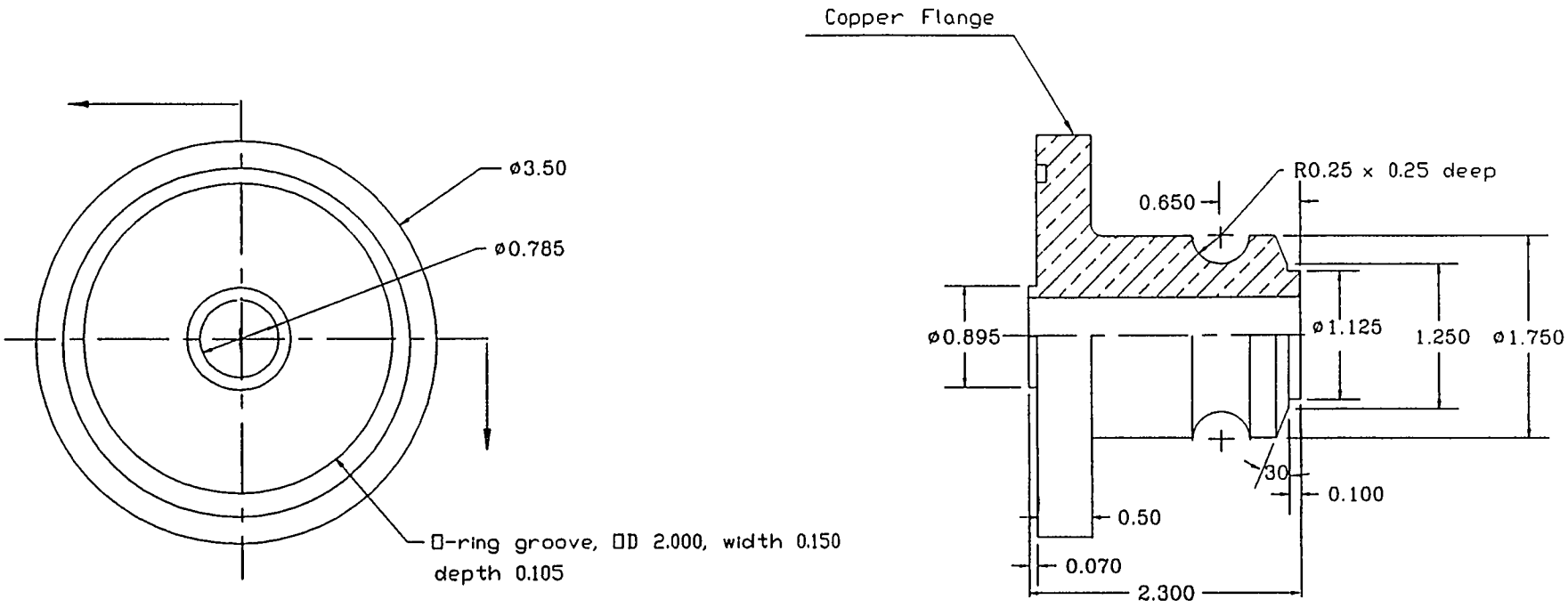
FIGURE 17



Section C-C

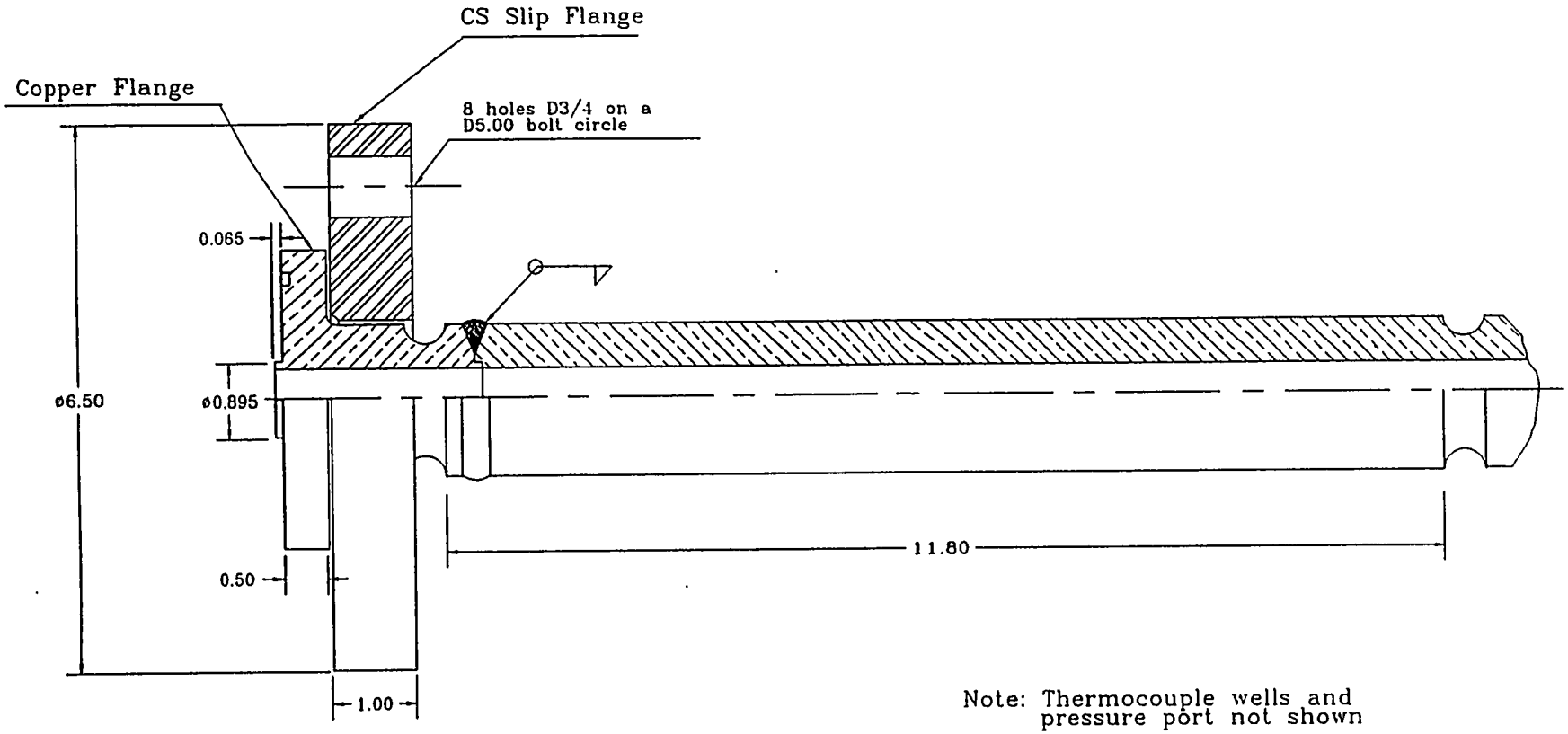
TUBE CROSS-SECTION SHOWING
PRESSURE TOP HOLE

FIGURE 18



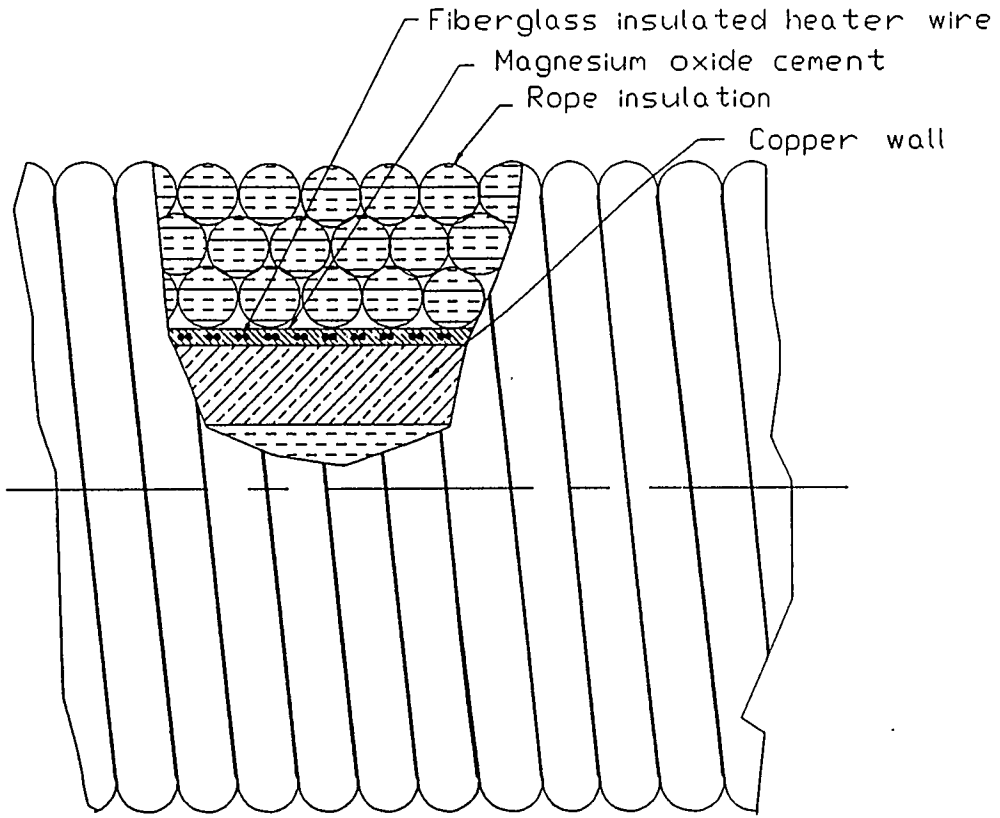
COPPER FLANGE

FIGURE 19



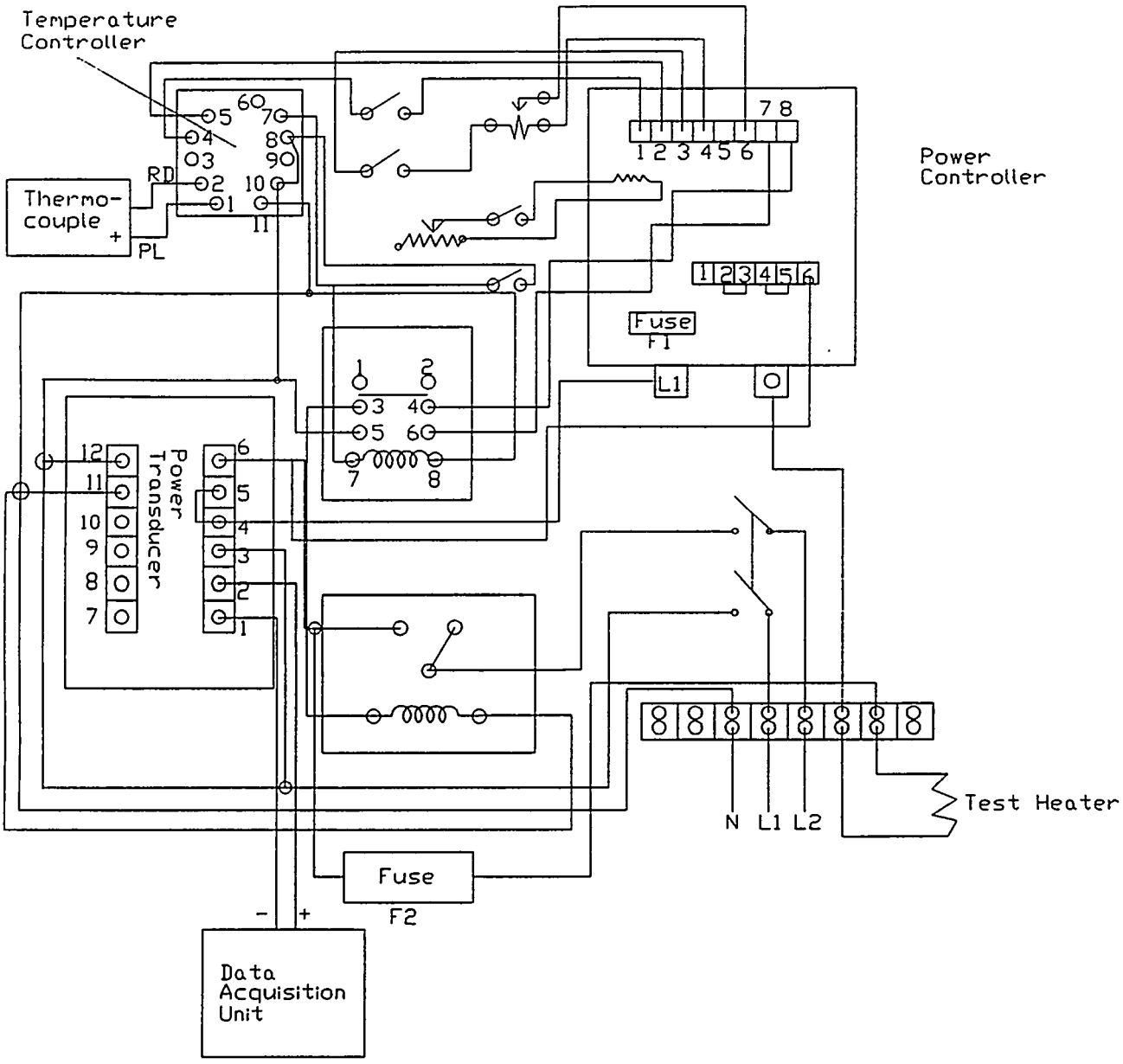
SEST SECTION FLANGE ASSEMBLY

FIGURE 20

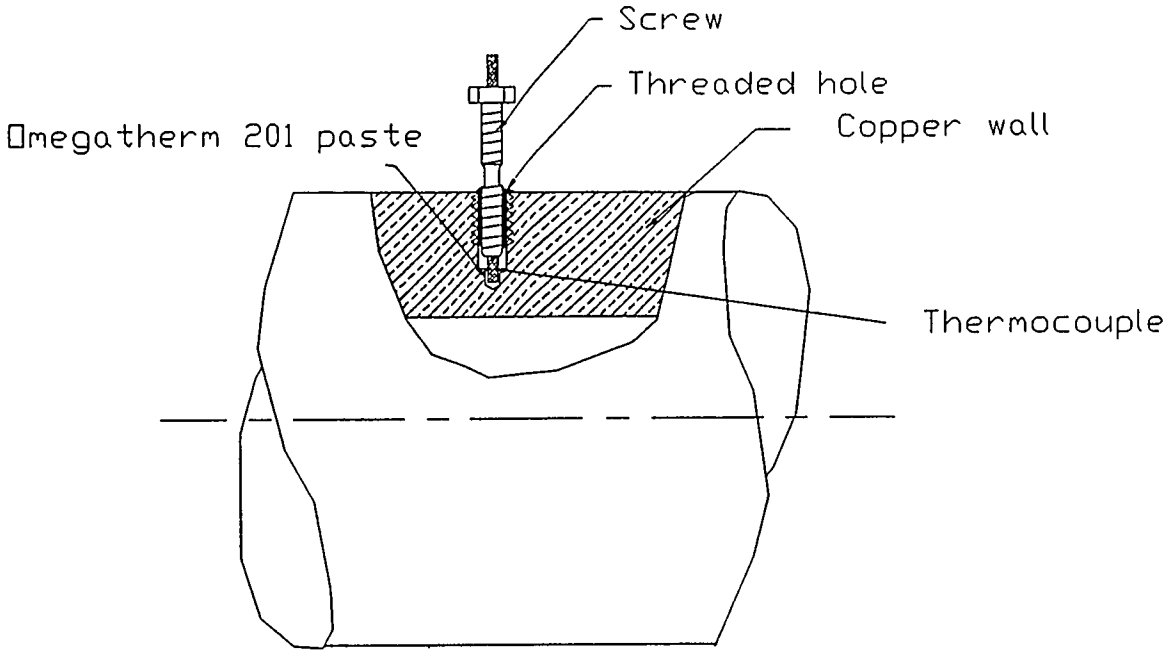


HEATER AND INSULA TION DETAILS

FIGURE 21

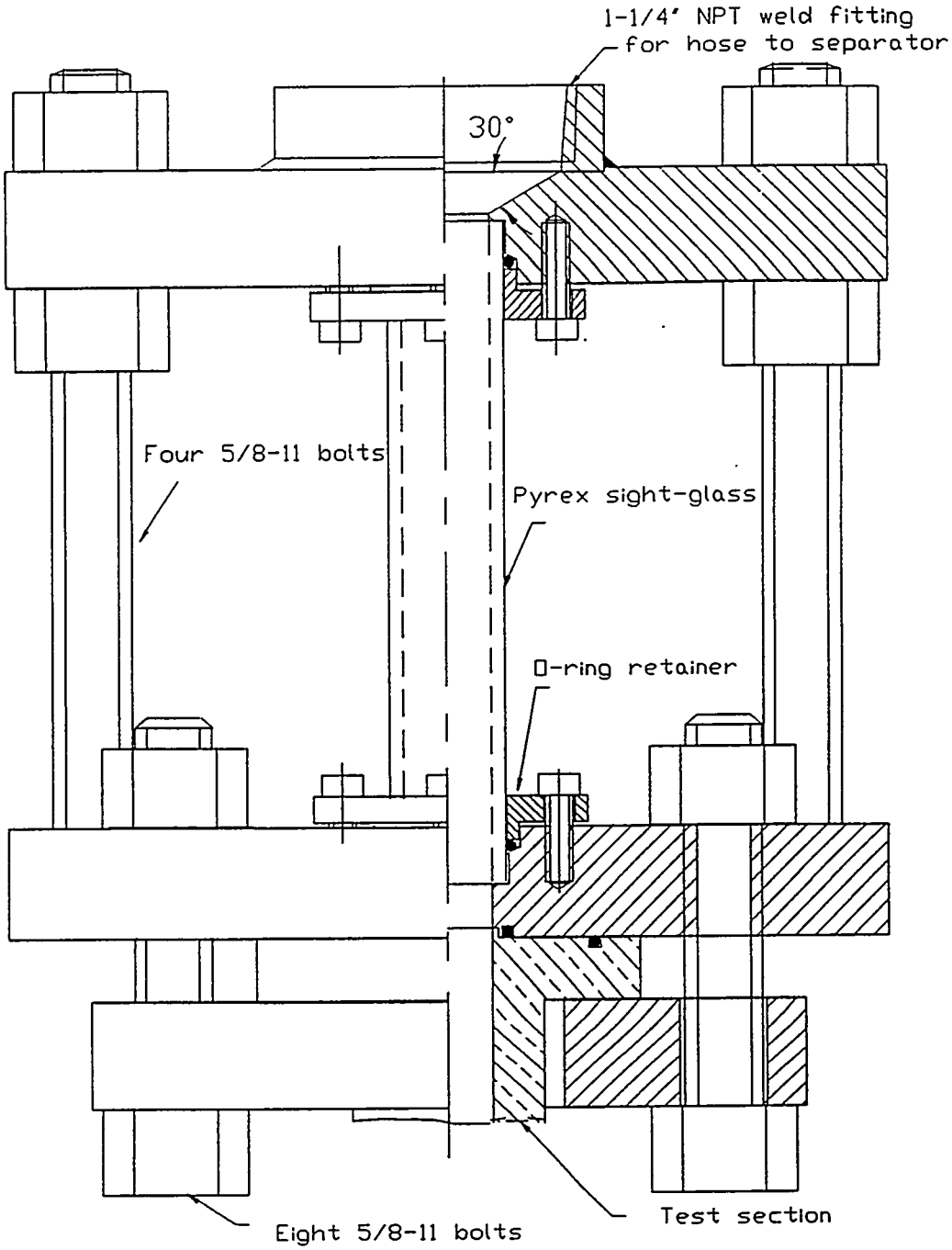


TEMPERATURE AND POWER CONTROL CIRCUIT
FIGURE 22



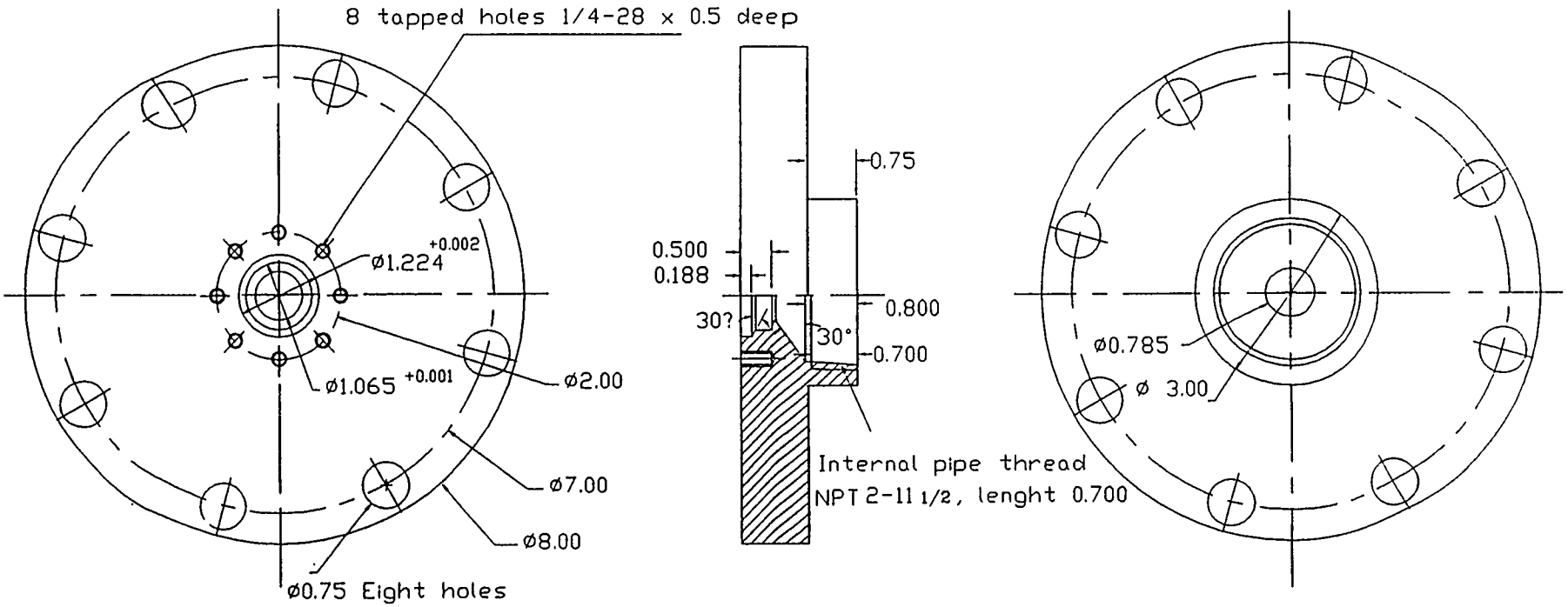
THERMOCOUPLE INSTALLATION DETAILS

FIGURE 23



FLOW VISUALIZATION SIGHT GLASS DETAILS

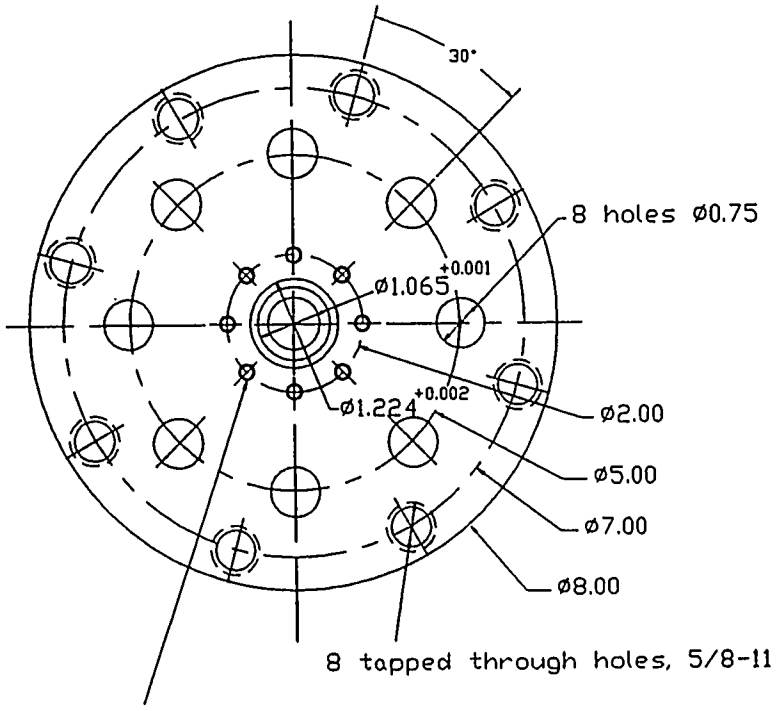
FIGURE 24

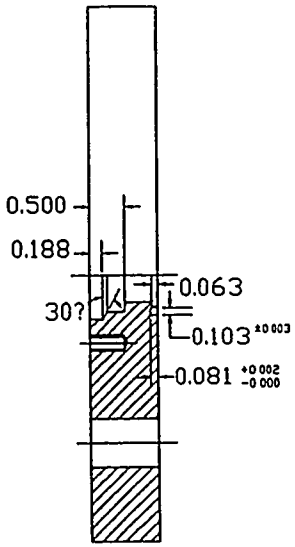


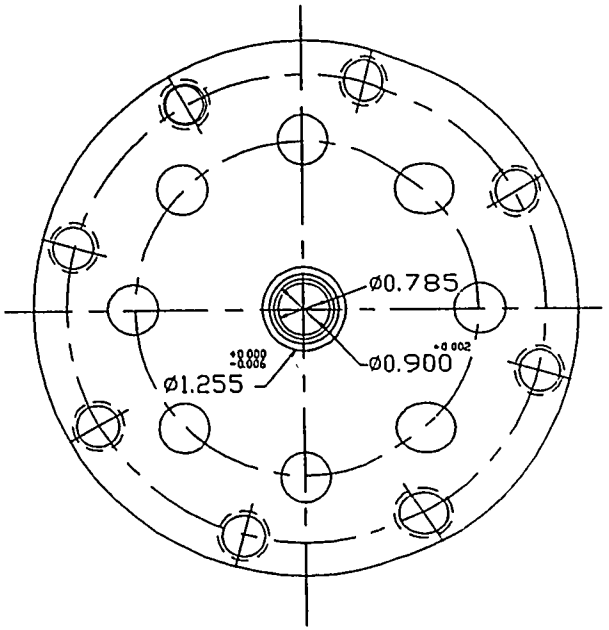
Material: Carbon Steel
Quantity: 1

UPPER FLANGE FOR GLASS TUBE

FIGURE 25



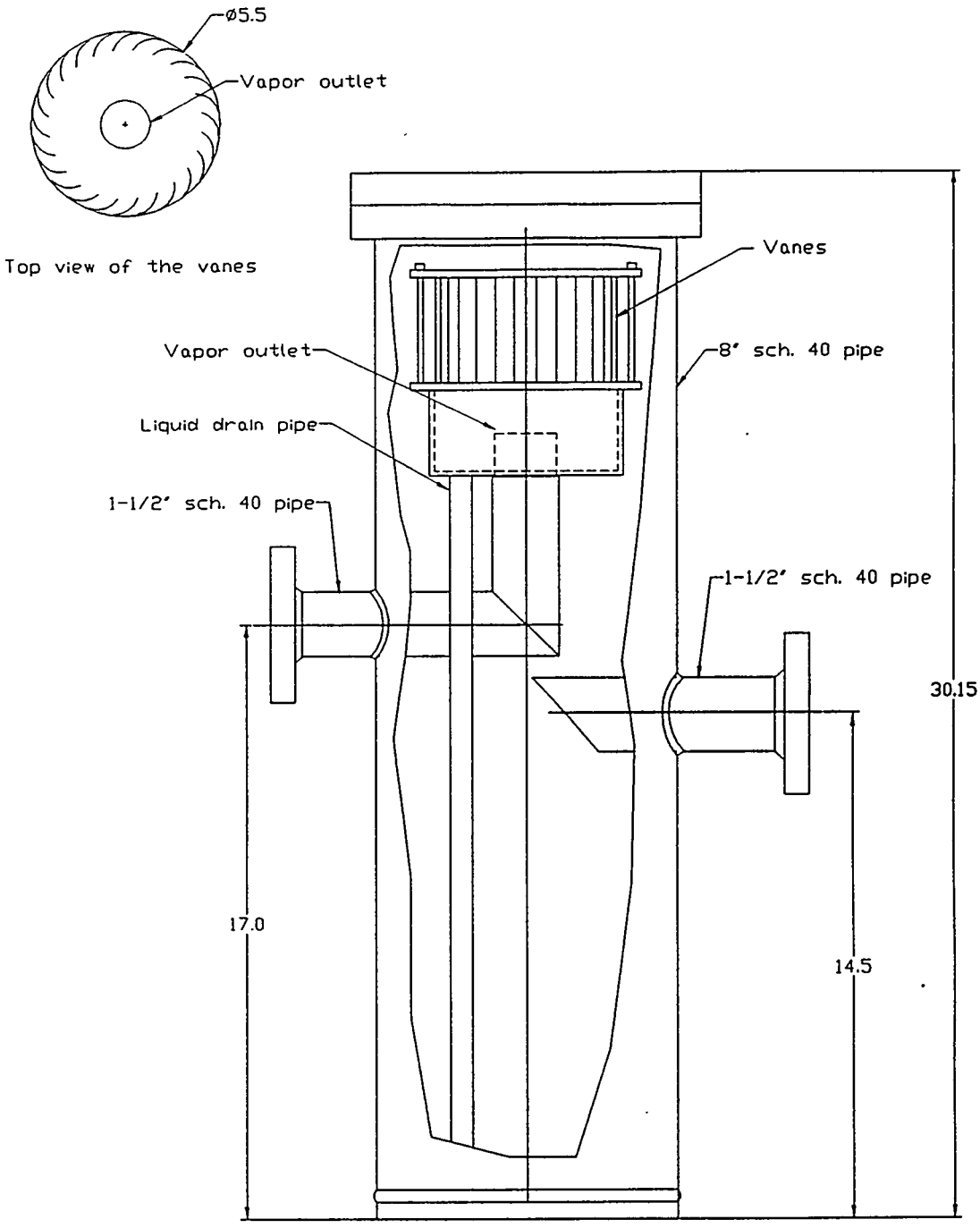




material: Carbon Steel
Quantity: 1

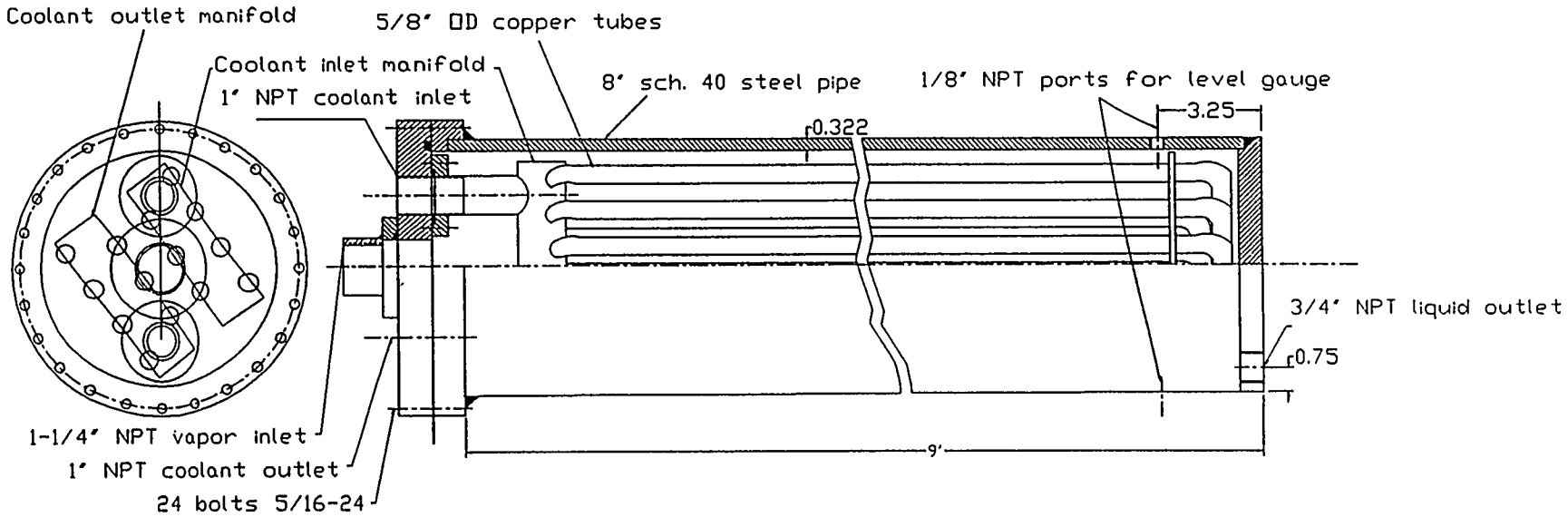
LOWER FLANGE FOR GLASS TUBE

FIGURE 26



SEPARATOR

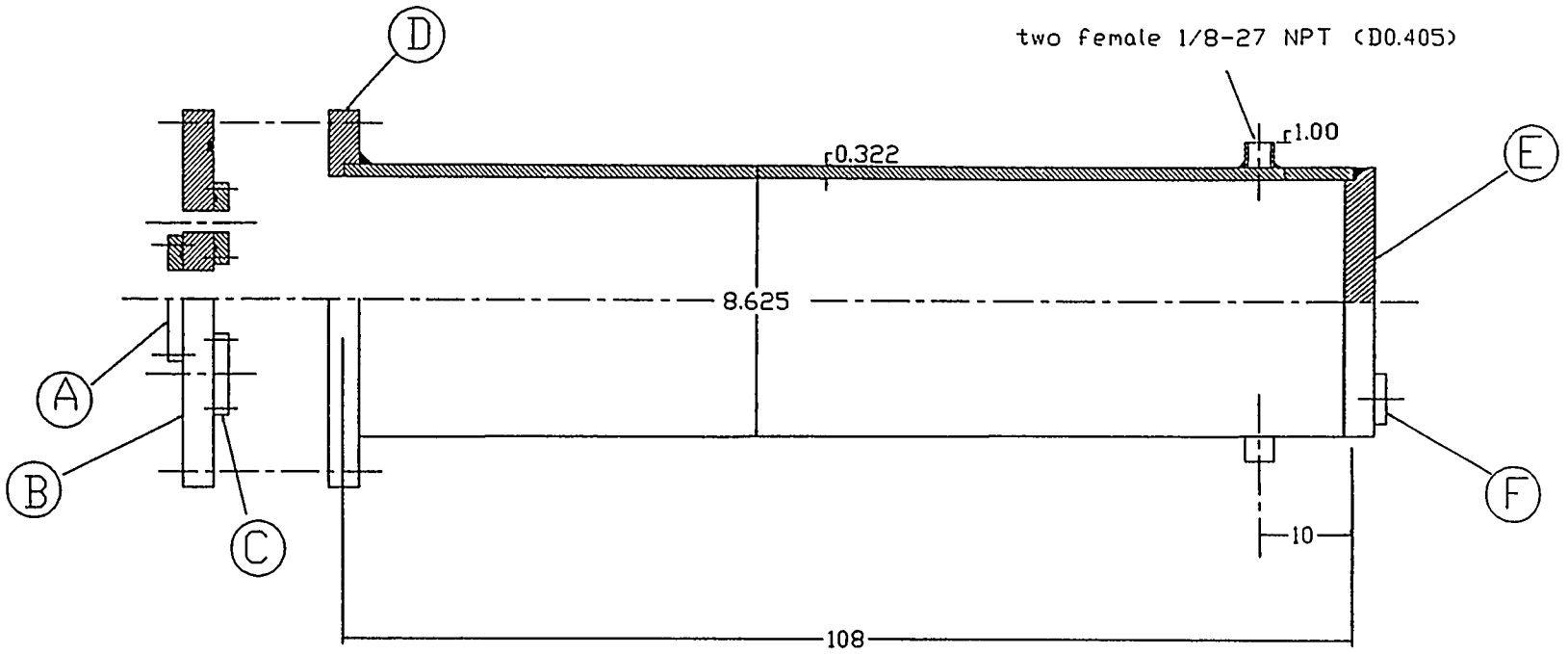
FIGURE 27



Note: The tube bundle consists of 7 bare copper tubes with two passes. Total length of each tube is 16' appx..

CONDENSER ASSEMBLY

FIGURE 28

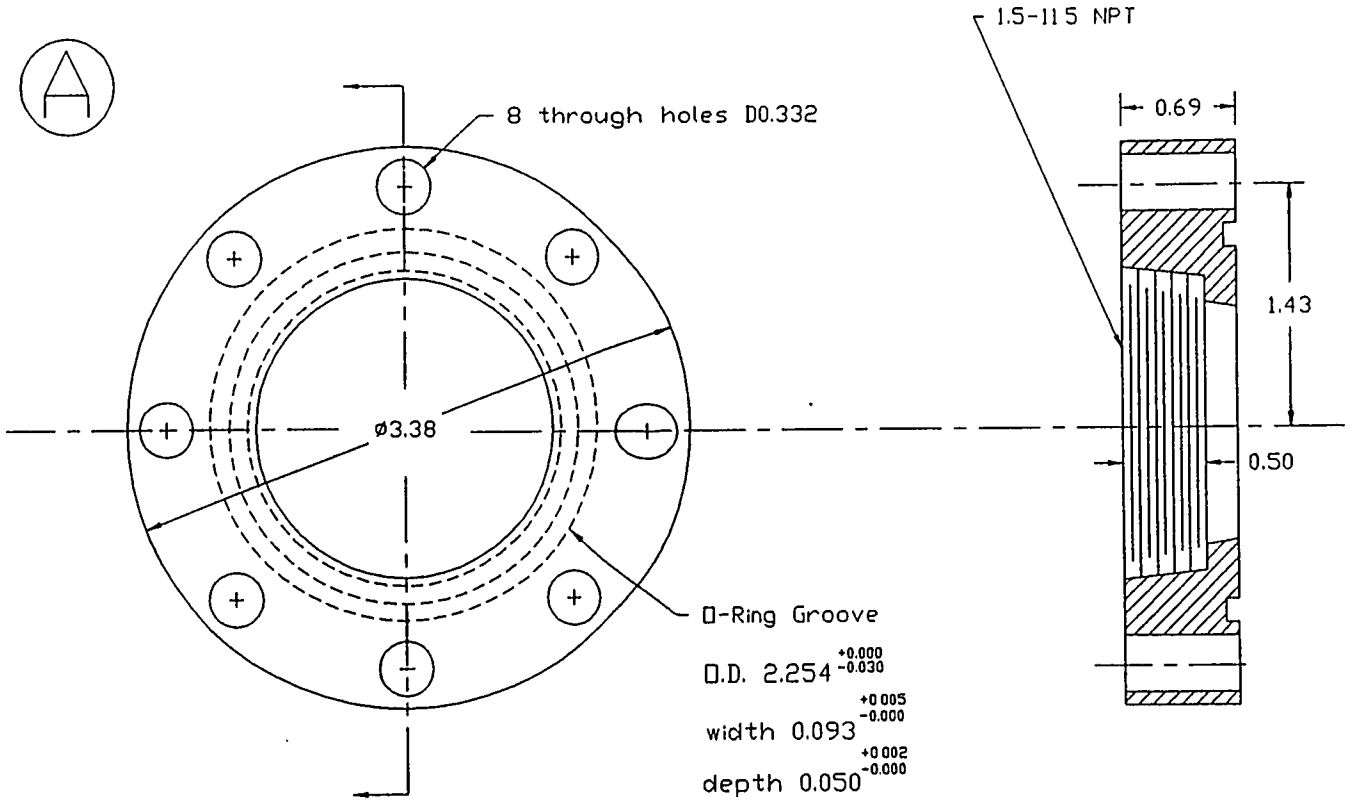


Note: The shell part is made of
8" Schedule 40 carbon steel pipe.

Title: Condenser
Unit: inch
Jimmy Chang (606) 2668198

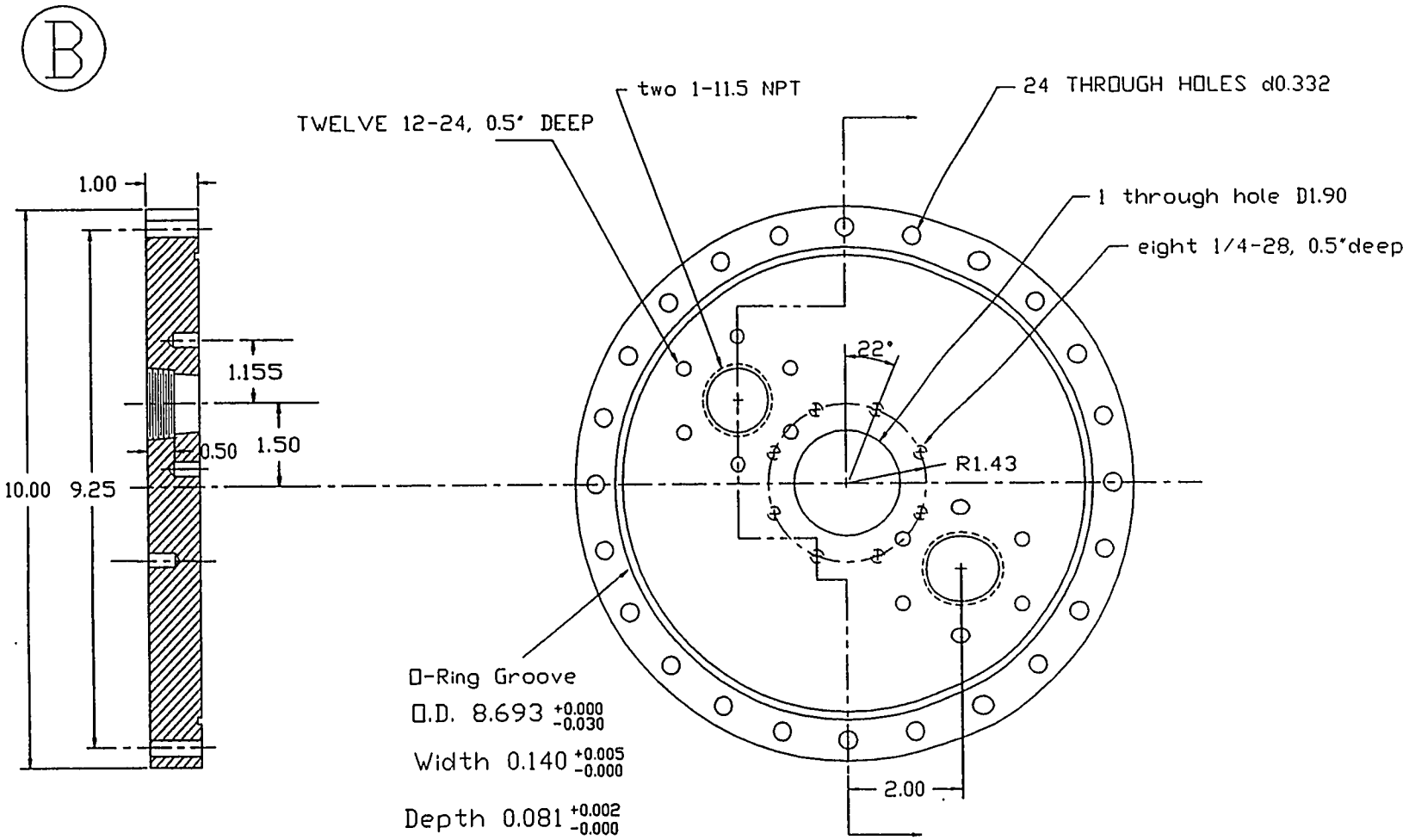
CONDENSER BODY

FIGURE 29



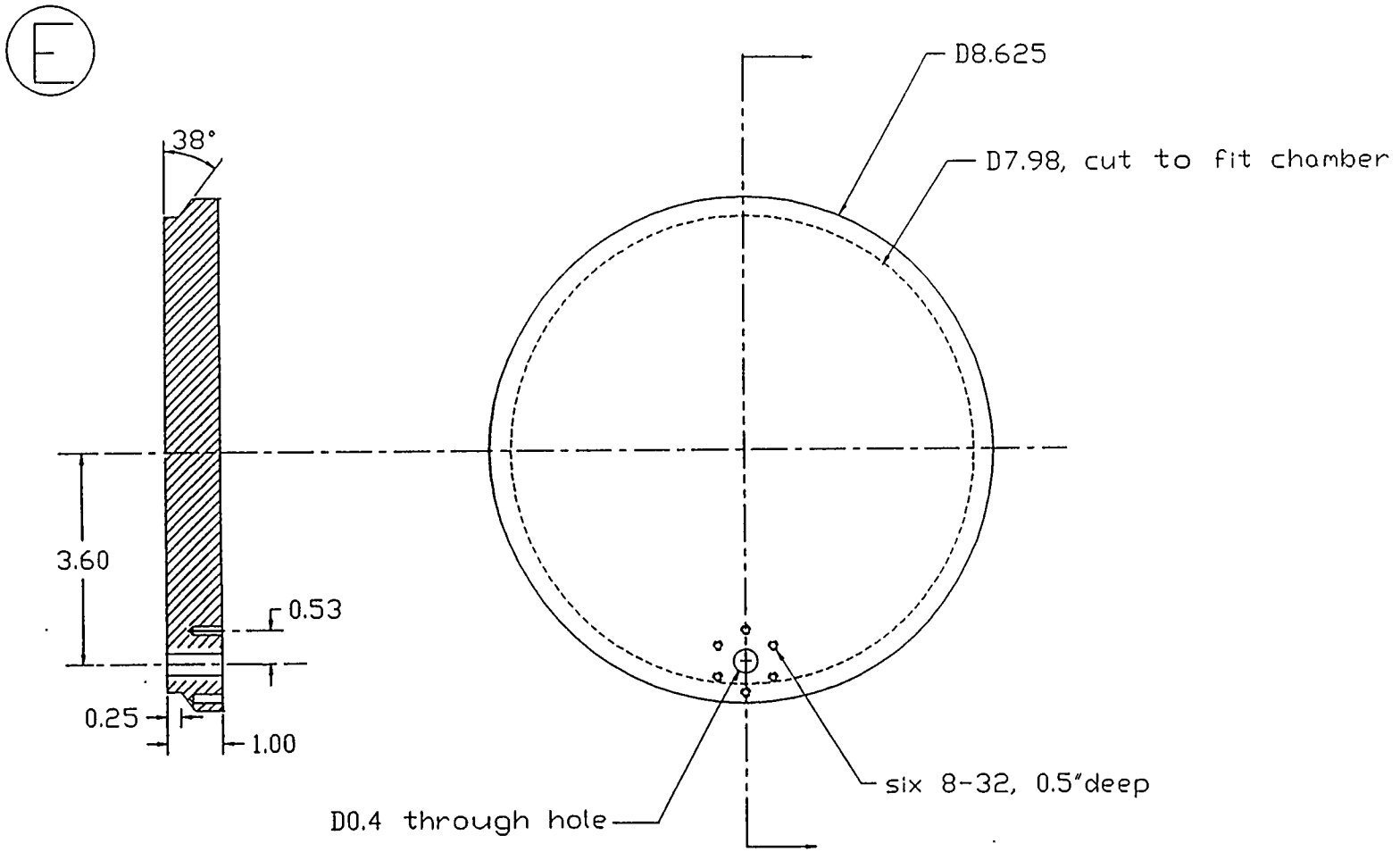
FLEX-HOSE CONNECTOR

FIGURE 30



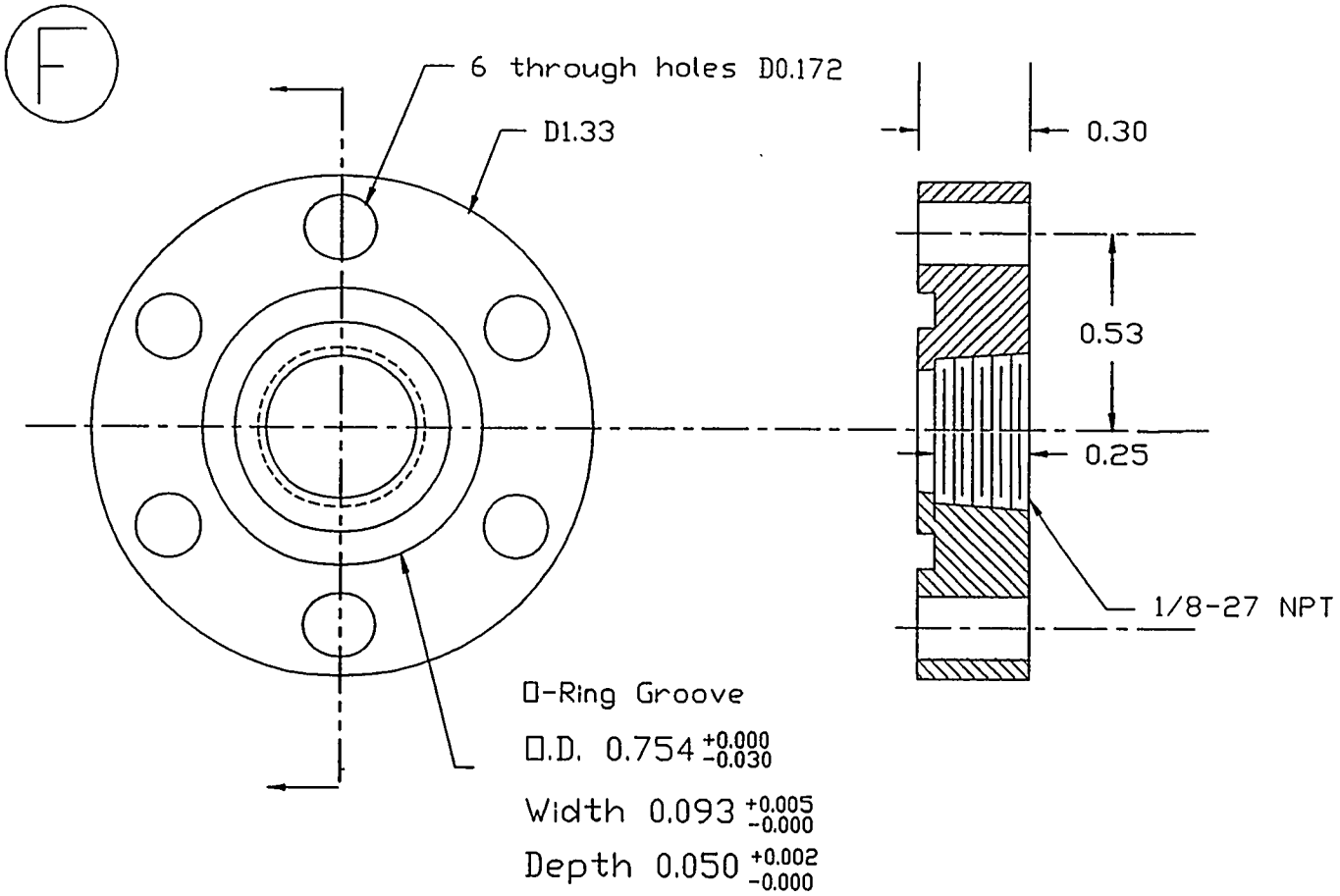
CONDENSER INLET FLANGE

FIGURE 31



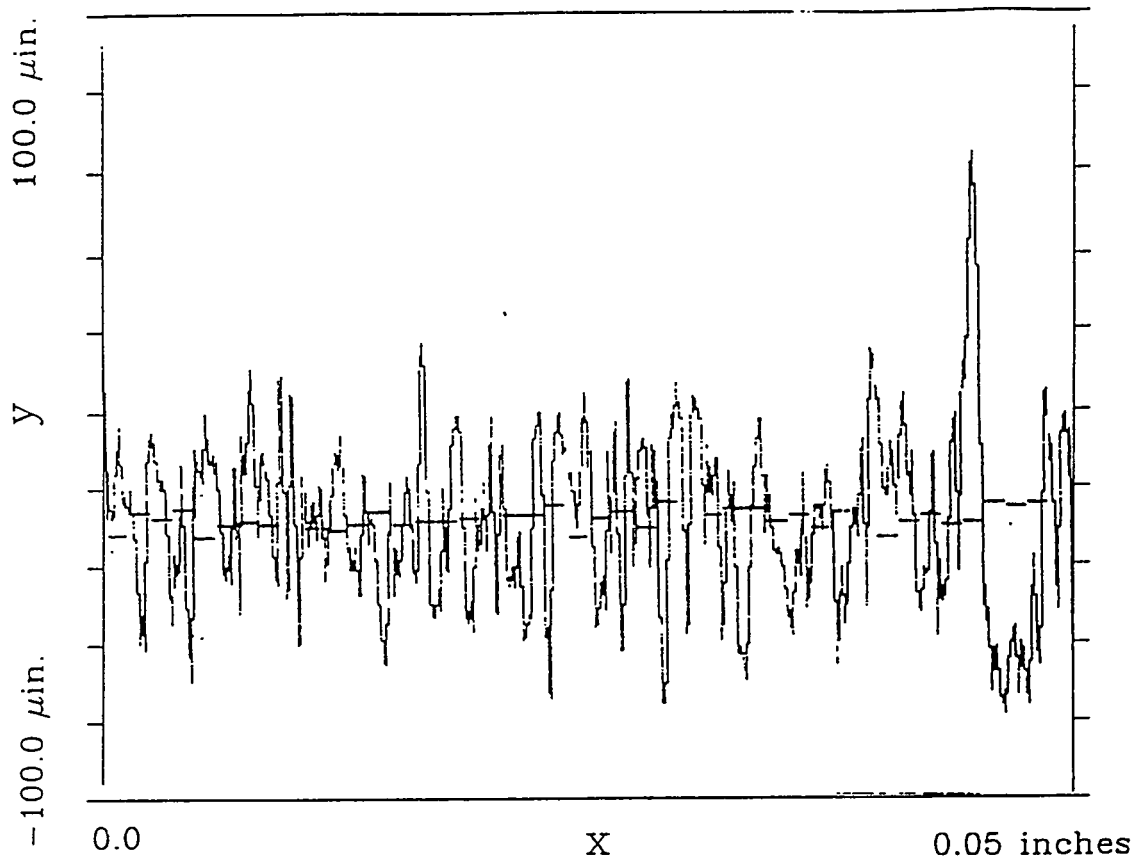
CONDENSER BOTTOM

FIGURE 32



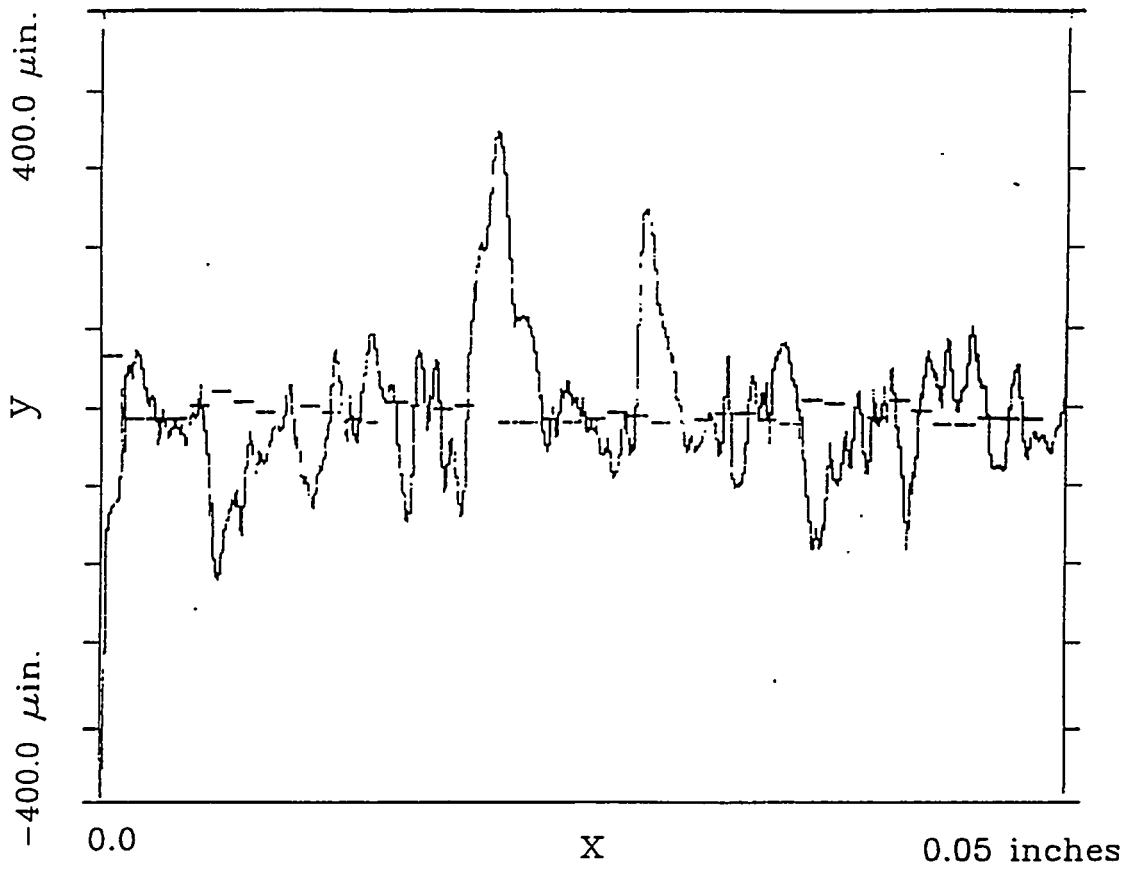
FLEX-HOSE CONNECTOR

FIGURE 33



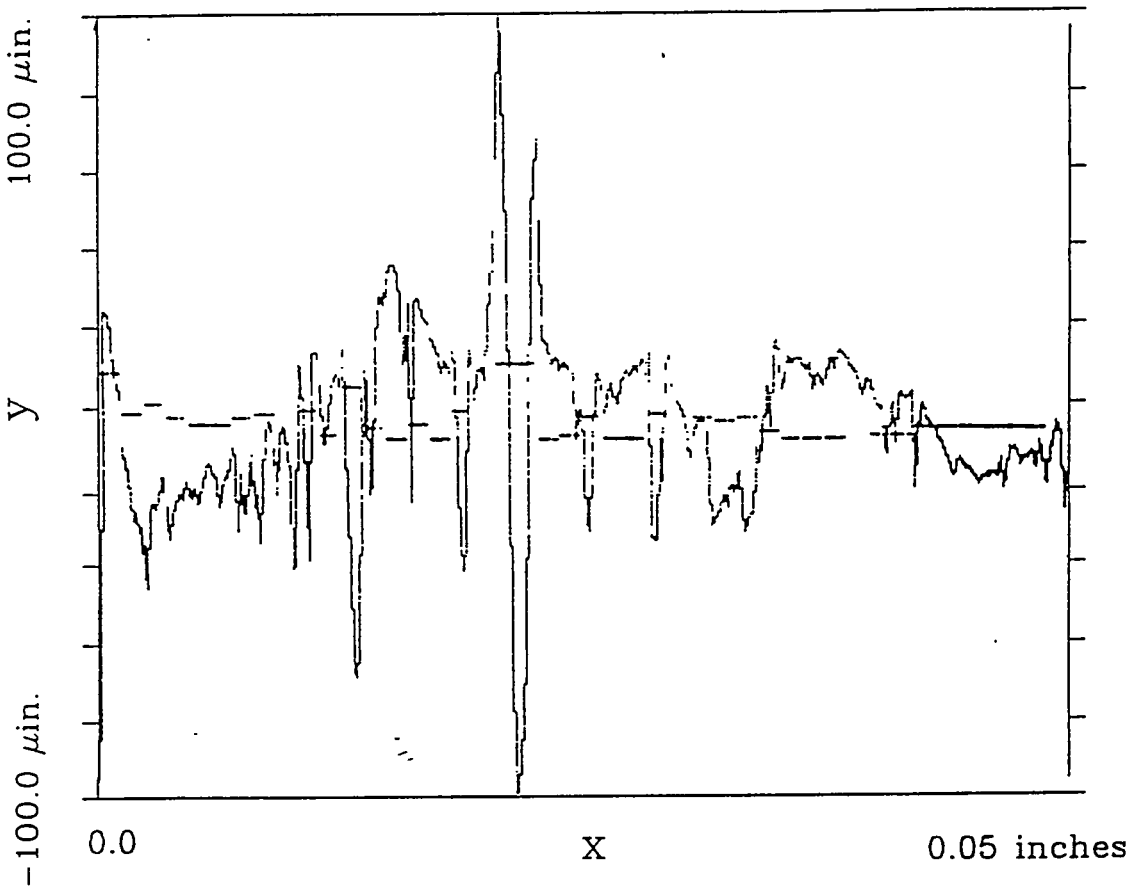
NEW TEST SECTION ROUGHNESS PROFILE

FIGURE 34



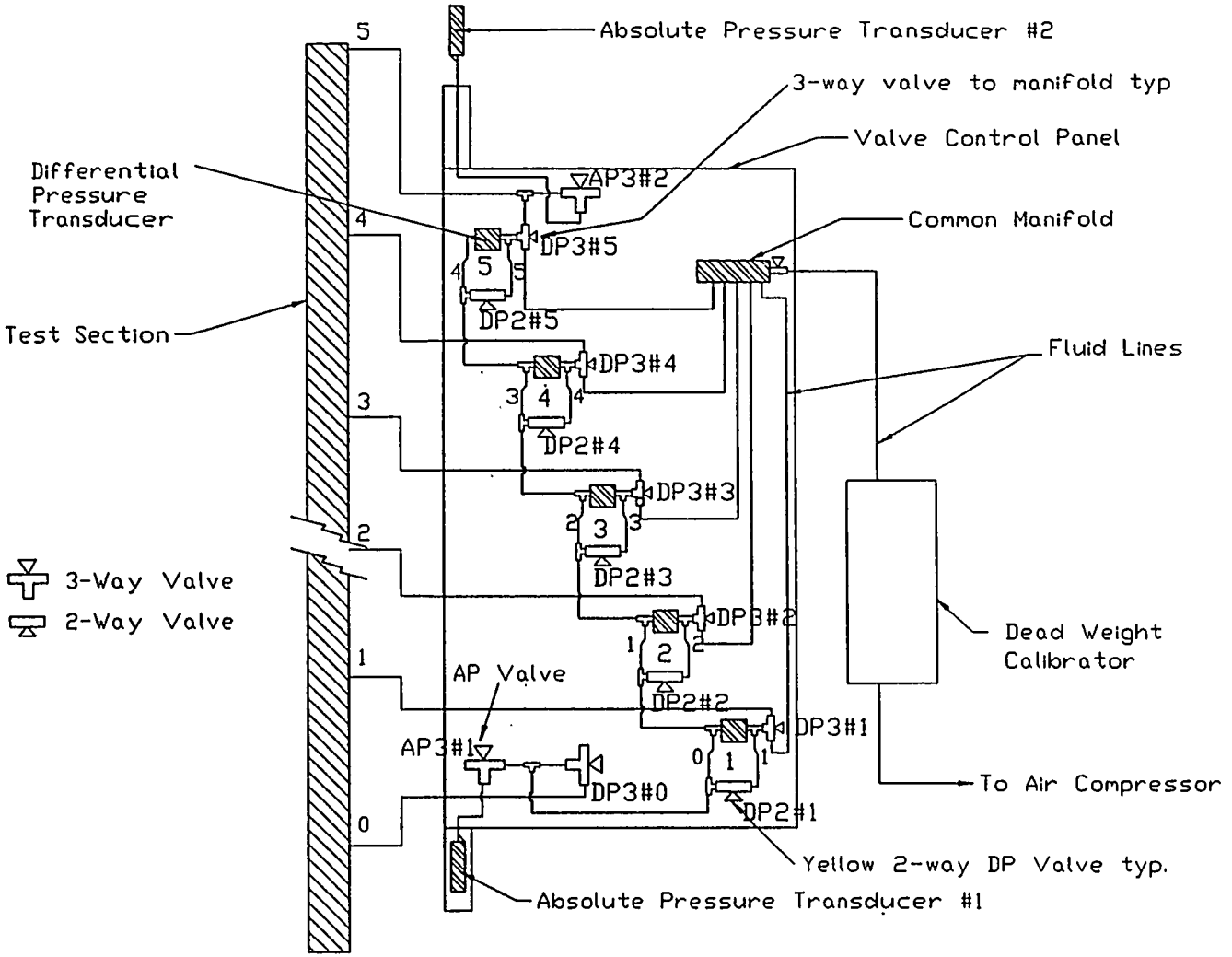
OLD TEST SECTION ROUGHNESS PROFILE [7]

FIGURE 35



1/2" COPPER TUBE ROUGHNESS PROFILE

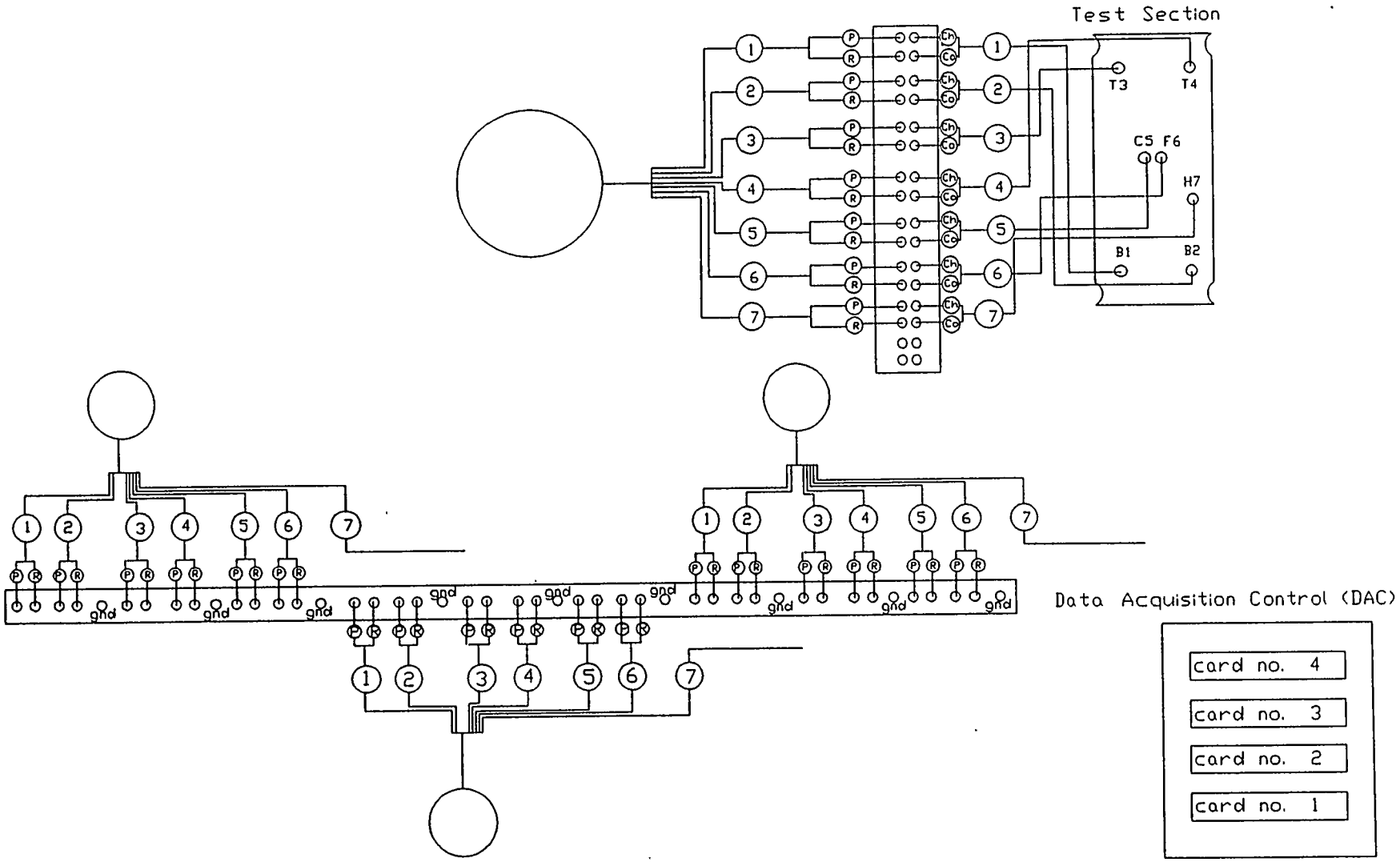
FIGURE 36



PRESSURE TRANSDUCER CALIBRATION CONTROL PANEL

FIGURE 37

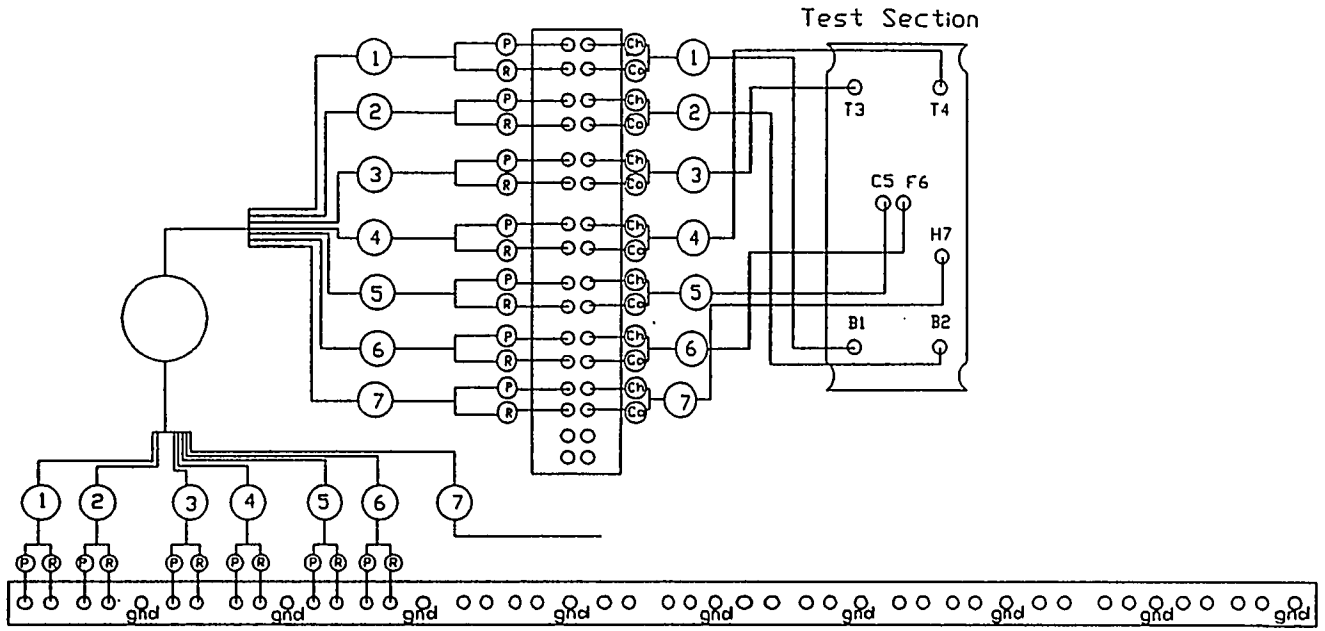
THERMOCOUPLE WIRING FOR TEST SECTION

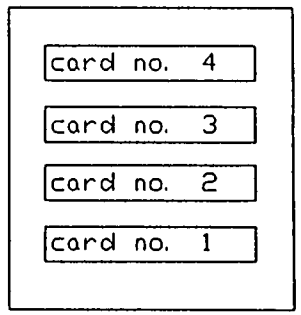


TC WIRING ON DAC

FIGURE 38

THERMOCOUPLE WIRING FOR TEST SECTION





TC WIRING ON DAC

FIGURE 39

Section 2

Study of Flow Boiling of R-114, C_4F_{10}, and C_4F_8 in a Vertical Tube

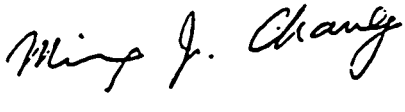
Study of Flow Boiling of R-114, C_4F_{10} and C_4F_8 in a Vertical Tube

by

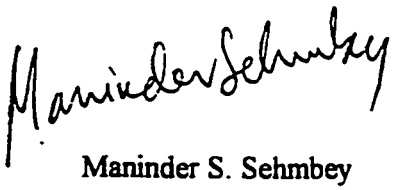
Cudo Technologies, Ltd.
P.O. Box 185, Lexington, KY 40584

Contract # 11K-NR559
Report # MMES-Cudo-NR559-2

Martin R. Pais, PhD, PE
Principal Investigator



Ming Jr Chang, PhD



Maninder S. Sehmbey

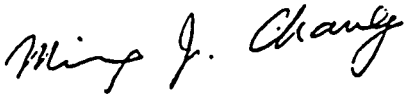
Study of Flow Boiling of R-114, C_4F_{10} and C_4F_8 in a Vertical Tube

by

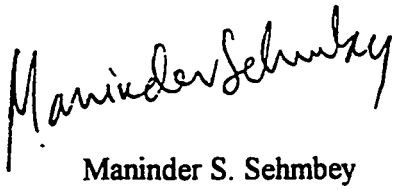
Cudo Technologies, Ltd.
P.O. Box 185, Lexington, KY 40584

Contract # 11K-NR559
Report # MMES-Cudo-NR559-2

Martin R. Pais, PhD, PE
Principal Investigator



Ming Jr Chang, PhD



Maninder S. Sehmbey

ABSTRACT

Convective pool and flow boiling experiments were conducted for three different liquids R-114, C_4F_{10} and C_4F_8 to determine the heat transfer and pressure drop characteristics in a vertical tube. Experiments were run over the saturation temperature range of 125 °F to 200 °F, heat flux range of 5000 to 25000 btu/hr.ft^2 and mass flow rate range of 0.2E6 to 1E6 lbm/hr.ft^2. The heat-transfer coefficient for C_4F_{10} and C_4F_8 are nearly the same and almost 80% higher than that for R-114. However, the critical heat flux supported by R-114 is almost 70% higher than that for C_4F_{10} and C_4F_8. Correlations are presented which provide a best fit prediction of the data.

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NOMENCLATURE

A	Area
Bo	Boiling number
c	Constant
C	Correction factor
Co	Convection number
C_p	Specific heat
d	Inside diameter of tube
E	Enhancement factor
F	Fluid dependent constant
Fr	Froude number
g	Gravitational acceleration
G	Mass flux
h	Heat-transfer coefficient
k	Thermal conductivity
Nu	Nusselt number ($=hd_i/k$)
p	Pressure
Pr	Prandtl number ($=C_p\mu/k$)
q	Heat flux ($=Q/A$)
Q	Heat input
R	Roughness
Re	Reynolds number (Gd_i/μ)
S	Suppression factor
T	Temperature
x	Vapor quality
z	Coordinate in direction of flow

Greek

α	Void fraction
Δ	Difference
λ	Latent heat of vaporization
μ	Viscosity
σ	Surface tension
ρ	Density
ν	Specific volume

Superscript

n	Exponent

Subscript

a	Average
cv	Convection
f	Instream
fl	Fluid
F	Friction
g	Vapor phase
i	Inside diameter
l	Liquid phase
nb	Nucleate boiling
nbf	Nucleate boiling factor
npb	Nucleate pool boiling
q	Root-mean-square
tpf	Two-phase factor
w	Wall
wf	Wall-fluid

INTRODUCTION

In several proposed cooling applications, the use of fully fluorinated carbon compounds is being seriously considered. This is because the common refrigerants in use today (chlorofluorocarbons CFCs) have been linked to the depletion of ozone in the stratosphere. The current world plan ironed out by the Montreal Protocol calls for a total ban of all CFCs by the year 2000. The USA has unilaterally called for a ban on all CFCs by 1995. This demands that replacement refrigerant fluids be sought and tested which will not only satisfy the tougher environmental standards but also, more importantly, provide satisfactory cooling capacities within the current existing installations.

Two fluids, namely, perfluorobutane C_4F_{10} and per-fluorocyclobutane C_4F_8 have been selected as promising replacements for R-114 in the nuclear fuel enrichment facilities. These fluids are special because they provide high heat transfer rates and do not react with the process fluids. They are also very inert, have thermophysical properties that are comparable to the currently used refrigerant R114, and can be manufactured with currently available technology.

Convective flow boiling experiments were conducted at Cudo Technologies Ltd.(Cudo) for three different liquids R-114, C_4F_{10} and C_4F_8. The experimental setup is described in detail in reference 1. Experiments were run for different saturation temperatures, heat fluxes, and mass flow rates so as to determine the heat transfer capability and pressure drop conditions. Also correlations are presented which provide a best fit prediction of the data.

Theory

The theory of nucleation and the solid-liquid-vapor relationship of forced convective boiling is addressed in detail in reference [1]. The flow regimes are generally divided into the single-phase, subcooled nucleate boiling, saturated nucleate boiling, slug flow, annular flow, single phase vapor and the critical heat flux. Depending on the heat flux and the temperature conditions at the wall, the occurrence of the intermediate regimes can be suppressed. The heat transfer capability of the fluid is dependent on a number of parameters [1]. Depending on the operating temperatures, pressures

and heat loads envisaged, conditions within the heat exchanger system can be reached which can be deleterious to the process. Hence, it is imperative that heat transfer and pressure drop data on these fluids be obtained.

TECHNICAL OBJECTIVES

The overall objective of this proposed study is to develop a method of measuring the heat-transfer coefficient and pressure drop on the internal surface of a cylindrical pipe under conditions of uniform heat flux in flow boiling in a vertical orientation with respect to gravity.

The overall objective of this part of the total research effort is to:

A. 1. Measure the boiling heat-transfer coefficient on the internal surface of a tube under conditions of:

- flow and free convective boiling,
- uniform heat flux, 3,000 to 60,000 Btu/hr.ft^2 per zone.
- fluid mass flux of 0.1e6 to 1.1e6 lbm/hr.ft^2.
- test section exit quality of 0 to 1.
- tube saturated length to diameter ratio L/D = 30 to 150.

2. Measure the two-phase flow pressure drop.
3. Measure the critical heat flux.
4. Measure the surface temperature distribution.
5. Measure the flow temperature distribution.
6. Measure and define the surface roughness conditions.
7. Maintain the desired saturation conditions, 100 °F to 250 °F.

B: Run tests using:

1. CFC-114; Compare the results with the currently existing R-114 data from the Oak Ridge Gaseous Diffusion Plant (ORGDP) [2].
2. C_4F_{10}
3. C_4F_8

C. Compare existing or determine a new correlation for:

- the heat flux,
- the CHF, and
- the pressure drop.

Experimental Setup [1]

Figure 1 illustrates the flow boiling system capable of operating at pressures from 0 to 350 psig and temperatures ranging from 50 °F to 300 °F. Liquid from the storage tank is pumped by a variable flow gear pump at a predetermined flow rate. The liquid on exiting the pump passes through a filter-drier, a flow meter and a pre-heater before entering the test section. The pre-heater allows fine control of the inlet sub-cooled/saturation conditions by the use of a temperature controller. Before entering the test section the liquid is made to flow through a flow straightener consisting of a honeycomb section ahead of a converging cone which mates with no transition in geometry with the inlet of the test tube test section. The liquid on flowing through the test section takes up heat through phase change and exits as a liquid-vapor mixture. At the top and exit of the test section is a sight-glass tube allowing visualization of the exit flow. The exiting liquid-vapor mixture next passes through a cyclone separator. The settled liquid passes through a flow meter before draining into the storage tank. The vapor is condensed in the condenser. The condensate passes through a flow meter before draining into the storage tank.

The test section [1,2] is primarily a 0.785 inch ID and 1.75 inch OD copper tube about 10 feet in length. At each end of the test section is a welded copper flange for mating with the other parts of the setup. The test section is divided into ten zones, each 11.5 inches long and thermally isolated from the adjacent zones by a 1/2 inch wide groove. Figure 2 illustrate the positioning of the thermocouples and pressure transducers [1]. The temperature profile in each zone is provided by seven thermocouples distributed longitudinally and azimuthally. Five thermocouples are imbedded in the 1/2 inch thick wall so as to be 1/8 inch from the inner tube wall. A sixth thermocouple is positioned midway in the fluid stream and a seventh thermocouple is clamped to the external heater. All the thermocouples were calibrated with their respective wiring harnesses in conjunction with the data acquisition. The uncertainty in the temperature measurement is ± 1 °F [1].

Seven pressure transducers were positioned along the length of the tube [1], see figure 1. One at the entrance of the tube and one at the exit measured the absolute pressures. Additionally, five

transducers are placed equidistantly within the test region to provide the differential pressure relative to the pressure at the inlet. The pressure taps are located in zones 1, 3, 5, 7, 9 & 10 such that the distance between two consecutive taps is 2' except for the tap in zone 10 which is at a distance of 22.5" from that in zone 8. The differential pressure transducers provide the pressure drop information along the length of the tube. The uncertainty in the differential pressure is ± 0.05 psi and in the absolute pressure ± 1 psia.

Each zone of the test section is wrapped with heaters capable of providing over 60,000 Btu/hr.ft^2 to the outer surface of the tube [1]. The heater arrangement and the test section was thermally insulated from the environment by three layers of high temperature Fiberfrax^r insulation (k = 0.65 Btu.in/hr.ft^2.°F @ 500 °F) and an aluminum foil radiation heat shield. The uncertainty in the heat flux is ± 175 btu/hr.ft^2.

SCR power supplies regulate the power to the heaters by varying the phase angle on each AC cycle proportional to the control signal [1]. This method of applying power provides a continuous uniform heat flux with fine control. A temperature controller, monitors the temperature of the outer heater surface. In the event of an overshoot in the temperature of the surface, an alarm disconnects the power to the heaters via relays. In the design of this experiment the number of devices to be measured included over eighty thermocouples, seven pressure transducers, six flow meters, and ten power transducers. To expedite on-site data analysis a PC-based data acquisition was used to measure, perform the necessary calculations, display system conditions and store the data. To reduce the uncertainty in the overall measurement, the devices were calibrated using standards in conjunction with the data acquisition.

Experimental Procedure [1]

With reference to figure 1, the variable flow pump is started and the flow rate adjusted to the desired predetermined value. The pre-heater is powered to control the inlet coolant entry temperature. The antifreeze is circulated through the cooling coils in the condenser at a flow rate such that the saturation pressure at the inlet is maintained at the desired value. Excessive cooling may

cause a low pressure at the pump inlet and lead to cavitation. Too little cooling will cause the pressure to rise and force the liquid at the inlet to the test section to be sub-cooled. A heater on the storage tank in conjunction with a cooling coil in the storage tank is used as an accessory control for inlet temperature and pressure, see figure 3.

The heaters on the test section are turned on and the power is ramped up in steps to the desired heat flux, making certain that steady-state conditions are reached on the surface of the heater. The data acquisition is set up to measure the heat input and temperature of the heaters. With this information the heat loss from the test section to the ambient and end-plates was calculated from the earlier heat loss calibration [1]. The balance of the heat is necessarily taken up by the fluid. Both the heat loss and the heat flux into each zone are displayed simultaneously by the data acquisition. Hence, it is possible to determine and set in real time the heat flux conditions. Steady-state thermal flow-field conditions are determined by monitoring the temperatures of the various regions of the system. When the temperature transients die down (1 °F or less change over a 5 minute period), the system can be assumed to be in thermal equilibrium. At this juncture the:

- temperatures at various locations
- system pressure and region differential pressures
- power input to the heaters
- flow meter readings
- flow field observations

are noted down and collected by the data acquisition unit.

The above process is followed for a step-wise increase in heat flux until CHF conditions are imminent. At this juncture the heat flux is further increased so as to span the L/D ratios for the CHF study. In regions where CHF occurs the heat flux is reduced so as to maintain the wall temperatures approximately equal to the upstream zone to reduce any heat losses. This is because at CHF the heat-transfer coefficient drops significantly and the wall temperature rises correspondingly. To prevent too high a temperature in the particular zone the heat flux must be dropped.

At the end of the experimentation all heaters are turned off. The antifreeze is pumped through the heat exchanger in the storage tank. This creates a low pressure zone in the storage tank (by condensing the vapor). This induces all the vapor and the liquid in the rest of the loop to collect in the storage tank. Once the system has cooled down, all power to the loop is disconnected and the storage tank is isolated from the rest of the system by closing the valves. Small leaks do exist in the flow loop and isolation reduces loss of freon over periods of no operation.

For each fluid at a predetermined boiling temperature and mass flux, the zone heat flux is gradually increased, (i.e. a constant heat flux was applied to successive zones in the direction of flow) until CHF conditions are reached in the exit heat zone. This was evidenced by a sharp rise in wall temperature at the last heated zone. As the critical condition was reached, the electrical power input to that particular zone was cut off or reduced.

In all runs undertaken, the flow at the inlet was slightly sub-cooled, the saturation temperature was maintained constant, and the surface heat flux was varied. The range of different coolant flow rates was then repeated at this surface heat flux. Once the surface heat fluxes between 5000 and 35000 Btu/hr/ft^2 were covered, a new saturation temperature was set and the entire procedure repeated. Thus, essentially, the coolant flow rate was the parameter most frequently varied, the surface heat flux the second most frequently varied, and the saturation temperature the least frequently varied. (Owing to the thermal mass of the fluid in the system, approximately 150 lbs, change in saturation conditions needed about three hours to reach steady state).

During the above tests the saturation temperature and pressure of the system are maintained steady at the predefined values. For each saturation temperature and each mass flow rate setting, the run provided data of the form:

- Surface superheat temperature versus heat flux
- Saturation temperature conditions
- Pressure drop profile
- Flow field observations

- Pressure at the inlet of the test section
- Pressure drop along the test section with intervals of 2, 4, 6, 8 and 9.88 ft from the inlet
- Room temperature
- Wall and in-stream temperatures in each of the 10 zones
- Gross heat input, heat loss and heat flux to each of the 10 zones
- Coolant flow rate and temperature at inlet of the test section
- Water flow rate and temperatures at inlet and outlet of the condenser

Owing to the heat losses to the flanges at either end of the test section the uncertainty in the heat input calculation is difficult to determine. The temperature measurement in section 6 indicated a inexplicable departure from the rest of the test section. The difference was attributed to the temperature compensation within the data acquisition. Hence for purpose of analysis the heat transfer data from sections 1, 6 and 10 are not presented or used for correlations in this study.

The range of parameters covered by these experiments are listed below:

Saturation temperature, °F:

$T = 125, 150, 175, 190$ (200 for R-114).

Liquid mass flux, lbm/hr-ft^2:

$G = 0.2, 0.36, 0.52, 0.68, 0.84, 1.0 * 10^6$

Surface heat flux, Btu/hr/ft^2

$q = 0.5, 1.0, 1.5, 2.0, 2.5 * 10^4$

Heat Transfer

The heat transfer characteristics are presented in the form of the heat flux **q** versus the wall-to-instream temperature difference ΔT. ΔT is the temperature difference between the average inside-wall temperature and the instream temperature. The average inside-wall temperature was determined by taking the average thermocouple measurements from five different locations on the section wall [1], see figure 2, and correcting them for wall thickness to determine the internal wall temperature. Five thermocouples were imbedded in the walls of each section. Owing to the

intermittent heating and cooling of the test section some of the thermocouples would not make good contact with the wall. The discrepancy was evident on study of the temperature field in the section in question. In such cases the incorrect temperature was not considered in the calculations. Generally at the end of the testing the thermocouple attachments were fixed.

From the results shown in Figures 4 to 15, the following trends are observed:

- ΔT increased with increase in heat flux q.
- As the saturation temperature increased, smaller ΔT were obtained.
- ΔT for liquids C_4F_{10} and C_4F_8 are smaller than that for R-114, this implies that C_4F_{10} and C_4F_8 provide higher heat-transfer coefficients than R-114.
- C_4F_{10} and C_4F_8 dry out earlier than R-114. In other words, C_4F_{10} and C_4F_8 support lower critical heat flux (CHF) levels.
- The liquid mass flux does not have a strong effect on the heat-transfer coefficient.

The copper tube used as the test section for this flow boiling experiment was identical to the one used by Jallouk [2]. R-114 was also used as the test fluid in Jallouk's experiment. Hence, initially experiments were run to determine the heat transfer and flow characteristics with R-114 and the data was compared with those of Jallouk's [2]. Figures 5 and 7 show the comparisons between the flow boiling test data of Cudo and Jallouk's [2] for R-114 at saturation temperatures of 150 °F and 200 °F. As it can be seen, the agreement is very poor. Jallouk's data shows a much lower heat-transfer coefficient compared with the data from Cudo. A number of experiments were then run within the single phase forced convection regime to determine the heat transfer characteristics of the tube and it was determined that a good agreement existed between the experiment and previously published correlations [3] (see Correlation section). Similarly, pool boiling experiments were run with the tube in the vertical orientation. The data indicated a significant increase from that of Jallouk [2]. Such a difference may be attributable to the surface characteristics such as roughness which play a controlling part in nucleation [4].

Roughness measurement

The 10-foot copper tube was supplied by Martin Marietta Utility Services, Inc. (MMUS). The inner surface was successively cleaned using 400 grit sand paper, acetone, and methanol. Also supplied was a part of the test section used by Jallouk [2] in his experiments. The roughness profiles of Jallouk's [2] test section and the present one were measured using a Surtronic 3P profilometer (made by Rank Taylor-Hobson); figures 16 and 17 show sample roughness profiles and table 1 shows the values of commonly used roughness parameter R_a and R_q. R_a is defined as the arithmetic mean of the departure of the roughness profile from the mean line.

$$R_a = \frac{1}{L}\int_0^L |y(x)|\,dx \qquad (1)$$

R_q is defined as the root-mean-square average of the departure of the roughness profile from the mean line.

$$R_q = \sqrt{\frac{1}{L}\int_0^L y(x)^2\,dx} \qquad (2)$$

Here L is the scan length, y the roughness profile in the direction parallel to the tube axis.

As shown in table 1, three scans were carried out for each tube. The third scan for each tube is presented in figures 16 and 17. The results show a marked difference in the roughness of the two test section tubes; moreover, the results of the old test section, see figure 17, show a large variance. This is due to the fact that the old test section had a thick layer of oxide like deposits on the inside that made it impossible to determine its original roughness; any attempt to remove the oxide layer would inevitably result in a change in the original roughness of the surface. Therefore it is not possible to compare the roughness of the present test section with the previous one.

Since the purpose of this study is to simulate flow boiling conditions encountered in actual practice, it would be more appropriate to compare the roughness of the test section with that of a commercially available copper tube. This was carried out by measuring the internal roughness of a

piece of 1/2" outer diameter copper tubing commonly used in the refrigeration industry; the results are presented in figure 18 and table 1. It can be seen that the roughness values of the new test section and the commercial tube are comparable. Thus the test section can be assumed to be an appropriate representation of the real situation.

Table 1 Roughness Values

Material		R_a μin	R_q μin
New test section	(figure 16)		
1st scan		12.0	15.1
2nd scan		13.1	17.7
3rd scan		15.7	20.4
Jallouk [7]	(figure 17)		
1st scan		29.9	37.7
2nd scan		59.3	85.2
3rd scan		52.9	76.1
Commercial 1/2" copper tubing (figure 18)			
1st scan		10.4	15.2
2nd scan		14.7	21.5
3rd scan		15.6	21.8

Correlation

The correlation for flow boiling developed by Jallouk [2] using R-114 test data was based on a superposition model first introduced by Chen [5]. In this correlation Chen [5] hypothesized that the flow boiling heat transfer could be modeled as a linear superposition of the forced convection and

nucleate boiling components of the flow field. Since the introduction of the Rohsenow superposition model [6] several new variations have been introduced. Within this part of the study an attempt is made to analyze the efficacy of some of the correlations to model the Cudo data.

Convective Flow Boiling Models

In forced convective boiling, the forced convection, nucleate boiling and evaporation components exists in varying degrees depending on the regime of flow boiling [1], complicating the mechanisms for heat transfer and the ability to empirically model them. The two terms in convective flow boiling namely, *convection* (q_{cv}) and *boiling* (q_{nb}) are specific types of the heat transfer process. *Convection* is the transport of heat through change in the sensible heat content of the fluid, i.e. by a change in the fluid temperature. *Boiling* occurs when vapor bubbles are formed at the heated wall. *Evaporation* occurs when liquid is superheated at the wall, and vaporizes at the liquid-vapor interface. If nucleate boiling occurs on a surface, without convective flow, the process is called *nucleate pool boiling*. This heat flux is written as q_{npb}. If nucleate boiling and convection occur simultaneously in a flowing fluid, the coexisting heat transfer mechanisms are described as *convective flow boiling*.

A variety of correlations exist for convective flow boiling. Three types of phenomenological models are generally used for calculating the heat-transfer coefficient in convective flow boiling, namely, the superposition, asymptotic, and enhancement models. These three types of convective flow boiling models incorporate different techniques for combining the nucleate boiling and convection contributions. Figures 19(a) & (b) [7] illustrate the convective flow boiling curve on the log-log plot of heat flux versus wall superheat ΔT ($=T_w - T_f$). The convective flow boiling curve is asymptotic to q_{cv} at low ΔT, and q_{nb} at high ΔT. The q_{cv} asymptote has unity slope, because its heat-transfer coefficient h_{cv} is independent of ΔT. These three different models are described below.

Superposition Model

Rohsenow [6] initially proposed the superposition model and applied it to subcooled convective flow boiling. The superposition model assumes that the total heat flux q is the sum of the *convective* and *nucleate boiling* components. Thus, the basic equation for the superposition model

is,

$$q = q_{nb} + q_{cv} \tag{3}$$

The terms $\mathbf{q_{nb}}$ and $\mathbf{q_{cv}}$ are calculated at the value of wall superheat $\Delta \mathbf{T}$ that exists in the system. One may write the superposition model in terms of the component heat-transfer coefficients by dividing Eq. (3) by the wall superheat $\Delta \mathbf{T}$ to obtain,

$$h = h_{nb} + h_{cv} \tag{4}$$

Chen [5] argued that as the velocity of the flow increased it suppressed the ability of the fluid to nucleate at the wall. Hence, a suppression factor S was introduced which empirically had the effect of modifying the contribution of nucleate boiling, i.e., $\mathbf{q_{nb} = Sq_{npb}}$

The Enhancement Model

The enhancement model was proposed by Shah [8]. For flow boiling in vertical tubes, it was described by,

$$h = E\, h_l \tag{5}$$

where E is the *enhancement factor* which is a function of the boiling number (**Bo**) and the convection number (**Co**). The term $\mathbf{h_l}$ is the single-phase heat-transfer coefficient for the liquid phase flowing alone. The **Bo** and **Co** numbers were defined as,

$$Bo = \frac{q}{\lambda G} \tag{6}$$

and

$$Co = \left(\frac{1-x}{x}\right)^{0.8} \left(\frac{\rho_g}{\rho_l}\right)^{0.5} \tag{7}$$

For application to horizontal tubes, E also depends on a third parameter, the Froude number ($\mathbf{Fr_l}$), if $\mathbf{Fr_l} < 0.04$. The Froude number accounts for partial wall wetting, which may occur in

horizontal channels. Kandlikar [9] modified the Shah [8] correlation with an empirical fluid-dependent parameter F_{fl}, which multiplies the nucleate boiling term. Kandlikar [9] updated the values of F_{fl}, based on a large data base containing 5246 data points.

Asymptotic Model

Kutateladze [10,11] proposed a *power-type/asymptotic* non-linear superposition model for the two boiling components in the form,

$$q^n = q^n_{nb} + q^n_{cv} \tag{8}$$

When n>1, the curved portion of the convective flow boiling curve is asymptotic with the limiting straight lines $\mathbf{q_{cv}}$ and $\mathbf{q_{nb}}$ on figure 19(a). One of the asymptotes correlates the forced convection component, where the nucleate boiling contribution is insignificant. The second asymptote predicts the nucleate boiling component, the contribution due to convective heat transfer being insignificant in this regime. The curved region between the two asymptotes reduces as the value of **n** increases. As $\mathbf{n} \to \infty$, the curved region shrinks to zero. If $\mathbf{n} = 1$, the total heat flux is the sum of the two components.

Kutateladze [10] introduced the asymptotic correlation for subcooled water in plain tubes and used the exponent $\mathbf{n} = 2$. There is no theoretical basis for selection of the exponent that gives the best fit of the data. Steiner and Taborek [12] have proposed a correlation for in-tube flow boiling data based on a variant of the asymptotic model. Their correlation is based on the asymptotic model Eq.(8) with $\mathbf{n} = 3$, which was evaluated using the data bank from the University of Karlsruhe. The two components in this model are independent of each other, their integration being governed by the basic equation Eq. (9). Thus, the selection of methods for the nucleate and convective components is independent of the base model itself.

$$h^n = [\, h_{nb}^{\,n} + h_{cv}^{\,n} \,]^{\frac{1}{n}} \tag{9}$$

$$= [\, (h_{npb}\, C_{nbf})^n + (h_l\, C_{tpf})^n \,]^{\frac{1}{n}} \tag{10}$$

here,

h_{npb} is the local nucleate pool boiling coefficient. The coefficient itself can originate from any predictive method or data. Thus, it leaves a great freedom of choice.

C_{nbf} is a nucleate boiling correction factor to h_{npb}, which compensates for differences between the pool and the flow conditions.

h_l is the local convective heat-transfer coefficient for single-phase liquid flow.

C_{tpf} is the two-phase flow correction factor to the convective component h_l, accounting for enhancement of the coefficient in the liquid-vapor mixture.

Heat Transfer Correlation

The flow boiling heat transfer tests conducted at Cudo, on R-114, C_4F_{10} and C_4F_8 has provided the necessary data to establish a new correlation. The correlation will be used in the gas cooler computer models to predict cooling water requirements under a variety of operating conditions and with different CFC replacement candidates. The existing correlation for the gas cooler computer models was developed by Jallouk [2] using R-114 test data, and was based on a superposition model. As we mentioned earlier, Figs. 5 and 7 shows poor agreement between the data from Cudo and Jallouk's [2] data. The R-114 test data from Cudo has consistently shown better heat transfer performance than that reported by Jallouk [2]; Consequently, the Jallouk [2] correlation under predicts the Cudo data by as much as 100%.

The present test data was also compared with the correlation provided by Kandlikar [9], which was recommended by Carey [13] and is an expansion of Shah's model [8]. The comparison did not show consistent agreement through various test conditions and the disagreement varies from about 10 to 100%. A set of constants in this correlation was established by regression analysis, using Kandlikar's [9] own data bank on water. However, when tested on refrigerants data, a fluid specific correction factor F_{fl} needs to be added to the correlation R-114 was one of the ten fluids tested by Kandlikar [9] and was ascribed a $F_{fl} = 1.24$. Even with this experimentally determined fluid parameter for R-114, the Kandlikar's [9] correlation did not predict our data well. Also, the values

of F_n follow no logical pattern and therefore are presumed to be data source dependent. Thus Kandlikar's [9] method can not be used for general applications. as values of F_n are not known.

The type of model chosen in this study is the asymptotic model as proposed by Steiner and Taborek [12], which was strongly recommended by Webb and Gupte [7]. Like the superposition model, the asymptotic model relies on combining a forced convection component and a nucleate pool boiling component. However, the asymptotic model uses a power relationship as given by Eq. (9). The model is called asymptotic because the flow boiling coefficient **h** approaches the larger values of the convective coefficient h_{cv} and the pool boiling coefficient h_{npb} as shown in figure 19(b). The maximum addition occurs when the two components are equal.

Steiner and Taborek [12] compared the predictive ability of their correlation with Chen [5], Shah [8], and Gungor and Winterton [14, 15] for ethanol, ammonia, and R-12. Their [12] asymptotic form avoids the abrupt transition between the nucleate boiling and convective regions and in general they showed that their correlation is significantly better than the other correlations [6,8-11].

In order to use this approach one must have experimentally determined values for the two components h_{nb} and h_{cv} in Eq. (9) or use those published by Steiner and Taborek [12] (determined from a 13,000 point data base covering a variety of fluids). We chose to use the experimental approach, and only used the convective multiplier C_{tpf}, which accounts for enhancement due to the liquid-vapor mixture, given in the paper. Thus, Eq. (10) can be rewritten as,

$$h^n = [h_{nb}^n + (h_l C_{tpf})^n]^{\frac{1}{n}} \qquad (11)$$

From Taborek's [12] analysis, C_{tpf} was derived as a function of the vapor fraction x and the liquid-vapor density ratio ρ_l/ρ_g.

$$C_{tpf} = [(1-x)^{1.5} + 1.9x^{0.6}(\frac{\rho_l}{\rho_g})^{0.35}]^{1.1} \qquad (12)$$

This correlation was developed and validated by Taborek [12] using a large data bank containing 15

fluids from 34 sources.

Single-Phase Liquid Flow

The forced convection component h_l in Eq. (11) was determined experimentally at Cudo by running subcooled liquid through the copper tube for R-114, C_4F_{10} and C_4F_8, and then correlating that data with a Dittus-Boelter type equation as given below,

$$Nu = \frac{h_l d_i}{k} = c\, Re^{0.8}\, Pr^{0.4} \qquad (13)$$

In this equation, the coefficient **c** is equal to 0.023 for singe-phase flow inside a smooth cylindrical tube. For the tube we used in our experiment, **c** was determined from single-phase liquid flow tests for the three different liquids. The results are shown in figures 20-22. As we can see, both fluids R-114 and C_4F_{10} correlate quite well with equation (13) with **c** = 0.028. This is exactly what one would expect for forced convection since the equation is in terms of dimensionless numbers. The coefficient **c** for C_4F_8 is slightly smaller and is about 0.025. This could be due to change of the surface roughness inside the tube during the course of our tests.

Nucleate Pool Boiling

The nucleate pool boiling term h_{nb} in Eq. (11) was also determined at Cudo by running very low flow in the tube and only using heat flux data from the bottom two zones 2 and 3 [1]. One of the most widely used nucleate boiling correlations for flow boiling presented by Rohsenow [6] was chosen for this study,

$$\frac{C_{Pl}\Delta T}{\lambda\, Pr_l^{1.7}} = C_{wf}\left(\frac{Q/A}{\mu_l \lambda}\sqrt{\frac{\sigma}{g\Delta\rho}}\right)^{0.33} \qquad (14)$$

The coefficient C_{wf} is dependent on the wall-fluid material characteristics and was determined from the pool boiling experiments.

The experimental results for the three different fluids are plotted in figures 23-25 using the Rohsenow [6] correlation Eq. (14) with a logarithmic scale. The line used by Jallouk [2] in his correlation is also shown for reference. Here, again all three fluids correlated the same, with an intercept value of 0.0038025. This number is the experimentally determined value of the coefficient C_{wf} in Eq. (14). It should be noted that in this coordinate system, the lower the line the higher the nucleate boiling coefficient. After the coefficient C_{wf} is determined, the correlation of the nucleate boiling term h_{nb} in Eq. (11) can be obtained from Eq. (14) in the form,

$$h_{nb} = \frac{Q}{A\Delta T} = \left(\frac{k_l^{1.7}}{C_{wf}\,\mu_l^{1.7}\,C_{p_l}^{0.7}}\right)^3 \mu_l \left(\frac{\Delta T}{\lambda}\right)^2 \sqrt{\frac{g\Delta\rho}{\sigma}} \qquad (15)$$

The fact that the predictive correlation is the same for the three different fluids does not mean that the nucleate boiling heat-transfer coefficient is the same. The difference in the physical properties of the fluids will result in different heat-transfer coefficients for the same temperature level and heat flow.

Convective Flow Boiling

With expressions for the convective and nucleate boiling components from Eqs. (13) and (15), one can make predictions for the flow boiling heat-transfer coefficient by employing Eq. (11). From the flow boiling tests at Cudo, the measured flow boiling heat-transfer coefficient also can be determined from the measured heat flux and ΔT. A flow boiling FORTRAN code was written and used for the calculation of the predicted and measured heat-transfer coefficients. All of the experimental data and calculated results for the flow boiling tests were set up in EXCEL spreadsheets.

Figures 26-29 show the comparison between the predicted and measured flow boiling heat transfer coefficients for R-114 at 125, 150, 175 and 200 °F with heat fluxes of 10,000, 15,000, 20,000, and 25,000 btu/hr/ft^2. An exact match would follow the 45-degree solid line. The same

information for C_3F_8 and C_3F_{10} are shown in figures 30-37. Here the data was taken at 125, 150, 175 and 190 °F, in the heat flux range of 5.000 to 20,000 btu/hr/ft^2. For all three fluids the liquid mass flux was varied from $0.2*10^6$ to $1.0*10^6$ lbm/hr/ft^2. Note, from these figures, that the correlation predicts the experimental results well. In general, the correlation consistently over predicts the experimental data at the lower saturation temperatures. The difference between the predicted and measured **h** for most of the R-114 and C_4F_{10} data fall within ± 25%, and ± 30% for C_3F_8. All the figures clearly show that the predicted coefficient is largely unaffected by changes in liquid mass flux and axial position (local quality) along the length of the tube. Part of the horizontal spread shown in the figures is attributed to uncertainty in the experiment.

It should be noted that the flow boiling heat-transfer correlation has not been adjusted based on the actual flow boiling test data from Cudo. Only the forced convection and in-tube pool boiling data have been used. This implies that this correlation can provide good prediction for in-tube flow boiling as long as pool boiling and forced convection data are available.

Figures 38 to 41 give comparison of predicted flow boiling heat-transfer coefficients for three different liquids with saturation temperatures of 125, 150, 175 and 190 °F. Heat-transfer coefficients under dry-out conditions were not presented in these figures. As we mentioned earlier, the predicted heat-transfer coefficient is largely unaffectedly by changes in liquid mass flux and axial position along the tube. Thus, we only present the coefficients with a typical mass flux of 0.52 lbm/hr/ft^2 at section 5 [1]. These figures show that the flow boiling heat-transfer coefficient is strongly dependent on the heat flux and the saturation temperature. The higher the heat flux and saturation temperature, the higher is the heat-transfer coefficient obtained. From these comparisons, we find that the heat-transfer coefficients for C_4F_{10} and C_4F_8 are about the same but much higher than that for R-114.

Critical Heat flux

The critical heat flux (CHF) is the maximum upper limit of heat flux at which a system can be operated normally without dryout. In exceeding this limit, the system will experience a rapid increase in wall temperature and sharp decrease in heat transfer effectiveness. The dry-out crisis

occurs in flow boiling when the number of vapor bubbles close to the wall coalesce to form an insulating vapor blanket thus impeding the contact of liquid with the wall and dropping the heat-transfer coefficient drastically. Then if the heat flux is held steady a steep increase in wall temperature is realized.

For flow boiling, CHF is strongly dependent on the mass flowrate and latent heat of the working fluid. In the present flow boiling tests, dryout was initiated within the last zone of the test section after the applied heat flux exceeded the CHF. When the heat flux was increased further, the dryout proceeded to advance upstream. In other words, dryout will occur earlier with higher heat flux. When CHF conditions were imminent the heat flux to the affected section was reduced to prevent any excessive temperatures.

A practical way to present CHF for the flow boiling is the critical heat flux versus the dry-out location of the tube. Figures 42-53 show the results from our CHF tests for the three different liquids. In general, dryout occurs earlier for the lower flowrate and higher heat flux. In comparing the CHF characteristics of the three different liquids, R-114 always is the one to dryout the latest and C_4F_{10} is the one to dryout the earliest under the same flow and heat flux conditions.

Pressure Drop

For two-phase flows inside a tubes, the gravitational, frictional, and acceleration components contribute to the pressure drop and all three must be taken into account. Two different models are generally used in predicting pressure drop for two-phase flows. They are the homogeneous and the separated flow models. The homogeneous model considers the two-phase flow as a single-phase flow possessing mean fluid properties. On the other hand, the separated flow model considers the two-phase flow to be artificially segregated into two streams; one of liquid and one of vapor. In the homogeneous model, each stream is assumed to travel at a mean velocity. In the case when a very large percentage of the two-phase flow inside a tube is annular in nature, the application of a separated flow model will yield results better than those obtained by the homogeneous model.

In this study, the separated flow model presented by Martinelli-Nelson [16,17] was adopted for pressure drop prediction. In the Martinelli-Nelson model [16,17], the two phases are assumed to be separate. The pressure drop is defined by Equation (2-46) of Collier's [18] as given below,

$$-\left(\frac{dp}{dz}\right) = -\left(\frac{dp}{dz}\right)_F + G^2\frac{d}{dz}\left[\frac{x^2 v_g}{\alpha} + \frac{(1-x)^2 v_l}{(1-\alpha)}\right] + g\left[\alpha \rho_g + (1-\alpha)\rho_l\right] \qquad (16)$$

The three terms contribute to the friction, acceleration, and gravitational pressure drop, respectively. These three pressure drop components are calculated using the Martinelli-Nelson model [16,17] in each section of the test tube. In the experiment, pressure drops with intervals of 2, 4, 6, 8 and 9.88 feet from the inlet of the test section were measured by five differential pressure transducers. The pressure readings from the differential pressure transducers were corrected for elevation of the pressure tap lines. The corrected pressure drop was then converted to the equivalent elevation of the liquid column at the operating saturation temperature.

All of the measured and predicted pressure drops were listed in EXCEL spreadsheets. Figures 54 to 54 present the comparison between the predicted and measured pressure drop along the test section for the three different liquids. As we can see from these figures, the Martinelli-Nelson model [16,17] consistently and slightly over predicts the measured pressure drop.

CONCLUSIONS

Forced convection, pool and flow boiling tests were run using R114, C_4F_{10} and C_4F_8 to determine the heat-transfer coefficient, CHF and pressure drop. A correlation for **h** based on a flow convective and pool boiling model proved to predict the measured flow boiling **h** within 30%. The dryout length under conditions of CHF increased with heat flux and reduction in flow rate. A pressure drop correlation, based on a separated flow model, slightly but consistently overpredicted the measured results.

ACKNOWLEDGEMENTS

This work was performed for Martin Marietta Energy Systems, Inc., under contract # 11K-NR559C. Thanks are due to Dr. Shin Park, Andy Szady, David Lannom and Prof. Louis Chow, for their technical help and discussions. Thanks are also due to Jon Curless, Gregory Mayes, Matthew McMillin, Tom Nett, E.B. Yates, Gregory Patrick, Larry Patrick, and Walter Cooper for their assistance at various stages of the project.

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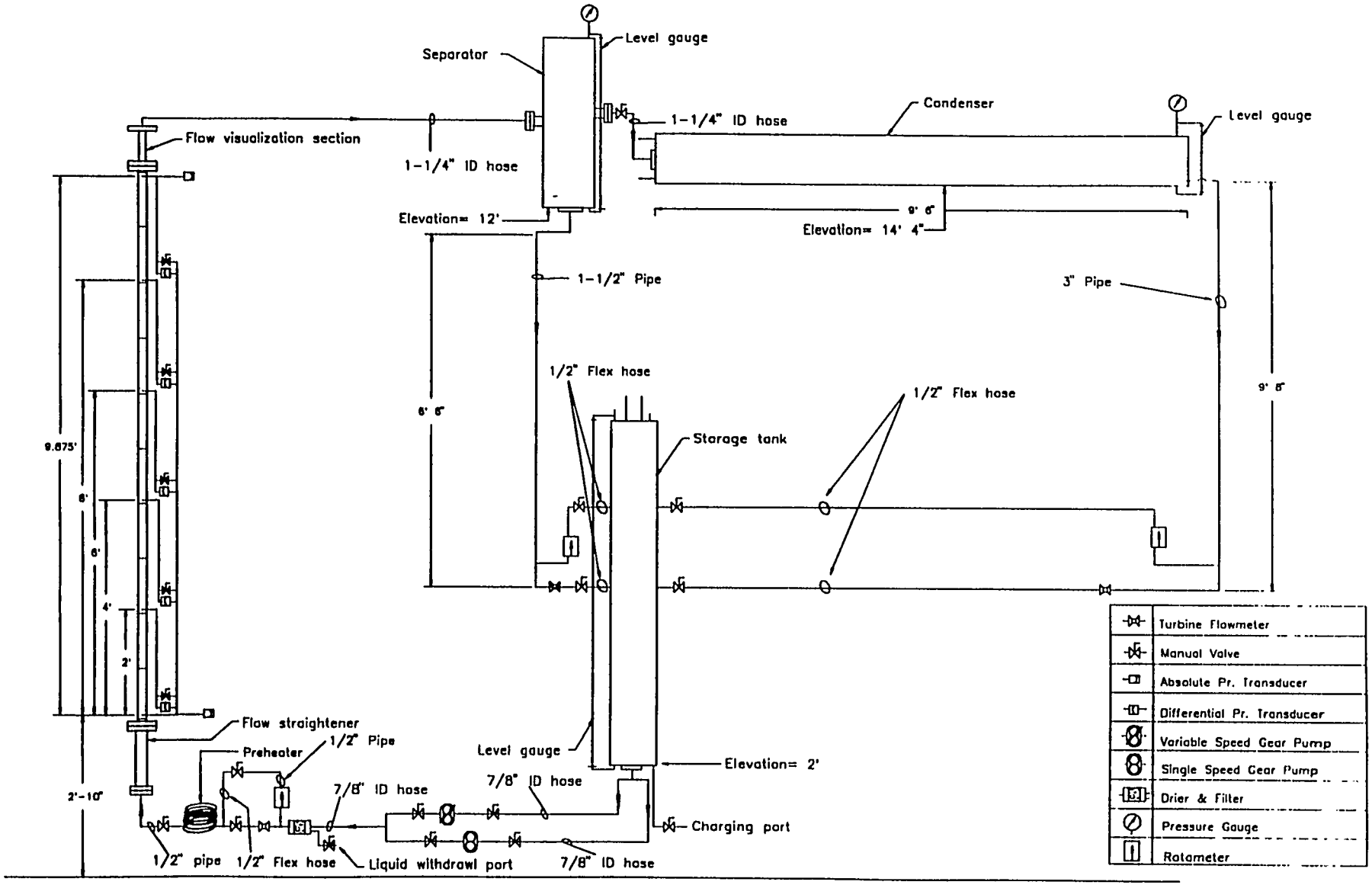
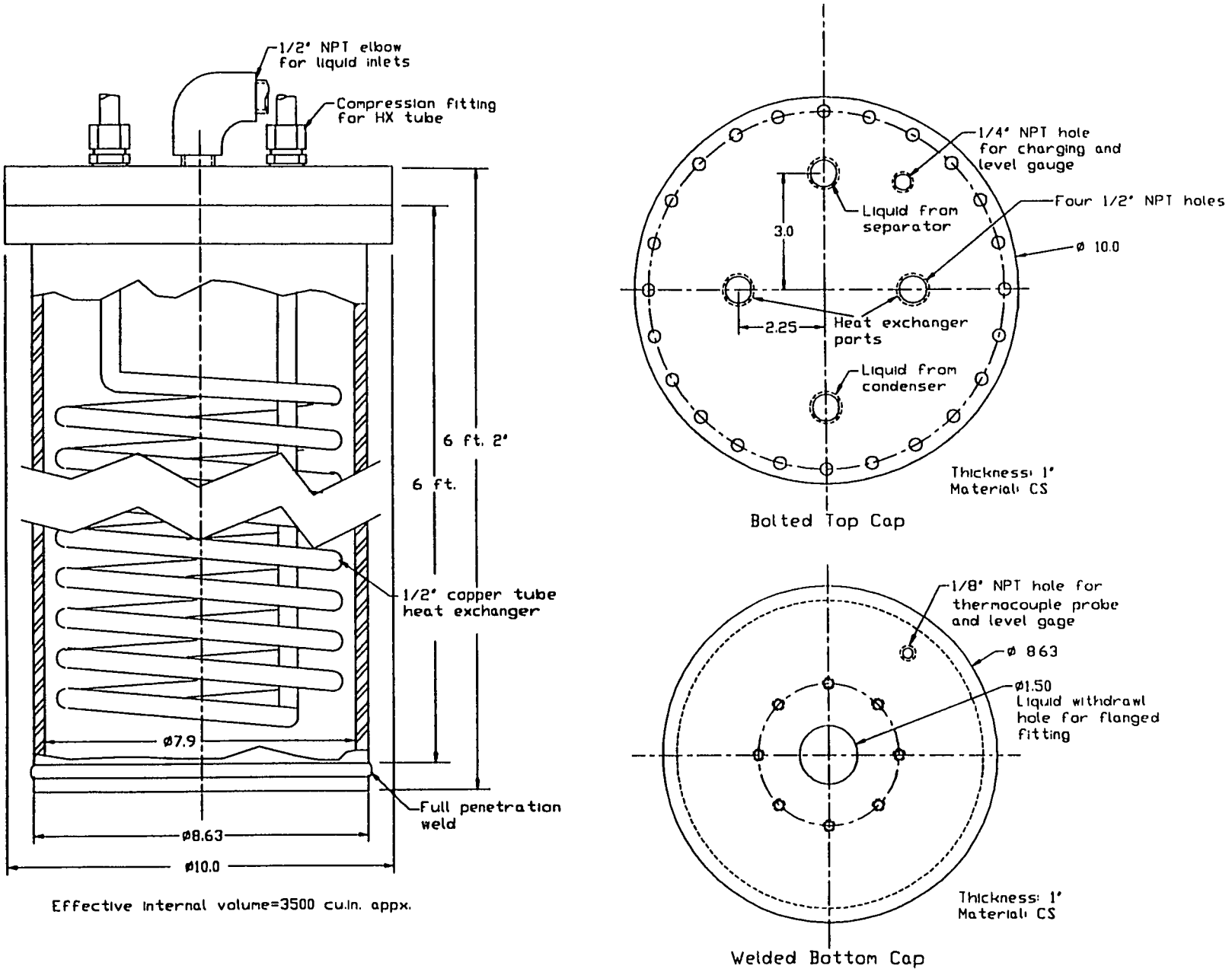
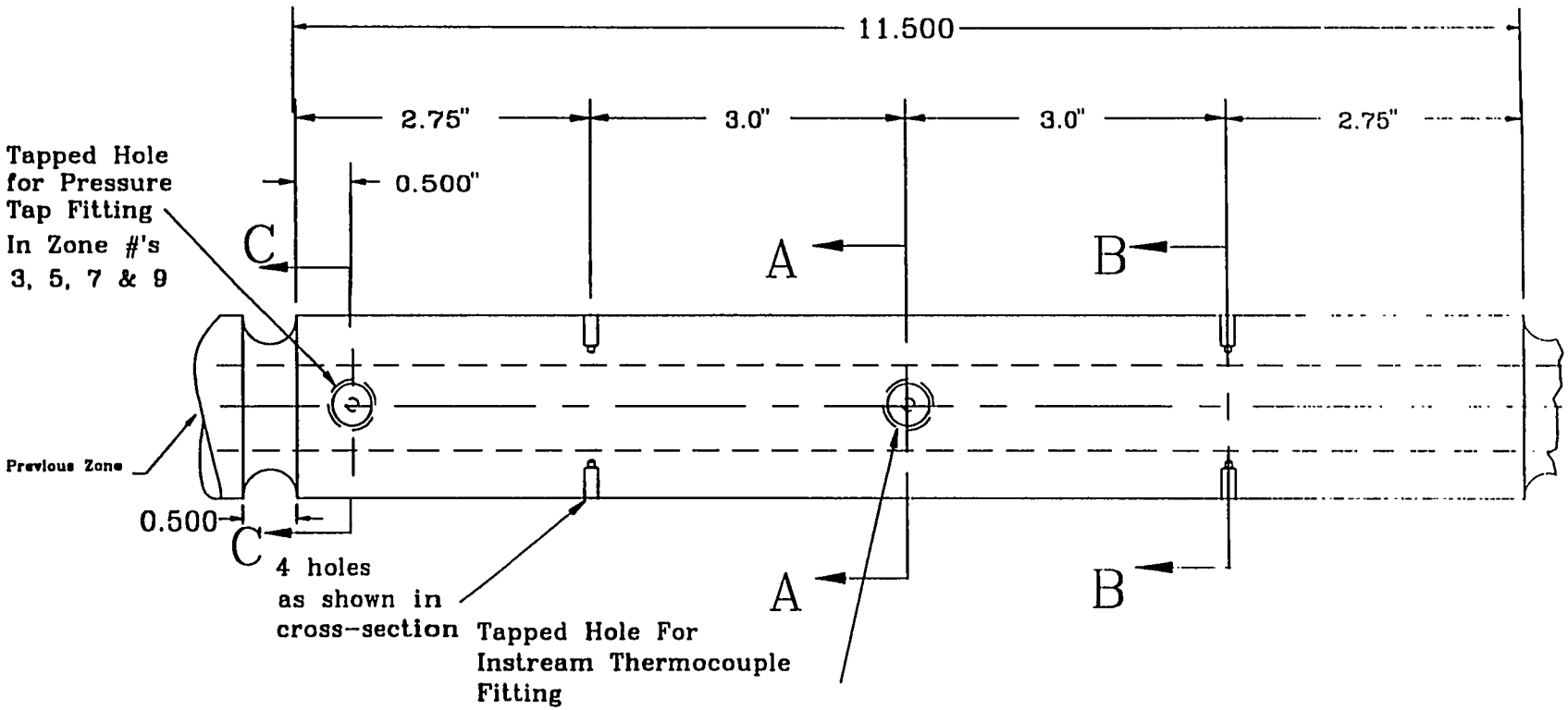


Figure 1. Test Fluid Loop



Storage Tank- Assembly and Caps

Figure 2.



Details of Zone 2 thru 9

Figure 3.

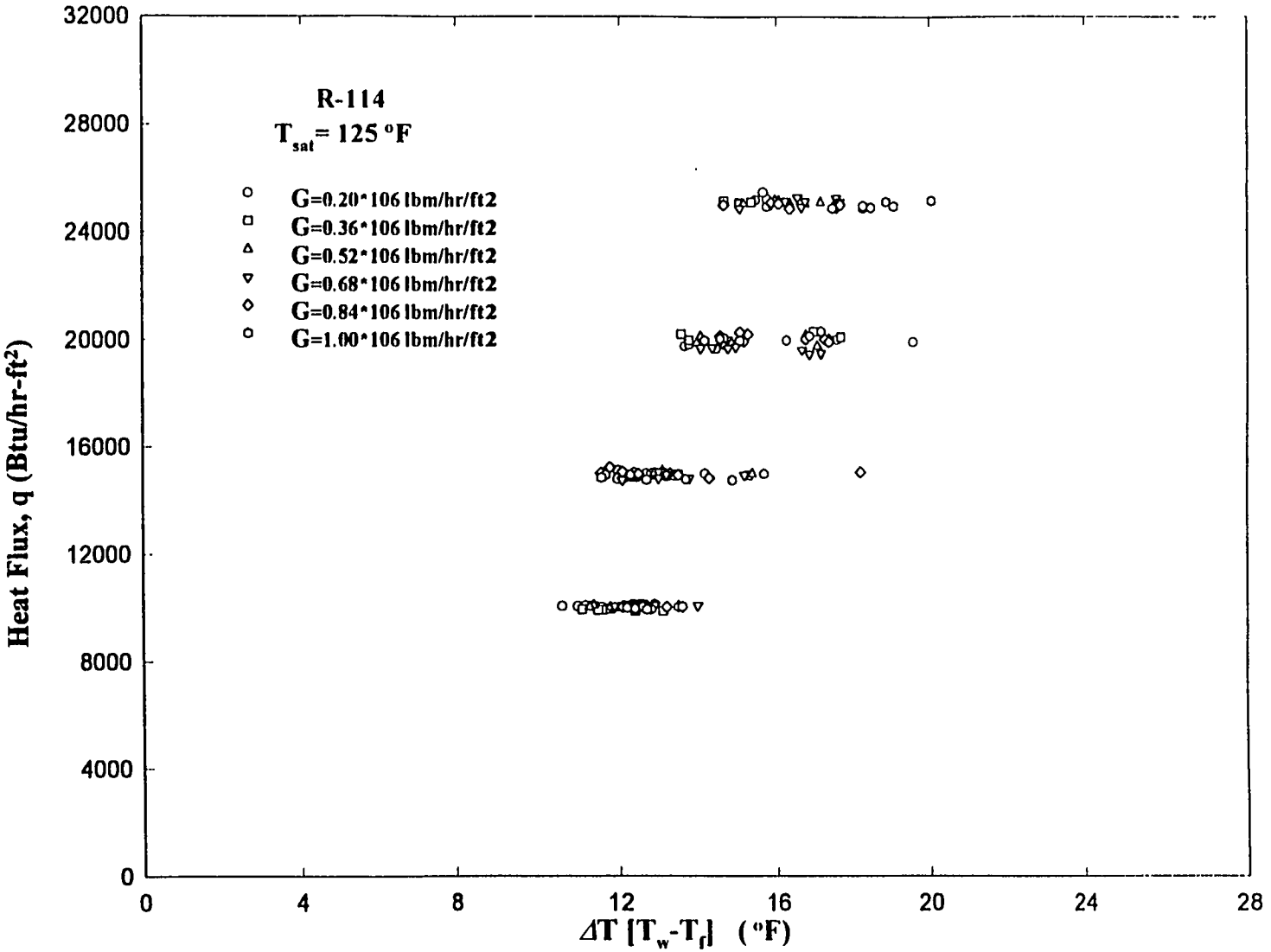


Figure. 4 Heat Flux Versus the Wall-to-instream Temperature Difference for R-114 at T_{sat}=125 °F

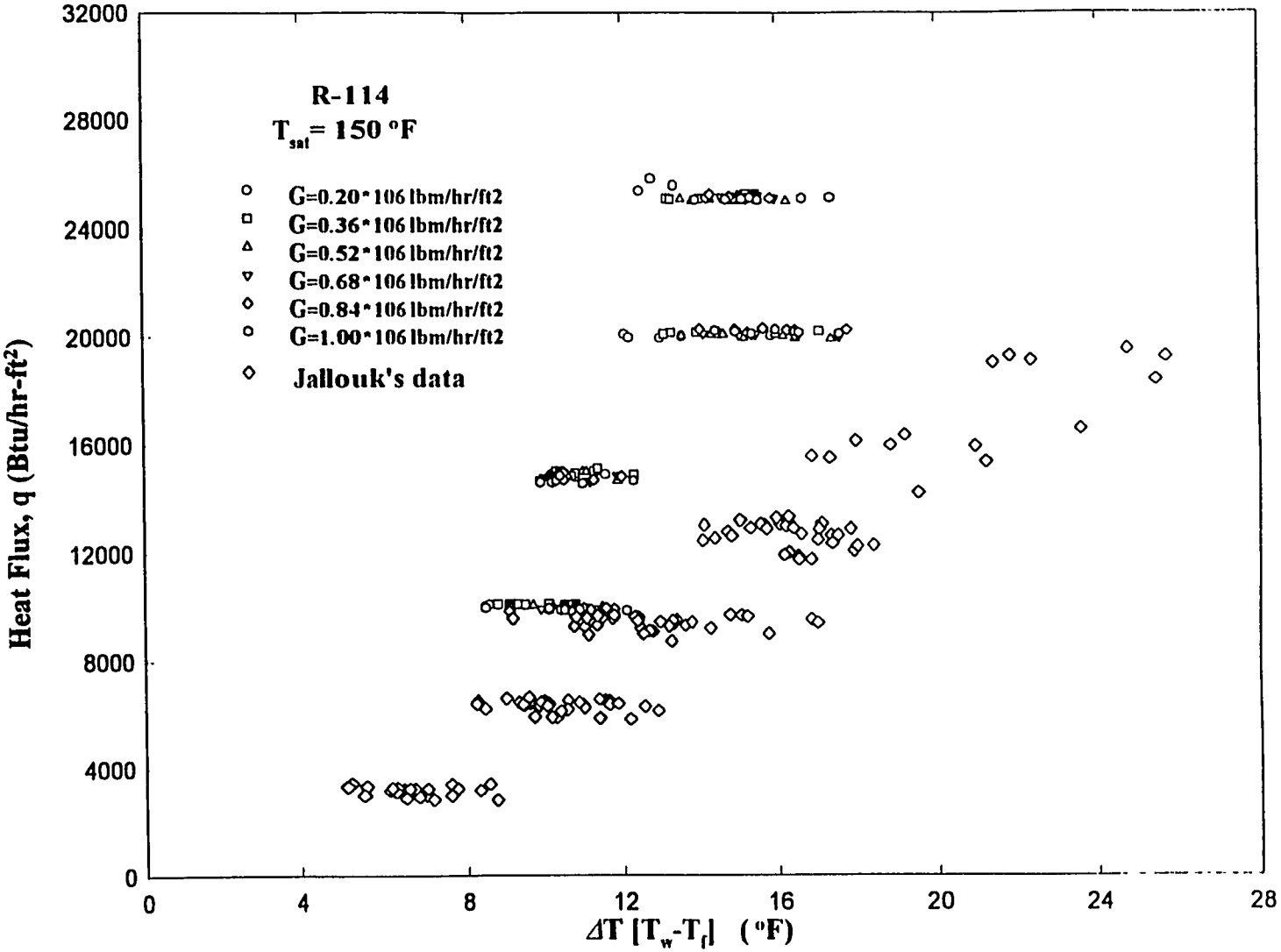


Figure 5. Heat Flux Versus the Wall-to-instream Temperature Difference for R-114 at T_{sat}=150 °F

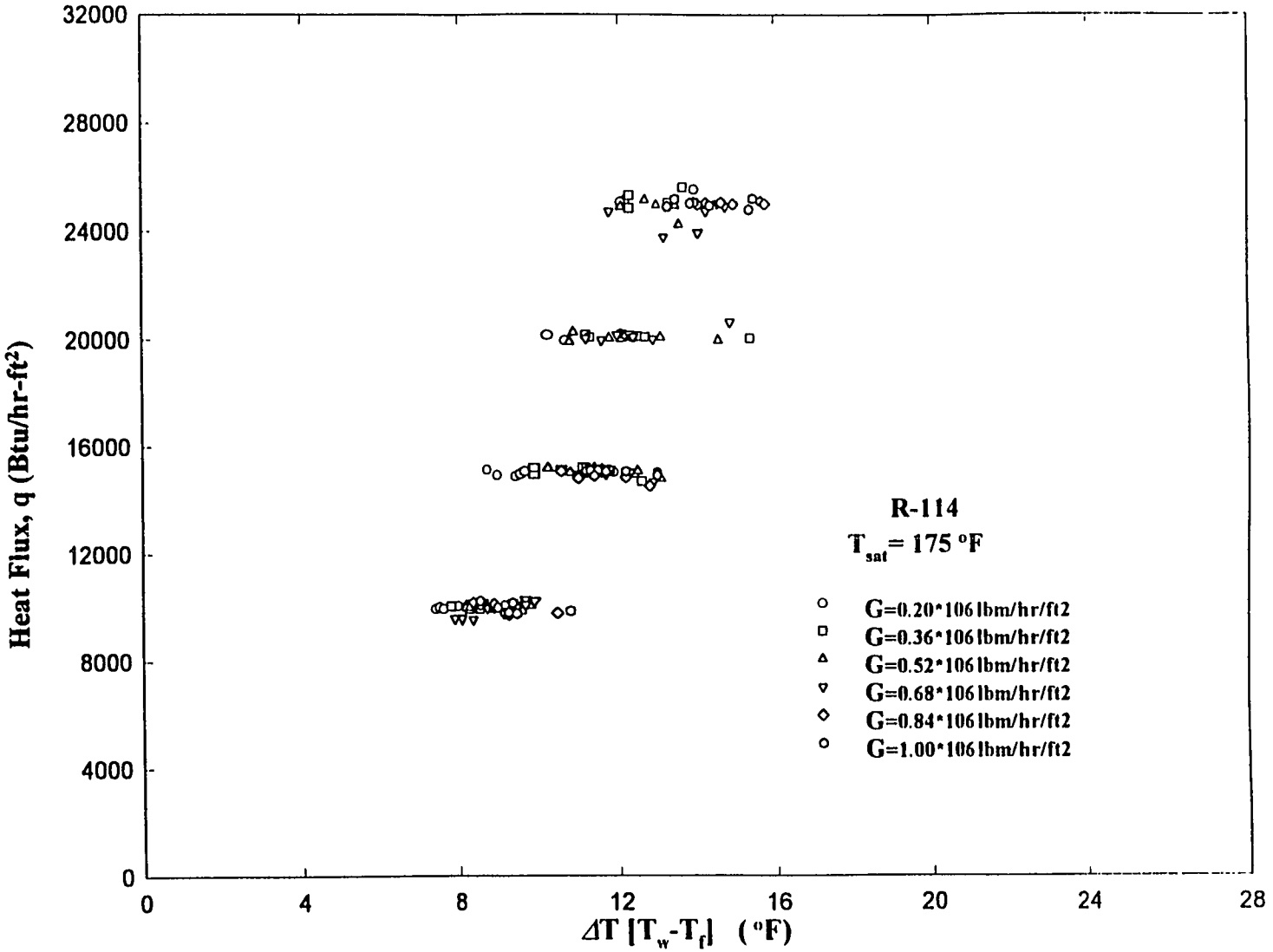


Figure 6. Heat Flux Versus the Wall-to-instream Temperature Difference for R-114 at T_{sat}=175 °F

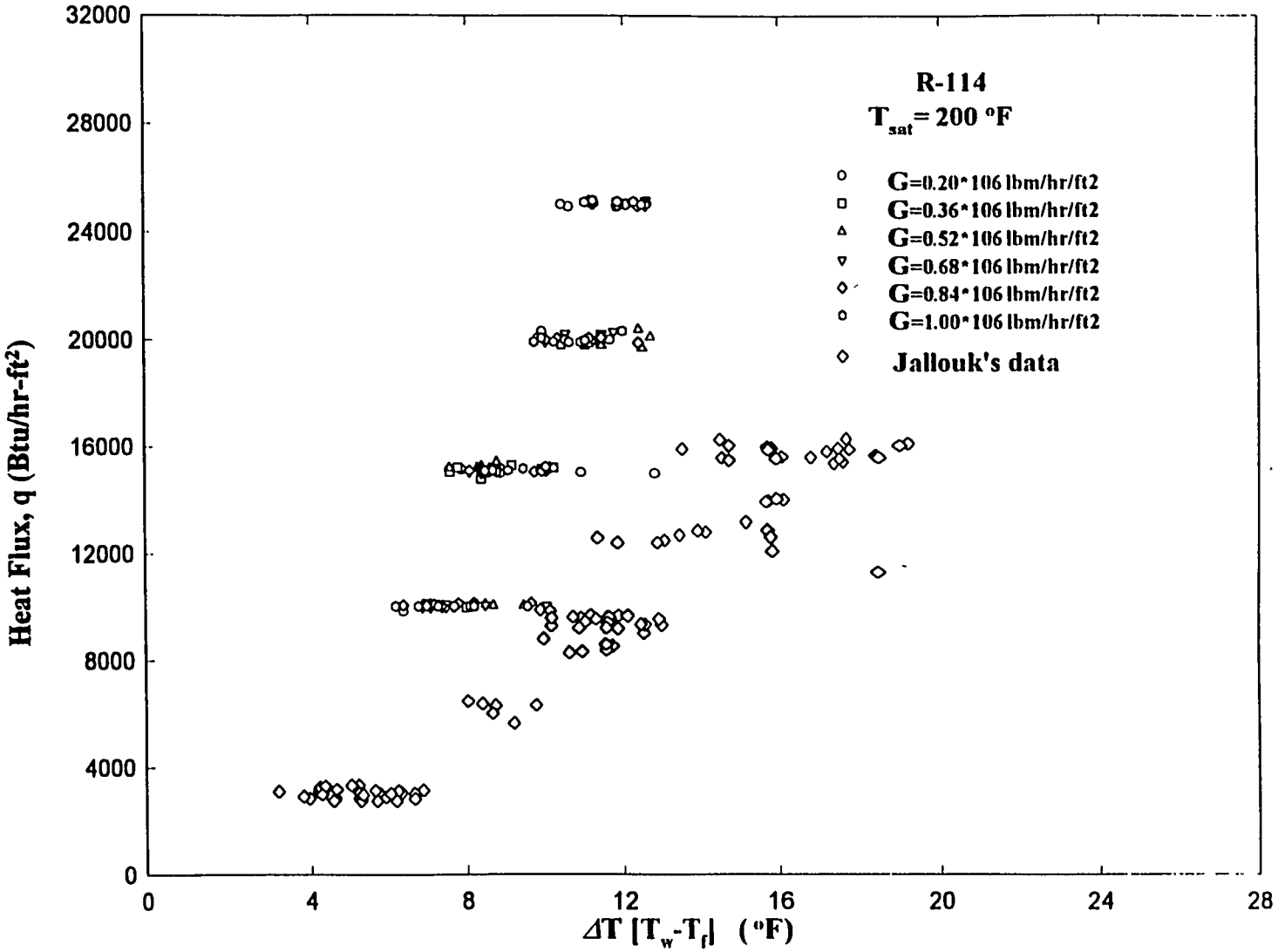


Figure 7. Heat Flux Versus the Wall-to-instream Temperature Difference for R-114 at T_{sat}=200 °F

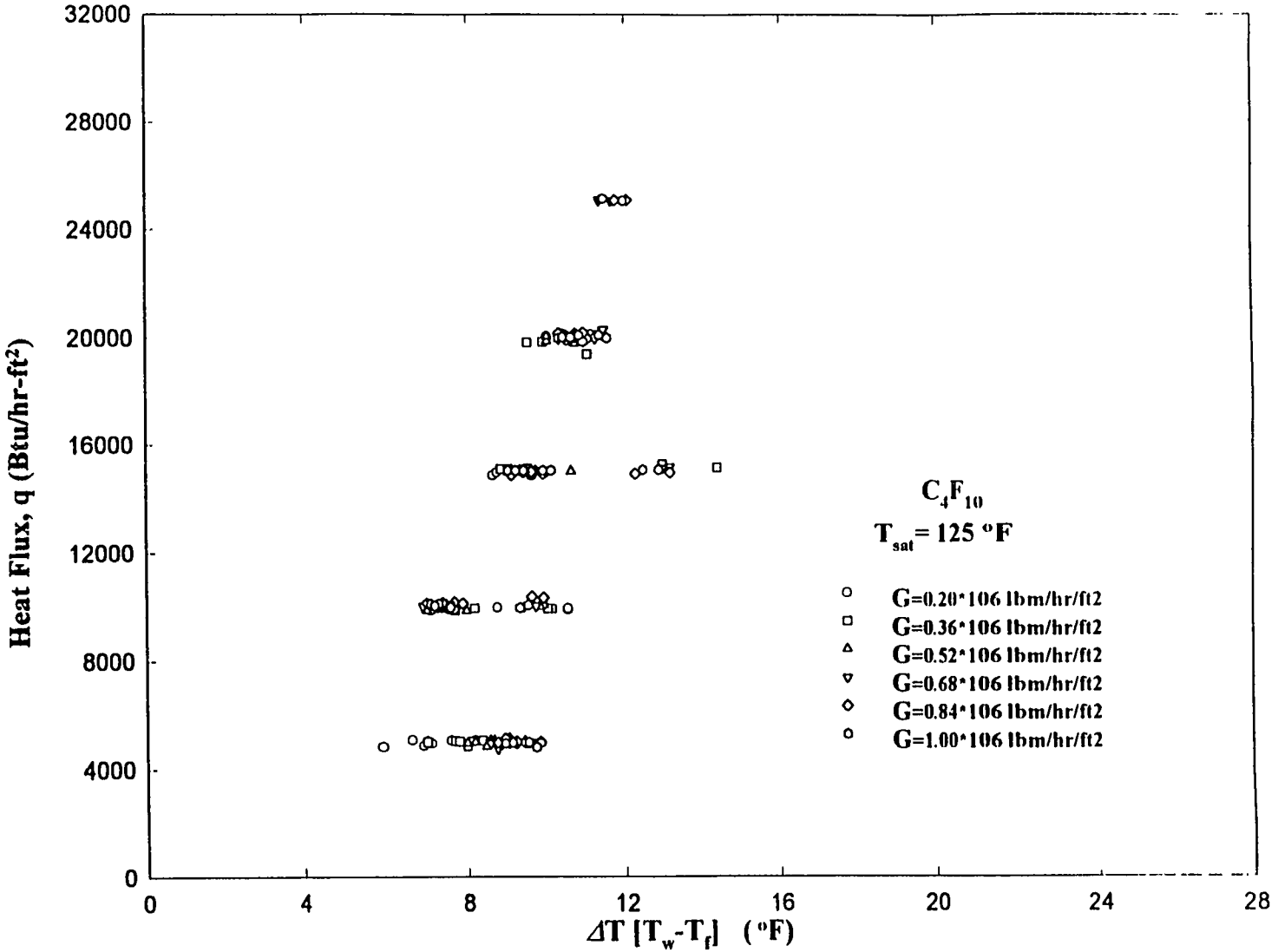


Figure 8. Heat Flux Versus the Wall-to-instream Temperature Difference for C_4F_{10} at T_{sat}=125 °F

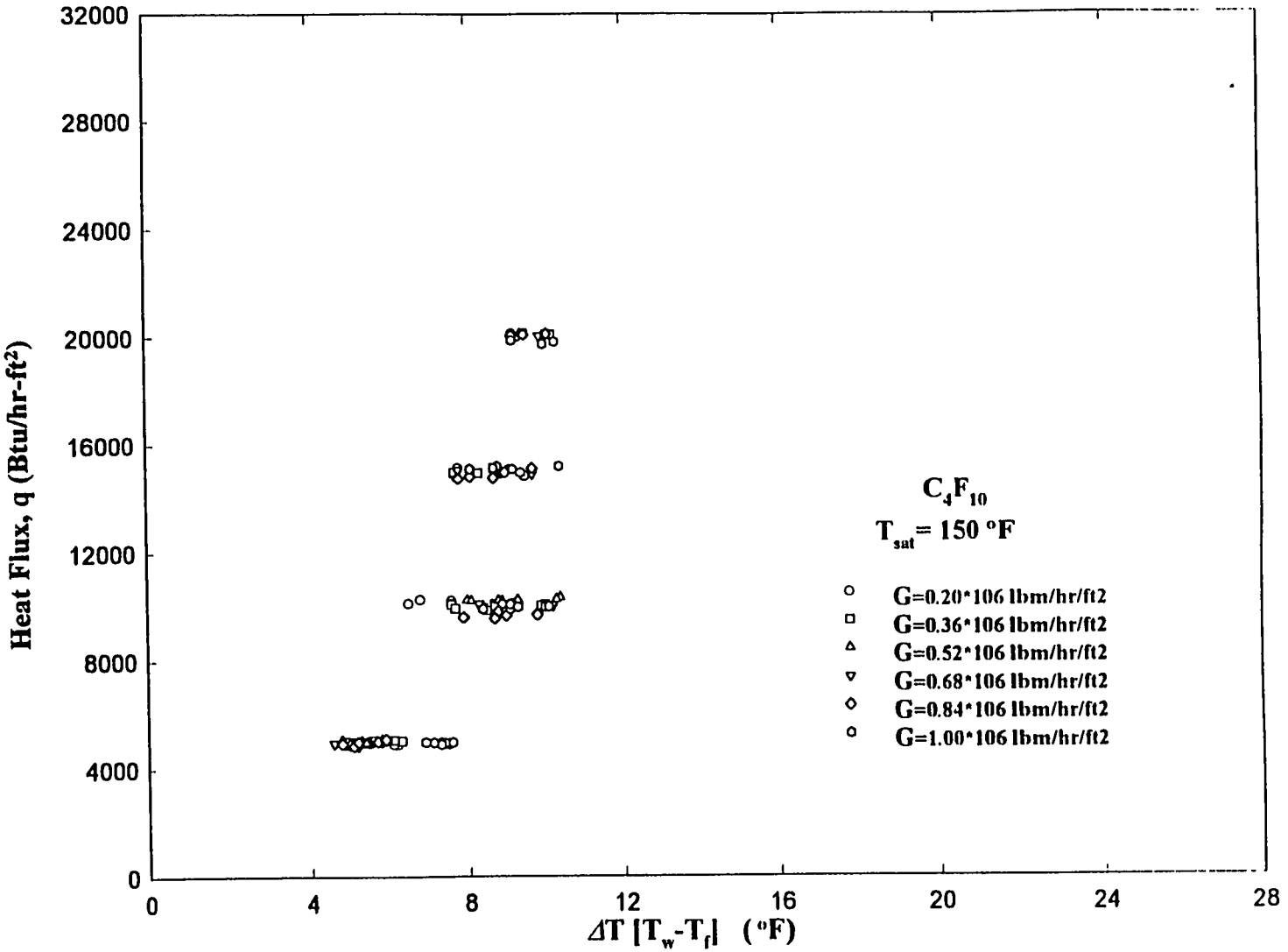


Figure 9. Heat Flux Versus the Wall-to-instream Temperature Difference for C_4F_{10} at T_{sat}=150 °F

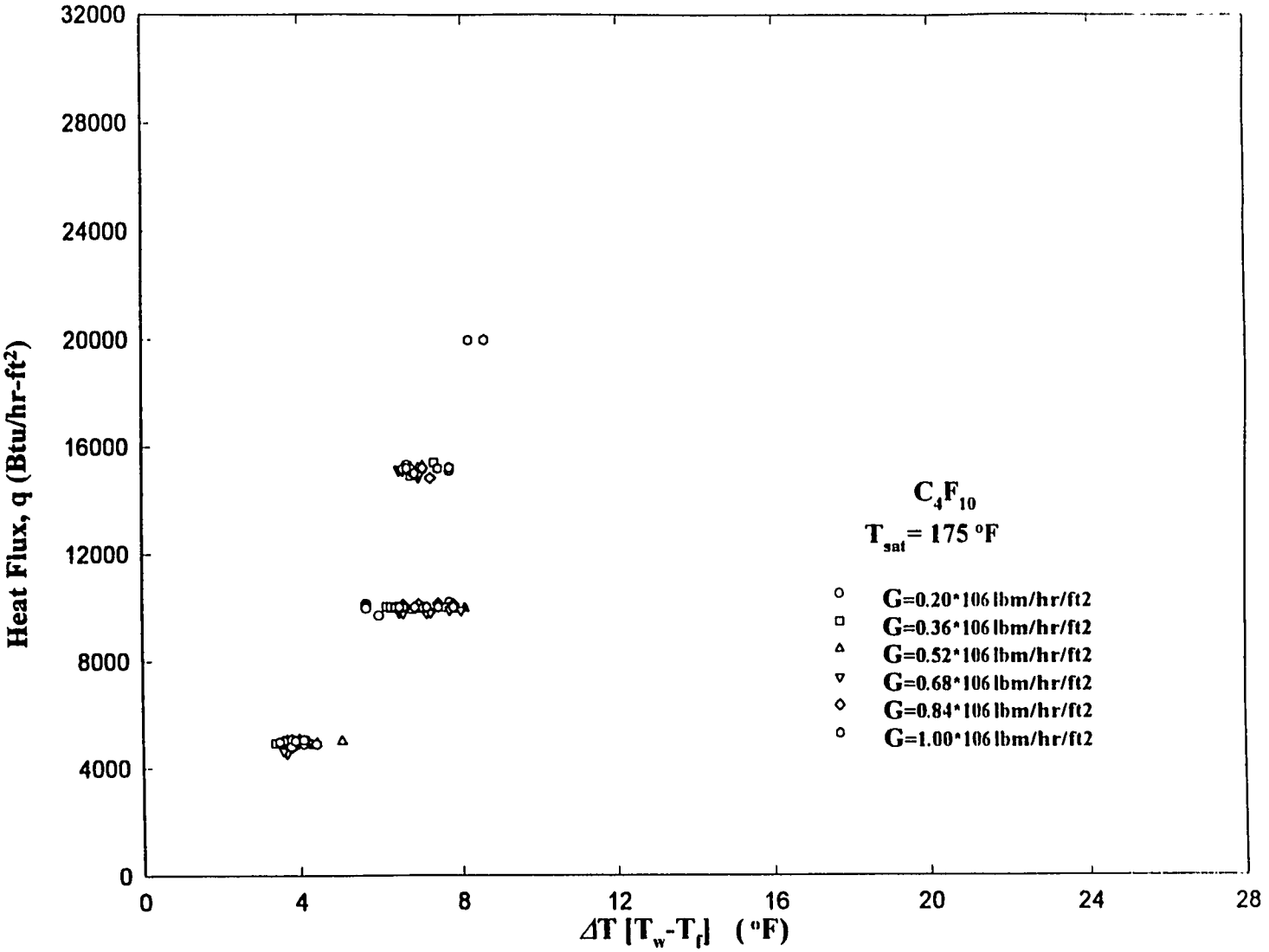


Figure 10. Heat Flux Versus the Wall-to-instream Temperature Difference for C_4F_{10} at T_{sat}=175 °F

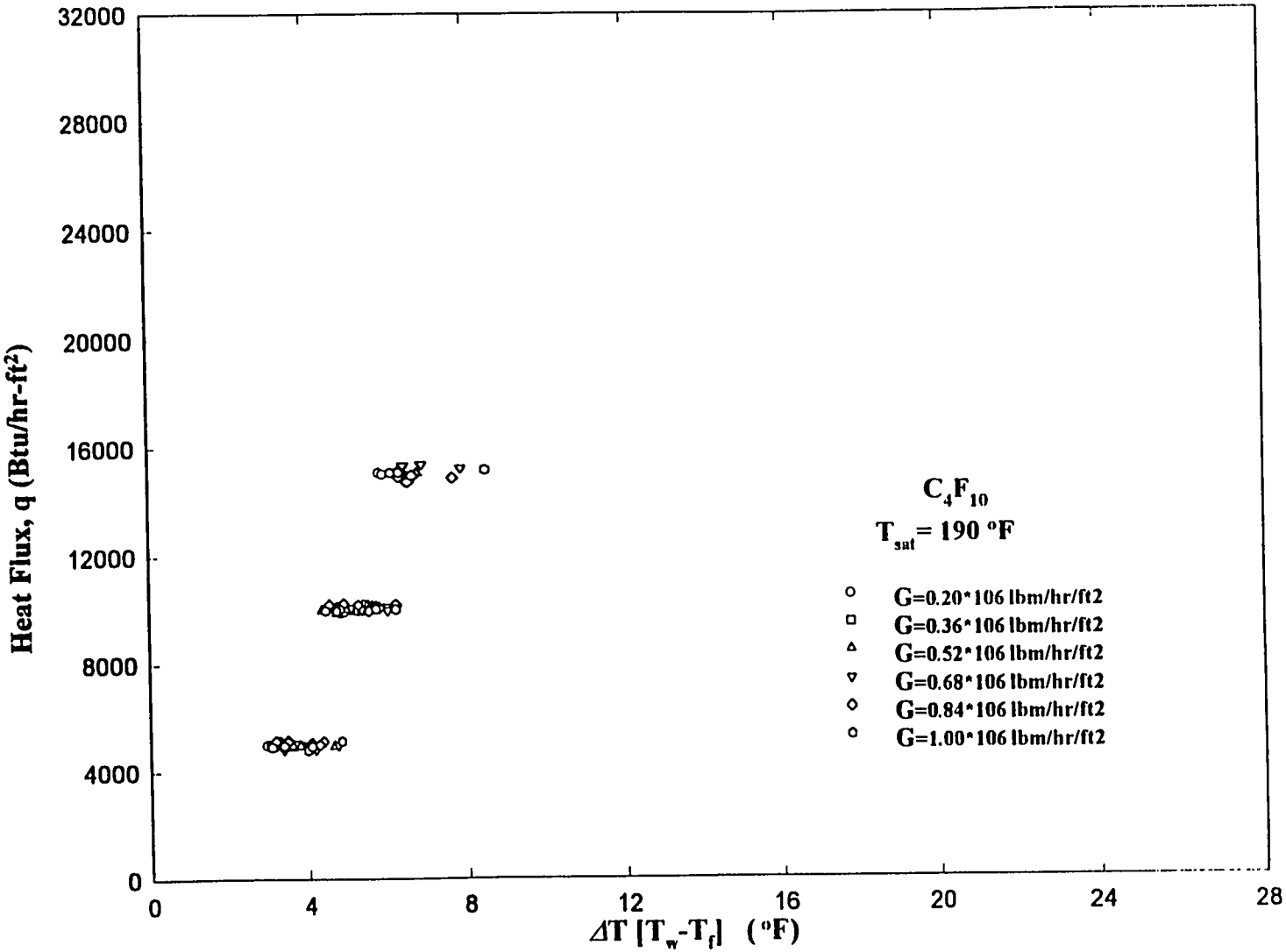


Figure 11. Heat Flux Versus the Wall-to-instream Temperature Difference for C_4F_{10} at T_{sat}=190 °F

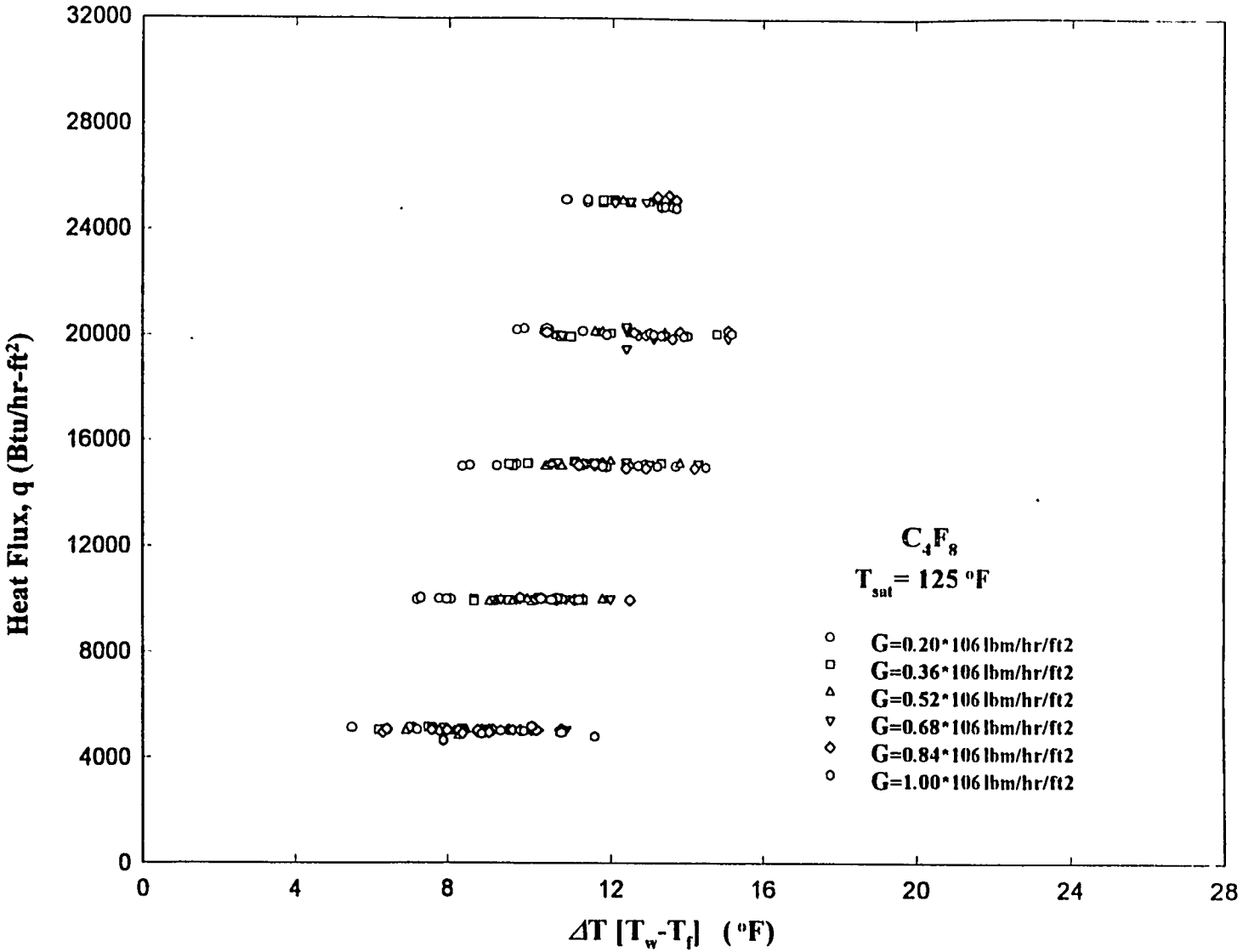


Figure 12. Heat Flux Versus the Wall-to-instream Temperature Difference for C_4F_8 at T_{sat}=125 °F

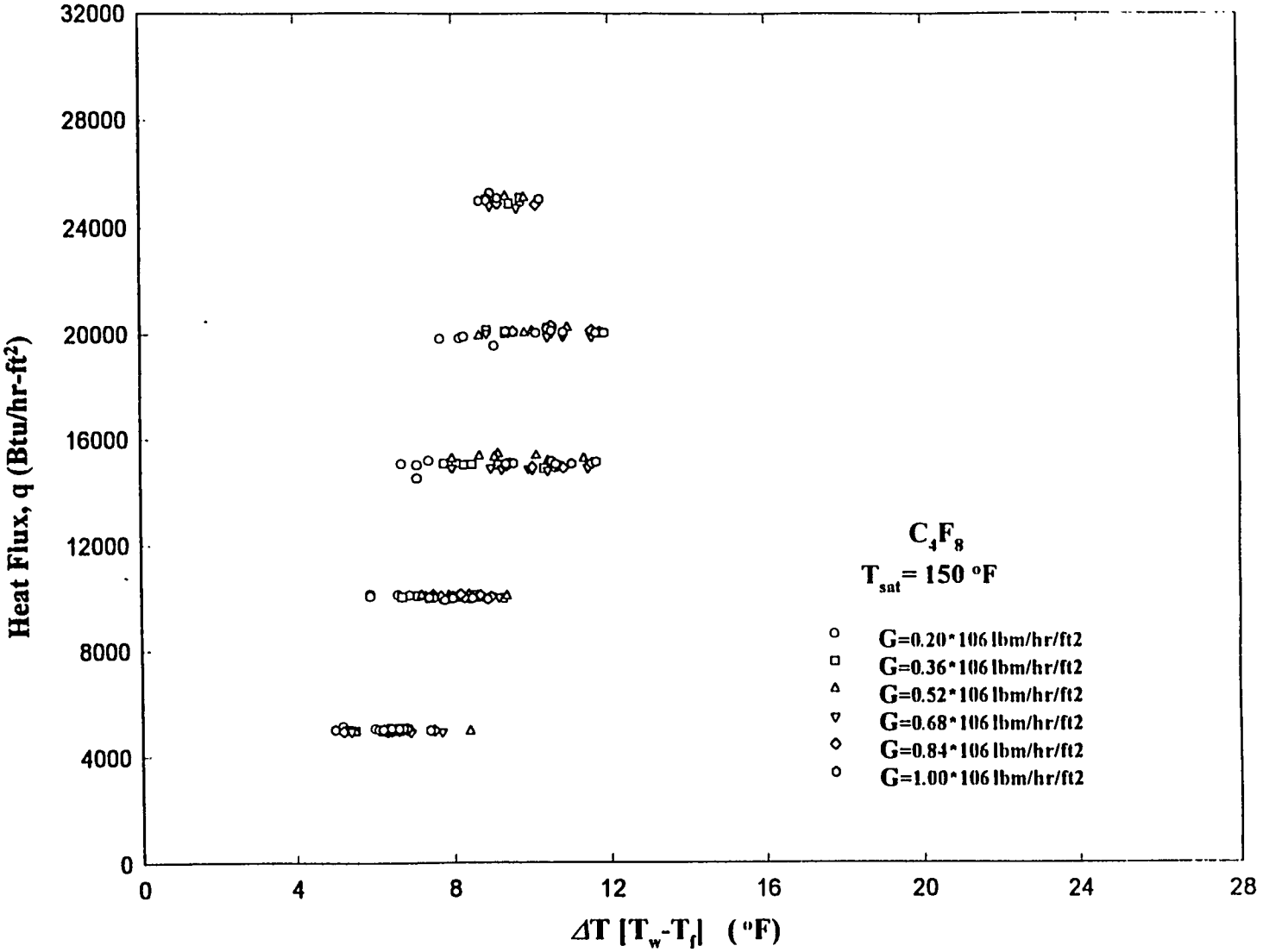


Figure 13. Heat Flux Versus the Wall-to-instream Temperature Difference for C_4F_8 at T_{sat}=150 °F

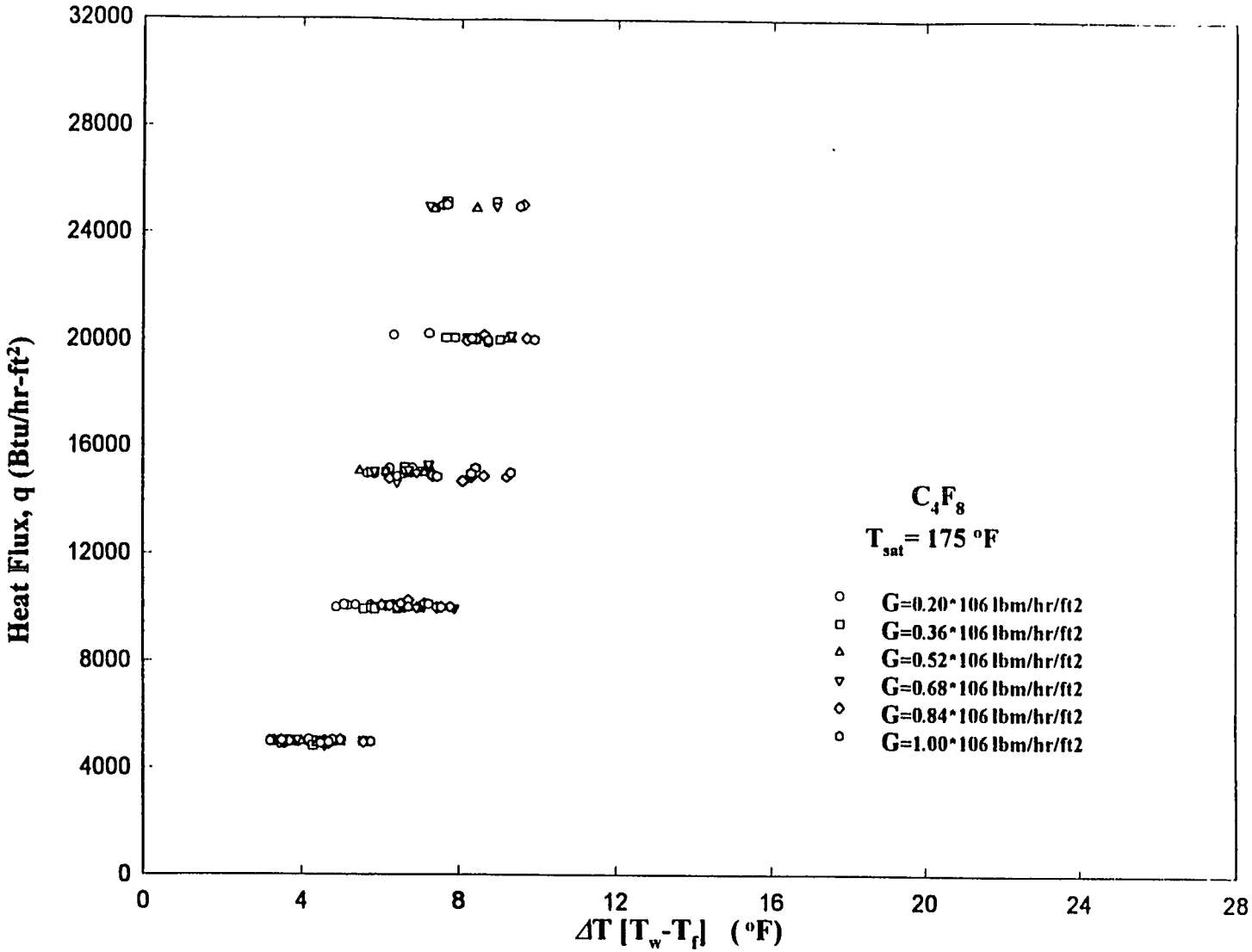


Figure 14. Heat Flux Versus the Wall-to-instream Temperature Difference for C_4F_8 at T_{sat}=175 °F

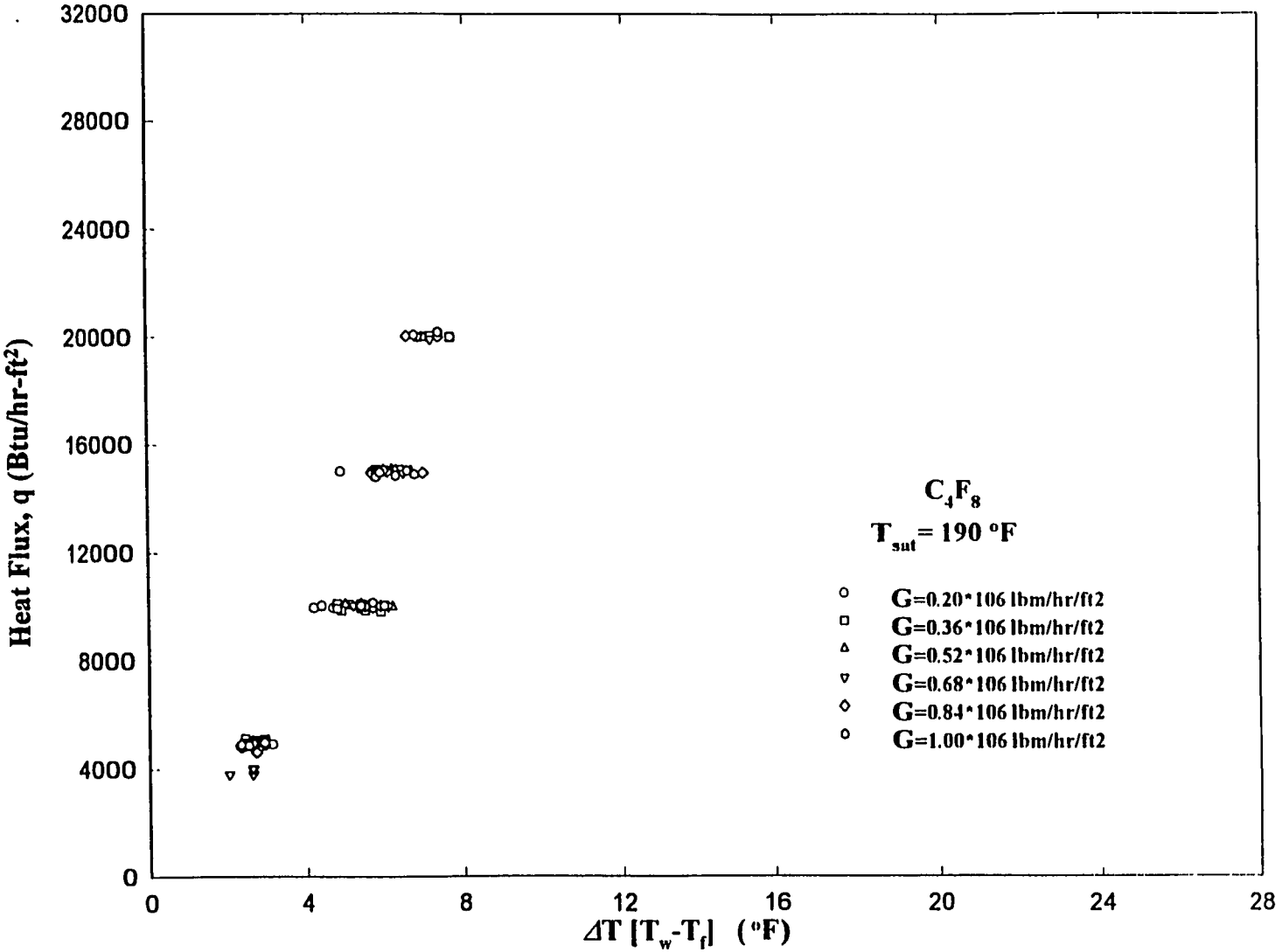
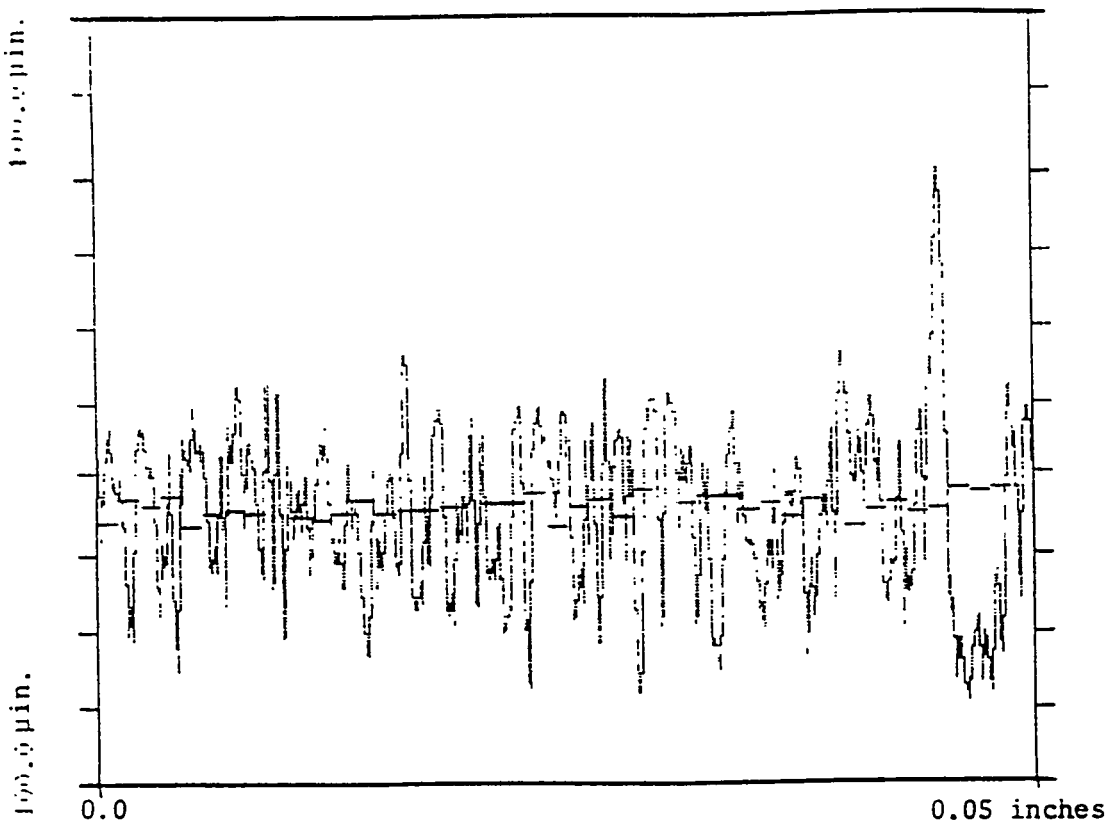
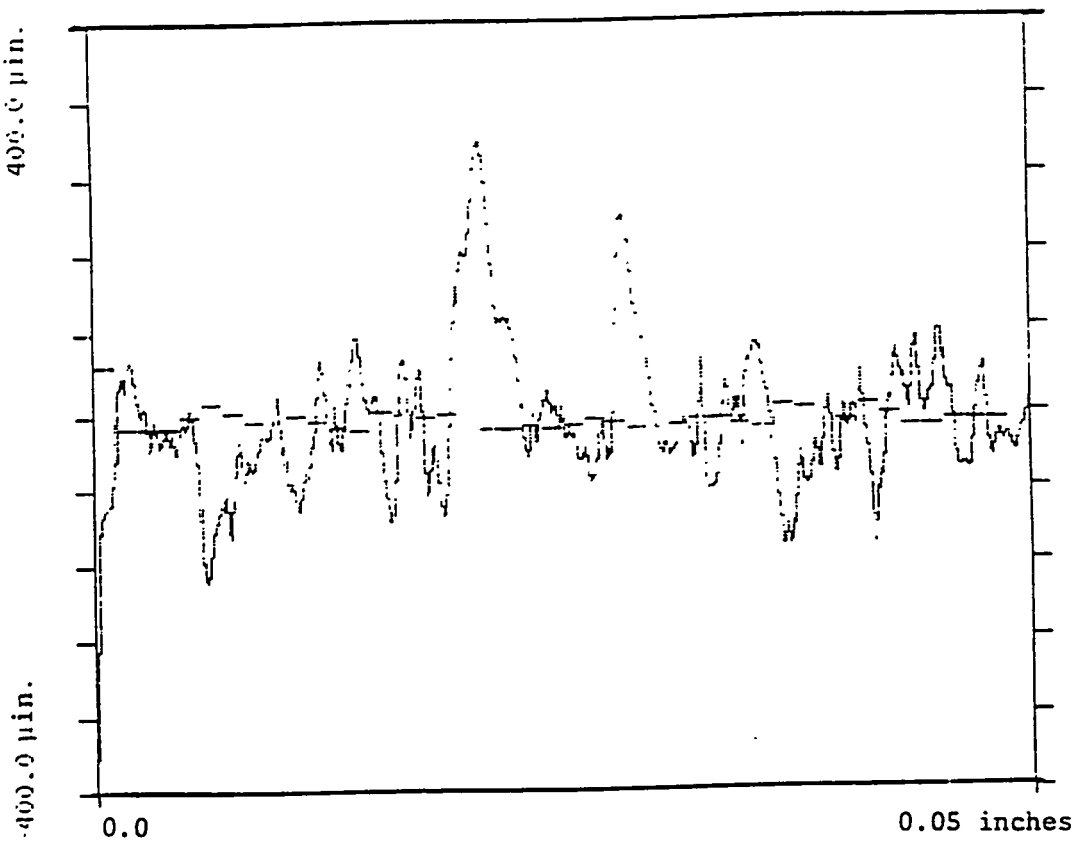


Figure 15. Heat Flux Versus the Wall-to-instream Temperature Difference for C_4F_8 at T_{sat}=190 °F



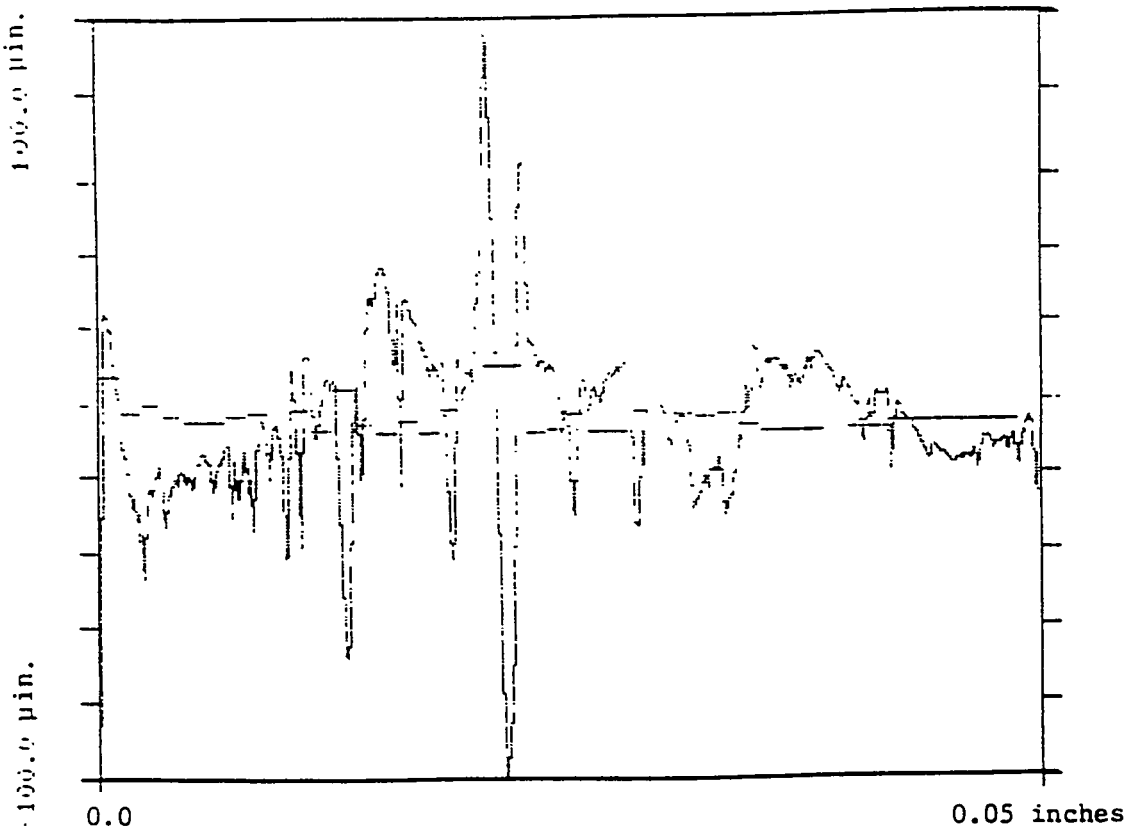
New Test Section Roughness Profile

Figure 16.



Old Test Section Roughness Profile

Figure 17.



1/2" Copper Tube Roughness Profile

Figure 18.

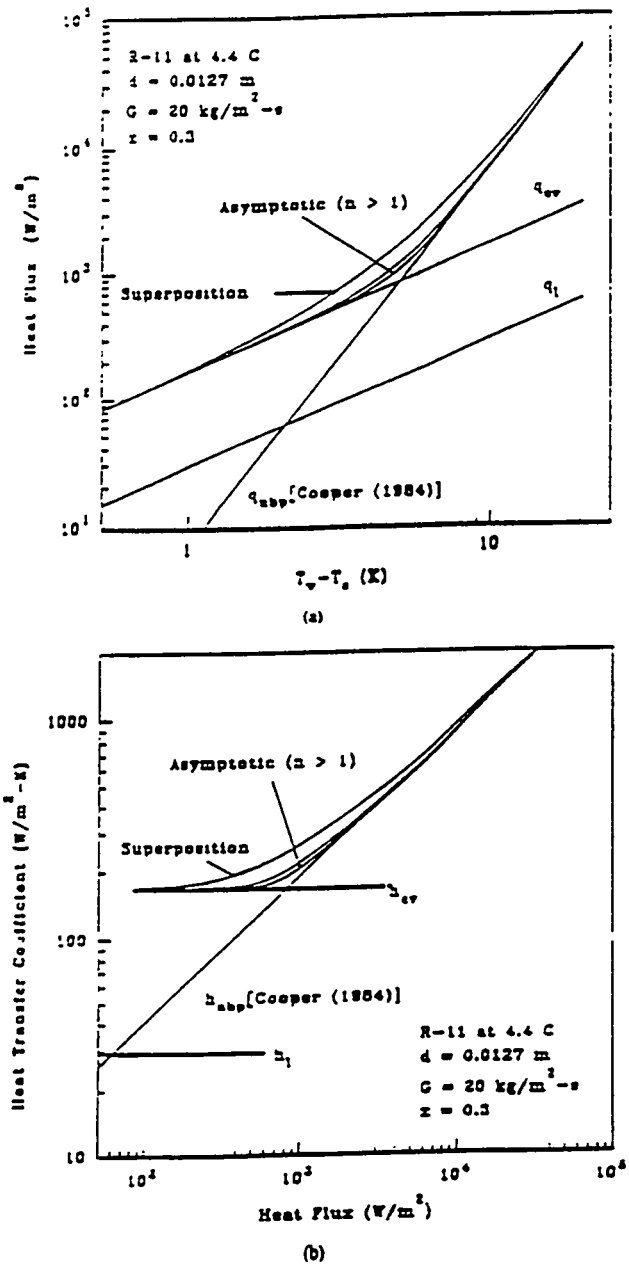


Figure 19. (a) Superposition and Asymptotic Models in the form q vs. ΔT.
(b) Superposition and Asymptotic Models in the form h vs. q (from Ref. 7)

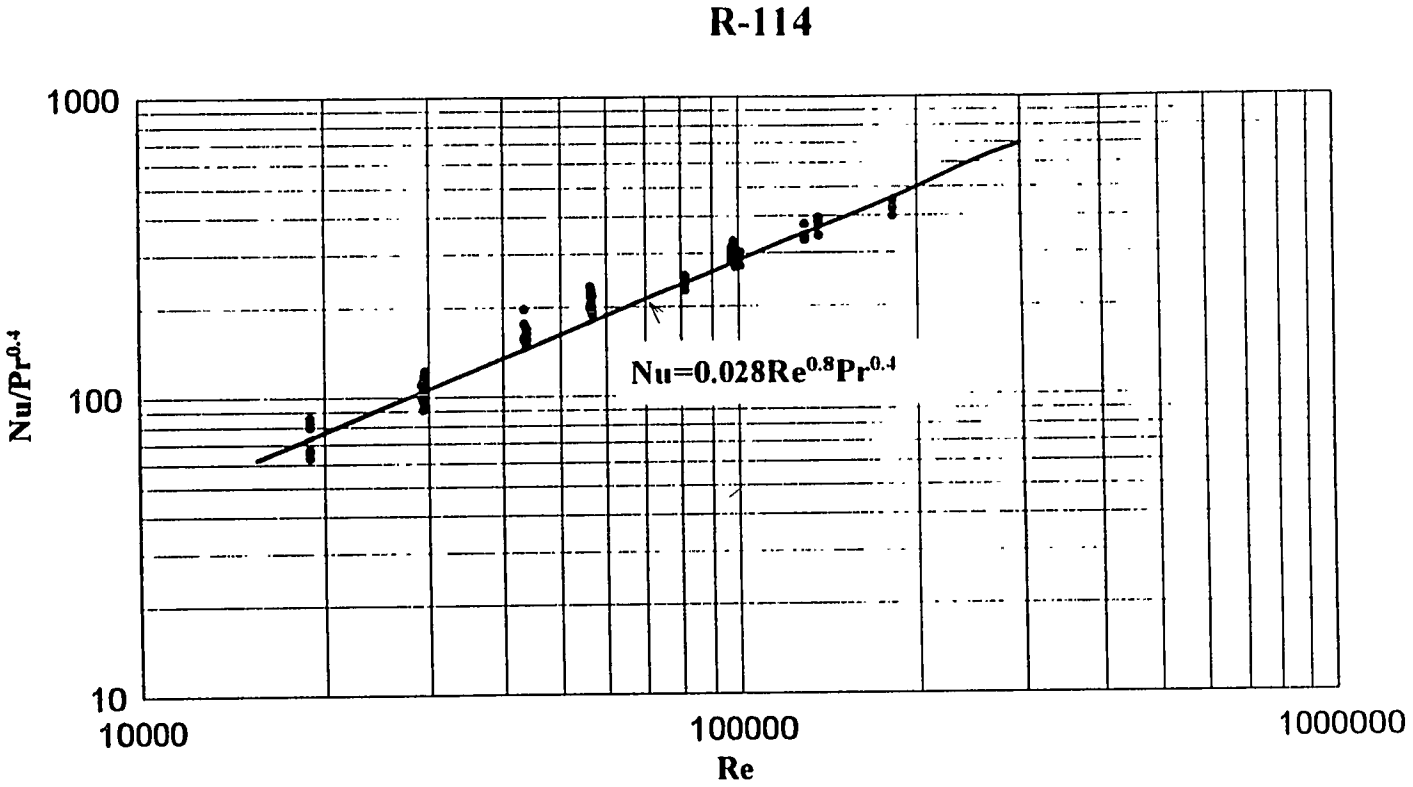


Figure 20. Correlation of Forced Convection for R-114

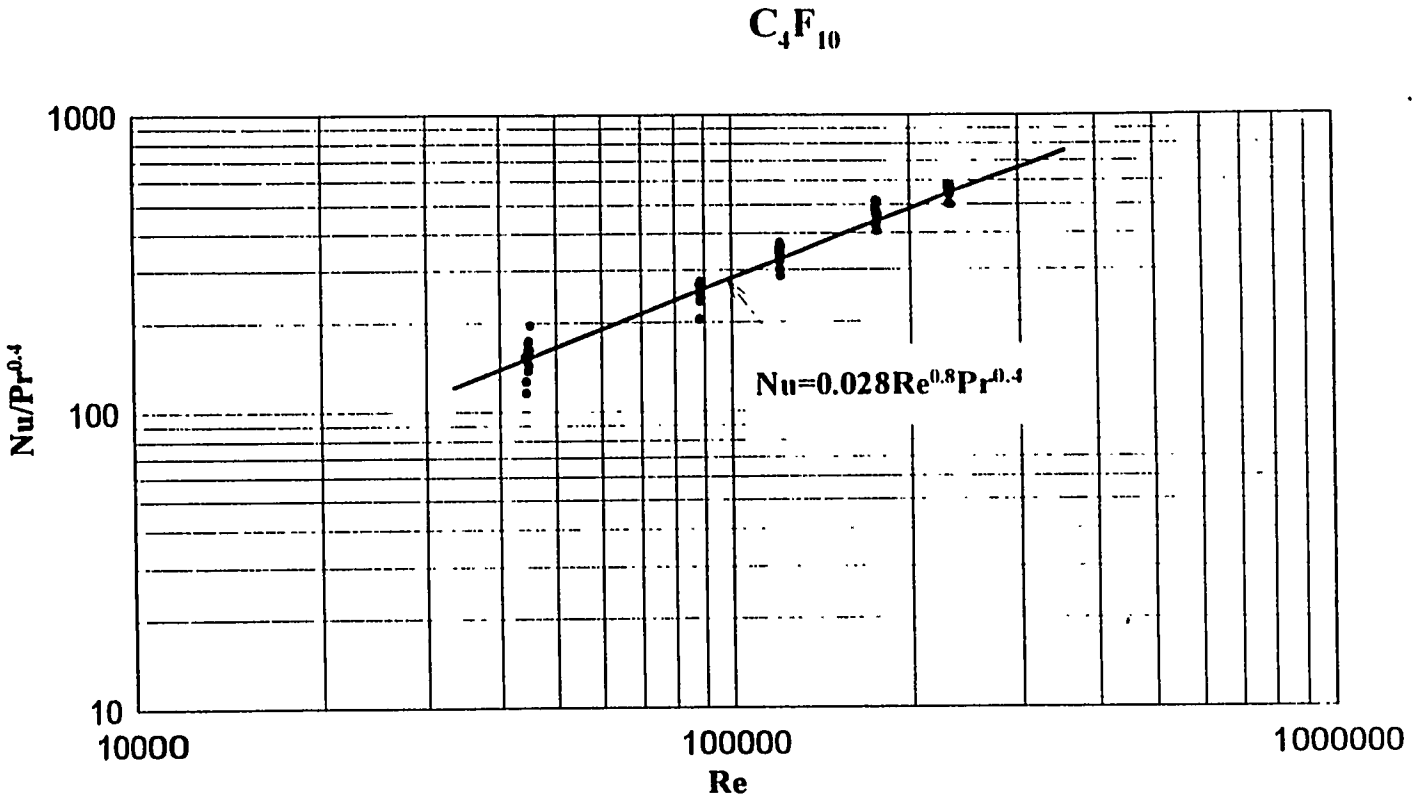


Figure 21. Correlation of Forced Convection for C_4F_{10}

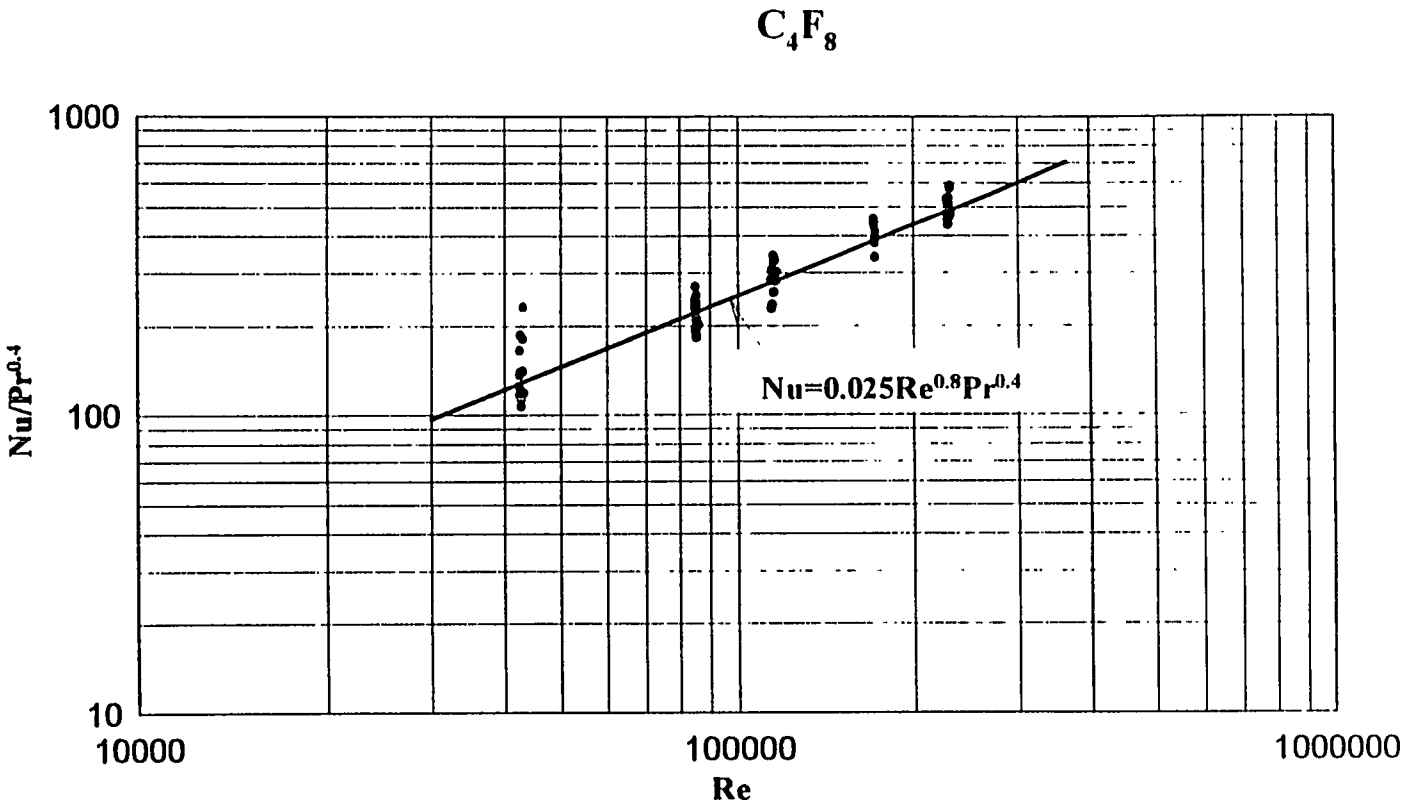


Figure 22. Correlation of Forced Convection for C_4F_8

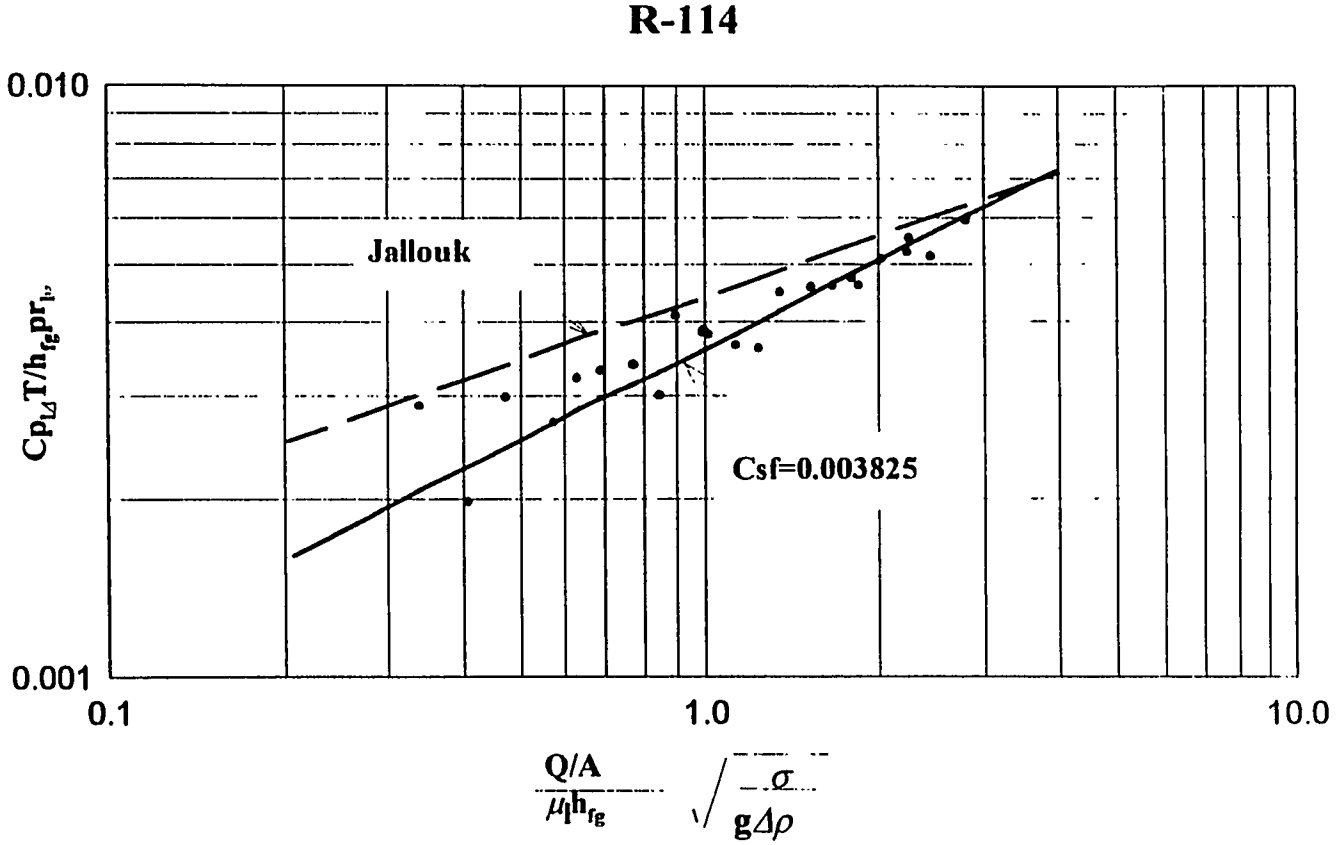


Figure 23. Correlation of Nucleate Pool Boiling for R-114

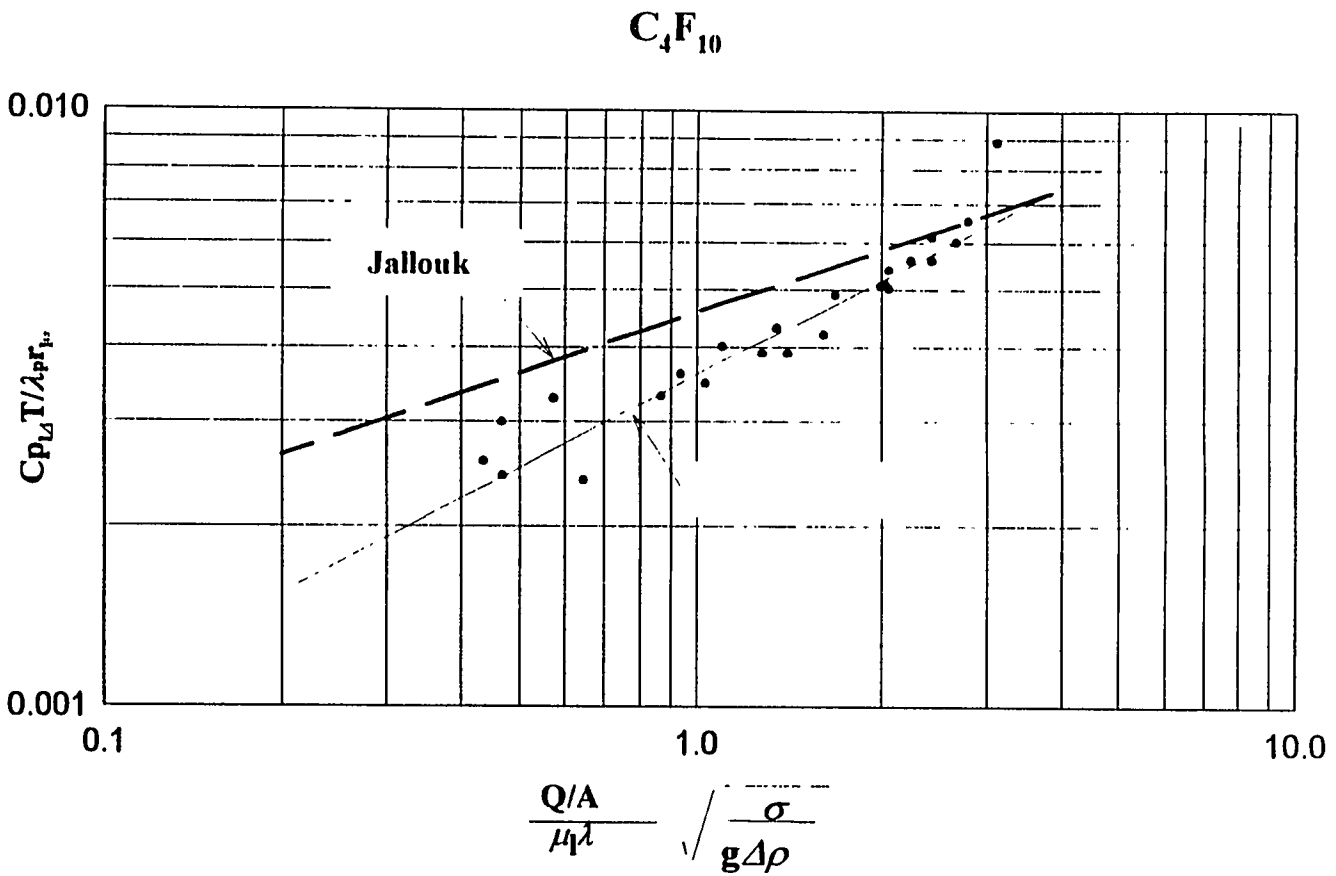


Figure 24. Correlation of Nucleate Pool Boiling for C_4F_{10}

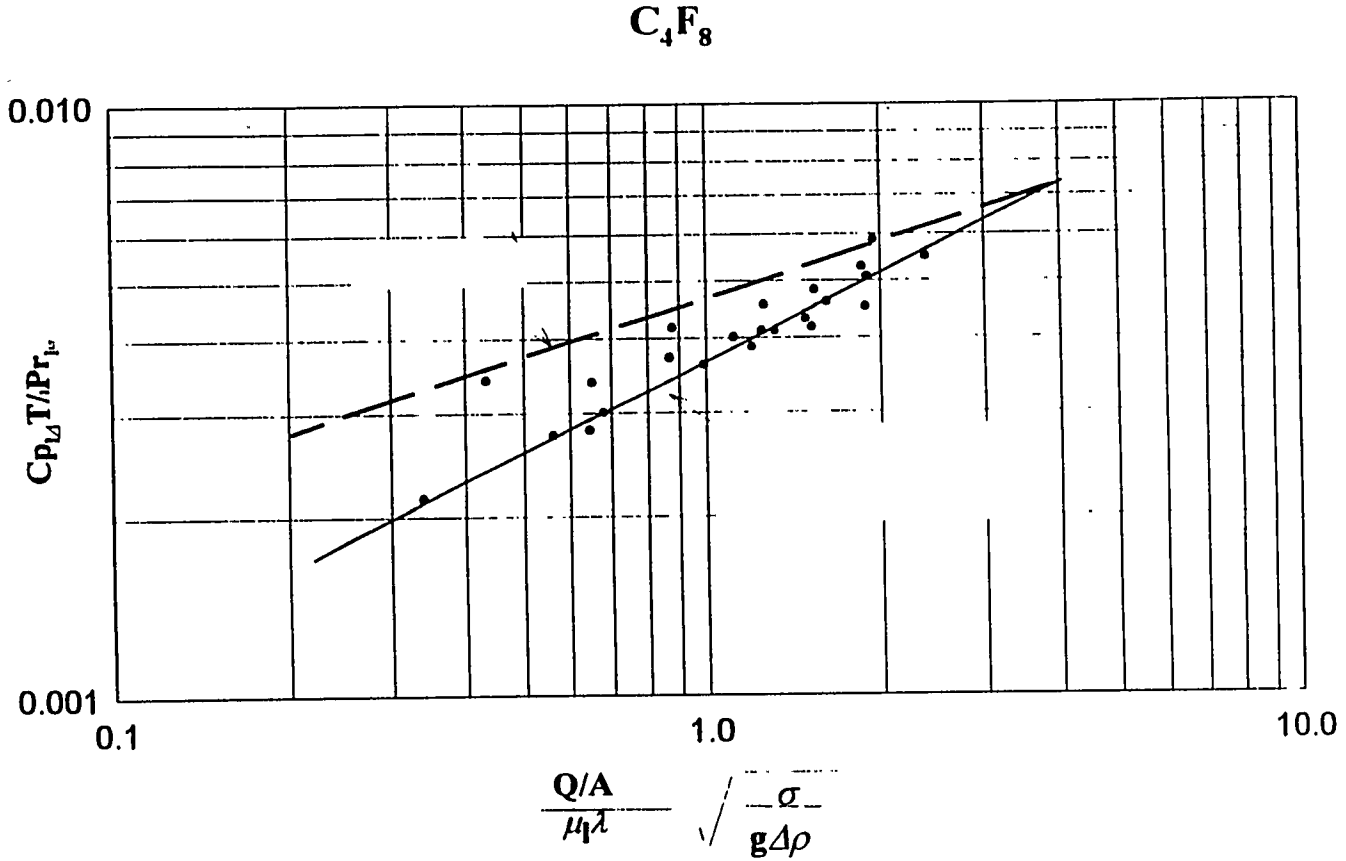


Figure 25. Correlation of Nucleate Pool Boiling for C_4F_8

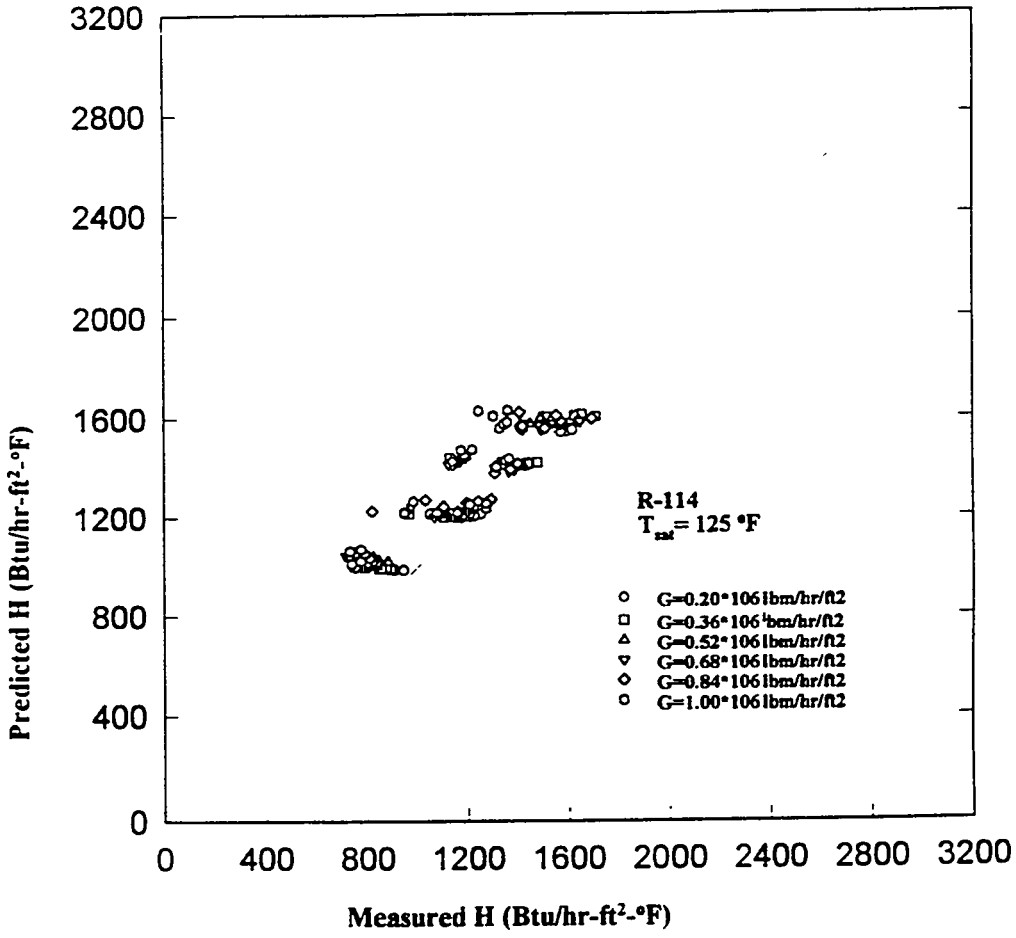


Figure 26. Comparison of Measured and Predicted Heat Transfer Coefficients for R-114 at T_{sat}=125°F

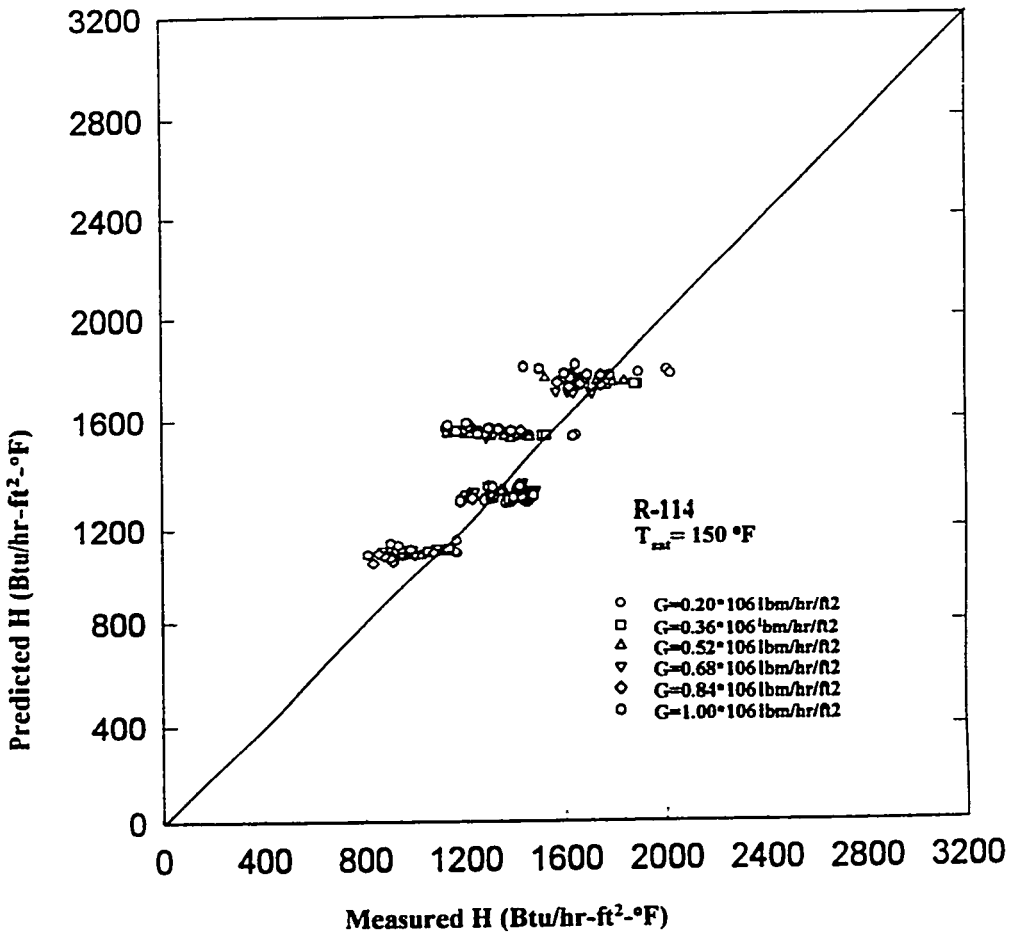


Figure 27. Comparison of Measured and Predicted Heat Transfer Coefficients for R-114 at T_{sat}=150°F

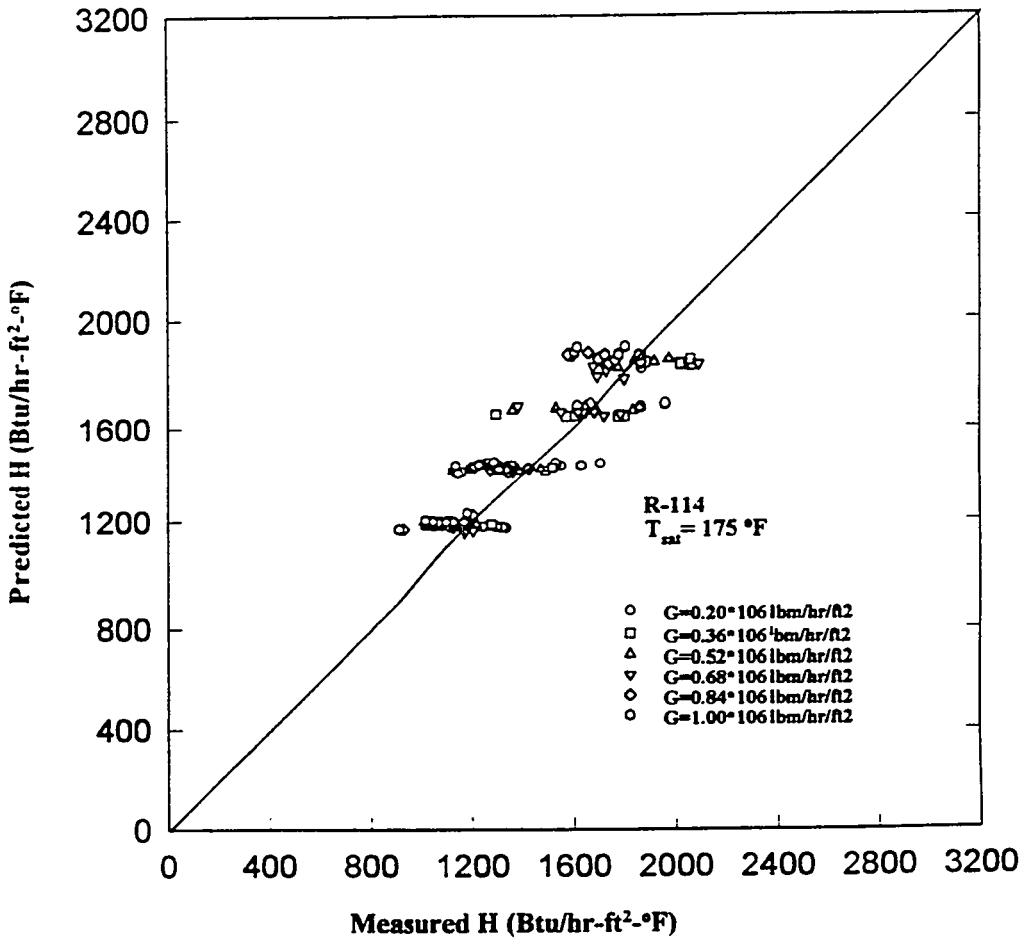


Figure 28. Comparison of Measured and Predicted Heat Transfer Coefficients for R-114 at T_{sat}=175°F

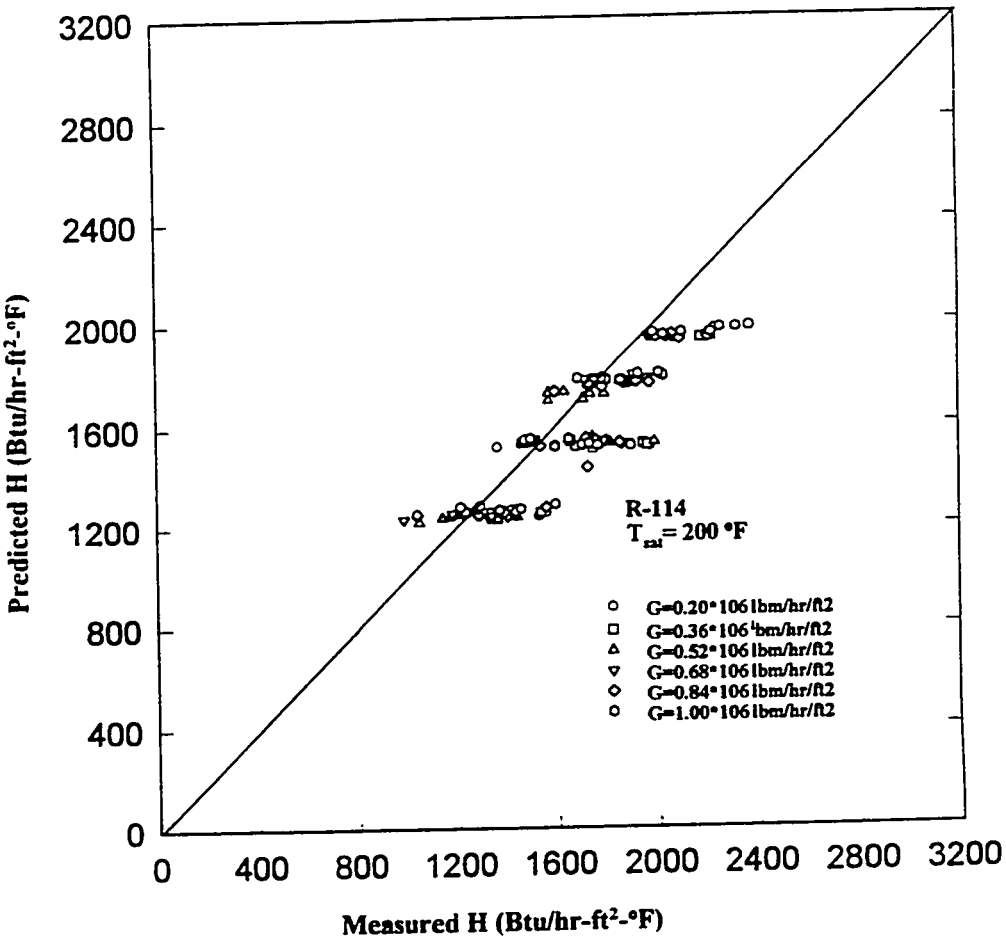


Figure 29. Comparison of Measured and Predicted Heat Transfer Coefficients for R-114 at T_{sat}=200°F

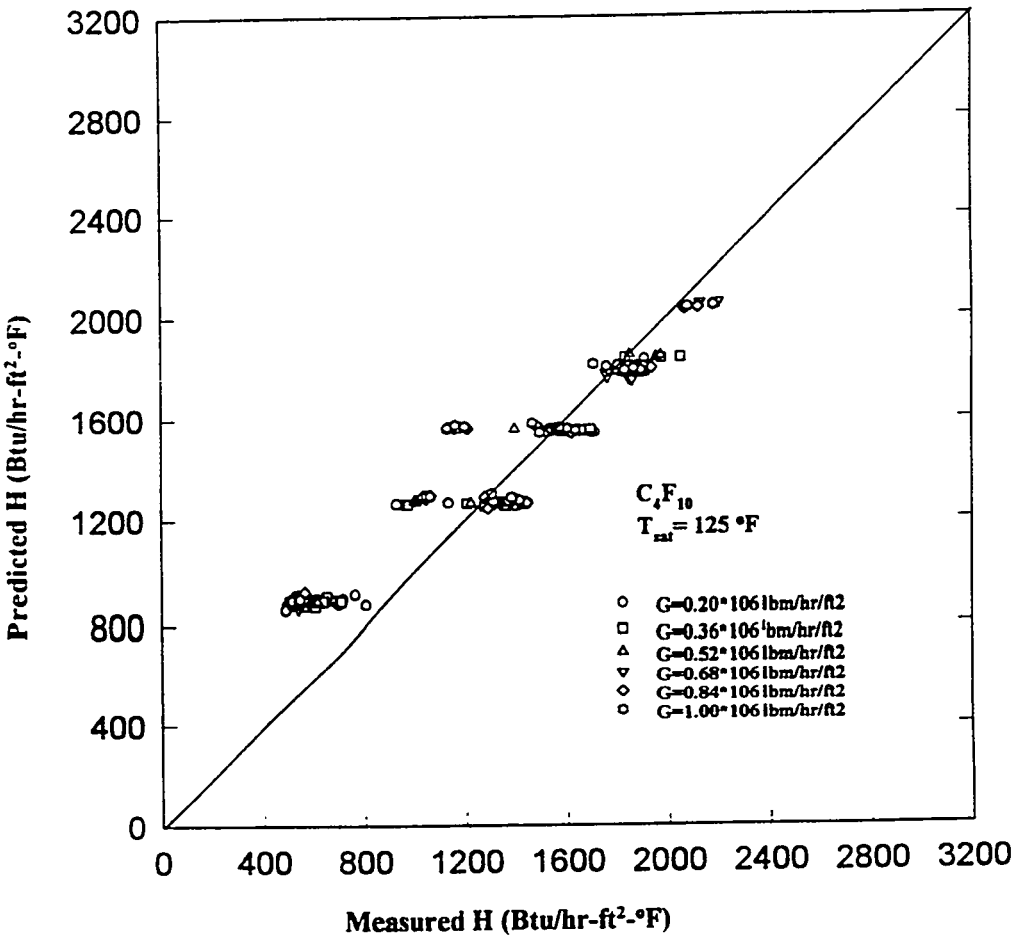


Figure 30. Comparison of Measured and Predicted Heat Transfer Coefficients for C_4F_{10} at T_{sat}=125°F

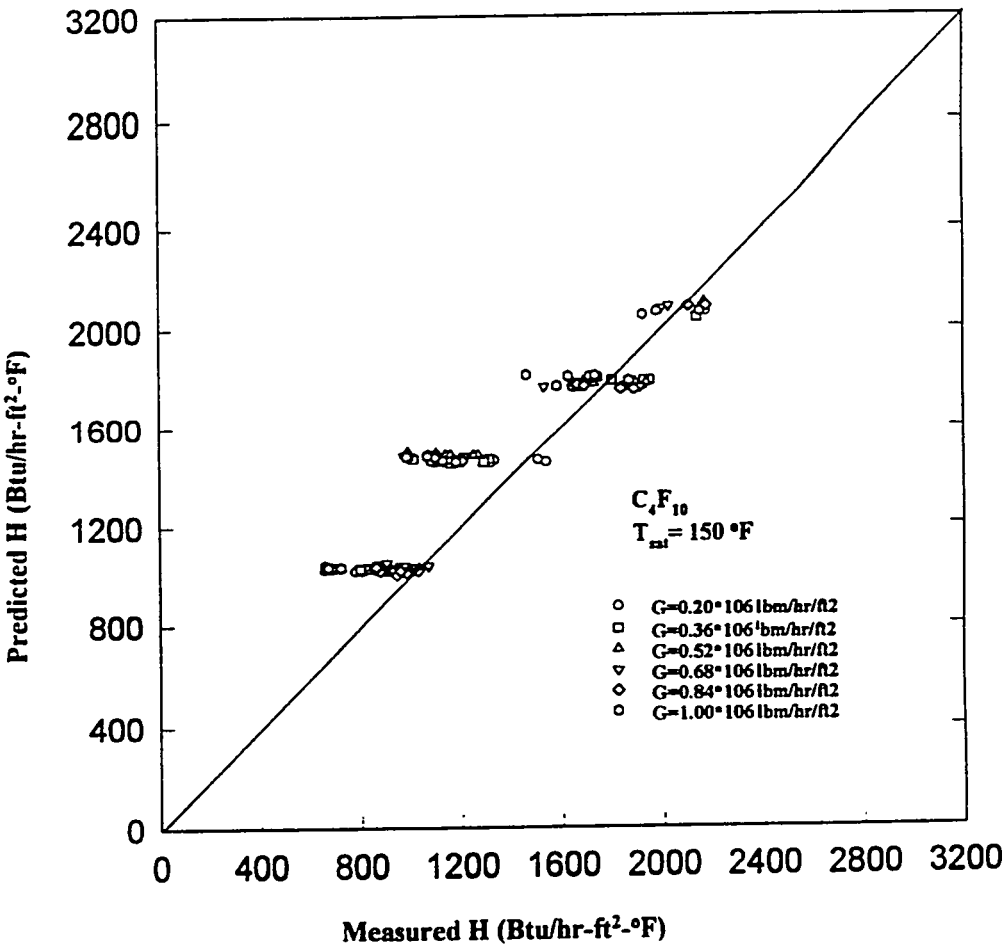


Figure 31. Comparison of Measured and Predicted Heat Transfer Coefficients for C_4F_{10} at T_{sat}=150°F

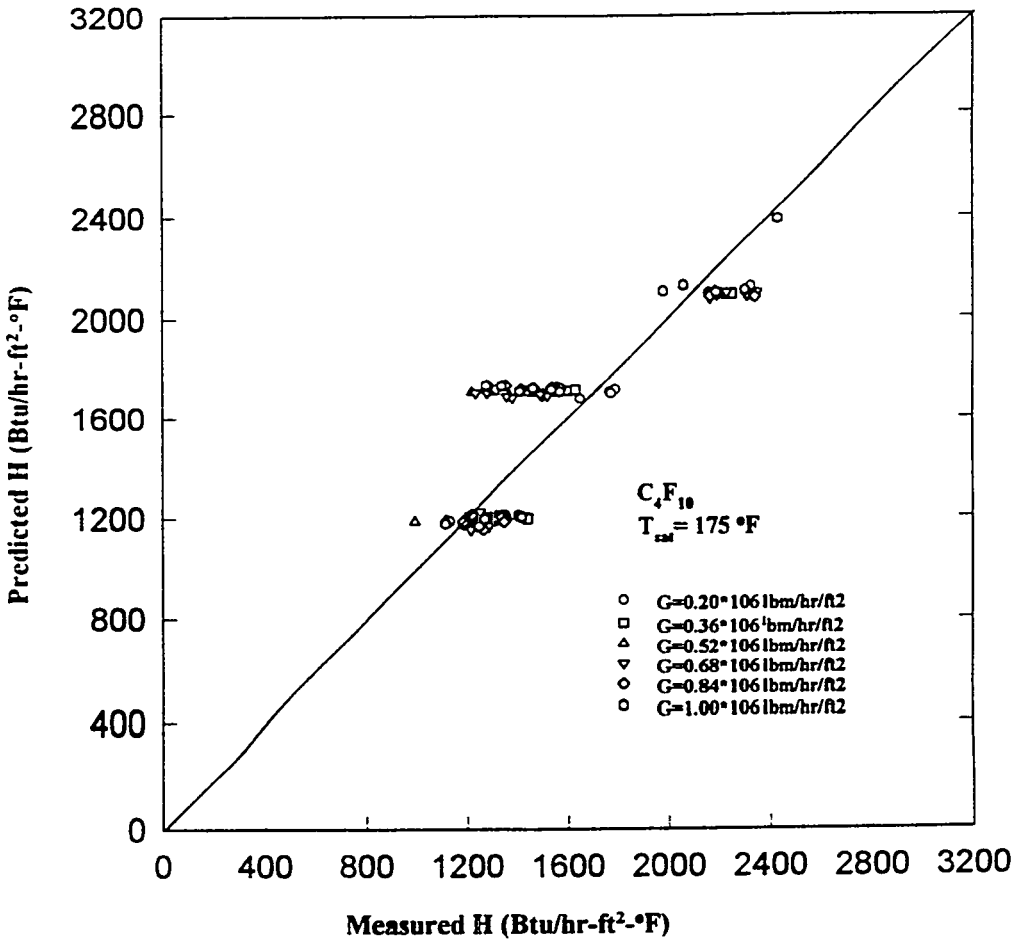


Figure 32. Comparison of Measured and Predicted Heat Transfer Coefficients for C_4F_{10} at T_{sat}=175°F

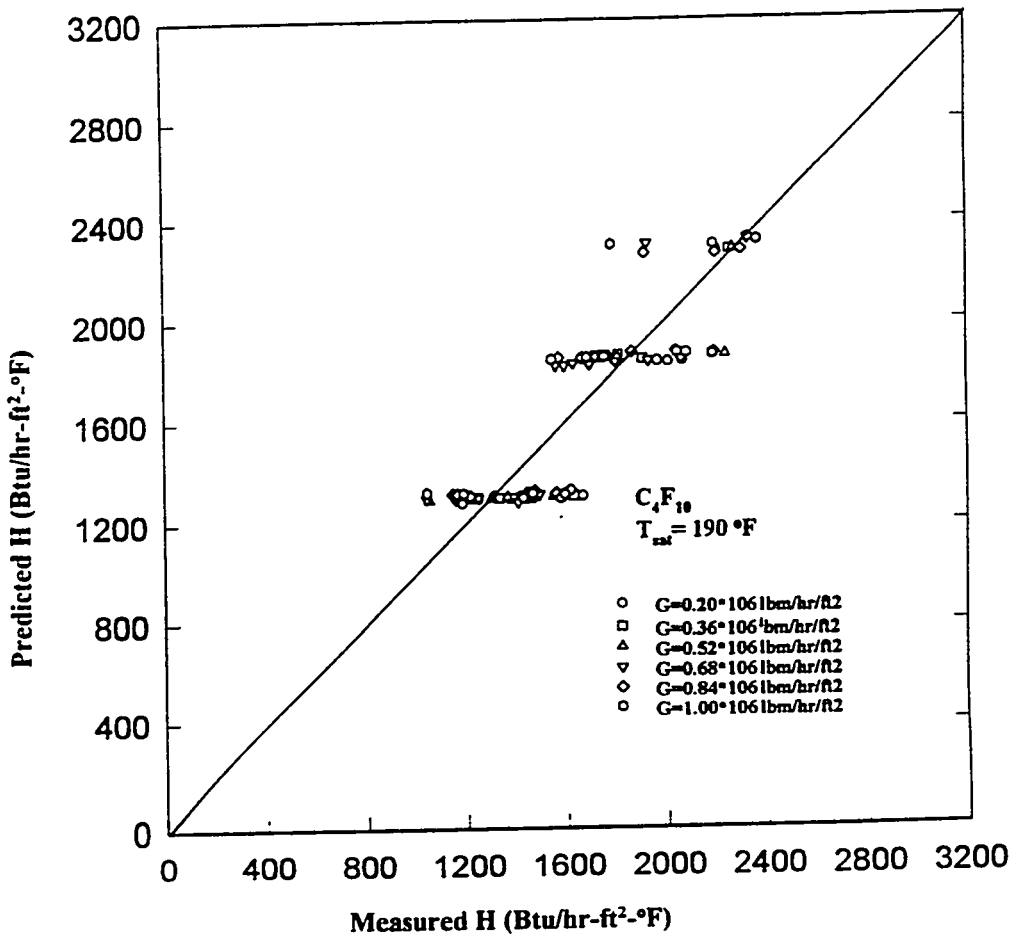


Figure 33. Comparison of Measured and Predicted Heat Transfer Coefficients for C_4F_{10} at T_{sat}=190°F

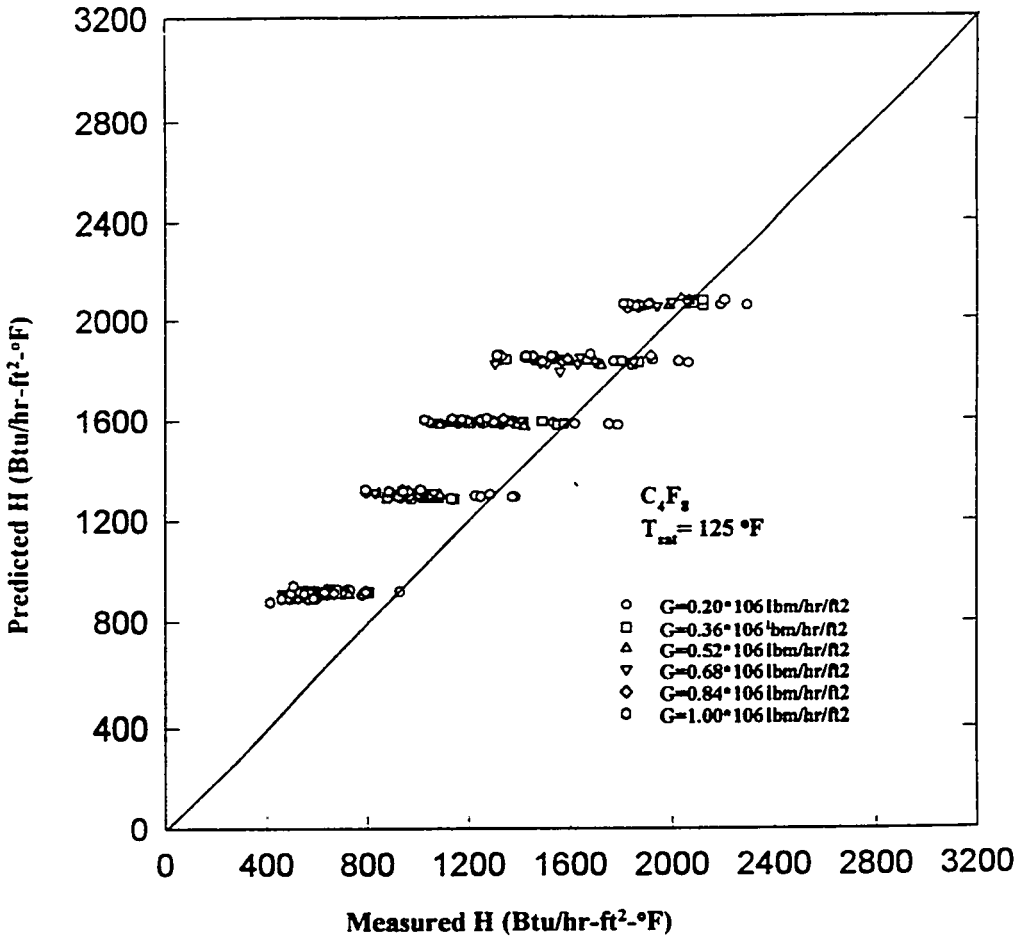


Figure 34. Comparison of Measured and Predicted Heat Transfer Coefficients for C_4F_8 at T_{sat}=125°F

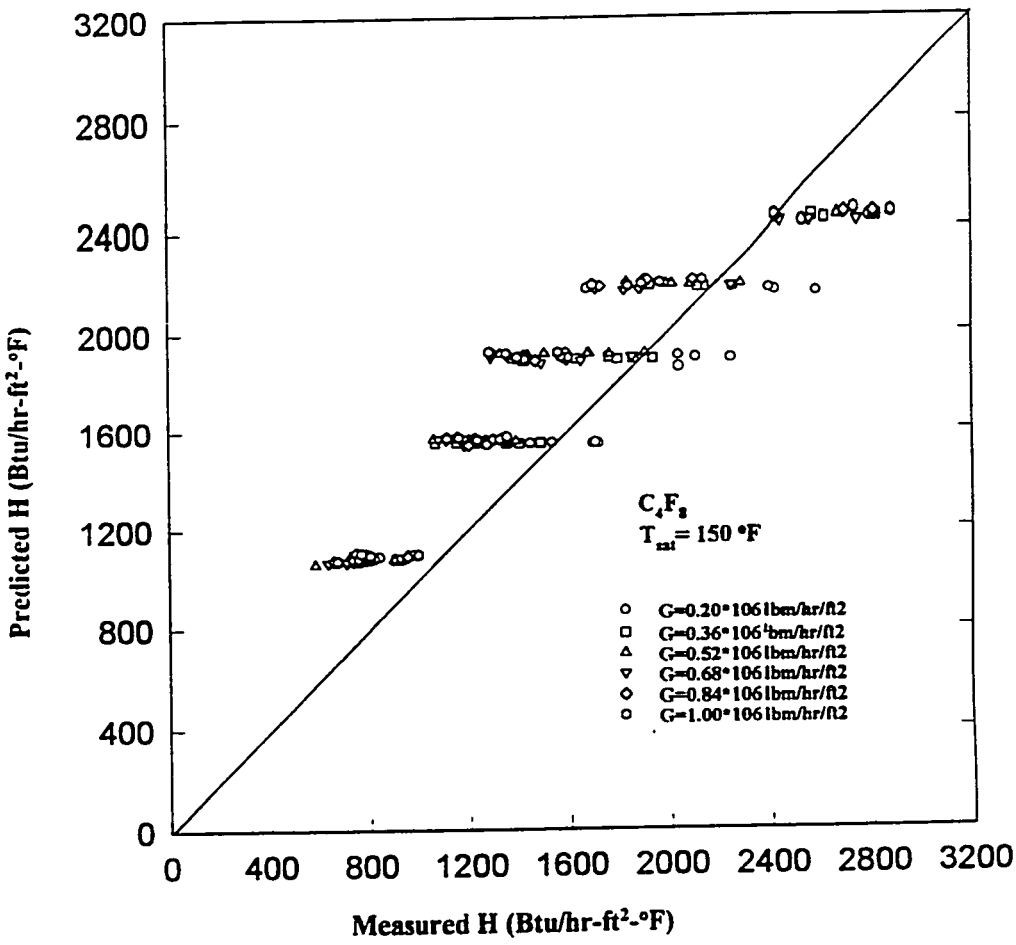


Figure 35. Comparison of Measured and Predicted Heat Transfer Coefficients for C_4F_8 at T_{sat}=150°F

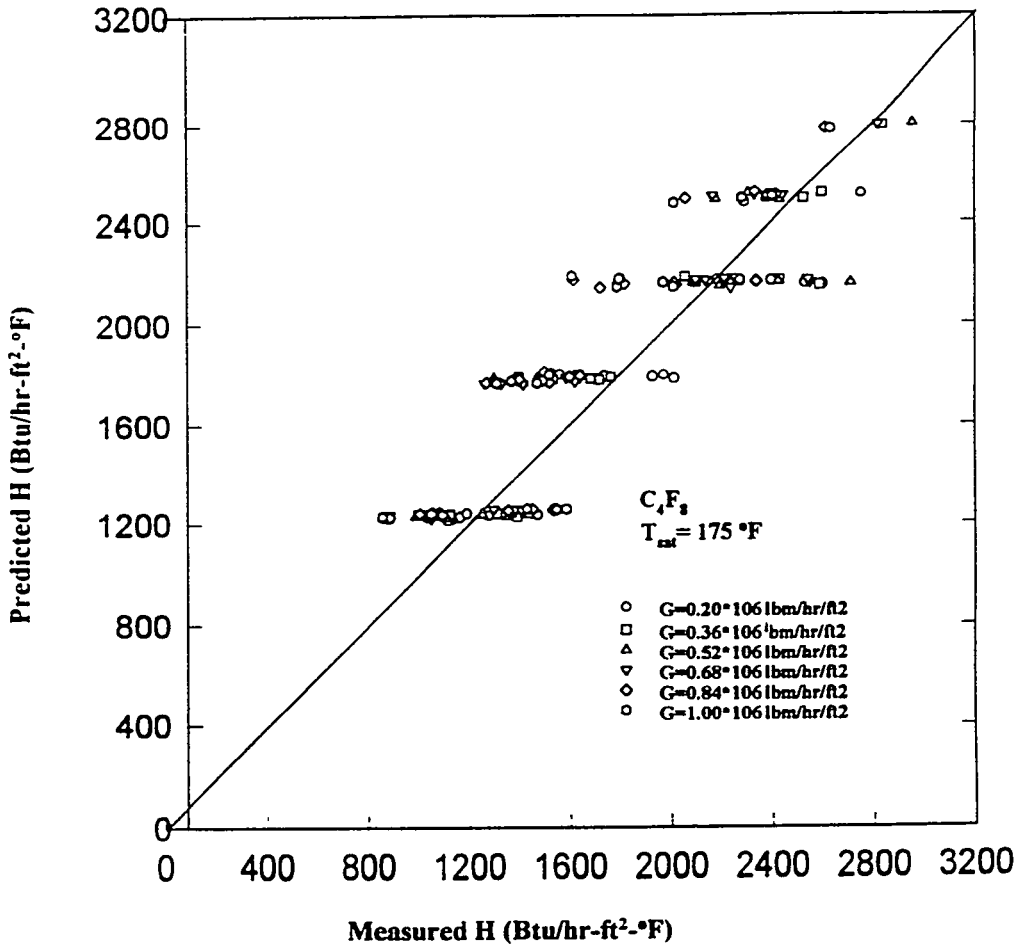


Figure 36. Comparison of Measured and Predicted Heat Transfer Coefficients for C_4F_8 at T_{sat}=175°F

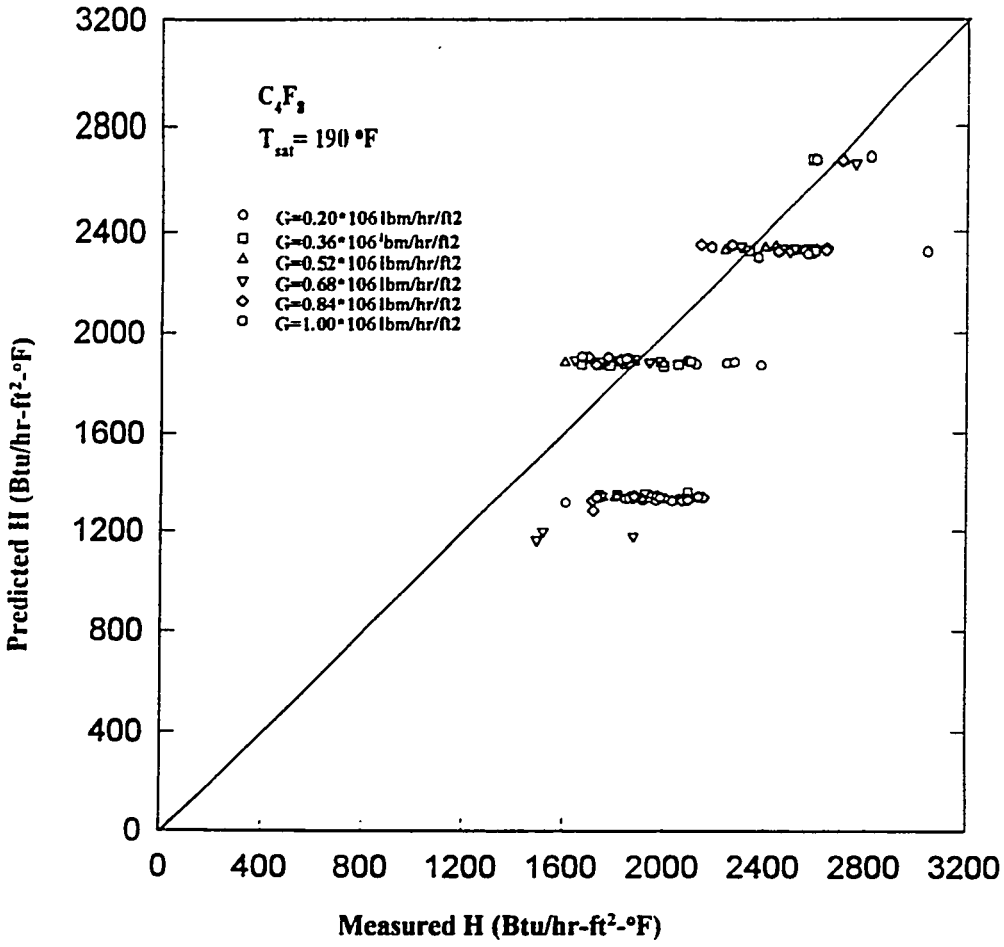


Figure 37. Comparison of Measured and Predicted Heat Transfer Coefficients for C_4F_8 at T_{sat}=190°F

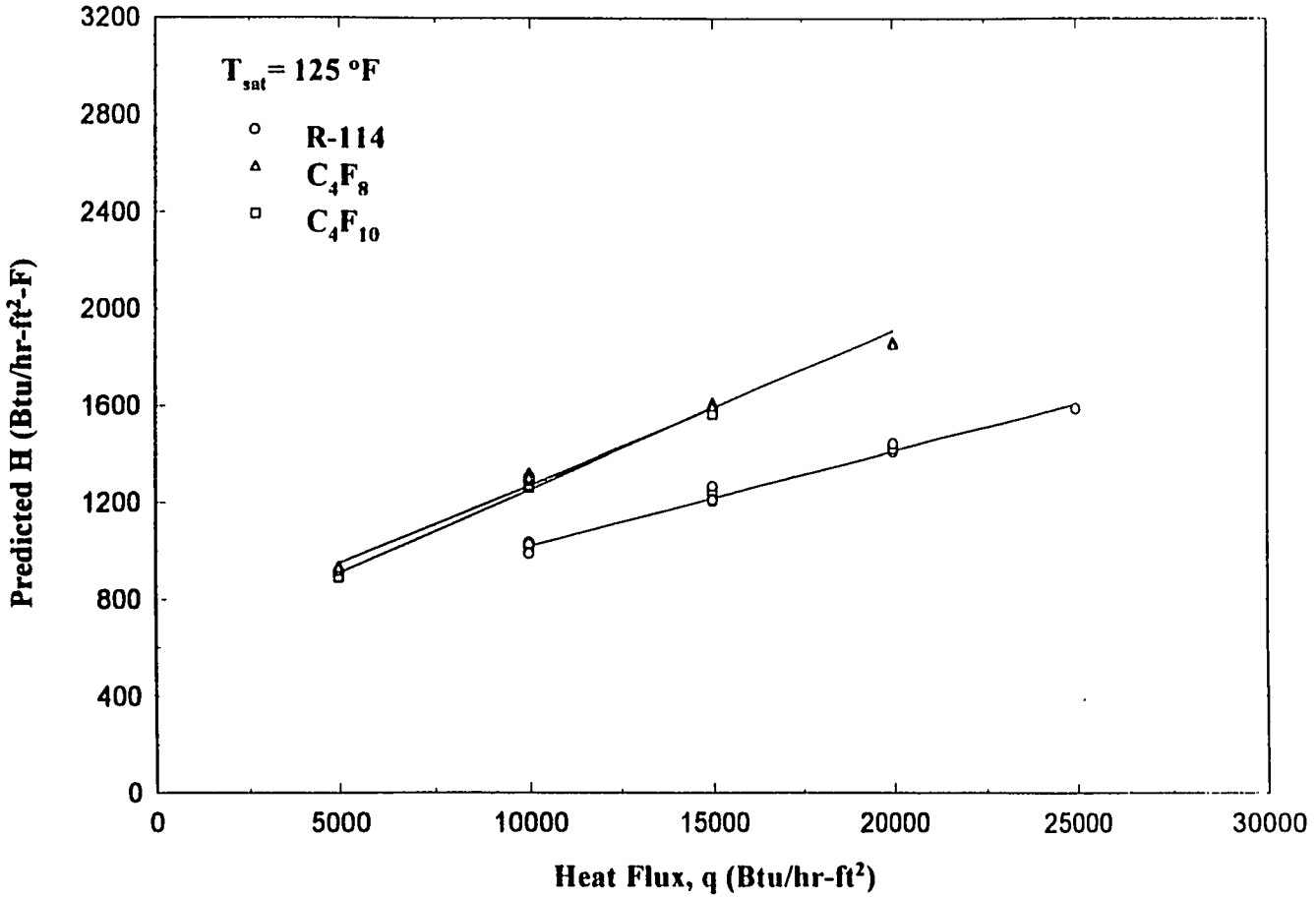
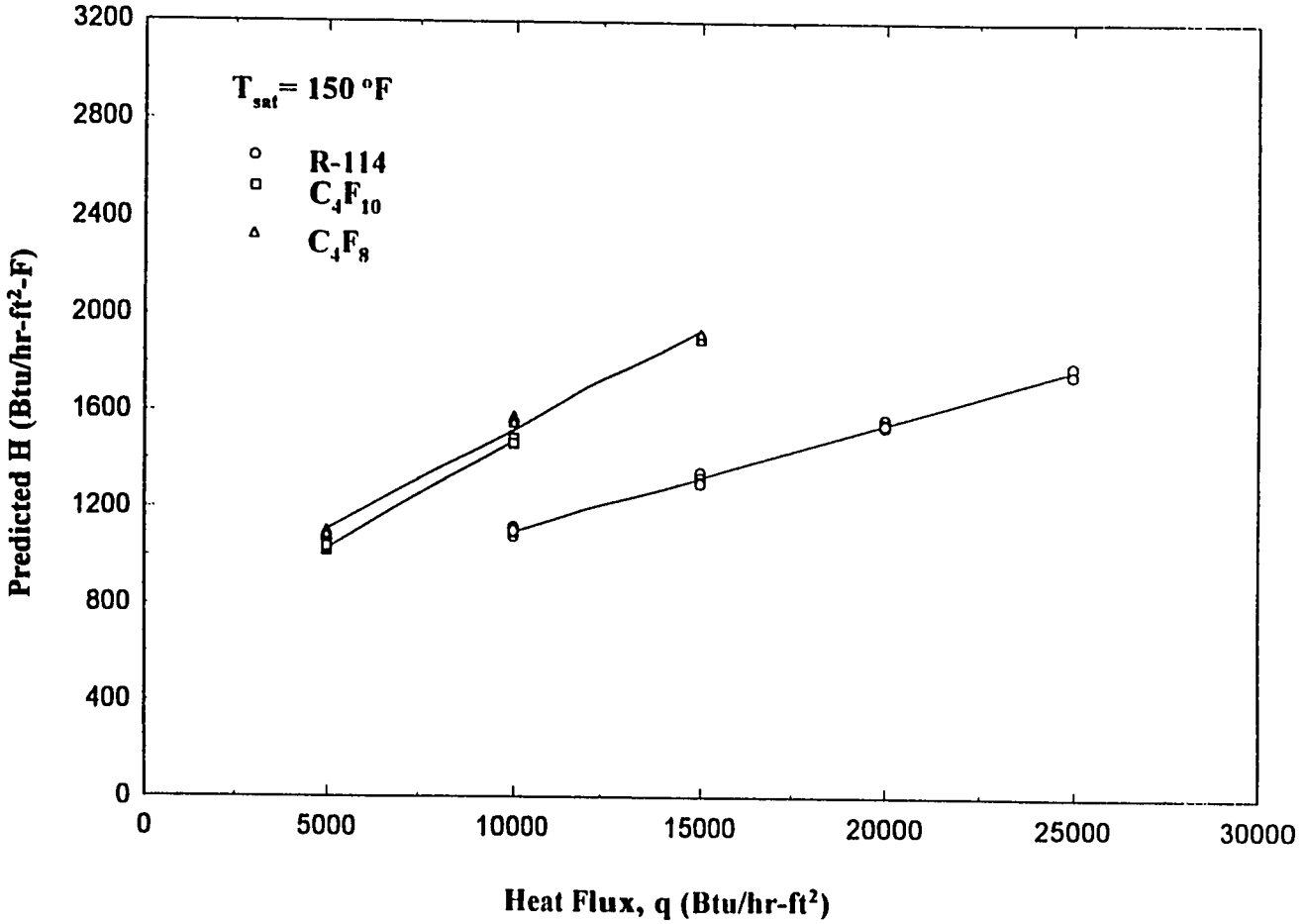


Figure 38. Comparison of Predicted Heat Transfer Coefficients vs Heat Flux at T_{sat}=125 °F



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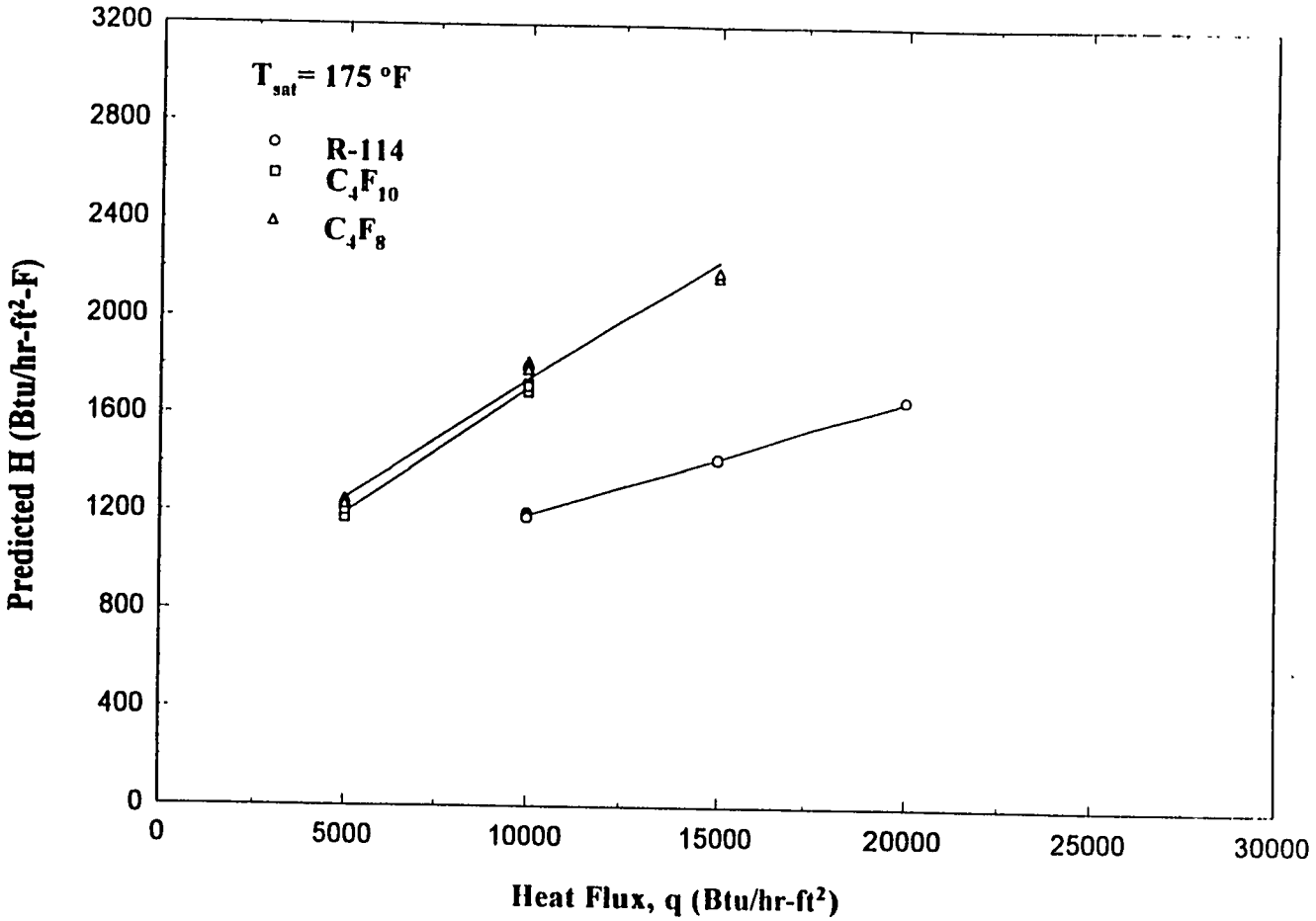

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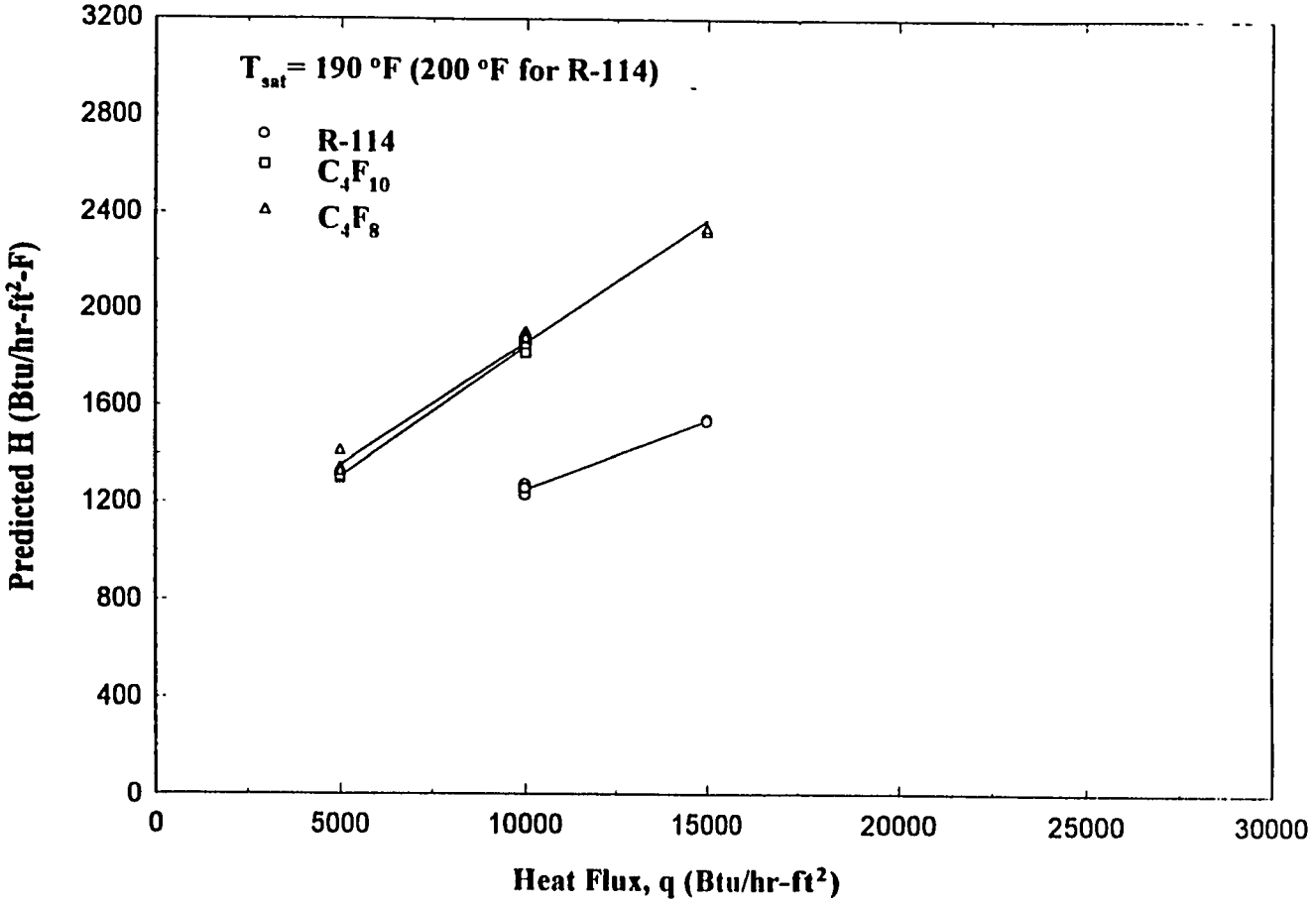

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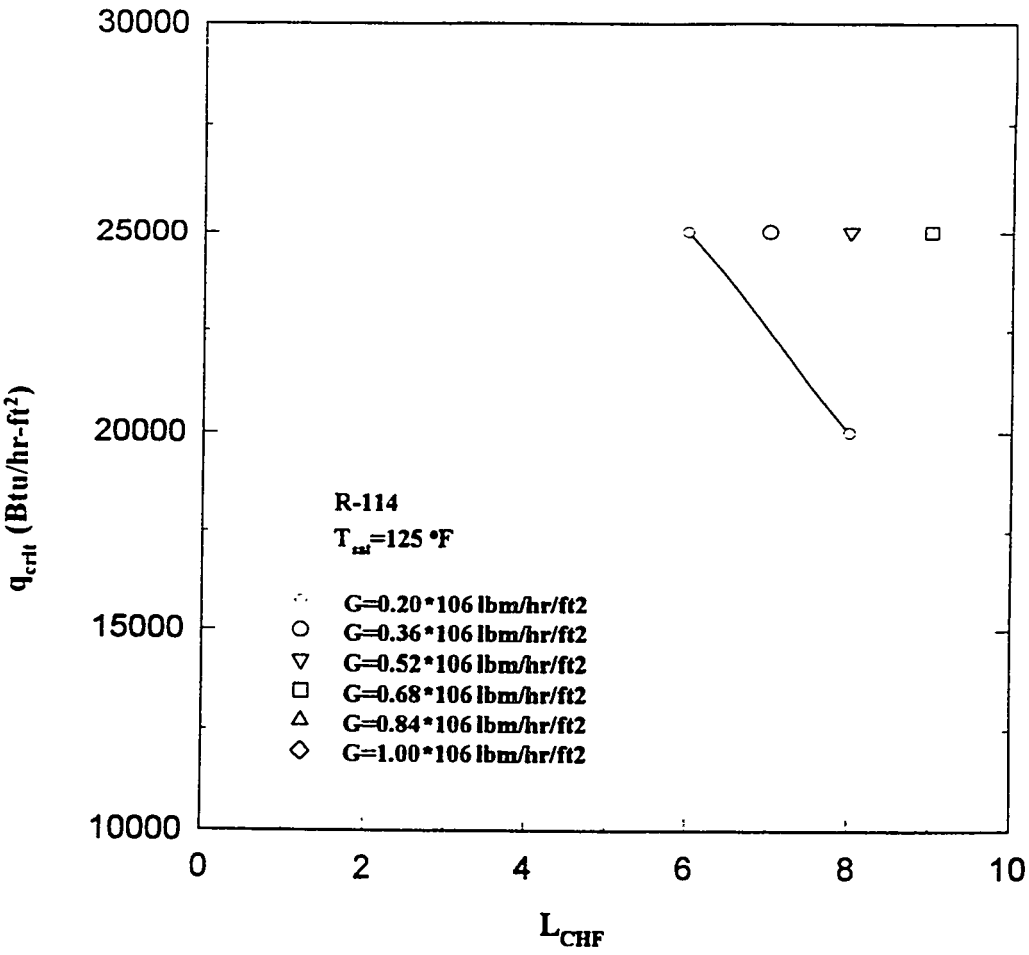


Figure 42. Critical Heat Flux versus the Dry-out Location L for R-114 at 125 °F

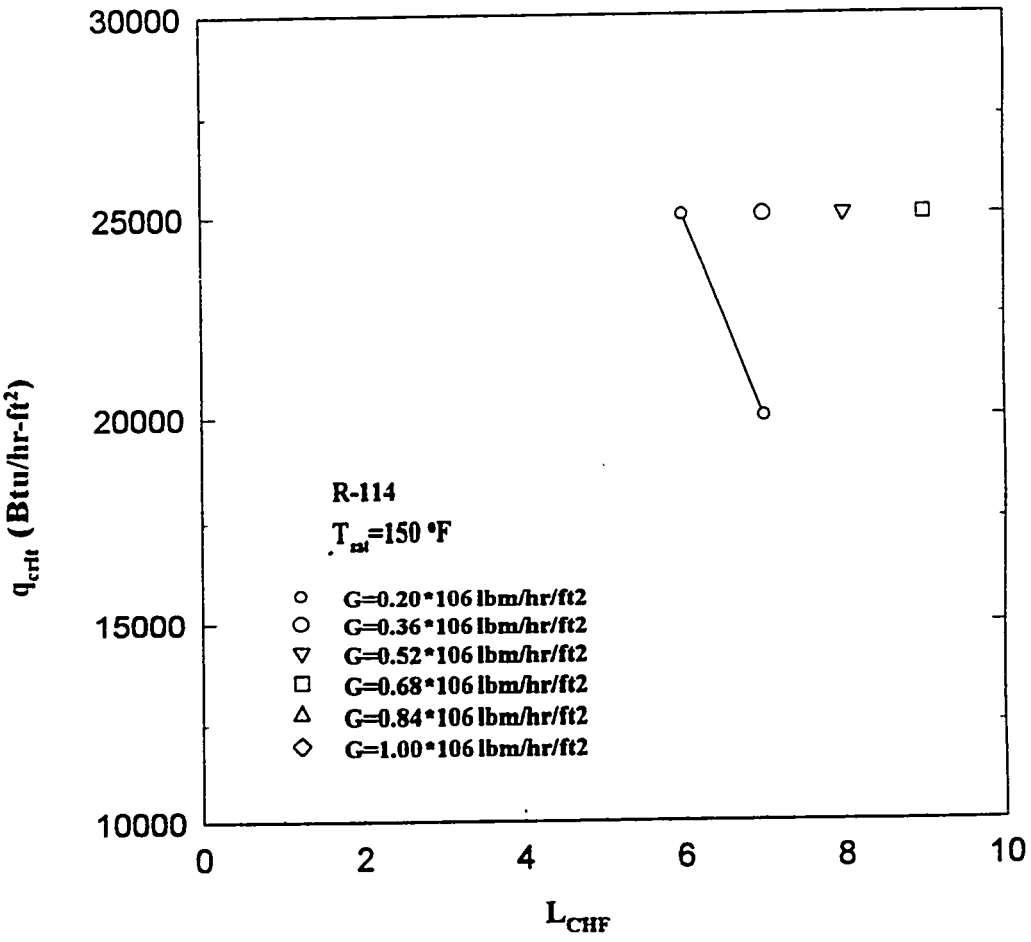


Figure 43. Critical Heat Flux versus the Dry-out Location L for R-114 at 150 °F

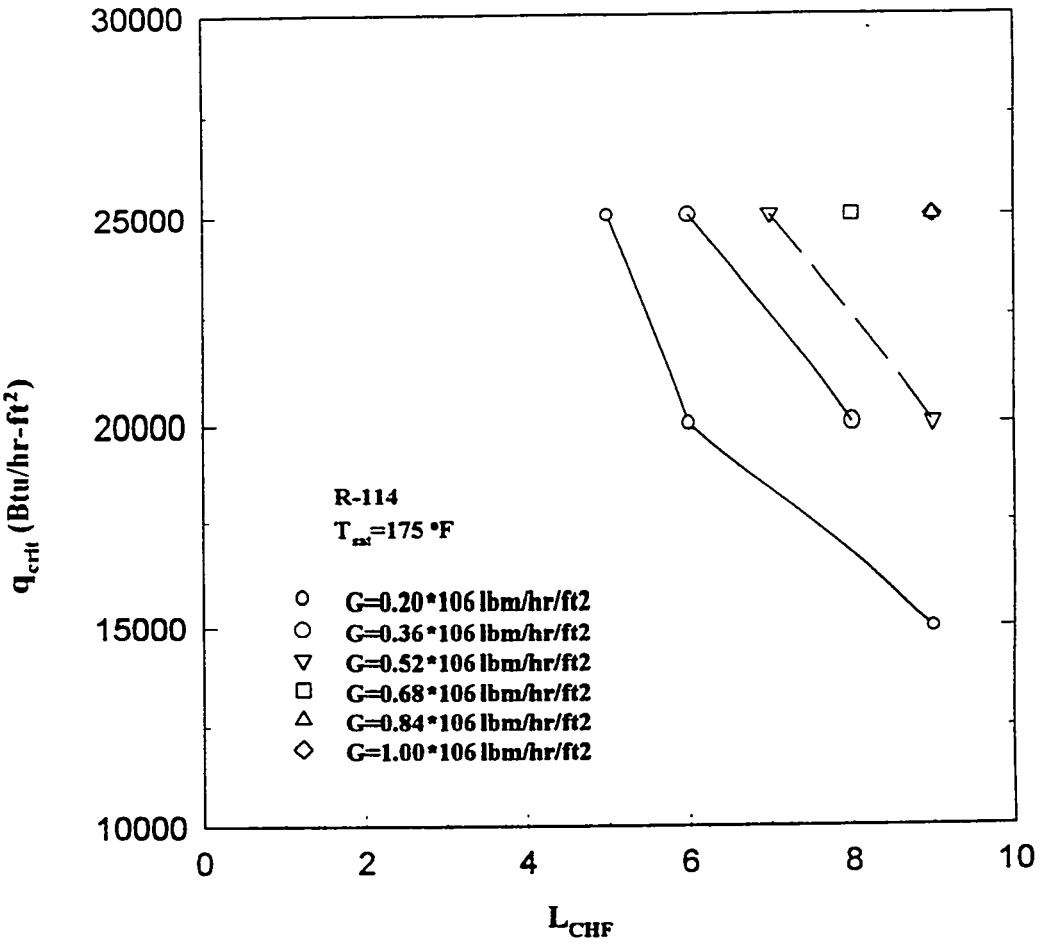


Figure 44. Critical Heat Flux versus the Dry-out Location L for R-114 at 175 °F

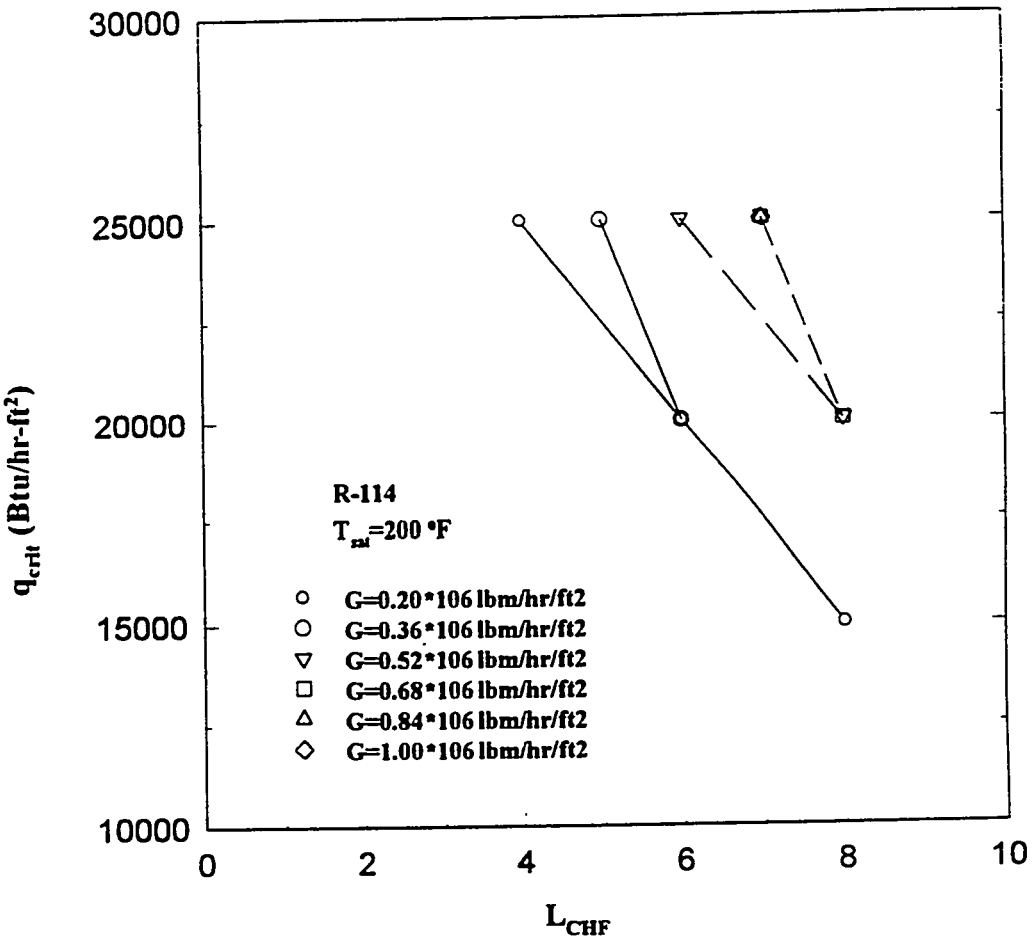


Figure 45. Critical Heat Flux versus the Dry-out Location L for R-114 at 200 °F

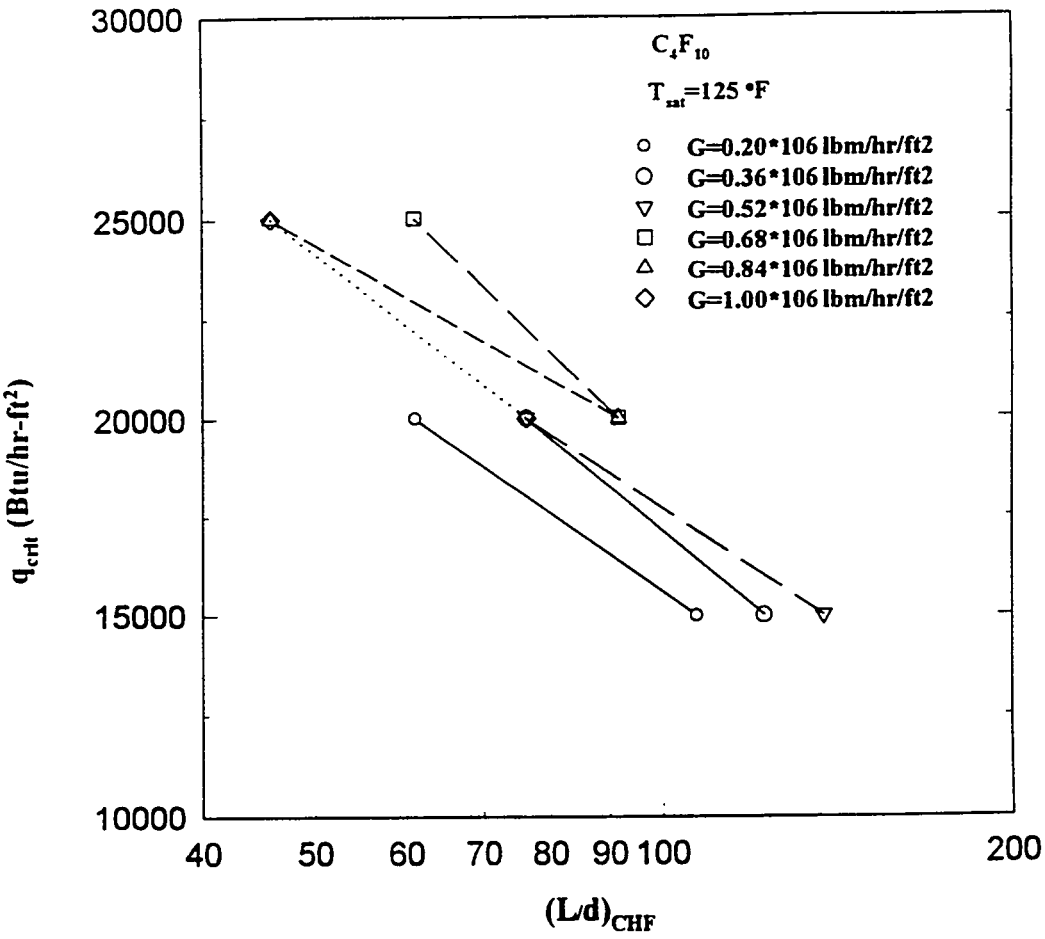
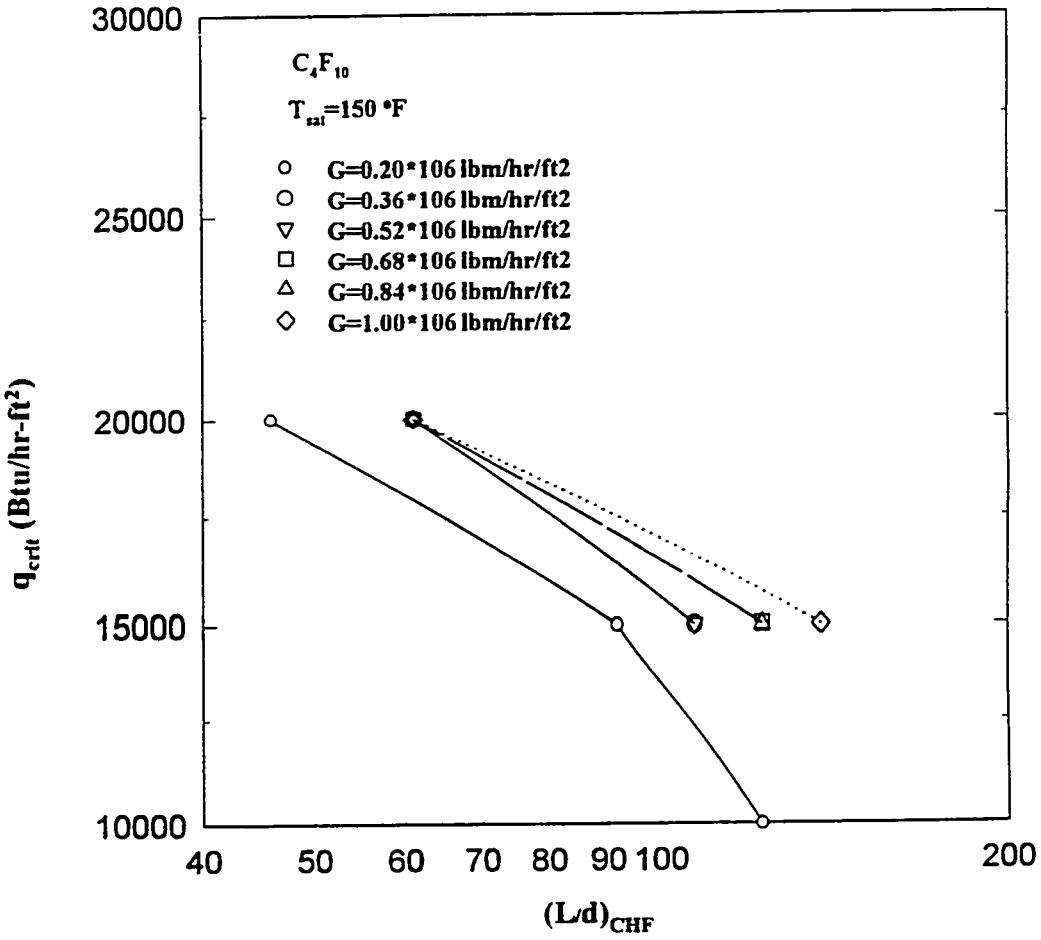


Figure 46. Critical Heat Flux versus L/d Ratio for C_4F_{10} at 125 °F



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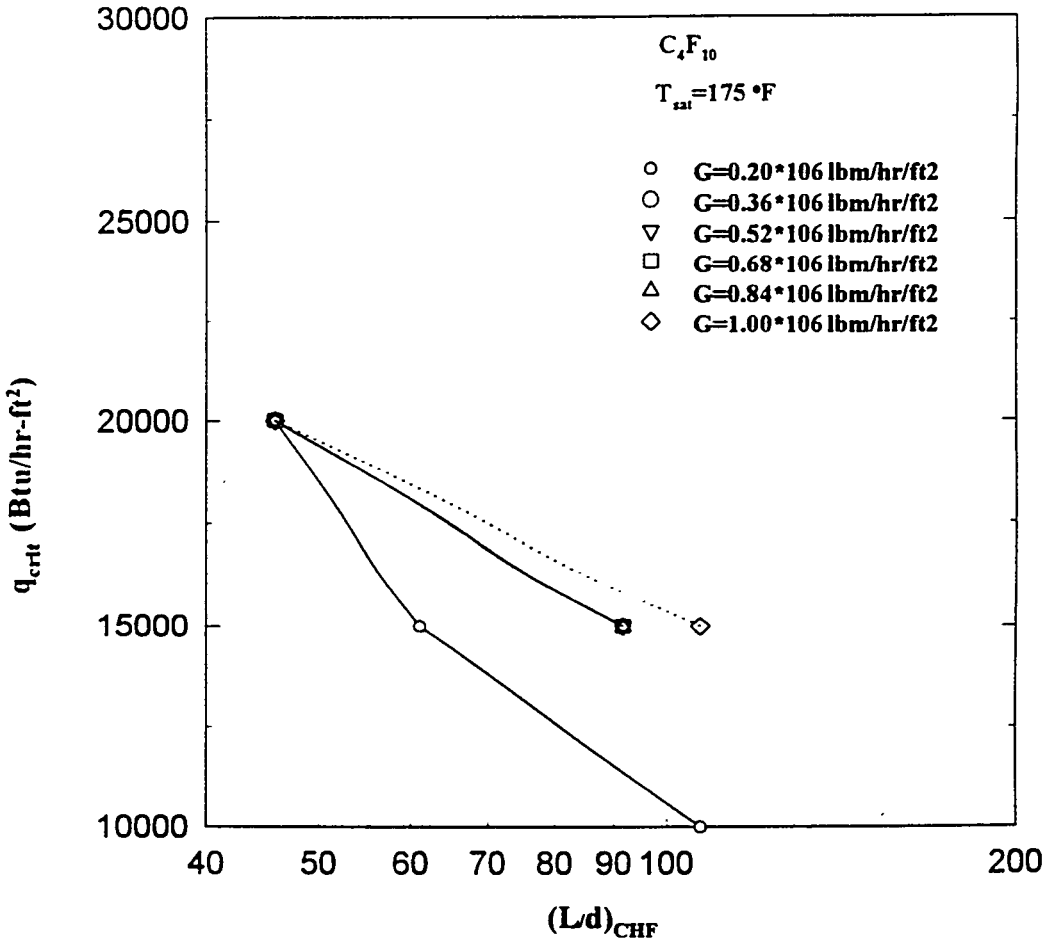


Figure 48. Critical Heat Flux versus L/d Ratio for C_4F_{10} at 175 °F

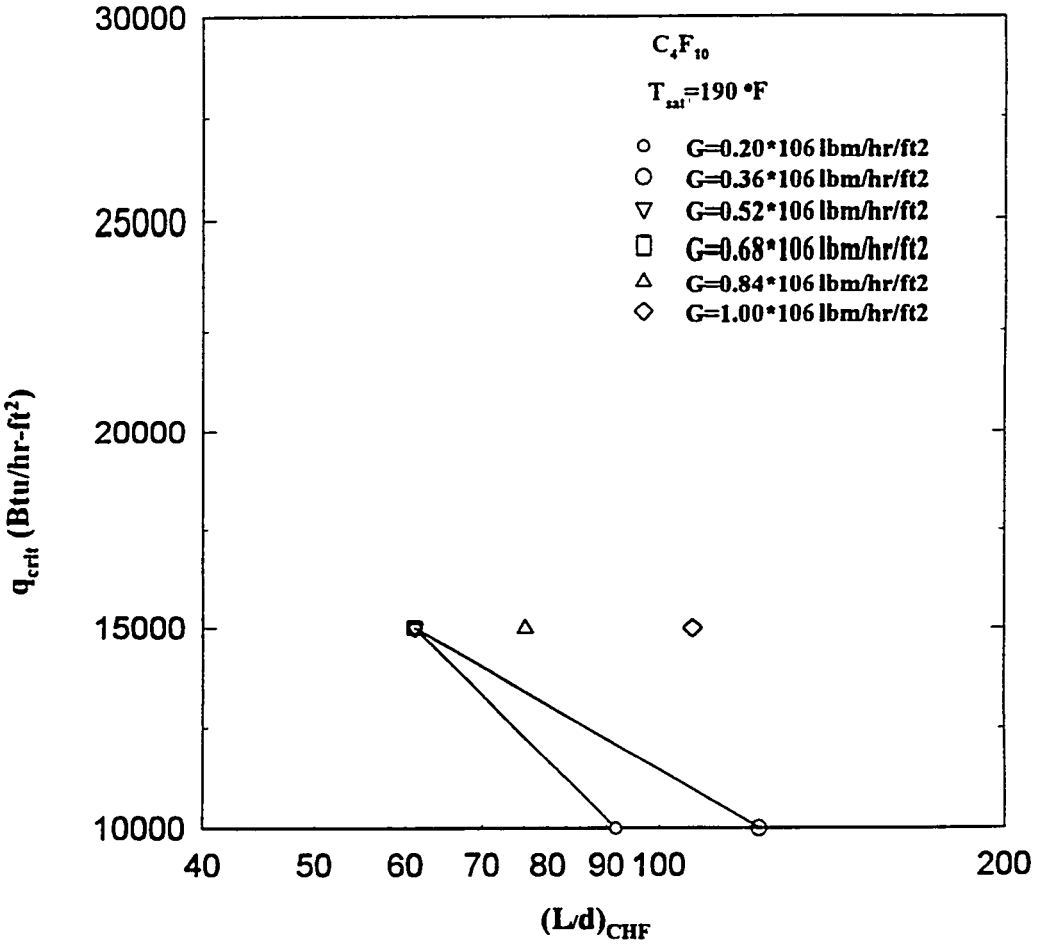


Figure 49. Critical Heat Flux versus L/d Ratio for C_4F_{10} at 190 °F

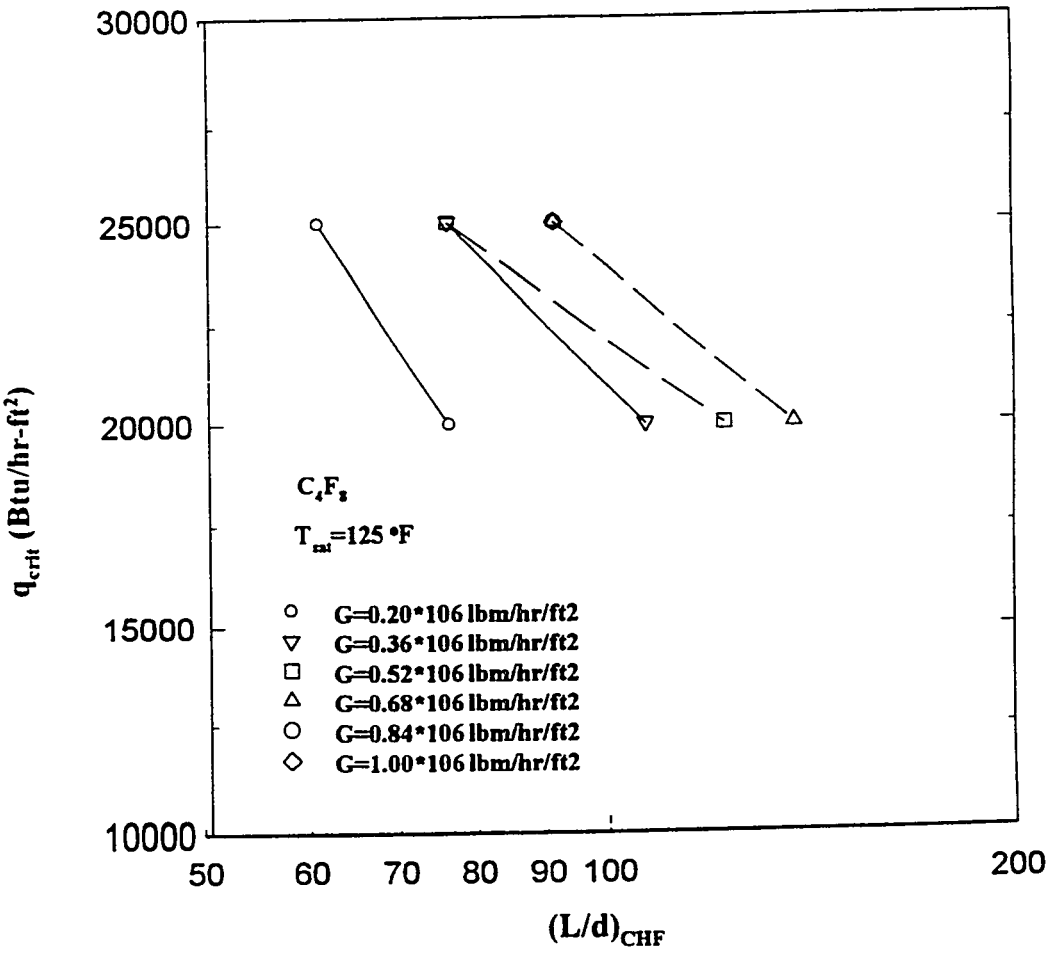


Figure 50. Critical Heat Flux versus L/d Ratio for C_4F_8 at 125 °F

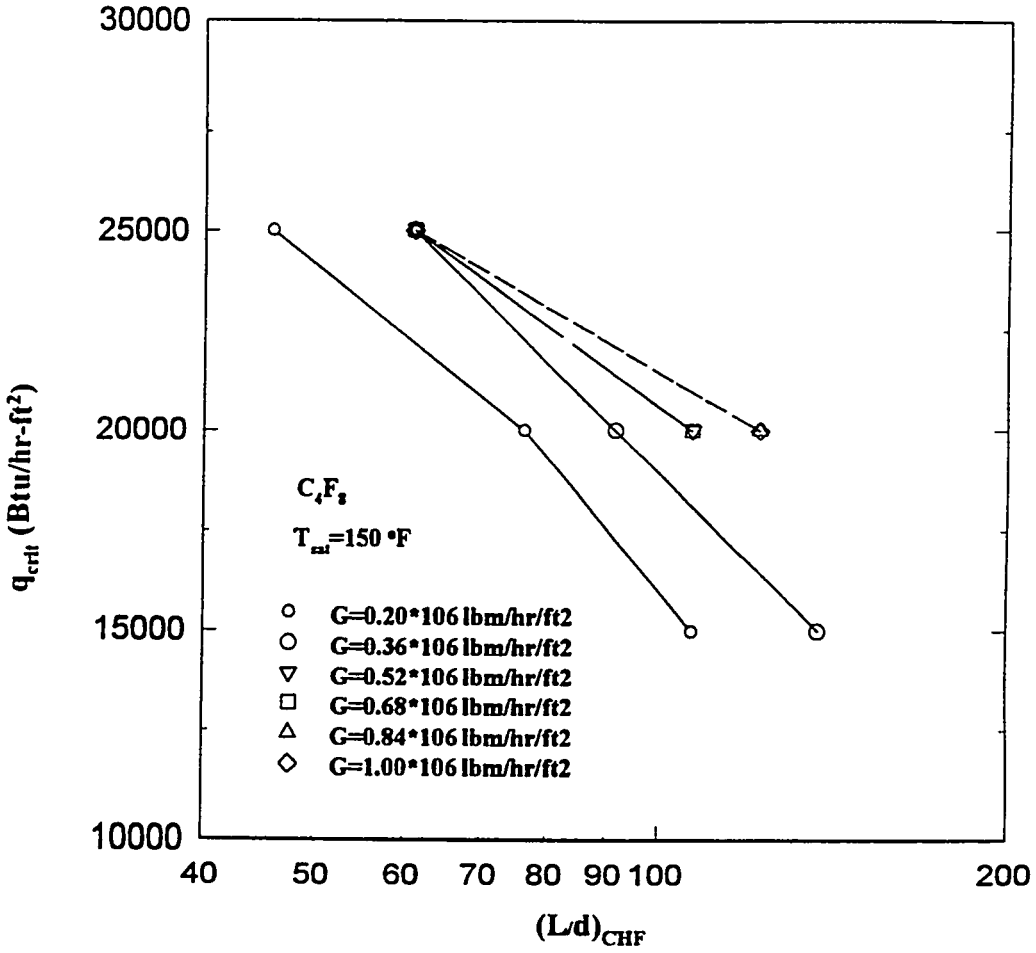
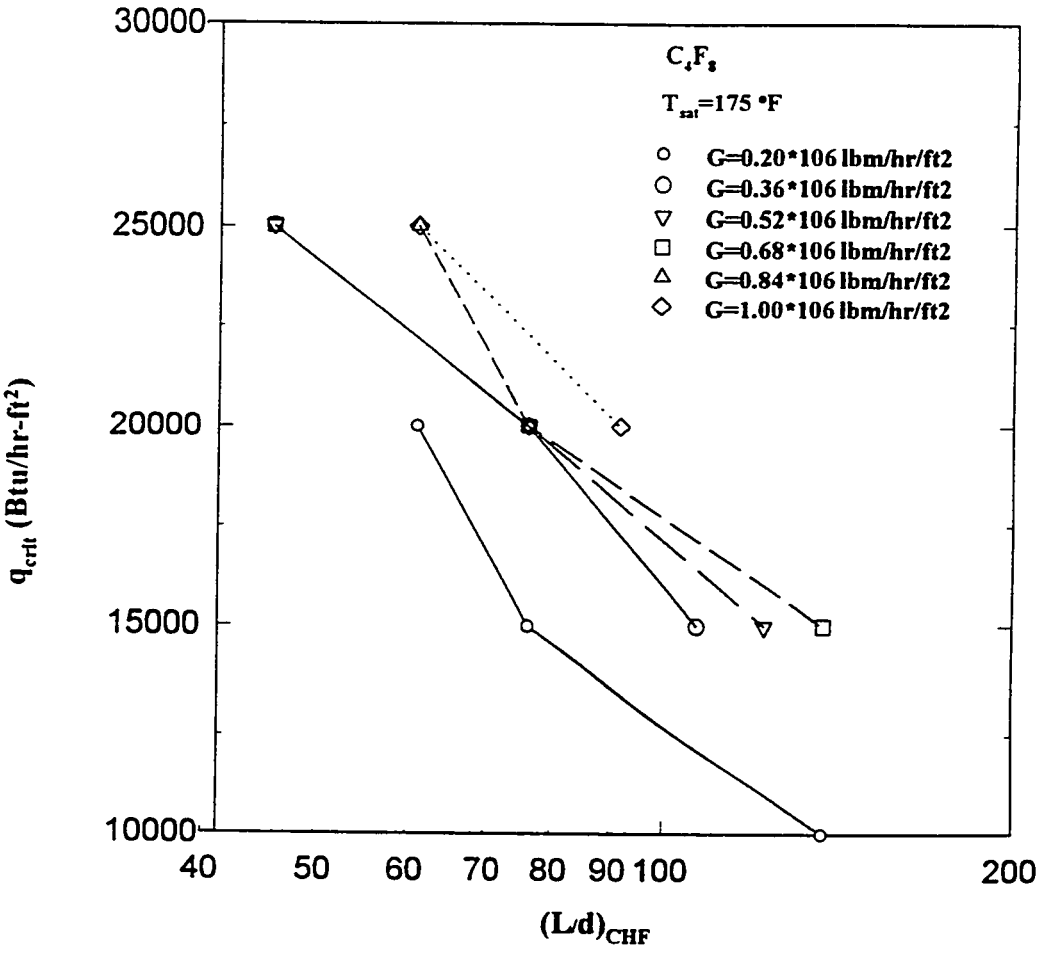


Figure 51. Critical Heat Flux versus L/d Ratio for C_4F_8 at 150 °F



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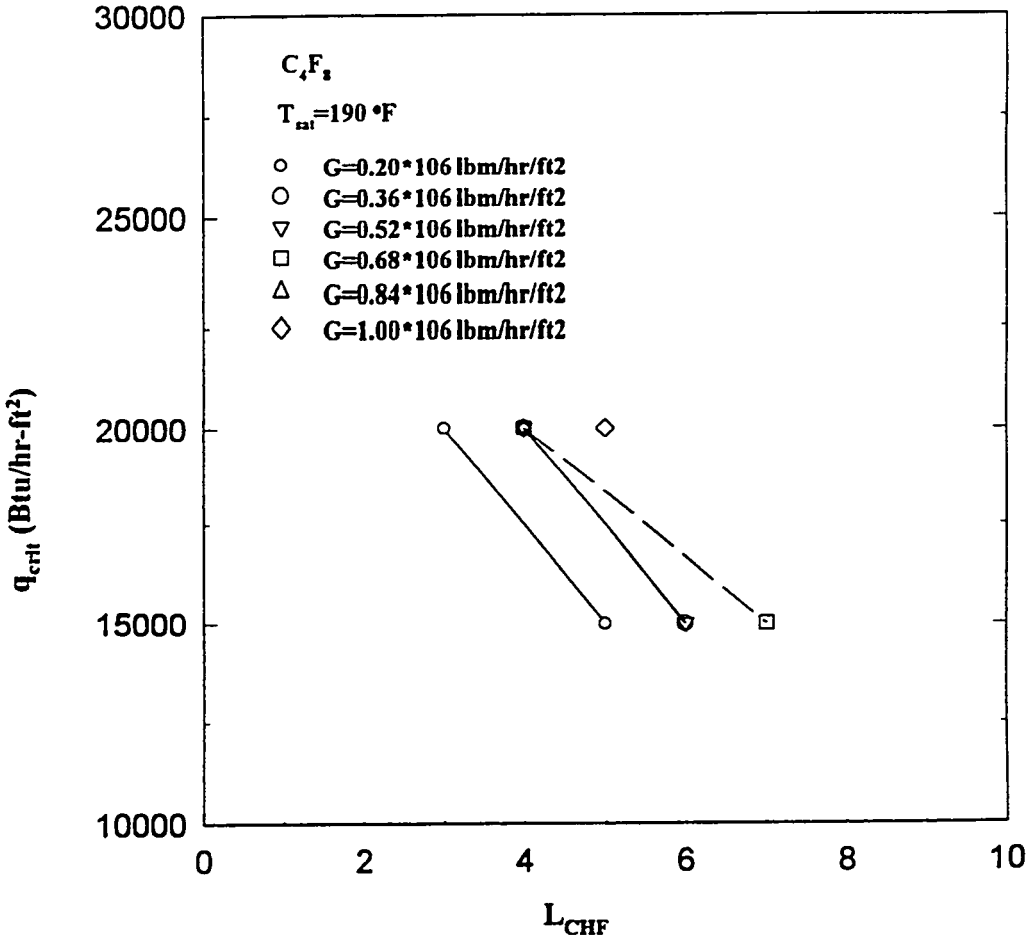


Figure 53. Critical Heat Flux versus the Dry-out Location L for C_4F_8 at 190 °F

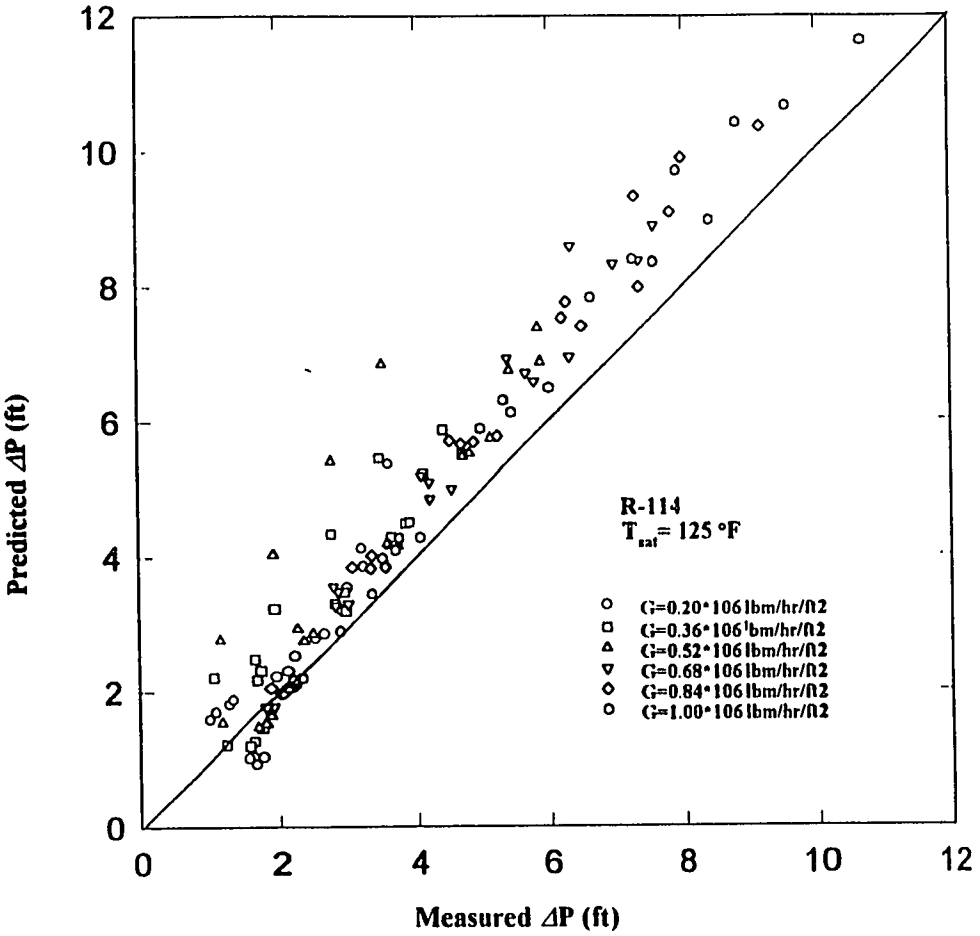
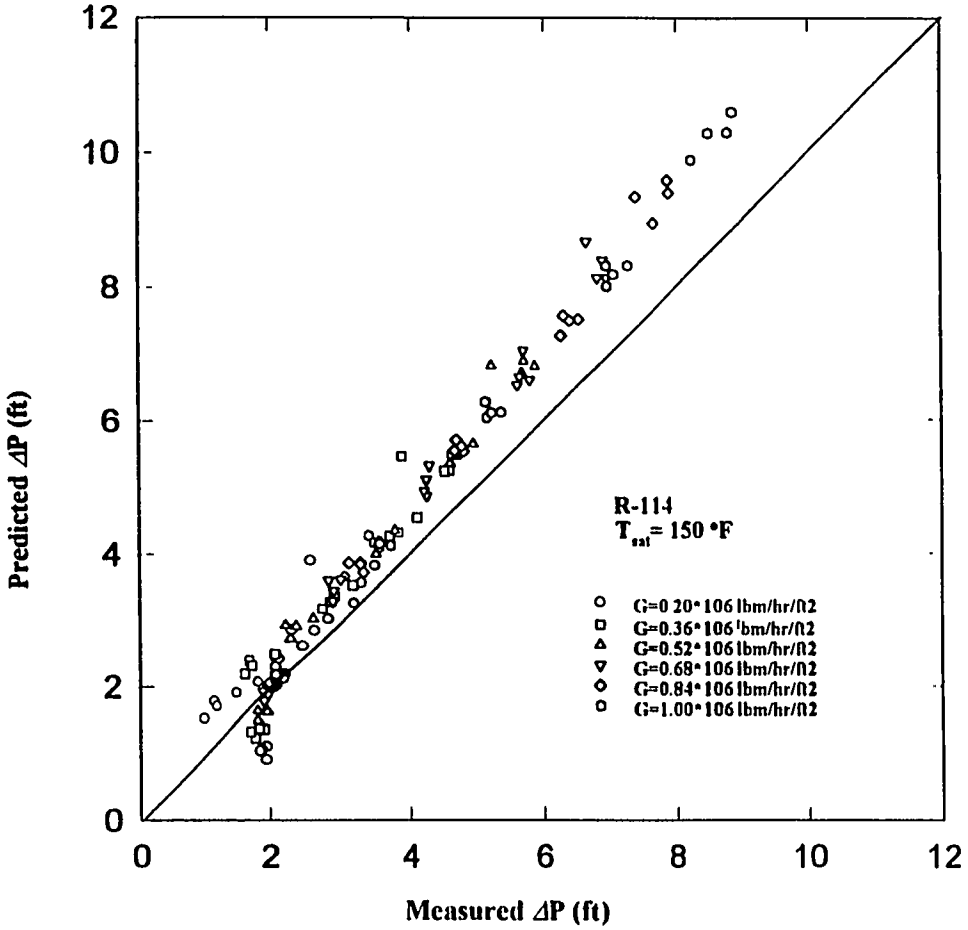


Figure 54. Comparison of Measured and Predicted Pressure Drop for R-114 at T_{sat}=125°F



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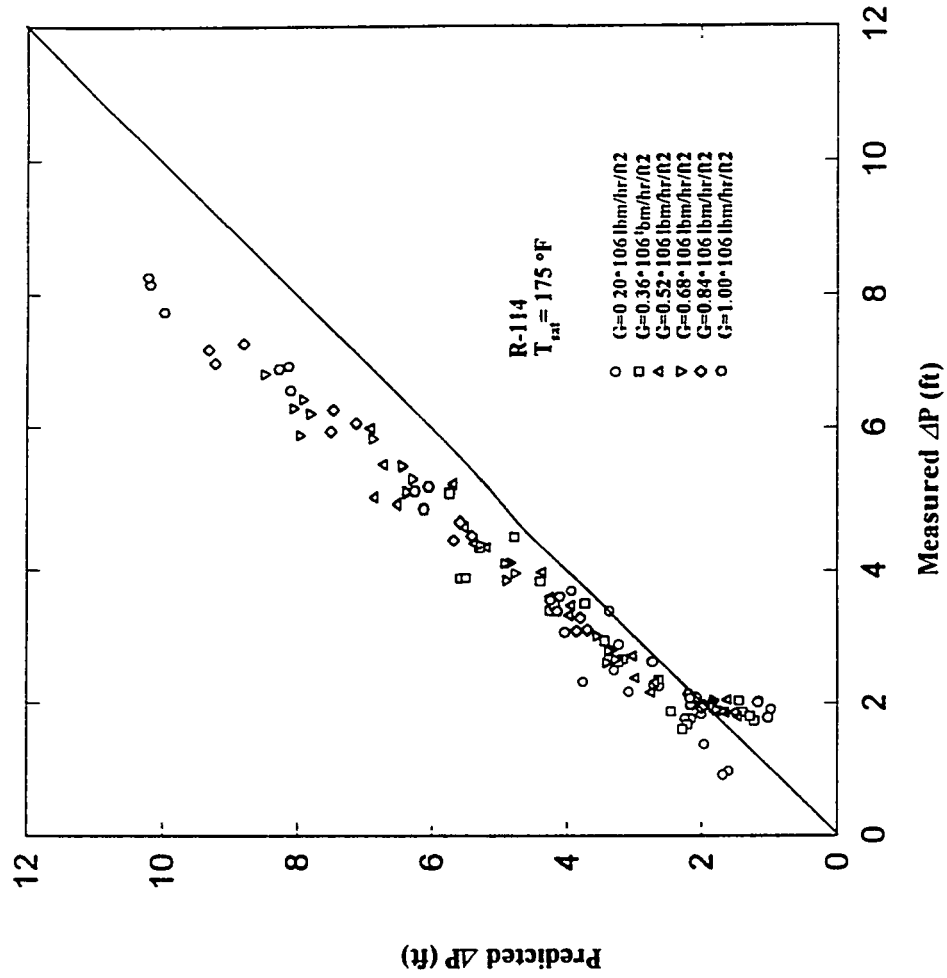


Figure 56. Comparison of Measured and Predicted Pressure Drop for R-114 at T_{sat}=175°F

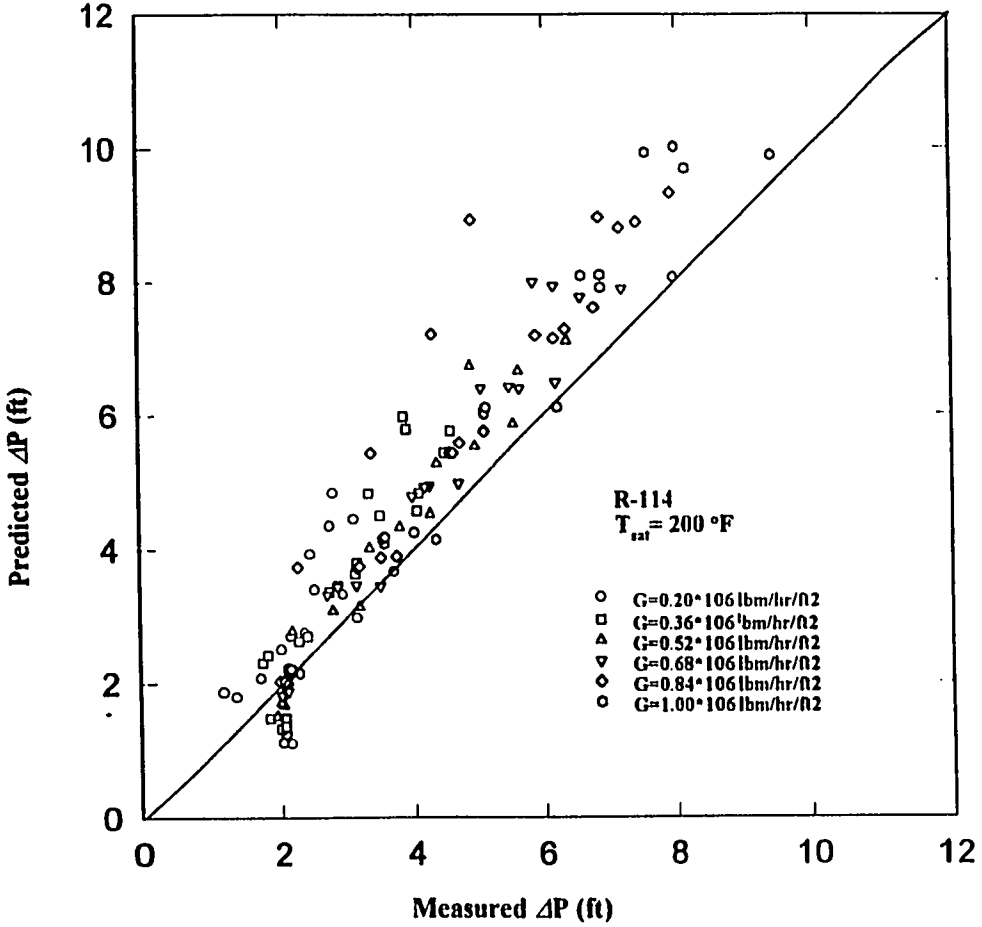


Figure 57. Comparison of Measured and Predicted Pressure Drop for R-114 at T_{sat}=200°F

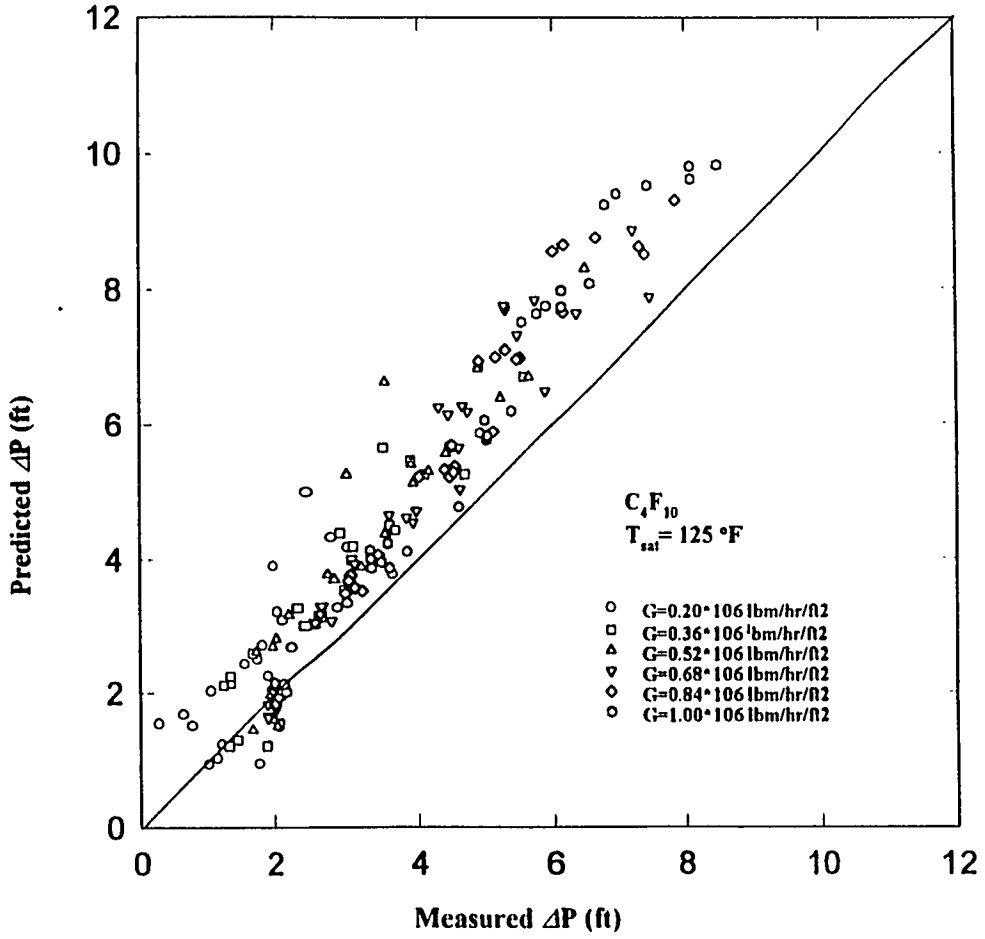


Figure 58. Comparison of Measured and Predicted Pressure Drop for C_4F_{10} at T_{sat}=125°F

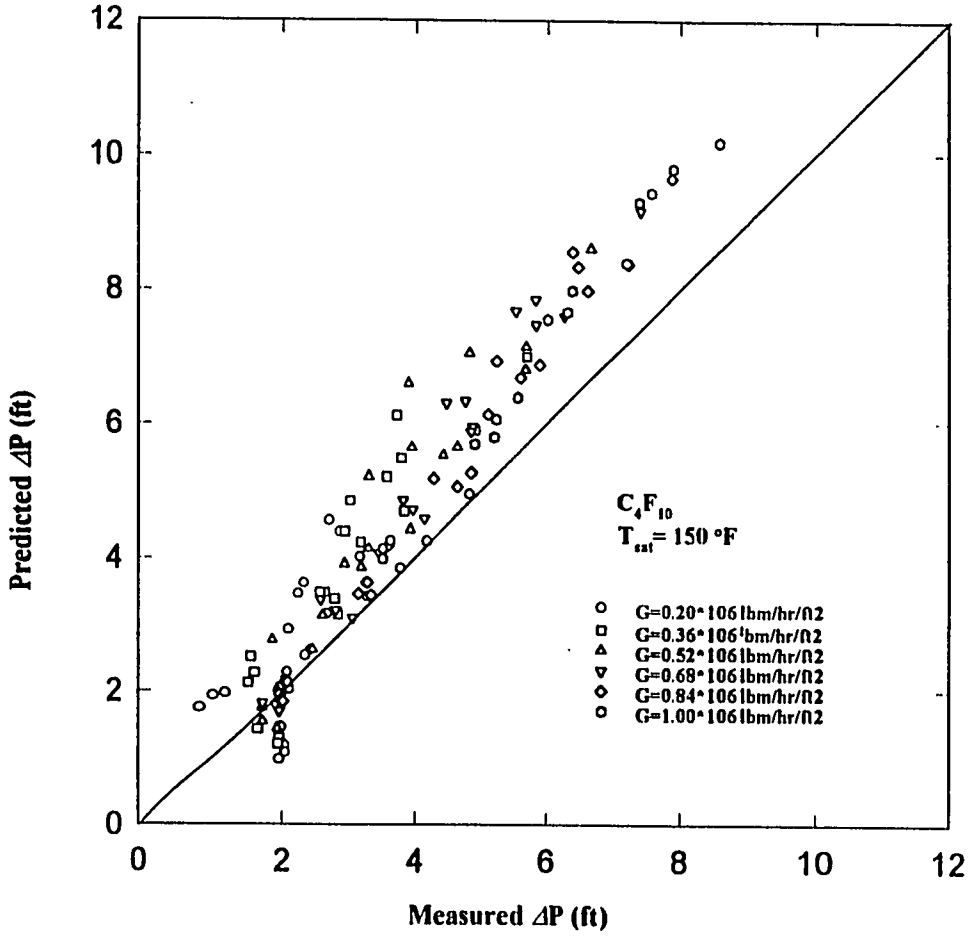


Figure 59. Comparison of Measured and Predicted Pressure Drop for C_4F_{10} at T_{sat}=150°F

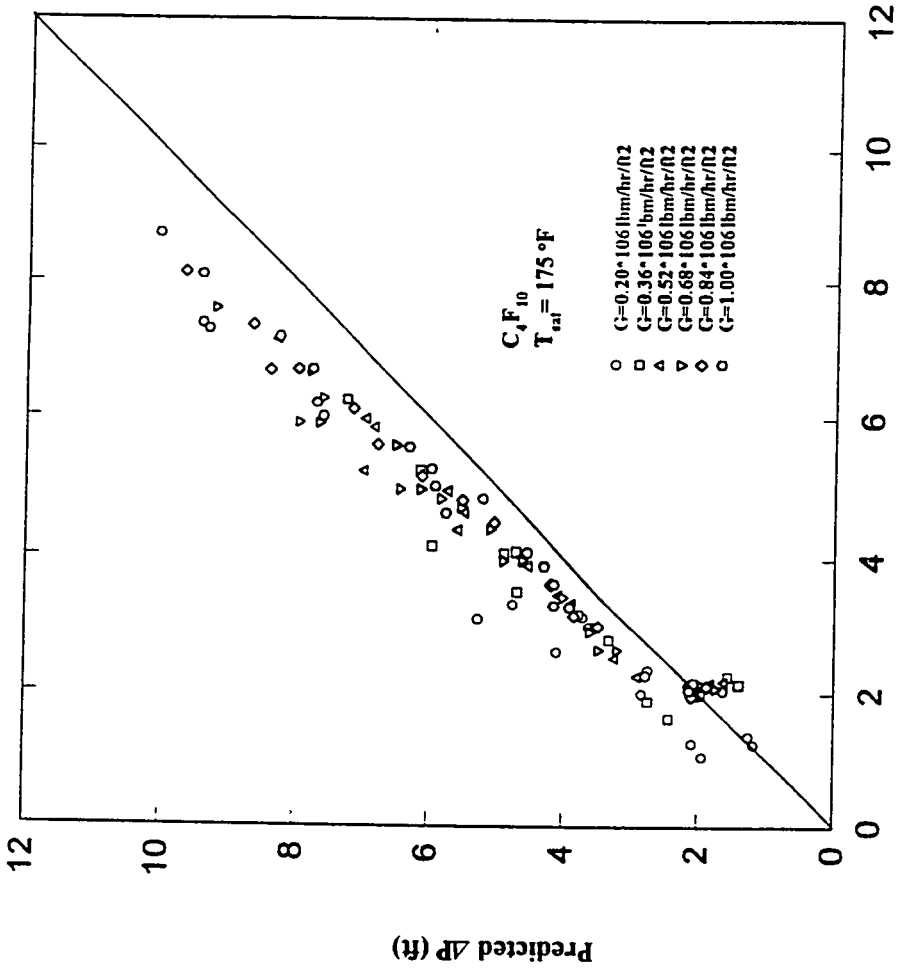
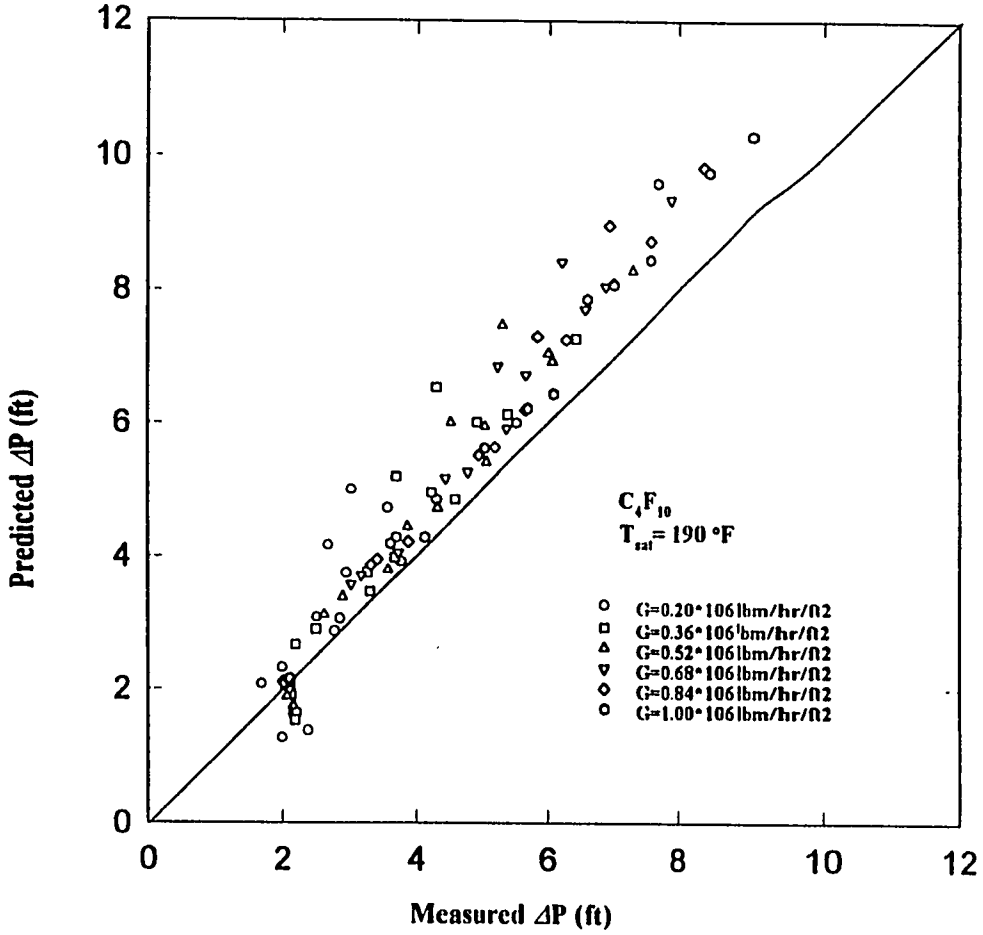


Figure 60. Comparison of Measured and Predicted Pressure Drop for C_4F_{10} at T_{sat}=175°F



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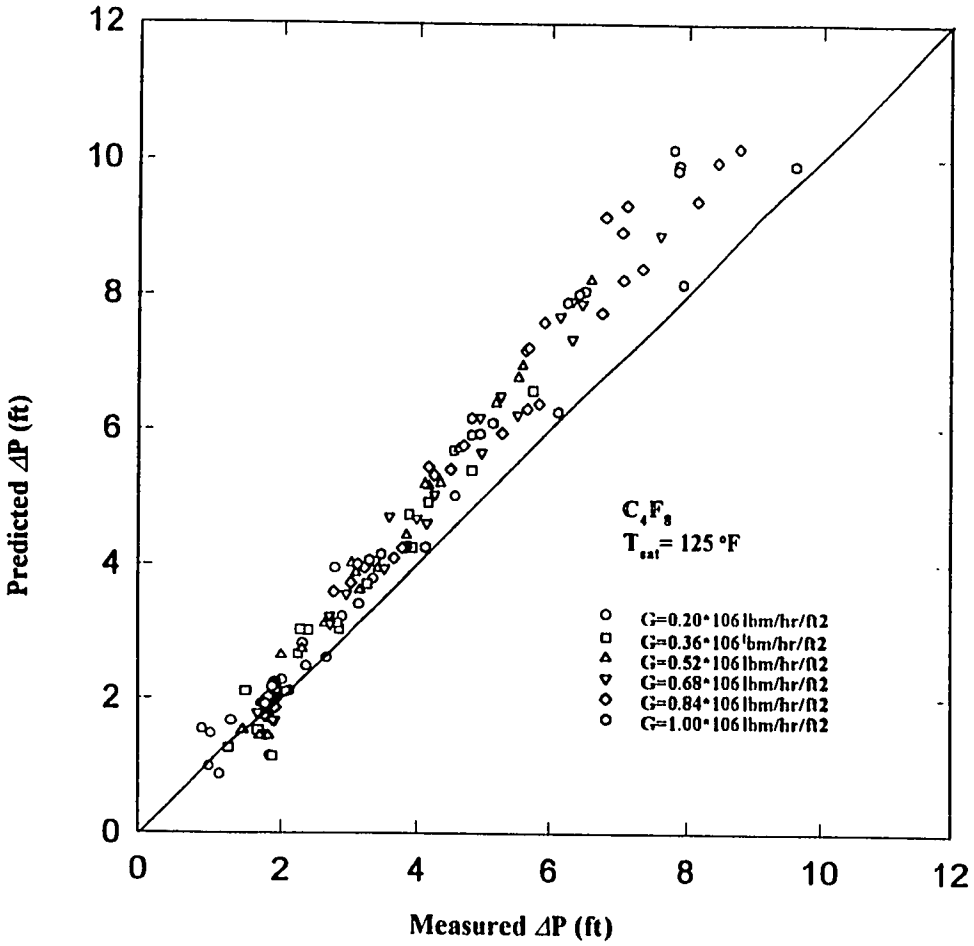

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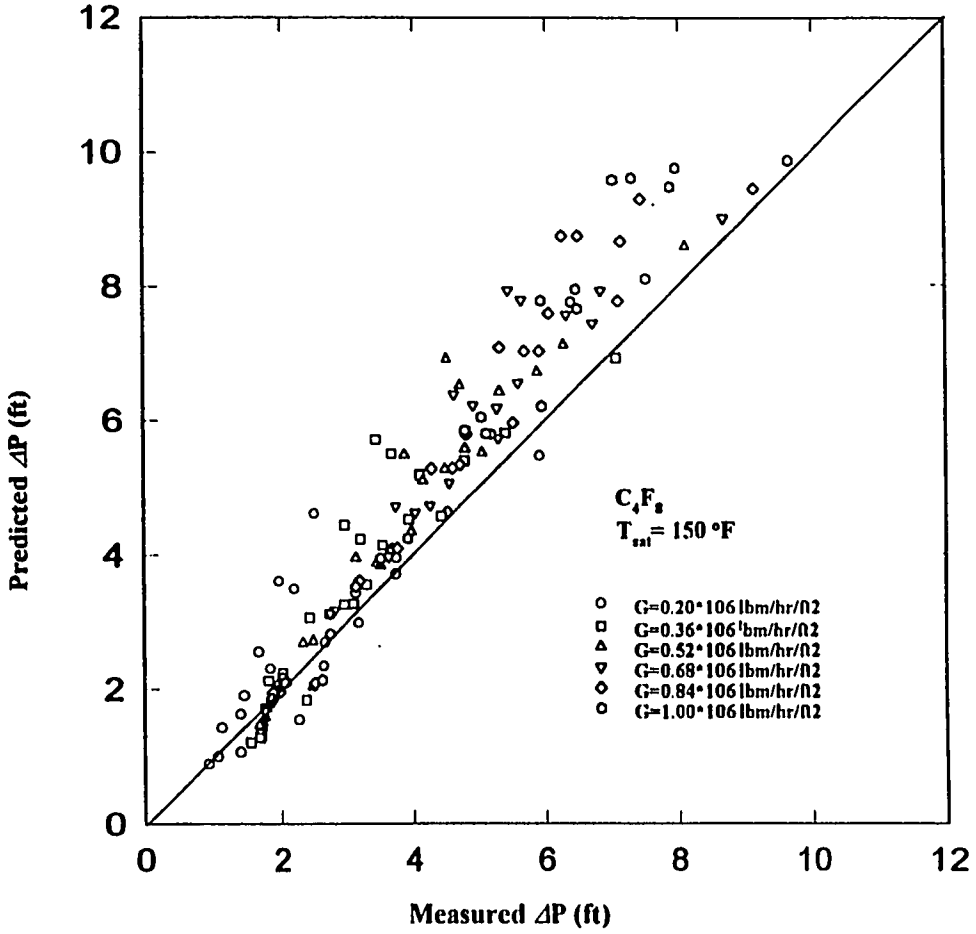

Figure 63. Comparison of Measured and Predicted Pressure Drop for C_4F_8 at T_{sat}=150°F

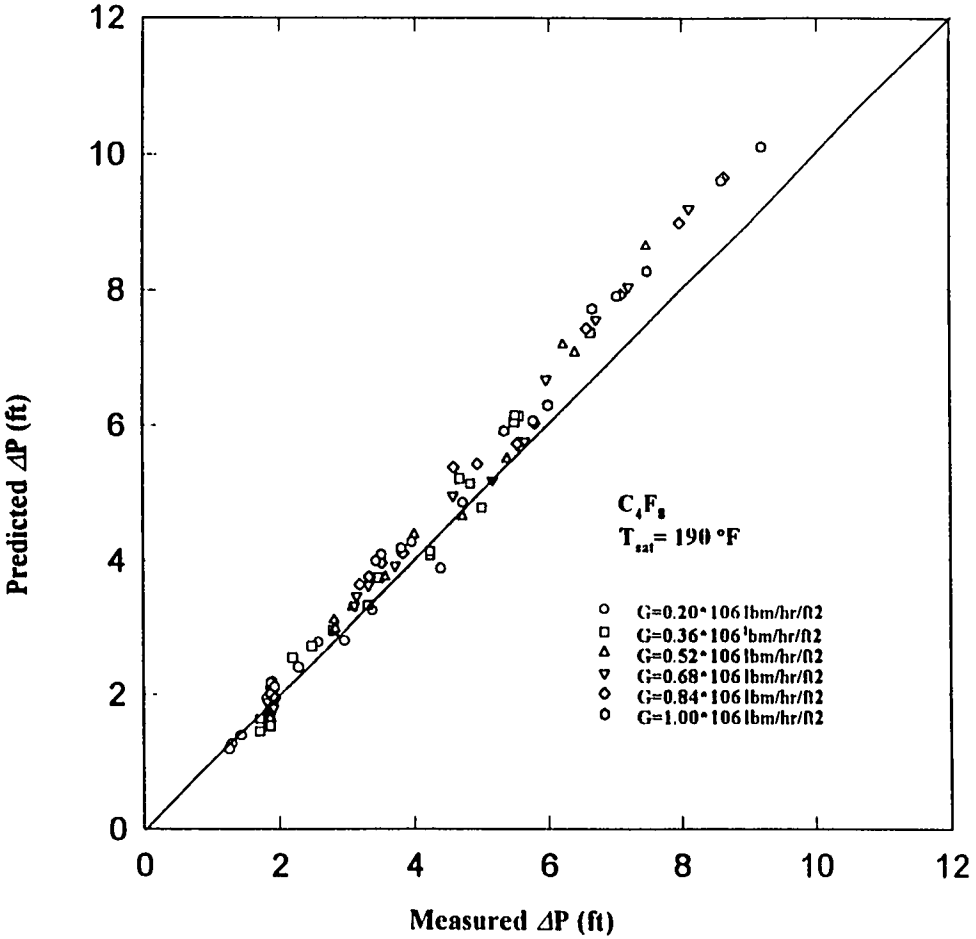

Figure 64. Comparison of Measured and Predicted Pressure Drop for C_4F_8 at T_{sat}=190°F

Section 3

Study of Flow Boiling of Mixtures of R-114, and C_4F_{10}, in a Vertical Tube

Study of Flow Boiling of Mixtures of R-114 and C_4F_{10} in a Vertical Tube

by

Cudo Technologies, Ltd.
P.O. Box 185, Lexington, KY 40584

Contract # 11K-NR559
Report # MMES-Cudo-NR559-3

Martin R. Pais, PhD, PE
Principal Investigator

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ABSTRACT

Convective pool and flow boiling experiments were conducted for three different mixtures of liquid R-114 and C_4F_{10} to determine the heat transfer and pressure drop characteristics in a vertical tube. Experiments were run over the saturation temperature range of 130 °F to 170 °F, heat flux range of 5000 to 25000 btu/hr.ft^2 and mass flow rate range of 0.5E6 to 1E6 lbm/hr.ft^2. Experiments were run for different saturation temperatures, heat fluxes, and mass flow rates so as to determine the heat transfer capability and pressure drop conditions. The heat-transfer coefficient of the mixture is as much as 30% lower than the ideal values under the same flow and saturation conditions. Correlations are presented which provide a best fit prediction of the data.

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NOMENCLATURE

A	Area
c	Constant
C	Correction factor
C_p	Specific heat
d	Inside diameter of tube; Differential operator
g	Gravitational acceleration
G	Mass flux
h	Heat-transfer coefficient
k	Thermal conductivity
Nu	Nusselt number ($=hd_i/k$)
P	Pressure
Pr	Prandtl number ($=C_p\mu/k$)
q	Heat flux ($=Q/A$)
Q	Heat input
Re	Reynolds number (Gd_i/μ)
T	Temperature
x	Vapor quality
z	Coordinate in direction of flow

Greek

α	Void fraction
Δ	Difference
λ	Latent heat of vaporization
μ	Viscosity
σ	Surface tension
ρ	Density
ν	Specific volume

Superscript

n	Exponent

Subscript

cv	Convection
F	Friction
g	Vapor phase
i	Inside diameter
l	Liquid phase
nb	Nucleate boiling
nbf	Nucleate boiling factor
npb	Nucleate pool boiling
sf	Based on surface characteristics
tpf	Two-phase factor

INTRODUCTION

Recently, a number of studies [1-3] on forced convective flow boiling of mixtures of fluorinated carbon liquids have been conducted as part of the effort to improve the performance of heat pump systems. One of the characteristics of such mixtures is the variable temperature during phase change at constant pressure. This phenomena can be utilized to reduce the thermodynamic irreversibility in counter-current heat exchangers resulting in an increase in heat exchanger efficiency.

The flow boiling tests conducted at CUDO, on mixtures of C_4F_{10} and R-114 provide useful information in selecting the replacement for the CFC liquid R-114 for gas-cooler heat exchangers. According to some experimental studies [4-7] for flow boiling using different mixtures, the heat-transfer coefficient of mixtures is significantly lower than that of pure fluid. The results from this experimental study show a good agreement with this trend. This study indicates that the heat-transfer coefficient of the mixture is strongly dependent on its composition and generally lower than the ideal value between the two pure liquids. The heat-transfer coefficient of the mixture is as much as 30% lower than the ideal values under the same flow and saturation conditions. References [4,6] attribute the reduction in the heat-transfer coefficient to the mixture effects on nucleate boiling, non-ideal variations in physical properties and the heat transfer resistance in the vapor phase.

Convective flow boiling experiments were conducted at Cudo Technologies Ltd.(Cudo) for three different liquid mixture compositions of R-114 and C_4F_{10}. The experimental setup is described in detail in reference 1. Experiments were run for different saturation temperatures, heat fluxes, and mass flow rates so as to determine the heat transfer capability and pressure drop conditions. Also correlations are presented which provide a best fit prediction of the data.

Experimental Setup [8]

Figure 1 illustrates the flow boiling system capable of operating at pressures from 0 to 350 psig and temperatures ranging from 50 °F to 300 °F. Liquid from the storage tank is pumped by a variable flow gear pump at a predetermined flow rate. The liquid on exiting the pump passes through a filter-drier, a flow meter and a pre-heater before entering the test section. The pre-heater allows fine control of the inlet sub-cooled/saturation conditions by the use of a temperature controller. Before entering the test section the liquid is made to flow through a flow straightener consisting of a honeycomb section ahead of a converging cone which mates with no transition in geometry with the inlet of the test tube test section. The liquid on flowing through the test section takes up heat through phase change and exits as a liquid-vapor mixture. At the top and exit of the test section is a sight-glass tube allowing visualization of the exit flow. The exiting liquid-vapor mixture next passes through a cyclone separator. The settled liquid passes through a flow meter before draining into the storage tank. The vapor is condensed in the condenser. The condensate passes through a flow meter before draining into the storage tank.

The test section [8] is primarily a 0.785 inch ID and 1.75 inch OD copper tube about 10 feet in length. At each end of the test section is a welded copper flange for mating with the other parts of the setup. The test section is divided into ten zones, each 11.5 inches long and thermally isolated from the adjacent zones by a 1/2 inch wide groove. Figure 2 illustrate the positioning of the thermocouples and pressure transducers [8]. The temperature profile in each zone is provided by seven thermocouples distributed longitudinally and azimuthally. Five thermocouples are imbedded in the 1/2 inch thick wall so as to be 1/8 inch from the inner tube wall. A sixth thermocouple is positioned midway in the fluid stream and a seventh thermocouple is clamped to the external heater. All the thermocouples were calibrated with their respective wiring harnesses in conjunction with the data acquisition. The uncertainty in the temperature measurement is ± 1 °F [8].

Seven pressure transducers were positioned along the length of the tube [8], see figure 1. One at the entrance of the tube and one at the exit measured the absolute pressures. Additionally, five

transducers are placed equidistantly within the test region to provide the differential pressure relative to the pressure at the inlet. The pressure taps are located in zones 1, 3, 5, 7, 9 & 10 such that the distance between two consecutive taps is 2' except for the tap in zone 10 which is at a distance of 22.5" from that in zone 8. The differential pressure transducers provide the pressure drop information along the length of the tube. The uncertainty in the differential pressure is ± 0.05 psi and in the absolute pressure ± 1 psia [8].

Each zone of the test section is wrapped with heaters capable of providing over 60,000 Btu/hr.ft^2 to the outer surface of the tube [8]. The heater arrangement and the test section was thermally insulated from the environment by three layers of high temperature Fiberfrax^r insulation (k = 0.65 Btu.in/hr.ft^2.°F @ 500 °F) and an aluminum foil radiation heat shield. The uncertainty in the heat flux is ± 175 btu/hr.ft^2 [8].

SCR power supplies regulate the power to the heaters by varying the phase angle on each AC cycle proportional to the control signal [8]. This method of applying power provides a continuous uniform heat flux with fine control. A temperature controller, monitors the temperature of the outer heater surface. In the event of an overshoot in the temperature of the surface, an alarm disconnects the power to the heaters via relays. In the design of this experiment the number of devices to be measured included over eighty thermocouples, seven pressure transducers, six flow meters, and ten power transducers. To expedite on-site data analysis a PC-based data acquisition was used to measure, perform the necessary calculations, display system conditions and store the data. To reduce the uncertainty in the overall measurement, the devices were calibrated using standards in conjunction with the data acquisition.

Experimental Procedure [8]

With reference to figure 1, the variable flow pump is started and the flow rate adjusted to the desired predetermined value. The pre-heater is powered to control the inlet coolant entry temperature. The antifreeze is circulated through the cooling coils in the condenser at a flow rate such that the saturation pressure at the inlet is maintained at the desired value. Excessive cooling

may cause a low pressure at the pump inlet and lead to cavitation. Too little cooling will cause the pressure to rise and force the liquid at the inlet to the test section to be sub-cooled. A heater on the storage tank in conjunction with a cooling coil in the storage tank is used as an accessory control for inlet temperature and pressure, see figure 3.

The heaters on the test section are turned on and the power is ramped up in steps to the desired heat flux, making certain that steady-state conditions are reached on the surface of the heater. The data acquisition is set up to measure the heat input and temperature of the heaters. With this information the heat loss from the test section to the ambient and end-plates was calculated from the earlier heat loss calibration [8]. The balance of the heat is necessarily taken up by the fluid. Both the heat loss and the heat flux into each zone are displayed simultaneously by the data acquisition. Hence, it is possible to determine and set in real time the heat flux conditions. Steady-state thermal flow-field conditions are determined by monitoring the temperatures of the various regions of the system. When the temperature transients die down (1 °F or less change over a 5 minute period), the system is assumed to be in thermal equilibrium. At this juncture the:

- temperatures at various locations
- system pressure and region differential pressures
- power input to the heaters
- flow meter readings
- flow field observations

are noted down and collected by the data acquisition unit.

The above process is followed for a step-wise increase in heat flux until CHF conditions are imminent. At this juncture the heat flux is further increased so as to span the L/D ratios for the CHF study. In regions where CHF occurs the heat flux is reduced so as to maintain the wall temperatures approximately equal to the upstream zone to reduce any heat losses. This is because at CHF the heat-transfer coefficient drops significantly and the wall temperature rises correspondingly. To prevent too high a temperature in the particular zone the heat flux must be

dropped.

At the end of the experimentation all heaters are turned off. The antifreeze is pumped through the heat exchanger in the storage tank. This creates a low pressure zone in the storage tank (by condensing the vapor). This induces all the vapor and the liquid in the rest of the loop to collect in the storage tank. Once the system has cooled down, all power to the loop is disconnected and the storage tank is isolated from the rest of the system by closing the valves. Small leaks do exist in the flow loop and isolation reduces loss of freon over periods of no operation.

For each fluid at a predetermined boiling temperature and mass flux, the zone heat flux is gradually increased, (i.e. a constant heat flux was applied to successive zones in the direction of flow) until CHF conditions are reached in the exit heat zone. This was evidenced by a sharp rise in wall temperature at the last heated zone. As the critical condition was reached, the electrical power input to that particular zone was cut off or reduced.

In all runs undertaken, the flow at the inlet was slightly sub-cooled, the saturation temperature was maintained constant, and the surface heat flux was varied. The range of different coolant flow rates was then repeated at this surface heat flux. Once the surface heat fluxes between 5000 and 35000 Btu/hr/ft^2 were covered, a new saturation temperature was set and the entire procedure repeated. Thus, essentially, the coolant flow rate was the parameter most frequently varied, the surface heat flux the second most frequently varied, and the saturation temperature the least frequently varied. (Owing to the thermal mass of the fluid in the system, approximately 150 lbs, change in saturation conditions needed about three hours to reach steady state).

During the above tests the saturation temperature and pressure of the system are maintained steady at the predefined values. For each saturation temperature and each mass flow rate setting, the run provided data of the form:

- Surface superheat temperature versus heat flux
- Saturation temperature conditions

- Pressure drop profile
- Flow field observations
- Pressure at the inlet of the test section
- Pressure drop along the test section with intervals of 2, 4, 6, 8 and 9.88 ft from the inlet
- Room temperature
- Wall and in-stream temperatures in each of the 10 zones
- Gross heat input, heat loss and heat flux to each of the 10 zones
- Coolant flow rate and temperature at inlet of the test section
- Water flow rate and temperatures at inlet and outlet of the condenser

Owing to the heat losses to the flanges at either end of the test section the uncertainty in the heat input calculation is difficult to determine. The temperature measurement in section 6 indicated an inexplicable departure from the rest of the test section. The difference was attributed to the temperature compensation within the data acquisition. Hence for purpose of analysis the heat transfer data from sections 1, 6 and 10 are not presented or used for correlations in this study.

Experimental Program

The range of parameters covered by these experiments are listed below:

Saturation temperatures, °F:

$T = 130, 150, 170$

Liquid mass fluxes, lbm/hr-ft^2:

$G = 0.5, 0.75, 1.0*10^6$

Surface heat fluxes, Btu/hr/ft^2

$q = 0.5, 1.0, 1.5*10^4$

Composition

Mass fraction of 25 % to 75 % of C_4F_{10} in R-114

Heat Transfer Measurement and Analysis

The heat transfer characteristics are presented in the form of the heat flux **q** versus the wall-to-instream temperature difference ΔT. ΔT is the temperature difference between the average inside-wall temperature and the instream temperature. The average inside-wall temperature was determined by taking the average thermocouple measurements from five different locations on the section wall [8], see figure 2, and correcting them for wall thickness to determine the internal wall temperature. Five thermocouples were imbedded in the walls of each section. Owing to the intermittent heating and cooling of the test section some of the thermocouples would not make good contact with the wall. The discrepancy was evident on study of the temperature field in the section in question. In such cases the incorrect temperature was not considered in the calculations. Generally at the end of the testing the thermocouple attachments were fixed.

Convective flow boiling experiments were conducted at Cudo Technologies Ltd. (Cudo) for the mixture of C_4F_{10}/R-114 with three different compositions. The three compositions are 26%, 51% and 66% of C_4F_{10} by mass fraction. Figures 4 and 5 show the saturation pressure and liquid density versus temperature for the mixture with three different compositions. Experiments were run for different saturation temperatures, heat fluxes, and mass flow rates to so as to determine the heat transfer capability and pressure drop conditions.

Heat Transfer Correlation

Convective flow boiling of mixtures is much more complicated than that for pure liquids. The complication is due to the mixture effects on nucleate boiling and the heat transfer resistance in the vapor phase. During the past decade, some correlation equations for flow boiling of mixtures have been proposed [2-7]. However, most of these correlations are not applicable to other mixtures because they also include some empirical relations or coefficients which only can be used for specific mixtures and compositions.

Pais et al. [9] performed an experimental study of flow boiling for pure liquids R-114, C_4F_{10} and C_4F_8. They compared their heat transfer results with an asymptotic model proposed by

Steiner and Taborek [10]. The agreement between the measured and predicted heat-transfer coefficients is very good and the differences are within 25% for three different liquids. This implies that the asymptotic model is a general correlation and can be applied to different liquids.

In this study, the flow boiling heat-transfer coefficient for the mixture C_4F_{10}/R-114 was assumed to be approximately equal to the mean value of that for pure liquids. Under this assumption, the heat-transfer coefficient for the mixture was correlated with its composition in mass fraction. Here, the asymptotic model [9] was used to calculate the heat-transfer coefficients for the pure liquids. Likewise, the heat transfer correlation for the mixture is written in the form,

$$h_{(mixture)} = X\, h_{(C_4F_{10})} + (1 - X)\, h_{(R\text{-}114)} \tag{1}$$

where, the heat-transfer coefficients for the pure liquids C_4F_{10} and R-114 are calculated using the thermophysical and transport properties of each pure liquid based on the same mass flux for the mixture.

The asymptotic model proposed by Steiner and Taborek [10] for pure liquids was strongly recommended by Webb and Gupte [11]. Like the superposition model [12], the asymptotic model relies on combining a forced convection component and a nucleate pool boiling component. However, the asymptotic model uses a power relationship of the form [9],

$$h^n = [h_{nb}{}^n + h_{cv}{}^n]^{1/n} \tag{2}$$

or

$$h^n = [(h_{npb}C_{nbf})^n + (h_l C_{tpf})^n]^{1/n} \tag{3}$$

here,

h_{npb} is the local nucleate pool boiling coefficient. The coefficient itself can originate from any predictive method or data. Thus, it leaves a great freedom of choice.

C_{nbf} is a correction factor to h_{npb}, which compensates for differences between the pool and the flow conditions.

h_l is the local convective heat-transfer coefficient for single-phase liquid flow.

C_{tpf} is the two-phase flow multiplier to the convective component h_l, accounting for enhancement of the coefficient in the liquid-vapor mixture.

Steiner and Taborek [10] compared the predictive ability of their correlation with Chen [12], Shah [13], and Gungor and Winterton [14,15] for ethanol, ammonia, and R-12. Their [10] asymptotic form avoids the abrupt transition between the nucleate boiling and convective regions and in general they showed that their correlation is significantly better than the other correlations.

In order to use this approach one must have experimentally determined values for the two components $\mathbf{h}_{nb}$ and $\mathbf{h}_{cv}$ in Equation 2 or use those published by Steiner and Taborek [10] (determined from a 13,000 point data base covering a variety of fluids). We chose to use the experimental approach, and only used the convective multiplier $\mathbf{C}_{tpf}$, which accounts for enhancement due to the liquid-vapor mixture. Thus, Equation 3 can be rewritten as,

$$h^n = [h_{nb}{}^n + (h_l C_{tpf})^n]^{1/n} \tag{4}$$

From Taborek's [10] analysis, $\mathbf{C}_{tpf}$ was derived as a function of the vapor fraction x and the liquid-vapor density ratio ρ_l/ρ_g.

$$C_{tpf} = [(1 - x)^{1.5} + 1.9 x^{0.6} (\frac{\rho_l}{\rho_g})^{0.35}]^{1.1} \tag{5}$$

The correlation was developed and validated by Taborek [10] using a large data bank containing 15 fluids from 34 sources.

Single-Phase Liquid Flow

The forced convection component $\mathbf{h}_l$ for pure liquids in Equation 4 was determined experimentally at Cudo by running subcooled liquid through the copper tube for C_4F_{10} and R-114, and then correlating that data with a Dittus-Boelter type equation as given below.

$$Nu = \frac{h_l d_i}{k} = c\, Re^{0.8} Pr^{0.4} \tag{6}$$

In the above equation, the coefficient c is equal to 0.023 for singe-phase flow inside a smooth cylindrical tube. For the tube we used in our experiment, c was determined from single-phase liquid flow tests for the three different liquids. The results are shown in figures 6 and 7. Note, that when $c = 0.028$ both fluids C_4F_{10} and R-114 correlate quite well with equation 6.

Nucleate Pool Boiling

The nucleate pool boiling term $\mathbf{h}_{nb}$ for pure liquids in equation 4 was also determined at Cudo by running very low flow in the tube and only using heat flux data from the bottom two zones 2 and 3. The nucleate boiling correlation for flow boiling presented by Rohsenow [16] was applied to the experimental data,

$$\frac{C_{p_l} \Delta T}{\lambda Pr_l^{1.7}} = C_{sf}\left(\frac{Q/A}{\mu_l \lambda}\sqrt{\frac{\sigma}{g \Delta \rho}}\right)^{0.33} \tag{7}$$

The coefficient $\mathbf{C}_{sf}$ is dependent on the wall-fluid material characteristics and was determined from the pool boiling experiments.

The experimental results for the two pure fluids are plotted in figures 8 and 9 using the Rohsenow [16] correlation equation 7 with a logarithmic scale. Here, again the two fluids correlated the same, with an experimentally determined value of $\mathbf{C}_{sf} = 0.0038025$. It should be noted that in this coordinate system, the lower the line the higher the nucleate-boiling coefficient. After the coefficient $\mathbf{C}_{sf}$ is determined, the correlation of the nucleate boiling term $\mathbf{h}_{nb}$ for pure

liquids in equation 4 can be obtained from equation 7 in the form,

$$h_{nb} = \frac{Q}{A\Delta T} = \left(\frac{k_l^{1.7}}{C_{sf}\,\mu_l^{1.7} C_{p_l}^{0.7}}\right)^3 \mu_l \left(\frac{\Delta T}{\lambda}\right)^2 \sqrt{\frac{g\,\Delta\rho}{\sigma}} \qquad (8)$$

The fact that the predictive correlation is the same for the two different pure liquids does not mean that the nucleate boiling heat-transfer coefficient is the same. The difference in the physical properties of the fluids will result in different heat-transfer coefficients for the same temperature level and heat flow.

Pressure Drop Correlation

For two-phase flows inside a tube, the gravitational, frictional, and acceleration components contribute to the pressure drop and all three must be taken into account. Two different models are generally used in predicting pressure drop for two-phase flows. They are the homogeneous and the separated flow models. The homogeneous model considers the two-phase flow as a single-phase flow possessing mean fluid properties. On the other hand, the separated flow model considers the two-phase flow to be artificially segregated into two streams; one of liquid and one of vapor. In the homogeneous model, each stream is assumed to travel at a mean velocity. In the case when a very large percentage of the two-phase flow inside a tube is annular in nature, the application of a separated flow model will yield results better than those obtained by the homogeneous model.

In this study, the separated flow model presented by Martinelli-Nelson [17,18] was adopted for pressure drop prediction for pure liquids. In the Martinelli-Nelson model [17,18], the two phases are assumed to be separate. The pressure drop for pure liquids is defined by Equation (2-46) of Collier's [19] as given below,

$$-\left(\frac{dP}{dz}\right) = -\left(\frac{dP}{dz}\right)_F + G^2 \frac{d}{dz}\left[\frac{x^2 v_g}{\alpha} + \frac{(1-x)^2 v_l}{(1-\alpha)}\right] + g[\alpha\rho_g + (1-\alpha)\rho_l] \qquad (9)$$

The three terms contribute to the friction, acceleration, and gravitational pressure drop, respectively. These three pressure drop components are calculated using the Martinelli-Nelson model [17,18] in each section of the test tube. In the experiment, pressure drops with intervals of 2, 4, 6, 8 and 9.88 ft from inlet of the test section were measured by five differential pressure transducers. The pressure readings from the differential pressure transducers were corrected for elevation of the pressure tap lines. The corrected pressure drop was then converted to the equivalent elevation of the liquid column at the operating saturation temperature.

In this study, the pressure drop for the mixture of C_4F_{10}/R-114 was assumed to be approximately equal to the mean value of the pure liquids. Under this assumption, the pressure drop for the mixture was correlated with liquid composition based on mass fraction by the following equation,

$$\Delta P_{(mixture)} = X \Delta P_{(C_4F_8)} + (1 - X) \Delta P_{(R\text{-}114)} \qquad \textbf{(10)}$$

RESULTS AND DISCUSSION

Heat Transfer

The heat transfer characteristics are presented in the form of the heat flux **q** versus the wall-to-instream temperature difference ΔT. Data for the pure liquids C_4F_{10} and R-114 are also compared with the results for the mixtures in Figs. 11, 14 and 17. ΔT is the temperature difference between the average inside-wall temperature and the instream temperature. The average inside-wall temperature was determined by taking the average thermocouple measurements from five different locations on the section wall, see figure 2 [8], and correcting them for wall thickness to determine the internal wall temperature. From the results shown in Figures 10 to 18, the following trends are observed:

- ΔT increased with increase in heat flux q.
- As the saturation temperature increased, smaller ΔT were obtained.
- ΔT for the pure liquids C_4F_{10} and R-114 are smaller than for the mixtures, this implies that C_4F_{10} and R-114 provide higher heat-transfer coefficients than the mixtures. ΔT for the

mixtures do not always fall in between that for the pure liquids of C_4F_{10} and R-114

- The mixtures dry out earlier than R-114. In other words, the mixtures support lower critical heat flux (CHF) levels.
- The liquid mass flux does not have a strong effect on the heat-transfer coefficient.

Figures 19 and 20 showed the average heat transfer coefficients for the mixtures of C_4F_{10}/R-114 with various compositions. Scattered data at a particular composition and heat flux are correspondent to different zones in the test section. It was found that the heat-transfer coefficients of the mixtures were strongly dependent on its composition and generally lower than the ideal value between the two pure liquids. The heat-transfer coefficient of the mixture is as much as 50% lower than the ideal values at the composition of 26% of C_4F_{10}.

Figures 21 to 29 showed the comparison between the predicted and measured flow boiling heat-transfer coefficients for the mixture of C_4F_{10}/R-114 at 130, 150 and 170 °F with heat fluxes of 5,000, 10,000 and 15,000 Btu/hr/ft^2. The liquid mass flux was varied from $0.5*10^6$ to $1.0*10^6$ lbm/hr/ft^2. The predicted values were based on the mean predicted values from the pure liquids and were calculated using the correlation equation 4. An exact match would follow the 45-degree solid line. Note, the correlation predicts the experimental results fairly. In general, the correlation consistently over-predicts the experimental data with differences of up to 80%. This implies that the mean form of the correlation equation 4 does not provide a good prediction capability of the heat transfer. Murata et al. [4] concluded that the reduction in heat-transfer coefficient of mixtures is attributed to the mixture effects on nucleate boiling and to sensible heating of the vapor phase accompanying rise of saturation in the flow direction.

Pressure Drop

Figures 30 to 38 present the comparison between the predicted and measured pressure drop along the test section for the mixtures of C_4F_{10}/R-114. The figures indicate that the Martinelli-Nelson model [17,18] consistently and slightly over predicts the measured pressure drop. It seems agree with Murata's [4] conclusion that the pressure drop for mixtures is approximately

equal to that for the equivalent pure fluid.

CONCLUSIONS

Forced convection, pool and flow boiling tests were run using mixtures of R114 and C_4F_{10} to determine the heat-transfer coefficient, CHF and pressure drop. A correlation for **h** based on a flow convective and pool boiling model is presented. The dryout length under conditions of CHF increased with heat flux and reduction in flow rate. A pressure drop correlation, based on a separated flow model, slightly but consistently over-predicted the measured results.

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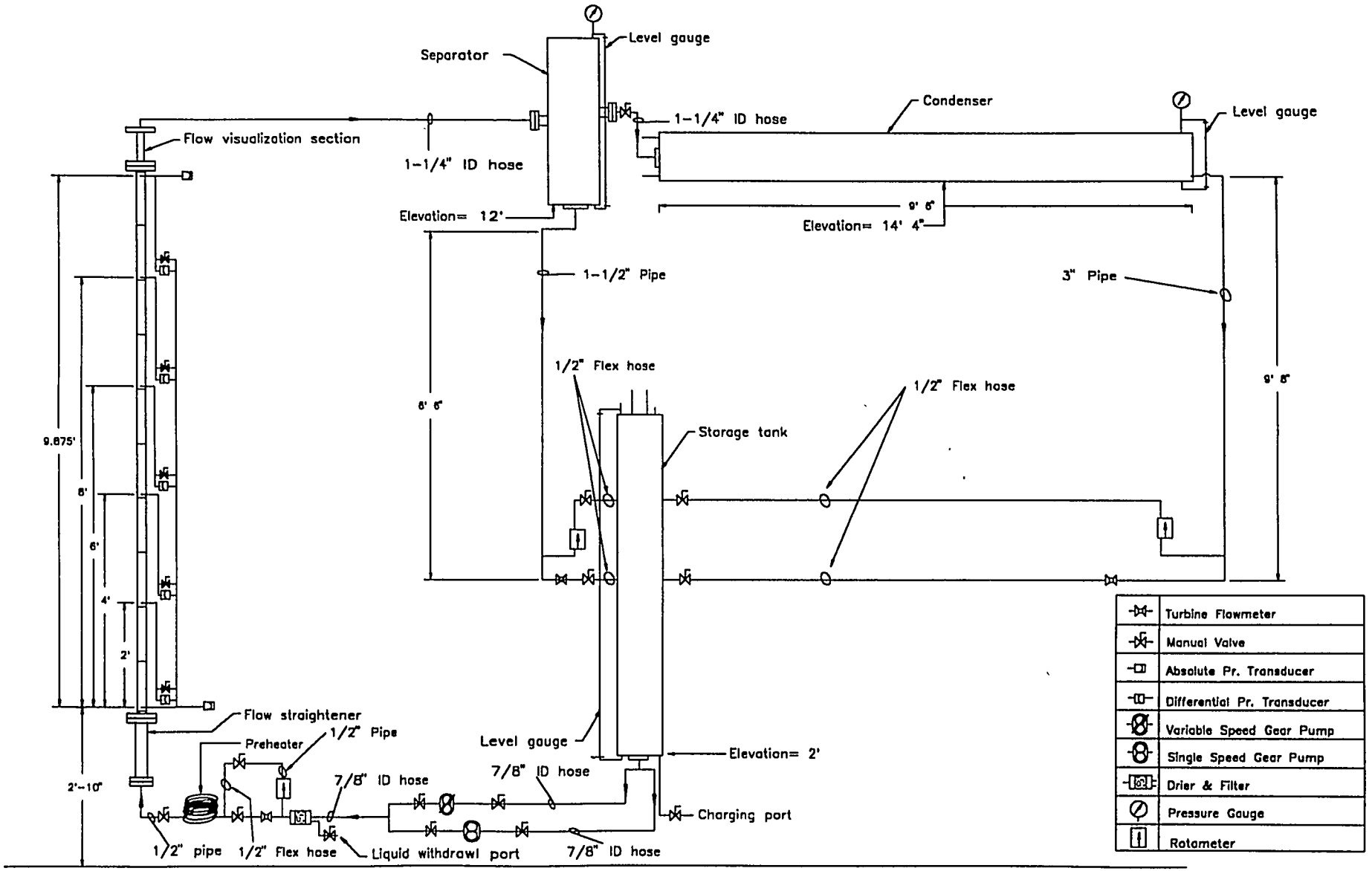
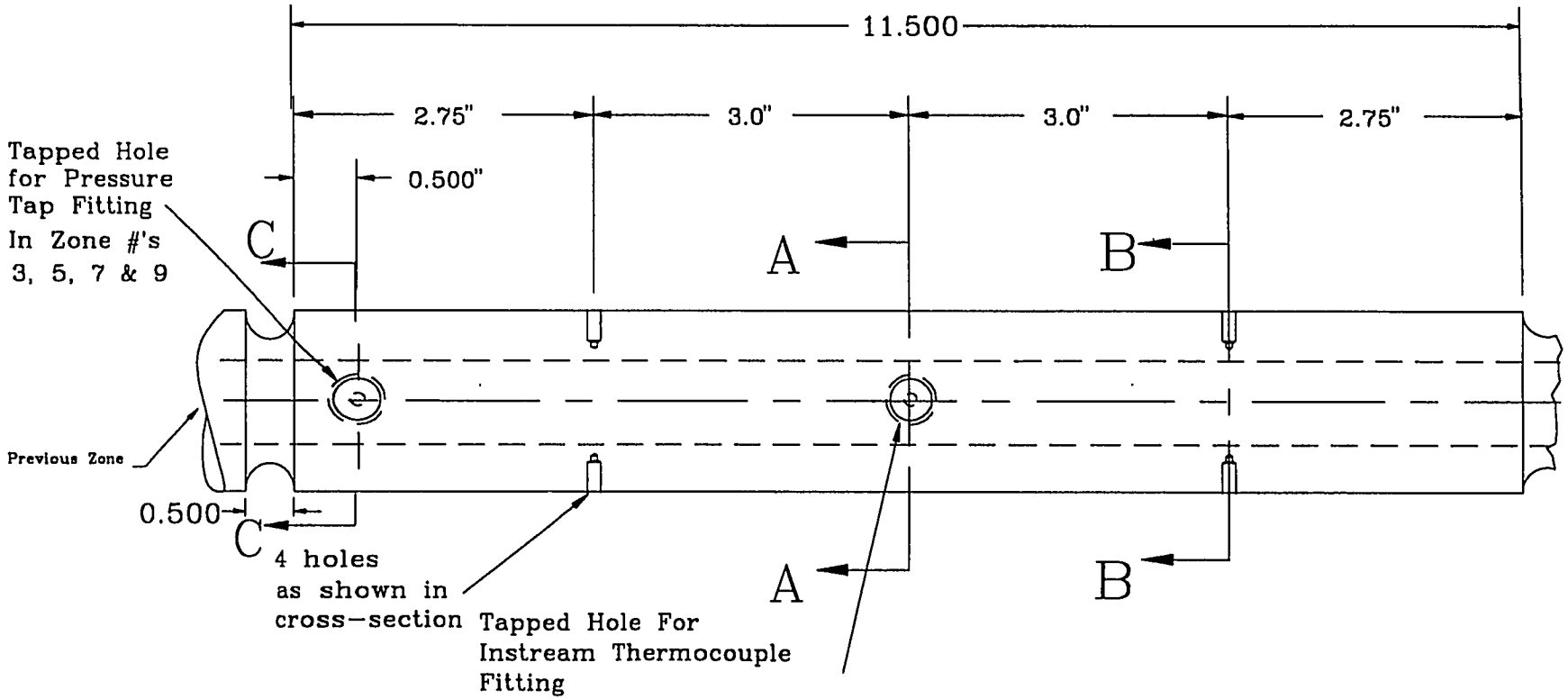
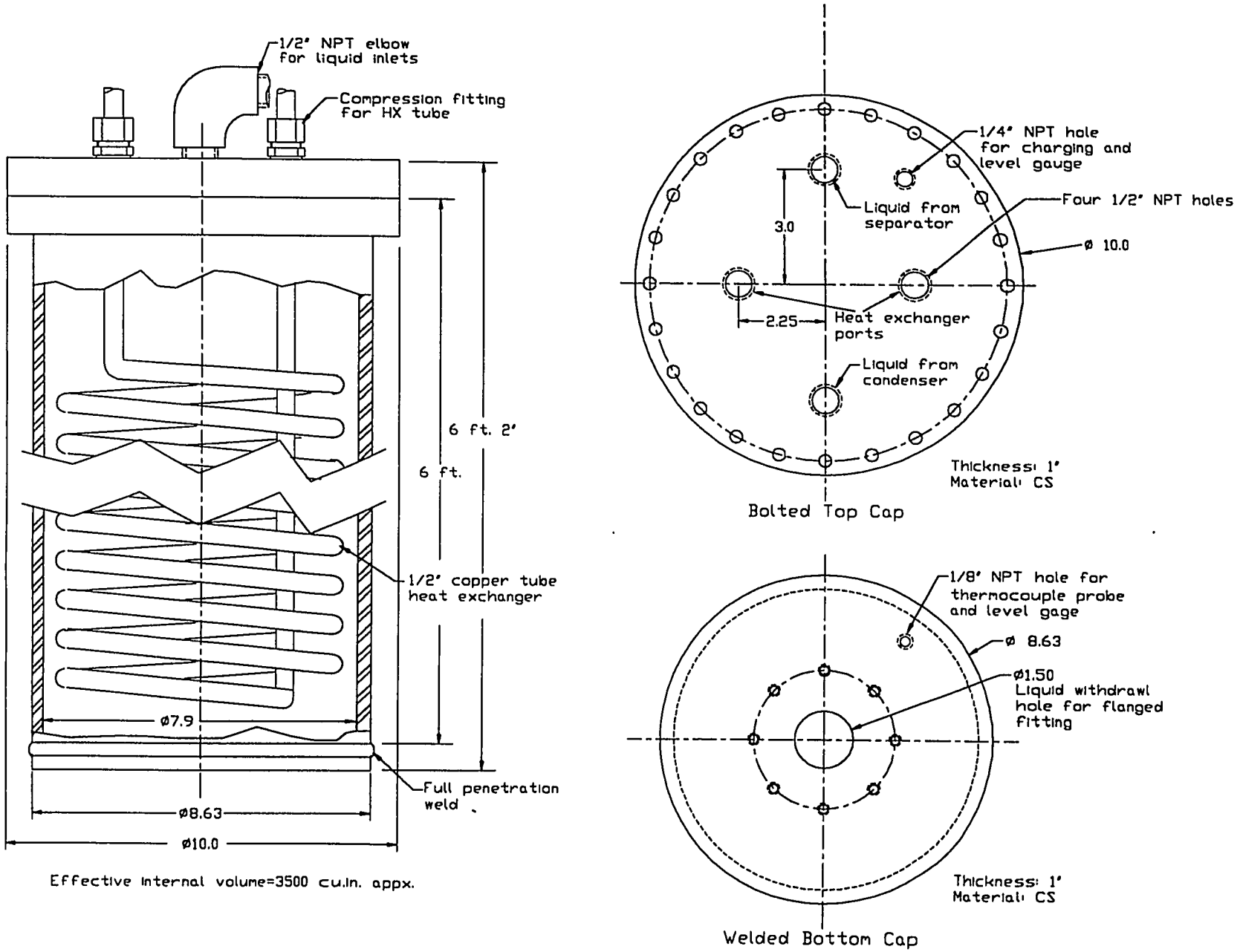


Figure 1. Test Fluid Loop



Details of Zone 2 thru 9

Figure 2 .



Storage Tank- Assembly and Caps

Figure 3.

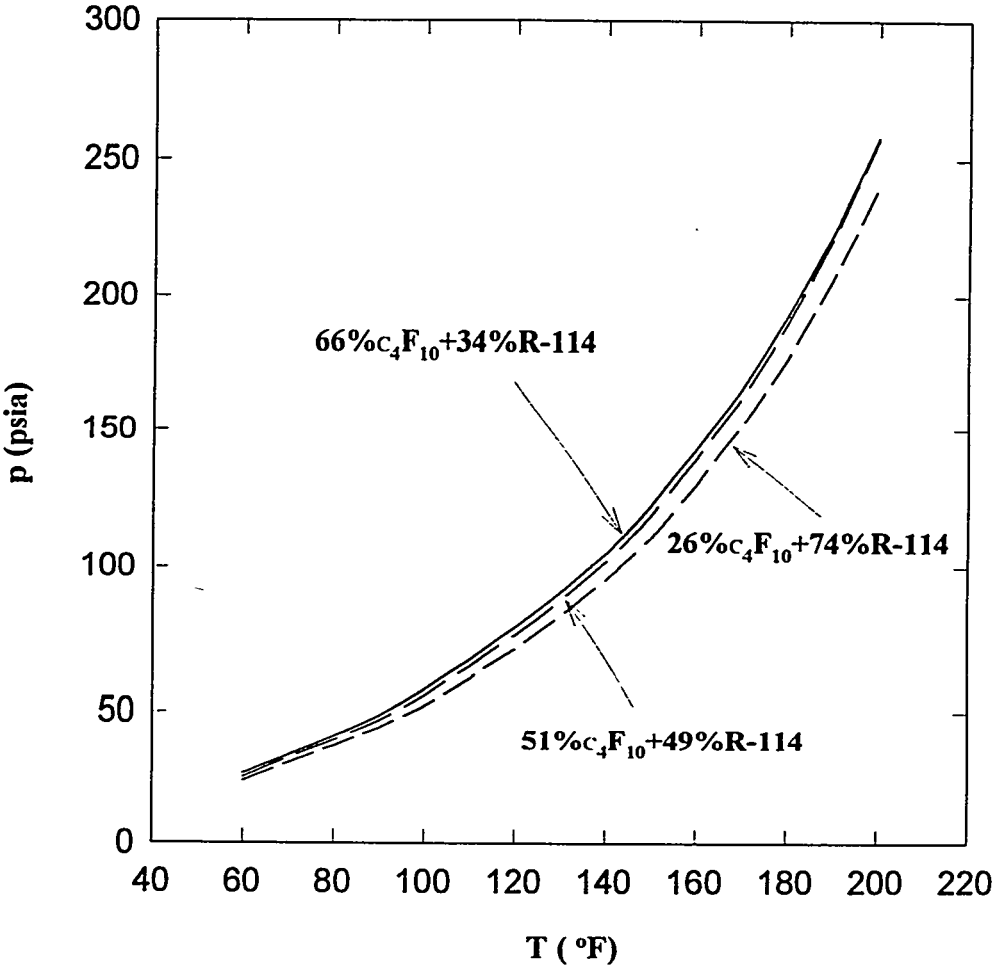


Figure 4. Saturation Pressure vs Temperature for Different Compositions of C_4F_{10} and R-114

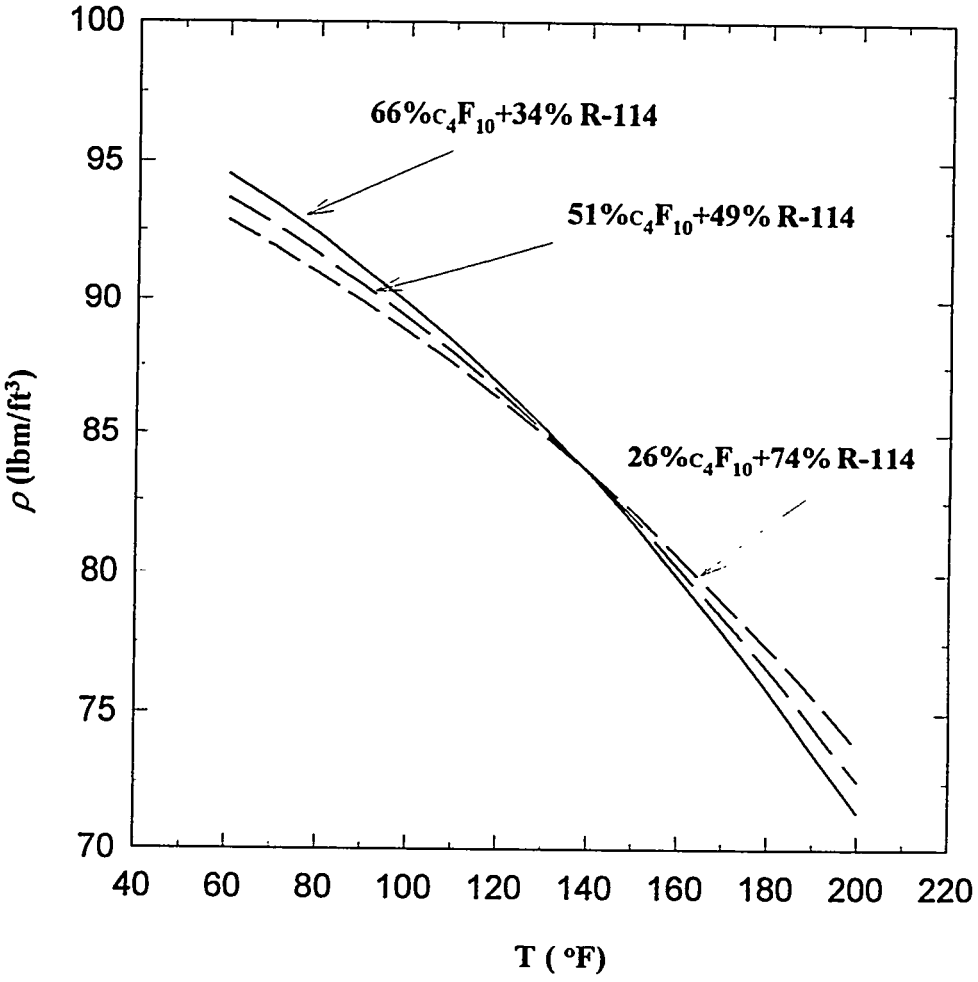


Figure 5. Liquid Density vs Temperature for Different Compositions of C_4F_{10} and R-114

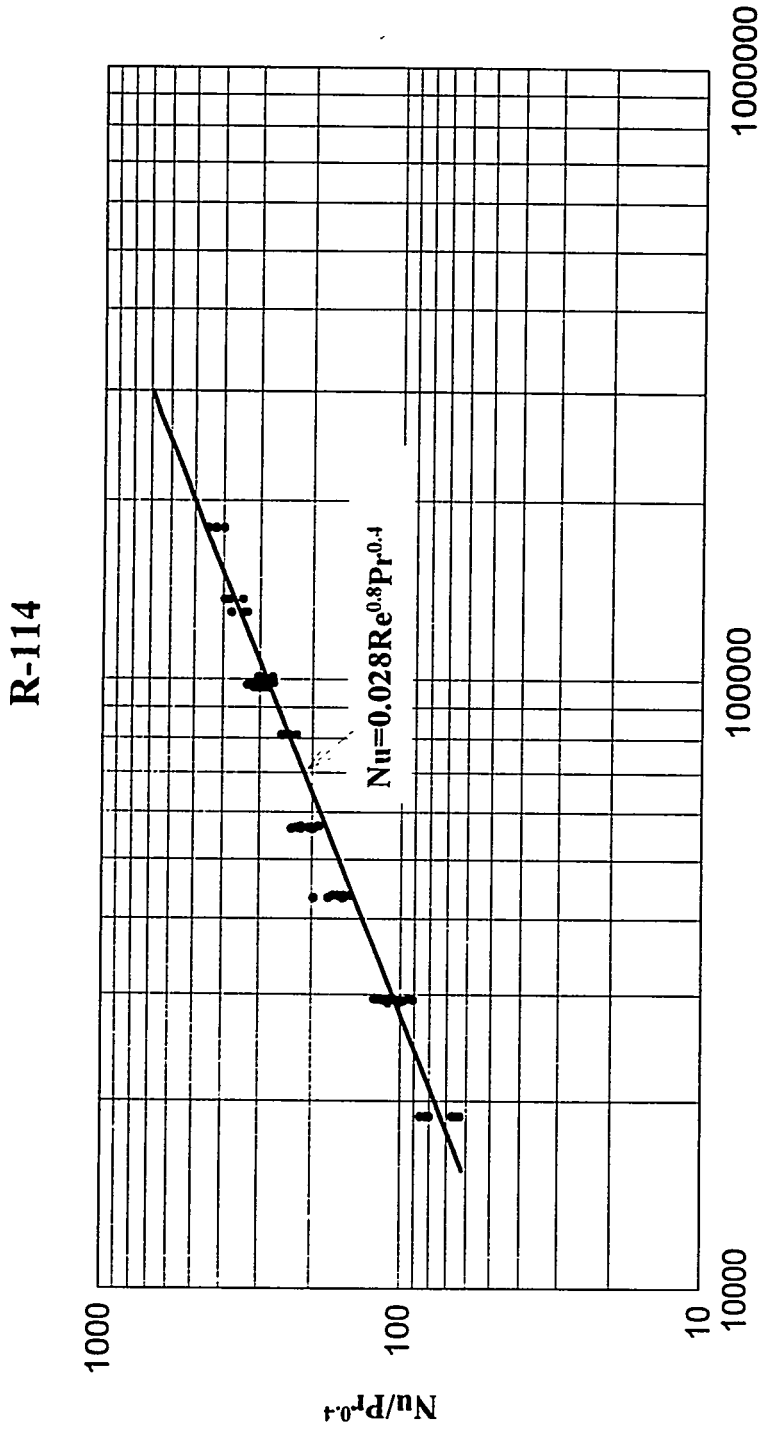


Figure 6. Correlation of Forced Convection for R-114

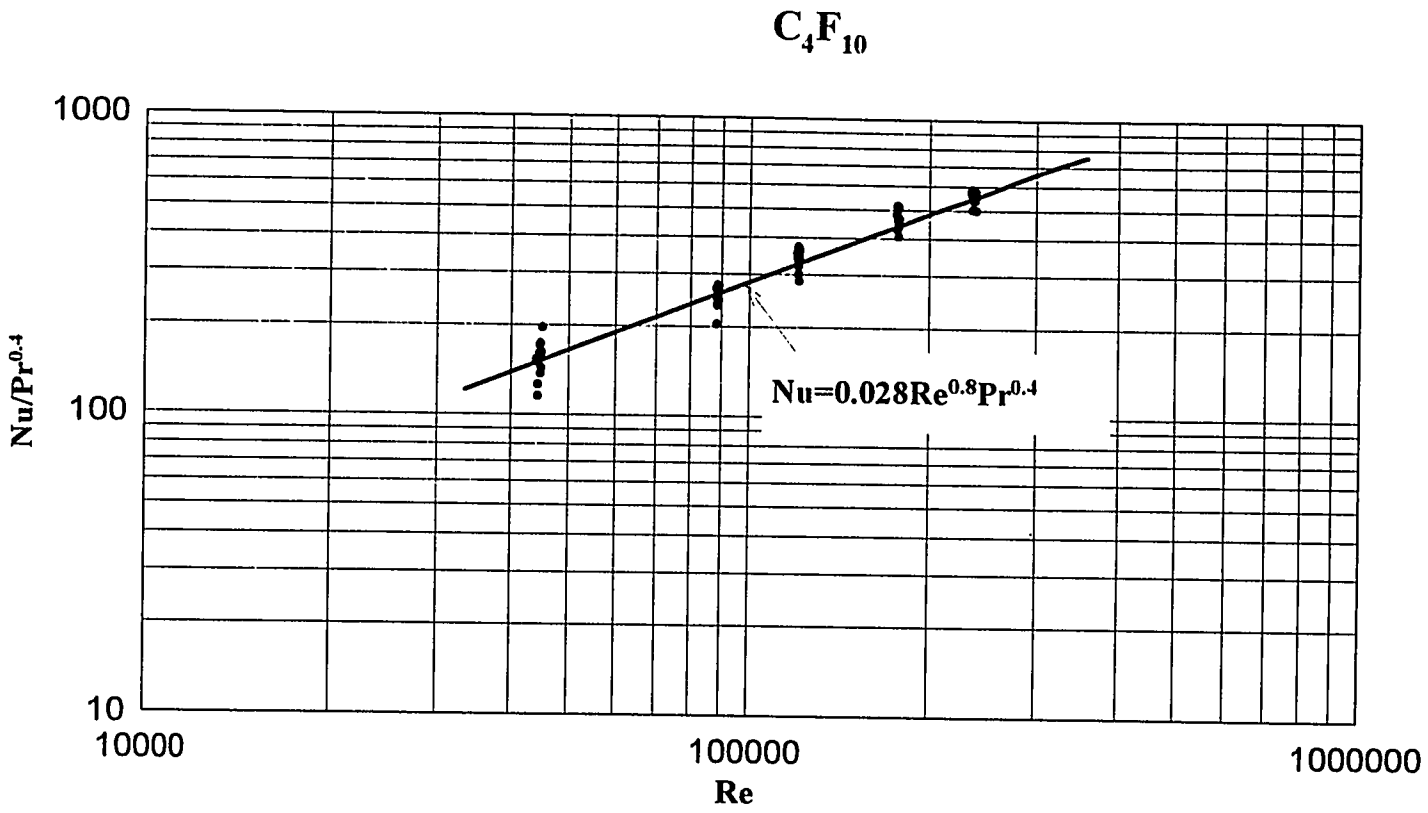


Figure 7. Correlation of Forced Convection for C_4F_{10}

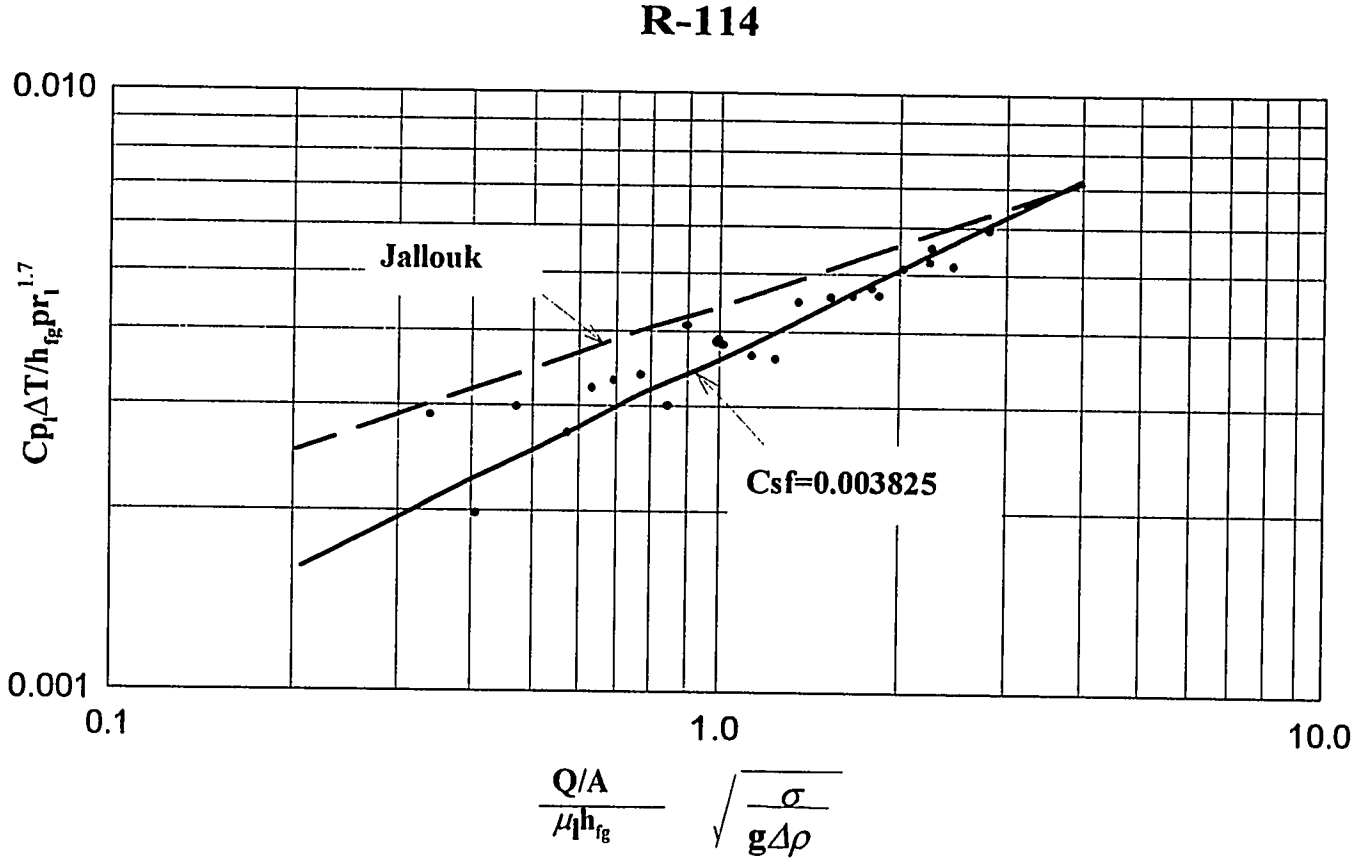


Figure 8. Correlation of Nucleate Pool Boiling for R-114

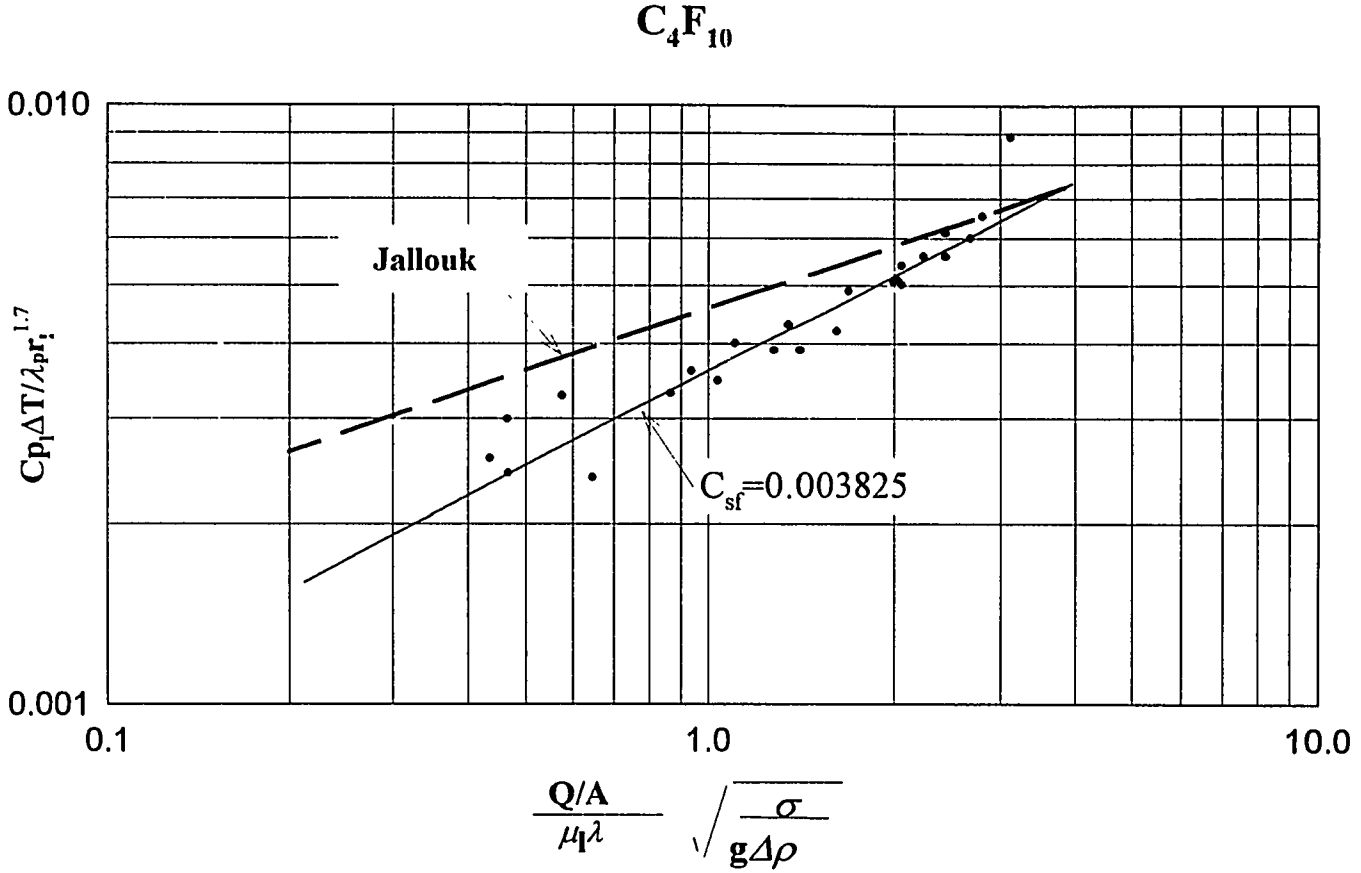


Figure 9. Correlation of Nucleate Pool Boiling for C_4F_{10}

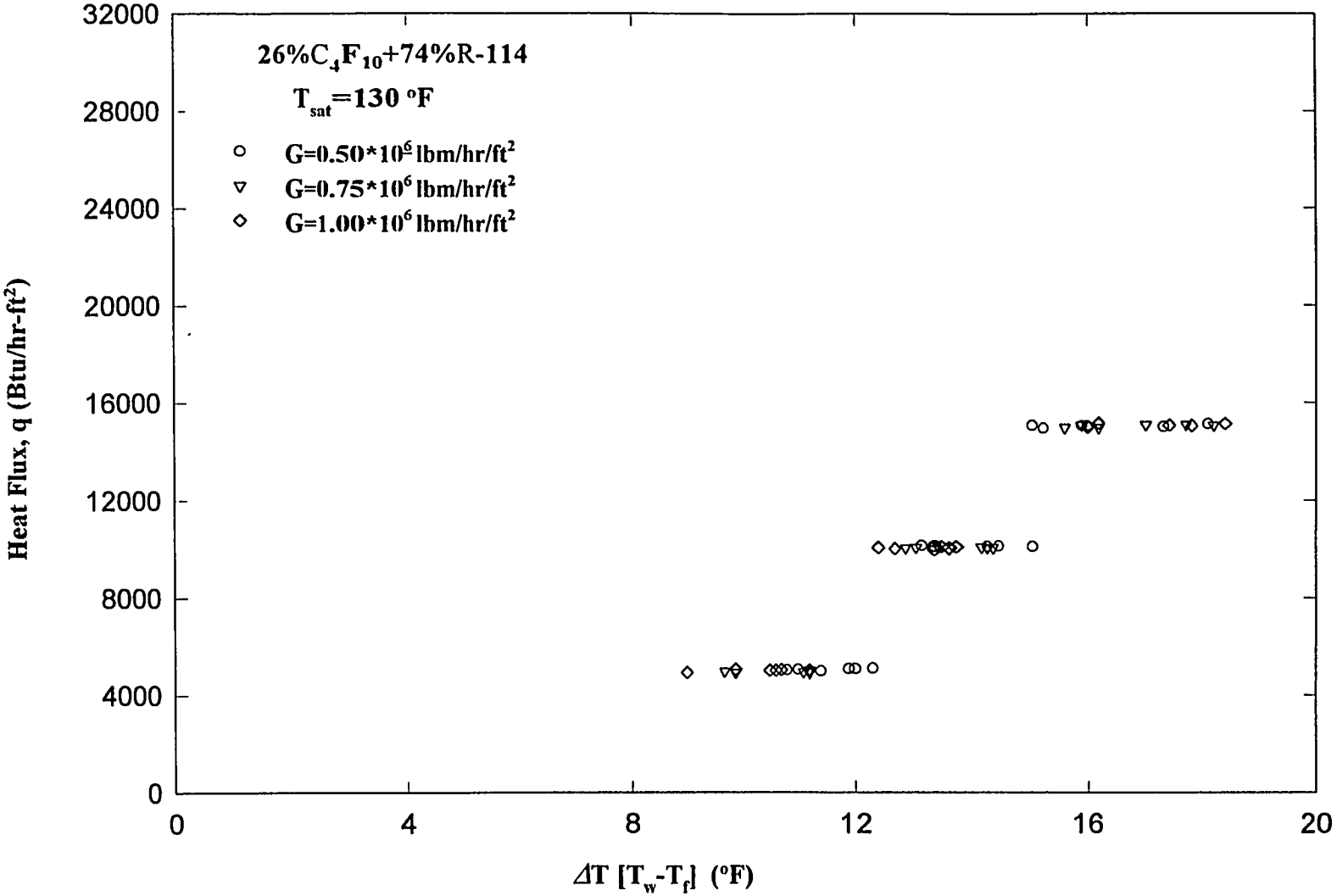


Figure 10. Heat Flux Versus the Wall-to-instream Temperature Difference for the Mixture of 26%C_4F_{10}+74%R-114 at T_{sat}=130 °F

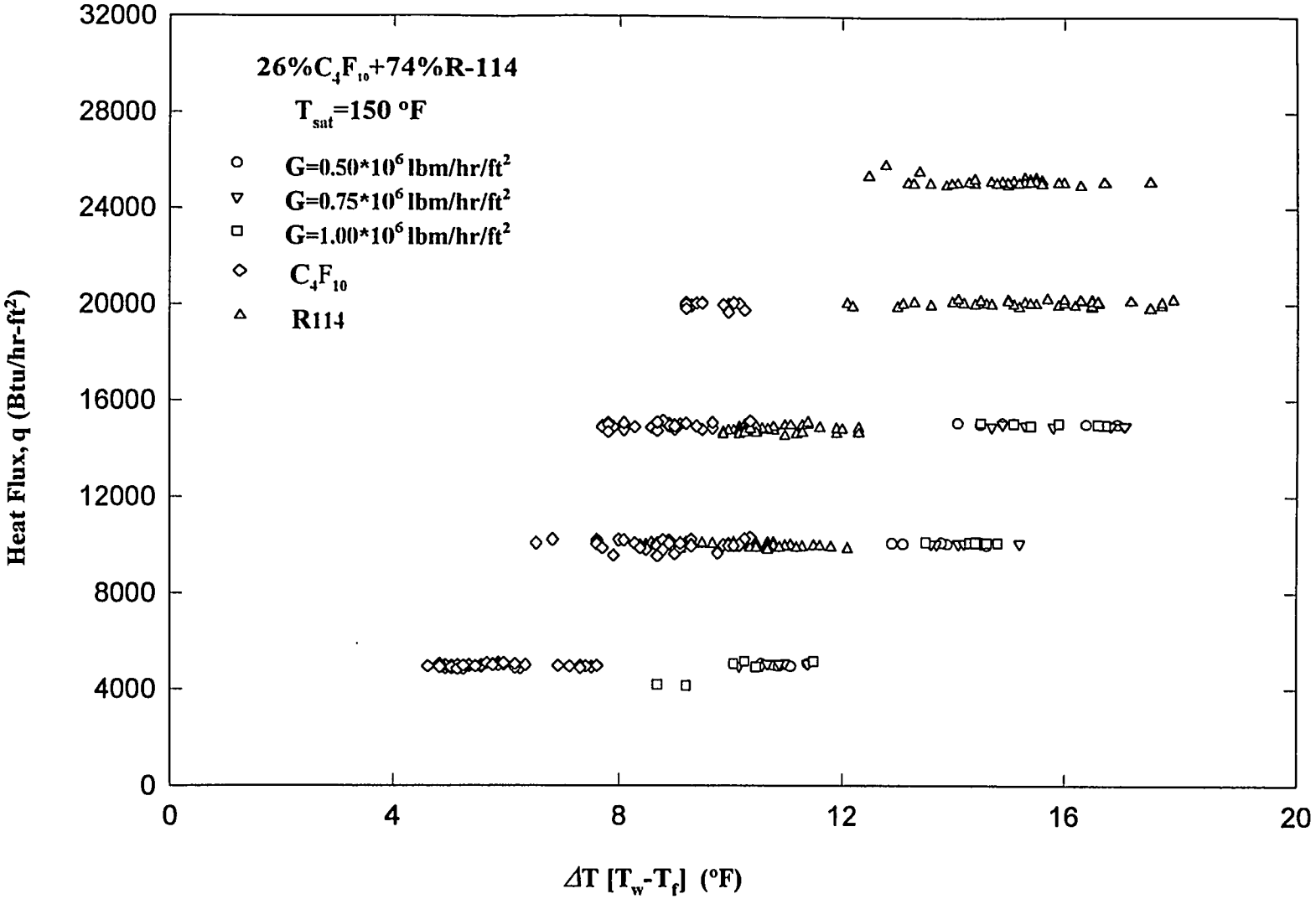


Figure 11. Heat Flux Versus the Wall-to-instream Temperature Difference for the Mixture of 26%C_4F_{10}+74%R-114 at T_{sat}=150 °F

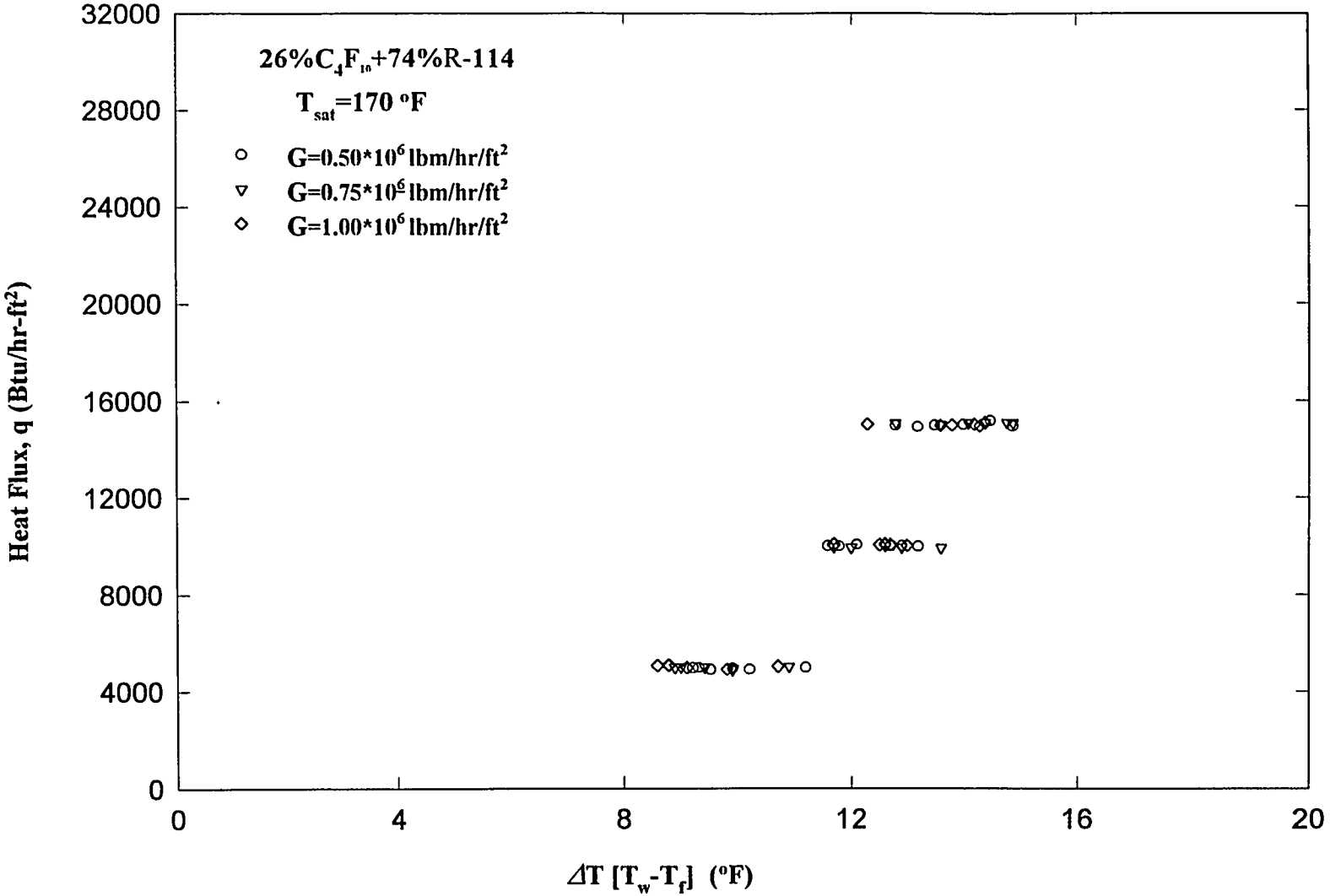


Figure 12. Heat Flux Versus the Wall-to-instream Temperature Difference for the Mixture of 26%C_4F_{10}+74%R-114 at T_{sat}=170 °F

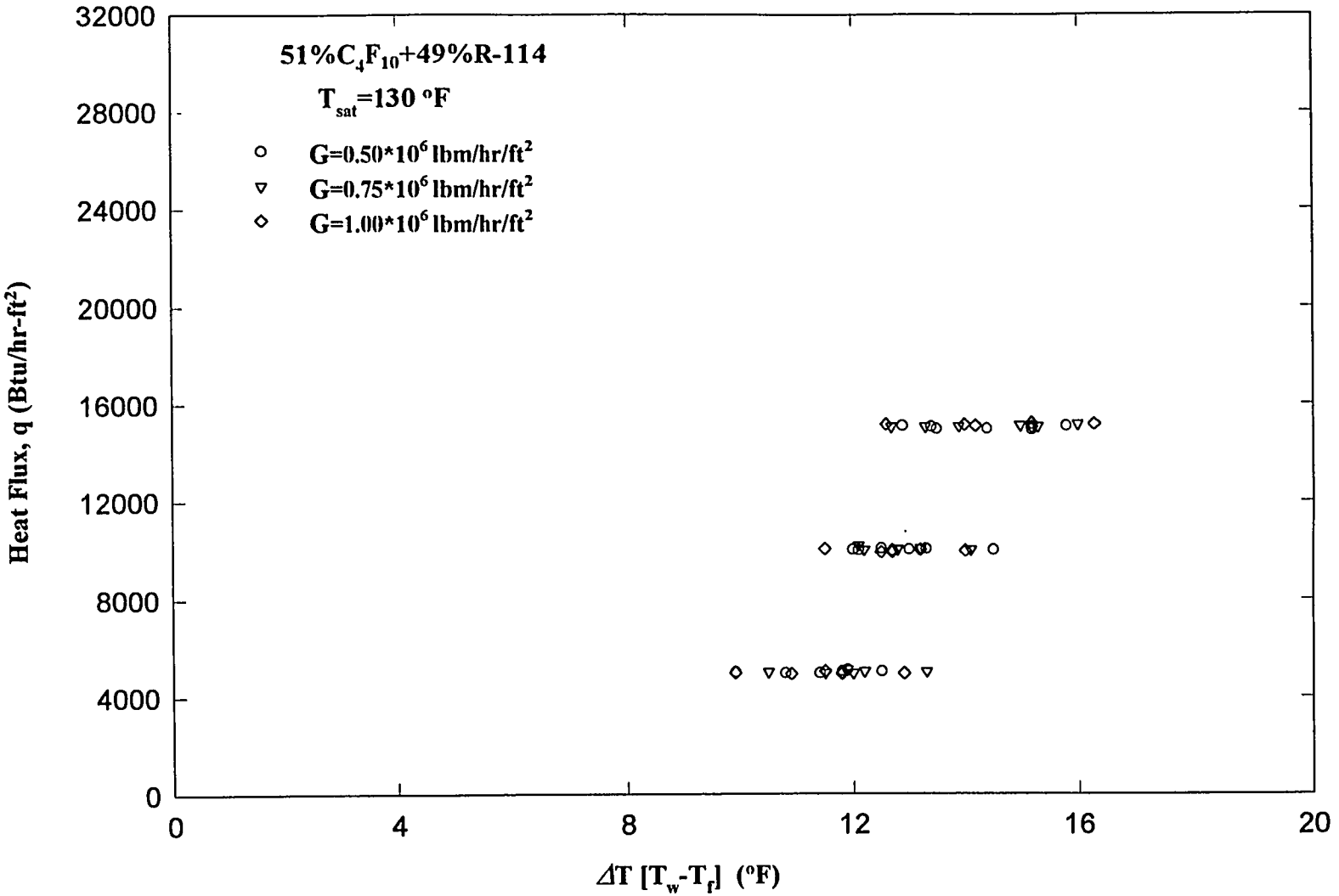


Figure 13. Heat Flux Versus the Wall-to-instream Temperature Difference for the Mixture of 51%C_4F_{10}+49%R-114 at T_{sat}=130 °F

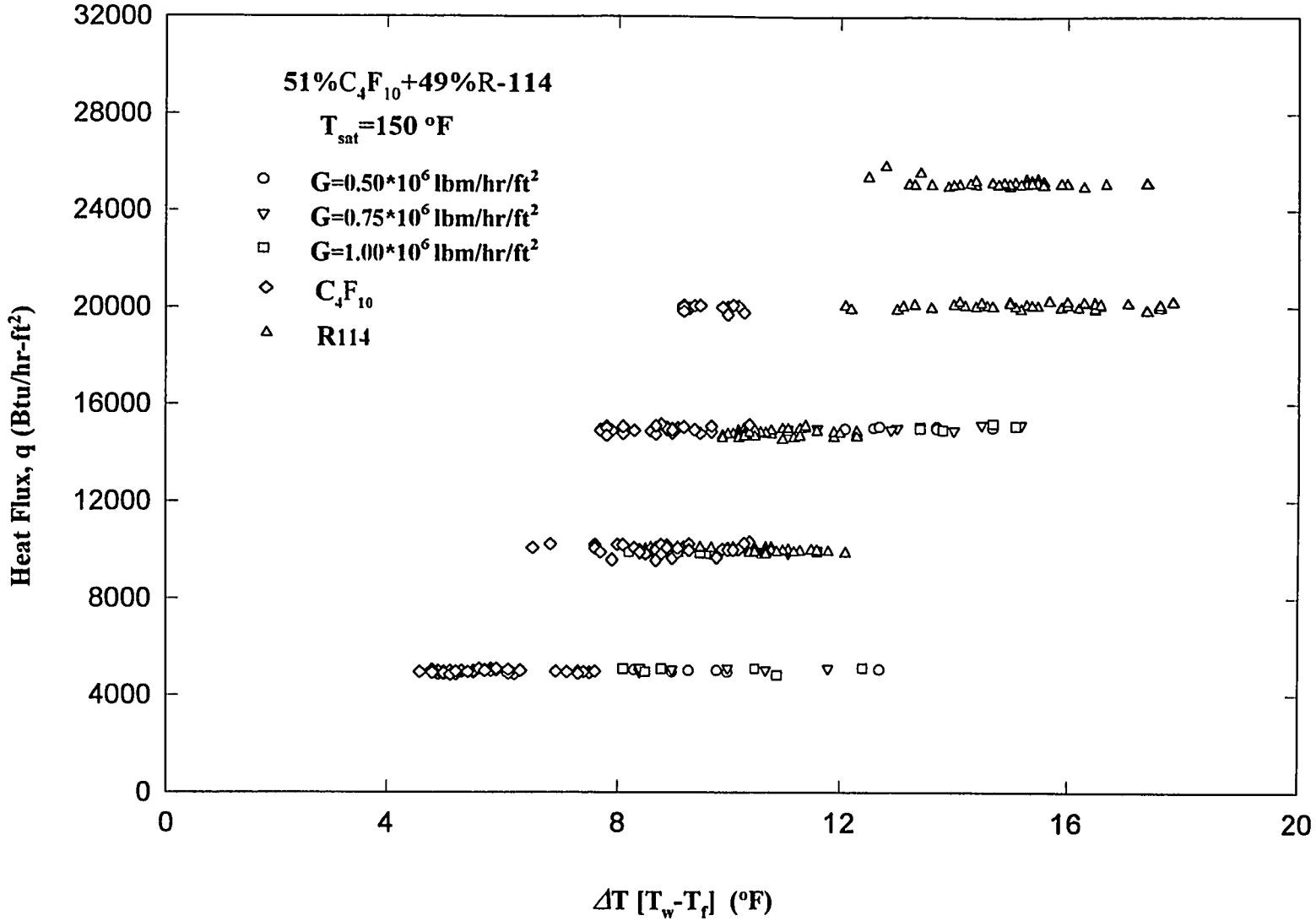


Figure 14. Heat Flux Versus the Wall-to-instream Temperature Difference for the Mixture of 51%C_4F_{10}+49% R-114 at T_{sat}=150 °F

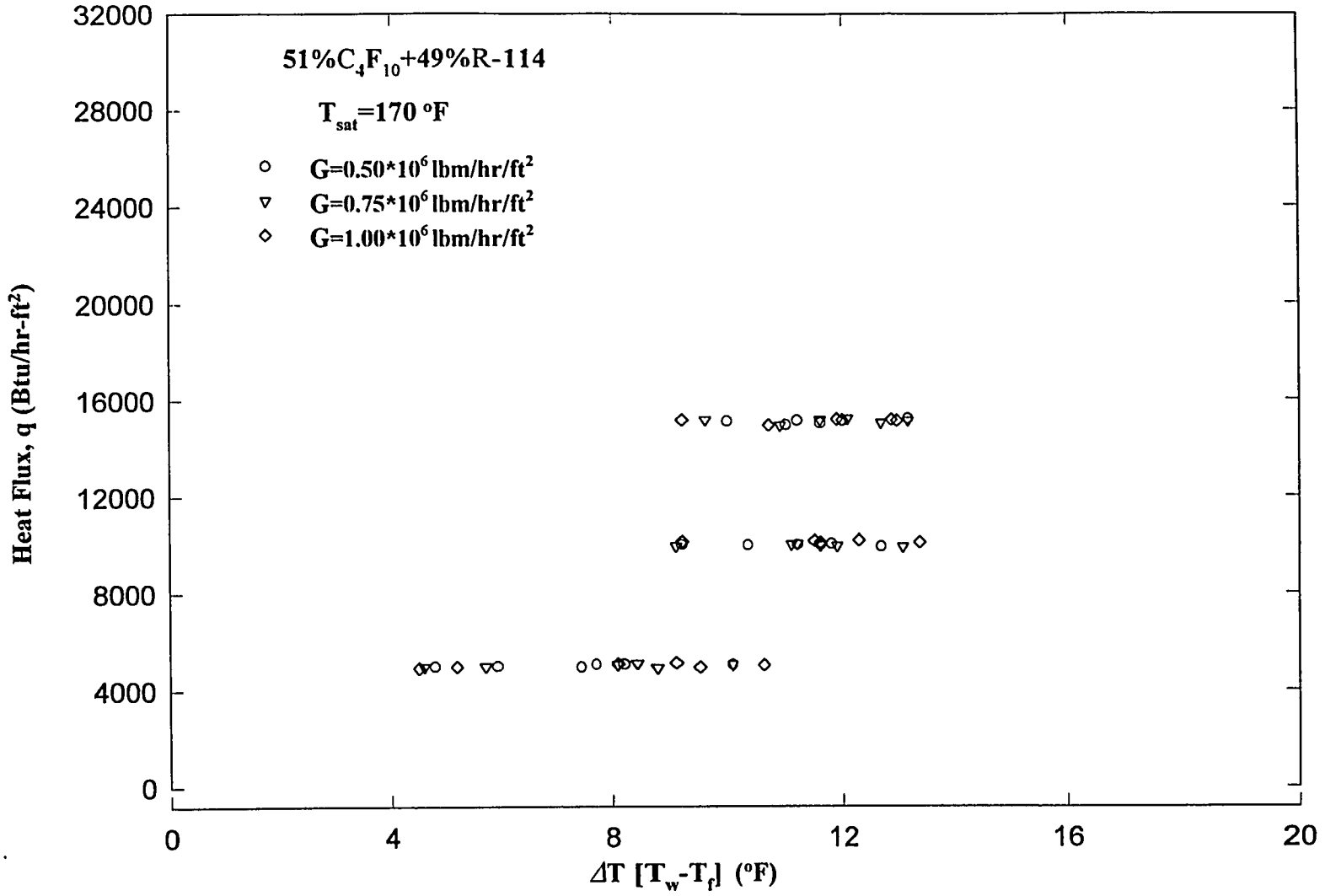


Figure 15. Heat Flux Versus the Wall-to-instream Temperature Difference for the Mixture of 51%C_4F_{10}+49%R-114 at T_{sat}=170 °F

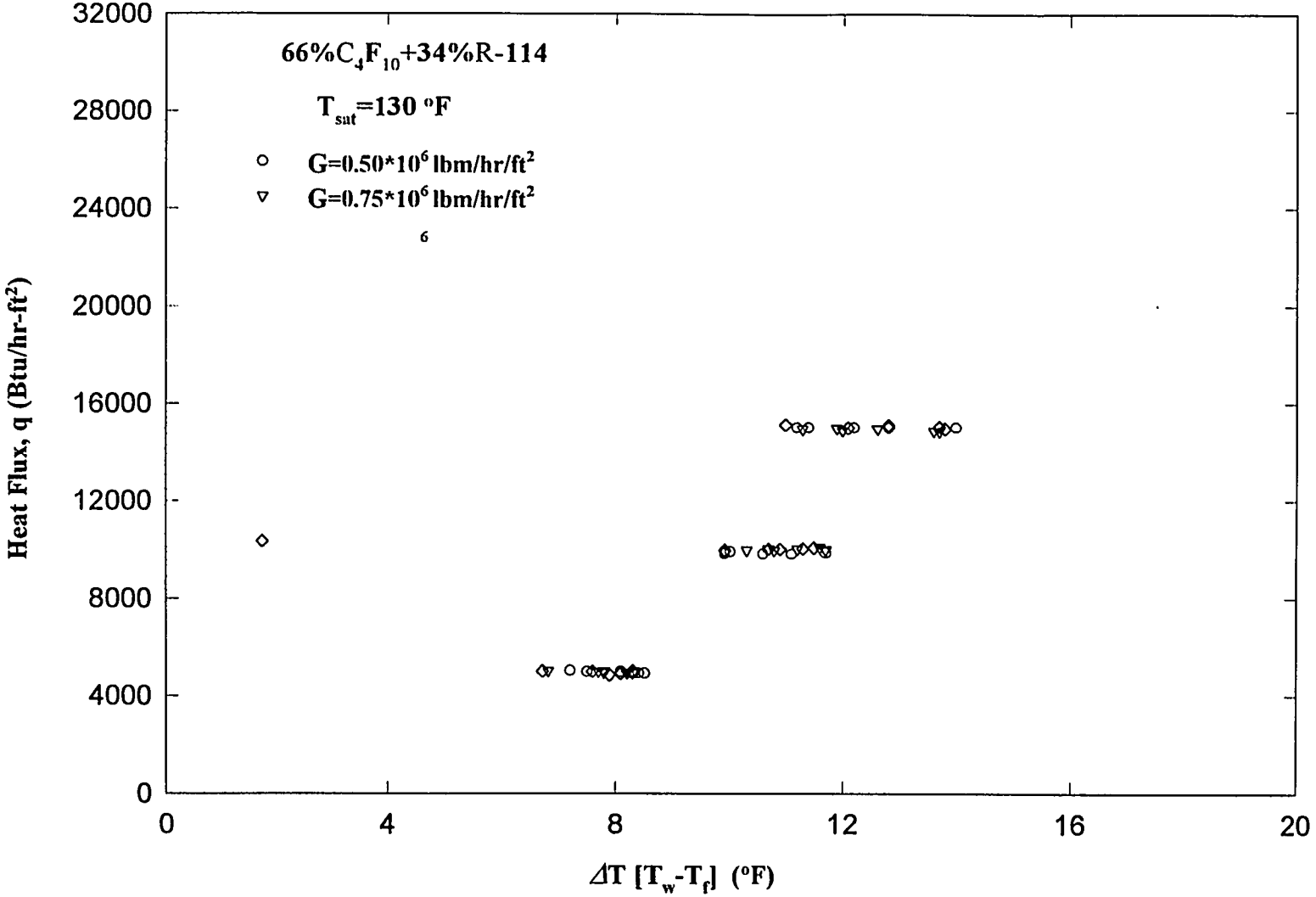


Figure 16. Heat Flux Versus the Wall-to-instream Temperature Difference for the Mixture of 66%C_4F_{10}+34%R-114 at T_{sat}=130 °F

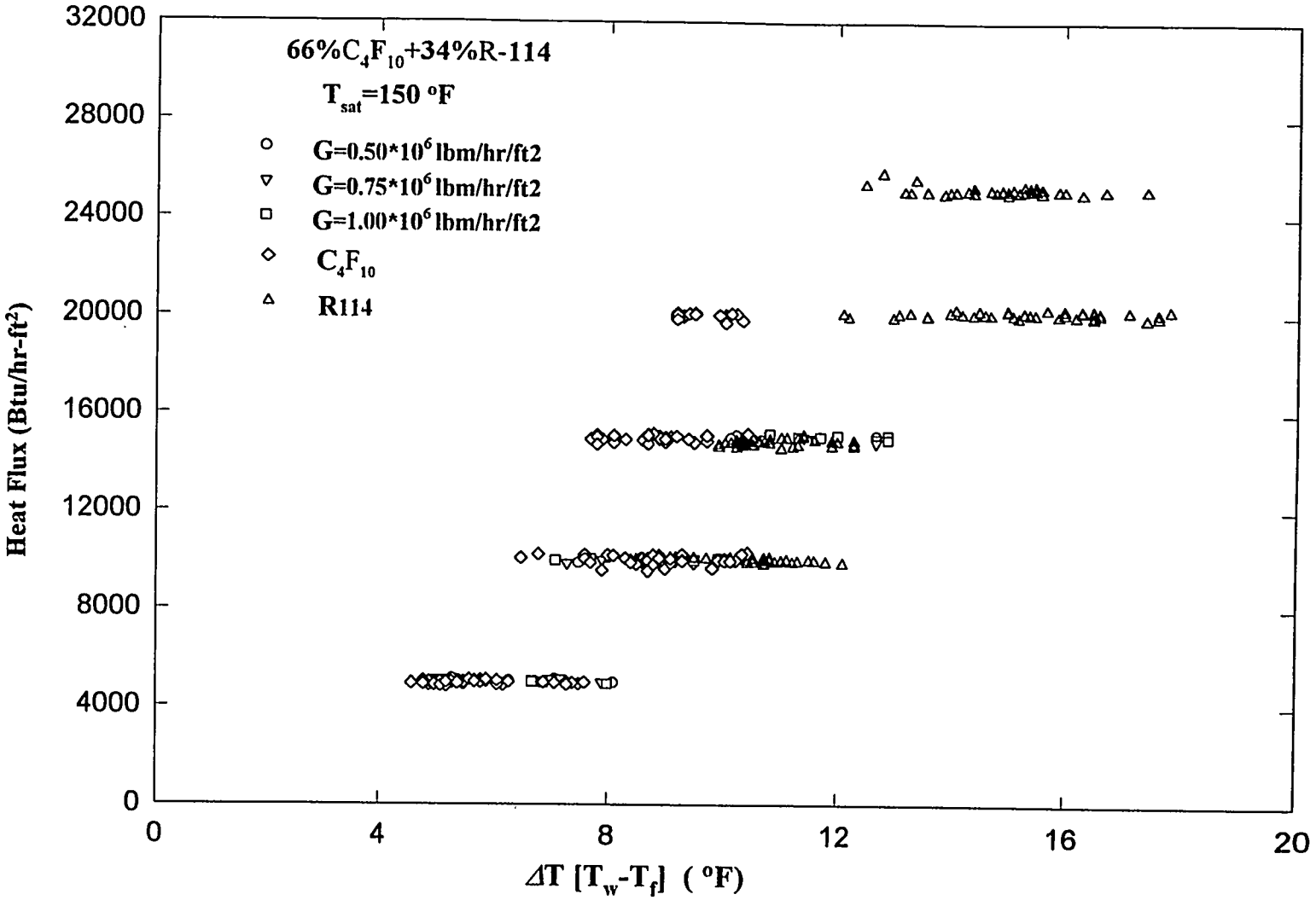


Figure 17. Heat Flux Versus the Wall-to-instream Temperature Difference for the Mixture of 66%C_4F_{10}+34%R-114 at T_{sat}=150 °F

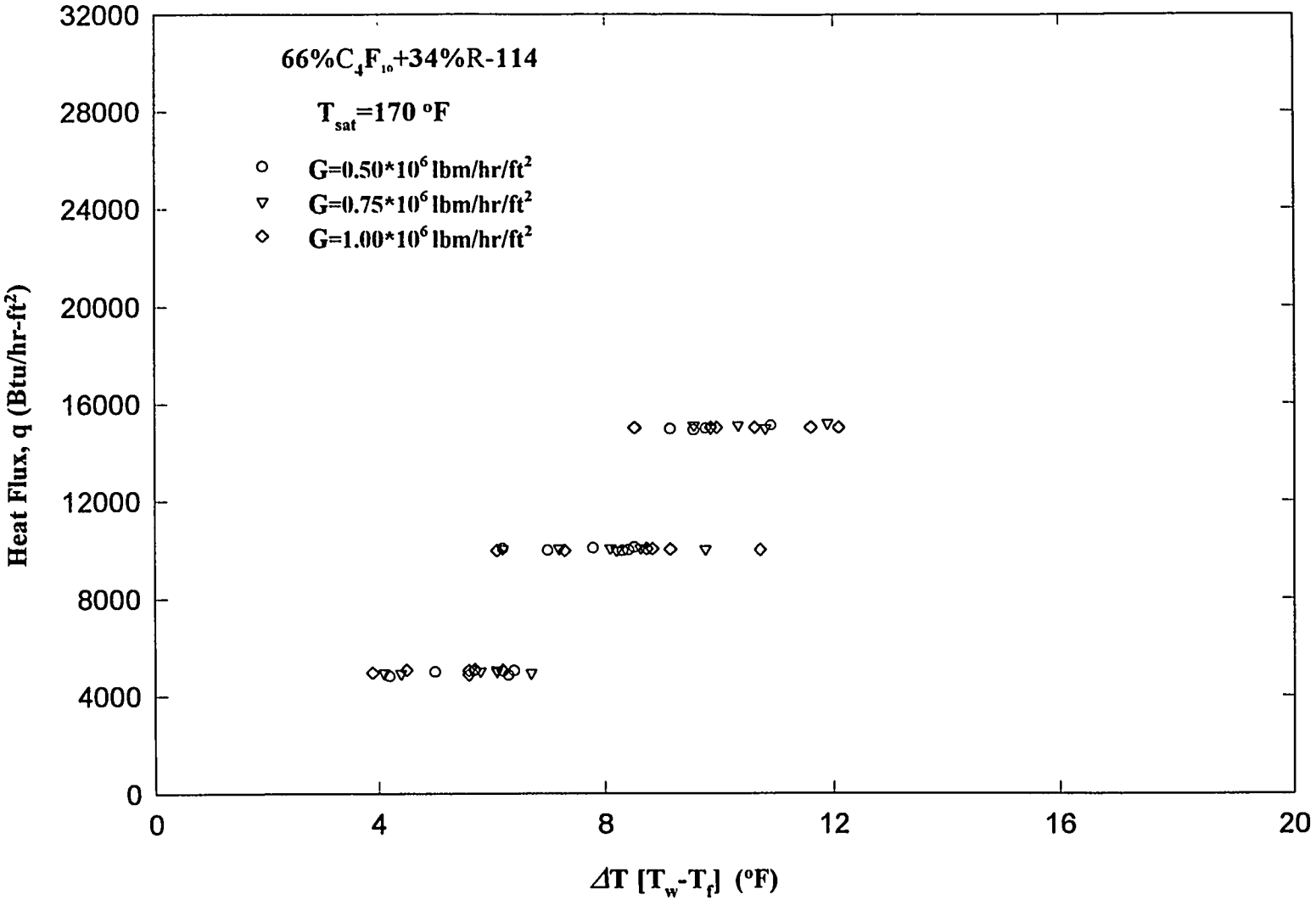


Figure 18. Heat Flux Versus the Wall-to-instream Temperature Difference for the Mixture of 66%C_4F_{10}+34%R-114 at T_{sat}=170 °F

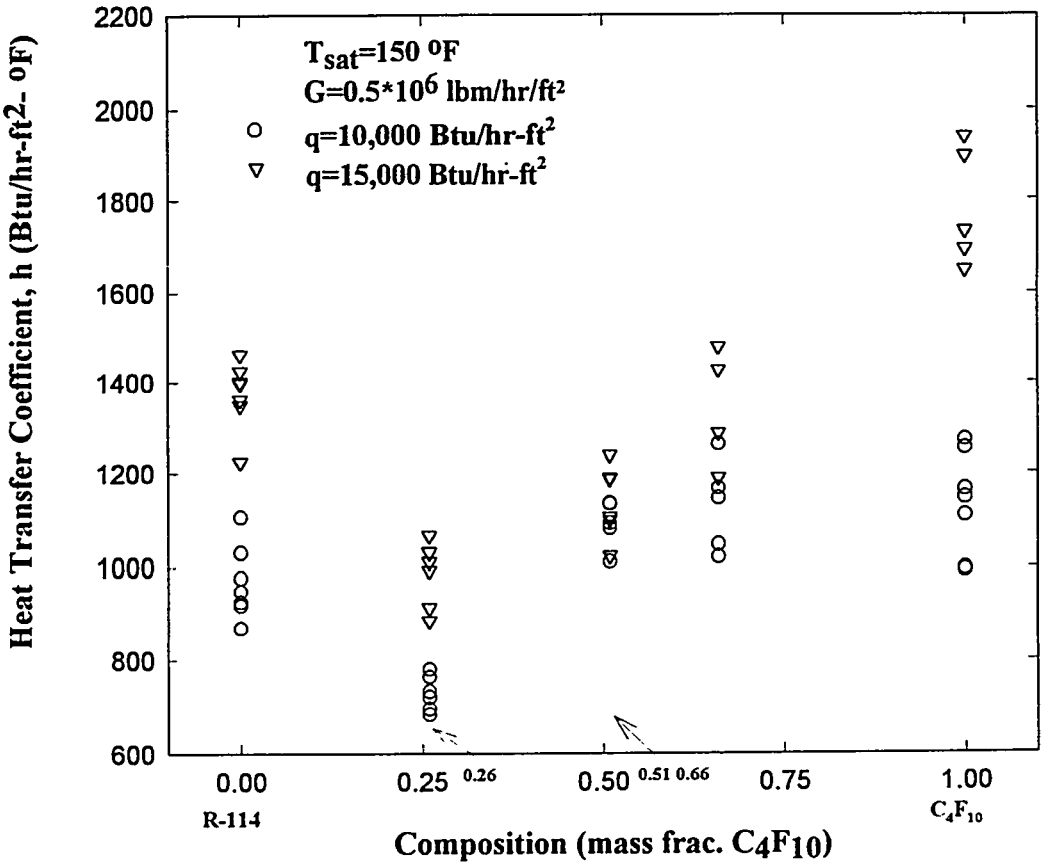


Figure 19. Flow Boiling Heat Transfer Characteristics for Mixtures of R-114 and C_4F_{10} with Various. Compositions

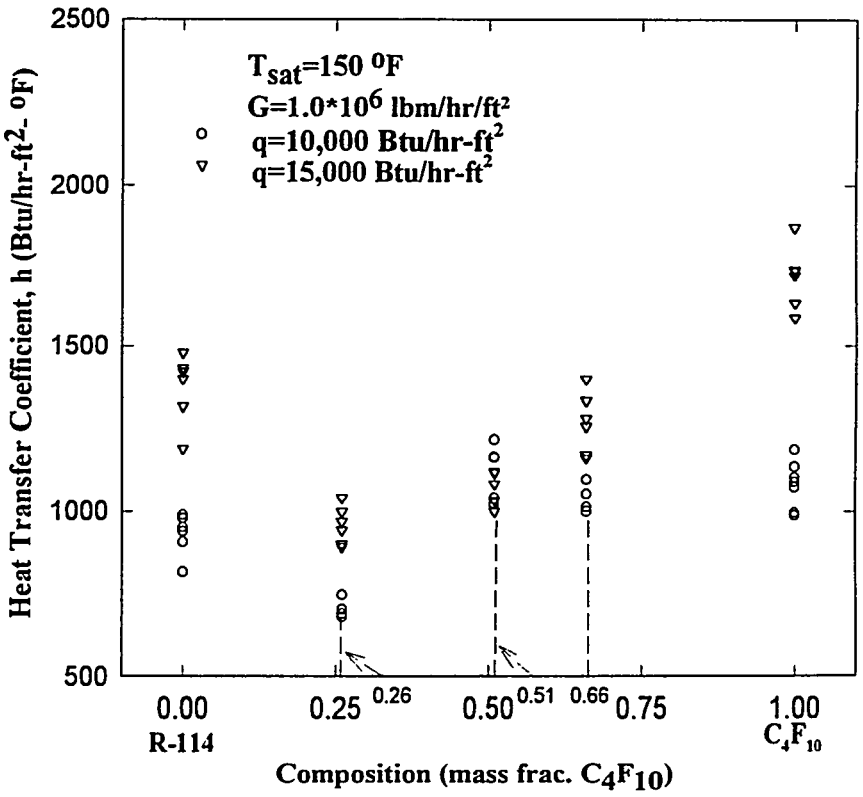


Figure 20. Flow Boiling Heat Transfer Characteristics for Mixtures of R-114 and C_4F_{10} with Various. Compositions

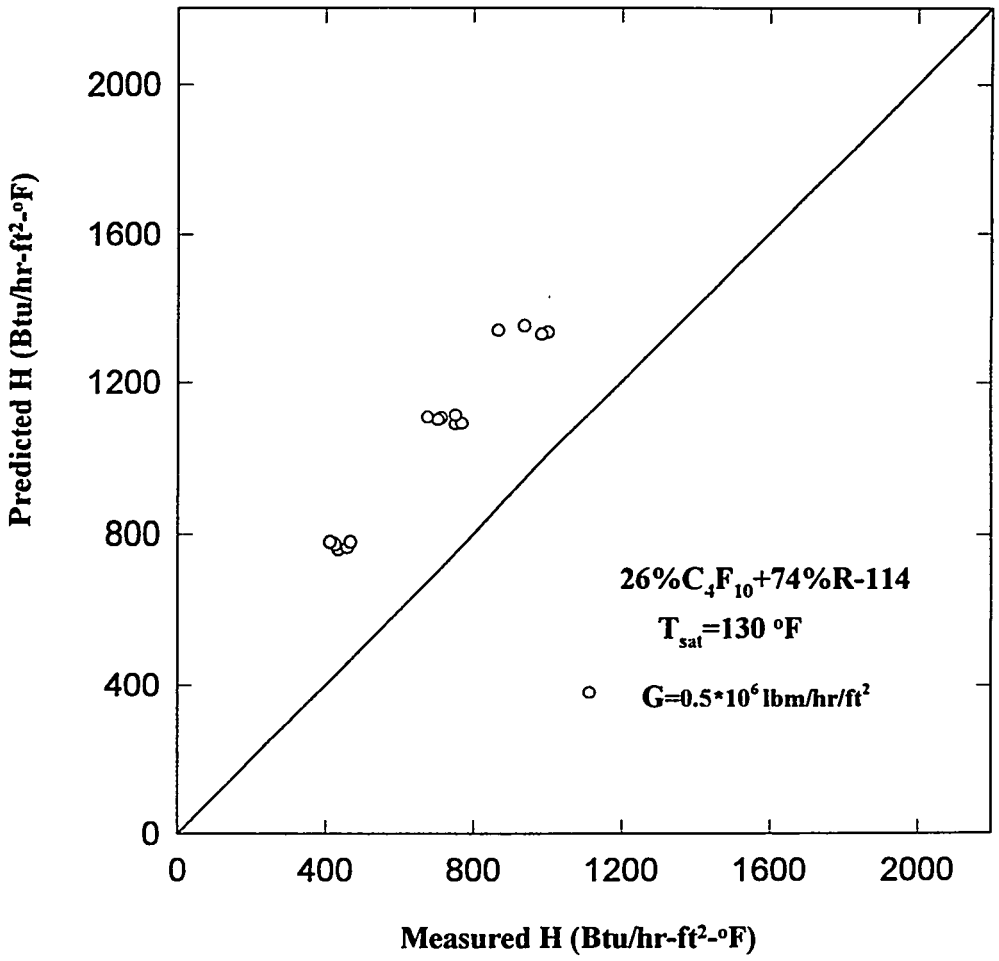


Figure 21. Comparison of Measured and Predicted Heat Transfer Coefficients for 26%C_4F_{10}+74%R-114 at T_{sat}=130·F

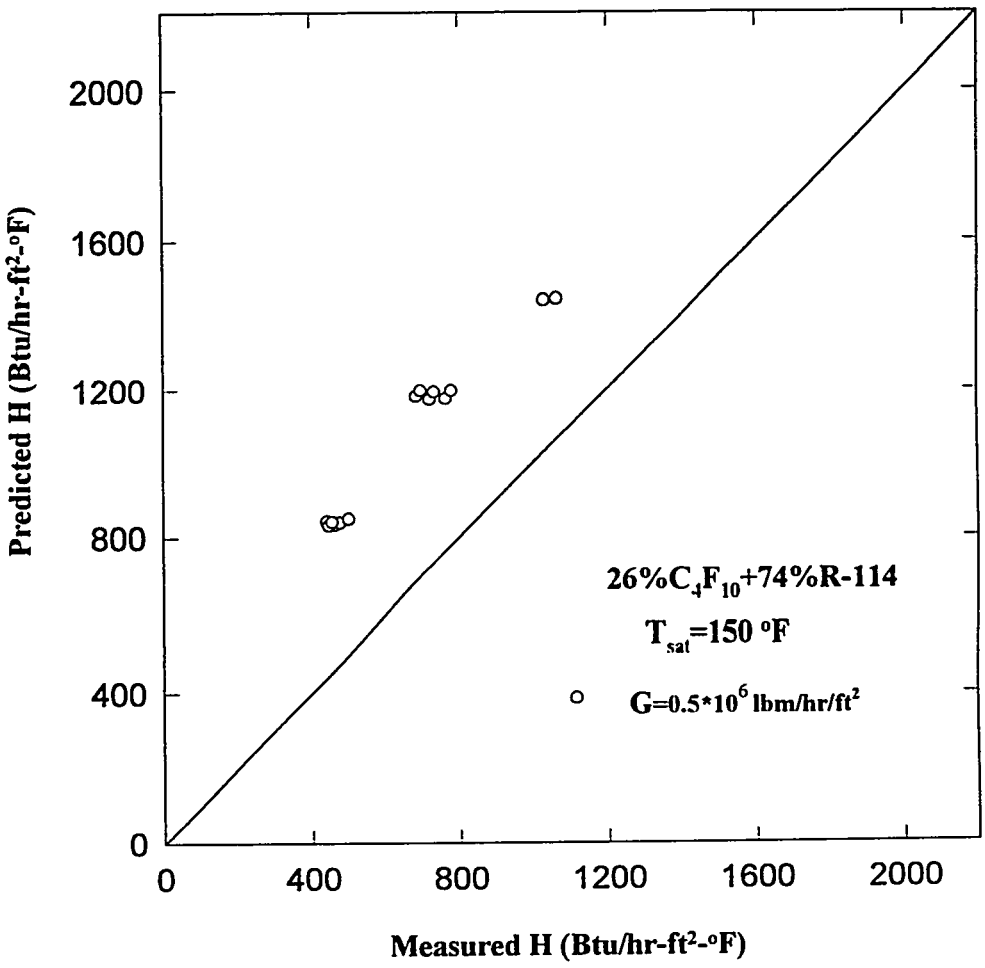


Figure 22. Comparison of Measured and Predicted Heat Transfer Coefficients for 26%C_4F_{10}+74%R-114 at T_{sat}=150·F

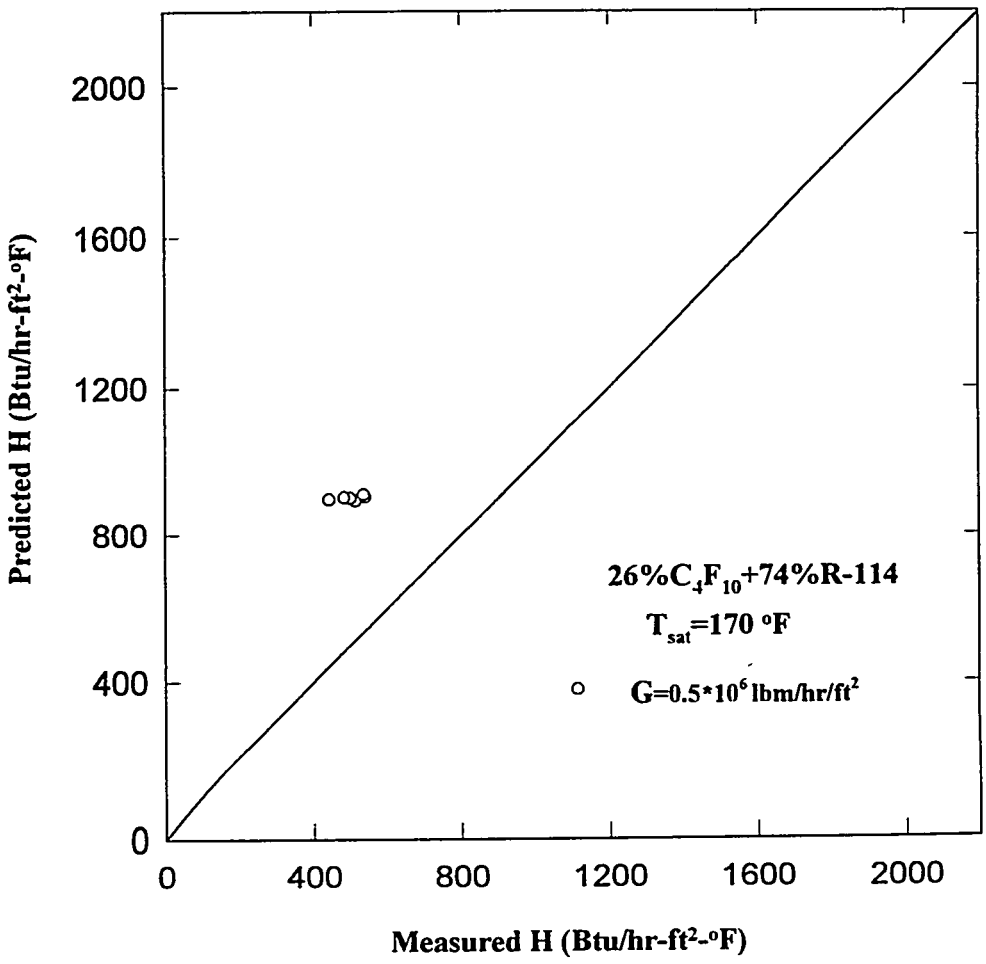


Figure 23. Comparison of Measured and Predicted Heat Transfer Coefficients for 26%C_4F_{10}+74%R-114 at T_{sat}=170°F

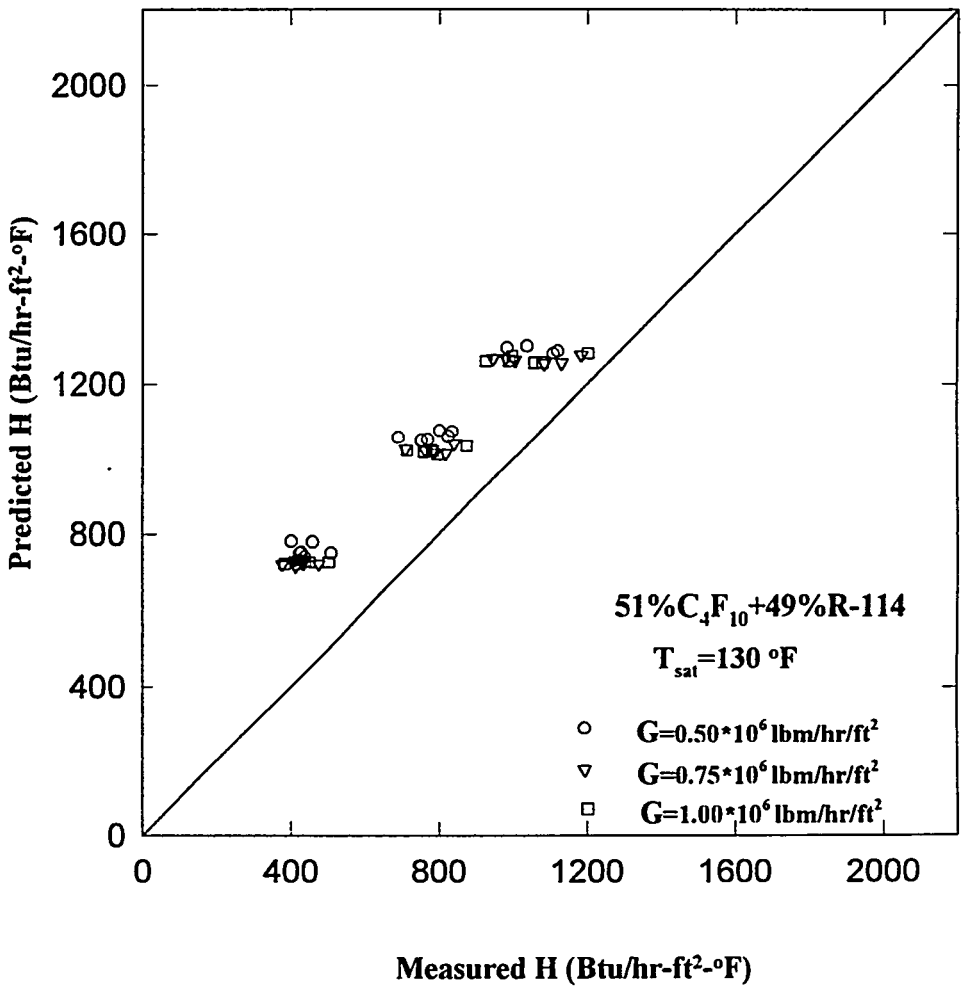


Figure 24. Comparison of Measured and Predicted Heat Transfer Coefficients for 51%C_4F_{10}+49%R-114 at T_{sat}=130·F

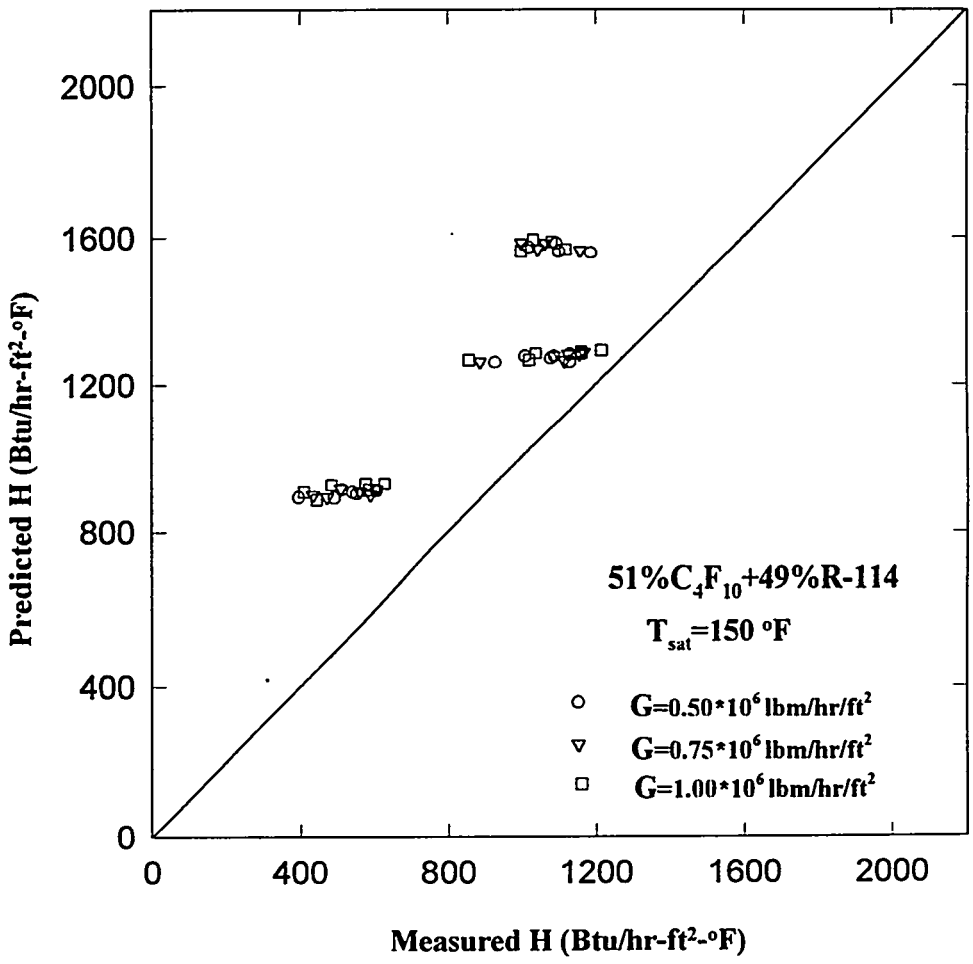


Figure 25. Comparison of Measured and Predicted Heat Transfer Coefficients for 51%C_4F_{10}+49%R-114 at T_{sat}=150·F

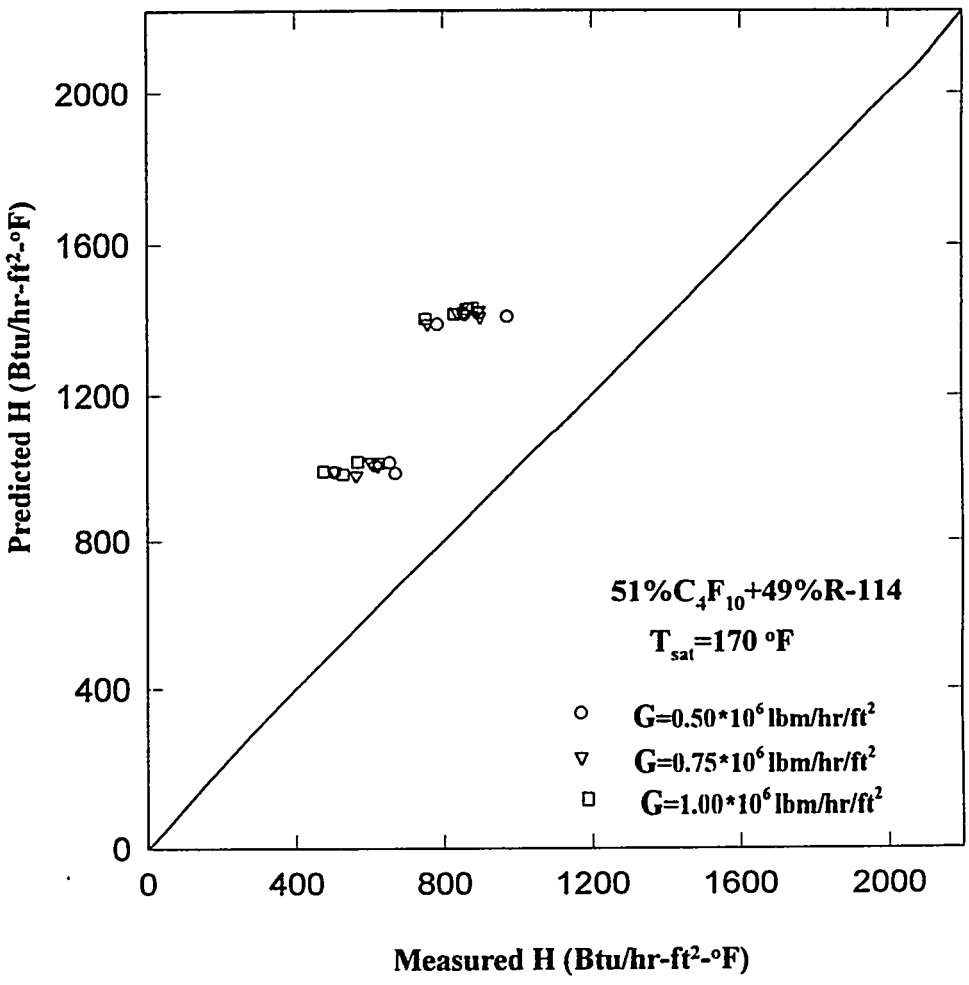


Figure 26. Comparison of Measured and Predicted Heat Transfer Coefficients for 51%C_4F_{10}+49%R-114 at T_{sat}=170·F

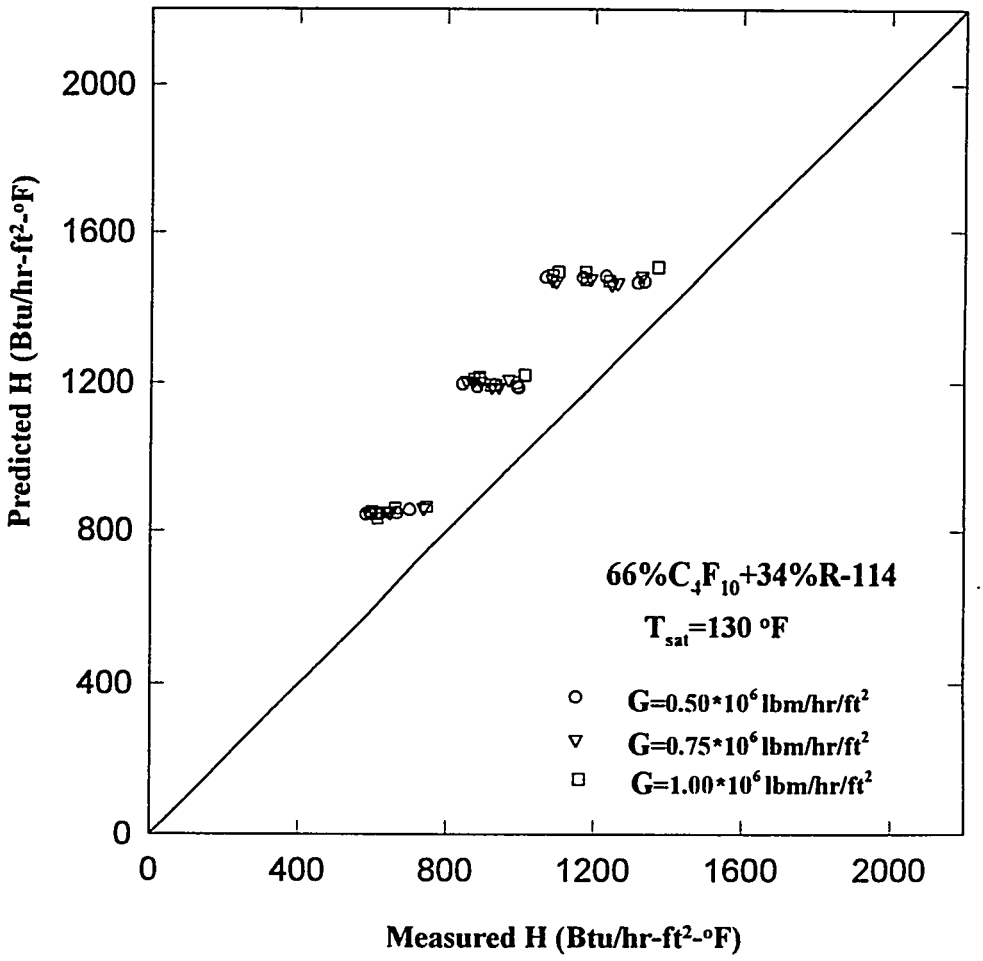


Figure 27. Comparison of Measured and Predicted Heat Transfer Coefficients for 66%C_4F_{10}+34%R-114 at T_{sat}=130·F

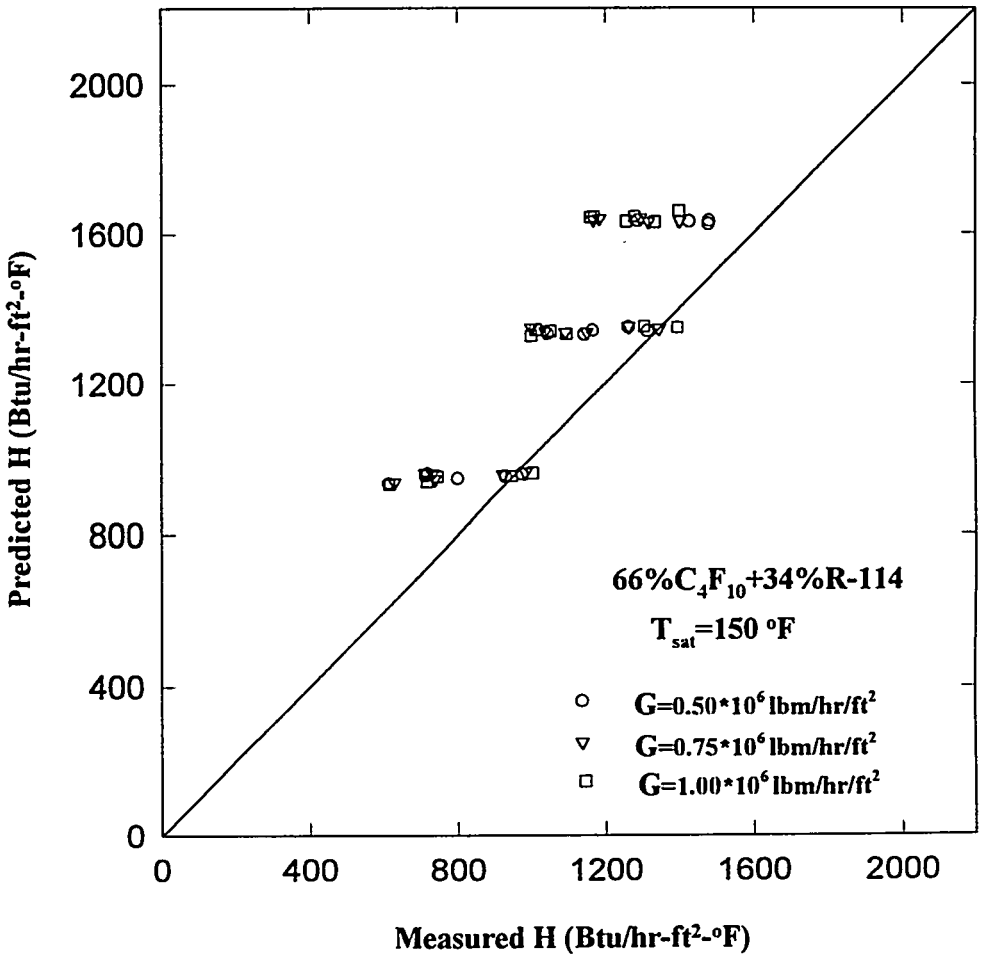


Figure 28. Comparison of Measured and Predicted Heat Transfer Coefficients for 66%C_4F_{10}+34%R-114 at T_{sat}=150·F

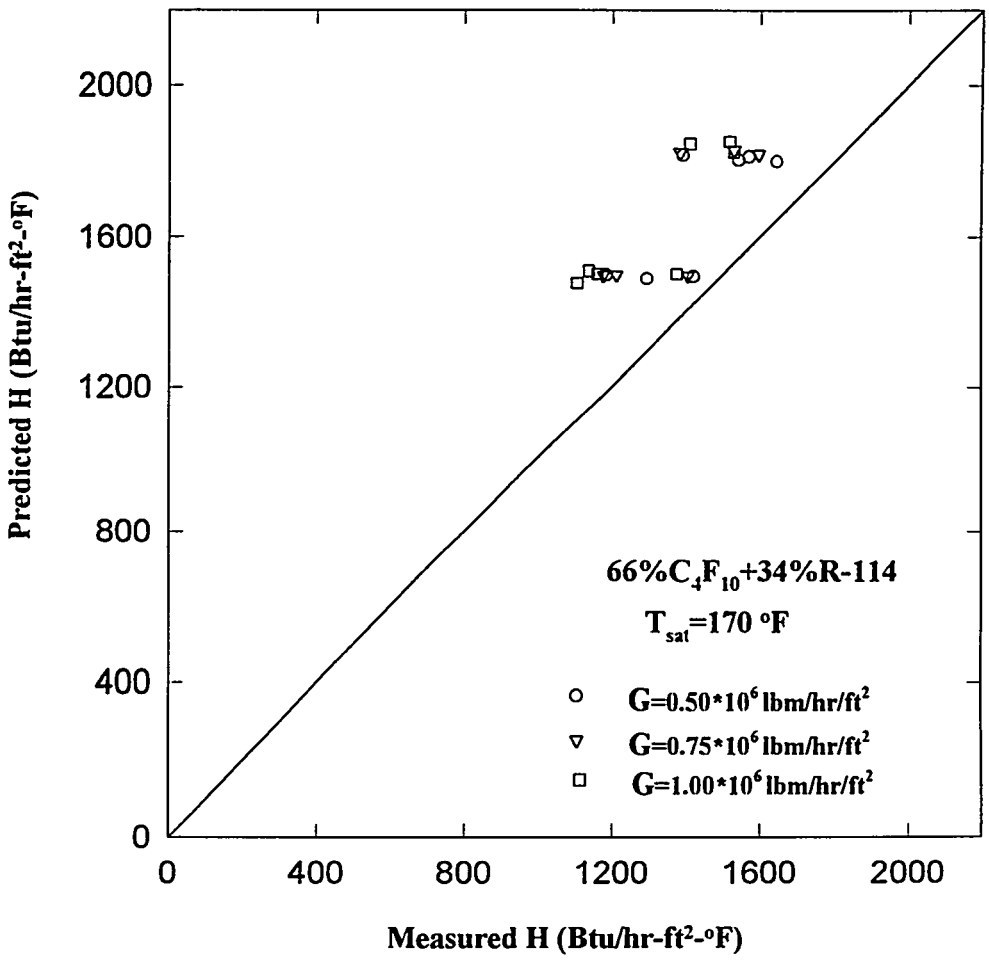


Figure 29. Comparison of Measured and Predicted Heat Transfer Coefficients for 66%C_4F_{10}+34%R-114 at T_{sat}=170°F

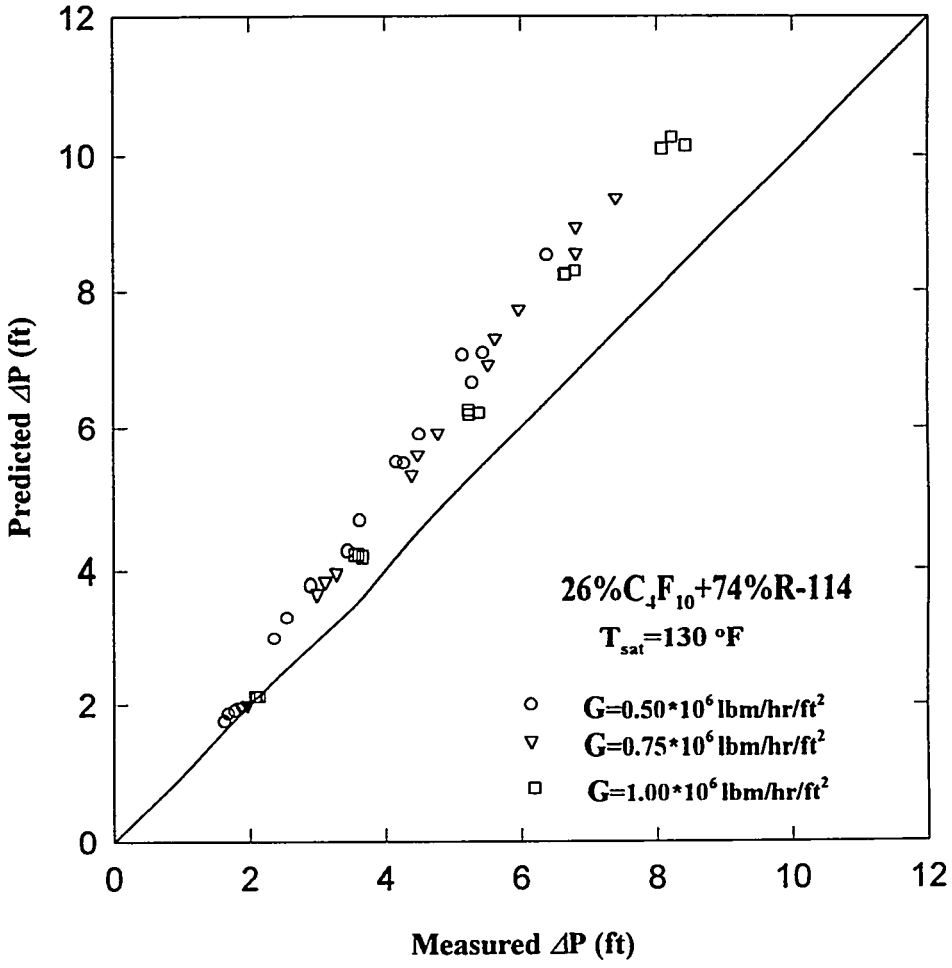


Figure 30. Comparison of Measured and Predicted Pressure Drop for 26%C_4F_{10}+74%R-114 at T_{sat}=130°F

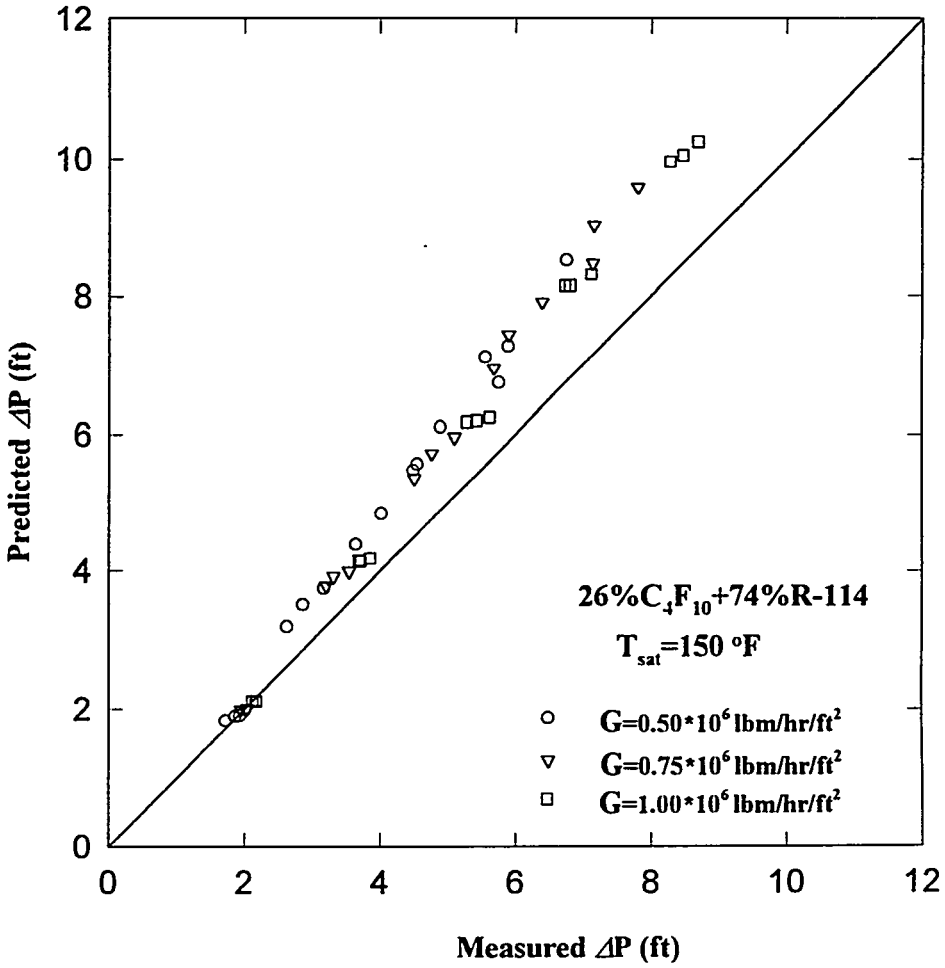


Figure 31. Comparison of Measured and Predicted Pressure Drop for 26%C_4F_{10}+74%R-114 at T_{sat}=150·F

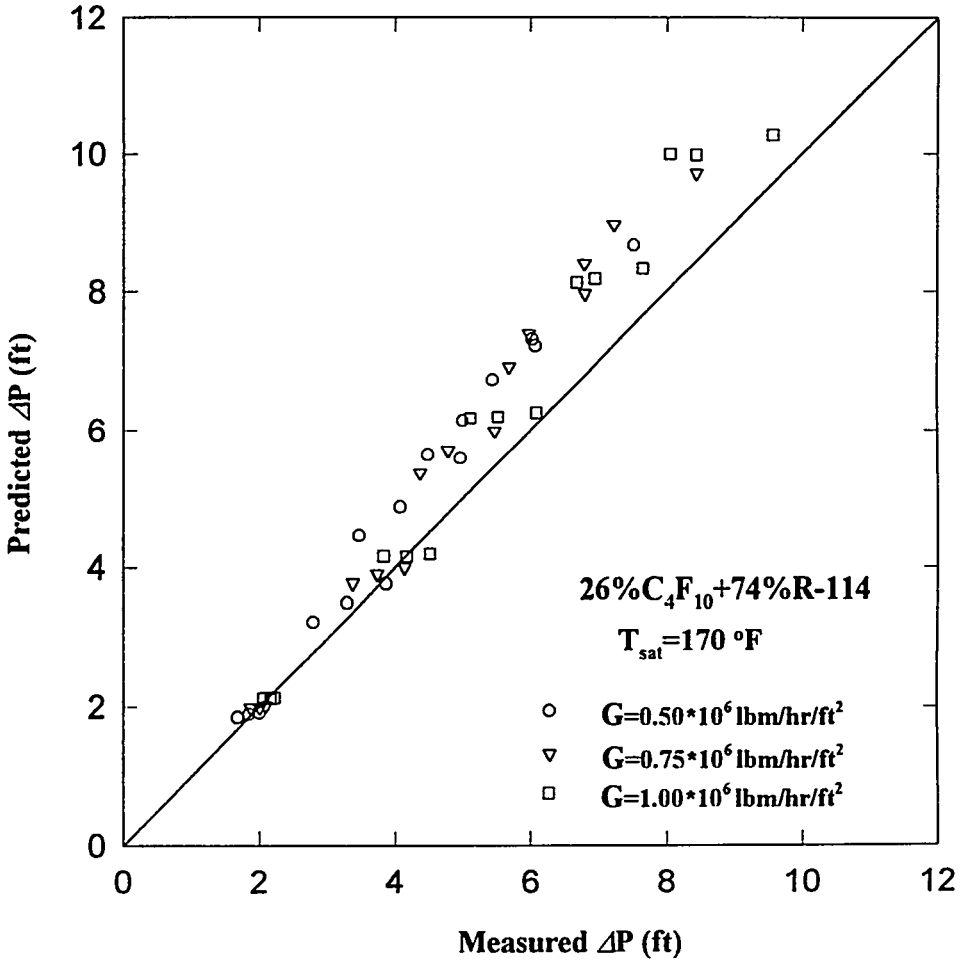


Figure 32. Comparison of Measured and Predicted Pressure Drop for 26%C_4F_{10}+74%R-114 at T_{sat}=170·F

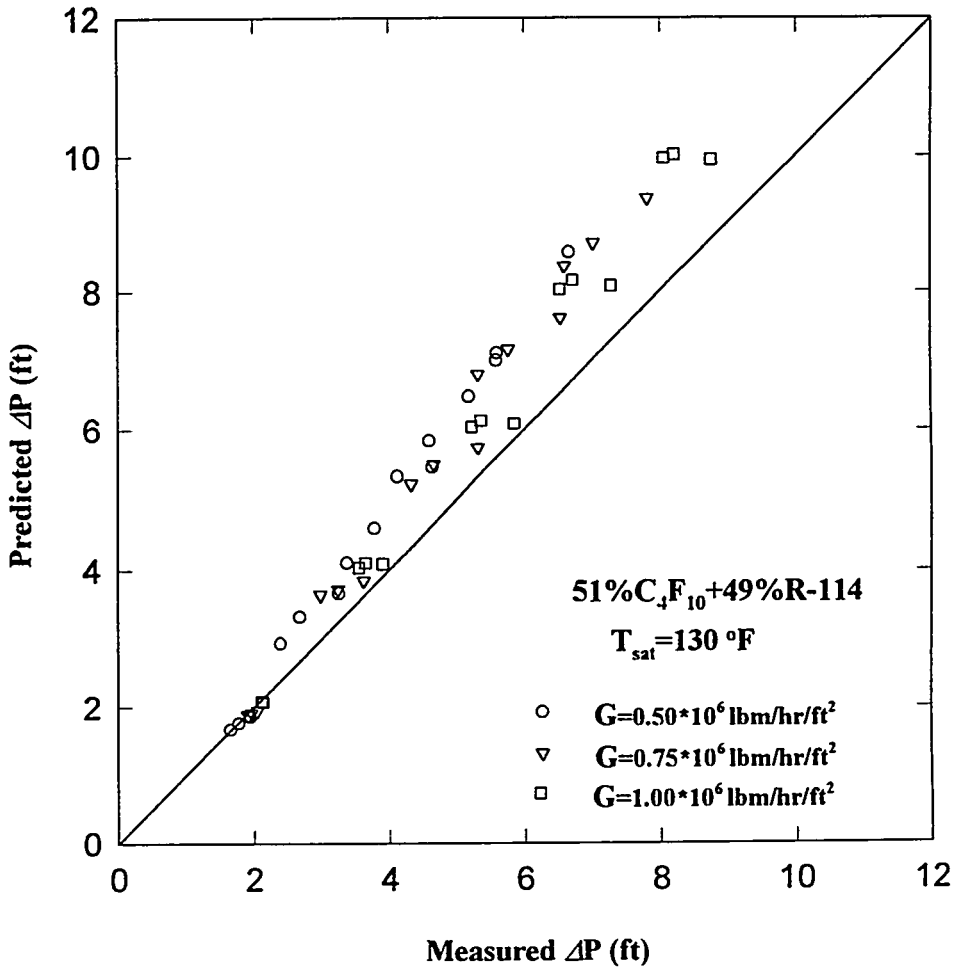


Figure 33. Comparison of Measured and Predicted Pressure Drop for 51%C_4F_{10}+49%R-114 at T_{sat}=130·F

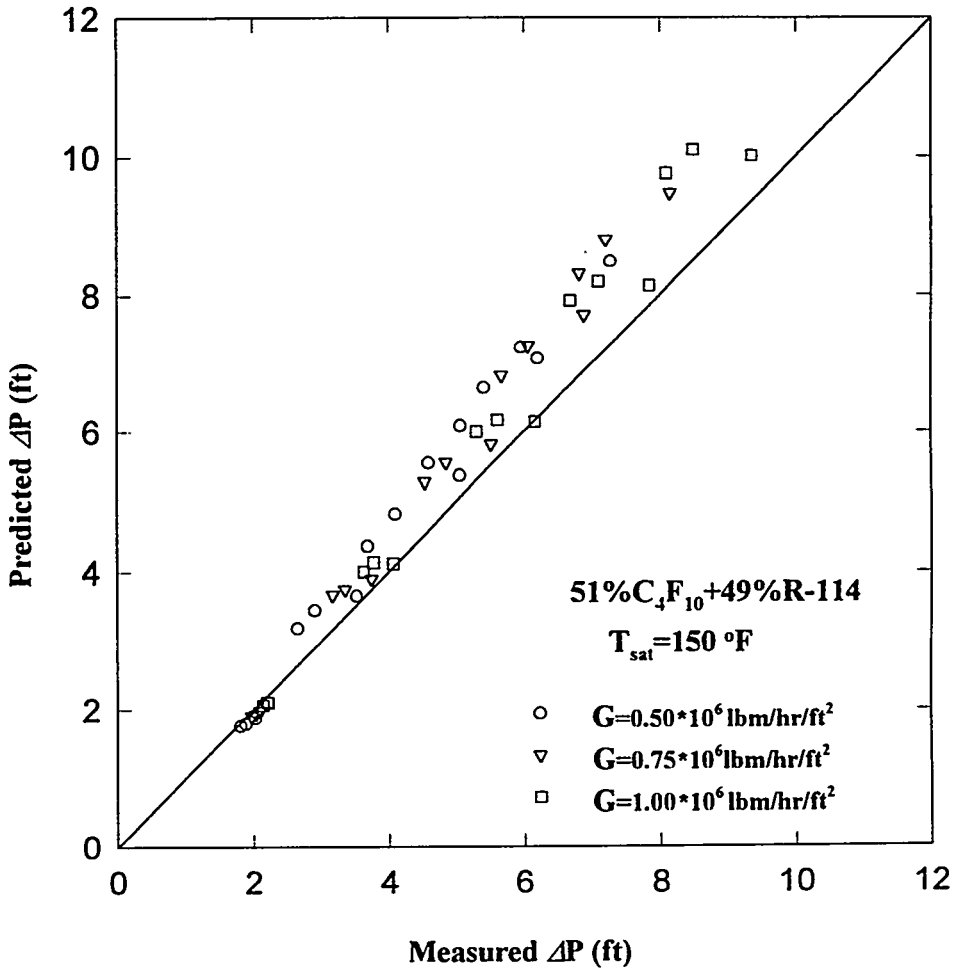


Figure 34. Comparison of Measured and Predicted Pressure Drop for 51%C_4F_{10}+49%R-114 at T_{sat}=150·F

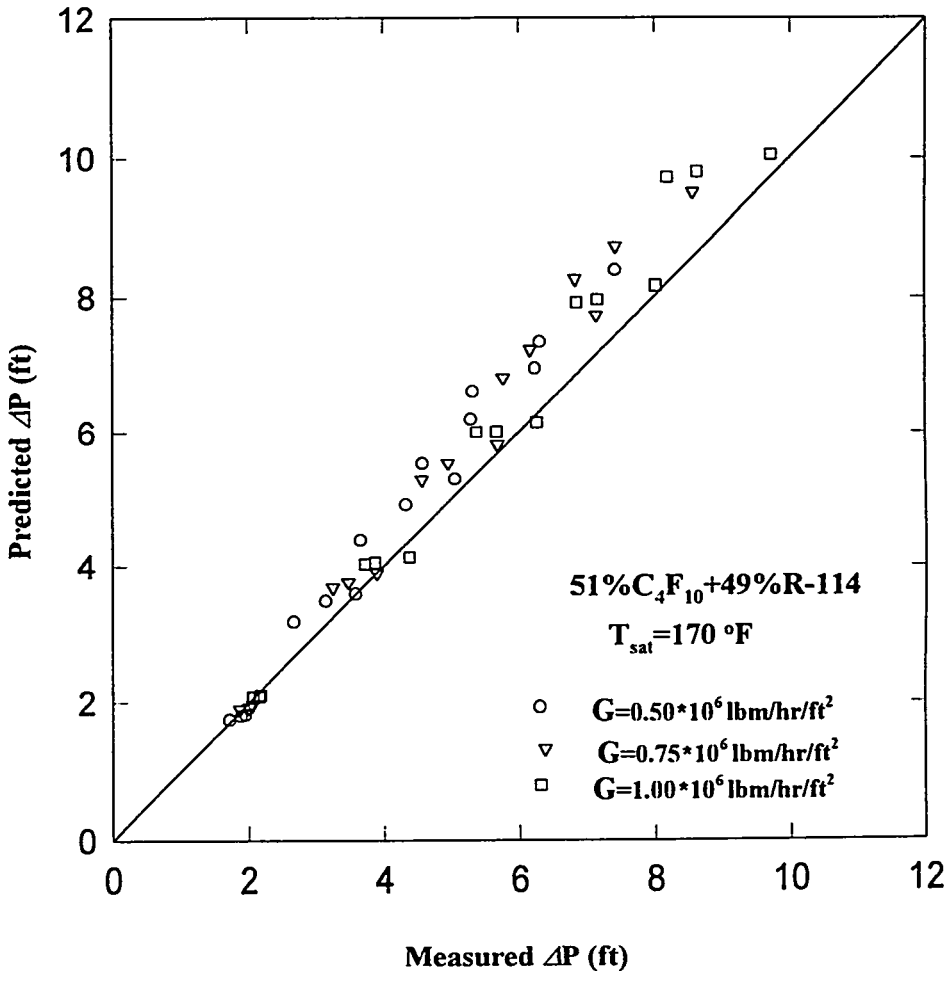


Figure 35. Comparison of Measured and Predicted Pressure Drop for 51%C_4F_{10}+49%R-114 at T_{sat}=170·F

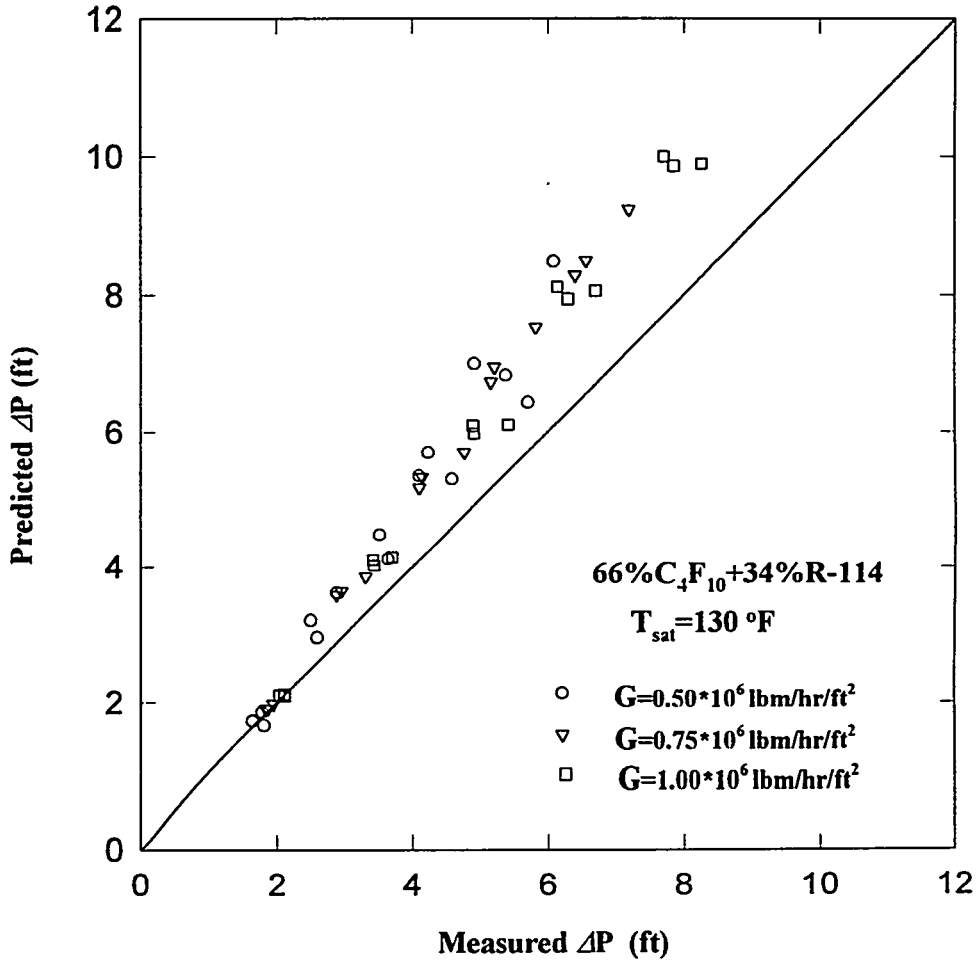


Figure 36. Comparison of Measured and Predicted Pressure Drop for 66%C_4F_{10}+34%R-114 at T_{sat}=130·F

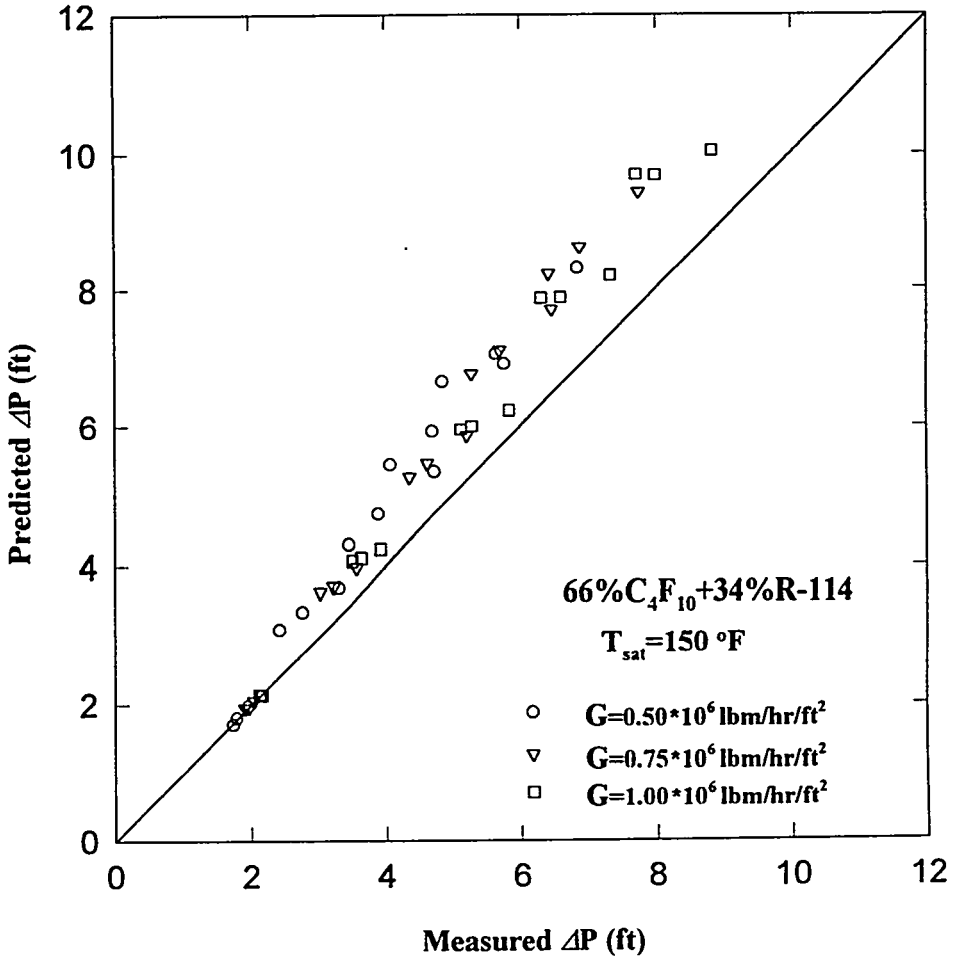


Figure 37. Comparison of Measured and Predicted Pressure Drop for 66%C_4F_{10}+34%R-114 at T_{sat}=150°F

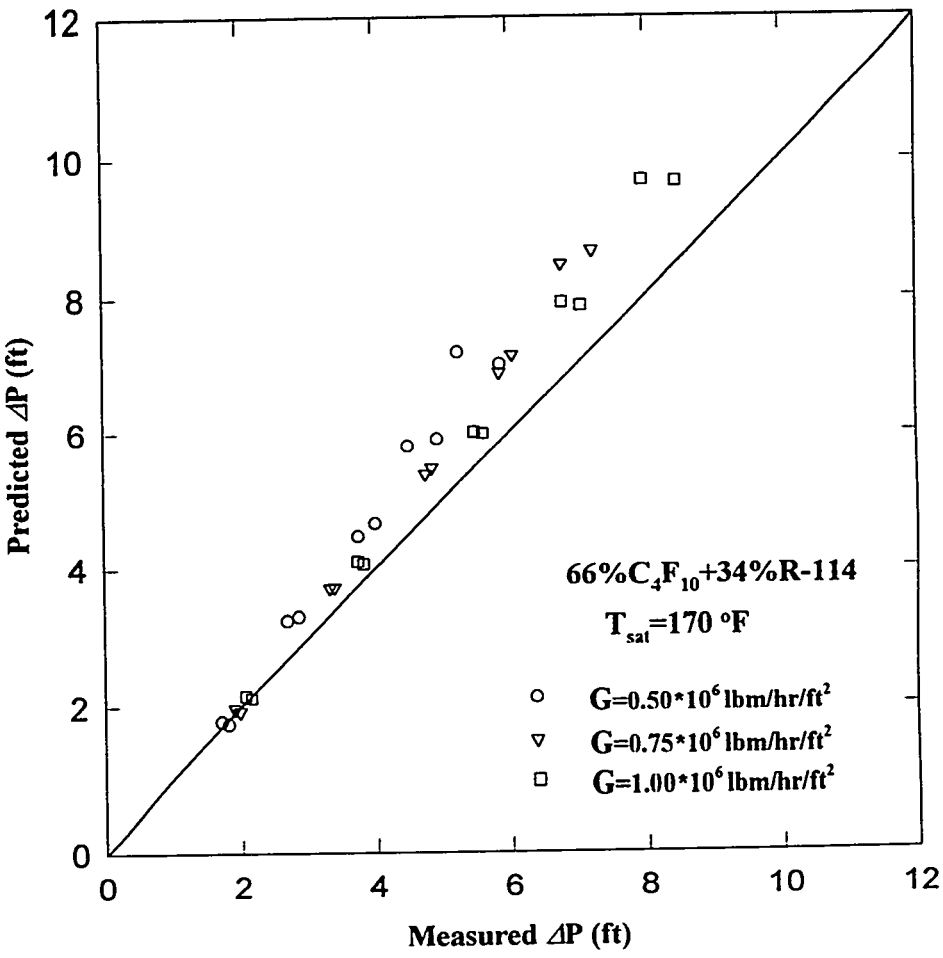


Figure 38. Comparison of Measured and Predicted Pressure Drop for 66%C_4F_{10}+34%R-114 at T_{sat}=170·F

Section 4

Test Data

Appendix A

The data contains terms both measured and calculated. The definition of each term listed on the data sheets is as follows:

Run #	A sequential test number
Test Fluid	Coolant tested. Coolants tested are CFC-114, C_4F_{10}, C_4F_8, Mixture of CFC-114 & C_4F_{10}
Flow Area-ft²	Cross-section area of test tube
Heat Flow Area-ft²	Total heating area
Sat. Pressure-psig	Saturation pressure of coolant entering the test section
Sat. Temp.-F(inlet)	Saturation temperature of coolant entering the test section

Physical Properties of Coolant

Liquid density	Coolant liquid density based on condition listed below for each zone
Latent heat	Latent heat of coolant based on condition listed below
Specific heat	Specific heat of coolant based on condition lised below
Liquid viscosity	Viscosity of liquid coolant based on condition listed below
Liquid thermal conductivity	Thermal conductivity of coolant in liquid based on condition listed below
Liquid Prandtl Number	Prandtl number of coolant in liquid based on condition listed below
Inlet Flow Rate-GPM	Coolant flow rate into test section
Outlet Liq. Flow Rate-GPM	Flow rate of outlet liquid coolant separated from entrainment separator
Outlet Vap. Flow Rate-GPM	Flow rate of outlet vapor coolant separated from enrichment separator
Inlet Temperature-F	Temperature of coolant entering the test section

Outlet Liq.Temp.-F	Temperature of outlet liquid coolant
Outlet Vap. Temp.-F	Temperature of outlet vapor coolant
Water Flow Rate-GPM	Recirculating cooling water flow rate to condenser
Water Inlet Temp.-F	Temperature of water entering the condenser
Water Outlet Temp.-F	Temperature of water exiting the condenser
Inlet G-lbm/hr/ft²	Coolant mass flux, [flow rate/tube cross-section area]
Subcooling, F	Target subcooling of coolant at entrance of test section

Flow Observation

There are 10 separate heating zones on the test section. [Zone 1 - Zone 10]

Heat Input-Watts(net)	Net heat input to heating zone
Heat Loss-Watts	Heat loss from the heating zone to ambient, measured
Heat Flux-Btu/hr/ft²	Heat flux to test section
Wall Temp.,-F #1 to #5	Five temperature sensors in each zone to measure cylinder wall temperature
Instream Temp.,-F	One temperature sensor to measure coolant temperature
Ave.Wall Temp.-F	Average wall temperature from five sensors
Ave.Wall DT.-F	Difference between average wall temperature and instream temperature
Remaining Subcool	Difference between desired subcool and measured subcool (See Item 1 in Appendix B)
Exit Quality	Quality of coolant exiting the test section (See Item 2 in Appendix B)
Exp. H	Boiling heat transfer coefficient obtained from test
Jallouk	Boiling heat transfer coefficient by Jaliouk's method (See Item 3 in Appendix B)

Szady1(Cudo Tube)	Boiling heat transfer coefficient by Szady's method using pool boiling data generated from the test section at Cudo Tech. (See Item 3 in Appendix B)
Szady2	Boiling heat transfer coefficient by Szady's revised method using different values for the Rohsenow correlation. (See Item 3 in Appendix B)
RLIQ, F, HLIQ, HBOI	See Item 4 in Appendix B

Pressures were measured at five locations along test section.

DP liquid Temp., F

DP Liquid Density-lbm/ft^3

Elevation-ft	Elevation of pressure tap measured from the entrance of test section
Measured DP - psid	Differential pressure measured between the entrance and 5 pressure taps
Zero Corrections - psid	Correction factor for reference pressure point
Corrected DP -psid	Corrected pressure differential between entrance and 5 pressure taps
Actual DP - ft	Measured pressure differential
Measured TP - psig	Total pressure measured at entrance point of test section
Measured Overall - ft	Overall pressure head measured
computed DP - ft	Computed pressure differential
Friction - ft	Pressure loss by friction
Acceleration - ft	Pressure loss by fluid acceleration
Elevation - ft	Pressure loss due to elevation variation

Appendix B

1. Remaining subcool

$$Remaining\ Subcool = Subcooling - \frac{q" A_{HeatFlow}}{G\ A_{Flow}\ C_{pl}}$$

where,

q"	Heat flux [btu/hr/ft^2]	= 5011
$A_{HeatFlow}$	Heat Flow Area [ft^2]	= 0.19695
A_{Flow}	Flow Area [ft^2]	= 0.00336
G	Inlet Liquid Flow Rate [lbm/hr/ft^2]	= 1021878
C_p	Specific Heat [btu/lbm/°F]	= 0.312
Subcooling [°F]		= 1.6
Remaining Subcool [°F]		= 0.6

2. Exit Quality

$$x_{in} = 0 \text{ [only liquid entering at section 1]}$$

$$x_{out} = \frac{q" A_{HeatFlow} - G A_{Flow}\ C_{pl}\ \Delta T_{sub}}{G A_{Flow}\ H_{fg}}$$

ΔT_{sub}	Subcooling [°F]	= 1.6
H_{fg}	Latent Heat [btu/lbm]	= 31.2
x_{out}	Exit Quality	= -0.01 (within experimental uncertainty)

3. Evaluation of Experimental H and Computed H (Jallouk, Szady1, Szady2)

Note eq. 14 of report (Vol #2)

Nucleate boiling correlation used for flow boiling presented by Rohsenow [6],

(14)

$$\frac{C_{pl}\Delta T}{H_{fg}Pr_l^{1.7}} = C_{wf}\left(\frac{Q/A}{\mu_l H_{fg}}\sqrt{\frac{\sigma}{g\Delta\rho}}\right)^n$$

The coefficient $\mathbf{C_{wf}}$ is dependent on the wall-fluid material characteristics and was determined from the pool boiling experiments. The value of the exponent **n** changes for the different predictions.

The experimental results for the fluid were plotted using the Rohsenow [6] correlation Eq. (14) with a logarithmic scale. For the ***Cudo tube (Szady1)*** the data correlated with an intercept value of $\mathbf{C_{wf}}$ = 0.0038025 and **n** = 0.494. This number is the experimentally determined value of the coefficient $\mathbf{C_{wf}}$ in Eq. (14). After the coefficient $\mathbf{C_{wf}}$ is determined, the correlation of the nucleate boiling term $\mathbf{h_{nb}}$ in Eq. (11) can be obtained from Eq. (14) in the form,

(15)

$$h_{nb} = \frac{Q}{A\ \Delta\ T} = \left(\frac{k_l^{1.7}}{C_{wf}\ \mu_l^{1.7}\ C_{pl}^{0.7}}\right)^3 \mu_l \left(\frac{\Delta T}{H_{fg}}\right)^2 \sqrt{\frac{g\Delta\rho}{\sigma}}$$

For ***Jallouk*** and ***Szady2*** the following values were used: $\mathbf{C_{wf}}$ = 0.0047 and **n** = 0.33

4. **Rliq** Reynolds number of liquid

$$R_{liq} = \frac{\rho VD\ (1\ -\ x)}{\mu_l}$$

V Mean flow velocity
D Diameter of tube

5. F, H_{liq}, H_{boil}

Steiner and Taborek proposed a correlation for in-tube flow boiling data based on a variant of the asymptotic model. Their correlation is based on the asymptotic model Eqs. (7,8) with **n** = 3. The two components in this model are independent of each other,

(7)

$$h^n = [H_{Liq}^n + H_{Boil}^n]^{\frac{1}{n}}$$

(8)

$$= [(h_{npb}C_{nbf})^n + (h_l F)^n]^{\frac{1}{n}}$$

here,

- $\mathbf{h_{npb}}$ is the local nucleate pool boiling coefficient. The coefficient itself can originate from any predictive method or data. Thus, it leaves a great freedom of choice.
- $\mathbf{C_{nbf}}$ is a nucleate boiling correction factor to h_{npb}, which compensates for differences between the pool and the flow conditions.
- $\mathbf{h_l}$ is the local convective heat-transfer coefficient for single-phase liquid flow.
- **F** is the two-phase flow correction factor to the convective component h_l, accounting for enhancement of the coefficient in the liquid-vapor mixture.

and $\mathbf{h_l}$ is obtained from the Dittus-Boelter type equation as given below,

(13)

$$N = \frac{h_l d_i}{k} = c\ Re^{0.8}\ Pr^{0.4}$$

Run#	301									
Test Fluid	R114									
Date:	2/19/93									
Time:	21:37									
Note	TABORE	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	71.6									
Sat. Temperature-F(inlet)	142.2									
Liq. Density-lbm/ft3	93.43	93.28	93.22	93.28	93.27	93.27	93.35	93.38	93.42	93.47
Latent Heat-Btu/lbm	48.21	48.07	48	48.07	48.05	48.05	48.13	48.16	48.2	48.25
Specific Heat-Btu/lbm/F	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262
Liq. Viscosity-lbm/ft-hr	0.568	0.565	0.563	0.565	0.564	0.564	0.566	0.567	0.568	0.569
Liq. Conductivity-Btu/hr-ft-F	0.0319	0.0318	0.0317	0.0318	0.0318	0.0318	0.0318	0.0319	0.0319	0.0319
Liq. Prandtl No.	4.67	4.66	4.66	4.66	4.66	4.66	4.66	4.67	4.67	4.67
Inlet Flow Rate-GPM	3									
Outlet Liq. Flow Rate-GPM	2.7									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	140.9									
Outlet Liq. Temperature-F	139.5									
Outlet Vap. Temperature-F	139.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	54.6									
Water outlet Temp.-F	135.2									
Inlet G-lbm/hr/ft2	862240		Temp	137.1	Density	84.02				
Subcooling-F	1.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	570.2	571	568.1	564.9	574	575	569.9	573.4	567.7	569.2
Heat Loss-Watts	25.2	5.8	7.9	9.9	11	10.9	8.7	9.6	9.2	49.6
Heat Flux-Btu/Hr/ft2	9884	9898	9848	9792	9950	9967	9879	9940	9841	9867
Wall Temp. #3-F	155	155.5	154.7	154.1	156.6	155.8	153.7	154.3	152.3	151.3
Wall Temp. #4-F	155	154.4	155.8	154.9	155.4	155.8	154.1	154.8	153	151.1
Wall Temp. #5-F	154.5	153.3	156.7	154.1	154.8	155.8	153.6	154.3	150.9	151.8
Wall Temp. #1-F	73.5	155.5	153.7	153.5	153.9	156.7	154.5	153.9	150.1	148.6
Wall Temp. #2-F	155.6	155.6	154.5	154.3	153.9	157.4	154.8	153.7	150.9	149.9
Instream Temp.-F	141.8	143	143.5	143	143.1	143.1	142.5	142.2	141.9	141.5
Avg. Wall Temp.-F	155	155.3	154.7	154.2	154.5	156	154.1	154.2	151.4	150.5
Avg. Wall DT.-F	12.8	11.8	10.7	10.7	11	12.5	11.2	11.6	9.1	8.6
Remaining Subcool-F	-1.3									
Exit Quality	0.01	0.02	0.04	0.05	0.06	0.08	0.09	0.11	0.12	0.13
EXP. H-Btu/Hr/ft2/F	773.5	838.6	917.8	914.5	908.6	799	882.6	860.6	1082	0
COMPUTED H										
Jallouk	686.1	672.1	667.7	664.8	670.6	668.9	667.7	671.3	672.1	675.9
Szady1(Cudo tube)	1043.9	1053.5	1058.5	1060.3	1075.3	1083.3	1084.9	1095	1098.2	1107.4
Szady2	854.7	864.1	867.6	867.2	881	887.6	887.5	888.1	895.9	910
(RLIQ)	98912	98457	97308	95677	94330	92923	91246	89715	88194	86639
(F)	1.234	1.525	1.787	2	2.184	2.35	2.508	2.654	2.791	2.922
(HLIQ)	310	383.7	449.6	503.1	549.3	591.3	630.7	667	701.2	733.9
(HBOIL)	1034.8	1036.2	1030.8	1021.1	1025.2	1021.1	1008.6	1005.4	993.2	987.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.9									
DP Liquid Density-lbm/ft3	90.92									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.107	0.679	1.095	1.41	1.847					
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111					
Corrected DP-Psid	0.101	0.636	1.052	1.395	1.958					
Actual DP-ft	2	3.26	4.72	6.31	7.38					
Measured TP-Psig	71.6				72.8					
Measured Overall-ft	-2.07									
Computed DP-ft	2.01	3.86	5.7	7.56	9.34					
Friction-ft	0.17	0.42	0.75	1.14	1.58					
Acceleration-ft	0.18	0.3	0.4	0.49	0.59					
Elevation-ft	1.65	3.14	4.56	5.92	7.17					

Run#	302									
Test Fluid	R114									
Date:	2/19/93									
Time:	23:51									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	85.6									
Sat. Temperature-F(inlet)	153.2									
Liq. Density-lbm/ft3	81.99	81.91	81.72	81.75	81.74	81.72	81.76	81.82	81.84	81.96
Latent Heat-Btu/lbm	46.82	46.74	46.56	46.59	46.57	46.56	46.6	46.65	46.68	46.79
Specific Heat-Btu/lbm/F	0.266	0.266	0.266	0.266	0.266	0.266	0.266	0.266	0.268	0.268
Liq. Viscosity-lbm/ft-hr	0.538	0.536	0.532	0.533	0.533	0.532	0.533	0.534	0.535	0.537
Liq. Conductivity-Btu/hr-ft-F	0.0309	0.0309	0.0308	0.0308	0.0308	0.0308	0.0308	0.0308	0.0308	0.0309
Liq. Prandtl No.	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61
Inlet Flow Rate-GPM	5.1									
Outlet Liq. Flow Rate-GPM	3.2									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	152.3									
Outlet Liq. Temperature-F	151.2									
Outlet Vap. Temperature-F	151.5									
Water Flow Rate-GPM										
Water inlet Temp.-F	61.1									
Water outlet Temp.-F	148.8									
Inlet G-lbm/hr/ft2	1005814		Temp	148	Density	82.64				
Subcooling-F	0.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	561.8	568	570.6	573.7	569.3	568.4	569.8	570.6	575.5	572.9
Heat Loss-Watts	31	6.8	8.9	10	10.8	10.5	9.7	10.9	10.7	56
Heat Flux-Btu/Hr/ft2	9738	9846	9891	9945	9868	9853	9877	9891	9976	9931
Wall Temp. #3-F	165.5	166.3	165.6	165.4	167.7	167	165.2	165.4	163.8	162.4
Wall Temp. #4-F	165.8	165.3	166.5	166.1	166.7	167	165.7	166.3	164.6	162.4
Wall Temp. #5-F	165.3	164	167.3	165.2	165.9	167.2	165.1	165.5	162.5	163.4
Wall Temp. #1-F	73	166.4	164.8	164.5	165	168.1	168	165.5	161.9	159.8
Wall Temp. #2-F	166.4	166.4	165.3	165.1	165.3	168.6	166.3	165.5	162.5	161.5
Instream Temp.-F	153	153.6	155	154.8	154.9	155	154.7	154.3	154.1	153.2
Avg. Wall Temp.-F	165.8	166.1	165.6	165.3	165.7	167.3	165.7	165.6	163.1	161.9
Avg. Wall DT.-F	12.3	12.1	10.1	10.1	10.4	11.9	10.5	10.9	8.5	8.3
Remaining Subcool-F	-1.2									
Exit Quality	0.01	0.02	0.03	0.04	0.06	0.07	0.08	0.09	0.11	0.12
EXP. H-Btu/Hr/ft2/F	791.1	816.7	979	989.5	950.8	829.4	939.5	908	1172.4	0
COMPUTED H										
Jallouk	692.3	689	690.5	691.7	688.4	687.3	689.4	691.7	696.2	696.7
Szady1(Cudo tube)	1077.7	1091	1104.6	1113.5	1117	1124	1132.2	1139.9	1152	1156.7
Szady2	870.4	885.4	900.3	922.6	922.6	927	933.4	940	944.8	955.2
(RLIQ)	121964	121147	120450	118805	117332	115864	114174	112431	110796	108782
(F)	1.214	1.471	1.692	1.876	2.034	2.175	2.308	2.434	2.551	2.689
(HLIQ)	348.4	422.2	486.3	539	584.6	625.2	663.2	699	732.6	788.2
(HBOIL)	1065.4	1069.5	1072.2	1069.7	1060.9	1055.4	1050.5	1044.6	1043.4	1031.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.4									
DP Liquid Density-lbm/ft3	91.08									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.084	0.55	0.901	1.12	1.442					
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111					
Corrected DP-Psid	0.078	0.507	0.858	1.105	1.553					
Actual DP-ft	2.09	3.55	5.16	6.95	8.25					
Measured TP-Psig	85.8				87.5					
Measured Overall-ft	-3.34									
Computed DP-ft	2.12	4.09	6.04	8	9.88					
Friction-ft	0.21	0.52	0.91	1.36	1.85					
Acceleration-ft	0.22	0.36	0.47	0.57	0.68					
Elevation-ft	1.68	3.21	4.67	6.07	7.35					

Run#	303									
Test Fluid	R114									
Date:	2/20/93									
Time:	0:30									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	81.4									
Sat. Temperature-F(inlet)	150									
Liq. Density-lbm/ft3	82.38	82.2	82.11	82.2	82.21	82.17	82.2	82.24	82.32	82.29
Latent Heat-Btu/lbm	47.2	47.02	46.93	47.02	47.03	47	47.02	47.06	47.13	47.11
Specific Heat-Btu/lbm/F	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265
Liq. Viscosity-lbm/ft-hr	0.546	0.542	0.54	0.542	0.542	0.541	0.542	0.543	0.544	0.544
Liq. Conductivity-Btu/hr-ft-F	0.0312	0.0311	0.031	0.0311	0.0311	0.0311	0.0311	0.0311	0.0312	0.0311
Liq. Prandtl No.	4.63	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62
Inlet Flow Rate-GPM	3.5									
Outlet Liq. Flow Rate-GPM	2.5									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	149.1									
Outlet Liq. Temperature-F	148.5									
Outlet Vap. Temperature-F	148.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	58.1									
Water outlet Temp.-F	146.1									
Inlet G-lbm/hr/ft2	695194		Temp	143.4	Density	83.23				
Subcooling-F	0.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	577.1	575.6	572	573.6	572.3	570.8	573.1	571.7	577.2	574.6
Heat Loss-Watts	29.4	6.5	8.7	10	10.7	10.6	9.5	10.6	10.3	54.9
Heat Flux-Btu/Hr/ft2	10004	9978	9915	9943	9920	9894	9934	9910	10005	9960
Wall Temp. #3-F	162.8	163.2	162.4	162.4	164.4	164.3	161.9	162.7	161	160.5
Wall Temp. #4-F	162.8	162.1	163.4	162.9	163.8	164.3	162.6	163.3	161.7	160.4
Wall Temp. #5-F	162.1	160.9	164.3	162.4	162.9	164.3	162	162.7	159.5	161
Wall Temp. #1-F	73.9	163.3	161.6	161.4	162	164.8	162.9	162.7	158.9	157.2
Wall Temp. #2-F	163.3	163.3	162.2	162.3	162.3	165.6	163.2	162.7	159.4	159
Instream Temp.-F	150	151.4	152.1	151.4	151.3	151.6	151.4	151.1	150.5	150.7
Avg. Wall Temp.-F	162.8	163	162.4	162.3	162.8	164.4	162.5	162.8	160.1	159.6
Avg. Wall DT.-F	12.3	11.1	9.9	10.4	11	12.4	10.7	11.3	9.1	8.5
Remaining Subcool-F	-2.3									
Exit Quality	0.01	0.03	0.05	0.07	0.08	0.1	0.12	0.14	0.16	0.17
EXP. H-Btu/Hr/ft2/F	813.4	896.9	1006.4	953.7	901.7	799.4	931	879.2	1093.7	0
COMPUTED H										
Jallouk	715.5	698.6	690.9	687.1	684.7	684.1	685.3	690.9	693.1	693.3
Szady1(Cudo tube)	1078.3	1085.2	1088.3	1091.8	1096	1099.6	1106.3	1109.8	1118.7	1123.4
Szady2	873	880	883.4	888	905.1	907.6	912.4	913.9	921.7	925
(RLIQ)	82833	82124	80905	79135	77601	76223	74656	73058	71351	69927
(F)	1.314	1.643	1.913	2.141	2.338	2.512	2.676	2.831	2.981	3.115
(HLIQ)	279.8	350.5	408.3	456.7	498.6	535.8	570.7	603.6	635.4	664
(HBOIL)	1071.9	1072.9	1068.8	1064.5	1059.4	1055.5	1053.2	1046.8	1045.8	1040
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.3									
DP Liquid Density-lbm/ft3	90.88									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.139	0.869	1.369	1.805	2.322					
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111					
Corrected DP-Psid	0.133	0.826	1.326	1.79	2.433					
Actual DP-ft	1.99	2.97	4.31	5.7	6.65					
Measured TP-Psig	81.4				83.9					
Measured Overall-ft	-4.97									
Computed DP-ft	1.88	3.61	5.32	7.04	8.67					
Friction-ft	0.13	0.32	0.57	0.87	1.19					
Acceleration-ft	0.14	0.22	0.3	0.37	0.45					
Elevation-ft	1.61	3.07	4.45	5.8	7.03					

Run#	304									
Test Fluid	R114									
Date:	2/20/93									
Time:	0:43									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	80									
Sat. Temperature-F(inlet)	148.9									
Liq. Density-lbm/ft3	82.55	82.29	82.25	82.34	82.34	82.32	82.96	82.39	82.41	82.45
Latent Heat-Btu/lbm	47.36	47.11	47.07	47.16	47.16	47.13	47.17	47.21	47.22	47.26
Specific Heat-Btu/lbm/F	0.264	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.264
Liq. Viscosity-lbm/ft-hr	0.549	0.544	0.543	0.545	0.545	0.544	0.545	0.548	0.546	0.547
Liq. Conductivity-Btu/hr-ft-F	0.0313	0.0311	0.0311	0.0312	0.0312	0.0312	0.0312	0.0312	0.0312	0.0312
Liq. Prandtl No.	4.63	4.62	4.62	4.63	4.63	4.62	4.63	4.63	4.63	4.63
Inlet Flow Rate-GPM	2.6									
Outlet Liq. Flow Rate-GPM	2.1									
Outlet Vap. Flow Rate-GPM	0.6									
Inlet Temperature-F	148									
Outlet Liq. Temperature-F	147.7									
Outlet Vap. Temperature-F	147.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	57.7									
Water outlet Temp.-F	145.6									
Inlet G-lbm/hr/ft2	518240		Temp	141.1	Density	83.52				
Subcooling-F	0.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	579.5	577.7	579.3	576.6	580	574.8	574.8	574.4	579.5	577.3
Heat Loss-Watts	28.8	6.3	8.5	10	10.7	10.7	9.4	10.5	10.2	54.1
Heat Flux-Btu/Hr/ft2	10045	10014	10042	9996	10054	9964	9964	9957	10045	10007
Wall Temp. #3-F	161.3	162.1	161.2	161	163.3	163.2	160.9	161.8	160.1	159.5
Wall Temp. #4-F	161.7	160.9	162.3	161.8	162.8	163.2	161.6	162.5	161	159.5
Wall Temp. #5-F	161.1	159.8	163.3	161	162	163.2	161	161.5	158.8	160.1
Wall Temp. #1-F	73.5	161.9	160.3	160.1	160.7	163.8	161.8	161.7	158.1	156.8
Wall Temp. #2-F	162.1	161.9	161	161	160.9	164.5	162.1	161.7	158.8	158.3
Instream Temp.-F	148.7	150.7	151	150.3	150.3	150.5	150.2	149.9	149.8	149.5
Avg. Wall Temp.-F	161.6	161.7	161.2	161	161.6	163.4	161.5	161.8	159.4	158.8
Avg. Wall DT.-F	12.4	10.5	9.7	10.2	10.8	12.4	10.8	11.5	9.1	8.9
Remaining Subcool-F	-3.4									
Exit Quality	0.02	0.04	0.07	0.09	0.11	0.14	0.16	0.19	0.21	0.23
EXP. H-Btu/Hr/ft2/F	810.4	949.4	1030.3	977.7	927	803.5	920	869.6	1103.1	0
COMPUTED H										
Jallouk	720.3	716.3	701.6	692.5	691	686.1	684.3	682.9	685.2	683.8
Szady1(Cudo tube)	1074.4	1082.2	1087.6	1085.7	1092.2	1091.8	1094.7	1097.6	1106.1	1106
Szady2	869.8	877	883	881.7	889.1	888.8	904.1	905.2	912.6	912.7
(RLIQ)	61168	60442	59032	57333	55836	54396	52830	51259	49756	48194
(F)	1.399	1.795	2.115	2.385	2.618	2.825	3.02	3.204	3.375	3.542
(HLIQ)	235.3	302.5	356.4	401.8	440.9	475.9	508.8	539.6	568.4	596.9
(HBOIL)	1070.7	1074.3	1074.6	1067.1	1067.7	1060.8	1056.8	1052.3	1053.7	1047.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.9									
DP Liquid Density-lbm/ft3	91.03									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.147	1.093	1.673	2.231	2.864					
Zero Corrections-psid	0.006	0.043	0.043	0.016	-0.111					
Corrected DP-Psid	0.141	1.05	1.63	2.216	2.975					
Actual DP-ft	1.96	2.58	3.78	4.96	5.71					
Measured TP-Psig	80				82.7					
Measured Overall-ft	-4.72									
Computed DP-ft	1.65	3.02	4.34	5.64	6.88					
Friction-ft	0.1	0.26	0.5	0.79	1.12					
Acceleration-ft	0.1	0.15	0.21	0.27	0.34					
Elevation-ft	1.45	2.6	3.63	4.58	5.43					

Run#	305									
Test Fluid	R114									
Date:	2/20/93									
Time:	1:24									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	85.7									
Sat. Temperature-F(inlet)	153.3									
Liq. Density-lbm/ft3	81.82	81.55	81.55	81.63	81.63	81.6	81.64	81.67	81.68	81.7
Latent Heat-Btu/lbm	46.65	46.39	46.39	46.47	46.47	46.45	46.48	46.51	46.52	46.54
Specific Heat-Btu/lbm/F	0.266	0.267	0.267	0.266	0.266	0.267	0.266	0.266	0.268	0.266
Liq. Viscosity-lbm/ft-hr	0.534	0.529	0.529	0.531	0.531	0.53	0.531	0.531	0.532	0.532
Liq. Conductivity-Btu/hr-ft-F	0.0308	0.0307	0.0307	0.0307	0.0307	0.0307	0.0307	0.0307	0.0307	0.0308
Liq. Prandtl No.	4.61	4.6	4.6	4.6	4.6	4.6	4.6	4.61	4.61	4.61
Inlet Flow Rate-GPM	1.8									
Outlet Liq. Flow Rate-GPM	1.8									
Outlet Vap. Flow Rate-GPM	0.4									
Inlet Temperature-F	153.4									
Outlet Liq. Temperature-F	153.4									
Outlet Vap. Temperature-F	153.5									
Water Flow Rate-GPM										
Water inlet Temp.-F	59.5									
Water outlet Temp.-F	150.5									
Inlet G-lbm/hr/ft2	356871		Temp	144.6	Density	83.08				
Subcooling-F	-0.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	584.1	582.7	582.3	581.3	581.9	576.9	579.9	580.9	581.8	578.8
Heat Loss-Watts	30.8	6.7	8.9	10	10.6	10.5	9.7	10.9	10.8	56.7
Heat Flux-Btu/Hr/ft2	10125	10101	10094	10076	10087	10000	10052	10070	10085	10033
Wall Temp. #3-F	168	166.4	166	165.8	168.2	168	168	166.1	165.5	164.7
Wall Temp. #4-F	166.2	165.5	167.1	166.3	167.6	168.1	168.7	167.3	166.1	164.6
Wall Temp. #5-F	165.7	164.9	168.2	165.9	166.5	167.9	166.1	166.1	164	165
Wall Temp. #1-F	74.8	166.2	164.8	164.9	165.4	168.5	167	166.7	163.4	162
Wall Temp. #2-F	166.6	166.2	165.5	165.8	165.6	169.2	167.2	167	164	163.6
Instream Temp.-F	154.3	156.3	156.3	155.7	155.7	155.9	155.6	155.4	155.3	155.2
Avg. Wall Temp.-F	166.1	166.1	165.9	165.7	166.3	168.1	166.6	166.6	164.6	164
Avg. Wall DT.-F	11.4	9.3	9.1	9.5	10.1	11.8	10.5	10.8	8.8	8.3
Remaining Subcool-F	-6.3									
Exit Quality	0.04	0.07	0.11	0.14	0.18	0.21	0.25	0.29	0.32	0.36
EXP. H-Btu/Hr/ft2/F	890.7	1083.9	1110	1058.5	996.8	849.4	953.2	933.7	1140.3	0
COMPUTED H										
Jallouk	754.5	744.3	729	719	713.9	706.8	705	702.8	701.2	697.8
Szady1(Cudo tube)	1097.8	1105	1106.4	1105.3	1107.9	1106.2	1110.4	1113.3	1116.6	1116.5
Szady2	891	897.7	899.5	899	902.3	900.6	905.8	909.8	913.2	913.4
(RLIQ)	42906	41739	40166	38481	36912	35385	33776	32182	30604	29031
(F)	1.571	2.072	2.44	2.755	3.028	3.271	3.503	3.721	3.925	4.12
(HLIQ)	196.9	260.2	306.4	345.8	380.1	410.7	439.7	466.9	492.6	517
(HBOIL)	1095.7	1100.2	1098.5	1093.9	1092.8	1087	1087	1085.2	1083.7	1078.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.6									
DP Liquid Density-lbm/ft3	90.85									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.178	1.388	2.039	2.725	3.478					
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111					
Corrected DP-Psid	0.172	1.345	1.996	2.71	3.587					
Actual DP-ft	1.92	2.08	3.15	4.12	4.66					
Measured TP-Psig	85.7				89.7					
Measured Overall-ft	-7.05									
Computed DP-ft	1.36	2.48	3.52	4.53	5.48					
Friction-ft	0.07	0.19	0.35	0.56	0.8					
Acceleration-ft	0.06	0.1	0.14	0.19	0.24					
Elevation-ft	1.24	2.19	3.03	3.78	4.44					

Run#	306									
Test Fluid	R114									
Date:	2/20/93									
Time:	2:11									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	85.2									
Sat. Temperature-F(inlet)	152.9									
Liq. Density-lbm/ft3	81.7	81.6	81.63	81.72	81.68	81.68	81.67	81.72	81.74	81.76
Latent Heat-Btu/lbm	46.54	46.45	46.47	46.56	46.52	46.52	46.51	46.56	46.57	46.6
Specific Heat-Btu/lbm/F	0.266	0.267	0.266	0.266	0.266	0.266	0.268	0.266	0.266	0.268
Liq. Viscosity-lbm/ft-hr	0.532	0.53	0.531	0.532	0.532	0.532	0.531	0.532	0.533	0.533
Liq. Conductivity-Btu/hr-ft-F	0.0308	0.0307	0.0307	0.0308	0.0307	0.0307	0.0307	0.0308	0.0308	0.0308
Liq. Prandtl No.	4.61	4.6	4.6	4.61	4.61	4.61	4.61	4.61	4.61	4.61
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	0.4									
Inlet Temperature-F	152.4									
Outlet Liq. Temperature-F	153									
Outlet Vap. Temperature-F	153.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	58.9									
Water outlet Temp.-F	151.2									
Inlet G-lbm/hr/ft2	199684		Temp	139.9	Density	83.67				
Subcooling-F	0.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	577	577.1	581.7	580.9	579.4	578.6	579.9	580.5	581	578.6
Heat Loss-Watts	30.6	6.7	8.9	10	10.6	10.5	9.7	10.9	10.8	56.7
Heat Flux-Btu/Hr/ft2	10002	10004	10083	10070	10044	10030	10052	10063	10071	10030
Wall Temp. #3-F	164.9	165.4	165	164.7	167.3	167.2	165.8	165.7	165	164.1
Wall Temp. #4-F	165	164.3	166	165.2	166.7	167.2	166.6	166.8	165.7	163.9
Wall Temp. #5-F	164.9	163	167.6	165.1	165.5	166.7	165.8	165.6	163.6	164.4
Wall Temp. #1-F	73.1	164.9	163.8	164.2	164.2	167.6	166.6	166.3	162.9	161.5
Wall Temp. #2-F	166	164.9	164.3	164.8	164.6	168.3	166.9	166.6	163.6	163.2
Instream Temp.-F	155.2	155.9	155.7	155	155.3	155.3	155.4	155	154.9	154.7
Avg. Wall Temp.-F	165.2	164.9	164.8	164.8	165.3	167.2	166.3	166.2	164.2	163.4
Avg. Wall DT.-F	9.5	8.5	8.6	9.3	9.5	11.4	10.5	10.7	8.8	8.3
Remaining Subcool-F	-10.5									
Exit Quality	0.06	0.12	0.19	0.25	0.31	0.38	0.44	0.5	0.57	0.63
EXP. H-Btu/Hr/ft2/F	1047.5	1173.7	1169.9	1077.5	1057.6	878.1	958.7	936.5	1143.8	0
COMPUTED H										
Jallouk	789.8	764.3	752.7	742.1	737.5	733.6	723.5	719.4	716.6	712.1
Szady1(Cudo tube)	1093.5	1096.8	1101.3	1099.1	1099.9	1100.4	1103.3	1104	1105.8	1104.7
Szady2	885.1	888.3	893.8	892.2	892.9	893.7	897.1	898.5	900.7	899.8
(RLIQ)	23819	22382	20800	19169	17638	16083	14534	12950	11387	9824
(F)	1.765	2.462	2.984	3.43	3.807	4.154	4.475	4.789	5.084	5.37
(HLIQ)	139.2	194.2	235.4	270.4	300.2	327.6	352.9	377.6	400.8	423.9
(HBOIL)	1092.7	1094.7	1097.7	1093.6	1092.4	1090.6	1091.2	1089.1	1088	1083.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.8									
DP Liquid Density-lbm/ft3	91.04									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.156	1.722	2.453	3.277	4.156					
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111					
Corrected DP-Psid	0.15	1.679	2.41	3.262	4.267					
Actual DP-ft	1.96	1.5	2.44	3.16	3.48					
Measured TP-Psig	85.2				89.6					
Measured Overall-ft	-7.57									
Computed DP-ft	1.11	1.91	2.61	3.25	3.82					
Friction-ft	0.03	0.1	0.19	0.31	0.45					
Acceleration-ft	0.03	0.05	0.08	0.12	0.17					
Elevation-ft	1.05	1.76	2.33	2.82	3.21					

Run#	307									
Test Fluid	R114									
Date:	2/20/93									
Time:	2:53									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	73.6									
Sat. Temperature-F(inlet)	143.8									
Liq. Density-lbm/ft3	83.41	83.46	83.46	83.5	83.46	83.41	83.42	83.41	83.4	83.37
Latent Heat-Btu/lbm	48.19	48.24	48.24	48.27	48.24	48.19	48.2	48.19	48.18	48.15
Specific Heat-Btu/lbm/F	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262
Liq. Viscosity-lbm/ft-hr	0.568	0.569	0.569	0.57	0.569	0.568	0.568	0.568	0.567	0.567
Liq. Conductivity-Btu/hr-ft-F	0.0319	0.0319	0.0319	0.0319	0.0319	0.0319	0.0319	0.0319	0.0319	0.0318
Liq. Prandtl No.	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.66
Inlet Flow Rate-GPM	4.2									
Outlet Liq. Flow Rate-GPM	2.8									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	141.6									
Outlet Liq. Temperature-F	140									
Outlet Vap. Temperature-F	144.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	138.1									
Water outlet Temp.-F	139.1									
Inlet G-lbm/hr/ft2	838925		Temp	139.7	Density	83.7				
Subcooling-F	2.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	0	0	0	0	0
Heat Loss-Watts	21.1	5	6.7	8.2	8.9	8.6	6.6	7.7	7.9	44
Heat Flux-Btu/Hr/ft2	0	0	0	0	0	0	0	0	0	0
Wall Temp. #3-F	143.1	142.9	142.9	142.9	142.7	142.8	142.8	143.1	143.1	142.7
Wall Temp. #4-F	143.1	143	142.9	142.9	142.6	142.9	142.9	143.1	143.3	142.6
Wall Temp. #5-F	143	143	143	142.8	142.6	142.9	142.9	143.1	143.5	143.4
Wall Temp. #1-F	72.8	143.2	142.7	143	142.7	143	142.6	143	143	143.8
Wall Temp. #2-F	143	143.3	142.7	142.7	142.6	142.6	142.7	143.1	143	143.6
Instream Temp.-F	142	141.6	141.6	141.3	141.6	142	141.9	142	142.1	142.3
Avg. Wall Temp.-F	143.1	143.1	142.8	142.9	142.6	142.9	142.8	143.1	143.2	143.2
Avg. Wall DT.-F	1.1	1.5	1.2	1.6	1	0.9	0.9	1.1	1.1	0.9
Remaining Subcool-F	2.2									
Exit Quality	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
EXP. H-Btu/Hr/ft2/F	0	0	0	0	0	0	0	0	0	0
COMPUTED H										
Jallouk	202	201.9	201.9	201.9	201.9	202	202	202	202	202.1
Szady1(Cudo tube)	247.6	247.5	247.5	247.4	247.5	247.6	247.6	247.6	247.6	247.6
Szady2	247.6	247.5	247.5	247.4	247.5	247.6	247.5	247.6	247.6	247.6
(RLIQ)	96678	96483	96483	96338	96483	96678	96629	96678	96726	96824
(F)	1.007	1.007	1.007	1.007	1.007	1.007	1.007	1.007	1.007	1.007
(HLIQ)	247.6	247.5	247.5	247.4	247.5	247.6	247.5	247.6	247.6	247.6
(HBOIL)	15.5	15.4	15.4	15.4	15.4	15.5	15.5	15.5	15.5	15.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.8									
DP Liquid Density-lbm/ft3	91.04									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.059	0.151	0.215	0.254	0.252					
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111					
Corrected DP-Psid	0.053	0.108	0.172	0.239	0.383					
Actual DP-ft	2.09	4.18	6.25	8.32	10.16					
Measured TP-Psig	73.6				73.3					
Measured Overall-ft	0.52									
Computed DP-ft	2.09	4.19	6.28	8.37	10.34					
Friction-ft	0.09	0.19	0.28	0.37	0.46					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.87					

Run#	308									
Test Fluid	R114									
Date:	2/20/93									
Time:	3: 1									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	114.9									
Sat. Temperature-F(inlet)	173.2									
Liq. Density-lbm/ft3	78.85	78.75	78.7	78.78	78.78	78.75	78.76	78.78	78.81	78.85
Latent Heat-Btu/lbm	43.77	43.67	43.63	43.7	43.7	43.67	43.68	43.7	43.72	43.77
Specific Heat-Btu/lbm/F	0.273	0.273	0.274	0.273	0.273	0.273	0.273	0.273	0.273	0.273
Liq. Viscosity-lbm/ft-hr	0.483	0.482	0.481	0.482	0.482	0.482	0.482	0.482	0.483	0.483
Liq. Conductivity-Btu/hr-ft-F	0.029	0.0289	0.0289	0.0289	0.0289	0.0289	0.0289	0.0289	0.0289	0.029
Liq. Prandtl No.	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56
Inlet Flow Rate-GPM	3.5									
Outlet Liq. Flow Rate-GPM	2.4									
Outlet Vap. Flow Rate-GPM	0.4									
Inlet Temperature-F	175.5									
Outlet Liq. Temperature-F	173.4									
Outlet Vap. Temperature-F	174.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	75.2									
Water outlet Temp.-F	171.4									
Inlet G-lbm/hr/ft2	668304		Temp	167.6	Density	80.01				
Subcooling-F	-2.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	580.2	586.5	551.4	553	576.9	576	592.3	590.1	550.6	542.7
Heat Loss-Watts	41.5	8.7	10.8	10	9.9	9.8	11.3	12.9	13.9	67.7
Heat Flux-Btu/Hr/ft2	10057	10167	9558	9586	10000	9985	10267	10229	9543	9407
Wall Temp. #3-F	185.5	185.8	185.5	184.9	187	187.1	186.2	186.2	185.6	184.3
Wall Temp. #4-F	185.8	184.8	186.7	185.7	186.6	187	186.9	187.2	186.2	183.9
Wall Temp. #5-F	185.2	184	187.2	184.9	186	187.3	186.2	186	184.5	184.5
Wall Temp. #1-F	73.7	186.1	184.4	184	185	188	186.6	187	184.2	182.8
Wall Temp. #2-F	186.5	186.1	184.9	184.6	185.1	188.4	187.2	187.4	184.5	183.5
Instream Temp.-F	175.8	176.5	176.8	176.3	176.3	176.5	176.4	176.3	176.1	175.8
Avg. Wall Temp.-F	185.8	185.7	185.4	184.9	185.7	187.4	186.6	186.8	185	183.8
Avg. Wall DT.-F	9.5	8.7	8.1	8.1	8.9	10.4	9.8	10	8.4	7.6
Remaining Subcool-F	-5.6									
Exit Quality	0.03	0.06	0.07	0.09	0.11	0.13	0.15	0.17	0.19	0.21
EXP. H-Btu/Hr/ft2/F	1059.2	1163.2	1173.8	1177.4	1120.7	960.2	1052.4	1023.1	1129.5	0
COMPUTED H										
Jallouk	761.5	753.6	724.3	721.6	734.6	732.6	740.4	737.8	711.1	708
Szady1(Cudo tube)	1170.2	1182.7	1151.7	1155.1	1182.1	1185.4	1204.5	1206	1172.1	1168.3
Szady2	980.9	991.8	938.1	943.3	973.8	978	999.5	1001.6	978.2	970.4
(RLIQ)	88893	86674	84993	83059	81276	79529	77650	75749	73884	72065
(F)	1.494	1.856	2.055	2.23	2.388	2.533	2.673	2.807	2.93	3.044
(HLIQ)	313.4	389.6	431.5	468	501.1	531.7	561.1	589	614.8	638.7
(HBOIL)	1162.6	1168.4	1131.1	1128.9	1151.3	1148.6	1162.4	1157.2	1112.8	1100.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	126.7									
DP Liquid Density-lbm/ft3	85.3									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.156	0.976	1.49	1.958	2.506					
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111					
Corrected DP-Psid	0.15	0.933	1.447	1.943	2.617					
Actual DP-ft	1.89	2.62	3.85	5.11	5.9					
Measured TP-Psig	114.9				119.6					
Measured Overall-ft	-8.58									
Computed DP-ft	1.7	3.41	4.89	6.37	7.96					
Friction-ft	0.17	0.36	0.68	1.03	1.32					
Acceleration-ft	0.16	0.22	0.28	0.35	0.41					
Elevation-ft	1.37	2.83	3.95	4.99	6.23					

Run#	309									
Test Fluid	R114									
Date:	2/20/93									
Time:	3:59									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	118.5									
Sat. Temperature-F(inlet)	175.4									
Liq. Density-lbm/ft3	78.69	78.49	78.37	78.47	78.43	78.38	78.41	78.44	78.44	78.57
Latent Heat-Btu/lbm	43.61	43.41	43.3	43.4	43.36	43.31	43.34	43.37	43.37	43.5
Specific Heat-Btu/lbm/F	0.274	0.274	0.274	0.274	0.274	0.274	0.274	0.274	0.274	0.274
Liq. Viscosity-lbm/ft-hr	0.481	0.478	0.476	0.478	0.477	0.476	0.477	0.477	0.477	0.479
Liq. Conductivity-Btu/hr-ft-F	0.0289	0.0287	0.0287	0.0287	0.0287	0.0287	0.0287	0.0287	0.0287	0.0288
Liq. Prandtl No.	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56
Inlet Flow Rate-GPM	3.6									
Outlet Liq. Flow Rate-GPM	2.8									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	176.6									
Outlet Liq. Temperature-F	175.9									
Outlet Vap. Temperature-F	176.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	79.2									
Water outlet Temp.-F	173.4									
Inlet G-lbm/hr/ft2	685356		Temp		169.3	Density	78.77			
Subcooling-F	-1.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	569.8	577.6	552.3	554	574.1	573.2	585	581.5	552.4	543.4
Heat Loss-Watts	42.6	8.9	11	10	9.8	9.7	11.5	13.2	14.2	68.8
Heat Flux-Btu/Hr/ft2	9877	10012	9574	9603	9952	9936	10141	10080	9576	9419
Wall Temp. #3-F	187.5	187.9	187.5	186.9	189.3	189.3	188.3	188.2	187.5	186.2
Wall Temp. #4-F	188	187	188.6	187.8	188.9	189.1	189	189.2	188.5	186
Wall Temp. #5-F	187.4	186.1	189.3	187	188.2	189.6	188.4	188	186.7	186.8
Wall Temp. #1-F	73.9	188.1	186.5	186.2	187.2	190.3	188.8	189.2	188.1	184.7
Wall Temp. #2-F	188.6	188.1	187.2	186.8	187.3	190.6	189.4	189.7	186.7	185.5
Instream Temp.-F	176.9	178.3	179.1	178.4	178.7	179	178.8	178.6	178.6	177.7
Avg. Wall Temp.-F	187.9	187.8	187.5	187	187.9	189.6	188.8	188.9	187.1	185.7
Avg. Wall DT.-F	10.5	9	7.9	8.1	8.8	10.1	9.5	9.8	8.1	7.6
Remaining Subcool-F	-4.3									
Exit Quality	0.03	0.05	0.07	0.08	0.1	0.12	0.14	0.16	0.18	0.2
EXP. H-Btu/Hr/ft2/F	938.1	1109.7	1209.2	1179.6	1137.3	981.2	1065	1028.1	1187	0
COMPUTED H										
Jallouk	757	752.4	730.1	726.6	737.7	735.6	740.7	737.1	720.5	709.2
Szady1(Cudo tube)	1162.9	1178.7	1158.7	1161.6	1185.9	1189.4	1204	1203.9	1180	1173.4
Szady2	973	987.7	963.1	949	976.5	981	997.7	998.1	972.4	976.7
(RLIQ)	91973	90363	88875	88822	85126	83398	81459	79512	77691	75627
(F)	1.423	1.755	1.959	2.138	2.296	2.441	2.581	2.713	2.832	2.953
(HLIQ)	304.9	376.2	420	458.3	492.1	523.3	553.2	581.5	607.1	632.9
(HBOIL)	1155.9	1165.8	1140	1137.3	1156.9	1154.6	1163.7	1156.9	1123.9	1108.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.2									
DP Liquid Density-lbm/ft3	91									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.151	0.923	1.426	1.88	2.417					
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111					
Corrected DP-Psid	0.145	0.88	1.383	1.865	2.528					
Actual DP-ft	2.05	3.02	4.41	5.85	6.8					
Measured TP-Psig	118.5				123.4					
Measured Overall-ft	-8.98									
Computed DP-ft	1.83	3.56	5.27	6.87	8.48					
Friction-ft	0.15	0.33	0.58	0.87	1.16					
Acceleration-ft	0.15	0.22	0.28	0.34	0.41					
Elevation-ft	1.53	3.02	4.43	5.66	6.91					

Run#	310									
Test Fluid	R114									
Date:	2/20/93									
Time:	4: 8									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	135.4									
Sat. Temperature-F(inlet)	185.2									
Liq. Density-lbm/ft3	77.33	77.25	77.11	77.04	76.99	76.9	76.93	76.92	76.93	77.16
Latent Heat-Btu/lbm	42.28	42.21	42.07	42	41.95	41.86	41.89	41.88	41.89	42.12
Specific Heat-Btu/lbm/F	0.277	0.277	0.277	0.277	0.277	0.278	0.278	0.278	0.278	0.277
Liq. Viscosity-lbm/ft-hr	0.462	0.461	0.459	0.458	0.457	0.456	0.456	0.456	0.456	0.459
Liq. Conductivity-Btu/hr-ft-F	0.028	0.028	0.0279	0.0278	0.0278	0.0277	0.0278	0.0278	0.0278	0.0279
Liq. Prandtl No.	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56
Inlet Flow Rate-GPM	5.4									
Outlet Liq. Flow Rate-GPM	3.9									
Outlet Vap. Flow Rate-GPM	0.5									
Inlet Temperature-F	185.5									
Outlet Liq. Temperature-F	195.4									
Outlet Vap. Temperature-F	186.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	93									
Water outlet Temp.-F	181.4									
Inlet G-lbm/hr/ft2	1006899		Temp		180.7	Density	78.13			
Subcooling-F	-0.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	580.2	572	582.6	582.5	589.4	590.3	575.3	575.8	585.4	581.3
Heat Loss-Watts	47.3	9.8	11.8	10	9.5	9.4	12.2	14.1	15.6	73.1
Heat Flux-Btu/Hr/ft2	10057	9915	10099	10097	10217	10232	9972	9981	10148	10076
Wall Temp. #3-F	197.2	197.4	197	196.5	198.3	198.6	197.9	197.7	197.4	195
Wall Temp. #4-F	197.6	196.6	198.2	197.4	198.1	198.5	198.4	198.5	198.3	196
Wall Temp. #5-F	197.1	195.6	198.8	196.6	197.3	198.9	197.8	197.6	196.5	195.9
Wall Temp. #1-F	75.8	197.6	196.1	195.9	196.4	199.5	198.2	198.3	195.9	192.8
Wall Temp. #2-F	198.1	197.6	196.7	196.3	196.6	199.7	198.8	198.8	196.6	193.7
Instream Temp.-F	186.1	186.6	187.5	188	188.3	188.9	188.7	188.8	188.7	187.2
Avg. Wall Temp.-F	197.5	197.3	197	196.6	197.1	198.9	198.2	198.2	196.9	194.4
Avg. Wall DT.-F	10.9	10.3	9	8.1	8.3	9.5	9.1	8.9	7.8	6.7
Remaining SubcooF	-2.4									
Exit Quality	0.02	0.03	0.04	0.06	0.07	0.09	0.1	0.11	0.13	0.14
EXP. H-Btu/Hr/ft2/F	918.9	967.2	1116.7	1239.9	1225.3	1075.7	1099.6	1117.8	1304.1	0
COMPUTED H										
Jallouk	765.6	751	755	752.9	755.5	755.8	741.5	740.9	745	740.8
Szady1(Cudo tube)	1205.5	1203.8	1221.8	1227.8	1240.3	1248.4	1238.7	1244.8	1259.1	1256.9
Szady2	1016.6	1010.7	1011.9	1019.6	1034	1043.1	1032.7	1052.8	1065.7	1059
(RLIQ)	141548	139757	138327	136621	134774	133135	131006	129055	126986	124082
(F)	1.293	1.541	1.711	1.855	1.983	2.098	2.207	2.306	2.402	2.506
(HLIQ)	377.8	450.5	500	542.2	579.8	613.5	645.5	674.4	702.4	732.5
(HBOIL)	1193	1182.4	1193.2	1191.5	1196.6	1197	1177.3	1174.9	1181.6	1187.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.8									
DP Liquid Density-lbm/ft3	90.93									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.124	0.475	0.968	1.231	1.588					
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111					
Corrected DP-Psid	0.118	0.432	0.925	1.216	1.699					
Actual DP-ft	2.14	3.91	5.34	7.16	8.47					
Measured TP-Psig	135.4				140.2					
Measured Overall-ft	-8.96									
Computed DP-ft	2.15	4.13	6.09	8.05	9.91					
Friction-ft	0.24	0.55	0.91	1.33	1.77					
Acceleration-ft	0.24	0.35	0.44	0.53	0.62					
Elevation-ft	1.67	3.23	4.73	6.18	7.51					

Run#	311									
Test Fluid	R114									
Date:	2/20/93									
Time:	4:53									
Note	TABORE# Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	115.9									
Sat. Temperature-F(inlet)	173.8									
Liq. Density-lbm/ft3	79.02	78.95	78.79	78.73	78.7	78.66	78.68	78.7	78.72	78.89
Latent Heat-Btu/lbm	43.84	43.87	43.71	43.65	43.63	43.58	43.6	43.63	43.64	43.81
Specific Heat-Btu/lbm/F	0.273	0.273	0.273	0.273	0.274	0.274	0.274	0.274	0.273	0.273
Liq. Viscosity-lbm/ft-hr	0.486	0.485	0.482	0.482	0.481	0.48	0.481	0.481	0.481	0.484
Liq. Conductivity-Btu/hr-ft-F	0.0291	0.029	0.0289	0.0289	0.0289	0.0288	0.0288	0.0289	0.0289	0.029
Liq. Prandtl No.	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56
Inlet Flow Rate-GPM	5.4									
Outlet Liq. Flow Rate-GPM	3.8									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	174.1									
Outlet Liq. Temperature-F	173.8									
Outlet Vap. Temperature-F	174.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	69.5									
Water outlet Temp.-F	170.8									
Inlet G-lbm/hr/ft2	1027491		Temp		169.6	Density		79.73		
Subcooling-F	-0.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	565.9	568.2	586	584.1	575.9	575.4	565.5	563.2	590	588.2
Heat Loss-Watts	41.3	8.7	10.8	10	9.9	9.8	11.2	12.9	13.9	67.1
Heat Flux-Btu/Hr/ft2	9810	9849	10158	10125	9983	9974	9803	9763	10227	10198
Wall Temp. #3-F	186.3	186.5	186.1	186	187.6	187.4	188.4	188.3	186.3	184.2
Wall Temp. #4-F	186.6	185.4	187.2	186.6	187.3	187.4	187	187.2	187.3	184.2
Wall Temp. #5-F	186.1	184.6	188	186.1	186.5	187.7	186.3	186.3	185.3	185.1
Wall Temp. #1-F	76.2	186.7	185.3	185.4	185.7	188.5	188.9	187	184.8	181.5
Wall Temp. #2-F	187.2	186.7	186	186	185.8	188.9	187.4	187.4	185.3	183
Instream Temp.-F	174.6	175.1	176.2	176.6	176.8	177.1	177	176.8	176.7	175.5
Avg. Wall Temp.-F	186.6	186.3	186.2	186	186.3	187.8	186.8	186.8	185.8	183.6
Avg. Wall DT.-F	11.5	10.8	9.5	9	9.1	10.2	9.4	9.6	8.6	7.6
Remaining Subcool-F	-2.4									
Exit Quality	0.01	0.03	0.04	0.05	0.07	0.08	0.09	0.11	0.12	0.13
EXP. H-Btu/Hr/ft2/F	852.5	913.7	1070.3	1129.1	1100.2	977.9	1047.6	1017.1	1184	0
COMPUTED H										
Jallouk	732.9	727.4	736.9	734.6	725.4	724.8	719.5	718.7	731.1	729.8
Szady1(Cudo tube)	1155.8	1165.7	1191.8	1196.8	1195.3	1201.6	1198.3	1202.1	1232.6	1235
Szady2	962.4	955.3	984.8	990.9	989.7	1010.4	1001.9	1002.4	1034.7	1034.5
(RLIQ)	137319	135726	134590	132989	131275	129627	127761	125858	123976	121454
(F)	1.299	1.555	1.73	1.881	2.014	2.133	2.245	2.349	2.449	2.557
(HLIQ)	384.4	460.1	512.2	557.1	596.5	631.9	664.9	695.7	725.3	756.7
(HBOIL)	1141.5	1141.3	1159.4	1155.1	1143.6	1140.3	1125.8	1118.8	1142.6	1132
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	127.9									
DP Liquid Density-lbm/ft3	85.16									
Elevation-ft	2.	4	6.	8	9.875					
Measured DP-Psid	0.105	0.556	0.909	1.152	1.48					
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111					
Corrected DP-Psid	0.099	0.513	0.866	1.137	1.591					
Actual DP-ft	1.98	3.38	4.9	6.56	7.75					
Measured TP-Psig	115.9				119.9					
Measured Overall-ft	-7.3									
Computed DP-ft	2.16	4.14	6.11	8.09	9.97					
Friction-ft	0.25	0.57	0.96	1.41	1.88					
Acceleration-ft	0.26	0.37	0.47	0.57	0.67					
Elevation-ft	1.65	3.2	4.68	6.11	7.42					

Run#	512									
Test Fluid	R114									
Date:	2/20/93									
Time:	5 7									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	120.1									
Sat. Temperature-F(inlet)	176.4									
Liq. Density-lbm/ft3	78.65	78.56	78.35	78.33	78.33	78.25	78.24	78.24	78.25	78.49
Latent Heat-Btu/lbm	43.57	43.48	43.28	43.26	43.26	43.18	43.17	43.17	43.18	43.41
Specific Heat-Btu/lbm/F	0.274	0.274	0.274	0.274	0.274	0.275	0.275	0.275	0.275	0.274
Liq. Viscosity-lbm/ft-hr	0.48	0.479	0.476	0.476	0.476	0.474	0.474	0.474	0.474	0.478
Liq. Conductivity-Btu/hr-ft-F	0.0288	0.0288	0.0286	0.0286	0.0286	0.0286	0.0286	0.0286	0.0286	0.0287
Liq. Prandtl No.	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56
Inlet Flow Rate-GPM	4.4									
Outlet Liq. Flow Rate-GPM	3.3									
Outlet Vap. Flow Rate-GPM	1									
Inlet Temperature-F	176.7									
Outlet Liq. Temperature-F	176.7									
Outlet Vap. Temperature-F	177.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	74									
Water outlet Temp.-F	173.9									
Inlet G-lbm/hr/ft2	833954		Temp		171.8	Density		79.42		
Subcooling-F	-0.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	561.6	564.6	583.8	581.4	576	576.6	562.6	560.6	587.4	585.1
Heat Loss-Watts	42.4	8.9	11	10	9.8	9.7	11.4	13.1	14.2	68.3
Heat Flux-Btu/Hr/ft2	9735	9787	10120	10078	9985	9995	9752	9718	10182	10142
Wall Temp. #3-F	188.6	188.8	188.5	188.4	190.1	190.2	189.4	189.4	189.3	187
Wall Temp. #4-F	189.1	188	189.7	189.2	189.8	190.2	190	190.2	190.2	187
Wall Temp. #5-F	188.6	187.1	190.7	188.5	189	190.2	189.3	189.3	188.3	187.8
Wall Temp. #1-F	76.2	189.1	187.8	187.7	188.1	191.1	189.8	190.1	187.7	184.3
Wall Temp. #2-F	189.7	189.1	188.5	188.3	188.4	191.3	190.4	190.4	188.4	185.7
Instream Temp.-F	177.2	177.8	179.2	179.4	179.4	179.9	180	180	179.9	178.3
Avg. Wall Temp.-F	189	188.8	188.6	188.5	188.8	190.4	189.8	189.9	188.8	186.4
Avg. Wall DT.-F	11.4	10.5	9	8.6	9	10.1	9.3	9.4	8.4	7.6
Remaining Subcool-F	-2.8									
Exit Quality	0.02	0.03	0.05	0.07	0.08	0.1	0.11	0.13	0.15	0.16
EXP. H-Btu/Hr/ft2/F	856.9	931.4	1128.5	1172.6	1112.6	992.2	1044.2	1029.3	1209.3	0
COMPUTED H										
Jallouk	743.9	736.5	746.8	741.9	736.4	736.3	728.1	721.8	735.3	731
Szady1(Cudo tube)	1156.8	1166	1193.3	1195.6	1194.6	1201	1192.4	1195.3	1225.1	1224.1
Szady2	965.3	972.2	983.3	986.9	986.7	994.2	985.2	1003.2	1034.6	1029.4
(RLIQ)	112584	110970	109825	108046	106178	104548	102749	100926	99019	96427
(F)	1.332	1.615	1.809	1.978	2.127	2.258	2.381	2.494	2.604	2.727
(HLIQ)	333.7	404.9	453.7	496.2	533.6	566.6	597.3	625.7	653.3	683.8
(HBOIL)	1147.5	1149.5	1171.1	1166.5	1158	1157.4	1140.2	1135.1	1159.8	1148.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	127.9									
DP Liquid Density-lbm/ft3	85.16									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.137	0.723	1.15	1.501	1.935					
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111					
Corrected DP-Psid	0.131	0.68	1.107	1.486	2.046					
Actual DP-ft	1.93	3.09	4.48	5.95	6.96					
Measured TP-Psig	120.1				124.7					
Measured Overall-ft	-8.44									
Computed DP-ft	2	3.85	5.67	7.49	9.22					
Friction-ft	0.18	0.42	0.71	1.05	1.41					
Acceleration-ft	0.19	0.27	0.35	0.43	0.51					
Elevation-ft	1.63	3.15	4.61	6.02	7.3					

Run#	313									
Test Fluid	R114									
Date:	2/20/93									
Time:	5:18									
Note	TABOREK Analytical di									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	121.1									
Sat. Temperature-F(inlet)	176.9									
Liq. Density-lbm/ft3	78.47	78.19	78.1	78.21	78.21	78.15	78.16	78.16	78.18	78.31
Latent Heat-Btu/lbm	43.4	43.13	43.04	43.14	43.14	43.08	43.1	43.1	43.11	43.24
Specific Heat-Btu/lbm/F	0.274	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.274
Liq. Viscosity-lbm/ft-hr	0.478	0.474	0.472	0.474	0.474	0.473	0.473	0.473	0.473	0.476
Liq. Conductivity-Btu/hr-ft-F	0.0287	0.0285	0.0285	0.0286	0.0286	0.0285	0.0285	0.0285	0.0285	0.0286
Liq. Prandtl No.	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56
Inlet Flow Rate-GPM	2.7									
Outlet Liq. Flow Rate-GPM	2.3									
Outlet Vap. Flow Rate-GPM	0.5									
Inlet Temperature-F	177.5									
Outlet Liq. Temperature-F	177.8									
Outlet Vap. Temperature-F	178.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	73.7									
Water outlet Temp.-F	176.1									
Inlet G-lbm/hr/ft2	513111	Temp	170.3	Density	79.63					
Subcooling-F	-0.6									
Flow Observation										

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	581.4	576.9	575.9	575.5	575	574.3	579.5	578.9	578.7	579.1
Heat Loss-Watts	42.9	9	11.1	10	9.8	9.7	11.5	13.2	14.3	69.1
Heat Flux-Btu/Hr/ft2	10078	10000	9983	9976	9967	9955	10045	10035	10031	10038
Wall Temp. #3-F	189.7	189.9	189.6	188.9	191	191.1	190.1	190.2	189.9	188.3
Wall Temp. #4-F	190	189	190.5	189.7	190.5	191.1	190.8	191.3	190.7	188
Wall Temp. #5-F	189.5	187.9	191.5	189	189.7	191.5	190.1	190.1	189	188.9
Wall Temp. #1-F	76.2	190.2	188.6	188.3	188.8	192.1	190.6	191.1	188.4	185.7
Wall Temp. #2-F	190.8	190.2	189.4	188.8	189	192.5	191.2	191.5	189	187
Instream Temp.-F	178.4	180.3	180.9	180.2	180.2	180.6	180.6	180.5	180.4	179.5
Avg. Wall Temp.-F	190	189.8	139.5	189	189.5	191.5	190.6	190.8	189.4	187.6
Avg. Wall DT.-F	11.1	9.1	9.2	8.3	8.8	10.4	9.6	9.9	8.5	7.6
Remaining Subcool-F	-4.8									
Exit Quality	0.03	0.06	0.08	0.11	0.14	0.16	0.19	0.22	0.24	0.27
EXP. H-Btu/Hr/ft2/F	904.3	1102.2	1221.3	1198.4	1126.3	957.2	1045.7	1015	1173.7	0
COMPUTED H										
Jallouk	787.7	771.5	763.3	755.3	750.4	747.2	747.7	745	742.8	739.9
Szady1(Cudo tube)	1177.5	1181	1183.8	1183.5	1185.3	1188.2	1195.6	1197.7	1200	1200.8
Szady2	990.6	992.6	994.1	992.1	992.4	976.8	985.9	988.9	992.1	993.9
(RLIQ)	69218	67811	66118	64039	62166	60406	58500	56612	54702	52606
(F)	1.446	1.818	2.074	2.297	2.491	2.661	2.824	2.976	3.12	3.269
(HLIQ)	245.9	309.4	352.9	390.9	423.7	452.8	480.5	506.3	530.8	556
(HBOIL)	1173.9	1173.8	1173.3	1169.1	1166.9	1165.8	1169.1	1166.7	1184.3	1159.7

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	77.2				
DP Liquid Density-lbm/ft3	90.89				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.148	1.091	1.666	2.224	2.857
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111
Corrected DP-Psid	0.142	1.048	1.623	2.209	2.968
Actual DP-ft	2.06	2.72	3.98	5.22	6
Measured TP-Psig	121.1				126.6
Measured Overall-ft	-10.11				
Computed DP-ft	1.61	3.01	4.35	5.66	6.88
Friction-ft	0.1	0.26	0.46	0.71	0.98
Acceleration-ft	0.09	0.14	0.19	0.24	0.3
Elevation-ft	1.42	2.61	3.7	4.71	5.6

Run#	314									
Test Fluid	R114									
Date:	2/20/93									
Time:	5:35									
Note	TABOREk	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	121									
Sat. Temperature-F(inlet)	176.9									
Liq. Density-lbm/ft3	78.7	78.18	78.12	78.21	78.19	78.15	78.15	78.15	78.15	78.28
Latent Heat-Btu/lbm	43.63	43.11	43.06	43.14	43.13	43.08	43.08	43.08	43.08	43.21
Specific Heat-Btu/lbm/F	0.274	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.274
Liq. Viscosity-lbm/ft-hr	0.481	0.473	0.473	0.474	0.474	0.473	0.473	0.473	0.473	0.475
Liq. Conductivity-Btu/hr-ft-F	0.0289	0.0285	0.0285	0.0286	0.0285	0.0285	0.0285	0.0285	0.0285	0.0288
Liq. Prandtl No.	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56
Inlet Flow Rate-GPM	1.9									
Outlet Liq. Flow Rate-GPM	2.6									
Outlet Vap. Flow Rate-GPM	.5									
Inlet Temperature-F	176.3									
Outlet Liq. Temperature-F	177.9									
Outlet Vap. Temperature-F	178.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	75.7									
Water outlet Temp.-F	175.1									
Inlet G-lbm/hr/ft2	363109		Temp		167.1	Density	80.08			
Subcooling-F	0.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	573.8	573.9	578.2	582.9	572.4	570.9	573.8	570	572.2	574.3
Heat Loss-Watts	42.9	9	11.1	10	9.7	9.7	11.5	13.3	14.4	69.1
Heat Flux-Btu/Hr/ft2	9946	9948	10023	10104	9922	9896	9946	9881	9919	9955
Wall Temp. #3-F	189.2	189.4	189.1	188.8	190.8	191	190.2	190	189.8	187.9
Wall Temp. #4-F	189.7	188.7	190.3	189.7	190.6	191	190.8	191.1	190.7	187.6
Wall Temp. #5-F	189.1	187.3	191.1	189.2	189.5	191.2	190.2	190	188.9	188.4
Wall Temp. #1-F	76.4	189.7	188.2	188.3	188.6	191.8	190.7	191	188.4	185.4
Wall Temp. #2-F	190.2	189.7	188.7	188.8	188.7	192.1	191.3	191.5	188.9	186.6
Instream Temp.-F	176.8	180.4	180.8	180.2	180.3	180.6	180.6	180.6	180.6	179.7
Avg. Wall Temp.-F	189.6	189.4	189.1	189	189.4	191.3	190.6	190.7	189.3	187.2
Avg. Wall DT.-F	12.3	9.5	7.8	8.3	9.6	10.2	9.6	9.7	8.3	7
Remaining Subcool-F	-5.3									
Exit Quality	0.03	0.07	0.11	0.15	0.18	0.22	0.26	0.29	0.33	0.37
EXP. H-Btu/Hr/ft2/F	808.6	1166.9	1281.3	1211	1153.5	970	1037.1	1021.4	1196.2	0
COMPUTED H										
Jallouk	811.6	799.1	782.5	777.2	762.8	757.6	756	750	749.1	746.4
Szady1(Cudo tube)	1163.6	1176.1	1183.1	1187.4	1178.6	1179.6	1184.2	1182.2	1186.3	1187.8
Szady2	976.4	989.1	995.6	999.2	988.2	988	991.9	988.4	974.8	977.6
(RLIQ)	48557	47591	45808	43796	41935	40129	38264	36399	34537	32537
(F)	1.477	1.506	2.235	2.518	2.758	2.969	3.167	3.351	3.525	3.707
(HLIQ)	190.3	245.9	288.4	324.8	355.8	383.1	408.6	432.4	454.9	478.2
(HBOIL)	1161.9	1172.6	1177.3	1179.2	1167.6	1165.9	1167.7	1162.6	1163.5	1161.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.3									
DP Liquid Density-lbm/ft3	90.88									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.158	1.282	1.932	2.604	3.348					
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111					
Corrected DP-Psid	0.152	1.239	1.889	2.589	3.459					
Actual DP-ft	2.04	2.38	3.49	4.53	5.1					
Measured TP-Psig	121				127					
Measured Overall-ft	-11.04									
Computed DP-ft	1.45	2.63	3.72	4.76	5.72					
Friction-ft	0.06	0.16	0.31	0.48	0.68					
Acceleration-ft	0.05	0.09	0.12	0.16	0.21					
Elevation-ft	1.33	2.38	3.29	4.12	4.83					

Run#	215									
Test Fluid	R114									
Date:	2/20/93.									
Time:	6: 4									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	117.6									
Sat. Temperature-F(inlet)	174.8									
Liq. Density-lbm/ft3	78.68	78.38	78.41	78.49	78.46	78.4	78.41	78.4	78.4	78.52
Latent Heat-Btu/lbm	43.6	43.31	43.34	43.41	43.38	43.33	43.34	43.33	43.33	43.44
Specific Heat-Btu/lbm/F	0.274	0.274	0.274	0.274	0.274	0.274	0.274	0.274	0.274	0.274
Liq. Viscosity-lbm/ft-hr	0.481	0.476	0.477	0.478	0.477	0.477	0.477	0.477	0.477	0.478
Liq. Conductivity-Btu/hr-ft-F	0.0288	0.0287	0.0287	0.0287	0.0287	0.0287	0.0287	0.0287	0.0287	0.0287
Liq. Prandtl No.	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	2.3									
Outlet Vap. Flow Rate-GPM	0.4									
Inlet Temperature-F	174.6									
Outlet Liq. Temperature-F	176.5									
Outlet Vap. Temperature-F	177.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	107.6									
Water outlet Temp.-F	171.8									
Inlet G-lbm/hr/ft2	193915		Temp	158.5	Density	81.26				
Subcooling-F	0.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	571.7	572.8	576.7	578.3	576.9	573.8	577.3	580	572.9	571.1
Heat Loss-Watts	42	8.7	10.9	10	9.8	9.8	11.4	13.1	14.1	68.1
Heat Flux-Btu/Hr/ft2	9910	9929	9997	10024	10000	9946	10007	10054	9931	9900
Wall Temp. #3-F	187	187.1	187	186.5	188.7	189	188.4	187.8	187.4	185.7
Wall Temp. #4-F	187.5	186.2	188.1	187.4	188.5	189	189.1	188.9	188.4	185.6
Wall Temp. #5-F	187.1	185	189.2	187	187.3	188.8	188.2	187.9	186.5	186.1
Wall Temp. #1-F	76.3	187.1	185.7	186.2	186.3	189.4	188.8	189	186	183.9
Wall Temp. #2-F	188.2	187.1	186.4	186.7	186.5	189.8	189.2	189.6	186.6	184.6
Instream Temp.-F	177	179	178.8	178.3	178.5	178.9	178.8	178.9	178.9	178.1
Avg. Wall Temp.-F	187.5	186.9	186.8	186.8	187.2	189.1	188.7	188.6	187	185
Avg. Wall DT.-F	10	7.4	7.5	8	8.2	9.7	9.5	9.3	7.6	6.5
Remaining Subcool-F	-10.7									
Exit Quality	0.07	0.14	0.21	0.28	0.35	0.41	0.48	0.55	0.62	0.69
EXP. H-Btu/Hr/ft2/F	990.8	1337	1324.4	1249.6	1219.8	1025.4	1054.7	1082.7	1301.3	0
COMPUTED H										
Jallouk	849.9	828.8	816.1	805.4	787.6	780.6	779.2	778.3	769.6	764.1
Szady1(Cudo tube)	1161.4	1169.4	1173.4	1174.1	1174.1	1173.1	1177.2	1181.3	1175.2	1172.2
Szady2	974.7	982.9	986.7	986.9	986.2	984.3	988.1	991.8	984.2	980
(RLIQ)	25504	23921	22057	20154	18319	16503	14648	12791	10936	9068
(F)	1.721	2.351	2.818	3.213	3.552	3.853	4.143	4.414	4.674	4.947
(HLIQ)	134.3	183.6	220	250.8	277.3	300.9	323.4	344.6	365	386.1
(HBOIL)	1160.8	1167.9	1170.8	1170.3	1169	1166.5	1169	1171.4	1163.4	1158
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77									
DP Liquid Density-lbm/ft3	90.91									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.156	1.563	2.391	3.218	4.111					
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111					
Corrected DP-Psid	0.15	1.52	2.348	3.203	4.222					
Actual DP-ft	2.04	1.84	2.64	3.39	3.69					
Measured TP-Psig	117.6				124.1					
Measured Overall-ft	-11.92									
Computed DP-ft	1.16	2	2.72	3.36	3.92					
Friction-ft	0.03	0.08	0.16	0.26	0.38					
Acceleration-ft	0.02	0.04	0.07	0.1	0.14					
Elevation-ft	1.11	1.88	2.5	3.01	3.42					

Run#	310									
Test Fluid	R114									
Date:	2/20/93									
Time:	7:41									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	166.7									
Sat. Temperature-F(inlet)	201.4									
Liq. Density-lbm/ft3	74.77	74.7	74.5	74.42	74.28	74.23	74.25	74.25	74.25	74.45
Latent Heat-Btu/lbm	39.78	39.71	39.52	39.44	39.31	39.26	39.27	39.27	39.27	39.47
Specific Heat-Btu/lbm/F	0.282	0.282	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283
Liq. Viscosity-lbm/ft-hr	0.431	0.43	0.428	0.427	0.425	0.425	0.425	0.425	0.425	0.427
Liq. Conductivity-Btu/hr-ft-F	0.0264	0.0264	0.0263	0.0262	0.0261	0.0261	0.0261	0.0261	0.0261	0.0262
Liq. Prandtl No.	4.6	4.6	4.6	4.6	4.61	4.61	4.61	4.61	4.61	4.6
Inlet Flow Rate-GPM	5.5									
Outlet Liq. Flow Rate-GPM	4									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	201.6									
Outlet Liq. Temperature-F	201.9									
Outlet Vap. Temperature-F	203.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	169.5									
Water outlet Temp.-F	181.3									
Inlet G-lbm/hr/ft2	392246	Temp		197.2	Density	75.6				
Subcooling-F	-0.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	577	577	577	577	577	577	577	577	577	577
Heat Loss-Watts	52.3	10.8	12.8	10	9.1	9	13	15.1	17.1	79.9
Heat Flux-Btu/Hr/ft2	10002	10002	10002	10002	10002	10002	10002	10002	10002	10002
Wall Temp. #3-F	212.3	213	212.7	212	213.5	213.7	213.8	212.9	212.4	210.7
Wall Temp. #4-F	212.8	212.3	213.7	212.7	213.6	213.6	214.5	213.9	213.3	210.5
Wall Temp. #5-F	212.8	211.1	214.2	212.1	212.5	213.8	213.5	212.8	211.9	211.2
Wall Temp. #1-F	77.9	212.8	211.2	211.7	211.9	214.5	214	213.8	211.1	208.6
Wall Temp. #2-F	213.5	212.6	212.1	212	212	214.7	214.5	214.4	211.8	209.7
Instream Temp.-F	202.3	202.7	203.9	204.4	205.2	205.5	205.4	205.4	205.4	204.2
Avg. Wall Temp.-F	212.9	212.7	212.4	212.1	212.5	213.9	214.1	213.6	212.1	210.1
Avg. Wall DT.-F	10.1	9.6	8.1	7.3	6.8	7.9	8.2	7.7	6.2	5.5
Remaining Subcool-F	-2.2									
Exit Quality	0.02	0.03	0.05	0.06	0.08	0.09	0.11	0.12	0.14	0.15
EXP. H-Btu/Hr/ft2/F	990.5	1044.8	1238.9	1375.2	1460.6	1258.4	1218.6	1297.6	1600.8	0
COMPUTED H										
Jallouk	792	782.1	778.8	776	774.7	773.1	771.3	770	763.6	760.2
Szady1(Cudo tube)	1246.9	1252.5	1260.1	1265.6	1272.1	1277	1280.8	1285	1289.4	1290.5
Szady2	1062.4	1064.7	1070	1053.9	1061.8	1068	1073	1078	1083	1101.9
(RLIQ)	149389	147335	145887	143956	142207	140114	137752	135454	133157	130184
(F)	1.27	1.504	1.665	1.801	1.918	2.025	2.127	2.221	2.309	2.403
(HLIQ)	367	434.7	481.3	520.6	554.3	585.4	614.7	641.8	667.3	694.5
(HBOIL)	1236.2	1234.7	1236.3	1235.6	1236	1234.6	1231.8	1229.3	1226.8	1219.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	21.9									
DP Liquid Density-lbm/ft3	96.45									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.165	0.479	0.853	1.252	1.615					
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111					
Corrected DP-Psid	0.159	0.436	0.81	1.237	1.726					
Actual DP-ft	2.28	4.34	6.21	7.97	9.45					
Measured TP-Psig	166.7				174					
Measured Overall-ft	-14.12									
Computed DP-ft	2.15	4.14	6.1	3.05	9.89					
Friction-ft	0.23	0.52	0.86	1.24	1.64					
Acceleration-ft	0.21	0.31	0.4	0.48	0.56					
Elevation-ft	1.71	3.3	4.84	6.33	7.69					

Run#	317									
Test Fluid	R114									
Date:	2/20/93									
Time:	8: 0									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	159.6									
Sat. Temperature-F(inlet)	198									
Liq. Density-lbm/ft3	75.31	75.26	75	74.93	74.85	74.78	74.77	74.77	74.77	74.98
Latent Heat-Btu/lbm	40.31	40.26	40	39.94	39.86	39.8	39.78	39.78	39.78	39.98
Specific Heat-Btu/lbm/F	0.281	0.281	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282
Liq. Viscosity-lbm/ft-hr	0.437	0.437	0.434	0.433	0.432	0.431	0.431	0.431	0.431	0.434
Liq. Conductivity-Btu/hr-ft-F	0.0268	0.0267	0.0266	0.0265	0.0265	0.0264	0.0264	0.0264	0.0264	0.0266
Liq. Prandtl No.	4.59	4.59	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Inlet Flow Rate-GPM	4.7									
Outlet Liq. Flow Rate-GPM	3.6									
Outlet Vap. Flow Rate-GPM	0.36									
Inlet Temperature-F	198.4									
Outlet Liq. Temperature-F	198.6									
Outlet Vap. Temperature-F	200									
Water Flow Rate-GPM										
Water Inlet Temp.-F	143									
Water outlet Temp.-F	194.3									
Inlet G-lbm/hr/ft2	853098		Temp	194.3	Density	76.06				
Subcooling-F	-0.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	582.9	584.5	575.5	580.7	578.8	580.5	584.1	583.7	579.3	580.2
Heat Loss-Watts	51.1	10.5	12.5	10	9.2	9.1	12.7	14.8	16.6	77.9
Heat Flux-Btu/Hr/ft2	10104	10132	9976	10066	10033	10063	10125	10118	10042	10057
Wall Temp. #3-F	209.2	209.7	209.1	208.8	210.4	210.6	210.7	209.9	209.5	207.7
Wall Temp. #4-F	209.7	208.9	210.3	209.5	210.3	210.6	211.4	210.9	210.5	207.3
Wall Temp. #5-F	209.6	208	211.2	209	209.2	210.7	210.4	209.8	208.8	208.3
Wall Temp. #1-F	79.1	209.6	208.2	208.6	208.6	211.5	210.9	210.9	208.2	205.4
Wall Temp. #2-F	210.5	209.5	208.7	208.9	208.8	211.6	211.5	211.5	208.9	206.8
Instream Temp.-F	199	199.3	200.9	201.3	201.8	202.2	202.3	202.3	202.3	201
Avg. Wall Temp.-F	209.8	209.4	209.1	209	209.2	210.9	211	210.6	209.2	207.1
Avg. Wall DT.-F	10.3	9.7	7 7.	7.2	7	8.2	8.2	7.8	6.4	5.6
Remaining Subcool-F	-2.9									
Exit Quality	0.02	0.04	0.05	0.07	0.09	0.11	0.12	0.14	0.16	0.18
EXP. H-Btu/Hr/ft2/F	981.6	1048.1	1291.5	1394.2	1439.1	1227.9	1231.4	1290.1	1562.6	0
COMPUTED H										
Jallouk	788.1	787.7	777.8	777.9	774.3	773.6	773.9	772	768.1	765.6
Szady1(Cudo tube)	1241.7	1247.9	1246.4	1256.3	1259.2	1265.5	1273	1276.2	1276.5	1278.9
Szady2	1058.4	1051.9	1057.2	1065.9	1048	1055.9	1064.9	1069.1	1068.8	1071.1
(RLIQ)	126309	124078	122743	120750	118788	116763	114561	112299	110045	107176
(F)	1.316	1.581	1.753	1.9	2.03	2.147	2.257	2.36	2.457	2.562
(HLIQ)	337.1	405	449	488.7	519.9	549.8	578	604.5	629.3	656.1
(HBOIL)	1233.3	1233.5	1226.7	1231.4	1228.9	1229.9	1232	1229.3	1222.3	1216.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79									
DP Liquid Density-lbm/ft3	90.7									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.192	0.608	1.173	1.532	1.978					
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111					
Corrected DP-Psid	0.186	0.565	1.13	1.517	2.089					
Actual DP-ft	2.06	3.75	5.09	6.76	7.93					
Measured TP-Psig	159.6				167.2					
Measured Overall-ft	-14.6									
Computed DP-ft	2.01	3.89	5.74	7.59	9.32					
Friction-ft	0.19	0.43	0.71	1.03	1.36					
Acceleration-ft	0.18	0.26	0.33	0.4	0.48					
Elevation-ft	1.64	3.2	4.7	6.16	7.49					

Run#	318									
Test Fluid	R114									
Date:	2/20/93									
Time:	8:29									
Note	TABOREK	Analytical ct								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	154.6									
Sat. Temperature-F(inlet)	195.4									
Liq. Density-lbm/ft3	75.85	75.73	75.32	75.26	75.23	75.18	75.21	75.21	75.26	75.31
Latent Heat-Btu/lbm	40.84	40.72	40.32	40.26	40.23	40.18	40.21	40.21	40.26	40.31
Specific Heat-Btu/lbm/F	0.28	0.28	0.281	0.281	0.281	0.281	0.281	0.281	0.281	0.281
Liq. Viscosity-lbm/ft-hr	0.444	0.442	0.438	0.437	0.436	0.436	0.436	0.436	0.437	0.437
Liq. Conductivity-Btu/hr-ft-F	0.0271	0.027	0.0268	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267	0.0268
Liq. Prandtl No.	4.58	4.58	4.59	4.59	4.59	4.59	4.59	4.59	4.59	4.59
Inlet Flow Rate-GPM	3.7									
Outlet Liq. Flow Rate-GPM	2.8									
Outlet Vap. Flow Rate-GPM	0.45									
Inlet Temperature-F	195.2									
Outlet Liq. Temperature-F	196.6									
Outlet Vap. Temperature-F	197.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	120.9									
Water outlet Temp.-F	195.3									
Inlet G-lbm/hr/ft2	677518		Temp		190	Density	76.73			
Subcooling-F	0.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	578.9	579.2	574.8	574.5	574.7	584.3	579.8	578.2	574.9	574.7
Heat Loss-Watts	49.9	10.3	12.3	10	9.3	9.2	12.5	14.5	16.3	76.6
Heat Flux-Btu/Hr/ft2	10035	10040	9964	9959	9962	10128	10050	10023	9968	9962
Wall Temp. #3-F	206.9	207.5	206.9	206.7	208.7	208.8	208.4	207.4	207	205.9
Wall Temp. #4-F	207.4	206.4	208.2	207.5	208.6	208.8	208.9	208.5	207.9	205.9
Wall Temp. #5-F	207	205.6	209	206.9	207.4	208.8	208	207.4	206.2	206.4
Wall Temp. #1-F	78	207	205.8	206.2	206.6	209.7	208.4	208.5	205.8	203.4
Wall Temp. #2-F	208	207	206.4	207	206.9	209.7	208.9	209.2	206.3	204.5
Instream Temp.-F	195.6	196.4	198.9	199.3	199.5	199.8	199.6	199.6	199.3	199
Avg. Wall Temp.-F	207.3	207	206.8	206.8	207.4	209	208.5	208.2	206.6	205.1
Avg. Wall DT.-F	11.3	10.1	7.5	7.1	7.4	8.8	8.5	8.1	6.9	5.6
Remaining Subcool-F	-2.9									
Exit Quality	0.02	0.04	0.06	0.08	0.1	0.13	0.15	0.17	0.19	0.21
EXP. H-Btu/Hr/ft2/F	890.3	992	1333	1407.6	1341.7	1155.3	1187.2	1230.2	1446.5	0
COMPUTED H										
Jallouk	816.2	792.2	785.3	780.3	776.6	780.5	774.1	770.7	766.2	764.1
Szady1(Cudo tube)	1225.8	1230.7	1235.4	1238.7	1242	1255.4	1252.9	1254.1	1252.9	1254.9
Szady2	1042.9	1045.9	1048.8	1050.3	1051.9	1065.3	1041.9	1044.1	1043.6	1046.6
(RLIQ)	98909	97196	96089	94098	92008	89933	87650	85456	83163	80884
(F)	1.316	1.606	1.812	1.987	2.141	2.279	2.411	2.531	2.646	2.756
(HLIQ)	280.3	342.2	385.9	423.2	456	485.5	513.5	539.1	563.6	587
(HBOIL)	1220.9	1221.8	1222.7	1222	1221.2	1230.7	1223.5	1220	1213.6	1210.6

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	79.1				
DP Liquid Density-lbm/ft3	90.69				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.193	0.731	1.366	1.817	2.351
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111
Corrected DP-Psid	0.187	0.688	1.323	1.802	2.462
Actual DP-ft	2.05	3.5	4.7	6.19	7.18
Measured TP-Psig	154.6				162.6
Measured Overall-ft	-15.3				
Computed DP-ft	1.84	3.44	4.97	6.47	7.87
Friction-ft	0.13	0.34	0.59	0.9	1.23
Acceleration-ft	0.12	0.18	0.24	0.3	0.36
Elevation-ft	1.58	2.92	4.13	5.27	6.29

Run#	319									
Test Fluid	R114									
Date:	2/20/93.									
Time:	8:56									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	147.1									
Sat. Temperature-F(inlet)	191.5									
Liq. Density-lbm/ft3	76.5	76.2	75.85	75.9	75.82	75.77	75.84	75.84	75.84	75.98
Latent Heat-Btu/lbm	41.47	41.18	40.84	40.89	40.81	40.76	40.83	40.83	40.83	40.95
Specific Heat-Btu/lbm/F	0.278	0.279	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
Liq. Viscosity-lbm/ft-hr	0.451	0.448	0.444	0.444	0.443	0.443	0.444	0.444	0.444	0.445
Liq. Conductivity-Btu/hr-ft-F	0.0275	0.0273	0.0271	0.0271	0.0271	0.027	0.0271	0.0271	0.0271	0.0272
Liq. Prandtl No.	4.57	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58
Inlet Flow Rate-GPM	2.8									
Outlet Liq. Flow Rate-GPM	2.5									
Outlet Vap. Flow Rate-GPM	0.44									
Inlet Temperature-F	190.8									
Outlet Liq. Temperature-F	193									
Outlet Vap. Temperature-F	193.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	111.8									
Water outlet Temp.-F	191.2									
Inlet G-lbm/hr/ft2	518415	Temp		184.4	Density	77.58				
Subcooling-F	0.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	579.2	578	575.1	577.8	576	575.4	578.4	580.9	576.2	576.3
Heat Loss-Watts	47.8	9.9	11.9	10	9.4	9.4	12.2	14.2	15.7	74.1
Heat Flux-Btu/Hr/ft2	10040	10019	9969	10016	9985	9974	10026	10070	9988	9990
Wall Temp. #3-F	203.1	203.8	203.5	203	205	205	204.6	204	203.6	202.2
Wall Temp. #4-F	203.5	202.8	204.8	203.9	204.7	205	205.3	204.9	204.4	202
Wall Temp. #5-F	203.4	201.8	205.5	203.4	203.6	205	204.4	203.8	202.5	202.5
Wall Temp. #1-F	78.4	203.4	202.2	202.5	202.8	205.6	204.8	205	202.2	199.5
Wall Temp. #2-F	204.4	203.4	202.9	203.4	203.1	206.1	205.3	205.8	202.6	200.9
Instream Temp.-F	191.6	193.4	195.6	195.3	195.8	196.1	195.7	195.7	195.7	194.9
Avg. Wall Temp.-F	203.6	203.4	203.4	203.2	203.6	205.2	204.9	204.7	203.1	201.4
Avg. Wall DT.-F	11.6	9.5	7.3	7.4	7.3	8.6	8.7	8.5	6.9	6.1
Remaining Subcool-F	-3.3									
Exit Quality	0.02	0.05	0.08	0.1	0.13	0.16	0.19	0.22	0.24	0.27
EXP. H-Btu/Hr/ft2/F	862.1	1055	1365.7	1344.9	1368	1159.9	1148.9	1178.4	1445.7	0
COMPUTED H										
Jallouk	829.3	812.1	802.4	787.7	782	777.9	775.9	774.8	769	765.6
Szady1(Cudo tube)	1214.2	1219.3	1223.7	1227.6	1228.9	1231	1235.2	1239.9	1237.3	1237.8
Szady2	1031.3	1035.4	1038.6	1041.2	1040.9	1041.7	1044.8	1048.6	1025.9	1027.6
(RLIQ)	74320	73013	71590	69398	67427	65397	63169	61040	58917	56813
(F)	1.349	1.683	1.933	2.148	2.33	2.493	2.65	2.793	2.926	3.063
(HLIQ)	232	289.4	332.3	369.3	400.6	428.7	455.6	480.2	503.2	526.7
(HBOIL)	1211.3	1213.8	1215.5	1216.3	1214.5	1213.4	1214.1	1215.4	1208.9	1205.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.1									
DP Liquid Density-lbm/ft3	90.69									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.195	0.878	1.579	2.127	2.756					
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111					
Corrected DP-Psid	0.189	0.835	1.536	2.112	2.867					
Actual DP-ft	2.03	3.19	4.25	5.55	6.35					
Measured TP-Psig	147.1				155.4					
Measured Overall-ft	-15.73									
Computed DP-ft	1.68	3.13	4.51	5.85	7.09					
Friction-ft	0.09	0.23	0.41	0.64	0.88					
Acceleration-ft	0.08	0.13	0.17	0.22	0.27					
Elevation-ft	1.51	2.77	3.92	4.99	5.93					

Run#	320									
Test Fluid	R114									
Date:	2/20/93									
Time:	9:18									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	166									
Sat. Temperature-F(inlet)	201.1									
Liq. Density-lbm/ft3	74.73	74.26	74.18	74.3	74.23	74.15	74.17	74.17	74.17	74.37
Latent Heat-Btu/lbm	39.75	39.31	39.21	39.32	39.26	39.17	39.19	39.19	39.19	39.39
Specific Heat-Btu/lbm/F	0.282	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283
Liq. Viscosity-lbm/ft-hr	0.431	0.425	0.424	0.426	0.425	0.424	0.424	0.424	0.424	0.428
Liq. Conductivity-Btu/hr-ft-F	0.0264	0.0261	0.0261	0.0262	0.0261	0.0261	0.0261	0.0261	0.0261	0.0262
Liq. Prandtl No.	4.6	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61
Inlet Flow Rate-GPM	2									
Outlet Liq. Flow Rate-GPM	2									
Outlet Vap. Flow Rate-GPM	0.54									
Inlet Temperature-F	201.3									
Outlet Liq. Temperature-F	203.2									
Outlet Vap. Temperature-F	204.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	111.3									
Water outlet Temp.-F	200.9									
Inlet G-lbm/hr/ft2	365042		Temp		91.6	Density	76.48			
Subcooling-F	6.2									

Flow Observation	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	577.2	572.1	577.6	579.3	577.2	576.5	574.5	573.9	583	584.1
Heat Loss-Watts	52	10.7	12.8	10	9.1	9	12.9	15.1	17.1	79.7
Heat Flux-Btu/Hr/ft2	10005	3917	10012	10042	10005	9993	9959	9948	10106	10125
Wall Temp. #3-F	212.5	213	212.9	213	214.6	214.5	214.3	214	213.8	211.5
Wall Temp. #4-F	213	212.2	214.1	213.7	214.5	214.5	214.7	214.8	214.6	211.4
Wall Temp. #5-F	212.8	211.3	214.8	213.1	213.4	214.5	213.9	213.8	213	212.2
Wall Temp. #1-F	80	212.8	211.7	212.4	212.5	215.3	214.5	214.5	212.4	209.2
Wall Temp. #2-F	214	212.7	212.3	212.8	212.7	215.4	214.9	214.8	213	210.6
Instream Temp.-F	202.5	205.2	205.8	205.1	205.5	206	205.9	205.9	205.9	204.7
Avg. Wall Temp.-F	213.1	212.7	212.8	213.1	213.3	214.7	214.5	214.4	213.4	211
Avg. Wall DT.-F	10.1	7	6.5	7.5	7.3	9.2	8.1	8	7	5.8
Remaining Subcool-F	-5.9									
Exit Quality	0.04	0.08	0.12	0.16	0.2	0.25	0.29	0.33	0.37	0.41
EXP. H-Btu/Hr/ft2/F	988.4	1411.3	1540.9	1339.6	1366.3	1211.5	1227.9	1238.8	1443	0
COMPUTED H										
Jallouk	876.8	856.5	849.7	839.2	830.9	825.5	818.3	813.3	816.8	803.2
Szady1(Cudo tube)	1242.3	1246.6	1255.6	1256	1256.2	1258.3	1257	1257.6	1268.6	1267.2
Szady2	1040.3	1066.5	1075.5	1075	1073.9	1075	1072.3	1071.8	1083.2	1080.5
(RLIQ)	54292	52670	50539	48074	45860	43685	41345	39048	36735	34209
(F)	1.473	1.869	2.15	2.395	2.6	2.782	2.954	3.114	3.266	3.432
(HLIQ)	191.3	242.7	279.3	311.1	337.7	361.3	383.7	404.5	424.2	445.7
(HBOIL)	1240.8	1243.5	1250.9	1249.7	1248	1248.3	1245	1243.5	1252.6	1248.6

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	130.4				
DP Liquid Density-lbm/ft3	84.85				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.237	1.158	1.951	2.622	3.347
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111
Corrected DP-Psid	0.231	1.115	1.908	2.607	3.458
Actual DP-ft	1.83	2.4	3.15	4.08	4.57
Measured TP-Psig	166				175.1
Measured Overall-ft	-17.62				
Computed DP-ft	1.48	2.69	3.79	4.82	5.75
Friction-ft	0.06	0.16	0.29	0.44	0.62
Acceleration-ft	0.05	0.08	0.11	0.15	0.19
Elevation-ft	1.37	2.45	3.39	4.23	4.95

Run#	121									
Test Fluid	R114									
Date:	2/20/93									
Time:	10:34									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	166.9									
Sat. Temperature-F(inlet)	201.5									
Liq. Density-lbm/ft3	74.7	74.1	74.08	74.22	74.15	74.08	74.15	74.11	74.11	74.2
Latent Heat-Btu/lbm	39.71	39.13	39.11	39.24	39.17	39.11	39.17	39.14	39.14	39.22
Specific Heat-Btu/lbm/F	0.282	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283	0.283
Liq. Viscosity-lbm/ft-hr	0.43	0.423	0.423	0.425	0.424	0.423	0.424	0.423	0.423	0.424
Liq. Conductivity-Btu/hr-ft-F	0.0264	0.026	0.026	0.0261	0.0261	0.026	0.0261	0.026	0.026	0.0261
Liq. Prandtl No.	4.6	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61
Inlet Flow Rate-GPM	1.1									
Outlet Liq. Flow Rate-GPM	2.2									
Outlet Vap. Flow Rate-GPM	0.46									
Inlet Temperature-F	201.5									
Outlet Liq. Temperature-F	203.8									
Outlet Vap. Temperature-F	204.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	186.2									
Water outlet Temp.-F	194.1									
Inlet G-lbm/hr/ft2	203899		Temp	183.8	Density	77.67				
Subcooling-F	0									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	578.6	566	577.4	579.6	578.3	576.8	575.1	575.1	582.6	583.2
Heat Loss-Watts	52.2	10.8	12.8	10	9.1	9	13	15.3	17.2	80.3
Heat Flux-Btu/Hr/ft2	10030	9811	10009	10047	10024	9998	9969	9969	10089	10109
Wall Temp. #3-F	213	213.6	213.5	213.3	214.7	214.8	214.6	214.4	214.1	212.3
Wall Temp. #4-F	213.6	212.6	214.6	214	214.8	215	215	215.1	215.1	212.2
Wall Temp. #5-F	213.2	211.5	215.2	213.5	213.7	214.8	214.1	214.2	213.5	213.2
Wall Temp. #1-F	80.4	213.2	212.1	212.8	212.9	215.7	214.7	214.8	212.8	210.1
Wall Temp. #2-F	214.5	213.1	212.8	213.1	213	215.8	215.1	215.2	213.3	211.2
Instream Temp.-F	202.7	206.3	206.4	205.6	206	206.4	206	206.2	206.2	205.7
Avg. Wall Temp.-F	213.6	213.1	213.3	213.4	213.6	215.1	214.7	214.7	213.8	211.8
Avg. Wall DT.-F	10.4	6.4	6.4	7.3	7.1	8.2	8.2	8.1	7.1	5.6
Remaining Subcool-F	-10.2									
Exit Quality	0.07	0.14	0.22	0.29	0.36	0.44	0.51	0.58	0.66	0.73
EXP. H-Btu/Hr/ft2/F	962.4	1537.4	1564.5	1367.7	1402.6	1215.9	1208.4	1232.3	1421.7	0
COMPUTED H										
Jallouk	904	879.6	891.4	878.7	869.9	862.9	854.5	850.7	853.8	850.1
Szady1(Cudo tube)	1243.8	1242.6	1255.8	1255.9	1256.5	1256.8	1254.3	1255.6	1284.4	1284.2
Szady2	1041.9	1039	1054	1054.6	1077.1	1076.8	1073.1	1073.9	1083.2	1082.1
(RLIQ)	29880	28123	25857	23446	21172	18888	16556	14265	11945	9586
(F)	1.649	2.181	2.571	2.908	3.19	3.443	3.691	3.915	4.136	4.365
(HLIQ)	134.4	177.8	209.5	237	260	280.6	300.8	319.1	337.1	355.8
(HBOIL)	1243.3	1241.4	1253.9	1253.1	1252.7	1252.1	1248.5	1248.7	1256.4	1254.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.8									
DP Liquid Density-lbm/ft3	90.61									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.194	1.454	2.198	3.145	4.037					
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111					
Corrected DP-Psid	0.188	1.411	2.155	3.13	4.148					
Actual DP-ft	2.08	2.15	3.15	3.7	4.01					
Measured TP-Psig	166.9				176.6					
Measured Overall-ft	-16.83									
Computed DP-ft	1.26	2.19	2.97	3.66	4.24					
Friction-ft	0.03	0.08	0.14	0.22	0.31					
Acceleration-ft	0.02	0.04	0.06	0.09	0.12					
Elevation-ft	1.21	2.07	2.77	3.35	3.81					

Run#	327									
Test Fluid	R114									
Date:	2/20/93									
Time:	11:59									
Note	TABOREK Analytical st									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	55.2									
Sat. Temperature-F(inlet)	127.3									
Liq. Density-lbm/ft3	85.22	85.09	85.05	85.07	85.08	85.13	85.22	85.24	85.29	85.35
Latent Heat-Btu/lbm	49.92	49.8	49.75	49.78	49.79	49.83	49.92	49.94	49.88	50.04
Specific Heat-Btu/lbm/F	0.257	0.258	0.258	0.258	0.258	0.258	0.257	0.257	0.257	0.257
Liq. Viscosity-lbm/ft-hr	0.612	0.608	0.607	0.608	0.608	0.61	0.612	0.613	0.614	0.616
Liq. Conductivity-Btu/hr-ft-F	0.0331	0.033	0.033	0.033	0.033	0.033	0.0331	0.0331	0.0331	0.0332
Liq. Prandtl No.	4.76	4.75	4.75	4.75	4.75	4.75	4.76	4.76	4.76	4.77
Inlet Flow Rate-GPM	1.9									
Outlet Liq. Flow Rate-GPM	2.8									
Outlet Vap. Flow Rate-GPM	0									
Inlet Temperature-F	126.5									
Outlet Liq. Temperature-F	124.3									
Outlet Vap. Temperature-F	127.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	49.7									
Water outlet Temp.-F	122.5									
Inlet G-lbm/hr/ft2	940094	Temp	123.9	Density	85.64					
Subcooling-F	0.9									
Flow Observation										

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	578.2	577	573.9	572.4	575.4	572	578.1	577.7	572.1	575.2
Heat Loss-Watts	19.4	4.6	6.2	7.3	7.8	7.5	5.3	6.5	6.8	37.7
Heat Flux-Btu/Hr/ft2	10023	10002	9948	9922	9974	9915	10021	10014	9917	9971
Wall Temp. #3-F	142.3	142.6	141.5	141.7	143.5	142.1	140	141.1	141.2	140.1
Wall Temp. #4-F	142.5	141.2	142.5	142.4	141.8	142.2	140.5	141.8	141.6	139.7
Wall Temp. #5-F	141.7	140.4	143.7	141.9	141.3	142.7	139.9	140.9	139	140.9
Wall Temp. #1-F	75.7	142.8	141	141.2	140.8	143.2	140.8	141.2	138.7	138.9
Wall Temp. #2-F	143	142.7	141.5	142.4	140.9	144.2	141.2	141.4	139.4	139.9
Instream Temp.-F	127.4	128.4	128.8	128.6	128.5	128.1	127.4	127.2	126.8	126.9
Avg. Wall Temp.-F	142.4	142.3	141.6	141.8	141.2	142.6	140.5	141.3	140	139.9
Avg. Wall DT.-F	14.5	13.5	12.4	12.8	12.2	14	12.6	13.6	12.7	13.1
Remaining Subcool-F	-1.6									
Exit Quality	0.01	0.02	0.03	0.05	0.06	0.07	0.08	0.1	0.11	0.12
EXP. H-Btu/Hr/ft2/F	690.2	742.4	803.9	778.1	814.3	708.1	793.6	734.8	778.9	0
COMPUTED H										
Jallouk	651.5	642	641.6	640.4	644.9	647.5	653.9	657.9	662.4	669.7
Szady1(Cudo tube)	1000.1	1009.2	1016	1022.6	1034	1040	1053.2	1063.7	1070.7	1076.2
Szady2	801.3	808.3	811.8	818.2	831.3	840.6	858.4	874.3	888.4	900.4
(RLIQ)	100072	99556	98504	97142	95832	94374	92773	91418	89979	88501
(F)	1.276	1.58	1.837	2.05	2.237	2.408	2.57	2.718	2.86	2.997
(HLIQ)	338.4	419.6	488.2	544.7	594.1	639.3	681.8	721	758.3	794.1
(HBOIL)	987.1	984.4	976.9	968.3	963.9	952.3	947.8	939.3	925	906.8

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	77.8				
DP Liquid Density-lbm/ft3	90.83				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.012	0.505	0.878	1.129	1.427
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111
Corrected DP-Psid	0.006	0.462	0.835	1.114	1.538
Actual DP-ft	2.12	3.48	4.98	6.63	7.91
Measured TP-Psig	55.2				56.8
Measured Overall-ft	-2.7				
Computed DP-ft	2.06	3.97	5.88	7.82	9.7
Friction-ft	0.21	0.51	0.91	1.38	1.91
Acceleration-ft	0.23	0.36	0.48	0.6	0.72
Elevation-ft	1.62	3.09	4.49	5.84	7.08

Run#	328									
Test Fluid	R114									
Date:	2/20/93									
Time:	12:51									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	52.7									
Sat. Temperature-F(inlet)	124.9									
Liq. Density-lbm/ft3	85.58	85.41	85.32	85.37	85.38	85.42	85.48	85.51	85.55	85.66
Latent Heat-Btu/lbm	50.26	50.1	50.02	50.06	50.08	50.11	50.17	50.19	50.24	50.34
Specific Heat-Btu/lbm/F	0.256	0.257	0.257	0.257	0.257	0.257	0.257	0.257	0.256	0.256
Liq. Viscosity-lbm/ft-hr	0.622	0.617	0.615	0.616	0.617	0.618	0.619	0.62	0.621	0.624
Liq. Conductivity-Btu/hr-ft-F	0.0333	0.0332	0.0332	0.0332	0.0332	0.0332	0.0333	0.0333	0.0333	0.0334
Liq. Prandtl No.	4.78	4.77	4.77	4.77	4.77	4.77	4.78	4.78	4.78	4.79
Inlet Flow Rate-GPM	4.1									
Outlet Liq. Flow Rate-GPM	3.1									
Outlet Vap. Flow Rate-GPM	0.51									
Inlet Temperature-F	123.5									
Outlet Liq. Temperature-F	122.1									
Outlet Vap. Temperature-F	121.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	51.7									
Water outlet Temp.-F	120.1									
Inlet G-lbm/hr/ft2	245336		Temp	117.5	Density	86.4				
Subcooling-F	1.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	577	577	577	577	577	577	577	577	577	577
Heat Loss-Watts	18.8	4.4	6	7	7.5	7.1	5	6.2	6.6	36
Heat Flux-Btu/Hr/ft2	10002	10002	10002	10002	10002	10002	10002	10002	10002	10002
Wall Temp. #3-F	139.4	139.7	139.4	139.1	140.6	139.8	137.7	138.8	139.5	137.2
Wall Temp. #4-F	139.7	138.4	140.3	140.1	139.4	139.9	138.1	139.5	139.9	136.7
Wall Temp. #5-F	139	137.6	141.5	139.5	138.8	140.3	137.6	138.7	137.2	138.1
Wall Temp. #1-F	74.8	139.9	138.5	138.4	138	140.8	138.5	139	137	136
Wall Temp. #2-F	140	139.9	139.2	139.6	138.2	141.6	138.7	139.2	137.7	136.9
Instream Temp.-F	124.4	125.8	126.5	126.1	126	125.7	125.2	125	124.6	123.7
Avg. Wall Temp.-F	139.5	139.5	139.4	139.3	138.6	140.2	138.1	139	138.3	137
Avg. Wall DT.-F	14.7	13.2	12.4	12.7	12.1	14.1	12.5	13.6	13.2	12.8
Remaining Subcool-F	-1.3									
Exit Quality	0.01	0.02	0.03	0.05	0.06	0.08	0.09	0.1	0.12	0.13
EXP. H-Btu/Hr/ft2/F	681.7	756.4	806.7	786.1	823.3	710.7	802.2	736.1	757.3	0
COMPUTED H										
Jallouk	643	638.1	637.7	638.4	638.1	641	644.6	649.3	652.9	658.1
Szady1(Cudo tube)	986.1	996.4	1005.9	1012.1	1020	1028	1036.2	1045.9	1055.8	1065.8
Szady2	796.1	799.8	805.3	810.1	818.1	827.9	839.4	853.5	868.9	879.2
(RLIQ)	86623	88360	87446	86018	84730	83355	81698	80577	79176	77572
(F)	1.252	1.572	1.861	2.099	2.305	2.492	2.667	2.827	2.982	3.136
(HLIQ)	304.1	382.4	453.2	510.8	560.8	606.1	648.2	687.2	724.3	761
(HBOIL)	976.3	977.3	974.3	966.7	960.1	952.4	943.6	935.9	927.2	915.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.2									
DP Liquid Density-lbm/ft3	90.89									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.045	0.602	1.041	1.369	1.789					
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111					
Corrected DP-Psid	0.039	0.559	0.998	1.354	1.9					
Actual DP-ft	2.06	3.3	4.69	6.21	7.28					
Measured TP-Psig	52.7				54.4					
Measured Overall-ft	-2.86									
Computed DP-ft	1.98	3.83	5.66	7.52	9.32					
Friction-ft	0.17	0.43	0.77	1.19	1.66					
Acceleration-ft	0.19	0.31	0.42	0.52	0.63					
Elevation-ft	1.63	3.09	4.47	5.81	7.03					

Run#	-9									
Test Fluid	R114									
Date:	2/20/98									
Time:	13:15									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	54.6									
Sat. Temperature-F(inlet)	126.8									
Liq. Density-lbm/ft3	85.03	85.06	85.07	85.13	85.16	85.17	85.24	85.28	85.31	85.36
Latent Heat-Btu/lbm	49.74	49.77	49.78	49.83	49.86	49.87	49.94	49.97	50.01	50.05
Specific Heat-Btu/lbm/F	0.258	0.258	0.258	0.258	0.257	0.257	0.257	0.257	0.257	0.257
Liq. Viscosity-lbm/ft-hr	0.607	0.608	0.608	0.61	0.61	0.611	0.613	0.614	0.615	0.616
Liq. Conductivity-Btu/hr-ft-F	0.033	0.033	0.033	0.033	0.033	0.033	0.0331	0.0331	0.0331	0.0332
Liq. Prandtl No.	4.75	4.75	4.75	4.75	4.76	4.76	4.76	4.76	4.77	4.77
Inlet Flow Rate-GPM	3.3									
Outlet Liq. Flow Rate-GPM	2.3									
Outlet Vap. Flow Rate-GPM	0.57									
Inlet Temperature-F	127.3									
Outlet Liq. Temperature-F	124.5									
Outlet Vap. Temperature-F	124.2									
Water Flow Rate-GPM										
Water inlet Temp.-F	51.5									
Water outlet Temp.-F	123									
Inlet G-lbm/hr/ft2	678536	Temp	119.5	Density	86.16					
Subcooling-F	-0.5									
Flow Observation										

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	580.4	583.1	578.9	585.9	586	587	584.1	579.5	580.7	582.2
Heat Loss-Watts	19.4	4.6	6.2	7.3	7.9	7.7	5.4	6.6	6.9	38
Heat Flux-Btu/Hr/ft2	10061	10108	10035	10156	10158	10175	10125	10045	10066	10092
Wall Temp. #3-F	141.2	141.7	141	140.9	143.1	142.5	139.7	141	141	139.6
Wall Temp. #4-F	141.5	140.4	141.9	141.6	141.6	142.5	140.2	141.8	141.5	139.3
Wall Temp. #5-F	140.7	139.5	143	141.1	140.9	142.9	139.6	140.9	138.9	140.5
Wall Temp. #1-F	74.1	141.8	140.2	140.1	140.2	143.1	140.6	141.4	138.8	138.3
Wall Temp. #2-F	141.7	141.7	140.7	141.4	140.3	144.2	141	141.6	139.4	139.4
Instream Temp.-F	128.9	128.7	128.6	128.1	127.9	127.8	127.2	126.9	126.6	126.2
Avg. Wall Temp.-F	141.3	141.4	141	140.9	140.8	142.8	140.2	141.3	139.9	139.4
Avg. Wall DT.-F	11.9	12.2	11.9	12.4	12.4	14.5	12.6	14	12.9	12.8
Remaining Subcool-F	-3.9									
Exit Quality	0.02	0.04	0.06	0.07	0.09	0.11	0.13	0.14	0.16	0.18
EXP. H-Btu/Hr/ft2/F	844	825.6	843.5	821.3	819.8	702.2	806	718.2	782.4	0
COMPUTED H										
Jallouk	656.5	648.6	643.3	645.5	646.3	645.5	645.4	646	649.5	653.4
Szady1(Cudo tube)	1005.5	1012.4	1013.9	1023.9	1029.8	1037.3	1040.8	1044.6	1053.4	1062.7
Szady2	806	820.7	812.1	821.9	827.2	835.3	840.5	847	859.5	873.2
(RLIQ)	72360	70901	69588	68130	66778	65462	63982	62618	61263	59878
(F)	1.469	1.877	2.16	2.405	2.624	2.823	3.014	3.189	3.356	3.517
(HLIQ)	300.7	384.3	442.1	492	536.6	577.2	615.8	651.5	685.3	717.9
(HBOIL)	996.4	993.6	985	994.5	978.8	974	963.4	952.2	946.2	939.8

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	76.7				
DP Liquid Density-lbm/ft3	90.94				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.142	0.898	1.416	1.865	2.366
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111
Corrected DP-Psid	0.136	0.855	1.373	1.85	2.477
Actual DP-ft	1.9	2.82	4.08	5.4	6.34
Measured TP-Psig	54.6				57
Measured Overall-ft	-4.05				
Computed DP-ft	1.78	3.48	5.19	6.92	8.58
Friction-ft	0.15	0.37	0.65	1	1.38
Acceleration-ft	0.17	0.26	0.34	0.43	0.53
Elevation-ft	1.46	2.86	4.19	5.49	6.67

Run#	330									
Test Fluid	R114									
Date:	2/20/93									
Time:	13:49									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	57.2									
Sat. Temperature-F(inlet)	129.3									
Liq. Density-lbm/ft3	84.75	84.68	84.7	84.77	84.78	84.79	84.88	84.88	84.89	84.97
Latent Heat-Btu/lbm	49.48	49.41	49.43	49.49	49.5	49.51	49.59	49.59	49.6	49.68
Specific Heat-Btu/lbm/F	0.259	0.259	0.259	0.258	0.258	0.258	0.258	0.258	0.258	0.258
Liq. Viscosity-lbm/ft-hr	0.6	0.598	0.599	0.6	0.601	0.601	0.603	0.603	0.603	0.606
Liq. Conductivity-Btu/hr-ft-F	0.0328	0.0327	0.0327	0.0328	0.0328	0.0328	0.0328	0.0328	0.0329	0.0329
Liq. Prandtl No.	4.73	4.73	4.73	4.73	4.73	4.73	4.74	4.74	4.74	4.76
Inlet Flow Rate-GPM	2.5									
Outlet Liq. Flow Rate-GPM	2.3									
Outlet Vap. Flow Rate-GPM	0.47									
Inlet Temperature-F	129.7									
Outlet Liq. Temperature-F	128.2									
Outlet Vap. Temperature-F	127.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	53.4									
Water outlet Temp.-F	126.8									
Inlet G-lbm/hr/ft2	512841		Temp		121.2	Density	85.96			
Subcooling-F	-0.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	580	580.3	577.2	574.9	576.4	577	579.3	578.8	574.8	575.1
Heat Loss-Watts	20	4.7	6.4	7.7	8.3	8.1	6	7.1	7.2	39.9
Heat Flux-Btu/Hr/ft2	10054	10059	10005	9968	9992	10002	10042	10033	9964	9969
Wall Temp. #3-F	143.4	143.9	143.5	143.6	145.5	145	142.7	143.6	143.6	142.4
Wall Temp. #4-F	143.9	142.7	144.4	144	144.2	145	143.2	144.7	144.1	142
Wall Temp. #5-F	143	142	145.5	143.7	143.3	145.1	142.6	143.6	141.8	143
Wall Temp. #1-F	74.4	144	142.6	142.4	142.7	145.6	143.3	144.2	141.6	140.9
Wall Temp. #2-F	144	144	143	143.7	142.7	146.6	143.7	144.6	142	142
Instream Temp.-F	131.2	131.8	131.6	131.1	131	130.9	130.2	130.2	130.1	129.4
Avg. Wall Temp.-F	143.6	143.7	143.4	143.4	143.2	145.2	143.1	144.1	142.6	142.1
Avg. Wall DT.-F	11.9	11.4	11.3	11.9	11.8	13.8	12.4	13.5	12	12.2
Remaining Subcool-F	-4.9									
Exit Quality	0.03	0.05	0.07	0.09	0.12	0.14	0.16	0.19	0.21	0.23
EXP. H-Btu/Hr/ft2/F	343.4	382.7	385.6	839.2	848.6	723.6	806.8	743.9	826.9	0
COMPUTED H										
Jallouk	676.7	663.8	653.2	647.6	646.9	646.8	647.1	648	644.4	644.9
Szady1(Cudo tube)	1011.6	1017.5	1017.7	1018.1	1023.5	1028.6	1033.5	1038.8	1041.5	1046.2
Szady2	815.1	828.5	814.8	813.5	818.1	834.1	838.8	834.4	838.3	845.7
(RLIQ)	55208	54015	52659	51232	49917	48602	47138	45851	44546	43111
(F)	1.529	1.995	2.327	2.611	2.86	3.089	3.31	3.509	3.698	3.889
(HLIQ)	250.9	327.4	381.9	428.3	469.2	506.5	542.4	575	605.9	636.8
(HBOIL)	1006.5	1006.1	999.5	992.2	989.6	985.9	981.1	976.4	968	960.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.7									
DP Liquid Density-lbm/ft3	90.94									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.183	1.121	1.713	2.291	2.919					
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111					
Corrected DP-Psid	0.177	1.078	1.67	2.276	3.03					
Actual DP-ft	1.84	2.45	3.59	4.71	5.43					
Measured TP-Psig	57.2				60.4					
Measured Overall-ft	-5.42									
Computed DP-ft	1.53	2.68	4.16	5.47	6.74					
Friction-ft	0.11	0.31	0.57	0.91	1.29					
Acceleration-ft	0.11	0.17	0.24	0.31	0.39					
Elevation-ft	1.3	2.38	3.35	4.25	5.05					

Run#	331									
Test Fluid	R114									
Date:	2/20/93									
Time:	14:03									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19696									
Sat. Pressure-Psig	52									
Sat. Temperature-F(inlet)	124.1									
Liq. Density-lbm/ft3	85.4	85.3	85.36	85.4	85.41	85.41	85.47	85.49	85.49	85.59
Latent Heat-Btu/lbm	50.09	50	50.05	50.09	50.1	50.1	50.16	50.18	50.18	50.21
Specific Heat-Btu/lbm/F	0.257	0.257	0.257	0.257	0.257	0.257	0.257	0.257	0.257	0.256
Liq. Viscosity-lbm/ft-hr	0.617	0.614	0.616	0.617	0.617	0.617	0.619	0.619	0.619	0.62
Liq. Conductivity-Btu/hr-ft-F	0.0332	0.0331	0.0332	0.0332	0.0332	0.0332	0.0333	0.0333	0.0333	0.0333
Liq. Prandtl No.	4.77	4.77	4.77	4.77	4.77	4.77	4.78	4.78	4.78	4.78
Inlet Flow Rate-GPM	1.6									
Outlet Liq. Flow Rate-GPM	1.7									
Outlet Vap. Flow Rate-GPM	0.54									
Inlet Temperature-F	124.4									
Outlet Liq. Temperature-F	123.4									
Outlet Vap. Temperature-F	123.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	50.8									
Water outlet Temp.-F	121.9									
Inlet G-lbm/hr/ft2	330111		Temp	117	Density	86.45				
Subcooling-F	-0.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	569.4	571.9	578.3	570.3	570.2	568.5	568.3	568.2	572.9	575.8
Heat Loss-Watts	18.7	4.4	6	7	7.5	7.1	5.1	6.3	6.8	36.6
Heat Flux-Btu/hr/ft2	9870	9914	10024	9886	9884	9820	9851	9849	9931	9981
Wall Temp. #3-F	138.6	138.5	138.2	137.6	140.4	139.2	137.8	138.1	138.4	137.7
Wall Temp. #4-F	138.7	137.3	139.3	138.5	139	139.4	138.3	139	138.8	137.2
Wall Temp. #5-F	138.2	136.4	140.7	138.4	137.8	139.2	137.5	138.2	138.5	138
Wall Temp. #1-F	74.2	138.6	137.1	137.4	137	139.7	138.4	138.7	136	136
Wall Temp. #2-F	139.2	138.4	137.7	138.6	137.2	140.8	138.8	139.2	137	138.6
Instream Temp.-F	125.9	126.7	126.2	125.9	125.8	125.8	125.3	125.1	125.1	124.8
Avg. Wall Temp.-F	138.7	138.2	138.1	138	137.8	139.4	138.2	138.6	137.3	137.1
Avg. Wall DT.-F	12.3	11.1	11.4	11.6	11.5	13.1	12.4	13.1	11.8	11.8
Remaining Subcool-F	-7.1									
Exit Quality	0.04	0.07	0.11	0.14	0.18	0.21	0.25	0.28	0.32	0.36
EXP. H-Btu/Hr/ft2/F	800.6	897	877.6	850.2	859.2	747.8	793.5	752.2	842.2	0
COMPUTED H										
Jallouk	670.1	660.6	648.5	643.7	637.1	632.7	631.4	630.4	632.7	633.8
Szady1(Cudo tube)	981.2	988.3	994.3	989.1	991.7	991.9	995.3	998.6	1006.7	1012.6
Szady2	791.8	796	789.8	791.5	799.1	791.2	794.1	796.6	804.8	811.3
(RLIQ)	34371	33262	31934	30647	29404	28183	26892	25647	24428	23183
(F)	1.674	2.279	2.728	3.107	3.439	3.739	4.027	4.293	4.542	4.789
(HLIQ)	191.9	261.5	312.9	356.3	394.3	428.7	461.4	491.8	520.3	548.4
(HBOIL)	978.8	982.2	983.9	973.4	970.4	964.5	961.1	957.1	958	955.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.5									
DP Liquid Density-lbm/ft3	90.97									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.269	1.51	2.187	2.921	3.685					
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111					
Corrected DP-Psid	0.263	1.467	2.144	2.906	3.796					
Actual DP-ft	1.68	1.78	2.77	3.62	4.11					
Measured TP-Psig	52				55.5					
Measured Overall-ft	-5.89									
Computed DP-ft	1.27	2.31	3.3	4.28	5.21					
Friction-ft	0.07	0.19	0.38	0.62	0.89					
Acceleration-ft	0.06	0.1	0.15	0.21	0.28					
Elevation-ft	1.15	2.01	2.77	3.45	4.04					

Run#	332									
Test Fluid	R114									
Date:	2/20/93									
Time:	14:37									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	49.7									
Sat. Temperature-F(inlet)	121.8									
Liq. Density-lbm/ft3	85.57	85.59	85.63	85.65	85.64	85.66	85.7	85.7	85.71	85.77
Latent Heat-Btu/lbm	50.25	50.27	50.3	50.33	50.32	50.34	50.37	50.37	50.38	50.44
Specific Heat-Btu/lbm/F	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256
Liq. Viscosity-lbm/ft-hr	0.621	0.622	0.623	0.624	0.623	0.624	0.625	0.625	0.625	0.627
Liq. Conductivity-Btu/hr-ft-F	0.0333	0.0333	0.0334	0.0334	0.0334	0.0334	0.0334	0.0334	0.0334	0.0335
Liq. Prandtl No.	4.78	4.78	4.79	4.79	4.79	4.79	4.79	4.79	4.79	4.8
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	0.52									
Inlet Temperature-F	122.2									
Outlet Liq. Temperature-F	121.7									
Outlet Vap. Temperature-F	121.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	50.8									
Water outlet Temp.-F	120.7									
Inlet G-lbm/hr/ft2	207600		Temp		112.4	Density	86.99			
Subcooling-F	-0.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	580.7	578.9	577.5	579.7	578.3	578.3	582.5	581.9	576.6	579.4
Heat Loss-Watts	18	4.2	5.7	6.6	7.1	6.7	4.8	6	6.3	35.2
Heat Flux-Btu/Hr/ft2	10066	10035	10011	10049	10024	10024	10097	10087	9995	10044
Wall Temp. #3-F	135.5	136	135.7	135.2	138.2	137.3	136.2	136	136.4	135.5
Wall Temp. #4-F	135.7	134.7	136.7	136.1	136.8	137.4	136.7	137	136.7	135
Wall Temp. #5-F	135.6	133.6	138.4	135.9	135.5	137	135.7	136	134.5	135.8
Wall Temp. #1-F	74.1	135.3	134.4	134.8	134.5	137.7	136.8	137	134.1	133.9
Wall Temp. #2-F	136.8	135.4	134.9	136.1	134.7	138.7	137.1	137.6	135	134.7
Instream Temp.-F	124.5	124.3	124	123.8	123.9	123.7	123.4	123.4	123.3	122.8
Avg. Wall Temp.-F	135.9	135.4	135.4	135.5	135.4	137.4	136.5	136.7	135.3	135
Avg. Wall DT.-F	10.9	10.6	11	11.2	11	13.2	12.6	12.9	11.6	11.7
Remaining Subcool-F	-11.5									
Exit Quality	0.06	0.11	0.17	0.23	0.28	0.34	0.4	0.45	0.51	0.57
EXP. H-Btu/Hr/ft2/F	919.7	947	912.3	893.5	909.5	759.6	798.6	784.1	862.5	0
COMPUTED H										
Jallouk	690.9	669.9	662.3	654.6	647.9	641.8	643.2	643.2	634.1	633.4
Szady1(Cudo tube)	985.1	984	983.1	988	987.1	988.6	993.5	995.7	994	997.8
Szady2	783	782.8	782.9	797.8	796.2	785	792.3	799.4	804.2	799.5
(RLIQ)	21210	19933	18674	17429	16211	14971	13721	12492	11264	10018
(F)	1.904	2.721	3.315	3.816	4.256	4.664	5.049	5.406	5.748	6.09
(HLIQ)	150.4	214.9	261.7	301.2	336	368.1	398.3	426.5	453.4	480.1
(HBOIL)	983.9	980.5	976.9	976.5	974	971.3	971.7	968.9	961.5	959.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.4									
DP Liquid Density-lbm/ft3	90.98									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.277	1.79	2.52	3.36	4.225					
Zero Corrections-psid	0.006	0.043	0.043	0.015	-0.111					
Corrected DP-Psid	0.271	1.747	2.477	3.345	4.336					
Actual DP-ft	1.67	1.31	2.21	2.87	3.19					
Measured TP-Psig	49.7				53.6					
Measured Overall-ft	-6.55									
Computed DP-ft	1.04	1.82	2.53	3.21	3.85					
Friction-ft	0.04	0.12	0.25	0.41	0.6					
Acceleration-ft	0.03	0.07	0.11	0.16	0.22					
Elevation-ft	0.97	1.63	2.17	2.64	3.03					

Run#	333									
Test Fluid	R114									
Date:	2/26/93									
Time:	19:53									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	98.4									
Sat. Temperature-F(inlet)	162.4									
Liq. Density-lbm/ft3	81.34	81.27	81.18	81.26	81.31	81.3	81.28	81.35	81.39	81.5
Latent Heat-Btu/lbm	46.19	46.12	46.03	46.11	46.16	46.15	46.13	46.2	46.24	46.34
Specfic Heat-Btu/lbm/F	0.267	0.267	0.268	0.267	0.267	0.267	0.267	0.267	0.267	0.267
Liq. Viscosity-lbm/ft-hr	0.525	0.524	0.522	0.524	0.525	0.524	0.524	0.525	0.526	0.528
Liq. Conductivity-Btu/hr-ft-F	0.0305	0.0305	0.0304	0.0305	0.0305	0.0305	0.0305	0.0305	0.0306	0.0306
Liq. Prandtl No.	4.6	4.59	4.59	4.59	4.6	4.6	4.6	4.6	4.6	4.6
Inlet Flow Rate-GPM	5.1									
Outlet Liq. Flow Rate-GPM	2.1									
Outlet Vap. Flow Rate-GPM	1.2									
Inlet Temperature-F	155.8									
Outlet Liq. Temperature-F	96.6									
Outlet Vap. Temperature-F	154.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	45.4									
Water outlet Temp.-F	148.1									
Inlet G-lbm/hr/ft2	998673		Temp		152.5	Density	82.05			
Subcooling-F	6.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1446.3	1447.3	1443.8	1444.4	1442.7	1447.8	1445.7	1447.1	1445	1442
Heat Loss-Watts	35.8	7.7	9.9	10	10.2	10.1	10.6	12	12.5	62.4
Heat Flux-Btu/Hr/ft2	25071	25088	25027	25038	25008	25097	25060	25085	25048	24998
Wall Temp. #3-F	174	177.7	174	174.2	180.1	176.1	175.3	175.8	175.6	175.4
Wall Temp. #4-F	173.9	173	176.4	176	176.7	176.1	176.1	177.5	176.5	174
Wall Temp. #5-F	172.8	170.6	178.3	173.9	174.7	176.6	174.8	174.9	171.8	173.9
Wall Temp. #1-F	70.3	174.8	172.7	173.5	173.6	178.9	177	176.5	171.2	167.4
Wall Temp. #2-F	174.5	174.3	173.9	177.9	174.3	183.6	177.5	177	174.1	171.6
Instream Temp.-F	157.9	158.4	159.1	158.5	158.1	158.2	158.3	157.8	157.5	156.7
Avg. Wall Temp.-F	173.8	175	174.3	174.4	174.8	176.9	176.1	176.3	173.8	172.5
Avg. Wall DT.-F	14.8	15.4	14	14.8	15.6	17.6	16.7	17.4	15.2	14.6
Remaining Subcool-F	1.1									
Exit Quality	-0.01	0.03	0.06	0.09	0.12	0.15	0.18	0.22	0.25	0.28
EXP. H-Btu/Hr/ft2/F	1697.8	1627.4	1785.2	1695.3	1603.6	1426.7	1503.5	1441.1	1647	0
COMPUTED H										
Jallouk	1259.8	1185.4	1106.6	1057.4	1017.3	980.9	947.1	909.9	873.2	829.5
Szady1(Cudo tube)	1757.7	1763.5	1771.6	1775.7	1780.4	1792.4	1800.8	1809.1	1817.1	1810.9
Szady2	1682.1	1688.7	1677	1680.9	1701.7	1708.5	1710.7	1694.2	1701.8	1706
(RLIQ)	124411	123517	119943	115624	111434	107518	103595	99383	95285	90991
(F)	1.006	1.383	1.903	2.265	2.563	2.82	3.052	3.273	3.478	3.681
(HLIQ)	288.2	396.1	545.6	648.8	734.1	807.8	874.2	937.2	995.8	1053.2
(HBOIL)	1755.1	1758.8	1754.2	1746.3	1737.7	1735.9	1729.4	1721	1711.4	1683.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	73.8									
DP Liquid Density-lbm/ft3	91.25									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.036	0.498	0.802	0.998	1.211					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.02	0.429	0.764	0.962	1.241					
Actual DP-ft	2.2	3.72	5.37	7.26	8.86					
Measured TP-Psig	98.4				0.2					
Measured Overall-ft	173.51									
Computed DP-ft	2.19	4.12	6.12	8.31	10.59					
Friction-ft	0.2	0.72	1.53	2.6	3.83					
Acceleration-ft	0.25	0.53	0.8	1.08	1.42					
Elevation-ft	1.74	2.86	3.8	4.63	5.34					

Run#	334									
Test Fluid	R114									
Date:	2/26/93									
Time:	21:15									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	89.1									
Sat. Temperature-F(inlet)	155.8									
Liq. Density-lbm/ft3	82.15	82.12	82.05	82.08	82.15	82.13	82.16	82.22	82.26	82.33
Latent Heat-Btu/lbm	46.97	46.94	46.88	46.91	46.97	46.96	46.98	47.05	47.08	47.15
Specific Heat-Btu/lbm/F	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265
Liq. Viscosity-lbm/ft-hr	0.541	0.54	0.539	0.539	0.541	0.54	0.541	0.542	0.543	0.544
Liq. Conductivity-Btu/hr-ft-F	0.031	0.031	0.031	0.031	0.031	0.031	0.0311	0.0311	0.0311	0.0312
Liq. Prandtl No.	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.63
Inlet Flow Rate-GPM	4.2									
Outlet Liq. Flow Rate-GPM	1.6									
Outlet Vap. Flow Rate-GPM	1.4									
Inlet Temperature-F	149.5									
Outlet Liq. Temperature-F	98.3									
Outlet Vap. Temperature-F	147.9									
Water Flow Rate-GPM										
Water inlet Temp.-F	43.9									
Water outlet Temp.-F	140.4									
Inlet G-lbm/hr/ft2	831672		Temp	145.4	Density	82.98				
Subcooling-F	6.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1453.4	1448.4	1447.6	1446	1446	1443.7	1449.4	1454.9	1445.6	1449.5
Heat Loss-Watts	32.4	7.1	9.3	10	10.4	10.3	9.9	11.1	11.5	59.1
Heat Flux-Btu/Hr/ft2	25194	25107	25093	25065	25065	25026	25124	25220	25059	25128
Wall Temp. #3-F	167.7	171.5	167.8	168.3	174.3	170	168.5	167.8	169.8	169.9
Wall Temp. #4-F	167.4	168.6	170.2	170	170.7	170.1	167	167.7	170.2	169.1
Wall Temp. #5-F	166.5	164.2	172.2	168	168.7	170.5	165.8	168.1	165.5	167.9
Wall Temp. #1-F	69.7	168.4	166.3	167.5	167.7	172.9	168.8	166.4	164.4	161.3
Wall Temp. #2-F	167.7	167.9	167.6	172.2	168.3	177.7	170.5	165.8	167	165.2
Instream Temp.-F	151.8	152	152.5	152.3	151.8	151.9	151.7	151.2	150.9	150.4
Avg. Wall Temp.-F	167.3	168.6	168	168.5	168.9	170.9	167.7	166.8	167.4	166.7
Avg. Wall DT.-F	14.4	15.5	14.3	15	15.9	17.8	14.9	14.4	15.3	15.1
Remaining Subcool-F	-0.4									
Exit Quality	0	0.04	0.08	0.12	0.15	0.19	0.23	0.27	0.3	0.34
EXP. H-Btu/Hr/ft2/F	1751.2	1623.4	1749.8	1669.1	1574.7	1402.5	1688	1748.9	1632.7	0
COMPUTED H										
Jallouk	1263.2	1167.4	1096.5	1054	1017.3	985.1	954.7	926.1	892.9	882.6
Szady1(Cuido tube)	1727.3	1728.3	1736.1	1740.3	1744.6	1751.5	1762.1	1771.8	1775.1	1785.5
Szady2	1627.4	1628.2	1636.8	1640.3	1683.2	1683.9	1669.8	1674.5	1655.8	1666.1
(RLIQ)	100500	98586	95034	91143	87132	83381	79527	75545	71661	67732
(F)	1.107	1.63	2.16	2.538	2.868	3.154	3.418	3.67	3.903	4.129
(HLIQ)	272.5	401.5	529.8	625.2	706.3	776.8	841.7	903.2	960.4	1015.5
(HBOIL)	1725	1721	1719.5	1712.9	1705.1	1699	1695.6	1689.8	1676	1688.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	74.5									
DP Liquid Density-lbm/ft3	91.18									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.092	0.712	1.081	1.384	1.719					
Zero Corrections-psid	0.016	0.069	0.038	0.038	-0.03					
Corrected DP-Psid	0.076	0.643	1.043	1.328	1.749					
Actual DP-ft	2.08	3.31	4.82	6.54	7.88					
Measured TP-Psig	89.1				0.1					
Measured Overall-ft	155.67									
Computed DP-ft	2.01	3.72	5.53	7.51	9.58					
Friction-ft	0.18	0.64	1.35	2.29	3.37					
Acceleration-ft	0.23	0.46	0.7	0.98	1.3					
Elevation-ft	1.6	2.62	3.48	4.25	4.9					

Run#	335									
Test Fluid	R114									
Date:	2/26/93									
Time:	21:24									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	81.8									
Sat. Temperature-F(inlet)	150.3									
Liq. Density-lbm/ft3	82.86	82.82	82.81	82.85	82.87	82.86	82.89	82.95	82.99	83.03
Latent Heat-Btu/lbm	47.66	47.62	47.61	47.65	47.67	47.66	47.68	47.75	47.78	47.82
Specific Heat-Btu/lbm/F	0.263	0.263	0.264	0.263	0.263	0.263	0.263	0.263	0.263	0.263
Liq. Viscosity-lbm/ft-hr	0.556	0.555	0.554	0.555	0.556	0.556	0.556	0.557	0.558	0.559
Liq. Conductivity-Btu/hr-ft-F	0.0315	0.0315	0.0315	0.0315	0.0315	0.0315	0.0315	0.0316	0.0316	0.0316
Liq. Prandtl No.	4.64	4.64	4.64	4.64	4.64	4.64	4.65	4.65	4.65	4.65
Inlet Flow Rate-GPM	3.4									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	1.2									
Inlet Temperature-F	143.8									
Outlet Liq. Temperature-F	94.8									
Outlet Vap. Temperature-F	142.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	43.9									
Water outlet Temp.-F	134.5									
Inlet G-lbm/hr/ft2	679945		Temp	138.9	Density	83.8				
Subcooling-F	6.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1458.4	1454.7	1449.3	1452.1	1445.8	1444.1	1457.3	1457.5	1447.3	1084.3
Heat Loss-Watts	29.2	6.6	8.8	10	10.6	10.5	9.6	10.6	10.7	55.5
Heat Flux-Btu/Hr/ft2	25280	25216	25123	25171	25062	25033	25281	25265	25088	18796
Wall Temp. #3-F	162.1	168.2	162.3	162.9	168.9	164.5	161.6	163	164.1	163.1
Wall Temp. #4-F	161.8	161.2	164.8	164.6	165	164.5	162.2	163.1	164.6	161
Wall Temp. #5-F	160.8	158.9	166.8	162.7	163.1	164.9	160.8	161.4	159.7	159.5
Wall Temp. #1-F	70.3	162.8	160.8	162.2	162.1	167.2	163.9	161.6	159.2	154.2
Wall Temp. #2-F	161.8	162.3	162.1	166.8	163	172.4	165.3	161	161.9	157.1
Instream Temp.-F	146.3	146.6	146.7	146.4	146.2	146.3	146.1	145.6	145.3	145
Avg. Wall Temp.-F	161.6	163.1	162.5	163.1	163.3	165.3	162.8	162	161.9	159
Avg. Wall DT.-F	14.2	15.4	14.7	15.6	16	17.8	15.5	15.3	15.5	13.1
Remaining Subcool-F	-1.7									
Exit Quality	0.01	0.06	0.1	0.15	0.19	0.24	0.28	0.33	0.37	0.41
EXP. H-Btu/Hr/ft2/F	1782.5	1639	1713.1	1617.4	1569.6	1402.9	1627.8	1653.6	1622.1	0
COMPUTED H										
Jallouk	1237.7	1163.6	1100.3	1055.5	1021.7	994.1	971.1	942.7	916.8	813.4
Szady1(Cudo tube)	1698.5	1700.6	1702.7	1708	1709.5	1715.9	1729.7	1735.5	1737.5	1528.1
Szady2	1615.7	1597	1598.8	1604.5	1604.6	1626.5	1637.2	1637.3	1614.9	1375.8
(RLIQ)	79676	77584	73970	70215	66508	62915	59217	55426	51721	48495
(F)	1.271	1.84	2.406	2.842	3.213	3.538	3.84	4.13	4.399	4.624
(HLIQ)	265.2	384	502.2	593.1	670.2	738	801	861	916.9	963.6
(HBOIL)	1696.4	1694.1	1688	1683.8	1674.4	1669.1	1670.4	1661.7	1647.8	1387.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	74.6									
DP Liquid Density-lbm/ft3	91.17									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.17	0.951	1.373	1.757	2.25					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.154	0.882	1.335	1.721	2.28					
Actual DP-ft	1.93	2.86	4.27	5.8	6.89					
Measured TP-Psig	81.8				0.2					
Measured Overall-ft	141.53									
Computed DP-ft	1.79	3.28	4.86	6.6	8.39					
Friction-ft	0.16	0.56	1.19	2.03	2.97					
Acceleration-ft	0.19	0.39	0.61	0.88	1.16					
Elevation-ft	1.43	2.33	3.06	3.69	4.26					

Run#	336									
Test Fluid	R114									
Date:	2/26/93									
Time:	22:02									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	93.1									
Sat. Temperature-F(inlet)	158.7									
Liq. Density-lbm/ft3	81.74	81.63	81.63	81.71	81.74	81.72	81.7	81.76	81.78	81.79
Latent Heat-Btu/lbm	46.57	46.47	46.47	46.55	46.57	46.56	46.54	46.6	46.61	46.63
Specific Heat-Btu/lbm/F	0.266	0.266	0.266	0.266	0.266	0.266	0.266	0.266	0.266	0.266
Liq. Viscosity-lbm/ft-hr	0.533	0.531	0.531	0.532	0.533	0.532	0.532	0.533	0.533	0.534
Liq. Conductivity-Btu/hr-ft-F	0.0308	0.0307	0.0307	0.0308	0.0308	0.0308	0.0308	0.0308	0.0308	0.0308
Liq. Prandtl No.	4.61	4.6	4.6	4.61	4.61	4.61	4.61	4.61	4.61	4.61
Inlet Flow Rate-GPM	2.6									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	153.2									
Outlet Liq. Temperature-F	94.6									
Outlet Vap. Temperature-F	152.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	48.7									
Water outlet Temp.-F	144.8									
Inlet G-lbm/hr/ft2	514048		Temp	146.4	Density	82.85				
Subcooling-F	5.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1438.4	1440.1	1445	1443.7	1450.7	1447	1440	1439.1	1	1
Heat Loss-Watts	33.2	7.3	9.5	10	10.3	10.2	10.2	11.6	9.6	51.6
Heat Flux-Btu/Hr/ft2	24934	24963	25048	25026	25147	25083	24961	24946	17	17
Wall Temp. #3-F	169.8	173.7	170.3	170.4	176.8	173	170.2	174.8	154.3	153.5
Wall Temp. #4-F	169.6	169	172.8	172.2	173.2	173	170.8	173.2	154.7	153.6
Wall Temp. #5-F	168.7	168.8	174.9	170.4	171	173.2	169.4	170.7	155.2	154.2
Wall Temp. #1-F	171.7	170.4	168.7	169.7	169.8	175.5	172.2	171.3	155.4	153.9
Wall Temp. #2-F	169.5	169.8	169.9	174.4	170.6	180.2	173.8	170.8	155.2	154.2
Instream Temp.-F	154.9	155.7	155.7	155.1	154.9	155	155.2	154.7	154.6	154.5
Avg. Wall Temp.-F	169.4	170.7	170.4	170.7	171.2	173.7	171.3	172.2	155	153.9
Avg. Wall DT.-F	13.4	13.9	13.6	14.4	15.1	17.5	15	16.3	0.4	-0.6
Remaining Subcool-F	-5.2									
Exit Quality	0.03	0.09	0.15	0.21	0.28	0.34	0.4	0.46	0.46	0.46
EXP. H-Btu/Hr/ft2/F	1864.5	1796.3	1842.7	1732.6	1653.9	1429.9	1669.4	1527.4	48.3	0
COMPUTED H										
Jallouk	1291.4	1212.2	1168.4	1121.6	1096.3	1072.6	1051.1	1030.7	518	518.3
Szady1(Cudo tube)	1735.6	1743.1	1749.1	1748.7	1756	1759	1761.1	1763.6	795.3	795.7
Szady2	1636.1	1644.8	1651.8	1650.8	1658.9	1681.1	1680.7	1678.2	795.8	795.7
(RLIQ)	62191	59560	55677	51636	47705	43845	40015	36065	34120	34101
(F)	1.505	2.145	2.723	3.19	3.591	3.946	4.269	4.586	4.736	4.738
(HLIQ)	252.7	360.6	457.7	536	603.2	662.9	717.3	770.2	795.3	795.7
(HBOIL)	1733.8	1737.9	1738.6	1731.8	1731.9	1727	1720.5	1713.2	19.2	19.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.3									
DP Liquid Density-lbm/ft3	91.09									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.236	1.305	1.845	2.474	3.247					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.22	1.238	1.807	2.438	3.277					
Actual DP-ft	1.84	2.28	3.5	4.62	5.23					
Measured TP-Psig	93.1				0.2					
Measured Overall-ft	163.56									
Computed DP-ft	1.5	2.72	3.99	5.35	6.81					
Friction-ft	0.13	0.45	0.92	1.54	1.91					
Acceleration-ft	0.15	0.29	0.47	0.7	0.7					
Elevation-ft	1.22	1.99	2.59	3.1	4.2					

Run#	337									
Test Fluid	R114									
Date:	2/26/93									
Time:	23:05									
Note	TABOREk	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	90.6									
Sat. Temperature-F(inlet)	156.9									
Liq. Density-lbm/ft3	82.05	81.86	81.87	81.95	81.96	81.91	81.91	81.95	81.96	81.99
Latent Heat-Btu/lbm	46.88	46.69	46.7	46.78	46.79	46.74	46.74	46.78	46.79	46.82
Specific Heat-Btu/lbm/F	0.265	0.266	0.266	0.266	0.266	0.266	0.266	0.266	0.266	0.266
Liq. Viscosity-lbm/ft-hr	0.539	0.535	0.535	0.537	0.537	0.536	0.536	0.537	0.537	0.538
Liq. Conductivity-Btu/hr-ft-F	0.031	0.0309	0.0309	0.0309	0.0309	0.0309	0.0309	0.0309	0.0309	0.0309
Liq. Prandtl No.	4.62	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61
Inlet Flow Rate-GPM	1.8									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	151.2									
Outlet Liq. Temperature-F	94.2									
Outlet Vap. Temperature-F	151.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	50.2									
Water outlet Temp.-F	145.9									
Inlet G-lbm/hr/ft2	358129		Temp	142.3	Density	83.37				
Subcooling-F	5.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1445.7	1445.7	1444.4	1445.4	1446.5	1444.9	1443.8	682.7	1	1
Heat Loss-Watts	32.2	7.1	9.3	10	10.4	10.3	10.1	11	9.5	50.9
Heat Flux-Btu/Hr/ft2	25060	25060	25038	25055	25074	25046	25027	11834	17	17
Wall Temp. #3-F	167.7	171.6	168.4	168.3	175.2	171.3	169.2	167.8	152.7	151.6
Wall Temp. #4-F	167.3	166.7	170.8	170	171.4	171.3	169.3	166.6	153.1	152.2
Wall Temp. #5-F	166.5	164.4	173.2	168.3	169.2	171.4	168.1	164.7	153.8	152.6
Wall Temp. #1-F	72.3	167.8	166.4	167.7	167.8	173.9	170.8	165.6	153.9	152.5
Wall Temp. #2-F	167.5	167.4	167.7	172.5	168.5	178.6	172.1	165.3	153.4	152.6
Instream Temp.-F	152.5	154	153.9	153.3	153.2	153.6	153.6	153.3	153.2	153
Avg. Wall Temp.-F	167.3	168.4	168.3	168.6	169.2	172	169.9	166	153.4	152.3
Avg. Wall DT.-F	13.6	13.2	13.3	14.1	14.9	17.2	15.2	12.2	0.2	-0.7
Remaining Subcool-F	-9.7									
Exit Quality	0.06	0.14	0.23	0.32	0.41	0.49	0.58	0.62	0.62	0.62
EXP. H-Btu/Hr/ft2/F	1840.3	1892.4	1883.5	1771.6	1683.8	1452.5	1649.9	972.8	96.7	0
COMPUTED H										
Jallouk	1307.1	1250.2	1192.2	1164.1	1138.2	1112.5	135.4	135.3	135.3	135.2
Szady1(Cudo tube)	1726	1736	1736.8	1736.7	1739.9	1744.6	135.4	135.3	135.3	135.2
Szady2	1625.5	1637	1637.8	1637.5	1640.8	1645.6	135.4	135.3	135.3	135.2
(RLIQ)	42271	39458	35605	31671	27829	24053	24053	24053	24053	24053
(F)	1.739	2.546	3.232	3.798	4.286	4.717	4.717	4.717	4.717	4.717
(HLIQ)	218.4	320.1	406.3	477.2	538.5	592.8	592.8	592.8	592.8	592.8
(HBOIL)	1724.9	1732.3	1729.4	1724.6	1722.5	1721.4	1721.4	1721.4	1721.4	1721.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.4									
DP Liquid Density-lbm/ft3	91.08									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.258	1.664	2.291	3.116	4.004					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.242	1.595	2.253	3.08	4.034					
Actual DP-ft	1.8	1.64	2.71	3.48	3.89					
Measured TP-Psig	90.6				0.2					
Measured Overall-ft	158.77									
Computed DP-ft	1.23	2.19	3.17	4.16	5.45					
Friction-ft	0.09	0.32	0.66	1.07	1.3					
Acceleration-ft	0.1	0.22	0.38	0.54	0.54					
Elevation-ft	1.04	1.66	2.12	2.55	3.61					

Run#	338									
Test Fluid	R114									
Date:	2/27/93									
Time:	0:29									
Note	TABOBEK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	98.2									
Sat. Temperature-F(inlet)	162.3									
Liq. Density-lbm/ft3	81.1	81.11	81.1	81.16	81.19	81.18	81.11	81.14	81.14	81.19
Latent Heat-Btu/lbm	45.95	45.97	45.95	46.02	46.04	46.02	45.97	45.89	45.99	46.04
Specific Heat-Btu/lbm/F	0.268	0.268	0.268	0.268	0.268	0.268	0.268	0.268	0.268	0.268
Liq. Viscosity-lbm/ft-hr	0.521	0.521	0.521	0.522	0.522	0.522	0.521	0.521	0.521	0.522
Liq. Conductivity-Btu/hr-ft-F	0.0304	0.0304	0.0304	0.0304	0.0304	0.0304	0.0304	0.0304	0.0304	0.0304
Liq. Prandtl No.	4.59	4.59	4.59	4.59	4.59	4.59	4.59	4.59	4.59	4.59
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	1									
Inlet Temperature-F	157									
Outlet Liq. Temperature-F	96.8									
Outlet Vap. Temperature-F	157.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	55.1									
Water outlet Temp.-F	153.6									
Inlet G-lbm/hr/ft2	197925		Temp		145.7	Density	82.94			
Subcooling-F	5.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1473.1	1488.9	1462.9	1473.8	1368.1	1001	811.5	1	1	1
Heat Loss-Watts	35.3	7.7	9.9	10	10.2	10.2	10.6	10.4	10.2	54.4
Heat Flux-Btu/Hr/ft2	25535	25809	25358	25547	23715	17352	14067	17	17	17
Wall Temp. #3-F	172.7	177	173.3	173.7	179.1	174.3	181.9	158.8	158	157.1
Wall Temp. #4-F	172.5	172.1	175.9	175.4	176	174.2	181.4	158.8	158.8	157.3
Wall Temp. #5-F	171.2	169.2	178	173.3	173.9	173.8	171.8	159.6	159.2	157.7
Wall Temp. #1-F	72.6	172.7	171.6	172.8	172.6	175.7	172.5	161.6	158.8	158.1
Wall Temp. #2-F	172.5	172.6	172.7	177.5	173.3	177.8	172.5	161.6	158.4	158.1
Instream Temp.-F	159.7	159.6	159.7	159.2	159	159.2	159.6	159.4	159.4	159
Avg. Wall Temp.-F	172.2	173.6	173.4	173.8	174	174.5	176	160.1	158.6	157.7
Avg. Wall DT.-F	11.4	12.8	12.5	13.4	13.9	14.5	15.8	0.7	-0.8	-1.3
Remaining Subcool-F	-23									
Exit Quality	0.13	0.3	0.46	0.63	0.78	0.89	0.98	0.98	0.98	0.98
EXP. H-Btu/Hr/ft2/F	2245.6	2011.1	2024	1900.1	1708.8	1195.4	891.2	26.3	-22.8	0
COMPUTED H										
Jallouk	1431.4	1350.4	1304.3	1271.1	85.1	85.1	85.1	85.1	85.1	85.1
Szady1(Cudo tube)	1782.8	1792.5	1778.6	1783.8	85.1	85.1	85.1	85.1	85.1	85.1
Szady2	1693	1705.3	1687.4	1694	85.1	85.1	85.1	85.1	85.1	85.1
(RLIQ)	23205	19464	15374	11270	11270	11270	11270	11270	11270	11270
(F)	2.191	3.349	4.247	5.011	5.011	5.011	5.011	5.011	5.011	5.011
(HLIQ)	172.1	263.1	333.6	393.5	393.5	393.5	393.5	393.5	393.5	393.5
(HBOIL)	1782.2	1790.6	1774.6	1777.4	1777.4	1777.4	1777.4	1777.4	1777.4	1777.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.3									
DP Liquid Density-lbm/ft3	91.09									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.174	2.053	2.798	3.802	4.781					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.158	1.984	2.76	3.768	4.811					
Actual DP-ft	1.96	0.97	1.84	2.3	2.55					
Measured TP-Psig	98.2				0.2					
Measured Overall-ft	173.82									
Computed DP-ft	0.91	1.53	2.07	2.86	3.9					
Friction-ft	0.05	0.18	0.33	0.44	0.51					
Acceleration-ft	0.06	0.16	0.27	0.32	0.32					
Elevation-ft	0.8	1.2	1.46	2.1	3.08					

Run#	340									
Test Fluid	R114									
Date:	2/27/93									
Time:	2.1									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	156.2									
Sat. Temperature-F(Inlet)	196.3									
Liq. Density-lbm/ft3	76.17	76.14	76.11	76.11	76.15	76.11	76.09	76.11	76.11	76.26
Latent Heat-Btu/lbm	41.15	41.12	41.09	41.09	41.14	41.09	41.07	41.09	41.09	41.24
Specific Heat-Btu/lbm/F	0.279	0.279	0.279	0.279	0.279	0.279	0.279	0.279	0.279	0.279
Liq. Viscosity-lbm/ft-hr	0.447	0.447	0.447	0.447	0.447	0.447	0.446	0.447	0.447	0.448
Liq. Conductivity-Btu/hr-ft-F	0.0273	0.0273	0.0273	0.0273	0.0273	0.0273	0.0272	0.0273	0.0273	0.0273
Liq. Prandtl No.	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.57
Inlet Flow Rate-GPM	5.5									
Outlet Liq. Flow Rate-GPM	2.5									
Outlet Vap. Flow Rate-GPM	1.2									
Inlet Temperature-F	192.2									
Outlet Liq. Temperature-F	111.4									
Outlet Vap. Temperature-F	192.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	57									
Water outlet Temp.-F	187.2									
Inlet G-lbm/hr/ft2	1011957		Temp	187.6	Density	77.1				
Subcooling-F	2.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1447.7	1447.3	1450.8	1447.9	1441.4	1445.1	1447.2	503.9	44.9	15.9
Heat Loss-Watts	51.3	10.7	12.7	10	9.1	9	12.7	14.1	15.2	72.7
Heat Flux-Btu/Hr/ft2	25095	25088	25149	25098	24986	25050	25086	8735	778	276
Wall Temp. #3-F	205.9	210.1	206.4	206.8	212.1	207.1	205.9	200.7	194.9	194.4
Wall Temp. #4-F	205.9	205.3	208.8	208.5	209.1	207.4	206.1	200.5	195.6	194.6
Wall Temp. #5-F	205.1	203.4	210.1	208.5	207.1	208	204.5	199.9	195.6	195.4
Wall Temp. #1-F	75.1	207.2	204.5	206.4	206.3	211.8	207.5	199.8	195.2	194.3
Wall Temp. #2-F	206.6	206.5	206.1	210.2	207	215.5	207.7	199.8	195	194.7
Instream Temp.-F	193.6	193.8	194	194	193.7	194	194.1	194	194	193
Avg. Wall Temp.-F	205.9	207.3	206.5	207.1	207.4	208.6	206.3	200.1	195.3	194.7
Avg. Wall DT.-F	11.1	12.3	11.3	11.9	12.5	13.4	11.1	5.7	1.2	1.7
Remaining Subcool-F	-1.1									
Exit Quality	0.01	0.04	0.08	0.11	0.15	0.18	0.22	0.23	0.23	0.23
EXP. H-Btu/Hr/ft2/F	2252.5	2032.9	2222.9	2106.3	1991.6	1863.4	2258.7	1520.3	635.4	0
COMPUTED H										
Jallouk	1358.6	1290.3	1236.9	1185.6	1147.3	1120.1	1096.2	717.1	590.4	592.8
Szady1(Cudo tube)	1942.3	1945.9	1953.7	1956.8	1956.8	1965.9	1973.5	1222.5	871	874.6
Szady2	1906	1907	1911.9	1910.4	1877.4	1887.6	1895.4	1038.3	869.7	874.5
(RLIQ)	147390	144322	139200	133955	128566	123502	118317	114736	113743	113169
(F)	1.185	1.557	1.92	2.196	2.428	2.629	2.813	2.93	2.962	2.978
(HLIQ)	348	457.2	563.7	644.4	713	771.9	825.9	860.4	869.7	874.5
(HBOIL)	1938.6	1937.4	1937.9	1933.2	1924.7	1925.4	1924.1	1059.7	143.6	63.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.8									
DP Liquid Density-lbm/ft3	90.93									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.131	0.709	1.129	1.606	2.21					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.115	0.64	1.091	1.57	2.24					
Actual DP-ft	2.17	3.56	5.09	6.57	7.55					
Measured TP-Psig	156.2				0.2					
Measured Overall-ft	294.56									
Computed DP-ft	2.16	4.08	6.04	8.07	9.92					
Friction-ft	0.26	0.77	1.49	2.22	2.8					
Acceleration-ft	0.29	0.51	0.73	0.89	0.9					
Elevation-ft	1.62	2.8	3.82	4.96	6.21					

Run#	341									
Test Fluid	R114									
Date:	2/27/93									
Time:	2.51									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	156.4									
Sat. Temperature-F(inlet)	196.4									
Liq. Density-lbm/ft3	76.25	76.15	76.09	76.12	76.15	76.07	76.11	76.11	76.12	76.25
Latent Heat-Btu/lbm	41.23	41.14	41.07	41.1	41.14	41.06	41.09	41.09	41.1	41.23
Specific Heat-Btu/lbm/F	0.279	0.279	0.279	0.279	0.279	0.279	0.279	0.279	0.279	0.279
Liq. Viscosity-lbm/ft-hr	0.448	0.447	0.446	0.447	0.447	0.446	0.447	0.447	0.447	0.448
Liq. Conductivity-Btu/hr-ft-F	0.0273	0.0273	0.0272	0.0273	0.0273	0.0272	0.0273	0.0273	0.0273	0.0273
Liq. Prandtl No.	4.57	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.57
Inlet Flow Rate-GPM	4.6									
Outlet Liq. Flow Rate-GPM	2.1									
Outlet Vap. Flow Rate-GPM	1.3									
Inlet Temperature-F	191.4									
Outlet Liq. Temperature-F	116									
Outlet Vap. Temperature-F	191.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	56.6									
Water outlet Temp.-F	186.9									
Inlet G-lbm/hr/ft2	848368		Temp	186.4	Density	77.28				
Subcooling-F	5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1446.5	1445.4	1443.7	1441.9	1440.3	1443.7	1448.8	704	398.7	403.8
Heat Loss-Watts	51.3	10.7	12.7	10	9.1	9	12.7	14.3	15.7	74.6
Heat Flux-Btu/Hr/ft2	25074	25055	25026	24994	24967	25026	25114	12203	6911	7000
Wall Temp. #3-F	206.1	210.3	206.5	207	212.4	207.1	205.9	202.3	199.3	198.6
Wall Temp. #4-F	206.1	205.6	208.9	208.5	209.2	207.4	206.1	202.4	200.4	198.6
Wall Temp. #5-F	205.8	203.3	210.2	206.5	207.1	207.9	204.6	201.3	199.1	198.6
Wall Temp. #1-F	77.2	207.2	204.7	206.5	206.4	211.7	207.6	201.4	198.3	196.4
Wall Temp. #2-F	206.7	206.7	206.1	210.3	207	215.5	207.7	201.4	198.5	197.7
Instream Temp.-F	193.1	193.7	194.1	193.9	193.7	194.2	194	194	193.9	193.1
Avg. Wall Temp.-F	206.1	207.5	206.6	207.1	207.4	208.5	206.4	201.8	199.1	198
Avg. Wall DT.-F	11.8	12.6	11.3	12.1	12.6	13.2	11.2	7.2	4.9	4.6
Remaining Subcool-F	-1.3									
Exit Quality	0.01	0.05	0.09	0.13	0.18	0.22	0.26	0.28	0.29	0.3
EXP. H-Btu/Hr/ft2/F	2121.9	1985.7	2210.9	2066.4	1982	1896.7	2233.3	1692.9	1408.2	0
COMPUTED H										
Jallouk	1390.6	1330.9	1260.7	1228.8	1187	1162.9	1139.2	803.6	665.2	669.6
Szady1(Cudo tube)	1938.6	1942.7	1947	1949	1951.5	1960.2	1967.5	1398.9	1105.7	1115.3
Szady2	1902.5	1904.5	1905.4	1903.6	1902.2	1881.9	1889.7	1220.6	920.4	932.2
(RLIQ)	123268	120440	115417	110103	104801	99785	94478	90579	88546	86810
(F)	1.196	1.607	2.008	2.313	2.569	2.789	2.996	3.137	3.208	3.269
(HLIQ)	304.9	409.8	512.2	589.8	655.2	711.1	763.7	799.9	818	833.7
(HBOIL)	1936.1	1936.6	1935.1	1930.8	1926.5	1928.5	1928.3	1305.6	930	931.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.1									
DP Liquid Density-lbm/ft3	90.69									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.17	0.917	1.396	1.95	2.574					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.154	0.848	1.358	1.914	2.604					
Actual DP-ft	2.09	3.16	4.57	5.9	6.83					
Measured TP-Psig	156.4				0.2					
Measured Overall-ft	295									
Computed DP-ft	2	3.71	5.42	7.18	8.95					
Friction-ft	0.2	0.61	1.21	1.92	2.4					
Acceleration-ft	0.22	0.41	0.59	0.75	0.82					
Elevation-ft	1.58	2.69	3.61	4.52	5.74					

Run#	342									
Test Fluid	R114									
Date:	2/27/93									
Time:	9:39									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	154.2									
Sat. Temperature-F(inlet)	195.2									
Liq. Density-lbm/ft3	76.54	76.28	76.26	76.33	76.33	76.28	76.29	76.29	76.29	76.37
Latent Heat-Btu/lbm	41.52	41.26	41.24	41.3	41.3	41.26	41.27	41.27	41.27	41.35
Specific Heat-Btu/lbm/F	0.279	0.279	0.279	0.279	0.279	0.279	0.279	0.279	0.279	0.279
Liq. Viscosity-lbm/ft-hr	0.452	0.449	0.449	0.449	0.449	0.449	0.449	0.449	0.449	0.45
Liq. Conductivity-Btu/hr-ft-F	0.0275	0.0274	0.0273	0.0274	0.0274	0.0274	0.0274	0.0274	0.0274	0.0274
Liq. Prandtl No.	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57
Inlet Flow Rate-GPM	3.7									
Outlet Liq. Flow Rate-GPM	1.5									
Outlet Vap. Flow Rate-GPM	1.3									
Inlet Temperature-F	189.9									
Outlet Liq. Temperature-F	116.3									
Outlet Vap. Temperature-F	190.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	57.3									
Water outlet Temp.-F	186.6									
Inlet G-lbm/hr/ft2	885314	Temp		194.2	Density	77.61				
Subcooling-F	5.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1445.9	1446.9	1445.6	1445.4	1439	1442.2	1451	297.8	207.3	201.9
Heat Loss-Watts	50.8	10.6	12.6	10	9.1	9.1	12.6	13.9	15.4	73.4
Heat Flux-Btu/Hr/ft2	25064	25081	25059	25055	24944	25000	25152	5162	3593	3500
Wall Temp. #3-F	204.5	208.8	205.4	205.6	210.9	205.1	209.9	197.6	196	195.5
Wall Temp. #4-F	204.5	204.1	207.8	207.3	208	205.2	210.4	197.5	196.9	196
Wall Temp. #5-F	203.8	202.1	209.2	205.5	206.2	205.7	202.9	197.3	196.5	196.3
Wall Temp. #1-F	75.7	205.7	203.5	204.9	205.3	210	204.8	199.2	196	194.4
Wall Temp. #2-F	205.2	205.2	205.1	209.1	206	213.9	204.9	199.2	196	195.2
Instream Temp.-F	191.2	192.9	193	192.6	192.6	192.9	192.8	192.8	192.8	192.3
Avg. Wall Temp.-F	204.5	206	205.5	205.8	206.4	206.5	206.6	198.2	196.3	195.5
Avg. Wall DT.-F	12.2	11.9	11.3	12.1	12.6	12.5	12.6	5.1	3.3	3
Remaining Subcool-F	-2.4									
Exit Quality	0.02	0.07	0.12	0.17	0.22	0.27	0.33	0.34	0.35	0.35
EXP. H-Btu/Hr/ft2/F	2059.9	2104.7	2214.1	2071.9	1972.2	2004.7	1989.4	1006.9	1083.1	0
COMPUTED H										
Jallouk	1422.5	1349	1301	1262.8	1228.4	1198.5	245.5	245.5	245.5	245.3
Szady1(Cudo tube)	1930	1939.4	1941.9	1943.2	1942.5	1949.4	245.5	245.5	245.5	245.3
Szady2	1893.8	1902.1	1901.7	1900.2	1895.1	1900.2	245.5	245.5	245.5	245.3
(RLIQ)	98451	95757	90619	85288	80119	75052	75052	75052	75052	75052
(F)	1.286	1.745	2.183	2.522	2.806	3.052	3.052	3.052	3.052	3.052
(HLIQ)	276.4	375.2	469.2	542.1	603.1	656.2	656.2	656.2	656.2	656.2
(HBOIL)	1928.1	1934.7	1932.7	1929.1	1922.9	1924.3	1924.3	1924.3	1924.3	1924.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80									
DP Liquid Density-lbm/ft3	90.59									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.21	1.151	1.703	2.388	3.073					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.194	1.082	1.665	2.352	3.103					
Actual DP-ft	2.01	2.7	3.98	5.05	5.86					
Measured TP-Psig	154.2				0.2					
Measured Overall-ft	290.36									
Computed DP-ft	1.92	3.31	4.78	6.39	7.98					
Friction-ft	0.16	0.49	0.98	1.46	1.83					
Acceleration-ft	0.17	0.32	0.48	0.6	0.63					
Elevation-ft	1.5	2.5	3.32	4.33	5.52					

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Run#	343									
Test Fluid	R114									
Date:	2/27/93									
Time:	4: 9									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	151									
Sat. Temperature-F(inlet)	193.6									
Liq. Density-lbm/ft3	76.93	76.54	76.51	76.58	76.56	76.5	76.53	76.51	76.51	76.65
Latent Heat-Btu/lbm	41.89	41.52	41.49	41.55	41.53	41.47	41.5	41.49	41.49	41.62
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.456	0.452	0.451	0.452	0.452	0.451	0.452	0.451	0.451	0.453
Liq. Conductivity-Btu/hr-ft-F	0.0278	0.0275	0.0275	0.0275	0.0275	0.0275	0.0275	0.0275	0.0275	0.0276
Liq. Prandtl No.	4.56	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57
Inlet Flow Rate-GPM	4.5									
Outlet Liq. Flow Rate-GPM	3.1									
Outlet Vap. Flow Rate-GPM	1									
Inlet Temperature-F	187.8									
Outlet Liq. Temperature-F	115.8									
Outlet Vap. Temperature-F	189.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	57.1									
Water outlet Temp.-F	186.9									
Inlet G-lbm/hr/ft2	(839247	Temp		190.6	Density	78.15				
Subcooling-F	5.8									
Flow Observation										

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1441.8	1441.2	1445.8	1447.3	1438.5	1441.3	770.3	297	205.8	203.8
Heat Loss-Watts	50	10.4	12.5	10	9.2	9.1	12.2	13.8	15.2	72.6
Heat Flux-Btu/Hr/ft2	24993	24982	25062	25088	24935	24984	13353	5148	3567	3533
Wall Temp. #3-F	202.9	207.2	203.7	204.1	209.6	203.6	199.8	196.4	194.8	194.1
Wall Temp. #4-F	202.9	202.5	206.4	205.8	206.5	203.6	199.6	196.4	196	194.4
Wall Temp. #5-F	202.1	200.4	207.6	204	204.5	204.3	198.7	196.1	195.4	194.8
Wall Temp. #1-F	76.9	203.9	202	203.7	203.6	208.5	200	196.1	194.6	193.9
Wall Temp. #2-F	203.4	203.4	203.4	207.7	204.1	212.6	200	196.2	194.6	194
Instream Temp.-F	188.7	191.2	191.4	191	191.1	191.5	191.3	191.4	191.4	190.6
Avg. Wall Temp.-F	202.8	204.3	203.9	204.4	204.7	205	199.6	196.2	195.1	194.1
Avg. Wall DT.-F	13	11.9	11.3	12.3	12.4	12.4	7.7	4.6	3.5	3.5
Remaining Subcool-F	-0.5									
Exit Quality	0	0.04	0.09	0.13	0.17	0.21	0.24	0.24	0.25	0.26
EXP. H-Btu/Hr/ft2/F	1923.2	2095.7	2209.6	2045.3	2003.2	2019.6	1730.4	1117.4	1013.8	0
COMPUTED H										
Jallouk	1398	1322.2	1260.5	1219.3	1181.8	1156.4	839.1	607.3	571.9	575.3
Szady1(Cudo tube)	1917.6	1929.1	1936.7	1940.1	1939.2	1947.1	1438.8	977	879.6	883.4
Szady2	1878.7	1889.2	1894.8	1895.1	1888.5	1894	1258	809.9	781	790.1
(RLIQ)	120132	118597	113597	108292	103226	98287	94288	92432	91540	90488
(F)	1.114	1.548	1.978	2.301	2.565	2.792	2.957	3.031	3.065	3.105
(HLIQ)	281.7	391.4	500.4	581.6	648.4	705.9	747.6	766.2	774.9	785
(HBOIL)	1915.5	1923.8	1925.5	1922.5	1914.7	1915.7	1368.1	784.4	599.3	590.2

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	80.3				
DP Liquid Density-lbm/ft3	90.56				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.222	1.384	2.015	2.788	3.57
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03
Corrected DP-Psid	0.206	1.315	1.977	2.75	3.6
Actual DP-ft	1.98	2.26	3.37	4.29	4.9
Measured TP-Psig	151				0.2
Measured Overall-ft	283.29				
Computed DP-ft	2.03	3.73	5.42	7.21	8.92
Friction-ft	0.18	0.58	1.17	1.71	2.15
Acceleration-ft	0.2	0.39	0.58	0.66	0.69
Elevation-ft	1.64	2.75	3.67	4.84	6.08

Run#	344									
Test Fluid	R114									
Date:	2/27/93									
Time	1:53									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	154.9									
Sat. Temperature-F(inlet)	195.6									
Liq. Density-lbm/ft3	76.64	76.18	76.2	76.25	76.23	76.17	76.15	76.15	76.15	76.28
Latent Heat-Btu/lbm	41.61	41.17	41.18	41.23	41.21	41.15	41.14	41.14	41.14	41.26
Specific Heat-Btu/lbm/F	0.278	0.279	0.279	0.279	0.279	0.279	0.279	0.279	0.279	0.279
Liq. Viscosity-lbm/ft-hr	0.453	0.448	0.448	0.448	0.448	0.447	0.447	0.447	0.447	0.449
Liq. Conductivity-Btu/hr-ft-F	0.0276	0.0273	0.0273	0.0273	0.0273	0.0273	0.0273	0.0273	0.0273	0.0274
Liq. Prandtl No.	4.57	4.58	4.58	4.57	4.57	4.58	4.58	4.58	4.58	4.57
Inlet Flow Rate-GPM	1.9									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	189.8									
Outlet Liq. Temperature-F	116.2									
Outlet Vap. Temperature-F	192.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	66.5									
Water outlet Temp.-F	189.5									
Inlet G-lbm/hr/ft2	354614		Temp		189.2	Density	73.21			
Subcooling-F	5.8									

Flow Observation

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1437.6	1437.8	1441.3	1435.1	1442.4	205.2	154.5	43.5	41.5	309
Heat Loss-Watts	50.8	10.5	12.6	10	9.1	9.5	11.9	13.6	15.1	74.4
Heat Flux-Btu/Hr/ft2	24920	24923	24984	24877	25003	3557	2678	754	719	5356
Wall Temp. #3-F	204.9	209	205.8	205.8	211.3	196.9	196.9	195.2	194.7	197.9
Wall Temp. #4-F	204.9	204.3	208.2	207.5	208.4	196.8	197	195.3	195.6	198.2
Wall Temp. #5-F	204.2	202.2	209.7	205.8	206.2	197	196.7	195.1	195.7	198.4
Wall Temp. #1-F	77.7	205.7	203.8	205.6	205.3	198.1	196.7	195	195.1	196.6
Wall Temp. #2-F	205.4	205.2	205.3	209.5	205.8	197.2	196.7	195.3	194.5	197.5
Instream Temp.-F	190.6	193.5	193.4	193.1	193.2	193.6	193.7	193.7	193.7	192.9
Avg. Wall Temp.-F	204.9	206.1	205.8	206.2	206.4	197.2	196.8	195.2	195.1	197.7
Avg. Wall DT.-F	13.1	11.4	11.2	12	12.1	3.4	3	1.4	1.4	4.6
Remaining Subcool-F	-9									
Exit Quality	0.06	0.16	0.26	0.36	0.46	0.47	0.48	0.49	0.49	0.51
EXP. H-Btu/Hr/ft2/F	1898.8	2181.7	2221.6	2081.6	2067.2	1034.2	899	521.5	518.5	0
COMPUTED H										
Jallouk	1502.8	1440.1	1381.9	1346.8	145.1	145.2	145.2	145.2	145.2	145
Szady1(Cuido tube)	1921.5	1934.4	1937.6	1933.8	145.1	145.2	145.2	145.2	145.2	145
Szady2	1883	1896.3	1899.2	1892.3	145.1	145.2	145.2	145.2	145.2	145
(RLIQ)	49685	46144	40963	35735	35735	35735	35735	35735	35735	35735
(F)	1.626	2.291	2.857	3.314	3.314	3.314	3.314	3.314	3.314	3.314
(HLIQ)	206.3	290.7	362.6	420.6	420.6	420.6	420.6	420.6	420.6	420.6
(HBOIL)	1920.7	1932.2	1933.3	1927.1	1927.1	1927.1	1927.1	1927.1	1927.1	1927.1

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	79.9				
DP Liquid Density-lbm/ft3	90.6				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.218	1.677	2.3	3.31	4.144
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03
Corrected DP-Psid	0.202	1.608	2.262	3.274	4.174
Actual DP-ft	1.99	1.72	2.86	3.32	3.85
Measured TP-Psig	154.9				0.2
Measured Overall-ft	252.04				
Computed DP-ft	1.32	2.3	3.45	4.82	5.97
Friction-ft	0.08	0.25	0.43	0.57	0.74
Acceleration-ft	0.08	0.17	0.24	0.25	0.26
Elevation-ft	1.16	1.89	2.78	4	4.97

Run#	345									
Test Fluid	R-14									
Date:	2/27/93									
Time:	6:55									
Note	TABOREk	Analytical di								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	171									
Sat. Temperature-F(inlet)	203.5									
Liq. Density-lbm/ft3	75.26	74.83	74.83	74.88	74.83	74.75	74.82	74.83	74.78	74.9
Latent Heat-Btu/lbm	40.26	39.84	39.84	39.89	39.84	39.76	39.83	39.84	39.8	39.91
Specific Heat-Btu/lbm/F	0.281	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282
Liq. Viscosity-lbm/ft-hr	0.437	0.432	0.432	0.432	0.432	0.431	0.432	0.432	0.431	0.433
Liq. Conductivity-Btu/hr-ft-F	0.0267	0.0265	0.0265	0.0265	0.0265	0.0264	0.0265	0.0265	0.0264	0.0265
Liq. Prandtl No.	4.59	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Inlet Flow Rate-GPM	1.1									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	0.6									
Inlet Temperature-F	193.5									
Outlet Liq. Temperature-F	119.8									
Outlet Vap. Temperature-F	200.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	88.5									
Water outlet Temp.-F	197.2									
Inlet G-lbm/hr/ft2	205303.		Temp		190.2	Density	78.21			
Subcooling-F	10									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1442.3	1437.2	1442.1	1436.5	696.4	30.4	30.6	31.1	30.5	298.6
Heat Loss-Watts	53.6	11.5	13.9	11.4	9.2	9.3	12.4	14.5	16.4	79.9
Heat Flux-Btu/Hr/ft2	25001	24913	24998	24901	12072	527	530	539	529	5176
Wall Temp. #3-F	212.3	216.6	213.5	214.7	212.1	203	203.4	203.4	202.8	206.4
Wall Temp. #4-F	212.3	212.3	216.1	216.3	211.4	202.9	203.4	203.3	204	206.6
Wall Temp. #5-F	211.7	209.7	217.3	213.9	210.3	203.2	203.4	203.2	203.9	206.6
Wall Temp. #1-F	77.9	213.3	211.6	213.7	210	203.7	203	203.3	203.2	205
Wall Temp. #2-F	213	212.8	212.8	217.3	210.2	202.6	203.2	203.4	202.8	205.7
Instream Temp.-F	199.3	201.9	201.9	201.8	201.9	202.4	202	201.9	202.2	201.5
Avg. Wall Temp.-F	212.3	213.8	213.6	214.7	210.5	203.2	203.3	203.3	203.3	206.1
Avg. Wall DT.-F	11.9	0.7	0.5	11.9	8	0.8	1.3	1.4	1.1	4.3
Remaining Subcool-F	-15.4									
Exit Quality	0.11	0.28	0.46	0.64	0.73	0.73	0.74	0.74	0.74	0.78
EXP. H-Btu/Hr/ft2/F	2101.8	2323.1	2376.2	2088.2	1503.4	678.9	422.3	386.3	473.7	0
COMPUTED H										
Jallouk	1606.6	1558.8	1512.7	95.5	95.5	95.7	95.6	95.5	95.6	95.5
Szady1(Cudo tube)	1962.3	1972.2	1976.1	95.5	95.5	95.7	95.6	95.5	95.6	95.5
Szady2	1928.5	1937.4	1942.2	95.5	95.5	95.7	95.6	95.5	95.6	95.5
(RLIQ)	29097	25016	19484	19484	19484	19484	19484	19484	19484	19484
(F)	1.83	2.694	3.423	3.423	3.423	3.423	3.423	3.423	3.423	3.423
(HLIQ)	150	220.7	280.5	280.5	280.5	280.5	280.5	280.5	280.5	280.5
(HBOIL)	1962	1971.3	1974.2	1974.2	1974.2	1974.2	1974.2	1974.2	1974.2	1974.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.7									
DP Liquid Density-lbm/ft3	90.63									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.158	1.896	2.698	3.798	4.732					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.142	1.827	2.66	3.762	4.762					
Actual DP-ft	2.15	1.33	2.15	2.45	2.79					
Measured TP-Psig	171				0.2					
Measured Overall-ft	328.38									
Computed DP-ft	1.11	1.8	2.7	3.92	4.83					
Friction-ft	0.04	0.12	0.2	0.26	0.33					
Acceleration-ft	0.04	0.11	0.13	0.13	0.15					
Elevation-ft	1.03	1.57	2.37	3.53	4.36					

Run#	147										
Test Fluid	R114										
Date:	2/27/98										
Time:	8:54										
Note	TABORE# Analytical dt										
Flow Area-ft2	0.00336										
Heat Flow Area-ft2	0.19695										
Sat. Pressure-Psig	123.2										
Sat. Temperature-F(inlet)	178.2										
Liq. Density-lbm/ft3	79.27	79.05	78.95	78.94	79.02	79.01	78.95	79.04	79.05	79.17	
Latent Heat-Btu/lbm	44.17	43.96	43.87	43.85	43.94	43.92	43.87	43.95	43.96	44.07	
Specific Heat-Btu/lbm/F	0.272	0.273	0.273	0.273	0.273	0.273	0.273	0.273	0.273	0.272	
Liq. Viscosity-lbm/ft-hr	0.43	0.485	0.485	0.485	0.486	0.486	0.485	0.486	0.486	0.488	
Liq. Conductivity-Btu/hr-ft-F	0.0292	0.0291	0.029	0.029	0.0291	0.0291	0.029	0.0291	0.0291	0.0291	
Liq. Prandtl No.	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	
Inlet Flow Rate-GPM	5.2										
Outlet Liq. Flow Rate-GPM	2.9										
Outlet Vap. Flow Rate-GPM	1.5										
Inlet Temperature-F	171.3										
Outlet Liq. Temperature-F	103.8										
Outlet Vap. Temperature-F	172.1										
Water Flow Rate-GPM											
Water Inlet Temp.-F	50.9										
Water outlet Temp.-F	166.8										
Inlet G-lbm/hr/ft2	991523		Temp		168.4	Density	79.9				
Subcooling-F	8.9										
Flow Observation											
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10	
Heat Input-Watts(net)	1447.9	1443.2	1451	1443.6	1436.8	1442.5	1428.1	1450.7	1441.9	662.1	
Heat Loss-Watts	42.4	8.9	11.1	10	9.7	9.6	11.6	13.3	14.4	65.3	
Heat Flux-Btu/Hr/ft2	25098	25017	25152	25024	24906	25005	24755	25147	24994	11477	
Wall Temp. #3-F	189.5	192.9	189.5	190.2	195.1	191	190.9	190.7	191.4	181.9	
Wall Temp. #4-F	189.4	188.1	191.9	191.7	191.7	191.1	191.6	191.3	192	182.1	
Wall Temp. #5-F	188.3	185.8	193.6	190	189.8	191.7	190.4	189.6	187.5	182.2	
Wall Temp. #1-F	75.4	190.2	188.2	189.6	189.2	194.2	192.3	191.8	186.7	179.1	
Wall Temp. #2-F	190.1	189.7	189.4	193.7	189.9	193.7	192.8	192.3	189.3	180.9	
Instream Temp.-F	172.9	174.4	175.1	175.2	174.6	174.7	175.1	174.5	174.4	173.6	
Avg. Wall Temp.-F	189.3	190.2	189.8	190.4	190.2	192	191.6	191.2	189.4	181.2	
Avg. Wall DT.-F	5.9	14.7	13.5	14	14.4	16.2	15.4	15.5	13.9	7.1	
Remaining Subcool-F	1.5										
Exit Quality	-0.01	0.02	0.06	0.09	0.13	0.16	0.19	0.23	0.26	0.28	
EXP. H-Btu/Hr/ft2/F	1641.4	1702.5	1951.3	1791.8	1726.7	1546.4	1607.3	1617.8	1804.6	0	
COMPUTED H											
Jallouk	1326.2	1260.3	1182.6	1130.9	1087.5	1059.1	1021.6	994.3	962.6	757.8	
Szady1(Cudo tube)	1840.3	1847	1850.9	1852.6	1851.7	1872.5	1873	1891.4	1893.9	1346.8	
Szady2	1759.5	1766.9	1782.5	1805.4	1797.1	1804.1	1796.4	1814.6	1792	1172.7	
(RLIQ)	132464	132335	128254	123792	118966	114533	110262	105480	100932	97308	
(F)	1.008	1.31	1.523	2.162	2.442	2.681	2.89	3.095	3.282	3.422	
(HLIQ)	269	376.5	524.4	521.8	702.2	770.8	831.3	890	943.6	983.5	
(HBOIL)	1837.9	1841.8	1947	1939.2	1827.8	1827.9	1816.7	1823.2	1812.4	1142.6	
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10						
DP liquid Temp.-F	79										
DP Liquid Density-lbm/ft3	90.7										
Elevation-ft	2	4	6	8	9.875						
Measured DP-Psid	0.1	0.61	0.968	1.27	1.698						
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03						
Corrected DP-Psid	0.084	0.541	0.93	1.234	1.728						
Actual DP-ft	2.14	3.6	5.18	6.92	8.17						
Measured TP-Psig	123.2				0.2						
Measured Overall-ft	223.73										
Computed DP-ft	2.19	4.1	6.04	8.12	10.18						
Friction-ft	0.2	0.67	1.39	2.34	3.23						
Acceleration-ft	0.22	0.49	0.72	0.98	1.19						
Elevation-ft	1.76	2.94	3.93	4.81	5.77						

Run#	346									
Test Fluid	R114									
Date:	2/27/93									
Time:	9:32									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	118									
Sat. Temperature-F(inlet)	175.1									
Liq. Density-lbm/ft3	79.65	79.46	79.38	79.39	79.48	79.42	79.42	79.49	79.51	79.59
Latent Heat-Btu/lbm	44.54	44.37	44.28	44.3	44.38	44.32	44.32	44.39	44.41	44.49
Specific Heat-Btu/lbm/F	0.271	0.272	0.272	0.272	0.272	0.272	0.272	0.272	0.272	0.271
Liq. Viscosity-lbm/ft-hr	0.496	0.493	0.491	0.492	0.493	0.492	0.492	0.493	0.493	0.495
Liq. Conductivity-Btu/hr-ft-F	0.0295	0.0293	0.0293	0.0293	0.0293	0.0293	0.0293	0.0294	0.0294	0.0294
Liq. Prandtl No.	4.57	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.57
Inlet Flow Rate-GPM	2.1									
Outlet Liq. Flow Rate-GPM	1.3									
Outlet Vap. Flow Rate-GPM	1.4									
Inlet Temperature-F	168.3									
Outlet Liq. Temperature-F	168.8									
Outlet Vap. Temperature-F	168.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	53.3									
Water outlet Temp.-F	164.8									
Inlet G-lbm/hr/ft2	844805.		Temp		164.4 Density		80.45.			
Subcooling-F	6.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1446.6	1442.6	1435.3	1439.7	1443.8	1441.6	1445.1	1439.3	1439.7	324.6
Heat Loss-Watts	40.2	8.5	10.7	10	9.9	9.8	11.3	12.9	14	65.9
Heat Flux-Btu/Hr/ft2	25076	25007	24880	24956	25027	24989	25050	24949	24956	5627
Wall Temp. #3-F	186.2	189.6	186.3	186.9	192.3	188.1	187.9	187.8	191.7	177.9
Wall Temp. #4-F	186.2	185	188.7	188.6	188.8	188.1	188.6	188.4	189.8	178.1
Wall Temp. #5-F	185.2	182.6	190.3	186.8	187.1	188.7	187.3	186.9	184.7	181.1
Wall Temp. #1-F	76.7	186.9	185.1	186.7	186.3	191.2	189.3	188.7	184	180.4
Wall Temp. #2-F	186.7	186.4	186.1	190.7	186.7	195.8	189.9	189.3	186.6	181.2
Instream Temp.-F	170.2	171.5	172.1	172	171.4	171.8	171.8	171.3	171.2	170.6
Avg. Wall Temp.-F	186.1	187	186.6	187.3	187.2	189	188.6	188.2	187.3	179.7
Avg. Wall DT.-F	14.7	14.3	13.3	14.1	14.7	16.1	15.7	15.8	15	8.9
Remaining Subcool-F	0.4									
Exit Quality	0	0.04	0.08	0.11	0.15	0.19	0.23	0.27	0.31	0.32
EXP. H-Btu/Hr/ft2/F	1701	1743.2	1867.1	1767.2	1703.2	1552.5	1598.8	1579.8	1662.4	0
COMPUTED H										
Jallouk	1344.1	1253.7	1181.1	1138.2	1102.3	1073.1	1047.8	1015	988.4	668.2
Szady1(Cudo tube)	1824.7	1831.4	1834.5	1841.7	1846.7	1853.3	1861.8	1862.9	1870	1053.8
Szady2	1740.9	1748.3	1750.5	1757.8	1783.6	1785.3	1789.8	1784.3	1764.7	947.3
(RLIQ)	111479.	110210	106136	101705.	97039	92823	88429	83844	79436	76549
(F)	1.006	1.504	2	2.356	2.659	2.914	3.149	3.373	3.577	3.706
(HLIQ)	253.9	379.6	505.9	635.4	671.5	736.3	795.6	852	903.5	935.8
(HBOIL)	1823	1826	1821.7	1820.8	1816.6	1813.8	1812.1	1801.5	1796.8	705.2

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	79.1				
DP Liquid Density-lbm/ft3	90.69				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.12	0.774	1.204	1.611	2.228
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03
Corrected DP-Psid	0.104	0.705	1.166	1.575	2.258
Actual DP-ft	2.09	3.28	4.73	6.27	7.17
Measured TP-Psig	118				0.2
Measured Overall-ft	213.13.				
Computed DP-ft	2.08	3.8	5.57	7.45	9.31
Friction-ft	0.16	0.58	1.21	2.03	2.8
Acceleration-ft	0.21	0.42	0.63	0.87	1.03
Elevation-ft	1.7	2.81	3.73	4.55	5.48

Run#	143									
Test Fluid	R114									
Date:	2/27/93									
Time:	9 1									
Note	TABOREK Analytical dt									
Flow Area-ft2	0 00336									
Heat Flow Area-ft2	0 19695									
Sat. Pressure-Psig	113.2									
Sat. Temperature-F(inlet)	172.1									
Liq. Density-lbm/ft3	79 98	79.86	79.8	79.87	79.93	79.87	79.87	79.94	79.94	80.03
Latent Heat-Btu/lbm	44.87	44.75	44.7	44.76	44.82	44.76	44.76	44.83	44.83	44.91
Specific Heat-Btu/lbm/F	0.27	0.271	0.271	0.271	0.271	0.271	0.271	0.271	0.271	0.27
Liq. Viscosity-lbm/ft-hr	0.501	0.499	0.498	0.499	0.5	0.499	0.499	0.501	0.501	0.502
Liq. Conductivity-Btu/hr-ft-F	0.0297	0.0296	0.0295	0.0296	0.0296	0 0296	0.0296	0.0296	0.0296	0.0297
Liq. Prandtl No.	4 57	4 57	4 57	4 57	4 57	4 57	4.57	4.57	4.57	4.57
Inlet Flow Rate-GPM	3.5									
Outlet Liq. Flow Rate-GPM	1 3									
Outlet Vap. Flow Rate-GPM	1 3									
Inlet Temperature-F	165									
Outlet Liq. Temperature-F	102.1									
Outlet Vap. Temperature-F	165.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	52.2									
Water outlet Temp.-F	102.1									
Inlet G-lbm/hr/ft2	676709		Tsat		165.2	Density	81.03			
Subcooling-F	7									

Flow Observation	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1428 5	1425 5	1370.6	1379.8	1434.6	1423.6	1426	1441.6	802.6	474.9
Heat Loss-Watts	39 1	8.4	10.5	10	9.9	9.9	10.8	12.5	12.7	61.6
Heat Flux-Btu/Hr/ft2	24675	24710	23758	23918	24868	24677	24719	24989	13913	8232
Wall Temp. #3-F	182.9	186.8	183.2	183.4	189.4	182.2	181.4	184.3	179.5	174.4
Wall Temp. #4-F	182.8	182.2	185.5	185	185.8	182.4	181.4	184.3	180	174.7
Wall Temp. #5-F	181.9	179.7	186.9	183.5	183.8	184.7	179.9	183.2	177.3	174.7
Wall Temp. #1-F	75.6	183.9	181.8	183.2	183	187.8	182.5	183.8	176.8	172.2
Wall Temp. #2-F	183.3	183.4	182.9	187.2	183.9	192.4	182.4	183.4	178	173.8
Instream Temp.-F	167.3	168.7	169.1	168.6	168.2	168.6	168.6	168.1	168.1	167.5
Avg. Wall Temp.-F	162.7	134 1	133.4	183.8	134.1	134.3	181.5	183.8	178.3	174
Avg. Wall DT.-F	13.8	14 3	13.2	14.1	14.8	14.6	11.8	14.6	9.6	6.1
Remaining Subcool-F	6.8									
Exit Quality	0	0.05	0 1	0.14	0.19	0.24	0.29	0.34	0.36	0.38
EXP. H-Btu/Hr/ft2/F	1786.8	1733	1803.1	1697	1680.1	1694.9	2094.3	1715	1450.5	0
COMPUTED H										
Jallouk	1333.6	1260.6	1175.4	1131.3	1122	1092.7	1070.1	1051.5	803.7	679.2
Szady1(Cudo tube)	1797.3	1805.3	1776.5	1783.8	1920.1	1820.3	1827.1	1839.7	1401.2	1132.7
Szady2	1707.3	1716.5	1678.7	1686.8	1731.6	1750	1753.1	1764.4	1225.2	953
(RLIQ)	88115	86155	82154	77873	73551	69442	65209	60807	57481	55435
(F)	1.16	1 689	2.207	2.594	2.928	3.217	3.484	3.74	3.924	4.037
(HLIQ)	234.9	856.7	466.4	347.9	518.3	679.6	735.8	789.8	828.5	852.1
(HBOIL)	1795.8	1800.6	1795.7	1796.4	1796	1798.2	1786.4	1789.8	1297.1	941.6

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	79 4				
DP Liquid Density-lbm/ft3	90.66				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.161	1.025	1.519	2.041	2.688
Zero Corrections-psid	0.016	0.069	0 038	0.036	-0.03
Corrected DP-Psid	0.145	0.956	1 481	2 005	2.718
Actual DP-ft	2	3.81	4 13	5.45	6.3
Measured TP-Psig	113.2				6.2
Measured Overall-ft	203.33				
Computed DP-ft	1.85	3.33	4 83	6.43	3.05
Friction-ft	0.14	0 48	1	1.58	2.25
Acceleration-ft	0.17	0.33	0 51	0.73	0.84
Elevation-ft	1 55	2.52	3.32	4 02	4 97

Run#	350									
Test Fluid	R114									
Date:	2/27/93									
Time:	9:21									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	113.9									
Sat. Temperature-F(inlet)	172.5									
Liq. Density-lbm/ft3	79.45	79.27	79.25	79.28	79.32	79.29	79.28	79.32	79.34	79.45
Latent Heat-Btu/lbm	44.35	44.17	44.16	44.19	44.23	44.2	44.19	44.23	44.24	44.35
Specific Heat-Btu/lbm/F	0.272	0.272	0.272	0.272	0.272	0.272	0.272	0.272	0.272	0.272
Liq. Visoosity-lbm/ft-hr	0.493	0.49	0.489	0.49	0.491	0.49	0.49	0.491	0.491	0.493
Liq. Conductivity-Btu/hr-ft-F	0.0293	0.0292	0.0292	0.0292	0.0292	0.0292	0.0292	0.0292	0.0293	0.0293
Liq. Prandtl No.	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56
Inlet Flow Rate-GPM	2.7									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	1.2									
Inlet Temperature-F	169.4									
Outlet Liq. Temperature-F	103.2									
Outlet Vap. Temperature-F	170.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	55.7									
Water outlet Temp.-F	162.2									
Inlet G-lbm/hr/ft2	519023		Temp	163.7	Density	80.55				
Subcooling-F	3.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1625.7	1437.9	1448.7	1436.7	1396.5	1390.8	1435.2	342.3	263.6	295.9
Heat Loss-Watts	40.2	8.6	10.7	10	9.9	9.8	11.1	11.8	12.4	62.4
Heat Flux-Btu/Hr/ft2	28180	24925	25112	24904	24207	24109	24878	5934	4569	5129
Wall Temp. #3-F	186.1	189.8	186.7	187.1	192.4	186.2	186	178.7	177.5	176.8
Wall Temp. #4-F	186	185.3	189	188.7	189	186.3	186.1	178.7	178.3	177.1
Wall Temp. #5-F	185.1	182.9	190.9	187.2	186.9	188.2	184.4	178.2	177.5	177.3
Wall Temp. #1-F	76	186.7	185.9	188.7	186	191.2	186.6	178.1	176.8	175.5
Wall Temp. #2-F	186.3	186.2	186.3	190.8	186.9	195.3	186.8	178.1	177	176.5
Instream Temp.-F	171.6	172.9	173	172.8	172.6	172.7	172.8	172.6	172.4	171.6
Avg. Wall Temp.-F	185.9	187	186.8	187.4	187.2	188	186	178.4	177.4	176.6
Avg. Wall DT.-F	13	13	12.7	13.5	13.6	14.2	12.1	5.6	4.8	4.8
Remaining Subcool-F	-8.6									
Exit Quality	0.05	0.12	0.18	0.24	0.31	0.37	0.43	0.45	0.46	0.47
EXP. H-Btu/Hr/ft2/F	2167.5	1921.2	1978.9	1844.8	1779.2	1699.5	2063.6	1061.1	949.3	1066.8
COMPUTED H										
Jallouk	1452.4	1277.5	1233.3	1191.8	1146	1123.7	188.7	188.6	188.6	188.3
Szady1(Cudo tube)	1941.9	1836	1846	1840.6	1817.5	1818.7	188.7	188.6	188.6	188.3
Szady2	1890.3	1753.5	1765.3	1757.3	1749.1	1745.9	188.7	188.6	188.6	188.3
(RLIQ)	67123	63504	59106	54621	50202	45974	45974	45974	45974	45974
(F)	1.643	2.257	2.736	3.132	3.475	3.773	3.773	3.773	3.773	3.773
(HLIQ)	281.2	386.4	468.4	536.1	594.7	645.9	645.9	645.9	645.9	645.9
(HBOIL)	1940	1830.3	1835.9	1825.3	1796	1791.2	1791.2	1791.2	1791.2	1791.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.8									
DP Liquid Density-lbm/ft3	90.61									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.279	1.307	1.906	2.624	3.399					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.263	1.238	1.868	2.588	3.429					
Actual DP-ft	1.8	2.32	3.46	4.43	5.05					
Measured TP-Psig	113.9				0.2					
Measured Overall-ft	206.08									
Computed DP-ft	1.46	2.68	3.92	5.35	6.83					
Friction-ft	0.15	0.46	0.9	1.33	1.65					
Acceleration-ft	0.16	0.29	0.45	0.58	0.62					
Elevation-ft	1.15	1.93	2.56	3.44	4.55					

Run#	351									
Test Fluid	R114									
Date:	2/27/93									
Time:	10:23									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	113.9									
Sat. Temperature-F(inlet)	172.5									
Liq. Density-lbm/ft3	79.56	79.41	79.42	79.46	79.49	79.44	79.42	79.45	79.46	79.52
Latent Heat-Btu/lbm	44.46	44.31	44.32	44.37	44.39	44.34	44.32	44.35	44.37	44.42
Specific Heat-Btu/lbm/F	0.271	0.272	0.272	0.272	0.272	0.272	0.272	0.272	0.272	0.272
Liq. Viscosity-lbm/ft-hr	0.494	0.492	0.492	0.493	0.493	0.492	0.492	0.493	0 493	0.494
Liq. Conductivity-Btu/hr-ft-F	0.0294	0.0293	0.0293	0.0293	0.0294	0.0293	0.0293	0.0293	0.0293	0.0294
Liq. Prandtl No.	4.57	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56
Inlet Flow Rate-GPM	1.9									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	1									
Inlet Temperature-F	170.3									
Outlet Liq. Temperature-F	170.8									
Outlet Vap. Temperature-F	169.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	56.3									
Water outlet Temp.-F	164.8									
Inlet G-lbm/hr/ft2	367829		Temp	159.5	Density	81.12				
Subcooling-F	2.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1455.5	1458.7	1432	1443	1475.3	1476.7	370	344.6	290.2	311.1
Heat Loss-Watts	39	8.3	10.5	10	9.9	9.9	10.4	11.8	12.3	62.3
Heat Flux-Btu/Hr/ft2	25230	25286	24823	25013	25573	25598	6414	5973	5030	5393
Wall Temp. #3-F	184.5	188.3	185.1	185.6	191.7	185.6	178	178.7	177.4	177.6
Wall Temp. #4-F	184.5	183.7	187.6	187.2	188.2	185.7	177.9	178.8	178.2	177.5
Wall Temp. #5-F	183.6	181.4	189.4	185.6	185.8	187.7	177.6	178.2	177.4	178
Wall Temp. #1-F	76.4	184.7	183.5	185.2	185	190.7	178.1	178	176.9	178.1
Wall Temp. #2-F	184.6	184.5	184.6	189.2	185.6	195.1	178	178	176.9	176.8
Instream Temp.-F	170.8	171.9	171.8	171.5	171.3	171.7	171.8	171.6	171.5	171.1
Avg. Wall Temp.-F	184.3	185.3	185.2	185.9	186.2	187.4	177.9	178.3	177.4	177.2
Avg. Wall DT.-F	12.4	12.3	12.3	13.3	13.7	14.6	5.8	6.5	5.6	5.9
Remaining Subcool-F	-12.6									
Exit Quality	0.08	0.17	0.26	0.35	0.44	0.53	0.55	0.57	0.59	0.61
EXP. H-Btu/Hr/ft2/F	2041.3	2062.9	2021.7	1885	1867.4	1757.1	1100.1	923.2	893.1	920.8
COMPUTED H										
Jallouk	1395.5	1323.3	1270.9	1244.3	1227.5	143	143	143	142.9	142.8
Szady1(Cudo tube)	1833.2	1842.5	1827.2	1834.7	1856	143	143	143	142.9	142.8
Szady2	1751.6	1762.6	1742.5	1751.5	1778.1	143	143	143	142.9	142.8
(RLIQ)	46806	42951	38535	34108	29644	29644	29644	29644	29644	29644
(F)	1.807	2.565	3.145	3.626	4.056	4.056	4.056	4.056	4.056	4.056
(HLIQ)	234.6	333.2	408.6	471	526.7	526.7	526.7	526.7	526.7	526.7
(HBOIL)	1831.9	1838.9	1820.3	1824.3	1841.8	1841.8	1841.8	1841.8	1841.8	1841.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.7									
DP Liquid Density-lbm/ft3	90.63									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.314	1.657	2.34	3.199	4.042					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.298	1.588	2.302	3.163	4.072					
Actual DP-ft	1.74	1.68	2.67	3.39	3.88					
Measured TP-Psig	113.9				0.2					
Measured Overall-ft	205.89									
Computed DP-ft	1.23	2.21	3.16	4.24	5.56					
Friction-ft	0.1	0.32	0.63	0.93	1.13					
Acceleration-ft	0.11	0.22	0.37	0.41	0.45					
Elevation-ft	1.02	1.67	2.16	2.9	3.98					

Run#	352									
Test Fluid	R114									
Date:	2/27/93									
Time:	11:52									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	113.9									
Sat. Temperature-F(inlet)	172.5									
Liq. Density-lbm/ft3	79.86	79.7	79.68	79.75	79.79	79.72	79.68	79.72	79.69	79.73
Latent Heat-Btu/lbm	44.75	44.6	44.57	44.64	44.68	44.61	44.57	44.61	44.59	44.63
Specific Heat-Btu/lbm/F	0.271	0.271	0.271	0.271	0.271	0.271	0.271	0.271	0.271	0.271
Liq. Viscosity-lbm/ft-hr	0.499	0.497	0.496	0.497	0.498	0.497	0.496	0.497	0.496	0.497
Liq. Conductivity-Btu/hr-ft-F	0.0296	0.0295	0.0295	0.0295	0.0295	0.0295	0.0295	0.0295	0.0295	0.0295
Liq. Prandtl No.	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	1									
Inlet Temperature-F	163									
Outlet Liq. Temperature-F	169.2									
Outlet Vap. Temperature-F	168									
Water Flow Rate-GPM										
Water Inlet Temp.-F	56.6									
Water outlet Temp.-F	163.6									
Inlet G-lbm/hr/ft2	195473		Temp	153.6	Density	81.91				
Subcooling-F	9.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1448.7	1448.2	1444.2	1433.3	1471.2	515.8	386.9	351.6	271.3	303.5
Heat Loss-Watts	37.7	8.1	10.3	10	10	10.3	10.3	11.5	12	63.9
Heat Flux-Btu/hr/ft2	25112	25104	25034	24845	25502	8941	6707	6095	4703	5261
Wall Temp. #3-F	182.4	186.1	183.1	183.8	189.9	178.5	176.8	177.2	176	181.2
Wall Temp. #4-F	182.3	181.7	185.7	185.4	186.5	178.4	176.8	177.2	176.8	181.2
Wall Temp. #5-F	181.2	178.8	187.7	183.4	184.1	178.3	176.3	176.4	175.9	178.2
Wall Temp. #1-F	76.6	182.4	181.6	188	183.2	179.4	178	176.1	175.6	174.7
Wall Temp. #2-F	182.8	182.3	182.5	187.4	183.7	179.9	177.9	176.1	175.9	175.8
Instream Temp.-F	168.7	169.8	170	169.5	169.2	169.7	170	169.7	169.9	169.6
Avg. Wall Temp.-F	182.2	183.1	183.2	183.9	184.4	178.7	177.2	176.6	176	178.2
Avg. Wall DT.-F	12.3	12.2	12.1	13.3	14	8.5	6.9	6.6	5.9	8.4
Remaining Subcool-F	-18.3									
Exit Quality	0.11	0.28	0.45	0.61	0.79	0.85	0.89	0.93	0.96	0.99
EXP. H-Btu/Hr/ft2/F	2035	2059.3	2070	1871.3	1818.7	1046.2	978.1	920	793.4	627.6
COMPUTED H										
Jallouk	1480.6	1403.8	1343.6	1309.3	85.8	85.9	86	85.9	85.9	85.9
Szady1(Cudo tube)	1817.2	1823.4	1822.9	1814.6	85.8	85.9	86	85.9	85.9	85.9
Szady2	1732.3	1739.5	1738.6	1728	85.8	85.9	86	85.9	85.9	85.9
(RLIQ)	24202	20739	16422	12073	12073	12073	12073	12073	12073	12073
(F)	2.01	3.069	3.947	4.681	4.681	4.681	4.681	4.681	4.681	4.681
(HLIQ)	157.2	240.2	308.9	366.3	366.3	366.3	366.3	366.3	366.3	366.3
(HBOIL)	1816.8	1822	1819.9	1809.6	1809.6	1809.6	1809.6	1809.6	1809.6	1809.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.4									
DP Liquid Density-lbm/ft3	90.66									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.211	2.046	2.837	3.803	4.798					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.195	1.977	2.799	3.767	4.828					
Actual DP-ft	1.92	0.98	1.77	2.29	2.51					
Measured TP-Psig	113.9				0.2					
Measured Overall-ft	205.35									
Computed DP-ft	0.98	1.6	2.15	2.7	3.29					
Friction-ft	0.04	0.15	0.28	0.41	0.5					
Acceleration-ft	0.05	0.13	0.22	0.25	0.28					
Elevation-ft	0.88	1.32	1.65	2.04	2.52					

Run#	334									
Test Fluid	R-14									
Date:	12/7/99									
Time	12:24									
Note	TABOREK Analysis at									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	56.6									
Sat. Temperature-F(inlet)	128.7									
Liq. Density-lbm/ft3	85.7	85.67	85.57	85.63	85.67	85.78	85.84	85.89	85.97	86.16
Latent Heat-Btu/lbm	50.37	50.35	50.25	50.3	50.35	50.45	50.51	50.55	50.63	50.81
Specific Heat-Btu/lbm/F	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.255	0.255
Liq. Viscosity-lbm/ft-hr	0.625	0.624	0.621	0.623	0.624	0.627	0.629	0.631	0.633	0.638
Liq. Conductivity-Btu/hr-ft-F	0.0334	0.0334	0.0333	0.0334	0.0334	0.0335	0.0335	0.0335	0.0336	0.0337
Liq. Prandtl No.	4.79	4.79	4.78	4.79	4.79	4.8	4.8	4.8	4.81	4.82
Inlet Flow Rate-GPM	5									
Outlet Liq. Flow Rate-GPM	2.9									
Outlet Vap. Flow Rate-GPM	1.3									
Inlet Temperature-F	119.7									
Outlet Liq. Temperature-F	118									
Outlet Vap. Temperature-F	116.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	44.9									
Water outlet Temp.-F	38.3									
Inlet G-lbm/hr/ft2	1036613		Temp		118.4	Density	86.88			
Subcooling-F	9									
Flow Observation										

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1442.8	1447.1	1433.8	1434.7	1433.7	1441.6	1438	1449.5	1438.2	1432.2
Heat Loss-Watts	20	4.8	6.6	8	8.6	8.4	6	7.1	7.1	38
Heat Flux-Btu/Hr/ft2	25010	25085	24854	24870	24852	24989	24927	25126	24930	24826
Wall Temp. #3-F	142.4	146.4	143	142.8	148.1	143.6	141.7	142.9	143	140.3
Wall Temp. #4-F	142.2	141.6	145.1	144.7	144.6	143.5	142.5	144.3	143.1	139.3
Wall Temp. #5-F	140.9	139.4	147.5	143.7	143.3	143.6	140.9	141.5	138.2	139.9
Wall Temp. #1-F	75.9	143.4	141.4	143.1	141.3	145.8	143.2	143.1	137.8	133.5
Wall Temp. #2-F	142.4	143	142.9	147.4	142.8	151.1	143.8	143.6	140.5	137.4
Instream Temp.-F	120.4	120.8	124.3	124	120.6	122.7	122.2	121.8	121.1	119.5
Avg. Wall Temp.-F	142	140.3	143.1	143.6	143	144.1	142.4	143.1	140.5	138.1
Avg. Wall DT.-F	17.4	19.9	17.5	18.5	18.3	20.3	19.1	20.1	18.3	17.5
Remaining Subcool-F	9.5									
Exit Quality	-0.02	0.01	0.04	0.07	0.09	0.12	0.15	0.18	0.21	0.23
EXP. H-Btu/Hr/ft2/F	1433.7	1329.6	1422.1	1347.9	1359.8	1231.3	1305.5	1247.3	1362.8	0
COMPUTED H										
Jallouk	1108.6	1111.4	979.2	926.5	881.5	840.9	798.6	752.2	773.5	816.5
Szady1(Cudo tube)	1555.5	1559	1565.7	1573.6	1582.9	1595.9	1607.2	1628	1630.1	1640.1
Szady2	1434.8	1439	1445.3	1467.1	1488.6	1463.1	1474	1494.5	1506.2	1508.1
(RLIQ)	108468	108584	106443	103119	99863	96358	93083	89868	86530	82832
(F)	1.003	1.008	1.811	2.279	2.651	2.981	3.276	3.547	3.806	4.07
(HLIQ)	287.8	287.9	517.9	651.4	757.4	850.7	934.2	1011	1084.1	1157.2
(HBOIL)	1552.2	1555.7	1546.5	1535.5	1522.8	1510.9	1494.2	1485.9	1451.3	1419.8

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	77.7				
DP Liquid Density-lbm/ft3	90.84				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	-0.099	0.166	0.22	0.049	-0.186
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03
Corrected DP-Psid	-0.115	0.097	0.182	0.013	-0.156
Actual DP-ft	2.3	4.06	6.62	8.41	10.67
Measured TP-Psig	56.6				0.2
Measured Overall-ft	94.26				
Computed DP-ft	2.2	4.29	6.48	8.96	11.63
Friction-ft	0.18	0.69	1.56	2.77	4.22
Acceleration-ft	0.2	0.57	0.91	1.28	1.72
Elevation-ft	1.82	2.01	4.01	4.91	5.69

Run#	355									
Test Fluid	R114									
Date:	2/27/03									
Time:	14:54									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	55.2									
Sat. Temperature-F(inlet)	127.3									
Liq. Density-lbm/ft3	85.82	85.77	85.66	85.74	85.77	85.84	85.92	85.99	86.07	86.18
Latent Heat-Btu/lbm	50.46	50.44	50.34	50.42	50.44	50.51	50.59	50.65	50.72	50.83
Specific Heat-Btu/lbm/F	0.256	0.256	0.256	0.256	0.256	0.256	0.255	0.255	0.255	0.255
Liq. Viscosity-lbm/ft-hr	0.629	0.627	0.624	0.626	0.627	0.629	0.632	0.634	0.636	0.639
Liq. Conductivity-Btu/hr-ft-F	0.0335	0.0335	0.0334	0.0334	0.0335	0.0335	0.0336	0.0336	0.0337	0.0337
Liq. Prandtl No.	4.9	4.8	4.79	4.79	4.8	4.8	4.81	4.81	4.82	4.82
Inlet Flow Rate-GPM	4.1									
Outlet Liq. Flow Rate-GPM	1.8									
Outlet Vap. Flow Rate-GPM	1.3									
Inlet Temperature-F	118.8									
Outlet Liq. Temperature-F	117.9									
Outlet Vap. Temperature-F	116.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	45.4									
Water outlet Temp.-F	98.2									
Inlet G-lbm/hr/ft2	851611	Temp	112	Density	87.04					
Subcooling-F	8.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1443	1441.9	1432.8	1434.3	1446.2	1442.3	1441	1443.3	1440.8	1444.2
Heat Loss-Watts	19.6	4.7	6.4	7.7	8.2	7.4	5.2	6.4	7	39
Heat Flux-Btu/Hr/ft2	25013	24994	24837	24863	25069	25001	24979	25019	24975	25034
Wall Temp. #3-F	140.6	144.5	141.1	140.9	145.9	137.3	137.4	139.3	141.9	141.6
Wall Temp. #4-F	140.6	139.8	143.7	143	141.1	137.5	137.3	139.3	142.1	140.7
Wall Temp. #5-F	139.6	137.6	145.9	142	139.4	137.3	135.7	137.2	136.8	140.9
Wall Temp. #1-F	72.8	141.1	139.6	140.9	138.8	140.8	138	137.7	136.2	134.7
Wall Temp. #2-F	140.6	140.7	140.6	145.6	140.	145.8	138.4	137.1	138.8	138.1
Instream Temp.-F	122.4	122.8	123.7	123	122.8	122.2	121.5	120.9	120.3	119.3
Avg. Wall Temp.-F	140.4	141.5	141.3	141.7	139.8	138.2	137.4	138.1	139.2	139.2
Avg. Wall DT.-F	16.8	17.6	16.4	17.6	15.9	14.9	14.7	16.1	17.7	18.8
Remaining Subcool-F	1.8									
Exit Quality	-0.01	0.02	0.06	0.09	0.13	0.16	0.2	0.23	0.26	0.3
EXP. H-Btu/Hr/ft2/F	1487.2	1420.5	1511.9	1414.5	1577.4	1678.5	1695.6	1555	1408.5	0
COMPUTED H										
Jallouk	1134.6	1071.2	990.9	936.4	901.1	864.9	830.1	795.1	755.4	762
Szady1(Cudo tube)	1549	1552.7	1560.4	1565.9	1581.3	1587.8	1596.8	1609.8	1622.2	1628.6
Szady2	1427.7	1431.6	1439.5	1459.5	1469.9	1469.4	1463.9	1476.2	1495.7	1502
(RLIQ)	86633	88124	85518	82181	79064	75785	72495	69268	66066	62750
(F)	1.008	1.416	2.122	2.602	2.997	3.351	3.675	3.977	4.261	4.543
(HLIQ)	245.6	345.7	518.1	624.6	730.8	816.6	895	967.6	1036.1	1103.2
(HBOIL)	1546.9	1547	1541.2	1530.4	1527.4	1512.3	1497	1483.6	1466.9	1438.6

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	77.4				
DP Liquid Density-lbm/ft3	90.87				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.007	0.482	0.685	0.692	0.707
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03
Corrected DP-Psid	-0.009	0.413	0.647	0.656	0.737
Actual DP-ft	2.12	3.53	5.25	7.34	9.18
Measured TP-Psig	55.2				0.2
Measured Overall-ft	91.9				
Computed DP-ft	2.07	3.84	5.77	7.97	10.36
Friction-ft	0.16	0.65	1.47	2.6	3.95
Acceleration-ft	0.22	0.49	0.79	1.13	1.55
Elevation-ft	1.69	2.69	3.51	4.24	4.85

Run#	356									
Test Fluid	R114									
Date:	2/27/93									
Time:	15:32									
Note	TABOREK Analytical at									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.13635									
Sat. Pressure-Psig	54.9									
Sat. Temperature-F(inlet)	127									
Liq. Density-lbm/ft3	85.74	85.7	85.71	85.76	85.79	85.86	85.95	86.01	86.03	86.15
Latent Heat-Btu/lbm	50.42	50.37	50.38	50.43	50.46	50.53	50.61	50.66	50.69	50.8
Specific Heat-Btu/lbm/F	0.256	0.256	0.256	0.256	0.256	0.256	0.255	0.255	0.255	0.255
Liq. Viscosity-lbm/ft-hr	0.626	0.625	0.625	0.627	0.628	0.63	0.632	0.634	0.635	0.638
Liq. Conductivity-Btu/hr-ft-F	0.0334	0.0334	0.0334	0.0335	0.0335	0.0335	0.0336	0.0336	0.0336	0.0337
Liq. Prandtl No.	4.79	4.79	4.79	4.79	4.8	4.8	4.81	4.81	4.81	4.82
Inlet Flow Rate-GPM	3.3									
Outlet Liq. Flow Rate-GPM	1.4									
Outlet Vap. Flow Rate-GPM	1.2									
Inlet Temperature-F	120.3									
Outlet Liq. Temperature-F	118.9									
Outlet Vap. Temperature-F	117.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	45.8									
Water outlet Temp.-F	100.5									
Inlet G-lbm/hr/ft2	685716		Temp	111.7	Density	87.07				
Subcooling-F	6.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1434.2	1436	1448.5	1455	1441.6	1436.5	1433.4	1456.6	1446.8	303.6
Heat Loss-Watts	19.5	4.6	5.4	7.8	8.2	7.4	5.2	6.5	7	31.5
Heat Flux-Btu/Hr/ft2	24861	24892	25109	25221	24989	24901	24847	25249	25079	5263
Wall Temp. #3-F	140.2	144.4	141.2	140.9	145.7	137.7	137.3	139.8	142.4	128.6
Wall Temp. #4-F	140.1	139.3	143.7	143	141	137.7	137.6	139.8	142.5	128.9
Wall Temp. #5-F	139	137.1	145.9	141.9	139.3	137.7	135.8	137.7	137	129.6
Wall Temp. #1-F	72.5	140.6	139.5	140.9	138.4	140.8	138.4	138.1	136.4	126.3
Wall Temp. #2-F	140.1	140.4	140.7	145.6	139.9	145.8	138.4	137.5	139.1	127.5
Instream Temp.-F	123	123.4	123.3	122.9	122.6	122	121.3	120.8	120.6	119.6
Avg. Wall Temp.-F	139.9	141.2	141.3	141.7	139.7	138.5	137.5	138.6	139.5	128.2
Avg. Wall DT.-F	15.7	16.7	16.8	17.6	15.9	15.3	15.1	16.6	17.7	8.3
Remaining Subcool-F	-1.6									
Exit Quality	0.01	0.05	0.09	0.14	0.18	0.22	0.26	0.3	0.35	0.98
EXP. H-Btu/Hr/ft2/F	1580.8	1495	1491	1430.2	1569.6	1622.2	1648	1517.5	1413.2	0
COMPUTED H										
Jallouk	1113.4	1050.1	994.8	955	917.7	883.5	855.5	833	803.8	699.9
Szady1(Cudo tube)	1548	1554.4	1566.7	1575.2	1575.3	1579.4	1585.4	1606.7	1614.9	1060.2
Szady2	1425.9	1433.3	1447.6	1472.2	1464.5	1462	1451.4	1475.3	1481.2	1030.4
(RLIQ)	71315	69671	66593	63396	60253	57050	53848	50708	47652	45596
(F)	1.277	1.904	2.543	3.04	3.463	3.845	4.2	4.531	4.839	5.041
(HLIQ)	261.8	330.7	521.8	623.5	710	787.8	859.7	926.9	989.6	1029.8
(HBOIL)	1545.5	1548.2	1547.1	1542	1525.6	1511.1	1496.3	1496.5	1480.1	463.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.3									
DP Liquid Density-lbm/ft3	90.88									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.126	0.815	1.109	1.303	1.679					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.11	0.746	1.071	1.267	1.709					
Actual DP-ft	1.93	2.97	4.54	6.32	7.56					
Measured TP-Psig	54.9				0.2					
Measured Overall-ft	91.43									
Computed DP-ft	1.78	3.3	4.99	6.93	8.88					
Friction-ft	0.17	0.63	1.37	2.38	3.31					
Acceleration-ft	0.21	0.43	0.7	1.03	1.27					
Elevation-ft	1.4	2.24	2.93	3.52	4.3					

Run#	357									
Test Fluid	R114									
Date:	2/27/93									
Time:	15:50									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	55.9									
Sat. Temperature-F(inlet)	128									
Liq. Density-lbm/ft3	85.59	85.53	85.55	85.6	85.65	85.68	85.76	85.78	85.82	85.89
Latent Heat-Btu/lbm	50.27	50.21	50.24	50.28	50.33	50.36	50.43	50.45	50.48	50.55
Specific Heat-Btu/lbm/F	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256
Liq. Viscosity-lbm/ft-hr	0.622	0.62	0.621	0.622	0.624	0.625	0.627	0.627	0.629	0.631
Liq. Conductivity-Btu/hr-ft-F	0.0333	0.0333	0.0333	0.0333	0.0334	0.0334	0.0335	0.0335	0.0335	0.0335
Liq. Prandtl No.	4.78	4.78	4.78	4.78	4.79	4.79	4.79	4.8	4.8	4.8
Inlet Flow Rate-GPM	2.5									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	1.1									
Inlet Temperature-F	121.8									
Outlet Liq. Temperature-F	121.4									
Outlet Vap. Temperature-F	119.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	47.6									
Water outlet Temp.-F	107.9									
Inlet G-lbm/hr/ft2	519275	Temp		112 Density		87.04				
Subcooling-F	6.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1454.8	1449.5	1443	1445.2	1450.5	1447.4	1442.4	1442.2	300.6	302.1
Heat Loss-Watts	19.7	4.7	6.5	7.9	8.4	7.7	5.5	6.8	5.7	31.9
Heat Flux-Btu/Hr/ft2	25218	25126	25013	25052	25143	25090	25003	25000	5211	5237
Wall Temp. #3-F	141	145.3	142.1	141.8	146.9	139.2	139.2	142.3	129.8	128.9
Wall Temp. #4-F	140.8	140.3	144.7	143.9	142.4	139.4	139.3	142.1	129.9	129.3
Wall Temp. #5-F	139.9	138.1	147.1	142.8	140.6	139	137.5	139.6	128.5	129.3
Wall Temp. #1-F	72.9	141.5	140.4	141.8	139.9	142.4	140	139.7	128.5	127.6
Wall Temp. #2-F	141	141.1	141.5	146.4	141	147.4	140.2	139.2	129.1	128.7
Instream Temp.-F	124.3	124.8	124.6	124.2	123.8	123.5	122.9	122.7	122.4	121.8
Avg. Wall Temp.-F	140.7	142.1	142.2	142.6	141	140	139.2	140.6	129.2	128.8
Avg. Wall DT.-F	15.2	16.1	16.4	17.2	16	15.4	15.2	16.8	6.5	6.7
Remaining Subcool-F	-4.9									
Exit Quality	0.02	0.08	0.14	0.19	0.25	0.31	0.36	0.42	0.43	0.44
EXP. H-Btu/Hr/ft2/F	1655.2	1559.2	1521.1	1452.9	1567.7	1632.8	1643.9	1492.5	798.6	0
COMPUTED H										
Jallouk	1142.2	1078.2	1021.5	981.3	955.7	931.7	902.8	883.1	612.8	618.3
Szady1(Cudo tube)	1566.8	1569.6	1569.5	1574.1	1581.3	1585.6	1588.5	1597	949.5	960.6
Szady2	1448	1450.8	1450.3	1455.1	1476.5	1475.3	1472.3	1484.3	893.2	907.3
(RLIQ)	53918	51836	48702	45529	42363	39232	36064	32994	31115	30385
(F)	1.544	2.283	2.969	3.519	3.999	4.432	4.838	5.211	5.432	5.523
(HLIQ)	253.9	375.7	488.4	578.6	657.3	728.1	794.4	855.4	891.4	905.6
(HBOIL)	1564.6	1562.4	1553.6	1547.6	1542.5	1532.7	1519.3	1510.6	528.8	523.7

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	77.4				
DP Liquid Density-lbm/ft3	90.87				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.24	1.205	1.602	2.024	2.709
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03
Corrected DP-Psid	0.224	1.136	1.564	1.988	2.739
Actual DP-ft	1.74	2.33	3.73	5.13	5.66
Measured TP-Psig	55.9				0.2
Measured Overall-ft	93.39				
Computed DP-ft	1.48	2.75	4.15	5.74	7.37
Friction-ft	0.15	0.52	1.11	1.91	2.4
Acceleration-ft	0.17	0.35	0.58	0.89	0.96
Elevation-ft	1.17	1.88	2.46	2.94	4.01

Run#	[illegible]									
Test Fluid	R114									
Date:	2/27/93									
Time:	[illegible]									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	61.9									
Sat. Temperature-F(inlet)	133.7									
Liq. Density-lbm/ft3	85.14	84.83	84.85	84.94	84.94	84.96	85.01	85	85.02	85.08
Latent Heat-Btu/lbm	49.85	49.55	49.57	49.65	49.65	49.67	49.72	49.71	49.73	49.79
Specific Heat-Btu/lbm/F	0.257	0.258	0.258	0.258	0.258	0.258	0.258	0.258	0.258	0.258
Liq. Viscosity-lbm/ft-hr	0.61	0.602	0.602	0.605	0.605	0.605	0.607	0.606	0.607	0.608
Liq. Conductivity-Btu/hr-ft-F	0.033	0.0328	0.0328	0.0329	0.0329	0.0329	0.0329	0.0329	0.0329	0.033
Liq. Prandtl No.	4.76	4.74	4.74	4.74	4.74	4.74	4.75	4.75	4.75	4.75
Inlet Flow Rate-GPM	1.7									
Outlet Liq. Flow Rate-GPM	1.3									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	126.4									
Outlet Liq. Temperature-F	128.1									
Outlet Vap. Temperature-F	126.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	51									
Water outlet Temp.-F	121.8									
Inlet G-lbm/hr/ft2	352449	Temp	113.4	Density	86.88					
Subcooling-F	7.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1445.4	1448.9	1445.5	1446.5	1445.8	1439.1	1442.5	330.5	323.4	299.4
Heat Loss-Watts	20.9	5	6.9	8.5	9.2	8.8	6.6	6.2	6.6	36.3
Heat Flux-Btu/Hr/ft2	25055	25116	25057	25074	25062	24946	25005	5729	5606	5190
Wall Temp. #3-F	145.4	149.7	146.7	145.6	152.2	144.9	145.4	136.7	136.2	135.5
Wall Temp. #4-F	145.2	144.9	149.2	148.6	147.8	144.9	145.5	136.7	136.9	135.6
Wall Temp. #5-F	144.3	142.6	151.8	147.1	146	144.6	143.7	136.1	135.3	135.7
Wall Temp. #1-F	73	145.6	144.8	146.3	144.9	147.8	145.9	136	135	134
Wall Temp. #2-F	145.4	145.4	146	150.9	146.2	152.7	146.1	136	135.3	135.1
Instream Temp.-F	129.	130.6	130.4	129.7	129.7	129.5	129.1	129.2	129	128.5
Avg. Wall Temp.-F	145.1	146.4	146.7	147.2	146.2	145.6	145.3	136.3	135.7	135.2
Avg. Wall DT.-F	15.9	14.7	15.1	16.3	15.4	14.9	15.1	6.8	6.5	6.4
Remaining Subcool-F	-8.9									
Exit Quality	0.05	0.13	0.21	0.3	0.38	0.47	0.55	0.57	0.59	0.6
EXP. H-Btu/Hr/ft2/F	1571.6	1712.6	1654.7	1536.7	1628.2	1671.7	1657	837.4	864.2	0
COMPUTED H										
Jallouk	1199.9	1143.7	1090.8	1053.2	1026.6	998.8	983.1	545.9	545.5	537.6
Szady1(Cudo tube)	1583.2	1602.3	1602.1	1602.2	1606.1	1606.3	1611.5	876.2	877.5	861.7
Szady2	1482.8	1488.5	1486.2	1488.4	1490.4	1489.6	1508.6	744.2	753.5	760.9
(RLIQ)	36922	34943	31694	28372	25168	21952	18728	16782	16044	15318
(F)	1.767	2.667	3.473	4.135	4.702	5.22	5.709	5.986	6.094	6.208
(HLIQ)	214	323.9	421.7	501.7	570.5	633.2	692.2	725.9	738.9	752.2
(HBOIL)	1581.9	1597.9	1592.3	1595.7	1581.8	1572.8	1567.8	662.1	648.2	598.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.5									
DP Liquid Density-lbm/ft3	90.86									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.319	1.573	2.092	2.812	3.596					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.303	1.504	2.054	2.776	3.626					
Actual DP-ft	1.62	1.73	2.93	3.84	4.41					
Measured TP-Psig	61.9				0.2					
Measured Overall-ft	104.43									
Computed DP-ft	1.2	2.17	3.19	4.48	5.86					
Friction-ft	0.1	0.35	0.75	1.15	1.43					
Acceleration-ft	0.11	0.25	0.45	0.6	0.66					
Elevation-ft	1	1.57	1.99	2.73	3.76					

Run#	359									
Test Fluid	R114									
Date:	2/27/93									
Time:	16:28									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	50.9									
Sat. Temperature-F(inlet)	123									
Liq. Density-lbm/ft3	86.08	86.07	86.09	86.07	86.11	86.15	86.18	86.2	86.22	86.28
Latent Heat-Btu/lbm	50.73	50.72	50.74	50.72	50.77	50.8	50.83	50.84	50.87	50.92
Specific Heat-Btu/lbm/F	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.256	0.256
Liq. Viscosity-lbm/ft-hr	0.636	0.636	0.636	0.636	0.637	0.638	0.639	0.639	0.64	0.642
Liq. Conductivity-Btu/hr-ft-F	0.0337	0.0337	0.0337	0.0337	0.0337	0.0337	0.0337	0.0338	0.0338	0.0338
Liq. Prandtl No.	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.83	4.83	4.83
Inlet Flow Rate-GPM	1.4									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	1									
Inlet Temperature-F	117.6									
Outlet Liq. Temperature-F	85.5									
Outlet Vap. Temperature-F	121									
Water Flow Rate-GPM										
Water Inlet Temp.-F	50.4									
Water outlet Temp.-F	109.8									
Inlet G-lbm/hr/ft2	289746		Temp	114.7	Density	86.72				
Subcooling-F	5.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1648.9	1453.7	1467	1436.9	1451.1	1141.8	4	3	2	1
Heat Loss-Watts	18.9	4.5	6.2	7.4	7.9	7.6	2.4	3.5	4.4	24.9
Heat Flux-Btu/Hr/ft2	28583	25199	25429	24908	25154	19792	69	52	35	17
Wall Temp. #3-F	136.8	140.7	136.9	137.2	142.8	137.6	119.1	118.7	118.4	118
Wall Temp. #4-F	136.3	135.6	139.1	138.8	138.2	137.8	119.1	118.7	118.6	118.1
Wall Temp. #5-F	135	132.8	142.3	138.5	136.3	137.6	119.4	118.7	118.8	118.2
Wall Temp. #1-F	73.5	136.3	135.5	136.5	135.4	138.5	120.7	118.7	118.7	117.9
Wall Temp. #2-F	135.8	136.3	136.4	141.8	136.4	141.9	120.7	118.7	118.3	118.2
Instream Temp.-F	120.2	120.3	120.1	120.3	119.9	119.6	119.3	119.2	119	118.5
Avg. Wall Temp.-F	136	137.2	137	137.3	136.6	137.9	119.8	118.7	118.6	118.1
Avg. Wall DT.-F	14.5	15.8	15.7	15.8	15.5	17.4	0.5	-0.5	-0.4	-0.4
Remaining Subcool-F	-17.2									
Exit Quality	0.09	0.19	0.29	0.39	0.49	0.57	0.57	0.57	0.57	0.57
EXP. H-Btu/Hr/ft2/F	1973.5	1596.3	1617.1	1574	1618.8	1138.8	139.5	-103.5	-78.5	0
COMPUTED H										
Jallouk	1247.7	1087.7	1057.1	1015	996.1	860.7	412.1	412.3	412.7	413.6
Szady1(Cudo tube)	1642.6	1544	1552.8	1541.8	1551.4	1387.2	654.8	655.2	656	657.6
Szady2	1547.8	1423.3	1434.1	1419.7	1430.9	1237.5	654.8	655.2	656	657.6
(RLIQ)	28510	25736	22702	19735	16723	14036	12840	12825	12806	12768
(F)	2.17	3.309	4.2	4.932	5.595	6.146	6.387	6.393	6.401	6.421
(HLIQ)	222.7	339.6	431	506.2	573.9	630.3	654.8	655.2	656	657.6
(HBOIL)	1641.2	1538.5	1541.7	1523.4	1524.8	1342.4	22	19.7	17.5	15.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.4									
DP Liquid Density-lbm/ft3	90.87									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.315	1.77	2.338	3.191	4.059					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.031					
Corrected DP-Psid	0.299	1.701	2.3	3.155	4.089					
Actual DP-ft	1.61	1.37	2.48	3.16	3.58					
Measured TP-Psig	50.9				0.2					
Measured Overall-ft	84.62									
Computed DP-ft	1.02	1.88	2.79	4.12	5.37					
Friction-ft	0.1	0.35	0.72	0.95	1.16					
Acceleration-ft	0.11	0.26	0.46	0.46	0.46					
Elevation-ft	0.81	1.27	1.62	2.72	3.75					

Run#	260.									
Test Fluid	R114									
Date:	3/3/93									
Time:	11:26									
Note	TABOREk	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	58.7									
Sat. Temperature-F(inlet)	130.7									
Liq. Density-lbm/ft3	85.76	85.46	85.26	85.2	85.22	85.25	85.32	85.36	85.41	85.53
Latent Heat-Btu/lbm	50.45	50.14	49.96	49.9	49.92	49.95	50.02	50.05	50.1	50.21
Specific Heat-Btu/lbm/F	0.256	0.257	0.257	0.257	0.257	0.257	0.257	0.257	0.257	0.256
Liq. Viscosity-lbm/ft-hr	0.627	0.619	0.613	0.612	0.612	0.613	0.615	0.616	0.617	0.62
Liq. Conductivity-Btu/hr-ft-F	0.0335	0.0332	0.0331	0.0331	0.0331	0.0331	0.0332	0.0332	0.0332	0.0333
Liq. Prandtl No.	4.3	4.78	4.76	4.76	4.76	4.76	4.77	4.77	4.77	4.78
Inlet Flow Rate-GPM	4.9									
Outlet Liq. Flow Rate-GPM	3.6									
Outlet Vap. Flow Rate-GPM	0.6									
Inlet Temperature-F	121.9									
Outlet Liq. Temperature-F	123.6									
Outlet Vap. Temperature-F	122.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	53.8									
Water outlet Temp.-F	116.5									
Inlet G-lbm/hr/ft2	1008903.		Temp		118.5	Density	86.28			
Subcooling-F	8.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	856.2	862	850.8	850.6	861	854.6	861.3	855	848.3	849
Heat Loss-Watts	20.5	4.8	6.5	7.8	8.4	7.7	5.9	6.8	7.5	41.1
Heat Flux-Btu/Hr/ft2	14842	14942	14748	14745	14925	14814	14930	14821	14705	14717
Wall Temp. #3-F	141.6	143.6	141.2	141.2	142.5	138.6	139.8	139.1	143.2	141.1
Wall Temp. #4-F	141.7	141.3	142.3	141.9	141.1	138.6	139.7	139.1	143.3	140.9
Wall Temp. #5-F	141.3	139	142.6	140.1	139.6	139.1	138.5	138	140	141.7
Wall Temp. #1-F	70.3	141.1	140.6	140.2	138.9	140.7	139.7	138.2	139.6	138.2
Wall Temp. #2-F	142.8	141.2	141.2	142.7	139.4	142.7	139.7	138	140.8	140.1
Instream Temp.-F	122.7	125.4	127	127.5	127.4	127.1	126.5	126.2	125.8	124.8
Avg. Wall Temp.-F	141.9	141.8	141.3	140.9	139.8	139.3	139.5	138.5	141.4	140.4
Avg. Wall DT.-F	18.5	15.7	13.7	12.7	11.7	11.5	12.3	11.6	14.9	14.9
Remaining Subcool-F	5.4									
Exit Quality	-0.03	-0.01	0.01	0.02	0.04	0.06	0.08	0.09	0.11	0.13
EXP. H-Btu/Hr/ft2/F	803.2	950.2	1079.8	1162.5	1278.3	1290.4	1213.3	1276.5	985.9	0
COMPUTED H										
Jallouk	814.9	827.1	826.1	771.8	761.7	749.1	741.6	735.5	732.3	730.4
Szady1(Cudo tube)	1198.7	1215.6	1215.6	1218.4	1233.7	1237.4	1249.8	1255.9	1262.7	1273.3
Szady2	1010.4	1027.8	1026.7	1048.8	1048.4	1055.6	1080.2	1079.9	1088.9	1094.1
(RLIQ)	105173	106701	107610	106241	104324	102296	100115	98103	96063	93738
(F)	1.008	1.008	1.008	1.604	1.946	2.22	2.46	2.674	2.871	3.063
(HLIQ)	291.4	292.2	292.7	456.4	546.3	622.9	689.8	749.6	804.5	857.4
(HBOIL)	1193.5	1210.5	1210.5	1197.5	1196.9	1182.3	1175.4	1159.7	1142.8	1127.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.4									
DP Liquid Density-lbm/ft3	91.08									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.015	0.379	0.662	0.791	0.969					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	-0.031	0.31	0.624	0.755	0.999					
Actual DP-ft	2.18	3.74	5.34	7.25	8.83					
Measured TP-Psig	58.7				59.3					
Measured Overall-ft	-1.01									
Computed DP-ft	2.13	4.27	6.31	8.38	10.41					
Friction-ft	0.13	0.36	0.76	1.28	1.9					
Acceleration-ft	0	0.29	0.49	0.68	0.87					
Elevation-ft	2	3.62	5.06	6.41	7.64					

Run#	361									
Test Fluid	R114									
Date:	3/3/93									
Time:	14:42									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	63.5									
Sat. Temperature-F(inlet)	135.1									
Liq. Density-lbm/ft3	85.53	85.25	84.72	84.61	84.62	84.68	84.73	84.75	84.8	84.88
Latent Heat-Btu/lbm	50.21	49.95	49.44	49.33	49.35	49.38	49.45	49.48	49.52	49.59
Specific Heat-Btu/lbm/F	0.256	0.257	0.259	0.259	0.259	0.259	0.259	0.259	0.258	0.258
Liq. Viscosity-lbm/ft-hr	0.62	0.613	0.599	0.596	0.596	0.597	0.599	0.6	0.601	0.603
Liq. Conductivity-Btu/hr-ft-F	0.0333	0.0331	0.0327	0.0327	0.0327	0.0327	0.0328	0.0328	0.0328	0.0328
Liq. Prandtl No.	4.78	4.76	4.73	4.72	4.73	4.73	4.73	4.73	4.74	4.74
Inlet Flow Rate-GPM	4									
Outlet Liq. Flow Rate-GPM	0									
Outlet Vap. Flow Rate-GPM	0.5									
Inlet Temperature-F	124									
Outlet Liq. Temperature-F	129.4									
Outlet Vap. Temperature-F	128									
Water Flow Rate-GPM										
Water Inlet Temp.-F	50.4									
Water outlet Temp.-F	125.9									
Inlet G-lbm/hr/ft2	521112		Temp		120.7	Density	86.02			
Subcooling-F	11.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	854.8	865.2	860.7	863.5	876.7	878.8	867.6	864.9	853.2	859.8
Heat Loss-Watts	21.7	5.1	7	8.5	9.2	8.8	6.7	7.6	8.2	44.4
Heat Flux-Btu/Hr/ft2	14817	14998	14920	14968	15197	15233	15039	14992	14790	14904
Wall Temp. #3-F	145.7	147.8	145.5	145.9	147.5	143.6	144.4	144	147.3	145.9
Wall Temp. #4-F	145.9	145.5	146.7	146.6	146.2	143.6	144.3	144.1	147.7	145.7
Wall Temp. #5-F	145.5	143.3	147.1	144.7	144.5	144.2	143.3	143	144.5	145.9
Wall Temp. #1-F	70.8	145.3	144.8	145	143.9	146.1	144.4	143.3	144	142.2
Wall Temp. #2-F	146.7	145.4	145.6	147.2	144.5	147.9	144.4	142.8	145.3	144.3
Instream Temp.-F	124.8	127.1	131.5	132.4	132.3	132	131.4	131.2	130.8	130.2
Avg. Wall Temp.-F	146	146	145.7	145.6	144.8	144.4	144.2	143.4	145.8	144.8
Avg. Wall DT.-F	20.5	18.2	13.5	12.5	11.8	11.7	12.1	11.6	14.3	13.9
Remaining Subcool-F	7									
Exit Quality	-0.04	-0.01	0.01	0.03	0.05	0.07	0.09	0.12	0.14	0.16
EXP. H-Btu/Hr/ft2/F	723.5	823	1107.2	1200	1289.2	1303.5	1244.9	1296.7	1034.8	0
COMPUTED H										
Jallouk	832	845.5	856.9	809.1	793.2	781.7	767	758.9	749.8	748.8
Szady1(Cudo tube)	1206.5	1224.6	1242.6	1255.5	1260.9	1267.8	1265	1270.7	1270.4	1282.4
Szady2	1017.8	1037	1054.7	1080.9	1093.7	1085	1084.6	1103	1095.4	1100.1
(RLIQ)	86563	87627	89674	88503	86494	84381	82156	80129	78043	75892
(F)	1.008	1.008	1.007	1.639	2.029	2.339	2.608	2.844	3.062	3.268
(HLIQ)	239.2	239.8	240.9	392.3	485.6	559.6	623.6	679.9	731.7	780.5
(HBOIL)	1203.3	1221.5	1239.6	1242.6	1236.4	1230.3	1212.3	1202.2	1183.7	1177.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	74.8									
DP Liquid Density-lbm/ft3	91.15									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.042	0.543	0.954	1.26	1.638					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.026	0.474	0.916	1.224	1.668					
Actual DP-ft	2.1	3.49	4.69	6.51	7.77					
Measured TP-Psig	63.5				64.9					
Measured Overall-ft	-2.38									
Computed DP-ft	2.09	4.01	5.69	7.39	9.08					
Friction-ft	0.09	0.27	0.64	1.17	1.82					
Acceleration-ft	0	0.21	0.37	0.52	0.68					
Elevation-ft	2	3.53	4.68	5.7	6.58					

Run#	332									
Test Fluid	R114									
Date:	3/3/93									
Time:	15:04									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	53.9									
Sat. Temperature-F(inlet)	126.1									
Liq. Density-lbm/ft3	85.79	85.72	85.65	85.72	85.74	85.79	85.83	85.86	85.92	85.98
Latent Heat-Btu/lbm	50.45	50.39	50.33	50.39	50.42	50.46	50.5	50.53	50.59	50.64
Specific Heat-Btu/lbm/F	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.255	0.255
Liq. Viscosity-lbm/ft-hr	0.628	0.626	0.624	0.626	0.626	0.628	0.629	0.63	0.632	0.633
Liq. Conductivity-Btu/hr-ft-F	0.0335	0.0334	0.0334	0.0334	0.0334	0.0335	0.0335	0.0335	0.0336	0.0336
Liq. Prandtl No.	4.8	4.79	4.79	4.79	4.79	4.8	4.8	4.8	4.81	4.81
Inlet Flow Rate-GPM	3.3									
Outlet Liq. Flow Rate-GPM	0									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	119.6									
Outlet Liq. Temperature-F	119.8									
Outlet Vap. Temperature-F	119									
Water Flow Rate-GPM										
Water Inlet Temp.-F	49									
Water outlet Temp.-F	113.6									
Inlet G-lbm/hr/ft2	683340		Temp		114.3	Density		86.77		
Subcooling-F	6.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	859.7	953.8	866.3	861.2	850.3	852.6	853.5	862.1	859.1	861
Heat Loss-Watts	19.2	4.5	6.1	7.2	7.5	6.9	5.2	6.1	6.9	38.3
Heat Flux-Btu/Hr/ft2	14902	14800	15017	14928	14739	14779	14795	14944	14892	14925
Wall Temp. #3-F	137.8	139.5	137.4	137.4	138.8	135	136.2	135.6	139.2	138.3
Wall Temp. #4-F	137.8	137.1	138.6	138.1	137.2	135.1	136	135.8	139.4	137.8
Wall Temp. #5-F	137.4	135	139	136.2	135.5	135.6	134.9	134.6	135.9	138.2
Wall Temp. #1-F	71.5	137.1	136.6	136.5	135	137.2	136.3	134.8	135.6	134.3
Wall Temp. #2-F	138.7	137.1	137.4	139.1	135.5	139.4	136.2	134.4	136.9	136.7
Instream Temp.-F	122.6	123.2	123.8	123.2	123	122.6	122.3	122	121.5	121
Avg. Wall Temp.-F	137.9	137.7	137.5	137.1	135.8	135.7	135.9	135	137.4	137.1
Avg. Wall DT.-F	14.7	13.8	13	13.2	12.1	12.5	13	12.4	15.2	15.4
Remaining Subcool-F	1.5									
Exit Quality	-0.01	0.02	0.04	0.07	0.09	0.12	0.14	0.17	0.19	0.22
EXP. H-Btu/Hr/ft2/F	1017.1	1070.1	1153.2	1133.1	1214.7	1186.4	1142.3	1208.6	978	0
COMPUTED H										
Jallouk	842.4	818.6	781.3	764.3	749.8	745.1	735	733.9	728.9	726.3
Szady1(Cudo tube)	1198.5	1199.1	1216.7	1217.7	1206.8	1214	1221.5	1234.7	1240.6	1250.6
Szady2	1010.2	1010.5	1029.8	1038.6	1020.5	1030.8	1040.6	1062.7	1064.4	1070.6
(RLIQ)	71196	71055	69467	67423	65549	63620	61731	59839	57885	55945
(F)	1.008	1.325	1.93	2.338	2.67	2.962	3.227	3.474	3.711	3.936
(HLIQ)	206	271.1	395.2	478.4	546	605.5	659.5	709.8	757.7	803.1
(HBOIL)	1196.5	1194.5	1202.6	1192.6	1168.4	1161.6	1153.7	1151	1138.2	1128.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.3									
DP Liquid Density-lbm/ft3	91.09									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.133	0.853	1.321	1.696	2.083					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.117	0.784	1.283	1.66	2.113					
Actual DP-ft	1.92	2.92	4.21	5.7	6.92					
Measured TP-Psig	53.9				55.9					
Measured Overall-ft	-3.35									
Computed DP-ft	1.99	3.56	5.09	6.7	8.31					
Friction-ft	0.09	0.35	0.76	1.31	1.96					
Acceleration-ft	0.11	0.26	0.39	0.53	0.7					
Elevation-ft	1.79	2.95	3.94	4.85	5.65					

Run#	363									
Test Fluid	R114									
Date:	3/3/93									
Time:	15:27									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	52.1									
Sat. Temperature-F(inlet)	124.3									
Liq. Density-lbm/ft3	86.27	85.89	85.86	85.89	85.92	85.99	85.99	86.05	86.08	86.15
Latent Heat-Btu/lbm	50.91	50.55	50.53	50.55	50.59	50.65	50.65	50.71	50.73	50.8
Specific Heat-Btu/lbm/F	0.255	0.256	0.256	0.256	0.255	0.255	0.255	0.255	0.255	0.255
Liq. Viscosity-lbm/ft-hr	0.642	0.631	0.63	0.631	0.632	0.634	0.634	0.635	0.636	0.638
Liq. Conductivity-Btu/hr-ft-F	0.0338	0.0335	0.0335	0.0335	0.0336	0.0336	0.0336	0.0337	0.0337	0.0337
Liq. Prandtl No.	4.83	4.8	4.8	4.8	4.81	4.81	4.81	4.82	4.82	4.82
Inlet Flow Rate-GPM	2.5									
Outlet Liq. Flow Rate-GPM	0									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	117.4									
Outlet Liq. Temperature-F	118.9									
Outlet Vap. Temperature-F	117.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	48.1									
Water outlet Temp.-F	113.4									
Inlet G-lbm/hr/ft2	519275		Temp		112	Density	87.04			
Subcooling-F	6.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1059.1	855.2	868.7	864.5	854.3	857.3	856.9	864.1	861.3	865.7
Heat Loss-Watts	18.8	4.4	6	7.1	7.4	6.8	5	5.9	6.8	37.4
Heat Flux-Btu/Hr/ft2	18359	14824	15058	14986	14809	14861	14854	14979	14930	15006
Wall Temp. #3-F	135.8	137.5	135.8	136.2	137.6	134.1	134.9	134.5	138	137
Wall Temp. #4-F	135.8	135.5	136.9	136.7	136.2	134.1	134.8	134.6	138.5	136.7
Wall Temp. #5-F	135.8	133.3	137.2	135	134.3	134.6	133.7	133.6	134.7	136.7
Wall Temp. #1-F	71.2	135.2	134.7	135.1	133.7	138.2	135.1	133.6	134.6	133
Wall Temp. #2-F	136.9	135.3	135.7	137.8	134.3	138.2	135.1	133.4	135.7	135.3
Instream Temp.-F	118.6	121.8	122	121.8	121.5	120.9	120.9	120.4	120.2	119.6
Avg. Wall Temp.-F	136.1	135.9	135.8	135.8	134.6	134.8	134.7	133.9	136.3	135.7
Avg. Wall DT.-F	16.6	13.4	13.1	13.3	12.5	13.2	13.1	12.9	15.4	15.5
Remaining Subcool-F	-1.3									
Exit Quality	0.01	0.04	0.07	0.11	0.14	0.17	0.21	0.24	0.27	0.31
EXP. H-Btu/Hr/ft2/F	1102.9	1105.9	1150	1129	1188.9	1127.7	1129.7	1164.5	967.9	970.5
COMPUTED H										
Jallouk	953.2	807.1	787.4	768.3	754.2	746.8	740	737.1	731.9	728.5
Szady1(Cudo tube)	1306.6	1194.2	1209	1211	1199.8	1205.2	1211.4	1221.3	1226.5	1235.6
Szady2	1153.1	1005.9	1022.5	1034	1026.9	1020.4	1029.1	1041.1	1054.2	1060.4
(RLIQ)	52775	52639	50904	49042	47174	45247	43471	41577	39764	37852
(F)	1.251	1.793	2.349	2.782	3.151	3.485	3.782	4.07	4.337	4.601
(HLIQ)	204.3	283.9	385.3	456.2	516.4	570.8	619.6	666.3	709.8	752.6
(HBOIL)	1304.9	1188.3	1195.8	1189.1	1167	1160.9	1154.8	1151.2	1141.5	1134.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.3									
DP Liquid Density-lbm/ft3	91.09									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.202	1.149	1.704	2.215	2.714					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.186	1.08	1.666	2.179	2.744					
Actual DP-ft	1.8	2.42	3.56	4.82	5.86					
Measured TP-Psig	52.1				54.8					
Measured Overall-ft	-4.51									
Computed DP-ft	1.65	2.93	4.19	5.52	6.86					
Friction-ft	0.09	0.32	0.68	1.17	1.74					
Acceleration-ft	0.11	0.21	0.32	0.45	0.6					
Elevation-ft	1.45	2.4	3.19	3.9	4.51					

Run#	334									
Test Fluid	R114									
Date:	2/2/93									
Time:	15:34									
Note	TABOREk Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	51.6									
Sat. Temperature-F(inlet)	123.7									
Liq. Density-lbm/ft3	86.29	85.86	85.92	85.92	85.94	85.98	86.03	86.07	86.09	86.16
Latent Heat-Btu/lbm	50.93	50.53	50.59	50.59	50.6	50.64	50.69	50.72	50.74	50.81
Specific Heat-Btu/lbm/F	0.254	0.256	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255
Liq. Viscosity-lbm/ft-hr	0.642	0.63	0.632	0.632	0.632	0.633	0.635	0.636	0.636	0.638
Liq. Conductivity-Btu/hr-ft-F	0.0339	0.0335	0.0336	0.0336	0.0336	0.0336	0.0336	0.0337	0.0337	0.0337
Liq. Prandtl No.	4.82	4.8	4.81	4.81	4.81	4.81	4.81	4.82	4.82	4.82
Inlet Flow Rate-GPM	1.7									
Outlet Liq. Flow Rate-GPM	0									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	116.6									
Outlet Liq. Temperature-F	119.1									
Outlet Vap. Temperature-F	117.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	49.3									
Water outlet Temp.-F	114.3									
Inlet G-lbm/hr/ft2	354230	Temp	109.6	Density	87.31					
Subcooling-F	7.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	861.4	859.1	864.8	860.7	855.3	858.4	860.3	864.6	858.3	861.5
Heat Loss-Watts	18.6	4.4	5.9	7	7.4	6.7	5	5.9	6.7	37.5
Heat Flux-Btu/Hr/ft2	14932	14892	14991	14920	14826	14880	14913	14987	14878	14934
Wall Temp. #3-F	135.4	137	135.4	135.5	137.6	133.7	135	134.6	137.9	137
Wall Temp. #4-F	135.6	134.6	136.5	136.6	135.8	134	134.9	134.7	138	138.4
Wall Temp. #5-F	135.2	132.9	137.1	134.8	134.3	134.3	133.7	133.5	134.7	136.9
Wall Temp. #1-F	71.7	135.1	134.3	134.8	133.6	135.8	135.1	133.6	134.2	133.1
Wall Temp. #2-F	136.2	135.1	134.9	137	134.1	137.9	135	133.2	135.8	135.4
Instream Temp.-F	118.4	122	121.5	121.5	121.4	121	120.6	120.3	120.1	119.5
Avg. Wall Temp.-F	135.6	135.5	135.3	135.4	134.5	134.5	134.7	133.9	136.1	135.8
Avg. Wall DT.-F	16.5	12.8	13.1	13.3	12.4	12.8	13.5	12.9	15.3	15.6
Remaining Subcool-F	-2.6									
Exit Quality	0.01	0.06	0.11	0.16	0.21	0.26	0.3	0.35	0.4	0.45
EXP. H-Btu/Hr/ft2/F	903.6	1165.5	1144.5	1126	1197.6	1164.5	1107.4	1158	969.4	0
COMPUTED H										
Jallouk	856.6	824.8	804.8	785.3	767.7	761.6	755.5	753.3	743.9	739.4
Szady1(Cudo tube)	1178.9	1196.2	1200.8	1202	1202.5	1207.8	1202.8	1209.4	1210	1215.8
Szady2	990.6	1008	1013.7	1014.7	1024.6	1027	1029.2	1025.8	1028.1	1035.5
(RLIQ)	35847	35427	33544	31749	29948	28107	26269	24447	22646	20809
(F)	1.379	2.054	2.739	3.27	3.723	4.134	4.515	4.871	5.205	5.537
(HLIQ)	165.8	243.1	330.6	394.6	449.3	498.7	544.4	587.1	627.3	666.7
(HBOIL)	1177.8	1192.7	1192.4	1197.6	1191.2	1178.8	1164.4	1161.4	1151	1144.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.4									
DP Liquid Density-lbm/ft3	91.08									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.269	1.476	2.088	2.757	3.422					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.253	1.407	2.05	2.721	3.452					
Actual DP-ft	1.69	1.88	2.92	3.91	4.67					
Measured TP-Psig	51.6				54.8					
Measured Overall-ft	5.35									
Computed DP-ft	1.46	2.48	3.47	4.5	5.51					
Friction-ft	0.06	0.22	0.47	0.82	1.23					
Acceleration-ft	0.06	0.14	0.22	0.34	0.48					
Elevation-ft	1.33	2.13	2.77	3.33	3.8					

Run#	365									
Test Fluid	R114									
Date:	3/3/93									
Time:	15:45									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	53.2									
Sat. Temperature-F(inlet)	125.4									
Liq. Density-lbm/ft3	85.88	85.68	85.7	85.67	85.68	85.71	85.76	85.77	85.79	85.82
Latent Heat-Btu/lbm	50.54	50.36	50.37	50.35	50.36	50.38	50.43	50.44	50.46	50.48
Specific Heat-Btu/lbm/F	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256
Liq. Viscosity-lbm/ft-hr	0.63	0.625	0.625	0.624	0.625	0.625	0.627	0.627	0.628	0.629
Liq. Conductivity-Btu/hr-ft-F	0.0335	0.0334	0.0334	0.0334	0.0334	0.0334	0.0335	0.0335	0.0335	0.0335
Liq. Prandtl No.	4.8	4.79	4.79	4.79	4.79	4.79	4.79	4.8	4.8	4.8
Inlet Flow Rate-GPM	0.9									
Outlet Liq. Flow Rate-GPM	0									
Outlet Vap. Flow Rate-GPM	0.6									
Inlet Temperature-F	116.2									
Outlet Liq. Temperature-F	122									
Outlet Vap. Temperature-F	120.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	50.9									
Water outlet Temp.-F	116.2									
Inlet G-lbm/hr/ft2	138149		Temp		107.1 Density		87.6			
Subcooling-F	9.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	861	854.5	870.2	865.6	851.9	854.5	856.3	863.3	862.4	865.9
Heat Loss-Watts	18.9	4.4	6	7.2	7.6	7.1	5.3	6.3	6.9	38.2
Heat Flux-Btu/Hr/ft2	14925	14812	15084	15005	14767	14812	14843	14965	14949	15010
Wall Temp. #3-F	136.4	137.8	136	136.7	139.3	136.1	136.9	136.8	139.1	138.1
Wall Temp. #4-F	136.6	135.4	137.6	137.6	137.6	136.1	136.9	136.9	139.3	137.5
Wall Temp. #5-F	138.1	133.7	138.5	136.3	138	136.5	135.7	135.7	138	138
Wall Temp. #1-F	71.6	136.1	135	136	135.3	138	137.2	135.8	135.7	134.2
Wall Temp. #2-F	137.3	136.1	135.7	138.5	135.7	140	137.1	135.6	137.2	136.6
Instream Temp.-F	121.9	123.5	123.4	123.6	123.5	123.3	122.9	122.8	122.6	122.4
Avg. Wall Temp.-F	136.6	136.4	136.1	136.7	136.2	136.7	136.8	136.2	137.5	136.9
Avg. Wall DT.-F	14	12.2	12	12.4	12	12.7	13.2	12.7	14.2	13.8
Remaining Subcool-F	-9									
Exit Quality	0.05	0.14	0.23	0.32	0.41	0.51	0.6	0.69	0.78	0.88
EXP. H-Btu/Hr/ft2/F	1064.1	1216	1257.7	1212.8	1232.4	1165.8	1125.4	1179.8	1053.9	0
COMPUTED H										
Jallouk	900.2	851.5	837.7	827	805.7	796.8	789.3	787.3	777.8	777.9
Szady1(Cudo tube)	1195	1199.2	1211	1211	1203.9	1207.6	1210.3	1218.1	1210.9	1216.2
Szady2	1006.6	1010.4	1024.1	1023.8	1015.5	1031.9	1032.3	1038.7	1038.8	1031.1
(RLIQ)	19084	17900	16073	14257	12436	10623	8800	6988	5170	3354
(F)	1.791	2.782	3.69	4.417	5.048	5.623	6.168	6.681	7.183	7.677
(HLIQ)	130.4	202.9	269.1	322.1	368.2	410	449.6	486.9	523.3	559.2
(HBOIL)	1194.5	1197.3	1206.6	1203.4	1192.3	1191.6	1189.2	1191.6	1177.4	1175.5

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	75.5				
DP Liquid Density-lbm/ft3	91.07				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.268	1.838	2.562	3.393	4.255
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03
Corrected DP-Psid	0.252	1.769	2.524	3.357	4.285
Actual DP-ft	1.7	1.26	2.15	2.66	3.29
Measured TP-Psig	53.2				57.3
Measured Overall-ft	-6.88				
Computed DP-ft	1.04	1.7	2.31	2.89	3.44
Friction-ft	0.03	0.13	0.27	0.46	0.67
Acceleration-ft	0.03	0.08	0.15	0.25	0.38
Elevation-ft	0.97	1.49	1.88	2.17	2.39

Run#	3									
Test Fluid	R114									
Date:	2/2/99									
Time:	16:43									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	84.6									
Sat. Temperature-F(inlet)	152.5									
Liq. Density-lbm/ft3	82.74	82.51	82.33	82.34	82.34	82.36	82.39	82.46	82.47	82.59
Latent Heat-Btu/lbm	47.55	47.32	47.15	47.16	47.16	47.17	47.21	47.27	47.29	47.4
Specific Heat-Btu/lbm/F	0.264	0.264	0.265	0.265	0.265	0.265	0.265	0.264	0.264	0.264
Liq. Viscosity-lbm/ft-hr	0.553	0.548	0.544	0.545	0.545	0.545	0.546	0.547	0.547	0.55
Liq. Conductivity-Btu/hr-ft-F	0.0314	0.0313	0.0312	0.0312	0.0312	0.0312	0.0312	0.0312	0.0313	0.0313
Liq. Prandtl No.	4.64	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63
Inlet Flow Rate-GPM	5									
Outlet Liq. Flow Rate-GPM	0.2									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	146.1									
Outlet Liq. Temperature-F	147.7									
Outlet Vap. Temperature-F	147									
Water Flow Rate-GPM										
Water Inlet Temp.-F	57.5									
Water outlet Temp.-F	143.7									
Inlet G-lbm/hr/ft2	995558		Temp	141.8	Density	83.43				
Subcooling-F	6.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	849.3	844.2	846.2	841.4	841.6	840.2	845.1	855	838.5	833.2
Heat Loss-Watts	26.6	5.9	8.1	10	10.9	10.9	8.9	9.8	9.8	52
Heat Flux-Btu/Hr/ft2	14722	14634	14668	14585	14589	14564	14649	14821	14535	14443
Wall Temp. #3-F	161.9	163.4	161.6	161.3	163.4	160.3	161.1	160.8	162.2	160.3
Wall Temp. #4-F	162.2	161.1	162.8	161.9	162.3	160.3	161	161.1	162.8	159.8
Wall Temp. #5-F	161.7	159.2	163.9	160.7	160.6	160.9	160.1	160.2	159.9	160.3
Wall Temp. #1-F	74.8	161.7	160.6	160.7	160	162.4	161.1	160.4	159.3	156.9
Wall Temp. #2-F	162.9	161.7	161.2	162.6	160.4	164.3	161.1	159.9	160.8	159
Instream Temp.-F	147.2	149	150.4	150.3	150.3	150.2	149.9	149.4	149.3	148.4
Avg. Wall Temp.-F	162.2	162	161.6	161.2	160.8	161	160.9	160.5	161	159.3
Avg. Wall DT.-F	14.3	12.3	10.5	10.2	9.9	10.1	10.3	10.4	11	10.2
Remaining Subcool-F	3.1									
Exit Quality	-0.02	0	0.02	0.04	0.06	0.07	0.09	0.11	0.13	0.15
EXP. H-Btu/Hr/ft2/F	1028.8	1188.4	1398.7	1431.2	1478.7	1439.6	1419.8	1423.7	1316.2	1416
COMPUTED H										
Jallouk	881.2	883.4	949	821.5	806.8	796.5	790.4	786.5	776.3	769.5
Szady1(Cudo tube)	1296.8	1300.6	1312.4	1314.4	1321.2	1326.8	1337	1350.5	1347.3	1350
Szady2	1132.1	1117.6	1133.1	1151.1	1136	1151.4	1169.3	1171.8	1163.5	1164.8
(RLIQ)	117742	118791	118406	116169	113993	111763	109424	106968	104740	102141
(F)	1.007	1.007	1.412	1.76	2.018	2.236	2.431	2.613	2.777	2.939
(HLIQ)	285.2	285.6	401.2	499.9	573.1	634.9	690.2	741.5	788	833.3
(HBOIL)	1292.2	1296	1299.8	1289.9	1284.2	1276.5	1272.6	1271.5	1250.6	1234.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.5									
DP Liquid Density-lbm/ft3	90.86									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.086	0.546	0.873	1.098	1.338					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.07	0.477	0.835	1.062	1.368					
Actual DP-ft	2.08	3.57	5.14	6.95	8.48					
Measured TP-Psig	84.6				86.6					
Measured Overall-ft	-3.84									
Computed DP-ft	2.13	4.27	6.27	8.31	10.28					
Friction-ft	0.13	0.4	0.8	1.3	1.86					
Acceleration-ft	0.01	0.33	0.49	0.65	0.81					
Elevation-ft	1.98	3.54	4.99	6.36	7.61					

Run#	357.									
Test Fluid	R114									
Date:	3/3/93									
Time:	16:54									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	85.6									
Sat. Temperature-F(Inlet)	153.2									
Liq. Density-lbm/ft3	82.73	82.39	82.21	82.24	82.25	82.22	82.28	82.36	82.38	82.45
Latent Heat-Btu/lbm	47.53	47.21	47.03	47.06	47.07	47.05	47.1	47.17	47.2	47.26
Specific Heat-Btu/lbm/F	0.264	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.264
Liq. Viscosity-lbm/ft-hr	0.553	0.546	0.542	0.543	0.543	0.542	0.543	0.545	0.546	0.547
Liq. Conductivity-Btu/hr-ft-F	0.0314	0.0312	0.0311	0.0311	0.0311	0.0311	0.0311	0.0312	0.0312	0.0312
Liq. Prandtl No.	4.64	4.63	4.62	4.62	4.62	4.62	4.62	4.63	4.63	4.63
Inlet Flow Rate-GPM	4.2									
Outlet Liq. Flow Rate-GPM	0.2									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	146.4									
Outlet Liq. Temperature-F	149									
Outlet Vap. Temperature-F	147.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	59.1									
Water outlet Temp.-F	145.3									
Inlet G-lbm/hr/ft2	837283.		Temp		141	Density	83.54			
Subcooling-F	6.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	856.2	853.4	854.1	850.1	848.6	849	852.3	861.5	846.2	839
Heat Loss-Watts	27	6	8.2	10	10.9	10.9	9.1	10	10	52.9
Heat Flux-Btu/Hr/ft2	14842	14793	14805	14736	14710	14717	14774	14934	14668	14544
Wall Temp. #3-F	162.6	163.9	162.1	162.1	164.6	161.5	162.1	162	163.1	161.7
Wall Temp. #4-F	162.6	162	163.4	162.9	163.4	161.5	162.1	162.1	163.6	161.4
Wall Temp. #5-F	162.1	160.1	164.3	161.5	161.6	162.2	161	161	160.8	161.6
Wall Temp. #1-F	73.9	162	161.2	161.5	161.1	163.8	162.2	161	160.5	158.1
Wall Temp. #2-F	163.7	162.2	162	163.4	161.6	165.4	162.1	160.9	161.8	160.5
Instream Temp.-F	147.3	149.9	151.3	151.1	151	151.2	150.8	150.2	150	149.5
Avg. Wall Temp.-F	162.8	162.5	162.2	162	161.9	162.3	161.9	161.4	162	160.7
Avg. Wall DT.-F	14.8	12	10.2	10.2	10.3	10.4	10.4	10.5	11.3	10.5
Remaining Subcool-F	2.9									
Exit Quality	-0.02	0.01	0.03	0.05	0.07	0.09	0.12	0.14	0.16	0.18
EXP. H-Btu/Hr/ft2/F	1004.2	1237.3	1450.7	1439.9	1433.7	1417.1	1416.2	1418.8	1298.4	1389
COMPUTED H										
Jallouk	901.9	908.1	863.5	833.1	822.9	811	803.3	798.7	787.2	779.4
Szady1(Cudo tube)	1301.7	1310.9	1321.5	1322.5	1326.2	1333.1	1340.2	1351.4	1346.9	1347.8
Szady2	1138.8	1147.1	1143	1145.7	1161	1152.2	1165.8	1181.8	1166.2	1164.1
(RLIQ)	99072.	100347.	99349.	97038.	94781.	92664.	90272.	87789.	85496.	83117.
(F)	1.007.	1.007.	1.554.	1.909.	2.183.	2.415.	2.627.	2.825.	3.005.	3.177.
(HLIQ)	248.3.	248.8.	384.6.	472.3.	540.1	597.6.	649.8.	698.6.	742.9	784.9
(HBOIL)	1298.7.	1307.9	1310.6.	1302.1.	1295.7.	1291.8.	1287.3.	1286.1	1266.9	1252.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.9									
DP Liquid Density-lbm/ft3	90.82									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.138	0.72	1.132	1.479	1.839					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.122	0.651	1.094	1.443	1.869					
Actual DP-ft	1.99	3.27	4.7	6.29	7.51					
Measured TP-Psig	85.6				88.2					
Measured Overall-ft	-4.54									
Computed DP-ft	2.07	3.86	5.54	7.26	8.94					
Friction-ft	0.11	0.37	0.79	1.34	1.98					
Acceleration-ft	0.08	0.27	0.41	0.54	0.68					
Elevation-ft	1.88	3.21	4.35	5.38	6.27					

Run#	363									
Test Fluid	R114									
Date:	3/3/93									
Time:	17:12									
Note	TABORE	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	90.4									
Sat. Temperature-F(inlet)	156.8									
Liq. Density-lbm/ft3	82.34	81.91	81.71	81.72	81.75	81.74	81.74	81.8	81.83	81.88
Latent Heat-Btu/lbm	47.16	46.74	46.55	46.56	46.59	46.57	46.57	46.64	46.66	46.72
Specific Heat-Btu/lbm/F	0.265	0.266	0.266	0.266	0.266	0.266	0.266	0.266	0.266	0.266
Liq. Viscosity-lbm/ft-hr	0.515	0.528	0.532	0.532	0.533	0.533	0.533	0.534	0.534	0.536
Liq. Conductivity-Btu/hr-ft-F	0.0312	0.0309	0.0308	0.0308	0.0308	0.0308	0.0308	0.0308	0.0308	0.0309
Liq. Prandtl No.	1.83	1.61	1.61	1.61	1.61	1.61	1.61	1.61	1.61	1.61
Inlet Flow Rate-GPM	3.4									
Outlet Liq. Flow Rate-GPM	0.2									
Outlet Vap. Flow Rate-GPM	0.6									
Inlet Temperature-F	149.6									
Outlet Liq. Temperature-F	153.3									
Outlet Vap. Temperature-F	152									
Water Flow Rate-GPM										
Water Inlet Temp.-F	61.4									
Water outlet Temp.-F	149.8									
Inlet G-lbm/hr/ft2	675021		Temp		143.7	Density	83.19			
Subcooling-F	7.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	857.5	855.3	850.9	847	852.7	854.4	857.4	862.8	842.4	833.8
Heat Loss-Watts	28.9	6.4	8.5	10	10.7	10.7	9.4	10.4	10.5	55
Heat Flux-Btu/Hr/ft2	14864	14826	14750	14682	14781	14810	14862	14956	14602	14453
Wall Temp. #3-F	165.9	167.7	165.8	165.7	168.5	165.4	166.1	166.1	167.2	165.8
Wall Temp. #4-F	166.3	165.5	166.9	166.5	167.4	165.4	166.1	166.1	167.8	165.4
Wall Temp. #5-F	165.8	163.6	168	165.1	165.6	165.8	165.1	165.1	165	165.6
Wall Temp. #1-F	74.4	165.8	164.8	164.9	164.8	167.4	166.3	165.3	164.5	162.3
Wall Temp. #2-F	167	165.8	165.4	166.9	165.4	169.1	166.1	164.9	166	164.4
Instream Temp.-F	150.3	153.6	155.1	155	154.8	154.9	154.9	154.4	154.2	153.8
Avg. Wall Temp.-F	166.9	166.2	166.7	166.6	166.8	166	165.9	165.5	166.1	164.7
Avg. Wall DT.-F	15.3	11.9	10	8.9	10.3	10.4	10.4	10.4	11.2	10.2
Remaining Subcool-F	2.3									
Exit Quality	-0.01	0.01	0.04	0.07	0.1	0.12	0.15	0.18	0.21	0.23
EXP. H-Btu/Hr/ft2/F	972.9	1242.8	1491.1	1485.1	1430.6	1419.9	1433.4	1434.8	1299.1	1417
COMPUTED H										
Jallouk	931.9	941	884.4	857.8	842.7	836.7	831.6	821.3	806	796.7
Szady1(Cudo tube)	1315.2	1327.9	1334.3	1334.4	1342	1348	1355	1362.2	1351.6	1349.6
Szady2	1152.4	1149.4	1176.9	1171.9	1177.4	1170.5	1183.1	1194	1171.5	1165.8
(RLIQ)	81059	82309	80638	78328	75977	73728	71436	68966	66625	64267
(F)	1.007	1.068	1.737	2.093	2.39	2.64	2.867	3.081	3.276	3.461
(HLIQ)	209.5	227	382.8	438.3	499.1	551.6	598.8	643.4	684	722.2
(HBOIL)	1313.4	1325.7	1325.3	1319.5	1319.6	1316.5	1314.8	1312.5	1290.5	1276.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.1									
DP Liquid Density-lbm/ft3	90.8									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.18	0.897	1.395	1.859	2.343					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.164	0.828	1.357	1.823	2.373					
Actual DP-ft	1.93	2.98	4.27	5.66	6.79					
Measured TP-Psig	90.4				93.7					
Measured Overall-ft	-5.8									
Computed DP-ft	2	3.6	5.11	6.64	8.12					
Friction-ft	0.09	0.3	0.63	1.06	1.57					
Acceleration-ft	0.09	0.21	0.32	0.43	0.55					
Elevation-ft	1.83	3.09	4.16	5.14	6					

Run#	369									
Test Fluid	R114									
Date:	3/3/93									
Time:	17:51									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	81.9									
Sat. Temperature-F(inlet)	150.4									
Liq. Density-lbm/ft3	82.59	82.51	82.51	82.58	82.58	82.56	82.6	82.65	82.68	82.71
Latent Heat-Btu/lbm	47.4	47.32	47.32	47.39	47.39	47.37	47.41	47.46	47.49	47.51
Specific Heat-Btu/lbm/F	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264
Liq. Viscosity-lbm/ft-hr	0.55	0.548	0.548	0.55	0.55	0.549	0.55	0.551	0.552	0.552
Liq. Conductivity-Btu/hr-ft-F	0.0313	0.0313	0.0313	0.0313	0.0313	0.0313	0.0313	0.0314	0.0314	0.0314
Liq. Prandtl No.	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.64	4.64	4.64
Inlet Flow Rate-GPM	2.5									
Outlet Liq. Flow Rate-GPM	0.2									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	146.7									
Outlet Liq. Temperature-F	146.9									
Outlet Vap. Temperature-F	146.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	58.8									
Water outlet Temp.-F	142.1									
Inlet G-lbm/hr/ft2	519953		Temp		138.9	Density	83.8			
Subcooling-F	3.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	859.8	861	851.8	847.8	855.9	856.1	863.2	863.4	843.6	837.5
Heat Loss-Watts	25.3	5.8	7.9	10	11	11	8.7	9.6	9.6	51.7
Heat Flux-Btu/Hr/ft2	14904	14925	14765	14696	14836	14840	14963	14966	14623	14518
Wall Temp. #3-F	159.9	161.8	159.7	159.7	162.7	159.5	160.1	160.2	161.6	160.3
Wall Temp. #4-F	160	159.4	161	160.7	161.4	159.5	160.1	160.4	162.1	159.7
Wall Temp. #5-F	159.5	157.5	162.1	159.2	159.5	160	159.1	159.3	159	160.8
Wall Temp. #1-F	74.8	159.6	158.8	159.1	158.8	161.5	160.3	159.4	158.7	156.8
Wall Temp. #2-F	161	159.8	159.5	161.3	159.3	163.6	160.2	159	160.1	158.9
Instream Temp.-F	148.4	149	149	148.5	148.5	148.6	148.3	147.9	147.7	147.5
Avg. Wall Temp.-F	160.1	160.2	159.8	159.7	159.8	160.1	160	159.7	160.3	159.1
Avg. Wall DT.-F	11	10.5	10.1	10.5	10.6	10.9	11	11.1	11.9	10.9
Remaining Subcool-F	-2.6									
Exit Quality	0.01	0.05	0.09	0.12	0.16	0.19	0.23	0.26	0.3	0.33
EXP. H-Btu/Hr/ft2/F	1351.7	1424.7	1464.4	1398.2	1402.4	1367.2	1362.3	1350.3	1224.8	1332
COMPUTED H										
Jallouk	918.1	888.4	863.7	842.7	830.8	825.3	822.1	815.9	798.2	790.9
Szady1(Cudo tube)	1308.9	1314.2	1309.9	1307.9	1317.5	1321.9	1330.1	1333.2	1322.8	1322.8
Szady2	1148.7	1150.9	1129.1	1128.2	1139.6	1160.7	1167	1166.5	1145.1	1152.9
(RLIQ)	61405	60029	57837	55524	53349	51190	48923	46631	44418	42244
(F)	1.346	1.83	2.279	2.636	2.941	3.213	3.469	3.711	3.933	4.142
(HLIQ)	227	308.8	384.5	444.6	495.9	541.9	584.9	625.5	662.9	698
(HBOIL)	1306.6	1308.5	1298.8	1290.5	1293.6	1290.8	1291.3	1285.6	1264.8	1254.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.5									
DP Liquid Density-lbm/ft3	90.75									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.205	1.21	1.784	2.365	2.949					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.189	1.141	1.745	2.329	2.979					
Actual DP-ft	1.67	2.4	3.54	4.72	5.65					
Measured TP-Psig	81.9				85.7					
Measured Overall-ft	-6.62									
Computed DP-ft	1.63	2.92	4.17	5.45	6.69					
Friction-ft	0.1	0.31	0.63	1.04	1.51					
Acceleration-ft	0.11	0.19	0.28	0.39	0.51					
Elevation-ft	1.43	2.42	3.26	4.02	4.67					

Run#										
Test Fluid	R114									
Date:	3/3/93									
Time:	17:54									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	78.9									
Sat. Temperature-F(inlet)	148.1									
Liq. Density-lbm/ft3	83.03	82.77	82.82	82.85	82.86	82.86	82.89	82.94	82.95	82.94
Latent Heat-Btu/lbm	47.62	47.57	47.62	47.65	47.66	47.66	47.68	47.73	47.75	47.73
Specific Heat-Btu/lbm/F	0.263	0.264	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263
Liq. Viscosity-lbm/ft-hr	0.559	0.554	0.555	0.555	0.556	0.556	0.556	0.557	0.557	0.557
Liq. Conductivity-Btu/hr-ft-F	0.0316	0.0315	0.0315	0.0315	0.0315	0.0315	0.0315	0.0316	0.0316	0.0316
Liq. Prandtl No.	4.65	4.64	4.64	4.64	4.64	4.64	4.65	4.65	4.65	4.65
Inlet Flow Rate-GPM	1.8									
Outlet Liq. Flow Rate-GPM	0									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	143.7									
Outlet Liq. Temperature-F	145									
Outlet Vap. Temperature-F	143.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	58.6									
Water outlet Temp.-F	140.7									
Inlet G-lbm/hr/ft2	362324		Temp		134.5	Density		84.35		
Subcooling-F	4.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	867.4	864.2	864.4	859.8	854.6	854.9	863.9	870.1	856.4	850.1
Heat Loss-Watts	24	5.7	7.7	9.7	10.8	10.8	8.5	9.3	9.4	50.9
Heat Flux-Btu/Hr/ft2	15036	14980	14984	14904	14814	14819	14975	15083	14845	14736
Wall Temp. #3-F	157.7	159.7	157.6	157.9	160.5	157.6	158.3	158.3	159.9	158.7
Wall Temp. #4-F	158	157.1	159.1	158.9	159.3	157.6	158.3	158.5	160.5	158.3
Wall Temp. #5-F	157.4	155.3	160	157.4	157.6	158.2	157.3	157.4	157.2	158.7
Wall Temp. #1-F	74.6	157.5	156.6	157.1	156.7	159.6	158.4	157.7	156.8	154.9
Wall Temp. #2-F	158.6	157.5	157.3	159.5	157.2	161.3	158.3	157.2	158.3	157.2
Instream Temp.-F	145	147	146.6	146.4	146.3	146.3	146.1	145.7	145.6	145.7
Avg. Wall Temp.-F	157.9	159	157.7	157.8	157.7	158.3	158.1	157.8	158.5	157.6
Avg. Wall DT.-F	12.2	10.3	10.4	10.8	10.7	11.3	11.3	11.4	12.3	11.2
Remaining Subcool-F	-4.9									
Exit Quality	0.03	0.08	0.13	0.18	0.23	0.28	0.33	0.38	0.43	0.48
EXP. H-Btu/Hr/ft2/F	1227.9	1458.2	1444.5	1386.2	1380.5	1313.7	1320.2	1318.6	1210	1316.8
COMPUTED H										
Jallouk	943.1	904.3	880.4	865.9	848.9	838.8	829.7	827.3	816.8	811.1
Szady1(Cudo tube)	1310.7	1306.9	1307.2	1305	1303.1	1306.1	1315	1321.3	1314.4	1314
Szady2	1139.1	1145	1144	1139.7	1121.7	1126	1138.5	1144	1150.5	1145.8
(RLIQ)	41819	40580	38329	36124	33953	31808	29622	27395	25225	23106
(F)	1.503	2.109	2.656	3.093	3.468	3.803	4.117	4.419	4.697	4.955
(HLIQ)	189.3	266.1	334.9	390	437.3	479.6	519.1	556.9	591.9	624.4
(HBOIL)	1309.3	1303.2	1299.8	1293.3	1286.5	1284.2	1287.5	1287.4	1273.1	1265.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.5									
DP Liquid Density-lbm/ft3	90.75									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.262	1.502	2.154	2.864	3.566					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.246	1.433	2.116	2.828	3.596					
Actual DP-ft	1.76	1.89	2.89	3.84	4.56					
Measured TP-Psig	78.9				83.3					
Measured Overall-ft	-7.64									
Computed DP-ft	1.37	2.39	3.35	4.31	5.25					
Friction-ft	0.07	0.23	0.46	0.77	1.12					
Acceleration-ft	0.07	0.13	0.21	0.3	0.41					
Elevation-ft	1.23	2.03	2.68	3.24	3.72					

Run#	371									
Test Fluid	R114									
Date:	2/3/99									
Time:	18:05									
Note	TABOREK Analytical pt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	77.7									
Sat. Temperature-F(inlet)	147.1									
Liq. Density-lbm/ft3	82.95	82.86	82.9	82.94	82.94	82.91	82.94	82.98	82.99	83.03
Latent Heat-Btu/lbm	47.75	47.66	47.7	47.73	47.73	47.71	47.73	47.77	47.78	47.82
Specific Heat-Btu/lbm/F	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263
Liq. Viscosity-lbm/ft-hr	0.557	0.556	0.556	0.557	0.557	0.557	0.557	0.558	0.558	0.559
Liq. Conductivity-Btu/hr-ft-F	0.0316	0.0315	0.0315	0.0316	0.0316	0.0315	0.0316	0.0316	0.0316	0.0316
Liq. Prandtl No.	4.65	4.64	4.65	4.65	4.65	4.65	4.65	4.65	4.65	4.65
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	141.4									
Outlet Liq. Temperature-F	144.8									
Outlet Vap. Temperature-F	143.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	58.9									
Water outlet Temp.-F	140.8									
Inlet G-lbm/hr/ft2	203103		Temp	128.3	Density	85.11				
Subcooling-F	5.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	861.1	858.8	855.8	851.2	852.2	852.2	857.4	865.1	848.3	841.7
Heat Loss-Watts	23.9	5.6	7.7	9.6	10.7	10.7	8.4	9.3	9.4	50.9
Heat Flux-Btu/Hr/ft2	14927	14887	14835	14755	14772	14772	14862	14996	14705	14590
Wall Temp. #3-F	156.7	158.9	156.8	157.2	160	157	158.1	158.1	159.7	159
Wall Temp. #4-F	157.1	156.5	158.4	158.2	158.7	157.1	158.1	158.1	160.2	158.6
Wall Temp. #5-F	156.6	154.6	159.5	156.7	156.8	157.6	157.1	157.1	157.1	158.3
Wall Temp. #1-F	75.2	156.7	155.8	156.5	156	159	158.3	157.3	156.4	154.5
Wall Temp. #2-F	157.8	156.7	156.5	158.8	156.5	160.9	158.1	157	158.1	156.9
Instream Temp.-F	145.6	146.3	146	145.7	145.7	145.9	145.7	145.4	145.3	145
Avg. Wall Temp.-F	157.1	157.2	156.9	157.2	157	157.7	157.9	157.5	158.3	157.5
Avg. Wall DT.-F	10.2	10.2	10.2	10.3	10.6	11.1	11.6	11.4	12.3	11.8
Remaining Subcool-F	-10.6									
Exit Quality	0.06	0.15	0.24	0.33	0.42	0.51	0.6	0.69	0.78	0.86
EXP. H-Btu/Hr/ft2/F	1385.2	1455.6	1453.7	1368.3	1389.4	1330	1284.8	1310.6	1192.1	1236
COMPUTED H										
Jallouk	981	928.9	903.6	885	874.7	873.8	867.9	865.1	850.9	844
Szady1(Cudo tube)	1296.8	1298.8	1296.2	1292.6	1294.8	1297.3	1302.2	1308.8	1298.1	1294.6
Szady2	1135.8	1138.8	1133	1127.8	1129.2	1114.1	1120.1	1127.9	1117.7	1114.7
(RLIQ)	23132	21436	19258	17095	14966	12850	10702	8537	6397	4286
(F)	1.798	2.665	3.398	3.993	4.509	4.974	5.419	5.852	6.262	6.669
(HLIQ)	142.6	211.5	269.5	316.7	357.6	394.5	429.8	464	496.5	528.6
(HBOIL)	1296.2	1296.9	1292.3	1286.2	1285.7	1285	1286.4	1289	1273.4	1264.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.7									
DP Liquid Density-lbm/ft3	90.73									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.241	1.837	2.593	3.459	4.324					
Zero Corrections-psid	0.016	0.069	0.038	0.036	-0.03					
Corrected DP-Psid	0.225	1.768	2.555	3.423	4.354					
Actual DP-ft	1.8	1.3	2.13	2.81	3.24					
Measured TP-Psig	77.7				83					
Measured Overall-ft	-9.19									
Computed DP-ft	1.07	1.79	2.42	3.02	3.56					
Friction-ft	0.04	0.13	0.26	0.43	0.61					
Acceleration-ft	0.04	0.08	0.14	0.22	0.32					
Elevation-ft	1	1.58	2.02	2.37	2.63					

Run#	372									
Test Fluid	P114									
Date:	3/5/93									
Time:	11:59									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	113.7									
Sat. Temperature-F(inlet)	172.4									
Liq. Density-lbm/ft3	79.86	79.73	79.52	79.48	79.52	79.52	79.51	79.59	79.61	79.69
Latent Heat-Btu/lbm	44.75	44.63	44.42	44.38	44.42	44.42	44.41	44.49	44.5	44.59
Specific Heat-Btu/lbm/F	0.271	0.271	0.272	0.272	0.272	0.272	0.272	0.271	0.271	0.271
Liq. Viscosity-lbm/ft-hr	0.499	0.497	0.494	0.493	0.494	0.494	0.493	0.495	0.495	0.496
Liq. Conductivity-Btu/hr-ft-F	0.0296	0.0295	0.0294	0.0293	0.0294	0.0294	0.0294	0.0294	0.0294	0.0295
Liq. Prandtl No.	4.57	4.57	4.56	4.56	4.56	4.56	4.56	4.57	4.57	4.57
Inlet Flow Rate-GPM	5.2									
Outlet Liq. Flow Rate-GPM	3									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	167.4									
Outlet Liq. Temperature-F	103.6									
Outlet Vap. Temperature-F	168.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	75.2									
Water outlet Temp.-F	165.4									
Inlet G-lbm/hr/ft2	1002821		Temp	161.8	Density	80.81				
Subcooling-F	5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	869.9	864.7	869.5	870	858.1	860.6	867.3	857.9	857.5	870.3
Heat Loss-Watts	40.3	8.6	10.7	10	9.9	9.8	11.2	12.8	13.7	67.3
Heat Flux-Btu/Hr/ft2	15079	14989	15072	15081	14875	14918	15034	14871	15038	15086
Wall Temp. #3-F	182.3	184.5	183.1	183.2	185.5	184.3	183.8	184	183.9	183
Wall Temp. #4-F	182.7	182.2	184.3	184.1	184.4	184.3	184.2	185	184.8	182.7
Wall Temp. #5-F	181.8	180.6	185.2	183.8	182.9	184.9	183.2	183.4	181.8	182.7
Wall Temp. #1-F	70.1	183.3	182.1	183.1	182.5	186.5	184.4	184.4	181.4	179.2
Wall Temp. #2-F	183.3	183.3	182.7	184.6	182.7	187.8	184.8	184.8	182.5	181.4
Instream Temp.-F	168.7	169.6	171.1	171.4	171.1	171.1	171.2	170.6	170.5	169.9
Avg. Wall Temp.-F	182.5	183.3	183.1	183.6	183.1	185	184.1	184.3	182.8	181.8
Avg. Wall DT.-F	13.1	13	11.3	11.5	11.4	13.2	12.2	13	11.7	11.2
Remaining Subcool-F	1.8									
Exit Quality	-0.01	0.01	0.03	0.05	0.07	0.09	0.11	0.13	0.15	0.17
EXP. H-Btu/Hr/ft2/F	1147.3	1148.8	1337.5	1315	1310.2	1127.9	1232.2	1139.7	1289.6	0
COMPUTED H										
Jallouk	956.2	955.3	906.7	885.1	862.7	852.9	846.9	833.7	830.2	823.3
Szady1(Cudo tube)	1403.8	1403.3	1418.7	1425.3	1419.9	1427.5	1439.1	1436	1449.7	1456.8
Szady2	1234.4	1290.5	1283.6	1270	1262.5	1269.1	1280	1278.6	1288.6	1291.8
(RLIQ)	131421	131966	130384	127930	125185	122530	119967	117030	114371	111443
(F)	1.006	1.006	1.531	1.807	2.027	2.216	2.383	2.542	2.686	2.828
(HLIQ)	291.1	291.2	443.4	523.5	587.3	641.7	690.3	736.2	777.9	818.8
(HBOIL)	1399.7	1399.1	1404.1	1401.3	1385.5	1382.9	1384.1	1368.3	1370.8	1365
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	71.5									
DP Liquid Density-lbm/ft3	91.49									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.13	0.629	1.005	1.296	1.62					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.121	0.585	0.976	1.278	1.694					
Actual DP-ft	2.08	3.54	5.13	6.88	8.28					
Measured TP-Psig	113.7				115.8					
Measured Overall-ft	-3.79									
Computed DP-ft	2.17	4.24	6.24	8.26	10.21					
Friction-ft	0.17	0.46	0.85	1.33	1.87					
Acceleration-ft	0.13	0.34	0.49	0.64	0.79					
Elevation-ft	1.87	3.44	4.89	6.29	7.56					

Run#	373									
Test Fluid	R114									
Date:	3/5/93									
Time:	13:06									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	113.6									
Sat. Temperature-F(inlet)	172.4									
Liq. Density-lbm/ft3	79.56	79.46	79.42	79.41	79.48	79.45	79.41	79.48	79.51	79.63
Latent Heat-Btu/lbm	44.46	44.37	44.32	44.31	44.38	44.35	44.31	44.38	44.41	44.53
Specific Heat-Btu/lbm/F	0.271	0.272	0.272	0.272	0.272	0.272	0.272	0.272	0.272	0.271
Liq. Viscosity-lbm/ft-hr	0.494	0.493	0.492	0.492	0.493	0.493	0.492	0.493	0.493	0.495
Liq. Conductivity-Btu/hr-ft-F	0.0294	0.0293	0.0293	0.0293	0.0293	0.0293	0.0293	0.0293	0.0294	0.0294
Liq. Prandtl No.	4.57	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.57
Inlet Flow Rate-GPM	4.4									
Outlet Liq. Flow Rate-GPM	2.3									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	169.9									
Outlet Liq. Temperature-F	104.3									
Outlet Vap. Temperature-F	168.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	72.9									
Water outlet Temp.-F	164.6									
Inlet G-lbm/hr/ft2	845670		Temp	163.8	Density	80.54				
Subcooling-F	2.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	854.3	853.3	868.8	868.9	857.8	859.7	854.9	835.5	868.3	870.7
Heat Loss-Watts	40.1	8.5	10.6	10	9.9	9.8	11.2	12.8	13.8	67.1
Heat Flux-Btu/hr/ft2	14809	14791	15060	15062	14869	14902	14819	14483	15017	15093
Wall Temp. #3-F	182.3	184.2	183	183.6	185.7	184.7	184.5	184.4	184.5	183
Wall Temp. #4-F	182.7	182.1	184.4	184.5	184.8	184.7	184.8	185.5	185.3	182.8
Wall Temp. #5-F	181.7	180.5	185.2	183.8	183.2	185.5	183.8	183.9	182.4	183.1
Wall Temp. #1-F	69.9	183.3	182	183.2	182.7	186.8	185.2	185	181.9	179.2
Wall Temp. #2-F	183.2	183.1	182.8	184.8	183.1	188.2	185.5	185.3	183.1	181.3
Instream Temp.-F	170.8	171.5	171.8	171.9	171.4	171.6	171.9	171.4	171.2	170.3
Avg. Wall Temp.-F	182.5	183.2	183.1	183.8	183.5	185.4	184.8	184.8	183.4	181.9
Avg. Wall DT.-F	11	11	10.6	11.2	11.4	13.2	12.2	12.8	11.6	10.9
Remaining Subcool-F	-1.3									
Exit Quality	0.01	0.03	0.05	0.08	0.1	0.12	0.15	0.17	0.19	0.22
EXP. H-Btu/Hr/ft2/F	1345.5	1343.9	1424.9	1345.5	1306.9	1133.1	1215.7	1134.5	1298.9	0
COMPUTED H										
Jallouk	947.1	919.9	903.8	888.9	872.4	859.1	849.6	833.2	839.4	832.9
Szady1(Cudo tube)	1399.9	1404.6	1422.3	1427	1420.6	1427.7	1430	1418.3	1447.3	1453.6
Szady2	1249.9	1249.4	1287.9	1272.1	1263.6	1269.9	1270.7	1254.7	1285.7	1290.2
(RLIQ)	111451	110062	107595	104987	102132	99613	97139	94348	91678	89677
(F)	1.214	1.643	1.856	2.103	2.317	2.501	2.667	2.828	2.976	3.13
(HLIQ)	306.9	390	469.3	531.7	585.6	632.3	674.5	714.8	752.3	790.7
(HBOIL)	1395	1394.5	1405.1	1401.9	1386.7	1385.1	1378.1	1355	1376	1371
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	72.1									
DP Liquid Density-lbm/ft3	91.43									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.188	0.864	1.321	1.736	2.18					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.179	0.82	1.292	1.718	2.254					
Actual DP-ft	1.97	3.11	4.55	6.08	7.26					
Measured TP-Psig	113.6				116.4					
Measured Overall-ft	-5.06									
Computed DP-ft	1.97	3.69	5.39	7.11	8.79					
Friction-ft	0.18	0.51	0.96	1.52	2.15					
Acceleration-ft	0.19	0.32	0.45	0.57	0.7					
Elevation-ft	1.6	2.86	3.98	5.02	5.93					

Run#	374									
Test Fluid	R114									
Date:	3/5/93									
Time:	13:36									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	111.8									
Sat. Temperature-F(inlet)	171.2									
Liq. Density-lbm/ft3	79.82	79.63	79.61	79.63	79.68	79.63	79.58	79.65	79.69	79.76
Latent Heat-Btu/lbm	44.71	44.53	44.5	44.53	44.57	44.53	44.48	44.54	44.59	44.65
Specific Heat-Btu/lbm/F	0.271	0.271	0.271	0.271	0.271	0.271	0.271	0.271	0.271	0.271
Liq. Viscosity-lbm/ft-hr	0.498	0.495	0.495	0.495	0.496	0.495	0.495	0.496	0.496	0.498
Liq. Conductivity-Btu/hr-ft-F	0.0296	0.0294	0.0294	0.0294	0.0295	0.0294	0.0294	0.0295	0.0295	0.0295
Liq. Prandtl No.	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57
Inlet Flow Rate-GPM	3.5									
Outlet Liq. Flow Rate-GPM	2.1									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	167.9									
Outlet Liq. Temperature-F	104.3									
Outlet Vap. Temperature-F	167.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	75.6									
Water outlet Temp.-F	164.5									
Inlet G-lbm/hr/ft2	676337		Temp	160.6	Density	80.97				
Subcooling-F	3.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	865.2	861.5	873.8	874.1	861.2	865.9	863.7	844.5	871.7	877.9
Heat Loss-Watts	39.5	8.4	10.5	10	9.9	9.9	11.1	12.7	13.6	66.8
Heat Flux-Btu/Hr/ft2	14998	14934	15147	15152	14928	15010	14972	14639	15110	15218
Wall Temp. #3-F	181	182.9	181.8	182.6	184.5	183.9	183.3	183.4	183.5	182.3
Wall Temp. #4-F	181.6	180.8	183	183.4	183.8	183.9	183.8	184.3	184.2	182.1
Wall Temp. #5-F	180.4	179.5	184	182.6	182.1	184.4	182.9	183	181.3	182.8
Wall Temp. #1-F	70.3	182	181	182.1	181.6	185.5	184	184.1	180.8	178.9
Wall Temp. #2-F	182	182	181.4	183.7	182	187	184.4	184.2	182.2	180.6
Instream Temp.-F	169	170.3	170.5	170.3	170	170.3	170.7	170.2	169.9	169.4
Avg. Wall Temp.-F	181.3	181.9	181.8	182.7	182.4	184.4	183.7	183.8	182.4	181.1
Avg. Wall DT.-F	11.6	11	10.6	11.7	11.7	13.4	12.3	12.9	11.8	11
Remaining Subcool-F	-1.5									
Exit Quality	0.01	0.04	0.07	0.1	0.13	0.16	0.18	0.21	0.24	0.27
EXP. H-Btu/Hr/ft2/F	1296	1363.8	1426.9	1296.1	1275.9	1116.2	1216.9	1131.4	1278.7	0
COMPUTED H										
Jallouk	971.4	947	925.4	905.7	882	878.5	872.5	849.6	855.2	850.5
Szady1(Cudo tube)	1400.6	1404.7	1418.5	1421.1	1413	1421.7	1425.3	1412.5	1437.2	1445
Szady2	1229.5	1228.9	1244.4	1245.4	1255.6	1264.4	1267.5	1251.4	1277.6	1284.5
(RLIQ)	88362	87201	84671	81961	79238	76748	74281	71538	68869	66080
(F)	1.23	1.606	1.972	2.258	2.503	2.713	2.903	3.088	3.26	3.43
(HLIQ)	259.7	339.4	416.6	477.2	528.7	573.3	613.6	652.4	688.7	724.5
(HBOIL)	1397.6	1398.1	1406.4	1402.9	1387.9	1389.9	1386.4	1364.5	1382.5	1381.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	72.4									
DP Liquid Density-lbm/ft3	91.4									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.202	1.033	1.558	2.074	2.633					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.193	0.989	1.529	2.056	2.707					
Actual DP-ft	1.94	2.8	4.12	5.46	6.43					
Measured TP-Psig	111.8				114.8					
Measured Overall-ft	-5.42									
Computed DP-ft	1.84	3.39	4.91	6.44	7.91					
Friction-ft	0.13	0.37	0.72	1.16	1.65					
Acceleration-ft	0.14	0.24	0.34	0.44	0.57					
Elevation-ft	1.57	2.78	3.85	4.83	5.7					

Run#	375									
Test Fluid	R114									
Date:	3/5/93									
Time:	13:46									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	112.5									
Sat. Temperature-F(inlet)	171.7									
Liq. Density-lbm/ft3	79.77	79.55	79.49	79.52	79.56	79.55	79.51	79.55	79.55	79.68
Latent Heat-Btu/lbm	44.67	44.45	44.39	44.42	44.46	44.45	44.41	44.45	44.45	44.57
Specific Heat-Btu/lbm/F	0.271	0.272	0.272	0.272	0.271	0.272	0.272	0.272	0.272	0.271
Liq. Viscosity-lbm/ft-hr	0.498	0.494	0.493	0.494	0.494	0.494	0.493	0.494	0.494	0.496
Liq. Conductivity-Btu/hr-ft-F	0.0295	0.0294	0.0294	0.0294	0.0294	0.0294	0.0294	0.0294	0.0294	0.0295
Liq. Prandtl No.	4.57	4.57	4.56	4.56	4.57	4.57	4.56	4.57	4.57	4.57
Inlet Flow Rate-GPM	2.7									
Outlet Liq. Flow Rate-GPM	1.7									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	168.6									
Outlet Liq. Temperature-F	104.5									
Outlet Vap. Temperature-F	168.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	76.5									
Water outlet Temp.-F	165.7									
Inlet G-lbm/hr/ft2	522704		Temp	159.5	Density	81.12				
Subcooling-F	3.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	868.2	865.2	874.7	874.3	864.5	867.8	867.2	850.2	871.4	875.9
Heat Loss-Watts	39.7	8.4	10.6	10	9.9	9.8	11.2	12.8	13.7	67
Heat Flux-Btu/Hr/ft2	15050	14998	15162	15155	14986	15043	15032	14738	15105	15183
Wall Temp. #3-F	181.5	183.2	182.3	183	185	184.3	184	184.1	184.2	182.9
Wall Temp. #4-F	182	181.3	183.4	183.8	184.4	184.3	184.5	185.2	184.9	182.8
Wall Temp. #5-F	181	179.8	184.5	183.2	182.6	184.8	183.4	183.7	182.2	182.8
Wall Temp. #1-F	71.1	182.6	181.4	182.7	182	186.3	185	184.9	181.7	179
Wall Temp. #2-F	182.6	182.4	182	184.2	182.4	187.8	185.2	185.2	182.7	181.2
Instream Temp.-F	169.3	170.9	171.3	171.1	170.8	170.9	171.2	170.9	170.9	170
Avg. Wall Temp.-F	181.8	182.4	182.3	183.2	182.9	184.9	184.4	184.6	183.1	181.7
Avg. Wall DT.-F	11.8	10.8	10.3	11.4	11.4	13.3	12.5	13.1	11.6	11.1
Remaining Subcool-F	-3.2									
Exit Quality	0.02	0.06	0.1	0.13	0.17	0.21	0.25	0.28	0.32	0.36
EXP. H-Btu/Hr/ft2/F	1276	1389	1473.5	1330.6	1317.7	1127.2	1198.7	1129	1307	0
COMPUTED H										
Jallouk	988.4	958.4	949.2	928.5	907.1	892.1	887.4	874	879.2	874.2
Szady1(Cudo tube)	1403.9	1409.4	1420.8	1422	1415.5	1421.3	1425	1413.4	1433.6	1437.5
Szady2	1233.7	1234.4	1247	1246.8	1259.6	1265.4	1268.9	1255	1276.4	1279.1
(RLIQ)	68083	66570	64061	61353	58637	56044	53493	50820	48215	45384
(F)	1.361	1.802	2.196	2.514	2.788	3.028	3.245	3.453	3.645	3.847
(HLIQ)	233.8	309.9	377.7	432.4	479.5	520.8	558.2	593.9	626.9	661.2
(HBOIL)	1401.7	1404.3	1411.9	1408.6	1396.9	1397.6	1395.8	1377.5	1392.5	1389.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	72.6									
DP Liquid Density-lbm/ft3	91.38									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.245	1.26	1.851	2.513	3.162					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.238	1.216	1.822	2.495	3.236					
Actual DP-ft	1.87	2.39	3.59	4.67	5.48					
Measured TP-Psig	112.5				116.2					
Measured Overall-ft	-6.69									
Computed DP-ft	1.65	2.97	4.23	5.49	6.69					
Friction-ft	0.1	0.3	0.58	0.95	1.35					
Acceleration-ft	0.1	0.18	0.26	0.35	0.46					
Elevation-ft	1.45	2.49	3.39	4.19	4.88					

Run#	376									
Test Fluid	R114									
Date:	3/5/93									
Time:	13:53									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	114									
Sat. Temperature-F(Inlet)	172.6									
Liq. Density-lbm/ft3	79.58	79.29	79.31	79.35	79.39	79.36	79.32	79.35	79.35	79.45
Latent Heat-Btu/lbm	44.48	44.2	44.21	44.26	44.3	44.27	44.23	44.26	44.26	44.35
Specific Heat-Btu/lbm/F	0.271	0.272	0.272	0.272	0.272	0.272	0.272	0.272	0.272	0.272
Liq. Viscosity-lbm/ft-hr	0.495	0.49	0.49	0.491	0.492	0.491	0.491	0.491	0.491	0.493
Liq. Conductivity-Btu/hr-ft-F	0.0294	0.0292	0.0292	0.0293	0.0293	0.0293	0.0292	0.0293	0.0293	0.0293
Liq. Prandtl No.	4.57	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56
Inlet Flow Rate-GPM	1.9									
Outlet Liq. Flow Rate-GPM	1.4									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	169.6									
Outlet Liq. Temperature-F	104.8									
Outlet Vap. Temperature-F	170.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	76.8									
Water outlet Temp.-F	167.1									
Inlet G-lbm/hr/ft2	368987		Temp	157.6	Density	81.38				
Subcooling-F	3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	865	862.2	875.6	876.7	863.5	866.8	862.5	845.6	875	879.1
Heat Loss-Watts	40.3	8.5	10.7	10	9.9	9.8	11.3	12.9	13.9	67.5
Heat Flux-Btu/Hr/ft2	14994	14946	15178	15197	14968	15025	14951	14658	15168	15239
Wall Temp. #3-F	182.7	184.3	183.4	184	186.3	185.7	185.2	185.1	185.3	183.9
Wall Temp. #4-F	183.2	182.5	184.6	185	185.3	185.5	185.7	186.1	186	183.6
Wall Temp. #5-F	182.1	181	185.7	184	183.7	188.1	184.7	184.4	182.9	183.4
Wall Temp. #1-F	71.9	183.6	182.1	183.4	183.2	187.3	186.1	185.9	182.6	179.9
Wall Temp. #2-F	183.6	183.2	183	185	183.3	188.8	186.4	186.4	184	181.9
Instream Temp.-F	170.7	172.7	172.6	172.3	172	172.2	172.5	172.3	172.3	171.6
Avg. Wall Temp.-F	182.9	183.4	183.3	184.1	183.9	186.2	185.6	185.6	184.2	182.5
Avg. Wall DT.-F	11.5	10	10	11.1	11.2	13.3	12.4	12.6	11.2	10.3
Remaining Subcool-F	-5.8									
Exit Quality	0.04	0.09	0.14	0.2	0.25	0.31	0.36	0.41	0.47	0.52
EXP. H-Btu/Hr/ft2/F	1301.3	1490.9	1519.5	1367.5	1336.6	1132.2	1201.4	1161.7	1357.3	0
COMPUTED H										
Jallouk	1014.8	985.2	971	954.5	938.1	929	917.7	898.8	909.6	897.9
Szady1(Cudo tube)	1406.4	1413.1	1425.1	1426.4	1416.2	1421.5	1421.2	1408.9	1435	1438.2
Szady2	1233.2	1260.1	1272.5	1278.3	1262	1267.6	1267.1	1253	1260.8	1283.1
(RLIQ)	47944	46203	43526	40785	38071	35462	32866	30224	27592	24831
(F)	1.612	2.064	2.513	2.889	3.214	3.498	3.757	4.004	4.236	4.479
(HLIQ)	196.8	267.6	327.4	376.4	418.6	455.7	489.4	521.5	551.8	583.3
(HBOIL)	1405.2	1409.9	1419.4	1417.6	1403.9	1405.8	1401.6	1384.7	1407.3	1405.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	72.9									
DP Liquid Density-lbm/ft3	91.35									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.248	1.545	2.206	2.982	3.784					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.239	1.501	2.177	2.964	3.858					
Actual DP-ft	1.87	1.88	2.95	3.83	4.96					
Measured TP-Psig	114				118.5					
Measured Overall-ft	-8.16									
Computed DP-ft	1.39	2.45	3.43	4.38	5.28					
Friction-ft	0.07	0.21	0.42	0.68	0.98					
Acceleration-ft	0.07	0.12	0.19	0.26	0.36					
Elevation-ft	1.25	2.11	2.82	3.43	3.94					

Run#	377									
Test Fluid	R114									
Date:	3/5/93									
Time:	14:05									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	123.6									
Sat. Temperature-F(inlet)	178.4									
Liq. Density-lbm/ft3	78.7	78.4	78.43	78.38	78.41	78.4	78.38	78.43	78.43	78.5
Latent Heat-Btu/lbm	43.63	43.33	43.36	43.31	43.34	43.33	43.31	43.36	43.36	43.43
Specific Heat-Btu/lbm/F	0.274	0.274	0.274	0.274	0.274	0.274	0.274	0.274	0.274	0.274
Liq. Viscosity-lbm/ft-hr	0.481	0.477	0.477	0.476	0.477	0.477	0.476	0.477	0.477	0.478
Liq. Conductivity-Btu/hr-ft-F	0.0289	0.0287	0.0287	0.0287	0.0287	0.0287	0.0287	0.0287	0.0287	0.0287
Liq. Prandtl No.	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56
Inlet Flow Rate-GPM	1.1									
Outlet Liq. Flow Rate-GPM	1.7									
Outlet Vap. Flow Rate-GPM	0.6									
Inlet Temperature-F	173									
Outlet Liq. Temperature-F	107									
Outlet Vap. Temperature-F	177.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	78.1									
Water outlet Temp.-F	174.8									
Inlet G-lbm/hr/ft2	214220		Temp	155.9	Density	81.6				
Subcooling-F	5.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	871.6	871.4	859.9	856.9	862.5	866.4	865.5	868.4	867.6	99.8
Heat Loss-Watts	42.9	9	11.1	10	9.7	9.6	11.7	13.4	14.6	67.2
Heat Flux-Btu/Hr/ft2	15109	15105	14906	14854	14951	15018	15003	15018	15039	1730
Wall Temp. #3-F	188	189.7	188.7	189.1	191.9	190.9	191.5	190.4	190.3	182.5
Wall Temp. #4-F	188.3	187.6	190.1	190	190.8	190.8	191.9	191.5	191.3	182.8
Wall Temp. #5-F	187.8	185.9	191.2	189.2	189.1	191.2	190.7	190.1	188.2	183.3
Wall Temp. #1-F	72.2	188.2	187.2	188.6	188.4	192.3	191.7	191.7	187.6	182
Wall Temp. #2-F	188.9	188.2	188	190	188.5	193.7	192.2	192.3	188.6	182.7
Instream Temp.-F	176.8	178.9	178.7	179	178.8	178.9	179	178.7	178.7	178.2
Avg. Wall Temp.-F	188.3	188.4	188.5	189.2	189.2	191.3	191.6	191.2	189.2	182.7
Avg. Wall DT.-F	10.8	8.8	9.1	9.6	9.7	11.7	11.9	11.8	9.8	4.4
Remaining Subcool-F	-9.7									
Exit Quality	0.06	0.16	0.25	0.34	0.44	0.53	0.63	0.72	0.82	0.83
EXP. H-Btu/Hr/ft2/F	1403.2	1708.3	1633.3	1554.8	1537.5	1281.3	1258.4	1270.5	1531.4	0
COMPUTED H										
Jallouk	1087	1053.7	1019.5	1002.1	993.3	987.2	979.9	974.4	972.3	338.1
Szady1(Cudo tube)	1435.7	1444.2	1434.4	1433.8	1438.7	1443.3	1444	1444.9	1447.2	562.6
Szady2	1289.2	1300.8	1267.2	1265.9	1271.8	1277.1	1277.5	1299.7	1301.7	470.5
(RLIQ)	28246	26229	23432	20701	17918	15144	12363	9562	6775	5210
(F)	1.68	2.399	3.001	3.477	3.899	4.281	4.637	4.989	5.328	5.529
(HLIQ)	141.9	202.8	253.7	294	329.7	361.9	392.1	421.8	450.3	467.3
(HBOIL)	1435.3	1442.9	1431.8	1429.7	1432.9	1435.7	1434.3	1432.8	1432.6	423.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	73.7									
DP Liquid Density-lbm/ft3	91.26									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.176	1.821	2.592	3.509	4.503					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.167	1.777	2.563	3.491	4.577					
Actual DP-ft	2.02	1.39	2.27	2.9	3.08					
Measured TP-Psig	123.6				129.4					
Measured Overall-ft	-10.64									
Computed DP-ft	1.17	1.96	2.62	3.22	4.02					
Friction-ft	0.03	0.11	0.22	0.36	0.46					
Acceleration-ft	0.03	0.07	0.12	0.18	0.22					
Elevation-ft	1.1	1.78	2.29	2.68	3.33					

Run#	378									
Test Fluid	R114									
Date:	3/5/93									
Time:	14:42									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	165.1									
Sat. Temperature-F(inlet)	200.7									
Liq. Density-lbm/ft3	75.53	75.01	75.05	75.05	75.03	74.96	74.98	74.98	74.98	75.08
Latent Heat-Btu/lbm	40.53	40.02	40.05	40.05	40.04	39.97	39.99	39.99	39.99	40.08
Specific Heat-Btu/lbm/F	0.281	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.281
Liq. Viscosity-lbm/ft-hr	0.44	0.434	0.434	0.434	0.434	0.433	0.434	0.434	0.434	0.435
Liq. Conductivity-Btu/hr-ft-F	0.0269	0.0266	0.0266	0.0266	0.0266	0.0266	0.0266	0.0266	0.0266	0.0266
Liq. Prandtl No.	4.59	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Inlet Flow Rate-GPM	1.1									
Outlet Liq. Flow Rate-GPM	1.8									
Outlet Vap. Flow Rate-GPM	0.6									
Inlet Temperature-F	194.5									
Outlet Liq. Temperature-F	112.6									
Outlet Vap. Temperature-F	199.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	109.6									
Water outlet Temp.-F	196.1									
Inlet G-lbm/hr/ft2	206873		Temp	176.1	Density	78.81				
Subcooling-F	6.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	861.9	871.6	871.6	874.6	864.5	870.2	865.3	862.3	156.4	85.5
Heat Loss-Watts	52.8	11	13.2	10.4	9.7	10.2	13.7	16.2	16.9	79.4
Heat Flux-Btu/Hr/ft2	14940	15109	15109	15161	14986	15084	14999	14947	2711	1482
Wall Temp. #3-F	208.4	210.4	209.3	209.9	212.7	212.1	212.6	215.8	204.5	203.6
Wall Temp. #4-F	208.9	208.5	211	211	212.1	212	213.1	216.1	205.5	203.9
Wall Temp. #5-F	208.4	206.8	211.8	210.2	210	212.1	211.7	212.5	205.7	204.4
Wall Temp. #1-F	73.3	208.8	207.9	209.5	209.4	213.5	212.7	213.8	205.4	203.7
Wall Temp. #2-F	209.5	208.8	208.7	210.9	209.6	214.7	213.1	214.1	205.1	204
Instream Temp.-F	197.6	200.8	200.6	200.6	200.7	201.1	201	201	201	200.4
Avg. Wall Temp.-F	208.8	209.1	209.2	210.2	210.3	212.4	212.6	214.5	205.2	203.9
Avg. Wall DT.-F	10.5	7.6	7.9	8.9	8.9	10.6	11	12.8	4.1	3.5
Remaining Subcool-F	-8.9									
Exit Quality	0.06	0.17	0.27	0.38	0.49	0.59	0.7	0.81	0.83	0.84
EXP. H-Btu/Hr/ft2/F	1419.5	1977	1902.3	1710.2	1684.2	1417.3	1368.3	1169.2	658.4	0
COMPUTED H										
Jallouk	1169.1	1135.6	1106.9	1091.1	1071.2	1067.6	1057.1	95.9	95.9	95.8
Szady1(Cudo tube)	1501.1	1521.4	1521.1	1524.3	1516.4	1523.6	1519.6	95.9	95.9	95.8
Szady2	1359.2	1383.2	1382.5	1385.8	1376.1	1384	1378.8	95.9	95.9	95.8
(RLIQ)	29808	27616	24280	20944	17630	14340	11009	11009	11009	11009
(F)	1.61	2.264	2.826	3.274	3.658	4.001	4.335	4.335	4.335	4.335
(HLIQ)	132.7	186.7	233	269.9	301.6	329.9	357.4	357.4	357.4	357.4
(HBOIL)	1500.8	1520.5	1519.3	1521.5	1512.4	1518.4	1513	1513	1513	1513
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	74.4									
DP Liquid Density-lbm/ft3	91.19									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.197	1.698	2.6	3.549	4.565					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.188	1.654	2.571	3.531	4.639					
Actual DP-ft	2.07	1.69	2.36	2.94	3.1					
Measured TP-Psig	165.1				171.4					
Measured Overall-ft	-12.08									
Computed DP-ft	1.24	2.07	2.75	3.32	4.44					
Friction-ft	0.03	0.09	0.18	0.28	0.34					
Acceleration-ft	0.03	0.06	0.1	0.16	0.17					
Elevation-ft	1.19	1.92	2.47	2.88	3.94					

Run#	379									
Test Fluid	R114									
Date:	3/5/93									
Time:	15:25									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	167.5									
Sat. Temperature-F(inlet)	201.8									
Liq. Density-lbm/ft3	75.24	74.85	74.83	74.88	74.88	74.85	74.85	74.87	74.9	74.95
Latent Heat-Btu/lbm	40.24	39.86	39.84	39.89	39.89	39.86	39.86	39.88	39.91	39.96
Specific Heat-Btu/lbm/F	0.281	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282
Liq. Viscosity-lbm/ft-hr	0.437	0.432	0.432	0.432	0.432	0.432	0.432	0.432	0.433	0.433
Liq. Conductivity-Btu/hr-ft-F	0.0267	0.0265	0.0265	0.0265	0.0265	0.0265	0.0265	0.0265	0.0265	0.0265
Liq. Prandtl No.	4.59	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Inlet Flow Rate-GPM	2									
Outlet Liq. Flow Rate-GPM	1.6									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	198.4									
Outlet Liq. Temperature-F	113.1									
Outlet Vap. Temperature-F	200									
Water Flow Rate-GPM										
Water Inlet Temp.-F	91.3									
Water outlet Temp.-F	197									
Inlet G-lbm/hr/ft2	368638		Temp	186.7	Density	77.24				
Subcooling-F	3.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	874.3	876	866.7	851.7	876	881	875	875.1	880.9	868.7
Heat Loss-Watts	53	11.1	13.3	10.3	9.7	10.1	13.7	15.9	17.7	83.2
Heat Flux-Btu/Hr/ft2	15155	15185	15024	14764	15185	15272	15168	15169	15270	15058
Wall Temp. #3-F	209.5	211.5	210.4	210.5	213.1	212.5	212.6	212.1	211.8	211.6
Wall Temp. #4-F	210.3	209.6	211.9	211.6	212.5	212.2	213.1	213.1	213.1	211.5
Wall Temp. #5-F	209.5	207.9	212.6	210.5	210.8	212.5	212	211.7	210.6	210.9
Wall Temp. #1-F	74.3	210	208.9	210.2	210.1	214	213	213	210.3	207.9
Wall Temp. #2-F	210.7	210	209.7	211.6	210.5	215.3	213.4	213.6	211.1	209.5
Instream Temp.-F	199.4	201.8	201.9	201.6	201.6	201.8	201.8	201.7	201.5	201.2
Avg. Wall Temp.-F	210	210.3	210.2	210.7	211	212.8	212.8	212.7	211.4	210.3
Avg. Wall DT.-F	9.9	7.8	7.6	8.4	8.7	10.3	10.3	10.3	9.2	8.4
Remaining Subcool-F	-5.1									
Exit Quality	0.04	0.1	0.16	0.21	0.28	0.34	0.4	0.46	0.52	0.58
EXP. H-Btu/Hr/ft2/F	1528.5	1949.6	1964.9	1750.7	1747.6	1481.3	1467.7	1470.7	1661.6	0
COMPUTED H										
Jallouk	1117	1089.6	1058.8	1039.6	1043.9	1035.8	1020.9	1011.9	1007.9	992.2
Szady1(Cudo tube)	1518.7	1529.8	1522.9	1509.5	1532.1	1538.4	1534.4	1535.5	1541.2	1531.2
Szady2	1379.7	1392.5	1383.8	1367.2	1392.9	1399.5	1369.5	1370.8	1378	1365.7
(RLIQ)	54246	52148	48824	45445	42116	38766	35379	31968	28577	25175
(F)	1.44	1.919	2.323	2.646	2.921	3.169	3.398	3.613	3.82	4.021
(HLIQ)	188.5	251.1	304.1	346.3	382.4	414.8	444.8	473	500.1	526.3
(HBOIL)	1517.7	1527.5	1518.8	1503.4	1524.1	1528.2	1521.8	1520.4	1523.5	1510.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	74.9									
DP Liquid Density-lbm/ft3	91.14									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.201	1.394	2.205	2.972	3.846					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.192	1.35	2.176	2.954	3.92					
Actual DP-ft	2.06	2.27	3.12	4.05	4.48					
Measured TP-Psig	167.5				173.3					
Measured Overall-ft	-11.14									
Computed DP-ft	1.48	2.62	3.62	4.56	5.42					
Friction-ft	0.06	0.18	0.35	0.56	0.79					
Acceleration-ft	0.06	0.1	0.16	0.23	0.31					
Elevation-ft	1.36	2.33	3.11	3.77	4.33					

Run#	380									
Test Fluid	R114									
Date:	3/5/93									
Time:	15:38									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	169.2									
Sat. Temperature-F(inlet)	202.7									
Liq. Density-lbm/ft3	75.16	74.8	74.72	74.78	74.78	74.72	74.72	74.73	74.73	74.85
Latent Heat-Btu/lbm	40.16	39.81	39.73	39.8	39.8	39.73	39.73	39.75	39.75	39.86
Specific Heat-Btu/lbm/F	0.281	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282
Liq. Viscosity-lbm/ft-hr	0.436	0.431	0.43	0.431	0.431	0.43	0.43	0.431	0.431	0.432
Liq. Conductivity-Btu/hr-ft-F	0.0267	0.0265	0.0264	0.0264	0.0264	0.0264	0.0264	0.0264	0.0264	0.0265
Liq. Prandtl No.	4.59	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Inlet Flow Rate-GPM	2.8									
Outlet Liq. Flow Rate-GPM	1.9									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	198.6									
Outlet Liq. Temperature-F	201.3									
Outlet Vap. Temperature-F	200.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	88.8									
Water outlet Temp.-F	197.5									
Inlet G-lbm/hr/ft2	512407		Temp	190.3	Density	76.68				
Subcooling-F	4.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	875.4	876.2	875.3	860.7	879.1	880.5	875.3	876.5	888.9	876.5
Heat Loss-Watts	53.2	11.2	13.4	10.5	9.8	10.2	13.7	15.9	17.7	83.3
Heat Flux-Btu/hr/ft2	15174	15188	15173	14920	15239	15263	15173	15194	15409	15194
Wall Temp. #3-F	210.4	212.4	210.9	211.1	213.6	212.7	213.2	212.7	212.6	211.8
Wall Temp. #4-F	210.9	210.4	212.6	212.1	212.9	212.5	213.7	213.7	213.6	211.6
Wall Temp. #5-F	210.4	208.7	213.4	211.3	211	213	212.6	212.2	211.1	211.3
Wall Temp. #1-F	75.3	210.9	209.8	210.8	210.7	214.5	213.7	213.6	210.7	208.1
Wall Temp. #2-F	211.5	210.8	210.3	212.2	210.7	215.6	214.2	214.2	212	210.1
Instream Temp.-F	199.9	202.1	202.6	202.2	202.2	202.6	202.6	202.5	202.5	201.8
Avg. Wall Temp.-F	210.8	211.1	210.9	211.3	211.3	213.2	213.5	213.3	212	210.6
Avg. Wall DT.-F	10.2	8.3	7.6	8.5	8.4	9.9	10.2	10.1	8.8	8.1
Remaining Subcool-F	-2.1									
Exit Quality	0.01	0.06	0.1	0.14	0.19	0.23	0.28	0.32	0.36	0.41
EXP. H-Btu/hr/ft2/F	1485.6	1821.5	1992.7	1766.5	1806.3	1544	1488.4	1505.3	1750.2	0
COMPUTED H										
Jallouk	1095.8	1067.1	1052	1019.2	1017.1	1006.4	991.9	983.1	982.9	961.9
Szady1(Cudo tube)	1521.7	1531.6	1534.1	1521.2	1539	1543.4	1540.7	1543.3	1555.9	1544.9
Szady2	1383.2	1394.3	1396.3	1379.9	1374.8	1379.9	1376.4	1379.5	1394.9	1381.7
(RLIQ)	76374	74867	71654	68162	64791	61495	58087	54659	51232	47656
(F)	1.262	1.654	2.02	2.305	2.545	2.755	2.948	3.128	3.297	3.469
(HLIQ)	214.9	281.7	344.1	392.7	433.5	469.2	502.2	532.9	561.6	590.9
(HBOIL)	1520.3	1528.4	1528.3	1512.5	1527.5	1528.8	1522.7	1521.8	1531.1	1515.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.3									
DP Liquid Density-lbm/ft3	91.09									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.233	1.131	1.857	2.506	3.246					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.224	1.087	1.828	2.488	3.32					
Actual DP-ft	2	2.78	3.79	4.95	5.63					
Measured TP-Psig	169.2				174.6					
Measured Overall-ft	-10.39									
Computed DP-ft	1.72	3.07	4.32	5.52	6.64					
Friction-ft	0.09	0.25	0.49	0.78	1.1					
Acceleration-ft	0.08	0.15	0.21	0.29	0.38					
Elevation-ft	1.56	2.67	3.62	4.46	5.16					

Run#	381									
Test Fluid	R114									
Date:	3/5/93									
Time:	16:10									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	169.8									
Sat. Temperature-F(inlet)	202.9									
Liq. Density-lbm/ft3	75.05	74.87	74.75	74.7	74.7	74.7	74.73	74.73	74.75	74.87
Latent Heat-Btu/lbm	40.05	39.88	39.76	39.71	39.71	39.71	39.75	39.75	39.76	39.88
Specific Heat-Btu/lbm/F	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282
Liq. Viscosity-lbm/ft-hr	0.434	0.432	0.431	0.43	0.43	0.43	0.431	0.431	0.431	0.432
Liq. Conductivity-Btu/hr-ft-F	0.0266	0.0265	0.0264	0.0264	0.0264	0.0264	0.0264	0.0264	0.0264	0.0265
Liq. Prandtl No.	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Inlet Flow Rate-GPM	3.7									
Outlet Liq. Flow Rate-GPM	2.3									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	199									
Outlet Liq. Temperature-F	201.7									
Outlet Vap. Temperature-F	200.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	86.9									
Water outlet Temp.-F	197.7									
Inlet G-lbm/hr/ft2	673849		Temp	192.6	Density	76.33				
Subcooling-F	3.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	873.5	873.6	868.1	864.4	873.7	871.8	875.4	876	874.2	872
Heat Loss-Watts	53.2	11.2	13.3	10.4	9.7	10.1	13.6	15.8	17.6	83
Heat Flux-Btu/Hr/ft2	15142	15143	15048	14984	15145	15112	15174	15185	15154	15116
Wall Temp. #3-F	210.7	212.5	211.2	211.5	213.8	213.2	213.1	212.5	212.4	211.7
Wall Temp. #4-F	211.3	210.6	212.9	212.4	213.2	213	213.7	213.6	213.4	211.7
Wall Temp. #5-F	210.6	208.9	213.2	211.8	211.6	213.2	212.5	212	210.9	211.7
Wall Temp. #1-F	75.1	211	209.7	211.5	211.1	214.6	213.7	213.6	210.4	208.1
Wall Temp. #2-F	211.8	210.8	210.8	212.5	211.4	215.7	214.1	214.1	211.7	209.9
Instream Temp.-F	200.6	201.7	202.4	202.7	202.7	202.7	202.6	202.6	202.4	201.7
Avg. Wall Temp.-F	211.1	211.2	211.2	211.8	211.8	213.5	213.4	213.2	211.8	210.6
Avg. Wall DT.-F	9.8	8.8	8.1	8.4	8.4	10.1	10.2	10	8.7	8.2
Remaining Subcool-F	-0.7									
Exit Quality	0.01	0.04	0.07	0.1	0.14	0.17	0.2	0.24	0.27	0.3
EXP. H-Btu/Hr/ft2/F	1542.6	1712.9	1864.7	1778.9	1794.3	1493.7	1482.7	1522.5	1746.8	0
COMPUTED H										
Jallouk	1078.3	1053	1018.9	996.8	987.6	967.3	961.9	956.4	950	935.6
Szady1(Cudo tube)	1522.9	1528.4	1528.3	1528.3	1538.7	1539.4	1544.2	1547.3	1548.1	1546.6
Szady2	1384.5	1390.1	1388.5	1386.9	1373.9	1374.6	1380.5	1384.1	1384.9	1383.2
(RLIQ)	101249	99804	96756	93528	90150	86756	83284	79883	76452	72896
(F)	1.14	1.485	1.822	2.072	2.284	2.471	2.642	2.799	2.946	3.092
(HLIQ)	241.9	314.9	386.4	439.6	484.4	524.1	560.5	593.6	624.8	656.9
(HBOIL)	1520.9	1524	1520	1516.1	1522.5	1518.9	1519.2	1517.6	1513.4	1506.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.1									
DP Liquid Density-lbm/ft3	91.01									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.199	0.939	1.617	2.139	2.757					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.19	0.895	1.588	2.121	2.831					
Actual DP-ft	2.07	9.14	4.24	5.65	6.56					
Measured TP-Psig	169.8				174.9					
Measured Overall-ft	-9.81									
Computed DP-ft	1.9	3.46	4.93	6.38	7.75					
Friction-ft	0.12	0.34	0.65	1.03	1.46					
Acceleration-ft	0.11	0.2	0.29	0.38	0.47					
Elevation-ft	1.67	2.92	4	4.98	5.82					

Run#	382									
Test Fluid	R114									
Date:	3/5/93									
Time:	16:15									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	171.1									
Sat. Temperature-F(inlet)	203.6									
Liq. Density-lbm/ft3	75	74.91	74.7	74.7	74.7	74.6	74.63	74.67	74.68	74.8
Latent Heat-Btu/lbm	40	39.92	39.71	39.71	39.71	39.62	39.65	39.68	39.7	39.81
Specific Heat-Btu/lbm/F	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282
Liq. Viscosity-lbm/ft-hr	0.434	0.433	0.43	0.43	0.43	0.429	0.429	0.43	0.43	0.431
Liq. Conductivity-Btu/hr-ft-F	0.0266	0.0265	0.0264	0.0264	0.0264	0.0263	0.0264	0.0264	0.0264	0.0265
Liq. Prandtl No.	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Inlet Flow Rate-GPM	4.6									
Outlet Liq. Flow Rate-GPM	2.9									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	199.3									
Outlet Liq. Temperature-F	201.5									
Outlet Vap. Temperature-F	200.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	90.1									
Water outlet Temp.-F	197.9									
Inlet G-lbm/hr/ft2	834600		Temp	194.5	Density	76.03				
Subcooling-F	4.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	866.4	868	870.6	867.4	871.9	864.6	868.7	868.9	871.1	865
Heat Loss-Watts	53	11.1	13.2	10.2	9.5	9.9	13.5	15.7	17.6	82.6
Heat Flux-Btu/Hr/ft2	15018	15046	15091	15036	15114	14987	15058	15062	15100	14994
Wall Temp. #3-F	211.1	213.1	211.4	211.9	214.2	213.2	213.6	213	212.9	212
Wall Temp. #4-F	211.6	211.1	213.1	212.9	213.6	213.2	214	214	213.9	212
Wall Temp. #5-F	211.1	209.5	214.1	211.9	211.7	213.5	213	212.6	211.3	212
Wall Temp. #1-F	75.1	211.6	210.5	211.4	211.2	214.7	214	213.9	210.9	208.4
Wall Temp. #2-F	212.4	211.6	211	212.9	211.3	216.2	214.6	214.4	212.2	210.2
Instream Temp.-F	200.9	201.4	202.7	202.7	202.7	203.3	203.1	202.9	202.8	202.1
Avg. Wall Temp.-F	211.6	211.9	211.5	212	212	213.7	213.8	213.6	212.2	210.9
Avg. Wall DT.-F	10	9.8	8.1	8.6	8.6	9.7	10.1	10	8.8	8.1
Remaining Subcool-F	0.5									
Exit Quality	0	0.02	0.05	0.08	0.1	0.13	0.16	0.18	0.21	0.24
EXP. H-Btu/Hr/ft2/F	1506.2	1540	1859	1739.2	1764.2	1549.4	1496.9	1506.3	1724.2	0
COMPUTED H										
Jallouk	1060	1036	1003.3	979.4	962.9	953.1	947.6	932.8	925.7	913.3
Szady1(Cudo tube)	1517.9	1522.7	1532.7	1532.7	1539.5	1538.4	1544.4	1547.1	1552	1548
Szady2	1378.6	1383.1	1392.9	1366.5	1374.8	1372.7	1380	1383.1	1388.8	1383.9
(RLIQ)	125875	124952	122323	118952	115571	112500	109017	105530	102093	98404
(F)	1.005	1.301	1.647	1.888	2.086	2.253	2.408	2.552	2.684	2.816
(HLIQ)	253	327.5	414.5	475.1	524.9	567	606.1	642.2	675.5	708.6
(HBOIL)	1515.6	1517.6	1522.5	1517.3	1518.9	1512.3	1512.6	1509.3	1508.1	1496.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.7									
DP Liquid Density-lbm/ft3	90.94									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.185	0.748	1.364	1.785	2.311					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.176	0.704	1.335	1.767	2.385					
Actual DP-ft	2.09	3.51	4.72	6.33	7.41					
Measured TP-Psig	171.1				176					
Measured Overall-ft	-9.43									
Computed DP-ft	2.09	3.87	5.57	7.27	8.88					
Friction-ft	0.14	0.41	0.77	1.22	1.71					
Acceleration-ft	0.13	0.25	0.36	0.46	0.57					
Elevation-ft	1.81	3.21	4.45	5.59	6.59					

Run#	383									
Test Fluid	R114									
Date:	3/5/93									
Time:	16:57									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	165.2									
Sat. Temperature-F(inlet)	200.7									
Liq. Density-lbm/ft3	75.34	75.29	75.14	75.16	75.16	75.1	75.1	75.11	75.16	75.24
Latent Heat-Btu/lbm	40.34	40.29	40.15	40.16	40.16	40.1	40.1	40.12	40.16	40.24
Specific Heat-Btu/lbm/F	0.281	0.281	0.281	0.281	0.281	0.281	0.281	0.281	0.281	0.281
Liq. Viscosity-lbm/ft-hr	0.438	0.437	0.435	0.436	0.436	0.435	0.435	0.435	0.436	0.437
Liq. Conductivity-Btu/hr-ft-F	0.0268	0.0268	0.0267	0.0267	0.0267	0.0266	0.0266	0.0266	0.0267	0.0267
Liq. Prandtl No.	4.59	4.59	4.59	4.59	4.59	4.59	4.59	4.59	4.59	4.59
Inlet Flow Rate-GPM	5.5									
Outlet Liq. Flow Rate-GPM	3.3									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	197.2									
Outlet Liq. Temperature-F	198.6									
Outlet Vap. Temperature-F	197.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	80.9									
Water outlet Temp.-F	195									
Inlet G-lbm/hr/ft2	1002637		Temp	192.2	Density	76.39				
Subcooling-F	3.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	875.2	874.4	869.8	868.9	870.4	886	876.2	878.2	870.7	866.1
Heat Loss-Watts	51.7	10.7	12.8	10	9.1	9	12.9	16.1	17.1	80.3
Heat Flux-Btu/Hr/ft2	15171	15157	15077	15027	15088	15012	15188	15223	15093	15013
Wall Temp. #3-F	208.7	210.6	209.3	209	211.3	210.2	211	210.4	210.3	209.7
Wall Temp. #4-F	209.2	208.6	210.9	210.1	210.7	210.1	211.5	211.5	211.2	209.1
Wall Temp. #5-F	208.5	207.2	211.3	209.4	209.2	210.7	210.3	209.9	208.9	209.3
Wall Temp. #1-F	77.3	209	207.8	209	208.3	212.2	211.5	211.4	208.5	205.7
Wall Temp. #2-F	209.9	208.8	208.8	210.4	208.9	213.4	212	211.9	209.6	207.7
Instream Temp.-F	198.8	199.1	200	199.9	199.9	200.3	200.3	200.2	199.9	199.4
Avg. Wall Temp.-F	209.1	209.3	209.2	209.4	209.3	210.8	211.3	211	209.7	208.3
Avg. Wall DT.-F	9.6	9.5	8.5	8.8	8.7	9.8	10.3	10.1	9.1	8.2
Remaining Subcool-F	0.4									
Exit Quality	0	0.02	0.04	0.06	0.09	0.11	0.13	0.15	0.17	0.2
EXP. H-Btu/Hr/ft2/F	1582.1	1601.4	1769.9	1708.4	1735.6	1528.4	1478.4	1502.5	1655.3	0
COMPUTED H										
Jallouk	1037.2	1008.5	971.4	949.1	941.2	923.2	918.6	910.3	898	887.5
Szady1(Cudo tube)	1518.7	1521.2	1524.2	1525	1531.9	1533.4	1546.2	1551.9	1549.1	1548.4
Szady2	1378.7	1355.7	1358.4	1359.2	1367.3	1368.5	1383.5	1389.7	1385.7	1384.2
(RLIQ)	149838	148773	146056	142699	139400	136341	133025	129625	126130	122563
(F)	1.005	1.283	1.595	1.814	1.994	2.148	2.29	2.421	2.546	2.664
(HLIQ)	293	374	465	528.7	581.2	626.2	667.4	705.8	741.9	776.4
(HBOIL)	1515.1	1513.6	1509.6	1503.5	1503.5	1497.8	1503.6	1501.6	1490.2	1480.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.7									
DP Liquid Density-lbm/ft3	90.84									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.171	0.723	1.149	1.479	1.891					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.162	0.679	1.12	1.461	1.965					
Actual DP-ft	2.1	3.53	5.1	6.86	8.16					
Measured TP-Psig	165.2				169.7					
Measured Overall-ft	-8.61									
Computed DP-ft	2.22	4.15	6.01	7.89	9.69					
Friction-ft	0.19	0.54	1	1.58	2.21					
Acceleration-ft	0.17	0.34	0.46	0.59	0.72					
Elevation-ft	1.86	3.28	4.55	5.72	6.76					

Run#	384									
Test Fluid	R114									
Date:	3/5/93									
Time:	19:15									
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	193									
Sat. Temperature-F(inlet)	213.6									
Liq. Density-lbm/ft3	75.61	75.71	75.73	75.69	75.65	75.27	73.01	72.99	72.99	73.03
Latent Heat-Btu/lbm	40.61	40.7	40.72	40.69	40.64	40.28	38.06	38.04	38.04	38.08
Specific Heat-Btu/lbm/F	0.28	0.28	0.28	0.28	0.28	0.281	0.286	0.286	0.286	0.286
Liq. Viscosity-lbm/ft-hr	0.441	0.442	0.442	0.442	0.441	0.437	0.41	0.41	0.41	0.41
Liq. Conductivity-Btu/hr-ft-F	0.027	0.027	0.027	0.027	0.027	0.0267	0.0254	0.0254	0.0254	0.0254
Liq. Prandtl No.	4.59	4.58	4.58	4.58	4.59	4.59	4.62	4.62	4.62	4.62
Inlet Flow Rate-GPM	1.5									
Outlet Liq. Flow Rate-GPM	1.4									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	196.1									
Outlet Liq. Temperature-F	212.2									
Outlet Vap. Temperature-F	211.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	187.5									
Water outlet Temp.-F	197.8									
Inlet G-lbm/hr/ft2	272491		Temp	193.9	Density	76.12				
Subcooling-F	17.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1	20	20.6	20.5	20.4	1624.4	1684.8	1714.2	1686.3	1088.3
Heat Loss-Watts	48.2	9.8	11.8	10	9.3	14.2	16	18.1	19.7	93.9
Heat Flux-Btu/Hr/ft2	17	347	357	355	354	28158	28858	29715	29231	18865
Wall Temp. #3-F	199.2	199.1	199.7	199.8	206.1	227.4	227.6	229.3	232.2	235.6
Wall Temp. #4-F	200	199.7	199.8	199.8	207.1	227.3	228.2	230.5	233.3	234.9
Wall Temp. #5-F	198.5	199.5	199.2	200.2	202.4	227.9	226.4	227.2	224.5	228.3
Wall Temp. #1-F	76.7	199.8	199.2	199.8	200.4	230.9	228.3	228.9	223.8	221.4
Wall Temp. #2-F	195.2	200.1	199.2	198.6	200.1	235	228.8	228.9	226.6	223.2
Instream Temp.-F	197.1	196.5	196.4	196.6	196.9	199.2	212.6	212.7	212.7	212.5
Avg. Wall Temp.-F	198.2	199.7	199.5	199.9	202.5	228.4	227.9	229	228.1	228.7
Avg. Wall DT.-F	1.1	3.2	3.1	3.3	5.6	27.9	14	14.9	14.1	15.3
Remaining Subcool-F	17.4									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	15.4	109.7	116.7	108.2	63.3	1009.2	2067.8	1992	2079.2	1230.8
COMPUTED H										
Jallouk	84.4	84.4	84.4	84.4	84.4	84.4	84.4	84.4	84.4	84.4
Szady1(Cudo tube)	104.9	106.5	107.3	108	108.7	109.2	109.3	109.8	110.3	110.7
Szady2	104.9	106.5	107.3	108	108.7	109.2	109.3	109.8	110.3	110.7
(RLIQ)	40423	40315	40294	40324	40371	40766	43418	43436	43432	43383
(F)	1.021	1.036	1.044	1.051	1.057	1.062	1.063	1.068	1.073	1.077
(HLIQ)	104.9	106.5	107.3	108	108.7	109.2	109.3	109.8	110.3	110.7
(HBOIL)	160.5	461.2	446	480.1	828	4348.9	2304.7	2469	2323.6	2535.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.2									
DP Liquid Density-lbm/ft3	90.79									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.179	0.478	0.897	1.461	2.336					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.17	0.434	0.868	1.443	2.41					
Actual DP-ft	2.15	4.12	5.75	7.1	7.52					
Measured TP-Psig	193				196.8					
Measured Overall-ft	-7.49									
Computed DP-ft	2.01	4.03	6.04	8.06	9.94					
Friction-ft	0.01	0.03	0.04	0.06	0.07					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.87					

Run#	385									
Test Fluid	R114									
Date:	3/5/93									
Time:	19:17									
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19686									
Sat. Pressure-Psig	203.6									
Sat. Temperature-F(inlet)	218.1									
Liq. Density-lbm/ft3	75.39	75.52	75.5	75.45	75.37	75.03	72.17	72.15	72.19	72.22
Latent Heat-Btu/lbm	40.39	40.51	40.5	40.45	40.37	40.04	37.24	37.22	37.25	37.29
Specific Heat-Btu/lbm/F	0.281	0.281	0.281	0.281	0.281	0.282	0.287	0.287	0.287	0.287
Liq. Viscosity-lbm/ft-hr	0.438	0.44	0.44	0.439	0.438	0.434	0.4	0.4	0.4	0.401
Liq. Conductivity-Btu/hr-ft-F	0.0268	0.0269	0.0269	0.0269	0.0268	0.0266	0.0249	0.0249	0.0249	0.0249
Liq. Prandtl No.	4.59	4.59	4.59	4.59	4.59	4.6	4.62	4.62	4.62	4.62
Inlet Flow Rate-GPM	1.5									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	0.6									
Inlet Temperature-F	197.6									
Outlet Liq. Temperature-F	216.7									
Outlet Vap. Temperature-F	215.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	193.4									
Water outlet Temp.-F	205.9									
Inlet G-lbm/hr/ft2	269921		Temp	198.4	Density	75.4				
Subcooling-F	20.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0.3	30.6	29.8	30.1	31.1	1626.2	1650	1697	1698	1089.7
Heat Loss-Watts	47.3	10.1	12	10	9.2	15.4	16.8	18.9	20.9	100
Heat Flux-Btu/Hr/ft2	5	530	517	522	539	28189	28602	29416	29434	18889
Wall Temp. #3-F	201.4	201.8	202.4	202.7	209.7	231.5	232.1	233.9	245.6	246.9
Wall Temp. #4-F	201.9	202.5	202.6	202.7	210.9	231.4	232.6	234.9	246.1	246
Wall Temp. #5-F	200.3	202.2	201.9	202.9	206	232.1	230.9	231.8	230	239.5
Wall Temp. #1-F	76.9	202.5	201.9	202.7	203.7	235	232.5	233.2	228.9	228.7
Wall Temp. #2-F	197.1	202.9	201.9	201.1	203.2	239.2	233.1	233.2	231.6	230.8
Instream Temp.-F	198.5	197.7	197.8	198.1	198.6	200.7	217.3	217.4	217.2	217
Avg. Wall Temp.-F	200.2	202.4	202.2	202.8	206	232.5	232.2	233.4	236.4	238.4
Avg. Wall DT.-F	1.7	4.7	4.4	4.6	7.3	30.5	13.6	14.7	17.9	20.5
Remaining Subcool-F	20.5									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	3.1	112.8	118	112.8	73.6	923.4	2095.8	2005.1	1643.4	920.2
COMPUTED H										
Jallouk	83.8	83.8	83.8	83.8	83.8	83.8	83.8	83.8	83.7	83.7
Szady1(Cudo tube)	104.1	105.6	106.4	107.2	107.8	108.3	108.3	108.8	109.3	109.7
Szady2	104.1	105.6	106.4	107.2	107.8	108.3	108.3	108.8	109.3	109.7
(RLIQ)	40282	40138	40151	40199	40281	40648	44098	44118	44065	44012
(F)	1.02	1.036	1.043	1.05	1.057	1.062	1.062	1.066	1.071	1.075
(HLIQ)	104.1	105.6	106.4	107.2	107.8	108.3	108.3	108.8	109.3	109.7
(HBOIL)	243	696.7	647.8	686.7	1102.1	4803.1	2326.7	2507.4	3071.4	3526.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.7									
DP Liquid Density-lbm/ft3	90.73									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.175	0.484	0.895	1.433	2.308					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.166	0.44	0.866	1.415	2.382					
Actual DP-ft	2.18	4.15	5.81	7.23	7.66					
Measured TP-Psig	203.6				207.6					
Measured Overall-ft	-7.98									
Computed DP-ft	2.01	4.03	6.04	8.06	9.94					
Friction-ft	0.01	0.03	0.04	0.06	0.07					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.87					

Run#	386									
Test Fluid	R114									
Date:	3/5/93									
Time:	19:23									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	212.6									
Sat. Temperature-F(inlet)	221.8									
Liq. Density-lbm/ft3	74.82	74.98	75	74.96	74.88	74.47	71.52	71.5	71.52	71.56
Latent Heat-Btu/lbm	39.83	39.99	40	39.97	39.89	39.49	36.6	36.59	36.6	36.64
Specific Heat-Btu/lbm/F	0.282	0.282	0.282	0.282	0.282	0.283	0.288	0.288	0.288	0.288
Liq. Viscosity-lbm/ft-hr	0.432	0.434	0.434	0.433	0.432	0.428	0.392	0.392	0.392	0.393
Liq. Conductivity-Btu/hr-ft-F	0.0265	0.0266	0.0266	0.0266	0.0265	0.0263	0.0245	0.0245	0.0245	0.0245
Liq. Prandtl No.	4.6	4.6	4.6	4.6	4.6	4.6	4.62	4.62	4.62	4.62
Inlet Flow Rate-GPM	1.5									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	200.3									
Outlet Liq. Temperature-F	220.4									
Outlet Vap. Temperature-F	219.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	206.6									
Water outlet Temp.-F	215.9									
Inlet G-lbm/hr/ft2	267581		Temp	202.4	Density	74.75				
Subcooling-F	21.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1	39.9	41.5	40.1	39.3	1622.5	1650	1697.3	1688.5	1080.9
Heat Loss-Watts	47.6	10.4	12.4	10	9.1	16.3	17.3	19.4	22	105.3
Heat Flux-Btu/Hr/ft2	17	692	719	695	681	28125	28602	29422	29269	18737
Wall Temp. #3-F	202.6	205.7	207.1	207.1	214.1	235	235.6	237.3	260.6	256.5
Wall Temp. #4-F	203.2	206.8	207.2	207.1	215	235	236	238.6	261	255.7
Wall Temp. #5-F	201	206	206.2	207.1	210	235.7	233.9	235.2	236.5	249.1
Wall Temp. #1-F	77.1	205.7	206.2	206.9	207.6	238.6	236.1	236.6	233.1	236.2
Wall Temp. #2-F	198	206.2	206.2	205.6	207.5	243.1	236.6	236.5	235.6	238
Instream Temp.-F	202	201	200.9	201.1	201.6	204.1	220.8	220.9	220.8	220.6
Avg. Wall Temp.-F	201.2	206.1	206.7	207.1	210	236.1	235.6	236.8	245.4	247.1
Avg. Wall DT.-F	0	5.1	5.7	5.9	8.4	30.7	13.5	14.6	23.2	25.7
Remaining Subcool-F	21.5									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	1733.4	136.5	125.3	117.4	81.2	916	2111.2	2013.7	1259.6	730.4
COMPUTED H										
Jallouk	83.2	83.2	83.2	83.2	83.2	83.2	83.2	83.2	83.2	83.2
Szady1(Cudo tube)	103.3	104.8	105.6	106.3	106.9	107.5	107.5	107.9	108.4	108.8
Szady2	103.3	104.8	105.6	106.3	106.9	107.5	107.5	107.9	108.4	108.8
(RLIQ)	40551	40365	40343	40375	40460	40916	44591	44612	44582	44525
(F)	1.02	1.035	1.043	1.05	1.056	1.061	1.06	1.065	1.069	1.074
(HLIQ)	103.3	104.8	105.6	106.3	106.9	107.5	107.5	107.9	108.4	108.8
(HBOIL)	1.3	764.6	868.5	896.6	1285.8	4916.7	2371.9	2564.8	4122.2	4554.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79									
DP Liquid Density-lbm/ft3	90.7									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.176	0.496	0.912	1.453	2.332					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.167	0.452	0.883	1.435	2.406					
Actual DP-ft	2.2	4.16	5.83	7.25	7.67					
Measured TP-Psig	212.6				217					
Measured Overall-ft	-8.85									
Computed DP-ft	2.01	4.03	6.04	8.06	9.94					
Friction-ft	0.01	0.03	0.04	0.06	0.07					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.87					
Run#	387									
Test Fluid	R114									
Date:	3/5/93									
Time:	19:32									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	216.3									
Sat. Temperature-F(inlet)	223.3									
Liq. Density-lbm/ft3	72.83	72.97	72.97	73.04	72.94	72.65	71.45	71.18	71.24	71.28
Latent Heat-Btu/lbm	37.89	38.03	38.03	38.1	37.99	37.71	36.53	36.27	36.33	36.37
Specific Heat-Btu/lbm/F	0.286	0.286	0.286	0.286	0.286	0.286	0.288	0.289	0.289	0.289
Liq. Viscosity-lbm/ft-hr	0.408	0.41	0.411	0.411	0.409	0.406	0.391	0.388	0.389	0.389
Liq. Conductivity-Btu/hr-ft-F	0.0253	0.0253	0.0253	0.0254	0.0253	0.0252	0.0244	0.0243	0.0243	0.0243
Liq. Prandtl No.	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62
Inlet Flow Rate-GPM	3									
Outlet Liq. Flow Rate-GPM	1.9									

Water Flow Rate-GPM										
Water Inlet Temp.-F	208.3									

Water outlet Temp.-F	215.8									
Inlet G-lbm/hr/ft2	523582		Temp	211.9	Density	73.13				
Subcooling-F	11									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1	61.2	60.4	59.2	59.9	1619.3	1661.3	1700.8	1564.4	892.8
Heat Loss-Watts	52.9	11.7	14.1	11.4	11.3	16.6	17.5	23.8	136.7	162.5
Heat Flux-Btu/Hr/ft2	17	1061	1047	1026	1038	28070	28798	29482	27118	15476
Wall Temp. #3-F	213.8	217.3	218.4	218.2	220.6	236.1	236.8	293.5	483.7	307.5
Wall Temp. #4-F	214.3	217.9	218.5	218.2	221.9	236.3	237.3	294	488.5	307.9
Wall Temp. #5-F	213.4	217.7	217.3	218.6	218.9	236.8	235.6	237.4	464.8	367.8
Wall Temp. #1-F	77.7	217.4	217.4	218.2	218.1	239.9	237.8	237.7	425.1	402.3
Wall Temp. #2-F	210.7	217.8	217.5	216.5	217.5	244.4	238.3	237.5	424.7	402.3
Instream Temp.-F	213.6	212.8	212.8	212.4	213	214.6	221.2	222.6	222.3	222.1
Avg. Wall Temp.-F	213.1	217.6	218	218.3	219.1	237.3	237.2	250	250	250
Avg. Wall DT.-F	0	4.8	5.1	5.9	6.1	21.4	14.7	26.1	26.5	27.2
Remaining Subcool-F	11									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	1733.4	223.2	205.2	175.3	171.5	1311.3	1964.6	1131	1024.3	569
COMPUTED H										
Jallouk	142.4	142.3	142.3	142.3	142.3	142.3	142.3	142.3	142.3	142.3
Szady1(Cudo tube)	176.6	179	180.3	181.4	182.4	183.3	183.8	184.6	185.3	186.1
Szady2	176.6	179	180.3	181.4	182.4	183.3	183.8	184.6	185.3	186.1
(RLIQ)	83915	83555	83546	83366	83616	84310	87455	88175	88008	87895
(F)	1.019	1.033	1.04	1.047	1.052	1.057	1.06	1.064	1.069	1.073
(HLIQ)	176.6	179	180.3	181.4	182.4	183.3	183.8	184.6	185.3	186.1
(HBOIL)	1.4	765.5	823.4	945.3	982.1	3619.9	2579.7	4706.2	4769.4	4895.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.9									
DP Liquid Density-lbm/ft3	60.6									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.205	0.513	0.925	1.311	2.017					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.196	0.469	0.896	1.293	2.091					
Actual DP-ft	2.15	4.14	5.82	7.56	8.33					
Measured TP-Psig	216.3				220.7					
Measured Overall-ft	-8.89									
Computed DP-ft	2.05	4.1	6.15	8.2	10.12					
Friction-ft	0.05	0.1	0.15	0.2	0.25					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.87					

Run#	388									
Test Fluid	R114									
Date:	3/5/93									
Time:	19:45									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	216.6									
Sat. Temperature-F(inlet)	223.5									
Liq. Density-lbm/ft3	72.78	72.87	72.87	72.9	72.83	72.62	71.45	71.22	71.22	71.3
Latent Heat-Btu/lbm	37.84	37.92	37.92	37.96	37.89	37.68	36.53	36.31	36.31	36.38
Specific Heat-Btu/lbm/F	0.286	0.286	0.286	0.286	0.286	0.286	0.288	0.289	0.289	0.289
Liq. Viscosity-lbm/ft-hr	0.407	0.409	0.409	0.409	0.408	0.406	0.391	0.389	0.389	0.389
Liq. Conductivity-Btu/hr-ft-F	0.0252	0.0253	0.0253	0.0253	0.0253	0.0251	0.0244	0.0243	0.0243	0.0243
Liq. Prandtl No.	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62
Inlet Flow Rate-GPM	3.1									
Outlet Liq. Flow Rate-GPM	1.9									
Outlet Vap. Flow Rate-GPM	0.6									
Inlet Temperature-F	212.2									
Outlet Liq. Temperature-F	221.8									
Outlet Vap. Temperature-F	220.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	204.6									
Water outlet Temp.-F	215.7									
Inlet G-lbm/hr/ft2	540645		Temp	212.2	Density	73.08				
Subcooling-F	11.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1	40.4	40.7	40.4	40.2	1632	1689.6	1494.2	1012	743.3
Heat Loss-Watts	53.2	11.6	13.9	11.1	10.9	16.5	17.5	53.7	117.7	125.9
Heat Flux-Btu/Hr/ft2	17	700	706	700	697	28290	29288	25901	17542	12885
Wall Temp. #3-F	214.8	216.8	217.4	217.4	219.9	236.3	236.9	450.5	423.5	241.9
Wall Temp. #4-F	215.5	217.3	217.4	217.4	220.8	236.4	237.4	449.4	427	242.2
Wall Temp. #5-F	214.5	217.1	216.7	217.4	218.2	237	235.6	404.1	425.9	292.9
Wall Temp. #1-F	77.8	217	216.8	217.4	217.3	240.2	237.9	308.9	426.3	351.2
Wall Temp. #2-F	212.2	217.3	216.8	216	217	244.6	238.4	309.8	425.9	352.4
Instream Temp.-F	213.9	213.4	213.4	213.2	213.6	214.8	221.2	222.4	222.4	222
Avg. Wall Temp.-F	214.3	217.1	217.1	217.4	218.3	237.5	237.2	250	250	250
Avg. Wall DT.-F	0.3	3.7	3.7	4.2	4.7	21.4	14.7	26.4	26.8	27.4
Remaining Subcool-F	11.2									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	49.6	190.9	192.3	168	148.5	1322.2	1990.2	980	654.4	469.9
COMPUTED H										
Jallouk	146.1	146	146	146	146	146	146	146	146	146
Szady1(Cudo tube)	181.2	183.6	184.9	186.1	187.1	188	188.6	189.4	190.2	190.9
Szady2	181.2	183.6	184.9	186.1	187.1	188	188.6	189.4	190.2	190.9
(RLIQ)	86785	86546	86537	86439	86610	87150	90306	90939	90930	90705
(F)	1.019	1.033	1.04	1.046	1.052	1.057	1.06	1.064	1.069	1.073
(HLIQ)	181.2	183.6	184.9	186.1	187.1	188	188.6	189.4	190.2	190.9
(HBOIL)	53.2	589.5	589.5	671.1	759.8	3623.1	2590.1	4765.1	4834.9	4931.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.1									
DP Liquid Density-lbm/ft3	90.58									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.208	0.516	0.928	1.337	2.008					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.199	0.472	0.899	1.319	2.082					
Actual DP-ft	2.14	4.13	5.81	7.5	8.34					
Measured TP-Psig	216.6				221.2					
Measured Overall-ft	-9.29									
Computed DP-ft	2.05	4.1	6.16	8.21	10.13					
Friction-ft	0.05	0.1	0.16	0.21	0.26					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.87					

Run#	389									
Test Fluid	R114									
Date:	3/5/93									
Time:	19:53									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	217.1									
Sat. Temperature-F(inlet)	223.7									
Liq. Density-lbm/ft3	72.69	72.83	72.83	72.85	72.81	72.53	71.39	71.11	71.13	71.24
Latent Heat-Btu/lbm	37.75	37.89	37.89	37.91	37.87	37.59	36.48	36.2	36.22	36.33
Specific Heat-Btu/lbm/F	0.286	0.286	0.286	0.286	0.286	0.286	0.289	0.289	0.289	0.289
Liq. Viscosity-lbm/ft-hr	0.406	0.408	0.408	0.408	0.408	0.404	0.391	0.387	0.387	0.389
Liq. Conductivity-Btu/hr-ft-F	0.0252	0.0253	0.0253	0.0253	0.0253	0.0251	0.0244	0.0242	0.0242	0.0243
Liq. Prandtl No.	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62
Inlet Flow Rate-GPM	3.1									
Outlet Liq. Flow Rate-GPM	1.9									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	212.6									
Outlet Liq. Temperature-F	222									
Outlet Vap. Temperature-F	221.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	200.4									
Water outlet Temp.-F	214.4									
Inlet G-lbm/hr/ft2	540254		Temp	212.5	Density	73.03				
Subcooling-F	11.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1	31.1	30.4	30.8	31.1	1629.3	1697	1467.7	822.8	753.6
Heat Loss-Watts	53.2	11.5	13.6	10.8	10.6	16.5	17.5	40.7	106.3	109
Heat Flux-Btu/Hr/ft2	17	539	527	534	539	28243	29416	25442	14263	13063
Wall Temp. #3-F	215	216	216.7	216.9	219.6	236.5	237.4	412.5	402.9	232.9
Wall Temp. #4-F	215.9	217	216.7	216.9	220.4	236.7	237.8	411.6	405.6	232.9
Wall Temp. #5-F	214.8	216.7	216.1	216.9	217.5	237.2	236.1	344.3	409.4	241.2
Wall Temp. #1-F	78.1	216.6	216.1	216.9	216.8	240.4	238.3	244.1	409	290.6
Wall Temp. #2-F	212.8	216.9	216.2	215.3	216.4	244.9	238.8	245.3	408.8	293.4
Instream Temp.-F	214.4	213.6	213.6	213.5	213.7	215.3	221.5	223	222.9	222.3
Avg. Wall Temp.-F	214.6	216.6	216.4	216.9	217.8	237.7	237.7	250	250	250
Avg. Wall DT.-F	0.2	3	2.8	3.4	4.1	21.1	14.9	25.9	26.5	27.1
Remaining Subcool-F	11.1									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	77.9	179.7	188.1	158.2	139.1	1337	1980.8	984.2	539.1	481.9
COMPUTED H										
Jallouk	146	146	146	145.9	145.9	145.9	146	146	146	145.9
Szady1(Cudo tube)	181.1	183.5	184.8	186	187	187.9	188.5	189.2	190	190.8
Szady2	181.1	183.5	184.8	186	187	187.9	188.5	189.2	190	190.8
(RLIQ)	86951	86574	86565	86511	86593	87319	90399	91201	91137	90801
(F)	1.019	1.033	1.04	1.046	1.052	1.057	1.06	1.064	1.069	1.073
(HLIQ)	181.1	183.5	184.8	186	187	187.9	188.5	189.2	190	190.8
(HBOIL)	33.9	480.5	447.8	541.8	653.8	3588.2	2620.7	4681.8	4790	4886.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.3									
DP Liquid Density-lbm/ft3	90.56									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.208	0.516	0.927	1.33	1.998					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.199	0.472	0.898	1.312	2.072					
Actual DP-ft	2.14	4.13	5.81	7.52	8.37					
Measured TP-Psig	217.1				221.7					
Measured Overall-ft	-9.3									
Computed DP-ft	2.05	4.1	6.16	8.21	10.13					
Friction-ft	0.05	0.1	0.16	0.21	0.26					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.87					

Run#	390									
Test Fluid	R114									
Date:	3/5/93									
Time:	19:59									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	217.9									
Sat. Temperature-F(inlet)	224									
Liq. Density-lbm/ft3	72.24	72.42	72.42	72.42	72.4	72.15	71.63	71.11	71.11	71.13
Latent Heat-Btu/lbm	37.31	37.49	37.49	37.49	37.47	37.22	36.71	36.2	36.2	36.22
Specific Heat-Btu/lbm/F	0.287	0.287	0.287	0.287	0.287	0.287	0.288	0.289	0.289	0.289
Liq. Viscosity-lbm/ft-hr	0.401	0.403	0.403	0.403	0.403	0.4	0.394	0.387	0.387	0.387
Liq. Conductivity-Btu/hr-ft-F	0.0249	0.025	0.025	0.025	0.025	0.0249	0.0245	0.0242	0.0242	0.0242
Liq. Prandtl No.	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62
Inlet Flow Rate-GPM	4									
Outlet Liq. Flow Rate-GPM	2.5									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	215.3									
Outlet Liq. Temperature-F	222.4									
Outlet Vap. Temperature-F	221.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	198.3									
Water outlet Temp.-F	215									
Inlet G-lbm/hr/ft2	693375		Temp	214.7	Density	72.64				
Subcooling-F	8.7									
Flow Observation										

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1	38.5	39.2	38.3	39.6	1634	1690.7	1459.7	787.5	745.6
Heat Loss-Watts	53.6	11.8	14.2	11.5	11.2	16.6	17.5	48.1	107.3	116.9
Heat Flux-Btu/Hr/ft2	17	667	680	664	686	28324	29307	25303	13651	12924
Wall Temp. #3-F	216	218.2	219	219.2	220.6	236.8	237.7	438.4	401.9	239.1
Wall Temp. #4-F	216.5	218.9	219.1	219.1	221.9	236.8	238.1	437.4	404.5	239.2
Wall Temp. #5-F	216	218.8	218.4	219.2	219.5	237.4	236.3	381.6	410	262
Wall Temp. #1-F	78	218.5	218.5	219.2	218.7	240.5	238.4	278.4	414.4	318.3
Wall Temp. #2-F	214.3	218.8	218.5	217.6	218.7	245.3	239	279.5	414.3	319.1
Instream Temp.-F	216.9	215.9	215.9	215.9	216	217.4	220.2	223	223	222.9
Avg. Wall Temp.-F	215.7	218.6	218.8	219.2	219.7	237.9	237.9	250	250	250
Avg. Wall DT.-F	0	2.7	2.8	3.2	3.7	19.2	16.4	25.9	26.4	26.5
Remaining Subcool-F	8.7									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	1739.4	250	238.9	204.6	187.1	1475.6	1789.7	978.6	517.4	487.4
COMPUTED H										
Jallouk	178.3	178.2	178.2	178.2	178.2	178.2	178.2	178.2	178.2	178.2
Szady1(Cudo tube)	221.1	224	225.6	226.9	228.2	229.3	230.2	231.1	232	232.9
Szady2	221.1	224	225.6	226.9	228.2	229.3	230.2	231.1	232	232.9
(RLIQ)	113104	112474	112463	112452	112501	113353	115146	117050	117038	116956
(F)	1.019	1.032	1.039	1.046	1.052	1.056	1.061	1.064	1.069	1.073
(HLIQ)	221.1	224	225.6	226.9	228.2	229.3	230.2	231.1	232	232.9
(HBOIL)	1.4	433.1	462.1	528.9	600.2	3302.1	2866.6	4682.9	4780.7	4801.2

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	80.5				
DP Liquid Density-lbm/ft3	90.54				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.215	0.493	0.885	1.216	1.816
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074
Corrected DP-Psid	0.206	0.449	0.856	1.198	1.89
Actual DP-ft	2.13	4.18	5.9	7.76	8.74
Measured TP-Psig	217.9				222.4
Measured Overall-ft	-9.11				
Computed DP-ft	2.08	4.16	6.25	8.33	10.28
Friction-ft	0.08	0.16	0.25	0.33	0.41
Acceleration-ft	0	0	0	0	0
Elevation-ft	2	4	6	8	9.87

Run#	391									
Test Fluid	R114									
Date:	3/5/93									
Time:	20:08									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	217.8									
Sat. Temperature-F(inlet)	223.9									
Liq. Density-lbm/ft3	72.26	72.44	72.42	72.42	72.33	72.08	71.52	71.05	71.07	71.11
Latent Heat-Btu/lbm	37.33	37.5	37.49	37.49	37.4	37.15	36.6	36.14	36.16	36.2
Specific Heat-Btu/lbm/F	0.287	0.287	0.287	0.287	0.287	0.287	0.288	0.289	0.289	0.289
Liq. Viscosity-lbm/ft-hr	0.401	0.403	0.403	0.403	0.402	0.399	0.392	0.386	0.387	0.387
Liq. Conductivity-Btu/hr-ft-F	0.0249	0.025	0.025	0.025	0.025	0.0248	0.0245	0.0242	0.0242	0.0242
Liq. Prandtl No.	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62
Inlet Flow Rate-GPM	4									
Outlet Liq. Flow Rate-GPM	2.5									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	215.2									
Outlet Liq. Temperature-F	222.4									
Outlet Vap. Temperature-F	221.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	196									
Water outlet Temp.-F	214.1									
Inlet G-lbm/hr/ft2	693033		Temp	214.9	Density	72.6				
Subcooling-F	8.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1	60	59.6	59.6	58.1	1680	1667.3	1143.2	305.6	644.9
Heat Loss-Watts	53.5	11.9	14.5	11.9	11.7	16.6	17.5	20.3	58.6	115.4
Heat Flux-Btu/Hr/ft2	17	1040	1033	1033	1007	29122	28902	19817	5297	11179
Wall Temp. #3-F	216.3	219.6	220.6	220.9	222.4	237.2	237.7	268.7	330.1	242.7
Wall Temp. #4-F	216.9	220.5	220.7	220.9	223.6	237.2	238.2	270.2	331	242.7
Wall Temp. #5-F	216	219.9	219.8	220.9	221.3	237.7	236.4	233.7	325.4	265.7
Wall Temp. #1-F	78	219.9	219.8	220.9	220.5	241	238.4	231.9	319.4	306.9
Wall Temp. #2-F	214.5	220	220.1	219.2	220.5	245.8	238.9	231.4	320.1	308.5
Instream Temp.-F	216.8	215.8	215.9	215.9	216.4	217.8	220.8	223.3	223.2	223
Avg. Wall Temp.-F	215.9	220	220.3	220.9	221.5	238.3	237.9	247.2	250	250
Avg. Wall DT.-F	0	4.2	4.4	5	5	19.2	15.8	23	26.6	26.5
Remaining Subcool-F	8.7									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	1733.4	250.4	237.9	208.6	200.2	1520	1827.6	862.2	199.4	421.9
COMPUTED H										
Jallouk	178.2	178.2	178.1	178.1	178.1	178.1	178.1	178.2	178.1	178.1
Szady1(Cudo tube)	221	223.9	225.5	226.9	228.1	229.2	230.1	230.9	231.9	232.8
Szady2	221	223.9	225.5	226.9	228.1	229.2	230.1	230.9	231.9	232.8
(RLIQ)	112987	112358	112408	112396	112690	113548	115489	117205	117122	116969
(F)	1.019	1.032	1.039	1.046	1.051	1.056	1.06	1.064	1.069	1.073
(HLIQ)	221	223.9	225.5	226.9	228.1	229.2	230.1	230.9	231.9	232.8
(HBOIL)	1.4	680.5	714.6	815.7	831.5	3305.5	2779.2	4161.5	4821.8	4801.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.8									
DP Liquid Density-lbm/ft3	90.51									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.208	0.493	0.884	1.19	1.821					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.199	0.449	0.855	1.172	1.895					
Actual DP-ft	2.14	4.18	5.91	7.81	8.73					
Measured TP-Psig	217.8				222.4					
Measured Overall-ft	-9.32									
Computed DP-ft	2.08	4.16	6.25	8.33	10.28					
Friction-ft	0.08	0.16	0.25	0.33	0.41					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.87					

Run#	392									
Test Fluid	R114									
Date:	3/5/93									
Time:	20:16									
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19686									
Sat. Pressure-Psig	212.3									
Sat. Temperature-F(inlet)	221.7									
Liq. Density-lbm/ft3	72.62	72.78	72.76	72.62	72.58	72.37	71.91	71.45	71.45	71.58
Latent Heat-Btu/lbm	37.68	37.84	37.82	37.68	37.64	37.43	36.99	36.53	36.53	36.66
Specific Heat-Btu/lbm/F	0.286	0.286	0.286	0.286	0.286	0.287	0.288	0.288	0.288	0.288
Liq. Viscosity-lbm/ft-hr	0.406	0.407	0.407	0.406	0.405	0.403	0.397	0.391	0.391	0.393
Liq. Conductivity-Btu/hr-ft-F	0.0251	0.0252	0.0252	0.0251	0.0251	0.025	0.0247	0.0244	0.0244	0.0245
Liq. Prandtl No.	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62	4.62
Inlet Flow Rate-GPM	4									
Outlet Liq. Flow Rate-GPM	2.5									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	213.3									
Outlet Liq. Temperature-F	220.2									
Outlet Vap. Temperature-F	219.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	197.4									
Water outlet Temp.-F	212.9									
Inlet G-lbm/hr/ft2	695584		Temp	213.4	Density	72.87				
Subcooling-F	8.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1	81	80.5	80	80.3	1438	1521.5	1015.6	354.2	385.2
Heat Loss-Watts	52.9	11.9	14.4	12	11.7	15.5	16.9	17.9	19	90
Heat Flux-Btu/hr/ft2	17	1404	1395	1387	1392	24927	26374	17605	6140	6331
Wall Temp. #3-F	214.9	219.9	220.7	221.4	222.6	234	235	231.2	226.1	226
Wall Temp. #4-F	215.4	220.4	220.7	221.4	223.7	234	235.3	231.2	226.5	225.9
Wall Temp. #5-F	214.5	219.9	219.9	221.4	221.6	234.6	233.7	229.8	225.5	226.4
Wall Temp. #1-F	78	219.6	219.9	221.1	220.8	237.4	235.4	228.9	224.6	223.3
Wall Temp. #2-F	213.1	220	220	219.8	220.6	241	235.9	228.5	225	224.7
Instream Temp.-F	214.8	213.9	214	214.8	215	216.2	218.7	221.2	221.2	220.5
Avg. Wall Temp.-F	214.5	220	220.3	221.3	221.7	235	235.1	229.9	225.5	225.3
Avg. Wall DT.-F	0	6	6.3	6.5	6.6	17.7	15.2	7.9	4.1	4.5
Remaining Subcool-F	8.4									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	1733.4	233.6	222.8	214.6	210.5	1410.4	1738.8	2221.6	1511.3	1415
COMPUTED H										
Jallouk	178.7	178.7	178.7	178.6	178.6	178.6	178.6	178.6	178.6	178.6
Szady1(Cudo tube)	221.6	224.6	226.2	227.6	228.8	229.9	230.9	231.7	232.7	233.7
Szady2	221.6	224.6	226.2	227.6	228.8	229.9	230.9	231.7	232.7	233.7
(RLIQ)	112187	111640	111687	112148	112256	112971	114530	116174	116162	115678
(F)	1.019	1.033	1.04	1.046	1.052	1.057	1.061	1.065	1.069	1.074
(HLIQ)	221.6	224.6	226.2	227.6	228.8	229.9	230.9	231.7	232.7	233.7
(HBOIL)	1.4	981	1023.6	1062.9	1089.7	3008.1	2619.8	1373.9	693	760.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.1									
DP Liquid Density-lbm/ft3	90.48									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.238	0.483	0.872	1.141	1.686					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.229	0.439	0.843	1.123	1.76					
Actual DP-ft	2.07	4.17	5.89	7.85	8.94					
Measured TP-Psig	212.3				216.4					
Measured Overall-ft	-8.25									
Computed DP-ft	2.08	4.16	6.25	8.33	10.28					
Friction-ft	0.08	0.16	0.25	0.33	0.41					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.87					

Run#	393									
Test Fluid	R114									
Date:	3/5/93									
Time:	20:31									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	200.4									
Sat. Temperature-F(inlet)	216.8									
Liq. Density-lbm/ft3	73.41	73.59	73.55	73.48	73.45	73.29	73.01	72.62	72.46	72.48
Latent Heat-Btu/lbm	38.45	38.62	38.59	38.52	38.49	38.34	38.06	37.68	37.52	37.54
Specific Heat-Btu/lbm/F	0.285	0.284	0.285	0.285	0.285	0.285	0.286	0.286	0.287	0.287
Liq. Viscosity-lbm/ft-hr	0.415	0.417	0.417	0.416	0.415	0.414	0.41	0.406	0.404	0.404
Liq. Conductivity-Btu/hr-ft-F	0.0256	0.0257	0.0257	0.0257	0.0256	0.0255	0.0254	0.0251	0.025	0.0251
Liq. Prandtl No.	4.61	4.61	4.61	4.61	4.61	4.62	4.62	4.62	4.62	4.62
Inlet Flow Rate-GPM	6									
Outlet Liq. Flow Rate-GPM	3.6									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	208.9									
Outlet Liq. Temperature-F	213									
Outlet Vap. Temperature-F	214.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	190.3									
Water outlet Temp.-F	205.9									
Inlet G-lbm/hr/ft2	1055858		Temp	208.4	Density	73.74				
Subcooling-F	7.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1	79.4	80	80.7	78.8	1433.8	1515.5	1009.9	353.2	367.3
Heat Loss-Watts	51.2	11	12.9	10	9.2	13.9	15.9	17.3	18.3	86.8
Heat Flux-Btu/Hr/ft2	17	1376	1387	1399	1366	24864	26270	17506	6122	6367
Wall Temp. #3-F	209.8	213.4	213.9	214.6	215.3	229.2	229.4	228.3	221.1	221.6
Wall Temp. #4-F	210.4	214	214	214.6	216.2	229.2	230	229.1	221.6	221.9
Wall Temp. #5-F	209.9	213.8	213.4	214.6	214.5	229.6	228.6	226.7	220.6	221
Wall Temp. #1-F	78.7	213.6	213.5	214.6	213.9	232.3	230.6	224.5	219.6	218.8
Wall Temp. #2-F	209.3	214	213.5	212.9	213.9	236	230.7	224	220.1	220.1
Instream Temp.-F	210.3	209.3	209.5	209.9	210.1	211	212.6	214.8	215.7	215.6
Avg. Wall Temp.-F	209.9	213.8	213.7	214.6	214.6	230.1	229.9	226.5	220.6	220.7
Avg. Wall DT.-F	0	4.4	4.2	4.6	4.5	18	16.1	10.9	4.6	4.8
Remaining Subcool-F	7.8									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	1733.4	313.7	333.2	301.7	306	1384.5	1634.5	1601.8	1324.3	1328.6
COMPUTED H										
Jallouk	249.5	249.5	249.4	249.4	249.4	249.4	249.4	249.4	249.4	249.3
Szady1(Cudo tube)	309.6	313.9	316.2	318.1	319.9	321.5	323	324.2	325.5	326.8
Szady2	309.6	313.9	316.2	318.1	319.9	321.5	323	324.2	325.5	326.8
(RLIQ)	168401	165555	165702	166013	166161	166893	168239	170166	170969	170861
(F)	1.019	1.033	1.041	1.047	1.053	1.059	1.063	1.067	1.071	1.076
(HLIQ)	309.6	313.9	316.2	318.1	319.9	321.5	323	324.2	325.5	326.8
(HBOIL)	1.4	690.2	654.6	733	705.7	2952.5	2663.4	1820.7	759	788.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.4									
DP Liquid Density-lbm/ft3	90.44									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.162	0.348	0.664	0.76	1.104					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.153	0.304	0.635	0.742	1.178					
Actual DP-ft	2.19	4.39	6.23	8.51	9.98					
Measured TP-Psig	200.4				203.4					
Measured Overall-ft	-5.96									
Computed DP-ft	2.17	4.34	6.52	8.69	10.73					
Friction-ft	0.17	0.34	0.51	0.69	0.85					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.87					

Run#	394									
Test Fluid	R114									
Date:	3/5/93									
Time:	20:35									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	197.1									
Sat. Temperature-F(inlet)	215.3									
Liq. Density-lbm/ft3	73.55	73.72	73.72	73.67	73.6	73.5	73.2	72.85	72.69	72.78
Latent Heat-Btu/lbm	38.59	38.76	38.76	38.71	38.64	38.54	38.25	37.91	37.75	37.84
Specific Heat-Btu/lbm/F	0.285	0.284	0.284	0.284	0.284	0.285	0.285	0.286	0.286	0.286
Liq. Viscosity-lbm/ft-hr	0.417	0.419	0.419	0.418	0.417	0.416	0.413	0.408	0.406	0.407
Liq. Conductivity-Btu/hr-ft-F	0.0257	0.0258	0.0258	0.0258	0.0257	0.0257	0.0255	0.0253	0.0252	0.0252
Liq. Prandtl No.	4.61	4.61	4.61	4.61	4.61	4.61	4.62	4.62	4.62	4.62
Inlet Flow Rate-GPM	6									
Outlet Liq. Flow Rate-GPM	3.6									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	208									
Outlet Liq. Temperature-F	211.8									
Outlet Vap. Temperature-F	213.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	187.3									
Water outlet Temp.-F	198.1									
Inlet G-lbm/hr/ft2	1058062		Temp		207.5	Density	73.89			
Subcooling-F	7.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1	60.6	60.1	60.9	60.3	1444.4	1527	1019.2	354.5	370.6
Heat Loss-Watts	50.9	10.8	12.7	10	9.1	13.5	15.7	17.1	18.1	85.6
Heat Flux-Btu/Hr/ft2	17	1060	1042	1056	1045	25038	26470	17667	6145	6424
Wall Temp. #3-F	209.1	211.8	212	212.9	213.5	227.8	228.2	227.2	219.5	219.9
Wall Temp. #4-F	209.6	212.5	212.1	212.7	214.1	227.8	228.7	227.8	220.6	220.1
Wall Temp. #5-F	209.4	212	211.6	212.9	212.6	228.3	227.6	225.5	219.2	219.4
Wall Temp. #1-F	79.3	212.2	211.6	212.4	212.3	230.9	229.4	223.4	218.4	217.2
Wall Temp. #2-F	208.6	212.2	211.9	211.3	211.9	234.7	229.7	223	218.9	218.3
Instream Temp.-F	209.5	208.5	208.5	208.8	209.2	209.8	211.5	213.5	214.4	213.9
Avg. Wall Temp.-F	209.2	212.2	211.9	212.7	212.7	228.7	228.7	225.4	219.3	219
Avg. Wall DT.-F	0	3.6	3.4	3.9	3.5	17.8	16	11.1	4.6	4.8
Remaining Subcool-F	7.3									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	1733.4	289.6	310.7	272.3	300.6	1409.1	1651.9	1594.3	1323.7	1341.2
COMPUTED H										
Jallouk	249.9	249.9	249.9	249.8	249.8	249.8	249.8	249.8	249.8	249.7
Szady1(Cudo tube)	310.2	314.5	316.8	318.7	320.5	322.2	323.6	324.9	326.2	327.6
Szady2	310.2	314.5	316.8	318.7	320.5	322.2	323.6	324.9	326.2	327.6
(RLIQ)	166089	165254	165237	165462	165770	166244	167647	169360	170144	169680
(F)	1.019	1.034	1.041	1.048	1.053	1.059	1.064	1.068	1.072	1.077
(HLIQ)	310.2	314.5	316.8	318.7	320.5	322.2	323.6	324.9	326.2	327.6
(HBOIL)	1.4	565.3	521.5	606.2	543.6	2900.1	2636.4	1830.6	755.4	777.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.4									
DP Liquid Density-lbm/ft3	90.44									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.166	0.342	0.654	0.748	1.096					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.147	0.298	0.625	0.73	1.17					
Actual DP-ft	2.19	4.38	6.22	8.5	9.96					
Measured TP-Psig	197.1				200					
Measured Overall-ft	-5.74									
Computed DP-ft	2.17	4.34	6.52	8.69	10.73					
Friction-ft	0.17	0.34	0.51	0.69	0.85					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.87					

Run#	395									
Test Fluid	R114									
Date:	3/5/93									
Time:	20:40									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19696									
Sat. Pressure-Psig	194.8									
Sat. Temperature-F(inlet)	214.3									
Liq. Density-lbm/ft3	73.71	73.88	73.83	73.79	73.71	73.55	73.26	72.96	72.81	72.92
Latent Heat-Btu/lbm	38.74	38.91	38.86	38.83	38.74	38.59	38.3	38.01	37.87	37.97
Specific Heat-Btu/lbm/F	0.284	0.284	0.284	0.284	0.284	0.285	0.285	0.286	0.286	0.286
Liq. Viscosity-lbm/ft-hr	0.419	0.421	0.42	0.42	0.419	0.417	0.413	0.41	0.408	0.409
Liq. Conductivity-Btu/hr-ft-F	0.0258	0.0259	0.0259	0.0258	0.0258	0.0257	0.0255	0.0253	0.0253	0.0253
Liq. Prandtl No.	4.61	4.61	4.61	4.61	4.61	4.61	4.62	4.62	4.62	4.62
Inlet Flow Rate-GPM	6									
Outlet Liq. Flow Rate-GPM	3.7									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	206.9									
Outlet Liq. Temperature-F	211.2									
Outlet Vap. Temperature-F	212.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	185.1									
Water outlet Temp.-F	193.6									
Inlet G-lbm/hr/ft2	1059524		Temp	206.9	Density	74				
Subcooling-F	7.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1	100	100	99.7	99.8	1441.8	1519.1	1012.7	353.3	370
Heat Loss-Watts	50.5	10.9	12.8	10	9	13.3	15.5	17	18	85.2
Heat Flux-Btu/Hr/ft2	17	1733	1733	1728	1730	24983	26333	17554	6124	6414
Wall Temp. #3-F	208.6	212.6	213.5	213.8	214.5	226.7	227.4	226.5	218.6	219.1
Wall Temp. #4-F	209.1	213.3	213.6	213.8	215.3	226.7	227.9	226.9	219.8	219.4
Wall Temp. #5-F	208.6	212.8	212.6	213.9	213.9	227.5	226.8	224.8	218.4	218.7
Wall Temp. #1-F	79.3	212.6	212.5	213.7	213.2	230.3	228.5	222.5	217.6	216.3
Wall Temp. #2-F	207.6	213	212.7	212.4	213	233.7	228.8	222.2	217.8	217.6
Instream Temp.-F	208.6	207.6	207.9	208.1	208.6	209.5	211.2	212.9	213.7	213.1
Avg. Wall Temp.-F	208.5	212.9	213.1	213.8	213.9	227.8	227.9	224.6	218.4	218.2
Avg. Wall DT.-F	0	5.2	5.1	5.6	5.2	17.2	15.5	10.9	4.5	4.8
Remaining Subcool-F	7.4									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	1783.4	333.6	340.1	307.4	334.5	1455.6	1700	1612.5	1372.2	1927.8
COMPUTED H										
Jallouk	250.2	250.2	250.1	250.1	250.1	250.1	250.1	250.1	250	250
Szady1(Cudo tube)	310.5	314.9	317.1	319.1	320.9	322.6	324	325.3	326.6	328
Szady2	310.5	314.9	317.1	319.1	320.9	322.6	324	325.3	326.6	328
(RLIQ)	165588	164765	164986	165129	165513	166227	167624	169067	169754	169208
(F)	1.019	1.034	1.041	1.048	1.054	1.059	1.064	1.068	1.072	1.077
(HLIQ)	310.5	314.9	317.1	319.1	320.9	322.6	324	325.3	326.6	328
(HBOIL)	1.4	812.6	798	883.3	813.3	2795.1	2541.7	1790.5	722.1	779.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.4									
DP Liquid Density-lbm/ft3	90.44									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.157	0.338	0.647	0.743	1.096					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.148	0.294	0.618	0.725	1.17					
Actual DP-ft	2.19	4.38	6.22	8.49	9.94					
Measured TP-Psig	194.8				197.8					
Measured Overall-ft	-5.92									
Computed DP-ft	2.17	4.34	6.52	8.69	10.73					
Friction-ft	0.17	0.34	0.51	0.69	0.85					
Acceleration-ft	0	0	0	0	0.01					
Elevation-ft	2	4	6	8	9.87					

Run#	396									
Test Fluid	R114									
Date:	3/5/93									
Time:	20:45									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	193.2									
Sat. Temperature-F(inlet)	213.6									
Liq. Density-lbm/ft3	73.71	73.84	73.81	73.79	73.74	73.6	73.33	73.13	72.94	73.13
Latent Heat-Btu/lbm	38.74	38.88	38.84	38.83	38.78	38.64	38.37	38.18	37.99	38.18
Specific Heat-Btu/lbm/F	0.284	0.284	0.284	0.284	0.284	0.284	0.285	0.285	0.286	0.285
Liq. Viscosity-lbm/ft-hr	0.419	0.42	0.42	0.42	0.419	0.417	0.414	0.412	0.409	0.412
Liq. Conductivity-Btu/hr-ft-F	0.0258	0.0259	0.0259	0.0258	0.0258	0.0257	0.0256	0.0254	0.0253	0.0254
Liq. Prandtl No.	4.61	4.61	4.61	4.61	4.61	4.61	4.62	4.62	4.62	4.62
Inlet Flow Rate-GPM	8									
Outlet Liq. Flow Rate-GPM	4.7									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	207.2									
Outlet Liq. Temperature-F	209.3									
Outlet Vap. Temperature-F	211.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	183.3									
Water outlet Temp.-F	190.5									
Inlet G-lbm/hr/ft2	1412050		Temp	207.1	Density	73.96				
Subcooling-F	6.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1	99.9	100.6	100.3	99.7	1435.8	1514.8	1008.8	352.1	370.2
Heat Loss-Watts	50.5	10.8	12.8	10	9.1	13	15.3	6.8	17.8	84.3
Heat Flux-Btu/Hr/ft2	17	1732	1744	1739	1728	24889	26258	17487	6103	6417
Wall Temp. #3-F	208.3	212.3	212.4	212.8	213.1	225.8	226.6	225.2	217.4	217.9
Wall Temp. #4-F	208.9	212.7	212.6	212.8	214.1	225.8	226.6	225.8	218.3	217.9
Wall Temp. #5-F	208.6	212.1	211.7	212.8	212.5	226.5	225.6	223.5	217.3	217.4
Wall Temp. #1-F	79.1	212.3	211.8	212.8	212.3	229.2	227.5	221.3	216.7	214.9
Wall Temp. #2-F	207.9	212.3	211.9	211.3	212.3	232.8	227.5	220.8	216.7	216.2
Instream Temp.-F	208.6	207.8	208	208.1	208.4	209.2	210.8	211.9	213	211.9
Avg. Wall Temp.-F	208.4	212.4	212.2	212.8	212.8	226.8	226.8	223.3	217.3	216.9
Avg. Wall DT.-F	0	4.5	4.1	4.6	4.3	16.5	14.8	10.6	4	4.7
Remaining Subcool-F	6.4									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	1739.4	383	425.7	376.2	399.9	1508.4	1777.4	1645.1	1524.8	1974.1
COMPUTED H										
Jallouk	314.8	314.8	314.8	314.7	314.7	314.7	314.7	314.6	314.6	314.6
Szady1(Cudo tube)	390.7	396.2	399.1	401.6	403.9	405.9	407.7	409.5	411.1	413
Szady2	390.7	396.2	399.1	401.6	403.9	405.9	407.7	409.5	411.1	413
(RLIQ)	220682	219796	219986	220071	220368	221208	222948	224167	225414	224123
(F)	1.019	1.034	1.041	1.048	1.054	1.059	1.064	1.068	1.072	1.077
(HLIQ)	390.7	396.2	399.1	401.6	403.9	405.9	407.7	409.5	411.1	413
(HBOIL)	1.4	705.5	638.3	722.7	675.9	2678.6	2415.3	1736	643.2	747.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.4									
DP Liquid Density-lbm/ft3	90.44									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.092	0.188	0.416	0.358	0.552					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.083	0.144	0.387	0.34	0.626					
Actual DP-ft	2.31	4.66	6.66	9.22	10.98					
Measured TP-Psig	193.2				196					
Measured Overall-ft	-5.51									
Computed DP-ft	2.29	4.58	6.87	9.16	11.31					
Friction-ft	0.29	0.57	0.86	1.15	1.42					
Acceleration-ft	0	0	0.01	0.01	0.01					
Elevation-ft	2	4	6	8	9.87					

Run#	397									
Test Fluid	R114									
Date:	3/5/93									
Time:	20:50									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	191.5									
Sat. Temperature-F(inlet)	212.9									
Liq. Density-lbm/ft3	73.77	73.91	73.88	73.91	73.83	73.72	73.46	73.22	73.13	73.24
Latent Heat-Btu/lbm	38.81	38.94	38.91	38.94	38.86	38.76	38.51	38.27	38.18	38.28
Specific Heat-Btu/lbm/F	0.284	0.284	0.284	0.284	0.284	0.284	0.285	0.285	0.285	0.285
Liq. Viscosity-lbm/ft-hr	0.419	0.421	0.421	0.421	0.42	0.419	0.416	0.413	0.412	0.413
Liq. Conductivity-Btu/hr-ft-F	0.0258	0.0259	0.0259	0.0259	0.0259	0.0258	0.0256	0.0255	0.0254	0.0255
Liq. Prandtl No.	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.62	4.62	4.62
Inlet Flow Rate-GPM	8									
Outlet Liq. Flow Rate-GPM	4.7									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	206.6									
Outlet Liq. Temperature-F	209.2									
Outlet Vap. Temperature-F	210.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	181.3									
Water outlet Temp.-F	188									
Inlet G-lbm/hr/ft2	1414642		Temp		206.3	Density		74.1		
Subcooling-F	6.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1	80.8	81.2	80.5	79.2	1433.2	1512.5	1005.8	354	370.8
Heat Loss-Watts	50.1	10.7	12.6	10	9.1	12.7	15.2	16.6	17.7	83.6
Heat Flux-Btu/Hr/ft2	17	1402	1408	1395	1373	24844	26218	17435	6136	6428
Wall Temp. #3-F	207.7	210.7	211.2	211.5	211.8	225.2	225.9	224.5	216.7	217
Wall Temp. #4-F	208.2	211.3	211.4	211.5	212.6	225.3	226.1	224.9	217.8	217.4
Wall Temp. #5-F	208.2	210.7	210.6	211.5	211.2	226	225	222.9	216.7	216.5
Wall Temp. #1-F	79.2	210.7	210.6	211.5	210.9	228.5	226.7	220.8	215.8	214.5
Wall Temp. #2-F	207.3	211.2	210.7	209.9	210.9	231.9	227	220.3	216.2	215.5
Instream Temp.-F	208.2	207.4	207.6	207.4	207.9	208.5	210	211.4	211.9	211.3
Avg. Wall Temp.-F	207.9	211	211	211.5	211.4	226.3	226.1	222.7	216.6	216.2
Avg. Wall DT.-F	0	3.5	3.3	4	3.4	16.6	15	10.5	4.5	4.6
Remaining Subcool-F	6.3									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	1793.4	399.3	425.1	345.7	399.3	1494.1	1759.1	1661.7	1975	1400.5
COMPUTED H										
Jallouk	315.3	315.2	315.2	315.2	315.2	315.1	315.1	315.1	315.1	315
Szady1(Cudo tube)	391.3	396.8	399.7	402.2	404.5	406.6	408.4	410.1	411.9	413.7
Szady2	391.3	396.8	399.7	402.2	404.5	406.6	408.4	410.1	411.9	413.7
(RLIQ)	220658	219777	219966	219733	220240	220858	222468	224010	224556	223852
(F)	1.019	1.034	1.041	1.048	1.054	1.059	1.064	1.068	1.073	1.078
(HLIQ)	391.3	396.8	399.7	402.2	404.5	406.6	408.4	410.1	411.9	413.7
(HSOIL)	1.3	543.3	512.2	626.7	533.1	2688.5	2433.7	1707.5	713.6	731.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.7									
DP Liquid Density-lbm/ft3	90.41									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.089	0.183	0.409	0.349	0.538					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.08	0.139	0.38	0.331	0.612					
Actual DP-ft	2.31	4.66	6.66	9.23	10.99					
Measured TP-Psig	191.5				194.2					
Measured Overall-ft	-5.31									
Computed DP-ft	2.29	4.58	6.87	9.16	11.31					
Friction-ft	0.29	0.57	0.86	1.15	1.43					
Acceleration-ft	0	0	0.01	0.01	0.01					
Elevation-ft	2	4	6	8	9.87					

Run#	398									
Test Fluid	R114									
Date:	3/5/93									
Time:	21:01									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	190.1									
Sat. Temperature-F(inlet)	212.3									
Liq. Density-lbm/ft3	73.96	74.06	74.06	74	73.91	73.81	73.53	73.33	73.22	73.34
Latent Heat-Btu/lbm	38.99	39.09	39.09	39.03	38.94	38.84	38.57	38.37	38.27	38.39
Specific Heat-Btu/lbm/F	0.284	0.284	0.284	0.284	0.284	0.284	0.285	0.285	0.285	0.285
Liq. Viscosity-lbm/ft-hr	0.422	0.423	0.423	0.422	0.421	0.42	0.416	0.414	0.413	0.414
Liq. Conductivity-Btu/hr-ft-F	0.0259	0.026	0.026	0.026	0.0259	0.0259	0.0257	0.0256	0.0255	0.0256
Liq. Prandtl No.	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.62	4.62	4.62
Inlet Flow Rate-GPM	8									
Outlet Liq. Flow Rate-GPM	4.7									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	206									
Outlet Liq. Temperature-F	208.4									
Outlet Vap. Temperature-F	209.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	180.1									
Water outlet Temp.-F	186									
Inlet G-lbm/hr/ft2	1414642		Temp	206.3	Density	74.1				
Subcooling-F	6.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1	120	120	120	120	1420.5	1464.9	943.4	203.6	246.9
Heat Loss-Watts	49.6	10.7	12.7	10	9.1	12.5	15	16.5	17.6	83.2
Heat Flux-Btu/Hr/ft2	17	2080	2080	2080	2080	24623	25393	16353	3529	4280
Wall Temp. #3-F	207.1	211.5	211.8	212.6	212.7	224.4	225.1	224.1	216.2	216.5
Wall Temp. #4-F	207.7	212.1	212	212.6	213.5	224.3	225.6	224.4	216.9	216.6
Wall Temp. #5-F	207.1	211.3	211.2	212.6	212.3	225.4	224.5	222.2	215.9	216
Wall Temp. #1-F	79.1	211.3	211.2	212	211.9	227.9	226.2	220.2	215.3	213.9
Wall Temp. #2-F	206.8	211.8	211.2	211	211.7	231.4	226.5	220	215.3	214.7
Instream Temp.-F	207.1	206.5	206.5	206.9	207.4	208	209.6	210.8	211.4	210.7
Avg. Wall Temp.-F	207.2	211.7	211.6	212.5	212.4	225.5	225.6	222.2	215.9	215.5
Avg. Wall DT.-F	0.1	5.1	5	5.5	4.9	16.4	14.8	10.6	4.4	4.6
Remaining Subcool-F	6.3									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	233.6	409.4	419.7	381.3	428.4	1502.6	1712	1536.8	809.4	921.1
COMPUTED H										
Jallouk	315.3	315.2	315.2	315.2	315.2	315.1	315.1	315.1	315.1	315
Szady1(Cudo tube)	391.4	396.9	399.8	402.3	404.6	406.7	408.5	410.2	411.9	413.8
Szady2	391.4	396.9	399.8	402.3	404.6	406.7	408.5	410.2	411.9	413.8
(RLIQ)	219495	218838	218816	219210	219711	220324	222028	223334	223988	223178
(F)	1.02	1.034	1.041	1.048	1.054	1.059	1.064	1.069	1.073	1.078
(HLIQ)	391.4	396.9	399.8	402.3	404.6	406.7	408.5	410.2	411.9	413.8
(HBOIL)	10.4	789.1	769.2	850.7	757.2	2641	2407.4	1725.9	694.7	738.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.7									
DP Liquid Density-lbm/ft3	90.41									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.087	0.18	0.402	0.339	0.533					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.078	0.136	0.373	0.321	0.607					
Actual DP-ft	2.31	4.68	6.66	9.23	10.98					
Measured TP-Psig	190.1				193.1					
Measured Overall-ft	-5.89									
Computed DP-ft	2.29	4.58	6.86	9.16	11.3					
Friction-ft	0.29	0.57	0.86	1.15	1.42					
Acceleration-ft	0	0	0.01	0.01	0.01					
Elevation-ft	2	4	6	8	9.87					

Run#	399									
Test Fluid	R114									
Date:	3/5/93									
Time:	21:11									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	172.7									
Sat. Temperature-F(inlet)	204.3									
Liq. Density-lbm/ft3	74.77	74.7	74.58	74.53	74.55	74.52	74.47	74.5	74.52	74.68
Latent Heat-Btu/lbm	39.78	39.71	39.6	39.55	39.57	39.54	39.49	39.52	39.54	39.7
Specific Heat-Btu/lbm/F	0.282	0.282	0.282	0.283	0.283	0.283	0.283	0.283	0.283	0.282
Liq. Viscosity-lbm/ft-hr	0.431	0.43	0.429	0.428	0.428	0.428	0.428	0.428	0.428	0.43
Liq. Conductivity-Btu/hr-ft-F	0.0264	0.0264	0.0263	0.0263	0.0263	0.0263	0.0263	0.0263	0.0263	0.0264
Liq. Prandtl No.	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Inlet Flow Rate-GPM	5.7									
Outlet Liq. Flow Rate-GPM	2.9									
Outlet Vap. Flow Rate-GPM	1.5									
Inlet Temperature-F	200.6									
Outlet Liq. Temperature-F	202.1									
Outlet Vap. Temperature-F	201.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	65.6									
Water outlet Temp.-F	198.8									
Inlet G-lbm/hr/ft2	1027453		Temp	197.6	Density	75.53				
Subcooling-F	3.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1162.6	1170.1	1147.2	1147	1150.5	1151.5	1147.9	1156	1148.1	1147.6
Heat Loss-Watts	52.5	11	13	10	9.2	9.5	12.9	15.1	17.3	81.6
Heat Flux-Btu/Hr/ft2	20153	20283	19886	19883	19943	19961	19898	20039	19902	19893
Wall Temp. #3-F	214.5	217.2	214.9	215.3	218.7	215.6	214.3	216.1	216.1	217.2
Wall Temp. #4-F	214.9	214.1	216.8	216.6	217.3	215.6	214.1	216.1	217.4	216.3
Wall Temp. #5-F	214.1	212.6	217.5	215.4	215.3	216.3	213.3	214.3	213.6	215.3
Wall Temp. #1-F	80.5	215.7	213.5	215.1	214.9	218.6	216.2	213.9	213.1	210.5
Wall Temp. #2-F	215.7	215.4	214.7	217.3	215.1	221.1	216.1	213.4	214.8	213.3
Instream Temp.-F	202.3	202.7	203.4	203.7	203.6	203.8	204.1	203.9	203.8	202.8
Avg. Wall Temp.-F	214.8	215.6	215	215.6	215.7	216.5	214.8	214.8	215	214.5
Avg. Wall DT.-F	11.6	12	10.7	11	11.1	11.8	9.8	10	10.3	10.8
Remaining Subcool-F	-0.4									
Exit Quality	0	0.03	0.06	0.09	0.12	0.15	0.18	0.2	0.23	0.26
EXP. H-Btu/Hr/ft2/F	1738.9	1692.6	1862.6	1807.3	1788.8	1688.3	2030.3	2013	1932.1	0
COMPUTED H										
Jallouk	1233.2	1176.9	1127.4	1097.3	1068.5	1053	1036.5	1023.6	1004.6	984.9
Szady1(Cudo tube)	1767.9	1777.7	1766.7	1771.5	1777.5	1783	1785.6	1795.1	1793.2	1793.5
Szady2	1658	1668.5	1681.5	1686.1	1691.4	1696.4	1697.9	1706.8	1702.1	1699.1
(RLIQ)	155738	153552	149523	145241	140673	136286	131956	127308	122723	117679
(F)	1.09	1.42	1.74	1.974	2.172	2.343	2.496	2.642	2.777	2.916
(HLIQ)	324.1	421.9	517.3	586.7	645.5	696.4	741.9	785.2	825.4	868.5
(HBOIL)	1764.3	1769.7	1751.8	1749.8	1748.6	1746.8	1741.8	1743.5	1732.9	1723.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	82.2									
DP Liquid Density-lbm/ft3	90.36									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.151	0.702	1.14	1.486	1.975					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.142	0.658	1.111	1.468	2.049					
Actual DP-ft	2.15	3.57	5.12	6.85	8					
Measured TP-Psig	172.7				178.1					
Measured Overall-ft	-10.41									
Computed DP-ft	2.21	4.17	6.1	8.08	10.01					
Friction-ft	0.23	0.64	1.2	1.89	2.66					
Acceleration-ft	0.23	0.42	0.59	0.76	0.95					
Elevation-ft	1.75	3.1	4.31	5.43	6.41					

Run#	400									
Test Fluid	R114									
Date:	3/5/93									
Time:	21:34									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	158.4									
Sat. Temperature-F(inlet)	197.4									
Liq. Density-lbm/ft3	76	75.84	75.71	75.61	75.63	75.61	75.52	75.55	75.55	75.77
Latent Heat-Btu/lbm	40.98	40.83	40.7	40.61	40.62	40.61	40.51	40.54	40.54	40.76
Specific Heat-Btu/lbm/F	0.28	0.28	0.28	0.28	0.28	0.28	0.281	0.28	0.28	0.28
Liq. Viscosity-lbm/ft-hr	0.445	0.444	0.442	0.441	0.441	0.441	0.44	0.44	0.44	0.443
Liq. Conductivity-Btu/hr-ft-F	0.0272	0.0271	0.027	0.027	0.027	0.027	0.0269	0.0269	0.0269	0.027
Liq. Prandtl No.	4.58	4.58	4.58	4.59	4.59	4.59	4.59	4.59	4.59	4.58
Inlet Flow Rate-GPM	4.6									
Outlet Liq. Flow Rate-GPM	2.5									
Outlet Vap. Flow Rate-GPM	1.4									
Inlet Temperature-F	193									
Outlet Liq. Temperature-F	195.5									
Outlet Vap. Temperature-F	194.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	58.7									
Water outlet Temp.-F	192.7									
Inlet G-lbm/hr/ft2	842490		Temp	189.9	Density	76.75				
Subcooling-F	4.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1146.9	1144.9	1155.1	1156	1156.1	1148.7	1153.1	1155.8	1151.4	1149.6
Heat Loss-Watts	49.9	10.3	12.4	10	9.2	9.2	12.5	14.5	16.5	77.5
Heat Flux-Btu/Hr/ft2	19881	19846	20023	20039	20040	19912	19988	20035	19959	19928
Wall Temp. #3-F	208	210.7	208.5	209.3	212.7	209.4	208.1	210.1	210.3	210.2
Wall Temp. #4-F	208.6	207.5	210.5	210.6	211.1	209.3	208	210.1	211.4	209.5
Wall Temp. #5-F	207.5	205.8	211.2	209.3	208.9	210	207.3	208.3	207.6	208.7
Wall Temp. #1-F	80.4	209.1	207	209	208.7	212.1	210.1	207.9	207	203.5
Wall Temp. #2-F	209.1	208.7	208.4	211.5	208.9	214.6	210.1	207.6	208.9	206.6
Instream Temp.-F	194.7	195.7	196.5	197.1	197	197.1	197.7	197.5	197.5	196.1
Avg. Wall Temp.-F	208.3	209	208.6	209.6	209.4	210.2	208.7	208.8	209	207.7
Avg. Wall DT.-F	12.7	12.4	11.2	11.5	11.5	12.2	10.1	10.4	10.6	10.7
Remaining Subcool-F	-0.6									
Exit Quality	0	0.04	0.07	0.11	0.14	0.17	0.21	0.24	0.28	0.31
EXP. H-Btu/Hr/ft2/F	1565.2	1600.1	1788.5	1735.8	1743.5	1632.1	1975.8	1927.5	1876.2	0
COMPUTED H										
Jallouk	1223.7	1168.5	1142.5	1112.8	1087.7	1058.3	1048.5	1035.5	1020.3	1005.8
Szady1(Cudo tube)	1724.4	1728.4	1742	1748	1750.8	1749	1758	1762.9	1763.6	1761.6
Szady2	1627.2	1638.4	1656.6	1637.3	1637.9	1630.8	1638.6	1642.4	1685.3	1660.2
(RLIQ)	123496	121668	117851	113878	109546	105317	101304	96921	92624	87820
(F)	1.125	1.491	1.854	2.122	2.349	2.547	2.72	2.887	3.042	3.207
(HLIQ)	285.2	378.1	470.1	538	595.7	645.9	689.7	732.2	771.3	813.2
(HBOIL)	1721.8	1722.4	1730.5	1730.8	1727.5	1719.1	1721.9	1719.8	1712.9	1701.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	82.8									
DP Liquid Density-lbm/ft3	90.29									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.181	0.876	1.365	1.795	2.36					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.172	0.832	1.336	1.777	2.434					
Actual DP-ft	2.06	3.19	4.61	6.16	7.14					
Measured TP-Psig	158.4				164.2					
Measured Overall-ft	-11.02									
Computed DP-ft	2.03	3.74	5.42	7.13	8.79					
Friction-ft	0.17	0.52	1	1.61	2.3					
Acceleration-ft	0.18	0.33	0.48	0.63	0.8					
Elevation-ft	1.67	2.89	3.94	4.88	5.7					

Run#	401									
Test Fluid	R114									
Date:	3/5/93									
Time:	22:36									
Note	TABOREK	Analytical dt								
✓ Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	170.4									
Sat. Temperature-F(inlet)	203.2									
Liq. Density-lbm/ft3	75.05	74.8	74.67	74.67	74.67	74.63	74.62	74.63	74.65	74.8
Latent Heat-Btu/lbm	40.05	39.81	39.68	39.68	39.68	39.65	39.63	39.65	39.67	39.81
✓ Specific Heat-Btu/lbm/F	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282
Liq. Viscosity-lbm/ft-hr	0.434	0.431	0.43	0.43	0.43	0.429	0.429	0.429	0.43	0.431
Liq. Conductivity-Btu/hr-ft-F	0.0266	0.0265	0.0264	0.0264	0.0264	0.0264	0.0263	0.0264	0.0264	0.0265
Liq. Prandtl No.	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Inlet Flow Rate-GPM	3.9									
Outlet Liq. Flow Rate-GPM	2.2									
Outlet Vap. Flow Rate-GPM	1.2									
Inlet Temperature-F	198.8									
Outlet Liq. Temperature-F	126									
Outlet Vap. Temperature-F	201.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	68.9									
Water outlet Temp.-F	189.1									
✓ Inlet G-lbm/hr/ft2	707007		Temp	194.9	Density	75.96				
✓ Subcooling-F	4.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1167.5	1168.8	1152.6	1165	1152.1	1151.4	1147.5	1165.3	734.2	1
Heat Loss-Watts	52.1	10.9	12.9	10	9	9.2	12.9	15.1	16.9	73.4
Heat Flux-Btu/Hr/ft2	20238	20260	19980	20195	19971	19959	19891	20200	12727	17
Wall Temp. #3-F	213.8	216.5	214.2	215	218.5	215.2	213.7	216	213.2	200.9
Wall Temp. #4-F	214.1	213.4	216.1	216.3	216.8	215.2	213.5	216.2	214.3	201.1
Wall Temp. #5-F	213.3	211.7	216.9	215	214.8	216	212.7	214.1	212.1	202.1
Wall Temp. #1-F	80.9	214.9	212.8	214.8	214.4	218.2	215.6	213.5	211	202
Wall Temp. #2-F	214.9	214.4	213.9	217.3	214.6	220.7	215.6	213.1	211.9	202.3
Instream Temp.-F	200.6	202.1	202.9	202.9	202.9	203.1	203.2	203.1	203	202.1
Avg. Wall Temp.-F	214	214.8	214.3	215.3	215.2	216.2	214.2	214.6	212.5	201.7
Avg. Wall DT.-F	12.5	11.8	10.4	11.5	11.3	12.1	10.1	10.6	8.9	-0.4
Remaining Subcool-F	-1.5									
Exit Quality	0.01	0.05	0.09	0.14	0.18	0.22	0.26	0.3	0.33	0.33
EXP. H-Btu/Hr/ft2/F	1617.7	1719.3	1912.5	1761.8	1759.9	1643	1969.2	1911.6	1426	0
COMPUTED H										
Jallouk	1279.2	1221.6	1176.4	1165.3	1133.2	1113.9	1095.5	1089.6	851.5	466.5
Szady1(Cudo tube)	1763.4	1772.3	1765.5	1777.2	1769.8	1772.6	1772.7	1788.5	1436.2	718.5
Szady2	1658.9	1684.8	1680.4	1693	1683.8	1688.4	1685.7	1702.8	1251	718.5
(RLIQ)	105917	103800	99682	95175	90662	86254	81808	77257	73517	71791
(F)	1.216	1.604	1.972	2.253	2.491	2.686	2.883	3.059	3.196	3.26
(HLIQ)	268.1	353.5	434.6	496.6	548.9	594.2	635.4	674.2	704.3	718.5
(HBOIL)	1761.4	1767.6	1756.7	1764.2	1752	1750	1745	1756	1377.4	25.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.3									
DP Liquid Density-lbm/ft3	90.24									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.174	1.063	1.622	2.182	2.916					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.165	1.019	1.593	2.164	2.99					
Actual DP-ft	2.1	2.86	4.17	5.49	6.16					
Measured TP-Psig	170.4				177					
Measured Overall-ft	-12.71									
Computed DP-ft	1.88	3.43	4.91	6.41	7.92					
Friction-ft	0.14	0.43	0.83	1.34	1.75					
Acceleration-ft	0.15	0.27	0.39	0.52	0.57					
Elevation-ft	1.59	2.73	3.69	4.55	5.6					

3152.

Run#	402									
Test Fluid	R114									
Date:	3/5/93									
Time:	22:42									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	139.6									
Sat. Temperature-F(inlet)	187.5									
Liq. Density-lbm/ft3	77.01	77.04	77.11	77.08	77.11	77.08	77.02	77.05	77.07	77.21
Latent Heat-Btu/lbm	41.97	42	42.07	42.04	42.07	42.04	41.98	42.01	42.03	42.16
Specific Heat-Btu/lbm/F	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277
Liq. Viscosity-lbm/ft-hr	0.457	0.458	0.459	0.458	0.459	0.458	0.458	0.458	0.458	0.46
Liq. Conductivity-Btu/hr-ft-F	0.0278	0.0278	0.0279	0.0279	0.0279	0.0279	0.0278	0.0278	0.0278	0.0279
Liq. Prandtl No.	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56
Inlet Flow Rate-GPM	2.9									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	1.2									
Inlet Temperature-F	187									
Outlet Liq. Temperature-F	186.7									
Outlet Vap. Temperature-F	186.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	58.1									
Water outlet Temp.-F	185.6									
Inlet G-lbm/hr/ft2	540946		Temp		180.5	Density	78.16			
Subcooling-F	0.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1364.2	1149.1	1138.1	1132.4	1173.2	1171.9	1151.1	1156.8	362	1
Heat Loss-Watts	45.1	9.4	11.5	10	9.5	9.5	11.8	13.7	14.2	65
Heat Flux-Btu/Hr/ft2	23648	19919	19728	19629	20337	20314	19954	20052	6275	17
Wall Temp. #3-F	199.6	202.3	199.7	200.6	204.4	201.1	199.6	202.4	194.7	185.7
Wall Temp. #4-F	199.8	198.9	201.9	202	202.4	201.1	199.5	202.5	195.6	186
Wall Temp. #5-F	199	196.9	202.8	200.9	200.5	201.8	198.5	201	194.4	186.7
Wall Temp. #1-F	80.5	200.2	198.5	200.7	200	204	201.5	201	193.6	187
Wall Temp. #2-F	200.3	199.9	199.5	203.3	200.4	206.9	201.4	200.8	193.9	187.1
Instream Temp.-F	188.2	188	187.5	187.7	187.5	187.7	188.1	187.9	187.8	186.9
Avg. Wall Temp.-F	199.7	200.3	199.9	201.1	200.8	202	200.1	201.5	194.4	186.5
Avg. Wall DT.-F	10.4	11.4	11.5	12.5	12.4	13.4	11.1	12.7	6.4	-0.4
Remaining Subcool-F	-8.7									
Exit Quality	0.06	0.11	0.16	0.21	0.26	0.32	0.37	0.42	0.43	0.43
EXP. H-Btu/Hr/ft2/F	2272.4	1743.5	1714.2	1575	1639.3	1518	1797.9	1574.7	987.2	0
COMPUTED H										
Jallouk	1345.4	1162.1	1126.2	1108.7	1110.1	1092.7	1069.1	1052.7	618.2	447.4
Szady1(Cudo tube)	1863	1717.2	1694.6	1693.2	1724.8	1727.1	1716.1	1722.3	1012.4	696.8
Szady2	1803.6	1605.4	1571.7	1575.1	1630.3	1606.1	1604.1	1611.3	815.1	696.8
(RLIQ)	75129	70856	66758	62902	58878	54889	50975	46946	44304	43507
(F)	1.618	2.141	2.502	2.787	3.066	3.307	3.525	3.737	3.87	3.919
(HLIQ)	287.7	380.7	445	497.5	545.1	588.2	626.9	664.6	688.3	696.8
(HBOIL)	1860.7	1711	1684.3	1678.8	1706.5	1704.1	1687.8	1688.6	892.7	23.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.6									
DP Liquid Density-lbm/ft3	90.21									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.229	1.386	1.998	2.692	3.496					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.22	1.342	1.969	2.674	3.57					
Actual DP-ft	1.93	2.17	3.34	4.36	4.88					
Measured TP-Psig	139.6				146					
Measured Overall-ft	-11.94									
Computed DP-ft	1.51	2.77	4.01	5.26	6.72					
Friction-ft	0.15	0.42	0.79	1.25	1.53					
Acceleration-ft	0.15	0.25	0.36	0.5	0.52					
Elevation-ft	1.21	2.11	2.86	3.52	4.67					

Run#	403									
Test Fluid	R114									
Date:	3/5/93									
Time:	23:17									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	169.6									
Sat. Temperature-F(inlet)	202.8									
Liq. Density-lbm/ft3	74.7	74.67	74.72	74.68	74.7	74.63	74.6	74.62	74.63	74.78
Latent Heat-Btu/lbm	39.71	39.68	39.73	39.7	39.71	39.65	39.62	39.63	39.65	39.8
Specific Heat-Btu/lbm/F	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282
Liq. Viscosity-lbm/ft-hr	0.43	0.43	0.43	0.43	0.43	0.429	0.429	0.429	0.429	0.431
Liq. Conductivity-Btu/hr-ft-F	0.0264	0.0264	0.0264	0.0264	0.0264	0.0264	0.0263	0.0263	0.0264	0.0264
Liq. Prandtl No.	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
Inlet Flow Rate-GPM	2									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	1.1									
Inlet Temperature-F	201									
Outlet Liq. Temperature-F	202.1									
Outlet Vap. Temperature-F	201.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	66									
Water outlet Temp.-F	199.1									
Inlet G-lbm/hr/ft2	365561		Temp	190.9	Density	76.59				
Subcooling-F	1.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1128.7	1150.3	1141.9	1140.1	1144.5	1147.6	939.2	154.9	139.3	116.2
Heat Loss-Watts	52	10.8	12.9	10	9	9.5	12.9	14.3	16.1	76.9
Heat Flux-Btu/Hr/ft2	19565	19940	19794	19763	19839	19893	16280	2685	2415	2014
Wall Temp. #3-F	213.1	216.1	214.1	214.5	218.3	215.9	214	207.3	206.4	206.6
Wall Temp. #4-F	213.5	213	216.1	215.7	216.7	215.8	214	207.3	207.3	207
Wall Temp. #5-F	212.8	211.1	216.8	214.6	214.4	216.4	212.5	206.8	207	207.3
Wall Temp. #1-F	81.1	214.1	212.3	214.4	213.9	218.6	215.1	207	206.3	206.4
Wall Temp. #2-F	213.9	213.6	213.5	216.7	214.2	221	215	207.2	206	206.8
Instream Temp.-F	202.7	202.9	202.6	202.8	202.7	203.1	203.3	203.2	203.1	202.2
Avg. Wall Temp.-F	213.3	214.2	214	214.8	214.8	216.7	214.1	207.1	206.6	206.8
Avg. Wall DT.-F	9.7	10.4	10.5	11.1	11.2	12.7	10.1	3.8	3.4	4.5
Remaining Subcool-F	-9.3									
Exit Quality	0.07	0.15	0.23	0.31	0.39	0.47	0.53	0.54	0.55	0.56
EXP. H-Btu/Hr/ft2/F	2008.6	1917.5	1884.2	1779.3	1770.8	1569.3	1614.4	706.9	712.1	0
COMPUTED H										
Jallouk	1322.7	1285.8	1234.4	1212.9	1198.7	1189	152.1	152	152	151.7
Szady1(Cudo tube)	1742.1	1760.5	1753.6	1754.2	1758.3	1763.7	152.1	152	152	151.7
Szady2	1655	1675.8	1687.2	1687.9	1672	1678.3	152.1	152	152	151.7
(RLIQ)	53750	49728	45204	40805	36345	31945	31945	31945	31945	31945
(F)	1.615	2.196	2.641	2.996	3.31	3.587	3.587	3.587	3.587	3.587
(HLIQ)	209.9	285.5	343.3	389.6	430.3	466.4	466.4	466.4	466.4	466.4
(HBOIL)	1741.1	1758	1749.2	1747.7	1749.6	1752.7	1752.7	1752.7	1752.7	1752.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.8									
DP Liquid Density-lbm/ft3	90.19									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.192	1.614	2.371	3.217	4.083					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.183	1.57	2.342	3.199	4.157					
Actual DP-ft	2.06	1.8	2.73	3.49	3.9					
Measured TP-Psig	169.6				177.3					
Measured Overall-ft	-14.83									
Computed DP-ft	1.36	2.41	3.35	4.49	5.78					
Friction-ft	0.08	0.23	0.43	0.62	0.76					
Acceleration-ft	0.07	0.14	0.23	0.27	0.28					
Elevation-ft	1.21	2.04	2.69	3.6	4.74					

Run#	404									
Test Fluid	R114									
Date:	3/6/93									
Time:	0:36									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	152.9									
Sat. Temperature-F(inlet)	194.6									
Liq. Density-lbm/ft3	76.04	75.96	76	75.98	76	75.93	75.84	75.84	75.84	76.01
Latent Heat-Btu/lbm	41.03	40.95	40.98	40.97	40.98	40.92	40.83	40.83	40.83	41
Specific Heat-Btu/lbm/F	0.279	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
Liq. Viscosity-lbm/ft-hr	0.446	0.445	0.445	0.445	0.445	0.445	0.444	0.444	0.444	0.446
Liq. Conductivity-Btu/hr-ft-F	0.0272	0.0272	0.0272	0.0272	0.0272	0.0271	0.0271	0.0271	0.0271	0.0272
Liq. Prandtl No.	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58
Inlet Flow Rate-GPM	1.2									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	191									
Outlet Liq. Temperature-F	194.2									
Outlet Vap. Temperature-F	193.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	67.4									
Water outlet Temp.-F	191.9									
Inlet G-lbm/hr/ft2	224889		Temp	178	Density	78.53				
Subcooling-F	3.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1161.6	1169.6	1156	1148.5	1151.4	1153.6	807.6	115.1	166.8	209
Heat Loss-Watts	48	10	12.1	10	9.3	9.3	15.2	13.8	15.2	72.6
Heat Flux-Btu/Hr/ft2	20136	20274	20039	19909	19959	19997	13999	1995	2891	3623
Wall Temp. #3-F	204.9	208.1	205.4	206.9	211.2	206.9	244	200.6	200.9	200.5
Wall Temp. #4-F	205.2	204.8	207.6	208.2	209.5	206.8	243.5	200.6	201.7	200.6
Wall Temp. #5-F	204.4	202.5	208.8	207	207.1	206.7	229.6	200.9	201.2	200.3
Wall Temp. #1-F	81	205.3	204.1	206.4	206.1	210.7	214	205.3	200.7	199
Wall Temp. #2-F	205.8	205.1	205.1	209	206.6	213.1	213.9	205.2	200.5	199.7
Instream Temp.-F	194.4	194.9	194.7	194.8	194.7	195.1	195.7	195.7	195.7	194.6
Avg. Wall Temp.-F	205.1	205.8	205.6	207.1	207.3	207.8	229	202.5	201	200
Avg. Wall DT.-F	9.8	10	9.9	11.4	11.7	11.8	32.7	6.7	5.2	5.3
Remaining Subcool-F	-15.2									
Exit Quality	0.1	0.23	0.36	0.49	0.61	0.74	0.83	0.84	0.86	0.88
EXP. H-Btu/Hr/ft2/F	2062	2025.7	2015.1	1742.5	1702.5	1698.8	428.5	296.5	559.3	0
COMPUTED H										
Jallouk	1376.3	1324.6	1278.2	1237.1	1224.6	101.2	101.3	101.3	101.3	101.1
Szady1(Cudo tube)	1747.8	1756.2	1746.5	1726.7	1729.3	101.2	101.3	101.3	101.3	101.1
Szady2	1630.1	1639.6	1632	1630.4	1632.8	101.2	101.3	101.3	101.3	101.1
(RLIQ)	31283	27508	23253	19064	14869	14869	14869	14869	14869	14869
(F)	1.837	2.626	3.234	3.726	4.168	4.168	4.168	4.168	4.168	4.168
(HLIQ)	161.9	231.5	285.1	328.5	367.4	367.4	367.4	367.4	367.4	367.4
(HBOIL)	1747.4	1754.8	1744	1722.7	1723.8	1723.8	1723.8	1723.8	1723.8	1723.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.7									
DP Liquid Density-lbm/ft3	90.2									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.194	1.949	2.73	3.702	4.665					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.185	1.905	2.701	3.684	4.739					
Actual DP-ft	2.02	1.14	2	2.51	2.74					
Measured TP-Psig	152.9				160.9					
Measured Overall-ft	-15.16									
Computed DP-ft	1.12	1.87	2.5	3.39	4.34					
Friction-ft	0.04	0.13	0.26	0.36	0.44					
Acceleration-ft	0.04	0.1	0.17	0.21	0.23					
Elevation-ft	1.03	1.64	2.07	2.82	3.67					

Run#	405									
Test Fluid	R114									
Date:	3/6/93									
Time:	0:55									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	125.9									
Sat. Temperature-F(inlet)	179.8									
Liq. Density-lbm/ft3	78.19	78.12	78.21	78.18	78.22	78.18	78.09	78.1	78.12	78.22
Latent Heat-Btu/lbm	43.13	43.06	43.14	43.11	43.16	43.11	43.03	43.04	43.06	43.16
Specific Heat-Btu/lbm/F	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.474	0.473	0.474	0.473	0.474	0.473	0.472	0.472	0.473	0.474
Liq. Conductivity-Btu/hr-ft-F	0.0285	0.0285	0.0286	0.0285	0.0286	0.0285	0.0285	0.0285	0.0285	0.0286
Liq. Prandtl No.	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56
Inlet Flow Rate-GPM	1.03									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	176.3									
Outlet Liq. Temperature-F	120.4									
Outlet Vap. Temperature-F	179.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	64.8									
Water outlet Temp.-F	177.7									
Inlet G-lbm/hr/ft2	198233		Temp		163	Density	80.65			
Subcooling-F	3.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1161.2	1162.2	1149.8	1162.4	1154.4	1160.8	759	118.4	186	174.4
Heat Loss-Watts	40.7	8.6	10.8	10	9.8	9.8	12.2	13.1	16.8	85.8
Heat Flux-Btu/Hr/ft2	20129	20146	19931	20149	20011	20122	13157	2052	3224	3023
Wall Temp. #3-F	191.2	194.2	191.6	193.1	197.4	192.6	222.8	193.4	215.4	214.7
Wall Temp. #4-F	191.5	191	193.7	194.6	195.5	192.6	222.4	193.1	216.5	215
Wall Temp. #5-F	190.8	188.6	195.8	193.2	193.1	192.5	197.8	192.5	210.7	222.6
Wall Temp. #1-F	80.4	191.4	190.5	192.6	192.2	196.3	192.7	197.4	204.3	221.7
Wall Temp. #2-F	192.2	191.3	191.3	195.6	192.7	199.2	192.7	197.3	203.8	221.9
Instream Temp.-F	180.3	180.8	180.2	180.4	180.1	180.4	181	180.9	180.8	180.1
Avg. Wall Temp.-F	191.4	192	191.8	193.4	193.4	193.5	205.6	194.7	210.1	219.2
Avg. Wall DT.-F	10.2	10.3	10.7	12.1	12.4	12.2	24	13.7	29.2	38.9
Remaining Subcool-F	-18.2									
Exit Quality	0.12	0.25	0.39	0.53	0.67	0.8	0.89	0.91	0.93	0.95
EXP. H-Btu/Hr/ft2/F	1970.4	1962.7	1867.2	1670.2	1617.6	1650.6	548.5	149.3	110.4	0
COMPUTED H										
Jallouk	1331.5	1272.8	1226	1200.9	1181.2	88.7	88.8	88.8	88.8	88.6
Szady1(Cudo tube)	1686.3	1690	1679.4	1690.2	1684.4	88.7	88.8	88.8	88.8	88.6
Szady2	1550.7	1555.3	1542.6	1555.1	1548.1	88.7	88.8	88.8	88.8	88.6
(RLIQ)	25796	22372	18550	14802	11017	11017	11017	11017	11017	11017
(F)	1.969	2.875	3.577	4.149	4.674	4.674	4.674	4.674	4.674	4.674
(HLIQ)	156.6	228.6	284.4	329.9	371.6	371.6	371.6	371.6	371.6	371.6
(HBOIL)	1685.9	1688.6	1676.7	1686	1678.4	1678.4	1678.4	1678.4	1678.4	1678.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.6									
DP Liquid Density-lbm/ft3	90.21									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.287	2.051	2.825	3.844	4.844					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.278	2.007	2.796	3.826	4.918					
Actual DP-ft	1.79	0.92	1.77	2.18	2.33					
Measured TP-Psig	125.9				134					
Measured Overall-ft	-14.91									
Computed DP-ft	1.02	1.69	2.24	3.07	3.75					
Friction-ft	0.04	0.13	0.25	0.34	0.43					
Acceleration-ft	0.04	0.1	0.18	0.22	0.24					
Elevation-ft	0.94	1.46	1.81	2.5	3.08					

Run#	406.									
Test Fluid	R114									
Date:	3/6/93									
Time:	1:16									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	111.8									
Sat. Temperature-F(inlet)	171.2									
Liq. Density-lbm/ft3	79.63	79.52	79.56	79.55	79.61	79.58	79.48	79.53	79.55	79.66
Latent Heat-Btu/lbm	44.53	44.42	44.46	44.45	44.5	44.48	44.38	44.43	44.45	44.56
Specific Heat-Btu/lbm/F	0.271	0.272	0.271	0.272	0.271	0.271	0.272	0.272	0.272	0.271
Liq. Viscosity-lbm/ft-hr	0.495	0.494	0.494	0.494	0.495	0.495	0.493	0.494	0.494	0.496
Liq. Conductivity-Btu/hr-ft-F	0.0294	0.0294	0.0294	0.0294	0.0294	0.0294	0.0293	0.0294	0.0294	0.0295
Liq. Prandtl No.	4.57	4.56	4.57	4.57	4.57	4.57	4.56	4.56	4.57	4.57
Inlet Flow Rate-GPM	1.9									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	1.1									
Inlet Temperature-F	168.5									
Outlet Liq. Temperature-F	170.1									
Outlet Vap. Temperature-F	169.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	60									
Water outlet Temp.-F	167.2									
Inlet G-lbm/hr/ft2	367400		Temp	160.2	Density	81.03				
Subcooling-F	2.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1155.3	1161.7	1156.3	1158.3	1156.3	1157.5	1157.8	1152.2	318	204.8
Heat Loss-Watts	36.4	7.8	10	10	10.1	10.1	10.6	12.3	11.8	59.5
Heat Flux-Btu/Hr/ft2	20026	20137	20044	20078	20044	20065	20070	19973	5512	3550
Wall Temp. #3-F	182.8	185.3	182.8	184	188	182.8	184.8	187.4	177.3	175.8
Wall Temp. #4-F	183	182.1	184.8	185.3	186	182.8	184.8	188.4	177.9	175.9
Wall Temp. #5-F	182.2	179.7	186.5	184.2	183.9	183	183.2	188.1	177.4	176.5
Wall Temp. #1-F	79.5	182.7	181.7	183.7	183.1	186.7	185	187.2	177.3	174.5
Wall Temp. #2-F	183.7	182.6	182.6	186.6	183.6	189.6	185	187.3	177.6	176.4
Instream Temp.-F	170.3	171.1	170.8	170.9	170.5	170.7	171.4	171	170.9	170.1
Avg. Wall Temp.-F	182.9	183.2	183	184.3	184.2	183.8	184.6	187.3	177.5	175.6
Avg. Wall DT.-F	11.7	11.2	11.3	12.5	12.7	12.2	12.3	15.4	6.4	5.4
Remaining Subcool-F	-9									
Exit Quality	0.06	0.13	0.2	0.27	0.34	0.42	0.49	0.56	0.58	0.59
EXP. H-Btu/Hr/ft2/F	1708.7	1803.6	1778.6	1607.2	1572.8	1642.2	1637.9	1298.8	868	0
COMPUTED H										
Jallouk	1217	1159	1123	1101.8	1086.4	1071	1060.7	1045.1	560.1	485.4
Szady1(Cudo tube)	1634.7	1644.4	1641.2	1645.2	1644.4	1648.9	1655.3	1653	908.4	775.5
Szady2	1521.2	1531.2	1525.1	1527.8	1524.5	1527.3	1509.7	1506.5	718.7	647.7
(RLIQ)	47167	44243	40680	37196	33634	30170	26760	23214	20976	20111
(F)	1.667	2.331	2.861	3.29	3.672	4.008	4.308	4.614	4.799	4.884
(HLIQ)	216.2	302.4	371.1	426.7	476.2	519.9	559	598.6	622.5	633.3
(HBOIL)	1633.4	1641	1634.8	1635.6	1631	1631.5	1633.8	1626.4	798.2	596.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.3									
DP Liquid Density-lbm/ft3	90.24									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.263	1.66	2.333	3.11	3.962					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.254	1.616	2.304	3.092	4.036					
Actual DP-ft	1.81	1.61	2.63	3.47	3.89					
Measured TP-Psig	111.8				118.2					
Measured Overall-ft	-11.57									
Computed DP-ft	1.29	2.28	3.23	4.17	5.48					
Friction-ft	0.09	0.27	0.53	0.87	1.06					
Acceleration-ft	0.09	0.17	0.27	0.4	0.43					
Elevation-ft	1.12	1.85	2.42	2.9	3.98					

Run#	407									
Test Fluid	R114									
Date:	3/6/93									
Time:	1:44									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	120.9									
Sat. Temperature-F(inlet)	176.8									
Liq. Density-lbm/ft3	78.79	78.66	78.7	78.7	78.75	78.72	78.63	78.69	78.69	78.81
Latent Heat-Btu/lbm	43.71	43.58	43.63	43.63	43.67	43.64	43.56	43.61	43.61	43.72
Specific Heat-Btu/lbm/F	0.273	0.274	0.274	0.274	0.273	0.273	0.274	0.274	0.274	0.273
Liq. Viscosity-lbm/ft-hr	0.482	0.48	0.481	0.481	0.482	0.481	0.48	0.481	0.481	0.483
Liq. Conductivity-Btu/hr-ft-F	0.0289	0.0288	0.0289	0.0289	0.0289	0.0289	0.0288	0.0289	0.0289	0.0289
Liq. Prandtl No.	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56
Inlet Flow Rate-GPM	2.7									
Outlet Liq. Flow Rate-GPM	1.7									
Outlet Vap. Flow Rate-GPM	1.3									
Inlet Temperature-F	174.5									
Outlet Liq. Temperature-F	175.6									
Outlet Vap. Temperature-F	175.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	58.2									
Water outlet Temp.-F	172.4									
Inlet G-lbm/hr/ft2	514919		Temp		168.3	Density	79.91			
Subcooling-F	2.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1151.6	1167	1146.6	1153.4	1160.3	1161.7	1154.4	1148.1	1155	396.3
Heat Loss-Watts	39.3	8.3	10.5	10	9.9	9.9	11	12.9	13.8	64
Heat Flux-Btu/Hr/ft2	19962	20229	19876	19993	20113	20137	20011	19902	20021	6870
Wall Temp. #3-F	188.3	191.1	188.3	189.5	193.3	188.1	190.4	192.5	192.6	184
Wall Temp. #4-F	188.5	187.8	190.4	190.8	191.4	188.1	190.3	193.6	193.3	184.2
Wall Temp. #5-F	187.9	185.3	191.9	189.8	189.4	188.4	188.5	191.2	188.9	184.5
Wall Temp. #1-F	79.9	188.3	187.3	189.2	188.5	192.1	190.5	192.3	188.8	182.7
Wall Temp. #2-F	189.2	188.3	188.1	192.1	189.1	194.9	190.5	192.4	190.7	183.9
Instream Temp.-F	176.2	177.1	176.8	176.8	176.5	176.7	177.3	176.9	176.9	176.1
Avg. Wall Temp.-F	188.5	188.9	188.5	189.8	189.6	189.2	190	192.4	190.9	183.9
Avg. Wall DT.-F	11.4	10.9	10.8	12.1	12.2	11.6	11.8	14.6	13.1	7.4
Remaining Subcool-F	-6									
Exit Quality	0.04	0.09	0.14	0.19	0.25	0.3	0.35	0.4	0.46	0.47
EXP. H-Btu/Hr/ft2/F	1755.3	1862.6	1835.8	1649.4	1649.8	1741.2	1690.7	1363.1	1533.6	0
COMPUTED H										
Jallouk	1186.7	1152.4	1106.9	1091.9	1072.5	1056.3	1035.1	1020.4	1014.3	627.7
Szady1(Cudo tube)	1661.3	1678.2	1665.4	1673	1679.6	1684.9	1671.8	1668.7	1676.9	1035.5
Szady2	1546.2	1565.4	1524	1532.6	1539.8	1545.6	1546.8	1543.3	1573.7	843.3
(RLIQ)	68522	65644	61895	58252	54516	50892	47358	43624	39973	37380
(F)	1.514	2.044	2.476	2.822	3.129	3.399	3.64	3.879	4.1	4.26
(HLIQ)	257.9	348.4	421.9	480.9	533.1	579.2	620.3	661.1	698.7	725.7
(HBOIL)	1659.2	1673.2	1656.4	1659.7	1661.5	1661.8	1642.9	1633.4	1635.5	899.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	82.8									
DP Liquid Density-lbm/ft3	90.29									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.241	1.368	1.975	2.643	3.405					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.232	1.322	1.946	2.625	3.479					
Actual DP-ft	1.87	2.17	3.32	4.37	4.96					
Measured TP-Psig	120.9				127.4					
Measured Overall-ft	-11.88									
Computed DP-ft	1.51	2.74	3.95	5.17	6.49					
Friction-ft	0.13	0.38	0.73	1.19	1.59					
Acceleration-ft	0.13	0.23	0.34	0.48	0.59					
Elevation-ft	1.26	2.14	2.87	3.5	4.31					

Run#	408									
Test Fluid	R114									
Date:	3/6/93									
Time:	2:13									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	114.6									
Sat. Temperature-F(inlet)	173									
Liq. Density-lbm/ft3	79.42	79.31	79.29	79.31	79.36	79.35	79.28	79.35	79.35	79.51
Latent Heat-Btu/lbm	44.32	44.21	44.2	44.21	44.27	44.26	44.19	44.26	44.26	44.41
Specific Heat-Btu/lbm/F	0.272	0.272	0.272	0.272	0.272	0.272	0.272	0.272	0.272	0.272
Liq. Viscosity-lbm/ft-hr	0.492	0.49	0.49	0.49	0.491	0.491	0.49	0.491	0.491	0.493
Liq. Conductivity-Btu/hr-ft-F	0.0293	0.0292	0.0292	0.0292	0.0293	0.0293	0.0292	0.0293	0.0293	0.0294
Liq. Prandtl No.	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56
Inlet Flow Rate-GPM	3.5									
Outlet Liq. Flow Rate-GPM	2.8									
Outlet Vap. Flow Rate-GPM	1.2									
Inlet Temperature-F	169									
Outlet Liq. Temperature-F	171									
Outlet Vap. Temperature-F	170.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	56.7									
Water outlet Temp.-F	167									
Inlet G-lbm/hr/ft2	672692		Temp	163.8	Density	80.54				
Subcooling-F	4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1175.1	1150.4	1153.9	1162.6	1157.1	1160.2	1161.2	1187.1	1151.8	1159.5
Heat Loss-Watts	37.5	8	10.1	10	10.1	10.1	10.7	12.4	13.1	64.6
Heat Flux-Btu/Hr/ft2	20370	19941	20002	20153	20058	20111	20129	20578	19966	20099
Wall Temp. #3-F	184.8	187.1	184.6	185.6	189.1	183.9	185.8	188.1	187.5	186.6
Wall Temp. #4-F	185.1	184.1	186.5	186.9	187.2	183.9	185.8	189.2	188.2	186
Wall Temp. #5-F	184.3	181.6	187.9	185.6	185.3	184.2	184.1	187.1	184.3	185.9
Wall Temp. #1-F	78.6	184.6	183.6	185	184.4	187.8	186.3	188	184.1	181
Wall Temp. #2-F	185.6	184.5	184.5	188.1	185	190.7	186.3	188.1	186.2	183.8
Instream Temp.-F	171.8	172.6	172.7	172.6	172.2	172.3	172.8	172.3	172.3	171.2
Avg. Wall Temp.-F	185	185.1	184.8	185.8	185.5	185	185.7	188.1	186.1	184.7
Avg. Wall DT.-F	12.2	11.6	11.2	12.3	12.4	11.7	12	14.9	12.9	12.6
Remaining Subcool-F	-2.5									
Exit Quality	0.02	0.05	0.09	0.13	0.17	0.21	0.25	0.29	0.33	0.37
EXP. H-Btu/Hr/ft2/F	1665.6	1723	1786.5	1643.2	1621.7	1712.9	1684.4	1383.8	1552.8	1601.3
COMPUTED H										
Jallouk	1170.3	1108.9	1077.8	1052.3	1022.5	1012.5	995.3	989.6	960.4	945.4
Szady1(Cudo tube)	1656.4	1645.9	1652.5	1662	1660.9	1654.8	1661.7	1681.7	1662	1667.8
Szady2	1547	1528.4	1532.9	1541.5	1516.2	1524.2	1532.9	1555.8	1552.3	1555.8
(RLIQ)	88723	86589	83099	79511	75817	72307	68915	65165	61588	57781
(F)	1.315	1.76	2.173	2.5	2.782	3.029	3.249	3.469	3.668	3.875
(HLIQ)	276.9	370.7	457.7	526.6	585.9	638	684.4	730.6	772.5	816.6
(HBOIL)	1653.8	1639.6	1640.7	1644.2	1636.2	1622.6	1622	1634.4	1604.4	1600
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	82.6									
DP Liquid Density-lbm/ft3	90.31									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.214	1.078	1.606	2.12	2.686					
Zero Corrections-psid	0.009	0.044	0.029	0.018	-0.074					
Corrected DP-Psid	0.205	1.034	1.577	2.102	2.76					
Actual DP-ft	1.9	2.67	3.96	5.28	6.22					
Measured TP-Psig	114.6				120.1					
Measured Overall-ft	-9.96									
Computed DP-ft	1.79	3.28	4.76	6.28	7.8					
Friction-ft	0.15	0.46	0.91	1.49	2.14					
Acceleration-ft	0.16	0.3	0.43	0.59	0.78					
Elevation-ft	1.48	2.53	3.42	4.19	4.88					

Run#	442									
Test Fluid	R114									
Date:	3/27/93									
Time:	2:26									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	87.1									
Sat. Temperature-F(inlet)	154.3									
Liq. Density-lbm/ft3	82.54	82.34	82.2	82.17	82.21	82.2	82.21	82.28	82.33	82.38
Latent Heat-Btu/lbm	47.35	47.16	47.02	47	47.03	47.02	47.03	47.1	47.15	47.2
Specific Heat-Btu/lbm/F	0.264	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265
Liq. Viscosity-lbm/ft-hr	0.549	0.545	0.542	0.541	0.542	0.542	0.542	0.543	0.544	0.546
Liq. Conductivity-Btu/hr-ft-F	0.0313	0.0312	0.0311	0.0311	0.0311	0.0311	0.0311	0.0311	0.0312	0.0312
Liq. Prandtl No.	4.63	4.63	4.62	4.62	4.62	4.62	4.62	4.62	4.63	4.63
Inlet Flow Rate-GPM	5.1									
Outlet Liq. Flow Rate-GPM	2.6									
Outlet Vap. Flow Rate-GPM	1.1									
Inlet Temperature-F	147.4									
Outlet Liq. Temperature-F	148.9									
Outlet Vap. Temperature-F	142.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	69.4									
Water outlet Temp.-F	130.1									
Inlet G-lbm/hr/ft2	1011290		Temp	144.5	Density	83.09				
Subcooling-F	6.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1159.6	1164.7	1163	1161	1155.7	1153.6	1160.3	1156.2	1158.6	1158.2
Heat Loss-Watts	32.8	7.2	9.4	10	10.4	10.3	10.2	11.5	11.9	60.1
Heat Flux-Btu/Hr/ft2	20101	20189	20160	20125	20033	19997	20113	20042	20084	20077
Wall Temp. #3-F	166.5	169.1	166.8	167.2	173.6	168.7	168.3	169.2	170.2	169.7
Wall Temp. #4-F	166.7	166	168.7	168.5	169.2	168.8	168.8	170.4	169.9	168
Wall Temp. #5-F	165.3	163.8	169.7	167.6	167.6	168.9	167.2	167.8	165.7	167.6
Wall Temp. #1-F	69.4	167.1	165.3	166.8	166.6	170.5	169	169.3	165.5	162
Wall Temp. #2-F	167.1	166.8	166.4	168.7	167	174	170.2	169.7	168	165.6
Instream Temp.-F	148.8	150.3	151.4	151.6	151.3	151.4	151.3	150.8	150.4	150
Avg. Wall Temp.-F	166.4	167.3	166.8	167.5	167.6	169.2	168.7	169.3	167.9	166.6
Avg. Wall DT.-F	16.7	16	14.5	15	15.4	16.9	16.5	17.6	16.6	15.7
Remaining Subcool-F	2.5									
Exit Quality	-0.01	0.01	0.04	0.06	0.08	0.11	0.13	0.16	0.18	0.21
EXP. H-Btu/Hr/ft2/F	1204.3	1258.9	1391.4	1340.3	1301.3	1181.8	1219.6	1140.4	1213.3	0
COMPUTED H										
Jallouk	1068.2	1076.4	988.6	950	914.9	893.4	874.1	853.9	834.8	816.5
Szady1(Cudo tube)	1529.5	1540.6	1552.9	1560.4	1564.2	1561.4	1573.4	1577.6	1587	1595.4
Szady2	1384.8	1397.5	1410	1431.5	1427.9	1413.8	1428.6	1433.5	1458.6	1480
(RLIQ)	120549	121439	119295	116383	113192	110235	107166	103893	100689	97498
(F)	1.007	1.007	1.667	2.025	2.312	2.655	2.774	2.981	3.173	3.365
(HLIQ)	289.2	289.5	479.9	583.1	665.3	735.4	798.5	857.7	912.6	964.5
(HBOIL)	1526.1	1537.2	1537.5	1532.8	1523	1505	1501.6	1488.1	1479.2	1468
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	71									
DP Liquid Density-lbm/ft3	91.55									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.089	0.576	0.844	1.103	1.229					
Zero Corrections-psid	0.015	0.066	0.02	0.053	-0.021					
Corrected DP-Psid	0.074	0.51	0.824	1.05	1.25					
Actual DP-ft	2.09	3.55	5.23	7.05	8.79					
Measured TP-Psig	87.1				80.2					
Measured Overall-ft	12.06									
Computed DP-ft	2.18	4.15	6.11	8.18	10.29					
Friction-ft	0.17	0.58	1.22	2.08	3.07					
Acceleration-ft	0.16	0.44	0.66	0.89	1.14					
Elevation-ft	1.84	3.13	4.22	5.22	6.09					

Run#	443.									
Test Fluid	R114									
Date:	3/27/93									
Time:	2:26									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	86.4									
Sat. Temperature-F(inlet)	153.8									
Liq. Density-lbm/ft3	82.55	82.37	82.22	82.22	82.25	82.24	82.21	82.3	82.33	82.38
Latent Heat-Btu/lbm	47.36	47.18	47.05	47.05	47.07	47.06	47.03	47.12	47.15	47.2
Specific Heat-Btu/lbm/F	0.264	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265
Liq. Viscosity-lbm/ft-hr	0.549	0.545	0.542	0.542	0.543	0.543	0.542	0.544	0.544	0.546
Liq. Conductivity-Btu/hr-ft-F	0.0313	0.0312	0.0311	0.0311	0.0311	0.0311	0.0311	0.0311	0.0312	0.0312
Liq. Prandtl No.	4.63	4.63	4.62	4.62	4.62	4.62	4.62	4.62	4.63	4.63
Inlet Flow Rate-GPM	4.3									
Outlet Liq. Flow Rate-GPM	2.3									
Outlet Vap. Flow Rate-GPM	1.2									
Inlet Temperature-F	146.9									
Outlet Liq. Temperature-F	148.8									
Outlet Vap. Temperature-F	142.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	78.1									
Water outlet Temp.-F	127									
Inlet G-lbm/hr/ft2	852000.		Temp	145	Density	83.03				
Subcooling-F	6.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1165.7	1166.7	1166	1164.5	1158.1	1156.9	1163.3	1164.4	1162.9	1163.9
Heat Loss-Watts	32.7	7.2	9.3	10	10.4	10.3	10.2	11.5	11.9	60.3
Heat Flux-Btu/Hr/ft2	20207	20224	20212	20186	20075	20054	20165	20184	20158	20175
Wall Temp. #3-F	165.9	168.6	166.3	166.8	173.2	168.5	168.3	169	170.1	169.6
Wall Temp. #4-F	166.2	165.5	168.1	168	168.9	168.6	168.8	170.4	169.9	167.8
Wall Temp. #5-F	164.6	163.3	169.3	167.2	167.2	168.8	167.3	167.8	165.7	167.5
Wall Temp. #1-F	69.7	166.5	164.8	166.4	166.2	170.2	169.1	169.4	165.4	161.9
Wall Temp. #2-F	166.6	166.3	165.8	168.3	166.6	173.6	169.2	169.8	167.9	165.4
Instream Temp.-F	148.7	150.1	151.2	151.2	151	151.1	151.3	150.6	150.4	150
Avg. Wall Temp.-F	165.9	166.7	166.3	167.1	167.2	169	168.5	169.3	167.8	166.4
Avg. Wall DT.-F	16.3	15.7	14.1	15	15.3	17	16.3	17.8	16.5	15.5
Remaining Subcool-F	1.7									
Exit Quality	-0.01	0.02	0.05	0.08	0.11	0.14	0.17	0.2	0.23	0.26
EXP. H-Btu/Hr/ft2/F	1242.6	1287.2	1429.8	1346.8	1310.6	1178.4	1234.9	1136	1222.5	0
COMPUTED H										
Jallouk	1094.3	1064.2	998.6	965.5	933.9	909.1	896.1	876.1	860.5	843.8
Szady1(Cudo tube)	1532.2	1541.7	1552.9	1558.4	1560.6	1568.2	1569.9	1575	1581.2	1588.9
Szady2	1388.3	1398.8	1410.4	1431.8	1427.1	1429.4	1428.9	1430.6	1437.8	1461.2
(RLIQ)	101511	101661	99186	96156	93041	90074	87141	83821	80723	77559
(F)	1.007	1.285	1.854	2.224	2.526	2.787	3.02	3.247	3.464	3.652
(HLIQ)	252.1	322.2	465.3	558	633.8	699.2	757.9	814.4	866.1	915.5
(HBOIL)	1529.9	1537	1538.9	1534.2	1524.9	1520.4	1508.7	1498.7	1489.4	1480.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	71.5									
DP Liquid Density-lbm/ft3	91.49									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.136	0.744	1.092	1.469	1.735					
Zero Corrections-psid	0.015	0.066	0.02	0.053	-0.021					
Corrected DP-Psid	0.121	0.678	1.072	1.416	1.756					
Actual DP-ft	2.01	3.26	4.79	6.41	7.9					
Measured TP-Psig	86.4				80					
Measured Overall-ft	11.19									
Computed DP-ft	2.06	3.84	5.61	7.49	9.39					
Friction-ft	0.15	0.5	1.05	1.78	2.62					
Acceleration-ft	0.17	0.38	0.56	0.76	0.99					
Elevation-ft	1.75	2.96	4	4.95	5.78					

Run#	444									
Test Fluid	R114									
Date:	3/27/93									
Time:	3:49									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	84.5									
Sat. Temperature-F(inlet)	152.4									
Liq. Density-lbm/ft3	82.69	82.52	82.38	82.42	82.43	82.41	82.41	82.49	82.51	82.55
Latent Heat-Btu/lbm	47.5	47.34	47.2	47.23	47.25	47.22	47.22	47.3	47.32	47.36
Specific Heat-Btu/lbm/F	0.264	0.264	0.265	0.265	0.264	0.265	0.265	0.264	0.264	0.264
Liq. Viscosity-lbm/ft-hr	0.552	0.548	0.546	0.546	0.547	0.546	0.546	0.548	0.548	0.549
Liq. Conductivity-Btu/hr-ft-F	0.0314	0.0313	0.0312	0.0312	0.0312	0.0312	0.0312	0.0313	0.0313	0.0313
Liq. Prandtl No.	4.64	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63
Inlet Flow Rate-GPM	3.4									
Outlet Liq. Flow Rate-GPM	2									
Outlet Vap. Flow Rate-GPM	1									
Inlet Temperature-F	145									
Outlet Liq. Temperature-F	147.8									
Outlet Vap. Temperature-F	141.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	80.1									
Water outlet Temp.-F	130.1									
Inlet G-lbm/hr/ft2	677390		Temp	141.4	Density	83.48				
Subcooling-F	7.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1143	1154	1156	1153	1154	1156	1154	1149	1150	1158
Heat Loss-Watts	30.1	6.7	8.9	10	10.5	10.5	9.8	11.1	11.2	57.7
Heat Flux-Btu/Hr/ft2	19813	20004	20039	19987	20004	20039	20004	19917	19935	20073
Wall Temp. #3-F	164.4	167.2	165.1	165.5	172.1	167.4	166.9	167.4	168.7	168.3
Wall Temp. #4-F	164.6	164	167.1	166.7	167.6	167.5	167.4	168.7	168.4	166.8
Wall Temp. #5-F	163.3	162	168.1	165.8	165.9	167.7	166.1	166.2	164.4	166.3
Wall Temp. #1-F	72.3	165.1	163.5	164.9	164.9	169.1	167.8	167.8	164.1	160.6
Wall Temp. #2-F	164.9	164.9	164.6	166.9	165.3	172.5	168.4	168.3	166.6	164.3
Instream Temp.-F	147.6	148.9	150	149.7	149.6	149.8	149.8	149.2	149	148.7
Avg. Wall Temp.-F	164.3	165.3	165.1	165.7	165.9	167.9	167.3	167.7	166.4	165.3
Avg. Wall DT.-F	15.8	15.5	14.2	15.1	15.4	17.2	16.6	17.6	16.5	15.7
Remaining Subcool-F	0.9									
Exit Quality	-0.01	0.03	0.07	0.1	0.14	0.18	0.21	0.25	0.29	0.32
EXP. H-Btu/Hr/ft2/F	1253.6	1290.9	1414.2	1321.7	1297.2	1163.7	1203.9	1133	1205.3	1282.4
COMPUTED H										
Jallouk	1115.6	1062.1	1005.4	976.7	953.6	933.9	913.4	895.9	881.7	869.9
Szady1(Cudo tube)	1511.2	1526.9	1538.4	1540	1545.9	1554.4	1560	1550.1	1556.4	1567.2
Szady2	1363.4	1381.5	1393.9	1413.4	1414.7	1419.2	1420	1401.4	1409.4	1421.9
(RLIQ)	80271	79725	77189	74105	71099	68194	65219	62068	59059	58020
(F)	1.007	1.488	2.06	2.467	2.803	3.094	3.36	3.614	3.847	4.07
(HLIQ)	209.6	310.1	429.9	514.5	584.6	645.5	700.9	753.7	802.1	848.4
(HBOIL)	1509.8	1522.7	1527.1	1520.6	1517.5	1516.4	1511.4	1488.2	1481.9	1479.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	71.5									
DP Liquid Density-lbm/ft3	91.49									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.183	0.962	1.406	1.919	2.275					
Zero Corrections-psid	0.015	0.066	0.02	0.053	-0.021					
Corrected DP-Psid	0.168	0.896	1.386	1.866	2.296					
Actual DP-ft	1.92	2.87	4.23	5.61	6.94					
Measured TP-Psig	84.5				79.1					
Measured Overall-ft	9.42									
Computed DP-ft	1.93	3.44	4.93	6.52	8.12					
Friction-ft	0.11	0.41	0.88	1.52	2.25					
Acceleration-ft	0.14	0.29	0.44	0.62	0.83					
Elevation-ft	1.68	2.74	3.61	4.38	5.04					

Run#	445.									
Test Fluid	R114									
Date:	3/27/93									
Time:	4: 3									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	82									
Sat. Temperature-F(inlet)	150.5									
Liq. Density-lbm/ft3	83.04	82.64	82.58	82.6	82.63	82.62	82.63	82.69	82.71	82.74
Latent Heat-Btu/lbm	47.83	47.45	47.39	47.41	47.44	47.42	47.44	47.5	47.51	47.55
Specific Heat-Btu/lbm/F	0.263	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264
Liq. Viscosity-lbm/ft-hr	0.559	0.551	0.55	0.55	0.551	0.55	0.551	0.552	0.552	0.553
Liq. Conductivity-Btu/hr-ft-F	0.0316	0.0314	0.0313	0.0313	0.0314	0.0313	0.0314	0.0314	0.0314	0.0314
Liq. Prandtl No.	4.65	4.64	4.63	4.63	4.64	4.64	4.64	4.64	4.64	4.64
Inlet Flow Rate-GPM	2.6									
Outlet Liq. Flow Rate-GPM	1.6									
Outlet Vap. Flow Rate-GPM	1.1									
Inlet Temperature-F	143.6									
Outlet Liq. Temperature-F	146.5									
Outlet Vap. Temperature-F	141.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	78.4									
Water outlet Temp.-F	126.9									
Inlet G-lbm/hr/ft2	519490		Temp	139.5	Density	83.72				
Subcooling-F	6.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1145.5	1153.9	1152	1153.9	1147.2	1145.8	1145.9	1143.9	1150.2	1152
Heat Loss-Watts	28.2	6.3	8.6	10	10.7	10.6	9.6	10.7	10.8	56
Heat Flux-Btu/Hr/ft2	19857	20002	19969	20002	19886	19862	19863	19829	19938	19969
Wall Temp. #3-F	162.5	165.3	163.1	163.6	170.4	165.6	165	165.6	167	166.7
Wall Temp. #4-F	162.7	162	165	164.8	165.9	165.8	165.6	167	166.6	164.9
Wall Temp. #5-F	161.5	160.1	166.2	164	164.2	165.9	164.1	164.3	162.6	164.7
Wall Temp. #1-F	74.2	163.2	161.5	163.1	163.1	167.2	166	166.1	162.2	159.1
Wall Temp. #2-F	162.8	162.8	162.6	165.1	163.6	170.6	166.7	166.6	164.8	162.7
Instream Temp.-F	144.9	148	148.5	148.3	148.1	148.2	148.1	147.6	147.5	147.2
Avg. Wall Temp.-F	162.4	163.3	163.1	163.9	164.2	166.1	165.5	165.9	164.6	163.6
Avg. Wall DT.-F	16.6	14.4	13.6	14.7	15.2	17	16.5	17.4	16.2	15.5
Remaining Subcool-F	-1.6									
Exit Quality	0.01	0.06	0.1	0.15	0.2	0.25	0.29	0.34	0.39	0.43
EXP. H-Btu/Hr/ft2/F	1197.8	1387	1463.2	1363.4	1308.2	1166.5	1205.1	1138	1227.8	0
COMPUTED H										
Jallouk	1094.4	1064.7	1010.6	990.2	967	949.3	933	915.2	903.5	894.7
Szady1(Cudo tube)	1498.7	1522.2	1526.9	1531.1	1530.4	1535	1540.1	1542.5	1541.4	1546.9
Szady2	1349.9	1376.3	1381.2	1385.5	1400.2	1400.7	1401.8	1399.8	1391.5	1398.7
(RLIQ)	60471	59677	56898	53905	50923	48030	45091	42074	39146	36177
(F)	1.262	1.836	2.411	2.855	3.231	3.56	3.864	4.154	4.422	4.682
(HLIQ)	212.1	309.3	406.4	481	544.4	599.9	651	699.6	744.5	788.1
(HBOIL)	1497.3	1517.9	1517.3	1515.1	1507.1	1503.9	1500.3	1493	1481.2	1475.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	74.9									
DP Liquid Density-lbm/ft3	91.14									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.225	1.24	1.759	2.4	2.85					
Zero Corrections-psid	0.015	0.066	0.02	0.053	-0.021					
Corrected DP-Psid	0.21	1.174	1.739	2.347	2.871					
Actual DP-ft	1.84	2.36	3.58	4.73	5.88					
Measured TP-Psig	82				77.6					
Measured Overall-ft	7.66									
Computed DP-ft	1.65	2.91	4.16	5.48	6.8					
Friction-ft	0.1	0.35	0.74	1.26	1.86					
Acceleration-ft	0.11	0.23	0.36	0.52	0.72					
Elevation-ft	1.44	2.33	3.06	3.69	4.22					

Run#	446.									
Test Fluid	R114									
Date:	3/27/93									
Time:	4: 3									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	83.1									
Sat. Temperature-F(inlet)	151.3									
Liq. Density-lbm/ft3	82.91	82.42	82.41	82.43	82.45	82.43	82.41	82.45	82.49	82.51
Latent Heat-Btu/lbm	47.71	47.23	47.22	47.25	47.26	47.25	47.22	47.26	47.3	47.32
Specific Heat-Btu/lbm/F	0.263	0.265	0.265	0.264	0.264	0.264	0.265	0.264	0.264	0.264
Liq. Viscosity-lbm/ft-hr	0.557	0.546	0.546	0.547	0.547	0.547	0.546	0.547	0.548	0.548
Liq. Conductivity-Btu/hr-ft-F	0.0315	0.0312	0.0312	0.0312	0.0312	0.0312	0.0312	0.0312	0.0313	0.0313
Liq. Prandtl No.	4.65	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63
Inlet Flow Rate-GPM	1.8									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	1.2									
Inlet Temperature-F	144.6									
Outlet Liq. Temperature-F	148.8									
Outlet Vap. Temperature-F	144.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	81.2									
Water outlet Temp.-F	130.6									
Inlet G-lbm/hr/ft2	359485		Temp	139.8	Density	83.69				
Subcooling-F	6.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1156.8	1158.6	1155.5	1159.2	1155.7	1158.9	1160.6	1161.1	1156.3	1154.4
Heat Loss-Watts	27.8	6.2	8.5	10	10.7	10.6	9.6	10.7	10.7	56.7
Heat Flux-Btu/Hr/ft2	20052	20084	20030	20094	20033	20089	20118	20127	20044	20011
Wall Temp. #3-F	163.3	166	164	164.3	171.3	166.8	166.4	167.2	168.4	171.9
Wall Temp. #4-F	163.4	162.8	165.8	165.4	166.9	166.9	167	168.6	168	169.2
Wall Temp. #5-F	162.3	160.9	167.2	164.6	165.1	166.8	165.5	165.9	164	168.1
Wall Temp. #1-F	77.3	163.4	162.3	163.9	163.8	168.4	167.7	167.8	163.7	160.6
Wall Temp. #2-F	163.7	163.3	163.1	165.8	164.3	171.8	168.2	168.2	166.3	164.3
Instream Temp.-F	145.9	149.7	149.8	149.6	149.5	149.6	149.8	149.5	149.2	149
Avg. Wall Temp.-F	163.2	163.9	163.8	164.6	165	167.2	167	167.5	166.1	166.4
Avg. Wall DT.-F	16.4	13.3	13.1	14	14.6	16.7	16.3	17.1	16	16.5
Remaining Subcool-F	-5.7									
Exit Quality	0.03	0.1	0.17	0.24	0.31	0.38	0.45	0.52	0.58	0.65
EXP. H-Btu/Hr/ft2/F	1225	1513.8	1529.6	1431	1370.3	1201.7	1238	1174.9	1254.8	0
COMPUTED H										
Jallouk	1132.2	1086.2	1054.3	1018.8	1005.4	992	982	970.6	957.6	948
Szady1(Cudo tube)	1511	1533.4	1534.2	1538.3	1538.7	1544.8	1550.7	1553.8	1554.1	1557.1
Szady2	1384.3	1389.1	1389.6	1394.1	1393.9	1418	1421.2	1421.1	1417	1416.3
(RLIQ)	41581	40217	37271	34255	31261	28299	25341	22317	19309	16328
(F)	1.55	2.25	2.897	3.414	3.86	4.257	4.621	4.974	5.312	5.635
(HLIQ)	194.1	282.7	364	429	485	534.9	580.7	624.9	667.2	707.7
(HBOIL)	1509.9	1530.2	1527.4	1527.1	1522.5	1523.1	1523.1	1519.4	1512	1506.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.4									
DP Liquid Density-lbm/ft3	90.76									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.283	1.586	2.18	2.975	3.602					
Zero Corrections-psid	0.015	0.066	0.02	0.053	-0.021					
Corrected DP-Psid	0.268	1.52	2.16	2.922	3.623					
Actual DP-ft	1.73	1.75	2.83	3.7	4.54					
Measured TP-Psig	83.1				80.4					
Measured Overall-ft	4.71									
Computed DP-ft	1.32	2.31	3.27	4.26	5.23					
Friction-ft	0.08	0.26	0.55	0.92	1.33					
Acceleration-ft	0.08	0.17	0.28	0.43	0.62					
Elevation-ft	1.16	1.88	2.44	2.91	3.28					

Run#	447									
Test Fluid	R114									
Date:	3/27/93									
Time:	4: 3									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	83.4									
Sat. Temperature-F(inlet)	151.6									
Liq. Density-lbm/ft3	82.8	82.33	82.34	82.34	82.36	82.36	82.33	82.37	82.37	82.42
Latent Heat-Btu/lbm	47.6	47.15	47.16	47.16	47.17	47.17	47.15	47.18	47.18	47.23
Specific Heat-Btu/lbm/F	0.264	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265
Liq. Viscosity-lbm/ft-hr	0.554	0.544	0.545	0.545	0.545	0.545	0.544	0.545	0.545	0.546
Liq. Conductivity-Btu/hr-ft-F	0.0315	0.0312	0.0312	0.0312	0.0312	0.0312	0.0312	0.0312	0.0312	0.0312
Liq. Prandtl No.	4.64	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	140.9									
Outlet Liq. Temperature-F	149.6									
Outlet Vap. Temperature-F	146.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	83.7									
Water outlet Temp.-F	141.1									
Inlet G-lbm/hr/ft2	201025		Temp	135.4	Density	84.24				
Subcooling-F	10.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1150.1	1156	1148.4	1147.4	1150.3	1155.4	1151	749.5	0	573.6
Heat Loss-Watts	27.7	6.2	8.5	10	10.7	10.6	9.6	10.3	8.6	53.9
Heat Flux-Btu/Hr/ft2	19936	20039	19907	19889	19940	20028	19952	12992	0	9943
Wall Temp. #3-F	162.9	165.5	163.5	164	171.2	166.8	166.4	163.5	150.5	163
Wall Temp. #4-F	162.9	162.6	165.1	165.3	166.8	166.8	167.5	163.3	151	162.4
Wall Temp. #5-F	162	160.1	166.8	164.1	164.7	166.8	166	162.2	150.5	161.5
Wall Temp. #1-F	76.9	162.8	162.1	163.5	163.4	168.4	167.7	163.8	151	158.6
Wall Temp. #2-F	163.5	162.9	162.7	165.3	164	171.6	168.5	164.3	150.5	160.7
Instream Temp.-F	146.8	150.4	150.3	150.3	150.2	150.2	150.4	150.1	150.1	149.7
Avg. Wall Temp.-F	162.8	163.5	163.4	164.2	164.7	167.2	167.2	163.4	150.7	161.2
Avg. Wall DT.-F	15.1	12.1	12.2	13	13.6	16.1	15.9	12.7	0.6	11.1
Remaining Subcool-F	-11.4									
Exit Quality	0.06	0.19	0.31	0.43	0.56	0.68	0.8	0.88	0.88	0.94
EXP. H-Btu/Hr/ft2/F	1318.2	1650	1638.4	1526.9	1463.6	1244.4	1253.4	1020.4	0	896.5
COMPUTED H										
Jallouk	1188.1	1144.6	1092	1069.1	1062	1050.6	84.8	84.7	84.7	84.7
Szady1(Cudo tube)	1511	1534.3	1530.1	1531	1534.2	1539.6	84.8	84.7	84.7	84.7
Szady2	1363.8	1389.9	1384.6	1385.4	1389	1395.2	84.8	84.7	84.7	84.7
(RLIQ)	22980	21147	18170	15201	12223	9243	9243	9243	9243	9243
(F)	1.827	2.806	3.688	4.394	5.015	5.586	5.586	5.586	5.586	5.586
(HLIQ)	143.8	221.6	291.2	347	396	441.1	441.1	441.1	441.1	441.1
(HBOIL)	1510.6	1532.8	1526.6	1525	1525.3	1527.4	1527.4	1527.4	1527.4	1527.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.7									
DP Liquid Density-lbm/ft3	90.84									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.208	1.918	2.611	3.609	4.472					
Zero Corrections-psid	0.015	0.066	0.02	0.053	-0.021					
Corrected DP-Psid	0.193	1.852	2.591	3.556	4.493					
Actual DP-ft	1.87	1.17	2.09	2.6	3.03					
Measured TP-Psig	83.4				80.9					
Measured Overall-ft	4.37									
Computed DP-ft	1.04	1.71	2.3	2.84	3.65					
Friction-ft	0.04	0.14	0.3	0.48	0.6					
Acceleration-ft	0.04	0.1	0.2	0.31	0.35					
Elevation-ft	0.96	1.46	1.8	2.06	2.71					

Run#	448									
Test Fluid	R114									
Date:	3/27/93									
Time:	4: 3									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	58.3									
Sat. Temperature-F(inlet)	130.3									
Liq. Density-lbm/ft3	85.08	85.06	85.06	85.05	85.05	85.06	85.13	85.14	85.17	85.19
Latent Heat-Btu/lbm	49.79	49.77	49.77	49.75	49.75	49.77	49.83	49.85	49.87	49.89
Specific Heat-Btu/lbm/F	0.258	0.258	0.258	0.258	0.258	0.258	0.258	0.257	0.257	0.257
Liq. Viscosity-lbm/ft-hr	0.608	0.608	0.608	0.607	0.607	0.608	0.61	0.61	0.611	0.611
Liq. Conductivity-Btu/hr-ft-F	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.0331
Liq. Prandtl No.	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.76	4.76	4.76
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	125.5									
Outlet Liq. Temperature-F	127.7									
Outlet Vap. Temperature-F	123.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	65.1									
Water outlet Temp.-F	115.6									
Inlet G-lbm/hr/ft2	205871		Temp		118.6	Density	86.27			
Subcooling-F	4.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1142.8	1136.9	1140.5	1130.6	1138.7	1142.8	1149.9	1145.2	376.2	230.3
Heat Loss-Watts	20.4	4.8	6.7	8.1	9	9	6.8	8.2	7.2	53.8
Heat Flux-Btu/Hr/ft2	19810	19707	19770	19598	19739	19810	19933	19851	6521	3992
Wall Temp. #3-F	143	145.4	143.4	144.1	151.1	146.3	146.3	150.4	142.2	157.2
Wall Temp. #4-F	142.9	142.3	145.2	145.1	146.2	146.8	147.1	150.4	141.8	157.3
Wall Temp. #5-F	142.1	140.2	147.2	144.1	144.2	148.2	145.2	148	137.5	161.7
Wall Temp. #1-F	76	142.6	142.1	143.6	143.3	147.6	146.6	147.6	137.4	157.8
Wall Temp. #2-F	143	142.7	142.7	145.6	143.8	151	147.6	148.2	137.4	158.1
Instream Temp.-F	128.5	128.7	128.7	128.8	128.8	128.7	128.1	128	127.8	127.6
Avg. Wall Temp.-F	142.8	143.3	143.4	144.2	144.4	146.7	146.6	148.5	139.3	158.4
Avg. Wall DT.-F	13.4	13.7	13.8	14.5	14.7	17.1	17.6	19.6	11.2	30.6
Remaining Subcool-F	-17.1									
Exit Quality	0.09	0.2	0.31	0.43	0.54	0.65	0.77	0.88	0.92	0.94
EXP. H-Btu/Hr/ft2/F	1483.3	1442.8	1437.1	1347.9	1344.3	1156.4	1135.2	1011.6	584.1	0
COMPUTED H										
Jallouk	1076.3	1022	984.9	959.6	947.8	938	930.9	83.1	83	83
Szady1(Cudo tube)	1409.7	1408.4	1412.4	1409.2	1416.8	1422	1426.8	83.1	83	83
Szady2	1270.2	1251.8	1256.7	1252.7	1261.6	1267.4	1278	83.1	83	83
(RLIQ)	21156	18951	16450	13963	11469	8957	6418	6418	6418	6418
(F)	2.125	3.26	4.167	4.915	5.58	6.201	6.814	6.814	6.814	6.814
(HLIQ)	167.5	257	328.5	387.5	439.9	488.8	536.8	536.8	536.8	536.8
(HBOIL)	1408.9	1405.5	1406.5	1399.4	1402.6	1402.4	1401	1401	1401	1401
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.2									
DP Liquid Density-lbm/ft3	90.89									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.266	1.999	2.639	3.556	4.469					
Zero Corrections-psid	0.015	0.066	0.02	0.053	-0.021					
Corrected DP-Psid	0.251	1.933	2.619	3.503	4.49					
Actual DP-ft	1.71	1	1.97	2.61	2.95					
Measured TP-Psig	58.3				55.5					
Measured Overall-ft	4.73									
Computed DP-ft	0.93	1.59	2.23	2.86	3.54					
Friction-ft	0.05	0.19	0.39	0.63	0.81					
Acceleration-ft	0.05	0.14	0.26	0.42	0.48					
Elevation-ft	0.82	1.27	1.58	1.81	2.26					

Run#	449									
Test Fluid	R114									
Date:	3/27/93									
Time:	6:39									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	57.2									
Sat. Temperature-F(inlet)	129.3									
Liq. Density-lbm/ft3	85.23	85.19	85.22	85.25	85.28	85.3	85.38	85.37	85.4	85.46
Latent Heat-Btu/lbm	49.93	49.89	49.92	49.95	49.97	50	50.05	50.06	50.09	50.14
Specific Heat-Btu/lbm/F	0.257	0.257	0.257	0.257	0.257	0.257	0.257	0.257	0.257	0.257
Liq. Viscosity-lbm/ft-hr	0.612	0.611	0.612	0.613	0.614	0.614	0.616	0.616	0.617	0.619
Liq. Conductivity-Btu/hr-ft-F	0.0331	0.0331	0.0331	0.0331	0.0331	0.0331	0.0332	0.0332	0.0332	0.0332
Liq. Prandtl No.	4.76	4.76	4.76	4.76	4.76	4.77	4.77	4.77	4.77	4.78
Inlet Flow Rate-GPM	1.8									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	1									
Inlet Temperature-F	126.1									
Outlet Liq. Temperature-F	125									
Outlet Vap. Temperature-F	120.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	68.1									
Water outlet Temp.-F	102.3									
Inlet G-lbm/hr/ft2	369449		Temp		120.8	Density	86.01			
Subcooling-F	3.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1157.5	1163	1150.1	1147.3	1147.9	1150.5	1149.4	1155.8	1167.9	1153.6
Heat Loss-Watts	20	4.7	6.5	7.9	8.7	8.6	6.5	7.5	7.7	43.1
Heat Flux-Btu/Hr/ft2	20065	20160	19936	19888	19898	19943	19924	20035	20245	19997
Wall Temp. #3-F	142	144.4	142.1	142.6	149.6	144.3	144.1	144.5	146.8	150.8
Wall Temp. #4-F	141.7	141.1	143.9	143.6	144.4	144.6	145	145.3	146.2	148.7
Wall Temp. #5-F	141	139	145.8	142.7	142.6	144.2	143.1	143.3	141.4	143.9
Wall Temp. #1-F	75.9	141.4	140.9	142.1	141.5	145.7	144.6	145	141.4	138.2
Wall Temp. #2-F	142	141.6	141.6	144.1	142	149.4	145.6	145.5	143.6	141.6
Instream Temp.-F	127.3	127.6	127.4	127.1	126.9	126.7	126.2	126.1	125.9	125.4
Avg. Wall Temp.-F	141.7	142.1	142.1	142.8	142.6	144.7	144.5	144.7	143.9	144.6
Avg. Wall DT.-F	13.5	13.6	13.8	14.8	14.8	17.1	17.4	17.7	17	18.3
Remaining Subcool-F	-9.2									
Exit Quality	0.05	0.11	0.17	0.24	0.3	0.36	0.43	0.49	0.56	0.62
EXP. H-Btu/Hr/ft2/F	1489.8	1480.8	1442.1	1348.2	1342.1	1166.4	1146.4	1131	1187.7	0
COMPUTED H										
Jallouk	1032.9	978.4	939.2	915.8	899.4	886.7	873.3	867	858.6	846.3
Szady1(Cudo tube)	1412.9	1420.2	1414.7	1415.5	1419.5	1425.3	1428.2	1437.9	1450.9	1448.7
Szady2	1274.4	1266.7	1260.2	1260.9	1265	1283	1281.5	1288.5	1287	1284
(RLIQ)	38533	36391	33836	31288	28766	26247	23696	21199	18676	16136
(F)	1.784	2.6	3.265	3.812	4.293	4.731	5.147	5.531	5.903	6.273
(HLIQ)	224.1	326.9	410.3	479	539.2	594.1	646	694.1	740.7	786.7
(HBOIL)	1411	1414.4	1403.1	1397	1393.1	1390.1	1382.7	1381.8	1383.5	1366.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	178.4									
DP Liquid Density-lbm/ft3	78.47									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.36	1.608	2.124	2.798	3.317					
Zero Corrections-psid	0.015	0.066	0.02	0.053	-0.021					
Corrected DP-Psid	0.345	1.542	2.104	2.745	3.338					
Actual DP-ft	1.26	1.07	1.96	2.72	3.44					
Measured TP-Psig	57.2				53.3					
Measured Overall-ft	6.57									
Computed DP-ft	1.22	2.21	3.23	4.33	5.45					
Friction-ft	0.1	0.34	0.71	1.19	1.73					
Acceleration-ft	0.1	0.21	0.36	0.55	0.79					
Elevation-ft	1.01	1.65	2.16	2.59	2.94					

Run#	450									
Test Fluid	R114									
Date:	3/27/93									
Time:	6:39									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	55.4									
Sat. Temperature-F(inlet)	127.5									
Liq. Density-lbm/ft3	85.76	85.46	85.45	85.48	85.49	85.52	85.59	85.63	85.65	85.74
Latent Heat-Btu/lbm	50.43	50.14	50.13	50.17	50.18	50.2	50.27	50.3	50.33	50.42
Specific Heat-Btu/lbm/F	0.256	0.257	0.257	0.257	0.257	0.257	0.256	0.256	0.256	0.256
Liq. Viscosity-lbm/ft-hr	0.627	0.619	0.618	0.619	0.619	0.62	0.622	0.623	0.624	0.626
Liq. Conductivity-Btu/hr-ft-F	0.0335	0.0332	0.0332	0.0333	0.0333	0.0333	0.0333	0.0334	0.0334	0.0334
Liq. Prandtl No.	4.79	4.78	4.77	4.78	4.78	4.78	4.78	4.79	4.79	4.79
Inlet Flow Rate-GPM	2.4									
Outlet Liq. Flow Rate-GPM	1.5									
Outlet Vap. Flow Rate-GPM	1.1									
Inlet Temperature-F	121.6									
Outlet Liq. Temperature-F	122.4									
Outlet Vap. Temperature-F	117.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	68.4									
Water outlet Temp.-F	98.7									
Inlet G-lbm/hr/ft2	495100		Temp	117.1	Density	86.44				
Subcooling-F	5.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1152.3	1157.8	1143.4	1143.3	1138.9	1141.6	1136.6	1151.7	1159.9	1154.4
Heat Loss-Watts	19.8	4.7	6.4	7.8	8.5	8.3	6.2	7.3	7.5	40.6
Heat Flux-Btu/Hr/ft2	19974	20070	19820	19818	19742	19789	19702	19964	20106	20011
Wall Temp. #3-F	140.3	142.5	140.3	140.7	147.5	142.1	142	142	144.4	143.6
Wall Temp. #4-F	140.2	139.4	142	141.9	142.4	142.6	142.7	142.9	143.7	141.7
Wall Temp. #5-F	139.4	137.1	143.7	141.1	140.6	142.1	141	141	139	141.3
Wall Temp. #1-F	75.2	139.8	139.2	140.3	139.7	143.6	142.4	142.7	139	135.4
Wall Temp. #2-F	140.4	139.9	139.9	142.1	140.2	147.3	143.4	143.1	141.2	139.1
Instream Temp.-F	122.9	125.4	125.5	125.2	125.1	124.9	124.3	124	123.8	123
Avg. Wall Temp.-F	140.1	140.4	140.4	141	140.7	142.6	142.3	142.3	141.5	140.2
Avg. Wall DT.-F	16.3	14.1	14	14.9	14.7	16.8	17.1	17.4	16.8	16.3
Remaining Subcool-F	-3.3									
Exit Quality	0.02	0.06	0.11	0.16	0.2	0.25	0.3	0.34	0.39	0.44
EXP. H-Btu/Hr/ft2/F	1227.5	1424.1	1420.4	1329.7	1340	1177.5	1151.5	1144.9	1200.3	0
COMPUTED H										
Jallouk	1006.8	958.2	916	892.3	872.9	860.1	841.9	834.2	825	812.9
Szady1(Cudo tube)	1386.2	1405.3	1401.6	1405.2	1408.2	1415.7	1417.6	1433.1	1445.9	1439.8
Szady2	1245.1	1250.6	1245.9	1249.7	1264.7	1267.9	1264.6	1267.5	1281.7	1284.5
(RLIQ)	51233	50249	47816	45293	42828	40347	37795	35306	32820	30240
(F)	1.434	2.087	2.714	3.211	3.636	4.02	4.382	4.717	5.035	5.357
(HLIQ)	226.6	330.8	430.2	508.7	576.1	636.7	693.6	746.4	796.5	846.7
(HBOIL)	1384.1	1399.2	1388	1382.7	1375.3	1371.4	1360	1362.2	1360.3	1334.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	229									
DP Liquid Density-lbm/ft3	69.94									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.271	1.305	1.773	2.319	2.697					
Zero Corrections-psid	0.015	0.066	0.02	0.053	-0.021					
Corrected DP-Psid	0.256	1.239	1.753	2.266	2.718					
Actual DP-ft	1.2	1.18	1.95	2.72	3.49					
Measured TP-Psig	55.4				51					
Measured Overall-ft	7.39									
Computed DP-ft	1.55	2.77	4.03	5.41	6.84					
Friction-ft	0.11	0.4	0.84	1.44	2.15					
Acceleration-ft	0.13	0.26	0.41	0.61	0.86					
Elevation-ft	1.31	2.12	2.78	3.35	3.83					

Run#	451									
Test Fluid	R114									
Date:	3/27/93									
Time:	6:39									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	54.3									
Sat. Temperature-F(Inlet)	126.4									
Liq. Density-lbm/ft3	85.66	85.64	85.64	85.66	85.7	85.74	85.83	85.88	85.94	85.98
Latent Heat-Btu/lbm	50.34	50.32	50.32	50.34	50.37	50.42	50.5	50.54	50.6	50.64
Specific Heat-Btu/lbm/F	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.255	0.255
Liq. Viscosity-lbm/ft-hr	0.624	0.623	0.623	0.624	0.625	0.626	0.629	0.63	0.632	0.633
Liq. Conductivity-Btu/hr-ft-F	0.0334	0.0334	0.0334	0.0334	0.0334	0.0334	0.0335	0.0335	0.0336	0.0336
Liq. Prandtl No.	4.79	4.79	4.79	4.79	4.79	4.79	4.8	4.8	4.81	4.81
Inlet Flow Rate-GPM	3.3									
Outlet Liq. Flow Rate-GPM	2.4									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	121.4									
Outlet Liq. Temperature-F	120									
Outlet Vap. Temperature-F	115.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	66.1									
Water outlet Temp.-F	96									
Inlet G-lbm/hr/ft2	680670		Temp		117.2	Density	86.43			
Subcooling-F	5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1129.8	1133.8	1133	1135.3	1132.2	1127.3	1119.4	1121	1128.8	1132.6
Heat Loss-Watts	19.4	4.6	6.3	7.5	8.2	7.9	5.8	6.8	7.1	38.8
Heat Flux-Btu/Hr/ft2	19584	19654	19640	19680	19626	19541	19404	19432	19567	19633
Wall Temp. #3-F	139.2	141.3	138.8	139.3	145.9	140.3	139.8	139.7	141.9	141.5
Wall Temp. #4-F	138.9	138	140.6	140.5	140.8	140.6	140.5	140.5	141.2	139.7
Wall Temp. #5-F	138.2	135.8	142.4	139.5	139	140.4	138.7	138.7	136.4	139.3
Wall Temp. #1-F	74.8	138.6	137.8	138.9	138.1	141.9	140.4	140.3	136.5	133.6
Wall Temp. #2-F	139.3	138.7	138.5	141	138.6	145.5	141.2	140.8	138.8	137.1
Instream Temp.-F	123.7	123.9	123.9	123.7	123.4	123	122.3	121.9	121.4	121
Avg. Wall Temp.-F	138.9	139.2	138.9	139.6	139.1	140.8	140.1	140	139	138.2
Avg. Wall DT.-F	14.3	14.4	14.1	15	14.8	16.9	16.9	17.2	16.7	16.4
Remaining Subcool-F	-1.5									
Exit Quality	0.01	0.04	0.08	0.11	0.14	0.18	0.21	0.24	0.28	0.31
EXP. H-Btu/Hr/ft2/F	1368.1	1368.5	1389.2	1315.4	1322.7	1155.1	1145.3	1128.3	1173.4	0
COMPUTED H										
Jallouk	975.2	919.2	883.8	861.2	840.6	821.7	805.2	793	782.7	773.6
Szady1(Cudo tube)	1377.5	1384.4	1390.3	1398	1403.2	1408.1	1411.2	1412.1	1425.4	1437.9
Szady2	1218.6	1226.7	1233.2	1253.8	1252.9	1239.2	1242.6	1253.4	1278.6	1284.4
(RLIQ)	71060	69657	67256	64785	62287	59774	57194	54730	52242	49783
(F)	1.273	1.818	2.363	2.786	3.151	3.478	3.783	4.064	4.333	4.589
(HLIQ)	259.8	371	482.3	568.6	642.7	709.1	770.8	827.5	881.8	933.5
(HBOIL)	1374.4	1375.5	1370.6	1365.9	1356.8	1345.4	1329.9	1310.1	1302.6	1292.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.6									
DP Liquid Density-lbm/ft3	90.96									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.172	0.934	1.295	1.645	1.833					
Zero Corrections-psid	0.015	0.066	0.02	0.053	-0.021					
Corrected DP-Psid	0.157	0.868	1.275	1.592	1.854					
Actual DP-ft	1.85	2.78	4.21	5.8	7.34					
Measured TP-Psig	54.3				49					
Measured Overall-ft	8.88									
Computed DP-ft	1.77	3.27	4.84	6.57	8.36					
Friction-ft	0.15	0.53	1.12	1.91	2.83					
Acceleration-ft	0.18	0.36	0.54	0.76	1.03					
Elevation-ft	1.44	2.38	3.18	3.89	4.5					

Run#	452									
Test Fluid	R114									
Date:	3/27/93									
Time:	6:39									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	51.9									
Sat. Temperature-F(inlet)	124									
Liq. Density-lbm/ft3	85.99	85.98	85.96	85.99	86.03	86.1	86.18	86.23	86.29	86.37
Latent Heat-Btu/lbm	50.65	50.64	50.62	50.65	50.69	50.75	50.83	50.88	50.93	51.01
Specific Heat-Btu/lbm/F	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.255	0.254	0.254
Liq. Viscosity-lbm/ft-hr	0.634	0.633	0.633	0.634	0.635	0.637	0.639	0.641	0.642	0.645
Liq. Conductivity-Btu/hr-ft-F	0.0336	0.0336	0.0336	0.0336	0.0336	0.0337	0.0337	0.0338	0.0338	0.0339
Liq. Prandtl No.	4.81	4.81	4.81	4.81	4.81	4.82	4.82	4.83	4.83	4.84
Inlet Flow Rate-GPM	4.1									
Outlet Liq. Flow Rate-GPM	2.5									
Outlet Vap. Flow Rate-GPM	1.2									
Inlet Temperature-F	118.2									
Outlet Liq. Temperature-F	116.3									
Outlet Vap. Temperature-F	109.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	62.9									
Water outlet Temp.-F	86.1									
Inlet G-lbm/hr/ft2	848999		Temp		114.3	Density	86.77			
Subcooling-F	5.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1141.5	1147.4	1158.9	1162.4	1166.9	1159.5	1151.7	1145.6	1152	1152.8
Heat Loss-Watts	18.8	4.4	6.1	7.1	7.7	7.3	5.3	6.4	6.7	36.6
Heat Flux-Btu/Hr/ft2	19787	19889	20089	20149	20227	20099	19964	19858	19969	19983
Wall Temp. #3-F	137.1	139.2	136.6	136.9	143.5	137.6	137.3	137	138.9	138.5
Wall Temp. #4-F	137	135.9	138.3	138	138.1	137.9	137.9	137.7	138.3	136.7
Wall Temp. #5-F	136.2	133.7	140.1	137.1	136.6	137.6	138	135.8	133.5	138.3
Wall Temp. #1-F	74.4	136.6	135.6	136.4	135.5	139.2	137.8	137.5	133.6	130.5
Wall Temp. #2-F	137.2	136.6	136.4	136.6	136.1	143	138.6	137.8	136	134.2
Instream Temp.-F	120.9	121	121.2	120.9	120.6	120	119.3	118.9	118.4	117.7
Avg. Wall Temp.-F	136.9	137.1	136.7	137.1	136.6	138.1	137.5	137.2	136.1	135.2
Avg. Wall DT.-F	15.1	15.2	14.6	15.3	15.1	17.2	17.3	17.4	16.8	16.6
Remaining Subcool-F	0.5									
Exit Quality	0	0.02	0.05	0.08	0.11	0.13	0.16	0.19	0.22	0.24
EXP. H-Btu/Hr/ft2/F	1312.1	1310.6	1374.3	1317.9	1343	1170.8	1152.8	1143.7	1191.7	0
COMPUTED H										
Jallouk	983.2	911.8	873.9	845.8	825.7	805.1	785.7	771.3	758.7	745.9
Szady1(Cudo tube)	1369.3	1376.9	1392.8	1402.7	1414.5	1419.8	1417.2	1425.4	1441.1	1454.6
Szady2	1210.8	1220	1238	1258.4	1284.6	1255	1260.6	1276	1287.8	1288.9
(RLIQ)	87650	86728	84430	81890	79349	76696	74037	71530	68999	66403
(F)	1.008	1.517	2.081	2.492	2.838	3.149	3.434	3.694	3.941	4.182
(HLIQ)	244.6	368.2	505.3	604.8	688.6	763.5	831.8	894.4	953.7	1011.1
(HBOIL)	1366.7	1368.1	1370.3	1364.2	1357.9	1342	1314.4	1296.7	1285.7	1269.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	127.3									
DP Liquid Density-lbm/ft3	85.23									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.06	0.619	0.863	1.027	1.03					
Zero Corrections-psid	0.015	0.066	0.02	0.053	-0.021					
Corrected DP-Psid	0.045	0.553	0.843	0.974	1.051					
Actual DP-ft	1.9	3.03	4.52	6.27	7.99					
Measured TP-Psig	51.9				46					
Measured Overall-ft	9.84									
Computed DP-ft	2.06	3.84	5.7	7.75	9.89					
Friction-ft	0.16	0.59	1.26	2.17	3.24					
Acceleration-ft	0.21	0.44	0.67	0.93	1.23					
Elevation-ft	1.69	2.8	3.77	4.65	5.42					

Run#	453									
Test Fluid	R114									
Date:	3/27/93									
Time:	6:39									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	56.8									
Sat. Temperature-F(inlet)	128.9									
Liq. Density-lbm/ft3	85.46	85.45	85.38	85.42	85.47	85.52	85.59	85.65	85.7	85.85
Latent Heat-Btu/lbm	50.14	50.13	50.08	50.11	50.16	50.2	50.27	50.33	50.37	50.52
Specific Heat-Btu/lbm/F	0.257	0.257	0.257	0.257	0.257	0.257	0.256	0.256	0.256	0.256
Liq. Viscosity-lbm/ft-hr	0.619	0.618	0.617	0.618	0.619	0.62	0.622	0.624	0.625	0.63
Liq. Conductivity-Btu/hr-ft-F	0.0332	0.0332	0.0332	0.0332	0.0333	0.0333	0.0333	0.0334	0.0334	0.0335
Liq. Prandtl No.	4.78	4.77	4.77	4.77	4.78	4.78	4.78	4.79	4.79	4.8
Inlet Flow Rate-GPM	4.8									
Outlet Liq. Flow Rate-GPM	2.6									
Outlet Vap. Flow Rate-GPM	1.2									
Inlet Temperature-F	122.8									
Outlet Liq. Temperature-F	120.8									
Outlet Vap. Temperature-F	112.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	61.9									
Water outlet Temp.-F	80.6									
Inlet G-lbm/hr/ft2	987232		Temp	119.3	Density	86.18				
Subcooling-F	6.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1350.1	1148.5	1149.3	1154.6	1152.9	1158.1	1158.5	1168.5	1149.4	1160.2
Heat Loss-Watts	19.8	4.6	6.4	7.6	8.3	8	5.9	6.9	7.1	38.7
Heat Flux-Btu/Hr/ft2	23403	19909	19922	20014	19985	20075	20082	20255	19924	20111
Wall Temp. #3-F	141.5	143.6	141	141.1	147.6	141.8	141.8	141.7	143.3	142.3
Wall Temp. #4-F	141.3	140.4	142.7	142.2	142.4	142.1	142.4	142.4	142.8	140.7
Wall Temp. #5-F	140.7	138	144.3	141.3	140.7	141.9	140.6	140.6	138.1	140.3
Wall Temp. #1-F	75.7	140.9	140	140.8	139.8	143.6	142.1	142.2	138.2	134.3
Wall Temp. #2-F	141.6	141.1	140.7	142.8	140.3	147.3	143.5	142.7	140.6	138.1
Instream Temp.-F	125.4	125.5	126	125.7	125.3	124.9	124.3	123.8	123.4	122.1
Avg. Wall Temp.-F	141.3	141.5	141.1	141.4	140.8	142.4	142.1	141.9	140.6	139.1
Avg. Wall DT.-F	14.8	15.1	14.2	14.7	14.6	16.5	16.9	17.2	16.3	16.1
Remaining Subcool-F	0.7									
Exit Quality	0	0.02	0.04	0.07	0.09	0.11	0.14	0.16	0.19	0.21
EXP. H-Btu/Hr/ft2/F	1579.4	1318.4	1403	1357.3	1369.1	1213.5	1190.2	1177.3	1222.4	0
COMPUTED H										
Jallouk	1086.2	918.9	874.7	847.2	822	805.1	787.4	771.4	753.9	748.8
Szady1(Cudo tube)	1515.8	1402.7	1415.2	1427.3	1436.3	1450.6	1452.4	1469.8	1473.3	1490.9
Szady2	1384.1	1247.3	1260.6	1281.9	1284.1	1288.4	1298.1	1323.4	1319.1	1331.7
(RLIQ)	104409	103597	101403	98767	96085	93411	90647	87938	85301	82287
(F)	1.008	1.425	1.942	2.311	2.621	2.896	3.161	3.388	3.609	3.835
(HLIQ)	277.4	392.2	534.9	636.3	721.4	796.8	866.3	930.9	991.1	1051.6
(HBOIL)	1512.7	1392.4	1389.2	1383.8	1372.9	1365.6	1341.4	1332.9	1305.4	1290.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.1									
DP Liquid Density-lbm/ft3	90.9									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.026	0.396	0.55	0.601	0.508					
Zero Corrections-psid	0.015	0.066	0.02	0.053	-0.021					
Corrected DP-Psid	-0.041	0.33	0.53	0.548	0.529					
Actual DP-ft	2.19	3.68	5.46	7.55	9.57					
Measured TP-Psig	56.8				50.3					
Measured Overall-ft	10.9									
Computed DP-ft	2.17	4.09	6.12	8.34	10.66					
Friction-ft	0.2	0.69	1.46	2.48	3.68					
Acceleration-ft	0.25	0.52	0.77	1.05	1.36					
Elevation-ft	1.72	2.88	3.89	4.81	5.62					

Run:	55									
Test Fluid	245F10									
Date:	4/16/98									
Time:	8:08									
Note	TABOREK Anarvical at									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psia	86.5									
Sat. Temperature-F(inlet)	139									
Liq. Density-lbm/ft3	85.78	85.96	86.06	85.96	85.97	85.99	85.96	85.97	85.97	85.97
Latent Heat-Btu/lbm	82.32	82.44	82.5	82.44	82.45	82.46	82.44	82.45	82.45	82.45
Specific Heat-Btu/lbm/F	0.276	0.276	0.275	0.276	0.276	0.276	0.276	0.276	0.276	0.276
Liq. Viscosity-lbm/ft-hr	0.516	0.521	0.523	0.521	0.521	0.521	0.521	0.521	0.521	0.521
Liq. Conductivity-Btu/hr-ft-F	0.0275	0.0276	0.0277	0.0276	0.0276	0.0277	0.0276	0.0276	0.0276	0.0276
Liq. Prandtl No	5.18	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
Inlet Flow Rate-GPM										
Outlet Liq. Flow Rate-GPM										
Outlet Vap. Flow Rate-GPM	7.9									
Inlet Temperature-F	126.8									
Outlet Liq. Temperature-F	126.9									
Outlet Vap. Temperature-F	126.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	123.4									
Water outlet Temp.-F	122.3									
Inlet G-lbm/hr/ft2	206792		Temp	120.5	Density	86.65				
Subcooling-F	12.2									
Flow Observation										

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	0	0	0	0	0
Heat Loss-Watts	16.8	4.1	5.4	6.3	6.6	5.8	4.3	5.3	5.8	33.5
Heat Flux-Btu/Hr/ft2	0	0	0	0	0	0	0	0	0	0
Wall Temp. #3-F	127.1	127.2	126.9	127.6	127.6	127.3	128	127.1	126.5	126.4
Wall Temp. #4-F	127.1	127.4	126.7	127.6	127.5	127.3	127.8	127.2	127	126.3
Wall Temp. #5-F	125.8	127.4	126.3	127.5	127.3	127.3	127.4	127.3	126.7	127.5
Wall Temp. #1-F	66.7	128	126.4	128.1	127.3	127.6	128.3	127.5	126.5	129
Wall Temp. #2-F	124.1	128	126.4	127.6	127.1	127.1	128.3	127.5	126.2	128.5
Instream Temp.-F	127.9	126.8	126.2	126.8	126.7	126.6	126.8	126.7	126.7	126.7
Avg. Wall Temp.-F	126	127.7	126.6	127.7	127.3	127.4	128	127.3	126.6	127.5
Avg. Wall DT.-F	-1.9	0.9	-0.4	0.9	0.6	0.8	1.2	0.6	-0.1	1.3
Remaining Subcool-F	12.2									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	0	0	0	0	0	0	0	0	0
COMPUTED H										
Jallouk	64	63.9	63.8	63.9	63.8	63.8	63.8	63.8	63.8	63.8
Szady1(Cudo tube)	79.8	81	81.7	82.4	82.9	83.5	84	84.5	84.9	85.4
Szady2	79.8	81	81.7	82.4	82.9	83.5	84	84.5	84.9	85.4
(RLIQ)	26203	25973	25848	25968	25945	25922	25960	25937	25935	25932
(F)	1.024	1.042	1.051	1.059	1.067	1.074	1.08	1.086	1.092	1.098
(HLIQ)	79.8	81	81.7	82.4	82.9	83.5	84	84.5	84.9	85.4
(HBOIL)	14.6	128.8	59.1	136.6	90.1	116.9	177.1	93.1	14.4	127.1

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	78.6				
DP Liquid Density-lbm/ft3	93.19				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.213	0.293	0.296	0.308	0.242
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009
Corrected DP-Psid	0.203	0.289	0.286	0.31	0.233
Actual DP-ft	2.51	4.82	6.98	9.19	11.09
Measured TP-Psig	98.5				98.5
Measured Overall-ft	0				
Computed DP-ft	2.01	4.01	6.02	8.03	9.88
Friction-ft	0.01	0.01	0.02	0.03	0.03
Acceleration-ft	0	0	0	0	0
Elevation-ft	2	4	6	8	9.84

Run#	456									
Test Fluid	R134F10									
Date	4/16/93									
Time	13:08									
Note	TABOREK	Analytical ot								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	86.6									
Sat. Temperature-F(inlet)	137.7									
Liq. Density-lbm/ft3	85.74	85.91	86.04	85.97	85.99	86.01	86.04	86.06	86.06	86.04
Latent Heat-Btu/lbm	32.29	32.4	32.49	32.45	32.46	32.47	32.49	32.5	32.5	32.49
Specific Heat-Btu/lbm/F	0.276	0.276	0.276	0.276	0.276	0.276	0.276	0.275	0.275	0.276
Liq. Viscosity-lbm/ft-hr	0.515	0.519	0.523	0.521	0.521	0.522	0.523	0.523	0.523	0.523
Liq. Conductivity-Btu/hr-ft-F	0.0275	0.0276	0.0277	0.0276	0.0277	0.0277	0.0277	0.0277	0.0277	0.0277
Liq. Prandtl No.	5.18	5.19	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
Inlet Flow Rate-GPM	2									
Outlet Liq. Flow Rate-GPM	2									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	126.6									
Outlet Liq. Temperature-F	125.5									
Outlet Vap. Temperature-F	124.1									
Water Flow Rate-GPM										
Water Inlet Temp -F	121.3									
Water outlet Temp.-F	120.7									
Inlet G-lbm/hr/ft2	411880		Temp		122.6 Density		86.3			
Subcooling-F	11.1									

Flow Observation

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	0	0	0	0	0
Heat Loss-Watts	16.8	4	5.3	6.2	6.4	5.5	4	5	5.7	32.3
Heat Flux-Btu/Hr/ft2	0	0	0	0	0	0	0	0	0	0
Wall Temp. #3-F	127	126.7	126.1	126.8	126.1	126.2	126.4	125.6	125.1	124.8
Wall Temp. #4-F	127	126.9	126.1	126.5	126.3	126.2	126.3	125.6	125.3	124.9
Wall Temp. #5-F	126.4	126.7	126	126.6	126.2	126.2	126.2	125.6	125.6	125.3
Wall Temp. #1-F	66.8	127.1	126.1	127.4	126.3	126.6	126.7	125.6	125.3	126.8
Wall Temp. #2-F	125.3	127.1	126.1	126.8	126.2	126.1	126.6	125.6	124.8	126.5
Instream Temp -F	128.1	127.1	126.3	126.7	126.6	126.5	126.3	126.2	126.2	126.3
Avg. Wall Temp -F	126.4	127	126.1	126.8	126.3	126.3	126.4	125.6	125.2	125.7
Avg. Wall DT -F	-1.7	0.1	-0.2	0.1	-0.3	-0.2	0.1	-0.8	-1	-0.6
Remaining Subcool-F	11.1									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP H-Btu/Hr/ft2/F	0	0	0	0	0	0	0	0	0	0
COMPUTED H										
Jallouk	111.1	110.9	110.8	110.8	110.8	110.8	110.7	110.7	110.7	110.7
Szady1(Cudo tube)	138.4	140.6	141.8	142.9	143.9	144.9	145.7	146.5	147.3	148.1
Szady2	138.4	140.6	141.8	142.9	143.9	144.9	145.7	146.5	147.3	148.1
(RLIQ)	52273	51855	51524	51681	51636	51590	51504	51458	51453	51488
(F)	1.024	1.042	1.051	1.059	1.067	1.074	1.08	1.087	1.093	1.098
(HLIQ)	138.4	140.6	141.8	142.9	143.9	144.9	145.7	146.5	147.3	148.1
(HBOIL)	14.6	14.4	14.3	18.1	14.4	14.3	20.2	14.3	14.3	14.3

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	78.2				
DP Liquid Density-lbm/ft3	93.25				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.218	0.298	0.31	0.33	0.27
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009
Corrected DP-Psid	0.208	0.294	0.3	0.332	0.261
Actual DP-ft	2.52	4.83	7	9.23	11.14
Measured TP-Psig	86.6				86.6
Measured Overall-ft	0				
Computed DP-ft	2.02	4.05	6.07	8.1	9.96
Friction-ft	0.02	0.05	0.07	0.1	0.12
Acceleration-ft	0	0	0	0	0
Elevation-ft	2	4	6	8	9.84

Run#	457									
Test Fluid	C4F10									
Date:	4/16/93									
Time:	18:08									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	85.6									
Sat. Temperature-F(inlet)	137									
Liq. Density-lbm/ft3	85.86	85.99	86.09	86.09	86.07	86.07	86.06	86.04	86.04	86.06
Latent Heat-Btu/lbm	32.37	32.46	32.53	32.53	32.51	32.51	32.5	32.49	32.49	32.5
Specific Heat-Btu/lbm/F	0.276	0.276	0.275	0.275	0.275	0.275	0.275	0.276	0.276	0.275
Liq. Viscosity-lbm/ft-hr	0.518	0.521	0.524	0.524	0.524	0.524	0.523	0.523	0.523	0.523
Liq. Conductivity-Btu/hr-ft-F	0.0276	0.0277	0.0277	0.0277	0.0277	0.0277	0.0277	0.0277	0.0277	0.0277
Liq. Prandtl No.	5.19	5.2	5.21	5.21	5.21	5.21	5.2	5.2	5.2	5.2
Inlet Flow Rate-GPM	3									
Outlet Liq. Flow Rate-GPM	2.4									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	126.3									
Outlet Liq. Temperature-F	124.7									
Outlet Vap. Temperature-F	123.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	120.4									
Water outlet Temp.-F	119.5									
Inlet G-lbm/hr/ft2	616718		Temp	123.5	Density	86.14				
Subcooling-F	10.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	0	0	0	0	0
Heat Loss-Watts	17.2	4.1	5.5	6.3	6.6	5.7	4.3	5.3	5.9	33.3
Heat Flux-Btu/Hr/ft2	0	0	0	0	0	0	0	0	0	0
Wall Temp. #3-F	126.6	126.3	126	126.1	125.5	125.9	126.2	125.6	125.4	124.8
Wall Temp. #4-F	126.7	126.9	125.9	126	126.4	125.8	126.1	126.1	125.9	125
Wall Temp. #5-F	126.2	126.8	125.6	126.1	126	125.9	125.9	126	125.9	125.4
Wall Temp. #1-F	65.6	126.8	125.9	126.8	125.8	126.2	126.6	125.7	125.7	126.7
Wall Temp. #2-F	125.6	126.8	125.9	126	125.8	125.5	126.5	125.8	125.3	126.2
Instream Temp.-F	127.4	126.6	126	126	126.1	126.1	126.2	126.3	126.3	126.2
Avg. Wall Temp.-F	126.3	126.7	125.9	126.3	126	126	126.3	125.8	125.6	125.6
Avg. Wall DT.-F	-1.1	0.1	-0.1	0.3	-0.1	-0.1	0.1	-0.5	-0.7	-1.6
Remaining Subcool-F	10.7									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	0	0	0	0	0	0	0	0	0
COMPUTED H										
Jallouk	153.2	153	152.9	152.9	152.9	152.9	152.9	152.9	152.9	152.9
Szady1(Cudo tube)	191	194.1	195.7	197.3	198.7	200	201.2	202.4	203.5	204.6
Szady2	191	194.1	195.7	197.3	198.7	200	201.2	202.4	203.5	204.6
(RLIQ)	77839	77338	76967	76959	77012	77004	77057	77110	77102	77034
(F)	1.024	1.042	1.051	1.059	1.067	1.074	1.08	1.087	1.093	1.098
(HLIQ)	191	194.1	195.7	197.3	198.7	200	201.2	202.4	203.5	204.6
(HBOIL)	14.5	14.4	14.2	36.4	14.3	14.3	8.5	14.3	14.3	14.3

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	73.7				
DP Liquid Density-lbm/ft3	93.9				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.21	0.281	0.288	0.307	0.235
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009
Corrected DP-Psid	0.2	0.277	0.278	0.309	0.226
Actual DP-ft	2.52	4.83	7.01	9.25	11.15
Measured TP-Psig	85.6				85.6
Measured Overall-ft	0				
Computed DP-ft	2.05	4.1	6.15	8.2	10.09
Friction-ft	0.05	0.1	0.15	0.2	0.25
Acceleration-ft	0	0	0	0	0.01
Elevation-ft	2	4	6	8	9.84

Run 458
Test Fluid R134F10
Date 4/16/93
Time 17:08
Note "ABORE" Analytical ct
Flow Area-ft2 .00336
Heat Flow Area-ft2 .19695
Sat. Pressure-Psig 34.2
Sat. Temperature-F(inlet) 126

Liq. Density-lbm/ft3	85.99	86.09	86.19	86.15	86.15	86.19	86.1	86.12	86.12	86.14
Latent Heat-Btu/lbm	32.46	32.53	32.59	32.57	32.57	32.59	32.54	32.55	32.55	32.56
Specific Heat-Btu/lbm/F	0.276	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.521	0.524	0.526	0.526	0.526	0.526	0.524	0.525	0.525	0.525
Liq. Conductivity-Btu/hr-ft-F	0.0277	0.0277	0.0278	0.0278	0.0278	0.0278	0.0277	0.0277	0.0277	0.0277
Liq. Prandtl No	5.2	5.21	5.22	5.21	5.21	5.22	5.21	5.21	5.21	5.21
Inlet Flow Rate-GPM	4									
Outlet Liq. Flow Rate-GPM	0.5									
Outlet Vap. Flow Rate-GPM	3.9									
Inlet Temperature-F	25.6									
Outlet Liq. Temperature-F	123.5									
Outlet Vap. Temperature-F	122.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	119.2									
Water outlet Temp.-F	118.1									
Inlet G-lbm/hr/ft2	822945		Temp	123.1	Density	86.21				
Subcooling-F	10.4									
Flow Observation										

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	0	0	0	0	0
Heat Loss-Watts	17.4	4.1	5.5	6.3	6.6	5.9	4.1	5.4	6	33.5
Heat Flux-Btu/Hr/ft2	0	0	0	0	0	0	0	0	0	0
Wall Temp. #3-F	125.9	125.8	125.6	125.5	124.8	125.4	125.7	125.4	124.8	124.5
Wall Temp. #4-F	126.1	126.2	125.5	125.3	125.6	125.3	125.6	125.6	125.4	124.6
Wall Temp. #5-F	125.9	126.1	125.4	125.5	125.5	125.4	125.5	125.4	125.4	124.8
Wall Temp. #1-F	126.1	126.1	125.5	125.8	125.2	125.6	125.9	125.3	125.4	126
Wall Temp. #2-F	125.4	126.1	125.6	125.3	125.2	125	123.2	125.4	124.8	125.6
Instream Temp.-F	126.6	126	125.4	125.6	125.6	125.4	125.9	125.8	125.8	125.7
Avg. Wall Temp.-F	125.8	126.1	125.6	125.5	125.4	125.4	125.2	125.4	125.2	125.1
Avg. Wall DT-F	-0.8		-0.1	-0.1	-0.2	0	-0.7	-0.4	-0.6	-0.6
Remaining Subcool-F	10.4									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	0	0	0	0	0	0	0	0	0
COMPUTED H										
Jallouk	192.8	192.6	192.4	192.5	192.5	192.4	192.5	192.5	192.4	192.4
Steady1(Cuda tube)	240.4	244.3	246.4	248.4	250.1	251.7	253.4	254.8	256.2	257.6
Steady2	240.4	244.3	246.4	248.4	250.1	251.7	253.4	254.8	256.2	257.6
(RLIQ)	103215	102714	102221	102372	102361	102190	102582	102491	102481	102390
(F)	1.024	1.042	1.051	1.06	1.067	1.074	1.081	1.087	1.093	1.099
(HLIQ)	240.4	244.3	246.4	248.4	250.1	251.7	253.4	254.8	256.2	257.6
(HBOIL)	14.4		21.4	14.2	14.2	3.4	14.2	14.2	14.2	14.2

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	72.2				
DP Liquid Density-lbm/ft3	94.11				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.193	0.242	0.236	0.246	0.158
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009
Corrected DP-Psid	0.183	0.238	0.226	0.248	0.149
Actual DP-ft	2.49	4.77	6.93	9.16	11.04
Measured TP-Psig	34.2				34.2
Measured Overall-ft	0				
Computed DP-ft	2.08	4.17	6.25	8.34	10.26
Friction-ft	0.08	0.17	0.25	0.33	0.41
Acceleration-ft	0	0	0	0	0.01
Elevation-ft	2	4	6	8	9.84

Run#	459									
Test Fluid	CF10									
Date:	3/16/93									
Time:	18:45									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	83.1									
Sat. Temperature-F(inlet)	135.2									
Liq. Density-lbm/ft3	86.02	86.2	86.25	86.17	86.19	86.22	86.15	86.23	86.25	86.23
Latent Heat-Btu/lbm	32.48	32.6	32.63	32.58	32.59	32.61	32.57	32.62	32.63	32.62
Specific Heat-Btu/lbm/F	0.276	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.522	0.527	0.528	0.526	0.526	0.527	0.526	0.528	0.528	0.528
Liq. Conductivity-Btu/hr-ft-F	0.0277	0.0278	0.0278	0.0278	0.0278	0.0278	0.0278	0.0278	0.0278	0.0278
Liq. Prandtl No.	5.2	5.22	5.22	5.21	5.22	5.22	5.21	5.22	5.22	5.22
Inlet Flow Rate-GPM	5									
Outlet Liq. Flow Rate-GPM	3.1									
Outlet Vap. Flow Rate-GPM	1.1									
Inlet Temperature-F	124.8									
Outlet Liq. Temperature-F	122.6									
Outlet Vap. Temperature-F	119.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	117.7									
Water outlet Temp.-F	116.9									
Inlet G-lbm/hr/ft2	1030922	Temp		122 Density		86.4				
Subcooling-F	10.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	0	0	0	0	0
Heat Loss-Watts	16.7	3.9	5.2	6	6.2	5.3	4.1	4.9	5.5	31.7
Heat Flux-Btu/Hr/ft2	0	0	0	0	0	0	0	0	0	0
Wall Temp. #3-F	125.9	125.3	124.9	125.6	124.6	124.9	125.5	124.7	124	124.5
Wall Temp. #4-F	126.1	125.3	124.8	125.6	124.7	124.9	125.3	124.2	124.5	124.7
Wall Temp. #5-F	125.9	125.1	124.7	125.6	124.9	125.1	125.2	124.6	124.7	124.3
Wall Temp. #1-F	66.4	125.9	124.8	125.7	125.4	125.3	125.4	124.8	124.5	125.3
Wall Temp. #2-F	125.6	125.9	124.8	125.3	125.1	124.6	128.4	124.9	124	125.2
Instream Temp.-F	126.4	125.3	125	125.5	125.4	125.2	125.6	125.1	125	125.1
Avg. Wall Temp.-F	125.9	125.6	124.8	125.6	125	125.1	126	124.6	124.3	124.8
Avg. Wall DT -F	-0.5	0.3	-0.2	0.1	-0.4	-0.2	0.4	-0.5	-0.7	-0.3
Remaining Subcool-F	10.4									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	0	0	0	0	0	0	0	0	0
COMPUTED H										
Jallouk	230.8	230.4	230.3	230.5	230.4	230.3	230.4	230.2	230.2	230.2
Szady1(Cudo tube)	287.8	292.4	294.9	297.4	299.5	301.4	303.4	305	306.6	308.3
Szady2	287.8	292.4	294.9	297.4	299.5	301.4	303.4	305	306.6	308.3
(RLIQ)	129097	127967	127653	128143	128029	127815	128205	127690	127577	127664
(F)	1.024	1.042	1.051	1.06	1.067	1.074	1.081	1.087	1.093	1.099
(HLIQ)	287.8	292.4	294.9	297.4	299.5	301.4	303.4	305	306.6	308.3
(HBOIL)	14.3	43.5	14.1	17.8	14.1	14.1	52.7	14.1	14.1	14.1

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	76.5				
DP Liquid Density-lbm/ft3	93.5				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.168	0.183	0.156	0.138	0.023
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009
Corrected DP-Psid	0.158	0.179	0.146	0.14	0.014
Actual DP-ft	2.43	4.64	6.75	8.91	10.73
Measured TP-Psig	83.1				83.1
Measured Overall-ft	0				
Computed DP-ft	2.13	4.25	6.38	8.5	10.48
Friction-ft	0.12	0.25	0.37	0.5	0.62
Acceleration-ft	0	0	0.01	0.01	0.01
Elevation-ft	2	4	6	8	9.84

Test	1F13									
Date	3/13/03									
Time	14:14									
Type	TABORE*	Analytical st								
Flow Area-ft2	.00336									
Heat Flow Area-ft2	.13695									
Sat. Pressure-Psig	36.9									
Sat. Temperature-F(inlet)	145.9									
Liq. Density-lbm/ft3	34.39	34.52	34.57	34.47	34.49	34.49	34.44	34.51	34.52	34.47
Latent Heat-Btu/lbm	31.36	31.46	31.49	31.42	31.43	31.43	31.4	31.45	31.46	31.42
Specific Heat-Btu/lbm/F	0.279	0.279	0.279	0.279	0.279	0.279	0.279	0.279	0.279	0.279
Liq. Viscosity-lbm/ft-hr	0.486	0.486	0.486	0.485	0.486	0.486	0.484	0.486	0.486	0.485
Liq. Conductivity-Btu/hr-ft-F	0.0266	0.0267	0.0268	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267
Liq. Prandtl No	5.07	5.08	5.08	5.08	5.08	5.08	5.07	5.08	5.08	5.08
Inlet Flow Rate-GPM	6									
Outlet Liq. Flow Rate-GPM	5									
Outlet Vap. Flow Rate-GPM	1									
Inlet Temperature-F	134.7									
Outlet Liq. Temperature-F	134.3									
Outlet Vap. Temperature-F	129.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	127.4									
Water outlet Temp.-F	125.9									
Inlet G-lbm/hr/ft2	1207784		Temp	133.7	Density	84.35				
Subcooling-F	11.2									

Flow Observation

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	0	0	0	0	0
Heat Loss-Watts	17.2	4.1	5.4	6.3	6.5	5.7	4.3	5.3	5.9	33.1
Heat Flux-Btu/Hr/ft2	0	0	0	0	0	0	0	0	0	0
Wall Temp. #3-F	136.2	135.8	135.6	136.3	135.6	135.5	135.8	135.2	134.7	134.9
Wall Temp. #4-F	136.3	135.8	135.6	136.3	135.4	135.5	135.7	135.1	135.1	135.3
Wall Temp. #5-F	136.2	135.7	135.4	136.3	135.5	135.6	135.7	135.1	135.5	134.8
Wall Temp #1-F	73	136.4	135.4	136.3	135.9	135.9	135.7	135.3	135.1	135.4
Wall Temp. #2-F	136	136.3	135.6	136	135.7	135.2	139.9	135.5	134.6	135.4
Instream Temp.-F	136.2	135.4	135.1	135.7	135.6	135.6	135.9	135.5	135.4	135.7
Avg. Wall Temp.-F	136.2	136.1	135.6	136.3	135.6	135.6	136.6	135.2	135	135.2
Avg. Wall DT-F	0	0.7	0.5	0.5	0	0	0.7	0.3	-0.4	-0.5
Remaining Subcool-F	11.2									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP H-Btu/Hr/ft2/F	0	0	0	0	0	0	0	0	0	0
COMPUTED H										
Hallouk	265.5	265.2	265.1	265.3	265.2	265.2	265.3	265.1	265.1	265.2
Szady1(Cudo tube)	330.7	335.7	338.4	341.2	343.4	345.6	347.7	349.4	351.2	353
Szady2	330.7	335.7	338.4	341.2	343.4	345.6	347.7	349.4	351.2	353
(RLIQ)	163471	162403	161998	162761	162614	162598	162973	162436	162289	162663
(F)	1.023	1.039	1.048	1.056	1.063	1.07	1.076	1.082	1.088	1.093
(HLIQ)	330.7	335.7	338.4	341.2	343.4	345.6	347.7	349.4	351.2	353
(HBOIL)	16.1	112.8	74.2	100.4	3.9	3.9	110.9	16	16	16

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	81.5				
DP Liquid Density-lbm/ft3	92.77				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.158	0.16	0.141	0.142	0.083
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009
Corrected DP-Psid	0.148	0.156	0.131	0.144	0.074
Actual DP-ft	2.45	4.66	5.81	9.03	10.97
Measured TP-Psig	98.9				98.9
Measured Overall-ft	0				
Computed DP-ft	2.17	4.34	6.51	8.69	10.72
Friction-ft	0.17	0.34	0.51	0.68	0.84
Acceleration-ft	0	0	0.01	0.01	0.01
Elevation-ft	2	4	6	8	9.86

Run#	461									
Test Fluid	C4F10									
Date:	4/16/93									
Time:	19:14									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	95									
Sat. Temperature-F(inlet)	143.4									
Liq. Density-lbm/ft3	84.9	84.91	85	84.95	84.96	84.91	84.96	84.98	84.98	84.93
Latent Heat-Btu/lbm	31.71	31.73	31.78	31.75	31.76	31.73	31.76	31.77	31.77	31.74
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.495	0.495	0.497	0.496	0.497	0.495	0.497	0.497	0.497	0.496
Liq. Conductivity-Btu/hr-ft-F	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027
Liq. Prandtl No.	5.11	5.11	5.12	5.11	5.11	5.11	5.11	5.11	5.11	5.11
Inlet Flow Rate-GPM	7									
Outlet Liq. Flow Rate-GPM	4.2									
Outlet Vap. Flow Rate-GPM	1									
Inlet Temperature-F	132.5									
Outlet Liq. Temperature-F	132									
Outlet Vap. Temperature-F	126.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	125.7									
Water outlet Temp.-F	124									
Inlet G-lbm/hr/ft2	1415364		Temp		131.6	Density		84.73		
Subcooling-F	10.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	0	0	0	0	0
Heat Loss-Watts	16.9	4	5.3	6.2	6.4	5.6	4	5.1	5.7	32.3
Heat Flux-Btu/Hr/ft2	0	0	0	0	0	0	0	0	0	0
Wall Temp. #3-F	133.1	132.9	132.7	133.2	132.4	132.9	132.6	132.2	132.2	131.4
Wall Temp. #4-F	133.1	133.3	132.6	133.1	133.1	132.9	132.4	132.6	132.7	131.8
Wall Temp. #5-F	133.1	133.3	132.5	133.3	132.9	132.9	132.3	132.6	132.8	132
Wall Temp. #1-F	72.6	133.1	132.6	133.3	133.1	133.1	132.7	132.2	132.2	132.2
Wall Temp. #2-F	132.9	133.3	132.6	132.7	132.9	132.3	134.9	132.2	132.2	132.1
Instream Temp.-F	133.2	133.1	132.6	132.9	132.8	133.1	132.8	132.7	132.7	133
Avg. Wall Temp.-F	133.1	133.2	132.6	133.2	133	133	133	132.4	132.4	131.9
Avg. Wall DT.-F	-0.1	0.1	0	0.3	0.2	-0.2	0.2	-0.3	-0.3	-1.1
Remaining Subcool-F	10.9									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	0	0	0	0	0	0	0	0	0
COMPUTED H										
Jallouk	300.3	300.2	300	300.1	300	300.1	299.9	299.9	299.9	300
Szady1(Cudo tube)	374	380.2	383.2	386.2	388.8	391.4	393.6	395.7	397.8	399.9
Szady2	374	380.2	383.2	386.2	388.8	391.4	393.6	395.7	397.8	399.9
(RLIQ)	187032	186855	186095	186520	186353	186780	186316	186149	186131	186557
(F)	1.023	1.04	1.049	1.057	1.064	1.071	1.077	1.083	1.089	1.094
(HLIQ)	374	380.2	383.2	386.2	388.8	391.4	393.6	395.7	397.8	399.9
(HBOIL)	15.5	7.6	3.7	51.8	31.5	15.5	28.2	15.4	15.4	15.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.5									
DP Liquid Density-lbm/ft3	93.5									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.115	0.074	0.011	-0.025	-0.119					
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009					
Corrected DP-Psid	0.105	0.07	0.001	-0.023	-0.128					
Actual DP-ft	2.38	4.52	6.61	8.77	10.65					
Measured TP-Psig	95				95					
Measured Overall-ft	0									
Computed DP-ft	2.23	4.45	6.68	8.91	10.99					
Friction-ft	0.22	0.45	0.67	0.9	1.12					
Acceleration-ft	0	0.01	0.01	0.01	0.03					
Elevation-ft	2	4	6	8	9.85					

Run#	462									
Test Fluid	134F10									
Date:	4/16/93									
Time:	13:51									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	32.8									
Sat. Temperature-F(inlet)	135									
Liq. Density-lbm/ft3	86.09	86.25	86.33	86.19	86.25	86.27	86.19	86.23	86.27	86.31
Latent Heat-Btu/lbm	32.53	32.63	32.69	32.59	32.63	32.65	32.59	32.62	32.65	32.68
Specific Heat-Btu/lbm/F	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.524	0.528	0.53	0.526	0.528	0.529	0.526	0.528	0.529	0.53
Liq. Conductivity-Btu/hr-ft-F	0.0277	0.0278	0.0279	0.0278	0.0278	0.0278	0.0278	0.0278	0.0278	0.0279
Liq. Prandtl No.	5.21	5.22	5.23	5.22	5.22	5.22	5.22	5.22	5.22	5.23
Inlet Flow Rate-GPM	5									
Outlet Liq. Flow Rate-GPM	3.2									
Outlet Vap. Flow Rate-GPM	1.1									
Inlet Temperature-F	124.1									
Outlet Liq. Temperature-F	122.4									
Outlet Vap. Temperature-F	118.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	116.6									
Water outlet Temp.-F	115.8									
Inlet G-lbm/hr/ft2	1030922		Temp		122	Density	86.4			
Subcooling-F	10.9									
Flow Observation										

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	0	0	0	0	0
Heat Loss-Watts	16.4	3.9	5.1	5.9	6	5.1	4	4.7	5.4	30.8
Heat Flux-Btu/Hr/ft2	0	0	0	0	0	0	0	0	0	0
Wall Temp. #3-F	125.6	125	124.6	125.4	124.4	124.8	125.5	124.6	124	123.9
Wall Temp. #4-F	125.9	125.2	124.6	125.3	124.5	124.8	125.3	124.2	124.6	124.5
Wall Temp. #5-F	125.7	124.9	124.5	125.3	124.8	125	125.3	124.6	124.6	123.7
Wall Temp. #1-F	67.5	125.6	124.6	125.8	125.1	125	125.6	124.6	124.6	124.9
Wall Temp. #2-F	125.5	125.5	124.6	125.3	125.1	124.5	128.2	124.7	124	124.6
Instream Temp.-F	126	125	124.5	125.4	125	124.9	125.4	125.1	124.9	124.6
Avg. Wall Temp.-F	125.7	125.3	124.6	125.5	124.9	124.9	126	124.5	124.4	124.3
Avg. Wall DT.-F	0	0.3	0.1	0	0	0	0.6	0	0	-0.3
Remaining Subcool-F	10.9									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	0	0	0	0	0	0	0	0	0
COMPUTED H										
Jallouk	230.7	230.3	230.1	230.4	230.3	230.2	230.4	230.2	230.2	230
Szady1(Cudo tube)	287.7	292.3	294.7	297.3	299.4	301.3	303.3	305	306.6	308.1
Szady2	287.7	292.3	294.7	297.3	299.4	301.3	303.3	305	306.6	308.1
(RLIQ)	128692	127666	127154	128042	127628	127515	128004	127690	127477	127184
(F)	1.024	1.042	1.052	1.06	1.067	1.074	1.081	1.087	1.093	1.099
(HLIQ)	287.7	292.3	294.7	297.3	299.4	301.3	303.3	305	306.6	308.1
(HBOIL)	1.3	47.1	14	7	1.3	1.3	85.6	1.3	1.3	14

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	77.9				
DP Liquid Density-lbm/ft3	93.29				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.166	0.179	0.155	0.142	0.024
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009
Corrected DP-Psid	0.156	0.175	0.145	0.144	0.015
Actual DP-ft	2.42	4.62	6.73	8.89	10.7
Measured TP-Psig	82.8				82.8
Measured Overall-ft	0				
Computed DP-ft	2.13	4.25	6.38	8.5	10.47
Friction-ft	0.12	0.25	0.37	0.5	0.62
Acceleration-ft	0	0	0.01	0.01	0.01
Elevation-ft	2	4	6	8	9.84

Run#	463									
Test Fluid	C4F10									
Date:	4/16/93									
Time:	18:54									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	82.5									
Sat. Temperature-F(inlet)	134.8									
Liq. Density-lbm/ft3	86.09	86.3	86.35	86.23	86.23	86.27	86.23	86.31	86.31	86.38
Latent Heat-Btu/lbm	32.53	32.67	32.7	32.62	32.62	32.65	32.62	32.68	32.68	32.72
Specific Heat-Btu/lbm/F	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.524	0.529	0.531	0.528	0.528	0.529	0.528	0.53	0.53	0.531
Liq. Conductivity-Btu/hr-ft-F	0.0277	0.0279	0.0279	0.0278	0.0278	0.0278	0.0278	0.0279	0.0279	0.0279
Liq. Prandtl No.	5.21	5.23	5.23	5.22	5.22	5.22	5.22	5.23	5.23	5.23
Inlet Flow Rate-GPM	5									
Outlet Liq. Flow Rate-GPM	3.2									
Outlet Vap. Flow Rate-GPM	1.1									
Inlet Temperature-F	123.8									
Outlet Liq. Temperature-F	122.3									
Outlet Vap. Temperature-F	118									
Water Flow Rate-GPM										
Water Inlet Temp.-F	115.7									
Water outlet Temp.-F	115.4									
Inlet G-lbm/hr/ft2	1031531		Temp		121.7 Density		86.45			
Subcooling-F	11									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	0	0	0	0	0
Heat Loss-Watts	16.4	3.8	5.1	5.8	6	5	3.9	4.7	5.3	30.6
Heat Flux-Btu/Hr/ft2	0	0	0	0	0	0	0	0	0	0
Wall Temp. #3-F	125.6	124.9	124.5	125.3	124.1	124.6	125.1	124.2	123.6	123.8
Wall Temp. #4-F	125.6	124.9	124.5	125.3	124.6	124.6	125	124.1	124.1	124.1
Wall Temp. #5-F	125.6	124.7	124.2	125.3	124.6	124.6	124.8	124.1	124.5	123.4
Wall Temp. #1-F	67.8	125.6	124.4	125.5	125.2	125.1	125.1	124.5	124.1	124.5
Wall Temp. #2-F	125.6	125.3	124.5	125.2	124.7	124.2	127.9	124.6	123.7	124.6
Instream Temp.-F	126	124.7	124.4	125.1	125.1	124.9	125.1	124.6	124.6	124.2
Avg. Wall Temp.-F	125.6	125.2	124.5	125.4	124.8	124.7	125.6	124.3	124	124.1
Avg. Wall DT.-F	-0.4	0.5	0.1	0.3	-0.3	-0.2	0.5	-0.3	-0.6	-0.1
Remaining Subcool-F	11									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	0	0	0	0	0	0	0	0	0
COMPUTED H										
Jallouk	230.8	230.3	230.2	230.4	230.4	230.3	230.4	230.2	230.2	230
Szady1(Cudo tube)	287.8	292.3	294.8	297.4	299.5	301.4	303.4	305	306.7	308.2
Szady2	287.8	292.3	294.8	297.4	299.5	301.4	303.4	305	306.7	308.2
(RLIQ)	128768	127441	127129	127816	127803	127590	127778	127265	127252	126841
(F)	1.024	1.042	1.052	1.06	1.067	1.074	1.081	1.088	1.094	1.1
(HLIQ)	287.8	292.3	294.8	297.4	299.5	301.4	303.4	305	306.7	308.2
(HBOIL)	14.2	69.2	10.4	36	14.1	14.1	70.3	14	14	13.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.4									
DP Liquid Density-lbm/ft3	93.22									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.166	0.177	0.153	0.141	0.022					
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009					
Corrected DP-Psid	0.156	0.173	0.143	0.143	0.013					
Actual DP-ft	2.42	4.61	6.71	8.87	10.68					
Measured TP-Psig	82.5				82.5					
Measured Overall-ft	0									
Computed DP-ft	2.13	4.25	6.38	8.5	10.48					
Friction-ft	0.12	0.25	0.37	0.5	0.62					
Acceleration-ft	0	0	0.01	0.01	0.01					
Elevation-ft	2	4	6	8	9.84					

Runs	464									
Test Fluid	CHF10									
Date	4/16/93									
Time	18:57									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	82.2									
Sat. Temperature-F(inlet)	134.6									
Liq. Density-lbm/ft3	86.09	86.3	86.36	86.25	86.28	86.3	86.25	86.33	86.33	86.4
Latent Heat-Btu/lbm	32.53	32.67	32.71	32.63	32.66	32.67	32.63	32.69	32.69	32.73
Specific Heat-Btu/lbm/F	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.524	0.529	0.531	0.528	0.529	0.529	0.528	0.53	0.53	0.532
Liq. Conductivity-Btu/hr-ft-F	0.0277	0.0279	0.0279	0.0278	0.0278	0.0279	0.0278	0.0279	0.0279	0.0279
Liq. Prandtl No.	5.21	5.23	5.23	5.22	5.22	5.23	5.22	5.23	5.23	5.23
Inlet Flow Rate-GPM	5									
Outlet Liq. Flow Rate-GPM	3.2									
Outlet Vap. Flow Rate-GPM	1.1									
Inlet Temperature-F	124									
Outlet Liq. Temperature-F	122.2									
Outlet Vap. Temperature-F	117.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	115.7									
Water outlet Temp.-F	115									
Inlet G-lbm/hr/ft2	1031937		Temp		121.5 Density		86.48			
Subcooling-F	10.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	0	0	0	0	0
Heat Loss-Watts	16.2	3.8	5	5.7	5.8	4.9	3.6	4.6	5.3	30.2
Heat Flux-Btu/Hr/ft2	0	0	0	0	0	0	0	0	0	0
Wall Temp. #3-F	125.5	124.9	124.5	125.1	123.9	124.5	125	124	123.5	123.8
Wall Temp. #4-F	125.6	125	124.4	125.1	124.4	124.4	124.9	123.9	123.9	123.9
Wall Temp. #5-F	125.5	124.7	124.2	125.1	124.6	124.8	124.7	123.9	124.2	123.6
Wall Temp. #1-F	68.4	125.5	124.3	125.7	125	124.9	125.1	124.3	123.9	124.8
Wall Temp. #2-F	125.5	125.3	124.4	125.1	124.7	124.3	128.1	124.4	123.5	124.5
Instream Temp.-F	126	124.7	124.3	125	124.8	124.7	125	124.5	124.5	124.1
Avg. Wall Temp.-F	125.5	125.2	124.4	125.3	124.7	124.7	125.6	124.1	123.8	124.1
Avg. Wall DT.-F	-0.5	0.5	0.1	0.3	-0.1	0	0.6	-0.4	-0.7	0
Remaining Subcool-F	10.6									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	0	0	0	0	0	0	0	0	0
COMPUTED H										
Jallouk	230.9	230.4	230.3	230.5	230.4	230.3	230.4	230.2	230.2	230.1
Szady1(Cudo tube)	287.9	292.4	294.9	297.5	299.5	301.5	303.4	305	306.7	308.2
Szady2	287.9	292.4	294.9	297.5	299.5	301.5	303.4	305	306.7	308.2
(RLIQ)	128819	127491	127079	127766	127553	127440	127728	127215	127202	126791
(F)	1.024	1.042	1.052	1.06	1.067	1.075	1.081	1.088	1.094	1.1
(HLIQ)	287.9	292.4	294.9	297.5	299.5	301.5	303.4	305	306.7	308.2
(HBOIL)	14.2	69.2	14	36	14	14	82.2	14	14	2.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.6									
DP Liquid Density-lbm/ft3	93.19									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.166	0.175	0.152	0.139	0.016					
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009					
Corrected DP-Psid	0.156	0.171	0.142	0.141	0.007					
Actual DP-ft	2.42	4.6	6.71	8.86	10.66					
Measured TP-Psig	82.2				82.2					
Measured Overall-ft	0									
Computed DP-ft	2.13	4.25	6.38	8.5	10.48					
Friction-ft	0.13	0.25	0.37	0.5	0.62					
Acceleration-ft	0	0	0.01	0.01	0.01					
Elevation-ft	2	4	6	8	9.84					

Run#	465									
Test Fluid	C4F10									
Date:	4/16/93									
Time:	20:04									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	90.7									
Sat. Temperature-F(inlet)	140.5									
Liq. Density-lbm/ft3	85.25	85.3	85.33	85.33	85.31	85.3	85.35	85.33	85.33	85.35
Latent Heat-Btu/lbm	31.96	31.99	32.01	32.01	32	31.99	32.02	32.01	32.01	32.02
Specific Heat-Btu/lbm/F	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277
Liq. Viscosity-lbm/ft-hr	0.503	0.504	0.505	0.505	0.505	0.504	0.506	0.505	0.505	0.506
Liq. Conductivity-Btu/hr-ft-F	0.0272	0.0272	0.0272	0.0272	0.0272	0.0272	0.0272	0.0272	0.0272	0.0272
Liq. Prandtl No.	5.14	5.14	5.14	5.14	5.14	5.14	5.14	5.14	5.14	5.14
Inlet Flow Rate-GPM	5									
Outlet Liq. Flow Rate-GPM	3.2									
Outlet Vap. Flow Rate-GPM	1.1									
Inlet Temperature-F	130.1									
Outlet Liq. Temperature-F	129.1									
Outlet Vap. Temperature-F	123.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	123.5									
Water outlet Temp.-F	121.6									
Inlet G-lbm/hr/ft2	1016676		Temp	128.9	Density	85.2				
Subcooling-F	10.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	0	0	0	0	0
Heat Loss-Watts	16.3	3.9	5.2	5.8	6	5.1	3.7	4.8	5.5	30.5
Heat Flux-Btu/Hr/ft2	0	0	0	0	0	0	0	0	0	0
Wall Temp. #3-F	130.7	130.6	130.6	130.9	130	130.6	130.4	130	129.9	129.1
Wall Temp. #4-F	130.9	130.9	130.5	130.8	130.6	130.6	130.2	130.1	130.2	129.4
Wall Temp. #5-F	130.9	130.9	130.4	130.9	130.6	130.7	130.2	130.2	130.5	129.8
Wall Temp. #1-F	72.8	131	130.4	130.9	130.7	130.9	130.3	130	130.1	129.8
Wall Temp. #2-F	130.6	131	130.5	130.5	130.6	130.2	133.2	130.1	129.8	129.7
Instream Temp.-F	131.1	130.8	130.6	130.6	130.7	130.8	130.6	130.6	130.6	130.5
Avg. Wall Temp.-F	130.8	130.9	130.5	130.9	130.6	130.7	130.9	130.1	130.1	129.6
Avg. Wall DT.-F	-0.3	0.1	-0.1	0.3	-0.1	-0.1	0.4	-0.5	-0.5	-0.9
Remaining Subcool-F	10.4									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	0	0	0	0	0	0	0	0	0
COMPUTED H										
Jallouk	229.8	229.7	229.6	229.6	229.6	229.6	229.5	229.5	229.5	229.4
Szady1(Cudo tube)	286.3	291	293.5	295.7	297.8	299.7	301.4	303.1	304.8	306.3
Szady2	286.3	291	293.5	295.7	297.8	299.7	301.4	303.1	304.8	306.3
(RLIQ)	132125	131792	131570	131557	131648	131739	131413	131504	131491	131374
(F)	1.023	1.041	1.05	1.058	1.065	1.072	1.078	1.084	1.09	1.096
(HLIQ)	286.3	291	293.5	295.7	297.8	299.7	301.4	303.1	304.8	306.3
(HBOIL)	15.2	11.2	15.1	42.5	15.1	15.1	55.9	15.1	15.1	15
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.1									
DP Liquid Density-lbm/ft3	93.55									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.177	0.2	0.2	0.212	0.171					
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009					
Corrected DP-Psid	0.167	0.196	0.19	0.214	0.162					
Actual DP-ft	2.47	4.72	6.9	9.13	11.1					
Measured TP-Psig	90.7				90.7					
Measured Overall-ft	0									
Computed DP-ft	2.13	4.25	6.37	8.5	10.47					
Friction-ft	0.12	0.25	0.37	0.49	0.61					
Acceleration-ft	0	0	0	0.01	0.01					
Elevation-ft	2	4	6	8	9.85					

Run#	466									
Test Fluid	C4F10									
Date:	4/16/93									
Time:	21:07									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	124.2									
Sat. Temperature-F(inlet)	160.8									
Liq. Density-lbm/ft3	82.11	82.18	82.17	82.09	82.07	82	81.62	81.59	81.59	81.61
Latent Heat-Btu/lbm	29.74	29.8	29.78	29.73	29.72	29.66	29.39	29.36	29.36	29.38
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.285	0.286	0.286	0.286	0.286
Liq. Viscosity-lbm/ft-hr	0.435	0.437	0.436	0.435	0.435	0.433	0.426	0.425	0.425	0.426
Liq. Conductivity-Btu/hr-ft-F	0.0252	0.0252	0.0252	0.0252	0.0252	0.0251	0.0249	0.0249	0.0249	0.0249
Liq. Prandtl Nc.	4.92	4.93	4.93	4.92	4.92	4.92	4.9	4.9	4.9	4.9
Inlet Flow Rate-GPM	1.5									
Outlet Liq. Flow Rate-GPM	1.5									
Outlet Vap. Flow Rate-GPM	0.4									
Inlet Temperature-F	148									
Outlet Liq. Temperature-F	151									
Outlet Vap. Temperature-F	147.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	145.3									
Water outlet Temp.-F	142.4									
Inlet G-lbm/hr/ft2	295398		Temp		143.6	Density	82.62			
Subcooling-F	12.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	20	20	20.4	19.9	180	686.9	671.7	0	0
Heat Loss-Watts	21.6	5.2	7.1	8.9	9.8	10.4	9.1	10	8.4	45
Heat Flux-Btu/Hr/ft2	0	347	347	354	345	3120	11907	11643	0	0
Wall Temp. #3-F	150.4	151.4	152.3	153.1	153.5	157.6	162.7	162.2	151	148.9
Wall Temp. #4-F	151	152	152.1	152.9	154.4	157.6	163.3	162.9	151.6	149.5
Wall Temp. #5-F	150.2	151.8	151.8	153.1	153.4	157.6	162.3	161.7	152.1	150.6
Wall Temp. #1-F	72.8	151.7	151.6	152.8	152.9	157.7	163.2	162.9	152.7	150.6
Wall Temp. #2-F	148.6	151.8	151.6	152.4	152.6	157.2	164.2	163.4	152.1	150.5
Instream Temp.-F	149	148.6	148.7	149.1	149.2	149.6	151.6	151.8	151.8	151.7
Avg. Wall Temp.-F	150.1	151.7	151.9	153	153.3	157.6	163.1	162.6	151.9	150
Avg. Wall DT -F	1.1	3.1	3.2	3.9	4.1	7.9	11	10.3	0.1	-1.7
Remaining Subcool-F	12.8									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	111.5	108.9	91.6	83.9	395.8	1082.3	1131.1	0	0
COMPUTED H										
Jallouk	87.5	87.4	87.4	87.5	87.5	87.5	87.7	87.7	87.7	87.7
Szady1(Cudo tube)	108.7	110.3	111.2	112	112.7	113.4	114.2	114.7	115.3	115.8
Szady2	108.7	110.3	111.2	112	112.7	113.4	114.2	114.7	115.3	115.8
(RLIQ)	44382	44228	44260	44404	44438	44580	45329	45401	45398	45353
(F)	1.021	1.036	1.044	1.052	1.058	1.064	1.069	1.074	1.079	1.084
(HLIQ)	108.7	110.3	111.2	112	112.7	113.4	114.2	114.7	115.3	115.8
(HBOIL)	209	632.3	648.8	793.7	847.5	1659.9	2392.2	2240	19.4	19.4

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	75.9				
DP Liquid Density-lbm/ft3	93.58				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.293	0.43	0.578	1.082	1.707
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009
Corrected DP-Psid	0.283	0.426	0.568	1.084	1.698
Actual DP-ft	2.79	5.34	7.88	11.09	(14.32)
Measured TP-Psig	124.2				124.2
Measured Overall-ft	0				
Computed DP-ft	2.01	4.03	6.04	8.05	(9.94)
Friction-ft	0.01	0.03	0.04	0.06	0.07
Acceleration-ft	0	0	0	0	0
Elevation-ft	2	4	6	8	9.87

Why ?

Run#	467									
Test Fluid	C4F10									
Date:	4/16/93									
Time:	22:02									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	123.5									
Sat. Temperature-F(inlet)	160.5									
Liq. Density-lbm/ft3	81.87	81.96	81.92	81.89	81.85	81.72	81.59	81.64	81.64	81.66
Latent Heat-Btu/lbm	29.57	29.63	29.61	29.58	29.55	29.46	29.36	29.4	29.4	29.42
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.286	0.286	0.286	0.286	0.286
Liq. Viscosity-lbm/ft-hr	0.431	0.432	0.432	0.431	0.43	0.428	0.425	0.426	0.426	0.427
Liq. Conductivity-Btu/hr-ft-F	0.025	0.0251	0.0251	0.025	0.025	0.0249	0.0249	0.0249	0.0249	0.0249
Liq. Prandtl No.	4.91	4.91	4.91	4.91	4.91	4.9	4.9	4.9	4.9	4.9
Inlet Flow Rate-GPM	1.5									
Outlet Liq. Flow Rate-GPM	1.4									
Outlet Vap. Flow Rate-GPM	0.4									
Inlet Temperature-F	149.5									
Outlet Liq. Temperature-F	150.7									
Outlet Vap. Temperature-F	147.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	144.8									
Water outlet Temp.-F	141.7									
Inlet G-lbm/hr/ft2	295669		Temp	143.2	Density	82.6				
Subcooling-F	11									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	30.1	30.6	30.4	30	178.6	686.3	668.9	0	0
Heat Loss-Watts	22	5.4	7.4	9.3	10.2	10.3	9.1	9.9	8.4	44.8
Heat Flux-Btu/Hr/ft2	0	522	530	527	520	3096	11897	11595	0	0
Wall Temp. #3-F	151.9	153.9	155.1	155.6	154.9	156.8	162.4	161.8	150.8	148.4
Wall Temp. #4-F	152.3	154.3	155.1	155.5	156	156.8	163	162.6	151.4	148.9
Wall Temp. #5-F	151.3	154	154.5	155.6	155.7	156.8	162.1	161.3	151.9	150
Wall Temp. #1-F	72.8	154	153.9	155.5	155.2	157.4	163	162.6	152.1	150
Wall Temp. #2-F	149.6	154	154.2	154.9	154.9	156.8	163.3	163.1	151.8	149.9
Instream Temp.-F	150.3	149.8	150	150.2	150.4	151.1	151.8	151.5	151.5	151.4
Avg. Wall Temp.-F	151.3	154.1	154.6	155.6	155.5	157	162.8	162.3	151.6	149.4
Avg. Wall DT.-F	1	4.2	4.6	5.3	5	5.7	10.4	10.3	0.1	-2
Remaining Subcool-F	11									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	123.5	116.6	98.9	103.5	542.2	1141.4	1130.6	0	0
COMPUTED H										
Jallouk	87.7	87.6	87.6	87.6	87.6	87.7	87.8	87.7	87.7	87.7
Szady1(Cudo tube)	109	110.5	111.4	112.2	112.9	113.6	114.3	114.8	115.3	115.9
Szady2	109	110.5	111.4	112.2	112.9	113.6	114.3	114.8	115.3	115.9
(RLIQ)	44908	44714	44784	44854	44925	45185	45447	45328	45323	45281
(F)	1.021	1.036	1.044	1.051	1.058	1.063	1.069	1.074	1.079	1.084
(HLIQ)	109	110.5	111.4	112.2	112.9	113.6	114.3	114.8	115.3	115.9
(HBOIL)	196.8	878.6	950	1118.8	1056.9	1214.6	2268.7	2223.5	19.4	19.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.9									
DP Liquid Density-lbm/ft3	93.58									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.297	0.439	0.61	1.183	1.824					
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009					
Corrected DP-Psid	0.287	0.435	0.6	1.185	1.815					
Actual DP-ft	2.8	5.35	7.93	11.26	14.52					
Measured TP-Psig	123.5				123.5					
Measured Overall-ft	0									
Computed DP-ft	2.01	4.03	6.04	8.05	9.94					
Friction-ft	0.01	0.03	0.04	0.06	0.07					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.87					

Run#	468									
Test Fluid	C4F10									
Date:	4/16/93									
Time:	22:02									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	124.3									
Sat. Temperature-F(inlet)	160.9									
Liq. Density-lbm/ft3	81.79	81.87	81.85	81.76	81.68	81.53	81.47	81.53	81.53	81.59
Latent Heat-Btu/lbm	29.51	29.57	29.55	29.49	29.43	29.32	29.28	29.32	29.32	29.36
Specific Heat-Btu/lbm/F	0.286	0.285	0.285	0.286	0.286	0.286	0.286	0.286	0.286	0.286
Liq. Viscosity-lbm/ft-hr	0.429	0.431	0.43	0.428	0.427	0.424	0.423	0.424	0.424	0.425
Liq. Conductivity-Btu/hr-ft-F	0.025	0.025	0.025	0.025	0.0249	0.0248	0.0248	0.0248	0.0248	0.0249
Liq. Prandtl No.	4.91	4.91	4.91	4.9	4.9	4.89	4.89	4.89	4.89	4.9
Inlet Flow Rate-GPM	1.5									
Outlet Liq. Flow Rate-GPM	1.4									
Outlet Vap. Flow Rate-GPM	0.5									
Inlet Temperature-F	149.6									
Outlet Liq. Temperature-F	151.3									
Outlet Vap. Temperature-F	147.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	145									
Water outlet Temp.-F	141.9									
Inlet G-lbm/hr/ft2	295466		Temp		143.5	Density		82.54		
Subcooling-F	11.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	40.4	40.1	40.3	40.5	179.3	691.1	671.5	0	0
Heat Loss-Watts	22.2	5.5	7.5	9.4	10.3	10.4	9.1	10	8.4	44.9
Heat Flux-Btu/Hr/ft2	0	700	695	699	702	3108	11980	11640	0	0
Wall Temp. #3-F	152.8	155.9	157	156.9	155.8	157.4	162.7	162.1	151	148.8
Wall Temp. #4-F	153	156.5	157	156.9	156.6	157.4	163.3	163.1	151.8	149.3
Wall Temp. #5-F	151.9	155.7	156.7	157.1	156.5	157.4	162.6	161.5	152.5	150.4
Wall Temp. #1-F	72.8	155.6	156	156.9	156.1	157.9	163.4	163.1	152.5	150.4
Wall Temp. #2-F	150.2	155.9	156.6	156.3	156.1	157.4	163.9	163.6	152.1	150.2
Instream Temp.-F	150.7	150.3	150.4	150.9	151.3	152.1	152.4	152.1	152.1	151.8
Avg. Wall Temp.-F	152	156	156.7	157	156.3	157.5	163.2	162.7	152	149.8
Avg. Wall DT.-F	1.3	5.6	6.2	6	5	5.3	10.2	10.1	-0.1	-2
Remaining Subcool-F	11.3									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	124.1	111.8	116.1	140.6	588.1	1170.1	1157.8	0	0
COMPUTED H										
Jallouk	87.7	87.6	87.6	87.7	87.7	87.8	87.8	87.7	87.7	87.7
Szady1(Cudo tube)	108.9	110.5	111.4	112.2	112.9	113.6	114.2	114.8	115.3	115.8
Szady2	108.9	110.5	111.4	112.2	112.9	113.6	114.2	114.8	115.3	115.8
(RLIQ)	45027	44870	44903	45087	45234	45535	45646	45526	45521	45402
(F)	1.021	1.036	1.044	1.051	1.057	1.063	1.068	1.074	1.079	1.084
(HLIQ)	108.9	110.5	111.4	112.2	112.9	113.6	114.2	114.8	115.3	115.8
(HBOIL)	260.2	1188.5	1314.4	1278.7	1061.2	1135.6	2243.9	2194.5	19.5	19.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.9									
DP Liquid Density-lbm/ft3	93.58									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.298	0.443	0.628	1.214	1.88					
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009					
Corrected DP-Psid	0.288	0.439	0.618	1.216	1.871					
Actual DP-ft	2.8	5.36	7.97	11.32	14.63					
Measured TP-Psig	124.3				124.3					
Measured Overall-ft	0									
Computed DP-ft	2.01	4.03	6.04	8.05	9.94					
Friction-ft	0.01	0.03	0.04	0.06	0.07					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.87					

Run#	469									
Test Fluid	C4F10									
Date:	4/16/93									
Time:	22:02									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	123.2									
Sat. Temperature-F(inlet)	160.3									
Liq. Density-lbm/ft3	81.91	82	81.98	81.92	81.89	81.76	81.72	81.66	81.74	81.81
Latent Heat-Btu/lbm	29.59	29.66	29.65	29.61	29.58	29.49	29.46	29.42	29.47	29.53
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.286	0.286	0.286	0.286	0.286
Liq. Viscosity-lbm/ft-hr	0.431	0.433	0.433	0.432	0.431	0.428	0.428	0.427	0.428	0.43
Liq. Conductivity-Btu/hr-ft-F	0.0251	0.0251	0.0251	0.0251	0.025	0.025	0.0249	0.0249	0.025	0.025
Liq. Prandtl No.	4.91	4.92	4.92	4.91	4.91	4.9	4.9	4.9	4.9	4.91
Inlet Flow Rate-GPM	3									
Outlet Liq. Flow Rate-GPM	2.2									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	148.9									
Outlet Liq. Temperature-F	150.3									
Outlet Vap. Temperature-F	146.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	144.4									
Water outlet Temp.-F	141.7									
Inlet G-lbm/hr/ft2	587787		Temp		145.8	Density	82.1			
Subcooling-F	11.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0.5	60.1	59.9	59.8	59.9	179.7	693.5	677.9	0	0
Heat Loss-Watts	22	5.4	7.4	9.3	10.2	10.2	9	9.8	8.3	44.5
Heat Flux-Btu/Hr/ft2	9	1042	1038	1037	1038	3115	12021	11751	0	0
Wall Temp. #3-F	151.6	154.8	155.5	155.9	155.2	156.7	161.8	161.3	150.1	148.1
Wall Temp. #4-F	151.7	155.4	155.4	155.9	156.1	156.6	162.4	161.8	150.7	148.9
Wall Temp. #5-F	151.2	154.5	155.2	156	155.6	156.7	161.5	160.8	151.6	149.7
Wall Temp. #1-F	74.1	154.7	154.9	155.9	155.2	157.2	162.7	161.9	151.8	149.7
Wall Temp. #2-F	150.1	154.8	154.9	155.4	155.2	156.6	162	162.4	151.2	149.5
Instream Temp.-F	150.1	149.6	149.7	150	150.2	150.9	151.1	151.4	151	150.6
Avg. Wall Temp.-F	151.2	154.9	155.2	155.9	155.5	156.8	162.1	161.6	151.1	149.2
Avg. Wall DT.-F	1	5.3	5.4	5.9	5.3	5.8	10.4	9.7	0.1	-1.4
Remaining Subcool-F	11.4									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	8.3	197.4	191.3	176.3	196.7	540.9	1151.8	1210.3	0	0
COMPUTED H										
Jallouk	151.9	151.8	151.8	151.8	151.8	151.9	152	152	151.9	151.8
Szady1(Cudo tube)	188.8	191.5	193	194.3	195.6	196.8	197.9	198.9	199.8	200.6
Szady2	188.8	191.5	193	194.3	195.6	196.8	197.9	198.9	199.8	200.6
(RLIQ)	89126	88742	88807	89021	89161	89676	89818	90035	89725	89415
(F)	1.021	1.036	1.044	1.051	1.058	1.063	1.069	1.074	1.079	1.085
(HLIQ)	188.8	191.5	193	194.3	195.6	196.8	197.9	198.9	199.8	200.6
(HBOIL)	211.7	1100.4	1133.9	1234.7	1108.5	1222.3	2252.8	2099.6	15.3	19.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76									
DP Liquid Density-lbm/ft3	93.57									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.275	0.394	0.529	0.878	1.373					
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009					
Corrected DP-Psid	0.265	0.39	0.519	0.88	1.364					
Actual DP-ft	2.75	5.28	7.78	10.7	13.69					
Measured TP-Psig	123.2				123.2					
Measured Overall-ft	0									
Computed DP-ft	2.05	4.1	6.14	8.19	10.11					
Friction-ft	0.05	0.1	0.14	0.19	0.24					
Acceleration-ft.	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.87					

Run#	470									
Test Fluid	C4F10									
Date:	4/16/93									
Time:	22:02									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	121.9									
Sat. Temperature-F(inlet)	159.6									
Liq. Density-lbm/ft3	82.04	82.11	82.07	82.02	82.02	81.91	81.85	81.85	81.91	81.92
Latent Heat-Btu/lbm	29.69	29.74	29.72	29.68	29.68	29.59	29.55	29.55	29.59	29.61
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285
Liq. Viscosity-lbm/ft-hr	0.434	0.435	0.435	0.434	0.434	0.431	0.43	0.43	0.431	0.432
Liq. Conductivity-Btu/hr-ft-F	0.0251	0.0252	0.0252	0.0251	0.0251	0.0251	0.025	0.025	0.0251	0.0251
Liq. Prandtl No.	4.92	4.92	4.92	4.92	4.92	4.91	4.91	4.91	4.91	4.91
Inlet Flow Rate-GPM	3									
Outlet Liq. Flow Rate-GPM	2.2									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	148.5									
Outlet Liq. Temperature-F	149.5									
Outlet Vap. Temperature-F	145.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	143.4									
Water outlet Temp.-F	140.1									
Inlet G-lbm/hr/ft2	588474		Temp		145.3	Density		82.2		
Subcooling-F	11.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0.4	40.6	40.5	40.4	39.6	200.2	691.5	673.2	0	0
Heat Loss-Watts	21.7	5.3	7.2	9	9.8	10.1	8.9	9.7	8.2	43.9
Heat Flux-Btu/Hr/ft2	7	704	702	700	686	3470	11987	11669	0	0
Wall Temp. #3-F	150.4	152.5	153.2	153.8	153.3	156.2	161.1	160.6	149.4	147.5
Wall Temp. #4-F	151	153	153.2	153.6	154.2	156.2	161.7	161.1	150	148.1
Wall Temp. #5-F	150.4	152.3	152.5	153.8	153.6	156.2	160.7	159.9	150.5	148.9
Wall Temp. #1-F	74.2	152.6	152.5	153.5	153.3	156.5	162	161.1	150.9	149
Wall Temp. #2-F	149.4	152.6	152.6	153	153.3	155.9	161.8	161.7	150.5	148.9
Instream Temp.-F	149.4	149	149.2	149.6	149.5	150.1	150.4	150.4	150.1	150
Avg. Wall Temp.-F	150.3	152.7	152.9	153.7	153.6	156.3	161.5	160.9	150.3	148.5
Avg. Wall DT.-F	0.9	3.6	3.6	4.1	4.1	6	10.5	10	0.2	-1.5
Remaining Subcool-F	11.1									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	7.7	193.2	192.7	169	168.7	576.6	1139.6	1172.5	0	0
COMPUTED H										
Jallouk	151.9	151.8	151.8	151.9	151.8	151.9	152	152	151.9	151.9
Szady1(Cudo tube)	188.8	191.5	193.1	194.4	195.6	196.9	198	198.9	199.8	200.7
Szady2	188.8	191.5	193.1	194.4	195.6	196.9	198	198.9	199.8	200.7
(RLIQ)	88711	88402	88541	88754	88745	89182	89397	89388	89155	89071
(F)	1.021	1.036	1.044	1.051	1.058	1.064	1.069	1.075	1.08	1.085
(HLIQ)	188.8	191.5	193.1	194.4	195.6	196.9	198	198.9	199.8	200.7
(HBOIL)	179.3	747.4	749.2	857.8	842	1266.4	2251.7	2127.8	30.8	19
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.9									
DP Liquid Density-lbm/ft3	93.58									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.273	0.39	0.521	0.865	1.36					
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009					
Corrected DP-Psid	0.263	0.386	0.511	0.867	1.351					
Actual DP-ft	2.75	5.25	7.75	10.66	13.65					
Measured TP-Psig	121.9				121.9					
Measured Overall-ft	0									
Computed DP-ft	2.05	4.1	6.14	8.19	10.11					
Friction-ft	0.05	0.1	0.15	0.19	0.24					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.87					

Run#	471									
Test Fluid	C4F10									
Date:	4/16/93									
Time:	22:02									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	122.4									
Sat. Temperature-F(inlet)	159.8									
Liq. Density-lbm/ft3	81.98	82.05	82.07	82.04	81.96	81.87	81.76	81.79	81.81	81.85
Latent Heat-Btu/lbm	29.65	29.7	29.72	29.69	29.63	29.57	29.49	29.51	29.53	29.55
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.285	0.286	0.286	0.286	0.285
Liq. Viscosity-lbm/ft-hr	0.433	0.434	0.436	0.434	0.432	0.431	0.428	0.429	0.43	0.43
Liq. Conductivity-Btu/hr-ft-F	0.0251	0.0252	0.0252	0.0251	0.0251	0.025	0.025	0.025	0.025	0.025
Liq. Prandtl No.	4.92	4.92	4.92	4.92	4.91	4.91	4.9	4.91	4.91	4.91
Inlet Flow Rate-GPM	3									
Outlet Liq. Flow Rate-GPM	2.2									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	148.7									
Outlet Liq. Temperature-F	149.6									
Outlet Vap. Temperature-F	146									
Water Flow Rate-GPM										
Water Inlet Temp.-F	143.4									
Water outlet Temp.-F	140.3									
Inlet G-lbm/hr/ft2	587787		Temp		145.8	Density	82.1			
Subcooling-F	11.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	29.9	30.3	30	30.1	199.9	690.4	674	0	0
Heat Loss-Watts	21.9	5.3	7.2	8.9	9.8	10.2	9	9.8	8.3	44.3
Heat Flux-Btu/Hr/ft2	0	518	525	520	522	3465	11968	11683	0	0
Wall Temp. #3-F	150.9	152	152.5	153	152.8	156.3	161.7	160.7	150	147.7
Wall Temp. #4-F	150.9	152.5	152.5	152.9	153.6	156.4	162	161.7	150.5	148.4
Wall Temp. #5-F	150.8	152.1	152.1	153.2	152.8	156.4	161.2	160.1	151	148.9
Wall Temp. #1-F	74	152.1	152	152.8	152.5	156.8	162.3	161.7	151.2	149.3
Wall Temp. #2-F	149.8	152.2	152.2	152.4	152.5	156.3	162.2	162	151	149
Instream Temp.-F	149.7	149.3	149.2	149.4	149.8	150.3	150.9	150.7	150.6	150.4
Avg. Wall Temp.-F	150.6	152.2	152.3	153	152.9	156.5	161.9	161.2	150.7	148.7
Avg. Wall DT.-F	0.9	2.9	3.1	3.6	3	6	10.4	10	0.1	-1.7
Remaining Subcool-F	11.1									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	180.2	170.7	146.4	172.4	575.8	1146.4	1166.9	0	0
COMPUTED H										
Jallouk	151.8	151.7	151.7	151.7	151.8	151.8	151.9	151.9	151.8	151.8
Szady1(Cudo tube)	188.7	191.4	192.9	194.2	195.5	196.7	197.8	198.8	199.7	200.6
Szady2	188.7	191.4	192.9	194.2	195.5	196.7	197.8	198.8	199.7	200.6
(RLIQ)	88829	88520	88437	88576	88863	89227	89667	89508	89424	89266
(F)	1.021	1.036	1.044	1.051	1.058	1.064	1.069	1.074	1.08	1.085
(HLIQ)	188.7	191.4	192.9	194.2	195.5	196.7	197.8	198.8	199.7	200.6
(HBOIL)	180	588.9	630	731.6	624	1269.5	2247.9	2148.5	27.1	19.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.8									
DP Liquid Density-lbm/ft3	93.6									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.274	0.392	0.522	0.862	1.352					
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009					
Corrected DP-Psid	0.264	0.388	0.512	0.864	1.343					
Actual DP-ft	2.75	5.26	7.76	10.67	13.65					
Measured TP-Psig	122.4				122.4					
Measured Overall-ft	0									
Computed DP-ft	2.05	4.1	6.14	8.19	10.11					
Friction-ft	0.05	0.1	0.14	0.19	0.24					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.87					

Run#	172									
Test Fluid	C4F10									
Date:	4/16/93									
Time:	23:34									
Note	TABOREk	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	122.8									
Sat. Temperature-F(inlet)	160.1									
Liq. Density-lbm/ft3	81.87	81.91	81.89	81.91	81.85	81.74	81.76	81.76	81.81	81.85
Latent Heat-Btu/lbm	29.57	29.59	29.58	29.59	29.55	29.47	29.49	29.49	29.53	29.55
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.286	0.286	0.286	0.286	0.285
Liq. Viscosity-lbm/ft-hr	0.431	0.431	0.431	0.431	0.43	0.428	0.428	0.428	0.43	0.43
Liq. Conductivity-Btu/hr-ft-F	0.025	0.0251	0.025	0.0251	0.025	0.025	0.025	0.025	0.025	0.025
Liq. Prandtl No.	4.91	4.91	4.91	4.91	4.91	4.9	4.9	4.9	4.91	4.91
Inlet Flow Rate-GPM	4.1									
Outlet Liq. Flow Rate-GPM	2.7									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	149.9									
Outlet Liq. Temperature-F	149.7									
Outlet Vap. Temperature-F	145.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	143.4									
Water outlet Temp.-F	140.5									
Inlet G-lbm/hr/ft2	799145		Temp		148	Density	81.68			
Subcooling-F	10.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	39.6	40.1	39.9	40.2	197.2	685	665.2	0	0
Heat Loss-Watts	21.9	5.3	7.2	8.9	9.8	10.2	8.8	9.7	8.3	44.4
Heat Flux-Btu/Hr/ft2	0	686	695	692	697	3418	11874	11531	0	0
Wall Temp. #3-F	151	152.7	153.2	153.6	153	156.5	161.6	160.6	150	147.9
Wall Temp. #4-F	151.5	153	153.2	153.6	154	156.5	162	161.4	150.5	148.7
Wall Temp. #5-F	151.2	152.8	153	153.6	153.3	156.5	161.2	160	151	149.4
Wall Temp. #1-F	73.2	152.8	152.6	153.2	153.1	156.9	162.3	161.7	151.2	149.5
Wall Temp. #2-F	150.4	153	152.6	152.9	152.9	156.5	159.2	162	150.9	149.2
Instream Temp.-F	150.3	150.1	150.2	150.1	150.4	151	150.9	150.9	150.6	150.4
Avg. Wall Temp.-F	151	152.9	152.9	153.5	153.3	156.6	161.3	161.1	150.7	148.9
Avg. Wall DT.-F	0.7	2.7	2.7	3.4	2.9	5.4	9.8	9.7	0.1	-1.5
Remaining SubcoolF	10.2									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	250.2	260.5	205.3	240.8	627.7	1208.8	1186.4	0	0
COMPUTED H										
Jallouk	194.2	194.1	194.2	194.1	194.2	194.3	194.2	194.2	194.1	194.1
Szady1(Cudo tube)	241.4	244.9	246.8	248.5	250.1	251.6	253	254.2	255.4	256.5
Szady2	241.4	244.9	246.8	248.5	250.1	251.6	253	254.2	255.4	256.5
(RLIQ)	121378	121157	121246	121132	121425	122025	121910	121898	121580	121364
(F)	1.021	1.036	1.044	1.051	1.058	1.063	1.069	1.074	1.08	1.085
(HLIQ)	241.4	244.9	246.8	248.5	250.1	251.6	253	254.2	255.4	256.5
(HBOIL)	145.3	566.5	551.2	699	600.3	1155.6	2112.2	2089.1	23.1	19.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.9									
DP Liquid Density-lbm/ft3	93.58									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.254	0.349	0.453	0.696	1.208					
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009					
Corrected DP-Psid	0.244	0.345	0.443	0.698	1.199					
Actual DP-ft	2.72	5.18	7.64	10.37	13.4					
Measured TP-Psig	122.8				122.8					
Measured Overall-ft	0									
Computed DP-ft	2.08	4.17	6.25	8.34	10.29					
Friction-ft	0.08	0.17	0.25	0.34	0.42					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.87					

Run#	473									
Test Fluid	C4F10									
Date:	4/16/93									
Time:	23:34									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	122.1									
Sat. Temperature-F(inlet)	159.7									
Liq. Density-lbm/ft3	81.94	82	82.04	82	81.98	81.87	81.81	81.79	81.87	81.87
Latent Heat-Btu/lbm	29.62	29.66	29.69	29.66	29.65	29.57	29.53	29.51	29.57	29.57
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.285	0.286	0.286	0.285	0.285
Liq. Viscosity-lbm/ft-hr	0.432	0.433	0.434	0.433	0.433	0.431	0.43	0.429	0.431	0.431
Liq. Conductivity-Btu/hr-ft-F	0.0251	0.0251	0.0251	0.0251	0.0251	0.025	0.025	0.025	0.025	0.025
Liq. Prandtl No.	4.91	4.92	4.92	4.92	4.92	4.91	4.91	4.91	4.91	4.91
Inlet Flow Rate-GPM	4.1									
Outlet Liq. Flow Rate-GPM	2.7									
Outlet Vap. Flow Rate-GPM	1									
Inlet Temperature-F	149.5									
Outlet Liq. Temperature-F	149.5									
Outlet Vap. Temperature-F	145.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	143.4									
Water outlet Temp.-F	140.1									
Inlet G-lbm/hr/ft2	799526	Temp	147.8	Density	81.71					
Subcooling-F	10.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	60.2	60	60.1	60.2	176.8	674.9	656.2	0	0
Heat Loss-Watts	21.7	5.3	7.3	9.1	9.9	10.1	8.7	9.7	8.2	44.2
Heat Flux-Btu/Hr/ft2	0	1044	1040	1042	1044	3065	11699	11375	0	0
Wall Temp. #3-F	150.6	153.6	154	154.5	154.2	156.1	161.3	160.2	149.6	147.9
Wall Temp. #4-F	151.2	153.8	153.9	154.5	154.6	156.1	161.8	161	150.1	148.8
Wall Temp. #5-F	150.6	153.4	153.8	154.5	154.5	156.1	160.9	159.7	150.8	149.1
Wall Temp. #1-F	73.2	153.3	153.4	154.3	154.1	156.2	162	161.3	151.1	149.3
Wall Temp. #2-F	149.8	153.5	153.5	153.9	153.8	155.8	158.6	161.8	150.7	149.2
Instream Temp.-F	149.9	149.6	149.4	149.6	149.7	150.3	150.6	150.7	150.3	150.3
Avg. Wall Temp.-F	150.6	153.6	153.7	154.5	154.3	156.1	160.9	160.8	150.5	148.9
Avg. Wall DT.-F	0.7	3.9	4.3	4.8	4.5	5.7	9.8	9.6	0.2	-1.4
Remaining Subcool-F	10.2									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	267.4	244.5	216.9	231.7	538.9	1194.8	1186.6	0	0
COMPUTED H										
Jallouk	194.2	194.1	194	194.1	194.1	194.2	194.3	194.3	194.2	194.1
Szady1(Cudo tube)	241.4	244.9	246.8	248.5	250.1	251.6	253	254.3	255.4	256.6
Szady2	241.4	244.9	246.8	248.5	250.1	251.6	253	254.3	255.4	256.6
(RLIQ)	121030	120709	120496	120685	120774	121369	121662	121752	121332	121320
(F)	1.021	1.036	1.044	1.051	1.058	1.064	1.069	1.074	1.08	1.085
(HLIQ)	241.4	244.9	246.8	248.6	250.1	251.6	253	254.3	255.4	256.6
(HBOIL)	129.3	807.8	880	999.1	936.3	1197.8	2097.5	2054.9	30.9	19.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76									
DP Liquid Density-lbm/ft3	93.57									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.252	0.346	0.446	0.681	1.182					
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009					
Corrected DP-Psid	0.242	0.342	0.436	0.683	1.173					
Actual DP-ft	2.71	5.17	7.62	10.34	13.35					
Measured TP-Psig	122.1				122.1					
Measured Overall-ft	0									
Computed DP-ft	2.08	4.17	6.25	8.34	10.29					
Friction-ft	0.08	0.17	0.25	0.34	0.42					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.87					

Run#	474									
Test Fluid	C4F10									
Date:	4/16/93									
Time:	23:34									
Note	TABOREk Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	121.8									
Sat. Temperature-F(inlet)	159.5									
Liq. Density-lbm/ft3	82.02	82.11	82.07	82.02	81.96	81.85	81.79	81.83	81.91	81.89
Latent Heat-Btu/lbm	29.68	29.74	29.72	29.68	29.63	29.55	29.51	29.54	29.59	29.58
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.285	0.286	0.286	0.285	0.285
Liq. Viscosity-lbm/ft-hr	0.434	0.435	0.435	0.434	0.432	0.43	0.429	0.43	0.431	0.431
Liq. Conductivity-Btu/hr-ft-F	0.0251	0.0252	0.0252	0.0251	0.0251	0.025	0.025	0.025	0.0251	0.025
Liq. Prandtl No.	4.92	4.92	4.92	4.92	4.91	4.91	4.91	4.91	4.91	4.91
Inlet Flow Rate-GPM	4.1									
Outlet Liq. Flow Rate-GPM	2.7									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	149.2									
Outlet Liq. Temperature-F	149.3									
Outlet Vap. Temperature-F	145.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	143.1									
Water outlet Temp.-F	139.9									
Inlet G-lbm/hr/ft2	800096	Temp		147.5	Density	81.77				
Subcooling-F	10.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	80.4	79.9	80.1	79.9	177.8	676.3	656.3	0	0
Heat Loss-Watts	21.6	5.4	7.3	9.2	10.1	10	8.6	9.6	8.1	43.7
Heat Flux-Btu/Hr/ft2	0	1394	1385	1388	1385	3082	11723	11377	0	0
Wall Temp. #3-F	150.6	154.7	155.2	155.6	154.9	155.9	160.9	160.1	149.2	147.7
Wall Temp. #4-F	151	154.8	155.2	155.6	155.9	156	161.5	160.8	149.9	148.4
Wall Temp. #5-F	150.4	154.3	154.7	155.6	155.3	155.9	160.5	159.6	150.6	148.9
Wall Temp. #1-F	73	154.2	154.4	155.1	154.9	156	161.7	161	150.8	149.1
Wall Temp. #2-F	149.5	154.4	154.6	154.7	154.9	155.5	158.5	161.5	150.3	149
Instream Temp.-F	149.5	149	149.2	149.5	149.8	150.4	150.7	150.5	150.1	150.2
Avg. Wall Temp.-F	150.4	154.5	154.9	155.5	155.3	156	160.6	160.6	150.2	148.6
Avg. Wall DT.-F	0.9	5.5	5.6	5.9	5.4	5.4	9.4	9.6	0.1	-1.6
Remaining Subcool-F	10.3									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	255.2	247.9	234.8	257.1	569.6	1248.5	1186.8	0	0
COMPUTED H										
Jallouk	194.2	194.1	194.1	194.2	194.2	194.3	194.4	194.3	194.2	194.2
Szady1(Cudo tube)	241.4	244.9	246.9	248.6	250.2	251.8	253.2	254.4	255.5	256.7
Szady2	241.4	244.9	246.9	248.6	250.2	251.8	253.2	254.4	255.5	256.7
(RLIQ)	120719	120193	120381	120670	120961	121557	121851	121634	121216	121305
(F)	1.021	1.036	1.044	1.051	1.058	1.064	1.069	1.075	1.08	1.085
(HLIQ)	241.4	244.9	246.9	248.6	250.2	251.8	253.2	254.4	255.5	256.7
(HBOIL)	174.4	1131.6	1161	1234.6	1126.5	1139.7	2011.9	2049.9	11.3	19.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.9									
DP Liquid Density-lbm/ft3	93.58									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.252	0.346	0.448	0.691	1.202					
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009					
Corrected DP-Psid	0.242	0.342	0.438	0.693	1.193					
Actual DP-ft	2.71	5.17	7.63	10.36	13.38					
Measured TP-Psig	121.8				121.8					
Measured Overall-ft	0									
Computed DP-ft	2.08	4.17	6.25	8.34	10.29					
Friction-ft	0.08	0.17	0.25	0.34	0.42					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.87					

Run#	475									
Test Fluid	C4F10									
Date:	4/16/93									
Time:	23:34									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	123.3									
Sat. Temperature-F(inlet)	160.3									
Liq. Density-lbm/ft3	81.96	82.04	82.07	82.02	81.98	81.87	81.78	81.81	81.81	81.89
Latent Heat-Btu/lbm	29.63	29.69	29.72	29.68	29.65	29.57	29.5	29.53	29.53	29.58
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.285	0.286	0.286	0.286	0.285
Liq. Viscosity-lbm/ft-hr	0.432	0.434	0.435	0.434	0.433	0.431	0.429	0.43	0.43	0.431
Liq. Conductivity-Btu/hr-ft-F	0.0251	0.0251	0.0252	0.0251	0.0251	0.025	0.025	0.025	0.025	0.025
Liq. Prandtl No.	4.91	4.92	4.92	4.92	4.92	4.91	4.9	4.91	4.91	4.91
Inlet Flow Rate-GPM	6									
Outlet Liq. Flow Rate-GPM	3.7									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	148.9									
Outlet Liq. Temperature-F	149.5									
Outlet Vap. Temperature-F	145.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	143.1									
Water outlet Temp.-F	140									
Inlet G-lbm/hr/ft2	1170038		Temp		147.8	Density	81.71			
Subcooling-F	11.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0.4	80.6	80.4	80.4	80.5	178.8	679.3	659.7	0	0
Heat Loss-Watts	21.5	5.3	7.2	8.9	9.8	9.9	9	9.6	8.2	43.6
Heat Flux-Btu/Hr/ft2	7	1397	1394	1394	1395	3099	11775	11435	0	0
Wall Temp. #3-F	150.3	153.3	153.5	154.2	153.6	155.7	161.3	160.6	149.9	148
Wall Temp. #4-F	150.5	153.5	153.5	154.1	154.6	155.7	161.8	161.3	150.5	148.6
Wall Temp. #5-F	150.4	153	153.2	154.2	154.1	155.7	160.9	160.1	151	149.1
Wall Temp. #1-F	73.8	153	153	153.9	153.7	156.1	162	161.3	151.1	149.2
Wall Temp. #2-F	149.9	153.2	153.1	153.4	153.4	155.6	166.7	161.8	150.6	149.2
Instream Temp.-F	149.8	149.4	149.2	149.5	149.7	150.3	150.8	150.6	150.6	150.2
Avg. Wall Temp.-F	150.3	153.3	153.3	154.1	154	155.8	162.5	161	150.6	148.8
Avg. Wall DT.-F	0.5	3.8	4	4.5	4.2	5.4	11.2	9.9	0	-1.4
Remaining Subcool-F	11.4									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	14.6	368.9	347.4	307.2	333.3	578.3	1050.6	1154.7	0	0
COMPUTED H										
Jallouk	263.3	263.2	263.1	263.2	263.2	263.4	263.5	263.4	263.4	263.2
Szady1(Cudo tube)	327.3	332.1	334.6	337	339.1	341.2	343.1	344.8	346.4	347.9
Szady2	327.3	332.1	334.6	337	339.1	341.2	343.1	344.8	346.4	347.9
(RLIQ)	176969	176353	176042	176465	176742	177613	178340	178024	178006	177393
(F)	1.021	1.036	1.044	1.051	1.058	1.064	1.069	1.075	1.08	1.085
(HLIQ)	327.3	332.1	334.6	337	339.1	341.2	343.1	344.8	346.4	347.9
(HBOIL)	93.6	781.3	827	941.4	869.1	1127.4	2414.6	2122	3.7	19.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.7									
DP Liquid Density-lbm/ft3	93.47									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.198	0.236	0.27	0.354	0.604					
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009					
Corrected DP-Psid	0.188	0.232	0.26	0.356	0.595					
Actual DP-ft	2.61	4.97	7.31	9.76	12.32					
Measured TP-Psig	123.3				123.3					
Measured Overall-ft	0									
Computed DP-ft	2.17	4.34	6.5	8.67	10.7					
Friction-ft	0.17	0.33	0.5	0.67	0.82					
Acceleration-ft	0	0	0	0.01	0.01					
Elevation-ft	2	4	6	8	9.87					

Run#	476									
Test Fluid	C4F10									
Date:	4/16/93									
Time:	23:34									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	123.9									
Sat. Temperature-F(inlet)	160.7									
Liq. Density-lbm/ft3	81.87	81.92	81.96	81.91	81.91	81.83	81.76	81.72	81.74	81.83
Latent Heat-Btu/lbm	29.57	29.61	29.63	29.59	29.59	29.54	29.49	29.46	29.47	29.54
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.286	0.286	0.286	0.286	0.286
Liq. Viscosity-lbm/ft-hr	0.431	0.432	0.432	0.431	0.431	0.43	0.428	0.428	0.428	0.43
Liq. Conductivity-Btu/hr-ft-F	0.025	0.0251	0.0251	0.0251	0.0251	0.025	0.025	0.0249	0.025	0.025
Liq. Prandtl No.	4.91	4.91	4.91	4.91	4.91	4.91	4.9	4.9	4.9	4.91
Inlet Flow Rate-GPM	6									
Outlet Liq. Flow Rate-GPM	3.7									
Outlet Vap. Flow Rate-GPM	1									
Inlet Temperature-F	149									
Outlet Liq. Temperature-F	149.8									
Outlet Vap. Temperature-F	145.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	143.3									
Water outlet Temp.-F	140.1									
Inlet G-lbm/hr/ft2	1168923		Temp		148.2 Density		81.64			
Subcooling-F	11.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0.2	60	59.6	59.8	59.3	180.3	682.3	664.9	0	0
Heat Loss-Watts	21.8	5.3	7.2	8.9	9.8	10	9	9.7	8.3	44.2
Heat Flux-Btu/Hr/ft2	3	1040	1033	1037	1028	3125	11827	11526	0	0
Wall Temp. #3-F	150.6	152.8	153.1	153.8	153.2	156.1	161.7	161.1	150.3	148.1
Wall Temp. #4-F	151.1	153.1	153.1	153.7	153.9	156.1	162.1	161.7	150.8	149.1
Wall Temp. #5-F	150.9	152.8	152.8	153.8	153.4	156	161.3	160.7	151.6	149.2
Wall Temp. #1-F	73.6	152.6	152.7	153.5	153.3	156.6	162.3	161.8	151.6	149.8
Wall Temp. #2-F	150.4	153.1	152.7	152.9	153	156	167.6	162.1	151	149.5
Instream Temp.-F	150.3	150	149.8	150.1	150.1	150.5	150.9	151.1	151	150.5
Avg. Wall Temp.-F	150.8	152.9	152.9	153.7	153.4	156.2	163	161.5	151.1	149.1
Avg. Wall DT.-F	0.4	2.9	3.1	3.6	3.3	5.6	11.6	9.9	0.1	-1.4
Remaining Subcool-F	11.7									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	7.7	364.6	338.4	291.7	315.9	562.2	1022.6	1169	0	0
COMPUTED H										
Jallouk	263.3	263.1	263.1	263.1	263.1	263.2	263.3	263.4	263.3	263.1
Szady1(Cudo tube)	327.2	332	334.5	336.9	339	341	342.9	344.7	346.3	347.7
Szady2	327.2	332	334.5	336.9	339	341	342.9	344.7	346.3	347.7
(RLIQ)	177541	177070	176756	177182	177165	177741	178320	178601	178434	177670
(F)	1.021	1.036	1.044	1.051	1.058	1.064	1.069	1.074	1.079	1.085
(HLIQ)	327.2	332	334.5	336.9	339	341	342.9	344.7	346.3	347.7
(HBOIL)	89.1	588.9	629.7	738.2	674.5	1173.1	2496.6	2125.1	11.4	19.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.2									
DP Liquid Density-lbm/ft3	93.54									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.199	0.237	0.273	0.355	0.6					
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009					
Corrected DP-Psid	0.189	0.233	0.263	0.357	0.591					
Actual DP-ft	2.62	4.98	7.32	9.77	12.33					
Measured TP-Psig	123.9				123.9					
Measured Overall-ft	0									
Computed DP-ft	2.17	4.34	6.5	8.67	10.7					
Friction-ft	0.17	0.33	0.5	0.67	0.82					
Acceleration-ft	0	0	0	0.01	0.01					
Elevation-ft	2	4	6	8	9.87					

Run#	683									
Test Fluid	C4F10									
Date:	7/7/93									
Time:	15:28									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	190.7									
Sat. Temperature-F(inlet)	192.1									
Liq. Density-lbm/ft3	72.88	72.63	72.57	72.54	72.54	72.43	72.32	72.26	72.23	72.54
Latent Heat-Btu/lbm	22.75	22.55	22.51	22.49	22.49	22.4	22.31	22.27	22.24	22.49
Specific Heat-Btu/lbm/F	0.313	0.314	0.314	0.315	0.315	0.315	0.315	0.316	0.316	0.315
Liq. Viscosity-lbm/ft-hr	0.296	0.293	0.292	0.292	0.292	0.29	0.289	0.288	0.288	0.292
Liq. Conductivity-Btu/hr-ft-F	0.0195	0.0193	0.0193	0.0193	0.0193	0.0192	0.0192	0.0191	0.0191	0.0193
Liq. Prandtl No.	4.75	4.75	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76
Inlet Flow Rate-GPM	1.1									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	188.1									
Outlet Liq. Temperature-F	192									
Outlet Vap. Temperature-F	189.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	120.8									
Water outlet Temp.-F	179.9									
Inlet G-lbm/hr/ft2	196920		Temp		178.7	Density		75.01		
Subcooling-F	4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	885.8	887.4	869.9	656.7	248.5	85.2	81.6	87.7	97	111.2
Heat Loss-Watts	19.4	4.6	6.3	7.5	7.5	6.6	5.1	6.3	6.8	37.2
Heat Flux-Btu/Hr/ft2	15005	15036	14976	11383	4308	1477	1414	1520	1681	1828
Wall Temp. #3-F	196.7	199.3	198.3	199.3	195	193.5	195	194.8	195.2	195
Wall Temp. #4-F	197.4	197.3	200	199.7	195.5	194.4	195	194.8	195.4	195.7
Wall Temp. #5-F	197.4	196	199.2	197.6	194.7	193.5	195	194.8	195.3	195
Wall Temp. #1-F	95.3	197.4	196.8	196.3	194.7	193.9	194.1	194.8	194.8	192.7
Wall Temp. #2-F	197.8	197.6	197.7	197	194.8	193.2	194.4	195.1	194.8	193.5
Instream Temp.-F	190.3	191.2	191.4	191.5	191.5	191.9	192.3	192.5	192.6	191.5
Avg. Wall Temp.-F	197.3	197.9	198.2	198.2	194.9	193.8	194.7	194.9	195.1	194.4
Avg. Wall DT.-F	6.3	6	6.1	6.2	3.2	1.9	2.3	2.3	2.4	2.8
Remaining Subcool-F	-10.3									
Exit Quality	0.14	0.34	0.54	0.69	0.74	0.76	0.78	0.8	0.82	0.85
EXP. H-Btu/Hr/ft2/F	2364.1	2497.4	2445.6	1832.9	1333.5	794.8	605.5	663.5	693.7	690.2
COMPUTED H										
Jallouk	1832.4	77.9	77.9	77.9	77.9	77.9	77.9	77.9	77.9	77.9
Szady1(Cudo tube)	2283.2	77.9	77.9	77.9	77.9	77.9	77.9	77.9	77.9	77.9
Szady2	2162.7	77.9	77.9	77.9	77.9	77.9	77.9	77.9	77.9	77.9
(RLIQ)	40493	40493	40493	40493	40493	40493	40493	40493	40493	40493
(F)	1.735	1.735	1.735	1.735	1.735	1.735	1.735	1.735	1.735	1.735
(HLIQ)	138.9	138.9	138.9	138.9	138.9	138.9	138.9	138.9	138.9	138.9
(HBOIL)	2283	2283	2283	2283	2283	2283	2283	2283	2283	2283
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	97.7									
DP Liquid Density-lbm/ft3	90.33									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.369	1.747	2.632	3.685	4.621					
Zero Corrections-psid	0.122	0.089	0.139	0.02	-0.044					
Corrected DP-Psid	0.247	1.658	2.493	3.665	4.665					
Actual DP-ft	2	1.69	2.52	2.69	3.04					
Measured TP-Psig	190.7				300.1					
Measured Overall-ft	******									
Computed DP-ft	1.27	2.07	3.07	4.16	4.99					
Friction-ft	0.02	0.06	0.1	0.14	0.17					
Acceleration-ft	0.03	0.06	0.07	0.07	0.08					
Elevation-ft	1.22	1.94	2.9	3.95	4.73					

Run#	477									
Test Fluid	C4F10									
Date:	4/17/93									
Time:	0:45									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	124.6									
Sat. Temperature-F(inlet)	161.1									
Liq. Density-lbm/ft3	81.83	81.91	81.87	81.85	81.83	81.72	81.61	81.62	81.66	81.74
Latent Heat-Btu/lbm	29.54	29.59	29.57	29.55	29.54	29.46	29.38	29.39	29.42	29.47
Specific Heat-Btu/lbm/F	0.286	0.285	0.285	0.285	0.286	0.286	0.286	0.286	0.286	0.286
Liq. Viscosity-lbm/ft-hr	0.43	0.431	0.431	0.43	0.43	0.428	0.426	0.426	0.427	0.428
Liq. Conductivity-Btu/hr-ft-F	0.025	0.0251	0.025	0.025	0.025	0.0249	0.0249	0.0249	0.0249	0.025
Liq. Prandtl No.	4.91	4.91	4.91	4.91	4.91	4.9	4.9	4.9	4.9	4.9
Inlet Flow Rate-GPM	6									
Outlet Liq. Flow Rate-GPM	3.7									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	149.6									
Outlet Liq. Temperature-F	150.3									
Outlet Vap. Temperature-F	145.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	143.4									
Water outlet Temp.-F	139.9									
Inlet G-lbm/hr/ft2	1168085		Temp	148.5	Density	81.58				
Subcooling-F	11.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	100	99	99.7	99.5	179	684.3	665.3	0	0
Heat Loss-Watts	21.9	5.4	7.4	9.3	10.2	10.2	9.1	9.9	8.4	44.7
Heat Flux-Btu/Hr/ft2	0	1733	1716	1728	1725	3103	11862	11533	0	0
Wall Temp. #3-F	151.2	155.1	155.4	155.9	155.6	156.6	162.3	161.4	150.7	148.7
Wall Temp. #4-F	151.6	155.2	155.4	155.8	156.4	156.6	162.8	162.2	151.2	149.4
Wall Temp. #5-F	151.2	154.4	155.2	155.8	156	156.6	161.9	160.9	151.8	149.8
Wall Temp. #1-F	73.3	154.7	154.7	155.8	155.4	157	162.9	162.4	152	150.2
Wall Temp. #2-F	150.6	154.8	154.7	155.3	155.1	156.5	168.4	162.8	151.7	149.9
Instream Temp.-F	150.5	150.1	150.3	150.4	150.5	151.1	151.7	151.6	151.4	151
Avg. Wall Temp.-F	151.2	155	155.1	155.8	155.7	156.7	163.7	161.9	151.5	149.6
Avg. Wall DT.-F	0.6	4.8	4.7	5.3	5.1	5.5	11.4	9.8	0.1	-1.4
Remaining Subcool-F	11.5									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	363.3	367.3	323.2	335.1	568.3	1038.3	1174.5	0	0
COMPUTED H										
Jallouk	263.2	263	263.1	263.1	263.1	263.3	263.4	263.4	263.3	263.1
Szady1(Cudo tube)	327.1	331.8	334.5	336.8	338.9	341	342.9	344.6	346.2	347.6
Szady2	327.1	331.8	334.5	336.8	338.9	341	342.9	344.6	346.2	347.6
(RLIQ)	177711	177091	177370	177500	177631	178509	179394	179225	178906	178288
(F)	1.021	1.036	1.044	1.051	1.058	1.063	1.069	1.074	1.079	1.084
(HLIQ)	327.1	331.8	334.5	336.8	338.9	341	342.9	344.6	346.2	347.6
(HBOIL)	130.2	998.5	979.6	1126	1084.2	1160.1	2489.2	2129	15.4	19.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.8									
DP Liquid Density-lbm/ft3	93.6									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.201	0.242	0.28	0.371	0.63					
Zero Corrections-psid	0.011	0.004	0.01	-0.002	0.009					
Corrected DP-Psid	0.191	0.238	0.27	0.373	0.621					
Actual DP-ft	2.63	5	7.35	9.82	12.4					
Measured TP-Psig	124.6				124.6					
Measured Overall-ft	0									
Computed DP-ft	2.17	4.34	6.5	8.67	10.7					
Friction-ft	0.17	0.33	0.5	0.67	0.82					
Acceleration-ft	0	0	0	0.01	0.01					
Elevation-ft	2	4	6	8	9.87					

Run#	478									
Test Fluid	C4F10									
Date:	4/17/93									
Time:	0:45									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	125.1									
Sat. Temperature-F(inlet)	161.3									
Liq. Density-lbm/ft3	81.91	81.96	81.96	81.96	81.94	81.85	81.74	81.7	81.68	81.72
Latent Heat-Btu/lbm	29.59	29.63	29.63	29.63	29.62	29.55	29.47	29.44	29.43	29.46
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.285	0.286	0.286	0.286	0.286
Liq. Viscosity-lbm/ft-hr	0.431	0.432	0.432	0.432	0.432	0.43	0.428	0.427	0.427	0.428
Liq. Conductivity-Btu/hr-ft-F	0.0251	0.0251	0.0251	0.0251	0.0251	0.025	0.025	0.0249	0.0249	0.0249
Liq. Prandtl No.	4.91	4.91	4.91	4.91	4.91	4.91	4.9	4.9	4.9	4.9
Inlet Flow Rate-GPM	8									
Outlet Liq. Flow Rate-GPM	4.8									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	149.2									
Outlet Liq. Temperature-F	150.1									
Outlet Vap. Temperature-F	145.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	143.7									
Water outlet Temp.-F	140.7									
Inlet G-lbm/hr/ft2	1557073		Temp		148.6	Density	81.56			
Subcooling-F	12.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0.	100.5	100.7	100.5	100.7	177	673.8	662.7	0	0
Heat Loss-Watts	21.7	5.4	7.2	9	9.9	10	9	9.7	8.3	44.5
Heat Flux-Btu/Hr/ft2	0	1742	1746	1742	1746	3068	11680	11487	0	0
Wall Temp. #3-F	150.7	154.1	154.3	154.5	154.1	156.2	162	161.4	150.7	148.9
Wall Temp. #4-F	151.1	154.3	154.3	154.5	154.8	156.2	162.5	161.9	151.3	149.7
Wall Temp. #5-F	150.9	153.6	153.9	154.5	154.2	156.3	161.7	160.9	151.8	150.2
Wall Temp. #1-F	73.7	153.9	153.8	154.1	153.9	156.5	162.6	162	151.8	150.2
Wall Temp. #2-F	150.5	154	153.9	153.8	153.8	156	166.7	162.5	151.5	150.1
Instream Temp.-F	150.1	149.8	149.8	149.8	149.9	150.4	151	151.2	151.3	151.1
Avg. Wall Temp.-F	150.8	154.1	154.1	154.4	154.2	156.3	163.1	161.7	151.4	149.8
Avg. Wall DT.-F	0.7	4.2	4.2	4.5	4.2	5.8	11.6	10	0.1	-1.3
Remaining Subcool-F	12.1									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	415.2	416	385.3	416	532.5	1009.3	1146.4	0	0
COMPUTED H										
Jallouk	331.1	330.9	330.9	330.9	330.9	331	331.2	331.3	331.3	331.2
Szady1(Cudo tube)	411.5	417.5	420.7	423.6	426.3	428.9	431.3	433.6	435.6	437.5
Szady2	411.5	417.5	420.7	423.6	426.3	428.9	431.3	433.6	435.6	437.5
(RLIQ)	236100	235473	235450	235426	235599	236563	237732	238107	238284	237880
(F)	1.021	1.036	1.044	1.051	1.058	1.064	1.069	1.074	1.079	1.084
(HLIQ)	411.5	417.5	420.7	423.6	426.3	428.9	431.3	433.6	435.6	437.5
(HBOIL)	139.8	872.2	872.1	941.4	873.2	1215.5	2501.1	2163.5	23.3	19.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.4									
DP Liquid Density-lbm/ft3	93.51									
Elevation-ft	2.	4.	6	8	9.875					
Measured DP-Psid	0.124	0.086	0.038	-0.02	0.071					
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009					
Corrected DP-Psid	0.114	0.082	0.028	-0.018	0.062					
Actual DP-ft	2.49	4.72	6.92	9.12	11.41					
Measured TP-Psig	125.1				125.1					
Measured Overall-ft	0									
Computed DP-ft	2.28	4.56	6.84	9.12	11.26					
Friction-ft	0.28	0.56	0.84	1.12	1.38					
Acceleration-ft	0	0.01	0.01	0.01	0.01					
Elevation-ft	2	4	6	8	9.87					

Run#	477									
Test Fluid	C4F10									
Date:	4/17/93									
Time:	0:45									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	124.6									
Sat. Temperature-F(inlet)	161.1									
Liq. Density-lbm/ft3	81.83	81.91	81.87	81.85	81.83	81.72	81.61	81.62	81.66	81.74
Latent Heat-Btu/lbm	29.54	29.59	29.57	29.55	29.54	29.46	29.38	29.39	29.42	29.47
Specific Heat-Btu/lbm/F	0.286	0.285	0.285	0.285	0.286	0.286	0.286	0.286	0.286	0.286
Liq. Viscosity-lbm/ft-hr	0.43	0.431	0.431	0.43	0.43	0.428	0.426	0.426	0.427	0.428
Liq. Conductivity-Btu/hr-ft-F	0.025	0.0251	0.025	0.025	0.025	0.0249	0.0249	0.0249	0.0249	0.025
Liq. Prandtl No.	4.91	4.91	4.91	4.91	4.91	4.9	4.9	4.9	4.9	4.9
Inlet Flow Rate-GPM	6									
Outlet Liq. Flow Rate-GPM	3.7									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	149.6									
Outlet Liq. Temperature-F	150.3									
Outlet Vap. Temperature-F	145.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	143.4									
Water outlet Temp.-F	139.9									
Inlet G-lbm/hr/ft2	1168085		Temp		148.5	Density	81.58			
Subcooling-F	11.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	100	99	99.7	99.5	179	684.3	665.3	0	0
Heat Loss-Watts	21.9	5.4	7.4	9.3	10.2	10.2	9.1	9.9	8.4	44.7
Heat Flux-Btu/Hr/ft2	0	1733	1716	1728	1725	3103	11862	11533	0	0
Wall Temp. #3-F	151.2	155.1	155.4	155.9	155.6	156.6	162.3	161.4	150.7	148.7
Wall Temp. #4-F	151.6	155.2	155.4	155.8	156.4	156.6	162.8	162.2	151.2	149.4
Wall Temp. #5-F	151.2	154.4	155.2	155.8	156	156.6	161.9	160.9	151.8	149.8
Wall Temp. #1-F	73.3	154.7	154.7	155.8	155.4	157	162.9	162.4	152	150.2
Wall Temp. #2-F	150.6	154.8	154.7	155.3	155.1	156.5	168.4	162.8	151.7	149.9
Instream Temp.-F	150.5	150.1	150.3	150.4	150.5	151.1	151.7	151.6	151.4	151
Avg. Wall Temp.-F	151.2	155	155.1	155.8	155.7	156.7	163.7	161.9	151.5	149.6
Avg. Wall DT.-F	0.6	4.8	4.7	5.3	5.1	5.5	11.4	9.8	0.1	-1.4
Remaining Subcool-F	11.5									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	363.3	367.3	323.2	335.1	568.3	1038.3	1174.5	0	0
COMPUTED H										
Jallouk	263.2	263	263.1	263.1	263.1	263.3	263.4	263.4	263.3	263.1
Szady1(Cudo tube)	327.1	331.8	334.5	336.8	338.9	341	342.9	344.6	346.2	347.6
Szady2	327.1	331.8	334.5	336.8	338.9	341	342.9	344.6	346.2	347.6
(RLIQ)	177711	177091	177370	177500	177631	178509	179394	179225	178906	178288
(F)	1.021	1.036	1.044	1.051	1.058	1.063	1.069	1.074	1.079	1.084
(HLIQ)	327.1	331.8	334.5	336.8	338.9	341	342.9	344.6	346.2	347.6
(HBOIL)	130.2	998.5	979.6	1126	1084.2	1160.1	2489.2	2129	15.4	19.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.8									
DP Liquid Density-lbm/ft3	93.6									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.201	0.242	0.28	0.371	0.63					
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009					
Corrected DP-Psid	0.191	0.238	0.27	0.373	0.621					
Actual DP-ft	2.63	5	7.35	9.82	12.4					
Measured TP-Psig	124.6				124.6					
Measured Overall-ft	0									
Computed DP-ft	2.17	4.34	6.5	8.67	10.7					
Friction-ft	0.17	0.33	0.5	0.67	0.82					
Acceleration-ft	0	0	0	0.01	0.01					
Elevation-ft	2	4	6	8	9.87					

Run#	478									
Test Fluid	C4F10									
Date:	4/17/93									
Time:	0:45									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	125.1									
Sat. Temperature-F(inlet)	161.3									
Liq. Density-lbm/ft3	81.91	81.96	81.96	81.96	81.94	81.85	81.74	81.7	81.68	81.72
Latent Heat-Btu/lbm	29.59	29.63	29.63	29.63	29.62	29.55	29.47	29.44	29.43	29.46
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.285	0.286	0.286	0.286	0.286
Liq. Viscosity-lbm/ft-hr	0.431	0.432	0.432	0.432	0.432	0.43	0.428	0.427	0.427	0.428
Liq. Conductivity-Btu/hr-ft-F	0.0251	0.0251	0.0251	0.0251	0.0251	0.025	0.025	0.0249	0.0249	0.0249
Liq. Prandtl No.	4.91	4.91	4.91	4.91	4.91	4.91	4.9	4.9	4.9	4.9
Inlet Flow Rate-GPM	8									
Outlet Liq. Flow Rate-GPM	4.8									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	149.2									
Outlet Liq. Temperature-F	150.1									
Outlet Vap. Temperature-F	145.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	143.7									
Water outlet Temp.-F	140.7									
Inlet G-lbm/hr/ft2	1557073		Temp		148.6	Density	81.56			
Subcooling-F	12.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	100.5	100.7	100.5	100.7	177	673.8	662.7	0	0
Heat Loss-Watts	21.7	5.4	7.2	9	9.9	10	9	9.7	8.3	44.5
Heat Flux-Btu/Hr/ft2	0	1742	1746	1742	1746	3068	11680	11487	0	0
Wall Temp. #3-F	150.7	154.1	154.3	154.5	154.1	156.2	162	161.4	150.7	148.9
Wall Temp. #4-F	151.1	154.3	154.3	154.5	154.8	156.2	162.5	161.9	151.3	149.7
Wall Temp. #5-F	150.9	153.6	153.9	154.5	154.2	156.3	161.7	160.9	151.8	150.2
Wall Temp. #1-F	73.7	153.9	153.8	154.1	153.9	156.5	162.6	162	151.8	150.2
Wall Temp. #2-F	150.5	154	153.9	153.8	153.8	156	166.7	162.5	151.5	150.1
Instream Temp.-F	150.1	149.8	149.8	149.8	149.9	150.4	151	151.2	151.3	151.1
Avg. Wall Temp.-F	150.8	154.1	154.1	154.4	154.2	156.3	163.1	161.7	151.4	149.8
Avg. Wall DT.-F	0.7	4.2	4.2	4.5	4.2	5.8	11.6	10	0.1	-1.3
Remaining Subcool-F	12.1									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	415.2	416	385.3	416	532.5	1009.3	1146.4	0	0
COMPUTED H										
Jallouk	331.1	330.9	330.9	330.9	330.9	331	331.2	331.3	331.3	331.2
Szady1(Cudo tube)	411.5	417.5	420.7	423.6	426.3	428.9	431.3	433.6	435.6	437.5
Szady2	411.5	417.5	420.7	423.6	426.3	428.9	431.3	433.6	435.6	437.5
(RLIQ)	238100	235473	235450	235426	235599	236563	237732	238107	238284	237860
(F)	1.021	1.036	1.044	1.051	1.058	1.064	1.069	1.074	1.079	1.084
(HLIQ)	411.5	417.5	420.7	423.6	426.3	428.9	431.3	433.6	435.6	437.5
(HBOIL)	139.8	872.2	872.1	941.4	873.2	1215.5	2501.1	2163.5	23.3	19.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.4									
DP Liquid Density-lbm/ft3	93.51									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.124	0.086	0.038	-0.02	0.071					
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009					
Corrected DP-Psid	0.114	0.082	0.028	-0.018	0.062					
Actual DP-ft	2.49	4.72	6.92	9.12	11.41					
Measured TP-Psig	125.1				125.1					
Measured Overall-ft	0									
Computed DP-ft	2.28	4.56	6.84	9.12	11.26					
Friction-ft	0.28	0.56	0.84	1.12	1.38					
Acceleration-ft	0	0.01	0.01	0.01	0.01					
Elevation-ft	2	4	6	8	9.87					

Run#	479									
Test Fluid	C4F10									
Date:	4/17/93									
Time:	0:45									
Note	TABOREK Anaytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	123.1									
Sat. Temperature-F(inlet)	160.2									
Liq. Density-lbm/ft3	82.13	82.18	82.18	82.17	82.13	82.02	81.96	81.92	81.91	81.92
Latent Heat-Btu/lbm	29.76	29.8	29.8	29.78	29.76	29.68	29.63	29.61	29.59	29.61
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285
Liq. Viscosity-lbm/ft-hr	0.436	0.437	0.437	0.436	0.436	0.434	0.432	0.432	0.431	0.432
Liq. Conductivity-Btu/hr-ft-F	0.0252	0.0252	0.0252	0.0252	0.0252	0.0251	0.0251	0.0251	0.0251	0.0251
Liq. Prandtl No.	4.92	4.93	4.93	4.93	4.92	4.92	4.91	4.91	4.91	4.91
Inlet Flow Rate-GPM	8									
Outlet Liq. Flow Rate-GPM	4.8									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	148.3									
Outlet Liq. Temperature-F	149.1									
Outlet Vap. Temperature-F	144.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	143									
Water outlet Temp.-F	140.1									
Inlet G-lbm/hr/ft2	1561534		Temp	147.4	Density	81.79				
Subcooling-F	11.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0.4	80.8	80.8	80.9	80.3	177.5	678.7	665.8	0	0
Heat Loss-Watts	21.4	5.2	7.1	8.8	9.6	9.9	8.9	9.6	8.1	44
Heat Flux-Btu/Hr/ft2	7	1401	1401	1402	1392	3077	11765	11541	0	0
Wall Temp. #3-F	149.4	152	152.2	152.7	152.4	155.3	161.1	160.4	149.5	148
Wall Temp. #4-F	149.8	152.3	152.2	152.7	152.9	155.3	161.7	161	150.1	148.6
Wall Temp. #5-F	149.7	151.8	151.9	152.7	152.5	155.4	160.7	159.8	150.7	149.1
Wall Temp. #1-F	73.5	151.9	151.7	152.5	152.2	155.5	161.6	161.1	150.7	149.2
Wall Temp. #2-F	149.3	152.1	151.9	152.1	152.1	155.1	166	161.6	150.4	149.2
Instream Temp.-F	148.9	148.6	148.6	148.7	148.9	149.6	149.8	150.	150.1	150
Avg. Wall Temp.-F	149.6	152.1	152.	152.7	152.4	155.4	162.2	160.8	150.3	148.8
Avg. Wall DT.-F	0.6	3.4	3.3	3.9	3.5	5.7	11.9	10.3	0.2	-1.2
Remaining Subcool-F	11.9									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	10.7	410.5	419.8	360.8	402.1	536.4	989.6	1125	0	0
COMPUTED H										
Jallouk	331.4	331.2	331.2	331.2	331.2	331.5	331.5	331.6	331.6	331.5
Szady1(Cudo tube)	411.9	418	421.2	424.2	426.9	429.5	431.9	434.2	436.3	438.2
Szady2	411.9	418	421.2	424.2	426.9	429.5	431.9	434.2	436.3	438.2
(RLIQ)	234418	233798	233775	233946	234312	235463	236030	236401	236575	236354
(F)	1.021	1.036	1.045	1.052	1.058	1.064	1.07	1.075	1.08	1.085
(HLIQ)	411.9	418	421.2	424.2	426.9	429.5	431.9	434.2	436.3	438.2
(HBOIL)	127.7	695.4	679.8	795.7	708.5	1196.9	2534.2	2184.2	34.8	19
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.3									
DP Liquid Density-lbm/ft3	93.52									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.12	0.079	0.028	-0.034	0.053					
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009					
Corrected DP-Psid	0.11	0.075	0.018	-0.032	0.044					
Actual DP-ft	2.48	4.7	6.88	9.08	11.35					
Measured TP-Psig	123.1				123.1					
Measured Overall-ft	0									
Computed DP-ft	2.28	4.56	6.84	9.13	11.27					
Friction-ft	0.28	0.56	0.84	1.12	1.38					
Acceleration-ft	0	0.01	0.01	0.01	0.01					
Elevation-ft	2	4	6	8	9.87					

Run#	480									
Test Fluid	C4F10									
Date:	4/17/93									
Time	0:45									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19595									
Sat. Pressure-Psig	124.4									
Sat. Temperature-F(inlet)	161									
Liq. Density-lbm/ft3	81.81	81.96	81.96	81.83	81.85	81.81	81.64	81.72	81.72	81.74
Latent Heat-Btu/lbm	29.53	29.63	29.63	29.54	29.55	29.53	29.4	29.46	29.46	29.47
Specific Heat-Btu/lbm/F	0.286	0.285	0.285	0.286	0.285	0.286	0.286	0.286	0.286	0.286
Liq. Viscosity-lbm/ft-hr	0.43	0.432	0.432	0.43	0.43	0.43	0.426	0.428	0.428	0.428
Liq. Conductivity-Btu/hr-ft-F	0.025	0.0251	0.0251	0.025	0.025	0.025	0.0249	0.0249	0.0249	0.025
Liq. Prandtl No.	4.91	4.91	4.91	4.91	4.91	4.91	4.9	4.9	4.9	4.9
Inlet Flow Rate-GPM	3									
Outlet Liq. Flow Rate-GPM	4.8									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	149.3									
Outlet Liq. Temperature-F	149.6									
Outlet Vap. Temperature-F	145.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	141.8									
Water outlet Temp.-F	139.4									
Inlet G-lbm/hr/ft2	1558564		Temp	148.2	Density	81.64				
Subcooling-F	11.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	60	59.6	60	60.4	179.3	672.4	655.6	0	0
Heat Loss-Watts	20.6	5	6.7	8.3	9	9.2	8.4	9	7.7	41.9
Heat Flux-Btu/Hr/ft2	0	1040	1033	1040	1047	3108	11656	11364	0	0
Wall Temp. #3-F	150.9	152.3	152.6	153.6	152.7	156.1	162.2	161.2	150.4	149.8
Wall Temp. #4-F	151.2	152.6	152.5	153.5	153.1	156.1	162.8	161.6	151	150.4
Wall Temp. #5-F	151.1	152	152.2	153.5	152.9	156.2	161.9	160.5	151.5	150
Wall Temp. #1-F	75.7	152.6	152.1	153.2	153.1	156.5	162.8	162	151.6	150.6
Wall Temp. #2-F	150.7	152.6	152.3	152.8	152.8	156	167	162.6	151	150.7
Instream Temp.-F	150.6	149.8	149.8	150.5	150.4	150.6	151.5	151.1	151.1	151
Avg. Wall Temp.-F	151	152.5	152.4	153.5	153	156.2	163.3	161.6	151.1	150.3
Avg. Wall DT.-F	0.4	2.7	2.5	2.9	2.5	5.5	11.3	10	0	-0.7
Remaining Subcool-F	11.7									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	388.4	408.6	358.3	414.2	566.7	1030.3	1140.3	0	0
COMPUTED H										
Jallouk	331.5	331.2	331.1	331.4	331.3	331.4	331.7	331.5	331.5	331.4
Szady1(Cudo tube)	412	417.8	421.1	424.2	426.8	429.3	431.8	433.9	435.9	437.8
Szady2	412	417.8	421.1	424.2	426.8	429.3	431.8	433.9	435.9	437.8
(RLIQ)	237317	235699	235675	237035	236813	237186	238961	238135	238111	237888
(F)	1.021	1.036	1.044	1.051	1.058	1.064	1.069	1.074	1.079	1.084
(HLIQ)	412	417.8	421.1	424.2	426.8	429.3	431.8	433.9	435.9	437.8
(HBOIL)	74.2	550.6	519.1	603.1	522.7	1158.5	2458.6	2148.8	1.8	19.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.9									
DP Liquid Density-lbm/ft3	92.71									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.119	0.079	0.029	-0.037	0.05					
Zero Corrections-psid	0.01	0.004	0.01	-0.002	0.009					
Corrected DP-Psid	0.109	0.075	0.019	-0.035	0.041					
Actual DP-ft	2.46	4.67	6.84	9.01	11.27					
Measured TP-Psig	124.4				124.4					
Measured Overall-ft	0									
Computed DP-ft	2.28	4.56	6.85	9.13	11.27					
Friction-ft	0.28	0.56	0.84	1.12	1.38					
Acceleration-ft	0	0.01	0.01	0.01	0.01					
Elevation-ft	2	4	6	8	9.87					

Run#	503									
Test Fluid	C4F10									
Date:	4/23/93									
Time:	16:42									
Note	TABORE<	Anarytical at								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	104.2									
Sat. Temperature-F(inlet)	149.2									
Liq. Density-lbm/ft3	82.18	82.17	82.11	82.09	82.13	82.11	82.15	82.24	82.28	82.31
Latent Heat-Btu/lbm	29.8	29.78	29.74	29.73	29.76	29.74	29.77	29.84	29.86	29.89
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.284	0.284	0.284
Liq. Viscosity-lbm/ft-hr	0.437	0.436	0.435	0.435	0.436	0.435	0.436	0.438	0.439	0.439
Liq. Conductivity-Btu/hr-ft-F	0.0252	0.0252	0.0252	0.0252	0.0252	0.0252	0.0252	0.0253	0.0253	0.0253
Liq. Prandtl No.	4.93	4.93	4.92	4.92	4.92	4.92	4.92	4.93	4.93	4.93
Inlet Flow Rate-GPM	5.1									
Outlet Liq. Flow Rate-GPM	1 1									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	146.9									
Outlet Liq. Temperature-F	147.3									
Outlet Vap. Temperature-F	143.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	74.8									
Water outlet Temp.-F	140.2									
Inlet G-lbm/hr/ft2	1001571		Temp	144.8	Density	82.29				
Subcooling-F	2.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	576.3	581.6	571.2	570.7	580.7	582.3	575.6	575.7	575.2	571.7
Heat Loss-Watts	23.8	5.6	7.6	9.6	10.7	10.8	8.4	9.3	9.2	49.7
Heat Flux-Btu/Hr/ft2	9990	10082	9901	9893	10066	10094	9978	9979	9971	9910
Wall Temp. #3-F	157.7	158.6	158.2	158.6	160.8	159.3	159.1	158.5	158.8	159.1
Wall Temp. #4-F	158.1	157.5	159.1	159.1	159.6	159.4	159.5	159.2	159.2	157.6
Wall Temp. #5-F	157.8	156.2	159.5	158.8	158.5	159.6	158.5	158.1	157	157.7
Wall Temp. #1-F	74.4	157.9	156.6	158.1	157.9	160.2	159.5	159	156.6	154.3
Wall Temp. #2-F	158.7	158.2	157.3	158.6	158	161.2	159.8	159.5	157.7	155.9
Instream Temp.-F	148.6	148.7	149	149.1	148.9	149	148.8	148.3	148.1	147.9
Avg. Wall Temp.-F	158.1	158.1	157.8	158.7	158.5	159.6	159.3	158.9	157.9	156.9
Avg. Wall DT.-F	9	3.9	8.4	9.1	9.1	10.2	10	10.1	9.3	8.6
Remaining Subcool-F	0.3									
Exit Quality	0	0 02	0.04	0.06	0.08	0.1	0.12	0 14	0 15	0 17
EXP. H-Btu/Hr/ft2/F	1107.1	1133.5	1135.4	1086.8	1100.7	992.6	994.9	987.2	1071	1156.1
COMPUTED H										
Jallouk	944.5	915.1	867.1	856	853.9	848	836.6	822.7	815.6	807.5
Szady1(Cudo tube)	1448	1457.8	1452.3	1456.9	1471.5	1478.9	1474.1	1475	1478	1477.8
Szady2	1248.2	1256.5	1243.9	1244.5	1258.2	1237.4	1233.6	1236.2	1240.3	1240.3
(RLIQ)	149995	149016	146436	143627	140436	137569	134374	130881	127739	124622
(F)	1.005	1.271	1.577	1.789	1.967	2.123	2.264	2.397	2.518	2.632
(HLIQ)	284.2	359.2	446	506.1	556.4	600.4	640.2	677.4	711.5	743.5
(HBOIL)	1444.3	1450.4	1438.1	1436.2	1444.5	1445.2	1432.7	1425.8	1420.9	1412.2

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	76.5				
DP Liquid Density-lbm/ft3	93.5				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.108	0.571	0.872	1.527	1.847
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051
Corrected DP-Psid	0.126	0.59	0.903	1.541	1.898
Actual DP-ft	2.05	3.51	5.24	6.39	7.9
Measured TP-Psig	104.2				-1.2
Measured Overall-ft	184.39				
Computed DP-ft	2.16	4.13	6.05	7.97	9.79
Friction-ft	0.16	0.41	0.72	1.1	1.5
Acceleration-ft	0.14	0.28	0.39	0.49	0.59
Elevation-ft	1.86	3.45	4.95	6.38	7.69

Run#	504									
Test Fluid	C4F10									
Date	4/23/93									
Time	19:04									
Note	TABOREK	Analytical st								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	107.7									
Sat. Temperature-F(inlet)	151.4									
Liq. Density-lbm/ft3	81.62	81.61	81.49	81.55	81.59	81.57	81.51	81.59	81.61	81.68
Latent Heat-Btu/lbm	29.39	29.38	29.29	29.33	29.36	29.35	29.31	29.36	29.38	29.43
Specific Heat-Btu/lbm/F	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.286
Liq. Viscosity-lbm/ft-hr	0.426	0.426	0.423	0.425	0.425	0.425	0.424	0.425	0.426	0.427
Liq. Conductivity-Btu/hr-ft-F	0.0249	0.0249	0.0248	0.0248	0.0249	0.0248	0.0248	0.0249	0.0249	0.0249
Liq. Prandtl No.	4.9	4.9	4.89	4.89	4.9	4.89	4.89	4.9	4.9	4.9
Inlet Flow Rate-GPM	4.3									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2.1									
Inlet Temperature-F	149.9									
Outlet Liq. Temperature-F	150.5									
Outlet Vap. Temperature-F	147.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	80.1									
Water outlet Temp.-F	144.6									
Inlet G-lbm/hr/ft2	839125		Temp	147.5	Density	81.77				
Subcooling-F	1.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	560.8	556.4	553.3	551.4	569.8	571.8	560.2	558.1	556.8	551.9
Heat Loss-Watts	25.5	5.8	8	10	10.9	10.9	9	9.9	9.7	51.9
Heat Flux-Btu/Hr/ft2	9721	9818	9591	9558	9877	9912	9711	9674	9652	9567
Wall Temp. #3-F	160.5	161.5	161.1	161	163.4	162.1	162.2	161.8	162.1	161.9
Wall Temp. #4-F	161	160.5	162	161.6	162.4	162.1	162.7	162.4	162.3	160.5
Wall Temp. #5-F	160.7	159.2	162.3	161.4	161.3	162.3	161.8	161.2	160.3	160.7
Wall Temp. #1-F	74	160.8	159.4	160.6	160.5	162.9	162.8	162.2	160	157.2
Wall Temp. #2-F	161.6	161	160.2	161.1	160.6	163.9	162.9	162.7	160.9	158.9
Instream Temp.-F	151.6	151.7	152.3	152	151.8	151.9	152.2	151.8	151.7	151.3
Avg. Wall Temp.-F	161	161	160.7	161.2	161.2	162.4	162.5	162.1	161.1	159.8
Avg. Wall DT.-F	8.9	8.8	7.9	8.7	9	10	9.8	9.8	9	8.1
Remaining Subcool-F	-0.9									
Exit Quality	0.01	0.03	0.06	0.08	0.1	0.12	0.15	0.17	0.19	0.22
EXP. H-Btu/Hr/ft2/F	1090.9	1114.9	1097.7	1096.4	1103.1	1091	1086.7	1084.9	1074.4	1080
COMPUTED H										
Jallouk	945.4	917.6	885.9	860.4	866.6	861.8	848.9	841	835.4	819.5
Szady1(Cudo tube)	1455.9	1456.2	1458.5	1456.9	1481.2	1488.1	1480.4	1478.3	1479.9	1474.9
Szady2	1251.4	1260.5	1245.9	1240.7	1267.3	1242.6	1234.9	1234	1236.6	1231.9
(RLIQ)	128286	126315	123965	120705	117513	114571	111838	108483	105425	102134
(F)	1.198	1.484	1.745	1.95	2.127	2.285	2.425	2.56	2.683	2.803
(HLIQ)	294.9	365.6	430	480.3	523.9	562.9	597.5	630.6	660.7	689.9
(HBOIL)	1451.8	1458.6	1446	1439.3	1459	1460.8	1447.2	1439.1	1434.7	1422.8

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	76.5				
DP Liquid Density-lbm/ft3	93.5				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.163	0.718	1.1	1.834	2.269
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051
Corrected DP-Psid	0.181	0.737	1.131	1.848	2.32
Actual DP-ft	1.97	3.28	4.87	5.9	7.21
Measured TP-Psig	107.7				-1.3
Measured Overall-ft	192.16				
Computed DP-ft	1.95	3.63	5.26	6.86	8.37
Friction-ft	0.15	0.39	0.72	1.11	1.54
Acceleration-ft	0.14	0.23	0.32	0.4	0.48
Elevation-ft	1.66	3.01	4.22	5.35	6.35

Run#	305									
Test Fluid	C4F10									
Date:	4/23/93									
Time:	20:02									
Note	TABOREk Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	104.9									
Sat. Temperature-F(inlet)	149.6									
Liq. Density-lbm/ft3	82	81.89	81.87	81.87	81.91	81.87	81.89	81.96	82	81.98
Latent Heat-Btu/lbm	29.66	29.58	29.57	29.57	29.59	29.57	29.58	29.63	29.66	29.65
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285
Liq. Viscosity-lbm/ft-hr	0.433	0.431	0.431	0.431	0.431	0.431	0.431	0.432	0.433	0.433
Liq. Conductivity-Btu/hr-ft-F	0.0251	0.025	0.025	0.025	0.0251	0.025	0.025	0.0251	0.0251	0.0251
Liq. Prandtl No.	4.92	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.92	4.92
Inlet Flow Rate-GPM	3.5									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	1.8									
Inlet Temperature-F	148.3									
Outlet Liq. Temperature-F	148.9									
Outlet Vap. Temperature-F	145.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	78.1									
Water outlet Temp.-F	142.6									
Inlet G-lbm/hr/ft2	687352		Temp	144.8	Density	82.29				
Subcooling-F	1.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	580.3	576.2	581.6	579.3	579.7	580	576.5	578	577.9	579
Heat Loss-Watts	24.9	5.8	7.9	10	11	10.9	8.9	9.8	9.6	51.8
Heat Flux-Btu/Hr/ft2	10059	9988	10082	10042	10049	10054	9993	10019	10018	10037
Wall Temp. #3-F	158.8	159.6	159.4	159.7	162	160.7	160.7	160	160.3	161.1
Wall Temp. #4-F	159.2	158.6	160.4	160.4	160.9	160.7	161	160.8	160.7	159.5
Wall Temp. #5-F	158.9	157.3	160.7	160	159.7	160.8	160	159.6	158.5	159.6
Wall Temp. #1-F	73.5	159	157.7	159.3	159	161.4	161.2	160.6	158.1	156.2
Wall Temp. #2-F	159.7	159.2	158.6	159.8	159.2	162.4	161.4	161.2	159.2	157.9
Instream Temp.-F	149.6	150.2	150.3	150.3	150.1	150.3	150.2	149.8	149.6	149.7
Avg. Wall Temp.-F	159.2	159.1	159	159.9	159.7	160.9	160.9	160.4	159.4	158.9
Avg. Wall DT.-F	9.1	8.4	8.3	9.1	9.1	10.1	10.2	10.2	9.3	9.7
Remaining Subcool-F	-1.7									
Exit Quality	0.02	0.04	0.07	0.1	0.13	0.16	0.19	0.22	0.25	0.28
EXP. H-Btu/Hr/ft2/F	1106	1182.2	1219.2	1104	1098.7	991	978.9	983.5	1076.3	1152.8
COMPUTED H										
Jallouk	970.3	935.1	917.6	899.5	877.3	871.7	862.8	857	851.4	848.5
Szady1(Cudo tube)	1461.4	1463.8	1473.8	1473.7	1475.2	1480.2	1478.2	1479.7	1481.2	1486.8
Szady2	1263	1262	1270.7	1267.3	1266.3	1269	1263.7	1236.9	1239.8	1246.6
(RLIQ)	102970	101156	98228	95197	92019	89148	86060	82774	79641	76713
(F)	1.282	1.613	1.9	2.129	2.328	2.502	2.663	2.816	2.958	3.088
(HLIQ)	268.6	338	398.2	446.3	487.8	524.3	558	589.9	619.5	646.8
(HBOIL)	1458.4	1457.7	1464	1459.9	1457.2	1457.9	1451.2	1447.8	1444.2	1444.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	126.6									
DP Liquid Density-lbm/ft3	85.61									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.191	0.89	1.364	2.185	2.67					
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051					
Corrected DP-Psid	0.209	0.909	1.395	2.199	2.721					
Actual DP-ft	1.72	2.58	3.82	4.49	5.53					
Measured TP-Psig	104.9				-1.3					
Measured Overall-ft	186.54									
Computed DP-ft	1.82	3.37	4.85	6.3	7.67					
Friction-ft	0.12	0.31	0.58	0.9	1.26					
Acceleration-ft	0.11	0.19	0.26	0.33	0.41					
Elevation-ft	1.59	2.86	4.01	5.07	6					

Run#	8									
Test Fluid	C4F10									
Date:	4/23/93									
Time	20:02									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	107.3									
Sat. Temperature-F(inlet)	151.1									
Liq. Density-lbm/ft3	81.98	81.81	81.83	81.85	81.87	81.85	81.87	81.94	81.96	81.96
Latent Heat-Btu/lbm	29.65	29.53	29.54	29.55	29.57	29.56	29.57	29.62	29.63	29.63
Specific Heat-Btu/lbm/F	0.285	0.286	0.286	0.285	0.285	0.285	0.285	0.285	0.285	0.285
Liq. Viscosity-lbm/ft-hr	0.433	0.43	0.43	0.43	0.431	0.43	0.431	0.432	0.432	0.432
Liq. Conductivity-Btu/hr-ft-F	0.0251	0.025	0.025	0.025	0.025	0.025	0.025	0.0251	0.0251	0.0251
Liq. Prandtl No.	4.92	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91
Inlet Flow Rate-GPM	2.8									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	1.7									
Inlet Temperature-F	148.3									
Outlet Liq. Temperature-F	149.4									
Outlet Vap. Temperature-F	146.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	77.7									
Water outlet Temp.-F	142.9									
Inlet G-lbm/hr/ft2	549626		Temp		145 Density		82.25			
Subcooling-F	2.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	590.9	589.4	588.3	587.7	589	589.2	595.1	591.6	590.1	591.4
Heat Loss-Watts	25.3	5.8	8	10	11	10.9	9.1	9.9	9.7	52.1
Heat Flux-Btu/Hr/ft2	10243	10217	10198	10187	10210	10213	10316	10255	10229	10252
Wall Temp. #3-F	158.8	159.7	159.5	159.6	162	160.7	160.9	160.1	160.4	160.9
Wall Temp. #4-F	159.2	158.6	160.5	160.3	160.8	160.8	161.4	161	160.8	159
Wall Temp. #5-F	158.7	157.2	160.9	160	159.6	160.8	160.4	159.9	158.7	159.3
Wall Temp. #1-F	72.6	158.9	157.9	159.2	158.8	161.4	161.5	160.9	158.3	155.9
Wall Temp. #2-F	159.7	159.2	158.5	159.8	159	162.5	161.6	161.4	159.4	157.7
Instream Temp.-F	149.7	150.6	150.5	150.4	150.3	150.4	150.3	149.9	149.8	149.8
Avg. Wall Temp.-F	159.1	159.1	159.1	159.8	159.6	160.9	161.2	160.7	159.5	158.6
Avg. Wall DT.-F	9.9	9	9.1	9.9	9.8	10.1	10.4	10.3	9.2	8.3
Remaining Subcool-F	-1									
Exit Quality	0.01	0.05	0.08	0.12	0.16	0.19	0.23	0.27	0.3	0.34
EXP. H-Btu/Hr/ft2/F	1146.1	1271	1252.9	1142.8	1161.7	1014.9	992.5	996	1104.9	1235.6
COMPUTED H										
Jallouk	999.2	985.5	953.5	933.1	919.3	908.5	903.3	882.3	875.6	872.2
Szady1(Cudo tube)	1474.3	1481.8	1481.4	1481.7	1484.5	1487.8	1496.3	1491	1490.9	1495.2
Szady2	1248.2	1285.4	1282.6	1280.6	1281.6	1282.9	1290.8	1282.4	1279.9	1253.8
(RLIQ)	82684	81341	78197	75056	71921	68904	65756	62449	59329	56266
(F)	1.212	1.585	1.947	2.223	2.457	2.662	2.851	3.031	3.194	3.348
(HLIQ)	212.2	277.9	341.4	389.7	430.7	466.6	499.6	530.9	559.6	586.4
(HBOIL)	1472.8	1478.5	1475.3	1472.7	1472.3	1472.4	1477.5	1488.3	1464.2	1464.5

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	75.3				
DP Liquid Density-lbm/ft3	93.67				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.31	1.096	1.633	2.54	3.141
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051
Corrected DP-Psid	0.328	1.115	1.664	2.554	3.192
Actual DP-ft	1.71	2.61	3.93	4.66	5.68
Measured TP-Psig	107.3				-1.5
Measured Overall-ft	191.15				
Computed DP-ft	1.75	3.13	4.41	5.64	6.79
Friction-ft	0.08	0.23	0.43	0.7	0.99
Acceleration-ft	0.07	0.13	0.19	0.26	0.33
Elevation-ft	1.6	2.77	3.78	4.69	5.47

Run#	...07									
Test Fluid	C4F10									
Date.	4/23/93									
Time:	21.21									
Note	ABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	106									
Sat. Temperature-F(inlet)	150.3									
Liq. Density-lbm/ft3	81.92	81.94	81.38	82	82.04	81.98	81.98	82.05	82.05	82.04
Latent Heat-Btu/lbm	29.61	29.62	29.65	29.66	29.69	29.65	29.65	29.7	29.7	29.69
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285
Liq. Viscosity-lbm/ft-hr	0.432	0.432	0.433	0.433	0.434	0.433	0.433	0.434	0.434	0.434
Liq. Conductivity-Btu/hr-ft-F	0.0251	0.0251	0.0251	0.0251	0.0251	0.0251	0.0251	0.0252	0.0252	0.0251
Liq. Prandtl No.	4.91	4.91	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92
Inlet Flow Rate-GPM	1.8									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	148.4									
Outlet Liq. Temperature-F	148.7									
Outlet Vap. Temperature-F	146.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	77.6									
Water outlet Temp.-F	142.6									
Inlet G-lbm/hr/ft2	355128	Temp	142.8	Density	92.67					
Subcooling-F	1.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	573.5	579.8	571.2	567.5	580.9	580.7	579.7	577.4	576.5	578.9
Heat Loss-Watts	25.1	5.8	7.9	10	11	10.9	9	9.8	9.6	51.8
Heat Flux-Btu/Hr/ft2	9941	10050	9901	9837	10070	10066	10049	10009	9993	10035
Wall Temp. #3-F	157.6	158.5	158.1	158.3	160.8	159.5	159.9	159	159.3	160.2
Wall Temp. #4-F	158.1	157.6	159.2	159	159.7	159.7	160.4	159.9	159.6	158.7
Wall Temp. #5-F	157.7	156.2	159.7	158.7	158.4	159.6	159.4	158.8	157.8	158.7
Wall Temp. #1-F	72.2	157.8	156.6	158	157.9	160.2	160.3	159.9	157.2	155.2
Wall Temp. #2-F	158.4	158.1	157.3	158.6	158.1	161.1	160.6	160.5	158.2	156.7
Instream Temp.-F	150	149.9	149.7	149.6	149.4	149.7	149.7	149.3	149.3	149.4
Avg. Wall Temp.-F	158	158	157.8	158.5	158.5	159.8	160.1	159.6	158.4	157.9
Avg. Wall DT.-F	7.5	7.6	7.7	9.5	8.7	9.6	10	9.9	8.7	8
Remaining Subcool-F	-3.8									
Exit Quality	0.04	0.09	0.15	0.2	0.26	0.31	0.37	0.43	0.48	0.54
EXP. H-Btu/Hr/ft2/F	1025.4	1314.5	1293.9	1163.4	1161.4	1049.1	1008.3	1014.3	1152.8	1247.1
COMPUTED H										
Jallouk	1005.1	981.7	951.6	944.5	942.6	933.1	922.8	910.6	903.3	900.6
Szady1(Cudo tube)	1455.2	1462.9	1451.7	1447.4	1463.4	1467.2	1467.4	1462.7	1463.3	1468.8
Szady2	1256.8	1265.1	1250.4	1243.8	1261.7	1264	1262.5	1255.6	1254.4	1259
(RLIQ)	52817	50277	47210	44223	41184	38283	35281	32177	29202	26248
(F)	1.459	1.95	2.353	2.672	2.952	3.198	3.427	3.65	3.852	4.044
(HLIQ)	180.3	240.9	290.5	329.9	364.4	394.9	423.3	450.6	475.5	499.2
(HBOIL)	1454.3	1460.8	1447.8	1441.7	1455.8	1457.6	1455.6	1448.3	1446.4	1449.4

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	126.1				
DP Liquid Density-lbm/ft3	85.69				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.235	1.477	2.038	3.07	3.794
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051
Corrected DP-Psid	0.253	1.496	2.069	3.084	3.845
Actual DP-ft	1.65	1.55	2.64	2.94	3.57
Measured TP-Psig	106				-1.3
Measured Overall-ft	188.35				
Computed DP-ft	1.43	2.51	3.48	4.38	5.19
Friction-ft	0.05	0.15	0.29	0.46	0.65
Acceleration-ft	0.05	0.08	0.13	0.18	0.24
Elevation-ft	1.33	2.28	3.07	3.74	4.3

Run#	58									
Test Fluid	C4F10									
Date:	4/23/93									
Time	21:21									
Note	TABORE	Analytical at								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	109.2									
Sat. Temperature-F(inlet)	148.6									
Liq. Density-lbm/ft3	82.29	82.22	82.26	82.28	82.28	82.22	82.2	82.28	82.29	82.31
Latent Heat-Btu/lbm	29.88	29.82	29.85	29.86	29.86	29.82	29.81	29.86	29.88	29.89
Specific Heat-Btu/lbm/F	0.284	0.285	0.284	0.284	0.284	0.285	0.285	0.284	0.284	0.284
Liq. Viscosity-lbm/ft-hr	0.439	0.438	0.438	0.439	0.439	0.438	0.437	0.439	0.439	0.439
Liq. Conductivity-Btu/hr-ft-F	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253	0.0252	0.0253	0.0253	0.0253
Liq. Prandtl No.	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	0.4									
Inlet Temperature-F	145.5									
Outlet Liq. Temperature-F	147.6									
Outlet Vap. Temperature-F	145.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	80									
Water outlet Temp.-F	142.8									
Inlet G-lbm/hr/ft2	199736		Temp	137.3	Density	83.7				
Subcooling-F	3.1									
Flow Observation										

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	577	581.8	590.7	588.7	580.6	577.8	582.1	580.5	232.8	101
Heat Loss-Watts	23.7	5.6	7.6	9.6	10.7	10.8	8.6	9.5	8.8	48
Heat Flux-Btu/Hr/ft2	10002	10085	10239	10205	10064	10016	10090	10063	4035	1751
Wall Temp. #3-F	155.3	156	155.7	156	158.5	157.6	158	156.9	154	153
Wall Temp. #4-F	155.8	155	156.6	156.8	157.5	157.6	158.6	157.4	154.1	153
Wall Temp. #5-F	155.5	153.7	157.7	156.4	156.1	157.2	157.5	156.9	152.6	153.4
Wall Temp. #1-F	72.1	155.1	154.4	155.6	155.5	157.8	158.1	158.3	152.4	151.7
Wall Temp. #2-F	156.5	155.5	155.1	156.4	155.6	158.7	158.5	159	152.8	152.3
Instream Temp.-F	148	148.4	148.2	148.1	148.1	148.4	148.5	148.1	148	147.9
Avg. Wall Temp.-F	155.8	155.4	155.5	156.2	156.2	157.6	158.1	157.7	153.2	152.7
Avg. Wall DT-F	7.3	6.5	6.9	7.8	7.6	9.7	9.2	9.1	5	4.7
Remaining Subcool-F	-7.2									
Exit Quality	0.07	0.17	0.27	0.37	0.47	0.57	0.67	0.76	0.8	0.92
EXP. H-Btu/Hr/ft2/F	1365.8	1541.1	1608.6	1635.9	1620.7	1551.6	1498.7	1460.3	807.5	372.4
COMPUTED H										
Jallouk	1059.7	1013.6	1001.1	983.9	965	956.2	969.9	960.3	553.3	364.3
Szady1(Cudo tube)	1441.3	1451.1	1460.7	1458.1	1449	1449	1456	1451.5	920.7	625.5
Szady2	1212.6	1223.4	1234.8	1261.9	1250.1	1248.5	1255.5	1249.6	667	441.3
(RLIQ)	28741	25331	23309	20296	17329	14427	11485	9494	6423	5572
(F)	1.668	2.352	2.509	3.36	3.749	4.093	4.421	4.754	4.98	5.074
(HLIQ)	129.8	183	226.3	261.4	291.6	318.5	344.1	369.8	387.3	394.6
(HBOIL)	1441	1450.2	1458.9	1455.3	1445	1443.9	1449.6	1443.5	897.3	568.1

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	75.4				
DP Liquid Density-lbm/ft3	93.65				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.114	1.898	2.485	3.658	4.559
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051
Corrected DP-Psid	0.132	1.917	2.516	3.672	4.61
Actual DP-ft	2.04	1.2	2.43	2.68	3.17
Measured TP-Psig	103.2				-1
Measured Overall-ft	182.29				
Computed DP-ft	1.19	1.97	2.61	3.16	4.01
Friction-ft	0.02	0.08	0.15	0.24	0.31
Acceleration-ft	0.02	0.05	0.08	0.13	0.14
Elevation-ft	1.14	1.84	2.38	2.79	3.56

15756

Run#	109									
Test Fluid	C4F10									
Date:	4/23/93									
Time:	21:21									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	103.9									
Sat. Temperature-F(inlet)	149									
Liq. Density-lbm/ft3	82.41	82.31	82.37	82.35	82.37	82.31	82.31	82.37	82.37	82.39
Latent Heat-Btu/lbm	29.96	29.89	29.93	29.92	29.93	29.89	29.89	29.93	29.93	29.94
Specific Heat-Btu/lbm/F	0.284	0.284	0.284	0.284	0.284	0.284	0.284	0.284	0.284	0.284
Liq. Viscosity-lbm/ft-hr	0.441	0.439	0.44	0.44	0.44	0.439	0.439	0.44	0.44	0.441
Liq. Conducuvity-Btu/hr-ft-F	0.0254	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253	0.0254
Liq. Prandtl No.	4.94	4.93	4.94	4.94	4.94	4.93	4.93	4.94	4.94	4.94
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	0.6									
Inlet Temperature-F	144									
Outlet Liq. Temperature-F	147.3									
Outlet Vap. Temperature-F	145									
Water Flow Rate-GPM										
Water Inlet Temp.-F	79.6									
Water outlet Temp.-F	142.3									
Inlet G-lbm/hr/ft2	199824		Temp	137.1	Density	83.73				
Subcooling-F	5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	874.8	871.1	868.3	867.4	854.2	852.6	109.3	96.9	104.4	99.1
Heat Loss-Watts	23.9	5.6	7.7	9.7	10.9	10.6	7.5	8.4	8.6	47.2
Heat Flux-Btu/Hr/ft2	15164	15100	15051	15036	14807	14779	1895	1680	1810	1718
Wall Temp. #3-F	156	157.7	156.6	157.5	161.6	177.6	151.3	151.2	151.8	151.7
Wall Temp. #4-F	156.5	155.8	158	158.4	159.5	177.3	151.5	151.5	152.3	151.9
Wall Temp. #5-F	156	154.1	159.2	157.3	157.6	169.1	151.3	151.2	151.6	152.3
Wall Temp. #1-F	72.5	155.9	155.1	156.8	156.7	161.5	153	151	151	150.9
Wall Temp. #2-F	157.2	156.3	156	158	157.1	163.4	152.8	151.2	150.8	151.3
Instream Temp.-F	147.4	147.9	147.6	147.7	147.6	147.9	147.9	147.6	147.6	147.5
Avg. Wall Temp.-F	156.4	156.4	156.4	157.5	157.7	171.4	152	151.2	151.5	151.6
Avg. Wall DT.-F	8.3	7.8	8.1	8.1	9.5	22.8	4	3.5	3.8	4
Remaining Subcool-F	-10.6									
Exit Quality	0.1	0.25	0.4	0.54	0.69	0.83	0.85	0.87	0.89	0.9
EXP. H-Btu/Hr/ft2/F	1818.3	1925.4	1848	1648.6	1565.9	648	474.3	473.9	474	425
COMPUTED H										
Jallouk	1350	1316.2	1268.3	1242.6	77.6	77.6	77.6	77.6	77.6	77.5
Szady1(Cudo tube)	1765.9	1767.8	1762.3	1763.1	77.6	77.6	77.6	77.6	77.6	77.5
Szady2	1596.8	1598.3	1592.2	1592.9	77.6	77.6	77.6	77.6	77.6	77.5
(RLIQ)	28137	24556	20110	15746	15746	15746	15746	15746	15746	15746
(F)	1.837	2.689	3.385	3.946	3.946	3.946	3.946	3.946	3.946	3.946
(HLIQ)	142.8	209.2	263.2	306.9	306.9	306.9	306.9	306.9	306.9	306.9
(HBOIL)	1765.6	1766.8	1760.4	1760	1760	1760	1760	1760	1760	1760

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	75.5				
DP Liquid Density-lbm/ft3	93.64				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.111	2.084	2.682	3.899	4.819
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051
Corrected DP-Psid	0.129	2.103	2.713	3.913	4.87
Actual DP-ft	2.05	0.87	2.08	2.25	2.71
Measured TP-Psig	103.9				-1.3
Measured Overall-ft	183.87				
Computed DP-ft	1.08	1.75	2.28	3.46	4.55
Friction-ft	0.03	0.1	0.19	0.25	0.3
Acceleration-ft	0.03	0.08	0.15	0.16	0.17
Elevation-ft	1.01	1.57	1.94	3.05	4.08

17726

Run#	510									
Test Fluid	C4F10									
Date:	4/23/93									
Time	21:21									
Note	TABOREK Analytical dI									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	106.5									
Sat. Temperature-F(inlet)	150.6									
Liq. Density-lbm/ft3	81.81	81.74	81.79	81.78	81.79	81.79	81.72	81.78	81.81	81.89
Latent Heat-Btu/lbm	29.53	29.47	29.51	29.5	29.51	29.51	29.46	29.5	29.53	29.58
Specific Heat-Btu/lbm/F	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.285
Liq. Viscosity-lbm/ft-hr	0.43	0.428	0.429	0.429	0.429	0.429	0.428	0.429	0.43	0.431
Liq. Conductivity-Btu/hr-ft-F	0.025	0.025	0.025	0.025	0.025	0.025	0.0249	0.025	0.025	0.025
Liq. Prandtl No.	4.91	4.9	4.91	4.9	4.91	4.91	4.9	4.9	4.91	4.91
Inlet Flow Rate-GPM	1.2									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	148.9									
Outlet Liq. Temperature-F	149.9									
Outlet Vap. Temperature-F	148.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	79.3									
Water outlet Temp.-F	144									
Inlet G-lbm/hr/ft2	354069	Temp	144.1	Density	82.43					
Subcooling-F	1.7									

Flow Observation

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	862.4	861	862.6	861	872.2	873.4	865.8	104.6	103.6	100.5
Heat Loss-Watts	25.5	5.8	8	10	10.9	10.9	10.1	9	8.9	49.2
Heat Flux-Btu/Hr/ft2	14949	14925	14953	14925	15119	15140	15008	1813	1796	1742
Wall Temp. #3-F	158.9	160.7	159.2	159.7	164.3	160.4	186.3	153.9	153.9	153.8
Wall Temp. #4-F	159.4	158.7	160.6	160.7	161.7	160.4	186.1	154	154.5	154.2
Wall Temp. #5-F	158.9	157	161.8	159.6	160	159.8	172.2	153.9	153.9	154.3
Wall Temp. #1-F	72.7	158.7	157.9	159	159	162.5	163.2	155.3	153.1	153.4
Wall Temp. #2-F	160	159.2	158.8	160.6	159.5	164.5	163.3	155.4	152.8	153.8
Instream Temp.-F	150.6	151	150.7	150.8	150.7	150.7	151.1	150.8	150.6	150.2
Avg. Wall Temp.-F	159.3	159.3	159.1	159.8	160.1	160.8	174.2	154.5	153.6	153.9
Avg. Wall DT.-F	8	7.7	7.7	8.3	8.7	9.4	22.4	3.6	3	3.6
Remaining Subcool-F	-6.9									
Exit Quality	0.07	0.15	0.23	0.32	0.4	0.49	0.57	0.58	0.59	0.6
EXP. H-Btu/Hr/ft2/F	1863	1950.8	1929.6	1803.5	1744.5	1612.2	668.8	501.1	606.9	481.1
COMPUTED H										
Jallouk	1296.7	1258.2	1218.5	1177.6	1170.1	122.8	122.9	122.9	122.8	122.8
Szady1(Cudo tube)	1787.6	1791.3	1790.7	1791.3	1803.1	122.8	122.9	122.9	122.8	122.8
Szady2	1618	1621.8	1621.6	1622.1	1671.6	122.8	122.9	122.9	122.8	122.8
(RLIQ)	52110	48208	43564	39073	34493	34493	34493	34493	34493	34493
(F)	1.647	2.266	2.748	3.136	3.479	3.479	3.479	3.479	3.479	3.479
(HLIQ)	203.2	279.6	338.9	386.8	429.1	429.1	429.1	429.1	429.1	429.1
(HBOIL)	1786.7	1789	1786.7	1785.3	1794.9	1794.9	1794.9	1794.9	1794.9	1794.9

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	75.6				
DP Liquid Density-lbm/ft3	93.62				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.17	1.672	2.257	3.379	4.212
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051
Corrected DP-Psid	0.188	1.691	2.288	3.393	4.263
Actual DP-ft	1.96	1.6	2.84	3.18	3.79
Measured TP-Psig	106.5				-1.5
Measured Overall-ft	189.92				
Computed DP-ft	1.3	2.27	3.14	4.22	5.47
Friction-ft	0.07	0.2	0.38	0.56	0.68
Acceleration-ft	0.07	0.13	0.21	0.26	0.27
Elevation-ft	1.17	1.95	2.55	3.4	4.51

Run#	511									
Test Fluid	C4F10									
Date:	4/23/93									
Time:	21:21									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	106.2									
Sat. Temperature-F(inlet)	150.4									
Liq. Density-lbm/ft3	82.02	81.92	81.96	82	82.04	81.98	81.98	82.05	82.13	82.11
Latent Heat-Btu/lbm	29.68	29.61	29.63	29.66	29.69	29.65	29.65	29.7	29.76	29.74
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285
Liq. Viscosity-lbm/ft-hr	0.434	0.432	0.432	0.433	0.434	0.433	0.433	0.434	0.436	0.435
Liq. Conductivity-Btu/hr-ft-F	0.0251	0.0251	0.0251	0.0251	0.0251	0.0251	0.0251	0.0252	0.0252	0.0252
Liq. Prandtl No.	4.92	4.91	4.91	4.92	4.92	4.92	4.92	4.92	4.92	4.92
Inlet Flow Rate-GPM	2.6									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	1.5									
Inlet Temperature-F	147.9									
Outlet Liq. Temperature-F	148.5									
Outlet Vap. Temperature-F	146.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	78.1									
Water outlet Temp.-F	142.5									
Inlet G-lbm/hr/ft2	512023		Temp		143.6	Density	82.52			
Subcooling-F	2.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	862.4	860.9	861.1	859.6	868.4	854.8	854.8	104.5	103.5	101.2
Heat Loss-Watts	24.9	5.8	7.9	10	11	11	8.8	8.6	8.7	48
Heat Flux-Btu/Hr/ft2	14949	14923	14927	14901	15053	14817	14817	1811	1794	1754
Wall Temp. #3-F	158.2	159.9	158.3	158.8	162.8	158.9	159.4	152.5	152.5	152.5
Wall Temp. #4-F	158.5	157.9	159.7	159.8	160.4	158.9	159.7	152.4	153	152.8
Wall Temp. #5-F	158.1	156.1	160.8	158.7	158.9	158.4	157.7	152	152.2	152.9
Wall Temp. #1-F	72.8	158.1	156.9	158.2	158.1	161	160.1	152	151.4	152.2
Wall Temp. #2-F	159.3	158.3	157.8	159.8	158.5	162.9	159.9	152	151.4	152.4
Instream Temp.-F	149.5	150	149.8	149.6	149.4	149.7	149.7	149.3	148.9	149
Avg. Wall Temp.-F	158.5	158.6	158.2	158.9	159	159.3	159.4	152.2	152.1	152.6
Avg. Wall DT.-F	9.3	7.9	7.7	8.6	8.9	9.9	9	2.8	3.1	3.5
Remaining Subcool-F	-3.5									
Exit Quality	0.03	0.09	0.15	0.21	0.26	0.32	0.38	0.39	0.39	0.4
EXP. H-Btu/Hr/ft2/F	1790.4	1894.9	1938.4	1732.3	1692.4	1659.2	1548.1	647.4	575.2	504
COMPUTED H										
Jallouk	1264.9	1209.3	1158.1	1131.1	1116.9	1091.4	1077.2	445.5	446.2	445.6
Szady1(Cudo tube)	1776.1	1781.1	1780.8	1778.9	1787.7	1779	1781.2	715.5	715.7	714.1
Szady2	1605.9	1611	1610.9	1642.2	1650.9	1637.3	1637.4	598.7	603.5	606.8
(RLIQ)	75973	72768	68184	63615	59046	54736	50313	47670	46977	46491
(F)	1.434	1.926	2.347	2.682	2.972	3.223	3.456	3.587	3.622	3.646
(HLIQ)	237.2	318.8	388.4	443.8	491.7	533.4	571.9	593.4	598.8	602.8
(HBOIL)	1774.7	1777.7	1774.6	1769.6	1775.2	1762.9	1761.4	539.9	533.5	525.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	126.2									
DP Liquid Density-lbm/ft3	85.68									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.193	1.301	1.862	2.865	3.602					
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051					
Corrected DP-Psid	0.211	1.32	1.893	2.879	3.653					
Actual DP-ft	1.72	1.86	2.94	3.3	3.9					
Measured TP-Psig	106.2				-0.8					
Measured Overall-ft	187.65									
Computed DP-ft	1.54	2.76	3.9	5.2	6.59					
Friction-ft	0.1	0.29	0.56	0.82	1.02					
Acceleration-ft	0.1	0.18	0.27	0.33	0.34					
Elevation-ft	1.35	2.3	3.07	4.05	5.23					

Run#	512									
Test Fluid	C4F10									
Date	1/29/98									
Time	23:52									
Note	TABORE= Analytical st									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.03695									
Sat. Pressure-Psia	101.1									
Sat. Temperature-F(inlet)	147.3									
Liq. Density-lbm/ft3	82.48	82.39	82.39	82.38	82.35	82.33	82.35	82.42	82.46	82.5
Latent Heat-Btu/lbm	30.01	29.94	29.94	29.9	29.92	29.9	29.92	29.97	30	30.02
Specific Heat-Btu/lbm/F	0.284	0.284	0.284	0.284	0.284	0.284	0.284	0.284	0.284	0.284
Liq. Viscosity-lbm/ft-hr	0.443	0.441	0.441	0.44	0.44	0.44	0.44	0.442	0.442	0.443
Liq. Conductivity-Btu/hr-ft-F	0.0254	0.0254	0.0254	0.0253	0.0253	0.0253	0.0253	0.0254	0.0254	0.0254
Liq. Prandtl No.	4.94	4.94	4.94	4.94	4.94	4.94	4.94	4.94	4.94	4.94
Inlet Flow Rate-GPM	3.4									
Outlet Liq. Flow Rate-GPM	1.4									
Outlet Vap. Flow Rate-GPM	2.2									
Inlet Temperature-F	144									
Outlet Liq. Temperature-F	146.3									
Outlet Vap. Temperature-F	144.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	74.3									
Water outlet Temp.-F	137.4									
Inlet G-lbm/hr/ft2	871104		Temp	142.6	Density	82.71				
Subcooling-F	3.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	865.4	862	867.3	867	866.1	875.3	861.8	857.6	120.1	103.5
Heat Loss-Watts	23.9	5.6	7.7	9.8	10.9	10.8	8.4	9.4	8.4	45.5
Heat Flux-Btu/Hr/ft2	15001	14942	15034	15029	15013	15173	14939	14866	2082	1794
Wall Temp. #3-F	156.2	157.6	156.1	157.3	161.3	157	157.4	158	150.2	148.9
Wall Temp. #4-F	156.7	155.6	157.6	158.4	158.8	157	157.5	157.7	150.6	149.1
Wall Temp. #5-F	156.1	153.9	158.6	157.1	157.3	156.8	155.5	156.9	150.1	149.7
Wall Temp. #1-F	72.4	155.6	154.8	156.9	156.7	159.4	157.7	157.7	149.5	148.4
Wall Temp. #2-F	157.3	156.4	155.6	158.2	156.9	161.4	158.1	158	149.7	149
Instream Temp.-F	147	147.5	147.5	147.8	147.7	147.8	147.7	147.3	147.1	146.9
Avg. Wall Temp.-F	156.6	156.3	156	157.4	157.4	157.6	157.2	157.7	150	149
Avg. Wall DT.-F	8.9	8.1	7.8	8.9	9	9.1	8.9	9.7	2.8	2
Remaining Subcool-F	-1.3									
Exit Quality	0.01	0.06	0.1	0.14	0.19	0.23	0.28	0.32	0.32	0.33
EXP. H-Btu/Hr/ft2/F	1686.1	1839.1	1916.3	1680	1659.6	1673.9	1685.2	1534.4	736.7	579.9
COMPUTED H										
Jallouk	1224.9	1157.7	1123	1096.5	1072.7	1060.7	1034.3	1014.8	502.7	495.4
Szady1(Cudo tube)	1753	1756.2	1763.9	1769.2	1769.9	1783	1771.5	1766.5	795	775.3
Szady2	1581.8	1584.8	1626.6	1629.8	1627.6	1640.5	1623	1613.8	698.1	701.6
(RLIQ)	98559	96179	91831	87683	83238	78908	74458	69886	67316	66645
(F)	1.249	1.669	2.078	2.38	2.642	2.872	3.084	3.284	3.392	3.419
(HLIQ)	255.8	342.2	424.9	487.9	541.6	588.9	632.2	672.8	694.8	700.2
(HBOIL)	1751.2	1751.9	1755.6	1756.7	1752.8	1761.3	1744.2	1733.3	550.7	497

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	74.5				
DP Liquid Density-lbm/ft3	93.78				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.197	0.979	1.501	2.396	3.037
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051
Corrected DP-Psid	0.215	0.998	1.532	2.41	3.088
Actual DP-ft	1.9	2.81	4.15	4.89	5.84
Measured TP-Psig	101.1				-1.1
Measured Overall-ft	178.39				
Computed DP-ft	1.79	3.21	4.58	5.94	7.46
Friction-ft	0.12	0.37	0.72	1.17	1.47
Acceleration-ft	0.13	0.23	0.34	0.47	0.49
Elevation-ft	1.54	2.61	3.51	4.3	5.5

23634.

Run#	513									
Test Fluid	C4F10									
Date:	4/23/93									
Time:	23:52									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	99.9									
Sat. Temperature-F(inlet)	146.5									
Liq. Density-lbm/ft3	82.26	82.28	82.29	82.28	82.29	82.29	82.33	82.42	82.44	82.5
Latent Heat-Btu/lbm	29.85	29.86	29.88	29.86	29.88	29.88	29.9	29.97	29.98	30.02
Specific Heat-Btu/lbm/F	0.284	0.284	0.284	0.284	0.284	0.284	0.284	0.284	0.284	0.284
Liq. Viscosity-lbm/ft-hr	0.438	0.439	0.439	0.439	0.439	0.439	0.44	0.442	0.442	0.443
Liq. Conductivity-Btu/hr-ft-F	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253	0.0254	0.0254	0.0254
Liq. Prandtl No.	4.93	4.93	4.93	4.93	4.93	4.93	4.94	4.94	4.94	4.94
Inlet Flow Rate-GPM	4.3									
Outlet Liq. Flow Rate-GPM	1.4									
Outlet Vap. Flow Rate-GPM	2									
Inlet Temperature-F	146									
Outlet Liq. Temperature-F	146.6									
Outlet Vap. Temperature-F	144.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	58.9									
Water outlet Temp.-F	134.9									
Inlet G-lbm/hr/ft2	843873	Temp	146.1	Density	82.24					
Subcooling-F	0.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	859.7	853.8	849.2	865.8	862.6	862.5	851.4	870.9	96.4	106.2
Heat Loss-Watts	24.4	5.7	7.7	9.8	11	10.9	8.5	9.5	8.5	46.2
Heat Flux-Btu/Hr/ft2	14902	14800	14720	15008	14953	14951	14758	15096	1671	1841
Wall Temp. #3-F	156.8	158.2	156.4	157.6	161.5	157.2	157.2	158.1	150.6	149.6
Wall Temp. #4-F	157.1	156.1	158	158.6	159	157.1	157.5	157.8	150.8	149.6
Wall Temp. #5-F	156.7	154.3	159	157.4	157.6	156.9	155.5	157.1	150.3	150.7
Wall Temp. #1-F	72.6	156.2	155.3	157.1	156.8	159.5	157.7	157.7	149.6	149.5
Wall Temp. #2-F	157.7	156.8	156.1	158.5	157.2	161.5	158	157.8	150.1	150
Instream Temp.-F	148.2	148.1	148	148.1	148	148	147.8	147.3	147.2	146.9
Avg. Wall Temp.-F	157.1	156.8	156.5	157.7	157.7	157.7	157.2	157.7	150.3	149.9
Avg. Wall DT.-F	9.2	9.1	7.8	8.9	9	9	8.7	9.7	3	2.9
Remaining Subcool-F	-3.1									
Exit Quality	0.03	0.06	0.1	0.13	0.17	0.2	0.24	0.27	0.28	0.28
EXP. H-Btu/Hr/ft2/F	1817	1837.1	1890.9	1686.9	1666.2	1661.3	1693.8	1553.5	556.2	635.5
COMPUTED H										
Jallouk	1150.6	1098.7	1063	1050.6	1026.7	1008.3	984.4	245.5	245.4	245.4
Szady1(Cudo tube)	1761.3	1757.1	1754.6	1775.8	1775.2	1778.9	1769.9	245.5	245.4	245.4
Szady2	1589.9	1616.9	1610	1632.2	1627.5	1628.1	1613	245.5	245.4	245.4
(RLIQ)	124096	119984	115548	111295	106823	102452	97948	97948	97948	97948
(F)	1.409	1.798	2.095	2.338	2.553	2.745	2.923	2.923	2.923	2.923
(HLIQ)	347.1	443	516.9	576.9	628.8	676	719.7	719.7	719.7	719.7
(HBOIL)	1756.8	1747.7	1739.6	1755.4	1748.5	1745.7	1729.3	1729.3	1729.3	1729.3

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	75.3				
DP Liquid Density-lbm/ft3	93.67				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.136	0.779	1.204	1.981	2.662
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051
Corrected DP-Psid	0.154	0.798	1.235	1.995	2.713
Actual DP-ft	2	3.15	4.66	5.6	6.43
Measured TP-Psig	99.9				-1.1
Measured Overall-ft	176.3				
Computed DP-ft	1.85	3.46	5.05	6.68	8.33
Friction-ft	0.21	0.57	1.05	1.65	2.05
Acceleration-ft	0.22	0.35	0.48	0.63	0.65
Elevation-ft	1.42	2.54	3.52	4.41	5.64

2363F.

Run#	514									
Test Fluid	C4F10									
Date.	1/23/93									
Time	23:52									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	102.5									
Sat. Temperature-F(inlet)	148.2									
Liq. Density-lbm/ft3	82.29	82.18	82.02	81.94	81.98	81.98	82	82.07	82.13	82.18
Latent Heat-Btu/lbm	29.88	29.8	29.68	29.62	29.65	29.65	29.66	29.72	29.76	29.8
Specific Heat-Btu/lbm/F	0.284	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285
Liq. Viscosity-lbm/ft-hr	0.439	0.437	0.434	0.432	0.433	0.433	0.433	0.435	0.436	0.437
Liq. Conductivity-Btu/hr-ft-F	0.0253	0.0252	0.0251	0.0251	0.0251	0.0251	0.0251	0.0252	0.0252	0.0252
Liq. Prandtl No.	4.93	4.93	4.92	4.91	4.92	4.92	4.92	4.92	4.92	4.93
Inlet Flow Rate-GPM	5.1									
Outlet Liq. Flow Rate-GPM	1.3									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	145.2									
Outlet Liq. Temperature-F	148									
Outlet Vap. Temperature-F	145.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	74.3									
Water outlet Temp.-F	140.6									
Inlet G-lbm/hr/ft2	1002268		Temp		144.6	Density	82.35			
Subcooling-F	3									
Flow Observation										

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	875.2	862.4	870.2	870.6	875.6	875.1	871.7	869.2	875.3	123.2
Heat Loss-Watts	25.5	5.8	7.9	10	10.9	10.9	8.8	9.8	9.8	47.5
Heat Flux-Btu/Hr/ft2	15171	14949	15084	15091	15178	15169	15110	15067	15173	2136
Wall Temp. #3-F	158.5	160	158.2	159.2	163	158.9	159	159.3	161.6	151.3
Wall Temp. #4-F	158.9	158.1	159.8	160.2	160.6	158.9	159.2	159.3	161.8	151.4
Wall Temp. #5-F	158.4	156.3	160.7	159	159.1	158.5	157.3	158.6	158.8	151.8
Wall Temp. #1-F	72.7	158.1	157.1	158.8	158.5	161.2	159.6	159.2	157.8	150.8
Wall Temp. #2-F	159.6	158.6	157.9	160	158.7	163.1	159.8	159.2	159.8	151.4
Instream Temp.-F	148	148.6	149.5	149.9	149.7	149.7	149.6	149.2	148.9	148.6
Avg. Wall Temp.-F	158.9	158.7	158.3	159.3	159.2	159.4	159	159.1	160	151.3
Avg. Wall DT.-F	10.2	9.4	9.1	9.7	9.8	9	9.7	9.2	10.4	2.6
Remaining Subcool-F	-0.2									
Exit Quality	0	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.24
EXP. H-Btu/Hr/ft2/F	1492.6	1586.2	1369.6	1731.1	1717.1	1687.5	1737.4	1630.8	1462.5	807.9
COMPUTED H										
Jallouk	1196	1120.9	1085.2	1055.8	1031.9	1009.2	986.8	965.1	949.3	595.1
Szady1(Cudo tube)	1774.1	1769.8	1791.1	1799.7	1806.7	1810.6	1810.8	1809.1	1817.1	905.4
Szady2	1605.9	1633.8	1654.3	1659.9	1664.2	1664.4	1660.1	1653.8	1631.5	853.4
(RLIQ)	149241	147677	144338	140319	135564	131029	126401	121493	116709	113883
(F)	1.071	1.429	1.779	2.035	2.252	2.443	2.615	2.777	2.929	3.014
(HLIQ)	302.7	404.2	503.6	576.3	637.9	691.8	740.5	786.1	828.7	352.4
(HBOIL)	1771.2	1762.8	1777.7	1779.7	1779.8	1776.3	1768.5	1758.2	1757.8	497

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	75.1				
DP Liquid Density-lbm/ft3	93.7				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.113	0.582	0.899	1.583	2.057
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051
Corrected DP-Psid	0.131	0.601	0.93	1.597	2.108
Actual DP-ft	2.05	3.51	5.21	6.32	7.56
Measured TP-Psig	102.5				-1.1
Measured Overall-ft	181.52				
Computed DP-ft	2.13	3.98	5.79	7.65	9.43
Friction-ft	0.18	0.54	1.04	1.66	2.25
Acceleration-ft	0.2	0.37	0.53	0.69	0.79
Elevation-ft	1.75	3.07	4.23	5.3	6.39

26588

Run#	315									
Test Fluid	C4F10									
Date:	4/23/93									
Time	23:52									
Note	TABORE?	Anaiytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	102.4									
Sat. Temperature-F(inlet)	148.1									
Liq. Density-lbm/ft3	82.13	82	81.89	81.83	81.89	81.87	81.91	81.96	82.04	82.07
Latent Heat-Btu/lbm	29.76	29.66	29.58	29.54	29.58	29.57	29.59	29.63	29.69	29.72
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.286	0.285	0.285	0.285	0.285	0.285	0.285
Liq. Viscosity-lbm/ft-hr	0.436	0.433	0.431	0.43	0.431	0.431	0.431	0.432	0.434	0.435
Liq. Conductivity-Btu/hr-ft-F	0.0252	0.0251	0.025	0.025	0.025	0.025	0.0251	0.0251	0.0251	0.0252
Liq. Prandtl No.	4.92	4.92	4.91	4.91	4.91	4.91	4.91	4.91	4.92	4.92
Inlet Flow Rate-GPM	5.1									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	2.5									
Inlet Temperature-F	146.2									
Outlet Liq. Temperature-F	148.5									
Outlet Vap. Temperature-F	145.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	90.7									
Water outlet Temp.-F	142.9									
Inlet G-lbm/hr/ft2	1001105		Temp		145	Density	82.25			
Subcooling-F	1.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1145.8	1141.8	1145.4	1136.9	180.8	118	201.7	198.5	174.8	130.4
Heat Loss-Watts	26.8	6	8.2	10	10.4	10.1	8.1	9	8.9	48.1
Heat Flux-Btu/Hr/ft2	19862	19792	19855	19707	3134	2045	3496	3441	3030	2260
Wall Temp. #3-F	160.3	162.7	160.3	161.3	154.3	152.8	153.6	153.7	153	151.4
Wall Temp. #4-F	160.6	159.7	162.3	162.6	154.4	152.8	153.8	153.9	153.5	151.6
Wall Temp. #5-F	160	157.6	163.3	160.9	153.7	152.9	153.5	153.5	152.9	151.9
Wall Temp. #1-F	72.3	160.1	158.8	160.6	154	153.6	153.7	153.3	152.4	151.1
Wall Temp. #2-F	161.4	160.6	159.9	162.7	154	153.1	154	153.5	152.6	151.6
Instream Temp.-F	148.9	149.6	150.2	150.5	150.2	150.3	150.1	149.8	149.4	149.2
Avg. Wall Temp.-F	160.6	160.8	160.3	161.4	154	153	153.7	153.6	152.9	151.5
Avg. Wall DT.-F	10.8	10.3	9.2	10	3.7	2.6	3.5	3.6	3.3	2.2
Remaining Subcool-F	-2.2									
Exit Quality	0.02	0.06	0.1	0.14	0.14	0.15	0.16	0.16	0.17	0.17
EXP. H-Btu/Hr/ft2/F	1842.9	1925.2	2151.6	1978.8	850.9		1009.9	949.3	806.4	1019.2
COMPUTED H										
Jallouk	1353.9	1291.6	1234.8	1184	562.9	529.4	580.4	581.7	572.3	552.4
Szady1(Cudo tube)	2043.3	2051	2065.1	2064.9	903.1	807.7	944.4	942.8	909.1	848.6
Szady2	1973.2	1979.4	1993	1988.4	730.4	711.6	763.4	769.1	758.8	752.4
(RLIQ)	148733	145084	139879	134276	130505	129834	128785	127423	126033	125036
(F)	1.332	1.725	2.064	2.332	2.473	2.502	2.536	2.578	2.618	2.649
(HLIQ)	376.4	488.1	584.6	660.6	700.2	708.4	717.8	729.4	740.4	749
(HBOIL)	2039.1	2041.7	2049.4	2042.1	732.7	555.5	778.9	766.3	701.6	575.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	74.8									
DP Liquid Density-lbm/ft3	93.74									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.083	0.429	1.072	1.762	2.174					
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051					
Corrected DP-Psid	0.101	0.448	1.103	1.776	2.225					
Actual DP-ft	2.11	3.78	4.92	6.02	7.37					
Measured TP-Psig	102.4				-0.5					
Measured Overall-ft	180.54									
Computed DP-ft	2.03	3.84	5.69	7.54	9.29					
Friction-ft	0.26	0.74	1.14	1.56	1.97					
Acceleration-ft	0.29	0.49	0.52	0.55	0.58					
Elevation-ft	1.47	2.6	4.02	5.43	6.73					

15736.

Run#	516									
Test Fluid	C4F10									
Date	4/23/93									
Time	15:52									
Note	TABOREK Analytical at									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	104									
Sat. Temperature-F(inlet)	149.1									
Liq. Density-lbm/ft3	81.68	81.68	81.68	81.66	81.68	81.66	81.68	81.76	81.79	81.89
Latent Heat-Btu/lbm	29.43	29.42	29.43	29.42	29.43	29.42	29.43	29.49	29.51	29.58
Specific Heat-Btu/lbm/F	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.285
Liq. Viscosity-lbm/ft-hr	0.427	0.427	0.427	0.427	0.427	0.427	0.427	0.428	0.429	0.431
Liq. Conductivity-Btu/hr-ft-F	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.025	0.025	0.025
Liq. Prandtl No.	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.91	4.91
Inlet Flow Rate-GPM	4.3									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	2									
Inlet Temperature-F	148.1									
Outlet Liq. Temperature-F	149.7									
Outlet Vap. Temperature-F	147.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	78.6									
Water outlet Temp.-F	143.6									
Inlet G-lbm/hr/ft2	841507	Temp	146.3	Density	82					
Subcooling-F	1									
Flow Observation										

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1157.4	1157.6	1155.3	1158.7	131	102.1	202.2	198.8	167.9	136.1
Heat Loss-Watts	27	6	8.3	10	10.4	10.1	8.1	9.1	9	48.8
Heat Flux-Btu/Hr/ft2	20063	20066	20026	20085	2271	1770	3505	3446	2910	2359
Wall Temp. #3-F	161.4	163.8	161.5	162.8	154.2	153.8	154.9	155.1	154.2	152.9
Wall Temp. #4-F	161.7	160.7	163.4	163.9	154.6	153.7	155.1	155.3	154.8	153
Wall Temp. #5-F	160.9	158.5	164.6	161.1	154.3	153.8	154.5	154.8	154.2	153.3
Wall Temp. #1-F	72.7	161.1	159.8	161.9	154.6	154.3	154.2	154.6	153.6	152.3
Wall Temp. #2-F	162.4	161.7	160.9	164.1	154.5	153.6	154.2	155	153.9	153.1
Instream Temp.-F	151.3	151.4	151.3	151.4	151.3	151.4	151.3	150.9	150.7	150.2
Avg. Wall Temp.-F	161.6	161.8	161.4	162.4	154.5	153.9	154.6	155	154.1	152.9
Avg. Wall DT.-F	9.4	9.5	9.2	10.1	3.1	2.4	3.1	3.9	3.3	2.6
Remaining Subcool-F	-3.9									
Exit Quality	0.04	0.09	0.13	0.18	0.19	0.19	0.2	0.21	0.21	0.22
EXP H-Btu/Hr/ft2/F	2135.9	2108.2	2078	1985.2	733.1	731.3	1122.8	962.6	879.7	802.7
COMPUTED H										
Jallouk	1400.9	1339.4	1278.7	245.7	245.6	245.7	245.6	245.6	245.5	245.5
Szady1(Cudo tube)	2083	2086.8	2086.4	245.7	245.6	245.7	245.6	245.6	245.5	245.5
Szady2	2022.5	2024.5	2020.7	245.7	245.6	245.7	245.6	245.6	245.5	245.5
(RLIQ)	126465	121071	114854	114854	114854	114854	114854	114854	114854	114854
(F)	1.462	1.913	2.264	2.264	2.264	2.264	2.264	2.264	2.264	2.264
(HLIQ)	360.7	471.9	558.5	558.5	558.5	558.5	558.5	558.5	558.5	558.5
(HBOIL)	2079.4	2078.8	2073	2073	2073	2073	2073	2073	2073	2073

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	74.6				
DP Liquid Density-lbm/ft3	93.77				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.137	0.687	1.438	2.212	2.737
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051
Corrected DP-Psid	0.155	0.706	1.469	2.226	2.788
Actual DP-ft	2.02	3.34	4.29	5.25	6.4
Measured TP-Psig	104				-0.6
Measured Overall-ft	183.94				
Computed DP-ft	1.84	3.44	5.17	6.92	8.55
Friction-ft	0.23	0.65	0.98	1.33	1.66
Acceleration-ft	0.25	0.42	0.44	0.47	0.49
Elevation-ft	1.35	2.37	3.75	5.12	6.39

15756

Run#	517									
Test Fluid	CHF10									
Date:	4/24/93									
Time:	3									
Note	TABOREK Analytical at									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	106.1									
Sat. Temperature-F(inlet)	150.4									
Liq. Density-lbm/ft3	82.15	81.72	81.64	81.68	81.72	81.68	81.64	81.74	81.76	81.81
Latent Heat-Btu/lbm	29.77	29.46	29.4	29.43	29.46	29.43	29.4	29.47	29.49	29.53
Specific Heat-Btu/lbm/F	0.285	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.286
Liq. Viscosity-lbm/ft-hr	0.436	0.428	0.426	0.427	0.428	0.427	0.426	0.428	0.428	0.43
Liq. Conducavity-Btu/hr-ft-F	0.0252	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.025	0.025	0.025
Liq. Prandtl No.	4.92	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.91
Inlet Flow Rate-GPM	3.4									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	147									
Outlet Liq. Temperature-F	149.9									
Outlet Vap. Temperature-F	147.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	94.9									
Water outlet Temp.-F	144.3									
Inlet G-lbm/hr/ft2	667869		Temp		144.7	Density	82.31			
Subcooling-F	3.4									

Flow Observation

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1170	1152.1	1150.6	1154.1	209.9	118.8	202.6	200.2	174.9	130.4
Heat Loss-Watts	26.9	6	8.2	10	10.4	10	8.1	9.1	9	48.5
Heat Flux-Btu/Hr/ft2	20281	19971	19945	20006	3638	2059	3512	3470	3032	2260
Wall Temp. #3-F	161.5	163.9	161.6	162.1	154.9	153.7	155.2	155.2	154.2	152.7
Wall Temp. #4-F	161.8	160.9	163.6	163.3	155.3	153.6	155.3	155.3	155	152.8
Wall Temp. #5-F	161	158.6	164.8	161.3	154.7	153.8	154.8	154.9	154.4	153.3
Wall Temp. #1-F	72.7	161.4	160.1	161.6	154.8	154.2	154.4	154.8	154	152.5
Wall Temp. #2-F	162.5	161.8	161.1	163.7	154.8	153.5	154.4	155	153.9	152.9
Instream Temp.-F	148.8	151.1	151.5	151.3	151.1	151.3	151.5	151	150.9	150.6
Avg. Wall Temp.-F	161.7	162	161.6	162.1	154.9	153.8	154.8	155	154.3	152.8
Avg. Wall DT.-F	12	10	9.2	9.9	3.6	2.4	3.2	3.9	3.3	2.1
Remaining Subcool-F	-2.9									
Exit Quality	0.03	0.09	0.15	0.21	0.22	0.22	0.23	0.24	0.25	0.26
EXP. H-Btu/Hr/ft2/F	1692.4	1997.6	2168.2	2026.7	1000.8	346.8	1110.9	693.7	329.1	1057.3
COMPUTED H										
Jallouk	1458.6	1390.3	1348.9	1303.4	550.4	468.4	547	546.2	526.8	488.7
Szady1(Cudo tube)	2062.4	2076.1	2081.8	2084.8	929.5	745.7	922.9	919.7	878.2	782.4
Szady2	1998.6	2013.5	2018	2019.2	701.1	602.1	701.8	704.2	671	638.5
(RLIQ)	98814	96325	90590	84345	80601	79868	79152	77758	75704	75711
(F)	1.389	1.874	2.307	2.651	2.832	2.87	2.906	2.961	3.007	3.047
(HLIQ)	284.1	384.2	473.2	543.7	580.6	588.5	596.1	607.1	616.4	624.3
(HBOIL)	2060.6	2071.7	2073.6	2072.4	846.9	595.2	831.2	821.4	762.4	617.6

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	75.2				
DP Liquid Density-lbm/ft3	93.68				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.17	0.842	1.616	2.474	3.059
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051
Corrected DP-Psid	0.188	0.861	1.647	2.488	3.11
Actual DP-ft	1.96	3.08	3.97	4.78	5.83
Measured TP-Psig	106.1				-0.8
Measured Overall-ft	188.16				
Computed DP-ft	1.7	3.09	4.71	6.33	7.84
Friction-ft	0.15	0.44	0.68	0.93	1.17
Acceleration-ft	0.16	0.3	0.32	0.34	0.36
Elevation-ft	1.39	2.35	3.71	5.05	6.3

Test Fluid	C4F10									
Date:	4/24/93									
Time	5:8									
Note	TABOREK Analytical at									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	105.9									
Sat. Temperature-F(inlet)	150.3									
Liq. Density-lbm/ft3	81.64	81.34	81.4	81.4	81.42	81.42	81.34	81.4	81.44	81.51
Latent Heat-btu/lbm	29.4	29.18	29.22	29.22	29.24	29.24	29.18	29.22	29.25	29.31
Specific Heat-Btu/lbm/F	0.286	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.286	0.286
Liq. Viscosity-lbm/ft-hr	0.426	0.421	0.422	0.422	0.422	0.422	0.421	0.422	0.422	0.424
Liq. Conductivity-Btu/hr-ft-F	0.0249	0.0247	0.0247	0.0247	0.0247	0.0247	0.0247	0.0247	0.0248	0.0248
Liq. Prandtl No.	4.9	4.88	4.89	4.89	4.89	4.89	4.88	4.89	4.89	4.89
Inlet Flow Rate-GPM	2.7									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	1.5									
Inlet Temperature-F	150.4									
Outlet Liq. Temperature-F	151.7									
Outlet Vap. Temperature-F	149.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	82.2									
Water outlet Temp.-F	146.8									
Inlet G-lbm/hr/ft2	527392	Temp	147.1	Density	81.85					
Subcooling-F	-0.1									

Flow Observation	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1153.7	1151.9	1158.2	1154	211.6	119.9	201.8	198.2	174.2	128.1
Heat Loss-Watts	27.9	6.2	8.5	10	10.8	10.5	8.5	8.5	9.4	50.2
Heat Flux-Btu/Hr/ft2	19999	19967	20077	20004	3668	2078	3498	3436	3020	2221
Wall Temp. #3-F	162.6	165.2	163.2	163.8	156.8	155.3	156.8	156.8	156.2	154.6
Wall Temp. #4-F	162.9	162	165.2	165.1	156.9	155.3	156.9	157.1	156.8	155
Wall Temp. #5-F	162	159.9	166.4	162.7	156.3	155.3	156.5	156.7	156.4	155.2
Wall Temp. #1-F	72.5	162.6	161.5	163.2	156.2	155.9	156.1	156.5	155.9	154.5
Wall Temp. #2-F	163.7	163	162.5	165.2	156.5	155.1	156.1	156.7	155.9	154.9
Instream Temp.-F	151.5	153.1	152.8	152.8	152.7	152.7	153.1	152.8	152.6	152.2
Avg. Wall Temp.-F	162.8	163.2	163.1	163.7	156.5	155.5	156.5	156.6	156.2	154.8
Avg. Wall DT.-F	10.4	9.2	9.4	10	9.6	2.7	9.2	9.8	9.5	2.5
Remaining Subcool-F	-7.9									
Exit Quality	0.08	0.15	0.23	0.3	0.32	0.33	0.34	0.35	0.36	0.37
EXP H-Btu/Hr/ft2/F	1923.6	2170.9	2137.5	2001.2	1316.3	782.5	1085.7	903	861.9	874.3
COMPUTED H										
Jallouk	1497.7	1417.6	169.2	169.2	169.2	169.2	169.2	169.2	169.2	169.1
Szady1(Cudo tube)	2081.2	2100.9	169.2	169.2	169.2	169.2	169.2	169.2	169.2	169.1
Szady2	2021.3	2043.9	169.2	169.2	169.2	169.2	169.2	169.2	169.2	169.1
(RLIQ)	77808	72616	72616	72616	72616	72616	72616	72616	72616	72616
(F)	1.696	2.284	2.284	2.284	2.284	2.284	2.284	2.284	2.284	2.284
(HLIQ)	288.1	388.5	388.5	388.5	388.5	388.5	388.5	388.5	388.5	388.5
(HBOIL)	2079.3	2096.5	2096.5	2096.5	2096.5	2096.5	2096.5	2096.5	2096.5	2096.5

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	75.2				
DP Liquid Density-lbm/ft3	93.68				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.189	1.192	2.005	2.955	3.631
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051
Corrected DP-Psid	0.207	1.211	2.036	2.969	3.682
Actual DP-ft	1.93	2.46	3.3	3.95	4.84
Measured TP-Psig	105.9				-0.8
Measured Overall-ft	188.5				
Computed DP-ft	1.44	2.62	4.13	5.63	7.04
Friction-ft	0.14	0.39	0.59	0.78	0.98
Acceleration-ft	0.14	0.26	0.28	0.31	0.32
Elevation-ft	1.16	1.96	3.26	4.55	5.74

Run#	519									
Test Fluid	C4F10									
Date:	4/24/93									
Time:	3: 8									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	98.2									
Sat. Temperature-F(inlet)	145.4									
Liq. Density-lbm/ft3	82.41	82.28	82.33	82.26	82.24	82.24	82.31	82.37	82.39	82.39
Latent Heat-Btu/lbm	29.96	29.86	29.9	29.85	29.84	29.84	29.89	29.93	29.94	29.94
Specific Heat-Btu/lbm/F	0.284	0.284	0.284	0.284	0.284	0.284	0.284	0.284	0.284	0.284
Liq. Viscosity-lbm/ft-hr	0.441	0.439	0.44	0.438	0.438	0.438	0.439	0.44	0.441	0.441
Liq. Conductivity-Btu/hr-ft-F	0.0254	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253	0.0253	0.0254	0.0254
Liq. Prandtl No.	4.94	4.93	4.94	4.93	4.93	4.93	4.93	4.94	4.94	4.94
Inlet Flow Rate-GPM	1.8									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	1.2									
Inlet Temperature-F	144.5									
Outlet Liq. Temperature-F	147.1									
Outlet Vap. Temperature-F	144.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	79.4									
Water outlet Temp.-F	142.2									
Inlet G-lbm/hr/ft2	356340		Temp	141	3.Density	82.95				
Subcooling-F	0.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1165.6	1153.1	1159.7	1157	191.2	105.3	200.4	194.2	166.9	133.7
Heat Loss-Watts	25.3	5.8	8	10	10.1	9.6	7.7	8.7	8.7	47.2
Heat Flux-Btu/Hr/ft2	20205	19988	20103	20056	3314	1825	3474	3366	2893	2318
Wall Temp. #3-F	157.7	160.2	158.1	159.5	152	150.7	152	152	151.2	149.8
Wall Temp. #4-F	158	157.4	160.3	160.6	152.3	150.7	152	152.3	151.9	150.2
Wall Temp. #5-F	157.3	155.3	161.5	158.2	151.6	150.7	151.5	151.8	151.2	150.5
Wall Temp. #1-F	72.3	157.7	156.7	158.8	151.8	151.1	150.8	151.5	150.7	149.5
Wall Temp. #2-F	158.6	158.1	157.6	160.9	151.8	150.5	151.1	151.8	150.9	150.1
Instream Temp.-F	147.4	148.1	147.8	148.2	148.3	148.3	147.9	147.6	147.5	147.5
Avg. Wall Temp.-F	157.9	158.4	158.2	159.3	151.9	150.8	151.5	151.9	151.2	150
Avg. Wall DT.-F	9.6	9.3	9.5	10.2	3.4	2.4	3.4	4.1	3.5	2.4
Remaining Subcool-F	-10.8									
Exit Quality	0.1	0.21	0.32	0.43	0.45	0.46	0.48	0.5	0.51	0.53
EXP. H-Btu/Hr/ft2/F	2107.6	2138.5	2123.6	1972.3	967.6	755	1014.8	815.5	815.1	959.6
COMPUTED H										
Jallouk	1518.7	1438.6	123.2	123.2	123.3	123.3	123.2	123.2	123.2	123.2
Szady1(Cudo tube)	2041	2039.3	123.2	123.2	123.3	123.3	123.2	123.2	123.2	123.2
Szady2	1972.6	1969.3	123.2	123.2	123.3	123.3	123.2	123.2	123.2	123.2
(RLIQ)	50144	44810	44810	44810	44810	44810	44810	44810	44810	44810
(F)	1.842	2.588	2.588	2.588	2.588	2.588	2.588	2.588	2.588	2.588
(HLIQ)	227.5	319.8	319.8	319.8	319.8	319.8	319.8	319.8	319.8	319.8
(HBOIL)	2040	2036.6	2036.6	2036.6	2036.6	2036.6	2036.6	2036.6	2036.6	2036.6

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	74.8				
DP Liquid Density-lbm/ft3	93.74				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.173	1.722	2.407	3.467	4.249
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051
Corrected DP-Psid	0.191	1.741	2.438	3.481	4.3
Actual DP-ft	1.94	1.51	2.57	3.02	3.72
Measured TP-Psig	98.2				-0.5
Measured Overall-ft	172.51				
Computed DP-ft	1.21	2.12	3.48	4.84	6.11
Friction-ft	0.08	0.25	0.38	0.5	0.62
Acceleration-ft	0.09	0.19	0.2	0.22	0.24
Elevation-ft	1.04	1.68	2.9	4.12	5.25

15736.

Run=	520									
Test Fluid	C4F10									
Date:	4/24/93									
Time	8									
Note	TABORE	Anarytical at								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	100.5									
Sat. Temperature-F(inlet)	146.9									
Liq. Density-lbm/ft3	82.17	82	82.04	81.94	81.98	81.94	81.96	82.02	82.02	82.07
Latent Heat-Btu/lbm	29.78	29.66	29.69	29.62	29.65	29.62	29.63	29.68	29.68	29.72
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285
Liq. Viscosity-lbm/ft-hr	0.436	0.433	0.434	0.432	0.433	0.432	0.432	0.434	0.434	0.435
Liq. Conductivity-Btu/hr-ft-F	0.0252	0.0251	0.0251	0.0251	0.0251	0.0251	0.0251	0.0251	0.0251	0.0252
Liq. Prandtl No.	4.93	4.92	4.92	4.91	4.92	4.91	4.91	4.92	4.92	4.92
Inlet Flow Rate-GPM										
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	0.6									
Inlet Temperature-F	142.3									
Outlet Liq. Temperature-F	148.9									
Outlet Vap. Temperature-F	147									
Water Flow Rate-GPM										
Water Inlet Temp.-F	96.3									
Water outlet Temp.-F	144.4									
Inlet G-lbm/hr/ft2	199429		Temp		138 Density	83.57				
Subcooling-F	4.6									
Flow Observation										

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1155.1	1139.4	1151.2	90.5	188.3	103.1	197.8	183.7	162.1	130.7
Heat Loss-Watts	26.1	5.9	8.2	9.4	10.4	10.1	8.1	9.1	9	48.9
Heat Flux-Btu/Hr/ft2	20023	20097	19955	1569	3264	1787	3429	3184	2810	2266
Wall Temp. #3-F	158.9	161.9	159.6	153	153.6	152.4	153.9	153.9	153.1	152.1
Wall Temp. #4-F	159.2	158.9	161.6	153.1	154	152.4	154.1	154.2	153.8	152.3
Wall Temp. #5-F	158.2	156.4	162.5	152.8	153.4	152.4	153.4	153.7	153.2	152.5
Wall Temp. #1-F	71.9	158.8	158	153	153.5	152.9	152.9	153.4	152.7	151.6
Wall Temp. #2-F	159.8	159.4	159.1	152.9	153.4	152.1	153.1	153.7	152.7	152.2
Instream Temp.-F	148.7	149.6	149.4	149.9	149.7	149.9	149.8	149.5	149.5	149.2
Avg. Wall Temp.-F	159	159.8	159.6	153	153.6	152.5	153.5	153.8	153.1	152.1
Avg. Wall DT.-F	9.4	9.2	9.3	3	3.7	2.5	3.5	4.1	3.5	2.8
Remaining Subcool-F	-16.1									
Exit Quality	0.15	0.35	0.55	0.56	0.6	0.62	0.65	0.68	0.71	0.73
EXP H-Btu/Hr/ft2/F	2125.5	2174.6	2151.9	522.2	875.7	702.4	972.7	769.9	809.1	798.4
COMPUTED H										
Jallouk	1614.5	1564.7	77.5	77.6	77.6	77.6	77.6	77.5	77.5	77.5
Szady1(Cudo tube)	2047.1	2062.4	77.5	77.6	77.6	77.6	77.6	77.5	77.5	77.5
Szady2	1980.4	1998.8	77.5	77.6	77.6	77.6	77.6	77.5	77.5	77.5
(RLIQ)	27598	22509	22509	22509	22509	22509	22509	22509	22509	22509
(F)	2.055	3.049	3.049	3.049	3.049	3.049	3.049	3.049	3.049	3.049
(HLIQ)	169.8	237.3	237.3	237.3	237.3	237.3	237.3	237.3	237.3	237.3
(HBOIL)	2046.8	2061.3	2061.3	2061.3	2061.3	2061.3	2061.3	2061.3	2061.3	2061.3

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	74.5				
DP Liquid Density-lbm/ft3	93.78				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.168	1.996	2.679	3.869	4.745
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051
Corrected DP-Psid	0.186	2.015	2.71	3.883	4.796
Actual DP-ft	.96	1.04	2.1	2.33	2.87
Measured TP-Psig	-0.5				-0.6
Measured Overall-ft	7.38				
Computed DP-ft	0.98	1.93	2.92	3.62	4.38
Friction-ft	0.04	0.1	0.16	0.24	0.31
Acceleration-ft	0.05	0.08	0.09	0.1	0.12
Elevation-ft	0.9	1.75	2.66	3.28	3.96

11817

Run#	521									
Test Fluid	C4F10									
Date:	4/24/93									
Time:	6: 1									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	77.4									
Sat. Temperature-F(inlet)	131.1									
Liq. Density-lbm/ft3	85.53	85.36	85.43	85.4	85.4	85.4	85.41	85.41	85.41	85.5
Latent Heat-Btu/lbm	32.15	32.04	32.08	32.06	32.06	32.06	32.07	32.07	32.07	32.13
Specific Heat-Btu/lbm/F	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277
Liq. Viscosity-lbm/ft-hr	0.51	0.506	0.508	0.507	0.507	0.507	0.507	0.507	0.507	0.509
Liq. Conductivity-Btu/hr-ft-F	0.0274	0.0273	0.0273	0.0273	0.0273	0.0273	0.0273	0.0273	0.0273	0.0273
Liq. Prandtl No.	5.16	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.15	5.16
Inlet Flow Rate-GPM	0.9									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	0.4									
Inlet Temperature-F	121.8									
Outlet Liq. Temperature-F	129.1									
Outlet Vap. Temperature-F	127.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	70.7									
Water outlet Temp.-F	126.1									
Inlet G-lbm/hr/ft2	186980		Temp	118.1	Density	87.06				
Subcooling-F	9.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1154	1154	1154	1154	100	100	100	100	100	100
Heat Loss-Watts	20.2	4.8	6.6	8.1	7.2	6.6	5.2	6	6.6	36.5
Heat Flux-Btu/Hr/ft2	20004	20004	20004	20004	1733	1733	1733	1733	1733	1733
Wall Temp. #3-F	140.9	143.6	141.3	142.8	133.2	134	135.4	134	134	134
Wall Temp. #4-F	141.2	140.4	143.2	144.1	133.6	134	135.3	134	134.5	134.1
Wall Temp. #5-F	139.8	138	144.3	141.7	133.3	133.7	135	133.9	134	134.1
Wall Temp. #1-F	70.1	140.4	140	141.9	133.4	133.9	135	133.6	133.5	133.1
Wall Temp. #2-F	140.7	141.2	140.9	144.2	133.4	133.4	135.3	134	133.6	133.6
Instream Temp.-F	129.4	130.4	130	130.2	130.2	130.2	130.1	130.1	130.1	129.6
Avg. Wall Temp.-F	140.7	141.4	141.4	142.6	133.4	133.9	135.2	133.9	133.9	133.8
Avg. Wall DT.-F	10.3	10.1	10.4	11.5	3.1	3.6	5	3.7	3.7	4.1
Remaining Subcool-F	-13.4									
Exit Quality	0.12	0.31	0.51	0.7	0.72	0.74	0.75	0.77	0.79	0.8
EXP. H-Btu/Hr/ft2/F	1933.5	1981.4	1915	1736.3	550.9	478.6	345.2	468.3	463.3	422.6
COMPUTED H										
Jallouk	1454.4	1385.2	1333.1	72.4	72.4	72.4	72.4	72.4	72.4	72.4
Szady1(Cudo tube)	1824.1	1835.4	1831.8	72.4	72.4	72.4	72.4	72.4	72.4	72.4
Szady2	1723.9	1705.7	1702.1	72.4	72.4	72.4	72.4	72.4	72.4	72.4
(RLIQ)	22594	19024	14257	14257	14257	14257	14257	14257	14257	14257
(F)	2.023	3.149	4.122	4.122	4.122	4.122	4.122	4.122	4.122	4.122
(HLIQ)	145.7	227.1	297.1	297.1	297.1	297.1	297.1	297.1	297.1	297.1
(HBOIL)	1823.8	1834.3	1829.2	1829.2	1829.2	1829.2	1829.2	1829.2	1829.2	1829.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	73.6									
DP Liquid Density-lbm/ft3	93.91									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.228	2.126	2.802	4.021	4.941					
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051					
Corrected DP-Psid	0.246	2.145	2.833	4.035	4.992					
Actual DP-ft	1.78	0.78	1.82	1.99	2.44					
Measured TP-Psig	77.4				-0.6					
Measured Overall-ft	131.37									
Computed DP-ft	0.95	1.52	2.71	3.89	4.99					
Friction-ft	0.04	0.13	0.18	0.24	0.3					
Acceleration-ft	0.04	0.12	0.13	0.14	0.15					
Elevation-ft	0.87	1.27	2.39	3.5	4.53					

15756

Run#	522									
Test Fluid	C4F10									
Date	4/24/93									
Time	8:1									
Note	TABOREK Anarytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	76.7									
Sat. Temperature-F(inlet)	130.5									
Liq. Density-lbm/ft3	85.31	85.2	85.3	85.21	85.23	85.21	85.28	85.3	85.3	85.41
Latent Heat-Btu/lbm	32	31.92	31.99	31.93	31.95	31.93	31.98	31.99	31.99	32.07
Specific Heat-Btu/lbm/F	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277
Liq. Viscosity-lbm/ft-hr	0.505	0.502	0.504	0.502	0.503	0.502	0.504	0.504	0.504	0.507
Liq. Conductivity-Btu/hr-ft-F	0.0272	0.0271	0.0272	0.0272	0.0272	0.0272	0.0272	0.0272	0.0272	0.0273
Liq. Prandtl No.	5.14	5.13	5.14	5.13	5.13	5.13	5.14	5.14	5.14	5.15
Inlet Flow Rate-GPM	1.8									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	127.9									
Outlet Liq. Temperature-F	129.9									
Outlet Vap. Temperature-F	129.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	66.5									
Water outlet Temp.-F	125.6									
Inlet G-lbm/hr/ft2	368774	Temp	125.2	Density	85.85					
Subcooling-F	2.6									
Flow Observation										

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1144.8	1141.6	1142.5	1140.7	1115.7	585	0	0	0	0
Heat Loss-Watts	20.4	4.8	3.6	3.2	9	7.9	4.5	5.5	6.1	33.6
Heat Flux-Btu/Hr/ft2	19844	19789	19804	19773	19340	10141	0	0	0	0
Wall Temp. #3-F	141.6	144	141.5	143	149.1	139.3	130.8	130.2	130	128.7
Wall Temp. #4-F	141.7	141.1	143.6	144.3	145.1	139.2	130.6	130.2	130.3	129.1
Wall Temp. #5-F	140.4	138.6	144.6	142	143	138.9	130.6	130.3	130.5	129.5
Wall Temp. #1-F	70.4	140.8	140.3	142.5	142	141.4	131.5	130	130	129.6
Wall Temp. #2-F	141.5	141.8	141.4	144.7	142.7	142.2	131.3	130.3	130	129.7
Instream Temp.-F	130.7	131.4	130.8	131.3	131.2	131.3	130.9	130.8	130.8	130.1
Avg. Wall Temp.-F	141.3	141.9	141.7	143	143.2	139.7	131	130.2	130.2	129.3
Avg. Wall DT.-F	9.7	9.6	10	10.8	11.1	7.9	0.1	0	0	0
Remaining Subcool-F	-8.8									
Exit Quality	0.08	0.17	0.27	0.37	0.47	0.52	0.52	0.52	0.52	0.52
EXP. H-Btu/Hr/ft2/F	2045.1	2054.8	1979.5	1838.3	1738.3	1276.9	0	0	0	0
COMPUTED H										
Jallouk	1361.4	1281.2	1235.2	1208.9	124.8	124.8	124.8	124.7	124.7	124.7
Szady1(Cudo tube)	1831.2	1837.4	1833.1	1838.9	124.8	124.8	124.8	124.7	124.7	124.7
Szady2	1699.1	1704.2	1700.1	1705.2	124.8	124.8	124.8	124.7	124.7	124.7
(RLIQ)	45968	42042	37137	32560	32560	32560	32560	32560	32560	32560
(F)	1.795	2.575	3.202	3.698	3.698	3.698	3.698	3.698	3.698	3.698
(HLIQ)	222.9	320.1	397.8	459.8	459.8	459.8	459.8	459.8	459.8	459.8
(HBOIL)	1830.1	1834.2	1826.9	1829.3	1829.3	1829.3	1829.3	1829.3	1829.3	1829.3

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	73.6				
DP Liquid Density-lbm/ft3	93.91				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.166	1.789	2.384	3.504	4.324
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051
Corrected DP-Psid	0.184	1.808	2.415	3.518	4.375
Actual DP-ft	1.89	1.35	2.53	2.86	3.40
Measured TP-Psig	76.7				-0.8
Measured Overall-ft	130.66				
Computed DP-ft	1.21	2.14	3.03	4.38	5.64
Friction-ft	0.09	0.29	0.56	0.73	0.88
Acceleration-ft	0.09	0.2	0.31	0.31	0.31
Elevation-ft	1.03	1.66	2.17	3.35	4.45

19695.
21692
- 892
- 20800

Run#	323									
Test Fluid	C4F10									
Date:	4/24/93									
Time:	6: 1									
Note	TABOREK Anarytical at									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	75.8									
Sat. Temperature-F(inlet)	129.8									
Liq. Density-lbm/ft3	85.48	85.23	85.3	85.15	85.2	85.23	85.31	85.4	85.45	85.43
Latent Heat-Btu/lbm	32.12	31.95	31.99	31.89	31.92	31.95	32	32.06	32.09	32.08
Specific Heat-Btu/lbm/F	0.277	0.277	0.277	0.278	0.277	0.277	0.277	0.277	0.277	0.277
Liq. Viscosity-lbm/ft-hr	0.509	0.503	0.504	0.501	0.502	0.503	0.505	0.507	0.508	0.508
Liq. Conductivity-Btu/hr-ft-F	0.0273	0.0272	0.0272	0.0271	0.0271	0.0272	0.0272	0.0273	0.0273	0.0273
Liq. Prandtl No.	5.15	5.13	5.14	5.13	5.13	5.13	5.14	5.15	5.15	5.15
Inlet Flow Rate-GPM	2.5									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	1.5									
Inlet Temperature-F	126.2									
Outlet Liq. Temperature-F	129.2									
Outlet Vap. Temperature-F	126.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	66.6									
Water outlet Temp.-F	124.7									
Inlet G-lbm/hr/ft2	512803	Temp	124.6	Density	85.95					
Subcooling-F	3.6									
Flow Observation										

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1143.1	1144.7	1154.6	1145.1	1139.5	891.4	0	0	0	0
Heat Loss-Watts	20.3	4.8	6.5	8	3.8	8	4.2	5.2	5.8	33.1
Heat Flux-Btu/Hr/ft2	19815	19843	20014	19850	19752	15452	0	0	0	0
Wall Temp. #3-F	142.3	144.2	141.7	143.3	149.3	141.7	130.7	129.9	129.1	129.6
Wall Temp. #4-F	142.4	141.1	143.7	144.7	144.5	141.7	130.6	129.5	129.4	130
Wall Temp. #5-F	141.2	138.6	144.5	142.3	142.9	140.8	130.6	129.7	129.8	129.5
Wall Temp. #1-F	71.2	141.4	140.5	142.9	142.3	143	131.7	129.9	129.4	130.1
Wall Temp. #2-F	142.3	142.2	141.4	145.1	142.8	145.8	131.7	130.1	129.3	130.2
Instream Temp.-F	129.7	131.2	130.8	131.7	131.4	131.2	130.7	130.2	129.9	130
Avg. Wall Temp.-F	142.1	142.2	141.8	143.3	143.1	141.8	131.1	129.8	129.4	129.9
Avg. Wall DT.-F	11.5	10.1	10.1	10.7	10.8	9.9	0.4	0	0	0
Remaining Subcool-F	-4.5									
Exit Quality	0.04	0.11	0.18	0.25	0.32	0.38	0.38	0.38	0.38	0.38
EXP. H-Btu/Hr/ft2/F	1729.9	1959.1	1977.6	1854.6	1823.5	1560.5	0	0	0	0
COMPUTED H										
Jallouk	1319.5	1252.5	1208.7	1184.7	162.5	162.5	162.4	162.3	162.2	162.3
Szady1(Cudo tube)	1819.2	1838.3	1844	1848.6	162.5	162.5	162.4	162.3	162.2	162.3
Szady2	1687	1705.8	1713.8	1715.7	162.5	162.5	162.4	162.3	162.2	162.3
(RLIQ)	64627	51740	56817	52453	52453	52453	52453	52453	52453	52453
(F)	1.543	2.171	2.725	3.15	3.15	3.15	3.15	3.15	3.15	3.15
(HLIQ)	249.2	351.3	440.8	510.1	510.1	510.1	510.1	510.1	510.1	510.1
(HBOIL)	1817.7	1834	1835.6	1835.6	1835.6	1835.6	1835.6	1835.6	1835.6	1835.6

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	130.3				
DP Liquid Density-lbm/ft3	84.96				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.167	1.317	1.905	2.955	3.694
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051
Corrected DP-Psid	0.185	1.336	1.936	2.969	3.745
Actual DP-ft	1.68	1.73	2.7	2.95	3.51
Measured TP-Psig	75.8				-0.6
Measured Overall-ft	128.78				
Computed DP-ft	1.45	2.61	3.76	5.24	6.62
Friction-ft	0.12	0.38	0.77	1.02	1.26
Acceleration-ft	0.13	0.25	0.4	0.4	0.4
Elevation-ft	1.2	1.97	2.6	3.82	4.96

19693.

Run#	524									
Test Fluid	C4F10									
Date:	4/24/93									
Time:	6: 1									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	66.8									
Sat. Temperature-F(inlet)	122.7									
Liq. Density-lbm/ft3	86.59	86.6	86.67	86.6	86.64	86.7	86.78	86.8	86.83	86.91
Latent Heat-Btu/lbm	32.86	32.87	32.91	32.87	32.89	32.93	32.99	33	33.02	33.07
Specific Heat-Btu/lbm/F	0.274	0.274	0.274	0.274	0.274	0.274	0.274	0.274	0.274	0.274
Liq. Viscosity-lbm/ft-hr	0.537	0.537	0.539	0.537	0.538	0.54	0.542	0.542	0.543	0.545
Liq. Conductivity-Btu/hr-ft-F	0.028	0.028	0.0281	0.028	0.0281	0.0281	0.0282	0.0282	0.0282	0.0282
Liq. Prandtl No.	5.25	5.25	5.26	5.25	5.26	5.26	5.27	5.27	5.27	5.28
Inlet Flow Rate-GPM	3.3									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2.1									
Inlet Temperature-F	119.4									
Outlet Liq. Temperature-F	120.3									
Outlet Vap. Temperature-F	117.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	60.6									
Water outlet Temp.-F	111.5									
Inlet G-lbm/hr/ft2	685726		Temp	118	Density	87.07				
Subcooling-F	3.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1140.2	1148.1	1146.1	1149.4	1168.5	1163.5	604.1	0	0	0
Heat Loss-Watts	18.7	4.4	6	7.2	7.9	10.3	8.6	4.3	5	28.2
Heat Flux-Btu/Hr/ft2	19765	19902	19867	19924	20255	20169	10472	0	0	0
Wall Temp. #3-F	134.4	136.5	133.7	135.1	141	161.4	148.4	121.3	120.9	120.3
Wall Temp. #4-F	134.4	133.5	135.8	136.4	136.4	160.5	148.1	121.4	121.2	120.6
Wall Temp. #5-F	133.2	130.9	136.7	134	134.9	142.9	149.1	121.5	121.4	120.4
Wall Temp. #1-F	68.8	133.4	132.7	134.4	134	138.6	156.9	122.2	121.1	120.6
Wall Temp. #2-F	134.1	134.3	133.6	136.8	134.8	140.4	156.9	122.7	120.9	121
Instream Temp.-F	122.9	122.8	122.4	122.8	122.6	122.2	121.7	121.6	121.4	120.9
Avg. Wall Temp.-F	134	134.4	134	135	135	150.4	151.9	121.8	121.1	120.6
Avg. Wall DT.-F	10.2	10.7	10.7	11.3	11.5	27.2	29.7	0.2	0	0
Remaining Subcool-F	-2.8									
Exit Quality	0.02	0.08	0.13	0.18	0.23	0.28	0.31	0.31	0.31	0.31
EXP. H-Btu/Hr/ft2/F	1931.7	1855.5	1865.1	1767.2	1759.8	740.4	352.5	0	0	0
COMPUTED H										
Jallouk	1216.7	1158.2	1110.7	1077.4	1052	203.1	203	202.9	202.9	202.8
Szady1(Cudo tube)	1745	1752.3	1750.1	1760.7	1777.5	203.1	203	202.9	202.9	202.8
Szady2	1622.4	1629.3	1627.4	1646.1	1661.2	203.1	203	202.9	202.9	202.8
(RLIQ)	82574	79370	74819	70738	68277	68277	68277	68277	68277	68277
(F)	1.42	1.977	2.485	2.879	3.226	3.226	3.226	3.226	3.226	3.226
(HLIQ)	286.5	398.9	501.1	580.7	650.7	650.7	650.7	650.7	650.7	650.7
(HBOIL)	1742.4	1745.4	1736.3	1739.4	1747.9	1747.9	1747.9	1747.9	1747.9	1747.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	73.2									
DP Liquid Density-lbm/ft3	93.97									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.138	0.938	1.51	2.52	3.194					
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051					
Corrected DP-Psid	0.156	0.957	1.541	2.534	3.245					
Actual DP-ft	1.9	2.74	3.93	4.45	5.3					
Measured TP-Psig	66.8				-0.8					
Measured Overall-ft	112.01									
Computed DP-ft	1.66	3.07	4.54	6.14	7.69					
Friction-ft	0.17	0.55	1.11	1.61	2					
Acceleration-ft	0.19	0.36	0.56	0.62	0.62					
Elevation-ft	1.31	2.17	2.87	3.91	5.07					

2634.

Run#	325									
Test Fluid	C3F10									
Date	4/24/93									
Time	1									
Note	TABORE	Analytical ca								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	19695									
Sat. Pressure-Psig	69.7									
Sat. Temperature-F(inlet)	125.1									
Liq. Density-lbm/ft3	86.22	86.23	86.27	86.22	86.25	86.27	86.4	86.38	86.44	86.51
Latent Heat-Btu/lbm	32.61	32.62	32.65	32.61	32.63	32.65	32.73	32.72	32.76	32.81
Specific Heat-Btu/lbm/F	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.274
Liq. Viscosity-lbm/ft-hr	0.527	0.528	0.529	0.527	0.528	0.529	0.532	0.531	0.533	0.535
Liq. Conductivity-Btu/hr-ft-F	0.0278	0.0278	0.0278	0.0278	0.0278	0.0278	0.0279	0.0279	0.0279	0.028
Liq. Prandtl No.	5.22	5.22	5.22	5.22	5.22	5.22	5.23	5.23	5.24	5.24
Inlet Flow Rate-GPM	4.1									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2									
Inlet Temperature-F	121.7									
Outlet Liq. Temperature-F	123.1									
Outlet Vap. Temperature-F	119.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	82.7									
Water outlet Temp.-F	113.5									
Inlet G-lbm/hr/ft2	847847	Temp	120.5	Density	86.65					
Subcooling-F	3.4									

Flow Observation

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1150.7	1154.4	1146.9	1151.8	1149.5	1144.6	117	0	0	0
Heat Loss-Watts	19.3	4.5	6.1	7.4	8	10.2	3.8	4.4	5.1	28.9
Heat Flux-Btu/Hr/ft2	19947	20011	19881	19966	19926	19841	2028	0	0	0
Wall Temp. #3-F	137.7	139	136.1	137.4	143.1	159.5	127.4	123.5	123.2	122.6
Wall Temp. #4-F	137.7	136	138.2	138.7	138.5	158.5	127.4	123.9	123.6	122.9
Wall Temp. #5-F	136.6	133.6	138.9	136.4	136.5	150.1	126.6	123.8	123.8	122.7
Wall Temp. #1-F	70	135.9	135.2	137	135.9	142	127.7	123.6	123.4	123.3
Wall Temp. #2-F	137.5	136.8	136	139.2	137	144.3	127.7	123.8	123.3	123.3
Instream Temp.-F	125.2	125.1	124.9	125.2	125	124.9	124.1	124.2	123.8	123.4
Avg. Wall Temp.-F	137.4	136.9	136.4	137.4	137	152.5	127.4	123.7	123.5	123
Avg. Wall DT.-F	11.3	10.9	10.6	11.3	11.1	26.7	3.2	0	0	0
Remaining Subcool-F	-1.6									
Exit Quality	0.01	0.06	0.1	0.14	0.18	0.22	0.23	0.23	0.23	0.23
EXP. H-Btu/Hr/ft2/F	1769.3	1832.4	1879.7	1771.2	1799.3	742.3	640.1	0	0	0
COMPUTED H										
Jallouk	1221.4	1155.8	1099.2	1058.4	1027.9	997.8	569.5	557.3	558.2	559.2
Szady1(Cudo tube)	1777.8	1782.2	1778.5	1790.2	1791.7	1792.8	828	801.2	802.4	803.6
Szady2	1638.5	1642.6	1633.8	1671	1670.7	1669.7	798.7	801.2	802.4	803.6
(RLIQ)	104489	101442	96848	92638	89056	83566	80629	80468	80216	79985
(F)	1.3	1.785	2.248	2.602	2.91	3.182	3.334	3.344	3.351	3.358
(HLIQ)	312	428.3	539.2	624.4	697.8	763	798.5	801.2	802.4	803.6
(HBOIL)	1774.5	1773.9	1761.9	1764.5	1755.7	1745.5	388.5	22	21.9	21.8

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	73.9				
DP Liquid Density-lbm/ft3	93.87				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.085	0.685	1.196	2.101	2.686
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051
Corrected DP-Psid	0.103	0.704	1.227	2.115	2.737
Actual DP-ft	2	3.17	4.47	5.16	6.18
Measured TP-Psig	69.7				-0.6
Measured Overall-ft	117.02				
Computed DP-ft	1.89	3.52	5.21	6.99	8.65
Friction-ft	0.2	0.65	1.32	1.81	2.26
Acceleration-ft	0.24	0.44	0.66	0.67	0.67
Elevation-ft	1.45	2.42	3.23	4.51	5.72

>1614.

Run#	526										
Test Fluid	134F10										
Date:	4/24/93										
Time:	10:29										
Note	TABOREK	Analytical dt									
Flow Area-ft2	0.00336										
Heat Flow Area-ft2	0.19695										
Sat. Pressure-Psig	71.5										
Sat. Temperature-F(inlet)	126.5										
Liq. Density-lbm/ft3	86.01	85.96	85.99	85.89	85.99	86.01	86.06	86.06	86.14	86.22	
Latent Heat-Btu/lbm	32.47	32.44	32.46	32.39	32.46	32.47	32.5	32.5	32.56	32.61	
Specific Heat-Btu/lbm/F	0.276	0.276	0.276	0.276	0.276	0.276	0.275	0.275	0.275	0.275	
Liq. Viscosity-lbm/ft-hr	0.522	0.521	0.521	0.519	0.521	0.522	0.523	0.523	0.525	0.527	
Liq. Conductivity-Btu/hr-ft-F	0.0277	0.0276	0.0277	0.0276	0.0277	0.0277	0.0277	0.0277	0.0277	0.0278	
Liq. Prandtl No.	5.2	5.2	5.2	5.19	5.2	5.2	5.2	5.2	5.21	5.22	
Inlet Flow Rate-GPM	4.8										
Outlet Liq. Flow Rate-GPM	1.1										
Outlet Vap. Flow Rate-GPM	2.3										
Inlet Temperature-F	123.4										
Outlet Liq. Temperature-F	124.6										
Outlet Vap. Temperature-F	120.3										
Water Flow Rate-GPM											
Water Inlet Temp.-F	64.3										
Water outlet Temp.-F	114.8										
Inlet G-lbm/hr/ft2	988708		Temp	122.5	Density	86.31					
Subcooling-F	3.1										
Flow Observation											
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10	
Heat Input-Watts(net)	1161.6	1155.7	1151	1143.5	1150.7	947.2	22.6	1.3	0	3.1	
Heat Loss-Watts	19.5	4.5	6.2	7.5	8.2	7.4	3.6	4.6	5.2	29.9	
Heat Flux-Btu/Hr/ft2	20136	20033	19952	19822	19947	16419	392	23	0	54	19695.
Wall Temp. #3-F	139.2	140.5	137.7	139	147	138.7	126.8	125.6	124.9	125	
Wall Temp. #4-F	139.5	137.5	139.8	140.5	141.2	138.3	126.7	125.6	125.6	125.4	
Wall Temp. #5-F	138.5	135.1	140.6	138.2	138.4	137.8	126.6	125.8	125.6	125.3	
Wall Temp. #1-F	71	137.6	136.7	138.5	138	139.3	127.2	125.6	125.4	125.3	
Wall Temp. #2-F	139	138.5	137.6	141	139	141.7	127.5	126	124.9	125.5	
Instream Temp.-F	126.6	126.8	126.6	127.2	126.6	126.5	126.2	126.2	125.7	125.2	
Avg. Wall Temp.-F	139.1	138.5	138	139.1	139.2	138.5	127	125.7	125.3	125.3	
Avg. Wall DT.-F	11.6	10.8	10.4	11	11.6	11.3	0.7	0	0	0.1	
Remaining Subcool-F	-1.2										
Exit Quality	0.01	0.05	0.08	0.12	0.16	0.19	0.19	0.19	0.19	0.19	
EXP. H-Btu/Hr/ft2/F	1729.9	1851.6	1909.6	1809.5	1712.4	1455.2	527.8	2253.5	0	550.7	
COMPUTED H											
Jallouk	1218.2	1153.1	1086.8	1043.3	1009.9	900.2	586	585.8	587.1	588.3	
Szady1(Cudo tube)	1800.6	1802.3	1801.5	1807.5	1813	1657.7	830	830.3	831.8	833.3	
Szady2	1688.3	1690.3	1687.5	1693.6	1696.2	1483.5	829.7	830.3	831.8	833.3	
(RLIQ)	123286	120671	115953	111976	106941	102738	100599	100552	100155	99757	
(F)	1.252	1.691	2.118	2.439	2.723	2.951	3.054	3.056	3.064	3.071	
(HLIQ)	340.2	459.8	575.8	663.5	740.2	802.1	829.7	830.3	831.8	833.3	
(HBOIL)	1796.6	1792.3	1781.7	1777.2	1770.9	1592.6	91.5	26.5	22.4	31.5	

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	74				
DP Liquid Density-lbm/ft3	93.85				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.022	0.446	0.874	1.738	2.227
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051
Corrected DP-Psid	0.04	0.463	0.905	1.752	2.278
Actual DP-ft	2.11	3.58	5.02	5.78	6.94
Measured TP-Psig	71.5				-0.7
Measured Overall-ft	120.59				
Computed DP-ft	2.04	3.86	5.76	7.63	9.39
Friction-ft	0.24	0.76	1.47	2.03	2.55
Acceleration-ft	0.29	0.52	0.74	0.75	0.75
Elevation-ft	1.51	2.58	3.54	4.86	6.09

Run#	527									
Test Fluid	C4F10									
Date:	4/24/93									
Time:	10:29									
Note	TABOREK Analytical ot									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	72									
Sat. Temperature-F(inlet)	126.9									
Liq. Density-lbm/ft3	85.84	85.86	85.89	85.83	85.84	85.86	86.01	86.02	86.07	86.22
Latent Heat-Btu/lbm	32.36	32.37	32.39	32.35	32.36	32.37	32.47	32.48	32.51	32.61
Specific Heat-Btu/lbm/F	0.276	0.276	0.276	0.276	0.276	0.276	0.276	0.276	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.518	0.518	0.519	0.517	0.518	0.518	0.522	0.522	0.524	0.527
Liq. Conductivity-Btu/hr-ft-F	0.0276	0.0276	0.0276	0.0275	0.0276	0.0276	0.0277	0.0277	0.0277	0.0278
Liq. Prandtl No.	5.19	5.19	5.19	5.18	5.19	5.19	5.2	5.2	5.21	5.22
Inlet Flow Rate-GPM	4.8									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	124									
Outlet Liq. Temperature-F	124.8									
Outlet Vap. Temperature-F	120.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	65.9									
Water outlet Temp.-F	118									
Inlet G-lbm/hr/ft2	987925		Temp	122.9	Density	86.24				
Subcooling-F	2.9									
Flow Observation										

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1450.1	1444.2	1448.6	910.3	5.2	3.9	0.5	0	0.4	0
Heat Loss-Watts	19.6	4.6	6.2	8.8	6	4.9	3.3	4.4	5.1	29.1
Heat Flux-Btu/Hr/ft2	25137	25034	25111	15779	90	68	9	0	7	0
Wall Temp. #3-F	141.1	143.3	139.6	151.4	127.2	127.4	126.4	125.9	125.3	125
Wall Temp. #4-F	141.1	139.1	141.9	152	127.6	127.4	126.4	125.9	125.9	125.4
Wall Temp. #5-F	139.9	136.4	143.3	149.4	127.9	127.6	126.4	126	126.1	125.3
Wall Temp. #1-F	71.7	139.5	138.3	149.4	129	127.8	126.5	125.9	125.8	125.2
Wall Temp. #2-F	140.9	140.3	139.5	150.9	128.7	127.1	126.7	126.2	125.6	125.6
Instream Temp.-F	127.5	127.4	127.2	127.6	127.5	127.4	126.6	126.4	126.1	125.2
Avg. Wall Temp.-F	140.8	140.6	139.8	150.6	128.3	127.6	126.5	126	125.7	125.3
Avg. Wall DT.-F	12.1	12	11.5	22.2	0.8	0.1	0	0	0	0.1
Remaining Subcool-F	-2.5									
Exit Quality	0.02	0.07	0.11	0.14	0.14	0.14	0.14	0.14	0.14	0.14
EXP. H-Btu/Hr/ft2/F	2075	2083	2185.4	709.6	113.2	460.1	366.7	0	593.4	0
COMPUTED H										
Jallouk	1374.5	1270.6	1200.2	916	536.1	536.4	538.3	538.5	539.2	541
Szady1(Cudo tube)	2036.6	2035.8	2042.8	1626.6	746.2	746.7	748.9	749.2	749.9	752
Szady2	1943.9	1941.9	1948.6	1445.8	746.2	746.7	748.9	749.2	749.9	752
(RLIQ)	123475	119193	113284	108964	107065	106963	106199	106115	105864	105117
(F)	1.385	1.888	2.345	2.637	2.743	2.745	2.757	2.758	2.762	2.774
(HLIQ)	376.7	513.6	637.5	717.5	746.2	746.7	748.9	749.2	749.9	752
(HBOIL)	2032.3	2024.8	2021.9	1578.7	40.6	36.1	24.3	22.6	23.9	22.3

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	74.6				
DP Liquid Density-lbm/ft3	93.77				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	-0.021	0.604	1.181	1.873	2.33
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051
Corrected DP-Psid	-0.003	0.623	1.212	1.887	2.381
Actual DP-ft	2.18	3.31	4.5	5.55	6.76
Measured TP-Psig	72				-0.4
Measured Overall-ft	120.92				
Computed DP-ft	2.01	3.86	5.68	7.51	9.23
Friction-ft	0.3	0.88	1.35	1.81	2.25
Acceleration-ft	0.35	0.59	0.59	0.59	0.59
Elevation-ft	1.36	2.38	3.75	5.11	6.38

1.4771
1.7878
-2.6

Run	628									
Test Fluid	34F10									
Date	4/24/93									
Time	10 29									
Note	TABORE	Analytical dt								
Flow Area-ft2	0.00000									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	71 8									
Sat. Temperature-F(inlet)	126.8									
Liq. Density-lbm/ft3	85.92	85.92	85.94	85.89	85.91	85.91	86.04	86.06	86.06	86.22
Latent Heat-Btu/lbm	32.42	32.42	32.43	32.39	32.4	32.4	32.49	32.5	32.5	32.61
Specific Heat-Btu/lbm/F	0.276	0.276	0.276	0.276	0.276	0.276	0.276	0.275	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.52	0.52	0.52	0.519	0.519	0.519	0.523	0.523	0.523	0.527
Liq. Conductivity-Btu/hr-ft-F	0.0276	0.0276	0.0276	0.0276	0.0276	0.0276	0.0277	0.0277	0.0277	0.0278
Liq. Prandtl No.	5.19	5.19	5.19	5.19	5.19	5.19	5.2	5.2	5.2	5.22
Inlet Flow Rate-GPM	4 1									
Outlet Liq. Flow Rate-GPM	0 9									
Outlet Vap. Flow Rate-GPM	2 1									
Inlet Temperature-F	123.6									
Outlet Liq. Temperature-F	124.9									
Outlet Vap. Temperature-F	121 1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	86 2									
Water outlet Temp.-F	117.6									
Inlet G-lbm/hr/ft2	843183	Temp	123.3	Density	86.18					
Subcooling-F	3.2									
Flow Observation										

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1444.7	1445.7	1445.9	1011	5.5	4.5	0.6	2.8	0.7	1
Heat Loss-Watts	18.8	4 4	6	8.7	5.6	4.5	2.9	3 1	4 9	27.4
Heat Flux-Btu/Hr/ft2	25043	25060	25064	17525	95	78	10	49	12	17
Wall Temp. #3-F	140.5	143	139.7	152.2	126.9	127.2	126.3	126	125.6	124.8
Wall Temp. #4-F	140.5	138.8	142	152.9	127.6	127.2	126.2	126.2	126	125.4
Wall Temp. #5-F	139.5	136.1	142.6	150	127.8	127.4	126.2	126.2	126.2	125.6
Wall Temp. #1-F	73.7	139.1	138.2	151	128.3	127.4	126.4	125.9	125.7	125.3
Wall Temp. #2-F	140.4	140	139.4	152.8	128.3	126.9	126.4	126.2	125.6	125.4
Instream Temp.-F	127	127	126.9	127.2	127.1	127.1	126.3	126.2	126.2	125.2
Avg. Wall Temp.-F	140.2	140.2	139.8	151.5	128	127.3	126.3	126.1	125.8	125.3
Avg. Wall DT.-F	12.1	12.1	11.8	23.5	0.9	0.2	0	0	0	0.1
Remaining Subcool-F	-3.2									
Exit Quality	0.03	0.08	0.13	0.17	0.17	0.17	0.17	0.17	0.17	0.17
EXP. H-Btu/Hr/ft2/F	2070.8	2072.4	2125.4	744.7	106.4	397	1040.1	4853.6	1213.4	174.7
COMPUTED H										
Jallouk	1394.5	1310.7	1237.2	985.3	501.1	501.2	502.9	503.2	503.2	505.3
Szady1(Cudo tube)	2026	2030.3	2034.7	1702.9	706.4	706.6	708.7	709	709.1	711.5
Szady2	1930.6	1935.2	1939.2	1540.6	706.3	706.6	708.7	709	709.1	711.5
(RLIQ)	104676	100404	94629	90002	87926	87906	87345	87269	87263	86577
(F)	1.443	1.997	2.491	2.822	2.949	2.95	2.962	2.964	2.964	2.979
(HLIQ)	345.5	478.3	596.4	676.1	706.3	706.6	708.7	709	709.1	711.5
(HBOIL)	2022.7	2021.5	2017.5	1666.6	42.4	38.8	24.7	32.4	25	25.7

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	75.8				
DP Liquid Density-lbm/ft3	93.6				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.069	0.829	1.462	2.244	2.768
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051
Corrected DP-Psid	0.087	0.848	1.493	2.258	2.819
Actual DP-ft	2.03	2.93	4.02	4.91	6.01
Measured TP-Psig	71.8				-0.3
Measured Overall-ft	120.42				
Computed DP-ft	1.84	3.48	5.21	6.93	8.55
Friction-ft	0.25	0.77	1.16	1.55	1.92
Acceleration-ft	0.29	0.5	0.5	0.5	0.51
Elevation-ft	1.3	2.21	3.55	4.88	6.12

14771

Run#	329									
Test Fluid	C4F10									
Date	4/24/93									
Time:	10:29									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	72.2									
Sat. Temperature-F(inlet)	127.1									
Liq. Density-lbm/ft3	85.78	85.63	85.66	85.56	85.58	85.6	85.73	85.74	85.78	85.84
Latent Heat-Btu/lbm	32.32	32.22	32.24	32.17	32.18	32.19	32.28	32.29	32.32	32.36
Specific Heat-Btu/lbm/F	0.276	0.276	0.276	0.277	0.277	0.277	0.276	0.276	0.276	0.276
Liq. Viscosity-lbm/ft-hr	0.516	0.513	0.513	0.511	0.511	0.512	0.515	0.515	0.516	0.518
Liq. Conductivity-Btu/hr-ft-F	0.0275	0.0274	0.0274	0.0274	0.0274	0.0274	0.0275	0.0275	0.0275	0.0276
Liq. Prandtl No.	5.18	5.17	5.17	5.16	5.16	5.16	5.18	5.18	5.18	5.19
Inlet Flow Rate-GPM	3.3									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	1.8									
Inlet Temperature-F	123.4									
Outlet Liq. Temperature-F	127.1									
Outlet Vap. Temperature-F	123.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	71.6									
Water outlet Temp.-F	121.1									
Inlet G-lbm/hr/ft2	679333	Temp		122.8	Density	86.26				
Subcooling-F	3.7									
Flow Observation										

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1444.8	1444.2	1445.9	1151.4	5.3	4.3	0	0.2	0.6	0.1
Heat Loss-Watts	19.3	4.5	6.2	8	5.9	4.8	3.2	4.4	5.1	29.2
Heat Flux-Btu/Hr/ft2	25045	25034	25064	19959	92	75	0	3	10	2
Wall Temp. #3-F	141.7	144.5	140.8	147.4	128.5	128.9	127.7	127.4	127.1	127
Wall Temp. #4-F	141.8	140.3	143	148.2	129.2	128.9	127.6	127.5	127.5	127.5
Wall Temp. #5-F	140.7	137.6	143.5	144.6	129.3	129.1	127.5	127.6	127.7	127.5
Wall Temp. #1-F	74.2	140.5	139.7	144.5	130.2	129.2	127.7	127.3	127.2	127.3
Wall Temp. #2-F	141.6	141.4	140.9	146.3	129.9	128.5	127.7	127.7	127.1	127.6
Instream Temp.-F	127.9	128.8	128.6	129.2	129.1	129	128.2	128.1	127.9	127.5
Avg. Wall Temp.-F	141.5	141.7	141.1	146.2	129.7	129	127.6	127.5	127.3	127.4
Avg. Wall DT.-F	12.4	11.7	11.4	16.1	0.5	0	0	0	0	0
Remaining Subcool-F	-4.2									
Exit Quality	0.04	0.1	0.17	0.22	0.22	0.22	0.22	0.22	0.22	0.22
EXP. H-Btu/Hr/ft2/F	2016.8	2131.7	2204.9	1241.8	168.3	3445.8	0	346.7	1040.1	173.3
COMPUTED H										
Jallouk	1438	1359	1293.6	203	203	203	202.8	202.8	202.8	202.7
Szady1(Cudo tube)	2036.8	2050.6	2053.4	203	203	203	202.8	202.8	202.8	202.7
Szady2	1944.9	1962.1	1964.1	203	203	203	202.8	202.8	202.8	202.7
(RLIQ)	84562	80730	74806	74806	74806	74806	74806	74806	74806	74806
(F)	1.519	2.139	2.685	2.685	2.685	2.685	2.685	2.685	2.685	2.685
(HLIQ)	306.4	431.9	542.2	542.2	542.2	542.2	542.2	542.2	542.2	542.2
(HBOIL)	2034.5	2044.2	2040.7	2040.7	2040.7	2040.7	2040.7	2040.7	2040.7	2040.7

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	75.5				
DP Liquid Density-lbm/ft3	93.64				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.146	1.069	1.745	2.618	3.221
Zero Corrections-psid	-0.018	-0.019	-0.031	-0.014	-0.051
Corrected DP-Psid	0.164	1.088	1.776	2.632	3.272
Actual DP-ft	1.91	2.54	3.57	4.31	5.28
Measured TP-Psig	72.2				-0.1
Measured Overall-ft	121.28				
Computed DP-ft	1.63	3.04	4.65	6.25	7.75
Friction-ft	0.19	0.61	0.91	1.22	1.51
Acceleration-ft	0.22	0.41	0.41	0.41	0.41
Elevation-ft	1.22	2.03	3.32	4.62	5.83

14771
18712
7331
16371

Run#	535									
Test Fluid	C4F10									
Date:	5/26/93									
Time:	12:52									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	114.5									
Sat. Temperature-F(inlet)	155.4									
Liq. Density-lbm/ft3	81.07	81.09	81.07	81.13	81.13	81.13	81.03	81.11	81.15	81.26
Latent Heat-Btu/lbm	28.98	29	28.98	29.03	29.03	29.03	28.96	29.01	29.04	29.12
Specific Heat-Btu/lbm/F	0.287	0.287	0.287	0.287	0.287	0.287	0.288	0.287	0.287	0.287
Liq. Viscosity-lbm/ft-hr	0.416	0.416	0.416	0.417	0.417	0.417	0.415	0.416	0.417	0.419
Liq. Conductivity-Btu/hr-ft-F	0.0245	0.0245	0.0245	0.0246	0.0246	0.0246	0.0245	0.0246	0.0246	0.0247
Liq. Prandtl No.	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.88
Inlet Flow Rate-GPM	5.1									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2.3									
Inlet Temperature-F	153.8									
Outlet Liq. Temperature-F	152.4									
Outlet Vap. Temperature-F	148.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	93.5									
Water outlet Temp.-F	137.9									
Inlet G-lbm/hr/ft2	989530		Temp	149.9	Density	81.3				
Subcooling-F	1.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	572.7	577.8	573.6	575.7	573.7	574.4	583.6	573.3	574.1	574.1
Heat Loss-Watts	11.1	2.6	3.5	3.5	3.5	2.6	1.7	2.6	3.3	18.1
Heat Flux-Btu/Hr/ft2	9927	10016	9943	9979	9945	9957	10116	9938	9952	9952
Wall Temp. #3-F	163	164.1	163.8	163.1	165.1	164	165.1	164.4	163.7	162.8
Wall Temp. #4-F	163.6	163	164.7	163.6	164.6	164.1	165.2	164.8	164.5	162.6
Wall Temp. #5-F	163.6	161.9	165.5	163.6	163.7	164.5	164.6	163.8	163.2	162.5
Wall Temp. #1-F	79.3	163.6	162.4	162.1	162.7	164.7	165.4	164.9	162.2	159.4
Wall Temp. #2-F	164.5	163.6	163.1	162.6	162.8	164.8	165.6	165.1	162.7	161.2
Instream Temp.-F	154.5	154.4	154.5	154.2	154.2	154.2	154.7	154.3	154.1	153.5
Avg. Wall Temp.-F	163.7	163.6	163.5	163.1	163.5	164.3	165.2	164.6	163.3	161.7
Avg. Wall DT.-F	8.7	8.7	8.6	8.4	8.8	9.7	10	9.9	8.7	7.8
Remaining Subcool-F	-0.5									
Exit Quality	0	0.03	0.05	0.07	0.09	0.11	0.13	0.15	0.17	0.19
EXP. H-Btu/Hr/ft2/F	1137.6	1148.3	1162.8	1181.1	1130	1029.1	1009.3	1008.8	1142.5	1284
COMPUTED H										
Jallouk	961	927.8	889.3	878.9	868.7	861.9	863.5	842.8	835.7	827.3
Szady1(Cudo tube)	1498	1506.3	1506	1509.9	1511.5	1516.6	1536.5	1525.2	1529	1528.7
Szady2	1295.4	1302.1	1296.7	1297.7	1266	1272.9	1295.4	1283.9	1288.8	1289.4
(RLIQ)	155384	153271	150227	146884	143524	140371	137775	134123	130741	126942
(F)	1.133	1.395	1.65	1.845	2.009	2.154	2.282	2.408	2.523	2.637
(HLIQ)	319.6	393.2	465.1	520	566.2	607	643.4	678.5	710.8	742.4
(HBOIL)	1493.2	1497.3	1491.1	1489	1484.6	1483.5	1498	1479	1476	1468
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.8									
DP Liquid Density-lbm/ft3	93.02									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.198	0.651	0.652	1.663	1.9					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.176	0.679	1.406	1.535	1.739					
Actual DP-ft	1.98	3.38	4.38	6.44	8.22					
Measured TP-Psig	114.5				3.5					
Measured Overall-ft	196.69									
Computed DP-ft	2.07	3.89	5.65	7.4	9.06					
Friction-ft	0.18	0.48	0.87	1.35	1.87					
Acceleration-ft	0.17	0.29	0.39	0.48	0.58					
Elevation-ft	1.72	3.12	4.39	5.57	6.61					

Run#	536									
Test Fluid	C4F10									
Date:	5/26/93									
Time:	12:52									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	118									
Sat. Temperature-F(inlet)	157.4									
Liq. Density-lbm/ft3	81.01	81.07	81.09	81.17	81.21	81.19	81.05	81.15	81.17	81.36
Latent Heat-Btu/lbm	28.94	28.98	29	29.05	29.08	29.07	28.97	29.04	29.05	29.19
Specific Heat-Btu/lbm/F	0.288	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287
Liq. Viscosity-lbm/ft-hr	0.415	0.416	0.416	0.417	0.418	0.418	0.415	0.417	0.417	0.421
Liq. Conductivity-Btu/hr-ft-F	0.0245	0.0245	0.0245	0.0246	0.0246	0.0246	0.0245	0.0246	0.0246	0.0247
Liq. Prandtl No.	4.87	4.87	4.87	4.87	4.88	4.88	4.87	4.87	4.87	4.88
Inlet Flow Rate-GPM	5									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	2.3									
Inlet Temperature-F	154									
Outlet Liq. Temperature-F	152.5									
Outlet Vap. Temperature-F	148.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	92.4									
Water outlet Temp.-F	135.4									
Inlet G-lbm/hr/ft2	969658		Temp		150.1	Density	81.26			
Subcooling-F	3.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	573.4	578.8	573.1	575	574.8	575	584.1	574.5	573.3	574.8
Heat Loss-Watts	11.2	2.6	3.6	3.5	3.5	2.6	1.7	2.6	3.4	18.2
Heat Flux-Btu/Hr/ft2	9940	10033	9934	9967	9964	9967	10125	9959	9938	9964
Wall Temp. #3-F	162.9	164	163.6	162.8	165.1	163.9	164.8	164.3	163.6	162.6
Wall Temp. #4-F	163.5	162.9	164.6	163.4	164.4	164.1	165	164.7	164.5	162.2
Wall Temp. #5-F	163.3	161.8	165.6	163.8	163.6	164.4	164.4	163.7	163.1	162.1
Wall Temp. #1-F	79.8	163.5	162.3	161.7	162.6	164.6	165.3	164.7	162.2	159
Wall Temp. #2-F	164.3	163.5	162.9	162.3	162.6	164.7	165.5	165	162.7	160.8
Instream Temp.-F	154.8	154.5	154.4	154	153.8	153.9	154.6	154.1	154	153
Avg. Wall Temp.-F	163.5	163.5	163.4	162.9	163.3	164.3	165	164.5	163.2	161.3
Avg. Wall DT.-F	8.3	8.5	8.5	8.5	9	9.9	9.9	9.9	8.8	7.9
Remaining Subcool-F	1.3									
Exit Quality	-0.01	0.01	0.03	0.05	0.07	0.09	0.11	0.13	0.15	0.17
EXP. H-Btu/Hr/ft2/F	1204.7	1177.4	1168.6	1176.1	1101	1006.8	1018.4	1002.9	1133	1262.9
COMPUTED H										
Jallouk	981.1	985	920.9	887.9	876.5	868.7	870.9	855.6	848.7	832.8
Szady1(Cudo tube)	1500.6	1504.6	1500.8	1503.4	1505.3	1510.5	1532	1520.2	1522.3	1520.1
Szady2	1299.3	1304.9	1294.9	1294.3	1292.7	1265.2	1289.4	1277.9	1281.1	1280.4
(RLIQ)	152993	152603	149662	148002	142607	139583	137227	133484	130201	125983
(F)	1.005	1.005	1.446	1.692	1.884	2.046	2.185	2.322	2.444	2.569
(HLIQ)	278.9	278.8	401	469	522.1	567.1	606.2	643.7	677.5	711.4
(HBOIL)	1497.4	1501.4	1491.2	1488	1484	1483.3	1499.6	1480.7	1476.2	1466.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.3									
DP Liquid Density-lbm/ft3	92.94									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.205	0.711	0.725	1.766	2.023					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.183	0.739	1.479	1.638	1.862					
Actual DP-ft	1.96	3.26	4.24	6.24	7.99					
Measured TP-Psig	118				3.5					
Measured Overall-ft	202.66									
Computed DP-ft	2.13	4.01	5.77	7.5	9.13					
Friction-ft	0.14	0.38	0.73	1.16	1.64					
Acceleration-ft	0.08	0.23	0.34	0.43	0.53					
Elevation-ft	1.91	3.39	4.7	5.91	6.96					

Run#	537									
Test Fluid	C4F10									
Date:	5/26/93									
Time:	14:24									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	118.8									
Sat. Temperature-F(inlet)	157.8									
Liq. Density-lbm/ft3	80.98	80.98	80.98	81.09	81.13	81.13	81	81.07	81.09	81.28
Latent Heat-Btu/lbm	28.91	28.91	28.91	29	29.03	29.03	28.93	28.98	29	29.14
Specific Heat-Btu/lbm/F	0.288	0.288	0.288	0.287	0.287	0.287	0.288	0.287	0.287	0.287
Liq. Viscosity-lbm/ft-hr	0.414	0.414	0.414	0.416	0.417	0.417	0.414	0.416	0.416	0.42
Liq. Conductivity-Btu/hr-ft-F	0.0245	0.0245	0.0245	0.0245	0.0246	0.0246	0.0245	0.0245	0.0245	0.0247
Liq. Prandtl No.	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.88
Inlet Flow Rate-GPM	5.1									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	154.2									
Outlet Liq. Temperature-F	152.8									
Outlet Vap. Temperature-F	148.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	93									
Water outlet Temp.-F	136.6									
Inlet G-lbm/hr/ft2	988571		Temp		150.3	Density	81.22			
Subcooling-F	3.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	574.4	579.6	573.6	575.2	574.6	575.6	585.1	575.6	573.2	574
Heat Loss-Watts	11.8	2.8	3.8	3.7	3.7	2.7	1.8	2.7	3.5	19.3
Heat Flux-Btu/Hr/ft2	9957	10047	9943	9971	9960	9978	10142	9978	9936	9950
Wall Temp. #3-F	163.4	164.6	164.2	163.1	165.3	164	165	164.5	164	163.1
Wall Temp. #4-F	163.8	163.4	165.1	163.6	164.6	164.4	165.5	165	164.6	162.6
Wall Temp. #5-F	163.7	162.3	165.9	163.9	163.9	164.6	164.6	164	163.5	162.6
Wall Temp. #1-F	80	164	162.6	162.2	163	164.9	165.7	165	162.4	159.4
Wall Temp. #2-F	164.6	164	163.3	162.5	163.1	165	165.6	165.3	162.9	161.2
Instream Temp.-F	155	155	155	154.4	154.2	154.2	154.9	154.6	154.4	153.4
Avg. Wall Temp.-F	163.9	164	163.8	163.2	163.7	164.5	165.3	164.8	163.5	161.8
Avg. Wall DT.-F	8.4	8.5	8.4	8.3	9	9.8	9.9	9.8	8.6	7.9
Remaining Subcool-F	1.6									
Exit Quality	-0.02	0	0.03	0.05	0.07	0.09	0.11	0.13	0.15	0.17
EXP. H-Btu/Hr/ft2/F	1181.8	1175.6	1190.7	1194.2	1106.7	1015.6	1022.2	1017.2	1151.2	1254.7
COMPUTED H										
Jallouk	980.4	985.8	927	890.1	878	870.1	872.3	857.3	843.1	832.8
Szady1(Cudo tube)	1503.8	1510.4	1506.6	1507.1	1508.5	1513.9	1535.9	1525.2	1526	1523
Szady2	1302.6	1310.7	1301.1	1298.2	1296	1268.6	1293.5	1283.1	1284.6	1283
(RLIQ)	156244	156244	153885	149927	146506	143345	140995	137314	134028	129762
(F)	1.005	1.005	1.396	1.652	1.847	2.011	2.152	2.287	2.409	2.534
(HLIQ)	283.3	283.3	393.3	465.3	520.2	566.3	606.3	644.3	678.6	712.7
(HBOIL)	1500.5	1507	1497.6	1492.2	1487.6	1487	1503.8	1485.9	1479.8	1469
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.3									
DP Liquid Density-lbm/ft3	92.94									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.203	0.682	0.691	1.716	1.965					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.181	0.71	1.445	1.588	1.804					
Actual DP-ft	1.97	3.92	4.3	6.33	8.1					
Measured TP-Psig	118.8				3.6					
Measured Overall-ft	204.09									
Computed DP-ft	2.13	4.06	5.83	7.58	9.23					
Friction-ft	0.14	0.38	0.73	1.16	1.65					
Acceleration-ft	0.06	0.23	0.34	0.44	0.53					
Elevation-ft	1.93	3.45	4.77	5.98	7.05					

Run#	538									
Test Fluid	C4F10									
Date:	5/26/93									
Time:	14:24									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	117.7									
Sat. Temperature-F(inlet)	157.2									
Liq. Density-lbm/ft3	80.84	80.88	80.88	80.98	81	80.96	80.84	80.94	80.98	81.15
Latent Heat-Btu/lbm	28.81	28.84	28.84	28.91	28.93	28.9	28.81	28.88	28.91	29.04
Specific Heat-Btu/lbm/F	0.288	0.288	0.288	0.288	0.288	0.288	0.288	0.288	0.288	0.287
Liq. Viscosity-lbm/ft-hr	0.411	0.412	0.412	0.414	0.414	0.414	0.411	0.413	0.414	0.417
Liq. Conductivity-Btu/hr-ft-F	0.0244	0.0244	0.0244	0.0245	0.0245	0.0245	0.0244	0.0244	0.0245	0.0246
Liq. Prandtl No.	4.86	4.86	4.86	4.87	4.87	4.86	4.86	4.86	4.87	4.87
Inlet Flow Rate-GPM	5.1									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	154.9									
Outlet Liq. Temperature-F	153.3									
Outlet Vap. Temperature-F	149									
Water Flow Rate-GPM										
Water Inlet Temp.-F	94.2									
Water outlet Temp.-F	137.4									
Inlet G-lbm/hr/ft2	987126		Temp		150.9	Density	81.11			
Subcooling-F	2.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	573.3	579.2	573.6	575.6	576.8	577.5	585	574.8	574.3	572.9
Heat Loss-Watts	12.2	2.9	3.9	3.8	3.8	2.8	1.9	2.9	3.7	20.1
Heat Flux-Btu/Hr/ft2	9938	10040	9943	9978	9998	10011	10141	9964	9955	9931
Wall Temp. #3-F	163.8	165.1	164.7	163.9	166.1	164.9	165.8	165.2	164.5	163.3
Wall Temp. #4-F	164.4	163.9	165.6	164.5	165.5	164.9	166	165.4	165.4	163.2
Wall Temp. #5-F	164.3	162.8	166.4	164.6	164.4	165.5	165.2	164.7	163.8	163.3
Wall Temp. #1-F	80.4	164.5	163.2	162.7	163.4	165.4	166.3	165.7	163.1	160.3
Wall Temp. #2-F	165.3	164.5	163.9	163.2	163.5	165.4	166.4	166	163.6	161.8
Instream Temp.-F	155.7	155.6	155.6	155	154.9	155.1	155.7	155.2	155	154.1
Avg. Wall Temp.-F	164.5	164.5	164.4	163.9	164.2	165.2	165.9	165.4	164.1	162.4
Avg. Wall DT.-F	8.3	8.5	8.4	8.5	8.8	9.6	9.8	9.7	8.6	7.8
Remaining Subcool-F	0.3									
Exit Quality	0	0.02	0.04	0.06	0.08	0.1	0.12	0.14	0.16	0.18
EXP. H-Btu/Hr/ft2/F	1197.2	1174.8	1183.6	1177.4	1130	1040.3	1036.7	1022	1153.5	1268.1
COMPUTED H										
Jallouk	983.5	951.3	912	886	877.1	870.5	871.1	855.8	841.8	830.9
Szady1(Cudo tube)	1509	1516.8	1513.8	1515.6	1520.2	1527	1545.8	1533.3	1535.5	1530.8
Szady2	1307.3	1314.4	1305.7	1304.6	1306.3	1282.9	1304.2	1291.6	1294.8	1290.8
(RLIQ)	156951	155479	152255	148408	145080	142122	139605	135778	132349	128176
(F)	1.005	1.266	1.567	1.779	1.953	2.102	2.234	2.363	2.481	2.6
(HLIQ)	283.1	356.5	441.4	500.8	549.7	591.9	629.2	665.4	698.3	731
(HBOIL)	1505.6	1510.2	1501.2	1497.2	1495.9	1496.8	1510.2	1490.4	1485.8	1473.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.8									
DP Liquid Density-lbm/ft3	92.87									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.202	0.677	0.685	1.709	1.957					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.18	0.705	1.439	1.581	1.796					
Actual DP-ft	1.97	3.33	4.31	6.35	8.11					
Measured TP-Psig	117.7				3.6					
Measured Overall-ft	202.47									
Computed DP-ft	2.15	4	5.76	7.51	9.16					
Friction-ft	0.15	0.43	0.81	1.27	1.77					
Acceleration-ft	0.14	0.27	0.37	0.46	0.56					
Elevation-ft	1.86	3.3	4.59	5.78	6.83					

Run#	539									
Test Fluid	C4F10									
Date:	5/26/93									
Time:	14:24									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	117.5									
Sat. Temperature-F(inlet)	157.1									
Liq. Density-lbm/ft3	80.7	80.74	80.72	80.8	80.8	80.76	80.66	80.76	80.82	80.98
Latent Heat-Btu/lbm	28.71	28.74	28.73	28.78	28.78	28.76	28.68	28.76	28.8	28.91
Specific Heat-Btu/lbm/F	0.288	0.288	0.288	0.288	0.288	0.288	0.288	0.288	0.288	0.288
Liq. Visocsity-lbm/ft-hr	0.409	0.41	0.409	0.411	0.411	0.41	0.408	0.41	0.411	0.414
Liq. Conductivity-Btu/hr-ft-F	0.0243	0.0243	0.0243	0.0244	0.0244	0.0243	0.0243	0.0243	0.0244	0.0245
Liq. Prandtl No.	4.85	4.85	4.85	4.86	4.86	4.86	4.85	4.86	4.86	4.87
Inlet Flow Rate-GPM	5.1									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	155.6									
Outlet Liq. Temperature-F	154.3									
Outlet Vap. Temperature-F	150.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	94.7									
Water outlet Temp.-F	138.9									
Inlet G-lbm/hr/ft2	985192		Temp		151.7	Density		80.95		
Subcooling-F	1.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	571.6	578.5	575.8	577.6	573.1	573.6	584.3	574.5	575.5	574.3
Heat Loss-Watts	12.6	3	4	4	4	2.9	1.9	3	3.8	20.8
Heat Flux-Btu/Hr/ft2	9908	10028	9981	10012	9934	9943	10128	9959	9976	9955
Wall Temp. #3-F	164.6	165.8	165.4	164.5	166.8	165.8	166.6	166	165.4	164.2
Wall Temp. #4-F	165.1	164.7	166.4	165.2	166	165.9	166.8	166.3	166.1	163.9
Wall Temp. #5-F	165.1	163.5	167.2	165.5	165.4	166.3	166	165.4	164.7	163.7
Wall Temp. #1-F	80.8	165.3	164	163.4	164.4	166.4	167	166.4	163.9	160.6
Wall Temp. #2-F	166	165.3	164.7	164	164.4	166.4	167.3	166.8	164.4	162.3
Instream Temp.-F	156.4	156.2	156.3	155.9	155.9	156.1	156.6	156.1	155.8	155
Avg. Wall Temp.-F	165.2	165.3	165.1	164.7	165.1	166.1	166.7	166.2	164.9	162.9
Avg. Wall DT.-F	8.4	8.6	8.4	8.3	8.7	9.6	9.7	9.6	8.6	7.5
Remaining Subcool-F	-0.5									
Exit Quality	0.01	0.03	0.05	0.07	0.09	0.11	0.13	0.15	0.17	0.19
EXP. H-Btu/Hr/ft2/F	1186.3	1163.1	1191.9	1206.7	1141.7	1041.1	1046.1	1034.1	1153.4	1329.1
COMPUTED H										
Jallouk	969	937.4	909.9	887.7	875.4	869.2	871.8	857	843.2	832.9
Szady1(Cudo tube)	1514.5	1524.1	1525.5	1527.9	1526.4	1532.9	1554.7	1542.7	1545.7	1542.1
Szady2	1310.9	1319.7	1316.6	1316.2	1280.6	1288.8	1313.4	1301.1	1305.3	1302.2
(RLIQ)	157157	154824	151695	147929	144692	141712	139046	135181	131598	127494
(F)	1.144	1.404	1.654	1.849	2.011	2.152	2.278	2.404	2.519	2.635
(HLIQ)	321.9	395	465.7	520.1	565.7	605.6	641.5	676.5	708.7	740.5
(HBOIL)	1509.6	1515.2	1510.9	1507.6	1500	1500.7	1517.4	1498	1494.4	1482.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.3									
DP Liquid Density-lbm/ft3	92.8									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.202	0.672	0.678	1.702	1.948					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.18	0.7	1.432	1.574	1.787					
Actual DP-ft	1.97	3.34	4.33	6.37	8.14					
Measured TP-Psig	117.5				3.5					
Measured Overall-ft	202.73									
Computed DP-ft	2.07	3.89	5.64	7.39	9.04					
Friction-ft	0.18	0.48	0.87	1.34	1.85					
Acceleration-ft	0.17	0.28	0.38	0.48	0.58					
Elevation-ft	1.72	3.12	4.39	5.57	6.61					

Run#	540									
Test Fluid	C4F10									
Date:	5/26/93									
Time:	14:24									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	143.9									
Sat. Temperature-F(inlet)	171.1									
Liq. Density-lbm/ft3	78.75	78.67	78.35	78.11	78	77.94	77.72	77.8	77.83	78.11
Latent Heat-Btu/lbm	27.25	27.19	26.95	26.76	26.68	26.63	26.46	26.53	26.55	26.76
Specific Heat-Btu/lbm/F	0.294	0.294	0.295	0.295	0.296	0.296	0.296	0.296	0.296	0.295
Liq. Viscosity-lbm/ft-hr	0.376	0.374	0.369	0.366	0.364	0.363	0.36	0.361	0.361	0.366
Liq. Conductivity-Btu/hr-ft-F	0.0231	0.023	0.0228	0.0227	0.0226	0.0226	0.0224	0.0225	0.0225	0.0227
Liq. Prandtl No.	4.78	4.78	4.77	4.76	4.76	4.76	4.75	4.76	4.76	4.76
Inlet Flow Rate-GPM	5.3									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	2.9									
Inlet Temperature-F	165.1									
Outlet Liq. Temperature-F	168.6									
Outlet Vap. Temperature-F	165.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	113.4									
Water outlet Temp.-F	160.9									
Inlet G-lbm/hr/ft2	991275		Temp	164.1	Density	78.37				
Subcooling-F	6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	568.1	576.7	605.6	609.7	620.7	618.6	581.5	572.6	609.4	608.6
Heat Loss-Watts	15.6	3.7	5	5.4	5.7	4.9	3.6	4.7	5.2	28.3
Heat Flux-Btu/Hr/ft2	9848	9997	10498	10465	10759	10723	10080	9926	10564	10515
Wall Temp. #3-F	177.7	178.7	178.9	177.7	180.1	179.2	180.1	179.4	179	177.7
Wall Temp. #4-F	178.2	177.8	179.7	178.4	179.6	179.3	180.3	179.8	179.9	177.4
Wall Temp. #5-F	178.2	176.9	180.5	178.5	178.7	179.7	179.6	178.8	178.6	177.3
Wall Temp. #1-F	81.4	178.6	177.5	176.7	177.8	179.9	180.4	179.8	177.7	174.3
Wall Temp. #2-F	179	178.7	178.1	177.2	177.9	180	180.7	180.2	178.2	175.9
Instream Temp.-F	166	166.4	167.9	169	169.5	169.8	170.8	170.4	170.3	169
Avg. Wall Temp.-F	178.3	178.5	178.6	177.8	178.5	179.5	180.2	179.6	178.7	176.5
Avg. Wall DT.-F	11.8	11.6	10.2	8.4	8.5	9.2	9	8.8	7.9	7
Remaining Subcool-F	4									
Exit Quality	-0.04	-0.02	0	0.02	0.05	0.07	0.09	0.12	0.14	0.16
EXP. H-Btu/Hr/ft2/F	832.4	861.9	1031.7	1253	1263.8	1160.5	1124.4	1134.2	1336.7	1492.6
COMPUTED H										
Jallouk	1020.3	1031.9	1071.8	1043.3	1026.6	1002.5	948.7	930.2	949.4	931.8
Szady1(Cudo tube)	1603	1618.5	1672.5	1684.2	1715.2	1718.8	1683.9	1671.2	1721.6	1708.1
Szady2	1395.1	1413.5	1477.4	1445.1	1480.7	1485.5	1445.8	1431.6	1489.4	1474.8
(RLIQ)	172525	173150	175526	175052	171699	167931	165337	160723	156473	150444
(F)	1.005	1.005	1.005	1.325	1.592	1.787	1.938	2.075	2.199	2.329
(RLIQ)	287.1	287.2	287.6	379.8	456.3	512.5	556.3	595.3	630.9	667.5
(HBOIL)	1599.9	1615.5	1669.6	1677.8	1704.3	1703.5	1683.4	1645.6	1692.9	1673.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.9									
DP Liquid Density-lbm/ft3	82.71									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.213	0.53	0.447	1.349	1.602					
Zero Corrections-psid	-0.018	0.016	-0.17	-0.102	-0.027					
Corrected DP-Psid	0.231	0.514	0.617	1.451	1.629					
Actual DP-ft	1.95	3.8	5.98	6.82	8.72					
Measured TP-Psig	143.9				3.6					
Measured Overall-ft	258.65									
Computed DP-ft	2.13	4.27	6.14	7.93	9.59					
Friction-ft	0.13	0.3	0.58	0.94	1.34					
Acceleration-ft	0	0.14	0.26	0.96	0.45					
Elevation-ft	2	3.83	5.3	6.63	7.79					

Run#	541									
Test Fluid	C4F10									
Date:	5/26/93									
Time:	14:24									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	115.2									
Sat. Temperature-F(inlet)	155.8									
Liq. Density-lbm/ft3	81.83	81.76	81.45	81.24	81.03	80.98	80.84	80.98	80.98	81.19
Latent Heat-Btu/lbm	29.54	29.49	29.26	29.11	28.96	28.91	28.81	28.91	28.91	29.07
Specific Heat-Btu/lbm/F	0.286	0.286	0.286	0.287	0.288	0.288	0.288	0.288	0.288	0.287
Liq. Viscosity-lbm/ft-hr	0.43	0.428	0.423	0.419	0.415	0.414	0.411	0.414	0.414	0.418
Liq. Conductivity-Btu/hr-ft-F	0.025	0.025	0.0248	0.0246	0.0245	0.0245	0.0244	0.0245	0.0245	0.0246
Liq. Prandtl No.	4.91	4.9	4.89	4.88	4.87	4.87	4.86	4.87	4.87	4.88
Inlet Flow Rate-GPM	5.3									
Outlet Liq. Flow Rate-GPM	0.5									
Outlet Vap. Flow Rate-GPM	3.3									
Inlet Temperature-F	149.6									
Outlet Liq. Temperature-F	153.4									
Outlet Vap. Temperature-F	149.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	101.5									
Water outlet Temp.-F	143.2									
Inlet G-lbm/hr/ft2	1032055		Temp	148.4	Density	81.6				
Subcooling-F	6.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	574.3	570.8	580.2	574.1	573.6	580.2	579	578.2	573.5	575.2
Heat Loss-Watts	28.6	6.3	8.5	10	10.8	10.7	9.5	10.5	10.4	54.5
Heat Flux-Btu/Hr/ft2	9955	9894	10057	9952	9943	10057	10037	10023	9941	9971
Wall Temp. #3-F	164.4	165.4	165.1	164.1	166.3	165.2	166.1	165.6	164.5	164.1
Wall Temp. #4-F	164.8	164.2	166.1	164.8	165.6	165.2	166.3	166	165.5	163.8
Wall Temp. #5-F	164.6	163.1	166.8	164.9	164.7	165.7	165.6	165	164.1	163.8
Wall Temp. #1-F	82.4	164.7	163.5	163	163.8	165.7	166.6	166.1	163.1	160.4
Wall Temp. #2-F	165.4	164.9	164.2	163.5	163.9	165.9	166.6	166.3	163.6	162.2
Instream Temp.-F	150.5	150.9	152.5	153.6	154.7	155	155.7	155	155	153.9
Avg. Wall Temp.-F	164.8	164.8	164.7	164.2	164.5	165.5	166.2	165.8	164.2	162.9
Avg. Wall DT.-F	13.9	13.5	11.8	10.2	9.4	10	10.1	10.3	8.7	8.5
Remaining Subcool-F	4.2									
Exit Quality	-0.04	-0.02	0	0.02	0.04	0.06	0.08	0.1	0.12	0.13
EXP. H-Btu/Hr/ft2/F	718.8	735.5	854.5	980.4	1063.3	1006.2	995.1	968.7	1141.3	1171.7
COMPUTED H										
Jallouk	948.7	947.4	965.7	929.8	902.8	886.4	878.8	867.1	856.9	840.7
Szady1(Cudo tube)	1462.7	1462	1488.2	1493.2	1507.1	1522.2	1531.4	1528.4	1527.2	1524.3
Szady2	1262	1260.4	1288.8	1289.2	1298.5	1311.8	1286.2	1285	1284.6	1283.5
(RLIQ)	157080	157557	159693	159980	158334	155550	153248	149115	145912	141393
(F)	1.005	1.005	1.005	1.265	1.554	1.757	1.922	2.075	2.208	2.34
(HLIQ)	291.7	291.9	292.4	368.4	453	512.6	561.2	605.3	644	681.6
(HBOIL)	1458.8	1458.1	1484.4	1485.7	1493.3	1502.6	1505.8	1496	1488	1477.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.1									
DP Liquid Density-lbm/ft3	92.53									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.158	0.415	0.286	1.233	1.337					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.136	0.443	1.04	1.105	1.176					
Actual DP-ft	2.04	3.77	4.99	7.16	9.17					
Measured TP-Psig	115.2				3.6					
Measured Overall-ft	197.84									
Computed DP-ft	2.13	4.31	6.31	8.26	10.08					
Friction-ft	0.13	0.3	0.56	0.87	1.23					
Acceleration-ft	0	0.15	0.29	0.39	0.49					
Elevation-ft	2	3.86	5.47	6.99	8.36					

Run#	542									
Test Fluid	C4F10									
Date:	5/26/93									
Time:	14:24									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	107.9									
Sat. Temperature-F(inlet)	151.5									
Liq. Density-lbm/ft3	82.09	82.04	81.91	81.94	81.89	81.87	81.76	81.83	81.85	82.05
Latent Heat-Btu/lbm	29.73	29.69	29.59	29.62	29.58	29.57	29.49	29.54	29.55	29.7
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.285	0.286	0.286	0.285	0.285
Liq. Viscosity-lbm/ft-hr	0.435	0.434	0.431	0.432	0.431	0.431	0.428	0.43	0.43	0.434
Liq. Conductivity-Btu/hr-ft-F	0.0252	0.0251	0.0251	0.0251	0.025	0.025	0.025	0.025	0.025	0.0252
Liq. Prandtl No.	4.92	4.92	4.91	4.91	4.91	4.91	4.9	4.91	4.91	4.92
Inlet Flow Rate-GPM	5.1									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	2.9									
Inlet Temperature-F	148.4									
Outlet Liq. Temperature-F	148.7									
Outlet Vap. Temperature-F	144.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	98.1									
Water outlet Temp.-F	135.2									
Inlet G-lbm/hr/ft2	1000872		Temp		145.1	Density	82.24			
Subcooling-F	3.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	598.9	579.7	550.8	552.6	586.6	590.2	585.2	578.3	545.6	594.6
Heat Loss-Watts	7.3	1.7	2.3	2.2	2.3	1.7	1.1	1.7	2.1	11.6
Heat Flux-Btu/Hr/ft2	10382	10049	9548	9579	10168	10231	10144	10024	9458	10307
Wall Temp. #3-F	160.1	161	160.3	159.5	161.9	160.5	161.3	160.9	159.8	159.6
Wall Temp. #4-F	160.3	159.9	161.2	160	161.1	160.6	161.7	161.4	160.8	159.1
Wall Temp. #5-F	160.2	158.8	161.8	160.3	160.1	161.1	160.9	160.4	159.4	159.4
Wall Temp. #1-F	84.2	160.2	159	158.4	159.4	161.2	162	161.3	158.5	155.8
Wall Temp. #2-F	161.1	160.3	159.6	159	159.5	161.4	161.9	161.6	159	157.6
Instream Temp.-F	149.1	149.4	150.1	149.9	150.2	150.3	150.9	150.5	150.4	149.3
Avg. Wall Temp.-F	160.4	160.4	160	159.6	160	160.9	161.6	161.1	159.5	158.3
Avg. Wall DT.-F	10.9	10.5	9.5	9.2	9.4	10.1	10.2	10.2	8.7	8.5
Remaining Subcool-F	0.9									
Exit Quality	-0.01	0.01	0.03	0.05	0.07	0.09	0.11	0.13	0.15	0.17
EXP. H-Btu/Hr/ft2/F	956.3	957.4	1005.7	1039.3	1085.7	1014.2	994.4	986	1090.5	1207.7
COMPUTED H										
Jallouk	969.5	952.3	871.6	849.1	867	861.5	853.4	841.2	807.3	828
Szady1(Cudo tube)	1479.9	1459.8	1435.3	1440.1	1488.3	1497.8	1501.7	1494.9	1460.6	1513.3
Szady2	1285.6	1260.2	1223	1224.4	1278	1256	1261	1254.9	1217.2	1278.2
(RLIQ)	150515	150755	148708	145598	142997	140050	137674	134168	131116	126964
(F)	1.005	1.079	1.484	1.711	1.895	2.059	2.2	2.336	2.455	2.58
(HLIQ)	284.2	305	420.2	484.2	536.5	583	623.3	661.4	695	729.5
(HBOIL)	1476.4	1455.4	1423.2	1421.7	1464.6	1467.8	1465.1	1450.5	1406.1	1454.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	84									
DP Liquid Density-lbm/ft3	92.4									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.125	0.534	0.114	1.621	1.835					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.103	0.562	0.868	1.493	1.674					
Actual DP-ft	2.07	3.52	5.23	6.39	8.18					
Measured TP-Psig	107.9				3.6					
Measured Overall-ft	183.04									
Computed DP-ft	2.14	4.14	5.92	7.75	9.5					
Friction-ft	0.15	0.38	0.75	1.16	1.61					
Acceleration-ft	0.11	0.26	0.37	0.47	0.57					
Elevation-ft	1.88	3.5	4.8	6.12	7.32					

Run#	543									
Test Fluid	C4F10									
Date:	5/26/93									
Time:	19:19									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	103.8									
Sat. Temperature-F(inlet)	149									
Liq. Density-lbm/ft3	82.35	82.46	82.53	82.62	82.62	82.62	82.51	82.61	82.64	82.77
Latent Heat-Btu/lbm	29.92	30	30.05	30.11	30.11	30.11	30.04	30.1	30.13	30.22
Specific Heat-Btu/lbm/F	0.284	0.284	0.284	0.284	0.284	0.284	0.284	0.284	0.284	0.283
Liq. Viscosity-lbm/ft-hr	0.44	0.442	0.444	0.446	0.446	0.446	0.443	0.445	0.446	0.448
Liq. Conductivity-Btu/hr-ft-F	0.0253	0.0254	0.0255	0.0255	0.0255	0.0255	0.0254	0.0255	0.0255	0.0256
Liq. Prandtl No.	4.94	4.94	4.95	4.95	4.95	4.95	4.95	4.95	4.95	4.96
Inlet Flow Rate-GPM	5.1									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	147.3									
Outlet Liq. Temperature-F	144.5									
Outlet Vap. Temperature-F	140									
Water Flow Rate-GPM										
Water Inlet Temp.-F	93.2									
Water outlet Temp.-F	124.6									
Inlet G-lbm/hr/ft2	1008489		Temp	141.8	Density	82.86				
Subcooling-F	1.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	582.9	583.4	581.3	576.8	575.1	574.8	576.3	575.8	576.5	581.3
Heat Loss-Watts	6	1.4	1.9	1.8	1.8	1.4	0.9	1.4	1.7	9.3
Heat Flux-Btu/Hr/ft2	10104	10113	10076	9998	9969	9964	9990	9981	9993	10076
Wall Temp. #3-F	156.1	157.2	156.7	156	157.8	156.4	157.2	156.9	156	155.6
Wall Temp. #4-F	156.5	155.9	157.5	156.4	156.9	156.4	157.7	157.2	156.9	155.2
Wall Temp. #5-F	156.5	154.7	158.1	156.6	156.1	156.9	156.8	156.4	155.5	155.4
Wall Temp. #1-F	82.6	156.3	155.2	154.6	155.5	156.9	157.7	157.2	154.5	152
Wall Temp. #2-F	157.3	156.5	155.8	155.2	155.5	157.3	157.7	157.5	155	153.7
Instream Temp.-F	147.7	147.1	146.7	146.2	146.2	146.2	146.8	146.3	146.1	146.4
Avg. Wall Temp.-F	156.6	156.5	156.3	155.9	156	156.7	157.4	157	155.6	154.4
Avg. Wall DT.-F	8.4	8.9	9.1	9.2	9.3	10	10.2	10.3	9	8.5
Remaining Subcool-F	-0.4									
Exit Quality	0	0.02	0.04	0.06	0.08	0.1	0.12	0.14	0.16	0.18
EXP. H-Btu/Hr/ft2/F	1196.7	1134	1101.9	1081.1	1066.3	996.4	982.4	970.1	1106.9	1182
COMPUTED H										
Jallouk	934	894.1	860.5	844.8	836	829.6	821.4	812.9	807.2	802.6
Szady1(Cudo tube)	1449	1447.4	1445.9	1440.8	1443.6	1448.2	1459.9	1460.5	1465.1	1470.6
Szady2	1249.7	1244.9	1238.4	1228.4	1201.2	1207.8	1221.1	1223.2	1228.9	1236
(RLIQ)	149629	147144	143747	140279	137424	134576	132380	128976	125908	122337
(F)	1.121	1.391	1.66	1.864	2.034	2.184	2.314	2.445	2.565	2.685
(HLIQ)	318.3	394.7	470.8	528.5	576.6	619	656.5	693.1	726.9	760.3
(HBOIL)	1443.8	1437.5	1429	1416.7	1412.3	1409.5	1414.3	1406.5	1402.9	1399.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83									
DP Liquid Density-lbm/ft3	92.55									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.163	0.705	0.344	1.873	2.095					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.141	0.733	1.098	1.745	1.934					
Actual DP-ft	1.99	3.2	4.8	5.91	7.68					
Measured TP-Psig	103.8				3.5					
Measured Overall-ft	174.5									
Computed DP-ft	2.13	4.09	6.01	7.93	9.76					
Friction-ft	0.18	0.44	0.78	1.17	1.59					
Acceleration-ft	0.18	0.31	0.41	0.52	0.62					
Elevation-ft	1.77	3.34	4.82	6.25	7.54					

Run#	544									
Test Fluid	C4F10									
Date:	5/26/93									
Time:	19:19									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	107.8									
Sat. Temperature-F(inlet)	151.4									
Liq. Density-lbm/ft3	81.85	81.96	82.02	82.17	82.13	82.11	82.02	82.15	82.15	82.29
Latent Heat-Btu/lbm	29.55	29.63	29.68	29.78	29.76	29.74	29.68	29.77	29.77	29.88
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.284
Liq. Viscosity-lbm/ft-hr	0.43	0.432	0.434	0.436	0.436	0.435	0.434	0.436	0.436	0.439
Liq. Conductivity-Btu/hr-ft-F	0.025	0.0251	0.0251	0.0252	0.0252	0.0252	0.0251	0.0252	0.0252	0.0253
Liq. Prandtl No.	4.91	4.91	4.92	4.93	4.92	4.92	4.92	4.92	4.92	4.93
Inlet Flow Rate-GPM	5.1									
Outlet Liq. Flow Rate-GPM	1.5									
Outlet Vap. Flow Rate-GPM	2.2									
Inlet Temperature-F	150.1									
Outlet Liq. Temperature-F	147.1									
Outlet Vap. Temperature-F	143.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	89.4									
Water outlet Temp.-F	119.7									
Inlet G-lbm/hr/ft2	1001803		Temp		144.7	Density	82.31			
Subcooling-F	1.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1418.8	570.7	562.5	563.8	562.2	567.3	571.8	567.9	585.7	564.2
Heat Loss-Watts	9.8	2	2.7	2.7	2.6	2	1.3	2	2.6	13.9
Heat Flux-Btu/Hr/ft2	24594	9893	9751	9773	9745	9834	9912	9844	10153	9780
Wall Temp. #3-F	162.5	159.3	158.7	157.9	159.9	158.4	159.4	159.2	158.5	157.9
Wall Temp. #4-F	162.5	158.2	159.7	158.6	158.8	158.6	159.9	159.4	159.4	157.7
Wall Temp. #5-F	162.1	157.1	160.3	158.7	158.3	158.6	159	158.7	158	157.8
Wall Temp. #1-F	81.8	158.7	157.5	157	157.2	159.2	160	159.4	157	154.4
Wall Temp. #2-F	163.1	158.8	158.1	157.4	157.4	159.2	160	159.7	157.5	156.3
Instream Temp.-F	150.4	149.8	149.5	148.7	148.9	149	149.5	148.8	148.8	148
Avg. Wall Temp.-F	162.6	158.8	158.5	158.1	157.9	158.7	159.7	159.3	158.1	156.8
Avg. Wall DT.-F	11	8.5	8.6	8.9	8.6	9.3	9.7	10	8.8	8.4
Remaining Subcool-F	-3.7									
Exit Quality	0.04	0.06	0.07	0.09	0.11	0.13	0.15	0.17	0.19	0.21
EXP. H-Btu/Hr/ft2/F	2228	1163.4	1139.2	1097.1	1135.2	1062.5	1020.6	981	1150.9	1167.3
COMPUTED H										
Jallouk	1524.4	859.4	843.7	834.8	829.1	820.7	819.4	809.1	814.2	795.4
Szady1(Cudo tube)	2296.6	1462.8	1454.8	1454.2	1458.8	1470.5	1484.9	1480	1505.5	1480.8
Szady2	2293.6	1250.6	1208.5	1210.4	1216.4	1230.1	1245.9	1241.5	1270.1	1259.9
(RLIQ)	149561	144602	141306	137476	134817	132034	129651	125974	123017	119279
(F)	1.452	1.779	1.956	2.114	2.25	2.375	2.488	2.607	2.714	2.826
(HLIQ)	411.3	503.7	553.6	597.8	636.3	671.8	704.2	737.3	767.5	798.5
(HBOIL)	2292.2	1442.7	1427.6	1419.7	1417.2	1422.2	1430.1	1416.3	1435.8	1398.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	82.4									
DP Liquid Density-lbm/ft3	92.64									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.237	0.989	0.673	2.221	2.501					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.215	1.017	1.427	2.093	2.34					
Actual DP-ft	1.88	2.72	4.26	5.34	7.02					
Measured TP-Psig	107.8				3.6					
Measured Overall-ft	182.33									
Computed DP-ft	2.06	3.98	5.9	7.82	9.66					
Friction-ft	0.25	0.57	0.94	1.36	1.82					
Acceleration-ft	0.28	0.38	0.48	0.58	0.69					
Elevation-ft	1.53	3.03	4.48	5.88	7.16					

Run#	545									
Test Fluid	C4F10									
Date:	5/26/93									
Time:	19:19									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	106									
Sat. Temperature-F(inlet)	150.3									
Liq. Density-lbm/ft3	81.89	82.07	82.13	82.13	82.15	82.15	82.02	82.07	82.15	82.22
Latent Heat-Btu/lbm	29.58	29.72	29.76	29.76	29.77	29.77	29.68	29.72	29.77	29.82
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285
Liq. Viscosity-lbm/ft-hr	0.431	0.436	0.436	0.436	0.436	0.436	0.434	0.435	0.436	0.438
Liq. Conductivity-Btu/hr-ft-F	0.025	0.0252	0.0252	0.0252	0.0252	0.0252	0.0251	0.0252	0.0252	0.0253
Liq. Prandtl No.	4.91	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.93
Inlet Flow Rate-GPM	5									
Outlet Liq. Flow Rate-GPM	1.6									
Outlet Vap. Flow Rate-GPM	2.2									
Inlet Temperature-F	150									
Outlet Liq. Temperature-F	147.5									
Outlet Vap. Temperature-F	143.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	87.7									
Water outlet Temp.-F	118.2									
Inlet G-lbm/hr/ft2	981019		Temp	145.2	Density	82.22				
Subcooling-F	0.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	864.1	866.2	867.3	868.2	876.3	877.1	861.8	859.2	115.4	46.4
Heat Loss-Watts	9.2	2.2	3	3	3	2.2	1.5	2.8	2.1	10.7
Heat Flux-Btu/Hr/ft2	14979	15015	15034	15050	15190	15204	14939	14894	2000	804
Wall Temp. #3-F	159.2	161.6	160.4	159.8	163.5	161	161.6	174.4	151.6	149.1
Wall Temp. #4-F	159.5	159.3	161.9	160.9	161.7	161.1	162.1	172.5	151.7	149.7
Wall Temp. #5-F	159.3	157.8	162.6	160.9	160.7	161.6	161.3	162.4	151.7	150
Wall Temp. #1-F	81.2	160.2	158.7	158.4	159.7	161.8	162.9	159.6	152	149.1
Wall Temp. #2-F	159.7	160.2	159.7	159.3	160	162.3	162.9	160.2	152	149.4
Instream Temp.-F	150.2	149.2	148.9	148.9	148.8	148.8	149.6	149.2	148.8	148.4
Avg. Wall Temp.-F	159.4	160.3	160.2	160	160.5	161.3	162.2	165.8	151.8	149.6
Avg. Wall DT.-F	8.5	10.4	10.6	10.4	11	11.8	12	15.9	2.9	1
Remaining Subcool-F	-2.8									
Exit Quality	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.24	0.24
EXP. H-Btu/Hr/ft2/F	1752.3	1437.3	1418.9	1444.3	1376.1	1284.3	1246.5	934	687.5	785.7
COMPUTED H										
Jallouk	1142.3	1089.3	1055.1	1029.8	1011.9	992.3	970.1	277.3	277.2	277.1
Szady1(Cudo tube)	1788	1783.1	1784.9	1789.8	1801.2	1806.5	1803.2	277.3	277.2	277.1
Szady2	1619.1	1645.7	1643.6	1645.1	1654.8	1656.9	1647.5	277.3	277.2	277.1
(RLIQ)	146874	141414	136603	132152	127576	123087	119331	119331	119331	119331
(F)	1.383	1.747	2.02	2.244	2.44	2.617	2.769	2.769	2.769	2.769
(HLIQ)	385.3	486.1	561.9	624.1	678.7	728	770.8	770.8	770.8	770.8
(HBOIL)	1782.1	1770.9	1766.1	1764.2	1768.5	1766.2	1755	1755	1755	1755
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	82.1									
DP Liquid Density-lbm/ft3	92.68									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.227	0.929	0.629	2.309	2.783					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.205	0.957	1.383	2.181	2.622					
Actual DP-ft	1.9	2.83	4.84	5.2	6.54					
Measured TP-Psig	106				3.4					
Measured Overall-ft	178.69									
Computed DP-ft	1.98	3.73	5.48	7.33	9.08					
Friction-ft	0.26	0.7	1.28	1.94	2.42					
Acceleration-ft	0.27	0.42	0.58	0.74	0.76					
Elevation-ft	1.45	2.6	3.62	4.65	5.9					

Run#	546									
Test Fluid	C4F10									
Date:	5/26/93									
Time:	19:19									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	114.5									
Sat. Temperature-F(inlet)	155.4									
Liq. Density-lbm/ft3	81.81	81.74	81.51	81.53	81.53	81.53	81.45	81.53	81.57	81.66
Latent Heat-Btu/lbm	29.53	29.47	29.31	29.32	29.32	29.32	29.28	29.32	29.35	29.42
Specific Heat-Btu/lbm/F	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.286
Liq. Viscosity-lbm/ft-hr	0.43	0.428	0.424	0.424	0.424	0.424	0.423	0.424	0.425	0.427
Liq. Conductivity-Btu/hr-ft-F	0.025	0.025	0.0248	0.0248	0.0248	0.0248	0.0248	0.0248	0.0248	0.0249
Liq. Prandtl No.	4.91	4.9	4.89	4.89	4.89	4.89	4.89	4.89	4.89	4.9
Inlet Flow Rate-GPM	5.1									
Outlet Liq. Flow Rate-GPM	1.5									
Outlet Vap. Flow Rate-GPM	2.3									
Inlet Temperature-F	149.8									
Outlet Liq. Temperature-F	150.7									
Outlet Vap. Temperature-F	146.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	88.1									
Water outlet Temp.-F	121.9									
Inlet G-lbm/hr/ft2	995960		Temp	147.2	Density	81.83				
Subcooling-F	5.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	868.4	874.6	867.3	864.8	865.5	868.5	869.6	872.1	874	856.5
Heat Loss-Watts	9.6	2.3	3.1	3	3.1	2.3	1.5	2.1	2.8	30.3
Heat Flux-Btu/Hr/ft2	15053	15161	15034	14991	15020	15055	15074	15117	15150	14847
Wall Temp. #3-F	162.4	164.8	163.9	163	166.7	164.4	164.4	162.5	161	207.2
Wall Temp. #4-F	162.9	162.8	165.2	163.7	165	164.4	165.2	161.9	162.7	206.7
Wall Temp. #5-F	162.8	161.4	166	163.9	163.9	164.9	164.3	161	161	186
Wall Temp. #1-F	78.6	163.8	162.1	161.5	162.9	165.1	165.9	161.9	160.4	157.6
Wall Temp. #2-F	163.2	163.6	162.9	162.2	163	165.7	166.2	162.6	161.3	160.4
Instream Temp.-F	160.6	161	162.2	162.1	162.1	162.1	162.6	162.1	161.9	161.4
Avg. Wall Temp.-F	162.8	163.8	163.5	163	163.7	164.7	165.2	162	161.3	183.6
Avg. Wall DT.-F	11.5	12.1	10.6	10.2	10.9	11.9	12	9.2	8.7	31.5
Remaining Subcool-F	2.5									
Exit Quality	-0.02	0.01	0.04	0.07	0.1	0.13	0.16	0.19	0.22	0.25
EXP. H-Btu/Hr/ft2/F	1303.9	1256.6	1412.2	1462.9	1375.3	1263	1254.2	1643.8	1742.3	471.2
COMPUTED H										
Jallouk	1223.4	1231.6	1137.8	1091.9	1062.4	1038.6	1019.8	998.9	980.3	951.7
Szady1(Cudo tube)	1794.7	1805.4	1814	1814	1819.5	1825.6	1835.1	1837.8	1842.2	1824.6
Szady2	1626.7	1639.1	1683.9	1679.3	1681.5	1684.5	1691.4	1690.7	1692	1635.8
(RLIQ)	151683	152173	150434	145692	141066	136431	132233	127131	122258	117150
(F)	1.005	1.005	1.493	1.819	2.066	2.274	2.453	2.624	2.781	2.931
(HLIQ)	283.6	283.7	422	514.1	583.8	642.6	693.6	741.6	785.7	827.6
(HBOIL)	1792.3	1803.1	1806.3	1800.1	1799.3	1798.6	1801.5	1796.6	1793.3	1766
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.7									
DP Liquid Density-lbm/ft3	92.89									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.123	0.595	0.231	1.655	2.135					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.101	0.623	0.985	1.527	1.974					
Actual DP-ft	2.1	3.45	5.09	6.41	7.75					
Measured TP-Psig	114.5				3.5					
Measured Overall-ft	196.73									
Computed DP-ft	2.13	4.04	5.79	7.56	9.3					
Friction-ft	0.14	0.44	0.9	1.49	2.15					
Acceleration-ft	0.08	0.3	0.45	0.6	0.77					
Elevation-ft	1.91	3.3	4.44	5.46	6.38					

Run#	547									
Test Fluid	C4F10									
Date:	5/26/93									
Time:	19:19									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	108.1									
Sat. Temperature-F(inlet)	151.6									
Liq. Density-lbm/ft3	81.78	81.92	81.98	82.04	82.05	82.04	81.98	82.09	82.13	82.13
Latent Heat-Btu/lbm	29.5	29.61	29.65	29.69	29.7	29.69	29.65	29.73	29.76	29.76
Specific Heat-Btu/lbm/F	0.286	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285
Liq. Viscosity-lbm/ft-hr	0.429	0.432	0.433	0.434	0.434	0.434	0.433	0.435	0.436	0.436
Liq. Conductivity-Btu/hr-ft-F	0.025	0.0251	0.0251	0.0251	0.0252	0.0251	0.0251	0.0252	0.0252	0.0252
Liq. Prandtl No.	4.9	4.91	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92
Inlet Flow Rate-GPM	4.3									
Outlet Liq. Flow Rate-GPM	1.5									
Outlet Vap. Flow Rate-GPM	2									
Inlet Temperature-F	150.3									
Outlet Liq. Temperature-F	147.9									
Outlet Vap. Temperature-F	143.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	83.8									
Water outlet Temp.-F	118.2									
Inlet G-lbm/hr/ft2	843086		Temp	145.5	Density	82.16				
Subcooling-F	1.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	868.5	869.8	879.2	873.4	846.4	854.5	876.4	875.6	466.2	331.3
Heat Loss-Watts	8.7	2.1	2.9	2.8	2.8	2.1	1.4	2	2.2	11.9
Heat Flux-Btu/Hr/ft2	15055	15077	15240	15140	14672	14812	15192	15178	8081	5743
Wall Temp. #3-F	159.8	162.4	161.2	160.6	163.6	161.1	161.8	161.1	156.3	154.8
Wall Temp. #4-F	160.3	160.1	162.6	161.6	162.1	161.4	162.6	160.6	156.8	154.7
Wall Temp. #5-F	160.1	158.6	163.3	161.6	161.1	162	161.6	158.7	155.7	154.5
Wall Temp. #1-F	77.9	161	159.5	159	160	162	163.2	159.4	154.9	152.7
Wall Temp. #2-F	160.6	161	160.4	159.9	160.5	162.4	163.2	160.5	155.1	153.7
Instream Temp.-F	150.8	160	149.7	149.4	149.3	149.4	149.7	149.1	148.9	148.9
Avg. Wall Temp.-F	160.2	161.1	160.9	160.7	160.9	161.6	162.5	160.1	155.8	154.1
Avg. Wall DT.-F	8.7	10.4	10.5	10.6	11	11.6	12.1	10.3	6.5	4.9
Remaining Subcool-F	-2.4									
Exit Quality	0.02	0.06	0.09	0.13	0.16	0.2	0.23	0.27	0.29	0.3
EXP. H-Btu/Hr/ft2/F	1726.6	1443.7	1446.5	1426.2	1338.4	1281.8	1256.2	1477.3	1244.3	1167.1
COMPUTED H										
Jallouk	1182.2	1131	1100.6	1067	1026.4	1014	1012.2	245.6	245.6	245.6
Szady1(Cudo tube)	1797.8	1793	1802.4	1796.6	1771.8	1784.7	1813.6	245.6	245.6	245.6
Szady2	1630.1	1680	1668.1	1657.3	1622.4	1634.4	1686.4	245.6	245.6	245.6
(RLIQ)	127127	122544	117694	112870	108341	104046	99833	99833	99833	99833
(F)	1.346	1.727	2.045	2.301	2.517	2.706	2.879	2.879	2.879	2.879
(HLIQ)	332.5	426.1	504.3	567.3	620.5	667.2	710.1	710.1	710.1	710.1
(HBOIL)	1794	1784.9	1789.2	1777.6	1746	1753	1776.5	1776.5	1776.5	1776.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.5									
DP Liquid Density-lbm/ft3	93.06									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.182	0.961	0.729	2.308	2.969					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.16	0.989	1.483	2.18	2.808					
Actual DP-ft	1.99	2.8	4.2	5.24	6.27					
Measured TP-Psig	108.1				3.5					
Measured Overall-ft	183.4									
Computed DP-ft	1.87	3.48	5.07	6.7	8.4					
Friction-ft	0.2	0.54	1.01	1.59	2					
Acceleration-ft	0.2	0.33	0.46	0.61	0.68					
Elevation-ft	1.47	2.61	3.6	4.5	5.72					

Run#	548									
Test Fluid	C4F10									
Date:	5/26/93									
Time:	19:19									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	121.2									
Sat. Temperature-F(inlet)	159.2									
Liq. Density-lbm/ft3	80.98	80.86	80.68	80.68	80.72	80.7	80.61	80.72	80.74	80.76
Latent Heat-Btu/lbm	28.91	28.83	28.7	28.7	28.73	28.71	28.64	28.73	28.74	28.76
Specific Heat-Btu/lbm/F	0.288	0.288	0.288	0.288	0.288	0.288	0.289	0.288	0.288	0.288
Liq. Viscosity-lbm/ft-hr	0.414	0.412	0.409	0.409	0.409	0.409	0.407	0.409	0.41	0.41
Liq. Conductivity-Btu/hr-ft-F	0.0245	0.0244	0.0243	0.0243	0.0243	0.0243	0.0242	0.0243	0.0243	0.0243
Liq. Prandtl No.	4.87	4.86	4.85	4.85	4.85	4.85	4.85	4.85	4.85	4.86
Inlet Flow Rate-GPM	4.3									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	2.1									
Inlet Temperature-F	154.4									
Outlet Liq. Temperature-F	155.2									
Outlet Vap. Temperature-F	151.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	90.4									
Water outlet Temp.-F	128.5									
Inlet G-lbm/hr/ft2	831876		Temp	151.1	Density	81.07				
Subcooling-F	4.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	877.6	876	890.1	893.8	854.6	862.9	876.5	872.8	495.1	350.6
Heat Loss-Watts	10.4	2.5	3.4	3.3	3.4	2.5	1.6	2.4	2.8	15.1
Heat Flux-Btu/Hr/ft2	15213	15185	15429	15493	14814	14958	15194	15129	8582	6077
Wall Temp. #3-F	166.3	168.6	167.6	167.1	170.4	168.1	168.2	166.6	162.4	161.6
Wall Temp. #4-F	166.9	166.6	169.1	168	168.9	168.3	168.8	166.7	163.6	161.6
Wall Temp. #5-F	166.6	165.1	169.8	168	167.8	168.8	168	165.1	162.1	161.2
Wall Temp. #1-F	77.4	167.5	168	165.7	166.7	169	169.7	165.9	161.3	159.6
Wall Temp. #2-F	167.1	167.4	166.8	166.3	166.9	169.5	169.9	166.8	162	160.6
Instream Temp.-F	155	155.6	156.5	156.5	156.3	156.4	156.9	156.3	156.2	156.1
Avg. Wall Temp.-F	166.7	167.5	167.4	167.2	167.6	168.6	168.9	166.2	162.3	160.9
Avg. Wall DT.-F	11	11.2	10.2	10	10.6	11.5	11.3	9.2	5.7	4.5
Remaining Subcool-F	1.1									
Exit Quality	-0.01	0.03	0.06	0.1	0.14	0.18	0.21	0.25	0.27	0.29
EXP. H-Btu/Hr/ft2/F	1378.3	1351.1	1516	1549.4	1396.8	1303.6	1340.6	1638	1507.7	1337.1
COMPUTED H										
Jallouk	1303.2	1253.6	1188.3	1155	1096.2	1081	1073.9	1049.2	790.8	687.6
Szady1(Cudo tube)	1852.1	1858	1885.7	1892.3	1851.7	1864.6	1887.6	1880.5	1429.7	1228.4
Szady2	1689.8	1696	1728.4	1772.9	1718	1730.4	1755.2	1743	1214.5	985.1
(RLIQ)	131478	131098	127139	122096	116942	112182	107724	102218	98261	95782
(F)	1.005	1.272	1.74	2.045	2.289	2.493	2.673	2.853	2.98	3.056
(HLIQ)	246.7	312.4	427.7	502.8	562.6	613	657.6	701.3	732.5	751.1
(HBOIL)	1850.6	1855	1878.3	1880.4	1834.2	1842.3	1860.6	1847.5	1362.5	1126.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.2									
DP Liquid Density-lbm/ft3	93.1									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.151	0.795	0.556	2.044	2.762					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.129	0.823	1.31	1.916	2.601					
Actual DP-ft	2.08	3.14	4.58	5.81	6.75					
Measured TP-Psig	121.2				3.6					
Measured Overall-ft	209.68									
Computed DP-ft	2.05	3.72	5.31	6.89	8.48					
Friction-ft	0.12	0.39	0.78	1.27	1.69					
Acceleration-ft	0.12	0.26	0.38	0.52	0.59					
Elevation-ft	1.8	3.07	4.15	5.11	6.2					

Run#	549									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	1:43									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	117.6									
Sat. Temperature-F(inlet)	157.2									
Liq. Density-lbm/ft3	81.3	81.17	81.21	81.24	81.26	81.26	81.21	81.32	81.32	81.24
Latent Heat-Btu/lbm	29.15	29.05	29.08	29.11	29.12	29.12	29.08	29.17	29.17	29.11
Specific Heat-Btu/lbm/F	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287
Liq. Viscosity-lbm/ft-hr	0.42	0.417	0.418	0.419	0.419	0.419	0.418	0.42	0.42	0.419
Liq. Conductivity-Btu/hr-ft-F	0.0247	0.0246	0.0246	0.0246	0.0247	0.0247	0.0246	0.0247	0.0247	0.0246
Liq. Prandtl No.	4.88	4.87	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88
Inlet Flow Rate-GPM	3.2									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	2.1									
Inlet Temperature-F	152.7									
Outlet Liq. Temperature-F	152.5									
Outlet Vap. Temperature-F	148.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	88.7									
Water outlet Temp.-F	134.4									
Inlet G-lbm/hr/ft2	624910		Temp	147.2	Density	81.83				
Subcooling-F	4.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	876.4	865.2	880.2	885.9	871.8	886	862.6	560	46.5	69.9
Heat Loss-Watts	11.2	2.7	3.6	3.6	3.6	2.6	1.6	2.4	2.6	14.8
Heat Flux-Btu/Hr/ft2	15192	14998	15258	15357	15112	15358	14953	9707	806	1212
Wall Temp. #3-F	163.5	165.8	164.8	164	167.4	164.9	162.7	162.1	154.9	155.1
Wall Temp. #4-F	163.9	163.7	166.2	165	165.8	165.4	162.7	162.1	155.3	155.1
Wall Temp. #5-F	163.9	162.2	167	165	164.9	165.8	161.8	161.1	155.3	155.4
Wall Temp. #1-F	73.9	164.5	163	162.5	163.8	165.9	163.6	161.1	154.8	155.2
Wall Temp. #2-F	164.3	164.5	164	163.6	163.9	166.5	163.3	161.1	154.9	155.3
Instream Temp.-F	153.3	154	153.8	153.6	153.6	153.6	153.8	153.2	153.2	153.6
Avg. Wall Temp.-F	163.9	164.6	164.5	164.1	164.6	165.5	162.8	161.5	155	155.2
Avg. Wall DT.-F	9.9	9.9	10	9.8	10.4	11.3	8.3	7.9	1.8	1.6
Remaining Subcool-F	-0.5									
Exit Quality	0.01	0.05	0.1	0.15	0.2	0.25	0.3	0.33	0.33	0.34
EXP. H-Btu/Hr/ft2/F	1532.4	1507.7	1524.2	1562	1450.7	1358.4	1792	1234.8	446.9	774.1
COMPUTED H										
Jallouk	1325.6	1243.9	1190.1	1163.6	1127.6	1118.6	1086	853.1	435.6	448.2
Szady1(Cudo tube)	1831.7	1828.8	1844.2	1849.9	1836.4	1853.4	1834.9	1493.3	665.2	693.1
Szady2	1667.6	1662.8	1681.8	1725.4	1705.7	1724.1	1697.5	1248.9	646.2	647.9
(RLIQ)	97107	95077	90151	85179	80319	75534	70956	66783	65085	64989
(F)	1.139	1.583	2.026	2.356	2.629	2.867	3.077	3.249	3.316	3.321
(HLIQ)	222	308.8	395.1	459.3	512.4	558.9	599.9	633.1	646.1	647.4
(HBOIL)	1830.6	1825.8	1838.1	1840.4	1823	1836.3	1813.3	1454.4	290.6	394.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.4									
DP Liquid Density-lbm/ft3	93.37									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.148	1.121	0.988	2.618	3.36					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.126	1.149	1.742	2.49	3.199					
Actual DP-ft	2.08	2.58	3.81	4.78	5.68					
Measured TP-Psig	117.6				3.5					
Measured Overall-ft	202.23									
Computed DP-ft	1.82	3.23	4.55	5.85	7.31					
Friction-ft	0.09	0.3	0.61	0.99	1.23					
Acceleration-ft	0.1	0.2	0.3	0.39	0.4					
Elevation-ft	1.63	2.73	3.64	4.47	5.68					

Run#	650									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	1:43									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	109.5									
Sat. Temperature-F(inlet)	152.4									
Liq. Density-lbm/ft3	81.94	82.02	82.11	82.11	82.05	82.04	82.02	82.13	82.18	82.17
Latent Heat-Btu/lbm	29.62	29.68	29.74	29.74	29.7	29.69	29.68	29.76	29.8	29.78
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285
Liq. Viscosity-lbm/ft-hr	0.432	0.434	0.435	0.435	0.434	0.434	0.434	0.436	0.437	0.436
Liq. Conductivity-Btu/hr-ft-F	0.0251	0.0251	0.0252	0.0252	0.0252	0.0251	0.0251	0.0252	0.0252	0.0252
Liq. Prandtl No.	4.91	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.93	4.93
Inlet Flow Rate-GPM	3.2									
Outlet Liq. Flow Rate-GPM	1.3									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	146.9									
Outlet Liq. Temperature-F	149.4									
Outlet Vap. Temperature-F	144.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	83.2									
Water outlet Temp.-F	124.2									
Inlet G-lbm/hr/ft2	630037		Temp	143.7	Density	82.6				
Subcooling-F	5.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	882.3	877.6	891.5	894.6	877	889.5	879.5	563.1	46.7	70.7
Heat Loss-Watts	11	2.6	3.6	3.5	3.6	2.6	1.6	2.3	2.5	14.5
Heat Flux-Btu/Hr/ft2	15294	15213	15454	15507	15202	15419	15246	9761	810	1226
Wall Temp. #3-F	159.2	161.5	160.2	159.9	163.5	160.6	158.4	157.6	150.6	150
Wall Temp. #4-F	159.6	159.2	161.7	160.9	161.7	161.2	158.5	157.9	150.6	150.6
Wall Temp. #5-F	159.6	157.9	162.8	160.9	160.5	161.6	157.6	157	151	151.1
Wall Temp. #1-F	72.9	160	158.5	158.7	159.7	161.7	159.3	158.5	150.6	150.5
Wall Temp. #2-F	159.9	160	159.5	159.3	159.9	162.3	159.1	157	150.6	150.7
Instream Temp.-F	149.9	149.5	149	149	149.3	149.4	149.5	148.9	148.6	148.7
Avg. Wall Temp.-F	159.6	160.2	160	160.1	160.5	161.3	158.6	157.2	150.7	150.6
Avg. Wall DT.-F	9	10	10.3	10.4	10.5	11.2	8.4	7.9	2	1.8
Remaining Subcool-F	0.5									
Exit Quality	-0.01	0.04	0.09	0.14	0.19	0.24	0.28	0.31	0.32	0.32
EXP. H-Btu/Hr/ft2/F	1702.4	1523.2	1503.8	1491.2	1453	1379.4	1816.9	1242	396.2	671.7
COMPUTED H										
Jallouk	1320.4	1233.4	1174.4	1143.8	1106.7	1096	1071.6	837.8	441.8	453.9
Szady1(Cudo tube)	1800.5	1792.3	1803.1	1808.4	1796.2	1812.3	1806	1459.8	667	692.8
Szady2	1634.9	1625.6	1639.4	1678.7	1660.4	1677.4	1666.3	1217.6	650.7	653.3
(RLIQ)	95382	93297	88355	83767	79420	74935	70432	66975	64647	64401
(F)	1.005	1.463	1.972	2.326	2.609	2.857	3.08	3.261	3.335	3.346
(HLIQ)	196.4	285.8	384.9	453.9	509.5	557.9	601.6	636.4	650.7	653
(HBOIL)	1799.7	1789.9	1797.2	1798.8	1782.4	1794.5	1783.4	1418.4	276.9	378.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76									
DP Liquid Density-lbm/ft3	93.57									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.145	1.225	1.069	2.711	3.456					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.123	1.253	1.823	2.583	3.295					
Actual DP-ft	2.06	2.38	3.64	4.58	5.47					
Measured TP-Psig	109.5				3.3					
Measured Overall-ft	185.6									
Computed DP-ft	1.9	3.32	4.64	5.96	7.43					
Friction-ft	0.08	0.29	0.6	0.99	1.25					
Acceleration-ft	0.09	0.2	0.3	0.4	0.41					
Elevation-ft	1.73	2.83	3.74	4.56	5.77					

Run#	551									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	1:43									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	113.2									
Sat. Temperature-F(inlet)	154.6									
Liq. Density-lbm/ft3	81.79	81.59	81.62	81.64	81.62	81.61	81.61	81.7	81.72	81.72
Latent Heat-Btu/lbm	29.51	29.36	29.39	29.4	29.39	29.38	29.38	29.44	29.46	29.46
Specific Heat-Btu/lbm/F	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.286
Liq. Viscosity-lbm/ft-hr	0.429	0.425	0.426	0.426	0.426	0.426	0.426	0.427	0.428	0.428
Liq. Conductivity-Btu/hr-ft-F	0.025	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249
Liq. Prandtl No.	4.91	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
Inlet Flow Rate-GPM	2.6									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	1.6									
Inlet Temperature-F	147.1									
Outlet Liq. Temperature-F	152.5									
Outlet Vap. Temperature-F	146.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	87.7									
Water outlet Temp.-F	131.2									
Inlet G-lbm/hr/ft2	512258		Temp	143.4	Density	82.56				
Subcooling-F	7.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	873.6	866	864.1	867.7	851.7	859.5	877.8	547.1	46	67.9
Heat Loss-Watts	12.8	3	4.1	4.1	4.1	3	1.8	2.8	3.1	17.6
Heat Flux-Btu/Hr/ft2	15143	15012	14979	15041	14764	14899	15216	9484	797	1177
Wall Temp. #3-F	161.3	163.4	162.2	161.7	165.1	162.8	160.4	160	152.8	152.3
Wall Temp. #4-F	161.9	161.3	163.7	162.6	163.5	163.2	160.7	160.3	153	152.8
Wall Temp. #5-F	161.9	160	164.9	162.6	162.2	163.3	159.9	159.1	153.2	153.3
Wall Temp. #1-F	72.1	161.9	160.4	160.4	161.8	163.8	161.3	158.6	152.6	152.8
Wall Temp. #2-F	162.1	162	161.4	161.2	161.9	164.3	161.4	158.5	152.7	153
Instream Temp.-F	150.7	151.8	151.6	151.5	151.6	151.7	151.7	151.2	151.1	151.1
Avg. Wall Temp.-F	161.8	162.2	161.9	161.8	162.3	163.3	160.7	159.3	152.9	152.8
Avg. Wall DT.-F	10.4	9.7	9.6	9.6	10	10.9	8.4	7.7	1.7	1.7
Remaining Subcool-F	1.5									
Exit Quality	-0.01	0.04	0.1	0.16	0.22	0.28	0.34	0.37	0.38	0.38
EXP. H-Btu/Hr/ft2/F	1453.9	1552.1	1552.5	1559.4	1471.5	1366.7	1821.8	1236.2	462.5	697.8
COMPUTED H										
Jallouk	1331.9	1292.5	1216	1169.9	1133.4	1121.8	1119.7	848	395.4	411.2
Szady1(Cudo tube)	1800	1804.6	1801.9	1806.1	1792.3	1803.4	1824.2	1452.8	609	641.7
Szady2	1633.1	1636.8	1633.8	1639	1656.4	1667.5	1691	1204.8	584	587
(RLIQ)	78072	77615	72901	68245	63741	59250	54635	50635	49025	48725
(F)	1.005	1.403	2.007	2.404	2.721	2.994	3.244	3.443	3.522	3.536
(HLIQ)	166.6	232.8	333	398.8	451.4	496.7	538.2	571	583.9	586.3
(HBOIL)	1799.6	1803.3	1798.1	1799.6	1782.7	1790.7	1808.4	1422.7	299.1	397.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	74.9									
DP Liquid Density-lbm/ft3	93.73									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.138	1.312	1.199	2.893	3.679					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.116	1.34	1.953	2.765	3.518					
Actual DP-ft	2.09	2.23	3.44	4.3	5.13					
Measured TP-Psig	113.2				3.6					
Measured Overall-ft	193.13									
Computed DP-ft	1.85	3.15	4.31	5.46	6.84					
Friction-ft	0.06	0.21	0.44	0.74	0.93					
Acceleration-ft	0.06	0.14	0.23	0.31	0.32					
Elevation-ft	1.73	2.79	3.64	4.41	5.6					

Run#	552									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	1:43									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	108.9									
Sat. Temperature-F(inlet)	152.1									
Liq. Density-lbm/ft3	81.87	81.96	82.04	81.96	81.98	81.98	81.92	82.04	82.04	82.09
Latent Heat-Btu/lbm	29.57	29.63	29.69	29.63	29.65	29.65	29.61	29.69	29.69	29.73
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285
Liq. Viscosity-lbm/ft-hr	0.431	0.432	0.434	0.432	0.433	0.433	0.432	0.434	0.434	0.435
Liq. Conductivity-Btu/hr-ft-F	0.025	0.0251	0.0251	0.0251	0.0251	0.0251	0.0251	0.0251	0.0251	0.0252
Liq. Prandtl No.	4.91	4.91	4.92	4.91	4.92	4.92	4.91	4.92	4.92	4.92
Inlet Flow Rate-GPM	2.6									
Outlet Liq. Flow Rate-GPM	1.3									
Outlet Vap. Flow Rate-GPM	1.7									
Inlet Temperature-F	146.9									
Outlet Liq. Temperature-F	150.4									
Outlet Vap. Temperature-F	144.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	85.2									
Water outlet Temp.-F	126.2									
Inlet G-lbm/hr/ft2	512728		Temp	143	Density	82.63				
Subcooling-F	5.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	870.2	863.4	864	863.6	864.1	868.4	867.7	545.3	46.3	67.5
Heat Loss-Watts	12.8	3	4.1	4.1	4.2	3.1	1.9	2.8	3.1	17.7
Heat Flux-Btu/Hr/ft2	15084	14966	14977	14970	14979	15053	15041	9452	803	1170
Wall Temp. #3-F	159.2	161.1	159.8	159.7	163.5	161	158.8	157.7	151.1	150.4
Wall Temp. #4-F	159.5	159.1	161.4	160.7	161.6	161.3	159.3	158.2	151.3	150.9
Wall Temp. #5-F	159.7	157.9	162.6	160.7	160.5	161.6	158.3	157.1	151.3	151.5
Wall Temp. #1-F	71.8	159.8	158	158.6	159.6	162.1	159.7	156.4	150.9	150.8
Wall Temp. #2-F	159.9	159.8	159	159.1	160.1	162.4	159.9	156.4	150.9	151.1
Instream Temp.-F	150.3	149.8	149.4	149.8	149.7	149.7	150	149.4	149.4	149.1
Avg. Wall Temp.-F	159.6	160	159.6	159.9	160.5	161.5	159.2	157.2	151.1	150.9
Avg. Wall DT.-F	8.6	9.5	9.5	9.4	10.1	11.1	8.5	7.3	1.7	1.8
Remaining Subcool-F	-0.9									
Exit Quality	0.01	0.07	0.12	0.18	0.24	0.3	0.36	0.39	0.39	0.4
EXP. H-Btu/Hr/ft2/F	1755.4	1579.8	1581	1584.4	1487	1353.7	1765.3	1289.1	482.4	654.7
COMPUTED H										
Jallouk	1299.5	1235.1	1170.4	1145.4	1123.3	1108.5	1094.4	837	403.6	418.1
Szady1(Cudo tube)	1792.4	1780.9	1778.8	1784.3	1785.6	1792	1796.6	1437	622.8	651.4
Szady2	1624.4	1611.2	1609.2	1649.8	1649.1	1654.5	1657.3	1190.3	601	604.6
(RLIQ)	77558	74688	69951	65710	61184	56898	52334	48421	46892	46482
(F)	1.192	1.692	2.186	2.545	2.85	3.118	3.357	3.554	3.628	3.649
(HLIQ)	197.6	280.3	362	421.7	472.1	516.6	556.3	588.5	600.9	604.1
(HBOIL)	1791.6	1778.6	1773.8	1776.5	1774.6	1777.6	1778.7	1403.3	290.7	382.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	74.5									
DP Liquid Density-lbm/ft3	93.78									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.135	1.469	1.33	3.045	3.839					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.113	1.497	2.084	2.917	3.678					
Actual DP-ft	2.09	1.94	3.2	4.02	4.83					
Measured TP-Psig	108.9				3.5					
Measured Overall-ft	184.89									
Computed DP-ft	1.71	2.96	4.11	5.26	6.64					
Friction-ft	0.07	0.24	0.5	0.81	1.01					
Acceleration-ft	0.08	0.16	0.25	0.34	0.34					
Elevation-ft	1.56	2.56	3.36	4.11	5.28					

Run#	553									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	1:43									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	116.6									
Sat. Temperature-F(inlet)	156.6									
Liq. Density-lbm/ft3	81.38	81.17	81.23	81.17	81.17	81.15	81.09	81.17	81.23	81.23
Latent Heat-Btu/lbm	29.21	29.05	29.1	29.05	29.05	29.04	29	29.05	29.1	29.1
Specific Heat-Btu/lbm/F	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287	0.287
Liq. Viscosity-lbm/ft-hr	0.421	0.417	0.418	0.417	0.417	0.417	0.416	0.417	0.418	0.418
Liq. Conductivity-Btu/hr-ft-F	0.0247	0.0246	0.0246	0.0246	0.0246	0.0246	0.0245	0.0246	0.0246	0.0246
Liq. Prandtl No.	4.88	4.87	4.88	4.87	4.87	4.87	4.87	4.87	4.88	4.88
Inlet Flow Rate-GPM	1.8									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	149.4									
Outlet Liq. Temperature-F	155									
Outlet Vap. Temperature-F	149.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	91.7									
Water outlet Temp.-F	131.1									
Inlet G-lbm/hr/ft2	353578		Temp	144.7	Density	82.31				
Subcooling-F	7.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	863.9	857.3	862	860.1	863.6	868.4	576	56.3	45.6	64.7
Heat Loss-Watts	14	3.3	4.5	4.8	5	4.1	2	2.8	3.6	20.7
Heat Flux-Btu/Hr/ft2	14975	14861	14942	14909	14970	15053	9985	976	790	1122
Wall Temp. #3-F	162.3	164.1	163.1	163.3	166.9	164.2	161.6	155.7	155.5	154.9
Wall Temp. #4-F	162.9	162.2	164.7	164.2	165.4	165.1	161.4	155.9	155.7	155.4
Wall Temp. #5-F	162.9	161.3	166.1	164	164	165.4	160	156	155.8	156
Wall Temp. #1-F	71.4	162.8	161.4	161.9	163.3	168	161.1	155.5	155	155.5
Wall Temp. #2-F	163.3	162.8	162.2	162.8	163.4	166.5	161.1	155.8	155	155.7
Instream Temp.-F	152.9	154	153.7	154	154	154.1	154.4	154	153.7	153.7
Avg. Wall Temp.-F	162.9	163	162.9	163.4	164	165.2	161	155.8	155.4	155.5
Avg. Wall DT.-F	9.3	8.3	8.5	8.7	9.3	10.4	6.2	1.7	1.7	1.7
Remaining Subcool-F	-1.5									
Exit Quality	0.01	0.1	0.18	0.27	0.35	0.44	0.5	0.5	0.51	0.51
EXP. H-Btu/Hr/ft2/F	1614.9	1789.7	1763.1	1718.4	1601.3	1448.2	1613.3	562.2	474.9	641.1
COMPUTED H										
Jallouk	1358.2	1299.8	1267.6	1234.7	1213	1184.9	933.4	346	332.2	356.9
Szady1(Cudo tube)	1813.8	1819.4	1822	1824.3	1829.1	1836.5	1508.3	565.1	533.2	586.2
Szady2	1646.3	1651.4	1655	1657.2	1663	1709	1299.5	483.6	485.5	489.6
(RLIQ)	54497	52270	47451	42858	38140	33423	29538	27704	27355	27054
(F)	1.261	1.855	2.438	2.865	3.226	3.546	3.787	3.9	3.924	3.942
(HLIQ)	165.8	229.4	301.4	354.3	399	438.6	468.5	482.3	485.1	487.3
(HBOIL)	1813.4	1818.2	1819.2	1819.8	1822.7	1828.1	1493.1	408.6	334.4	440.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	74									
DP Liquid Density-lbm/ft3	93.85									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.064	1.69	1.612	3.415	4.261					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.042	1.718	2.366	3.287	4.1					
Actual DP-ft	2.24	1.58	2.74	3.42	4.14					
Measured TP-Psig	116.6				3.4					
Measured Overall-ft	200.69									
Computed DP-ft	1.57	2.6	3.5	4.61	5.87					
Friction-ft	0.04	0.15	0.32	0.47	0.58					
Acceleration-ft	0.05	0.1	0.17	0.21	0.21					
Elevation-ft	1.48	2.35	3.01	3.93	5.08					

Run#	554									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	5:28									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	106.3									
Sat. Temperature-F(inlet)	150.5									
Liq. Density-lbm/ft3	81.98	82.05	82.13	82.07	82.09	82.09	81.94	82.05	82.07	82.07
Latent Heat-Btu/lbm	29.65	29.7	29.76	29.72	29.73	29.73	29.62	29.7	29.72	29.72
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285
Liq. Viscosity-lbm/ft-hr	0.433	0.434	0.436	0.435	0.435	0.435	0.432	0.434	0.435	0.435
Liq. Conductivity-Btu/hr-ft-F	0.0251	0.0252	0.0252	0.0252	0.0252	0.0252	0.0251	0.0252	0.0252	0.0252
Liq. Prandtl No.	4.92	4.92	4.92	4.92	4.92	4.92	4.91	4.92	4.92	4.92
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	1.4									
Outlet Vap. Flow Rate-GPM	1.5									
Inlet Temperature-F	145.4									
Outlet Liq. Temperature-F	150.3									
Outlet Vap. Temperature-F	145.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	92.1									
Water outlet Temp.-F	133.3									
Inlet G-lbm/hr/ft2	199824		Temp	137.1	Density	83.73				
Subcooling-F	5.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	875	863.2	858.5	857	857.2	650.4	77.6	55.8	46.5	65.2
Heat Loss-Watts	13.7	3.2	4.4	4.6	4.9	4.8	1.8	2.8	3.6	20.9
Heat Flux-Btu/Hr/ft2	15168	14963	14882	14856	14859	11274	1345	967	806	1130
Wall Temp. #3-F	157.1	159.2	157.3	158.4	161.7	165.8	152.2	151.8	151.3	151
Wall Temp. #4-F	157.6	157.1	159	159.4	160	165.6	152.3	151.8	151.7	151.5
Wall Temp. #5-F	157.4	155.6	160.6	158.7	159	160.3	152.5	151.9	151.7	152.1
Wall Temp. #1-F	70.3	157.1	156.1	156.5	158.1	159.4	159.2	151.4	150.8	151.5
Wall Temp. #2-F	158.2	157.4	156.9	157.6	158.6	159.4	153.4	151.8	150.8	151.7
Instream Temp.-F	149.7	149.3	148.9	149.2	149.1	149.1	149.9	149.3	149.2	149.2
Avg. Wall Temp.-F	157.6	157.7	157.3	158.3	158.9	162.8	152.7	151.7	151.3	151.6
Avg. Wall DT.-F	7.2	7.7	7.8	8.4	9.2	13.2	2.8	2.4	2	2.3
Remaining Subcool-F	-10.5									
Exit Quality	0.1	0.25	0.4	0.54	0.69	0.8	0.81	0.82	0.83	0.84
EXP. H-Btu/Hr/ft2/F	2109.7	1937.3	1919.6	1773	1623.3	856.3	487.5	403.6	398.3	489.5
COMPUTED H										
Jallouk	1389.9	1300.1	1272.6	1248.2	77.6	77.6	77.7	77.7	77.6	77.6
Szady1(Cudo tube)	1790.6	1774.6	1766	1768.3	77.6	77.6	77.7	77.7	77.6	77.6
Szady2	1623.2	1604.3	1594.5	1596.8	77.6	77.6	77.7	77.7	77.6	77.6
(RLIQ)	28877	24896	20329	15969	15969	15969	15969	15969	15969	15969
(F)	1.824	2.673	3.361	3.908	3.908	3.908	3.908	3.908	3.908	3.908
(HLIQ)	142.2	208.3	261.7	304.4	304.4	304.4	304.4	304.4	304.4	304.4
(HBOIL)	1790.3	1773.6	1764.1	1765.3	1765.3	1765.3	1765.3	1765.3	1765.3	1765.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	74.1									
DP Liquid Density-lbm/ft3	93.84									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.537	2.258	2.158	4.054	5.003					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.515	2.286	2.912	3.926	4.842					
Actual DP-ft	1.38	0.56	1.75	2.26	2.8					
Measured TP-Psig	106.3				3.3					
Measured Overall-ft	180.19									
Computed DP-ft	1.09	1.77	2.3	3.48	4.59					
Friction-ft	0.03	0.1	0.19	0.24	0.29					
Acceleration-ft	0.03	0.08	0.13	0.14	0.15					
Elevation-ft	1.02	1.59	1.98	3.1	4.15					

Run#	555									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	5:28									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	101.4									
Sat. Temperature-F(inlet)	147.5									
Liq. Density-lbm/ft3	82.39	82.5	82.57	82.51	82.5	82.48	82.39	82.48	82.51	82.5
Latent Heat-Btu/lbm	29.94	30.02	30.07	30.04	30.02	30.01	29.94	30.01	30.04	30.02
Specific Heat-Btu/lbm/F	0.284	0.284	0.284	0.284	0.284	0.284	0.284	0.284	0.284	0.284
Liq. Visoosity-lbm/ft-hr	0.441	0.443	0.444	0.443	0.443	0.443	0.441	0.443	0.443	0.443
Liq. Conductivity-Btu/hr-ft-F	0.0254	0.0254	0.0255	0.0254	0.0254	0.0254	0.0254	0.0254	0.0254	0.0254
Liq. Prandtl No.	4.94	4.94	4.95	4.95	4.94	4.94	4.94	4.94	4.95	4.94
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	1.7									
Outlet Vap. Flow Rate-GPM	2.6									
Inlet Temperature-F	144									
Outlet Liq. Temperature-F	148.1									
Outlet Vap. Temperature-F	143.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	89.7									
Water outlet Temp.-F	129.4									
Inlet G-lbm/hr/ft2	200303		Temp		136	Density	83.93			
Subcooling-F	3.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	863.3	852.7	848	843.4	847.2	642.7	76.3	55.2	45.4	64.6
Heat Loss-Watts	13.1	3.1	4.2	4.4	4.6	4.4	1.7	2.6	3.5	19.8
Heat Flux-Btu/Hr/ft2	14965	14781	14700	14620	14686	11141	1323	957	787	1120
Wall Temp. #3-F	154.8	156.7	155	156.4	159.8	168.1	149.9	149.4	149.3	149
Wall Temp. #4-F	155.3	154.5	156.8	157.3	157.8	167.9	150	149.5	149.4	149.3
Wall Temp. #5-F	155.1	153.2	158.3	156.5	156.7	161.1	150.2	149.5	149.4	149.9
Wall Temp. #1-F	71	154.7	153.7	154.6	156.1	157.9	151	149.4	148.7	149.1
Wall Temp. #2-F	156.1	155.1	154.6	155.4	156.4	157.7	151.1	149.4	148.7	149.4
Instream Temp.-F	147.6	146.9	146.6	146.8	146.9	147	147.5	147	146.8	146.9
Avg. Wall Temp.-F	155.3	155.3	155	156.2	156.8	163.8	150.4	149.4	149.1	149.3
Avg. Wall DT.-F	7.1	7.7	7.9	8.7	9.2	16.2	2.9	2.4	2.3	2.4
Remaining Subcool-F	-11.9									
Exit Quality	0.11	0.26	0.4	0.54	0.69	0.79	0.81	0.82	0.82	0.84
EXP. H-Btu/Hr/ft2/F	2093.3	1924.1	1870	1672.9	1598.6	685.7	459.2	399.2	347.5	468.7
COMPUTED H										
Jallouk	1334.4	1284.8	1237.9	1212.7	77.7	77.7	77.7	77.7	77.7	77.7
Szady1(Cudo tube)	1755.2	1738.6	1730.2	1729.3	77.7	77.7	77.7	77.7	77.7	77.7
Szady2	1583.7	1564.5	1555	1553.4	77.7	77.7	77.7	77.7	77.7	77.7
(RLIQ)	28043	24094	19774	15605	15605	15605	15605	15605	15605	15605
(F)	1.894	2.76	3.434	3.974	3.974	3.974	3.974	3.974	3.974	3.974
(HLIQ)	147.6	214.8	267.2	309.4	309.4	309.4	309.4	309.4	309.4	309.4
(HBOIL)	1754.9	1737.5	1728.1	1726	1726	1726	1726	1726	1726	1726
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	74.7									
DP Liquid Density-lbm/ft3	93.75									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.744	2.382	2.238	4.145	5.104					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.722	2.41	2.992	4.017	4.943					
Actual DP-ft	1.01	0.34	1.6	2.08	2.59					
Measured TP-Psig	101.4				3.0					
Measured Overall-ft	170.71									
Computed DP-ft	1.05	1.72	2.26	3.44	4.54					
Friction-ft	0.03	0.1	0.2	0.25	0.3					
Acceleration-ft	0.03	0.08	0.14	0.14	0.15					
Elevation-ft	0.99	1.54	1.92	3.04	4.09					

Run#	556									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	5:28									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	112.8									
Sat. Temperature-F(inlet)	154.4									
Liq. Density-lbm/ft3	82.13	81.42	81.49	81.32	81.4	81.45	81.19	81.36	81.47	81.38
Latent Heat-Btu/lbm	29.76	29.24	29.29	29.17	29.22	29.28	29.07	29.19	29.28	29.21
Specific Heat-Btu/lbm/F	0.285	0.287	0.286	0.287	0.287	0.286	0.287	0.287	0.286	0.287
Liq. Viscosity-lbm/ft-hr	0.436	0.422	0.423	0.42	0.422	0.423	0.418	0.421	0.423	0.421
Liq. Conductivity-Btu/hr-ft-F	0.0252	0.0247	0.0248	0.0247	0.0247	0.0248	0.0246	0.0247	0.0248	0.0247
Liq. Prandtl No.	4.92	4.89	4.89	4.88	4.89	4.89	4.88	4.88	4.89	4.88
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	142.4									
Outlet Liq. Temperature-F	153.3									
Outlet Vap. Temperature-F	149.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	97.2									
Water outlet Temp.-F	138.1									
Inlet G-lbm/hr/ft2	199077		Temp	138.8	Density	83.42				
Subcooling-F	12									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	872.6	882	874.3	868.1	871.6	665.5	76.9	56.7	44.2	55.6
Heat Loss-Watts	14.4	3.4	4.6	5	5.3	4	1.9	2.9	3.8	22.8
Heat Flux-Btu/Hr/ft2	15126	15289	15155	15048	15109	11536	1333	983	766	964
Wall Temp. #3-F	160.5	162.6	160.6	162.4	165.3	161.5	156.2	155.6	154.8	155.1
Wall Temp. #4-F	161	160.5	162.3	163.3	163.3	161.5	156.3	155.5	154.9	155.4
Wall Temp. #5-F	160.9	158.9	163.7	162.4	162.2	161	156.3	155.4	154.8	155.4
Wall Temp. #1-F	73.1	160.5	159.5	160.5	161.9	162	156.6	155.5	154.3	155.6
Wall Temp. #2-F	161.7	160.9	160.3	161.6	162.2	162	156.6	155.6	154.4	155.7
Instream Temp.-F	148.9	152.7	152.3	153.2	152.8	152.6	153.9	153	152.4	152.9
Avg. Wall Temp.-F	161	161.1	160.7	162.2	162.4	161.5	156.4	155.5	154.6	155.4
Avg. Wall DT.-F	11.4	7.7	7.7	8.3	8.9	8.5	2.4	2.5	2.2	2.5
Remaining Subcool-F	-3.7									
Exit Quality	0.03	0.19	0.34	0.49	0.64	0.76	0.77	0.78	0.79	0.8
EXP. H-Btu/Hr/ft2/F	1322	1976.8	1970.8	1819.6	1694.3	1360.6	546.4	397	347.4	386.1
COMPUTED H										
Jallouk	1392.2	1372.2	1315.4	1307.7	1285.1	77.6	77.7	77.6	77.6	77.6
Szady1(Cudo tube)	1779.5	1830.6	1818.7	1822.6	1822.6	77.6	77.7	77.6	77.6	77.6
Szady2	1610.9	1667.2	1653.2	1656.6	1657.1	77.6	77.7	77.6	77.6	77.6
(RLIQ)	29366	27445	22681	18147	13396	13396	13396	13396	13396	13396
(F)	1.448	2.261	3.05	3.625	4.145	4.145	4.145	4.145	4.145	4.145
(HLIQ)	112.6	176.3	237.8	282.9	323.4	323.4	323.4	323.4	323.4	323.4
(HBOIL)	1779.3	1830.1	1817.3	1820.3	1819.2	1819.2	1819.2	1819.2	1819.2	1819.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.9									
DP Liquid Density-lbm/ft3	92.86									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.585	1.939	1.923	3.786	4.708					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.563	1.967	2.677	3.658	4.547					
Actual DP-ft	1.29	1.08	2.11	2.68	3.22					
Measured TP-Psig	112.8				3.7					
Measured Overall-ft	183.06									
Computed DP-ft	1.29	2.03	2.59	3.78	4.9					
Friction-ft	0.02	0.08	0.16	0.21	0.26					
Acceleration-ft	0.02	0.06	0.12	0.12	0.13					
Elevation-ft	1.25	1.88	2.31	3.45	4.51					

Run#	557									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	5:28									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	79.4									
Sat. Temperature-F(inlet)	132.5									
Liq. Density-lbm/ft3	85.56	85.45	85.18	85.2	85.18	85.2	85.27	85.33	85.35	85.45
Latent Heat-Btu/lbm	32.17	32.09	31.91	31.92	31.91	31.92	31.97	32.01	32.02	32.09
Specific Heat-Btu/lbm/F	0.277	0.277	0.278	0.277	0.278	0.277	0.277	0.277	0.277	0.277
Liq. Viscosity-lbm/ft-hr	0.511	0.508	0.502	0.502	0.502	0.502	0.504	0.505	0.506	0.508
Liq. Conductivity-Btu/hr-ft-F	0.0274	0.0273	0.0271	0.0271	0.0271	0.0271	0.0272	0.0272	0.0272	0.0273
Liq. Prandtl No.	5.16	5.15	5.13	5.13	5.13	5.13	5.14	5.14	5.14	5.15
Inlet Flow Rate-GPM	3.9									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	2.3									
Inlet Temperature-F	128.3									
Outlet Liq. Temperature-F	129.3									
Outlet Vap. Temperature-F	125.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	85.7									
Water outlet Temp.-F	114.5									
Inlet G-lbm/hr/ft2	798043		Temp	125.8	Density	85.75				
Subcooling-F	4.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	590.6	576.4	572.9	573.4	583.2	584.9	579.9	578.2	578.8	587.6
Heat Loss-Watts	22.3	5.3	7.2	8.8	9.7	9.5	7.4	8.4	8.3	45.4
Heat Flux-Btu/Hr/ft2	10238	9992	9931	9940	10109	10139	10052	10023	10033	10186
Wall Temp. #3-F	141.5	143.1	142.9	142	144.3	142.4	142.5	142	141.3	142
Wall Temp. #4-F	141.9	141.6	143.8	142.6	143.1	142.4	143.1	142.5	142	141.4
Wall Temp. #5-F	142	140.5	144.6	143	142.1	143	142	141.4	140.4	141.4
Wall Temp. #1-F	76.8	142.3	141.1	140.8	141.1	143	143	142.5	139.5	137.7
Wall Temp. #2-F	142.9	142.3	141.8	141.4	141.2	143.4	143.3	143	140.1	139.6
Instream Temp.-F	129.2	129.9	131.5	131.4	131.5	131.4	131	130.6	130.5	129.9
Avg. Wall Temp.-F	142.1	142.3	142.4	142.1	141.9	142.7	142.8	142.3	140.7	140.4
Avg. Wall DT.-F	12.4	12	10.5	10.3	9.9	10.8	11.3	11.2	9.7	10.1
Remaining Subcool-F	1.5									
Exit Quality	-0.01	0.01	0.03	0.06	0.08	0.1	0.13	0.15	0.17	0.19
EXP. H-Btu/Hr/ft2/F	824.8	834.5	950.2	969.6	1019.3	935.2	887.6	892.7	1033.6	1012.5
COMPUTED H										
Jallouk	879.6	870.6	824.1	801.4	800.7	795.1	785.7	779.8	771.7	771.3
Szady1(Cudo tube)	1301.6	1291.4	1304.3	1308	1323.7	1329.2	1325.5	1325.8	1331	1341.3
Szady2	1079.8	1067.5	1099.9	1100.1	1114.3	1117.2	1093.2	1095.4	1102.1	1114.7
(RLIQ)	102174	102741	101860	99409	97088	94589	91883	89208	86762	83969
(F)	1.006	1.006	1.561	1.861	2.099	2.307	2.494	2.666	2.822	2.977
(HLIQ)	231.3	231.5	360	429.1	484.1	531.9	574.8	614.1	650	685.1
(HBOIL)	1299.2	1289	1295.1	1292.4	1301.7	1300.2	1288.5	1280.4	1277.2	1278.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.9									
DP Liquid Density-lbm/ft3	93.15									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.123	0.64	0.317	1.9	2.197					
Zero Corrections-psid	-0.027	-0.102	-0.17	0.016	-0.018					
Corrected DP-Psid	0.15	0.742	0.487	1.884	2.215					
Actual DP-ft	1.93	3.11	5.72	5.55	7.03					
Measured TP-Psig	79.4				3.5					
Measured Overall-ft	127.91									
Computed DP-ft	2.04	3.74	5.32	6.89	8.38					
Friction-ft	0.1	0.3	0.61	1	1.45					
Acceleration-ft	0.08	0.2	0.29	0.39	0.49					
Elevation-ft	1.87	3.24	4.42	5.5	6.45					

Run#	558									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	9:54									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	80.1									
Sat. Temperature-F(inlet)	133.1									
Liq. Density-lbm/ft3	85.71	85.6	85.3	85.3	85.3	85.31	85.35	85.36	85.36	85.53
Latent Heat-Btu/lbm	32.27	32.19	31.99	31.99	31.99	32	32.02	32.04	32.04	32.15
Specific Heat-Btu/lbm/F	0.276	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277
Liq. Viscosity-lbm/ft-hr	0.515	0.512	0.504	0.504	0.504	0.505	0.506	0.506	0.506	0.51
Liq. Conductivity-Btu/hr-ft-F	0.0275	0.0274	0.0272	0.0272	0.0272	0.0272	0.0272	0.0273	0.0273	0.0274
Liq. Prandtl No.	5.17	5.16	5.14	5.14	5.14	5.14	5.14	5.15	5.15	5.16
Inlet Flow Rate-GPM	3.9									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	2.3									
Inlet Temperature-F	127.5									
Outlet Liq. Temperature-F	128.7									
Outlet Vap. Temperature-F	125.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	86.3									
Water outlet Temp.-F	114.4									
Inlet G-lbm/hr/ft2	798688		Temp		125.4	Density		85.81		
Subcooling-F	5.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	588.2	573.5	574.8	574.5	581.1	582.8	577.6	576	580.1	589
Heat Loss-Watts	22	5.2	7.1	8.7	9.6	9.3	7.3	8.2	8.2	44.6
Heat Flux-Btu/Hr/ft2	10196	9941	9964	9959	10073	10102	10012	9985	10056	10210
Wall Temp. #3-F	140.9	142.4	142.2	141.8	144.1	141.8	142.4	141.7	141.1	141.5
Wall Temp. #4-F	141.4	140.9	143.1	142.3	142.8	142.3	142.9	141.9	141.9	140.7
Wall Temp. #5-F	141.4	139.9	143.9	142.6	141.7	142.4	141.6	141.2	140.1	140.7
Wall Temp. #1-F	77.2	141.6	140.6	140.2	140.9	142.6	142.5	142.4	139	137
Wall Temp. #2-F	142.2	141.7	141.1	140.9	140.9	142.8	142.9	142.7	139.6	138.8
Instream Temp.-F	128.3	129	130.8	130.8	130.8	130.7	130.6	130.4	130.4	129.4
Avg. Wall Temp.-F	141.5	141.7	141.8	141.7	141.6	142.3	142.5	142	140.3	139.7
Avg. Wall DT.-F	12.7	12.2	10.5	10.5	10.3	11.1	11.5	11.1	9.5	9.9
Remaining Subcool-F	2.8									
Exit Quality	-0.02	0	0.02	0.04	0.07	0.09	0.11	0.14	0.16	0.18
EXP. H-Btu/Hr/ft2/F	801.9	814.8	949	950.7	976.1	908.6	870.1	897.2	1060.1	1033.5
COMPUTED H										
Jallouk	872.6	863.1	837.8	805.1	800.1	793.8	784.5	779.3	778.7	772
Szady1(Cudo tube)	1291.9	1281.2	1298.9	1302.5	1313.9	1319.3	1316.9	1319.4	1328.9	1336.3
Szady2	1070.2	1057.3	1096.7	1096.5	1105.5	1108.2	1083.7	1088.1	1099.5	1109.7
(RLIQ)	101533	102095	102565	100206	97827	95356	92822	90383	88014	84944
(F)	1.006	1.006	1.355	1.724	1.99	2.212	2.407	2.583	2.743	2.909
(HLIQ)	231.1	231.3	312.4	397.6	458.7	509.8	554.8	595	632.1	669.2
(HBOIL)	1289.4	1278.7	1292.9	1290.1	1295	1293.4	1283.2	1277.7	1279.4	1277.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.2									
DP Liquid Density-lbm/ft3	93.1									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.122	0.628	0.301	1.876	2.13					
Zero Corrections-psid	-0.027	-0.102	-0.17	0.016	-0.018					
Corrected DP-Psid	0.149	0.73	0.471	1.86	2.198					
Actual DP-ft	1.93	3.19	5.74	5.58	7.05					
Measured TP-Psig	80.1				3.6					
Measured Overall-ft	128.8									
Computed DP-ft	2.08	3.89	5.48	7.05	8.54					
Friction-ft	0.08	0.26	0.54	0.91	1.34					
Acceleration-ft	0	0.18	0.27	0.36	0.46					
Elevation-ft	2	3.46	4.67	5.77	6.73					

Run#	559									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	9:54									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	79.7									
Sat. Temperature-F(inlet)	132.8									
Liq. Density-lbm/ft3	85.66	85.55	85.25	85.27	85.27	85.28	85.35	85.36	85.36	85.56
Latent Heat-Btu/lbm	32.24	32.16	31.96	31.97	31.97	31.98	32.02	32.04	32.04	32.17
Specific Heat-Btu/lbm/F	0.276	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277
Liq. Viscosity-lbm/ft-hr	0.513	0.511	0.503	0.504	0.504	0.504	0.506	0.506	0.506	0.511
Liq. Conductivity-Btu/hr-ft-F	0.0274	0.0274	0.0272	0.0272	0.0272	0.0272	0.0272	0.0273	0.0273	0.0274
Liq. Prandtl No.	5.17	5.16	5.14	5.14	5.14	5.14	5.14	5.15	5.15	5.16
Inlet Flow Rate-GPM	3.9									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	2.3									
Inlet Temperature-F	127.7									
Outlet Liq. Temperature-F	128.9									
Outlet Vap. Temperature-F	125.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	86.9									
Water outlet Temp.-F	114.7									
Inlet G-lbm/hr/ft2	798527		Temp	125.5	Density	85.8				
Subcooling-F	5.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	589.1	575.4	573.3	572.6	583.9	585.6	579.1	577	578.5	587.8
Heat Loss-Watts	21.8	5.2	7	8.6	9.4	9.2	7.2	8.1	8.1	44.1
Heat Flux-Btu/Hr/ft2	10212	9974	9938	9926	10122	10151	10038	10002	10028	10189
Wall Temp. #3-F	141.2	142.5	142.3	141.7	143.9	142	142.2	141.6	141	141.5
Wall Temp. #4-F	141.5	141.2	143.4	142.2	142.7	142.2	142.7	142.1	141.9	140.6
Wall Temp. #5-F	141.6	140.2	144.2	142.6	141.7	142.5	141.6	141.1	140.3	140.6
Wall Temp. #1-F	77.2	141.9	140.7	140.3	140.7	142.5	142.7	142.2	139.2	137.1
Wall Temp. #2-F	142.4	142	141.3	141	140.8	143.1	142.9	142.7	139.8	139
Instream Temp.-F	128.6	129.3	131.1	131	131	130.9	130.5	130.4	130.4	129.2
Avg. Wall Temp.-F	141.7	141.9	141.9	141.7	141.5	142.3	142.4	141.9	140.4	139.8
Avg. Wall DT.-F	12.6	12.1	10.4	10.3	10	10.9	11.5	11.1	9.6	10.1
Remaining Subcool-F	2.3									
Exit Quality	-0.02	0	0.03	0.05	0.07	0.09	0.12	0.14	0.16	0.19
EXP. H-Btu/Hr/ft2/F	809.6	821	957.8	968.2	1010.4	927.8	875.5	902.1	1046	1008.9
COMPUTED H										
Jallouk	875	866.5	831.1	802.3	801.4	795.3	784.6	779.3	772.3	770
Szady1(Cudo tube)	1295.2	1285.7	1300.4	1302.8	1319.3	1324.7	1319.4	1321.4	1328.3	1334.7
Szady2	1073.5	1061.8	1097.2	1095.7	1110.8	1113.6	1086.8	1090.6	1099	1108.3
(RLIQ)	101753	102316	102341	99902	97515	95027	92333	89889	87520	84327
(F)	1.006	1.006	1.441	1.778	2.032	2.249	2.443	2.616	2.774	2.94
(HLIQ)	231.2	231.4	332.3	409.9	468.5	518.5	562.9	602.6	639.1	676.2
(HBOIL)	1292.8	1283.1	1293.1	1289.1	1299.3	1297.7	1284.4	1278.3	1277	1274.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.2									
DP Liquid Density-lbm/ft3	93.1									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.121	0.627	0.299	1.869	2.18					
Zero Corrections-psid	-0.027	-0.102	-0.17	0.016	-0.018					
Corrected DP-Psid	0.148	0.729	0.469	1.853	2.198					
Actual DP-ft	1.93	3.13	5.74	5.59	7.05					
Measured TP-Psig	79.7				3.6					
Measured Overall-ft	128.07									
Computed DP-ft	2.05	3.82	5.41	6.97	8.46					
Friction-ft	0.09	0.27	0.56	0.95	1.39					
Acceleration-ft	0.03	0.19	0.28	0.37	0.47					
Elevation-ft	1.94	3.36	4.56	5.65	6.61					

Run#	560									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	9:54									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	82.3									
Sat. Temperature-F(inlet)	134.7									
Liq. Density-lbm/ft3	85.28	85.16	85	84.95	84.96	84.98	85.11	85.11	85.15	85.31
Latent Heat-Btu/lbm	31.98	31.9	31.78	31.75	31.76	31.77	31.88	31.86	31.89	32
Specific Heat-Btu/lbm/F	0.277	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.277
Liq. Visoosity-lbm/ft-hr	0.504	0.501	0.497	0.496	0.497	0.497	0.5	0.5	0.501	0.505
Liq. Conductivity-Btu/hr-ft-F	0.0272	0.0271	0.027	0.027	0.027	0.027	0.0271	0.0271	0.0271	0.0272
Liq. Prandtl No.	5.14	5.13	5.12	5.11	5.11	5.11	5.12	5.12	5.13	5.14
Inlet Flow Rate-GPM	3.9									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	129.7									
Outlet Liq. Temperature-F	130.6									
Outlet Vap. Temperature-F	127.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	88.1									
Water outlet Temp.-F	115.8									
Inlet G-lbm/hr/ft2	796427		Temp		126.8	Density	85.57			
Subcooling-F	5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	593.1	578.6	569.1	569.4	579.3	580.6	581.5	579.6	573.1	580.7
Heat Loss-Watts	21.7	5.1	7	8.5	9.4	9.2	7.1	8	8	43.8
Heat Flux-Btu/Hr/ft2	10281	10030	9865	9870	10042	10064	10080	10047	9934	10066
Wall Temp. #3-F	142.4	143.8	143.6	143.2	145.5	143.3	143.6	142.9	142.2	142.6
Wall Temp. #4-F	143	142.4	144.6	143.8	144.2	143.7	143.9	143.6	142.9	141.8
Wall Temp. #5-F	143	141.7	145.5	143.9	143.2	144	143	142.3	141.8	141.8
Wall Temp. #1-F	78.2	143.3	141.9	141.8	142.4	144.2	143.9	143.7	140.7	138.2
Wall Temp. #2-F	143.7	143.3	142.5	142.2	142.4	144.2	144.5	143.9	141.3	140.2
Instream Temp.-F	130.9	131.6	132.6	132.9	132.8	132.7	131.9	131.9	131.7	130.7
Avg. Wall Temp.-F	143	143.2	143.2	143.2	143.1	143.8	143.8	143.3	141.8	140.9
Avg. Wall DT.-F	11.7	11.1	10.1	9.8	9.8	10.6	11.4	10.9	9.6	9.8
Remaining Subcool-F	2.2									
Exit Quality	-0.02	0	0.03	0.05	0.07	0.1	0.12	0.14	0.17	0.19
EXP. H-Btu/Hr/ft2/F	881.7	899.8	976.3	1004.2	1025.1	945.4	882.3	919.6	1031.5	1030.8
COMPUTED H										
Jallouk	891.3	882	833.5	807.4	805.3	799	791.3	786.2	773.6	771
Szady1(Cudo tube)	1317.8	1307.3	1307.6	1314.2	1328.4	1333.3	1332.7	1335.6	1332.3	1338.4
Szady2	1095.8	1083	1103.8	1106.7	1119.4	1121.5	1099.3	1103.8	1101.6	1110.3
(RLIQ)	103347	103923	103161	101014	98514	95994	92955	90531	87988	84912
(F)	1.006	1.006	1.46	1.784	2.033	2.246	2.441	2.612	2.771	2.931
(HLIQ)	231.4	231.6	336.5	411.5	468.9	517.9	562.3	601.7	638.1	674.1
(HBOIL)	1315.4	1304.8	1300.1	1300.6	1308.6	1306.8	1298.5	1293.6	1281.6	1278.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.2									
DP Liquid Density-lbm/ft3	92.96									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.128	0.664	0.348	1.933	2.237					
Zero Corrections-psid	-0.027	-0.102	-0.17	0.016	-0.018					
Corrected DP-Psid	0.155	0.766	0.518	1.917	2.255					
Actual DP-ft	1.92	3.07	5.68	5.48	6.95					
Measured TP-Psig	82.3				3.6					
Measured Overall-ft	132.83									
Computed DP-ft	2.05	3.8	5.39	6.95	8.44					
Friction-ft	0.09	0.28	0.56	0.94	1.38					
Acceleration-ft	0.04	0.19	0.28	0.37	0.47					
Elevation-ft	1.92	3.34	4.54	5.64	6.59					

Run#	561									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	9:54									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	82									
Sat. Temperature-F(inlet)	134.4									
Liq. Density-lbm/ft3	85.05	84.96	84.8	84.83	84.83	84.85	84.86	84.88	84.91	85.03
Latent Heat-Btu/lbm	31.82	31.76	31.64	31.67	31.67	31.68	31.69	31.7	31.73	31.81
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.499	0.497	0.493	0.493	0.493	0.494	0.494	0.495	0.495	0.498
Liq. Conductivity-Btu/hr-ft-F	0.0271	0.027	0.0269	0.0269	0.0269	0.0269	0.0269	0.0269	0.027	0.027
Liq. Prandtl No.	5.12	5.11	5.1	5.1	5.1	5.1	5.11	5.11	5.11	5.12
Inlet Flow Rate-GPM	3.9									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	131.2									
Outlet Liq. Temperature-F	131.9									
Outlet Vap. Temperature-F	128.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	89.4									
Water outlet Temp.-F	117.3									
Inlet G-lbm/hr/ft2	794151		Temp		128.2	Density	85.33			
Subcooling-F	3.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	595.8	580.6	570.7	571.1	586	588.2	584.2	582.6	574.9	587
Heat Loss-Watts	21.7	5.1	7	8.5	9.4	9.1	7.1	8.1	8	44
Heat Flux-Btu/Hr/ft2	10328	10064	9893	9900	10158	10196	10127	10099	9966	10175
Wall Temp. #3-F	143.7	145.2	144.8	144.1	146.3	144.3	144.7	144.2	143.6	144
Wall Temp. #4-F	144.2	143.8	145.7	144.7	145.2	144.7	145.3	144.7	144.2	143.3
Wall Temp. #5-F	144.2	142.7	146.6	144.8	144.3	144.9	144.2	143.7	142.9	143.3
Wall Temp. #1-F	78.9	144.6	143	142.7	143.4	144.9	145.4	144.9	142.1	139.7
Wall Temp. #2-F	145	144.5	143.7	143.2	143.5	145.4	145.8	145.3	142.5	141.7
Instream Temp.-F	132.3	132.8	133.8	133.6	133.6	133.5	133.4	133.3	133.1	132.4
Avg. Wall Temp.-F	144.3	144.5	144.3	144.1	144.1	144.7	145.1	144.6	143.1	142.4
Avg. Wall DT.-F	11.5	11.2	10.1	10	10	10.7	11.2	10.8	9.5	9.5
Remaining Subcool-F	0.5									
Exit Quality	0	0.02	0.04	0.07	0.09	0.11	0.14	0.16	0.18	0.21
EXP. H-Btu/Hr/ft2/F	897.4	895	984.1	987.2	1011.7	949.4	902.4	934.8	1047.9	1066.6
COMPUTED H										
Jallouk	901.8	858.2	825.2	805.4	808.7	803.6	795.9	790.9	777.1	778.2
Szady1(Cudo tube)	1332	1320.7	1321.4	1324.2	1344.8	1350.7	1350.3	1352.7	1348.1	1361
Szady2	1109.9	1120.2	1115.5	1114.9	1135	1138.6	1117.2	1121.2	1117.4	1133
(RLIQ)	104203	103845	102233	99645	97184	94812	92048	89501	86910	83984
(F)	1.006	1.3	1.687	1.953	2.174	2.371	2.548	2.71	2.862	3.013
(HLIQ)	231.3	299.2	388.6	449.9	500.9	546.2	586.9	624.2	658.9	692.9
(HBOIL)	1329.7	1315.6	1310.1	1306.6	1321.2	1320.3	1312.2	1306.8	1293.5	1298.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.5									
DP Liquid Density-lbm/ft3	92.92									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.129	0.668	0.353	1.937	2.244					
Zero Corrections-psid	-0.027	-0.102	-0.17	0.016	-0.018					
Corrected DP-Psid	0.156	0.77	0.523	1.921	2.262					
Actual DP-ft	1.92	3.07	5.67	5.49	6.96					
Measured TP-Psig	82				3.6					
Measured Overall-ft	132.77									
Computed DP-ft	2.04	3.7	5.27	6.84	8.33					
Friction-ft	0.11	0.33	0.64	1.05	1.5					
Acceleration-ft	0.11	0.22	0.31	0.4	0.5					
Elevation-ft	1.83	3.16	4.32	5.39	6.33					

Run#	562									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	9:54									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	85.8									
Sat. Temperature-F(inlet)	137.1									
Liq. Density-lbm/ft3	84.91	84.81	84.64	84.68	84.68	84.69	84.66	84.74	84.76	84.91
Latent Heat-Btu/lbm	31.73	31.68	31.54	31.56	31.56	31.57	31.55	31.61	31.62	31.73
Specific Heat-Btu/lbm/F	0.278	0.278	0.279	0.279	0.279	0.279	0.279	0.279	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.495	0.493	0.489	0.49	0.49	0.49	0.489	0.491	0.492	0.495
Liq. Conductivity-Btu/hr-ft-F	0.027	0.0269	0.0268	0.0268	0.0268	0.0268	0.0268	0.0269	0.0269	0.027
Liq. Prandtl No.	5.11	5.1	5.09	5.09	5.09	5.09	5.09	5.1	5.1	5.11
Inlet Flow Rate-GPM	3.9									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	132									
Outlet Liq. Temperature-F	132.5									
Outlet Vap. Temperature-F	129.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	90.1									
Water outlet Temp.-F	118									
Inlet G-lbm/hr/ft2	782024		Temp		129.5	Density	85.1			
Subcooling-F	5.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	598.7	583.4	574.1	574.4	591.2	592.8	586.9	586.1	578.4	589.7
Heat Loss-Watts	21.8	5.2	7	8.5	9.4	9.2	7.3	8.2	8.1	44.1
Heat Flux-Btu/Hr/ft2	10378	10113	9952	9957	10248	10276	10174	10160	10026	10222
Wall Temp. #3-F	144.6	146.1	145.8	145	147.4	145.5	146.1	145.4	144.6	145.1
Wall Temp. #4-F	144.9	144.5	146.6	145.6	146.1	145.6	146.5	145.8	145.5	144
Wall Temp. #5-F	145.1	143.6	147.5	145.8	145	146.1	145.4	144.9	143.9	144
Wall Temp. #1-F	79.3	145.3	144	143.5	144.2	146.1	146.5	146.1	142.8	140.6
Wall Temp. #2-F	145.8	145.3	144.7	144	144.2	146.3	146.6	146.5	143.5	142.4
Instream Temp.-F	133.1	133.7	134.7	134.5	134.5	134.4	134.6	134.1	134	133.1
Avg. Wall Temp.-F	145.1	145.3	145.3	145	144.9	145.8	146.2	145.7	144.1	143.2
Avg. Wall DT.-F	11.5	11.1	10.1	10	9.9	11	11.2	11.2	9.6	9.7
Remaining Subcool-F	2.4									
Exit Quality	-0.02	0	0.03	0.05	0.07	0.1	0.12	0.15	0.17	0.19
EXP. H-Btu/Hr/ft2/F	900	907.6	982.9	993.2	1033.9	937.5	911.6	908.7	1043.6	1058.4
COMPUTED H										
Jallouk	909.2	898.5	850	818.7	821.5	814.5	805.5	798.4	789.9	784.6
Szady1(Cudo tube)	1341.7	1329.4	1329.7	1332.2	1354.8	1359.9	1359.4	1359.3	1355.1	1365.5
Szady2	1119.8	1105.1	1127.2	1126	1148.3	1150.6	1124.3	1126.5	1123.2	1136.7
(RLIQ)	104587	105088	104409	101777	99272	96850	94268	91381	88817	85704
(F)	1.006	1.006	1.439	1.772	2.024	2.24	2.427	2.602	2.76	2.919
(HLIQ)	231.1	231.2	331.2	407.8	465.9	515.5	558.6	598.6	634.8	670.5
(HBOIL)	1339.4	1327	1322.8	1319.3	1336.2	1334.7	1327.2	1319.4	1307	1309.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.3									
DP Liquid Density-lbm/ft3	92.94									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.13	0.676	0.363	1.957	2.263					
Zero Corrections-psid	-0.027	-0.102	-0.17	0.016	-0.018					
Corrected DP-Psid	0.157	0.778	0.533	1.941	2.281					
Actual DP-ft	1.92	3.06	5.66	5.47	6.94					
Measured TP-Psig	85.8				3.6					
Measured Overall-ft	139.4									
Computed DP-ft	2.05	3.82	5.41	6.97	8.45					
Friction-ft	0.09	0.27	0.55	0.92	1.35					
Acceleration-ft	0.03	0.18	0.27	0.36	0.46					
Elevation-ft	1.94	3.37	4.58	5.68	6.64					

Run#	563									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	12:14									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	95.3									
Sat. Temperature-F(inlet)	136.8									
Liq. Density-lbm/ft3	84.76	84.64	84.49	84.51	84.52	84.52	84.52	84.54	84.54	84.69
Latent Heat-Btu/lbm	31.62	31.54	31.43	31.45	31.46	31.46	31.46	31.47	31.47	31.57
Specific Heat-Btu/lbm/F	0.278	0.279	0.279	0.279	0.279	0.279	0.279	0.279	0.279	0.279
Liq. Viscosity-lbm/ft-hr	0.492	0.489	0.486	0.486	0.486	0.486	0.486	0.487	0.487	0.49
Liq. Conductivity-Btu/hr-ft-F	0.0269	0.0268	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267	0.0267	0.0268
Liq. Prandtl No.	5.1	5.09	5.08	5.08	5.08	5.08	5.08	5.08	5.08	5.09
Inlet Flow Rate-GPM	3.9									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	133.4									
Outlet Liq. Temperature-F	133.6									
Outlet Vap. Temperature-F	130.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	91									
Water outlet Temp.-F	119.1									
Inlet G-lbm/hr/ft2	790708		Temp		130.3	Density	84.96			
Subcooling-F	3.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	600.4	584.6	573.7	574	588	589.8	587.3	586.4	577.6	589.1
Heat Loss-Watts	21.9	5.2	7.1	8.6	9.5	9.2	7.3	8.2	8.2	44.4
Heat Flux-Btu/Hr/ft2	10408	10134	9945	9950	10193	10224	10180	10165	10012	10212
Wall Temp. #3-F	145.4	147	146.6	146.1	148.2	146.2	147	146.4	145.5	145.9
Wall Temp. #4-F	145.9	145.5	147.5	146.5	147	146.6	147.4	146.7	146.4	145.1
Wall Temp. #5-F	145.9	144.5	148.3	146.7	146	146.8	146.3	145.8	145.1	145.1
Wall Temp. #1-F	79.8	146.2	144.9	144.5	145.2	146.9	147.2	147.1	143.9	141.5
Wall Temp. #2-F	146.8	146.2	145.5	145.1	145.2	147	147.8	147.4	144.5	143.5
Instream Temp.-F	134	134.7	135.6	135.5	135.4	135.4	135.4	135.3	135.3	134.4
Avg. Wall Temp.-F	146	146.2	146.1	146	145.9	146.6	147.1	146.7	145.1	144.2
Avg. Wall DT.-F	11.5	11.1	10.1	10	10	10.8	11.3	10.9	9.3	9.4
Remaining Subcool-F	0.6									
Exit Quality	-0.01	0.02	0.04	0.07	0.09	0.11	0.14	0.16	0.18	0.21
EXP. H-Btu/Hr/ft2/F	902.7	915.7	987	995	1020.3	949.9	902.5	930.8	1073.4	1091.2
COMPUTED H										
Jallouk	916	874.5	837.2	816	817.9	812.6	805.8	800.7	786.9	786.5
Szady1(Cudo tube)	1350.9	1340.3	1338.9	1342.3	1361.1	1367.2	1368.9	1371.9	1367.3	1377.9
Szady2	1129	1141	1134	1133.9	1152.1	1155.8	1134.6	1139.3	1135.2	1148.8
(RLIQ)	105165	105066	103316	100741	98136	95578	93022	90401	87875	84733
(F)	1.006	1.275	1.672	1.94	2.162	2.358	2.533	2.695	2.843	2.996
(HLIQ)	231	293.2	384.9	446.4	497.5	542.5	582.9	620.1	654.2	688.5
(HBOIL)	1348.6	1335.6	1328.3	1325.6	1338.5	1338.1	1332.8	1328.3	1315.4	1318.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.8									
DP Liquid Density-lbm/ft3	92.87									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.133	0.68	0.37	1.92	2.271					
Zero Corrections-psid	-0.027	-0.102	-0.17	0.016	-0.018					
Corrected DP-Psid	0.16	0.782	0.54	1.904	2.289					
Actual DP-ft	1.92	3.06	5.66	5.54	6.94					
Measured TP-Psig	85.3				3.6					
Measured Overall-ft	138.91									
Computed DP-ft	2.04	3.7	5.27	6.84	8.32					
Friction-ft	0.1	0.32	0.63	1.03	1.47					
Acceleration-ft	0.1	0.21	0.3	0.39	0.49					
Elevation-ft	1.84	3.17	4.34	5.42	6.36					

Run#	564									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	12:14									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	84									
Sat. Temperature-F(inlet)	135.9									
Liq. Density-lbm/ft3	84.64	84.52	84.37	84.39	84.37	84.37	84.4	84.42	84.44	84.57
Latent Heat-Btu/lbm	31.54	31.46	31.35	31.36	31.35	31.35	31.37	31.39	31.4	31.49
Specific Heat-Btu/lbm/F	0.279	0.279	0.279	0.279	0.279	0.279	0.279	0.279	0.279	0.279
Liq. Viscosity-lbm/ft-hr	0.489	0.486	0.483	0.483	0.483	0.483	0.484	0.484	0.484	0.488
Liq. Conductivity-Btu/hr-ft-F	0.0268	0.0267	0.0266	0.0266	0.0266	0.0266	0.0266	0.0267	0.0267	0.0268
Liq. Prandtl No.	5.09	5.08	5.07	5.07	5.07	5.07	5.07	5.07	5.07	5.08
Inlet Flow Rate-GPM	3.9									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	133.7									
Outlet Liq. Temperature-F	134.4									
Outlet Vap. Temperature-F	131.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	91.6									
Water outlet Temp.-F	119.4									
Inlet G-lbm/hr/ft2	789563		Temp	131	Density	84.83				
Subcooling-F	2.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	599.7	584.2	576.7	577.2	587	588.7	586.6	586.1	581.9	592.5
Heat Loss-Watts	21.9	5.2	7.1	8.6	9.5	9.2	7.3	8.2	8.2	44.4
Heat Flux-Btu/Hr/ft2	10395	10127	9997	10005	10175	10205	10168	10160	10087	10271
Wall Temp. #3-F	146	147.4	147.2	146.6	148.9	147	147.4	146.9	146.4	146.3
Wall Temp. #4-F	146.5	146.1	148.1	147.1	147.6	147.1	148	147.4	147	145.8
Wall Temp. #5-F	146.5	145.1	149	147.4	148.8	147.5	147	146.4	145.7	145.7
Wall Temp. #1-F	80.2	148.8	145.5	145.3	145.8	147.5	148.1	147.4	144.7	142.2
Wall Temp. #2-F	147.3	146.8	146	145.8	146	147.9	148.4	148	145.3	144
Instream Temp.-F	134.7	135.4	136.3	136.2	136.3	136.3	136.1	136	135.9	135.1
Avg. Wall Temp.-F	146.6	146.8	146.7	146.6	146.6	147.3	147.8	147.2	145.8	144.8
Avg. Wall DT.-F	11.4	10.9	9.9	9.9	9.8	10.5	11.2	10.8	9.5	9.2
Remaining Subcool-F	-0.6									
Exit Quality	0.01	0.03	0.05	0.08	0.1	0.12	0.15	0.17	0.2	0.22
EXP. H-Btu/Hr/ft2/F	911.5	927.6	1004.9	1005.8	1039.3	970.6	906.2	944.1	1065.8	1112
COMPUTED H										
Jallouk	902.4	858.6	826.9	817.5	817.8	813	806.1	801.5	789.8	789.2
Szady1(Cudo tube)	1356.6	1347.2	1349.7	1353.2	1369	1375.1	1375.7	1379.1	1378.7	1389.1
Szady2	1134.6	1148.1	1143.7	1144.1	1158.7	1139.1	1141.6	1146.6	1147.2	1160.3
(RLIQ)	105317	104358	102577	99969	97494	94915	92187	89547	86922	83818
(F)	1.163	1.487	1.801	2.043	2.249	2.433	2.603	2.759	2.904	3.053
(HLIQ)	267	341.7	414.4	470.1	517.5	560	598.9	634.7	668	701.6
(HBOIL)	1353.1	1339.8	1336.5	1334	1343.9	1343.4	1336.8	1332.7	1324.3	1326.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.3									
DP Liquid Density-lbm/ft3	92.8									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.133	0.679	0.37	1.951	2.269					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.111	0.707	1.124	1.823	2.108					
Actual DP-ft	2.01	3.19	4.67	5.67	7.25					
Measured TP-Psig	84				3.6					
Measured Overall-ft	136.89									
Computed DP-ft	1.91	3.54	5.1	6.66	8.15					
Friction-ft	0.13	0.37	0.7	1.11	1.57					
Acceleration-ft	0.13	0.23	0.32	0.41	0.51					
Elevation-ft	1.65	2.94	4.09	5.15	6.08					

Run#	565									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	12:14									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	96.7									
Sat. Temperature-F(inlet)	144.5									
Liq. Density-lbm/ft3	84.61	84.49	84.09	83.78	83.31	82.91	82.82	82.88	82.91	83.04
Latent Heat-Btu/lbm	31.52	31.43	31.16	30.94	30.6	30.32	30.26	30.3	30.32	30.41
Specific Heat-Btu/lbm/F	0.279	0.279	0.28	0.281	0.282	0.283	0.283	0.283	0.283	0.283
Liq. Viscosity-lbm/ft-hr	0.488	0.486	0.477	0.47	0.46	0.451	0.45	0.451	0.451	0.454
Liq. Conductivity-Btu/hr-ft-F	0.0268	0.0267	0.0264	0.0262	0.0259	0.0257	0.0256	0.0257	0.0257	0.0258
Liq. Prandtl No.	5.09	5.08	5.05	5.03	4.99	4.97	4.96	4.97	4.97	4.98
Inlet Flow Rate-GPM	3.9									
Outlet Liq. Flow Rate-GPM	1.7									
Outlet Vap. Flow Rate-GPM	3.1									
Inlet Temperature-F	133.9									
Outlet Liq. Temperature-F	143.2									
Outlet Vap. Temperature-F	140.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	104.2									
Water outlet Temp.-F	137.7									
Inlet G-lbm/hr/ft2	786898		Temp	132.6	Density	84.55				
Subcooling-F	10.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	607.1	594.2	591.9	590.3	586.9	588.8	595.1	595.1	597.2	598.4
Heat Loss-Watts	26.3	6	8.2	10	10.9	10.9	9.2	10.1	9.8	52.5
Heat Flux-Btu/Hr/ft2	10524	10300	10260	10232	10174	10206	10316	10316	10352	10373
Wall Temp. #3-F	154.6	156	155.6	154.9	156.9	155.8	156.3	155.7	155.1	155.2
Wall Temp. #4-F	154.9	154.6	156.8	155.6	156.1	155.8	156.8	156.3	155.7	154.4
Wall Temp. #5-F	154.9	153.5	157.8	155.6	155.2	156.1	155.8	155.4	154.1	154.3
Wall Temp. #1-F	81.3	155.2	154.2	153.5	154.3	156.1	157	156.3	153.4	150.8
Wall Temp. #2-F	155.2	155.2	154.7	154	154.3	156.1	157.3	156.8	154	152.7
Instream Temp.-F	134.9	135.6	137.9	139.7	142.4	144.6	145.1	144.8	144.6	143.9
Avg. Wall Temp.-F	154.9	155.3	155.3	154.9	155	156	156.6	156.1	154.5	153.5
Avg. Wall DT.-F	19.5	19.2	17	14.7	12.1	10.9	11.1	10.8	9.4	9.1
Remaining Subcool-F	7.8									
Exit Quality	-0.07	-0.04	-0.02	0	0.03	0.05	0.08	0.1	0.13	0.16
EXP. H-Btu/Hr/ft2/F	539	536.9	604.9	694.3	839.7	937.3	931.5	952.2	1102.2	1138.5
COMPUTED H										
Jallouk	927.9	919.9	930.9	939.8	899.4	887.2	870.2	859.9	853.2	844.7
Szady1(Cudo tube)	1365.7	1357	1373.4	1386.6	1408.3	1432.7	1447.7	1448.6	1453	1452.3
Szady2	1144.6	1133.8	1149.3	1161.8	1209	1230.5	1243.9	1241.6	1243.6	1214.6
(RLIQ)	105412	106004	107979	109558	110126	109312	106890	103730	100662	97200
(F)	1.006	1.006	1.006	1.006	1.454	1.76	1.996	2.201	2.381	2.552
(HLIQ)	230.4	230.6	231.3	231.8	336.4	408.3	463.2	510.6	552.4	591.4
(HBOIL)	1363.5	1354.8	1371.2	1384.5	1401.9	1421.5	1431.7	1427.1	1425.9	1418.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	82.2									
DP Liquid Density-lbm/ft3	92.67									
Elevation-ft	2.	4	6	8	9.875					
Measured DP-Psid	0.108	0.347	-0.216	1.13	1.499					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.086	0.375	0.538	1.002	1.338					
Actual DP-ft	2.08	3.81	5.76	7.19	8.7					
Measured TP-Psig	96.7				3.5					
Measured Overall-ft	161.62									
Computed DP-ft	2.08	4.13	5.89	7.48	8.95					
Friction-ft	0.08	0.17	0.35	0.62	0.94					
Acceleration-ft	0	0.04	0.18	0.28	0.35					
Elevation-ft	2	3.92	5.36	6.6	7.66					

Run#	566									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	13:23									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	103.4									
Sat. Temperature-F(inlet)	148.7									
Liq. Density-lbm/ft3	84.3	84.16	83.82	83.39	82.93	82.61	82.48	82.57	82.64	82.71
Latent Heat-Btu/lbm	31.3	31.21	30.96	30.68	30.39	30.1	30.01	30.07	30.13	30.18
Specific Heat-Btu/lbm/F	0.28	0.28	0.281	0.282	0.283	0.284	0.284	0.284	0.284	0.283
Liq. Viscosity-lbm/ft-hr	0.481	0.478	0.471	0.462	0.452	0.445	0.443	0.444	0.446	0.447
Liq. Conductivity-Btu/hr-ft-F	0.0266	0.0265	0.0263	0.026	0.0257	0.0255	0.0254	0.0255	0.0255	0.0256
Liq. Prandtl No.	5.06	5.05	5.03	5	4.97	4.95	4.94	4.95	4.95	4.96
Inlet Flow Rate-GPM	3.9									
Outlet Liq. Flow Rate-GPM	1.6									
Outlet Vap. Flow Rate-GPM	3.1									
Inlet Temperature-F	136.1									
Outlet Liq. Temperature-F	145.2									
Outlet Vap. Temperature-F	142.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	102.5									
Water outlet Temp.-F	136									
Inlet G-lbm/hr/ft2	783211		Temp	134.8	Density	84.15				
Subcooling-F	12.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	575.5	575.9	579.6	580.3	573.5	576.8	582.2	578	575.5	1155.2
Heat Loss-Watts	26.1	5.9	8.1	10	10.9	10.9	9.2	10.1	9.8	55.1
Heat Flux-Btu/Hr/ft2	9976	9983	10047	10059	9941	9998	10092	10019	9976	20025
Wall Temp. #3-F	155.7	157.2	157	156.5	158.7	157.4	158.1	157.2	156.6	162.6
Wall Temp. #4-F	156	155.8	157.8	157.1	157.8	157.6	158.2	157.7	157.2	160.5
Wall Temp. #5-F	156.2	154.6	158.8	157.4	156.7	157.7	157.5	156.6	156	161
Wall Temp. #1-F	81.5	156.4	155.2	155.3	156	157.7	158.5	158	155	154.5
Wall Temp. #2-F	156.2	156.4	155.9	155.8	156	158.1	158.8	158.3	155.6	158.3
Instream Temp.-F	136.7	137.5	139.5	141.9	144.5	146.3	147	146.5	146.1	145.7
Avg. Wall Temp.-F	156	156.5	156.5	156.6	156.6	157.6	158.2	157.6	156.1	159.4
Avg. Wall DT.-F	18.9	18.5	16.5	14.2	11.7	10.8	10.8	10.6	9.5	12.8
Remaining Subcool-F	10									
Exit Quality	-0.09	-0.07	-0.04	-0.02	0.01	0.03	0.06	0.08	0.11	0.16
EXP. H-Btu/Hr/ft2/F	528.5	539.6	608.1	707.4	851.4	921.7	937.6	944.6	1046.9	1567.5
COMPUTED H										
Jallouk	909.1	913.9	928.9	929.2	936.1	907.7	892.1	862	850.4	1234
Szady1(Cudo tube)	1344.7	1351.7	1372.5	1393.5	1407.6	1430.3	1446	1439.9	1437	2019
Szady2	1118.3	1125.2	1146.1	1166.7	1179.2	1228.5	1242.2	1232	1225.4	1937.7
(RLIQ)	106441	107128	108868	111007	113389	112790	110565	107223	104010	99399
(F)	1.006	1.006	1.006	1.006	1.005	1.492	1.784	2.015	2.212	2.466
(HLIQ)	230.1	230.3	230.9	231.6	232.3	345.6	413.6	466.8	512	570.7
(HBOIL)	1342.4	1349.4	1370.3	1391.4	1405.5	1423.5	1434.7	1423.4	1415	2003.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	82.6									
DP Liquid Density-lbm/ft3	92.61									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.113	0.361	-0.193	1.159	1.465					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.091	0.389	0.561	1.031	1.324					
Actual DP-ft	2.08	3.8	5.74	7.16	8.75					
Measured TP-Psig	103.4				3.6					
Measured Overall-ft	173.74									
Computed DP-ft	2.08	4.16	6.07	7.7	9.17					
Friction-ft	0.08	0.16	0.29	0.52	0.83					
Acceleration-ft	0	0	0.13	0.22	0.34					
Elevation-ft	2	4	5.65	6.97	8					

Run#	567									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	13:23									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	97.9									
Sat. Temperature-F(inlet)	145.3									
Liq. Density-lbm/ft3	84.68	84.57	84.22	83.87	83.41	83.11	82.97	83.06	83.07	83.2
Latent Heat-Btu/lbm	31.56	31.49	31.24	31	30.68	30.46	30.38	30.42	30.44	30.59
Specific Heat-Btu/lbm/F	0.279	0.279	0.28	0.281	0.282	0.282	0.283	0.283	0.282	0.282
Liq. Viscosity-lbm/ft-hr	0.49	0.488	0.479	0.472	0.462	0.456	0.453	0.454	0.456	0.457
Liq. Conductivity-Btu/hr-ft-F	0.0268	0.0268	0.0265	0.0263	0.026	0.0258	0.0257	0.0258	0.0258	0.0259
Liq. Prandtl No.	5.09	5.08	5.06	5.03	5	4.98	4.97	4.98	4.98	4.99
Inlet Flow Rate-GPM	3.9									
Outlet Liq. Flow Rate-GPM	1.7									
Outlet Vap. Flow Rate-GPM	3.1									
Inlet Temperature-F	133.7									
Outlet Liq. Temperature-F	142.2									
Outlet Vap. Temperature-F	139.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	99.1									
Water outlet Temp.-F	131.5									
Inlet G-lbm/hr/ft2	787730		Temp	132.1	Density	84.64				
Subcooling-F	11.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	567.6	582.4	579.7	581.7	579	579.3	580.7	573.4	1152.9	1153.4
Heat Loss-Watts	24.9	5.8	7.9	9.9	11	11	9	9.7	9.9	53.4
Heat Flux-Btu/Hr/ft2	9839	10096	10049	10083	10037	10042	10066	9940	19985	19993
Wall Temp. #3-F	153.4	155	154.7	154	156.3	154.7	155.6	154.7	157.5	159.8
Wall Temp. #4-F	153.8	153.5	155.6	154.6	155.1	154.8	155.9	155.1	159	157.8
Wall Temp. #5-F	153.9	152.4	156.6	155	154.2	155.1	155	154.3	156.3	158.4
Wall Temp. #1-F	81.9	154.1	153	152.7	153.3	155.1	156.1	155.5	155.1	151.7
Wall Temp. #2-F	154	154.3	153.5	153.4	153.4	155.5	156.4	155.9	156.4	155.8
Instream Temp.-F	134.5	135.1	137.2	139.2	141.8	143.5	144.3	143.8	143.7	143
Avg. Wall Temp.-F	153.8	154.2	154.2	154.1	154	154.9	155.8	155.1	156.9	156.7
Avg. Wall DT.-F	18.8	18.7	16.5	14.4	11.7	11	11	10.9	12.3	12.8
Remaining Subcool-F	8.9									
Exit Quality	-0.08	-0.06	-0.03	-0.01	0.02	0.04	0.07	0.09	0.14	0.19
EXP. H-Btu/Hr/ft2/F	522.5	540.8	607.3	699.3	854.4	915.3	911.4	916	1630.5	1562.4
COMPUTED H										
Jallouk	888.7	906	915.2	928.5	914.4	883.7	870	843.2	1230.1	1182.8
Szady1(Cudo tube)	1317.8	1339.6	1353.6	1372.5	1392.2	1410.4	1422.2	1412.9	1992.5	1988.1
Szady2	1091.1	1114.7	1127.8	1146.4	1165.5	1207.7	1216.6	1202.4	1906.2	1898
(RLIQ)	105187	105693	107486	109231	111029	109839	107775	104560	100326	94249
(F)	1.006	1.006	1.006	1.006	1.218	1.624	1.884	2.101	2.373	2.687
(HLIQ)	230.5	230.7	231.3	231.9	281.9	376.5	437.3	487.4	550.2	622.6
(HBOIL)	1315.5	1337.3	1351.4	1370.3	1388.4	1401.4	1408.3	1393.3	1978.4	1967.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.2									
DP Liquid Density-lbm/ft3	92.52									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.106	0.348	-0.207	1.157	1.456					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.084	0.376	0.547	1.029	1.295					
Actual DP-ft	2.08	3.8	5.79	7.12	8.74					
Measured TP-Psig	97.9				3.6					
Measured Overall-ft	163.21									
Computed DP-ft	2.08	4.16	6.03	7.64	9.1					
Friction-ft	0.08	0.16	0.31	0.56	0.94					
Acceleration-ft	0	0	0.15	0.24	0.41					
Elevation-ft	2	4	5.56	6.84	7.74					

Run#	568									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	14:15									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19685									
Sat. Pressure-Psig	82.2									
Sat. Temperature-F(inlet)	134.6									
Liq. Density-lbm/ft3	85.86	85.74	85.41	85	84.88	84.86	84.86	84.9	84.9	85.03
Latent Heat-Btu/lbm	32.37	32.29	32.07	31.78	31.7	31.69	31.69	31.71	31.71	31.81
Specific Heat-Btu/lbm/F	0.276	0.276	0.277	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.518	0.515	0.507	0.497	0.495	0.494	0.494	0.495	0.495	0.498
Liq. Conductivity-Btu/hr-ft-F	0.0276	0.0275	0.0273	0.027	0.0269	0.0269	0.0269	0.027	0.027	0.027
Liq. Prandtl No.	5.19	5.18	5.15	5.12	5.11	5.11	5.11	5.11	5.11	5.12
Inlet Flow Rate-GPM	3.9									
Outlet Liq. Flow Rate-GPM	1.5									
Outlet Vap. Flow Rate-GPM	2.6									
Inlet Temperature-F	126.5									
Outlet Liq. Temperature-F	131.5									
Outlet Vap. Temperature-F	127.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	93.1									
Water outlet Temp.-F	118.9									
Inlet G-lbm/hr/ft2	799652		Temp	124.8	Density	85.92				
Subcooling-F	8.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	554.6	566.7	570.6	584.8	566.7	566.8	561.4	559.6	562.7	569.6
Heat Loss-Watts	21.2	5	6.9	8.2	9.1	8.8	6.9	7.7	7.7	42.1
Heat Flux-Btu/Hr/ft2	9614	9823	9891	9790	9823	9825	9732	9700	9754	9872
Wall Temp. #3-F	143.8	145.1	144.9	144.2	146.5	144.7	145.2	144.3	142.8	142.7
Wall Temp. #4-F	144.1	143.8	146	144.8	145.1	144.9	145.7	144.7	143.7	141.9
Wall Temp. #5-F	144.2	142.7	146.7	145.2	144.2	145.1	144.7	143.8	142.4	142.7
Wall Temp. #1-F	82.2	144.4	143.4	142.9	143.4	145.1	145.7	145.1	141.4	139.1
Wall Temp. #2-F	144.7	144.4	143.9	143.5	143.5	145.5	146.1	145.4	142	141.2
Instream Temp.-F	127.4	128.1	130.1	132.6	133.3	133.4	133.4	133.2	133.2	132.4
Avg. Wall Temp.-F	144.2	144.4	144.6	144.3	144.1	145	145.5	144.7	142.5	141.5
Avg. Wall DT.-F	16.4	15.9	14	11.2	10.3	11.1	11.6	11	8.8	8.7
Remaining Subcool-F	5.5									
Exit Quality	-0.05	-0.02	0	0.02	0.04	0.07	0.09	0.11	0.13	0.16
EXP. H-Btu/Hr/ft2/F	587.4	618.6	706.3	871.6	953.2	884.7	836	880.1	1106	1138.1
COMPUTED H										
Jallouk	837.6	852.2	866.2	839.7	810	800.8	790.3	783.6	781.9	780.1
Szady1(Cudo tube)	1248	1266.7	1286.6	1301.7	1313.2	1318.1	1316.3	1317.2	1325.3	1331.7
Szady2	1022.3	1042.3	1061.8	1098.3	1106.3	1107.8	1101.9	1079.9	1090.3	1099.6
(RLIQ)	100937	101495	103111	104251	102452	100133	97741	95211	92835	89865
(F)	1.006	1.006	1.006	1.333	1.699	1.958	2.173	2.361	2.53	2.697
(HLIQ)	231.1	231.3	231.9	308.4	393.3	453.5	503.2	546.7	585.9	623.7
(HBOIL)	1245.3	1264.2	1284	1295.9	1301.3	1299.9	1291.3	1285.1	1286	1284.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.4									
DP Liquid Density-lbm/ft3	92.49									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.08	0.403	-0.039	1.517	1.768					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.058	0.431	0.715	1.389	1.607					
Actual DP-ft	2.08	3.62	5.32	6.35	8.02					
Measured TP-Psig	82.2				3.6					
Measured Overall-ft	133.11									
Computed DP-ft	2.08	4.13	5.78	7.36	8.83					
Friction-ft	0.08	0.19	0.41	0.73	1.11					
Acceleration-ft	0	0.11	0.22	0.31	0.4					
Elevation-ft	2	3.83	5.16	6.32	7.32					

Run#	569									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	15:03									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	94.8									
Sat. Temperature-F(inlet)	143.2									
Liq. Density-lbm/ft3	84.66	84.73	84.78	84.74	84.59	84.16	83.75	83.75	83.76	83.89
Latent Heat-Btu/lbm	31.55	31.6	31.63	31.61	31.5	31.21	30.91	30.91	30.93	31.01
Specific Heat-Btu/lbm/F	0.279	0.279	0.278	0.279	0.279	0.28	0.281	0.281	0.281	0.281
Liq. Viscosity-lbm/ft-hr	0.489	0.491	0.492	0.491	0.488	0.478	0.469	0.469	0.469	0.472
Liq. Conductivity-Btu/hr-ft-F	0.0268	0.0268	0.0269	0.0269	0.0268	0.0265	0.0262	0.0262	0.0262	0.0263
Liq. Prandtl No.	5.09	5.09	5.1	5.1	5.08	5.05	5.02	5.02	5.02	5.03
Inlet Flow Rate-GPM	3.9									
Outlet Liq. Flow Rate-GPM	1.7									
Outlet Vap. Flow Rate-GPM	2.9									
Inlet Temperature-F	133.7									
Outlet Liq. Temperature-F	138.9									
Outlet Vap. Temperature-F	135									
Water Flow Rate-GPM										
Water Inlet Temp.-F	118									
Water outlet Temp.-F	128.9									
Inlet G-lbm/hr/ft2	786564		Temp	132.8	Density	84.51				
Subcooling-F	9.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	571.1	578.2	573.9	573.4	576.5	573.2	565.1
Heat Loss-Watts	17.3	4.1	5.6	8.6	9.6	9.4	7.4	8.3	8.1	44
Heat Flux-Btu/Hr/ft2	0	0	0	9900	10023	9948	9940	9993	9936	9796
Wall Temp. #3-F	133.5	133.2	135.7	150.7	153	151.4	151.9	151.1	149.5	148.8
Wall Temp. #4-F	133.6	133.7	135.6	151.3	152	151.5	152.3	151.7	150.3	148.1
Wall Temp. #5-F	133.8	133.7	134.3	151.4	151	151.8	151.4	150.6	149.2	148.7
Wall Temp. #1-F	81.7	133.7	133.6	149.1	150	151.9	152.4	152	148.2	145.7
Wall Temp. #2-F	133.1	133.8	133.6	149.6	150.1	152.2	152.7	152.3	148.8	147.5
Instream Temp.-F	134.6	134.2	133.9	134.1	135	137.5	139.9	139.9	139.8	139.1
Avg. Wall Temp.-F	133.5	133.6	134.6	150.6	150.8	151.7	152.1	151.5	149.2	147.8
Avg. Wall DT.-F	0	0	0.7	16.1	15.3	13.7	11.8	11.2	9	8.2
Remaining Subcool-F	9.5									
Exit Quality	-0.08	-0.08	-0.08	-0.06	-0.04	-0.01	0.01	0.03	0.06	0.08
EXP. H-Btu/Hr/ft2/F	0	0	0	615.7	654.1	726.1	843	893.2	1110.1	1192.1
COMPUTED H										
Jallouk	188.2	188.1	188	890	901.6	911.5	924.6	869.9	837.3	819.3
Szady1(Cudo tube)	230.3	230.2	230.1	1318.6	1334	1349.4	1368.6	1375.9	1374.8	1363.4
Szady2	230.2	230.1	230	1092.5	1108.5	1122.6	1141.1	1173.3	1168	1151.6
(RLIQ)	105116	104781	104530	104697	105452	107586	109688	107281	104562	101382
(F)	1.006	1.006	1.006	1.006	1.006	1.006	1.006	1.544	1.836	2.068
(HLIQ)	230.2	230.1	230	230.1	230.4	231.1	231.8	355.8	423.2	476.3
(HBOIL)	25	24.8	24.8	1316.3	1331.7	1347.1	1366.4	1367.9	1361.3	1343.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.3									
DP Liquid Density-lbm/ft3	92.51									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.1	0.28	-0.389	0.996	1.17					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.078	0.308	0.365	0.868	1.009					
Actual DP-ft	2.07	3.88	5.99	7.33	9.16					
Measured TP-Psig	94.8				3.5					
Measured Overall-ft	156.73									
Computed DP-ft	2.08	4.16	6.23	8.12	9.65					
Friction-ft	0.08	0.16	0.24	0.37	0.6					
Acceleration-ft	0	0	0	0.14	0.23					
Elevation-ft	2	4	6	7.61	8.81					

Run#	570									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	15:03									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	97.4									
Sat. Temperature-F(inlet)	144.9									
Liq. Density-lbm/ft3	84.71	84.76	84.81	84.85	84.8	84.63	84.16	83.76	83.68	83.75
Latent Heat-Btu/lbm	31.59	31.62	31.68	31.68	31.64	31.53	31.21	30.93	30.86	30.91
Specific Heat-Btu/lbm/F	0.279	0.278	0.278	0.278	0.278	0.279	0.28	0.281	0.281	0.281
Liq. Viscosity-lbm/ft-hr	0.491	0.492	0.493	0.494	0.493	0.489	0.478	0.469	0.468	0.469
Liq. Conductivity-Btu/hr-ft-F	0.0268	0.0269	0.0269	0.0269	0.0269	0.0268	0.0265	0.0262	0.0262	0.0262
Liq. Prandtl No.	5.09	5.1	5.1	5.1	5.1	5.09	5.05	5.02	5.02	5.02
Inlet Flow Rate-GPM	3.9									
Outlet Liq. Flow Rate-GPM	1.7									
Outlet Vap. Flow Rate-GPM	3									
Inlet Temperature-F	133.1									
Outlet Liq. Temperature-F	139									
Outlet Vap. Temperature-F	135.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	106.9									
Water outlet Temp.-F	133.5									
Inlet G-lbm/hr/ft2	788726		Temp	131.5	Density	84.74				
Subcooling-F	11.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	572	572.7	567.9	569.5	560.2	569.8
Heat Loss-Watts	20.3	4.8	6.5	8	10.9	10.9	9.2	10	9.6	51.7
Heat Flux-Btu/Hr/ft2	0	0	0	0	9915	9927	9844	9872	9711	9877
Wall Temp. #3-F	134.3	134.1	134.4	136.6	153.7	152	153	151.9	150.3	150.1
Wall Temp. #4-F	134.5	134.4	134.4	136.6	152.5	152.1	153.3	152.4	151.1	149.2
Wall Temp. #5-F	134.7	134.6	134.6	135	151.6	152.5	152.3	151.4	149.8	149.8
Wall Temp. #1-F	82.7	134.5	134.3	134.1	150.2	152.5	153.5	152.9	149	148.8
Wall Temp. #2-F	134.1	134.6	134.3	134.4	150.4	152.9	153.8	153.2	149.5	148.7
Instream Temp.-F	134.3	134	133.7	133.5	133.8	134.8	137.5	139.8	140.3	139.9
Avg. Wall Temp.-F	134.4	134.4	134.4	135.6	151.2	152.3	153.2	152.4	149.9	148.9
Avg. Wall DT.-F	0.1	0.4	0.7	2.1	16.9	17	15.2	12.1	9.2	8.6
Remaining Subcool-F	11.8									
Exit Quality	-0.1	-0.1	-0.1	-0.1	-0.08	-0.06	-0.03	-0.01	0.01	0.04
EXP. H-Btu/Hr/ft2/F	0	0	0	0	585.8	583.1	646.2	814.9	1055.4	1152
COMPUTED H										
Jallouk	188.5	188.4	188.3	188.3	888.9	895	905.4	919.9	913.5	861.4
Szady1(Cudo tube)	230.8	230.7	230.6	230.5	1317.3	1326.1	1342.4	1363.2	1356.6	1368.5
Szady2	230.7	230.6	230.5	230.4	1091.4	1099.9	1114.7	1135.1	1127	1164.2
(RLIQ)	105152	104901	104651	104484	104734	105573	107882	109901	110287	107340
(F)	1.006	1.006	1.006	1.006	1.006	1.006	1.006	1.006	1.061	1.574
(HLIQ)	230.7	230.6	230.5	230.4	230.5	230.8	231.6	232.3	245.3	363.7
(HBOIL)	24.9	24.8	24.7	24.6	1314.9	1323.7	1340.1	1361	1353.9	1359.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.9									
DP Liquid Density-lbm/ft3	92.42									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.097	0.271	-0.474	0.801	0.894					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.075	0.299	0.28	0.673	0.733					
Actual DP-ft	2.08	3.9	6.14	7.67	9.64					
Measured TP-Psig	97.4				3.6					
Measured Overall-ft	161.29									
Computed DP-ft	2.08	4.16	6.24	8.31	10.09					
Friction-ft	0.08	0.16	0.24	0.32	0.45					
Acceleration-ft	0	0	0	0	0.14					
Elevation-ft	2	4	6	8	9.5					

Run#	571									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	15:03									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	89.8									
Sat. Temperature-F(inlet)	139.9									
Liq. Density-lbm/ft3	85.53	85.6	85.61	85.56	85.51	85.5	85.31	84.93	84.59	84.69
Latent Heat-Btu/lbm	32.15	32.19	32.2	32.17	32.14	32.13	32	31.74	31.5	31.57
Specific Heat-Btu/lbm/F	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.278	0.279	0.279
Liq. Viscosity-lbm/ft-hr	0.51	0.512	0.512	0.511	0.51	0.509	0.505	0.496	0.488	0.49
Liq. Conductivity-Btu/hr-ft-F	0.0274	0.0274	0.0274	0.0274	0.0274	0.0273	0.0272	0.027	0.0268	0.0268
Liq. Prandtl No.	5.16	5.16	5.17	5.16	5.16	5.16	5.14	5.11	5.08	5.09
Inlet Flow Rate-GPM	3.9									
Outlet Liq. Flow Rate-GPM	1.6									
Outlet Vap. Flow Rate-GPM	2.9									
Inlet Temperature-F	128.5									
Outlet Liq. Temperature-F	134									
Outlet Vap. Temperature-F	130.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	99.8									
Water outlet Temp.-F	128.2									
Inlet G-lbm/hr/ft2	796103		Temp		127	Density	85.54			
Subcooling-F	11.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	589.7	566.6	568	561.2	572.4
Heat Loss-Watts	19.3	4.6	6.2	7.4	8.2	10.8	8.7	9.5	9.1	49.4
Heat Flux-Btu/Hr/ft2	0	0	0	0	0	10222	9822	9846	9728	9922
Wall Temp. #3-F	129.5	129.3	129.7	130.1	133.1	147.5	148.1	147.1	145.4	145.2
Wall Temp. #4-F	129.6	129.7	129.6	130.1	132.9	147.7	148.5	147.7	146.3	144.3
Wall Temp. #5-F	130	129.9	129.9	130.1	131.2	148	147.6	146.7	145.1	145
Wall Temp. #1-F	82.2	129.6	129.4	129.8	130.5	147.9	148.7	148.1	144.1	141.8
Wall Temp. #2-F	129.5	129.8	129.5	129.9	130.5	148.2	149	148.4	144.7	143.7
Instream Temp.-F	129.4	129	128.9	129.2	129.5	129.6	130.7	133	135	134.4
Avg. Wall Temp.-F	129.7	129.6	129.6	130	131.3	147.8	148.4	147.6	145.1	144
Avg. Wall DT.-F	0.3	0.6	0.7	0.8	1.8	17.7	17.2	14.2	9.7	9.2
Remaining Subcool-F	11.4									
Exit Quality	-0.1	-0.1	-0.1	-0.1	-0.1	-0.07	-0.05	-0.03	-0.01	0.02
EXP. H-Btu/Hr/ft2/F	0	0	0	0	0	577.1	569.8	695.6	1004.9	1084.2
COMPUTED H										
Jallouk	188.6	188.5	188.5	188.6	188.6	881.2	866.2	879.8	884.2	866.8
Szady1(Cudo tube)	230.9	230.8	230.8	230.9	231	1303.8	1286.7	1306.4	1314.5	1323.8
Szady2	230.9	230.7	230.7	230.8	230.9	1081.7	1061.2	1080.2	1086.7	1122.7
(RLIQ)	102087	101784	101684	101925	102167	102248	103142	105042	106731	105725
(F)	1.006	1.006	1.006	1.006	1.006	1.006	1.006	1.006	1.006	1.227
(HLIQ)	230.9	230.7	230.7	230.8	230.9	230.9	231.3	232	232.6	283.4
(HBOIL)	23.5	23.3	23.3	23.4	23.5	1301.3	1284.2	1304	1312.1	1319.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.6									
DP Liquid Density-lbm/ft3	92.46									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.088	0.1	-0.538	0.681	0.713					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.167					
Corrected DP-Psid	0.064	0.128	0.216	0.553	0.552					
Actual DP-ft	2.07	4.15	6.18	7.79	9.84					
Measured TP-Psig	89.8				3.5					
Measured Overall-ft	146.73									
Computed DP-ft	2.08	4.16	6.24	8.32	10.25					
Friction-ft	0.08	0.16	0.24	0.32	0.41					
Acceleration-ft	0	0	0	0	0.1					
Elevation-ft	2	4	6	8	9.74					

Run#	572									
Test Fluid	C4F10									
Date:	5/27/93									
Time:	15:03									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	80.5									
Sat. Temperature-F(inlet)	133.3									
Liq. Density-lbm/ft3	85.27	85.3	85.31	85.38	85.36	85.45	85.43	85.45	85.53	85.66
Latent Heat-Btu/lbm	31.97	31.99	32	32.05	32.04	32.09	32.08	32.09	32.15	32.24
Specific Heat-Btu/lbm/F	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.277	0.276
Liq. Viscosity-lbm/ft-hr	0.504	0.504	0.505	0.506	0.506	0.508	0.508	0.508	0.51	0.513
Liq. Conductivity-Btu/hr-ft-F	0.0272	0.0272	0.0272	0.0273	0.0273	0.0273	0.0273	0.0273	0.0274	0.0274
Liq. Prandtl No.	5.14	5.14	5.14	5.15	5.15	5.15	5.15	5.15	5.16	5.17
Inlet Flow Rate-GPM	3.9									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	2.1									
Inlet Temperature-F	130									
Outlet Liq. Temperature-F	128.1									
Outlet Vap. Temperature-F	123									
Water Flow Rate-GPM										
Water Inlet Temp.-F	85.8									
Water outlet Temp.-F	113.8									
Inlet G-lbm/hr/ft2	796103		Temp	127	Density	85.54				
Subcooling-F	3.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	3	0.5	587.3	583.7	576.4	580.2	581.2	586.9
Heat Loss-Watts	4.9	1.2	1.5	1.6	2.6	1.9	1.2	1.9	2.3	12.3
Heat Flux-Btu/Hr/ft2	0	0	52	9	10180	10118	9982	10057	10075	10174
Wall Temp. #3-F	130.8	130.7	131.1	132.5	143.8	141.5	142.5	141.5	139.8	139.1
Wall Temp. #4-F	130.9	130.9	131	132.5	142.8	141.5	142.8	142	140.6	138.4
Wall Temp. #5-F	131.2	131.3	131.1	131.1	141.5	142.1	141.8	141	139.2	139.1
Wall Temp. #1-F	83.3	131	130.8	130.3	141.1	142.1	143	142.5	138.3	135.9
Wall Temp. #2-F	130.7	131	130.9	130.5	141.8	142.4	143.1	142.6	138.9	137.7
Instream Temp.-F	131	130.8	130.7	130.3	130.4	129.9	130	129.9	129.4	128.6
Avg. Wall Temp.-F	130.9	130.9	131	131.6	141.8	141.8	142.6	141.9	139.4	138
Avg. Wall DT.-F	0	0.1	0.2	1.3	10.9	11.4	12.2	11.6	9.5	9
Remaining Subcool-F	3.3									
Exit Quality	-0.03	-0.03	-0.03	-0.03	-0.01	0.02	0.04	0.06	0.09	0.11
EXP. H-Btu/Hr/ft2/F	0	0	210	6.7	930.6	884.2	819.8	869.6	1060	1132.9
COMPUTED H										
Jallouk	189	189	189.7	188.9	883.4	848.8	805.3	797	788.5	783.8
Szady1(Cudo tube)	231.5	231.4	232.3	231.3	1307.4	1301	1297.8	1305.3	1307	1311.7
Szady2	231.4	231.3	231.3	231.1	1084.8	1100.7	1092.5	1097.2	1095.9	1080.6
(RLIQ)	103387	103224	103142	102816	102897	101863	99576	97141	94400	91452
(F)	1.006	1.006	1.006	1.006	1.006	1.274	1.686	1.962	2.194	2.401
(HLIQ)	231.4	231.3	231.3	231.1	231.2	292.6	387.2	450.7	503.5	550.5
(HBOIL)	23.9	23.9	55.1	28.9	1305	1296.1	1286.2	1287.2	1281.6	1278.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	84									
DP Liquid Density-lbm/ft3	92.4									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.089	0.262	-0.403	1.121	1.344					
Zero Corrections-psid	0.022	-0.028	-0.754	0.128	0.161					
Corrected DP-Psid	0.067	0.29	0.351	0.993	1.183					
Actual DP-ft	2.04	3.83	5.88	6.96	8.66					
Measured TP-Psig	80.5				3.6					
Measured Overall-ft	129.27									
Computed DP-ft	2.08	4.16	6.2	7.86	9.34					
Friction-ft	0.08	0.16	0.26	0.49	0.79					
Acceleration-ft	0	0	0.11	0.22	0.31					
Elevation-ft	2	4	5.83	7.15	8.23					

Run#	573									
Test Fluid	C4F10									
Date:	6/1/93									
Time:	8:30									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	153.4									
Sat. Temperature-F(inlet)	175.7									
Liq. Density-lbm/ft3	76.77	76.77	76.72	76.67	76.7	76.63	76.58	76.7	76.7	76.93
Latent Heat-Btu/lbm	25.74	25.74	25.7	25.67	25.68	25.63	25.59	25.68	25.68	25.88
Specific Heat-Btu/lbm/F	0.299	0.299	0.299	0.3	0.3	0.3	0.3	0.3	0.3	0.299
Liq. Viscosity-lbm/ft-hr	0.346	0.346	0.345	0.344	0.345	0.344	0.343	0.345	0.345	0.348
Liq. Conductivity-Btu/hr-ft-F	0.0218	0.0218	0.0218	0.0218	0.0218	0.0218	0.0217	0.0218	0.0218	0.0219
Liq. Prandtl No.	4.74	4.74	4.74	4.74	4.74	4.73	4.73	4.74	4.74	4.74
Inlet Flow Rate-GPM	5.4									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2.6									
Inlet Temperature-F	172.1									
Outlet Liq. Temperature-F	175.7									
Outlet Vap. Temperature-F	171.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	107.3									
Water outlet Temp.-F	157									
Inlet G-lbm/hr/ft2	995743		Temp	169.1	Density	77.27				
Subcooling-F	3.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	577	577	577	577	577	577	577	577	577	577
Heat Loss-Watts	17.9	4.2	5.7	6.5	7	6.4	4.8	5.8	6.2	33.7
Heat Flux-Btu/Hr/ft2	10002	10002	10002	10002	10002	10002	10002	10002	10002	10002
Wall Temp. #3-F	181.8	182.6	182.4	182.2	183.7	183.2	183.9	182.9	182.4	181.4
Wall Temp. #4-F	182.5	182	183.2	182.8	183.6	183.2	184.2	183.4	183.2	181
Wall Temp. #5-F	182.8	181.1	184	182.7	182.5	183.5	183.4	182.4	182.1	181
Wall Temp. #1-F	78	182.8	180.9	181.1	182.1	184	184.2	183.4	181.1	178
Wall Temp. #2-F	183.3	182.7	182.1	181.7	182.1	183.7	184.6	183.9	181.8	179.7
Instream Temp.-F	175	175	175.2	175.4	175.3	175.6	175.8	175.3	175.3	174.3
Avg. Wall Temp.-F	182.6	182.5	182.2	182.2	182.6	183.5	184.1	183.2	182.1	180.2
Avg. Wall DT.-F	7.1	7.1	6.5	6.3	6.8	7.4	7.8	7.4	6.4	5.5
Remaining Subcool-F	1.6									
Exit Quality	-0.02	0	0.03	0.05	0.07	0.1	0.12	0.14	0.16	0.19
EXP. H-Btu/Hr/ft2/F	1399.3	1414.1	1539.2	1575.6	1465.9	1347.4	1281	1342.9	1570.7	1829.2
COMPUTED H										
Jallouk	1081.3	1081.3	1047.8	1016.4	994.2	967.8	959	947.6	939.2	926.5
Szady1(Cudo tube)	1710.7	1710.7	1715.8	1721.1	1723	1729.3	1734.5	1732.2	1707	1699.7
Szady2	1475.7	1475.7	1524.5	1525	1523.5	1525.2	1526.4	1522	1521.8	1513.3
(RLIQ)	188415	188415	185908	181838	177431	173599	169578	164422	160084	154271
(F)	1.005	1.005	1.346	1.585	1.764	1.911	2.04	2.162	2.27	2.382
(HLIQ)	290.5	290.5	389.2	458.4	510.1	552.8	590.1	625.3	656.6	688.3
(HBOIL)	1707.9	1707.9	1709.1	1710.2	1708	1710.3	1711.4	1704.7	1673.9	1661.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	73.8									
DP Liquid Density-lbm/ft3	93.88									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.213	0.6	0.362	1.737	2.18					
Zero Corrections-psid	0.039	-0.054	-0.741	0.111	0.077					
Corrected DP-Psid	0.174	0.654	1.103	1.626	2.103					
Actual DP-ft	2.12	3.66	5.28	6.72	8.11					
Measured TP-Psig	153.4				3.5					
Measured Overall-ft	280.6									
Computed DP-ft	2.14	4.14	5.97	7.75	9.41					
Friction-ft	0.14	0.37	0.69	1.07	1.49					
Acceleration-ft	0.04	0.2	0.3	0.39	0.47					
Elevation-ft	1.96	3.56	4.98	6.29	7.44					

Run#	674									
Test Fluid	C4F10									
Date:	6/1/93									
Time:	11:33									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	152									
Sat. Temperature-F(inlet)	175									
Liq. Density-lbm/ft3	76.72	76.7	76.67	76.77	76.79	76.7	76.7	76.77	76.74	76.9
Latent Heat-Btu/lbm	25.7	25.68	25.67	25.74	25.76	25.68	25.68	25.74	25.72	25.84
Specific Heat-Btu/lbm/F	0.299	0.3	0.3	0.299	0.299	0.3	0.3	0.299	0.299	0.299
Liq. Viscosity-lbm/ft-hr	0.345	0.345	0.344	0.346	0.346	0.345	0.345	0.346	0.345	0.348
Liq. Conductivity-Btu/hr-ft-F	0.0218	0.0218	0.0218	0.0218	0.0219	0.0218	0.0218	0.0218	0.0218	0.0219
Liq. Prandtl No.	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74
Inlet Flow Rate-GPM	4.5									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2.2									
Inlet Temperature-F	172.3									
Outlet Liq. Temperature-F	175.7									
Outlet Vap. Temperature-F	171.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	109.4									
Water outlet Temp.-F	160.3									
Inlet G-lbm/hr/ft2	828816		Temp	169.5	Density	77.18				
Subcooling-F	2.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	582.3	582.5	581.7	576.9	575.9	577.8	581.7	583.9	575.2	583
Heat Loss-Watts	17.9	4.2	5.7	6.5	7	6.4	4.8	5.8	6.2	34
Heat Flux-Btu/Hr/ft2	10094	10097	10083	10000	9983	10016	10083	10122	9971	10106
Wall Temp. #3-F	181.8	182.8	182.6	181.9	183.7	183.2	183.3	182.6	182.2	181.6
Wall Temp. #4-F	182.5	182.1	183.6	182.4	183.3	183.2	183.7	183.1	183.1	181.2
Wall Temp. #5-F	182.8	181.3	184.2	182.3	182.2	183.3	182.9	182.1	182	181.4
Wall Temp. #1-F	73.2	182.8	181.2	180.8	182	183.8	183.9	183.1	180.9	177.8
Wall Temp. #2-F	183.2	182.8	182.2	181.3	182	183.7	184.1	183.6	181.5	179.8
Instream Temp.-F	176.2	176.3	176.4	176	174.9	176.3	176.3	176	176.1	174.4
Avg. Wall Temp.-F	182.6	182.6	182.4	181.9	182.4	183.4	183.6	182.9	181.9	180.4
Avg. Wall DT.-F	6.9	6.9	6.5	6.4	7	7.6	7.8	7.4	6.4	5.5
Remaining Subcool-F	0.4									
Exit Quality	0	0.02	0.05	0.08	0.11	0.13	0.16	0.19	0.22	0.24
EXP. H-Btu/Hr/ft2/F	1458.9	1470	1540.8	1563	1421.3	1314	1288.7	1359.9	1560.5	1836.3
COMPUTED H										
Jallouk	1116.4	1085.2	1061.5	1028.6	1008.4	997.7	988.2	967.1	953.2	949.2
Szady1(Cudo tube)	1719.5	1722.2	1724.7	1716	1715.9	1725.3	1733	1736.3	1727.2	1732.9
Szady2	1485.7	1488.9	1535.7	1521.9	1518.4	1524.9	1532.3	1533.9	1516.8	1526.4
(RLIQ)	157190	155748	151525	148608	142161	138888	134049	129297	125084	119948
(F)	1.004	1.267	1.58	1.794	1.967	2.113	2.247	2.373	2.486	2.601
(HLIQ)	250.8	316.5	394.6	448	491.2	527.7	561.2	592.6	620.6	649
(HBOIL)	1717.7	1718.7	1717.8	1705.8	1702.4	1708.7	1713.2	1711.9	1700.1	1702
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	73.8									
DP Liquid Density-lbm/ft3	93.88									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.215	0.846	0.603	2.055	2.582					
Zero Corrections-psid	0.039	-0.054	-0.741	0.111	0.077					
Corrected DP-Psid	0.176	0.9	1.344	1.944	2.505					
Actual DP-ft	2.11	3.2	4.81	6.13	7.98					
Measured TP-Psig	152				3.6					
Measured Overall-ft	277.88									
Computed DP-ft	2.06	3.84	5.51	7.14	8.65					
Friction-ft	0.12	0.32	0.59	0.91	1.25					
Acceleration-ft	0.09	0.18	0.26	0.33	0.41					
Elevation-ft	1.85	3.34	4.67	5.9	6.99					

Run#	575									
Test Fluid	C4F10									
Date:	6/1/93									
Time:	12:45									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	150.8									
Sat. Temperature-F(inlet)	174.5									
Liq. Density-lbm/ft3	77	76.95	76.88	76.93	76.97	76.9	76.9	77	76.97	77.11
Latent Heat-Btu/lbm	25.91	25.88	25.83	25.86	25.9	25.84	25.84	25.91	25.9	26
Specific Heat-Btu/lbm/F	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.298
Liq. Viscosity-lbm/ft-hr	0.349	0.348	0.347	0.348	0.349	0.348	0.348	0.349	0.349	0.351
Liq. Conductivity-Btu/hr-ft-F	0.022	0.022	0.0219	0.0219	0.022	0.0219	0.0219	0.022	0.022	0.0221
Liq. Prandtl No.	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74
Inlet Flow Rate-GPM	3.6									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	170.8									
Outlet Liq. Temperature-F	175									
Outlet Vap. Temperature-F	170.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	109.1									
Water outlet Temp.-F	156.2									
Inlet G-lbm/hr/ft2	665756		Temp	168.1	Density	77.49				
Subcooling-F	3.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	566.6	563.9	566	565.4	564.7	571.5	569.9	571.6	564.4	569.5
Heat Loss-Watts	17.2	4	5.5	6.2	6.6	6	4.4	5.4	5.9	32.1
Heat Flux-Btu/Hr/ft2	9822	9775	9811	9801	9789	9907	9879	9908	9784	9872
Wall Temp. #3-F	181	181.8	181.8	181.2	183	182.4	182.6	181.8	181.3	180.9
Wall Temp. #4-F	181.6	181.2	182.5	181.7	182.7	182.5	182.9	182.4	182.2	180.4
Wall Temp. #5-F	181.8	180.4	183.4	181.7	181.7	182.7	182.4	181.3	181.1	180.8
Wall Temp. #1-F	76.4	181.8	180.3	180.1	181.3	183.1	182.9	182.4	180.1	176.9
Wall Temp. #2-F	182.2	182	181.3	180.6	181.2	183.1	183.3	182.9	180.7	178
Instream Temp.-F	174	174.2	174.5	174.3	174.1	174.4	174.4	174	174.1	173.5
Avg. Wall Temp.-F	181.7	181.7	181.5	181.2	181.7	182.7	182.8	182.2	181.1	179.6
Avg. Wall DT.-F	7.2	7.1	6.5	6.4	7.2	7.8	8	7.7	6.5	5.7
Remaining Subcool-F	0.8									
Exit Quality	-0.01	0.02	0.06	0.09	0.12	0.16	0.19	0.23	0.26	0.29
EXP. H-Btu/Hr/ft2/F	1363	1384.9	1502.1	1523.7	1362.8	1265.6	1239	1284.8	1496.4	1746
COMPUTED H										
Jallouk	1120.4	1093.3	1060.2	1050.1	1028.5	1022.2	1007.1	994.5	977.9	970
Szady1(Cudo tube)	1684	1683.1	1691.1	1689.9	1688.6	1703	1702.7	1702.6	1695.9	1698.6
Szady2	1445.2	1444.3	1497	1493.7	1490.2	1505.9	1502.1	1502	1487.6	1492.8
(RLIQ)	124778	124057	120239	115832	111445	107569	103853	98755	94567	89982
(F)	1.005	1.234	1.613	1.86	2.058	2.225	2.377	2.52	2.647	2.775
(HLIQ)	210.3	258.4	337.9	389.4	430.9	466	497.8	527.7	554.2	580.7
(HBOIL)	1682.9	1681.1	1686.6	1683	1679.1	1691.3	1688.4	1685.6	1675.9	1675.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.4									
DP Liquid Density-lbm/ft3	93.51									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.214	0.963	0.796	2.31	2.91					
Zero Corrections-psid	0.039	-0.054	-0.741	0.111	0.077					
Corrected DP-Psid	0.175	1.017	1.537	2.199	2.833					
Actual DP-ft	2.1	2.95	4.41	5.59	6.68					
Measured TP-Psig	150.8				3.6					
Measured Overall-ft	274.89									
Computed DP-ft	1.99	3.61	5.09	6.5	7.79					
Friction-ft	0.08	0.23	0.44	0.69	0.97					
Acceleration-ft	0.06	0.13	0.19	0.25	0.32					
Elevation-ft	1.85	3.25	4.47	5.56	6.5					

Run#	576									
Test Fluid	C4F10									
Date:	6/1/93									
Time:	12:45									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19895									
Sat. Pressure-Psig	150									
Sat. Temperature-F(inlet)	174.1									
Liq. Density-lbm/ft3	77.04	76.9	76.9	76.95	76.95	76.9	76.86	76.93	76.93	77.11
Latent Heat-Btu/lbm	25.95	25.84	25.84	25.88	25.88	25.84	25.81	25.86	25.86	26
Specific Heat-Btu/lbm/F	0.298	0.298	0.299	0.299	0.299	0.299	0.299	0.298	0.299	0.298
Liq. Viscosity-lbm/ft-hr	0.35	0.348	0.348	0.348	0.348	0.348	0.347	0.348	0.348	0.351
Liq. Conductivity-Btu/hr-ft-F	0.022	0.0219	0.0219	0.022	0.022	0.0219	0.0219	0.0219	0.0219	0.0221
Liq. Prandtl No.	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74
Inlet Flow Rate-GPM	2.8									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	1.7									
Inlet Temperature-F	171									
Outlet Liq. Temperature-F	175									
Outlet Vap. Temperature-F	171.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	109.4									
Water outlet Temp.-F	156.1									
Inlet G-lbm/hr/ft2	519446		Temp	167	Density	77.74				
Subcooling-F	3.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	570.1	577.2	571.7	570.9	568.1	571.4	573.7	574.6	570.3	575.3
Heat Loss-Watts	17.1	4	5.5	6.2	6.7	6	4.5	5.5	5.9	32.5
Heat Flux-Btu/Hr/ft2	9882	10005	9910	9896	9848	9906	9945	9960	9886	9972
Wall Temp. #3-F	180.8	181.8	181.7	181.3	183	182.4	182.9	182.2	181.5	181.2
Wall Temp. #4-F	181.5	181	182.6	181.7	182.8	182.4	183.3	182.7	182.6	180.7
Wall Temp. #5-F	181.6	180.2	183.4	181.7	181.7	182.7	182.6	181.5	181.5	180.8
Wall Temp. #1-F	77.7	181.9	180.2	180.2	181.4	183.1	183.4	182.7	180.4	177.5
Wall Temp. #2-F	182	181.9	181.2	180.7	181.3	183	183.7	183.1	181.1	179.4
Instream Temp.-F	173.8	174.4	174.4	174.2	174.2	174.4	174.6	174.3	174.3	173.5
Avg. Wall Temp.-F	181.5	181.7	181.4	181.2	181.8	182.7	183.2	182.4	181.4	179.9
Avg. Wall DT.-F	7.2	6.8	6.6	6.6	7.2	7.8	8.1	7.7	6.7	6
Remaining Subcool-F	-0.7									
Exit Quality	0.01	0.05	0.09	0.14	0.18	0.22	0.27	0.31	0.35	0.4
EXP. H-Btu/Hr/ft2/F	1367.2	1471.8	1506.7	1504.5	1376.3	1269.5	1223.1	1295.3	1481.4	1670.6
COMPUTED H										
Jallouk	1141.7	1118.4	1084.4	1063.8	1060.7	1050.9	1042	1029.6	1015.3	1006.2
Szady1(Cudo tube)	1686.5	1703.8	1697.4	1695.4	1692.8	1700.9	1707.6	1707.1	1702.7	1702.6
Szady2	1447.9	1457.6	1460.5	1458.2	1498.4	1506.3	1512.1	1511.2	1502	1505.5
(RLIQ)	96807	94968	90629	86240	82089	77968	73898	69442	65212	60521
(F)	1.154	1.507	1.848	2.101	2.309	2.489	2.652	2.809	2.951	3.099
(HLIQ)	198.1	258.8	317.3	360.7	396.5	427.5	455.4	482.3	506.7	531.8
(HBOIL)	1685.6	1701.8	1693.7	1689.9	1685.5	1691.8	1696.7	1694.1	1687.6	1685.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.1									
DP Liquid Density-lbm/ft3	93.41									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.18	1.178	1.055	2.653	3.346					
Zero Corrections-psid	0.039	-0.054	-0.741	0.111	0.077					
Corrected DP-Psid	0.141	1.232	1.796	2.542	3.269					
Actual DP-ft	2.16	2.64	3.91	4.94	5.86					
Measured TP-Psig	150				3.5					
Measured Overall-ft	273.59									
Computed DP-ft	1.81	3.23	4.51	5.71	6.8					
Friction-ft	0.06	0.18	0.35	0.55	0.77					
Acceleration-ft	0.06	0.1	0.15	0.2	0.26					
Elevation-ft	1.69	2.94	4.01	4.96	5.77					

Run#	577									
Test Fluid	C4F10									
Date:	6/1/93									
Time:	12:45									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	151.8									
Sat. Temperature-F(inlet)	174.9									
Liq. Density-lbm/ft3	76.72	76.67	76.77	76.72	76.72	76.67	76.58	76.67	76.63	76.83
Latent Heat-Btu/lbm	25.7	25.67	25.74	25.7	25.7	25.67	25.59	25.67	25.63	25.78
Specific Heat-Btu/lbm/F	0.299	0.3	0.299	0.299	0.299	0.3	0.3	0.3	0.3	0.299
Liq. Viscosity-lbm/ft-hr	0.345	0.344	0.346	0.345	0.345	0.344	0.343	0.344	0.344	0.347
Liq. Conductivity-Btu/hr-ft-F	0.0218	0.0218	0.0218	0.0218	0.0218	0.0218	0.0217	0.0218	0.0218	0.0219
Liq. Prandtl No.	4.74	4.74	4.74	4.74	4.74	4.74	4.73	4.74	4.73	4.74
Inlet Flow Rate-GPM	1.9									
Outlet Liq. Flow Rate-GPM	1.3									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	172.2									
Outlet Liq. Temperature-F	176.5									
Outlet Vap. Temperature-F	172.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	109.5									
Water outlet Temp.-F	154.3									
Inlet G-lbm/hr/ft2	352481		Temp	167	Density	77.74				
Subcooling-F	2.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	572.4	577.3	575.3	574.6	575.4	576.5	573.7	575.9	576.8	561.8
Heat Loss-Watts	17	4	5.5	6.2	6.6	5.9	4.5	5.5	6	46.8
Heat Flux-Btu/Hr/ft2	9922	10007	9972	9960	9974	9993	9945	9983	9998	9738
Wall Temp. #3-F	181.3	182.2	182.1	181.9	183.9	183.4	183.8	183.2	182.7	209.4
Wall Temp. #4-F	181.9	181.5	183	182.5	183.5	183.4	184.4	183.6	183.6	209.4
Wall Temp. #5-F	182.1	180.6	183.9	182.5	182.5	183.4	183.3	182.6	182.2	205
Wall Temp. #1-F	79.5	182	180.8	180.6	182.1	183.9	184.1	183.6	181.1	188.2
Wall Temp. #2-F	182.6	182.2	181.6	181.3	182.1	183.9	184.4	184.2	181.8	189.6
Instream Temp.-F	175.2	175.4	175	175.2	175.2	175.4	175.8	175.4	175.8	174.7
Avg. Wall Temp.-F	182	182	181.8	181.9	182.6	183.5	184	183.4	182.3	200.3
Avg. Wall DT.-F	6.3	6.1	6.4	6.2	6.9	7.7	7.8	7.6	6.2	25.2
Remaining Subcool-F	-2.8									
Exit Quality	0.03	0.1	0.16	0.23	0.29	0.36	0.42	0.48	0.55	0.61
EXP. H-Btu/Hr/ft2/F	1568.3	1634.4	1564.5	1600.1	1445.7	1302.3	1283.1	1315.5	1605.4	388.8
COMPUTED H										
Jallouk	1183.1	1157.1	1127	1110.5	1098	1089.6	1080	1089.5	124	123.9
Szady1(Cudo tube)	1704.9	1714.5	1708	1710	1711.9	1716.5	1717.9	1717.5	124	123.9
Szady2	1469.2	1480.1	1472.6	1475	1521.7	1525.2	1522	1523.4	124	123.9
(RLIQ)	65748	62629	58078	53880	49575	45348	41184	38699	38699	38699
(F)	1.358	1.788	2.162	2.446	2.689	2.903	3.093	3.284	3.284	3.284
(HLIQ)	171.1	225.3	272.3	308.3	338.9	365.8	389.9	413.9	413.9	413.9
(HBOIL)	1704.3	1713.2	1705.7	1706.6	1707.5	1710.9	1711.1	1709.4	1709.4	1709.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.1									
DP Liquid Density-lbm/ft3	93.26									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.127	1.521	1.425	3.103	3.965					
Zero Corrections-psid	0.039	-0.054	-0.741	0.111	0.077					
Corrected DP-Psid	0.088	1.575	2.166	2.992	3.888					
Actual DP-ft	2.26	1.9	3.22	4.1	4.7					
Measured TP-Psig	151.8				3.6					
Measured Overall-ft	277.75									
Computed DP-ft	1.56	2.74	3.77	4.7	5.51					
Friction-ft	0.04	0.12	0.23	0.36	0.5					
Acceleration-ft	0.04	0.07	0.11	0.16	0.2					
Elevation-ft	1.48	2.55	3.43	4.19	4.8					

Run#	578									
Test Fluid	C4F10									
Date:	6/1/93									
Time:	14:59									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	150.9									
Sat. Temperature-F(inlet)	174.5									
Liq. Density-lbm/ft3	76.93	76.83	76.86	76.9	76.93	76.81	76.72	76.79	76.77	76.97
Latent Heat-Btu/lbm	25.86	25.79	25.81	25.84	25.86	25.77	25.7	25.76	25.74	25.9
Specific Heat-Btu/lbm/F	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299
Liq. Viscosity-lbm/ft-hr	0.348	0.347	0.347	0.348	0.348	0.346	0.345	0.346	0.346	0.349
Liq. Conductivity-Btu/hr-ft-F	0.0219	0.0219	0.0219	0.0219	0.0219	0.0219	0.0218	0.0219	0.0218	0.022
Liq. Prandtl No.	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	172.4									
Outlet Liq. Temperature-F	173.7									
Outlet Vap. Temperature-F	172.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	115.7									
Water outlet Temp.-F	165.7									
Inlet G-lbm/hr/ft2	188111		Temp		162	Density	78.82			
Subcooling-F	2.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	582.8	583.5	576.8	573.7	558.7	563	586.8	87.9	81.2	71
Heat Loss-Watts	17.6	4.1	5.7	6.4	6.9	6.2	4.9	5.1	5.8	31.5
Heat Flux-Btu/Hr/ft2	10099	10116	9998	9945	9685	9759	10172	1524	1408	1231
Wall Temp. #3-F	180.4	181.1	180.9	180.5	181.9	180.8	184.9	177.8	178.1	175.8
Wall Temp. #4-F	180.9	180.2	181.9	181.1	181.4	180.8	185.2	177.7	178.6	176.3
Wall Temp. #5-F	181	179.3	182.9	181.1	180.8	181.3	181.9	177.5	178.5	176.6
Wall Temp. #1-F	80.1	180.9	179.6	179.1	180	181.8	182.5	177.5	177.5	175.9
Wall Temp. #2-F	181.5	181	180.4	180	180.2	181.5	182.5	177.8	177.5	176.1
Instream Temp.-F	174.3	174.7	174.6	174.4	174.3	174.8	175.2	174.9	175	174.1
Avg. Wall Temp.-F	181	180.8	180.7	180.5	180.6	181.2	183.4	177.7	178	176.1
Avg. Wall DT.-F	6.2	5.6	5.6	5.6	5.9	5.9	7.7	2.7	3	2
Remaining Subcool-F	-8.4									
Exit Quality	0.1	0.22	0.34	0.46	0.58	0.69	0.82	0.84	0.85	0.87
EXP. H-Btu/Hr/ft2/F	1630.6	1792.4	1770.2	1775.7	1652	1644.6	1314.1	566.2	472.9	620.2
COMPUTED H										
Jallouk	1276.1	1210.4	1177.7	1156.5	1126	75	75	75	75	75
Szady1(Cudo tube)	1708.8	1714.8	1704.7	1698.6	1677.1	75	75	75	75	75
Szady2	1473.1	1480	1468.7	1461.8	1480.9	75	75	75	75	75
(RLIQ)	33639	29881	25551	21241	17035	17035	17035	17035	17035	17035
(F)	1.677	2.3	2.772	3.156	3.489	3.489	3.489	3.489	3.489	3.489
(HLIQ)	127.8	175.3	211.3	240.4	265.8	265.8	265.8	265.8	265.8	265.8
(HBOIL)	1708.6	1714.2	1703.7	1697	1674.8	1674.8	1674.8	1674.8	1674.8	1674.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80									
DP Liquid Density-lbm/ft3	82.99									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.594	1.848	1.87	3.656	4.653					
Zero Corrections-psid	0.039	-0.054	-0.741	0.111	0.077					
Corrected DP-Psid	0.555	1.902	2.611	3.545	4.576					
Actual DP-ft	1.38	1.27	2.36	3.03	3.37					
Measured TP-Psig	150.9				3.4					
Measured Overall-ft	275.94									
Computed DP-ft	1.25	2.08	2.74	3.62	4.74					
Friction-ft	0.02	0.06	0.11	0.16	0.19					
Acceleration-ft	0.02	0.04	0.07	0.09	0.09					
Elevation-ft	1.21	1.98	2.56	3.37	4.46					

13787.

Run#	579									
Test Fluid	C4F10									
Date:	6/1/93									
Time:	14:59									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	155.4									
Sat. Temperature-F(inlet)	176.7									
Liq. Density-lbm/ft3	76.77	76.67	76.7	76.72	76.72	76.65	76.51	76.58	76.58	76.77
Latent Heat-Btu/lbm	25.74	25.67	25.68	25.7	25.7	25.65	25.54	25.59	25.59	25.74
Specific Heat-Btu/lbm/F	0.299	0.3	0.3	0.299	0.299	0.3	0.3	0.3	0.3	0.299
Liq. Viscosity-lbm/ft-hr	0.346	0.344	0.345	0.345	0.345	0.344	0.342	0.343	0.343	0.346
Liq. Conductivity-Btu/hr-ft-F	0.0218	0.0218	0.0218	0.0218	0.0218	0.0218	0.0217	0.0217	0.0217	0.0218
Liq. Prandtl No.	4.74	4.74	4.74	4.74	4.74	4.73	4.73	4.73	4.73	4.74
Inlet Flow Rate-GPM	1.1									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	173.3									
Outlet Liq. Temperature-F	174.9									
Outlet Vap. Temperature-F	178.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	116.5									
Water outlet Temp.-F	166.6									
Inlet G-lbm/hr/ft2	205622		Temp	164.3	Density	78.33				
Subcooling-F	3.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	872.6	872.3	863.5	869.3	130.3	115.6	101.5	100	82.2	73.5
Heat Loss-Watts	17.3	4.1	5.6	6.4	5.8	4.9	3.5	4.8	5.5	29.7
Heat Flux-Btu/hr/ft2	15126	15121	14968	15069	2259	2004	1759	1733	1425	1274
Wall Temp. #3-F	182	184.1	183	184.3	178.2	177.8	178.2	179.1	178.7	178.8
Wall Temp. #4-F	182.5	182.3	184.5	185	178.4	177.8	178.2	179.1	179.1	177.2
Wall Temp. #5-F	182.6	180.8	185.5	183.8	177.8	177.8	178.2	179.1	179.1	177.4
Wall Temp. #1-F	80.6	182.9	181.5	181.3	178	178.4	178.9	178.9	178.5	176.6
Wall Temp. #2-F	183.6	183	182.4	182.3	177.9	177.7	178.2	179.1	178.6	176.9
Instream Temp.-F	175	176.4	176.3	176.2	176.2	176.5	176.1	176.8	176.8	176
Avg. Wall Temp.-F	182.7	183.1	182.9	183.6	178	178	178.2	179.1	178.8	176.9
Avg. Wall DT.-F	7	7	6.9	7.7	2.7	2.4	2	3.2	2.9	1.9
Remaining Subcool-F	-11									
Exit Quality	0.13	0.3	0.46	0.63	0.65	0.68	0.7	0.72	0.73	0.75
EXP. H-Btu/Hr/ft2/F	2163.5	2162.7	2177.7	1952.2	829.5	849.3	862.3	544.8	485.4	676.8
COMPUTED H										
Jallouk	1644.2	1579	80.5	80.5	80.5	80.5	80.6	80.6	80.6	80.5
Szady1(Cudo tube)	2086.3	2091.4	80.5	80.5	80.5	80.5	80.6	80.6	80.6	80.5
Szady2	1997.1	2002.4	80.5	80.5	80.5	80.5	80.6	80.6	80.6	80.5
(RLIQ)	38409	30770	30770	30770	30770	30770	30770	30770	30770	30770
(F)	1.788	2.517	2.517	2.517	2.517	2.517	2.517	2.517	2.517	2.517
(HLIQ)	146.4	206.1	206.1	206.1	206.1	206.1	206.1	206.1	206.1	206.1
(HBOIL)	2086	2090.7	2090.7	2090.7	2090.7	2090.7	2090.7	2090.7	2090.7	2090.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.6									
DP Liquid Density-lbm/ft3	92.9									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.664	1.961	2.059	3.863	4.768					
Zero Corrections-psid	0.039	-0.054	-0.741	0.111	0.077					
Corrected DP-Psid	0.625	2.015	2.8	3.752	4.691					
Actual DP-ft	1.25	1.06	2.01	2.64	3.15					
Measured TP-Psig	155.4				3.5					
Measured Overall-ft	284.94									
Computed DP-ft	1.18	1.93	2.83	4.09	5.26					
Friction-ft	0.03	0.08	0.14	0.17	0.21					
Acceleration-ft	0.03	0.07	0.08	0.08	0.09					
Elevation-ft	1.13	1.78	2.62	3.83	4.96					

118.7.

Run#	580									
Test Fluid	C4F10									
Date:	6/1/93									
Time:	14:59									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	151.3									
Sat. Temperature-F(inlet)	174.7									
Liq. Density-lbm/ft3	77.09	76.67	76.72	76.77	76.81	76.7	76.53	76.63	76.6	76.68
Latent Heat-Btu/lbm	25.98	25.67	25.7	25.74	25.77	25.68	25.58	25.63	25.61	25.63
Specific Heat-Btu/lbm/F	0.298	0.3	0.298	0.298	0.299	0.3	0.3	0.3	0.3	0.298
Liq. Viscosity-lbm/ft-hr	0.35	0.344	0.345	0.346	0.346	0.345	0.342	0.344	0.343	0.347
Liq. Conductivity-Btu/hr-ft-F	0.022	0.0218	0.0218	0.0218	0.0219	0.0218	0.0217	0.0218	0.0217	0.0219
Liq. Prandtl No.	4.74	4.74	4.74	4.74	4.74	4.74	4.73	4.73	4.73	4.74
Inlet Flow Rate-GPM	1.9									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	172.9									
Outlet Liq. Temperature-F	174.2									
Outlet Vap. Temperature-F	173.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	112.9									
Water outlet Temp.-F	159									
Inlet G-lbm/hr/ft2	352481		Temp	167	Density	77.74				
Subcooling-F	1.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	868.7	867.5	870	859.6	887.5	876.4	122.8	101.5	84.9	74.2
Heat Loss-Watts	18.3	4.3	5.9	6.8	7.4	9.3	4.1	5.3	5.9	32
Heat Flux-Btu/hr/ft2	15058	15038	15081	14901	15384	15192	2129	1759	1472	1286 (1772 e.
Wall Temp. #3-F	182.1	183.8	182.4	182.4	185.4	201.9	177.9	178.2	178.2	178.1
Wall Temp. #4-F	182.7	182	184.2	183.2	184.2	201.7	177.9	178.2	178.4	178.6
Wall Temp. #5-F	182.6	180.6	185	183	182.8	200.3	177.9	178.2	178.8	178.6
Wall Temp. #1-F	81.5	182.7	181.5	180.7	181.9	191.9	178.5	177.7	177.7	178.1
Wall Temp. #2-F	183.6	182.8	182.2	181.8	182.4	191.6	178.4	177.7	177.7	178.3
Instream Temp.-F	173.6	175.4	175.2	175	174.8	175.3	176	175.8	175.7	174.5
Avg. Wall Temp.-F	182.8	182.8	182.6	182.3	182.8	199	178.1	178	178.2	178.3
Avg. Wall DT.-F	8.5	6.7	6.7	6.7	7.3	23	2	2.3	2.4	1.8
Remaining Subcool-F	-6.6									
Exit Quality	0.08	0.17	0.27	0.37	0.47	0.56	0.58	0.59	0.6	0.61
EXP. H-Btu/Hr/ft2/F	1778	2229.3	2253.1	2240.2	2098.9	661.6	1051.8	758.2	614.9	721.8
COMPUTED H										
Jallouk	1505.3	1468.2	1432.7	123.9	123.9	124	124	124	124	123.9
Szady1(Cudo tube)	2064	2088.2	2087.3	123.9	123.9	124	124	124	124	123.9
Szady2	1971.1	1994.7	1995.7	123.9	123.9	124	124	124	124	123.9
(RLIQ)	63825	58670	52079	52079	52079	52079	52079	52079	52079	52079
(F)	1.59	2.13	2.552	2.552	2.552	2.552	2.552	2.552	2.552	2.552
(HLIQ)	200.1	268.5	321.6	321.6	321.6	321.6	321.6	321.6	321.6	321.6
(HBOIL)	2063.4	2084.7	2084.7	2084.7	2084.7	2084.7	2084.7	2084.7	2084.7	2084.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.5									
DP Liquid Density-lbm/ft3	92.77									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.179	1.648	1.618	3.372	4.212					
Zero Corrections-psid	0.039	-0.054	-0.741	0.111	0.077					
Corrected DP-Psid	0.14	1.7	2.357	3.261	4.135					
Actual DP-ft	2.15	1.64	2.83	3.55	4.17					
Measured TP-Psig	151.3				3.5					
Measured Overall-ft	276.84									
Computed DP-ft	1.4	2.43	3.32	4.68	5.95					
Friction-ft	0.06	0.16	0.31	0.4	0.49					
Acceleration-ft	0.06	0.11	0.18	0.19	0.2					
Elevation-ft	1.29	2.16	2.84	4.09	5.26					

Run#	581									
Test Fluid	C4F10									
Date:	6/1/93									
Time:	14:59									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	153.1									
Sat. Temperature-F(inlet)	175.6									
Liq. Density-lbm/ft3	76.95	76.67	76.7	76.74	76.72	76.7	76.56	76.67	76.67	76.83
Latent Heat-Btu/lbm	25.68	25.67	25.68	25.72	25.7	25.68	25.58	25.67	25.67	25.79
Specific Heat-Btu/lbm/F	0.299	0.3	0.3	0.299	0.299	0.3	0.3	0.3	0.3	0.299
Liq. Viscosity-lbm/ft-hr	0.348	0.344	0.345	0.345	0.345	0.345	0.343	0.344	0.344	0.347
Liq. Conductivity-Btu/hr-ft-F	0.022	0.0218	0.0218	0.0218	0.0218	0.0218	0.0217	0.0218	0.0218	0.0219
Liq. Prandtl No.	4.74	4.74	4.74	4.74	4.74	4.74	4.73	4.74	4.74	4.74
Inlet Flow Rate-GPM	2.8									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	1.8									
Inlet Temperature-F	173.3									
Outlet Liq. Temperature-F	174.1									
Outlet Vap. Temperature-F	173.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	112.6									
Water outlet Temp.-F	154									
Inlet G-lbm/hr/ft2	516161		Temp	169.2	Density	77.25				
Subcooling-F	2.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	879.7	875.6	878.3	878.3	880.9	872.1	127.2	100.4	85.1	77.6
Heat Loss-Watts	17	4	5.4	6.1	6.5	5.8	3.3	4.4	5.2	28.4
Heat Flux-Btu/hr/ft2	15249	15178	15225	15225	15270	15117	2205	1740	1475	1345
Wall Temp. #3-F	182.4	184	182.5	182.4	185.4	184.9	178.3	178.1	177.9	175.8
Wall Temp. #4-F	182.9	182.2	184.1	183.4	184.1	184.7	178.2	178.2	178.4	176.4
Wall Temp. #5-F	183	180.7	185	183.1	182.9	183.7	178.1	177.7	178.4	176.4
Wall Temp. #1-F	82.1	182.9	181.4	180.9	182.1	184	178.2	177.3	177.8	176.8
Wall Temp. #2-F	183.8	183	182.3	182	182.6	184.1	178.1	177.3	177.9	176.1
Instream Temp.-F	174.2	175.4	175.3	175.1	175.2	175.3	175.9	175.4	175.4	174.7
Avg. Wall Temp.-F	183	183	182.6	182.5	182.9	184.3	178.2	177.7	178.1	176.1
Avg. Wall DT.-F	8.1	6.9	6.6	6.7	7	8.3	2.2	2.2	2.6	1.3
Remaining Subcool-F	-3.5									
Exit Quality	0.04	0.11	0.17	0.24	0.31	0.38	0.39	0.39	0.4	0.41
EXP. H-Btu/hr/ft2/F	1874.3	2187.3	2311.3	2285.3	2170.6	1812.2	1011.3	776.5	564.5	1004.4
COMPUTED H										
Jallouk	1471.5	1424.5	1388.3	168.2	168.2	168.2	168.2	168.2	168.2	168.2
Szady1(Cudo tube)	2084.8	2096.4	2099.3	168.2	168.2	168.2	168.2	168.2	168.2	168.2
Szady2	1996.6	2007.4	2010	168.2	168.2	168.2	168.2	168.2	168.2	168.2
(RLIQ)	94952	90787	84141	84141	84141	84141	84141	84141	84141	84141
(F)	1.412	1.85	2.215	2.215	2.215	2.215	2.215	2.215	2.215	2.215
(HLIQ)	241.2	316.4	378.8	378.8	378.8	378.8	378.8	378.8	378.8	378.8
(HBOIL)	2083.8	2094	2095.2	2095.2	2095.2	2095.2	2095.2	2095.2	2095.2	2095.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	82									
DP Liquid Density-lbm/ft3	92.7									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.156	1.314	1.249	2.916	3.649					
Zero Corrections-psid	0.039	-0.054	-0.741	0.111	0.077					
Corrected DP-Psid	0.117	1.368	1.99	2.805	3.572					
Actual DP-ft	2.18	2.28	3.51	4.39	5.22					
Measured TP-Psig	153.1				3.6					
Measured Overall-ft	280.18									
Computed DP-ft	1.61	2.89	4.06	5.56	6.98					
Friction-ft	0.09	0.25	0.47	0.63	0.78					
Acceleration-ft	0.09	0.16	0.24	0.25	0.26					
Elevation-ft	1.44	2.48	3.34	4.68	5.92					

Run#	582									
Test Fluid	C4F10									
Date:	6/1/93									
Time:	14:59									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	160.3									
Sat. Temperature-F(inlet)	178.9									
Liq. Density-lbm/ft3	76.7	76.6	76.65	76.77	76.81	76.79	76.56	76.67	76.67	76.9
Latent Heat-Btu/lbm	25.68	25.61	25.65	25.74	25.77	25.76	25.58	25.67	25.67	25.84
Specific Heat-Btu/lbm/F	0.3	0.3	0.3	0.299	0.299	0.299	0.3	0.3	0.3	0.299
Liq. Viscosity-lbm/ft-hr	0.345	0.343	0.344	0.346	0.346	0.346	0.343	0.344	0.344	0.348
Liq. Conductivity-Btu/hr-ft-F	0.0218	0.0217	0.0218	0.0218	0.0219	0.0219	0.0217	0.0218	0.0218	0.0219
Liq. Prandtl No.	4.74	4.73	4.73	4.74	4.74	4.74	4.73	4.74	4.74	4.74
Inlet Flow Rate-GPM	3.7									
Outlet Liq. Flow Rate-GPM	1.3									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	174.6									
Outlet Liq. Temperature-F	173.8									
Outlet Vap. Temperature-F	172.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	112.2									
Water outlet Temp.-F	153.7									
Inlet G-lbm/hr/ft2	679869		Temp	170.3	Density	77				
Subcooling-F	4.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	860	868.9	872.4	874.3	858.8	856.7	493.2	82	85.7	79.7
Heat Loss-Watts	16.5	3.9	5.3	5.8	6.2	5.3	3.6	4.1	4.9	27.1
Heat Flux-Btu/Hr/ft2	14906	15062	15122	15155	14852	14850	8549	1421	1486	1382
Wall Temp. #3-F	182.5	184.1	182.6	182.1	184.9	182.4	181.9	177.1	177.7	175.5
Wall Temp. #4-F	182.9	182.2	184.2	183.2	183.3	182.4	181.9	177.1	178.1	176.1
Wall Temp. #5-F	183.1	180.7	185.1	182.7	182.4	182.9	180.4	177.1	178.1	176.1
Wall Temp. #1-F	83.4	183	181.7	180.5	181.5	183.3	181	176.7	176.6	175.5
Wall Temp. #2-F	183.8	183.2	182.3	181.6	182.1	183.3	180.9	177.1	176.7	175.7
Instream Temp.-F	175.3	175.7	175.5	175	174.8	174.9	175.9	175.4	175.4	174.4
Avg. Wall Temp.-F	183.1	183.1	182.7	182.1	182.3	182.8	181.2	177	177.4	175.8
Avg. Wall DT.-F	7.1	6.7	6.5	6.4	6.9	7.2	4.9	1.6	2	1.3
Remaining Subcool-F	0									
Exit Quality	0	0.05	0.1	0.15	0.2	0.25	0.28	0.28	0.29	0.29
EXP. H-Btu/Hr/ft2/F	2099.3	2233.3	2320.6	2353.3	2167	2068.6	1732.9	913.6	753	1048.6
COMPUTED H										
Jallouk	1467.2	1406.1	1372.7	1327.3	1278.2	209.6	209.7	209.7	209.7	209.6
Szady1(Cudo tube)	2075.6	2092.3	2095.4	2092.8	2071.4	209.6	209.7	209.7	209.7	209.6
Szady2	1981.6	2001.2	2003.6	1999.2	1968.8	209.6	209.7	209.7	209.7	209.6
(RLIQ)	129016	126908	119510	112889	105711	105711	105711	105711	105711	105711
(F)	1.004	1.456	1.859	2.147	2.38	2.38	2.38	2.38	2.38	2.38
(HLIQ)	214.1	310.5	396.3	457.6	507.1	507.1	507.1	507.1	507.1	507.1
(HBOIL)	2074.8	2090	2090.6	2085.5	2061.2	2061.2	2061.2	2061.2	2061.2	2061.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.2									
DP Liquid Density-lbm/ft3	92.52									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.182	1.09	0.996	2.602	3.252					
Zero Corrections-psid	0.039	-0.054	-0.741	0.111	0.077					
Corrected DP-Psid	0.143	1.144	1.727	2.491	3.185					
Actual DP-ft	2.14	2.67	3.98	4.98	5.92					
Measured TP-Psig	160.3				3.6					
Measured Overall-ft	293.42									
Computed DP-ft	1.97	3.48	4.9	6.44	7.96					
Friction-ft	0.1	0.3	0.58	0.83	1.04					
Acceleration-ft	0.09	0.19	0.28	0.32	0.33					
Elevation-ft	1.78	3	4.04	5.29	6.59					

Run#	583									
Test Fluid	C4F10									
Date:	6/1/93									
Time:	18:44									
Note	TABOREK	Analytical dt								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Prossure-Psig	152.2									
Sat. Temperature-F(inlet)	175.1									
Liq. Density-lbm/ft3	76.86	76.79	76.83	76.86	76.9	76.9	76.74	76.79	76.79	77.02
Latent Heat-Btu/lbm	25.81	25.76	25.79	25.81	25.84	25.84	25.72	25.76	25.76	25.83
Specific Heat-Btu/lbm/F	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299
Liq. Viscosity-lbm/ft-hr	0.347	0.346	0.347	0.347	0.348	0.348	0.345	0.346	0.346	0.349
Liq. Conductivity-Btu/hr-ft-F	0.0219	0.0219	0.0219	0.0219	0.0219	0.0219	0.0218	0.0219	0.0219	0.022
Liq. Prandtl No.	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74
Inlet Flow Rate-GPM	3.7									
Outlet Liq. Flow Rate-GPM	1.3									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	173.9									
Outlet Liq. Temperature-F	173.2									
Outlet Vap. Temperature-F	172.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	112.2									
Water outlet Temp.-F	155.1									
Inlet G-lbm/hr/ft2	680872		Temp	169.8	Density	77.11				
Subcooling-F	1.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	857.1	869.7	869.8	871.6	860.6	860.1	494.2	82.1	85.8	79.9
Heat Loss-Watts	16.4	3.9	5.3	5.8	6.2	5.3	3.5	4	4.9	27
Heat Flux-Btu/Hr/ft2	14857	15076	15077	15109	14918	14909	8567	1423	1487	1385
Wall Temp. #3-F	181.8	183.4	181.9	181.6	184.5	181.9	181.4	176.4	177.3	175.1
Wall Temp. #4-F	182.3	181.5	183.4	182.7	182.9	181.9	181.3	176.4	177.3	175.6
Wall Temp. #5-F	182.3	180.3	184.3	182.2	182	182.4	180.2	176.4	177.3	175.7
Wall Temp. #1-F	83.3	182.4	180.7	180.2	181.2	182.8	180.4	176.4	176.4	175.2
Wall Temp. #2-F	183.1	182.5	181.6	181.1	181.6	182.9	180.4	176.4	176.4	175.4
Instream Temp.-F	174.6	174.9	174.7	174.6	174.4	174.4	175.1	174.9	174.9	173.9
Avg. Wall Temp.-F	182.4	182.5	181.9	181.7	181.9	182.3	180.7	176.4	176.9	175.4
Avg. Wall DT.-F	7.1	6.9	6.5	6.4	6.9	7.2	5.3	1.4	2	1.4
Remaining Subcool-F	-3									
Exit Quality	0.04	0.09	0.14	0.19	0.24	0.29	0.31	0.32	0.32	0.33
EXP. H-Btu/Hr/ft2/F	2091.5	2194.8	2313	2363.6	2177.5	2077.6	1630.9	991.3	753.9	963.6
COMPUTED H										
Jallouk	1398	1379.6	1331.4	209.9	209.8	209.8	209.9	209.9	209.9	209.8
Szady1(Cudo tube)	2063.9	2084	2083.2	209.9	209.8	209.8	209.9	209.9	209.9	209.8
Szady2	1967	1990.8	1987.9	209.9	209.8	209.8	209.9	209.9	209.9	209.8
(RLIQ)	126087	120951	114254	114254	114254	114254	114254	114254	114254	114254
(F)	1.378	1.761	2.069	2.069	2.069	2.069	2.069	2.069	2.069	2.069
(HLIQ)	293.8	375.6	441.2	441.2	441.2	441.2	441.2	441.2	441.2	441.2
(HBOIL)	2062	2079.9	2076.6	2076.6	2076.6	2076.6	2076.6	2076.6	2076.6	2076.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.2									
DP Liquid Density-lbm/ft3	92.52									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.204	1.087	0.982	2.598	3.262					
Zero Corrections-psid	0.039	-0.054	-0.741	0.111	0.077					
Corrected DP-Psid	0.165	1.141	1.723	2.487	3.185					
Actual DP-ft	2.09	2.67	3.99	4.96	5.91					
Measured TP-Psig	152.2				3.4					
Measured Overall-ft	278.21									
Computed DP-ft	1.75	3.21	4.61	6.13	7.65					
Friction-ft	0.14	0.37	0.68	0.95	1.17					
Acceleration-ft	0.13	0.22	0.32	0.36	0.37					
Elevation-ft	1.49	2.62	3.61	4.83	6.11					

Run#	584									
Test Fluid	C4F10									
Data:	6/1/93									
Time:	18:44									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	148.4									
Sat. Temperature-F(inlet)	173.3									
Liq. Density-lbm/ft3	77.06	77.06	77.06	77.15	77.2	77.11	77	77.06	77.06	77.34
Latent Heat-Btu/lbm	25.97	25.97	25.97	26.04	26.07	26	25.91	25.97	25.97	26.17
Specific Heat-Btu/lbm/F	0.298	0.298	0.298	0.298	0.298	0.298	0.299	0.298	0.298	0.298
Liq. Viscosity-lbm/ft-hr	0.35	0.35	0.35	0.351	0.352	0.351	0.349	0.35	0.35	0.354
Liq. Conductivity-Btu/hr-ft-F	0.022	0.022	0.022	0.0221	0.0221	0.0221	0.022	0.022	0.022	0.0222
Liq. Prandtl No.	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.76
Inlet Flow Rate-GPM	4.5									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	2.2									
Inlet Temperature-F	172.7									
Outlet Liq. Temperature-F	172									
Outlet Vap. Temperature-F	170.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	111.5									
Water outlet Temp.-F	152.9									
Inlet G-lbm/hr/ft2	828816		Temp	169.5	Density	77.18				
Subcooling-F	0.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	871.1	877	874.3	876.2	855	855.1	212.8	83.2	86.4	81.6
Heat Loss-Watts	16.1	3.8	5.1	5.6	5.9	5	2.8	3.8	4.7	25.8
Heat Flux-Btu/hr/ft2	15100	15202	15155	15188	14821	14823	3680	1442	1498	1414
Wall Temp. #3-F	180.7	182.4	180.8	180.6	183.3	180.4	176.9	175.2	175.9	178.7
Wall Temp. #4-F	181.2	180.4	182.4	181.7	181.8	180.6	176.9	175.2	176.2	174.2
Wall Temp. #5-F	181.2	179.2	183.3	181.3	181	181.1	176.5	175.1	176.2	174.6
Wall Temp. #1-F	82.7	181.4	179.8	179.2	180.8	181.6	177	175.2	175.2	178.7
Wall Temp. #2-F	182.1	181.4	180.4	180.3	180.6	181.8	176.9	175.2	176.2	174.1
Instream Temp.-F	173.7	173.7	173.7	173.3	173.1	173.5	174	173.7	173.7	172.5
Avg. Wall Temp.-F	181.3	181.4	180.9	180.7	180.9	180.9	176.8	175.2	175.7	174.1
Avg. Wall DT.-F	6.9	7	6.5	6.7	7.2	6.8	2.7	1.4	2	1.5
Remaining Subcool-F	-3									
Exit Quality	0.03	0.08	0.12	0.16	0.2	0.24	0.25	0.25	0.26	0.26
EXP. H-Btu/Hr/ft2/F	2182.8	2167.7	2344.2	2262.3	2071.3	2194.9	1376.4	1019.4	759.4	945.5
COMPUTED H										
Jallouk	1380.5	1321.4	1275.7	245.5	245.5	245.5	245.6	245.5	245.5	245.4
Szady1(Cudo tube)	2069.7	2078.5	2077.5	245.5	245.5	245.5	245.6	245.5	245.5	245.4
Szady2	1975.9	1984.8	1980.4	245.5	245.5	245.5	245.6	245.5	245.5	245.4
(RLIQ)	152253	146402	140000	140000	140000	140000	140000	140000	140000	140000
(F)	1.374	1.728	1.997	1.997	1.997	1.997	1.997	1.997	1.997	1.997
(HLIQ)	342.6	430.9	498	498	498	498	498	498	498	498
(HBOIL)	2068.5	2072.3	2067.9	2067.9	2067.9	2067.9	2067.9	2067.9	2067.9	2067.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.4									
DP Liquid Density-lbm/ft3	92.49									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.186	0.884	0.694	2.243	2.824					
Zero Corrections-psid	0.039	-0.054	-0.741	0.111	0.077					
Corrected DP-Psid	0.147	0.938	1.435	2.132	2.747					
Actual DP-ft	2.12	3.04	4.5	5.6	6.7					
Measured TP-Psig	148.4				3.4					
Measured Overall-ft	269.99									
Computed DP-ft	1.67	3.48	5.03	6.77	8.38					
Friction-ft	0.19	0.5	0.9	1.2	1.49					
Acceleration-ft	0.18	0.29	0.41	0.43	0.44					
Elevation-ft	1.5	2.69	3.72	5.13	6.45					

177.0.

Run#	585									
Test Fluid	C4F10									
Date:	6/1/93									
Time:	18:44									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	164.5									
Sat. Temperature-F(inlet)	180.8									
Liq. Density-lbm/ft3	76.72	76.63	76.49	76.63	76.8	76.53	76.42	76.46	76.51	76.77
Latent Heat-Btu/lbm	25.7	25.63	25.52	25.63	25.61	25.56	25.47	25.51	25.54	25.74
Specific Heat-Btu/lbm/F	0.299	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.299
Liq. Viscosity-lbm/ft-hr	0.345	0.344	0.342	0.344	0.343	0.342	0.341	0.341	0.342	0.346
Liq. Conductivity-Btu/hr-ft-F	0.0218	0.0218	0.0217	0.0218	0.0217	0.0217	0.0216	0.0217	0.0217	0.0218
Liq. Prandtl No.	4.74	4.73	4.73	4.73	4.73	4.73	4.73	4.73	4.73	4.74
Inlet Flow Rate-GPM	5.3									
Outlet Liq. Flow Rate-GPM	1.3									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	174.6									
Outlet Liq. Temperature-F	174.5									
Outlet Vap. Temperature-F	173.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	113.1									
Water outlet Temp.-F	156.3									
Inlet G-lbm/hr/ft2	972425		Temp	170.8	Density	76.88				
Subcooling-F	6.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	880.1	876.8	883.7	875.8	865.2	857.1	875	83.2	87.8	82.6
Heat Loss-Watts	16.5	3.9	5.3	5.8	6.2	5.2	3.9	4	4.9	26.8
Heat Flux-Btu/hr/ft2	15256	15199	15318	15181	14998	14867	15168	1442	1522	1432
Wall Temp. #3-F	183.4	184.9	183.4	182.9	185.8	182.8	184.4	177.8	178.4	178.1
Wall Temp. #4-F	183.8	183.1	185	183.8	184.3	182.8	184.5	177.9	178.5	178.4
Wall Temp. #5-F	183.8	181.8	185.8	183.5	183.8	182.9	183.6	177.9	178.5	178.5
Wall Temp. #1-F	82.5	183.7	182.4	181.5	182.4	183.8	185.3	177.5	177.5	178.3
Wall Temp. #2-F	184.6	184.1	183.1	182.2	182.9	184.1	184.9	178	177.5	178.4
Instream Temp.-F	175.2	175.6	176.2	175.6	175.7	176	176.5	176.3	176.1	176
Avg. Wall Temp.-F	183.9	184	183.5	182.9	183.2	183.1	184.5	177.8	178.1	178.3
Avg. Wall DT.-F	8	7.7	6.6	6.6	6.8	6.4	7.4	1.4	1.9	1.3
Remaining Subcool-F	3.2									
Exit Quality	-0.04	0	0.03	0.07	0.11	0.14	0.18	0.18	0.18	0.19
EXP. H-Btu/Hr/ft2/F	1904.5	1983.4	2327.1	2304.1	2190.3	2320.2	2062.3	1019.4	796.3	1122.7
COMPUTED H										
Jallouk	1411.7	1411.4	1367.7	1288.8	1239	1202.5	1183.3	481.7	487.1	486.8
Szady1(Cudo tube)	2098.7	2100	2117.6	2103.1	2094.6	2091.5	2121.6	786	797.9	789
Szady2	2011.6	2012.2	2031.6	2010.2	1994.8	1986.3	2021.9	676.6	682.1	687.6
(RLIQ)	184956	185066	183044	175389	168922	162889	157077	153124	152177	149933
(F)	1.004	1.004	1.362	1.701	1.935	2.123	2.283	2.37	2.386	2.414
(HLIQ)	285.1	285.1	386.7	482.8	549.3	602.7	648.7	673.1	677.8	684.8
(HBOIL)	2096.9	2098.2	2113.2	2094.6	2081.9	2074.7	2101.2	565.2	581.5	554
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83									
DP Liquid Density-lbm/ft3	92.55									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.181	0.733	0.447	1.937	2.491					
Zero Corrections-psid	0.039	-0.054	-0.741	0.111	0.077					
Corrected DP-Psid	0.142	0.787	1.188	1.826	2.414					
Actual DP-ft	2.14	3.96	5.01	6.22	7.38					
Measured TP-Psig	164.5				3.6					
Measured Overall-ft	301.82									
Computed DP-ft	2.13	4.14	5.91	7.69	9.4					
Friction-ft	0.13	0.38	0.75	1.14	1.46					
Acceleration-ft	0	0.23	0.36	0.44	0.45					
Elevation-ft	2	3.53	4.8	6.12	7.5					

2080.

Run#	586									
Test Fluid	C4F10									
Date:	6/1/93									
Time:	18:44									
Note	TABOREK Analytical dt									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	156									
Sat. Temperature-F(inlet)	176.9									
Liq. Density-lbm/ft3	76.88	76.95	77.04	77.18	77.22	77.15	76.97	77.06	77.09	77.31
Latent Heat-Btu/lbm	25.83	25.88	25.95	26.05	26.09	26.04	25.9	25.97	25.98	26.16
Specific Heat-Btu/lbm/F	0.299	0.299	0.298	0.298	0.298	0.298	0.299	0.298	0.298	0.298
Liq. Viscosity-lbm/ft-hr	0.347	0.348	0.35	0.352	0.352	0.351	0.349	0.35	0.35	0.354
Liq. Conductivity-Btu/hr-ft-F	0.0219	0.022	0.022	0.0221	0.0221	0.0221	0.022	0.022	0.022	0.0222
Liq. Prandtl No.	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.76
Inlet Flow Rate-GPM	5.3									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	2.6									
Inlet Temperature-F	174.2									
Outlet Liq. Temperature-F	171.9									
Outlet Vap. Temperature-F	170.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	118									
Water outlet Temp.-F	164.1									
Inlet G-lbm/hr/ft2	980424		Temp	168	Density	77.52				
Subcooling-F	2.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1161	1151.2	1151.8	105.8	71.7	71.6	72.5	74.4	81	70.8
Heat Loss-Watts	16.9	4	5.4	5.2	5.1	4.1	2.8	4	4.9	26.7
Heat Flux-Btu/Hr/ft2	20125	19955	19967	1825	1243	1241	1257	1290	1404	1227
Wall Temp. #3-F	182.2	185	183.1	175.4	174.1	174.6	175.3	174.9	175.6	173.2
Wall Temp. #4-F	182.6	182.3	185.1	175.4	175	174.5	175.3	175	175.9	173.8
Wall Temp. #5-F	182.5	180.3	183.8	175.4	174.7	174.7	175.4	175.1	175.9	174
Wall Temp. #1-F	80.7	183	182	175.3	174.6	175.1	175.2	174.7	174.8	173.6
Wall Temp. #2-F	183.5	182.9	182.9	175.5	174.4	174.4	175.2	175	174.8	173.7
Instream Temp.-F	174.5	174.2	173.8	173.2	173	173.3	174.1	173.7	173.6	172.6
Avg. Wall Temp.-F	182.7	183.3	183.3	175.4	174.7	174.7	175.3	174.9	175.4	173.7
Avg. Wall DT.-F	7.3	8.2	8.6	2.1	1.6	1.4	1.1	1.2	1.7	1
Remaining Subcool-F	-1.3									
Exit Quality	0.01	0.06	0.11	0.11	0.11	0.12	0.12	0.12	0.13	0.13
EXP. H-Btu/Hr/ft2/F	2760.5	2434.1	2329.2	872.8	767.8	906.7	1118.9	1061.4	808.5	1221.7
COMPUTED H										
Jallouk	1606.5	1536.2	280.9	280.8	280.8	280.8	280.9	280.9	280.9	280.8
Szady1(Cudo tube)	2398.8	2388	280.9	280.8	280.8	280.8	280.9	280.9	280.9	280.8
Szady2	2352.4	2335.8	280.9	280.8	280.8	280.8	280.9	280.9	280.9	280.8
(RLIQ)	183250	177096	177096	177096	177096	177096	177096	177096	177096	177096
(F)	1.23	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59	1.59
(HLIQ)	351.2	453.7	453.7	453.7	453.7	453.7	453.7	453.7	453.7	453.7
(HBOIL)	2396.3	2380.6	2380.6	2380.6	2380.6	2380.6	2380.6	2380.6	2380.6	2380.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.5									
DP Liquid Density-lbm/ft3	82.77									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.162	0.736	0.636	2.034	2.517					
Zero Corrections-psid	0.039	-0.054	-0.741	0.111	0.077					
Corrected DP-Psid	0.123	0.789	1.377	1.923	2.44					
Actual DP-ft	2.17	3.33	4.63	6.02	7.3					
Measured TP-Psig	156				3.6					
Measured Overall-ft	283.85									
Computed DP-ft	2.07	3.91	5.75	7.59	9.31					
Friction-ft	0.22	0.54	0.84	1.13	1.42					
Acceleration-ft	0.22	0.32	0.38	0.34	0.36					
Elevation-ft	1.63	3.04	4.58	6.11	7.54					

Run#	587									
Test Fluid	C4F10									
Date:	6/1/93									
Time:	23:10									
Note	Analytical	Pin=Psat is assumed								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	62.3									
Sat. Temperature-F(inlet)	119									
Liq. Density-lbm/ft3	86.59	86.59	86.59	86.54	86.59	86.65	86.72	86.76	86.81	86.94
Latent Heat-Btu/lbm	32.86	32.86	32.86	32.83	32.86	32.9	32.95	32.98	33.01	33.09
Specific Heat-Btu/lbm/F	0.274	0.274	0.274	0.274	0.274	0.274	0.274	0.274	0.274	0.273
Liq. Viscosity-lbm/ft-hr	0.537	0.537	0.537	0.536	0.537	0.539	0.54	0.541	0.543	0.546
Liq. Conductivity-Btu/hr-ft-F	0.028	0.028	0.028	0.028	0.028	0.0281	0.0281	0.0281	0.0282	0.0283
Liq. Prandtl No.	5.25	5.25	5.25	5.25	5.25	5.26	5.26	5.27	5.27	5.29
Inlet Flow Rate-GPM	4.8									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2.5									
Inlet Temperature-F	119.7									
Outlet Liq. Temperature-F	121.4									
Outlet Vap. Temperature-F	116.1									
Water Flow Rate-GPM										
Water inlet Temp.-F	77.2									
Water outlet Temp.-F	107.9									
Inlet G-lbm/hr/ft2	997036		Temp	.118.2	Density	87.04				
Subcooling-F	-0.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	289.7	288.7	277.1	284.9	286.2	288	287.7	287.1	285.1	282.4
Heat Loss-Watts	9.6	2.1	2.9	2.9	2.8	2	1.3	2	2.6	13.8
Heat Flux-Btu/hr/ft2	5022	4970	4803	4939	4961	4958	4967	4977	4942	4895
Wall Temp. #3-F	133.9	133.1	133	132.9	133.7	131.9	131.9	131.2	131.3	129.5
Wall Temp. #4-F	133.9	132.5	133.4	133.3	133.3	131.9	132	131.3	131.7	129.4
Wall Temp. #5-F	135.3	132.4	134.4	133.4	132.6	132.3	131.3	130.9	130.9	129.8
Wall Temp. #1-F	71.4	133.4	132.3	132.3	132.5	133	132.4	131.3	129.8	127.8
Wall Temp. #2-F	135.1	133.1	132.9	132.3	132.6	133	132.2	131.6	130	129
Instream Temp.-F	122.9	122.9	122.9	123.2	122.9	122.5	122.1	121.8	121.5	120.7
Avg. Wall Temp.-F	134.6	133	132.9	133	132.8	132.3	132	131.3	130.7	129.1
Avg. Wall DT.-F	11.4	9.9	9.8	9.6	9.6	9.6	9.6	9.2	9	8.2
Remaining Subcool-F	-1.8									
Exit Quality	0.02	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.09
EXP. H-Btu/Hr/ft2/F	439.6	502	491	517	515.4	519.1	517.6	538.9	548.1	598.5
COMPUTED H										
Jallouk	546.4	549.9	548.1	559.9	561.3	565.6	571.4	576.1	580.3	583.9
Szady1(Cudo tube)	882.6	885.6	877.2	895.5	901.8	905.9	912.8	917.4	920.5	921.3
Szady2	652.5	668.1	648.7	672.7	688.7	690.8	701.4	711	720.2	729.2
(RLIQ)	120567	119108	118047	117263	115812	114475	113045	111709	110385	109651
(F)	1.324	1.568	1.706	1.824	1.996	2.04	2.139	2.231	2.319	2.407
(HLIQ)	360.4	426.8	464.3	496.8	527	555.1	581.5	606.3	629.9	653.1
(HBOIL)	862	851.2	831.5	841.3	837.3	830.2	826.1	818.9	809.3	795.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75									
DP Liquid Density-lbm/ft3	93.71									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.088	0.391	-0.102	1.382	1.57					
Zero Corrections-psid	0.037	-0.067	-0.75	0.121	0.273					
Corrected DP-Psid	0.051	0.458	0.648	1.261	1.297					
Actual DP-ft	2.07	3.55	5.39	6.58	8.5					
Measured TP-Psig	62.3				3.7					
Measured Overall-ft	97.06									
Computed DP-ft	2.05	3.93	5.78	7.64	9.38					
Friction-ft	0.21	0.46	0.76	1.1	1.46					
Acceleration-ft	0.21	0.28	0.34	0.41	0.47					
Elevation-ft	1.64	3.19	4.68	6.13	7.46					

Run#	588									
Test Fluid	C4F10									
Date:	6/2/93									
Time:	0:16									
Note	Analytical	Pin=Psat is assumed								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	66.3									
Sat. Temperature-F(inlet)	122.3									
Liq. Density-lbm/ft3	86.28	86.28	86.17	86.14	86.14	86.22	86.23	86.31	86.31	86.44
Latent Heat-Btu/lbm	32.66	32.68	32.58	32.56	32.56	32.61	32.62	32.68	32.68	32.76
Specific Heat-Btu/lbm/F	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.529	0.529	0.526	0.525	0.525	0.527	0.528	0.53	0.53	0.533
Liq. Conductivity-Btu/hr-ft-F	0.0278	0.0278	0.0278	0.0277	0.0277	0.0278	0.0278	0.0279	0.0279	0.0279
Liq. Prandtl No.	5.22	5.22	5.21	5.21	5.21	5.22	5.22	5.23	5.23	5.24
Inlet Flow Rate-GPM	4.1									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2.2									
Inlet Temperature-F	122.7									
Outlet Liq. Temperature-F	124									
Outlet Vap. Temperature-F	118.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	79.2									
Water outlet Temp.-F	110									
Inlet G-lbm/hr/ft2	845522		Temp	121.9	Density	86.42				
Subcooling-F	-0.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	290.6	287.5	285.1	295.2	286.5	286.1	287.7	289.2	294.9	288.8
Heat Loss-Watts	10.5	2.4	3.3	3.2	3.2	2.3	1.5	2.3	3	16
Heat Flux-Btu/hr/ft2	5037	4984	4942	5117	4968	4959	4987	5013	5112	5006
Wall Temp. #3-F	135.1	135	135.1	134.9	135.8	134.7	134.6	133.8	134.3	132.7
Wall Temp. #4-F	135.3	134.7	135.6	135.2	135.4	134.6	135	134	134.5	132.6
Wall Temp. #5-F	136.2	134.8	136.6	135.7	134.7	134.7	134.4	133.8	133.8	132.7
Wall Temp. #1-F	71	135.1	134.1	134.5	134.4	135.3	135.2	134.3	133.2	130.8
Wall Temp. #2-F	136.8	135.1	135.1	134.7	134.5	135.3	135.1	134.8	133.5	131.8
Instream Temp.-F	124.8	124.8	125.5	125.7	125.7	125.2	125.1	124.8	124.8	123.8
Avg. Wall Temp.-F	135.9	135	135	135.1	134.8	134.8	134.9	134.1	133.9	132.1
Avg. Wall DT.-F	10.8	9.9	9.3	9.1	8.8	9.4	9.5	9.3	9	8.1
Remaining Subcool-F	-1.6									
Exit Quality	0.01	0.02	0.03	0.05	0.06	0.07	0.08	0.09	0.1	0.11
EXP. H-Btu/Hr/ft2/F	465.5	500.9	534.2	559.6	562.7	527.5	523.1	538.3	566.2	618.5
COMPUTED H										
Jallouk	556	549.5	551.8	563.8	560.5	563.1	564.1	567.9	575.5	574.5
Szady1(Cudo tube)	889.9	890.1	894.2	914.4	906.2	907.8	914.5	919.8	932.8	928.2
Szady2	654.1	659.7	676.2	694.6	673	684.1	698.3	711	715.3	714.7
(RLIQ)	103848	102574	102032	101067	99887	98438	97252	95762	94840	92895
(F)	1.303	1.553	1.712	1.852	1.977	2.094	2.2	2.304	2.399	2.498
(HLIQ)	311.8	371.5	410	443.6	473.6	501.2	526.5	551	573.8	596.7
(HBOIL)	877	868	864.5	878.2	860.8	853.7	852.1	848	853.4	834.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	74.2									
DP Liquid Density-lbm/ft3	93.83									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.122	0.5	0.083	1.64	1.986					
Zero Corrections-psid	0.037	-0.067	-0.75	0.121	0.273					
Corrected DP-Psid	0.085	0.567	0.833	1.519	1.713					
Actual DP-ft	2.03	3.4	5.12	6.15	7.86					
Measured TP-Psig	66.3				3.7					
Measured Overall-ft	104.28									
Computed DP-ft	1.95	3.75	5.51	7.26	8.91					
Friction-ft	0.15	0.34	0.57	0.84	1.12					
Acceleration-ft	0.15	0.21	0.26	0.31	0.36					
Elevation-ft	1.65	3.19	4.67	6.11	7.42					

Run#	589									
Test Fluid	C4F10									
Date:	6/2/93									
Time:	0:16									
Note	Analytical	Pin=Psat is assumed								
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	64.7									
Sat. Temperature-F(inlet)	121									
Liq. Density-lbm/ft3	86.31	86.28	86.28	86.3	86.3	86.33	86.41	86.43	86.48	86.57
Latent Heat-Btu/lbm	32.68	32.66	32.66	32.67	32.67	32.69	32.74	32.75	32.79	32.85
Specific Heat-Btu/lbm/F	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.274
Liq. Viscosity-lbm/ft-hr	0.53	0.529	0.529	0.529	0.529	0.53	0.532	0.533	0.534	0.536
Liq. Conductivity-Btu/hr-ft-F	0.0279	0.0278	0.0278	0.0279	0.0279	0.0279	0.0279	0.0279	0.028	0.028
Liq. Prandtl No.	5.23	5.22	5.22	5.23	5.23	5.23	5.24	5.24	5.24	5.25
Inlet Flow Rate-GPM	3.3									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	121.4									
Outlet Liq. Temperature-F	124.1									
Outlet Vap. Temperature-F	117.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	78.6									
Water outlet Temp.-F	107.6									
Inlet G-lbm/hr/ft2	684140		Temp	119.2	Density	86.87				
Subcooling-F	-0.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	289.8	287.1	274	282.8	288.6	286.2	287.2	288.7	285.3	286
Heat Loss-Watts	10.3	2.4	3.2	3.2	3.1	2.3	1.5	2.2	2.9	15.9
Heat Flux-Btu/hr/ft2	5023	4977	4750	4902	4968	4961	4978	5004	4945	4958
Wall Temp. #3-F	133.9	134.1	134	133.9	134.6	133.7	133.9	132.7	132.7	131.7
Wall Temp. #4-F	134.3	133.6	134.4	133.9	134.3	133.7	133.9	133.2	133.2	131.5
Wall Temp. #5-F	134.7	133.5	135.3	134.2	133.5	133.7	133.3	132.7	132.5	131.7
Wall Temp. #1-F	68.3	134.3	132.8	133.3	133.1	134.3	134.4	133.2	131.9	129.7
Wall Temp. #2-F	135.8	134.3	133.8	133.3	133	134.3	134.5	133.6	131.9	130.7
Instream Temp.-F	124.6	124.8	124.8	124.7	124.7	124.5	124	123.9	123.6	122
Avg. Wall Temp.-F	134.7	134.1	133.8	133.8	133.5	133.9	134	133.1	132.4	131.1
Avg. Wall DT.-F	9.8	9.1	8.8	8.9	8.6	9.1	9.8	9	8.6	7.8
Remaining Subcool-F	-2									
Exit Quality	0.02	0.03	0.04	0.05	0.07	0.08	0.09	0.11	0.12	0.13
EXP. H-Btu/hr/ft2/F	510.1	549.9	542.2	550.6	581	543.6	509.3	558.9	574	632.7
COMPUTED H										
Jallouk	550.2	554.2	536.1	545.7	551.1	552.8	555.3	559.2	559.3	558
Szady1(Cudo tube)	885.3	885.7	868.9	885	894	896	896.8	904.4	902.3	904.9
Szady2	663.1	651.7	639.8	668.7	675.6	676	666.7	678.9	686.5	696.6
(RLIQ)	83779	82859	81580	80446	79351	78128	76727	75569	74301	72878
(F)	1.338	1.618	1.8	1.955	2.096	2.227	2.351	2.465	2.576	2.683
(HLIQ)	270.2	326.8	363.5	394.7	423.2	449.5	474.3	497.3	519.2	540.5
(HBOIL)	876.8	870.6	847.1	858	861.2	856.6	852.4	851.2	840.9	835.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	72.8									
DP Liquid Density-lbm/ft3	94.05									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.145	0.703	0.402	2.052	2.398					
Zero Corrections-psid	0.037	-0.067	-0.75	0.121	0.273					
Corrected DP-Psid	0.108	0.77	1.152	1.931	2.125					
Actual DP-ft	1.99	3.06	4.6	5.48	7.19					
Measured TP-Psig	64.7				3.7					
Measured Overall-ft	101.46									
Computed DP-ft	1.84	3.54	5.21	6.88	8.4					
Friction-ft	0.11	0.25	0.42	0.63	0.84					
Acceleration-ft	0.11	0.15	0.19	0.24	0.28					
Elevation-ft	1.62	3.14	4.59	6	7.28					

Run#	590									
Test Fluid	C4F10									
Date:	6/2/93									
Time:	0:16									
Note	Analytical	Pin=Psat is assumed								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	63.7									
Sat. Temperature-F(inlet)	120.2									
Liq. Density-lbm/ft3	88.38	86.36	86.36	86.35	86.35	86.38	86.46	86.48	86.56	86.62
Latent Heat-Btu/lbm	32.72	32.71	32.71	32.7	32.7	32.72	32.77	32.79	32.84	32.88
Specific Heat-Btu/lbm/F	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.274	0.274
Liq. Viscosity-lbm/ft-hr	0.531	0.531	0.531	0.531	0.531	0.531	0.533	0.534	0.536	0.539
Liq. Conductivity-Btu/hr-ft-F	0.0279	0.0279	0.0279	0.0279	0.0279	0.0279	0.028	0.028	0.028	0.0281
Liq. Prandtl No.	5.23	5.23	5.23	5.23	5.23	5.23	5.24	5.24	5.25	5.26
Inlet Flow Rate-GPM	2.5									
Outlet Liq. Flow Rate-GPM	0.6									
Outlet Vap. Flow Rate-GPM	2									
Inlet Temperature-F	120.7									
Outlet Liq. Temperature-F	123.7									
Outlet Vap. Temperature-F	117.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	78.6									
Water outlet Temp.-F	107.7									
Inlet G-lbm/hr/ft2	518290		Temp	118.2	Density	87.04				
Subcooling-F	-0.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	291.8	289	278.4	291	287.4	287.1	288.9	290	285.6	289.1
Heat Loss-Watts	10.2	2.3	3.2	3.1	3.1	2.3	1.5	2.2	2.8	15.8
Heat Flux-Btu/Hr/ft2	5068	5010	4826	5044	4982	4977	5008	5027	4951	5011
Wall Temp. #3-F	133.3	133.1	133.3	133.3	134.1	133.1	133.3	132	131.7	131.4
Wall Temp. #4-F	133.6	132.9	133.8	133.3	133.9	133.2	133.5	132.4	132.4	131.8
Wall Temp. #5-F	134.2	132.4	134.8	133.9	132.9	132.9	132.9	132.1	131.2	131.2
Wall Temp. #1-F	69	133.5	132	132.6	132.4	133.5	133.8	132.8	130.7	129.1
Wall Temp. #2-F	134.7	133.4	132.8	133	132.3	133.5	133.7	133.1	130.7	130.1
Instream Temp.-F	124.2	124.3	124.3	124.4	124.4	124.2	123.7	123.8	123.1	122.7
Avg. Wall Temp.-F	134	133.2	133	133.3	132.9	133.2	133.5	132.5	131.3	130.6
Avg. Wall DT.-F	9.5	8.7	8.5	8.8	8.2	8.8	9.5	8.7	8	7.7
Remaining Subcool-F	-2.6									
Exit Quality	0.02	0.04	0.06	0.07	0.09	0.11	0.12	0.14	0.16	0.18
EXP. H-Btu/Hr/ft2/F	531.2	575.9	570.6	583.4	603.9	568.8	525.3	581	617.6	651.4
COMPUTED H										
Jallouk	561.2	548.7	542.7	556.6	547.4	547.4	549	551.2	548.2	552.1
Szady1(Cudo tube)	899.3	883	869	890.9	887.9	889	891.9	895.8	890.1	886.4
Szady2	663.9	645.2	636.7	658.1	657.9	673.5	674.7	677.2	670.6	666.8
(RLIQ)	63218	62011	60826	59683	58776	57586	56264	55120	53816	52566
(F)	1.401	1.732	1.947	2.131	2.298	2.45	2.596	2.73	2.861	2.995
(HLIQ)	226.8	280.4	315.2	345	372	396.6	419.9	441.4	462.3	482.1
(HBOIL)	894.4	873.5	855	873.3	865.6	861.9	859.7	858.6	846.4	847.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	72.9									
DP Liquid Density-lbm/ft3	94.01									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.176	0.871	0.686	2.395	2.833					
Zero Corrections-psid	0.037	-0.067	-0.75	0.121	0.273					
Corrected DP-Psid	0.139	0.938	1.416	2.274	2.56					
Actual DP-ft	1.94	2.78	4.16	4.9	6.46					
Measured TP-Psig	63.7				3.7					
Measured Overall-ft	99.75									
Computed DP-ft	1.68	3.28	4.85	6.38	7.82					
Friction-ft	0.07	0.17	0.3	0.44	0.6					
Acceleration-ft	0.07	0.11	0.14	0.17	0.2					
Elevation-ft	1.53	3.01	4.41	5.78	7.02					

Run#	591									
Test Fluid	C4F10									
Date:	6/2/93									
Time:	0:16									
Note	Analytical	Pin=Psat is assumed								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	64.9									
Sat. Temperature-F(inlet)	121.2									
Liq. Density-lbm/ft3	86.23	86.15	86.25	86.23	86.25	86.28	86.3	86.35	86.38	86.43
Latent Heat-Btu/lbm	32.62	32.57	32.63	32.62	32.63	32.66	32.67	32.7	32.72	32.75
Specific Heat-Btu/lbm/F	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.528	0.526	0.528	0.528	0.528	0.529	0.529	0.531	0.531	0.533
Liq. Conductivity-Btu/hr-ft-F	0.0278	0.0278	0.0278	0.0278	0.0278	0.0278	0.0279	0.0279	0.0279	0.0279
Liq. Prandtl No.	5.22	5.21	5.22	5.22	5.22	5.22	5.23	5.23	5.23	5.24
Inlet Flow Rate-GPM	1.7									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	1.2									
Inlet Temperature-F	121.3									
Outlet Liq. Temperature-F	124.9									
Outlet Vap. Temperature-F	118.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	79.5									
Water outlet Temp.-F	108.7									
Inlet G-lbm/hr/ft2	353389		Temp	117.8	Density	87.11				
Subcooling-F	-0.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	292.6	289.7	279.3	289.1	288.8	288.7	289.6	291.1	287.7	290.4
Heat Loss-Watts	10.2	2.3	3.1	3.1	3	2.2	1.5	2.2	2.8	15.8
Heat Flux-Btu/Hr/ft2	5072	5022	4841	5011	5006	5004	5020	5046	4987	5034
Wall Temp. #3-F	133.8	133.5	133.5	133.4	134.3	133.6	134.1	132.3	131.8	132
Wall Temp. #4-F	134.5	133.1	134	133.4	134.1	133.7	134	133	132.3	131.7
Wall Temp. #5-F	134.7	132.6	135.4	134.1	133	133.2	133.5	132.3	131.4	131.2
Wall Temp. #1-F	69	133.6	132.4	132.8	132.7	133.9	134.2	133.6	130.8	129.6
Wall Temp. #2-F	135	133.8	132.8	132.9	132.4	133.7	134.2	133.8	130.9	130.7
Instream Temp.-F	125.1	125.6	125	125.1	125	124.8	124.7	124.4	124.2	123.9
Avg. Wall Temp.-F	134.5	133.5	133.2	133.4	133.1	133.6	134	133	131.4	131
Avg. Wall DT.-F	9.2	7.7	8	8.1	7.8	8.6	9.1	8.4	7	6.9
Remaining Subcool-F	-3.2									
Exit Quality	0.03	0.05	0.08	0.1	0.13	0.15	0.18	0.2	0.23	0.26
EXP. H-Btu/Hr/ft2/F	553.1	654.5	608.5	618.8	639.9	583.7	553.3	602.7	711	728.2
COMPUTED H										
Jallouk	581.2	566.9	547.3	550	551.1	552.3	554.6	556.9	547	549.1
Szady1(Cudo tube)	903.6	904.1	870.4	887.4	887.9	888.3	890.8	893.3	889.1	893.6
Szady2	689.3	687	648.3	649.1	651.8	654.3	658.5	662.7	674.5	677.7
(RLIQ)	43219	42236	40940	39874	38729	37556	36415	35216	34054	32872
(F)	1.449	1.844	2.127	2.361	2.573	2.767	2.945	3.115	3.274	3.428
(HLIQ)	172.6	219.8	253.4	281.3	306.4	329.4	350.5	370.7	389.5	407.6
(HBOIL)	901.5	899.8	863.2	877.9	875.5	872.9	872.3	871.5	863.5	864.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	72.7									
DP Liquid Density-lbm/ft3	94.04									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.129	1.147	1.017	2.659	3.373					
Zero Corrections-psid	0.037	-0.067	-0.75	0.121	0.273					
Corrected DP-Psid	0.092	1.214	1.767	2.538	3.1					
Actual DP-ft	2.02	2.88	3.58	4.48	5.58					
Measured TP-Psig	64.9				3.7					
Measured Overall-ft	101.97									
Computed DP-ft	1.48	2.73	3.9	5.02	6.05					
Friction-ft	0.05	0.12	0.22	0.34	0.47					
Acceleration-ft	0.04	0.06	0.08	0.1	0.13					
Elevation-ft	1.39	2.55	3.61	4.58	5.45					

Run#	582									
Test Fluid	C4F10									
Date:	6/2/93									
Time:	0:16									
Note	Analytical	Pin=Psat is assumed								
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	65.4									
Sat. Temperature-F(inlet)	121.8									
Liq. Density-lbm/ft3	86.09	86.01	86.1	86.02	86.04	86.06	86.09	86.15	86.15	86.22
Latent Heat-Btu/lbm	32.53	32.47	32.54	32.48	32.49	32.5	32.53	32.57	32.57	32.61
Specific Heat-Btu/lbm/F	0.275	0.276	0.275	0.276	0.276	0.275	0.275	0.275	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.524	0.522	0.524	0.522	0.523	0.523	0.524	0.526	0.526	0.527
Liq. Conductivity-Btu/hr-ft-F	0.0277	0.0277	0.0277	0.0277	0.0277	0.0277	0.0277	0.0278	0.0278	0.0278
Liq. Prandtl No.	5.21	5.2	5.21	5.2	5.2	5.2	5.21	5.21	5.21	5.22
Inlet Flow Rate-GPM	0.9									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	122									
Outlet Liq. Temperature-F	126.6									
Outlet Vap. Temperature-F	120.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	81.3									
Water outlet Temp.-F	110.8									
Inlet G-lbm/hr/ft2	188017		Temp	115.2	Density	87.54				
Subcooling-F	-0.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	294.3	291.6	280.2	285.3	288.9	288.9	290.8	291.4	277.3	285.4
Heat Loss-Watts	10.4	2.3	3.2	3.2	3.1	2.3	1.5	2.3	2.9	16.3
Heat Flux-Btu/Hr/ft2	5101	5055	4857	4945	5008	5008	5041	5051	4807	4947
Wall Temp. #3-F	134.1	133.2	133.3	133.8	134.8	134.2	134.2	132.8	132	132.6
Wall Temp. #4-F	134.4	133	134	133.9	134.4	134.2	134.7	133.2	132.7	132.2
Wall Temp. #5-F	135.1	132.3	135.6	134.1	133.5	133.9	133.8	132.9	131.7	132.2
Wall Temp. #1-F	68	133.5	132.1	133.2	133.1	134.4	134.6	133.7	130.9	130.6
Wall Temp. #2-F	135.4	133.6	132.7	133.3	133	134.3	134.7	134.3	131.5	131.3
Instream Temp.-F	128	128.5	125.9	126.4	126.3	126.2	126	125.6	125.6	125.2
Avg. Wall Temp.-F	134.8	133.3	133	133.8	133.5	134.2	134.4	133.4	131.8	131.8
Avg. Wall DT.-F	8.5	6.6	6.9	7.1	7	7.7	8.2	7.6	5.9	6.4
Remaining Subcool-F	-6.2									
Exit Quality	0.05	0.1	0.15	0.19	0.24	0.29	0.34	0.39	0.43	0.48
EXP. H-Btu/Hr/ft2/F	598.8	766.3	703.4	694	718.1	645.3	616.8	668.9	808.9	778.3
COMPUTED H										
Jallouk	594.2	581.9	568.6	570.9	570.5	566.7	565.5	562.7	539.8	548.8
Szady1(Cudo tube)	910.3	910.1	874.3	886.5	891.3	891.5	894.2	893.9	873.2	884.7
Szady2	678.2	674.2	653.3	663.7	669	668.7	671.1	665.7	638.4	650.1
(RLIQ)	22858	21760	20643	19517	18378	17235	16077	14895	13790	12659
(F)	1.661	2.23	2.631	2.954	3.25	3.521	3.775	4.021	4.24	4.458
(HLIQ)	119.5	160.7	189.4	212.8	234	253.5	271.8	289.3	305	320.6
(HBOIL)	909.6	908.5	871.3	881.4	885.9	884.6	885.8	883.7	860.7	870.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	72									
DP Liquid Density-lbm/ft3	94.14									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.101	1.498	1.399	3.049	3.987					
Zero Corrections-psid	0.037	-0.067	-0.75	0.121	0.273					
Corrected DP-Psid	0.064	1.565	2.149	2.928	3.694					
Actual DP-ft	2.08	1.75	2.96	3.84	4.61					
Measured TP-Psig	65.4				3.7					
Measured Overall-ft	103.05									
Computed DP-ft	1.2	2.11	2.92	3.65	4.29					
Friction-ft	0.02	0.06	0.11	0.18	0.25					
Acceleration-ft	0.02	0.03	0.04	0.06	0.08					
Elevation-ft	1.16	2.03	2.76	3.41	3.96					

Run#	593									
Test Fluid	C4F10									
Date:	6/2/93									
Time:	5:13									
Note	Analytical	Pin=Psat is assumed								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	62.7									
Sat. Temperature-F(inlet)	119.3									
Liq. Density-lbm/ft3	86.15	86.02	86.06	86.02	86.04	86.06	86.06	86.1	86.12	86.22
Latent Heat-Btu/lbm	32.57	32.48	32.5	32.48	32.49	32.5	32.5	32.54	32.55	32.61
Specific Heat-Btu/lbm/F	0.275	0.276	0.275	0.276	0.276	0.275	0.275	0.275	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.526	0.522	0.523	0.522	0.523	0.523	0.523	0.524	0.525	0.527
Liq. Conductivity-Btu/hr-ft-F	0.0278	0.0277	0.0277	0.0277	0.0277	0.0277	0.0277	0.0277	0.0277	0.0278
Liq. Prandtl No.	5.21	5.2	5.2	5.2	5.2	5.2	5.2	5.21	5.21	5.22
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	0.6									
Inlet Temperature-F	120.2									
Outlet Liq. Temperature-F	127.1									
Outlet Vap. Temperature-F	122.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	78.4									
Water outlet Temp.-F	107.1									
Inlet G-lbm/hr/ft2	207876		Temp	117.8	Density	87.11				
Subcooling-F	-0.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	574.2	568.2	580.5	570.2	573	573.9	569.4	571.2	574.2	571.1
Heat Loss-Watts	11.5	2.7	3.6	3.7	3.7	2.8	1.8	2.8	3.6	20.2
Heat Flux-Btu/Hr/ft2	9953	9849	10063	9884	9933	9948	9870	9901	9953	9900
Wall Temp. #3-F	134	134.8	133.5	134.8	136.6	136.4	136.9	136.3	135.7	136.3
Wall Temp. #4-F	134.3	133.7	134.6	135.3	135.7	136.4	137.9	137.3	136.1	135.5
Wall Temp. #5-F	134	132.5	135	134.6	134.4	136.2	136.2	136.2	134.6	135.4
Wall Temp. #1-F	67.1	133.4	132.9	133.2	133.8	136.3	137.3	137.3	134	132.2
Wall Temp. #2-F	133.8	134	133.5	133.8	134	136.4	137.7	137.8	134.6	133.9
Instream Temp.-F	125.6	126.4	126.2	126.4	126.3	126.2	126.2	125.9	125.8	125.2
Avg. Wall Temp.-F	134	134	133.6	134.5	134.5	136.3	137.2	137	135	134.7
Avg. Wall DT.-F	8	7.1	7	7.6	7.7	9.7	10.6	10.6	8.8	9
Remaining Subcool-F	-11.1									
Exit Quality	0.09	0.18	0.27	0.35	0.44	0.52	0.61	0.7	0.78	0.87
EXP. H-Btu/Hr/ft2/F	1248	1381.4	1443.6	1295.7	1285.6	1028.2	935.2	931.2	1137.5	1098.4
COMPUTED H										
Jallouk	889.3	870.8	861.7	840.8	833.3	828.3	817.1	813	812.3	78.4
Szady1(Cudo tube)	1254.7	1255.1	1267.8	1259.2	1262.7	1264.2	1260.8	1262.1	1268.4	78.4
Szady2	1031.9	1031.4	1067.3	1056.3	1059	1059.5	1054.2	1054.4	1057.8	78.4
(RLIQ)	24560	22487	20208	17988	15787	13483	11249	8998	6762	6762
(F)	1.93	2.715	3.273	3.737	4.152	4.595	4.882	5.243	5.581	5.581
(HLIQ)	150.5	211.9	255.4	291.7	324	353.9	381.7	409	436.3	436.3
(HBOIL)	1254	1253	1264.4	1254	1255.5	1254.9	1249	1247.6	1249	1249
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	70.7									
DP Liquid Density-lbm/ft3	94.32									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.615	1.917	1.828	3.672	4.573					
Zero Corrections-psid	0.037	-0.067	-0.75	0.121	0.278					
Corrected DP-Psid	0.578	1.984	2.578	3.551	4.3					
Actual DP-ft	1.22	1.06	2.26	2.82	3.62					
Measured TP-Psig	62.7				3.7					
Measured Overall-ft	98.54									
Computed DP-ft	1.03	1.76	2.39	2.96	3.44					
Friction-ft	0.04	0.11	0.21	0.33	0.48					
Acceleration-ft	0.03	0.06	0.11	0.16	0.23					
Elevation-ft	0.97	1.59	2.08	2.46	2.76					

Run#	594									
Test Fluid	C4F10									
Date:	6/2/93									
Time:	5:13									
Note	Analytical	Pin=Psat is assumed								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	64.2									
Sat. Temperature-F(inlet)	120.6									
Liq. Density-lbm/ft3	86.96	86.17	86.19	86.15	86.15	86.19	86.2	86.27	86.28	86.36
Latent Heat-Btu/lbm	32.71	32.58	32.59	32.57	32.57	32.59	32.6	32.65	32.66	32.71
Specific Heat-Btu/lbm/F	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.531	0.526	0.526	0.526	0.526	0.526	0.527	0.529	0.529	0.531
Liq. Conductivity-Btu/hr-ft-F	0.0279	0.0278	0.0278	0.0278	0.0278	0.0278	0.0278	0.0278	0.0278	0.0279
Liq. Prandtl No.	5.23	5.21	5.22	5.21	5.21	5.22	5.22	5.22	5.22	5.23
Inlet Flow Rate-GPM	1.7									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	120.9									
Outlet Liq. Temperature-F	125.7									
Outlet Vap. Temperature-F	120.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	78									
Water outlet Temp.-F	106.2									
Inlet G-lbm/hr/ft2	352845		Temp	118.6	Density	86.97				
Subcooling-F	-0.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	574.9	572.6	578	567.5	570	570.8	570.7	571.3	572.2	571.3
Heat Loss-Watts	11.3	2.6	3.5	3.6	3.6	2.7	1.8	2.7	3.4	19.6
Heat Flux-Btu/Hr/ft2	9966	9926	10019	9837	9881	9894	9893	9903	9919	9903
Wall Temp. #3-F	133.2	134	132.7	134	135.9	135.2	135.8	135.1	133.9	135
Wall Temp. #4-F	133.7	133	133.8	134.6	134.7	135.8	136.4	135.6	134.7	134.5
Wall Temp. #5-F	133.3	131.8	133.9	133.9	133.5	135.2	135.1	134.5	133.1	134.4
Wall Temp. #1-F	67.2	132.8	132.1	132.4	133	135.2	136	135.8	132.4	131.1
Wall Temp. #2-F	133.3	133.2	132.8	133	133.3	135.5	136.5	136.4	133.1	132.8
Instream Temp.-F	124.8	125.5	125.4	125.6	125.6	125.4	125.9	124.9	124.8	124.8
Avg. Wall Temp.-F	133.4	133.3	132.9	133.7	133.8	135.2	136	135.5	133.4	133.6
Avg. Wall DT.-F	8.6	7.3	7	7.7	7.6	9.4	10.2	10.1	8.2	8.8
Remaining Subcool-F	-6.3									
Exit Quality	0.06	0.1	0.15	0.2	0.26	0.31	0.36	0.41	0.46	0.51
EXP. H-Btu/Hr/ft2/F	1155.5	1359.4	1431.9	1280.8	1303.8	1055.1	968.6	977.4	1210.8	1123.8
COMPUTED H										
Jallouk	861.9	836.4	823.9	804.9	790.1	784.6	779.9	775.2	772.5	767.5
Szady1(Cudo tube)	1246.2	1254.3	1261	1253	1257.7	1259.3	1260.8	1261.2	1264.1	1262.6
Szady2	1024.2	1052.3	1058.1	1047.1	1050.5	1050.5	1050.4	1049.1	1033.2	1033.3
(RLIQ)	42809	40495	38179	36017	33810	31547	29313	27019	24796	22508
(F)	1.675	2.256	2.675	3.021	3.327	3.609	3.869	4.121	4.355	4.561
(HLIQ)	199	268.5	318.4	359.7	396	429.5	460.4	490.2	517.9	545.5
(HBOIL)	1244.5	1250.2	1254.2	1243.1	1244.5	1242.4	1240.1	1236	1234.5	1227.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	70.9									
DP Liquid Density-lbm/ft3	94.3									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.1	1.547	1.429	3.162	3.924					
Zero Corrections-psid	0.037	-0.067	-0.75	0.121	0.273					
Corrected DP-Psid	0.063	1.614	2.179	3.041	3.651					
Actual DP-ft	2.08	1.68	2.92	3.66	4.69					
Measured TP-Psig	64.2				3.7					
Measured Overall-ft	100.88									
Computed DP-ft	1.27	2.26	3.17	4.05	4.87					
Friction-ft	0.07	0.19	0.37	0.59	0.84					
Acceleration-ft	0.06	0.1	0.16	0.22	0.29					
Elevation-ft	1.14	1.96	2.64	3.24	3.73					

Run#	595									
Test Fluid	C4F10									
Date:	6/2/93									
Time:	5:13									
Note	Analytical	Pin=Psat is assumed								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	64.7									
Sat. Temperature-F(inlet)	121									
Liq. Density-lbm/ft3	86.27	86.19	86.22	86.09	86.12	86.19	86.22	86.3	86.31	86.4
Latent Heat-Btu/lbm	32.65	32.59	32.61	32.53	32.55	32.59	32.61	32.67	32.68	32.73
Specific Heat-Btu/lbm/F	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.529	0.526	0.527	0.524	0.525	0.526	0.527	0.529	0.53	0.532
Liq. Conductivity-Btu/hr-ft-F	0.0278	0.0278	0.0278	0.0277	0.0277	0.0278	0.0278	0.0279	0.0279	0.0279
Liq. Prandtl No.	5.22	5.22	5.22	5.21	5.21	5.22	5.22	5.23	5.23	5.23
Inlet Flow Rate-GPM	2.5									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	1.6									
Inlet Temperature-F	121.6									
Outlet Liq. Temperature-F	125.5									
Outlet Vap. Temperature-F	120.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	77.8									
Water outlet Temp.-F	106									
Inlet G-lbm/hr/ft2	518790		Temp	118.7	Density	86.96				
Subcooling-F	-0.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	574.6	578.9	568.2	569.5	573.1	571.9	579.5	575.2	567	568.4
Heat Loss-Watts	11.4	2.6	3.5	3.6	3.6	2.7	1.8	2.7	3.4	19.4
Heat Flux-Btu/Hr/ft2	9960	10035	9849	9872	9934	9914	10045	9971	9829	9853
Wall Temp. #3-F	133.5	134.3	132.7	134	135.9	135.2	135.5	134.6	133.4	134.6
Wall Temp. #4-F	133.8	132.8	133.6	134.6	134.6	135.2	136.2	135.2	134.2	133.7
Wall Temp. #5-F	133.5	131.9	134	134	133.6	134.8	134.6	134.1	133	134
Wall Temp. #1-F	68.1	133	131.9	133	133.2	135.2	135.9	135.5	131.8	130.8
Wall Temp. #2-F	133.5	133.5	132.5	133.5	133.2	135.3	136.2	135.8	132.8	132.5
Instream Temp.-F	124.9	125.4	125.2	126	125.8	125.4	125.2	124.7	124.6	124.1
Avg. Wall Temp.-F	133.6	133.4	132.7	133.9	133.7	135.1	135.7	135	133.1	133.1
Avg. Wall DT.-F	8.2	7.5	7	7.5	7.4	9.3	10	9.9	8	8.6
Remaining Subcool-F	-4.7									
Exit Quality	0.04	0.07	0.11	0.14	0.18	0.21	0.25	0.28	0.31	0.35
EXP. H-Btu/Hr/ft2/F	1211	1329.7	1401.1	1324.4	1342.3	1071.5	1001.9	1008.2	1226.1	1149.1
COMPUTED H										
Jallouk	834.7	814.7	784.3	781.6	777.9	771	771.8	764.3	756.8	754.2
Szady1(Cudo tube)	1251.5	1282.5	1252.1	1252.3	1267.8	1268.9	1277	1272.8	1267.7	1270
Szady2	1050	1059.2	1045.1	1053.4	1057.3	1034.8	1047.4	1044.6	1040.1	1043.9
(RLIQ)	62942	60798	58485	56641	54331	51940	49631	47213	44962	42695
(F)	1.564	2.043	2.374	2.64	2.887	3.116	3.327	3.531	3.716	3.9
(HLIQ)	253.2	331	384.5	428.1	468	504.8	538.8	571.5	601.3	630.6
(HBOIL)	1248	1254.8	1239.9	1245.7	1246.2	1239.6	1244.2	1233.1	1220.9	1215.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	70.3									
DP Liquid Density-lbm/ft3	94.38									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.166	1.222	1.075	2.717	3.352					
Zero Corrections-psid	0.037	-0.067	-0.75	0.121	0.273					
Corrected DP-Psid	0.129	1.289	1.825	2.596	3.079					
Actual DP-ft	1.97	2.22	3.51	4.41	5.66					
Measured TP-Psig	64.7				3.7					
Measured Overall-ft	101.67									
Computed DP-ft	1.47	2.72	3.91	5.1	6.23					
Friction-ft	0.11	0.3	0.56	0.88	1.25					
Acceleration-ft	0.11	0.17	0.23	0.31	0.39					
Elevation-ft	1.26	2.25	3.12	3.91	4.59					

Run#	596									
Test Fluid	C4F10									
Date:	6/2/93									
Time:	5:13									
Note	Analytical	Pin=Psat is assumed								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	65.9									
Sat. Temperature-F(inlet)	122									
Liq. Density-lbm/ft3	86.14	86.04	86.07	85.97	85.99	86.06	86.1	86.17	86.2	86.3
Latent Heat-Btu/lbm	32.56	32.49	32.51	32.45	32.48	32.5	32.54	32.58	32.6	32.67
Specific Heat-Btu/lbm/F	0.275	0.276	0.275	0.276	0.276	0.275	0.275	0.275	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.525	0.523	0.524	0.521	0.521	0.523	0.524	0.526	0.527	0.529
Liq. Conductivity-Btu/hr-ft-F	0.0277	0.0277	0.0277	0.0276	0.0277	0.0277	0.0277	0.0278	0.0278	0.0279
Liq. Prandtl No.	5.21	5.2	5.21	5.2	5.2	5.2	5.21	5.21	5.22	5.23
Inlet Flow Rate-GPM	3.3									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	122.3									
Outlet Liq. Temperature-F	126									
Outlet Vap. Temperature-F	120.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	78.2									
Water outlet Temp.-F	106.6									
Inlet G-lbm/hr/ft2	683079		Temp	120	Density	86.74				
Subcooling-F	-0.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	577	577	577	577	577	577	577	577	577	577
Heat Loss-Watts	11.8	2.7	3.6	3.7	3.7	2.8	1.8	2.8	3.5	19.8
Heat Flux-Btu/Hr/ft2	10002	10002	10002	10002	10002	10002	10002	10002	10002	10002
Wall Temp. #3-F	134.3	134.9	133.3	134.8	136.4	135.6	136.1	135.1	134	135
Wall Temp. #4-F	134.7	133.9	134.5	135.3	135.2	135.7	136.6	135.6	134.7	134
Wall Temp. #5-F	134.4	132.8	134.6	134.6	134.1	135.3	135.2	134.6	133.2	134.5
Wall Temp. #1-F	66	133.8	132.8	133.5	133.7	135.7	136.3	135.8	132.4	131
Wall Temp. #2-F	134.3	134.2	133.3	134	134	135.9	136.7	136.4	133.1	133
Instream Temp.-F	125.7	126.3	126.1	126.7	126.6	126.2	125.9	125.5	125.3	124.7
Avg. Wall Temp.-F	134.4	134.2	133.5	134.6	134.3	135.6	136.2	135.5	133.5	133.5
Avg. Wall DT.-F	8.3	7.4	6.9	7.4	7.2	8.9	9.8	9.5	7.7	8.3
Remaining Subcool-F	-3.4									
Exit Quality	0.03	0.06	0.08	0.11	0.13	0.16	0.19	0.21	0.24	0.27
EXP. H-Btu/Hr/ft2/F	1209	1342.9	1444.7	1352	1389.5	1120.9	1017.7	1047.5	1294.2	1196.1
COMPUTED H										
Jallouk	821.5	793.8	783.4	779.3	774	768.8	765	761.5	753.8	749.8
Szady1(Cudo tube)	1261.4	1269.5	1271.7	1290	1283.5	1286	1287.6	1289.8	1288.7	1296.3
Szady2	1059.2	1064.2	1063.5	1068.3	1051.9	1055.6	1060	1063.7	1068.6	1085.1
(RLIQ)	83849	81885	79505	77617	75293	72798	70376	67814	65573	63042
(F)	1.466	1.87	2.156	2.389	2.602	2.798	2.98	3.153	3.313	3.474
(HLIQ)	296.2	377.9	436.6	483.3	526.1	565.8	602.1	636.6	668.8	700.8
(HBOIL)	1255.9	1258.3	1254.4	1256.7	1253.3	1247.4	1242.1	1236.9	1231.2	1223
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	12.6									
DP Liquid Density-lbm/ft3	101.95									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.162	0.828	0.727	2.249	2.797					
Zero Corrections-psid	0.037	-0.067	-0.75	0.121	0.273					
Corrected DP-Psid	0.125	0.995	1.477	2.128	2.524					
Actual DP-ft	2.15	3.07	4.62	5.9	7.45					
Measured TP-Psig	65.9				3.7					
Measured Overall-ft	103.79									
Computed DP-ft	1.69	3.17	4.62	6.06	7.49					
Friction-ft	0.15	0.4	0.72	1.13	1.57					
Acceleration-ft	0.15	0.23	0.32	0.4	0.5					
Elevation-ft	1.38	2.54	3.58	4.55	5.41					

Run#	597									
Test Fluid	C4F10									
Date:	6/2/93									
Time:	5:13									

Run#	599									
Test Fluid	C4F10									
Date:	6/2/93									
Time:	7:14									
Note	Analytical	Pin=Psat is assumed								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	64.7									
Sat. Temperature-F(inlet)	121									
Liq. Density-lbm/ft3	86.25	86.15	86.1	86.09	86.1	86.15	86.27	86.28	86.31	86.44
Latent Heat-Btu/lbm	32.63	32.57	32.54	32.53	32.54	32.57	32.65	32.66	32.68	32.78
Specific Heat-Btu/lbm/F	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.528	0.526	0.524	0.524	0.524	0.526	0.529	0.529	0.53	0.533
Liq. Conductivity-Btu/hr-ft-F	0.0278	0.0278	0.0277	0.0277	0.0277	0.0278	0.0278	0.0278	0.0279	0.0279
Liq. Prandtl No.	5.22	5.21	5.21	5.21	5.21	5.21	5.22	5.22	5.23	5.24
Inlet Flow Rate-GPM	4.8									
Outlet Liq. Flow Rate-GPM	1.4									
Outlet Vap. Flow Rate-GPM	2.2									
Inlet Temperature-F	121.4									
Outlet Liq. Temperature-F	124.6									
Outlet Vap. Temperature-F	118.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	74.6									
Water outlet Temp.-F	97.8									
Inlet G-lbm/hr/ft2	992601		Temp	120.5	Density	86.65				
Subcooling-F	-0.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	868	868	868	868	868	868	868	868	868	868
Heat Loss-Watts	9.1	2.1	2.8	2.8	2.9	2.2	1.4	2.2	2.7	15.4
Heat Flux-Btu/Hr/ft2	15012	15012	15012	15012	15012	15012	15012	15012	15012	15012
Wall Temp. #3-F	136.3	137.6	135.5	136.3	139.6	137.4	137.8	138.1	136.1	138.1
Wall Temp. #4-F	136.3	135.8	137.1	137.1	137.4	137.7	138.5	138.5	137.4	136.7
Wall Temp. #5-F	136	134	137	136.3	136.1	137.7	136.9	137.3	134.9	137
Wall Temp. #1-F	79.1	136.6	134.8	134.4	135.2	138	138.4	138.7	134.2	131.4
Wall Temp. #2-F	136	136.2	135.5	135.3	135.7	138.7	138.7	139.2	134.9	134.5
Instream Temp.-F	125	125.6	125.9	126	125.9	125.6	124.9	124.8	124.6	123.8
Avg. Wall Temp.-F	136.2	136.3	135.7	136	136.1	137.7	138.1	138.4	135.5	135.5
Avg. Wall DT.-F	10.5	10	9.1	9.3	9.5	11.4	12.5	12.9	10.2	11.1
Remaining Subcool-F	-3.6									
Exit Quality	0.03	0.06	0.08	0.11	0.14	0.17	0.19	0.22	0.25	0.28
EXP. H-Btu/Hr/ft2/F	1433.5	1497.9	1641.2	1606.1	1576.6	1314.3	1202.7	1165.3	1468.6	1357.1
COMPUTED H										
Jallouk	987.1	947.7	922.7	904.1	887.6	872.2	856.3	843.8	831.4	815.4
Szady1(Cudo tube)	1541.5	1552.5	1560.8	1567.8	1573.5	1577.9	1579.6	1586.9	1593.8	1596.8
Szady2	1374.9	1382.1	1371.3	1379.2	1386.5	1390.5	1412.3	1414.9	1417.3	1415.3
(PLIQ)	121074	118082	114995	111712	108251	104631	100713	97297	93818	89827
(F)	1.484	1.698	2.185	2.427	2.644	2.843	3.034	3.206	3.37	3.539
(HLIQ)	403.8	517	595.3	661.4	720.2	774.2	825.5	872	916.3	960.8
(HBOIL)	1532.2	1533.2	1531.4	1527.6	1521.5	1513.2	1500.6	1493.8	1485.7	1471.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	74.7									
DP Liquid Density-lbm/ft3	93.75									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.134	0.555	0.139	1.65	1.837					
Zero Corrections-psid	0.037	-0.067	-0.75	0.121	0.273					

Run#	600									
Test Fluid	C4F10									
Date:	6/2/93									
Time:	7:14									
Note	Analytical	Pin=Psat is assumed								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	64.7									
Sat. Temperature-F(inlet)	121									
Liq. Density-lbm/ft3	86.2	86.12	86.14	86.12	86.12	86.15	86.2	86.3	86.3	86.36
Latent Heat-Btu/lbm	32.6	32.55	32.56	32.55	32.55	32.57	32.6	32.67	32.67	32.71
Specific Heat-Btu/lbm/F	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.527	0.525	0.525	0.525	0.525	0.528	0.527	0.529	0.529	0.531
Liq. Conductivity-Btu/hr-ft-F	0.0278	0.0277	0.0277	0.0277	0.0277	0.0278	0.0278	0.0279	0.0279	0.0279
Liq. Prandtl No.	5.22	5.21	5.21	5.21	5.21	5.21	5.22	5.23	5.23	5.23
Inlet Flow Rate-GPM	4.1									
Outlet Liq. Flow Rate-GPM	1.4									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	121.6									
Outlet Liq. Temperature-F	125.2									
Outlet Vap. Temperature-F	118.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	75.1									
Water outlet Temp.-F	98.5									
Inlet G-lbm/hr/ft2	847681		Temp	120.6	Density	86.64				
Subcooling-F	-0.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	857.1	884.9	857.4	864.2	862.3	859.7	858.2	860.8	859.1	885.6
Heat Loss-Watts	8.6	2	2.7	2.7	2.7	2.1	1.4	2.1	2.5	14.7
Heat Flux-Btu/Hr/ft2	14857	14992	14862	14980	14947	14902	14878	14921	14882	15005
Wall Temp. #3-F	136.3	137.9	135.2	136.4	139.8	137.5	137.9	138.3	135.6	138.1
Wall Temp. #4-F	136.3	135.4	137.1	137.5	137.5	137.9	138.9	138.8	137.2	136.8
Wall Temp. #5-F	135.6	134	137.1	136.4	135.9	137.9	136.9	137.3	135	137.1
Wall Temp. #1-F	73	135.6	134.6	134.4	135.1	138	138.5	138.9	134.1	181.7
Wall Temp. #2-F	135.7	136.3	135.2	135.3	135.6	138.6	139	139.4	135	135
Instream Temp.-F	125.3	125.8	125.7	125.8	125.8	125.6	125.9	124.7	124.7	124.3
Avg. Wall Temp.-F	136	136.3	135.5	136.2	136	137.8	138.2	138.5	135.4	135.7
Avg. Wall DT.-F	10	9.8	9.2	9.7	9.5	11.6	12.3	13.2	10	10.8
Remaining Subcool-F	-4.3									
Exit Quality	0.04	0.07	0.1	0.13	0.16	0.2	0.23	0.26	0.29	0.32
EXP. H-Btu/Hr/ft2/F	1485.2	1526.3	1623.7	1544.7	1585.3	1290.1	1212.6	1133.4	1488.2	1394.2
COMPUTED H										
Jallouk	1002	960.1	939.2	919.8	903.2	887.8	874	861.8	851.2	842.2
Szady1(Cudo tube)	1535.1	1551.2	1548.2	1560.2	1564	1565.9	1568.4	1572.4	1578.2	1587.9
Szady2	1368.3	1360	1366.7	1370.7	1374.9	1377.1	1379.7	1404.5	1405.9	1412.4
(RLIQ)	103323	100118	98695	98422	90065	86579	83048	79347	76040	72498
(F)	1.537	1.982	2.306	2.569	2.803	3.018	3.219	3.414	3.588	3.763
(HLIQ)	368.9	478.4	553.6	616.8	673	724.4	772.3	818.3	860.1	901.5
(HBOIL)	1528	1535.9	1524.3	1527.4	1521.3	1512.4	1503.3	1494.7	1487.9	1484.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	74.7									
DP Liquid Density-lbm/ft3	93.75									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.141	0.749	0.438	2.051	2.331					
Zero Corrections-psid	0.037	-0.067	-0.75	0.121	0.273					
Corrected DP-Psid	0.104	0.816	1.188	1.93	2.058					
Actual DP-ft	2	2.98	4.53	5.47	7.29					
Measured TP-Psig	64.7				3.7					
Measured Overall-ft	101.71									
Computed DP-ft	1.8	3.4	5.05	6.78	8.51					
Friction-ft	0.26	0.69	1.29	2.03	2.86					
Acceleration-ft	0.27	0.42	0.58	0.76	0.96					
Elevation-ft	1.28	2.29	3.18	3.99	4.69					

Run#	601									
Test Fluid	C4F10									
Date:	5/2/93									
Time:	7:14									
Note	Analytical	Pin=Psat is assumed								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	65.1									
Sat. Temperature-F(inlet)	121.3									
Liq. Density-lbm/ft3	86.12	86.09	86.12	86.09	86.1	86.12	86.27	86.27	86.27	86.36
Latent Heat-Btu/lbm	32.55	32.53	32.55	32.53	32.54	32.55	32.65	32.65	32.65	32.71
Specific Heat-Btu/lbm/F	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.525	0.524	0.525	0.524	0.524	0.525	0.529	0.529	0.529	0.531
Liq. Conductivity-Btu/hr-ft-F	0.0277	0.0277	0.0277	0.0277	0.0277	0.0277	0.0278	0.0278	0.0278	0.0279
Liq. Prandtl No.	5.21	5.21	5.21	5.21	5.21	5.21	5.22	5.22	5.22	5.23
Inlet Flow Rate-GPM	3.3									
Outlet Liq. Flow Rate-GPM	1.4									
Outlet Vap. Flow Rate-GPM	2									
Inlet Temperature-F	121.7									
Outlet Liq. Temperature-F	125.5									
Outlet Vap. Temperature-F	119.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	75.9									
Water outlet Temp.-F	100									
Inlet G-lbm/hr/ft2	682690		Temp	120.3	Density	86.69				
Subcooling-F	-0.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	868.5	871.4	866.8	872.6	861.3	859.9	869.2	872.4	865.2	873.8
Heat Loss-Watts	8.5	2	2.7	2.7	2.7	2.1	1.4	2.1	2.5	14.6
Heat Flux-Btu/Hr/ft2	15055	15105	15008	15126	14930	14906	15067	15122	14998	15147
Wall Temp. #3-F	136	137.6	135.4	136.6	139.7	137.7	138.2	138.5	135.7	138.2
Wall Temp. #4-F	136.8	135.6	137.2	137.4	137.7	138	139.2	139.1	137.4	137.2
Wall Temp. #5-F	135.9	134	136.9	136.6	138.1	137.9	137.4	137.4	135.4	137.5
Wall Temp. #1-F	72.7	135.4	134.8	134.4	135.4	138.2	138.8	139.1	134.5	131.9
Wall Temp. #2-F	135.9	136.2	135.4	135.6	135.7	138.8	139.2	139.6	135.4	135
Instream Temp.-F	125.8	126	125.8	126	125.9	125.8	124.9	124.9	124.9	124.8
Avg. Wall Temp.-F	136	136.2	135.7	136.3	136.2	138	138.6	138.7	135.7	136
Avg. Wall DT.-F	9.5	9.5	9.2	9.6	9.7	11.5	13	13.2	10.1	11
Remaining Subcool-F	-5.1									
Exit Quality	0.04	0.08	0.12	0.16	0.2	0.24	0.28	0.32	0.36	0.4
EXP. H-Btu/Hr/ft2/F	1577.3	1587.1	1627.5	1581.2	1547.1	1298.8	1160.9	1149.4	1484.6	1380.1
COMPUTED H										
Jallouk	1042.9	997.9	960.4	951.6	926.9	912.4	901.1	892.3	879.8	202.8
Szady1(Cuido tube)	1548.6	1556.3	1553	1564.7	1558.1	1560.6	1565.8	1573.9	1573.5	202.8
Szady2	1384.7	1391.2	1362.2	1375.8	1368	1371	1378.5	1387.4	1386	202.8
(RLIQ)	83276	79887	76382	73114	69880	66276	62469	59111	55765	55765
(F)	1.587	2.099	2.461	2.762	3.03	3.272	3.511	3.723	3.923	3.923
(HLIQ)	320.5	423.9	497	557.8	611.8	660.5	708.1	750.8	791.1	791.1
(HBOIL)	1544	1545.7	1535.8	1540.7	1526	1520.1	1516	1514.7	1503.9	1503.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	74.8									
DP Liquid Density-lbm/ft3	93.74									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.202	0.968	0.771	2.488	2.896					
Zero Corrections-psid	0.037	-0.067	-0.75	0.121	0.273					
Corrected DP-Psid	0.165	1.035	1.521	2.367	2.623					
Actual DP-ft	1.9	2.62	3.98	4.74	6.34					
Measured TP-Psig	65.1				3.7					
Measured Overall-ft	102.38									
Computed DP-ft	1.62	3.04	4.48	5.98	7.47					
Friction-ft	0.19	0.52	0.99	1.57	2.22					
Acceleration-ft	0.19	0.32	0.45	0.62	0.8					
Elevation-ft	1.23	2.2	3.04	3.79	4.44					

Run#	602									
Test Fluid	C4F10									
Date:	6/2/93									
Time:	7:14									
Note	Analytical	Pin=Psat is assumed								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	64.9									
Sat. Temperature-F(inlet)	121.2									
Liq. Density-lbm/ft3	86.25	86.15	86.19	86.12	86.12	86.12	86.22	86.27	86.27	86.36
Latent Heat-Btu/lbm	32.63	32.57	32.59	32.56	32.55	32.55	32.61	32.65	32.65	32.71
Specific Heat-Btu/lbm/F	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.528	0.526	0.526	0.525	0.525	0.525	0.527	0.529	0.529	0.531
Liq. Conductivity-Btu/hr-ft-F	0.0278	0.0278	0.0278	0.0277	0.0277	0.0277	0.0278	0.0278	0.0278	0.0279
Liq. Prandtl No.	5.22	5.21	5.22	5.21	5.21	5.21	5.22	5.22	5.22	5.23
Inlet Flow Rate-GPM	2.5									
Outlet Liq. Flow Rate-GPM	1.3									
Outlet Vap. Flow Rate-GPM	1.4									
Inlet Temperature-F	121.6									
Outlet Liq. Temperature-F	126									
Outlet Vap. Temperature-F	119.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	77.8									
Water outlet Temp.-F	103.2									
Inlet G-lbm/hr/ft2	517282		Temp	120.2	Density	86.7				
Subcooling-F	-0.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	863.5	861.2	862.6	864	858.7	862.5	868.5	868.7	863.6	102.8
Heat Loss-Watts	9.7	2.3	3.1	3.1	3.1	2.4	1.6	2.4	3	12.7
Heat Flux-Btu/hr/ft2	14968	14928	14953	14977	14885	14951	15055	15024	14970	1782
Wall Temp. #3-F	135.4	137.1	135	136.1	139.6	137.9	138.5	138.3	137.1	127.3
Wall Temp. #4-F	135.8	136	136.7	137.1	137.5	138.2	139.2	139.1	138	127.7
Wall Temp. #5-F	135.4	133.5	136.6	136.4	136.1	138.2	137.4	137.4	135.5	128.3
Wall Temp. #1-F	73.5	134.9	134.2	134.4	135.2	139.2	139.1	139.4	134.9	127.1
Wall Temp. #2-F	135.4	135.6	134.9	135.8	135.7	138.8	139.5	139.8	135.9	127.7
Instream Temp.-F	125	125.6	125.4	125.8	125.8	125.8	125.2	124.9	124.9	124.3
Avg. Wall Temp.-F	135.5	135.7	135.2	136	136.1	138.1	138.7	138.8	136.3	127.6
Avg. Wall DT.-F	9.8	9.4	9.1	9.5	9.7	11.6	12.9	13.2	10.7	3.2
Remaining Subcool-F	-6.6									
Exit Quality	0.06	0.11	0.16	0.21	0.26	0.32	0.37	0.42	0.47	0.48
EXP. H-Btu/hr/ft2/F	1523.7	1592.3	1638.8	1572.7	1542.1	1283.4	1170.7	1136.3	1398.6	550.1
COMPUTED H										
Jallouk	1054.3	1018.9	991.1	965.6	952.6	945.6	937	919.2	162.5	162.4
Szady1(Cudo tube)	1536.8	1541.5	1543.5	1551.2	1549.6	1558.4	1560.1	1559.9	162.5	162.4
Szady2	1370.8	1375.6	1351.7	1360.1	1358.2	1366.3	1371.8	1371.9	162.5	162.4
(RLIQ)	62294	59130	55701	52521	49173	45825	42258	38811	38811	38811
(F)	1.689	2.283	2.706	3.054	3.365	3.647	3.824	4.18	4.18	4.18
(HLIQ)	272.8	369.1	437.4	494	544.2	589.9	634	675.1	675.1	675.1
(HBOIL)	1532.9	1534.4	1531.7	1534.3	1526.9	1527.6	1524.3	1516.6	1516.6	1516.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.4									
DP Liquid Density-lbm/ft3	93.65									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.138	1.309	1.154	2.987	3.561					
Zero Corrections-psid	0.037	-0.067	-0.75	0.121	0.273					
Corrected DP-Psid	0.101	1.376	1.904	2.846	3.288					
Actual DP-ft	2	2.04	3.38	3.98	5.28					
Measured TP-Psig	64.9				3.7					
Measured Overall-ft	102.04									
Computed DP-ft	1.4	2.58	3.72	4.9	6.17					
Friction-ft	0.14	0.39	0.75	1.21	1.61					
Acceleration-ft	0.13	0.23	0.35	0.49	0.58					
Elevation-ft	1.13	1.94	2.62	3.21	3.99					

1782 > 6588.
127.3 > 6939
127.7 + 171
127.1 > 7136

Run#	603									
Test Fluid	C4F10									
Date:	6/2/93									
Time:	7:14									
Note	Analytical	Pin=Psat is assumed								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	66.1									
Sat. Temperature-F(inlet)	122.2									
Liq. Density-lbm/ft3	86.12	86.02	86.1	86.02	85.99	86.01	86.08	86.07	86.09	86.2
Latent Heat-Btu/lbm	32.55	32.48	32.54	32.48	32.48	32.47	32.5	32.51	32.53	32.6
Specific Heat-Btu/lbm/F	0.275	0.276	0.275	0.276	0.276	0.276	0.275	0.275	0.275	0.276
Liq. Viscosity-lbm/ft-hr	0.525	0.522	0.524	0.522	0.521	0.522	0.523	0.524	0.524	0.527
Liq. Conductivity-Btu/hr-ft-F	0.0277	0.0277	0.0277	0.0277	0.0277	0.0277	0.0277	0.0277	0.0277	0.0278
Liq. Prandtl No.	5.21	5.2	5.21	5.2	5.2	5.2	5.2	5.21	5.21	5.22
Inlet Flow Rate-GPM	1.7									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	122.2									
Outlet Liq. Temperature-F	127									
Outlet Vap. Temperature-F	121.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	79.7									
Water outlet Temp.-F	106.6									
Inlet G-lbm/hr/ft2	351762		Temp	120.2	Density	86.7				
Subcooling-F	0									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	872	869.5	869.4	870.9	864.1	865.6	877.9	870.4	106.9	101.1
Heat Loss-Watts	9.5	2.2	3	3.1	3.1	2.4	1.6	2.6	2.3	12.8
Heat Flux-Btu/Hr/ft2	15116	15072	15070	15096	14979	15005	15218	15088	1853	1753
Wall Temp. #3-F	135.8	137.6	135.3	137	140.4	139	139.8	142.8	129.5	128.4
Wall Temp. #4-F	136.1	135.2	137.3	138.1	138.2	139.1	140.4	142	129.9	128.7
Wall Temp. #5-F	135.7	133.9	137.3	137	136.9	139.1	138.7	139.1	129.4	129.3
Wall Temp. #1-F	73.7	135.2	134.7	134.8	136.1	139.1	140	140.9	128.9	128
Wall Temp. #2-F	135.8	135.8	135.8	135.9	136.7	139.6	140.6	141.2	128.9	128.5
Instream Temp.-F	125.8	126.4	125.9	126.4	126.6	126.5	126.2	126.1	126	125.9
Avg. Wall Temp.-F	135.9	136	135.7	136.7	137	139.1	139.9	141.2	129.3	128.6
Avg. Wall DT.-F	9.4	8.9	9.1	9.8	9.7	11.9	13	14.4	3.2	3.2
Remaining Subcool-F	-9.2									
Exit Quality	0.08	0.15	0.23	0.31	0.39	0.48	0.54	0.62	0.63	0.64
EXP. H-Btu/Hr/ft2/F	1613.7	1699.5	1661.8	1565.6	1544.5	1261.2	1169.5	1046.4	572.6	547.5
COMPUTED H										
Jallouk	1106	1073.2	1039.5	1022	1001.6	988.7	119.6	119.5	119.5	119.4
Szady1(Cudo tube)	1550	1554.7	1551.6	1559.4	1557.2	1559.9	119.6	119.6	119.5	119.4
Szady2	1387.6	1391.8	1387.2	1394.7	1390.6	1368.9	119.6	119.5	119.5	119.4
(RLIQ)	42144	38985	35394	32128	28779	25965	25965	25965	25965	25965
(F)	1.832	2.565	3.103	3.538	3.923	4.28	4.28	4.28	4.28	4.28
(HLIQ)	217.7	304.9	368.6	420.6	466.5	509	509	509	509	509
(HBOIL)	1548.6	1550.8	1544.6	1549.1	1543.1	1541.7	1541.7	1541.7	1541.7	1541.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.9									
DP Liquid Density-lbm/ft3	93.58									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.466	1.722	1.591	3.515	4.244					
Zero Corrections-psid	0.037	-0.067	-0.75	0.121	0.273					
Corrected DP-Psid	0.429	1.789	2.341	3.394	3.971					
Actual DP-ft	1.45	1.95	2.6	3.02	4.09					
Measured TP-Psig	66.1				3.7					
Measured Overall-ft	104.24									
Computed DP-ft	1.19	2.1	2.97	3.84	5.09					
Friction-ft	0.08	0.25	0.49	0.78	0.96					
Acceleration-ft	0.08	0.16	0.25	0.38	0.4					
Elevation-ft	1.02	1.7	2.23	2.67	3.73					

23977

Run#	604									
Test Fluid	C4F10									
Date:	6/2/93									
Time:	12:13									
Note	Analytical	Pin=Psat is assumed								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	64.7									
Sat. Temperature-F(inlet)	121									
Liq. Density-lbm/ft3	86.07	86.04	86.1	86.04	86.04	86.04	86.1	86.1	86.1	86.15
Latent Heat-Btu/lbm	32.51	32.49	32.54	32.49	32.49	32.49	32.54	32.54	32.54	32.57
Specific Heat-Btu/lbm/F	0.275	0.276	0.275	0.276	0.276	0.276	0.275	0.275	0.275	0.276
Liq. Viscosity-lbm/ft-hr	0.524	0.523	0.524	0.523	0.523	0.523	0.524	0.524	0.524	0.526
Liq. Conductivity-Btu/hr-ft-F	0.0277	0.0277	0.0277	0.0277	0.0277	0.0277	0.0277	0.0277	0.0277	0.0278
Liq. Prandtl No.	5.21	5.2	5.21	5.2	5.2	5.2	5.21	5.21	5.21	5.21
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	0.6									
Inlet Temperature-F	121.3									
Outlet Liq. Temperature-F	127.3									
Outlet Vap. Temperature-F	122.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	80.9									
Water outlet Temp.-F	108.7									
Inlet G-lbm/hr/ft2	207896		Temp		119	Density	86.91			
Subcooling-F	-0.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	858.4	858.5	862.4	865.1	855.5	864.5	862.6	132.7	102.8	85.2
Heat Loss-Watts	10.1	2.4	3.2	3.3	3.3	2.6	1.8	2.1	2.9	18.3
Heat Flux-Btu/hr/ft2	14880	14847	14949	14996	14830	14986	14953	2300	1773	1477
Wall Temp. #3-F	135.2	137.3	135.2	136.5	140.3	139.2	145	133	139.1	136.6
Wall Temp. #4-F	135.4	134.9	136.9	137.6	138.1	139.2	144.1	132.8	139.3	136.8
Wall Temp. #5-F	135	133.5	137	136.5	136.6	139.2	139.5	132.3	136.2	140.6
Wall Temp. #1-F	74.7	134.9	134.4	134.5	135.7	139	140.6	133.8	133.5	140.3
Wall Temp. #2-F	135.2	135.4	134.9	135.5	136.3	139.7	141.1	133.8	133.6	140.7
Instream Temp.-F	126.1	126.3	125.9	126.3	126.3	126.3	125.9	125.9	125.9	125.6
Avg. Wall Temp.-F	135.2	135.6	135.4	136.3	136.7	139.2	142.1	133.1	136.3	139
Avg. Wall DT.-F	8.4	8.7	8.8	9.3	9.7	12.2	15.5	7.1	10.4	13.3
Remaining Subcool-F	-15.6									
Exit Quality	0.13	0.26	0.39	0.52	0.65	0.78	0.91	0.93	0.95	0.96
EXP. H-Btu/Hr/ft2/F	1765.6	1715.6	1703.7	1612.9	1528.1	1231.1	965.7	322.3	171.2	110.8
COMPUTED H										
Jallouk	1154.9	1108	1070	1068.4	1048.9	78.4	78.3	78.3	78.3	78.3
Szady1(Cudo tube)	1540.1	1541	1543.6	1550.8	1543.4	78.4	78.3	78.3	78.3	78.3
Szady2	1378.4	1376.8	1379.2	1386.6	1377.1	78.4	78.3	78.3	78.3	78.3
(RLIQ)	24204	20857	17441	14119	10756	10756	10756	10756	10756	10756
(F)	2.131	3.115	3.831	4.423	4.963	4.963	4.963	4.963	4.963	4.963
(HLIQ)	165.9	242.6	298.3	344.6	386.6	386.6	386.6	386.6	386.6	386.6
(HBOIL)	1539.5	1539	1539.8	1545.1	1535.3	1535.3	1535.3	1535.3	1535.3	1535.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.5									
DP Liquid Density-lbm/ft3	93.5									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.65	2.14	2.003	4.039	4.905					
Zero Corrections-psid	0.037	-0.067	-0.75	0.121	0.273					
Corrected DP-Psid	0.613	2.207	2.753	3.918	4.632					
Actual DP-ft	1.15	0.65	1.91	2.13	2.97					
Measured TP-Psig	64.7				3.7					
Measured Overall-ft	101.96									
Computed DP-ft	0.94	1.58	2.13	2.95	4.02					
Friction-ft	0.04	0.14	0.27	0.37	0.44					
Acceleration-ft	0.05	0.1	0.19	0.25	0.27					
Elevation-ft	0.85	1.34	1.67	2.32	3.32					

21132
+ 57
21189

Run#	605									
Test Fluid	C4F10									
Date:	6/2/93									
Time:	12:13									
Note	Analytical	Pin=Psat is assumed								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	64.3									
Sat. Temperature-F(inlet)	120.7									
Liq. Density-lbm/ft3	86.25	86.19	86.22	86.17	86.2	86.23	86.31	86.31	86.33	86.48
Latent Heat-Btu/lbm	32.63	32.59	32.61	32.58	32.6	32.62	32.68	32.68	32.69	32.79
Specific Heat-Btu/lbm/F	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.528	0.526	0.527	0.526	0.527	0.528	0.53	0.53	0.53	0.534
Liq. Conductivity-Btu/hr-ft-F	0.0278	0.0278	0.0278	0.0278	0.0278	0.0278	0.0279	0.0279	0.0279	0.028
Liq. Prandtl No.	5.22	5.22	5.22	5.21	5.22	5.22	5.23	5.23	5.23	5.24
Inlet Flow Rate-GPM	4.8									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2.3									
Inlet Temperature-F	121.3									
Outlet Liq. Temperature-F	124.4									
Outlet Vap. Temperature-F	119									
Water Flow Rate-GPM										
Water Inlet Temp.-F	79.8									
Water outlet Temp.-F	104.9									
Inlet G-lbm/hr/ft2	991825		Temp	120.9	Density	86.58				
Subcooling-F	-0.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1161.6	1156.8	1153	1152.5	1156.9	535.1	109.6	101.2	120.1	107.9
Heat Loss-Watts	12	2.8	3.8	3.8	3.9	2.4	1.3	2.1	2.7	15
Heat Flux-Btu/hr/ft2	20136	20052	19987	19978	20054	9278	1900	1754	2082	1860
Wall Temp. #3-F	137.1	139.6	138.4	137.2	145.4	131.8	127.6	127.2	127.3	126.8
Wall Temp. #4-F	137.4	138	138.5	138.5	140.3	132	127.5	127.2	127.6	126.4
Wall Temp. #5-F	136.6	134.3	138.4	137.5	138.9	132	127.4	127.3	127.3	126.6
Wall Temp. #1-F	76.1	136.3	135.3	135.1	136.1	133	127.8	127.2	126.8	125.5
Wall Temp. #2-F	137.1	137	136.8	136.1	137	133.1	127.6	127.2	126.8	126.1
Instream Temp.-F	125	125.4	125.2	125.5	125.3	125.1	124.6	124.6	124.5	123.6
Avg. Wall Temp.-F	137.1	137.2	136.6	137.1	137.6	132.2	127.6	127.2	127.2	126.2
Avg. Wall DT.-F	11.1	10.9	10.5	10.7	11.4	6.7	2.9	2.5	2.6	2.5
Remaining Subcool-F	-5									
Exit Quality	0.04	0.08	0.11	0.15	0.19	0.2	0.21	0.21	0.21	0.22
EXP. H-Btu/hr/ft2/F	1807.5	1836.5	1899.5	1872	1764	1388.4	656.4	690.4	811.3	745.2
COMPUTED H										
Jallouk	1161.8	1087.8	1039.6	273.8	273.7	273.7	273.5	273.5	273.5	273.2
Szady1(Cudo tube)	1786.7	1792.7	1793.4	273.8	273.7	273.7	273.5	273.5	273.5	273.2
Szady2	1650.3	1648.9	1678.9	273.8	273.7	273.7	273.5	273.5	273.5	273.2
(RLIQ)	120289	115855	111211	111211	111211	111211	111211	111211	111211	111211
(F)	1.582	2.075	2.416	2.416	2.416	2.416	2.416	2.416	2.416	2.416
(HLIQ)	430.3	564.6	657.1	657.1	657.1	657.1	657.1	657.1	657.1	657.1
(HBOIL)	1778.4	1773.8	1763.5	1763.5	1763.5	1763.5	1763.5	1763.5	1763.5	1763.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.6									
DP Liquid Density-lbm/ft3	93.34									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.041	0.445	0.183	1.756	2.216					
Zero Corrections-psid	0.037	-0.067	-0.75	0.121	0.273					
Corrected DP-Psid	0.004	0.512	0.933	1.635	1.943					
Actual DP-ft	2.15	3.46	4.82	5.91	7.42					
Measured TP-Psig	64.3				3.7					
Measured Overall-ft	100.91									
Computed DP-ft	2	3.85	5.83	7.75	9.57					
Friction-ft	0.36	1	1.7	2.3	2.88					
Acceleration-ft	0.4	0.63	0.82	0.85	0.87					
Elevation-ft	1.24	2.22	3.31	4.61	5.82					

Run#	606									
Test Fluid	C4F10									
Date:	6/2/83									
Time:	12:13									
Note	Analytical	Pin=Psat is assumed								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	64.5									
Sat. Temperature-F(inlet)	120.8									
Liq. Density-lbm/ft3	86.2	86.14	86.14	86.14	86.14	86.17	86.28	86.28	86.28	86.44
Latent Heat-Btu/lbm	32.6	32.56	32.56	32.56	32.56	32.58	32.66	32.66	32.66	32.76
Specific Heat-Btu/lbm/F	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.527	0.525	0.525	0.525	0.525	0.526	0.529	0.529	0.529	0.533
Liq. Conductivity-Btu/hr-ft-F	0.0278	0.0277	0.0277	0.0277	0.0277	0.0278	0.0278	0.0278	0.0278	0.0279
Liq. Prandtl No.	5.22	5.21	5.21	5.21	5.21	5.21	5.22	5.22	5.22	5.24
Inlet Flow Rate-GPM	4.1									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2									
Inlet Temperature-F	121.2									
Outlet Liq. Temperature-F	124.8									
Outlet Vap. Temperature-F	119									
Water Flow Rate-GPM										
Water inlet Temp.-F	80.2									
Water outlet Temp.-F	106.3									
Inlet G-lbm/hr/ft2	847616		Temp	120.7	Density	86.62				
Subcooling-F	-0.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1164.5	1162.2	1161.3	1160.2	1155.3	542.6	112.3	104.8	121.5	113.3
Heat Loss-Watts	10.5	2.5	3.3	3.3	3.4	2.1	1.1	1.7	2.3	12.7
Heat Flux-Btu/Hr/ft2	20186	20146	20130	20111	20026	9406	1947	1817	2106	1964
Wall Temp. #3-F	137.2	140	136.7	137.4	142.3	132.2	127.8	127.3	127.6	126.7
Wall Temp. #4-F	137.3	136.4	138.9	139	138.5	132.2	127.7	127.5	128.1	127.2
Wall Temp. #5-F	136.7	134.5	138.8	137.9	136.9	132.2	127.6	127.5	127.6	127.1
Wall Temp. #1-F	74.4	136.7	135.6	135.2	136.8	133.2	127.9	127.1	127	126.1
Wall Temp. #2-F	137.2	137.2	136.7	136.8	137.2	133.2	127.8	127.4	127	126.7
Instream Temp.-F	125.3	125.7	125.7	125.7	125.7	125.6	124.8	124.8	124.9	123.9
Avg. Wall Temp.-F	137.1	137.6	137	137.4	137.2	132.5	127.8	127.4	127.5	126.8
Avg. Wall DT.-F	10.9	11	10.4	10.8	10.6	6.5	2.9	2.5	2.6	2.9
Remaining Subcool-F	-5.4									
Exit Quality	0.05	0.09	0.13	0.17	0.22	0.24	0.24	0.24	0.25	0.25
EXP. H-Btu/Hr/ft2/F	1854	1837.4	1942.1	1868	1885.7	1441.5	677.8	733.1	821.2	684
COMPUTED H										
Jallouk	1185	1125.1	1079.8	241.5	241.5	241.4	241.2	241.2	241.2	241
Szady1(Cudo tube)	1791	1797.7	1801.6	241.5	241.5	241.4	241.2	241.2	241.2	241
Szady2	1656.4	1656.4	1685.2	241.5	241.5	241.4	241.2	241.2	241.2	241
(RLIQ)	102814	98482	93951	93951	93951	93951	93951	93951	93951	93951
(F)	1.614	2.147	2.524	2.524	2.524	2.524	2.524	2.524	2.524	2.524
(HLIQ)	387.1	515.3	605.7	605.7	605.7	605.7	605.7	605.7	605.7	605.7
(HBOIL)	1785	1783.5	1778.5	1778.5	1778.5	1778.5	1778.5	1778.5	1778.5	1778.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.2									
DP Liquid Density-lbm/ft3	93.54									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.092	0.697	0.513	2.133	2.712					
Zero Corrections-psid	0.037	-0.067	-0.75	0.121	0.273					
Corrected DP-Psid	0.055	0.764	1.263	2.012	2.439					
Actual DP-ft	2.07	3.06	4.39	5.3	6.92					
Measured TP-Psig	64.5				3.7					
Measured Overall-ft	101.28									
Computed DP-ft	1.8	3.44	5.24	7.03	8.73					
Friction-ft	0.29	0.83	1.42	1.92	2.4					
Acceleration-ft	0.32	0.52	0.69	0.71	0.74					
Elevation-ft	1.19	2.09	3.13	4.4	5.59					

Run#	607									
Test Fluid	C4F10									
Date:	6/2/93									
Time:	12:13									
Note	Analytical	Pin=Psat is assumed								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	63.7									
Sat. Temperature-F(inlet)	120.2									
Liq. Density-lbm/ft3	86.2	86.1	86.14	86.12	86.12	86.15	86.2	86.23	86.25	86.38
Latent Heat-Btu/lbm	32.6	32.54	32.56	32.55	32.55	32.57	32.6	32.62	32.63	32.72
Specific Heat-Btu/lbm/F	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.276
Liq. Viscosity-lbm/ft-hr	0.527	0.524	0.525	0.525	0.525	0.526	0.527	0.528	0.528	0.531
Liq. Conductivity-Btu/hr-ft-F	0.0278	0.0277	0.0277	0.0277	0.0277	0.0278	0.0278	0.0278	0.0278	0.0279
Liq. Prandtl No.	5.22	5.21	5.21	5.21	5.21	5.21	5.22	5.22	5.22	5.23
Inlet Flow Rate-GPM	3.3									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	2.1									
Inlet Temperature-F	120.9									
Outlet Liq. Temperature-F	125.7									
Outlet Vap. Temperature-F	119.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	80.2									
Water outlet Temp.-F	104.6									
Inlet G-lbm/hr/ft2	682413		Temp	120.5	Density	86.65				
Subcooling-F	-0.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1155.2	1153	1148.9	1149.9	1158.4	1155.4	286.4	107.8	124.5	118.5
Heat Loss-Watts	10.1	2.4	3.2	3.2	3.2	2.4	1.2	1.6	2.2	12.3
Heat Flux-Btu/Hr/ft2	20025	19987	19915	19933	20080	20028	4965	1869	2158	2054
Wall Temp. #3-F	137.2	140.1	136.7	137.7	141.9	138.6	131.4	127.7	128.3	127.4
Wall Temp. #4-F	137.3	136.4	139	139.1	138.4	138.2	131.2	127.7	128.7	127.8
Wall Temp. #5-F	136.7	134.6	139	138.1	137	137.5	130.5	127.7	128.3	128.2
Wall Temp. #1-F	73.4	196.7	135.7	135.5	196.5	138.6	130.5	127.4	127.4	126.6
Wall Temp. #2-F	137.2	137.2	136.7	136.8	137.6	139.6	130.5	127.7	127.7	127.3
Instream Temp.-F	125.3	125.9	125.7	125.8	125.8	125.6	125.3	125.1	125	124.2
Avg. Wall Temp.-F	137.1	137.6	137	137.6	137.4	138.2	130.8	127.6	128.1	127.5
Avg. Wall DT.-F	10.9	10.8	10.4	10.9	10.7	11.7	5.3	2.5	3	3.2
Remaining Subcool-F	-7									
Exit Quality	0.06	0.11	0.16	0.22	0.27	0.32	0.34	0.34	0.35	0.35
EXP. H-Btu/Hr/ft2/F	1838	1851.2	1910.4	1828.8	1882.4	1708.9	937.5	761	723.6	648.6
COMPUTED H										
Jallouk	1208.9	1157.2	1109.3	203.1	203.1	203	203	202.9	202.9	202.7
Szady1(Cudo tube)	1782.9	1790.9	1789.1	203.1	203.1	203	203	202.9	202.9	202.7
Szady2	1644.5	1675.1	1671.9	203.1	203.1	203	203	202.9	202.9	202.7
(RLIQ)	82228	77864	73271	73271	73271	73271	73271	73271	73271	73271
(F)	1.712	2.315	2.736	2.736	2.736	2.736	2.736	2.736	2.736	2.736
(HLIQ)	345.2	467.3	552.1	552.1	552.1	552.1	552.1	552.1	552.1	552.1
(HBOIL)	1778.6	1780.2	1771.4	1771.4	1771.4	1771.4	1771.4	1771.4	1771.4	1771.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.4									
DP Liquid Density-lbm/ft3	93.65									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.119	0.973	0.854	2.529	3.247					
Zero Corrections-psid	0.037	-0.067	-0.75	0.121	0.273					
Corrected DP-Psid	0.082	1.04	1.604	2.408	2.974					
Actual DP-ft	2.03	2.6	3.83	4.66	5.75					
Measured TP-Psig	63.7				3.7					
Measured Overall-ft	100.02									
Computed DP-ft	1.58	2.99	4.47	6.16	7.78					
Friction-ft	0.23	0.66	1.26	1.68	2.08					
Acceleration-ft	0.24	0.41	0.62	0.66	0.68					
Elevation-ft	1.12	1.92	2.59	3.82	4.97					

Run#	608									
Test Fluid	C4F10									
Date:	6/2/93									
Time:	12:13									
Note	Analytical	Pin=Psat is assumed								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	62.4									
Sat. Temperature-F(inlet)	119									
Liq. Density-lbm/ft3	86.49	86.22	86.23	86.22	86.2	86.2	86.3	86.31	86.31	86.4
Latent Heat-Btu/lbm	32.8	32.61	32.62	32.61	32.6	32.6	32.67	32.68	32.68	32.78
Specific Heat-Btu/lbm/F	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.534	0.527	0.528	0.527	0.527	0.527	0.529	0.53	0.53	0.532
Liq. Conductivity-Btu/hr-ft-F	0.028	0.0278	0.0278	0.0278	0.0278	0.0278	0.0279	0.0279	0.0279	0.0279
Liq. Prandtl No.	5.24	5.22	5.22	5.22	5.22	5.22	5.23	5.23	5.23	5.23
Inlet Flow Rate-GPM	2.5									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	1.5									
Inlet Temperature-F	120									
Outlet Liq. Temperature-F	125.4									
Outlet Vap. Temperature-F	119.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	81.2									
Water outlet Temp.-F	106.3									
Inlet G-lbm/hr/ft2	518489		Temp	119	Density	86.91				
Subcooling-F	-1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1155.4	1154.3	1149.6	1150.9	1152.4	563.7	285.1	108	119.5	115.2
Heat Loss-Watts	10	2.3	3.2	3.2	3.2	2.1	1.2	1.6	2.2	12.3
Heat Flux-Btu/hr/ft2	20028	20009	19928	19950	19976	9771	4942	1872	2071	1997
Wall Temp. #3-F	136.6	139.4	136.1	137.2	141.3	133.6	129.8	127.3	127.9	127.2
Wall Temp. #4-F	136.6	135.8	138.6	138.6	137.8	133.4	129.7	127.3	128.1	127.5
Wall Temp. #5-F	136.1	134	138.6	137.5	136.2	133.1	129.1	127.3	127.9	127.6
Wall Temp. #1-F	73.1	136.1	135	134.9	135.9	133.6	131.1	127	126.8	126.3
Wall Temp. #2-F	136.5	136.6	136.1	136.1	137	133.7	131.1	127.3	127.1	126.9
Instream Temp.-F	123.6	125.2	125.1	125.2	125.3	125.3	124.7	124.6	124.6	124.1
Avg. Wall Temp.-F	136.5	137	136.5	137.1	136.7	133.4	130.2	127.2	127.6	127.1
Avg. Wall DT.-F	12	10.9	10.4	10.9	10.5	7.7	5.2	2.6	2.9	2.9
Remaining Subcool-F	-9.2									
Exit Quality	0.08	0.15	0.21	0.28	0.35	0.39	0.4	0.41	0.42	0.42
EXP. H-Btu/hr/ft2/F	1662.8	1840.6	1907	1822.2	1898.5	1271.7	943.7	732.6	722.7	686.3
COMPUTED H										
Jallouk	1231	1182.2	1149.3	162.9	162.9	162.9	162.8	162.8	162.8	162.7
Szady1(Cudo tube)	1763.2	1782.7	1780.8	162.9	162.9	162.9	162.8	162.8	162.8	162.7
Szady2	1643.9	1643.1	1637.6	162.9	162.9	162.9	162.8	162.8	162.8	162.7
(RLIQ)	61031	57156	52676	52676	52676	52676	52676	52676	52676	52676
(F)	1.841	2.541	3.033	3.033	3.033	3.033	3.033	3.033	3.033	3.033
(HLIQ)	297.3	411.3	490.9	490.9	490.9	490.9	490.9	490.9	490.9	490.9
(HBOIL)	1760.4	1775.3	1768.1	1768.1	1768.1	1768.1	1768.1	1768.1	1768.1	1768.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.6									
DP Liquid Density-lbm/ft3	93.62									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.108	1.344	1.258	2.984	3.761					
Zero Corrections-psid	0.037	-0.067	-0.75	0.121	0.273					
Corrected DP-Psid	0.071	1.411	2.008	2.863	3.488					
Actual DP-ft	2.05	1.98	3.16	3.9	4 89					
Measured TP-Psig	62.4				3.7					
Measured Overall-ft	97.84									
Computed DP-ft	1.36	2.53	3.74	5.26	6.88					
Friction-ft	0.16	0.48	0.91	1.2	1.48					
Acceleration-ft	0.17	0.31	0.45	0.48	0.5					
Elevation-ft	1.03	1.74	2.38	3.58	4.7					

Run#	609									
Test Fluid	C4F10									
Date:	6/2/93									
Time:	15:17									
Note	Analytical	Pin=Psat is assumed								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	63									
Sat. Temperature-F(inlet)	119.6									
Liq. Density-lbm/ft3	86.48	86.25	86.3	86.28	86.28	86.27	86.33	86.31	86.35	86.46
Latent Heat-Btu/lbm	32.79	32.63	32.67	32.66	32.66	32.65	32.69	32.68	32.7	32.77
Specific Heat-Btu/lbm/F	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.534	0.528	0.529	0.529	0.529	0.529	0.53	0.53	0.531	0.533
Liq. Conductivity-Btu/hr-ft-F	0.028	0.0278	0.0279	0.0278	0.0278	0.0278	0.0279	0.0279	0.0279	0.028
Liq. Prandtl No.	5.24	5.22	5.23	5.22	5.22	5.22	5.23	5.23	5.23	5.24
Inlet Flow Rate-GPM	1.7									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	120.1									
Outlet Liq. Temperature-F	125.5									
Outlet Vap. Temperature-F	119.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	81.2									
Water outlet Temp.-F	106									
Inlet G-lbm/hr/ft2	352504		Temp	119.1	Density	86.89				
Subcooling-F	-0.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1161.4	1158.5	1155.8	1158.5	1157.3	564.9	287.5	109.5	121.1	116.7
Heat Loss-Watts	10.1	2.4	3.2	3.2	3.3	2.1	1.2	1.7	2.3	12.8
Heat Flux-Btu/hr/ft2	20132	20082	20035	20082	20061	9792	4984	1898	2099	2023
Wall Temp. #3-F	135.8	138.8	135.9	136.7	142.2	133.1	130.1	127.3	128.2	127.2
Wall Temp. #4-F	136.1	135.2	138.3	138.2	138.5	133	129.9	127.5	128.3	127.3
Wall Temp. #5-F	135.5	133.6	138.1	137.3	137.3	133	129.6	127.5	128.1	127.9
Wall Temp. #1-F	72.5	135.5	134.8	134.6	136	134	130.2	127	127.1	126.5
Wall Temp. #2-F	135.8	136.1	135.6	135.7	136.8	134.2	130.1	127.1	127.1	127
Instream Temp.-F	123.6	125	124.7	124.8	124.8	124.9	124.5	124.6	124.4	123.7
Avg. Wall Temp.-F	135.8	136.4	136.2	136.7	137.2	133.3	130	127.3	127.8	127.2
Avg. Wall DT.-F	11.3	10.5	10.5	11	11.4	7.9	5.3	2.6	3.3	3.4
Remaining Subcool-F	-12.7									
Exit Quality	0.11	0.21	0.31	0.41	0.51	0.56	0.59	0.6	0.61	0.62
EXP. H-Btu/hr/ft2/F	1783.2	1913.9	1900	1826.9	1753.1	1234.4	948.4	731.7	642.9	597
COMPUTED H										
Jallouk	1301.3	1231.1	1191.1	119.6	119.6	119.6	119.5	119.6	119.5	119.4
Szady1(Cudo tube)	1768.2	1782.2	1778.7	119.6	119.6	119.6	119.5	119.6	119.5	119.4
Szady2	1647.8	1648.4	1641.6	119.6	119.6	119.6	119.5	119.6	119.5	119.4
(RLIQ)	40687	36780	32263	32263	32263	32263	32263	32263	32263	32263
(F)	2.016	2.882	3.508	3.508	3.508	3.508	3.508	3.508	3.508	3.508
(HLIQ)	289.1	342.5	416.8	416.8	416.8	416.8	416.8	416.8	416.8	416.8
(HBOIL)	1768.7	1778	1771	1771	1771	1771	1771	1771	1771	1771
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.2									
DP Liquid Density-lbm/ft3	83.68									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.539	1.787	1.696	3.501	4.361					
Zero Corrections-psid	0.037	-0.067	-0.75	0.121	0.273					
Corrected DP-Psid	0.502	1.854	2.449	3.38	4.088					
Actual DP-ft	1.38	1.25	2.42	3.04	3.89					
Measured TP-Psig	63				3.7					
Measured Overall-ft	98.76									
Computed DP-ft	1.12	2.01	2.9	4.08	5.34					
Friction-ft	0.1	0.32	0.6	0.82	0.99					
Acceleration-ft	0.11	0.22	0.34	0.38	0.39					
Elevation-ft	0.91	1.47	1.95	2.89	3.95					

Run#	610									
Test Fluid	C4F10									
Date:	6/2/93									
Time:	15:17									
Note	Analytical	Pin=Psat is assumed								
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	63									
Sat. Temperature-F(inlet)	119.6									
Liq. Density-lbm/ft3	86.2	86.19	86.23	86.17	86.1	86.12	86.23	86.2	86.2	86.33
Latent Heat-Btu/lbm	32.6	32.59	32.62	32.58	32.54	32.55	32.62	32.6	32.6	32.69
Specific Heat-Btu/lbm/F	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275
Liq. Viscosity-lbm/ft-hr	0.527	0.526	0.528	0.528	0.524	0.525	0.528	0.527	0.527	0.53
Liq. Conductivity-Btu/hr-ft-F	0.0278	0.0278	0.0278	0.0278	0.0277	0.0277	0.0278	0.0278	0.0278	0.0279
Liq. Prandtl No.	5.22	5.22	5.22	5.21	5.21	5.21	5.22	5.22	5.22	5.23
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	120.2									
Outlet Liq. Temperature-F	126.6									
Outlet Vap. Temperature-F	121.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	84.1									
Water outlet Temp.-F	110.9									
Inlet G-lbm/hr/ft2	207758		Temp	118.1	Density	87.06				
Subcooling-F	-0.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1151.8	1156.7	1159.2	1157.4	470.7	102.9	144.7	141.5	118.2	112.7
Heat Loss-Watts	11.1	2.6	3.6	3.7	3.2	2.1	1.4	2.2	2.8	16
Heat Flux-Btu/hr/ft2	19968	20051	20094	20063	8159	1784	2508	2453	2049	1954
Wall Temp. #3-F	138.1	139.3	136.2	137.8	135	128.9	130.1	130.6	130.9	129.2
Wall Temp. #4-F	136.1	135.9	138.6	139.2	134	128.7	129.9	130.8	130.8	129.6
Wall Temp. #5-F	135.4	133.7	138.7	138.2	132.9	128.6	129.3	130.3	130.3	130.4
Wall Temp. #1-F	71.9	135.8	135.2	135.3	132.6	129.7	129.6	129.7	129.2	128.9
Wall Temp. #2-F	135.7	136.4	136.2	136.6	132.8	129.1	129.5	130	129.8	129.2
Instream Temp.-F	125.3	125.4	125.1	125.5	125.9	125.8	125.1	125.3	125.3	124.5
Avg. Wall Temp.-F	135.8	136.9	136.5	137.6	133.1	129	129.7	130.3	130	129.5
Avg. Wall DT.-F	9.6	10.5	10.5	11.2	6.8	3.1	4.5	4.9	4.6	4.9
Remaining Subcool-F	-21.1									
Exit Quality	0.18	0.35	0.53	0.7	0.77	0.78	0.81	0.83	0.85	0.86
EXP. H-Btu/lb/ft2/F	2074.9	1901.6	1910.6	1788.4	1198.8	576.4	661.6	603.7	448.6	401
COMPUTED H										
Jallouk	1373.3	1304.9	78.4	78.4	78.4	78.4	78.4	78.4	78.4	78.3
Szady1(Cudo tube)	1778.4	1784	78.4	78.4	78.4	78.4	78.4	78.4	78.4	78.3
Szady2	1640.1	1648.6	78.4	78.4	78.4	78.4	78.4	78.4	78.4	78.3
(RLIQ)	23499	18960	18960	18960	18960	18960	18960	18960	18960	18960
(F)	2.353	3.525	3.525	3.525	3.525	3.525	3.525	3.525	3.525	3.525
(HLIQ)	183.3	274.6	274.6	274.6	274.6	274.6	274.6	274.6	274.6	274.6
(HBOIL)	1777.7	1781.9	1781.9	1781.9	1781.9	1781.9	1781.9	1781.9	1781.9	1781.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.2									
DP Liquid Density-lbm/ft3	83.68									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.727	2.37	2.217	4.098	5.055					
Zero Corrections-psid	0.037	-0.067	-0.75	0.121	0.273					
Corrected DP-Psid	0.69	2.437	2.967	3.977	4.782					
Actual DP-ft	1.02	0.28	1.58	2.05	2.74					
Measured TP-Psig	63				3.7					
Measured Overall-ft	88.91									
Computed DP-ft	0.88	1.47	2.33	3.1	4.2					
Friction-ft	0.06	0.17	0.28	0.39	0.46					
Acceleration-ft	0.06	0.16	0.19	0.21	0.23					
Elevation-ft	0.76	1.13	1.86	2.5	3.51					

Run#	625									
Test Fluid	C4F10									
Date:	6/9/93									
Time:	8:48									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	107.4									
Sat. Temperature-F(inlet)	151.2									
Liq. Density-lbm/ft3	82.04	81.79	81.83	81.89	81.91	81.83	81.76	81.81	81.81	81.98
Latent Heat-Btu/lbm	29.69	29.51	29.54	29.58	29.59	29.54	29.49	29.53	29.53	29.65
Specific Heat-Btu/lbm/F	0.285	0.286	0.286	0.285	0.285	0.286	0.286	0.286	0.286	0.285
Liq. Viscosity-lbm/ft-hr	0.434	0.429	0.43	0.431	0.431	0.43	0.428	0.43	0.43	0.433
Liq. Conductivity-Btu/hr-ft-F	0.0251	0.025	0.025	0.025	0.0251	0.025	0.025	0.025	0.025	0.0251
Liq. Prandtl No.	4.92	4.91	4.91	4.91	4.91	4.91	4.9	4.91	4.91	4.92
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	148.5									
Outlet Liq. Temperature-F	149.3									
Outlet Vap. Temperature-F	147.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	106.1									
Water outlet Temp.-F	145									
Inlet G-lbm/hr/ft2	198056		Temp	141.1	Density	82.99				
Subcooling-F	2.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	289.3	285.5	285.9	284.7	288.9	289	281.2	282.8	281.2	288.4
Heat Loss-Watts	14.1	3.3	4.5	4.7	4.8	3.8	2.6	3.7	4.4	24.7
Heat Flux-Btu/Hr/ft2	5015	4949	4956	4935	5008	5010	4874	4902	4874	4999
Wall Temp. #3-F	155.9	156.2	156.4	155.8	156.9	156.7	157.3	156.4	155.7	154.6
Wall Temp. #4-F	156.3	155.9	157	156.3	156.8	156.9	157.6	156.8	156.3	154.6
Wall Temp. #5-F	156.3	155.5	157.9	156.4	156.1	157	157	156.8	155.9	155.1
Wall Temp. #1-F	82.3	156.1	155.4	155.3	155.2	157	157.5	157.1	155.2	153.4
Wall Temp. #2-F	156.9	156.2	155.7	155.4	155.3	156.9	157.4	157.3	155.4	154.1
Instream Temp.-F	149.4	150.7	150.5	150.2	150.1	150.5	150.9	150.6	150.6	149.7
Avg. Wall Temp.-F	156.4	156.1	156.1	156	155.9	156.9	157.4	156.9	155.7	154.4
Avg. Wall DT.-F	6.7	6.2	5.4	5.5	5.5	6.2	6.2	6.1	4.9	4.4
Remaining Subcool-F	-2.5									
Exit Quality	0.02	0.07	0.12	0.17	0.22	0.27	0.32	0.37	0.42	0.47
EXP. H-Btu/Hr/ft2/F	745.9	956.1	917.6	892.9	906.6	811.5	781.2	809.1	998.9	1127.5
COMPUTED H										
Jallouk	706.5	686.9	674	662.4	661.9	658.5	633.1	632.4	630.1	633.1
Szady1(Cudo tube)	1020.5	1021.9	1021.8	1018.3	1025.6	1028.7	1017.7	1019.3	1017	1025.1
Szady2	767.7	777.1	776.8	773.8	778.9	784.3	781.3	781.8	781.8	782.9
(RLIQ)	29498	28706	27166	25808	24092	22664	21245	19718	18235	16617
(F)	1.362	1.805	2.201	2.514	2.782	3.014	3.222	3.425	3.611	3.81
(HLIQ)	105.4	139.9	170.5	194.7	215.4	233.5	249.7	265.4	279.8	294.9
(HBOIL)	1020.1	1021	1020.2	1015.9	1022.4	1024.7	1012.6	1013.3	1009.9	1016.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.5									
DP Liquid Density-lbm/ft3	92.48									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.184	1.192	1.246	2.942	3.734					
Zero Corrections-psid	0.032	-0.04	-0.734	0.191	0.148					
Corrected DP-Psid	0.152	1.232	1.98	2.751	3.586					
Actual DP-ft	1.99	2.95	3.29	4.19	4.84					
Measured TP-Psig	107.4				-1.6					
Measured Overall-ft	191.46									
Computed DP-ft	1.46	2.53	3.41	4.24	4.94					
Friction-ft	0.02	0.05	0.09	0.14	0.2					
Acceleration-ft	0.01	0.02	0.03	0.05	0.06					
Elevation-ft	1.43	2.46	3.29	4.05	4.67					

Run#	628									
Test Fluid	C4F10									
Date:	6/9/93									
Time:	11:28									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	111									
Sat. Temperature-F(inlet)	153.3									
Liq. Density-lbm/ft3	81.61	81.62	81.57	81.53	81.53	81.47	81.51	81.59	81.61	81.7
Latent Heat-Btu/lbm	29.38	29.39	29.35	29.32	29.32	29.28	29.31	29.36	29.38	29.44
Specific Heat-Btu/lbm/F	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.286
Liq. Viscosity-lbm/ft-hr	0.426	0.426	0.425	0.424	0.424	0.423	0.424	0.425	0.426	0.427
Liq. Conductivity-Btu/hr-ft-F	0.0249	0.0249	0.0248	0.0248	0.0248	0.0248	0.0248	0.0249	0.0249	0.0249
Liq. Prandtl No.	4.9	4.9	4.89	4.89	4.89	4.89	4.89	4.9	4.9	4.9
Inlet Flow Rate-GPM	3.4									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	2									
Inlet Temperature-F	148.4									
Outlet Liq. Temperature-F	152.3									
Outlet Vap. Temperature-F	148									
Water Flow Rate-GPM										
Water Inlet Temp.-F	106.2									
Water outlet Temp.-F	145.2									
Inlet G-lbm/hr/ft2	664595		Temp	146.8	Density	81.91				
Subcooling-F	4.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	291	288.7	281.8	279.3	289	289.9	291.7	294.2	285.8	285
Heat Loss-Watts	12.7	3	4	4	3.9	2.9	1.9	2.9	3.7	20.6
Heat Flux-Btu/hr/ft2	5044	5004	4885	4841	5010	5025	5056	5100	4954	4940
Wall Temp. #3-F	157.8	157.7	157.3	157.7	158.1	157.9	158.1	157.3	156.6	155.4
Wall Temp. #4-F	158.3	157.5	157.8	157.7	158.2	157.9	158.4	157.7	157.2	155.8
Wall Temp. #5-F	158.3	157	158.8	157.7	157.4	157.9	157.8	157.5	156.6	155.8
Wall Temp. #1-F	80.2	157.7	156.8	156.9	157.1	158.5	158.1	157.7	156	153.9
Wall Temp. #2-F	158.7	157.8	156.9	157.2	157.1	158.4	158.1	158.1	156.3	154.9
Instream Temp.-F	161.7	161.6	161.9	162.1	162.1	162.4	162.2	161.8	161.7	161.2
Avg. Wall Temp.-F	158.3	157.7	157.1	157.5	157.5	158.1	158.1	157.7	156.5	155.2
Avg. Wall DT.-F	6.3	5.8	5	5.2	5.1	5.4	5.7	5.6	4.6	3.7
Remaining SubcoolF	3.4									
Exit Quality	-0.03	-0.02	0	0.01	0.03	0.04	0.06	0.07	0.09	0.1
EXP. H-Btu/Hr/ft2/F	794.7	855.6	986	934.4	977.8	926.7	891.6	905.9	1073.2	1322.1
COMPUTED H										
Jakouk	660.7	657	637.7	633.5	641.8	634.1	632.5	632	621.3	618.5
Szady1(Cudo tube)	1039	1034.2	1023.6	1021.3	1041	1046.4	1050.4	1054.4	1041.2	1039.1
Szady2	796.4	792.8	788.4	790.7	807.4	817	822.6	827.1	789.4	787.6
(RLIQ)	102144	102058	102316	102066	100549	99253	97530	95639	94015	92110
(F)	1.005	1.005	1.005	1.188	1.46	1.645	1.798	1.935	2.055	2.166
(HLIQ)	205.4	205.4	205.5	242.9	298.5	338.4	367.7	395.4	419.9	442.4
(HBOIL)	1036.3	1031.5	1020.8	1016.7	1032.7	1034.7	1035.1	1035.5	1017.9	1011.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.7									
DP Liquid Density-lbm/ft3	93.03									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.193	0.587	0.379	1.802	2.337					
Zero Corrections-psid	0.032	-0.04	-0.734	0.181	0.148					
Corrected DP-Psid	0.161	0.627	1.113	1.611	2.189					
Actual DP-ft	1.99	3.45	4.87	6.27	7.99					
Measured TP-Psig	111				-1.6					
Measured Overall-ft	198.46									
Computed DP-ft	2.06	4.07	5.87	7.59	9.16					
Friction-ft	0.06	0.13	0.24	0.37	0.51					
Acceleration-ft	0	0.05	0.1	0.14	0.17					
Elevation-ft	2	3.88	5.53	7.08	8.48					

Run#	629									
Test Fluid	C4F10									
Date:	6/9/93									
Time:	11:28									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	106									
Sat. Temperature-F(inlet)	150.3									
Liq. Density-lbm/ft3	82.11	82.13	82.07	82.09	82.11	82.11	82.17	82.24	82.26	82.29
Latent Heat-Btu/lbm	29.74	29.76	29.72	29.73	29.74	29.74	29.78	29.84	29.85	29.88
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.284	0.284	0.284
Liq. Viscosity-lbm/ft-hr	0.436	0.436	0.436	0.436	0.436	0.436	0.436	0.438	0.438	0.439
Liq. Conductivity-Btu/hr-ft-F	0.0252	0.0252	0.0252	0.0252	0.0252	0.0252	0.0252	0.0253	0.0253	0.0253
Liq. Prandtl No.	4.92	4.92	4.92	4.92	4.92	4.92	4.93	4.93	4.93	4.93
Inlet Flow Rate-GPM	4.3									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2.3									
Inlet Temperature-F	145.7									
Outlet Liq. Temperature-F	148.9									
Outlet Vap. Temperature-F	144.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	102.9									
Water outlet Temp.-F	141.3									
Inlet G-lbm/hr/ft2	845832		Temp	144.1	Density	82.43				
Subcooling-F	4.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	291.5	289.1	283.4	280.3	288.1	288.3	291.9	294.5	284.3	288.3
Heat Loss-Watts	12.1	2.8	3.7	3.7	3.7	2.7	1.8	2.7	3.5	19.3
Heat Flux-Btu/Hr/ft2	5053	5011	4913	4859	4994	4997	5060	5105	4928	4997
Wall Temp. #3-F	154.8	154.8	154.5	154.6	155.1	154.9	154.5	154.1	153.3	152.5
Wall Temp. #4-F	155.2	154.7	155.1	154.7	155	154.9	155.1	154.5	154	152.5
Wall Temp. #5-F	155.5	154.4	156.1	154.7	154.3	154.9	154.6	154.1	153.4	152.9
Wall Temp. #1-F	79.3	154.8	153.7	153.8	154.2	155.4	154.7	154.5	152.4	150.9
Wall Temp. #2-F	155.6	155	154.9	154.4	154.2	154.9	155.1	155	152.9	152.1
Instream Temp.-F	149	148.9	149.2	149.1	149	149	148.7	148.3	148.2	148
Avg. Wall Temp.-F	155.3	154.8	154.4	154.5	154.4	155	154.8	154.4	153.2	152.2
Avg. Wall DT.-F	6	5.7	5	5.1	5.2	5.8	5.9	5.9	4.8	4
Remaining Subcool-F	3.4									
Exit Quality	-0.03	-0.02	-0.01	0	0.01	0.03	0.04	0.05	0.06	0.07
EXP. H-Btu/Hr/ft2/F	835.7	879.4	986.9	947.1	960.5	861.8	861.8	863.9	1031.6	1263.9
COMPUTED H										
Jallouk	632.6	629.9	625.5	622.1	630.1	617.6	619.1	620.1	610.2	614.4
Szady1(Cudo tube)	1024.5	1019.6	1011.3	1006.2	1021.4	1024.8	1032.2	1037.2	1022.4	1031.2
Szady2	774.1	770.5	767.2	762.9	779.1	788.4	797.9	805.6	775.7	785.1
(RLIQ)	127094	126988	127305	127199	126113	124633	122838	120935	119363	117713
(F)	1.005	1.005	1.005	1.005	1.278	1.476	1.628	1.758	1.871	1.974
(HLIQ)	248.4	248.3	248.4	248.4	315.7	364.6	402	434	461.9	487
(HBOIL)	1019.6	1014.7	1006.3	1000.1	1011.2	1009.2	1011.4	1011.3	990	983.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.5									
DP Liquid Density-lbm/ft3	93.06									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.177	0.494	0.219	1.577	2.026					
Zero Corrections-psid	0.032	-0.04	-0.734	0.191	0.148					
Corrected DP-Psid	0.145	0.534	0.953	1.386	1.878					
Actual DP-ft	2.01	3.69	5.12	6.62	7.88					
Measured TP-Psig	106				-1.6					
Measured Overall-ft	188.28									
Computed DP-ft	2.09	4.17	6.13	7.97	9.65					
Friction-ft	0.09	0.19	0.33	0.51	0.71					
Acceleration-ft	0	0.02	0.13	0.18	0.23					
Elevation-ft	2	3.97	5.67	7.27	8.71					

Run#	626									
Test Fluid	C4F10									
Date:	6/9/93									
Time:	11:28									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	106.2									
Sat. Temperature-F(inlet)	150.4									
Liq. Density-lbm/ft3	82.07	81.98	82.04	82.04	82.04	81.98	82.02	82.07	82.07	82.17
Latent Heat-Btu/lbm	29.72	29.65	29.69	29.69	29.69	29.65	29.68	29.72	29.72	29.78
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285	0.285
Liq. Viscosity-lbm/ft-hr	0.435	0.433	0.434	0.434	0.434	0.433	0.434	0.435	0.435	0.436
Liq. Conductivity-Btu/hr-ft-F	0.0252	0.0251	0.0251	0.0251	0.0251	0.0251	0.0251	0.0252	0.0252	0.0252
Liq. Prandtl No.	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.93
Inlet Flow Rate-GPM	1.8									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	1.3									
Inlet Temperature-F	146.1									
Outlet Liq. Temperature-F	149.8									
Outlet Vap. Temperature-F	145.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	102.4									
Water outlet Temp.-F	141.9									
Inlet G-lbm/hr/ft2	355128		Temp	142.8	Density	82.67				
Subcooling-F	4.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	289.2	287.2	287.9	289.1	286.3	288.7	289.5	291.7	288.9	295.9
Heat Loss-Watts	14.9	3.5	4.7	5.1	5.2	4.3	2.9	4.1	4.7	26.9
Heat Flux-Btu/hr/ft2	5013	4978	4991	5011	4963	5004	5018	5056	5008	5119
Wall Temp. #3-F	155	155	155.1	155.2	155.9	155.9	155.9	155	154.5	153.5
Wall Temp. #4-F	155.4	154.8	155.6	155.3	155.9	155.9	156.3	155.5	155	153.6
Wall Temp. #5-F	155.6	154.4	156.9	155.5	155	155.9	155.6	155.2	154.5	153.8
Wall Temp. #1-F	79.1	155	154.2	154.4	154.5	156.2	156	155.6	153.7	151.6
Wall Temp. #2-F	156.1	155	154.5	154.6	154.4	155.9	156.2	156.1	154	153.1
Instream Temp.-F	149.2	149.7	149.4	149.4	149.4	149.7	149.5	149.2	149.2	148.7
Avg. Wall Temp.-F	155.5	155	154.9	155.1	155	156	156	155.5	154.3	153.1
Avg. Wall DT.-F	6.1	5	5.2	5.5	5.3	6	6.3	6.1	4.9	4.2
Remaining Subcool-F	1.4									
Exit Quality	-0.01	0.01	0.04	0.07	0.1	0.12	0.15	0.18	0.21	0.24
EXP. H-Btu/l-hr/ft2/F	822	990.7	955.2	915.6	931.9	827.3	800	835.6	1019.2	1222.1
COMPUTED H										
Jallouk	689.6	688.1	656.7	648	629.7	632.7	632.4	633.4	631	635.5
Szady1(Cuido tube)	1019.3	1018.7	1019.1	1022.1	1018.1	1025.1	1026.3	1029.4	1025.6	1034.8
Szady2	766.1	768.7	769.6	773.6	773.3	781.6	783.6	786.3	786.5	792.2
(RLIQ)	53450	53671	52053	50584	49080	47717	46144	44590	43096	41961
(F)	1.005	1.014	1.585	1.873	2.1	2.292	2.468	2.631	2.778	2.925
(HLIQ)	124.1	125.2	195.7	231.2	259.3	283	304.7	324.7	342.9	360.8
(HBOIL)	1018.6	1018.1	1016.7	1018.2	1012.4	1017.8	1017.2	1018.5	1012.6	1020
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.4									
DP Liquid Density-lbm/ft3	92.83									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.193	0.949	0.947	2.547	3.268					
Zero Corrections-psid	0.032	-0.04	-0.734	0.191	0.148					
Corrected DP-Psid	0.161	0.989	1.681	2.356	3.12					
Actual DP-ft	1.98	2.79	3.84	4.92	5.7					
Measured TP-Psig	106.2				-1.6					
Measured Overall-ft	188.93									
Computed DP-ft	1.91	3.38	4.68	5.89	6.98					
Friction-ft	0.02	0.07	0.14	0.23	0.33					
Acceleration-ft	0.02	0.04	0.06	0.08	0.1					
Elevation-ft	1.87	3.27	4.48	5.59	6.56					

Run#	627									
Test Fluid	C4F10									
Date:	6/9/93									
Time:	11:28									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	108.7									
Sat. Temperature-F(inlet)	152									
Liq. Density-lbm/ft3	81.87	81.83	81.76	81.83	81.85	81.78	81.81	81.87	81.87	81.92
Latent Heat-Btu/lbm	29.57	29.54	29.49	29.54	29.55	29.5	29.53	29.57	29.57	29.61
Specific Heat-Btu/lbm/F	0.285	0.286	0.286	0.286	0.285	0.286	0.286	0.285	0.285	0.285
Liq. Viscosity-lbm/ft-hr	0.431	0.43	0.428	0.43	0.43	0.429	0.43	0.431	0.431	0.432
Liq. Conductivity-Btu/hr-ft-F	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.0251
Liq. Prandtl No.	4.91	4.91	4.9	4.91	4.91	4.9	4.91	4.91	4.91	4.91
Inlet Flow Rate-GPM	2.6									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	2.1									
Inlet Temperature-F	147.1									
Outlet Liq. Temperature-F	150.7									
Outlet Vap. Temperature-F	146.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	104.2									
Water outlet Temp.-F	143.4									
Inlet G-lbm/hr/ft2	510605		Temp	144.8	Density	82.29				
Subcooling-F	4.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	290.3	288.8	289.3	289.2	286.1	288.2	290.8	293.2	291.7	294.4
Heat Loss-Watts	15.3	3.6	4.8	5.2	5.4	4.5	3.1	4.2	4.8	27
Heat Flux-Btu/Hr/ft2	5032	5006	5015	5013	4959	4996	5041	5082	5056	5103
Wall Temp. #3-F	156.4	156.4	156.2	156.1	156.7	156.7	156.6	156	155.4	154.6
Wall Temp. #4-F	156.7	156.1	156.8	156.3	156.8	156.7	157.1	156.5	156	154.7
Wall Temp. #5-F	156.9	155.6	157.8	156.3	156	156.6	156.3	156	155.5	155.2
Wall Temp. #1-F	78.6	156.2	155.2	155.4	155.8	157.1	156.7	156.5	154.8	153.1
Wall Temp. #2-F	157.4	156.4	155.7	155.7	155.6	157	157.1	156.8	154.9	154.2
Instream Temp.-F	150.3	150.5	150.9	150.5	150.4	150.8	150.6	150.3	150.3	150
Avg. Wall Temp.-F	156.9	156.3	156	156	156	156.8	156.8	156.4	155.3	154.4
Avg. Wall DT.-F	6.3	5.5	4.8	5.3	5.4	5.7	5.9	5.8	4.8	4.1
Remaining Subcool-F	2.8									
Exit Quality	-0.03	-0.01	0.01	0.03	0.05	0.07	0.09	0.11	0.13	0.15
EXP. H-Btu/Hr/ft2/F	795.9	902.2	1034.3	946.1	922.5	868.9	849.7	871.7	1064.2	1235.8
COMPUTED H										
Jallouk	671.6	670.1	667.4	636.9	632.6	636.1	638.2	630.1	626.5	627.3
Szady1(Cudo tube)	1028.4	1026.9	1030.6	1029.5	1024.8	1032.4	1037.2	1041.2	1040.1	1044.7
Szady2	779.4	779.8	785.2	785.9	785.8	796.1	801.2	805.4	808.4	813.2
(RLIQ)	77560	77690	77807	76032	74463	73207	71568	69862	68334	66838
(F)	1.005	1.005	1.118	1.499	1.725	1.904	2.063	2.207	2.337	2.461
(HLIQ)	166.1	166.1	184.9	247.7	285.1	314.8	341	364.7	386.2	406.6
(HBOIL)	1026.9	1025.5	1028.6	1024.7	1017.4	1022.5	1024.8	1026	1022.1	1023.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.6									
DP Liquid Density-lbm/ft3	93.05									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.219	0.729	0.616	2.122	2.734					
Zero Corrections-psid	0.032	-0.04	-0.734	0.191	0.148					
Corrected DP-Psid	0.187	0.769	1.35	1.931	2.586					
Actual DP-ft	1.94	3.19	4.44	5.69	6.67					
Measured TP-Psig	106.7				-1.6					
Measured Overall-ft	193.88									
Computed DP-ft	2.04	3.85	5.52	7.13	8.6					
Friction-ft	0.04	0.1	0.18	0.28	0.38					
Acceleration-ft	0	0.05	0.08	0.11	0.13					
Elevation-ft	2	3.71	5.26	6.74	8.08					

Run#	630									
Test Fluid	C4F10									
Date:	6/9/93									
Time:	11:28									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	101.2									
Sat. Temperature-F(inlet)	147.3									
Liq. Density-lbm/ft3	82.44	82.5	82.55	82.62	82.62	82.62	82.64	82.71	82.77	82.86
Latent Heat-Btu/lbm	29.98	30.02	30.06	30.11	30.11	30.11	30.13	30.18	30.22	30.28
Specific Heat-Btu/lbm/F	0.284	0.284	0.284	0.284	0.284	0.284	0.284	0.283	0.283	0.283
Liq. Viscosity-lbm/ft-hr	0.442	0.443	0.444	0.446	0.446	0.446	0.446	0.447	0.448	0.45
Liq. Conductivity-Btu/hr-ft-F	0.0254	0.0254	0.0255	0.0255	0.0255	0.0255	0.0255	0.0256	0.0256	0.0257
Liq. Prandtl No.	4.94	4.94	4.95	4.95	4.95	4.95	4.95	4.96	4.96	4.97
Inlet Flow Rate-GPM	4.2									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2.3									
Inlet Temperature-F	144.4									
Outlet Liq. Temperature-F	145.1									
Outlet Vap. Temperature-F	142									
Water Flow Rate-GPM										
Water Inlet Temp.-F	101.6									
Water outlet Temp.-F	139									
Inlet G-lbm/hr/ft2	829955		Temp	142.1	Density	82.8				
Subcooling-F	2.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	288.1	0	293.8	0	292	0	294.7	0	288.5	0
Heat Loss-Watts	11.2	2.3	3.5	3	3.3	2.1	1.6	2.1	3.2	14.9
Heat Flux-Btu/Hr/ft2	4994	0	5093	0	5062	0	5108	0	5001	0
Wall Temp. #3-F	152.4	147.6	152.1	147.2	152.4	146.6	152.2	148	150.8	144
Wall Temp. #4-F	152.9	148	152.6	147.1	152.3	146.5	152.6	146.1	151.3	144.3
Wall Temp. #5-F	152.9	148	153.7	147	151.7	146.4	152	146.1	150.8	144.9
Wall Temp. #1-F	78.9	148.3	151.3	147.4	151.2	147	152.2	146.4	150	144.6
Wall Temp. #2-F	153.3	148.4	151.8	147.5	151.2	146.6	152.5	146.6	150.4	144.7
Instream Temp.-F	147.2	146.9	146.6	146.2	146.2	146.2	146.1	145.7	145.4	144.9
Avg. Wall Temp.-F	152.9	148.1	152	147.2	151.6	146.6	152.3	146.2	150.7	144.5
Avg. Wall DT.-F	5.4	1.2	5.1	1	5.2	0.4	6	0.5	5	0
Remaining SubcoolF	1.7									
Exit Quality	-0.02	-0.02	0	0	0.01	0.01	0.02	0.02	0.03	0.03
EXP. H-Btu/l-Hr/ft2/F	916.5	0	994.7	0	978.8	0	855.8	0	993.4	0
COMPUTED H										
Jallouk	622.5	199.5	625.8	199.4	622.4	246.7	617.9	281.4	606.5	305.6
Szady1(Cudo tube)	1007.5	244.2	1013.8	244	1009.3	311.1	1016.7	361.4	1005.1	399
Szady2	753.4	244	782.6	243.8	777.1	311	764.5	361.4	761.5	398.9
(RLIQ)	122859	122554	122251	121848	121634	120911	120082	118961	117959	116770
(F)	1.005	1.005	1.005	1.005	1.118	1.282	1.396	1.491	1.572	1.647
(HLIQ)	244.1	244	244	243.8	271.2	311	338.5	361.4	381	398.9
(HBOIL)	1002.7	29	1009.1	28.7	1002.7	28.7	1004.1	28.5	986.5	28.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.9									
DP Liquid Density-lbm/ft3	93									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.191	0.482	0.16	1.468	1.871					
Zero Corrections-psid	0.032	-0.04	-0.734	0.191	0.148					
Corrected DP-Psid	0.159	0.522	0.894	1.277	1.723					
Actual DP-ft	1.97	3.58	5.18	6.78	8.09					
Measured TP-Psig	101.2				-1.6					
Measured Overall-ft	178.65									
Computed DP-ft	2.09	4.18	6.15	8.03	9.74					
Friction-ft	0.09	0.18	0.29	0.43	0.58					
Acceleration-ft	0	0	0.06	0.11	0.14					
Elevation-ft	2	4	5.8	7.49	9.02					

Run#	631									
Test Fluid	C4F10									
Date:	6/9/93									
Time:	16:34									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	116.6									
Sat. Temperature-F(inlet)	156.6									
Liq. Density-lbm/ft3	80.9	80.94	80.92	80.92	80.96	80.96	80.86	80.98	80.98	81.17
Latent Heat-Btu/lbm	28.86	28.88	28.87	28.87	28.9	28.9	28.83	28.91	28.91	29.05
Specific Heat-Btu/lbm/F	0.288	0.288	0.288	0.288	0.288	0.288	0.288	0.288	0.288	0.287
Liq. Viscosity-lbm/ft-hr	0.412	0.413	0.413	0.413	0.414	0.414	0.412	0.414	0.414	0.417
Liq. Conductivity-Btu/hr-ft-F	0.0244	0.0244	0.0244	0.0244	0.0245	0.0245	0.0244	0.0245	0.0245	0.0246
Liq. Prandtl No.	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.87	4.87	4.87
Inlet Flow Rate-GPM	5.1									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	2.7									
Inlet Temperature-F	151.7									
Outlet Liq. Temperature-F	154.7									
Outlet Vap. Temperature-F	150.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	106.9									
Water outlet Temp.-F	147.1									
Inlet G-lbm/hr/ft2	989291		Temp	150	Density	81.28				
Subcooling-F	4.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	291.3	294	288.5	290.4	294.8	294	292.4	295	289.1	290.3
Heat Loss-Watts	12.6	3.1	4.1	4.2	4	3	1.9	3	3.7	21.2
Heat Flux-Btu/Hr/ft2	5049	5096	5001	5034	5110	5096	5069	5114	5011	5032
Wall Temp. #3-F	160.7	162.4	161.6	162.6	162.5	162.9	161.6	162.3	159.8	160.5
Wall Temp. #4-F	161.2	162.2	162.1	162.6	162.4	162.9	161.8	162.6	160.1	160.5
Wall Temp. #5-F	161.3	161.8	163.3	163.2	161.8	163	161.4	162.3	159.8	160.5
Wall Temp. #1-F	80.2	162.3	160.8	161.9	161	163.2	161.7	162.3	159.1	158.5
Wall Temp. #2-F	161.6	162.3	161.4	162	160.9	163.1	161.8	162.8	159.4	159.7
Instream Temp.-F	155.4	155.2	155.3	155.3	155.1	155.1	155.6	155	155	154
Avg. Wall Temp.-F	161.2	162.3	161.5	162.6	161.5	163	161.7	162.5	159.6	159.9
Avg. Wall DT.-F	5.6	6.9	5.9	7	6.2	7.7	5.8	7.2	4.4	5.7
Remaining Subcool-F	3.8									
Exit Quality	-0.04	-0.03	-0.02	-0.01	0	0.01	0.02	0.03	0.04	0.06
EXP. H-Btu/Hr/ft2/F	906.3	741.9	840.6	714.3	825	664.5	869.3	707.4	1135.5	880.9
COMPUTED H										
Jallouk	656.8	658.6	653.7	655.5	658.9	642.8	639.2	639.1	633.1	632.4
Szady1(Cudo tube)	1065.1	1068.7	1059.3	1062.8	1069.5	1072.1	1075.9	1080.2	1073.2	1072.8
Szady2	809.6	814.8	803.1	807.3	816.2	816.6	817.9	823.6	815.4	817.4
(RLIQ)	158892	158624	158758	158758	158491	155171	154198	151776	150152	147285
(F)	1.005	1.005	1.005	1.005	1.005	1.281	1.448	1.581	1.692	1.796
(HLIQ)	283.5	283.5	283.5	283.5	283.5	361.4	408.7	445.9	477.2	505.8
(HBOIL)	1058.3	1062	1052.5	1056	1062.8	1058.2	1055.9	1054.2	1040.8	1033.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.5									
DP Liquid Density-lbm/ft3	93.06									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.169	0.482	0.091	1.392	1.794					
Zero Corrections-psid	0.032	-0.04	-0.734	0.191	0.148					
Corrected DP-Psid	0.137	0.522	0.825	1.201	1.646					
Actual DP-ft	2.05	3.86	5.42	7.04	8.4					
Measured TP-Psig	116.6				-1.6					
Measured Overall-ft	209.7									
Computed DP-ft	2.13	4.25	6.35	8.31	10.09					
Friction-ft	0.13	0.25	0.41	0.62	0.84					
Acceleration-ft	0	0	0.12	0.2	0.26					
Elevation-ft	2	4	5.83	7.5	8.99					

Run#	632									
Test Fluid	C4F10									
Date:	6/9/93									
Time:	16:34									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	110.9									
Sat. Temperature-F(inlet)	153.3									
Liq. Density-lbm/ft3	81.68	81.68	81.64	81.68	81.66	81.62	81.59	81.66	81.72	81.85
Latent Heat-Btu/lbm	29.43	29.43	29.4	29.43	29.42	29.39	29.36	29.42	29.48	29.55
Specific Heat-Btu/lbm/F	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.286	0.285
Liq. Viscosity-lbm/ft-hr	0.427	0.427	0.426	0.427	0.427	0.426	0.425	0.427	0.428	0.43
Liq. Conductivity-Btu/hr-ft-F	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.0249	0.025
Liq. Prandtl No.	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.91
Inlet Flow Rate-GPM	5.1									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2.7									
Inlet Temperature-F	147.8									
Outlet Liq. Temperature-F	151									
Outlet Vap. Temperature-F	146.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	104.1									
Water outlet Temp.-F	143									
Inlet G-lbm/hr/ft2	997832		Temp		146.4	Density	81.99			
Subcooling-F	5.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	281.5	284.6	286.9	287.8	287.8	288.8	287.8	286.7	282.7	287.7
Heat Loss-Watts	11.9	2.7	3.7	3.7	3.6	2.7	1.7	2.7	3.5	19
Heat Flux-Btu/Hr/ft2	4880	4933	4973	4989	4989	5006	4989	4970	4900	4987
Wall Temp. #3-F	159	159.2	159	158.7	159.2	159.1	159.4	158.8	158.8	157
Wall Temp. #4-F	159.5	158.9	159.6	159.1	159.3	159.2	159.9	159.2	159.3	157.1
Wall Temp. #5-F	160	158.5	160.5	159.3	158.4	159.4	159	158.8	158.8	157.2
Wall Temp. #1-F	80.5	159	158	158.1	158.3	159.7	159.7	159.1	157.9	155.2
Wall Temp. #2-F	160.3	159	158.8	158.5	158.1	159.4	159.9	159.4	158.2	156.2
Instream Temp.-F	151.3	151.3	151.5	151.3	151.4	151.6	151.8	151.4	151.1	150.4
Avg. Wall Temp.-F	159.7	159	158.9	158.8	158.5	159.4	159.6	159.1	158.6	156.5
Avg. Wall DT.-F	8.2	7.5	7.1	7.3	6.9	7.5	7.6	7.4	7.3	5.9
Remaining Subcool-F	4.5									
Exit Quality	-0.04	-0.03	-0.02	-0.01	0	0.01	0.02	0.03	0.04	0.05
EXP. H-Btu/Hr/ft2/F	596.6	657.6	698	685.8	723.1	665.4	660.4	668.4	673.3	843.2
COMPUTED H										
Jallouk	631.7	634.6	637.5	637.6	638	639.8	624.2	620.7	616.4	620.5
Szady1(Cudo tube)	1022	1027.5	1032.9	1033.3	1033.9	1038.1	1041.9	1041.2	1036.2	1044.4
Szady2	789.5	792.8	797.3	796.3	797.3	803.8	791.4	790.1	784.3	794.5
(RLIQ)	152845	152845	153102	152845	152979	153033	151758	149726	147844	145483
(F)	1.005	1.005	1.005	1.005	1.005	1.095	1.341	1.494	1.618	1.728
(HLIQ)	284.2	284.2	284.3	284.2	284.3	309.8	379.3	422.6	457.3	488
(HBOIL)	1014.6	1020.2	1025.7	1026	1026.7	1028.8	1024.9	1017.5	1005.6	1007.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.5									
DP Liquid Density-lbm/ft3	93.06									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.138	0.481	-0.016	1.273	1.65					
Zero Corrections-psid	0.032	-0.04	-0.734	0.191	0.148					
Corrected DP-Psid	0.106	0.521	0.718	1.082	1.502					
Actual DP-ft	2.09	3.63	5.56	7.19	8.59					
Measured TP-Psig	110.9				-1.6					
Measured Overall-ft	197.82									
Computed DP-ft	2.13	4.25	6.38	8.38	10.18					
Friction-ft	0.13	0.25	0.39	0.59	0.81					
Acceleration-ft	0	0	0.08	0.18	0.24					
Elevation-ft	2	4	5.91	7.61	9.13					

Run#	633									
Test Fluid	C4F10									
Date:	6/9/93									
Time:	19:51									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	155.9									
Sat. Temperature-F(inlet)	176.9									
Liq. Density-lbm/ft3	76.44	76.34	76.39	76.39	76.39	76.27	76.3	76.34	76.34	76.49
Latent Heat-Btu/lbm	25.49	25.41	25.45	25.45	25.45	25.96	25.88	25.41	25.41	25.52
Specific Heat-Btu/lbm/F	0.3	0.301	0.3	0.3	0.3	0.301	0.301	0.301	0.301	0.3
Liq. Viscosity-lbm/ft-hr	0.341	0.34	0.34	0.34	0.34	0.339	0.339	0.34	0.34	0.342
Liq. Conductivity-Btu/hr-ft-F	0.0216	0.0216	0.0216	0.0216	0.0216	0.0215	0.0216	0.0216	0.0216	0.0217
Liq. Prandtl No.	4.73	4.73	4.73	4.73	4.73	4.73	4.73	4.73	4.73	4.73
Inlet Flow Rate-GPM	0.9									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	172.5									
Outlet Liq. Temperature-F	176									
Outlet Vap. Temperature-F	173.9									
Water Flow Rate-GPM										
Water inlet Temp.-F	151.9									
Water outlet Temp.-F	167.4									
Inlet G-lbm/hr/ft2	170795		Temp	158.7	Density	79.62				
Subcooling-F	4.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	282.9	280.8	279.3	286	288.8	289.5	280.4	281	282	279.5
Heat Loss-Watts	15	3.5	4.7	5.1	5.2	4.2	2.8	4.1	4.8	26.6
Heat Flux-Btu/Hr/ft2	4904	4867	4841	4958	5006	5018	4861	4871	4888	4845
Wall Temp. #3-F	180.8	180.5	180.9	180.9	181.1	181	181.1	181.3	180.8	179.6
Wall Temp. #4-F	181.5	180.6	181.4	181.2	181.4	181	181.3	181.4	181.5	179.7
Wall Temp. #5-F	181.9	180.1	183	180.9	180.9	180.9	180.9	181.1	181.1	179.8
Wall Temp. #1-F	77.9	180.9	179.8	180.3	180.7	181.6	180.9	181.3	180.2	177.9
Wall Temp. #2-F	182	180.9	180.3	180.8	180.7	181.2	181.1	181.5	180.4	178.9
Instream Temp.-F	176.4	176.8	176.6	176.6	176.6	177.1	177	176.8	176.8	176.2
Avg. Wall Temp.-F	181.6	180.7	180.6	180.8	180.9	181.1	181.1	181.3	180.8	179.2
Avg. Wall DT.-F	4.9	3.7	3.8	4	4.1	3.8	3.8	4.3	3.8	2.8
Remaining Subcool-F	-1.2									
Exit Quality	0.01	0.08	0.15	0.21	0.28	0.35	0.41	0.48	0.54	0.61
EXP. H-Btu/Hr/ft2/F	995	1313.8	1280.4	1239.1	1221.4	1321.2	1265.7	1132.8	1293.5	1754.8
COMPUTED H										
Jallouk	844.2	818.5	775.4	781.2	780.5	779	757.2	754.2	753.2	743.7
Szady1(Cudo tube)	1187.8	1186.4	1182	1196.3	1202.4	1207.7	1188.2	1188.3	1190.7	1181.5
Szady2	914.5	912.4	908.2	923.8	930.5	935.7	915	915.6	918.4	909.7
(RLIQ)	32523	31338	29129	26960	24758	22648	20428	18224	16057	13816
(F)	1.221	1.652	2.062	2.368	2.626	2.845	3.049	3.239	3.416	3.6
(HLIQ)	86.3	116.8	145.7	167.3	185.5	201.1	215.5	228.9	241.4	254.3
(HBOIL)	1187.7	1186.1	1181.3	1195.2	1200.9	1205.9	1185.9	1185.5	1187.4	1177.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80									
DP Liquid Density-lbm/ft3	92.99									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.189	1.304	1.355	3.093	3.919					
Zero Corrections-psid	0.032	-0.04	-0.734	0.191	0.148					
Corrected DP-Psid	0.157	1.344	2.089	2.902	3.771					
Actual DP-ft	2.14	2.33	3.38	4.26	4.91					
Measured TP-Psig	155.9				-1.6					
Measured Overall-ft	296.53									
Computed DP-ft	1.63	2.77	3.71	4.53	5.2					
Friction-ft	0.01	0.03	0.06	0.09	0.13					
Acceleration-ft	0.01	0.02	0.02	0.03	0.05					
Elevation-ft	1.61	2.73	3.63	4.4	5.02					

Run#	634									
Test Fluid	C4F10									
Date:	6/9/93									
Time:	19:51									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	155.1									
Sat. Temperature-F(inlet)	176.5									
Liq. Density-lbm/ft3	76.63	76.46	76.49	76.49	76.49	76.44	76.32	76.34	76.37	76.67
Latent Heat-Btu/lbm	25.63	25.51	25.52	25.52	25.52	25.49	25.4	25.41	25.43	25.67
Specific Heat-Btu/lbm/F	0.3	0.3	0.3	0.3	0.3	0.3	0.301	0.301	0.301	0.3
Liq. Viscosity-lbm/ft-hr	0.344	0.341	0.342	0.342	0.342	0.341	0.339	0.34	0.34	0.344
Liq. Conductivity-Btu/hr-ft-F	0.0218	0.0217	0.0217	0.0217	0.0217	0.0216	0.0216	0.0216	0.0216	0.0218
Liq. Prandtl No.	4.73	4.73	4.73	4.73	4.73	4.73	4.73	4.73	4.73	4.74
Inlet Flow Rate-GPM	2									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	1.4									
Inlet Temperature-F	172.2									
Outlet Liq. Temperature-F	175.2									
Outlet Vap. Temperature-F	173.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	129.2									
Water outlet Temp.-F	169.6									
Inlet G-lbm/hr/ft2	371350		Temp	166.7	Density	77.8				
Subcooling-F	4.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	283.2	286.7	286.7	281	288.8	290.3	284.5	283.7	283.2	282.3
Heat Loss-Watts	14.7	3.4	4.6	4.9	5	3.9	2.7	3.9	4.7	25.3
Heat Flux-Btu/Hr/ft2	4909	4970	4970	4871	5006	5032	4932	4918	4909	4893
Wall Temp. #3-F	180.5	180.2	180.4	180.4	180.5	180.3	180.8	180.7	180.2	178.6
Wall Temp. #4-F	181.1	180.3	181	180.5	180.9	180.3	180.8	181.2	180.9	178.7
Wall Temp. #5-F	181.7	180	182.4	180.5	180.3	180.3	180.9	180.6	180.6	178.9
Wall Temp. #1-F	80.5	180.5	179.4	179.7	180.1	181	180.6	180.9	179.7	177.1
Wall Temp. #2-F	181.8	180.6	179.9	180.1	180	180.7	180.8	181.3	180.2	177.9
Instream Temp.-F	175.6	176.3	176.2	176.2	176.2	176.4	176.9	176.8	176.7	176.4
Avg. Wall Temp.-F	181.3	180.4	180.2	180.3	180.3	180.5	180.8	180.9	180.3	178.2
Avg. Wall DT.-F	5.5	3.9	3.8	3.9	3.9	3.8	3.7	3.9	3.4	2.6
Remaining Subcool-F	1.7									
Exit Quality	-0.02	0.01	0.04	0.07	0.1	0.13	0.16	0.19	0.22	0.26
EXP. H-Btu/Hr/ft2/F	900.2	1282.4	1325.1	1263.6	1284	1307.9	1348.5	1255.2	1444.6	1868.6
COMPUTED H										
Jallouk	773	782.5	780.3	740	746.6	744.2	732.1	726.5	722	712.2
Szady1(Cudo tube)	1182.9	1195.3	1195.2	1184	1200.8	1206	1198.3	1196.6	1195.5	1185.1
Szady2	910.7	922.9	923.5	911.8	930.4	936.1	927.5	926.3	925.7	917.1
(RLIQ)	70873	71152	69253	67090	64919	62835	60935	59692	58455	53805
(F)	1.004	1.004	1.465	1.724	1.923	2.091	2.235	2.368	2.491	2.622
(HLIQ)	132	132.1	182.6	226.7	252.9	275	294	311.5	327.7	344.5
(HBOIL)	1182.3	1194.7	1193.5	1181.2	1197.1	1201.2	1192.4	1189.5	1187.3	1175.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.6									
DP Liquid Density-lbm/ft3	92.9									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.216	0.906	0.875	2.476	3.148					
Zero Corrections-psid	0.032	-0.04	-0.734	0.191	0.148					
Corrected DP-Psid	0.184	0.948	1.609	2.285	3					
Actual DP-ft	2.08	3.07	4.25	5.4	6.33					
Measured TP-Psig	155.1				-1.6					
Measured Overall-ft	294.3									
Computed DP-ft	1.96	3.52	4.88	6.13	7.23					
Friction-ft	0.03	0.07	0.14	0.22	0.3					
Acceleration-ft	0.01	0.03	0.05	0.07	0.08					
Elevation-ft	1.92	3.41	4.69	5.85	6.84					

Run#	635									
Test Fluid	C4F10									
Date:	6/9/93									
Time:	19:51									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	153.5									
Sat. Temperature-F(inlet)	175.8									
Liq. Density-lbm/ft3	76.95	76.88	76.67	76.6	76.67	76.63	76.58	76.7	76.7	76.88
Latent Heat-Btu/lbm	25.88	25.83	25.67	25.61	25.67	25.63	25.59	25.68	25.68	25.83
Specific Heat-Btu/lbm/F	0.299	0.299	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.299
Liq. Viscosity-lbm/ft-hr	0.348	0.347	0.344	0.343	0.344	0.344	0.343	0.345	0.345	0.347
Liq. Conductivity-Btu/hr-ft-F	0.022	0.0219	0.0218	0.0217	0.0218	0.0218	0.0217	0.0218	0.0218	0.0219
Liq. Prandtl No.	4.74	4.74	4.74	4.73	4.74	4.73	4.73	4.74	4.74	4.74
Inlet Flow Rate-GPM	2.8									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	2.2									
Inlet Temperature-F	171.1									
Outlet Liq. Temperature-F	174.3									
Outlet Vap. Temperature-F	172.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	125.2									
Water outlet Temp.-F	169.3									
Inlet G-lbm/hr/ft2	518258		Temp	167.8	Density	77.56				
Subcooling-F	4.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	287.6	288.2	290.4	291.3	285.6	284.7	285.8	284.7	290.6	294.5
Heat Loss-Watts	14.3	3.3	4.5	4.7	4.7	3.5	2.4	3.6	4.4	24.4
Heat Flux-Btu/Hr/ft2	4985	4996	5034	5049	4951	4935	4954	4935	5037	5105
Wall Temp. #3-F	179.9	179.5	179.5	179.8	179.9	179.5	179.9	179.8	179.2	178.3
Wall Temp. #4-F	180.5	179.7	180.2	180.3	180.2	179.5	179.9	180.1	179.8	178.4
Wall Temp. #5-F	181.1	179.3	181.6	180.1	179.6	179.5	179.8	179.7	179.6	178.4
Wall Temp. #1-F	82.2	179.9	178.8	179.5	179.4	180.1	179.9	179.8	178.8	178.5
Wall Temp. #2-F	181.3	179.9	179.3	179.8	179.3	179.7	179.9	180.3	178.9	177.5
Instream Temp.-F	174.2	174.5	175.4	175.7	175.4	175.6	175.8	175.3	175.3	174.5
Avg. Wall Temp.-F	180.7	179.8	179.5	179.9	179.6	179.7	179.9	179.9	179.2	177.8
Avg. Wall DT.-F	6.3	5	3.8	4	4	3.8	3.9	4.4	3.7	3.1
Remaining Subcool-F	2.8									
Exit Quality	-0.03	-0.01	0.01	0.03	0.06	0.08	0.1	0.12	0.14	0.17
EXP. H-Btu/Hr/ft2/F	794.5	994.3	1316.9	1263.4	1237.3	1289.6	1284.8	1117.3	1364.3	1652.5
COMPUTED H										
Jallouk	755.1	757.4	764.8	744.3	725	718.5	716.4	708.9	714.3	713.6
Szady1(Cudo tube)	1182.3	1185.7	1196.9	1202.2	1189.3	1189.9	1194.6	1189.9	1203	1206.2
Szady2	912.7	915.9	926.6	932.6	919.9	920.9	926.2	922.5	937	942.1
(RLIQ)	97318	97597	98357	96455	94006	92037	90061	87482	85319	82489
(F)	1.005	1.005	1.065	1.438	1.643	1.802	1.937	2.063	2.175	2.287
(HLIQ)	172.1	172.2	182.7	246.7	281.9	309.2	332.5	353.9	373	392.1
(HBOIL)	1181.1	1184.5	1195.5	1198.7	1184	1182.9	1186	1179.3	1190.9	1192.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.7									
DP Liquid Density-lbm/ft3	92.74									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.216	0.702	0.557	2.068	2.659					
Zero Corrections-psid	0.032	-0.04	-0.734	0.191	0.148					
Corrected DP-Psid	0.184	0.742	1.291	1.877	2.511					
Actual DP-ft	2.07	3.44	4.82	6.13	7.21					
Measured TP-Psig	159.5				-1.6					
Measured Overall-ft	290.51									
Computed DP-ft	2.04	3.87	5.46	6.94	8.27					
Friction-ft	0.04	0.1	0.19	0.3	0.42					
Acceleration-ft	0	0.04	0.07	0.09	0.12					
Elevation-ft	2	3.72	5.19	6.54	7.73					

Run#	636									
Test Fluid	C4F10									
Date:	6/9/93									
Time:	19:51									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	156.1									
Sat. Temperature-F(inlet)	177									
Liq. Density-lbm/ft3	76.44	76.39	76.42	76.3	76.37	76.37	76.25	76.3	76.37	76.65
Latent Heat-Btu/lbm	25.49	25.45	25.47	25.38	25.43	25.43	25.34	25.38	25.43	25.65
Specific Heat-Btu/lbm/F	0.3	0.3	0.3	0.301	0.301	0.301	0.301	0.301	0.301	0.3
Liq. Viscosity-lbm/ft-hr	0.341	0.34	0.341	0.339	0.34	0.34	0.338	0.339	0.34	0.344
Liq. Conductivity-Btu/hr-ft-F	0.0216	0.0216	0.0216	0.0216	0.0216	0.0216	0.0215	0.0216	0.0216	0.0218
Liq. Prandtl No.	4.73	4.73	4.73	4.73	4.73	4.73	4.73	4.73	4.73	4.73
Inlet Flow Rate-GPM	3.7									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	2									
Inlet Temperature-F	173.7									
Outlet Liq. Temperature-F	175.4									
Outlet Vap. Temperature-F	173.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	124.4									
Water outlet Temp.-F	169.6									
Inlet G-lbm/hr/ft2	678467		Temp	170.5	Density	76.95				
Subcooling-F	3.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	288.8	286.5	294.5	263.3	282.5	281.4	293.4	285.4	267.8	286.6
Heat Loss-Watts	14.2	3.3	4.4	4.7	4.6	3.5	2.3	3.6	4.3	24
Heat Flux-Btu/Hr/ft2	5006	4966	5105	4564	4897	4878	5086	4947	4642	4968
Wall Temp. #3-F	181.1	180.6	180.6	180.9	181	180.5	181.3	181.2	180.5	179
Wall Temp. #4-F	181.7	180.7	181.2	181.2	181.2	180.6	181.7	181.5	181.1	179.2
Wall Temp. #5-F	182.3	180.4	182.6	181.1	180.6	180.6	181.3	181.1	180.7	179.2
Wall Temp. #1-F	82.3	181	180	180.6	180.6	181.1	181.4	181.2	180	177.5
Wall Temp. #2-F	182.3	181.2	180.4	180.9	180.6	180.7	181.7	181.5	180.2	178.4
Instream Temp.-F	176.4	176.6	176.5	177	176.7	176.7	177.2	177	176.7	176.6
Avg. Wall Temp.-F	181.9	180.9	180.6	181	180.8	180.7	181.5	181.3	180.5	178.7
Avg. Wall DT.-F	5.2	4.1	3.8	3.7	3.8	3.8	4.1	4.1	3.6	2.9
Remaining Subcool-F	1.8									
Exit Quality	-0.02	0	0.01	0.03	0.04	0.06	0.08	0.1	0.11	0.13
EXP. H-Btu/Hr/ft2/F	958.3	1226.1	1336.6	1219.1	1279	1290.6	1255.7	1213.6	1293	1692.4
COMPUTED H										
Jallouk	746.8	743.6	749.2	687.7	710.1	703.8	718.9	703.7	676.5	695.2
Szady1(Cudo tube)	1201.4	1198.1	1214.6	1154.3	1194.3	1193.5	1223.3	1207	1169.9	1201.8
Szady2	930.1	926.2	944.7	880.8	924.6	924.7	956.4	940.2	902.7	938
(RLIQ)	130314	130567	129948	128434	125963	123784	122179	119708	117228	118770
(F)	1.004	1.004	1.152	1.402	1.563	1.697	1.811	1.917	2.012	2.107
(HLIQ)	214.2	214.2	245.7	299	333.3	361.9	386.4	409.1	429.1	449
(HBOIL)	1199.1	1195.8	1211.2	1147.6	1185.6	1182.3	1210.3	1191.1	1150.3	1180.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	82.4									
DP Liquid Density-lbm/ft3	92.64									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.236	0.655	0.458	1.906	2.42					
Zero Corrections-psid	0.032	-0.04	-0.734	0.191	0.148					
Corrected DP-Psid	0.204	0.695	1.192	1.715	2.272					
Actual DP-ft	2.09	3.53	5.01	6.45	7.67					
Measured TP-Psig	158.1				-1.6					
Measured Overall-ft	286.27									
Computed DP-ft	2.07	4.01	5.83	7.6	9.21					
Friction-ft	0.07	0.16	0.28	0.41	0.55					
Acceleration-ft	0	0.07	0.1	0.14	0.16					
Elevation-ft	2	3.78	5.45	7.05	8.5					

Run#	637									
Test Fluid	C4F10									
Date:	6/9/93									
Time:	19:51									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	150.7									
Sat. Temperature-F(inlet)	174.4									
Liq. Density-lbm/ft3	77	77	77	76.93	77	76.97	76.83	76.95	77	77.29
Latent Heat-Btu/lbm	25.91	25.91	25.91	25.86	25.91	25.9	25.79	25.88	25.91	26.14
Specific Heat-Btu/lbm/F	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.299	0.298
Liq. Viscosity-lbm/ft-hr	0.349	0.349	0.349	0.348	0.349	0.349	0.347	0.348	0.349	0.353
Liq. Conductivity-Btu/hr-ft-F	0.022	0.022	0.022	0.0219	0.022	0.022	0.0219	0.022	0.022	0.0222
Liq. Prandtl No.	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.74
Inlet Flow Rate-GPM	4.5									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	170.9									
Outlet Liq. Temperature-F	172.7									
Outlet Vap. Temperature-F	170.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	124.1									
Water outlet Temp.-F	165.2									
Inlet G-lbm/hr/ft2	832195		Temp	168.1	Density	77.49				
Subcooling-F	3.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	287.2	285.1	275.1	287.6	280.4	279.2	291.9	283.9	283.6	296.3
Heat Loss-Watts	13.6	3.2	4.2	4.4	4.3	3.1	2	3.2	4	22.4
Heat Flux-Btu/Hr/ft2	4978	4942	4769	4985	4861	4840	5060	4921	4916	5136
Wall Temp. #3-F	178.5	178.1	178.1	178.6	178.4	177.8	178.7	178.5	177.9	176.3
Wall Temp. #4-F	179.2	178.2	178.6	178.7	178.6	177.8	178.7	178.6	178.5	176.4
Wall Temp. #5-F	179.8	177.9	179.9	178.7	178	177.8	178.6	178.3	178	176.5
Wall Temp. #1-F	83.6	178.5	177.4	178.1	178	178.5	178.8	178.6	177.8	174.8
Wall Temp. #2-F	179.8	178.7	177.8	178.3	177.9	178.1	178.7	178.8	177.6	175.7
Instream Temp.-F	174	174	174	174.3	174	174.1	174.7	174.2	174	172.7
Avg. Wall Temp.-F	179.3	178.4	178	178.5	178.1	178	178.7	178.6	177.9	175.9
Avg. Wall DT.-F	5.1	4.2	3.8	4	3.9	3.7	3.8	4.1	3.6	3
Remaining Subcool-F	2.3									
Exit Quality	-0.03	-0.01	0	0.01	0.03	0.04	0.05	0.07	0.08	0.09
EXP. H-Btu/Hr/ft2/F	976.2	1190.4	1268.4	1246.4	1244.6	1323.7	1341.7	1189.4	1351.4	1707.6
COMPUTED H										
Jallouk	721	717.7	701.8	712.1	691.3	685.4	700.7	686	682.9	692.1
Szady1(Cudo tube)	1181.6	1177.3	1156.6	1185.2	1171.6	1172	1204	1186.4	1186.6	1204.6
Szady2	913.2	908.6	886.5	918.7	905	906.3	940.1	923.2	954.2	970.7
(RLIQ)	155972	155972	155972	155466	152934	151019	149774	146936	144565	140682
(F)	1.005	1.005	1.005	1.205	1.402	1.541	1.655	1.761	1.854	1.949
(HLIQ)	251.4	251.4	251.4	301.5	351	385.7	414.5	440.8	464	487.2
(HBOIL)	1177.8	1173.5	1152.6	1179.7	1161.1	1157.9	1187.3	1165.8	1162.3	1177.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	82.7									
DP Liquid Density-lbm/ft3	92.59									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.219	0.54	0.262	1.643	2.092					
Zero Corrections-psid	0.032	-0.04	-0.734	0.191	0.148					
Corrected DP-Psid	0.187	0.58	0.996	1.452	1.944					
Actual DP-ft	2.05	3.71	5.33	6.88	8.21					
Measured TP-Psig	150.7				-1.6					
Measured Overall-ft	283.75									
Computed DP-ft	2.1	4.18	6.11	7.97	9.67					
Friction-ft	0.1	0.21	0.36	0.53	0.71					
Acceleration-ft	0	0.07	0.13	0.17	0.21					
Elevation-ft	2	3.91	5.63	7.27	8.75					

Run#	638									
Test Fluid	C4F10									
Date:	6/10/93									
Time:	2: 3									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	152.9									
Sat. Temperature-F(inlet)	175.5									
Liq. Density-lbm/ft3	76.81	76.81	76.79	76.74	76.86	76.81	76.58	76.72	76.77	77.02
Latent Heat-Btu/lbm	25.77	25.77	25.76	25.72	25.81	25.77	25.59	25.7	25.74	25.93
Specific Heat-Btu/lbm/F	0.299	0.299	0.299	0.299	0.299	0.299	0.3	0.299	0.299	0.299
Liq. Viscosity-lbm/ft-hr	0.346	0.346	0.346	0.345	0.347	0.346	0.343	0.345	0.346	0.349
Liq. Conductivity-Btu/hr-ft-F	0.0219	0.0219	0.0219	0.0218	0.0219	0.0219	0.0217	0.0218	0.0218	0.022
Liq. Prandtl No.	4.74	4.74	4.74	4.74	4.74	4.74	4.73	4.74	4.74	4.74
Inlet Flow Rate-GPM	5.4									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	2.7									
Inlet Temperature-F	172.5									
Outlet Liq. Temperature-F	174									
Outlet Vap. Temperature-F	171.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	119.6									
Water outlet Temp.-F	167									
Inlet G-lbm/hr/ft2	994871		Temp	169.4	Density	77.2				
Subcooling-F	3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	284.9	282	276.7	288.6	292.2	282.2	288.9	291.3	286.4	287.7
Heat Loss-Watts	13.3	3.1	4.1	4.2	4.1	3.3	1.9	3	3.9	21.8
Heat Flux-Btu/hr/ft2	4939	4889	4796	5003	5065	4892	5008	5049	4965	4987
Wall Temp. #3-F	179.5	179.1	179.2	179.4	179.3	180.1	179.7	179.5	178.8	177.4
Wall Temp. #4-F	180.1	179.1	179.5	179.4	179.4	180.3	179.9	179.7	179.5	177.3
Wall Temp. #5-F	180.2	178.8	180.7	179.4	178.8	182.1	179.7	179.4	178.9	177.3
Wall Temp. #1-F	84.2	179.6	178.4	178.8	178.8	182.7	179.2	179.5	178	175.7
Wall Temp. #2-F	180.8	179.8	178.7	178.8	178.8	182.9	179.4	179.7	178.4	176.8
Instream Temp.-F	174.8	174.8	174.9	175.1	174.6	174.8	175.8	175.2	175	173.9
Avg. Wall Temp.-F	180.2	179.4	179	179.3	179	181.3	179.6	179.6	178.7	176.9
Avg. Wall DT.-F	5.1	4.4	3.8	3.9	4.1	6.3	3.6	4.1	3.5	2.8
Remaining Subcool-F	2									
Exit Quality	-0.02	-0.01	0	0.01	0.02	0.03	0.04	0.06	0.07	0.08
EXP. H-Btu/hr/ft2/F	963.3	1116.3	1251.3	1274.9	1229.1	779.1	1409.2	1222.1	1420.2	1787.4
COMPUTED H										
Jallouk	708.5	704.1	696.6	706.8	701	684.8	693.5	692.2	684.4	681.5
Szady1(Cudo tube)	1183.8	1177.9	1167.8	1195.6	1202.3	1186.3	1209.5	1212.6	1204.1	1201.8
Szady2	915.1	908.7	897.6	928.5	937.9	922	946.1	980.3	968.5	963.3
(RLIQ)	187890	187890	188069	187558	184502	182717	182335	179111	176603	172638
(F)	1.005	1.005	1.005	1.173	1.36	1.488	1.59	1.686	1.771	1.855
(HLIQ)	290.2	290.2	290.2	339	392.7	429.9	459.6	487.3	511.9	535.6
(HBOIL)	1178	1172	1161.6	1186.5	1188.2	1167.2	1186.9	1185.8	1172.4	1165.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.4									
DP Liquid Density-lbm/ft3	92.49									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.174	0.414	0.046	1.401	1.787					
Zero Corrections-psid	0.032	-0.04	-0.734	0.191	0.148					
Corrected DP-Psid	0.142	0.454	0.78	1.21	1.639					
Actual DP-ft	2.14	3.95	5.75	7.34	8.79					
Measured TP-Psig	152.9				-1.6					
Measured Overall-ft	288.87									
Computed DP-ft	2.14	4.29	6.3	8.25	10.05					
Friction-ft	0.14	0.29	0.48	0.71	0.95					
Acceleration-ft	0	0.08	0.16	0.22	0.27					
Elevation-ft	2	3.92	5.66	7.33	8.84					

Run#	666									
Test Fluid	C4F10									
Date:	7/2/93									
Time:	11:31									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	191									
Sat. Temperature-F(inlet)	192.2									
Liq. Density-lbm/ft3	73.13	72.97	72.88	72.8	72.8	72.74	72.6	72.6	72.6	73
Latent Heat-Btu/lbm	22.94	22.81	22.75	22.68	22.68	22.64	22.53	22.53	22.53	22.69
Specific Heat-Btu/lbm/F	0.312	0.313	0.313	0.313	0.313	0.314	0.314	0.314	0.314	0.313
Liq. Viscosity-lbm/ft-hr	0.299	0.297	0.296	0.295	0.295	0.294	0.292	0.292	0.292	0.297
Liq. Conductivity-Btu/hr-ft-F	0.0196	0.0195	0.0195	0.0194	0.0194	0.0194	0.0193	0.0193	0.0193	0.0196
Liq. Prandtl No.	4.74	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75
Inlet Flow Rate-GPM	5.6									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	3									
Inlet Temperature-F	187.8									
Outlet Liq. Temperature-F	189.4									
Outlet Vap. Temperature-F	186.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	130.3									
Water outlet Temp.-F	182.1									
Inlet G-lbm/hr/ft2	978751		Temp	185.7	Density	73.24				
Subcooling-F	4.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	298.3	295.8	276.7	283.8	283.9	289.3	286.4	284.2	285.1	295.2
Heat Loss-Watts	16.9	4	5.4	6	6.3	5.6	4	5.1	5.9	31.5
Heat Flux-Btu/Hr/ft2	5171	5128	4796	4919	4921	5015	4965	4926	4942	5117
Wall Temp. #3-F	194.4	195.1	194.6	194.4	193.9	194.4	194.8	194.7	195.8	193.2
Wall Temp. #4-F	195.1	194.8	194.9	194.6	194.3	195.5	195.2	194.6	196.2	193.4
Wall Temp. #5-F	195.2	194.2	194.7	194	193.7	194.6	194.7	194.5	195.9	192.8
Wall Temp. #1-F	86.6	195.3	194.2	194	193.8	195.3	194.8	194.6	195.1	191
Wall Temp. #2-F	195.3	195.3	194.5	194.1	193.9	194.6	195	194.6	195.3	192.2
Instream Temp.-F	189.4	190	190.3	190.6	190.6	190.8	191.3	191.3	191.3	189.9
Avg. Wall Temp.-F	195	195.1	194.6	194.3	193.9	195	194.9	194.6	195.7	192.5
Avg. Wall DT.-F	5.4	4.9	4	3.4	3.1	3.9	3.4	3.1	4.1	2.4
Remaining Subcool-F	3.4									
Exit Quality	-0.05	-0.03	-0.02	-0.01	0.01	0.02	0.03	0.05	0.06	0.07
EXP. H-Btu/Hr/ft2/F	963.6	1047.9	1189.2	1435.2	1586.2	1278.2	1470.7	1600.9	1194.7	2142.2
COMPUTED H										
Jallouk	782.5	780.5	750.3	763	763.2	757.8	748.1	740.1	737.6	742.9
Szady1(Cudo tube)	1322.1	1321.3	1280.9	1299.2	1299.4	1316.1	1315.7	1313	1317	1330.6
Szady2	1043.3	1041.7	997.9	1017.2	1017.4	1037.8	1038.7	1037.2	1042.9	1059.8
(RLIQ)	214459	215870	216583	217901	217301	215114	213425	210554	207882	201614
(F)	1.004	1.004	1.004	1.004	1.004	1.272	1.411	1.52	1.613	1.704
(HLIQ)	289.7	289.8	289.9	289.9	289.9	367.3	407.7	439.1	465.9	491.9
(HBOIL)	1317.4	1316.6	1275.9	1294.4	1294.6	1306.5	1302.6	1296.4	1297.3	1307.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	89.7									
DP Liquid Density-lbm/ft3	91.55									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.347	0.563	0.884	1.31	1.67					
Zero Corrections-psid	0.144	0.111	0.156	0.051	0.032					
Corrected DP-Psid	0.203	0.452	0.728	1.259	1.638					
Actual DP-ft	2.11	4.13	6.09	7.55	9 15					
Measured TP-Psig	191				300.1					
Measured Overall-ft	******									
Computed DP-ft	2.14	4.28	6.42	8.44	10.29					
Friction-ft	0.14	0.28	0.45	0.65	0.86					
Acceleration-ft	0	0	0.09	0.15	0.2					
Elevation-ft	2	4	5.87	7.64	9.24					

Run#	667									
Test Fluid	C4F10									
Date:	7/2/93									
Time:	11:47									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	187.3									
Sat. Temperature-F(inlet)	190.7									
Liq. Density-lbm/ft3	73.35	73.16	73.19	73.25	73.22	73.16	73.02	73	72.97	73.33
Latent Heat-Btu/lbm	23.11	22.98	22.98	23.03	23.01	22.96	22.86	22.83	22.81	23.09
Specific Heat-Btu/lbm/F	0.311	0.312	0.312	0.312	0.312	0.312	0.313	0.313	0.313	0.311
Liq. Viscosity-lbm/ft-hr	0.301	0.299	0.299	0.3	0.3	0.299	0.297	0.297	0.297	0.301
Liq. Conductivity-Btu/hr-ft-F	0.0198	0.0197	0.0197	0.0197	0.0197	0.0197	0.0196	0.0196	0.0195	0.0198
Liq. Prandtl No.	4.74	4.74	4.74	4.74	4.74	4.74	4.74	4.75	4.75	4.74
Inlet Flow Rate-GPM	4.8									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2.5									
Inlet Temperature-F	187.2									
Outlet Liq. Temperature-F	188.2									
Outlet Vap. Temperature-F	184.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	125.3									
Water outlet Temp.-F	180.9									
Inlet G-lbm/hr/ft2	843714		Temp	184.1	Density	73.66				
Subcooling-F	3.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	298.9	295.8	291.9	297.1	295.3	296.3	295.9	296.8	288.7	296.8
Heat Loss-Watts	16.4	3.9	5.2	5.7	5.9	5.1	3.7	4.8	5.7	30.1
Heat Flux-Btu/Hr/ft2	5181	5128	5060	5150	5119	5136	5129	5145	5004	5145
Wall Temp. #3-F	193.6	193.9	193.6	193	192.7	193.1	193.5	193.4	194.5	192.2
Wall Temp. #4-F	194.2	193.6	194.1	193.1	193.2	194	193.7	193.3	195.1	192.4
Wall Temp. #5-F	194.2	193.2	193.6	192.5	192.7	193.2	193.3	193.4	194.7	191.8
Wall Temp. #1-F	87.3	194.2	193	192.4	192.2	193.8	193.3	193.2	194.1	190.2
Wall Temp. #2-F	194.2	194.2	193.6	192.9	192.3	193.3	193.7	193.2	194.1	191.5
Instream Temp.-F	188.6	189.3	189.2	189	189.1	189.3	189.8	189.9	190	188.7
Avg. Wall Temp.-F	194.1	194	193.6	192.8	192.6	193.5	193.5	193.3	194.5	191.6
Avg. Wall DT.-F	5.2	4.4	4.1	3.5	3.3	4	3.5	3.2	4.3	2.7
Remaining Subcool-F	2.3									
Exit Quality	-0.03	-0.02	0	0.01	0.03	0.05	0.06	0.08	0.09	0.11
EXP. H-Btu/Hr/ft2/F	993.4	1154	1220.3	1464.2	1566	1286.3	1478.9	1624.3	1170.9	1914.4
COMPUTED H										
Jallouk	793.3	790.5	783.5	780.4	767	762.7	759	756.4	742	745.3
Szady1(Cudo tube)	1316.3	1315	1305.6	1316.9	1315.7	1321.2	1325.8	1330.2	1315	1324.4
Szady2	1037.2	1034.9	1024.9	1038.7	1038.9	1045.8	1051.4	1057.1	1041.9	1054.2
(RLIQ)	183272	184669	184468	182741	180084	177618	175711	173008	170327	165099
(F)	1.004	1.004	1.004	1.203	1.392	1.526	1.634	1.729	1.814	1.902
(HLIQ)	257.1	257.2	257.2	308.1	356.6	390.9	418.7	443.2	464.9	487
(HBOIL)	1313	1311.7	1302.3	1311.3	1307	1309.7	1311.8	1313.6	1295.4	1302.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	90.4									
DP Liquid Density-lbm/ft3	91.45									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.384	0.668	1.075	1.583	2.026					
Zero Corrections-psid	0.144	0.111	0.156	0.051	0.032					
Corrected DP-Psid	0.24	0.557	0.919	1.532	1.994					
Actual DP-ft	2.02	3.89	5.68	6.97	8.4					
Measured TP-Psig	187.3				300.1					
Measured Overall-ft	******									
Computed DP-ft	2.11	4.21	6.18	8.08	9.83					
Friction-ft	0.11	0.23	0.38	0.55	0.73					
Acceleration-ft	0	0.06	0.12	0.16	0.19					
Elevation-ft	2	3.92	5.68	7.37	8.9					

Run#	668									
Test Fluid	C4F10									
Date:	7/2/93									
Time:	11:47									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	188.3									
Sat. Temperature-F(inlet)	191.1									
Liq. Density-lbm/ft3	73.25	73.13	73.02	73.05	73	72.94	72.86	72.86	72.86	73.13
Latent Heat-Btu/lbm	23.03	22.94	22.86	22.88	22.83	22.79	22.73	22.73	22.73	22.94
Specific Heat-Btu/lbm/F	0.312	0.312	0.313	0.312	0.313	0.313	0.313	0.313	0.313	0.312
Liq. Viscosity-lbm/ft-hr	0.3	0.299	0.297	0.298	0.297	0.296	0.295	0.295	0.295	0.299
Liq. Conductivity-Btu/hr-ft-F	0.0197	0.0196	0.0196	0.0196	0.0196	0.0195	0.0195	0.0195	0.0195	0.0196
Liq. Prandtl No.	4.74	4.74	4.74	4.74	4.75	4.75	4.75	4.75	4.75	4.74
Inlet Flow Rate-GPM	3.8									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2.1									
Inlet Temperature-F	187.6									
Outlet Liq. Temperature-F	189.1									
Outlet Vap. Temperature-F	185.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	124.9									
Water outlet Temp.-F	181.3									
Inlet G-lbm/hr/ft2	667470		Temp	184.3	Density	73.6				
Subcooling-F	3.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	287.3	288.1	287.3	279.4	288.4	291.7	289.5	289.7	279.3	289.4
Heat Loss-Watts	16.4	3.9	5.2	5.8	6	5.3	3.7	4.8	5.7	30.3
Heat Flux-Btu/Hr/ft2	4980	4994	4980	4843	4999	5056	5018	5022	4841	5017
Wall Temp. #3-F	193.6	194.3	194	193.4	193.4	194	193.9	193.9	194.8	192.6
Wall Temp. #4-F	194.3	194.1	194.4	193.8	193.8	195	194.3	193.7	195.4	192.6
Wall Temp. #5-F	194.3	193.6	194.1	193.2	193.2	194.1	193.8	193.7	195	192.4
Wall Temp. #1-F	87.9	194.6	193.6	193	193	194.7	193.8	193.7	194.2	190.6
Wall Temp. #2-F	194.4	194.6	194	193.4	193.2	194.1	194.1	193.7	194.5	191.8
Instream Temp.-F	189	189.4	189.8	189.7	189.9	190.1	190.4	190.4	190.4	189.4
Avg. Wall Temp.-F	194.2	194.4	194	193.4	193.3	194.5	194	193.7	194.8	192
Avg. Wall DT.-F	4.9	4.8	4	3.4	3.2	4.1	3.4	3.1	4.2	2.4
Remaining Subcool-F	2.1									
Exit Quality	-0.03	-0.01	0.01	0.03	0.05	0.07	0.09	0.11	0.12	0.14
EXP. H-Btu/Hr/ft2/F	1011.2	1046	1252.9	1411.6	1575	1226.8	1496.6	1613.1	1163.5	2113.8
COMPUTED H										
Jallouk	792.6	795.5	795.5	763.6	772.2	772.5	765.4	761.7	742.5	750.8
Szady1(Cudo tube)	1293	1297.8	1299.2	1282.4	1305.3	1315.3	1313.9	1315.6	1293.7	1309.8
Szady2	1054.2	1059.5	1060.8	1000	1025.5	1037.1	1036.2	1038.9	1016.5	1035.4
(RLIQ)	145617	146252	146858	143934	141471	138938	136529	133865	130849	126637
(F)	1.004	1.004	1.028	1.354	1.522	1.655	1.768	1.869	1.958	2.05
(HLIQ)	213.2	213.3	218.3	287.6	323.3	351.8	375.8	397.2	416.3	435.6
(HBOIL)	1291	1295.9	1297.1	1277.6	1298.7	1306.9	1303.6	1303.4	1279.2	1293.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	90.9									
DP Liquid Density-lbm/ft3	91.37									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.389	0.75	1.227	1.803	2.291					
Zero Corrections-psid	0.144	0.111	0.156	0.051	0.032					
Corrected DP-Psid	0.245	0.639	1.071	1.752	2.259					
Actual DP-ft	2.02	3.74	5.39	6.55	7.89					
Measured TP-Psig	188.3				300.1					
Measured Overall-ft	******									
Computed DP-ft	2.07	4.05	5.91	7.7	9.35					
Friction-ft	0.07	0.16	0.27	0.39	0.52					
Acceleration-ft	0	0.05	0.09	0.12	0.15					
Elevation-ft	2	3.83	5.55	7.19	8.69					

Run#	669									
Test Fluid	C4F10									
Date:	7/2/93									
Time:	11:47									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	187.3									
Sat. Temperature-F(inlet)	190.7									
Liq. Density-lbm/ft3	73.38	73.22	73.08	73.08	73.08	73	72.97	72.94	72.88	73.13
Latent Heat-Btu/lbm	23.13	23.01	22.9	22.9	22.9	22.83	22.81	22.79	22.75	22.94
Specific Heat-Btu/lbm/F	0.311	0.312	0.312	0.312	0.312	0.313	0.313	0.313	0.313	0.312
Liq. Viscosity-lbm/ft-hr	0.301	0.3	0.298	0.298	0.298	0.297	0.297	0.296	0.296	0.299
Liq. Conductivity-Btu/hr-ft-F	0.0198	0.0197	0.0196	0.0196	0.0196	0.0196	0.0195	0.0195	0.0195	0.0196
Liq. Prandtl No.	4.74	4.74	4.74	4.74	4.74	4.75	4.75	4.75	4.75	4.74
Inlet Flow Rate-GPM	2.9									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	187.4									
Outlet Liq. Temperature-F	188.9									
Outlet Vap. Temperature-F	185.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	127.9									
Water outlet Temp.-F	182.1									
Inlet G-lbm/hr/ft2	513113		Temp	182.2	Density	74.14				
Subcooling-F	3.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	284	285.7	286.8	295.9	288.4	291.6	287.1	287.1	285.1	284.7
Heat Loss-Watts	16.9	4	5.4	6.1	6.3	5.6	4.1	5.2	6	31.7
Heat Flux-Btu/Hr/ft2	4923	4952	4971	5129	4999	5055	4977	4977	4942	4935
Wall Temp. #3-F	193.5	193.9	193.7	193.6	193.4	193.8	193.8	193.7	194.8	192.6
Wall Temp. #4-F	194	193.8	194	193.7	193.9	194.7	194.1	193.4	195.3	192.8
Wall Temp. #5-F	194	193.4	193.9	193.1	193.4	193.9	193.6	193.6	194.8	192.4
Wall Temp. #1-F	88.6	194.1	193.3	193.1	192.9	194.3	193.7	193.5	194	190.8
Wall Temp. #2-F	194.1	194.2	193.5	193.3	193	194	194.1	193.4	194.3	191.7
Instream Temp.-F	188.5	189.1	189.6	189.6	189.6	189.9	190	190.1	190.3	189.4
Avg. Wall Temp.-F	193.9	194	193.6	193.4	193.3	194.2	193.9	193.5	194.6	192.1
Avg. Wall DT.-F	5.2	4.7	3.8	3.5	3.5	4	3.6	3.2	4.1	2.4
Remaining Subcool-F	1.5									
Exit Quality	-0.02	0	0.03	0.05	0.08	0.11	0.13	0.15	0.18	0.2
EXP. H-Btu/Hr/ft2/F	950.8	1059.1	1308.2	1447.6	1439	1249.1	1369.1	1557.6	1200.5	2025.1
COMPUTED H										
Jallouk	829.2	835.3	796.8	803.7	783.5	785	773.4	770	764.2	756.8
Szady1(Cudo tube)	1281.2	1289.6	1296.7	1317.8	1302	1312.2	1303.9	1305.4	1303.3	1296.6
Szady2	1042.2	1051.2	1014.2	1037.8	1021.5	1032.9	1024.4	1026.7	1024.9	1018.4
(RLIQ)	111338	112064	110783	107831	105085	102597	99874	97163	94557	90844
(F)	1.004	1.004	1.331	1.554	1.72	1.855	1.973	2.078	2.173	2.273
(HLIQ)	172.7	172.8	229.1	267.5	296.1	319.3	339.6	357.8	374.2	391.1
(HBOIL)	1280.2	1288.6	1294.4	1314.1	1296.9	1305.9	1296.1	1296.4	1293	1284.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	91.5									
DP Liquid Density-lbm/ft3	91.28									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.369	0.825	1.382	2.038	2.6					
Zero Corrections-psid	0.144	0.111	0.156	0.051	0.032					
Corrected DP-Psid	0.225	0.714	1.226	1.987	2.568					
Actual DP-ft	2.05	3.59	5.07	6.07	7.27					
Measured TP-Psig	187.3				300.1					
Measured Overall-ft	******									
Computed DP-ft	2.02	3.79	5.4	6.91	8.28					
Friction-ft	0.05	0.11	0.2	0.31	0.42					
Acceleration-ft	0.01	0.05	0.07	0.09	0.11					
Elevation-ft	1.96	3.63	5.12	6.51	7.74					

Run#	670									
Test Fluid	C4F10									
Date:	7/2/93									
Time:	11:47									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	186.8									
Sat. Temperature-F(inlet)	190.5									
Liq. Density-lbm/ft3	73.35	73.05	73	73.22	73.16	73.08	72.94	72.91	72.91	73.08
Latent Heat-Btu/lbm	23.11	22.88	22.83	23.01	22.96	22.9	22.79	22.77	22.77	22.9
Specific Heat-Btu/lbm/F	0.311	0.312	0.313	0.312	0.312	0.312	0.313	0.313	0.313	0.312
Liq. Viscosity-lbm/ft-hr	0.301	0.298	0.297	0.3	0.299	0.298	0.296	0.296	0.296	0.298
Liq. Conductivity-Btu/hr-ft-F	0.0198	0.0196	0.0196	0.0197	0.0197	0.0196	0.0195	0.0195	0.0195	0.0196
Liq. Prandtl No.	4.74	4.74	4.75	4.74	4.74	4.74	4.75	4.75	4.75	4.74
Inlet Flow Rate-GPM	2									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	1.5									
Inlet Temperature-F	187.4									
Outlet Liq. Temperature-F	188.9									
Outlet Vap. Temperature-F	185.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	127									
Water outlet Temp.-F	182.2									
Inlet G-lbm/hr/ft2	356861		Temp	179.7	Density	74.77				
Subcooling-F	3.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	285.8	287.4	285.9	289.2	287.6	290.2	288.8	288.3	284.8	284.4
Heat Loss-Watts	16.8	4	5.3	6	6.2	5.5	4	5.1	5.9	31.7
Heat Flux-Btu/Hr/ft2	4954	4982	4956	5013	4985	5030	5006	4997	4937	4930
Wall Temp. #3-F	193.4	193.9	193.8	193.1	192.9	193.5	193.7	193.5	194.5	192.7
Wall Temp. #4-F	194	193.8	194.1	193.4	193.4	194.4	193.9	193.5	195	193.1
Wall Temp. #5-F	194.2	193.3	193.8	192.9	192.8	193.8	193.5	193.4	194.6	192.5
Wall Temp. #1-F	89.1	194.2	193.3	192.9	192.7	194.1	193.7	193.5	193.7	190.7
Wall Temp. #2-F	194.2	194.2	193.6	193	192.8	193.8	193.7	193.5	194.1	191.7
Instream Temp.-F	188.6	189.7	189.9	189.1	189.3	189.6	190.1	190.2	190.2	189.6
Avg. Wall Temp.-F	194	194	193.7	193.1	192.9	194	193.7	193.5	194.4	192.1
Avg. Wall DT.-F	5.1	4.1	3.6	3.7	3.4	4.1	3.4	3.1	4	2.3
Remaining Subcool-F	0.5									
Exit Quality	-0.01	0.03	0.06	0.1	0.14	0.17	0.21	0.24	0.28	0.32
EXP. H-Btu/Hr/ft2/F	966.5	1215.1	1385.9	1337.4	1466.4	1220.2	1483.9	1636.3	1247.7	2127.5
COMPUTED H										
Jallouk	870.1	860.8	839.2	829	798.5	799.8	795.2	791.1	781.5	775.3
Szady1(Cudo tube)	1285.6	1297.9	1296.6	1298.3	1296.8	1305.4	1306.6	1306.7	1299.5	1294.6
Szady2	1047.4	1060.3	1058.2	1016.6	1015.2	1024.5	1025.7	1026.2	1018.9	1014.8
(RLIQ)	77517	77545	74925	71483	68841	66263	63795	61030	58205	55036
(F)	1.004	1.265	1.588	1.81	1.984	2.131	2.259	2.378	2.489	2.602
(HLIQ)	129.2	162.8	204.6	232.9	255.3	274.3	290.9	306.3	320.6	334.9
(HBOIL)	1285.2	1297	1294.9	1295.8	1293.5	1301.3	1301.8	1301.1	1292.9	1287.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	91.9									
DP Liquid Density-lbm/ft3	91.22									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.331	0.962	1.625	2.379	3.036					
Zero Corrections-psid	0.144	0.111	0.156	0.051	0.032					
Corrected DP-Psid	0.187	0.851	1.469	2.328	3.004					
Actual DP-ft	2.13	3.32	4.59	5.4	6.41					
Measured TP-Psig	186.8				300.1					
Measured Overall-ft	******									
Computed DP-ft	1.91	3.46	4.84	6.12	7.25					
Friction-ft	0.03	0.07	0.13	0.2	0.28					
Acceleration-ft	0.02	0.03	0.05	0.06	0.08					
Elevation-ft	1.87	3.36	4.66	5.85	6.89					

Run#	671									
Test Fluid	C4F10									
Date:	7/2/93									
Time:	11:47									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	188.8									
Sat. Temperature-F(inlet)	191.3									
Liq. Density-lbm/ft3	73	72.77	72.8	72.88	72.77	72.69	72.6	72.54	72.54	72.8
Latent Heat-Btu/lbm	22.83	22.66	22.68	22.75	22.66	22.6	22.53	22.49	22.49	22.68
Specific Heat-Btu/lbm/F	0.313	0.314	0.313	0.313	0.314	0.314	0.314	0.315	0.315	0.313
Liq. Viscosity-lbm/ft-hr	0.297	0.294	0.295	0.296	0.294	0.293	0.292	0.292	0.292	0.296
Liq. Conductivity-Btu/hr-ft-F	0.0196	0.0194	0.0194	0.0195	0.0194	0.0194	0.0193	0.0193	0.0193	0.0194
Liq. Prandtl No.	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.76	4.76	4.75
Inlet Flow Rate-GPM	1.1									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	188.8									
Outlet Liq. Temperature-F	190.3									
Outlet Vap. Temperature-F	187.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	128.4									
Water outlet Temp.-F	184.2									
Inlet G-lbm/hr/ft2	199135		Temp	175.2	Density	75.86				
Subcooling-F	2.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	284.9	286.9	287.3	294.5	287.1	290.3	288.2	287.6	284.3	283.7
Heat Loss-Watts	17.2	4.1	5.5	6.2	6.5	5.9	4.3	5.4	6	32.8
Heat Flux-Btu/Hr/ft2	4939	4973	4980	5105	4977	5032	4996	4985	4928	4918
Wall Temp. #3-F	194.1	194.7	194.4	194.1	194	194.5	195	194.8	195.2	193.6
Wall Temp. #4-F	194.7	194.3	194.8	194.4	194.3	195.6	195.1	194.8	195.9	194
Wall Temp. #5-F	194.9	194	194.5	194	193.7	194.7	194.7	194.7	195.3	193.5
Wall Temp. #1-F	89.5	194.9	193.8	193.7	193.8	195.2	194.7	194.8	194.4	191.8
Wall Temp. #2-F	194.9	194.9	194.3	194	193.8	194.7	195	194.8	194.8	192.7
Instream Temp.-F	189.9	190.7	190.6	190.3	190.7	191	191.3	191.5	191.5	190.6
Avg. Wall Temp.-F	194.7	194.7	194.3	194.1	193.9	195	194.9	194.8	195.1	193.1
Avg. Wall DT.-F	4.5	3.8	3.5	3.5	3	3.8	3.4	3.1	3.4	2.3
Remaining Subcool-F	-2.1									
Exit Quality	0.03	0.09	0.16	0.22	0.29	0.35	0.42	0.48	0.55	0.61
EXP. H-Btu/Hr/ft2/F	1091	1317.3	1422.9	1450.6	1672.8	1333.9	1480.6	1632	1450.6	2140.2
COMPUTED H										
Jallouk	916.4	903	886.2	885.6	865.9	866.5	858.7	853.9	843.8	833.5
Szady1(Cudo tube)	1293.4	1304.2	1304.5	1318.5	1305.3	1315	1312.8	1313.3	1306.1	1298.2
Szady2	1055.9	1067.4	1067.5	1082.5	1067.8	1078.1	1075.4	1075.5	1022.6	1015.4
(RLIQ)	43229	41543	38851	35639	32907	30136	27331	24486	21592	18529
(F)	1.304	1.678	2.004	2.259	2.465	2.645	2.808	2.96	3.107	3.269
(HLIQ)	105.3	135.5	161.9	182.6	199.2	213.7	226.9	239.3	251.1	264.1
(HBOIL)	1293.2	1303.7	1303.7	1317.4	1303.8	1313.1	1310.6	1310.6	1303	1294.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	92.6									
DP Liquid Density-lbm/ft3	91.12									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.312	1.23	2.043	2.936	3.728					
Zero Corrections-psid	0.078	-0.044	0.008	0.039	0.018					
Corrected DP-Psid	0.234	1.274	2.035	2.897	3.71					
Actual DP-ft	2.04	2.49	3.48	4.28	5.02					
Measured TP-Psig	188.8				300.1					
Measured Overall-ft	******									
Computed DP-ft	1.62	2.86	3.91	4.84	5.61					
Friction-ft	0.01	0.04	0.07	0.11	0.15					
Acceleration-ft	0.01	0.02	0.03	0.04	0.05					
Elevation-ft	1.6	2.81	3.82	4.69	5.41					

Run#	672									
Test Fluid	C4F10									
Date:	7/6/93									
Time:	8:29									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	191.9									
Sat. Temperature-F(inlet)	192.6									
Liq. Density-lbm/ft3	73.13	73	72.88	72.8	72.74	72.66	72.6	72.57	72.52	72.94
Latent Heat-Btu/lbm	22.94	22.83	22.75	22.68	22.64	22.57	22.53	22.51	22.47	22.79
Specific Heat-Btu/lbm/F	0.312	0.313	0.313	0.313	0.314	0.314	0.314	0.314	0.315	0.313
Liq. Viscosity-lbm/ft-hr	0.299	0.297	0.296	0.295	0.294	0.293	0.292	0.292	0.291	0.296
Liq. Conductivity-Btu/hr-ft-F	0.0196	0.0196	0.0195	0.0194	0.0194	0.0194	0.0193	0.0193	0.0193	0.0195
Liq. Prandtl No.	4.74	4.75	4.75	4.75	4.75	4.75	4.75	4.76	4.76	4.75
Inlet Flow Rate-GPM	5.7									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	2.8									
Inlet Temperature-F	187.3									
Outlet Liq. Temperature-F	190.8									
Outlet Vap. Temperature-F	186.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	114.4									
Water outlet Temp.-F	169.4									
Inlet G-lbm/hr/ft2	998015		Temp	185.2	Density	73.37				
Subcooling-F	5.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	579.5	576.8	577.8	575.7	573.6	575.5	575.1	577.9	574.2	571.2
Heat Loss-Watts	18.3	4.3	5.9	6.8	7.3	6.6	4.9	6.1	6.6	35.7
Heat Flux-Btu/Hr/ft2	10045	9998	10016	9979	9943	9976	9969	10018	9953	9901
Wall Temp. #3-F	195.8	197.2	196.8	196.6	197.7	196	196.3	197.1	197.1	196.5
Wall Temp. #4-F	196.3	196.2	197.6	197.3	197.7	196.9	196.9	197.2	198.1	195.9
Wall Temp. #5-F	196.7	195.8	198.4	197.2	197	196	195.9	196.6	196.8	195.8
Wall Temp. #1-F	86.8	196.9	195.7	195.9	196.4	197	196.1	196.2	195.7	192.9
Wall Temp. #2-F	197	196.9	196.6	196.3	196.5	196.5	196.3	196.6	196.4	194.4
Instream Temp.-F	189.4	189.9	190.3	190.6	190.8	191.1	191.3	191.4	191.6	190.1
Avg. Wall Temp.-F	196.5	196.8	196.7	196.8	196.9	196.5	196.3	196.7	196.8	195
Avg. Wall DT.-F	6.6	6.4	5.9	5.7	5.7	4.9	4.5	4.9	4.8	4.4
Remaining Subcool-F	3.4									
Exit Quality	-0.05	-0.02	0.01	0.03	0.06	0.08	0.11	0.14	0.16	0.19
EXP. H-Btu/Hr/ft2/F	1522.9	1550.6	1691.2	1751.1	1759.6	2025.9	2191.2	2049.7	2086.6	2233.8
COMPUTED H										
Jallouk	1170.2	1169.9	1173.5	1140	1104.9	1085.4	1067.1	1054.1	1036.8	1003.1
Szady1(Cudo tube)	1843.1	1844.1	1850	1851.6	1852.2	1860.2	1863.3	1870.6	1868.5	1850
Szady2	1632.2	1688.6	1696.6	1698.9	1699.4	1708.5	1711.8	1719.3	1716.7	1690.2
(RLIQ)	218880	219878	220846	217485	212249	207207	201884	196293	190898	182041
(F)	1.004	1.004	1.004	1.345	1.564	1.726	1.861	1.98	2.086	2.2
(HLIQ)	294.2	294.3	294.4	394.4	458.8	506.5	546.2	581.1	612.1	644.9
(HBOIL)	1840.6	1841.6	1847.5	1845.7	1842.8	1847.6	1847.6	1851.7	1846.3	1823.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	88.5									
DP Liquid Density-lbm/ft3	91.73									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.344	0.768	1.071	1.599	2.082					
Zero Corrections-psid	0.133	0.101	0.139	0.036	0.086					
Corrected DP-Psid	0.211	0.667	0.932	1.563	1.996					
Actual DP-ft	2.1	3.71	5.71	8.98	8.48					
Measured TP-Psig	191.9				300.1					
Measured Overall-ft	******									
Computed DP-ft	2.15	4.28	6.21	8.06	9.75					
Friction-ft	0.15	0.33	0.6	0.92	1.27					
Acceleration-ft	0	0.13	0.23	0.31	0.39					
Elevation-ft	2	3.82	5.39	6.83	8.09					

Run#	673									
Test Fluid	C4F10									
Date:	7/6/93									
Time:	11:11									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	187.9									
Sat. Temperature-F(inlet)	190.9									
Liq. Density-lbm/ft3	73.33	73.19	73.08	73.16	73.13	73.05	73	72.94	72.88	73.22
Latent Heat-Btu/lbm	23.09	22.98	22.9	22.96	22.94	22.88	22.83	22.79	22.75	23.01
Specific Heat-Btu/lbm/F	0.311	0.312	0.312	0.312	0.312	0.312	0.313	0.313	0.313	0.312
Liq. Viscosity-lbm/ft-hr	0.301	0.299	0.298	0.299	0.299	0.298	0.297	0.296	0.296	0.3
Liq. Conductivity-Btu/hr-ft-F	0.0198	0.0197	0.0196	0.0197	0.0196	0.0196	0.0196	0.0195	0.0195	0.0197
Liq. Prandtl No.	4.74	4.74	4.74	4.74	4.74	4.74	4.75	4.75	4.75	4.74
Inlet Flow Rate-GPM	4.7									
Outlet Liq. Flow Rate-GPM	1.3									
Outlet Vap. Flow Rate-GPM	2.2									
Inlet Temperature-F	187.1									
Outlet Liq. Temperature-F	189.7									
Outlet Vap. Temperature-F	185.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	109.7									
Water outlet Temp.-F	167.4									
Inlet G-lbm/hr/ft2	822336		Temp	185.4	Density	73.32				
Subcooling-F	3.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	588.5	586	584.3	584.8	580.4	583	588.1	590.4	587.1	585.4
Heat Loss-Watts	18.3	4.3	5.9	6.8	7.3	6.6	4.8	6	6.6	35.7
Heat Flux-Btu/Hr/ft2	10201	10158	10128	10137	10061	10106	10194	10234	10177	10148
Wall Temp. #3-F	195.2	196.5	196.1	195.7	196.8	195.3	195	195.9	196.4	195.9
Wall Temp. #4-F	195.6	195.5	196.7	196.1	196.6	196.2	195.5	196.2	197.3	195.3
Wall Temp. #5-F	195.6	195	197.7	196.1	195.8	195.3	194.4	195.5	196.5	195.3
Wall Temp. #1-F	89.3	196.2	195	194.6	195.5	195.7	194.8	195.1	195.1	191.6
Wall Temp. #2-F	196.2	196.2	195.7	195.2	195.6	195.6	195.3	195.1	195.7	193.9
Instream Temp.-F	188.7	189.2	189.6	189.3	189.4	189.7	189.9	190.1	190.3	189.1
Avg. Wall Temp.-F	195.7	196.1	195.9	195.6	195.9	195.6	195	195.6	196.2	194.4
Avg. Wall DT.-F	6.5	6.4	5.8	5.9	6	5.5	4.6	5	5.4	4.8
Remaining Subcool-F	1.5									
Exit Quality	-0.02	0.01	0.04	0.07	0.11	0.14	0.17	0.2	0.23	0.26
EXP. H-Btu/Hr/ft2/F	1572.1	1577.1	1741.1	1727.9	1671.1	1848.1	2197.4	2047.9	1870.7	2096
COMPUTED H										
Jallouk	1213.1	1213.2	1159.6	1146.4	1118.2	1104.4	1095.2	1084.4	1069.1	244.5
Szady1(Cudo tube)	1849.5	1850.9	1854	1853	1848.4	1857.1	1868.6	1875.8	1874.1	244.5
Szady2	1647.5	1645.4	1645.1	1644.7	1636.2	1645	1658.6	1668.1	1719.2	244.5
(RLIQ)	178821	179794	175713	169474	164004	158883	153511	148066	142591	142591
(F)	1.004	1.004	1.431	1.667	1.845	1.991	2.121	2.238	2.345	2.345
(HLIQ)	251.9	252	359.2	418.4	463	499.9	532.5	562	588.9	588.9
(HBOIL)	1847.9	1849.3	1849.5	1845.9	1838.7	1844.9	1854.1	1858.8	1854.5	1854.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	90.5									
DP Liquid Density-lbm/ft3	91.43									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.339	0.898	1.3	1.924	2.51					
Zero Corrections-psid	0.133	0.101	0.139	0.036	0.086					
Corrected DP-Psid	0.206	0.797	1.161	1.888	2.424					
Actual DP-ft	2.09	3.43	5.21	6.28	7.58					
Measured TP-Psig	187.9				300.1					
Measured Overall-ft	*****									
Computed DP-ft	2.1	3.95	5.63	7.24	8.72					
Friction-ft	0.11	0.29	0.53	0.83	1.14					
Acceleration-ft	0.05	0.15	0.22	0.29	0.36					
Elevation-ft	1.93	3.51	4.88	6.13	7.22					

run#	674									
Test Fluid	C4F10									
Date:	7/6/93									
Time:	11:11									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	182.3									
Sat. Temperature-F(inlet)	188.6									
Liq. Density-lbm/ft3	73.92	73.79	73.68	73.71	73.65	73.6	73.57	73.55	73.52	73.73
Latent Heat-Btu/lbm	23.55	23.44	23.36	23.38	23.34	23.3	23.28	23.26	23.24	23.4
Specific Heat-Btu/lbm/F	0.309	0.309	0.31	0.31	0.31	0.31	0.31	0.31	0.311	0.31
Liq. Viscosity-lbm/ft-hr	0.308	0.306	0.305	0.305	0.305	0.304	0.304	0.303	0.303	0.306
Liq. Conductivity-Btu/hr-ft-F	0.0201	0.02	0.02	0.02	0.02	0.0199	0.0199	0.0199	0.0199	0.02
Liq. Prandtl No.	4.73	4.73	4.73	4.73	4.73	4.73	4.74	4.74	4.74	4.73
Inlet Flow Rate-GPM	3.8									
Outlet Liq. Flow Rate-GPM	1.4									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	184.6									
Outlet Liq. Temperature-F	187.9									
Outlet Vap. Temperature-F	183.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	107.7									
Water outlet Temp.-F	166.3									
Inlet G-lbm/hr/ft2	671895		Temp	182.4	Density	74.09				
Subcooling-F	4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	578.5	580.4	579	582.7	574.6	577.2	586.7	581.3	577.3	579.8
Heat Loss-Watts	17.6	4.2	5.7	6.5	6.9	6.1	4.4	5.6	6.3	33.8
Heat Flux-Btu/Hr/ft2	10028	10061	10037	10101	9960	10005	10170	10076	10007	10050
Wall Temp. #3-F	192.9	194.3	193.8	193.8	195.1	193.4	193.2	194.1	193.9	193.7
Wall Temp. #4-F	193.6	193.4	194.8	194.5	194.9	194.3	193.8	194.1	195.1	193.3
Wall Temp. #5-F	193.7	192.8	195.6	194.4	194.3	193.4	192.6	193.3	194.2	193.4
Wall Temp. #1-F	89.5	193.9	192.7	193	193.7	194.2	192.9	193	193.1	189.6
Wall Temp. #2-F	194.1	193.9	193.7	193.4	193.8	193.9	193.4	193.3	193.7	191.9
Instream Temp.-F	186.5	187	187.4	187.3	187.5	187.7	187.8	187.9	188	187.2
Avg. Wall Temp.-F	193.6	193.9	193.8	193.9	194.2	193.8	193.2	193.6	194	192.4
Avg. Wall DT.-F	6.6	6.4	5.9	6.2	6.2	5.7	4.9	5.2	5.5	4.7
Remaining Subcool-F	1.2									
Exit Quality	-0.02	0.02	0.06	0.1	0.13	0.17	0.21	0.25	0.28	0.32
EXP. H-Btu/Hr/ft2/F	1514.4	1567	1702.1	1637.5	1600.1	1763.7	2066.9	1936.1	1803.8	2126.7
COMPUTED H										
Jallouk	1219.7	1213.8	1164.3	1143.9	1133.6	1120.3	1116.5	1097.2	1081.2	208
Szady1(Cudo tube)	1809.7	1818.3	1821.5	1827.4	1817.7	1825	1842.2	1835.8	1831.7	208
Szady2	1609.3	1617.2	1617.2	1625.2	1608.8	1616.6	1639	1628.2	1620.6	208
(RLIQ)	142708	142934	138231	132683	127568	122454	117127	111761	106423	106423
(F)	1.004	1.131	1.553	1.797	1.985	2.144	2.286	2.415	2.533	2.533
(HLIQ)	214	241	331.1	383	423.3	457.2	487.5	515.1	540.2	540.2
(HBOIL)	1808.7	1816.9	1817.9	1821.7	1810	1815.4	1830.7	1822.2	1815.9	1815.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	90.8									
DP Liquid Density-lbm/ft3	91.39									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.325	1.005	1.497	2.205	2.847					
Zero Corrections-psid	0.133	0.101	0.139	0.036	0.086					
Corrected DP-Psid	0.192	0.904	1.358	2.169	2.761					
Actual DP-ft	2.1	3.19	4.78	5.68	6.85					
Measured TP-Psig	182.3				300.1					
Measured Overall-ft	******									
Computed DP-ft	2.02	3.71	5.25	6.71	8.04					
Friction-ft	0.08	0.22	0.41	0.64	0.89					
Acceleration-ft	0.05	0.12	0.17	0.23	0.3					
Elevation-ft	1.88	3.37	4.67	5.84	6.85					

Run#	675									
Test Fluid	C4F10									
Date:	7/6/93									
Time:	11:11									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	189.4									
Sat. Temperature-F(inlet)	191.5									
Liq. Density-lbm/ft3	73.11	72.88	72.86	72.91	72.77	72.69	72.6	72.6	72.57	72.83
Latent Heat-Btu/lbm	22.92	22.75	22.73	22.77	22.68	22.6	22.53	22.53	22.51	22.71
Specific Heat-Btu/lbm/F	0.312	0.313	0.313	0.313	0.314	0.314	0.314	0.314	0.314	0.313
Liq. Viscosity-lbm/ft-hr	0.298	0.296	0.296	0.296	0.294	0.293	0.292	0.292	0.292	0.296
Liq. Conductivity-Btu/hr-ft-F	0.0196	0.0195	0.0195	0.0195	0.0194	0.0194	0.0193	0.0193	0.0193	0.0195
Liq. Prandtl No.	4.74	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.76	4.75
Inlet Flow Rate-GPM	2.9									
Outlet Liq. Flow Rate-GPM	1.3									
Outlet Vap. Flow Rate-GPM	1.8									
Inlet Temperature-F	188.1									
Outlet Liq. Temperature-F	191.1									
Outlet Vap. Temperature-F	187.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	111.4									
Water outlet Temp.-F	164.3									
Inlet G-lbm/hr/ft2	510459		Temp	183.7	Density	73.76				
Subcooling-F	3.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	576.6	579.6	577.2	576.1	576.3	573	575.4	578.5	570	572.8
Heat Loss-Watts	18.6	4.4	6	7	7.6	6.9	5.1	6.3	6.7	40.1
Heat Flux-Btu/Hr/ft2	9995	10047	10005	9986	9990	9933	9974	10028	9881	9929
Wall Temp. #3-F	195.5	196.8	196.5	196.5	198.1	196.3	196.4	197.2	196.8	206.3
Wall Temp. #4-F	196.3	196.2	197.4	197.1	197.8	197.2	196.8	197.5	197.8	205.9
Wall Temp. #5-F	196.3	195.4	198.3	196.9	197	196.3	195.5	196.5	196.6	197.1
Wall Temp. #1-F	91.6	198.4	195.5	195.7	196.5	197	195.9	198.6	195.7	193.1
Wall Temp. #2-F	196.7	196.5	196.1	196.2	196.6	196.9	196.4	196.4	196.3	195.3
Instream Temp.-F	189.6	190.3	190.4	190.2	190.7	191	191.3	191.3	191.4	190.5
Avg. Wall Temp.-F	196.2	196.5	196.4	196.6	197	196.7	196.2	196.8	196.6	199.5
Avg. Wall DT.-F	6.2	5.7	5.5	5.9	5.8	5.3	4.4	5.1	4.8	8.6
Remaining Subcool-F	-0.2									
Exit Quality	0	0.05	0.1	0.15	0.2	0.26	0.31	0.36	0.41	0.46
EXP. H-Btu/Hr/ft2/F	1599.6	1756.2	1811.6	1693	1715.4	1891.5	2241.8	1971.4	2061.3	1155.7
COMPUTED H										
Jallouk	1284	1246.3	1212.2	1188.3	1176.2	1160.8	1174.2	166.9	166.9	166.9
Szady1(Cudo tube)	1838.6	1852.4	1850.2	1847	1853.3	1851.8	1859.6	166.9	166.9	166.9
Szady2	1625.8	1699.3	1697.2	1692.7	1701.2	1700.5	1709.8	166.9	166.9	166.9
(RLIQ)	111800	109769	104190	98267	93091	87671	82196	82196	82196	82196
(F)	1.082	1.44	1.779	2.022	2.213	2.379	2.527	2.527	2.527	2.527
(HLIQ)	185.4	246.9	305.1	346.7	379.7	408.2	433.6	433.6	433.6	433.6
(HBOIL)	1837.9	1850.9	1847.5	1842.9	1848	1845.2	1851.7	1851.7	1851.7	1851.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	93.4									
DP Liquid Density-lbm/ft3	90.99									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.351	1.156	1.748	2.538	3.289					
Zero Corrections-psid	0.133	0.101	0.139	0.038	0.086					
Corrected DP-Psid	0.218	1.055	1.609	2.502	3.203					
Actual DP-ft	2.07	2.91	4.32	5.05	6.01					
Measured TP-Psig	189.4				300.1					
Measured Overall-ft	******									
Computed DP-ft	1.89	3.38	4.71	5.94	7.03					
Friction-ft	0.06	0.16	0.3	0.47	0.66					
Acceleration-ft	0.05	0.09	0.13	0.18	0.24					
Elevation-ft	1.79	3.13	4.27	5.28	6.13					

Run#	676									
Test Fluid	C4F10									
Date:	7/6/93									
Time:	11:11									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	186.9									
Sat. Temperature-F(inlet)	190.5									
Liq. Density-lbm/ft3	73.22	72.97	73.02	73.05	72.97	72.88	72.8	72.8	72.74	72.97
Latent Heat-Btu/lbm	23.01	22.81	22.86	22.88	22.81	22.75	22.68	22.68	22.64	22.81
Specific Heat-Btu/lbm/F	0.312	0.313	0.313	0.312	0.313	0.313	0.313	0.313	0.314	0.313
Liq. Viscosity-lbm/ft-hr	0.3	0.297	0.297	0.288	0.297	0.296	0.295	0.295	0.294	0.297
Liq. Conductivity-Btu/hr-ft-F	0.0197	0.0195	0.0196	0.0196	0.0195	0.0195	0.0194	0.0194	0.0194	0.0195
Liq. Prandtl No.	4.74	4.75	4.74	4.74	4.75	4.75	4.75	4.75	4.75	4.75
Inlet Flow Rate-GPM	2									
Outlet Liq. Flow Rate-GPM	1.3									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	187.6									
Outlet Liq. Temperature-F	190.7									
Outlet Vap. Temperature-F	187.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	112.7									
Water outlet Temp.-F	164.8									
Inlet G-lbm/hr/ft2	354356		Temp		181.8	Density		74.24		
Subcooling-F	2.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	579.5	576.4	588.1	584.9	575	577.5	581.3	574.4	425.1	0
Heat Loss-Watts	18.7	4.4	6	7.1	7.6	6.9	5.2	6.4	6.8	33.5
Heat Flux-Btu/Hr/ft2	10045	9992	10194	10139	9967	10011	10076	9957	7369	0
Wall Temp. #3-F	194.7	196.1	196.1	195.8	197.1	195.4	196	197.5	197.7	191
Wall Temp. #4-F	195.5	195.3	196.8	196.5	196.8	196.3	196.4	197.3	198.2	191.4
Wall Temp. #5-F	195.6	194.7	197.6	196.4	196	195.4	195.2	195.8	195.2	191.6
Wall Temp. #1-F	92.1	195.6	194.9	194.9	195.5	196.1	195.4	195.9	194.4	190.5
Wall Temp. #2-F	196.2	195.7	195.7	195.4	195.6	196	195.7	195.9	194.8	191.1
Instream Temp.-F	189.1	190	189.8	189.7	190	190.3	190.6	190.6	190.8	190
Avg. Wall Temp.-F	195.5	195.7	195.9	195.9	196	195.8	195.7	196.5	196.1	191.1
Avg. Wall DT.-F	5.9	5.2	5.6	5.7	5.5	5	4.7	5.4	4.9	1.1
Remaining Subcool-F	-2.4									
Exit Quality	0.03	0.1	0.18	0.25	0.32	0.4	0.47	0.54	0.6	0.6
EXP. H-Btu/Hr/ft2/F	1689.4	1912.8	1815.8	1765.8	1804.2	1983.2	2151	1833.7	1495.6	0
COMPUTED H										
Jallouk	1308.3	1275.5	1261.7	1236.8	1211.4	1205	124.7	124.7	124.7	124.7
Szady1(Cudo tube)	1838.9	1843.8	1860.8	1855.1	1842.8	1850.5	124.7	124.7	124.7	124.7
Szady2	1629.6	1688.9	1654.5	1646.7	1687.4	1696.7	124.7	124.7	124.7	124.7
(RLIQ)	76123	72787	68948	61137	55656	50170	50170	50170	50170	50170
(F)	1.326	1.725	2.077	2.348	2.568	2.759	2.759	2.759	2.759	2.759
(HLIQ)	169.6	220.9	265.9	300.6	328.8	353.3	353.3	353.3	353.3	353.3
(HBOIL)	1838.4	1842.7	1859	1852.4	1839.3	1846.2	1846.2	1846.2	1846.2	1846.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	93.5									
DP Liquid Density-lbm/ft3	90.98									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.276	1.354	2.059	2.949	3.834					
Zero Corrections-psid	0.133	0.101	0.139	0.036	0.086					
Corrected DP-Psid	0.143	1.253	1.92	2.913	3.748					
Actual DP-ft	2.21	2.51	3.69	4.23	4.92					
Measured TP-Psig	186.9				300.1					
Measured Overall-ft	******									
Computed DP-ft	1.64	2.89	3.97	4.94	6					
Friction-ft	0.04	0.11	0.21	0.32	0.41					
Acceleration-ft	0.03	0.06	0.1	0.14	0.16					
Elevation-ft	1.57	2.72	3.67	4.48	5.43					

15756
17207

Run#	677									
Test Fluid	C4F10									
Date:	7/6/93									
Time:	11:11									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	186.5									
Sat. Temperature-F(inlet)	190.4									
Liq. Density-lbm/ft3	73.13	73	73.02	73	72.97	72.88	72.74	72.66	72.6	72.91
Latent Heat-Btu/lbm	22.94	22.83	22.86	22.83	22.81	22.75	22.64	22.57	22.53	22.77
Specific Heat-Btu/lbm/F	0.312	0.313	0.313	0.313	0.313	0.313	0.314	0.314	0.314	0.313
Liq. Visoosity-lbm/ft-hr	0.299	0.297	0.297	0.297	0.297	0.296	0.294	0.293	0.292	0.296
Liq. Conductivity-Btu/hr-ft-F	0.0196	0.0196	0.0196	0.0196	0.0195	0.0195	0.0194	0.0194	0.0193	0.0195
Liq. Prandtl No.	4.74	4.75	4.74	4.75	4.75	4.75	4.75	4.75	4.75	4.75
Inlet Flow Rate-GPM	1.1									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	187.7									
Outlet Liq. Temperature-F	190.9									
Outlet Vap. Temperature-F	188.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	118									
Water outlet Temp.-F	176.8									
Inlet G-lbm/hr/ft2	197815		Temp	177.3	Density	75.36				
Subcooling-F	2.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	574.8	569.9	574.1	571.8	574.4	577.8	363.8	155.2	101.5	72.9
Heat Loss-Watts	19.6	4.6	6.3	7.5	8.2	7.9	6.4	7.2	7.3	39.2
Heat Flux-Btu/Hr/ft2	9964	9879	9952	9912	9957	10016	6306	2690	1759	1264
Wall Temp. #3-F	194.4	195.6	195	195.5	197.1	197.4	204	199.5	196.7	193.1
Wall Temp. #4-F	195.1	194.9	196.3	196.1	196.8	198.1	204	199.4	197.1	193.8
Wall Temp. #5-F	195.3	194.1	197.2	195.7	195.8	196.8	198.3	197.9	196.9	195.9
Wall Temp. #1-F	92.6	195.2	194	194.2	195.2	197.3	196.3	196.7	195.8	195.3
Wall Temp. #2-F	195.7	195.3	194.9	194.8	195.5	196.9	196.4	196.9	195.8	195.6
Instream Temp.-F	189.4	189.9	189.8	189.9	190	190.3	190.8	191.1	191.3	190.2
Avg. Wall Temp.-F	195.1	195.3	195.1	195.4	195.8	197.4	199.8	198.1	196.5	194.7
Avg. Wall DT.-F	5.3	4.9	4.8	5	5.4	6.6	8.7	6.9	5.1	4.5
Remaining Subcool-F	-6.8									
Exit Quality	0.09	0.22	0.35	0.48	0.61	0.74	0.82	0.85	0.88	0.89
EXP. H-Btu/Hr/ft2/F	1889	2014.6	2073.1	1971.7	1852.4	1506.7	723.6	392.3	346.3	281.9
COMPUTED H										
Jallouk	1372.3	1328.7	1306.6	1286.1	78.2	78.2	78.2	78.2	78.2	78.2
Szady1(Cudo tube)	1834.3	1831.9	1837.8	1835.4	78.2	78.2	78.2	78.2	78.2	78.2
Szady2	1620.9	1675.9	1681.7	1679.4	78.2	78.2	78.2	78.2	78.2	78.2
(RLIQ)	41340	36771	31144	25565	25565	25565	25565	25565	25565	25565
(F)	1.585	2.135	2.561	2.9	2.9	2.9	2.9	2.9	2.9	2.9
(HLIQ)	127.3	171.5	205.7	232.9	232.9	232.9	232.9	232.9	232.9	232.9
(HBOIL)	1834.1	1831.4	1837	1834.1	1834.1	1834.1	1834.1	1834.1	1834.1	1834.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	95									
DP Liquid Density-lbm/ft3	90.75									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.183	1.61	2.467	3.573	4.493					
Zero Corrections-psid	0.093	0.079	0.091	0.008	0.059					
Corrected DP-Psid	0.09	1.531	2.376	3.565	4.434					
Actual DP-ft	2.31	1.95	2.78	2.92	3.53					
Measured TP-Psig	186.5				300.1					
Measured Overall-ft	******									
Computed DP-ft	1.38	2.32	3.05	3.74	4.71					
Friction-ft	0.02	0.05	0.1	0.15	0.18					
Acceleration-ft	0.02	0.04	0.07	0.08	0.09					
Elevation-ft	1.34	2.23	2.88	3.51	4.44					

Run#	678									
Test Fluid	C4F10									
Date:	7/7/93									
Time:	8:40									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	194.7									
Sat. Temperature-F(inlet)	193.7									
Liq. Density-lbm/ft3	72.94	72.77	72.52	72.4	72.34	72.32	72.14	72.11	72.08	72.49
Latent Heat-Btu/lbm	22.79	22.66	22.47	22.38	22.33	22.31	22.18	22.15	22.13	22.44
Specific Heat-Btu/lbm/F	0.313	0.314	0.315	0.315	0.315	0.315	0.316	0.316	0.317	0.315
Liq. Viscosity-lbm/ft-hr	0.296	0.294	0.291	0.29	0.289	0.289	0.287	0.287	0.288	0.291
Liq. Conductivity-Btu/hr-ft-F	0.0195	0.0194	0.0193	0.0192	0.0192	0.0192	0.019	0.019	0.019	0.0193
Liq. Prandtl No.	4.75	4.75	4.76	4.76	4.76	4.76	4.77	4.77	4.77	4.76
Inlet Flow Rate-GPM	5.7									
Outlet Liq. Flow Rate-GPM	1.4									
Outlet Vap. Flow Rate-GPM	2.7									
Inlet Temperature-F	188.3									
Outlet Liq. Temperature-F	191.8									
Outlet Vap. Temperature-F	188.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	109.7									
Water outlet Temp.-F	162.3									
Inlet G-lbm/hr/ft2	891638		Temp	187	Density	72.89				
Subcooling-F	5.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	875.2	874.1	861.8	868.1	871.1	873.4	868.6	420.3	94.3	109.4
Heat Loss-Watts	19.4	4.6	6.2	7.3	8	7.5	5.7	6.3	6.4	35.3
Heat Flux-Btu/Hr/ft2	15171	15152	14939	15048	15100	15140	15057	7286	1635	1896
Wall Temp. #3-F	198.8	201.1	199	199.1	201.5	199.2	199.9	197.5	194.3	193.4
Wall Temp. #4-F	199.3	198.9	200.3	199.9	200.4	200.1	200.3	197.2	194.7	194.2
Wall Temp. #5-F	199.3	198	200.1	199.1	199.2	199.7	199.2	197	195	194.1
Wall Temp. #1-F	89.2	199.7	198	198	198.7	200.4	200.3	196.9	194	192.4
Wall Temp. #2-F	199.9	199.7	199	198.6	199.1	200.4	200.7	197	194	193.1
Instream Temp.-F	190.1	190.7	191.6	192	192.2	192.3	192.9	193	193.1	191.7
Avg. Wall Temp.-F	199.3	199.9	199.1	199	199.4	199.9	200.1	197.1	194.4	193.4
Avg. Wall DT.-F	8.5	8.5	6.8	6.3	6.5	6.9	6.5	3.8	1.2	1.7
Remaining Subcool-F	2.5									
Exit Quality	-0.03	0	0.04	0.08	0.12	0.16	0.2	0.22	0.23	0.23
EXP. H-Btu/Hr/ft2/F	1776.6	1789.9	2196.9	2371.6	2334.7	2205.1	2316.6	1922	1333.2	1146.3
COMPUTED H										
Jallouk	1517.4	1520.8	1437	1409	1369.3	283.9	283.8	283.8	283.8	283.9
Szady1(Cudo tube)	2293.6	2300.5	2299	2314.7	2323.3	283.9	283.8	283.8	283.8	283.9
Szady2	2174.8	2184.5	2184.7	2204.3	2215	283.9	283.8	283.8	283.8	283.9
(RLIQ)	218931	220383	217226	209419	200986	200986	200988	200986	200986	200986
(F)	1.004	1.004	1.398	1.682	1.889	1.889	1.889	1.889	1.889	1.889
(HLIQ)	292.8	293	408.3	491.3	551.8	551.8	551.8	551.8	551.8	551.8
(HBOIL)	2292	2298.9	2294.7	2307.3	2312.9	2312.9	2312.9	2312.9	2312.9	2312.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	92.3									
DP Liquid Density-lbm/ft3	91.16									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.319	0.794	1.148	1.77	2.345					
Zero Corrections-psid	0.122	0.089	0.139	0.02	-0.044					
Corrected DP-Psid	0.197	0.705	1.009	1.75	2.389					
Actual DP-ft	2.12	3.63	5.54	6.58	7.67					
Measured TP-Psig	194.7				300.1					
Measured Overall-ft	******									
Computed DP-ft	2.15	4.18	6	7.85	9.59					
Friction-ft	0.15	0.4	0.76	1.13	1.44					
Acceleration-ft	0.04	0.22	0.34	0.44	0.45					
Elevation-ft	1.96	3.55	4.89	6.28	7.7					

1896 → 1680

Run#	679									
Test Fluid	C4F10									
Date:	7/7/93									
Time:	8:40									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	189.4									
Sat. Temperature-F(inlet)	191.5									
Liq. Density-lbm/ft3	73.33	73.13	73.02	72.97	72.94	72.86	72.69	72.69	72.69	73.08
Latent Heat-Btu/lbm	23.09	22.94	22.86	22.81	22.79	22.73	22.6	22.6	22.6	22.9
Specific Heat-Btu/lbm/F	0.311	0.312	0.313	0.313	0.313	0.313	0.314	0.314	0.314	0.312
Liq. Viscosity-lbm/ft-hr	0.301	0.289	0.297	0.297	0.296	0.295	0.293	0.293	0.293	0.298
Liq. Conductivity-Btu/hr-ft-F	0.0198	0.0196	0.0196	0.0195	0.0195	0.0195	0.0194	0.0194	0.0194	0.0196
Liq. Prandtl No.	4.74	4.74	4.74	4.75	4.75	4.75	4.75	4.75	4.75	4.74
Inlet Flow Rate-GPM	4.8									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	187.2									
Outlet Liq. Temperature-F	189.9									
Outlet Vap. Temperature-F	186.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	114.6									
Water outlet Temp.-F	174.5									
Inlet G-lbm/hr/ft2	841631		Temp	184.8	Density	73.47				
Subcooling-F	4.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	875.9	857.4	852.8	859.5	848.1	397.5	107.8	109.9	93.9	110.7
Heat Loss-Watts	19.3	4.6	6.2	7.3	8	6.9	4.7	5.8	6.3	34.8
Heat Flux-Btu/Hr/ft2	15183	14862	14783	14899	14701	6890	1869	1905	1628	1919
Wall Temp. #3-F	196.9	198.8	196.8	197.3	199.8	194.9	192.4	192.3	192.1	191.5
Wall Temp. #4-F	197.4	196.8	198.4	198	198.4	195.7	192.5	192.4	192.6	192.2
Wall Temp. #5-F	197.4	195.9	197.7	197.3	197.5	195.7	192.4	192.3	192.5	191.8
Wall Temp. #1-F	90.7	197.8	196.8	195.9	196.7	196	192.4	192	192	190.2
Wall Temp. #2-F	197.8	197.8	197.2	196.6	197.1	195.4	192.4	192.2	192.2	190.8
Instream Temp.-F	188.7	189.4	189.8	190	190.1	190.4	191	191	191	189.6
Avg. Wall Temp.-F	197.4	197.8	197.2	197.1	197.4	195.6	192.4	192.2	192.3	191.3
Avg. Wall DT.-F	8	7.7	6.7	6.5	6.7	4.9	1.3	1.2	1.2	1.6
Remaining Subcool-F	1									
Exit Quality	-0.01	0.03	0.08	0.12	0.17	0.19	0.19	0.2	0.2	0.21
EXP. H-Btu/Hr/ft2/F	1900.5	1923.1	2204.1	2309.3	2207.2	1416.7	1399.2	1651	1349.2	1189.4
COMPUTED H										
Jallouk	1550.3	1493.8	1423.8	1409.9	249	249	249	249	249	249.1
Szady1(Cudo tube)	2274.8	2261.6	2263.1	2276.1	249	249	249	249	249	249.1
Szady2	2149.1	2134.7	2137.2	2153.1	249	249	249	249	249	249.1
(RLIQ)	183017	182655	175149	167157	167157	167157	167157	167157	167157	167157
(F)	1.004	1.238	1.638	1.889	1.889	1.889	1.889	1.889	1.889	1.889
(HLIQ)	266.6	316.6	419	483.2	483.2	483.2	483.2	483.2	483.2	483.2
(HBOIL)	2273.7	2259.6	2258.3	2268.8	2268.8	2268.8	2268.8	2268.8	2268.8	2268.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	93.6									
DP Liquid Density-lbm/ft3	90.96									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.35	0.923	1.418	2.107	2.686					
Zero Corrections-psid	0.122	0.089	0.139	0.02	-0.044					
Corrected DP-Psid	0.228	0.834	1.279	2.087	2.73					
Actual DP-ft	2.04	3.34	4.95	5.85	6.91					
Measured TP-Psig	189.4				300.1					
Measured Overall-ft	******									
Computed DP-ft	2.08	3.86	5.51	7.29	8.96					
Friction-ft	0.13	0.36	0.65	0.89	1.11					
Acceleration-ft	0.09	0.21	0.28	0.3	0.31					
Elevation-ft	1.86	3.29	4.57	6.11	7.53					

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Run#	680									
Test Fluid	C4F10									
Date:	7/7/93									
Time:	8:40									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	191.8									
Sat. Temperature-F(inlet)	192.5									
Liq. Density-lbm/ft3	73.16	72.86	72.66	72.69	72.6	72.54	72.43	72.4	72.37	72.74
Latent Heat-Btu/lbm	22.96	22.73	22.57	22.6	22.53	22.49	22.4	22.38	22.35	22.64
Specific Heat-Btu/lbm/F	0.312	0.313	0.314	0.314	0.314	0.315	0.315	0.315	0.315	0.314
Liq. Viscosity-lbm/ft-hr	0.289	0.295	0.293	0.283	0.282	0.292	0.29	0.29	0.29	0.294
Liq. Conductivity-Btu/hr-ft-F	0.0197	0.0195	0.0194	0.0194	0.0193	0.0193	0.0192	0.0192	0.0192	0.0194
Liq. Prandtl No.	4.74	4.75	4.75	4.75	4.75	4.76	4.76	4.76	4.76	4.75
Inlet Flow Rate-GPM	3.8									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2									
Inlet Temperature-F	187.9									
Outlet Liq. Temperature-F	191.1									
Outlet Vap. Temperature-F	187.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	117.2									
Water outlet Temp.-F	176.2									
Inlet G-lbm/hr/ft2	665343		Temp	185.2	Density	73.37				
Subcooling-F	4.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	877.1	877.4	883	885.9	482.1	202	106.8	97.7	95.5	110.9
Heat Loss-Watts	19.1	4.5	6.1	7.2	7.8	6.5	4.6	5.7	6.2	34.7
Heat Flux-Btu/Hr/ft2	15204	15209	15306	15357	8357	3502	1851	1694	1655	1922
Wall Temp. #3-F	197.9	200	198.1	199	200.7	194.4	193.3	193.2	193.2	192.6
Wall Temp. #4-F	198.4	198	199.7	199.9	199.5	195.2	193.5	193.5	193.7	193.3
Wall Temp. #5-F	198.5	197.1	199.3	198.6	199.4	194.9	193.5	193.4	193.8	193
Wall Temp. #1-F	91.1	198.9	197.9	197.1	197.4	195.8	193.2	192.8	193	191.5
Wall Temp. #2-F	199	198.9	198.3	197.9	197	195	193.3	193.1	193.1	192.1
Instream Temp.-F	189.3	190.4	191.1	191	191.3	191.5	191.9	192	192.1	190.8
Avg. Wall Temp.-F	198.5	199	198.4	198.7	198.3	195.1	193.4	193.2	193.4	192.5
Avg. Wall DT.-F	8.5	7.9	6.6	7	6.6	3.4	1.4	1.1	1.2	1.6
Remaining Subcool-F	0.3									
Exit Quality	0	0.05	0.11	0.17	0.21	0.22	0.23	0.23	0.24	0.25
EXP. H-Btu/Hr/ft2/F	1796.5	1934.4	2333.9	2207.7	1257.2	1024.8	1345.1	1507.5	1396.8	1191.7
COMPUTED H										
Jallouk	1613.5	1557.8	1512.9	206.3	206.3	206.3	206.3	206.3	206.3	206.3
Szady1(Cudo tube)	2284.3	2300.6	2318.6	206.3	206.3	206.3	206.3	206.3	206.3	206.3
Szady2	2161.8	2183.9	2207.2	206.3	206.3	206.3	206.3	206.3	206.3	206.3
(RLIQ)	145628	143741	138121	138121	138121	138121	138121	138121	138121	138121
(F)	1.004	1.408	1.801	1.801	1.801	1.801	1.801	1.801	1.801	1.801
(HLIQ)	212.7	298.6	381.9	381.9	381.9	381.9	381.9	381.9	381.9	381.9
(HBOIL)	2283.7	2298.9	2315.1	2315.1	2315.1	2315.1	2315.1	2315.1	2315.1	2315.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	94.1									
DP Liquid Density-lbm/ft3	90.89									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.318	1.077	1.684	2.419	3.051					
Zero Corrections-psid	0.122	0.089	0.139	0.02	-0.044					
Corrected DP-Psid	0.196	0.988	1.545	2.399	3.095					
Actual DP-ft	2.11	3.04	4.44	5.25	6.21					
Measured TP-Psig	191.8				300.1					
Measured Overall-ft	******									
Computed DP-ft	1.99	3.57	5.16	6.84	8.41					
Friction-ft	0.09	0.27	0.45	0.61	0.77					
Acceleration-ft	0.08	0.16	0.2	0.21	0.22					
Elevation-ft	1.82	3.14	4.51	6.02	7.42					

11817

Run#	681									
Test Fluid	C4F10									
Date:	7/7/93									
Time:	8:40									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	188.7									
Sat. Temperature-F(inlet)	191.2									
Liq. Density-lbm/ft3	73.16	72.91	72.97	72.91	72.91	72.83	72.69	72.69	72.69	73
Latent Heat-Btu/lbm	22.96	22.77	22.81	22.77	22.77	22.71	22.6	22.6	22.6	22.83
Specific Heat-Btu/lbm/F	0.312	0.313	0.313	0.313	0.313	0.313	0.314	0.314	0.314	0.313
Liq. Viscosity-lbm/ft-hr	0.299	0.296	0.297	0.296	0.296	0.295	0.293	0.293	0.293	0.297
Liq. Conductivity-Btu/hr-ft-F	0.0197	0.0195	0.0195	0.0195	0.0195	0.0195	0.0194	0.0194	0.0194	0.0196
Liq. Prandtl No.	4.74	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75
Inlet Flow Rate-GPM	2.9									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2									
Inlet Temperature-F	187.7									
Outlet Liq. Temperature-F	190.5									
Outlet Vap. Temperature-F	186.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	115.2									
Water outlet Temp.-F	173.8									
Inlet G-lbm/hr/ft2	513113		Temp	182.2	Density	74.14				
Subcooling-F	3.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	860.9	863.2	865.3	866.8	353.5	274.5	96.6	92.2	95.7	111.4
Heat Loss-Watts	18.8	4.5	6	7.1	7.2	6.3	4.4	5.5	6.1	33.9
Heat Flux-Btu/Hr/ft2	14923	14963	14999	15025	6128	4758	1674	1598	1659	1931
Wall Temp. #3-F	196.7	198.8	197.3	198.2	194.9	193.6	192.1	192.2	192	191.6
Wall Temp. #4-F	197.2	196.8	198.5	198.7	195	194.5	192.3	192.1	192.6	192.2
Wall Temp. #5-F	197.4	195.8	198.3	197.9	194.8	193.6	192.3	192	192.6	192.1
Wall Temp. #1-F	92.1	197.5	196.1	196.3	194.9	194.3	191.9	191.7	191.8	190.6
Wall Temp. #2-F	197.7	197.5	197.2	196.9	194.8	193.8	192	191.9	192.1	191.3
Instream Temp.-F	189.3	190.2	190	190.2	190.2	190.5	191	191	191	189.9
Avg. Wall Temp.-F	197.3	197.7	197.3	197.8	194.9	194	192.1	192	192.2	191.6
Avg. Wall DT.-F	7.3	6.8	6.6	6.9	4.4	3.3	1	0.9	1.1	1.6
Remaining Subcool-F	-1.9									
Exit Quality	0.03	0.1	0.18	0.25	0.28	0.31	0.31	0.32	0.33	0.34
EXP. H-Btu/Hr/ft2/F	2051.1	2209	2273.6	2178.9	1393.3	1448.5	1603.4	1760.6	1448.8	1227.8
COMPUTED H										
Jallouk	1643.3	1566.5	1522.3	167.6	167.6	167.6	167.6	167.6	167.6	167.6
Szady1(Cudo tube)	2263.8	2279.7	2280.5	167.6	167.6	167.6	167.6	167.6	167.6	167.6
Szady2	2137.1	2158.3	2158.7	167.6	167.6	167.6	167.6	167.6	167.6	167.6
(RLIQ)	110848	106248	97547	97547	97547	97547	97547	97547	97547	97547
(F)	1.285	1.692	2.061	2.061	2.061	2.061	2.061	2.061	2.061	2.061
(HLIQ)	221.1	291.3	354.9	354.9	354.9	354.9	354.9	354.9	354.9	354.9
(HBOIL)	2263.1	2278.1	2277.6	2277.6	2277.6	2277.6	2277.6	2277.6	2277.6	2277.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	94.8									
DP Liquid Density-lbm/ft3	90.78									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.281	1.277	1.958	2.77	3.486					
Zero Corrections-psid	0.122	0.089	0.139	0.02	-0.044					
Corrected DP-Psid	0.159	1.188	1.819	2.75	3.53					
Actual DP-ft	2.17	2.69	3.87	4.52	5.32					
Measured TP-Psig	188.7				300.1					
Measured Overall-ft	******									
Computed DP-ft	1.74	3.11	4.43	6	7.46					
Friction-ft	0.08	0.21	0.36	0.48	0.59					
Acceleration-ft	0.07	0.13	0.16	0.17	0.18					
Elevation-ft	1.6	2.76	3.91	5.35	6.69					

1817

Run#	682									
Test Fluid	C4F10									
Date:	7/7/93									
Time:	8:40									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	188.7									
Sat. Temperature-F(inlet)	191.2									
Liq. Density-lbm/ft3	73.16	72.88	72.94	72.97	72.88	72.8	72.74	72.72	72.63	72.94
Latent Heat-Btu/lbm	22.98	22.75	22.79	22.81	22.75	22.68	22.64	22.62	22.55	22.79
Specific Heat-Btu/lbm/F	0.312	0.313	0.313	0.313	0.313	0.313	0.314	0.314	0.314	0.313
Liq. Viscosity-lbm/ft-hr	0.299	0.296	0.296	0.297	0.296	0.295	0.294	0.294	0.293	0.296
Liq. Conductivity-Btu/hr-ft-F	0.0197	0.0195	0.0195	0.0195	0.0195	0.0194	0.0194	0.0194	0.0193	0.0195
Liq. Prandtl No.	4.74	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75
Inlet Flow Rate-GPM	2									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	1.1									
Inlet Temperature-F	187.8									
Outlet Liq. Temperature-F	190.6									
Outlet Vap. Temperature-F	187.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	116.5									
Water outlet Temp.-F	175.4									
Inlet G-lbm/hr/ft2	354355		Temp	181.8	Density	74.24				
Subcooling-F	3.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	858.7	860	860.7	856.4	301.9	263.5	95.8	90.6	95.9	111.5
Heat Loss-Watts	18.7	4.4	6	7.6	7	6.3	4.4	5.5	6.1	34
Heat Flux-Btu/Hr/ft2	14885	14908	14920	14845	5233	4568	1661	1570	1662	1933
Wall Temp. #3-F	196.4	198.7	197.4	207.4	194.1	193.7	192.3	192.2	192.3	191.8
Wall Temp. #4-F	197	196.8	198.7	207.9	194.4	194.6	192.3	192.4	193	192.4
Wall Temp. #5-F	197.2	195.8	198.5	198.8	193.8	193.7	192.3	192.3	192.9	192.4
Wall Temp. #1-F	93.5	197.4	196.3	196.2	194	194.3	192	191.8	192.1	190.7
Wall Temp. #2-F	197.4	197.4	197.4	197.1	194	193.7	192.1	192.1	192.2	191.5
Instream Temp.-F	189.3	190.3	190.1	190	190.3	190.6	190.8	190.9	191.2	190.1
Avg. Wall Temp.-F	197	197.6	197.5	202.6	194.1	194.1	192.2	192.2	192.5	191.8
Avg. Wall DT.-F	7	6.6	6.7	11.9	3.5	3.3	1.3	1.2	1.2	1.6
Remaining Subcool-F	-4.4									
Exit Quality	0.06	0.17	0.28	0.38	0.42	0.46	0.47	0.48	0.49	0.5
EXP. H-Btu/Hr/ft2/F	2118.2	2258.3	2234.9	1247.1	1489.5	1397.4	1253.4	1320.8	1357.2	1229
COMPUTED H										
Jallouk	1707.5	1655.7	124.7	124.7	124.7	124.7	124.7	124.7	124.6	124.7
Szady1(Cudo tube)	2260.8	2276.6	124.7	124.7	124.7	124.7	124.7	124.7	124.6	124.7
Szady2	2133.6	2154.8	124.7	124.7	124.7	124.7	124.7	124.7	124.6	124.7
(RLIQ)	75220	69472	69472	69472	69472	69472	69472	69472	69472	69472
(F)	1.46	1.955	1.955	1.955	1.955	1.955	1.955	1.955	1.955	1.955
(HLIQ)	186.9	250.3	250.3	250.3	250.3	250.3	250.3	250.3	250.3	250.3
(HBOIL)	2260.4	2275.6	2275.6	2275.6	2275.6	2275.6	2275.6	2275.6	2275.6	2275.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	96.1									
DP Liquid Density-lbm/ft3	90.58									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.273	1.491	2.25	3.172	3.988					
Zero Corrections-psid	0.122	0.089	0.139	0.02	-0.044					
Corrected DP-Psid	0.151	1.402	2.111	3.152	4.032					
Actual DP-ft	2.19	2.2	3.28	3.71	4.3					
Measured TP-Psig	188.7				300.1					
Measured Overall-ft	******									
Computed DP-ft	1.53	2.66	3.75	5.18	6.52					
Friction-ft	0.05	0.14	0.24	0.31	0.38					
Acceleration-ft	0.05	0.1	0.12	0.12	0.13					
Elevation-ft	1.44	2.43	3.39	4.75	6.02					

Run#	683									
Test Fluid	C4F10									
Date:	7/7/93									
Time:	15:28									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	190.7									
Sat. Temperature-F(inlet)	192.1									
Liq. Density-lbm/ft3	72.88	72.63	72.57	72.54	72.54	72.43	72.32	72.26	72.23	72.54
Latent Heat-Btu/lbm	22.75	22.55	22.51	22.49	22.49	22.4	22.31	22.27	22.24	22.49
Specific Heat-Btu/lbm/F	0.313	0.314	0.314	0.315	0.315	0.315	0.315	0.316	0.316	0.315
Liq. Viscosity-lbm/ft-hr	0.296	0.293	0.292	0.292	0.292	0.29	0.289	0.288	0.288	0.292
Liq. Conductivity-Btu/hr-ft-F	0.0195	0.0193	0.0193	0.0193	0.0193	0.0192	0.0192	0.0191	0.0191	0.0193
Liq. Prandtl No.	4.75	4.75	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76
Inlet Flow Rate-GPM	1.1									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	188.1									
Outlet Liq. Temperature-F	192									
Outlet Vap. Temperature-F	189.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	120.8									
Water outlet Temp.-F	179.9									
Inlet G-lbm/hr/ft2	196920		Temp	178.7	Density	75.01				
Subcooling-F	4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	865.6	887.4	869.9	656.7	248.5	85.2	81.8	87.7	97	111.2
Heat Loss-Watts	19.4	4.6	6.3	7.5	7.5	6.6	5.1	6.3	6.8	37.2
Heat Flux-Btu/Hr/ft2	15005	15036	14975	11383	4308	1477	1414	1520	1681	1928
Wall Temp. #3-F	196.7	199.3	198.3	199.3	195	193.5	195	194.8	195.2	195
Wall Temp. #4-F	197.4	197.3	200	199.7	195.5	194.4	195	194.8	195.4	195.7
Wall Temp. #5-F	197.4	196	199.2	197.6	194.7	193.5	195	194.8	195.3	195
Wall Temp. #1-F	95.3	197.4	196.8	196.3	194.7	193.9	194.1	194.8	194.8	192.7
Wall Temp. #2-F	197.8	197.6	197.7	197	194.8	193.2	194.4	195.1	194.8	193.5
Instream Temp.-F	190.3	191.2	191.4	191.5	191.5	191.9	192.3	192.5	192.6	191.5
Avg. Wall Temp.-F	197.3	197.9	198.2	198.2	194.9	193.8	194.7	194.9	195.1	194.4
Avg. Wall DT.-F	6.3	6	6.1	6.2	3.2	1.9	2.3	2.3	2.4	2.8
Remaining Subcool-F	-10.3									
Exit Quality	0.14	0.34	0.54	0.69	0.74	0.76	0.78	0.8	0.82	0.85
EXP. H-Btu/Hr/ft2/F	2364.1	2497.4	2445.6	1832.9	1333.5	794.8	605.5	663.5	693.7	690.2
COMPUTED H										
Jallouk	1832.4	77.9	77.9	77.9	77.9	77.9	77.9	77.9	77.9	77.9
Szady1(Cudo tube)	2283.2	77.9	77.9	77.9	77.9	77.9	77.9	77.9	77.9	77.9
Szady2	2162.7	77.9	77.9	77.9	77.9	77.9	77.9	77.9	77.9	77.9
(RLIQ)	40493	40493	40493	40493	40493	40493	40493	40493	40493	40493
(F)	1.735	1.735	1.735	1.735	1.735	1.735	1.735	1.735	1.735	1.735
(HLIQ)	138.9	138.9	138.9	138.9	138.9	138.9	138.9	138.9	138.9	138.9
(HBOIL)	2283	2283	2283	2283	2283	2283	2283	2283	2283	2283
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	97.7									
DP Liquid Density-lbm/ft3	90.33									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.369	1.747	2.632	3.685	4.621					
Zero Corrections-psid	0.122	0.089	0.139	0.02	-0.044					
Corrected DP-Psid	0.247	1.658	2.493	3.665	4.665					
Actual DP-ft	2	1.69	2.52	2.69	3.04					
Measured TP-Psig	190.7				300.1					
Measured Overall-ft	******									
Computed DP-ft	1.27	2.07	3.07	4.16	4.99					
Friction-ft	0.02	0.06	0.1	0.14	0.17					
Acceleration-ft	0.03	0.06	0.07	0.07	0.08					
Elevation-ft	1.22	1.94	2.9	3.95	4.73					

Run#	685									
Test Fluid	C4F8									
Date:	7/19/93									
Time:	13:47									
Flow Area-ft2	0.00396									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	4.2									
Sat. Temperature-F(inlet)	30									
Liq. Density-lbm/ft3	93.65	93.65	93.65	93.58	93.59	93.59	93.7	93.7	93.7	93.6
Latent Heat-Btu/lbm	44.88	44.88	44.88	44.83	44.84	44.84	44.92	44.92	44.92	44.85
Specific Heat-Btu/lbm/F	0.261	0.261	0.261	0.261	0.261	0.261	0.26	0.26	0.26	0.261
Liq. Viscosity-lbm/ft-hr	0.879	0.879	0.879	0.876	0.877	0.877	0.882	0.882	0.882	0.877
Liq. Conductivity-Btu/hr-ft-F	0.0378	0.0378	0.0378	0.0378	0.0378	0.0378	0.0379	0.0379	0.0379	0.0378
Liq. Prandtl No.	6.05	6.05	6.05	6.04	6.04	6.04	6.06	6.06	6.06	6.05
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	75.3									
Outlet Liq. Temperature-F	78.7									
Outlet Vap. Temperature-F	78.7									
Water Flow Rate-GPM										
Water inlet Temp.-F	81.3									
Water outlet Temp.-F	81.4									
Inlet G-lbm/hr/ft2	223712		Temp	76.1	Density	93.74				
Subcooling-F	****									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0.1	0	1	0	0.6	3
Heat Loss-Watts	-2.4	-0.6	-0.8	-0.7	-0.7	-0.5	-0.4	-0.6	-0.7	-3.5
Heat Flux-Btu/hr/ft2	0	0	0	0	2	0	17	0	10	52
Wall Temp. #3-F	76.9	76.9	76.9	77.5	77.5	77.5	76.9	76.9	76.9	78.4
Wall Temp. #4-F	76.9	76.9	76.9	77.5	77.3	77.5	76.9	76.5	76.9	78.4
Wall Temp. #5-F	76.7	76.4	76.4	77.1	76.9	77.1	76.4	76.4	76.4	77.8
Wall Temp. #1-F	80.1	76.9	76.9	77.5	77.5	77.5	76.8	76.9	76.9	78.2
Wall Temp. #2-F	76.9	76.9	76.9	77.5	77.5	77.5	76.7	76.9	76.9	77.8
Instream Temp.-F	76.8	76.8	76.8	77.3	77.2	77.2	76.4	76.4	76.4	77.1
Avg. Wall Temp.-F	76.9	76.9	76.9	77.4	77.3	77.4	76.7	76.7	76.8	78.1
Avg. Wall DT.-F	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.4	1
Remaining Subcool-F	-45.3									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/hr/ft2/F	0	0	0	0	17.3	0	51.1	0	28	51.1
COMPUTED H										
Jallouk	65.1	65.1	65.1	65.2	65.2	65.1	65	65	65	65.1
Szady1(Cudo tube)	81.9	83.8	84.8	85.8	86.6	87.4	88	88.6	89.3	90
Szady2	81.9	83.8	84.8	85.8	86.6	87.4	88	88.6	89.3	90
(RLIQ)	16838	16836	16834	16702	16696	16684	16572	16571	16569	16664
(F)	1.033	1.057	1.07	1.081	1.091	1.101	1.11	1.119	1.127	1.134
(HLIQ)	81.9	83.8	84.8	85.8	86.6	87.4	88	88.6	89.3	90
(HBOIL)	3.5	7	7	7.1	7.1	14.4	24.5	23.1	29	76.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	86									
DP Liquid Density-lbm/ft3	92.35									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.092	0.065	-0.459	-0.318	0.061					
Zero Corrections-psid	0.117	0.098	0.045	0.027	0.084					
Corrected DP-Psid	-0.025	-0.021	-0.504	-0.345	-0.023					
Actual DP-ft	2.01	3.98	6.7	8.42	9.78					
Measured TP-Psig	4.2				300.1					
Measured Overall-ft	******									
Computed DP-ft	2.01	4.01	5.97	7.88	9.86					
Friction-ft	0.01	0.01	0.02	0.03	0.04					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	5.94	7.85	9.62					

Run#	686									
Test Fluid	C4F8									
Date:	7/19/93									
Time:	13:47									
Flow Area-ft2	0.00398									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	4.2									
Sat. Temperature-F(inlet)	30									
Liq. Density-lbm/ft3	93.44	93.49	93.49	93.37	93.41	93.42	93.55	93.55	93.55	93.49
Latent Heat-Btu/lbm	44.72	44.76	44.76	44.66	44.69	44.7	44.8	44.8	44.8	44.76
Specific Heat-Btu/lbm/F	0.261	0.261	0.261	0.261	0.261	0.261	0.261	0.261	0.261	0.261
Liq. Viscosity-lbm/ft-hr	0.869	0.871	0.871	0.865	0.867	0.868	0.874	0.874	0.874	0.871
Liq. Conductivity-Btu/hr-ft-F	0.0377	0.0377	0.0377	0.0376	0.0377	0.0377	0.0378	0.0378	0.0378	0.0377
Liq. Prandtl No.	6.01	6.02	6.02	6	6.01	6.01	6.03	6.03	6.03	6.02
Inlet Flow Rate-GPM	2									
Outlet Liq. Flow Rate-GPM	0									
Outlet Vap. Flow Rate-GPM	1.8									
Inlet Temperature-F	76.5									
Outlet Liq. Temperature-F	78.1									
Outlet Vap. Temperature-F	78.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	81.3									
Water outlet Temp.-F	81.5									
Inlet G-lbm/hr/ft2	446566		Temp	77.4	Density	93.56				
Subcooling-F	****									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0.1	0	1	0	0.5	3
Heat Loss-Watts	-2.2	-0.5	-0.7	-0.6	-0.6	-0.5	-0.9	-0.5	-0.7	-3.5
Heat Flux-Btu/Hr/ft2	0	0	0	0	2	0	17	0	9	52
Wall Temp. #3-F	78	77.7	77.7	78.9	78.2	78	77.5	77.5	77.5	78.7
Wall Temp. #4-F	78	77.7	77.7	78.8	78	78	77.5	77.2	77.5	78.7
Wall Temp. #5-F	77.7	77.7	77.7	78	77.9	77.8	77.1	77.2	77.1	77.9
Wall Temp. #1-F	80.5	77.7	77.7	79.1	78.3	78	77.5	77.5	77.5	78.5
Wall Temp. #2-F	77.7	77.7	77.7	78.9	78.2	78.2	77.5	77.5	77.5	78.1
Instream Temp.-F	78.3	77.9	77.9	78.8	78.5	78.4	77.5	77.5	77.5	77.9
Avg. Wall Temp.-F	77.8	77.7	77.7	78.7	78.1	78	77.4	77.4	77.4	78.4
Avg. Wall DT.-F	0	0	0	0	0	0	0	0	0	0.5
Remaining Subcool-F	-46.5									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	0	0	0	173.3	0	1733.4	0	866.7	108.9
COMPUTED H										
Jallouk	113.6	113.5	113.5	113.7	113.6	113.5	113.3	113.3	113.3	113.4
Szady1(Cudo tube)	142.8	146	147.7	149.5	150.8	152.1	153.2	154.3	155.5	156.8
Szady2	142.8	146	147.7	149.5	150.8	152.1	153.2	154.3	155.5	156.8
(RLIQ)	33690	33513	33510	33760	33672	33640	33385	33381	33378	33488
(F)	1.033	1.057	1.069	1.08	1.09	1.1	1.11	1.118	1.128	1.134
(HLIQ)	142.8	146	147.7	149.5	150.8	152.1	153.2	154.3	155.5	156.8
(HBOIL)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	35.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	88.3									
DP Liquid Density-lbm/ft3	92.91									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.08	0.043	-0.391	-0.369	-0.038					
Zero Corrections-psid	0.117	0.086	0.045	0.027	0.064					
Corrected DP-Psid	-0.037	-0.043	-0.436	-0.396	-0.122					
Actual DP-ft	2.03	4.02	6.6	8.51	9.94					
Measured TP-Psig	4.2				300.1					
Measured Overall-ft	******									
Computed DP-ft	2.03	4.05	6.03	7.97	9.77					
Friction-ft	0.03	0.05	0.08	0.11	0.14					
Acceleration-ft	0	0	0	0.01	0.01					
Elevation-ft	2	4	5.94	7.85	9.62					

Run#	687									
Test Fluid	C4F8									
Date:	7/19/93									
Time:	13:47									
Flow Area-ft2	0.00398									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	4.2									
Sat. Temperature-F(inlet)	30									
Liq. Density-lbm/ft3	93.31	93.31	93.33	93.2	93.26	93.24	93.42	93.42	93.42	93.3
Latent Heat-Btu/lbm	44.62	44.62	44.63	44.53	44.57	44.56	44.7	44.7	44.7	44.61
Specific Heat-Btu/lbm/F	0.261	0.261	0.261	0.261	0.261	0.261	0.261	0.261	0.261	0.261
Liq. Viscosity-lbm/ft-hr	0.862	0.862	0.863	0.856	0.859	0.858	0.868	0.868	0.868	0.861
Liq. Conductivity-Btu/hr-ft-F	0.0376	0.0376	0.0376	0.0375	0.0375	0.0375	0.0377	0.0377	0.0377	0.0376
Liq. Prandtl No.	5.99	5.99	5.99	5.97	5.98	5.98	6.01	6.01	6.01	5.99
Inlet Flow Rate-GPM	3									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2.2									
Inlet Temperature-F	77.7									
Outlet Liq. Temperature-F	79.6									
Outlet Vap. Temperature-F	78.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	81.3									
Water outlet Temp.-F	81.5									
Inlet G-lbm/hr/ft2	668855		Temp		78.4	Density	93.42			
Subcooling-F	****									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	0	1	0	0.5	2.5
Heat Loss-Watts	-1.9	-0.5	-0.6	-0.5	-0.5	-0.4	-0.9	-0.5	-0.6	-3
Heat Flux-Btu/Hr/ft2	0	0	0	0	0	0	17	0	9	43
Wall Temp. #3-F	79	78.9	78.9	80	79.6	79.6	78.4	78.4	78.4	80
Wall Temp. #4-F	79.2	78.9	78.9	79.7	79.6	79.6	78.4	78.4	78.4	80
Wall Temp. #5-F	78.9	78.9	78.9	79.6	79.6	79.6	78.4	78.4	78.3	78.9
Wall Temp. #1-F	81.1	78.9	78.9	80.1	79.6	79.6	78.4	78.4	78.4	79.5
Wall Temp. #2-F	78.9	78.9	78.9	80.1	79.6	79.6	78.4	78.4	78.4	79.4
Instream Temp.-F	79.2	79.2	79.1	80	79.6	79.7	78.4	78.4	78.4	79.3
Avg. Wall Temp.-F	79	78.9	78.9	79.8	79.6	79.6	78.4	78.4	78.4	79.6
Avg. Wall DT.-F	0	0	0	0	0	0	0	0	0	0.3
Remaining Subcool-F	-47.7									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	0	0	0	0	0	1733.4	0	866.7	167.9
COMPUTED H										
Jallouk	167.2	167.2	167.1	167.4	167.3	167.3	166.9	166.9	166.9	167.1
Szady1(Cudo tube)	197.6	202.1	204.5	206.9	208.8	210.8	211.9	213.5	215	216.8
Szady2	197.6	202.1	204.5	206.9	208.8	210.8	211.9	213.5	215	216.8
(RLIQ)	50753	50746	50698	51080	50902	50940	50380	50375	50370	50748
(F)	1.032	1.056	1.069	1.079	1.09	1.099	1.109	1.117	1.125	1.132
(HLIQ)	197.6	202.1	204.5	206.9	208.8	210.8	211.9	213.5	215	216.8
(HBOIL)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	19.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	86.6									
DP Liquid Density-lbm/ft3	92.27									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.064	0.008	-0.181	-0.455	-0.16					
Zero Corrections-psid	0.117	0.088	0.045	0.027	0.084					
Corrected DP-Psid	-0.053	-0.078	-0.226	-0.482	-0.244					
Actual DP-ft	2.06	4.08	6.28	8.66	10.14					
Measured TP-Psig	4.2				300.1					
Measured Overall-ft	******									
Computed DP-ft	2.06	4.11	6.12	8.09	9.92					
Friction-ft	0.05	0.11	0.17	0.22	0.28					
Acceleration-ft	0	0	0.01	0.01	0.02					
Elevation-ft	2	4	5.95	7.86	9.63					

Run#	688									
Test Fluid	C4F8									
Date:	7/19/93									
Time:	13:47									
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	4.3									
Sat. Temperature-F(inlet)	30.2									
Liq. Density-lbm/ft3	92.98	93.02	93	92.99	92.99	92.99	93.17	93.17	93.17	93.09
Latent Heat-Btu/lbm	44.35	44.38	44.37	44.36	44.36	44.36	44.51	44.51	44.51	44.44
Specific Heat-Btu/lbm/F	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262
Liq. Viscosity-lbm/ft-hr	0.845	0.847	0.846	0.845	0.845	0.845	0.855	0.855	0.856	0.85
Liq. Conductivity-Btu/hr-ft-F	0.0373	0.0374	0.0374	0.0373	0.0373	0.0373	0.0375	0.0375	0.0375	0.0374
Liq. Prandtl No.	5.93	5.93	5.93	5.93	5.93	5.93	5.96	5.96	5.96	5.95
Inlet Flow Rate-GPM	4									
Outlet Liq. Flow Rate-GPM	1.4									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	79.3									
Outlet Liq. Temperature-F	81									
Outlet Vap. Temperature-F	79.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	81.4									
Water outlet Temp.-F	81.8									
Inlet G-lbm/hr/ft2	889410		Temp		80.2	Density	93.17			
Subcooling-F	****									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	0	0.9	0	0.3	2
Heat Loss-Watts	-1.4	-0.3	-0.5	-0.4	-0.4	-0.3	-0.2	-0.4	-0.5	-2.4
Heat Flux-Btu/hr/ft2	0	0	0	0	0	0	16	0	5	35
Wall Temp. #3-F	81.3	80.8	80.8	81.5	81.3	81.3	80.2	80.2	80.2	81.1
Wall Temp. #4-F	81.3	80.8	80.8	81.5	81.1	81.3	80.2	80	80.2	81.1
Wall Temp. #5-F	80.5	80.5	80.5	81.3	81	81	79.7	79.6	79.5	80.5
Wall Temp. #1-F	81.7	81.1	80.8	81.5	81.5	81.3	80.2	80.2	80.2	81.1
Wall Temp. #2-F	81	81	80.9	81.5	81.5	81.4	80.2	80.2	80.2	81.1
Instream Temp.-F	81.6	81.3	81.4	81.5	81.5	81.5	80.2	80.2	80.2	80.8
Avg. Wall Temp.-F	81	80.9	80.8	81.5	81.3	81.2	80.1	80	80.1	81
Avg. Wall DT.-F	0	0	0	0	0	0	0	0	0	0.2
Remaining Subcool-F	-49.1									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/hr/ft2/F	0	0	0	0	0	0	1560.1	0	520	194.8
COMPUTED H										
Jallouk	198.4	198.3	198.4	198.4	198.4	198.4	197.8	197.8	197.7	198
Szady1(Cudo tube)	249.4	254.9	257.9	260.6	263	265.3	266.9	268.9	270.8	272.9
Szady2	249.4	254.9	257.9	260.6	263	265.3	266.9	268.9	270.8	272.9
(RLIQ)	68879	68693	68744	68796	68790	68783	68018	68011	68005	68345
(F)	1.032	1.055	1.068	1.079	1.089	1.098	1.108	1.116	1.124	1.131
(HLIQ)	249.4	254.9	257.9	260.6	263	265.3	266.9	268.9	270.8	272.9
(HBOIL)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	13.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	87.2									
DP Liquid Density-lbm/ft3	92.18									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.035	-0.04	-0.134	-0.578	-0.299					
Zero Corrections-psid	0.117	0.086	0.045	0.027	0.084					
Corrected DP-Psid	-0.082	-0.126	-0.179	-0.605	-0.383					
Actual DP-ft	2.11	4.16	6.22	8.86	10.37					
Measured TP-Psig	4.3				300.1					
Measured Overall-ft	******									
Computed DP-ft	2.09	4.19	6.24	8.28	10.13					
Friction-ft	0.09	0.18	0.28	0.38	0.47					
Acceleration-ft	0	0.01	0.01	0.02	0.03					
Elevation-ft	2	4	5.95	7.86	9.63					

Run#	689									
Test Fluid	C4F8									
Date:	7/19/93									
Time:	14:41									
Flow Area-ft2	0.00396									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	4.4									
Sat. Temperature-F(inlet)	30.5									
Liq. Density-lbm/ft3	92.95	92.95	92.95	92.89	92.89	92.89	93.1	93.1	93.1	93
Latent Heat-Btu/lbm	44.33	44.33	44.33	44.28	44.28	44.28	44.45	44.45	44.45	44.37
Specific Heat-Btu/lbm/F	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262
Liq. Viscosity-lbm/ft-hr	0.843	0.843	0.843	0.84	0.84	0.84	0.851	0.851	0.851	0.846
Liq. Conductivity-Btu/hr-ft-F	0.0373	0.0373	0.0373	0.0373	0.0373	0.0373	0.0374	0.0374	0.0374	0.0374
Liq. Prandtl No.	5.92	5.92	5.92	5.91	5.91	5.91	5.95	5.95	5.95	5.93
Inlet Flow Rate-GPM	4									
Outlet Liq. Flow Rate-GPM	1.4									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	80.2									
Outlet Liq. Temperature-F	82.1									
Outlet Vap. Temperature-F	79.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	81.6									
Water outlet Temp.-F	81.7									
Inlet G-lbm/hr/ft2	888741		Temp	80.7	Density	93.1				
Subcooling-F	****									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	0	0.9	0	0.3	1.7
Heat Loss-Watts	-1.2	-0.3	-0.4	-0.3	-0.3	-0.3	-0.2	-0.4	-0.5	-2.1
Heat Flux-Btu/Hr/ft2	0	0	0	0	0	0	16	0	5	29
Wall Temp. #3-F	81.8	81.8	81.8	82.2	82.2	82.2	80.7	80.7	80.7	82
Wall Temp. #4-F	81.8	81.8	81.8	82.2	82.2	82.2	80.7	80.7	80.7	82
Wall Temp. #5-F	81.7	81.6	81.7	82.2	82.1	82.1	80.6	80.7	80.7	81.4
Wall Temp. #1-F	81.6	81.8	81.8	82.2	82.2	82.2	80.7	80.7	80.7	81.8
Wall Temp. #2-F	81.8	81.8	81.8	82.2	82.2	82.2	80.7	80.7	80.7	81.4
Instream Temp.-F	81.8	81.8	81.8	82.2	82.2	82.2	80.7	80.7	80.7	81.4
Avg. Wall Temp.-F	81.8	81.8	81.8	82.2	82.2	82.2	80.7	80.7	80.7	81.7
Avg. Wall DT.-F	0	0	0	0	0	0	0	0	0	0.3
Remaining Subcool-F	-49.7									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	0	0	0	0	0	1560.1	0	520	92.5
COMPUTED H										
Jallouk	198.4	198.4	198.4	198.6	198.6	198.6	197.9	197.9	197.8	198.1
Szady1(Cudo tube)	249.3	255	257.9	260.8	263.2	265.4	268.9	268.9	270.8	272.9
Szady2	249.3	255	257.9	260.8	263.2	265.4	268.9	268.9	270.8	272.9
(RLIQ)	68946	68935	68928	69158	69152	69145	68258	68250	68243	68645
(F)	1.032	1.055	1.068	1.078	1.088	1.098	1.107	1.116	1.124	1.131
(HLIQ)	249.3	255	257.9	260.8	263.2	265.4	268.9	268.9	270.8	272.9
(HEOIL)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	24.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	87									
DP Liquid Density-lbm/ft3	92.21									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.035	-0.037	-0.132	-0.589	-0.308					
Zero Corrections-psid	0.117	0.086	0.045	0.027	0.084					
Corrected DP-Psid	-0.082	-0.123	-0.177	-0.616	-0.39					
Actual DP-ft	2.11	4.16	6.22	8.89	10.39					
Measured TP-Psig	4.4				300.1					
Measured Overall-ft	******									
Computed DP-ft	2.09	4.19	6.24	8.28	10.13					
Friction-ft	0.09	0.18	0.28	0.38	0.47					
Acceleration-ft	0	0.01	0.01	0.02	0.03					
Elevation-ft	2	4	5.95	7.86	9.69					

Run#	690									
Test Fluid	C4F8									
Date:	7/19/93									
Time:	14:45									
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	4.4									
Sat. Temperature-F(inlet)	30.5									
Liq. Density-lbm/ft3	92.85	92.85	92.85	92.82	92.82	92.82	93.03	93.02	93.02	92.92
Latent Heat-Btu/lbm	44.25	44.25	44.25	44.23	44.23	44.23	44.39	44.38	44.38	44.31
Specific Heat-Btu/lbm/F	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262
Liq. Viscosity-lbm/ft-hr	0.838	0.838	0.838	0.837	0.837	0.837	0.847	0.847	0.847	0.842
Liq. Conductivity-Btu/hr-ft-F	0.0372	0.0372	0.0372	0.0372	0.0372	0.0372	0.0374	0.0374	0.0374	0.0373
Liq. Prandtl No.	5.9	5.9	5.9	5.9	5.9	5.9	5.94	5.93	5.93	5.92
Inlet Flow Rate-GPM	3									
Outlet Liq. Flow Rate-GPM	1.4									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	80.3									
Outlet Liq. Temperature-F	82.2									
Outlet Vap. Temperature-F	80.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	81.6									
Water outlet Temp.-F	81.9									
Inlet G-lbm/hr/ft2	888473		Temp	80.9	Density	93.07				
Subcooling-F	****									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	0	0.9	3	3.5	1.8
Heat Loss-Watts	-1.2	-0.3	-0.4	-0.4	-0.4	-0.3	-0.2	-0.4	-0.5	-2
Heat Flux-Btu/Hr/ft2	0	0	0	0	0	0	16	0	5	28
Wall Temp. #3-F	82.3	82	82.2	82.6	82.3	82.4	80.7	80.9	81.1	82.6
Wall Temp. #4-F	82.3	82.1	82.2	82.4	82.4	82.4	80.8	80.5	81.2	82.6
Wall Temp. #5-F	81.8	81.8	81.8	82.2	82.2	82.2	80.5	80.5	80.5	81.4
Wall Temp. #1-F	81.8	82.2	82.2	82.7	82.3	82.4	80.5	80.7	81	82.2
Wall Temp. #2-F	81.8	82.1	82.3	82.6	82.3	82.4	80.6	80.8	81.1	82
Instream Temp.-F	82.5	82.5	82.5	82.7	82.7	82.7	81.2	81.3	81.3	82
Avg. Wall Temp.-F	82.1	82.1	82.2	82.5	82.3	82.4	80.6	80.7	81	82.2
Avg. Wall DT.-F	0	0	0	0	0	0	0	0	0	0.2
Remaining Subcool-F	-49.8									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	0	0	0	0	0	1560.1	0	520	174.7
COMPUTED H										
[illegible]	198.7	198.7	198.7	198.7	198.7	198.7	198	198.1	198	198.2
Szady1(Cudo tube)	249.6	255.2	258.2	260.9	263.3	265.6	267	269.1	271	273.1
Szady2	249.6	255.2	258.2	260.9	263.3	265.6	267	269.1	271	273.1
(RLIQ)	69340	69330	69323	69436	69429	69422	68527	68579	68572	68978
(F)	1.032	1.055	1.067	1.078	1.088	1.097	1.107	1.115	1.123	1.13
(HLIQ)	249.6	255.2	258.2	260.9	263.3	265.6	267	269.1	271	273.1
(HBOIL)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	12.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	87.3									
DP Liquid Density-lbm/ft3	92.17									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.038	-0.036	-0.131	-0.653	-0.31					
Zero Corrections-psid	0.117	0.086	0.045	0.027	0.084					
Corrected DP-Psid	-0.081	-0.122	-0.176	-0.68	-0.394					
Actual DP-ft	2.11	4.16	6.22	8.99	10.41					
Measured TP-Psig	4.4				300.1					
Measured Overall-ft	******									
Computed DP-ft	2.09	4.19	6.24	8.26	10.14					
Friction-ft	0.09	0.18	0.28	0.38	0.47					
Acceleration-ft	0	0.01	0.01	0.02	0.03					
Elevation-ft	2	4	5.95	7.88	9.64					

Run:	691.									
Test Fluid	C4F8									
Date:	7/19/93									
Time:	14:49									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	4.5									
Sat. Temperature-F(inlet)	30.8									
Liq. Density-lbm/ft3	92.78	92.79	92.79	92.82	92.82	92.82	92.99	93	92.98	92.86
Latent Heat-Btu/lbm	44.19	44.2	44.2	44.23	44.23	44.23	44.36	44.37	44.35	44.26
Specific Heat-Btu/lbm/F	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262
Liq. Viscosity-lbm/ft-hr	0.834	0.835	0.835	0.837	0.837	0.837	0.845	0.846	0.845	0.839
Liq. Conductivity-Btu/hr-ft-F	0.0372	0.0372	0.0372	0.0372	0.0372	0.0372	0.0373	0.0374	0.0373	0.0372
Liq. Prandtl No.	5.89	5.89	5.89	5.9	5.9	5.9	5.93	5.93	5.93	5.9
Inlet Flow Rate-GPM	4									
Outlet Liq. Flow Rate-GPM	1.4									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	81.3									
Outlet Liq. Temperature-F	82.5									
Outlet Vap. Temperature-F	80.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	82									
Water outlet Temp.-F	82.2									
Inlet G-lbm/hr/ft2	887803		Temp		81.4	Density		93		
Subcooling-F	****									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	0	0.9	0	0.3	1.2
Heat Loss-Watts	-1.1	-0.3	-0.4	-0.3	-0.3	-0.2	-0.2	-0.3	-0.4	-1.7
Heat Flux-Btu/Hr/ft2	0	0	0	0	0	0	16	0	5	21
Wall Temp. #3-F	82.7	82.5	82.6	82.7	82.7	82.7	81.4	81.4	81.4	83.4
Wall Temp. #4-F	82.8	82.5	82.6	82.7	82.7	82.7	81.4	81.4	81.4	83.4
Wall Temp. #5-F	82.5	82.5	82.5	82.7	82.6	82.6	81.4	81.4	81.4	82.3
Wall Temp. #1-F	81.8	82.5	82.5	82.7	82.7	82.7	81.4	81.4	81.4	83.3
Wall Temp. #2-F	82.5	82.5	82.5	82.7	82.7	82.7	81.4	81.4	81.4	82.8
Instream Temp.-F	83	82.9	82.9	82.7	82.7	82.7	81.5	81.4	81.6	82.4
Avg. Wall Temp.-F	82.6	82.5	82.5	82.7	82.7	82.7	81.4	81.4	81.4	83
Avg. Wall DT.-F	0	0	0	0	0	0	0	0	0	0.6
Remaining Subcool-F	-50.5									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	0	0	0	0	0	1560.1	0	520	32.5
COMPUTED H										
Jallouk	198.8	198.7	198.7	198.6	198.6	198.6	198	198	198.1	198.4
Szady1(Cudo tube)	249.7	255.3	258.2	260.8	263.2	265.4	267	269	271	273.1
Szady2	249.7	255.3	258.2	260.8	263.2	265.4	267	269	271	273.1
(RLIQ)	69587	69517	69510	69383	69376	69389	68852	68586	68697	69163
(F)	1.032	1.055	1.067	1.078	1.088	1.097	1.107	1.115	1.123	1.13
(HLIQ)	249.7	255.3	258.2	260.8	263.2	265.4	267	269	271	273.1
(HBOIL)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	51.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	87.1									
DP Liquid Density-lbm/ft3	92.2									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.038	-0.035	0.126	0.74	-0.316					
Zero Corrections-psid	0.117	0.088	0.045	0.027	0.084					
Corrected DP-Psid	-0.079	-0.121	-0.174	-0.787	-0.4					
Actual DP-ft	2.11	4.18	6.23	9.13	10.42					
Measured TP-Psig	4.5				300.1					
Measured Overall-ft	******									
Computed DP-ft	2.09	4.19	6.24	8.26	10.14					
Friction-ft	0.09	0.18	0.28	0.37	0.47					
Acceleration-ft	0	0.01	0.01	0.02	0.03					
Elevation-ft	2	4	5.95	7.86	9.64					

Run#	692									
Test Fluid	C4F8									
Date:	7/19/93									
Time:	14:54									
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	4.5									
Sat. Temperature-F(inlet)	30.8									
Liq. Density-lbm/ft3	92.72	92.74	92.72	92.74	92.74	92.74	92.89	92.89	92.89	92.74
Latent Heat-Btu/lbm	44.15	44.16	44.15	44.16	44.16	44.16	44.28	44.28	44.28	44.16
Specific Heat-Btu/lbm/F	0.263	0.263	0.263	0.263	0.263	0.263	0.262	0.262	0.262	0.263
Liq. Viscosity-lbm/ft-hr	0.832	0.832	0.832	0.832	0.832	0.832	0.84	0.84	0.84	0.832
Liq. Conductivity-Btu/hr-ft-F	0.0371	0.0372	0.0371	0.0372	0.0372	0.0372	0.0373	0.0373	0.0373	0.0372
Liq. Prandtl No.	5.88	5.88	5.88	5.88	5.88	5.88	5.91	5.91	5.91	5.88
Inlet Flow Rate-GPM	4									
Outlet Liq. Flow Rate-GPM	1.4									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	81.6									
Outlet Liq. Temperature-F	82.9									
Outlet Vap. Temperature-F	81.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	82.2									
Water outlet Temp.-F	82.4									
Inlet G-lbm/hr/ft2	886997		Temp		82	Density	92.92			
Subcooling-F	****									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	0	0.9	0	0.3	1.2
Heat Loss-Watts	-1	-0.2	-0.3	-0.3	-0.3	-0.2	-0.2	-0.3	-0.4	-1.7
Heat Flux-Btu/Hr/ft2	0	0	0	0	0	0	16	0	5	21
Wall Temp. #3-F	83.1	83.1	83.1	83.3	83.3	83.3	82.2	82.2	82.2	83.7
Wall Temp. #4-F	83.1	83.1	83.1	83.3	83.3	83.3	82.2	81.9	82.2	83.7
Wall Temp. #5-F	82.9	82.9	82.9	83.3	83.2	83.1	81.8	81.9	81.9	83
Wall Temp. #1-F	82.1	83.1	83.1	83.3	83.3	83.3	81.9	82.2	82.1	83.7
Wall Temp. #2-F	83.1	83.1	83.1	83.3	83.3	83.3	82.2	82.2	82.2	83.3
Instream Temp.-F	83.4	83.3	83.4	83.3	83.3	83.3	82.2	82.2	82.2	83.3
Avg. Wall Temp.-F	83.1	83.1	83.1	83.3	83.3	83.3	82.1	82.1	82.1	83.5
Avg. Wall DT-F	0	0	0	0	0	0	0	0	0	0.2
Remaining Subcool-F	-50.8									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	0	0	0	0	0	1560.1	0	520	116.2
COMPUTED H										
Jallouk	198.8	198.8	198.8	198.7	198.7	198.7	198.2	198.2	198.2	198.6
Szady1(Cudo tube)	249.7	255.3	258.3	260.8	263.2	265.5	267.1	269.1	271	273.3
Szady2	249.7	255.3	258.3	260.8	263.2	265.5	267.1	269.1	271	273.3
(RLIQ)	69765	69694	69748	69680	69673	69666	69002	68995	68988	69638
(F)	1.032	1.055	1.067	1.078	1.088	1.097	1.106	1.115	1.122	1.129
(HLIQ)	249.7	255.3	258.3	260.8	263.2	265.5	267.1	269.1	271	273.3
(HBOIL)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	14.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	87.8									
DP Liquid Density-lbm/ft3	92.1									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.038	-0.033	-0.127	-0.69	-0.323					
Zero Corrections-psid	0.117	0.086	0.045	0.027	0.084					
Corrected DP-Psid	-0.079	-0.119	-0.172	-0.717	-0.407					
Actual DP-ft	2.11	4.16	6.23	9.06	10.44					
Measured TP-Psig	4.5				300.1					
Measured Overall-ft	******									
Computed DP-ft	2.09	4.19	6.24	8.26	10.14					
Friction-ft	0.09	0.18	0.28	0.37	0.47					
Acceleration-ft	0	0.01	0.01	0.02	0.03					
Elevation-ft	2	4	5.95	7.87	9.64					

Run#	693									
Test Fluid	C4F8									
Date:	7/19/93									
Time:	15:01									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19696									
Sat. Pressure-Psig	4.6									
Sat. Temperature-F(inlet)	30.8									
Liq. Density-lbm/ft3	92.62	92.65	92.65	92.62	92.64	92.64	92.81	92.82	92.81	92.64
Latent Heat-Btu/lbm	44.07	44.09	44.09	44.07	44.08	44.08	44.22	44.23	44.22	44.08
Specific Heat-Btu/lbm/F	0.263	0.263	0.263	0.263	0.263	0.263	0.262	0.262	0.262	0.263
Liq. Viscosity-lbm/ft-hr	0.827	0.828	0.828	0.827	0.827	0.827	0.836	0.837	0.836	0.827
Liq. Conductivity-Btu/hr-ft-F	0.0371	0.0371	0.0371	0.0371	0.0371	0.0371	0.0372	0.0372	0.0372	0.0371
Liq. Prandtl No.	5.86	5.86	5.86	5.86	5.86	5.86	5.89	5.9	5.89	5.86
Inlet Flow Rate-GPM	4									
Outlet Liq. Flow Rate-GPM	1.4									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	82.3									
Outlet Liq. Temperature-F	83.6									
Outlet Vap. Temperature-F	81.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	82.9									
Water outlet Temp.-F	83									
Inlet G-lbm/hr/ft2	886190		Temp		82.6	Density	92.84			
Subcooling-F	****									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	0	0.9	0	0.3	1.2
Heat Loss-Watts	-1.1	-0.3	-0.4	-0.3	-0.3	-0.2	-0.2	-0.3	-0.4	-1.6
Heat Flux-Btu/Hr/ft2	0	0	0	0	0	0	16	0	6	21
Wall Temp. #3-F	83.9	83.6	83.6	84.1	84	84	82.7	82.6	82.7	84.3
Wall Temp. #4-F	83.9	83.6	83.6	84	84	84	82.7	82.6	82.7	84.3
Wall Temp. #5-F	83.6	83.6	83.6	84	84	84	82.5	82.5	82.6	83.8
Wall Temp. #1-F	82.3	83.8	83.6	84.3	84	84	82.6	82.6	82.6	84.3
Wall Temp. #2-F	83.8	83.8	83.6	84.2	84	84	82.7	82.7	82.6	84.2
Instream Temp.-F	84.1	83.9	83.9	84.1	84	84	82.8	82.7	82.8	84
Avg. Wall Temp.-F	83.8	83.7	83.6	84.1	84	84	82.6	82.6	82.6	84.2
Avg. Wall DT.-F	0	0	0	0	0	0	0	0	0	0.2
Remaining Subcool-F	-51.5									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	0	0	0	0	0	1560.1	0	520	116.2
COMPUTED H										
Jallouk	199	198.9	198.9	198.9	198.9	198.9	198.3	198.3	198.3	198.8
Szady1(Cudo tube)	249.9	255.4	258.3	261	263.4	265.6	267.2	269.1	271	273.3
Szady2	249.9	255.4	258.3	261	263.4	265.8	267.2	269.1	271	273.3
(RLIQ)	70126	69994	69987	70101	70033	70026	69296	69229	69282	69998
(F)	1.031	1.054	1.067	1.077	1.087	1.096	1.106	1.114	1.122	1.128
(HLIQ)	249.9	255.4	258.3	261	263.4	265.8	267.2	269.1	271	273.3
(HBOIL)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	14.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	88									
DP Liquid Density-lbm/ft3	92.07									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.038	-0.031	-0.123	-0.728	-0.33					
Zero Corrections-psid	0.117	0.086	0.045	0.027	0.084					
Corrected DP-Psid	-0.079	-0.117	-0.168	-0.755	-0.414					
Actual DP-ft	2.11	4.16	6.22	9.12	10.48					
Measured TP-Psig	4.5				300.1					
Measured Overall-ft	******									
Computed DP-ft	2.09	4.19	6.24	8.26	10.14					
Friction-ft	0.09	0.18	0.28	0.37	0.47					
Acceleration-ft	0	0.01	0.01	0.02	0.03					
Elevation-ft	2	4	5.95	7.87	9.64					

Run#	694									
Test Fluid	C4F8									
Date:	7/19/93									
Time:	15:12									
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	4.6									
Sat. Temperature-F(inlet)	31									
Liq. Density-lbm/ft3	92.41	92.44	92.44	92.45	92.45	92.45	92.54	92.54	92.54	92.44
Latent Heat-Btu/lbm	43.9	43.92	43.92	43.93	43.93	43.93	44	44	44	43.92
Specific Heat-Btu/lbm/F	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263	0.263
Liq. Viscosity-lbm/ft-hr	0.816	0.817	0.817	0.818	0.818	0.818	0.822	0.822	0.822	0.817
Liq. Conductivity-Btu/hr-ft-F	0.0369	0.0369	0.0369	0.0369	0.0369	0.0369	0.037	0.037	0.037	0.0369
Liq. Prandtl No.	5.82	5.82	5.82	5.83	5.83	5.83	5.84	5.84	5.84	5.82
Inlet Flow Rate-GPM	5									
Outlet Liq. Flow Rate-GPM	1.3									
Outlet Vap. Flow Rate-GPM	2.8									
Inlet Temperature-F	84.4									
Outlet Liq. Temperature-F	84.5									
Outlet Vap. Temperature-F	82.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	84									
Water outlet Temp.-F	84									
Inlet G-lbm/hr/ft2	1104188		Temp		84.7	Density	92.54			
Subcooling-F	****									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	0	0.8	0	0.2	0.9
Heat Loss-Watts	-0.7	-0.2	-0.3	-0.2	-0.2	-0.2	-0.1	-0.2	-0.3	-1.2
Heat Flux-Btu/Hr/ft2	0	0	0	0	0	0	14	0	3	18
Wall Temp. #3-F	85.4	85.2	85.2	85.3	85.3	85.3	84.7	84.7	84.7	85.7
Wall Temp. #4-F	85.4	85.2	85.1	85.3	85.3	85.3	84.7	84.7	84.7	85.7
Wall Temp. #5-F	85.2	85	85	85.3	85.3	85.3	84.7	84.6	84.7	85.2
Wall Temp. #1-F	82.7	85.4	85.1	85.5	85.3	85.3	84.7	84.7	84.7	85.7
Wall Temp. #2-F	85.4	85.3	85.1	85.3	85.3	85.3	84.7	84.7	84.7	85.6
Instream Temp.-F	85.6	85.4	85.4	85.3	85.3	85.3	84.7	84.7	84.7	85.4
Avg. Wall Temp.-F	85.4	85.3	85.1	85.3	85.3	85.3	84.7	84.7	84.7	85.6
Avg. Wall DT-F	0	0	0	0	0	0	0	0	0	0.2
Remaining Subcool-F	-53.4									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	0	0	0	0	0	1386.7	0	348.7	87
COMPUTED H										
Jallouk	238.1	237.9	237.9	237.8	237.8	237.8	237.5	237.5	237.4	237.8
Szady1(Cudo tube)	298.9	305.4	308.8	311.9	314.7	317.4	319.5	321.9	324.1	328.8
Szady2	298.9	305.4	308.8	311.9	314.7	317.4	319.5	321.9	324.1	328.8
(RLIQ)	88527	88359	88350	88264	88255	88246	87777	87768	87759	88288
(F)	1.031	1.054	1.066	1.077	1.087	1.096	1.105	1.113	1.12	1.127
(HLIQ)	298.9	305.4	308.8	311.9	314.7	317.4	319.5	321.9	324.1	328.8
(RBOIL)	0.8	0.8	0.8	3.9	0.8	0.8	0.7	0.7	0.7	14.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	88.4									
DP Liquid Density-lbm/ft3	92.01									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.009	-0.09	-0.211	-0.347	-0.482					
Zero Corrections-psid	0.117	0.086	0.045	0.027	0.084					
Corrected DP-Psid	-0.108	-0.176	-0.256	-0.374	-0.566					
Actual DP-ft	2.16	4.26	6.37	8.55	10.71					
Measured TP-Psig	4.6				300.1					
Measured Overall-ft	******									
Computed DP-ft	2.14	4.28	6.38	8.46	10.39					
Friction-ft	0.13	0.27	0.41	0.58	0.7					
Acceleration-ft	0.01	0.01	0.02	0.03	0.04					
Elevation-ft	2	4	5.95	7.87	9.65					

Run#	695									
Test Fluid	C4F8									
Date:	7/19/93									
Time:	15:35									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	4.8									
Sat. Temperature-F(inlet)	31.6									
Liq. Density-lbm/ft3	92.12	92.12	92.12	92.12	92.12	92.12	92.25	92.25	92.25	92.07
Latent Heat-Btu/lbm	43.67	43.67	43.67	43.67	43.67	43.67	43.77	43.77	43.77	43.63
Specific Heat-Btu/lbm/F	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264
Liq. Viscosity-lbm/ft-hr	0.802	0.802	0.802	0.802	0.802	0.802	0.808	0.808	0.808	0.799
Liq. Conductivity-Btu/hr-ft-F	0.0367	0.0367	0.0367	0.0367	0.0367	0.0367	0.0368	0.0368	0.0368	0.0366
Liq. Prandtl No.	5.76	5.76	5.76	5.76	5.76	5.76	5.79	5.79	5.79	5.75
Inlet Flow Rate-GPM	6									
Outlet Liq. Flow Rate-GPM	0.6									
Outlet Vap. Flow Rate-GPM	3.2									
Inlet Temperature-F	86.9									
Outlet Liq. Temperature-F	86.3									
Outlet Vap. Temperature-F	84.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	85.8									
Water outlet Temp.-F	85.8									
Inlet G-lbm/hr/ft2	1320940		Temp		86.7	Density	92.25			
Subcooling-F	****									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	0	0.8	0	0.1	0.4
Heat Loss-Watts	-0.7	-0.2	-0.2	-0.2	-0.2	-0.1	-0.1	-0.2	-0.3	-0.8
Heat Flux-Btu/Hr/ft2	0	0	0	0	0	0	14	0	2	7
Wall Temp. #3-F	87.5	87.2	87.2	87.6	87.5	87.6	86.7	86.7	86.7	88
Wall Temp. #4-F	87.5	87.2	87.2	87.6	87.6	87.6	86.7	86.7	86.7	88
Wall Temp. #5-F	87.4	87.2	87.2	87.6	87.5	87.6	86.7	86.7	86.7	87.8
Wall Temp. #1-F	83.1	87.4	87.2	87.8	87.6	87.6	86.7	86.7	86.7	88.2
Wall Temp. #2-F	87.3	87.3	87.2	87.7	87.6	87.6	86.7	86.7	86.7	88
Instream Temp.-F	87.6	87.6	87.6	87.6	87.6	87.6	86.7	86.7	86.7	88
Avg. Wall Temp.-F	87.4	87.3	87.2	87.6	87.6	87.6	86.7	86.7	86.7	88
Avg. Wall DT.-F	0	0	0	0	0	0	0	0	0	0
Remaining Subcool-F	-55.3									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	0	0	0	0	0	1386.7	0	179.9	693.4
COMPUTED H										
Jallouk	276	276	276	275.9	275.9	275.9	275.3	275.3	275.3	276.1
Szady1(Cudo tube)	346.4	353.9	357.9	361.5	364.7	367.7	370	372.7	375.3	378.5
Szady2	346.4	353.9	357.9	361.5	364.7	367.7	370	372.7	375.3	378.5
(FLIQ)	107787	107770	107760	107749	107738	107727	106864	106853	106842	106067
(F)	1.031	1.053	1.065	1.076	1.085	1.094	1.103	1.111	1.119	1.125
(HLIQ)	348.4	353.9	357.9	361.5	364.7	367.7	370	372.7	375.3	378.5
(HBOIL)	0.8	0.8	0.8	4.1	0.8	0.8	0.8	0.8	0.8	0.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	88.8									
DP Liquid Density-lbm/ft3	91.95									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.023	-0.163	-0.307	-0.444	-0.733					
Zero Corrections-psid	0.117	0.086	0.045	0.027	0.084					
Corrected DP-Psid	-0.14	-0.239	-0.352	-0.471	-0.817					
Actual DP-ft	2.22	4.37	6.54	8.73	11.14					
Measured TP-Psig	4.8				300.1					
Measured Overall-ft	******									
Computed DP-ft	2.19	4.38	6.55	8.69	10.68					
Friction-ft	0.19	0.37	0.57	0.77	0.96					
Acceleration-ft	0.01	0.01	0.03	0.05	0.08					
Elevation-ft	2	4	5.95	7.88	9.66					

Run#	696.									
Test Fluid	C4F8									
Date:	7/13/93									
Time:	15:35									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	5.									
Sat. Temperature-F(inlet)	32.1									
Liq. Density-lbm/ft3	91.91	91.91	91.91	91.84	91.85	91.86	91.89	92.04	92.01	91.82
Latent Heat-Btu/lbm	43.5	43.5	43.5	43.44	43.45	43.47	43.57	43.6	43.58	43.43
Specific Heat-Btu/lbm/F	0.264	0.264	0.264	0.265	0.264	0.264	0.264	0.264	0.264	0.265
Liq. Viscosity-lbm/ft-hr	0.791	0.791	0.791	0.787	0.788	0.789	0.795	0.797	0.796	0.787
Liq. Conductivity-Btu/hr-ft-F	0.0365	0.0365	0.0365	0.0365	0.0365	0.0365	0.0366	0.0366	0.0366	0.0365
Liq. Prandtl No.	5.72	5.72	5.72	5.71	5.71	5.72	5.74	5.75	5.74	5.71
Inlet Flow Rate-GPM	7									
Outlet Liq. Flow Rate-GPM	0									
Outlet Vap. Flow Rate-GPM	3.6									
Inlet Temperature-F	88.8									
Outlet Liq. Temperature-F	88.									
Outlet Vap. Temperature-F	86.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	87.3									
Water outlet Temp.-F	87.2									
Inlet G-lbm/hr/ft2	1537740		Temp		88.1	Density	92.05			
Subcooling-F	****									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	0	0.8	0	0.1	0.1
Heat Loss-Watts	-0.5	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2	-0.4
Heat Flux-Btu/Hr/ft2	0	0	0	0	0	0	14	0	2	2
Wall Temp. #3-F	89.1	89	88.9	89.5	89	89.2	88.1	88.1	88.1	89.5
Wall Temp. #4-F	89.1	89	88.8	89.4	89.1	89.2	88.1	88.1	88.1	89.7
Wall Temp. #5-F	89.1	88.8	88.8	89.2	89	89	88.1	88.1	88.1	89.4
Wall Temp. #1-F	83.4	89.1	88.9	89.6	89.3	89.1	88.1	88.1	88.1	89.8
Wall Temp. #2-F	89.1	89.1	89	89.6	89.2	89.2	88.1	88.1	88.1	89.5
Instream Temp.-F	89.1	89.1	89.1	89.6	89.5	89.4	88.5	88.2	88.4	89.7
Avg. Wall Temp.-F	89.1	89.1	88.9	89.4	89.2	89.1	88.1	88.1	88.1	89.6
Avg. Wall DT.-F	0	0	0	0	0	0	0	0	0	0
Remaining Subcool-F	-56.7									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	0	0	0	0	0	1388.7	0	173.9	173.9
COMPUTED H										
Jallouk	312.8	312.7	312.7	313	312.9	312.8	312.2	311.9	312.1	313
Szady1(Cudo tube)	392.4	400.9	405.3	409.7	413.3	416.6	419.1	421.9	424.9	428.5
Szady2	392.4	400.9	405.3	409.7	413.3	416.6	419.1	421.9	424.9	428.5
(RLIQ)	127161	127141	127129	127685	127558	127431	126401	126052	126263	127722
(F)	1.03	1.053	1.064	1.075	1.084	1.093	1.102	1.11	1.118	1.124
(HLIQ)	392.4	400.9	405.3	409.7	413.3	416.6	419.1	421.9	424.9	428.5
(HBOIL)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	89.1									
DP Liquid Density-lbm/ft3	91.91									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.061	-0.23	-0.422	-0.593	-0.88					
Zero Corrections-psid	0.117	0.086	0.045	0.027	0.084					
Corrected DP-Psid	-0.178	-0.316	-0.467	-0.62	-0.974					
Actual DP-ft	2.28	4.5	6.74	8.98	11.41					
Measured TP-Psig	5				300.1					
Measured Overall-ft	******									
Computed DP-ft	2.25	4.5	6.74	8.95	11.01					
Friction-ft	0.24	0.49	0.75	1.01	1.27					
Acceleration-ft	0.01	0.02	0.04	0.06	0.08					
Elevation-ft	2	4	5.98	7.88	9.66					

Run#	697									
Test Fluid	C4F8									
Date:	7/19/93									
Time:	15:35									
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	5.2									
Sat. Temperature-F(inlet)	32.6									
Liq. Density-lbm/ft3	91.65	91.66	91.65	91.6	91.59	91.59	91.69	91.69	91.68	91.8
Latent Heat-Btu/lbm	43.29	43.3	43.29	43.26	43.25	43.25	43.33	43.33	43.32	43.26
Specific Heat-Btu/lbm/F	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265	0.265
Liq. Viscosity-lbm/ft-hr	0.778	0.779	0.778	0.776	0.776	0.776	0.78	0.78	0.78	0.776
Liq. Conductivity-Btu/hr-ft-F	0.0363	0.0363	0.0363	0.0363	0.0363	0.0363	0.0364	0.0364	0.0364	0.0363
Liq. Prandtl No.	5.68	5.68	5.68	5.67	5.66	5.66	5.68	5.68	5.68	5.67
Inlet Flow Rate-GPM	7.6									
Outlet Liq. Flow Rate-GPM	0									
Outlet Vap. Flow Rate-GPM	3.9									
Inlet Temperature-F	90.3									
Outlet Liq. Temperature-F	90.2									
Outlet Vap. Temperature-F	88.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	88.6									
Water outlet Temp.-F	88									
Inlet G-lbm/hr/ft2	1662729		Temp		90.7	Density		91.68		
Subcooling-F	****									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	0	0	0	0	0	0.7	0	0	0
Heat Loss-Watts	-0.2	-0.1	-0.1	0	-0.1	0	-0.1	-0.1	-0.1	-0.3
Heat Flux-Btu/Hr/ft2	0	0	0	0	0	0	12	0	0	0
Wall Temp. #3-F	90.6	90.5	90.6	91.1	90.8	31	30.1	90.2	90.3	90.9
Wall Temp. #4-F	90.6	90.6	90.6	91	91.1	91.1	90.2	90.2	90.3	90.9
Wall Temp. #5-F	90.6	90.6	90.6	91	91	91	90.1	90.2	90.3	90.8
Wall Temp. #1-F	83.2	90.6	90.6	91.2	91	91	90.1	90.1	90.3	91.2
Wall Temp. #2-F	90.6	90.6	90.6	91.1	91	91	90.1	90.2	90.3	90.9
Instream Temp.-F	90.9	90.8	90.9	91.2	91.3	91.3	90.6	90.6	90.7	91.2
Avg. Wall Temp.-F	90.6	90.6	90.6	91.1	91	91	90.1	90.2	90.3	90.9
Avg. Wall DT.-F	0	0	0	0	0	0	0	0	0	0
Remaining Subcool-F	-57.7									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	0	0	0	0	0	1219.4	0	0	0
COMPUTED H										
Jallouk	334.3	334.2	334.2	334.5	334.5	334.5	333.9	333.9	333.9	334.2
Szady1(Cudo tube)	419.3	428.2	433	437.4	441.3	444.9	447.7	450.9	454	457.3
Szady2	419.3	428.2	433	437.4	441.3	444.9	447.7	450.9	454	457.3
(RLIQ)	139730	139584	139695	140059	140171	140157	139264	139250	139381	139975
(F)	1.03	1.052	1.064	1.074	1.083	1.092	1.101	1.109	1.116	1.123
(HLIQ)	419.3	428.2	433	437.4	441.3	444.9	447.7	450.9	454	457.3
(HBOIL)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	88.4									
DP Liquid Density-lbm/ft3	92.01									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.085	-0.279	-0.497	-0.691	-0.815					
Zero Corrections-psid	0.117	0.086	0.045	0.027	0.084					
Corrected DP-Psid	-0.202	-0.365	-0.542	-0.718	-0.899					
Actual DP-ft	2.33	4.59	6.88	9.16	11.33					
Measured TP-Psig	5.2				300.1					
Measured Overall-ft	******									
Computed DP-ft	2.29	4.58	6.88	9.12	11.22					
Friction-ft	0.28	0.56	0.86	1.16	1.46					
Acceleration-ft	0.01	0.02	0.04	0.07	0.09					
Elevation-ft	2	4	5.98	7.89	9.67					

Run#	698									
Test Fluid	C4F8									
Date:	7/21/93									
Time:	12:06									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	145.4									
Sat. Temperature-F(inlet)	160.2									
Liq. Density-lbm/ft3	81.63	81.72	81.74	81.7	81.63	81.49	81.16	80.96	80.7	80.14
Latent Heat-Btu/lbm	35.2	35.28	35.3	35.27	35.2	35.09	34.82	34.66	34.45	33.98
Specific Heat-Btu/lbm/F	0.292	0.292	0.292	0.292	0.292	0.293	0.294	0.295	0.296	0.298
Liq. Viscosity-lbm/ft-hr	0.442	0.444	0.444	0.444	0.442	0.439	0.432	0.429	0.424	0.413
Liq. Conductivity-Btu/hr-ft-F	0.0292	0.0293	0.0293	0.0293	0.0292	0.0291	0.0289	0.0288	0.0286	0.0282
Liq. Prandtl No.	4.42	4.42	4.43	4.42	4.42	4.41	4.4	4.39	4.38	4.35
Inlet Flow Rate-GPM	1.5									
Outlet Liq. Flow Rate-GPM	0									
Outlet Vap. Flow Rate-GPM	2									
Inlet Temperature-F	150.7									
Outlet Liq. Temperature-F	158.2									
Outlet Vap. Temperature-F	156.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	147.3									
Water outlet Temp.-F	150.3									
Inlet G-lbm/hr/ft2	293575		Temp		149.2	Density		82.01		
Subcooling-F	9.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	2.7	20.9	20.6	20.6	20.6	303.8	0	0	1188.9	1201.7
Heat Loss-Watts	4.4	1.2	1.7	1.8	1.8	2.1	0.9	1.4	3.1	18
Heat Flux-Btu/Hr/ft2	47	362	357	357	362	5266	0	0	20574	20831
Wall Temp. #3-F	150.6	152.6	153.3	154	155.6	166.2	155.2	156.8	170.3	172.9
Wall Temp. #4-F	150.9	152.9	153.3	154	156.7	166.8	155.2	156.8	171.7	171.1
Wall Temp. #5-F	150.4	152.7	153.3	154	155	166.2	156.2	155.5	169.4	171.3
Wall Temp. #1-F	86.4	152.6	152.7	153.8	154.2	166.2	157.6	154.5	168.2	165.2
Wall Temp. #2-F	148.9	152.6	152.9	153.8	154.1	166.2	157.7	154.7	169.4	169.1
Instream Temp.-F	151.2	150.7	150.6	150.8	151.2	151.9	153.6	154.6	155.9	158.7
Avg. Wall Temp.-F	150.2	152.7	153.1	154	155	166.4	156.4	155.7	169.8	169.9
Avg. Wall DT.-F	0	1.9	2.4	3.1	3.8	14.2	2.8	1.1	13	10.3
Remaining Subcool-F	9.5									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	4680.3	187.4	148.7	113.8	95.8	370.5	0	0	1598.3	2029.8
COMPUTED H										
Jallouk	95.6	95.5	95.4	95.5	95.5	95.7	95.9	96.1	96.3	96.8
Szady1(Cudo tube)	118.8	120.4	121.3	122.2	123	123.8	124.8	125.6	126.4	127.4
Szady2	118.8	120.4	121.3	122.2	123	123.8	124.8	125.6	126.4	127.4
(RLIQ)	43446	43243	43199	43274	43427	43699	44372	44769	45292	46488
(F)	1.021	1.038	1.044	1.051	1.057	1.063	1.068	1.072	1.077	1.08
(HLIQ)	118.8	120.4	121.3	122.2	123	123.8	124.8	125.6	126.4	127.4
(HBOIL)	2	443.2	560.3	727.7	887	3470.2	666	251.1	3315.2	2698
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	90									
DP Liquid Density-lbm/ft3	91.78									
Elevation-ft	2	4	6	8	9.975					
Measured DP-Psid	0.238	0.37	0.491	0.829	1.049					
Zero Corrections-psid	0.097	0.092	0.053	0.017	0.101					
Corrected DP-Psid	0.141	0.278	0.438	0.812	0.948					
Actual DP-ft	2.04	4.08	6.08	7.7	9.61					
Measured TP-Psig	145.4				143.9					
Measured Overall-ft	2.7									
Computed DP-ft	2.01	4.03	6.04	8.05	9.93					
Friction-ft	0.01	0.03	0.04	0.06	0.07					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.86					

Run#	699									
Test Fluid	C4F8									
Date:	7/21/93									
Time:	12:06									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	146.4									
Sat. Temperature-F(inlet)	160.7									
Liq. Density-lbm/ft3	81.84	81.94	81.95	81.92	81.82	81.7	81.39	81.16	80.92	80.04
Latent Heat-Btu/lbm	35.38	35.45	35.47	35.44	35.36	35.27	35.01	34.82	34.62	33.9
Specific Heat-Btu/lbm/F	0.292	0.291	0.291	0.291	0.292	0.292	0.293	0.294	0.295	0.298
Liq. Viscosity-lbm/ft-hr	0.446	0.448	0.449	0.448	0.446	0.444	0.437	0.432	0.428	0.411
Liq. Conductivity-Btu/hr-ft-F	0.0294	0.0294	0.0294	0.0294	0.0294	0.0293	0.0291	0.0289	0.0288	0.0282
Liq. Prandtl No.	4.43	4.44	4.44	4.44	4.43	4.42	4.41	4.4	4.38	4.35
Inlet Flow Rate-GPM	1.5									
Outlet Liq. Flow Rate-GPM	0									
Outlet Vap. Flow Rate-GPM	2.2									
Inlet Temperature-F	149.8									
Outlet Liq. Temperature-F	158.4									
Outlet Vap. Temperature-F	157.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	148.8									
Water outlet Temp.-F	151.1									
Inlet G-lbm/hr/ft2	292819		Temp		150.3	Density	81.8			
Subcooling-F	10.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	30.1	29.7	29.7	29.2	269.9	0	0	1090.5	1104.1
Heat Loss-Watts	17.1	4.3	5.9	7	7.7	9.1	5.3	6.3	8.7	48.3
Heat Flux-Btu/Hr/ft2	0	522	516	516	506	4679	0	0	18903	19139
Wall Temp. #3-F	149.5	153.2	154.4	156.1	156.8	166	154.4	156.3	170.1	173.5
Wall Temp. #4-F	150	153.5	154.4	155	157.8	166.8	154.5	156.3	171.7	171.2
Wall Temp. #5-F	149.2	153	154.3	154.9	156.1	166.5	155.7	154.6	169.6	172
Wall Temp. #1-F	88.3	152.8	153.7	154.5	155.2	168.4	157.4	153.6	168.5	165.7
Wall Temp. #2-F	148.1	152.8	153.8	154.5	155	166.2	157.3	154	169.7	169.5
Instream Temp.-F	150.1	149.6	149.5	149.7	150.2	150.8	152.4	153.6	154.8	159.2
Avg. Wall Temp.-F	149.2	153.1	154.1	154.9	156	166.4	155.9	155	169.9	170.4
Avg. Wall DT.-F	0	3.5	4.6	5.2	5.8	15.4	3.5	1.4	14.3	10.3
Remaining Subcool-F	10.9									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	151.2	113.1	99.9	87.2	303.5	0	0	1325.1	1856.4
COMPUTED H										
Jallouk	95.2	95.1	95	95.1	95.2	95.3	95.5	95.7	95.9	96.7
Szady1(Cudo tube)	118.3	119.9	120.9	121.7	122.6	123.4	124.3	125.1	125.9	127.2
Szady2	118.3	119.9	120.9	121.7	122.6	123.4	124.3	125.1	125.9	127.2
(RLIQ)	42903	42702	42659	42732	42923	43154	43780	44253	44730	46526
(F)	1.021	1.036	1.044	1.051	1.058	1.063	1.068	1.073	1.077	1.08
(HLIQ)	118.3	119.9	120.9	121.7	122.6	123.4	124.3	125.1	125.9	127.2
(HBOIL)	2	791.3	1049.3	1194.2	1357.3	3720.1	821.3	320.2	3607.7	2723.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	92.6									
DP Liquid Density-lbm/ft3	91.4									
Elevation-ft	2	4	6	8	9.876					
Measured DP-Psid	0.229	0.358	0.471	0.8	0.992					
Zero Corrections-psid	0.097	0.092	0.053	0.017	0.101					
Corrected DP-Psid	0.132	0.268	0.418	0.783	0.891					
Actual DP-ft	2.05	4.09	6.1	7.73	9.67					
Measured TP-Psig	146.4				145.2					
Measured Overall-ft	2.16									
Computed DP-ft	2.01	4.03	6.04	8.05	9.93					
Friction-ft	0.01	0.03	0.04	0.06	0.07					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.88					

Run#	700									
Test Fluid	C4F8									
Date:	7/21/93									
Time:	12:06									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	145.3									
Sat. Temperature-F(inlet)	160.2									
Liq. Density-lbm/ft3	81.95	82.05	82.05	82.03	81.88	81.7	81.43	81.22	80.92	80.14
Latent Heat-Btu/lbm	35.47	35.55	35.55	35.53	35.41	35.27	35.04	34.87	34.62	33.98
Specific Heat-Btu/lbm/F	0.291	0.291	0.291	0.291	0.291	0.292	0.293	0.294	0.295	0.298
Liq. Viscosity-lbm/ft-hr	0.449	0.451	0.451	0.45	0.447	0.444	0.438	0.434	0.428	0.413
Liq. Conductivity-Btu/hr-ft-F	0.0294	0.0295	0.0295	0.0295	0.0294	0.0293	0.0291	0.029	0.0288	0.0282
Liq. Prandtl No.	4.44	4.44	4.44	4.44	4.43	4.42	4.41	4.4	4.38	4.35
Inlet Flow Rate-GPM	1.5									
Outlet Liq. Flow Rate-GPM	0									
Outlet Vap. Flow Rate-GPM	2.2									
Inlet Temperature-F	148.8									
Outlet Liq. Temperature-F	157.8									
Outlet Vap. Temperature-F	157.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	148.4									
Water outlet Temp.-F	150.5									
Inlet G-lbm/hr/ft2	293506	Temp		149.3	Density	81.99				
Subcooling-F	11.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	40.2	39.5	40	40.2	265.9	0	0	1084.6	1097.5
Heat Loss-Watts	17.5	4.5	6.1	7.4	8.2	9.2	5.5	6.5	8.8	48.7
Heat Flux-Btu/Hr/ft2	0	697	685	683	697	4609	0	0	18801	19024
Wall Temp. #3-F	149.7	154.5	155.7	156.8	157.8	165.8	154.7	156.3	169.7	172.7
Wall Temp. #4-F	150.1	154.5	155.6	156.6	159.1	166.4	154.7	156.4	171.1	170.5
Wall Temp. #5-F	149.5	154.3	155.6	156.3	157.6	165.8	155.7	154.8	169	171.5
Wall Temp. #1-F	88.6	153.8	154.6	155.8	156.7	165.8	157.5	154.1	167.9	164.8
Wall Temp. #2-F	148	154	154.8	155.8	156.5	165.8	157.3	154.1	169	168.7
Instream Temp.-F	149.5	149	149	149.1	149.9	150.8	152.2	153.3	154.8	158.7
Avg. Wall Temp.-F	149.3	154.2	155.2	156.4	157.5	166	156	155.1	169.3	169.6
Avg. Wall DT.-F	0	5.2	6.1	7.2	7.5	14.9	3.8	1.8	13.7	10.1
Remaining Subcool-F	11.4									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	134.8	111.4	95.7	92.4	308.5	0	0	1378.9	1887.8
COMPUTED H										
Jallouk	95.2	95.1	95.1	95.1	95.3	95.4	95.7	95.9	96.1	96.8
Szady1(Cudo tube)	118.4	120.1	121	121.8	122.7	123.6	124.5	125.3	126.2	127.4
Szady2	118.4	120.1	121	121.8	122.7	123.6	124.5	125.3	126.2	127.4
(RLIQ)	42770	42569	42564	42599	42906	43255	43803	44237	44835	46428
(F)	1.021	1.036	1.044	1.051	1.058	1.063	1.068	1.073	1.077	1.08
(HLIQ)	118.4	120.1	121	121.8	122.7	123.6	124.5	125.3	126.2	127.4
(HBOIL)	2	1187.6	1417.8	1680.3	1769.3	3603.5	897	434.9	3458.7	2644.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	92.6									
DP Liquid Density-lbm/ft3	91.4									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.228	0.354	0.466	0.795	0.983					
Zero Corrections-psid	0.097	0.092	0.053	0.017	0.101					
Corrected DP-Psid	0.131	0.262	0.413	0.778	0.882					
Actual DP-ft	2.05	4.09	6.1	7.73	9.68					
Measured TP-Psig	145.3				144.3					
Measured Overall-ft	1.8									
Computed DP-ft	2.01	4.03	6.04	8.05	9.93					
Friction-ft	0.01	0.03	0.04	0.06	0.07					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.86					

Run#	701									
Test Fluid	C4F8									
Date:	7/21/93									
Time:	14:34									
Flow Area-ft2	0.00396									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	136									
Sat Temperature-F(inlet)	155.7									
Liq. Density-lbm/ft3	82.24	82.24	82.26	82.22	82.16	82.07	81.9	81.76	81.59	81.2
Latent Heat-Btu/lbm	35.7	35.7	35.72	35.69	35.63	35.56	35.42	35.31	35.17	34.85
Specific Heat-Btu/lbm/F	0.29	0.29	0.29	0.29	0.291	0.291	0.291	0.292	0.292	0.294
Liq. Viscosity-lbm/ft-hr	0.455	0.455	0.455	0.455	0.453	0.451	0.448	0.445	0.441	0.433
Liq. Conductivity-Btu/hr-ft-F	0.0296	0.0296	0.0297	0.0296	0.0296	0.0295	0.0294	0.0293	0.0292	0.0289
Liq. Prandtl No.	4.46	4.46	4.46	4.45	4.45	4.44	4.43	4.43	4.42	4.4
Inlet Flow Rate-GPM	3									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	2.7									
Inlet Temperature-F	147.8									
Outlet Liq. Temperature-F	153.4									
Outlet Vap. Temperature-F	151.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	144.8									
Water outlet Temp.-F	145.3									
Inlet G-lbm/hr/ft2	592023		Temp		145.6	Density	82.69			
Subcooling-F	7.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	21.8	31.4	31.9	29.6	345.3	0	0	1317.7	1292
Heat Loss-Watts	22.8	5.4	7.4	9.4	10.4	10.7	8.1	8.9	11.1	58.6
Heat Flux-Btu/Hr/ft2	0	378	544	553	513	5986	0	0	22841	22398
Wall Temp. #3-F	149.2	149.6	150.8	151.8	152	161.9	150.7	151.8	166.6	170.7
Wall Temp. #4-F	149.7	150.1	150.8	151.7	153	162.9	150.7	152.1	168.1	167.8
Wall Temp. #5-F	149.7	150	151.1	151.7	151.8	162.5	151.6	151	165.4	169.2
Wall Temp. #1-F	89.9	150.2	150.3	151.3	151.4	162.4	152.8	150.1	164.3	161.2
Wall Temp. #2-F	148.6	150.2	150.6	151.3	151.1	162.3	152.8	150.4	165.4	165.9
Instream Temp.-F	148	148	147.9	148.1	148.5	148.8	149.8	150.5	151.4	153.4
Avg. Wall Temp.-F	149.3	150	150.6	151.6	151.8	162.4	151.7	151.1	165.9	167
Avg. Wall DT.-F	1.3	2	2.7	3.5	3.3	13.3	1.9	0.6	13.5	12.5
Remaining Subcool-F	7.9									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	188.2	201.6	168	155.4	451.6	0	0	1691	1784.8
COMPUTED H										
Jallouk	168.5	168.5	168.4	168.5	168.6	168.7	167	167.2	167.5	168.1
Szady1(Cudo tube)	207	210.1	211.7	213.2	214.7	216.1	217.5	218.8	220.1	221.7
Szady2	207	210.1	211.7	213.2	214.7	216.1	217.5	218.8	220.1	221.7
(RLIQ)	85096	85083	84997	85144	85447	85751	86448	86993	87699	89292
(F)	1.021	1.036	1.045	1.052	1.058	1.064	1.069	1.074	1.079	1.083
(HLIQ)	207	210.1	211.7	213.2	214.7	216.1	217.5	218.8	220.1	221.7
(HBOIL)	285.2	445.2	602.3	787.6	745.7	3112.2	435.1	128.8	3274	3110.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	93.1									
DP Liquid Density-lbm/ft3	91.33									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.199	0.298	0.38	0.678	0.607					
Zero Corrections-psid	0.097	0.092	0.053	0.017	0.101					
Corrected DP-Psid	0.102	0.206	0.327	0.661	0.596					
Actual DP-ft	2.07	4.13	6.17	7.83	10.05					
Measured TP-Psig	136				135.7					
Measured Overall-ft	0.53									
Computed DP-ft	2.05	4.1	6.15	8.2	10.1					
Friction-ft	0.05	0.1	0.15	0.2	0.24					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.85					

Run#	702									
Test Fluid	C4F8									
Date:	7/21/93									
Time:	14:34									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19696									
Sat. Pressure-Psig	136.4									
Sat. Temperature-F(inlet)	155.9									
Liq. Density-lbm/ft3	82.22	82.22	82.2	82.16	82.11	82.01	81.86	81.68	81.49	81.12
Latent Heat-Btu/lbm	35.69	35.69	35.67	35.64	35.6	35.52	35.39	35.25	35.09	34.79
Specific Heat-Btu/lbm/F	0.29	0.29	0.29	0.29	0.291	0.291	0.291	0.292	0.293	0.294
Liq. Viscosity-lbm/ft-hr	0.455	0.455	0.454	0.453	0.452	0.45	0.447	0.443	0.439	0.432
Liq. Conductivity-Btu/hr-ft-F	0.0296	0.0296	0.0296	0.0296	0.0296	0.0295	0.0294	0.0293	0.0291	0.0289
Liq. Prandtl No.	4.45	4.45	4.45	4.45	4.45	4.44	4.43	4.42	4.41	4.39
Inlet Flow Rate-GPM	3									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2.7									
Inlet Temperature-F	147.9									
Outlet Liq. Temperature-F	153.7									
Outlet Vap. Temperature-F	152.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	145									
Water outlet Temp.-F	145.5									
Inlet G-lbm/hr/ft2	591487		Temp		146	Density	82.62			
Subcooling-F	8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	31.3	31.9	32	30.5	348.5	0	0	1325.5	1296.8
Heat Loss-Watts	23.1	5.5	7.5	9.5	10.6	10.7	8.3	9.1	11.3	59.2
Heat Flux-Btu/Hr/ft2	0	543	553	555	529	6041	0	0	22977	22471
Wall Temp. #3-F	149.3	150.4	151.4	152	152.4	162.4	151.1	152.3	166.9	171.1
Wall Temp. #4-F	149.7	150.6	151.3	152	153.5	163.2	151.2	152.3	168.6	168.2
Wall Temp. #5-F	149.7	150.5	151.3	152	152.2	162.9	151.9	151.4	165.9	169.7
Wall Temp. #1-F	90	150.6	150.8	151.5	151.8	162.8	153	150.7	164.5	161.5
Wall Temp. #2-F	149.1	150.7	150.8	151.5	151.5	162.7	153	150.9	166.1	166.3
Instream Temp.-F	148.1	148.1	148.2	148.4	148.7	149.2	150	150.9	151.9	153.8
Avg. Wall Temp.-F	149.5	150.6	151.1	151.9	152.3	162.8	152	151.5	166.4	167.4
Avg. Wall DT.-F	1.3	2.5	2.9	3.4	3.5	13.4	2	0.6	13.5	12.5
Remaining Subcool-F	8									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	221.4	194	160.8	149.9	452.4	0	0	1708.8	1791.9
COMPUTED H										
Jallouk	166.4	166.4	166.4	166.4	166.5	166.7	166.9	167.2	167.5	168.1
Szady1(Cudo tuba)	206.9	210	211.7	213.2	214.6	216	217.4	218.8	220.1	221.7
Szady2	206.9	210	211.7	213.2	214.6	216	217.4	218.8	220.1	221.7
(RLIQ)	85096	85084	85153	85300	85526	85909	86529	87231	88017	89584
(F)	1.021	1.036	1.045	1.052	1.058	1.064	1.069	1.074	1.079	1.083
(HLIQ)	206.9	210	211.7	213.2	214.6	216	217.4	218.8	220.1	221.7
(HBOIL)	296.8	546.7	638.9	779	799.7	3147.6	464.1	138.6	3282.6	3125
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	93.4									
DP Liquid Density-lbm/ft3	91.28									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.199	0.295	0.382	0.68	0.639					
Zero Corrections-psid	0.097	0.092	0.053	0.017	0.101					
Corrected DP-Psid	0.102	0.203	0.329	0.663	0.598					
Actual DP-ft	2.07	4.14	6.17	7.83	10.05					
Measured TP-Psig	136.4				138.1					
Measured Overall-ft	0.53									
Computed DP-ft	2.05	4.1	6.15	8.2	10.1					
Friction-ft	0.05	0.1	0.15	0.2	0.24					
Acceleration-ft	0	0	0	0	0					
Elevation-ft	2	4	6	8	9.86					

Run#	703									
Test Fluid	C4F8									
Date:	7/21/93									
Time:	14:34									
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	137.8									
Sat. Temperature-F(inlet)	156.6									
Liq. Density-lbm/ft3	82.18	82.16	82.15	82.16	82.09	81.97	81.74	81.59	81.41	80.98
Latent Heat-Btu/lbm	35.66	35.64	35.63	35.64	35.58	35.49	35.3	35.17	35.03	34.67
Specific Heat-Btu/lbm/F	0.29	0.29	0.291	0.29	0.291	0.291	0.292	0.292	0.293	0.295
Liq. Viscosity-lbm/ft-hr	0.454	0.453	0.453	0.453	0.452	0.449	0.444	0.441	0.438	0.429
Liq. Conductivity-Btu/hr-ft-F	0.0296	0.0296	0.0296	0.0296	0.0295	0.0295	0.0293	0.0292	0.0291	0.0288
Liq. Prandtl No.	4.45	4.45	4.45	4.45	4.45	4.44	4.43	4.42	4.41	4.39
Inlet Flow Rate-GPM	3									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2.6									
Inlet Temperature-F	148.5									
Outlet Liq. Temperature-F	154.2									
Outlet Vap. Temperature-F	152.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	145.9									
Water outlet Temp.-F	146.6									
Inlet G-lbm/hr/ft2	592825		Temp		145	Density	82.8			
Subcooling-F	8.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	40.6	40.6	40.6	40.2	350.2	0	0	1398.4	1402.3
Heat Loss-Watts	24.3	5.8	7.9	10	10.9	10.6	8.9	9.7	11.9	61.9
Heat Flux-Btu/hr/ft2	0	704	702	702	697	6070	0	0	24240	24308
Wall Temp. #3-F	150.2	151.7	152.4	152.8	153.3	163	151.4	152.6	168	173.3
Wall Temp. #4-F	150.3	152	152.4	152.8	154.4	163.7	151.4	152.7	169.8	169.8
Wall Temp. #5-F	150.3	151.8	152.4	152.6	153.1	163.3	152	151.4	166.9	171.4
Wall Temp. #1-F	89.9	151.8	151.8	151.8	152.4	163.2	153.4	151	165.4	162.4
Wall Temp. #2-F	149.6	151.8	151.8	152.2	152.4	163.1	153.6	151	166.9	167.7
Instream Temp.-F	148.3	148.4	148.5	148.4	148.8	149.4	150.6	151.4	152.3	154.5
Avg. Wall Temp.-F	150.1	151.8	152.1	152.5	153.1	163.3	152.4	151.7	167.4	168.9
Avg. Wall DT.-F	1.8	3.4	3.6	4.1	4.2	13.6	1.8	0.3	14	13.3
Remaining Subcool-F	8.1									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/hr/ft2/F	0	207.4	196.7	172.6	164.2	445.6	0	0	1730.9	1824.7
COMPUTED H										
Jallouk	166.8	166.8	166.8	166.7	166.9	167	167.4	167.6	167.9	168.6
Szady1(Cudo tube)	207.3	210.5	212.1	213.6	215	216.5	218	219.3	220.7	222.3
Szady2	207.3	210.5	212.1	213.6	215	216.5	218	219.3	220.7	222.3
(RLIQ)	85445	85510	85580	85493	85798	86260	87189	87826	88537	90305
(F)	1.021	1.036	1.044	1.052	1.058	1.064	1.069	1.074	1.079	1.082
(HLIQ)	207.3	210.5	212.1	213.6	215	216.5	218	219.3	220.7	222.3
(HBOIL)	399.6	765.9	807.4	922.3	968	3221.8	402	75.4	3435.1	3351.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	93.2									
DP Liquid Density-lbm/ft3	91.31									
Elevation-ft	2	4	6	8	9.876					
Measured DP-Psid	0.2	0.295	0.384	0.683	0.7					
Zero Corrections-psid	0.097	0.092	0.053	0.017	0.101					
Corrected DP-Psid	0.103	0.203	0.331	0.666	0.599					
Actual DP-ft	2.07	4.15	6.18	7.84	10.07					
Measured TP-Psig	137.8				137.4					
Measured Overall-ft	0.71									
Computed DP-ft	2.05	4.1	6.15	8.2	10.1					
Friction-ft	0.05	0.1	0.15	0.2	0.25					
Acceleration-ft	0	0	0	0	0.01					
Elevation-ft	2	4	6	8	9.85					

Run:	4									
Test File:	C4F8									
Date:	7/21/93									
Time:	14:34									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	139.3									
Sat. Temperature-F(inlet)	157.3									
Liq. Density-lbm/ft3	82.2	82.16	82.13	82.11	81.99	81.86	81.57	81.43	81.22	80.8
Latent Heat-Btu/lbm	35.67	35.64	35.61	35.6	35.5	35.39	35.15	35.04	34.87	34.53
Specific Heat-Btu/lbm/F	0.29	0.29	0.291	0.291	0.291	0.291	0.292	0.293	0.294	0.295
Liq. Viscosity-lbm/ft-hr	0.454	0.453	0.453	0.452	0.45	0.447	0.441	0.438	0.434	0.426
Liq. Conductivity-Btu/hr-ft-F	0.0296	0.0296	0.0296	0.0296	0.0295	0.0294	0.0292	0.0291	0.029	0.0287
Liq. Prandtl No.	4.45	4.45	4.45	4.45	4.44	4.43	4.42	4.41	4.4	4.38
Inlet Flow Rate-GPM	3									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2.9									
Inlet Temperature-F	148.6									
Outlet Liq. Temperature-F	154.9									
Outlet Vap. Temperature-F	153.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	146.5									
Water outlet Temp.-F	147.2									
Inlet G-lbm/hr/ft2	593625		Temp	144.4	Density	82.92				
Subcooling-F	8.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	60	61.7	61.7	61.2	351.5	0	0	1391.3	1392.2
Heat Loss-Watts	25.4	6.1	8.3	10	10.8	10.5	9.2	10.1	12.3	69.2
Heat Flux-Btu/hr/ft2	0	1040	1070	1070	1061	6093	0	0	24117	24133
Wall Temp. #3-F	150.7	153.7	154.8	155.5	155.9	163.9	152.7	154	168.9	174
Wall Temp. #4-F	151	154	154.7	155.4	157.1	164.6	152.7	154.1	170.8	170.6
Wall Temp. #5-F	150.8	153.6	154.8	155.4	156	164.1	153.7	152.8	167.8	172.2
Wall Temp. #1-F	89.8	153.6	154	154.6	155.1	164.1	154.7	152.2	166.4	163.1
Wall Temp. #2-F	150	153.7	154.1	154.8	155	164.1	154.6	152.5	167.8	168.5
Instream Temp.-F	148.2	148.4	148.6	148.7	149.3	150	151.5	152.2	153.3	155.4
Avg. Wall Temp.-F	150.6	153.8	154.4	155.2	155.8	164.2	153.7	153.1	168.3	169.7
Avg. Wall DT.-F	2.4	5.3	5.8	6.5	6.5	13.9	2.2	0.9	13.9	13.2
Remaining Subcool-F	8.7									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/hr/ft2/F	0	196.1	186	165.1	164.4	438.4	0	0	1783.8	1829.7
COMPUTED H										
Jallouk	168.9	167	167	167	167.2	167.4	167.9	168.1	168.4	169
Szady1(Cuido tube)	207.5	210.7	212.4	213.9	215.4	216.9	218.5	219.8	221.2	222.8
Szady2	207.5	210.7	212.4	213.9	215.4	216.9	218.5	219.8	221.2	222.8
(RLIQ)	85482	85626	85774	85844	86306	86850	88033	88585	89462	91163
(F)	1.021	1.036	1.044	1.052	1.058	1.064	1.069	1.074	1.078	1.082
(HLIQ)	207.5	210.7	212.4	213.9	215.4	216.9	218.5	219.8	221.2	222.8
(HBOIL)	541.5	1210	1318.4	1490.7	1496.3	3313.1	506.1	211	3453	3352.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	92.9									
DP Liquid Density-lbm/ft3	91.96									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.2	0.297	0.388	0.69	0.708					
Zero Corrections-psid	0.097	0.092	0.053	0.017	0.101					
Corrected DP-Psid	0.103	0.205	0.335	0.673	0.607					
Actual DP-ft	2.08	4.16	6.19	7.85	10.08					
Measured TP-Psig	139.3				138.8					
Measured Overall-ft	0.89									
Computed DP-ft	2.05	4.1	6.15	8.2	10.1					
Friction-ft	0.05	0.1	0.15	0.2	0.25					
Acceleration-ft	0	0	0	0	0.01					
Elevation-ft	2	4	6	8	9.85					

Run#	705									
Test Fluid	C4F8									
Date:	[illegible]									
Time:	8:14									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	134.2									
Sat. Temperature-F(inlet)	154.8									
Liq. Density-lbm/ft3	82.22	82.24	82.26	82.2	82.16	82.09	81.88	81.8	81.65	81.57
Latent Heat-Btu/lbm	35.69	35.7	35.72	35.67	35.64	35.58	35.41	35.34	35.22	35.15
Specific Heat-Btu/lbm/F	0.29	0.29	0.29	0.29	0.29	0.291	0.291	0.292	0.292	0.292
Liq. Viscosity-lbm/ft-hr	0.455	0.455	0.455	0.454	0.453	0.452	0.447	0.446	0.442	0.441
Liq. Conductivity-Btu/hr-ft-F	0.0296	0.0296	0.0297	0.0296	0.0296	0.0295	0.0294	0.0293	0.0292	0.0292
Liq. Prandtl No.	4.45	4.46	4.46	4.45	4.45	4.45	4.43	4.43	4.42	4.42
Inlet Flow Rate-GPM	4									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	3.3									
Inlet Temperature-F	146.3									
Outlet Liq. Temperature-F	152.1									
Outlet Vap. Temperature-F	150.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	141.3									
Water outlet Temp.-F	141.7									
Inlet G-lbm/hr/ft2	791322		Temp	144.5	Density	82.9				
Subcooling-F	8.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	39.9	39.9	39.3	39.3	348	0	0	1348.6	1352.6
Heat Loss-Watts	22.9	5.6	7.6	9.6	10.6	10.8	8.2	9.1	11.3	59.2
Heat Flux-Btu/ft-hr/ft2	0	692	692	681	681	5998	0	0	23341	23450
Wall Temp. #3-F	148.3	150.6	151	152.1	151.6	160.5	150.5	151.4	166.9	171.1
Wall Temp. #4-F	148.6	151	151.1	151.9	152.9	161.1	150.6	151.5	168	167.6
Wall Temp. #5-F	149	151	151.5	151.9	152	160.5	151.3	150.7	165.2	168.8
Wall Temp. #1-F	81.3	150.7	150.6	151.6	151.6	160.5	152	150.1	163.8	160.7
Wall Temp. #2-F	148.2	150.8	150.8	151.7	151.4	160.6	151.9	150.3	165.2	165.4
Instream Temp.-F	148.1	148	147.9	148.2	148.4	148.8	149.9	150.3	151.1	151.5
Avg. Wall Temp.-F	148.5	150.8	150.9	151.9	152	160.7	151.3	150.8	165.7	166.7
Avg. Wall DT.-F	0.4	2.7	2.9	3.6	3.5	11.6	1.4	0.5	13.5	14.2
Remaining Subcool-F	8.5									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/hr-ft/ft2/F	0	252.1	296	186.9	192.2	518	0	0	1729.2	1656
COMPUTED H										
Jallouk	210	210	209.9	210	210.1	210.2	210.6	210.8	211.1	211.2
Szady1(Cudo tube)	261.1	265	267	269	270.8	272.5	274.4	275.9	277.5	278.9
Szady2	261.1	265	267	269	270.8	272.5	274.4	275.9	277.5	278.9
(RLIQ)	113848	113725	113610	113911	114108	114514	115657	116067	116903	117316
(F)	1.021	1.036	1.045	1.052	1.058	1.064	1.069	1.075	1.079	1.084
(HLIQ)	261.1	265	267	269	270.8	272.5	274.4	275.9	277.5	278.9
(HBOIL)	90.9	613	658	821.9	800.8	2706.4	306	110.3	3271.1	3440.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.4									
DP Liquid Density-lbm/ft3	92.72									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.209	0.284	0.371	0.541	0.627					
Zero Corrections-psid	0.103	0.076	0.08	0.027	0.086					
Corrected DP-Psid	0.106	0.208	0.291	0.514	0.541					
Actual DP-ft	2.09	4.18	6.31	8.19	10.27					
Measured TP-Psig	134.2				132					
Measured Overall-ft	3.88									
Computed DP-ft	2.08	4.17	6.25	8.33	10.27					
Friction-ft	0.08	0.17	0.25	0.33	0.41					
Acceleration-ft	0	0	0	0	0.01					
Elevation-ft	2	4	6	8	9.85					

Run#	706									
	C4I-8									
Date:	7/22/93									
Time:	8:14									
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	135.5									
Sat. Temperature-F(inlet)	155.4									
Liq. Density-lbm/ft3	82.03	82.05	82.03	82.01	81.94	81.82	81.59	81.51	81.39	81.3
Latent Heat-Btu/lbm	35.53	35.55	35.53	35.52	35.45	35.36	35.17	35.11	35.01	34.93
Specific Heat-Btu/lbm/F	0.291	0.291	0.291	0.291	0.291	0.292	0.292	0.293	0.293	0.293
Liq. Viscosity-lbm/ft-hr	0.45	0.451	0.45	0.45	0.448	0.446	0.441	0.44	0.437	0.435
Liq. Conductivity-Btu/hr-ft-F	0.0295	0.0295	0.0295	0.0295	0.0294	0.0294	0.0292	0.0291	0.0291	0.029
Liq. Prandtl No.	4.44	4.44	4.44	4.44	4.44	4.43	4.42	4.41	4.41	4.4
Inlet Flow Rate-GPM	-									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	3.4									
Inlet Temperature-F	148.3									
Outlet Liq. Temperature-F	152.6									
Outlet Vap. Temperature-F	151.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	142.6									
Water outlet Temp.-F	143									
Inlet G-lbm/hr/ft2	791145		Temp	144.6	Density	82.88				
Subcooling-F	7.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	60.9	60.7	61.4	60.9	352.6	0	0	1415.5	1348.8
Heat Loss-Watts	23.1	5.7	7.8	9.9	10.9	10.7	8.4	9.2	11.4	59.6
Heat Flux-Btu/Hr/ft2	0	1056	1052	1064	1056	6112	0	0	24537	23381
Wall Temp. #3-F	149.3	152.8	153.3	154.4	154.2	161.4	151.7	152.6	167.3	172.7
Wall Temp. #4-F	149.6	153	153.4	154.4	155.1	162	151.7	152.8	169.1	169
Wall Temp. #5-F	149.8	152.8	153.5	154.4	154.5	161.4	152.5	151.9	166.1	170.4
Wall Temp. #1-F	83.3	152.6	152.7	153.9	153.7	161.4	153.2	151.2	164.7	161.8
Wall Temp. #2-F	149	152.9	152.9	153.9	153.7	161.4	153.1	151.5	166.3	168.7
Instream Temp.-F	149.1	149	149.1	149.2	149.6	150.2	151.4	151.8	152.4	152.9
Avg. Wall Temp.-F	149.4	152.8	153.1	154.3	154.3	161.6	152.4	152	166.7	168.1
Avg. Wall DT.-F	0.3	3.8	3.9	5	4.6	11.1	1	0.2	13.2	14.2
Remaining Subcool-F	7.1									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	279.6	267.9	211.7	229.4	551.9	0	0	1880.1	1660.8
COMPUTED H										
Jallouk	210.4	210.3	210.4	210.4	210.5	210.7	211.2	211.3	211.8	211.7
Szady1(Cudo tube)	261.5	265.4	267.5	269.4	271.2	273	274.9	276.5	278	279.4
Szady2	261.5	265.4	267.5	269.4	271.2	273	274.9	276.5	278	279.4
(RLIQ)	114866	114744	114837	114930	115339	115959	117219	117633	118262	118787
(F)	1.021	1.036	1.044	1.051	1.058	1.064	1.069	1.074	1.079	1.083
(HLIQ)	261.5	265.4	267.5	269.4	271.2	273	274.9	276.5	278	279.4
(HBOIL)	69.9	861.4	897.6	1157.3	1062.6	2631.6	238.9	44	3234.8	3500.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	86.5									
DP Liquid Density-lbm/ft3	92.28									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.203	0.279	0.368	0.665	0.622					
Zero Corrections-psid	0.103	0.076	0.08	0.027	0.086					
Corrected DP-Psid	0.1	0.203	0.288	0.638	0.536					
Actual DP-ft	2.09	4.18	6.3	7.95	10.26					
Measured TP-Psig	135.5				133.9					
Measured Overall-ft	2.83									
Computed DP-ft	2.08	4.17	6.25	8.33	10.27					
Friction-ft	0.08	0.17	0.25	0.33	0.41					
Acceleration-ft	0	0	0	0	0.01					
Elevation-ft	2	4	6	8	9.85					

Run#										
Test Fluid	C4F8									
Date:	7/22/93									
Time:	8:14									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	137.4									
Sat. Temperature-F(inlet)	156.4									
Liq. Density-lbm/ft3	81.92	81.94	81.92	81.78	81.7	81.63	81.35	81.3	81.18	81.12
Latent Heat-Btu/lbm	35.44	35.45	35.44	35.33	35.27	35.2	34.98	34.93	34.83	34.79
Specific Heat-Btu/lbm/F	0.291	0.291	0.291	0.292	0.292	0.292	0.293	0.293	0.294	0.294
Liq. Viscosity-lbm/ft-hr	0.448	0.448	0.448	0.445	0.444	0.442	0.436	0.435	0.433	0.432
Liq. Conductivity-Btu/hr-ft-F	0.0294	0.0294	0.0294	0.0293	0.0293	0.0292	0.029	0.029	0.0289	0.0289
Liq. Prandtl No.	4.44	4.44	4.44	4.43	4.42	4.42	4.41	4.4	4.4	4.39
Inlet Flow Rate-GPM	4									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	3.4									
Inlet Temperature-F	148.6									
Outlet Liq. Temperature-F	153.9									
Outlet Vap. Temperature-F	152.2									
Water Flow Rate-GPM										
Water inlet Temp.-F	143.2									
Water outlet Temp.-F	143.7									
Inlet G-lbm/hr/ft2	789721		Temp	145.4	Density	82.73				
Subcooling-F	7.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	81.2	81.2	81.1	80.7	358.7	0	0	1409.1	1406.1
Heat Loss-Watts	23.9	5.9	8	10	10.9	10.7	8.7	9.5	11.8	60.7
Heat Flux-Btu/Hr/ft2	0	1408	1408	1406	1398	6218	0	0	24426	24406
Wall Temp. #3-F	151.2	154.8	155.4	157.1	156.3	162.2	152.8	153.8	168.1	173.7
Wall Temp. #4-F	151.7	155	155.4	158.8	157.6	162.9	152.8	153.8	170	169.6
Wall Temp. #5-F	151.7	154.8	155.6	156.5	156.7	162.5	153.5	152.8	166.9	171.4
Wall Temp. #1-F	84	154.6	154.6	156	156.1	162.4	154.1	152.3	165.4	162.4
Wall Temp. #2-F	150.6	154.8	154.7	156	155.9	162.2	154.3	152.6	167.1	167.5
Instream Temp.-F	149.7	149.6	149.7	150.4	150.8	151.2	152.6	152.9	153.5	153.8
Avg. Wall Temp.-F	151.3	154.8	155	156.6	156.6	162.5	153.5	153	167.5	168.9
Avg. Wall DT.-F	1.6	5.1	5.3	6.1	5.7	11	0.9	0.1	12.9	14
Remaining Subcool-F	7.8									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	274	267.5	229.1	244.9	564.8	0	0	1894	1741.4
COMPUTED H										
Jallouk	210.3	210.3	210.3	210.5	210.7	210.8	211.4	211.5	211.7	211.8
Szady1(Cudo tube)	261.4	265.3	267.4	269.5	271.3	273	275	276.5	278	279.4
Szady2	261.4	265.3	267.4	269.5	271.3	273	275	276.5	278	279.4
(RLIQ)	115288	115168	115259	115984	116395	116807	118287	118597	119230	119541
(F)	1.021	1.036	1.044	1.051	1.057	1.063	1.068	1.073	1.078	1.083
(HLIQ)	261.4	265.3	267.4	269.5	271.3	273	275	276.5	278	279.4
(HBOIL)	360.5	1189.1	1220.2	1441.1	1345.7	2651	207.3	26.4	3203.2	3501.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	86.9									
DP Liquid Density-lbm/ft3	92.22									
Elevation-ft	2	4	6	8	9.876					
Measured DP-Psid	0.205	0.393	0.373	0.668	0.638					
Zero Corrections-psid	0.103	0.076	0.08	0.027	0.088					
Corrected DP-Psid	0.101	0.207	0.293	0.631	0.552					
Actual DP-ft	2.09	4.18	6.3	7.98	10.25					
Measured TP-Psig	137.4				135.8					
Measured Overall-ft	2.84									
Computed DP-ft	2.08	4.17	6.25	8.33	10.27					
Friction-ft	0.08	0.17	0.25	0.33	0.41					
Acceleration-ft	0	0	0	0	0.01					
Elevation-ft	2	4	6	8	9.85					

Run#	708									
Test Fluid	C4F8									
Date:	7/22/93									
Time:	8:14									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	134.9									
Sat. Temperature-F(inlet)	155.1									
Liq. Density-lbm/ft3	81.97	82.05	82.09	82.01	81.95	81.92	81.68	81.67	81.59	81.55
Latent Heat-Btu/lbm	35.49	35.55	35.58	35.52	35.47	35.44	35.25	35.23	35.17	35.14
Specific Heat-Btu/lbm/F	0.291	0.291	0.291	0.291	0.291	0.291	0.292	0.292	0.292	0.293
Liq. Viscosity-lbm/ft-hr	0.449	0.451	0.452	0.45	0.449	0.448	0.443	0.443	0.441	0.44
Liq. Conductivity-Btu/hr-ft-F	0.0295	0.0295	0.0295	0.0295	0.0294	0.0294	[illegible]	[illegible]	[illegible]32	0.0292
Liq. Prandtl No.	4.44	4.44	4.45	4.44	4.44	4.44	4.42	4.42	4.42	4.42
Inlet Flow Rate-GPM	6									
Outlet Liq. Flow Rate-GPM	0.2									
Outlet Vap. Flow Rate-GPM	4.1									
Inlet Temperature-F	147.6									
Outlet Liq. Temperature-F	152									
Outlet Vap. Temperature-F	151									
Water Flow Rate-GPM										
Water Inlet Temp.-F	142.6									
Water outlet Temp.-F	143.1									
Inlet G-lbm/hr/ft2	1182167		Temp		146.3	Density	82.56			
Subcooling-F	7.5									

Flow Observation

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	60.6	60.1	59.8	60.5	358.9	0	0	1355.6	1356.7
Heat Loss-Watts	23.8	5.8	7.8	9.9	11	10.7	8.8	9.4	11.5	60.4
Heat Flux-Btu/Hr/ft2	0	1050	1042	1037	1049	6221	0	0	23498	23518
Wall Temp. #3-F	149.8	151.8	152	153.2	152.6	160.6	151.1	151.8	166.7	171.8
Wall Temp. #4-F	150.3	152.1	152	153.2	153.4	161.2	151.3	151.8	168.2	168.2
Wall Temp. #5-F	150.4	152.1	152.4	152.9	152.9	160.8	151.9	151.3	165.5	169.9
Wall Temp. #1-F	85.2	151.9	151.5	152.7	152.5	160.8	152	150.8	164	161.2
Wall Temp. #2-F	149.7	152	151.7	152.7	152.5	160.7	152.2	150.9	165.7	166.2
Instream Temp.-F	149.4	149	148.8	149.2	149.5	149.7	150.9	151	151.4	151.6
Avg. Wall Temp.-F	150.1	152	151.8	153	152.8	160.8	151.7	151.3	166	167.5
Avg. Wall DT.-F	0.7	2.9	3	3.8	3.3	10.8	0.8	0.3	13.6	14.8
Remaining Subcool-F	7.5									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	381.9	352.8	276.2	320	578.7	0	0	1733.2	1589.8
COMPUTED H										
Jallouk	290.3	290	289.9	290.1	290.2	290.3	291	291	291.2	291.3
Szady1(Cudo tube)	360.8	366	368.7	371.4	373.9	376.2	378.8	380.8	382.8	384.6
Szady2	360.8	366	368.7	371.4	373.9	376.2	378.8	380.8	382.8	384.6
(RLIQ)	172108	171456	171126	171734	172188	172484	174361	174502	175119	175418
(F)	1.021	1.036	1.044	1.051	1.058	1.064	1.069	1.074	1.079	1.084
(HLIQ)	360.8	366	368.7	371.4	373.9	376.2	378.8	380.8	382.8	384.6
(HBOIL)	142.7	657.7	667.7	857.9	749.6	2559.5	179.9	70.5	3286.4	3609.3

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	87.8				
DP Liquid Density-lbm/ft3	92.1				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.148	0.165	0.184	0.426	0.218
Zero Corrections-psid	0.103	0.076	0.08	0.027	0.086
Corrected DP-Psid	0.045	0.089	0.104	0.398	0.132
Actual DP-ft	2.18	4.36	6.59	8.33	10.92
Measured TP-Psig	134.9				133.7
Measured Overall-ft	2.12				
Computed DP-ft	2.17	4.34	6.52	8.69	10.72
Friction-ft	0.17	0.34	0.51	0.68	0.85
Acceleration-ft	0	0	0	0	0.021
Elevation-ft	2	4	6	8	9.85

Run#	709									
Test Fluid	C4F8									
Date:	7/22/93									
Time:	13:10									
Flow Area-ft2	0.00396									
Heat Flow Area-ft2	0.19686									
Sat. Pressure-Psig	134									
Sat. Temperature-F(inlet)	154.7									
Liq. Density-lbm/ft3	82.13	82.16	82.15	82.03	82.03	81.92	81.72	81.7	81.59	81.57
Latent Heat-Btu/lbm	35.61	35.64	35.63	35.53	35.53	35.44	35.28	35.27	35.17	35.15
Specific Heat-Btu/lbm/F	0.291	0.29	0.291	0.291	0.291	0.291	0.292	0.292	0.292	0.292
Liq. Viscosity-lbm/ft-hr	0.453	0.453	0.453	0.45	0.45	0.448	0.444	0.444	0.441	0.441
Liq. Conductivity-Btu/hr-ft-F	0.0296	0.0296	0.0296	0.0295	0.0295	0.0294	0.0293	0.0293	0.0292	0.0292
Liq. Prandtl No.	4.45	4.45	4.45	4.44	4.44	4.44	4.42	4.42	4.42	4.42
Inlet Flow Rate-GPM	6									
Outlet Liq. Flow Rate-GPM	0.1									
Outlet Vap. Flow Rate-GPM	4.2									
Inlet Temperature-F	147.3									
Outlet Liq. Temperature-F	151.8									
Outlet Vap. Temperature-F	150.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	142.5									
Water outlet Temp.-F	142.6									
Inlet G-lbm/hr/ft2	1183510		Temp		145.8	Density		82.65		
Subcooling-F	7.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	80.2	80	80.3	81.1	348.5	0	0	1337.2	1334.4
Heat Loss-Watts	23.6	5.8	7.8	10	11	10.7	8.4	9.3	11.4	59.9
Heat Flux-Btu/Hr/ft2	0	1390	1387	1392	1406	6041	0	0	23179	23131
Wall Temp. #3-F	149.5	152.3	152.6	153.8	153.3	160	150.7	151.4	168	171.4
Wall Temp. #4-F	149.8	152.4	152.5	153.8	154.4	160.9	150.8	151.6	167.9	167.9
Wall Temp. #5-F	150.2	152.2	152.9	153.8	153.6	160.4	151.3	151	164.8	169.4
Wall Temp. #1-F	85.8	152.1	151.9	153.3	153.2	160.3	151.9	150.5	163.5	161.1
Wall Temp. #2-F	149.2	152.4	152.2	153.3	153.1	160.3	151.8	150.7	164.9	165.8
Instream Temp.-F	148.6	148.4	148.5	149.1	149.1	149.7	150.7	150.8	151.4	151.5
Avg. Wall Temp.-F	149.7	152.3	152.3	153.7	153.8	160.4	151.3	151	165.4	167.1
Avg. Wall DT-F	1.1	3.8	3.7	4.5	4.4	10.4	0.6	0.2	13	14.6
Remaining Subcool-F	7.4									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	362.9	373.6	308.5	318.7	579.4	0	0	1784.1	1587.1
COMPUTED H										
Jallouk	290.1	290	290	290.3	290.3	290.6	291.1	291.1	291.4	291.5
Szady1(Cudo tube)	360.6	365.9	368.8	371.7	374	376.5	379.1	381	383.1	384.9
Szady2	360.6	365.9	368.8	371.7	374	376.5	379.1	381	383.1	384.9
(RLIQ)	171050	170712	170851	171773	171755	172680	174242	174383	175318	175459
(F)	1.021	1.036	1.044	1.051	1.058	1.064	1.069	1.074	1.079	1.084
(HLIQ)	360.6	365.9	368.8	371.7	374	376.5	379.1	381	383.1	384.9
(HBOIL)	238.6	868.7	840.8	1034.7	1011.1	2458.8	133.7	52.4	3146.1	3543.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	88									
DP Liquid Density-lbm/ft3	92.07									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.145	0.161	0.179	0.418	0.206					
Zero Corrections-psid	0.103	0.076	0.08	0.027	0.088					
Corrected DP-Psid	0.042	0.085	0.099	0.391	0.12					
Actual DP-ft	2.18	4.36	6.6	8.34	10.93					
Measured TP-Psig	134				132.7					
Measured Overall-ft	2.29									
Computed DP-ft	2.17	4.34	6.52	8.69	10.72					
Friction-ft	0.17	0.34	0.51	0.69	0.85					
Acceleration-ft	0	0	0	0	0.02					
Elevation-ft	2	4	6	8	9.85					

Run#	710									
Test Fluid	C4F8									
Date:	7/22/93									
Time:	13:10									
Flow Area-ft2	0.00398									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	134.2									
Sat. Temperature-F(inlet)	154.8									
Liq. Density-lbm/ft3	82.05	82.15	82.11	82.01	81.97	81.84	81.68	81.67	81.57	81.55
Latent Heat-Btu/lbm	35.55	35.53	35.6	35.52	35.49	35.38	35.25	35.23	35.15	35.14
Specific Heat-Btu/lbm/F	0.291	0.291	0.291	0.291	0.291	0.292	0.292	0.292	0.292	0.293
Liq. Viscosity-lbm/ft-hr	0.451	0.453	0.452	0.45	0.449	0.446	0.443	0.443	0.441	0.44
Liq. Conductivity-Btu/hr-ft-F	0.0295	0.0296	0.0296	0.0295	0.0295	0.0294	0.0293	0.0293	0.0292	0.0292
Liq. Prandtl No.	4.44	4.45	4.45	4.44	4.44	4.43	4.42	4.42	4.42	4.42
Inlet Flow Rate-GPM	6									
Outlet Liq. Flow Rate-GPM	0.2									
Outlet Vap. Flow Rate-GPM	4.2									
Inlet Temperature-F	147.6									
Outlet Liq. Temperature-F	152									
Outlet Vap. Temperature-F	150.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	142.3									
Water outlet Temp.-F	142.7									
Inlet G-lbm/hr/ft2	1182973		Temp		146	Density	82.62			
Subcooling-F	7.2									
Flow Observation										

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	100.8	100.6	100.6	100.1	353.2	0	0	1357.5	1359
Heat Loss-Watts	23.6	5.8	7.9	10	11	10.7	8.4	9.3	11.4	60.2
Heat Flux-Btu/Hr/ft2	0	1747	1744	1742	1735	6122	0	0	23531	23567
Wall Temp. #3-F	149.8	153.4	153.7	155.1	154.3	160.1	151	151.8	168.3	171.7
Wall Temp. #4-F	150.1	153.4	153.7	155.1	155.3	161	151	151.8	168.1	167.9
Wall Temp. #5-F	150.1	153.2	154	154.7	154.7	160.7	151.9	151	164.9	169.5
Wall Temp. #1-F	86.1	153.3	153	154	154.3	160.6	152	150.8	163.6	161
Wall Temp. #2-F	149.5	153.4	153.4	154.3	154.2	160.5	152.3	150.9	165.2	166
Instream Temp.-F	149	148.5	148.7	149.2	149.4	150.1	150.9	151	151.5	[illegible]
Avg. Wall Temp.-F	149.9	153.4	153.5	154.7	154.6	160.6	151.6	151.3	165.6	167.2
Avg. Wall DT.-F	0.9	4.8	4.7	5.4	5.1	10.2	0.7	0.3	13.1	14.6
Remaining Subcool-F	7.2									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	364.3	373.3	319.9	337.1	598.9	0	0	1802.3	1618.5
COMPUTED H										
Jallouk	290.2	289.9	290	290.2	290.3	290.7	291.1	291.1	291.4	291.4
Szady1(Cudo tube)	360.8	365.8	368.8	371.6	374.1	376.6	379	381	383.1	384.8
Szady2	360.8	365.8	368.8	371.6	374.1	376.6	379	381	383.1	384.8
(RLIQ)	171598	170791	171086	171851	172148	173232	174479	174621	175397	175539
(F)	1.021	1.036	1.044	1.051	1.058	1.064	1.069	1.074	1.079	1.084
(HLIQ)	360.8	365.8	368.8	371.6	374.1	376.6	379	381	383.1	384.8
(HBOIL)	192.6	1093.1	1066.7	1256.2	1188.5	2421.7	168.1	57	3165.9	3543

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	89				
DP Liquid Density-lbm/ft3	91.82				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	0.144	0.16	0.178	0.418	0.208
Zero Corrections-psid	0.103	0.076	0.08	0.027	0.088
Corrected DP-Psid	0.041	0.084	0.098	0.391	0.12
Actual DP-ft	2.18	4.36	6.59	8.33	10.92
Measured TP-Psig	134.2				133
Measured Overall-ft	2.12				
Computed DP-ft	2.17	4.34	6.52	8.69	10.72
Friction-ft	0.17	0.34	0.51	0.69	0.85
Acceleration-ft	0	0	0	0	0.02
Elevation-ft	2	4	6	8	9.85

Run#	711									
Test Fluid	C4F8									
Date:	7/22/93									
Time:	13:10									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19696									
Sat. Pressure-Psig	132.5									
Sat. Temperature-F(inlet)	153.9									
Liq. Density-lbm/ft3	82.11	82.18	82.2	82.11	82.13	82.05	81.86	81.84	81.78	81.76
Latent Heat-Btu/lbm	35.6	35.66	35.67	35.6	35.61	35.55	35.39	35.38	35.33	35.31
Specific Heat-Btu/lbm/F	0.291	0.29	0.29	0.291	0.291	0.291	0.291	0.292	0.292	0.292
Liq. Viscosity-lbm/ft-hr	0.452	0.454	0.454	0.452	0.453	0.451	0.447	0.446	0.445	0.445
Liq. Conductivity-Btu/hr-ft-F	0.0296	0.0296	0.0296	0.0296	0.0296	0.0295	0.0294	0.0294	0.0293	0.0293
Liq. Prandtl No.	4.45	4.45	4.45	4.45	4.45	4.44	4.43	4.43	4.43	4.43
Inlet Flow Rate-GPM	8									
Outlet Liq. Flow Rate-GPM	0									
Outlet Vap. Flow Rate-GPM	4.2									
Inlet Temperature-F	147.6									
Outlet Liq. Temperature-F	150.6									
Outlet Vap. Temperature-F	149.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	142.									
Water outlet Temp.-F	142.1									
Inlet G-lbm/hr/ft2	1576223		Temp		146.3	Density	82.56			
Subcooling-F	6.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	60.4	61.2	60.5	60.5	352.9	0	0	1366.5	1368
Heat Loss-Watts	23.7	5.7	7.7	9.8	10.8	10.8	8.4	9.3	11.4	60.2
Heat Flux-Btu/hr/ft2	0	1047	1061	1049	1049	6117	0	0	23687	23713
Wall Temp. #3-F	149.2	150.6	150.8	151.8	151.1	158.7	150	150.5	165.3	171
Wall Temp. #4-F	149.4	151	150.8	151.8	152.1	159.5	150.1	150.6	167.1	167.4
Wall Temp. #5-F	149.7	150.9	151.1	151.8	151.4	159.1	150.6	150.1	164.2	168.9
Wall Temp. #1-F	86.7	150.8	150.4	151.3	151.2	158.9	151	150	162.7	160.3
Wall Temp. #2-F	93.2	150.8	150.7	151.3	151.1	158.8	151	150	164.2	165.4
Instream Temp.-F	148.7	148.3	148.2	148.7	148.6	149	150	150.1	150.4	150.5
Avg. Wall Temp.-F	149.4	150.8	150.7	151.7	151.5	159.1	150.5	150.2	164.7	166.6
Avg. Wall DT.-F	0.7	2.5	2.4	2.9	2.8	9.8	0.5	0.1	13.2	15
Remaining Subcool-F	6.4									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/hr/ft2/F	0	428.9	437.1	358.2	374.2	625.9	0	0	1790.5	1577.9
COMPUTED H										
Jallouk	364.9	364.6	364.5	364.8	364.7	365	365.6	365.7	365.9	365.9
Szady1(Cudo tube)	453.6	460.1	463.6	467.2	470	473	476.3	478.7	481.2	483.4
Szady2	453.6	460.1	463.6	467.2	470	473	476.3	478.7	481.2	483.4
(RLIQ)	228016	227150	226920	227936	227706	228516	230586	230772	231380	231567
(F)	1.021	1.038	1.045	1.052	1.058	1.064	1.069	1.075	1.08	1.084
(HLIQ)	453.6	460.1	463.6	467.2	470	473	476.3	478.7	481.2	483.4
(HBOIL)	147.1	548.6	542	661	631.3	2280.8	118.9	29.9	3165.4	3611.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	89.2									
DP Liquid Density-lbm/ft3	91.89									
Elevation-ft	2	4	6	8	9.375					
Measured DP-Psid	0.067	0.003	-0.067	0.099	-0.273					
Zero Corrections-psid	0.103	0.076	0.08	0.027	0.086					
Corrected DP-Psid	-0.036	-0.073	-0.147	0.072	-0.359					
Actual DP-ft	2.31	4.62	7	8.86	11.73					
Measured TP-Psig	132.5				131.5					
Measured Overall-ft	1.76									
Computed DP-ft	2.29	4.58	6.86	9.15	11.3					
Friction-ft	0.29	0.57	0.88	1.15	1.43					
Acceleration-ft	0	0	0.01	0.01	0.03					
Elevation-ft	2	4	6	8	9.85					

Run#	712									
Test Fluid	C4F8									
Date:	7/22/93									
Time:	13:10									
Flow Area-ft2	0.00336									
Heat Flow Area #2	0.19685									
Sat. Pressure-Psig	132.9									
Sat. Temperature-F(inlet)	154.1									
Liq. Density-lbm/ft3	81.97	82.07	82.07	82.03	82.03	81.92	81.7	81.67	81.65	81.65
Latent Heat-Btu/lbm	35.49	35.56	35.56	35.53	35.53	35.44	35.27	35.23	35.22	35.22
Specific Heat-Btu/lbm/F	0.291	0.291	0.291	0.291	0.291	0.291	0.292	0.292	0.292	0.292
Liq. Viscosity-lbm/ft-hr	0.449	0.451	0.451	0.45	0.45	0.448	0.444	0.443	0.442	0.442
Liq. Conductivity-Btu/hr-ft-F	0.0295	0.0295	0.0295	0.0295	0.0295	0.0294	0.0293	0.0293	0.0292	0.0292
Liq. Prandtl No.	4.44	4.44	4.44	4.44	4.44	4.44	4.42	4.42	4.42	4.42
Inlet Flow Rate-GPM	8									
Outlet Liq. Flow Rate-GPM	0.1									
Outlet Vap. Flow Rate-GPM	4.2									
Inlet Temperature-F	148.7									
Outlet Liq. Temperature-F	150.9									
Outlet Vap. Temperature-F	150.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	142.8									
Water outlet Temp.-F	142.8									
Inlet G-lbm/hr/ft2	1577298		Temp		146	Density	82.62			
Subcooling-F	5.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	81.4	81.7	81.3	81.1	406	0	0	1451.2	1300.6
Heat Loss-Watts	24.2	5.8	7.9	10	11	10.7	8.7	9.5	11.8	60.8
Heat Flux-Btu/Hr/ft2	0	1411	1416	1409	1406	7038	0	0	25156	22545
Wall Temp. #3-F	149.9	152.2	152.3	153.1	152.6	159.7	150.9	151.4	166.2	170.7
Wall Temp. #4-F	150	152.5	152.3	153.1	153.5	160.4	150.9	151.4	168.1	167.1
Wall Temp. #5-F	150.3	152.1	152.4	152.9	152.9	160.2	151.4	150.9	164.9	158.7
Wall Temp. #1-F	87.6	152.2	152.1	152.4	152.5	160.1	151.8	150.6	163.6	160.4
Wall Temp. #2-F	149.9	152.5	152.1	152.6	152.4	159.8	151.8	150.9	165.1	165.2
Instream Temp.-F	149.4	148.9	148.9	149.1	149.1	149.7	150.8	151	151.1	151.1
Avg. Wall Temp.-F	150	152.4	152.2	152.9	152.8	160.1	151.4	151	165.8	166.4
Avg. Wall DT.-F	0.6	3.4	3.2	3.7	3.7	10.1	0.6	0	13.3	14.3
Remaining Subcool-F	5.4									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	416.7	437.8	379.7	389.9	698.1	0	0	1885.9	1578.5
COMPUTED H										
Jallouk	365.6	365.2	365.2	365.3	365.3	365.6	366.4	366.5	366.5	368.5
Szady1(Cudo tube)	454.4	460.8	464.4	467.7	470.6	473.8	477.1	479.6	481.9	484.1
Szady2	454.4	460.8	464.4	467.7	470.6	473.8	477.1	479.6	481.9	484.1
(RLIQ)	229534	228555	228532	228926	228903	230136	232428	232827	233016	232992
(F)	1.021	1.038	1.044	1.051	1.058	1.064	1.069	1.074	1.079	1.084
(HLIQ)	454.4	460.8	464.4	467.7	470.6	473.8	477.1	479.6	481.9	484.1
(HBOIL)	137.1	769.2	734.2	847	835.4	2375.5	124.7	8.4	3221.1	3458.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	88.8									
DP Liquid Density-lbm/ft3	91.95									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.067	0.005	-0.065	0.105	-0.277					
Zero Corrections-psid	0.103	0.076	0.08	0.027	0.086					
Corrected DP-Psid	-0.036	-0.071	-0.145	0.078	-0.363					
Actual DP-ft	2.32	4.63	7.01	8.87	11.76					
Measured TP-Psig	132.9				132					
Measured Overall-ft	1.59									
Computed DP-ft	2.29	4.58	6.87	9.16	11.31					
Friction-ft	0.29	0.57	0.86	1.15	1.43					
Acceleration-ft	0	0	0.01	0.01	0.03					
Elevation-ft	2	4	6	8	9.85					

Run#	713									
Test Fluid	C4F8									
Date:	7/22/93									
Time:	13:10									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	134.2									
Sat. Temperature-F(inlet)	154.8									
Liq. Density-lbm/ft3	81.9	81.94	81.94	81.9	81.88	81.76	81.55	81.53	81.49	81.49
Latent Heat-Btu/lbm	35.42	35.45	35.45	35.42	35.41	35.31	35.14	35.12	35.09	35.09
Specific Heat-Btu/lbm/F	0.291	0.291	0.291	0.291	0.291	0.292	0.293	0.293	0.293	0.293
Liq. Viscosity-lbm/ft-hr	0.448	0.448	0.448	0.448	0.447	0.445	0.44	0.44	0.439	0.439
Liq. Conductivity-Btu/hr-ft-F	0.0294	0.0294	0.0294	0.0294	0.0294	0.0293	0.0292	0.0292	0.0291	0.0291
Liq. Prandtl No.	4.43	4.44	4.44	4.43	4.43	4.43	4.42	4.41	4.41	4.41
Inlet Flow Rate-GPM	8									
Outlet Liq. Flow Rate-GPM	0.1									
Outlet Vap. Flow Rate-GPM	4.2									
Inlet Temperature-F	149.4									
Outlet Liq. Temperature-F	89.8									
Outlet Vap. Temperature-F	150.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	143									
Water outlet Temp.-F	143.2									
Inlet G-lbm/hr/ft2	1575864		Temp	146.4	Density	82.64				
Subcooling-F	5.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	0	98.1	98.1	98.3	97.5	455.5	0	0	1483.5	1294.8
Heat Loss-Watts	24.4	5.9	8.1	10	10.9	10.6	8.9	9.7	11.8	61
Heat Flux-Btu/Hr/ft2	0	1700	1700	1704	1690	7896	0	0	25716	22445
Wall Temp. #3-F	149.6	153.2	153.4	154.7	154	161.2	151.8	151.9	167.1	171
Wall Temp. #4-F	150.3	153.4	153.4	154.7	154.9	161.9	151.8	152.2	168.8	167.5
Wall Temp. #5-F	150.3	153	153.3	154.4	154.3	161.4	152.2	151.8	165.5	169
Wall Temp. #1-F	88.6	153.3	152.9	153.6	154	161.7	152.5	151.1	164.8	160.9
Wall Temp. #2-F	149.6	153.3	153.2	153.9	153.8	161.3	152.5	151.7	165.6	165.6
Instream Temp.-F	149.8	149.6	149.6	149.8	149.9	150.5	151.6	151.7	151.9	151.9
Avg. Wall Temp.-F	150	153.3	153.2	154.4	154.3	161.6	152.2	151.7	166.3	168.9
Avg. Wall DT.-F	0.1	3.6	3.5	4.5	4.3	10.7	0.6	0	13.2	13.9
Remaining Subcool-F	5.4									
Exit Quality	0	0	0	0	0	0	0	0	0	0
EXP. H-Btu/Hr/ft2/F	0	469.3	479.3	380.9	395.5	738.4	0	0	1948.5	1616.4
COMPUTED H										
Jallouk	365.6	365.4	365.4	365.5	365.5	365.9	366.7	366.7	366.8	366.8
Szady1(Cudo tube)	454.4	461	464.6	467.9	470.9	474	477.3	479.7	482.1	484.3
Szady2	454.4	461	464.6	467.9	470.9	474	477.3	479.7	482.1	484.3
(RLIQ)	230263	229809	229786	230183	230369	231607	233910	234098	234500	234476
(F)	1.021	1.036	1.044	1.051	1.058	1.069	1.069	1.074	1.078	1.084
(HLIQ)	454.4	461	464.6	467.9	470.9	474	477.3	479.7	482.1	484.3
(HBOIL)	31.9	831.7	814	1034.6	988.6	2548.5	125.9	8.4	3216.8	3388.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	89.9									
DP Liquid Density-lbm/ft3	91.79									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.067	0.007	-0.063	0.111	-0.275					
Zero Corrections-psid	0.103	0.076	0.08	0.027	0.086					
Corrected DP-Psid	-0.036	-0.069	-0.143	0.084	-0.361					
Actual DP-ft	2.32	4.63	7.01	8.86	11.78					
Measured TP-Psig	134.2				133.6					
Measured Overall-ft	1.24									
Computed DP-ft	2.29	4.58	6.87	9.16	11.31					
Friction-ft	0.29	0.57	0.86	1.15	1.43					
Acceleration-ft	0	0	0.01	0.01	0.03					
Elevation-ft	2	4	6	8	9.85					

Run#	771									
Test Fluid	C4F8									
Date:	8/16/93									
Time:	11:41									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	85.6									
Sat. Temperature-F(inlet)	126.8									
Liq. Density-lbm/ft3	86.32	86.25	86.3	86.24	86.29	86.3	86.24	86.3	86.32	85.78
Latent Heat-Btu/lbm	39.02	38.96	39.01	38.95	38.99	39.01	38.95	39.01	39.02	38.58
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.28
Liq. Viscosity-lbm/ft-hr	0.564	0.562	0.564	0.561	0.563	0.564	0.561	0.564	0.564	0.547
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0324	0.0325	0.0324	0.0324	0.0325	0.0324	0.0325	0.0325	0.0321
Liq. Prandtl No.	4.83	4.82	4.83	4.82	4.83	4.83	4.82	4.83	4.83	4.77
Inlet Flow Rate-GPM	1.1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	122.5									
Outlet Liq. Temperature-F	124.8									
Outlet Vap. Temperature-F	122.1									
Water Flow Rate-GPM										
Water inlet Temp.-F	82.6									
Water outlet Temp.-F	111.6									
Inlet G-lbm/hr/ft2	227820		Temp	122.3	Density	86.79				
Subcooling-F	4.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	289.6	292.1	287.9	288.7	286.9	287.7	285	292.5	289.4	290.8
Heat Loss-Watts	5.3	1.2	1.5	1.6	1.5	1.1	0.7	1.2	1.5	8.4
Heat Flux-Btu/Hr/ft2	5020	5063	4991	4970	4978	4987	4940	5070	5017	5041
Wall Temp. #3-F	131.3	131.5	129.5	131	130.7	130.1	131.5	131.2	130.6	130.2
Wall Temp. #4-F	131.6	130.9	130	131.2	130.7	130.7	131.3	131.8	131.1	131.9
Wall Temp. #5-F	131.7	130.6	131.3	130.9	130.2	130	130.3	131.2	130.2	130.1
Wall Temp. #1-F	88.9	131.9	130.3	130.3	130.2	130.4	131.2	131.6	129.7	129.5
Wall Temp. #2-F	132	131.5	130.8	130.5	130.2	130.3	130.9	131.9	130.1	130.4
Instream Temp.-F	125.1	125.5	125.2	125.6	125.9	125.2	125.6	125.2	125.1	129.9
Avg. Wall Temp.-F	131.7	131.3	130.2	130.9	130.3	130.3	131	131.5	130.3	130.4
Avg. Wall DT.-F	6.3	5.6	4.7	5	4.8	4.9	5.2	6.1	5	1.9
Remaining Subcool-F	-0.3									
Exit Quality	0	0.04	0.07	0.1	0.13	0.17	0.2	0.23	0.27	0.3
EXP. H-Btu/Hr/ft2/F	793.9	908.9	1056.3	988.9	1096	1023.1	947	829.7	1000.7	2684
COMPUTED H										
Jallouk	606.2	595.3	588	590.9	575.2	564	564.7	571.8	570.4	585.7
Szady1(Cudo tube)	907.6	914.5	906.3	907.6	906.4	907.6	906.7	916.5	911.7	936.4
Szady2	668.5	674.7	666.2	666.6	665.2	665.9	664.1	673.8	652.8	675.8
(HLIQ)	26388	26017	25066	24289	23952	22460	21677	20721	19622	19534
(F)	1.103	1.549	1.994	2.316	2.593	2.836	3.048	3.258	3.452	3.57
(HLIQ)	88.6	124.5	160.2	188.2	208.3	227.8	245.1	261.7	277.2	288.9
(HBOIL)	907.3	913.8	904.6	905	902.8	902.8	900.7	909.3	903	927.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	92.6									
DP Liquid Density-lbm/ft3	91.4									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.206	1.262	2.123	2.64	3.321					
Zero Corrections-psid	-0.008	-0.021	-0.06	0.023	-0.08					
Corrected DP-Psid	0.215	1.283	2.183	2.617	3.401					
Actual DP-ft	1.77	2.11	2.79	4.18	4.81					
Measured TP-Psig	85.6				84.7					
Measured Overall-ft	1.61									
Computed DP-ft	1.64	2.75	3.71	4.61	5.4					
Friction-ft	0.02	0.05	0.11	0.19	0.28					
Acceleration-ft	0.01	0.03	0.04	0.05	0.07					
Elevation-ft	1.6	2.68	3.56	4.36	5.06					

Run#	772									
Test Fluid	C4F8									
Date:	8/18/93									
Time:	11:41									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	85.6									
Sat. Temperature-F(inlet)	126.8									
Liq. Density-lbm/ft3	86.3	86.25	86.3	86.29	86.32	86.37	86.29	86.35	86.35	86.22
Latent Heat-Btu/lbm	39.01	38.96	39.01	38.99	39.02	39.06	38.99	39.05	39.05	38.94
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.564	0.562	0.564	0.563	0.564	0.568	0.563	0.565	0.565	0.561
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0324	0.0325	0.0324	0.0325	0.0325	0.0324	0.0325	0.0325	0.0324
Liq. Prandtl No.	4.83	4.82	4.83	4.83	4.83	4.84	4.83	4.84	4.84	4.82
Inlet Flow Rate-GPM	1.7									
Outlet Liq. Flow Rate-GPM	0.5									
Outlet Vap. Flow Rate-GPM	1.3									
Inlet Temperature-F	122.7									
Outlet Liq. Temperature-F	124.3									
Outlet Vap. Temperature-F	121.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	82.9									
Water outlet Temp.-F	110.2									
Inlet G-lbm/hr/ft2	351480		Temp	123.2	Density	86.64				
Subcooling-F	4.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	282.9	284.9	291.7	290.2	286.1	288.8	256	289.8	291.7	295
Heat Loss-Watts	4.8	1.1	1.4	1.4	1.3	1	0.6	1.1	1.3	7.4
Heat Flux-Btu/Hr/ft2	4904	4939	5056	5030	4959	4971	4438	5023	5056	5114
Wall Temp. #3-F	131.2	131.4	129.5	130.6	130.3	129.8	130.8	130.8	130.1	129.7
Wall Temp. #4-F	131.6	130.8	130	130.7	130.3	130.2	130.6	131.1	130.8	131.4
Wall Temp. #5-F	131.6	130.5	131.2	130.4	129.8	129.7	129.7	130.9	129.8	129.6
Wall Temp. #1-F	89.5	131.1	130.2	130.1	129.7	130	130.3	130.9	129.4	129.1
Wall Temp. #2-F	131.9	131.4	130.7	130.1	129.8	129.9	130.1	131.1	129.8	129.8
Instream Temp.-F	125.2	125.5	125.2	125.3	125.1	124.8	125.3	124.9	124.9	125.7
Avg. Wall Temp.-F	131.6	131.2	130.1	130.5	129.9	129.9	130.3	131	130	129.9
Avg. Wall DT.-F	6.2	5.5	4.7	4.9	4.8	4.9	4.8	5.8	4.9	4
Remaining Subcool-F	1.2									
Exit Quality	-0.01	0.01	0.03	0.06	0.08	0.1	0.12	0.14	0.16	0.18
EXP. H-Btu/Hr/ft2/F	798.9	905.9	1082.4	1021.9	1077.9	1014.5	924.6	861.2	1042.2	1282
COMPUTED H										
Jallouk	598.2	585.3	583.9	575.9	564.9	567.3	533.8	568.3	570.6	577.4
Szady1(Cudo tube)	897.8	903.2	912.8	911.9	905	905	859.6	912.4	916.4	928.1
Szady2	658.4	663.3	672.2	670.4	662.9	662.6	606.1	655.8	661	672.8
(PLIQ)	40795	40828	39840	38997	38052	37061	36438	35477	34601	33976
(F)	1.006	1.148	1.623	1.912	2.145	2.348	2.513	2.675	2.831	2.968
(HLIQ)	114.3	130.5	184.5	217.4	243.7	266.5	285.6	303.7	321.5	337.6
(HBOIL)	897.1	902.2	910.2	907.8	899.1	897.3	849	901	903.1	913
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	93.1									
DP Liquid Density-lbm/ft3	91.33									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.184	1.048	1.706	2.282	2.859					
Zero Corrections-psid	-0.009	-0.021	-0.06	0.023	-0.08					
Corrected DP-Psid	0.193	1.067	1.766	2.259	2.939					
Actual DP-ft	1.8	2.45	3.41	4.78	5.55					
Measured TP-Psig	85.6				84.9					
Measured Overall-ft	1.17									
Computed DP-ft	1.88	3.26	4.48	5.78	6.83					
Friction-ft	0.02	0.08	0.16	0.26	0.38					
Acceleration-ft	0.02	0.05	0.06	0.08	0.1					
Elevation-ft	1.84	3.13	4.25	5.44	6.35					

Run#	773									
Test Fluid	C4F8									
Date:	8/16/93									
Time:	11:41									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	87									
Sat. Temperature-F(inlet)	127.8									
Liq. Density-lbm/ft3	86.39	86.32	86.24	86.08	86.16	86.17	86.16	86.25	86.29	86.17
Latent Heat-Btu/lbm	39.07	39.02	38.95	38.83	38.88	38.9	38.88	38.96	38.99	38.9
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.279	0.279	0.278	0.279	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.566	0.564	0.561	0.557	0.559	0.559	0.559	0.562	0.563	0.559
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0325	0.0324	0.0323	0.0323	0.0324	0.0323	0.0324	0.0324	0.0324
Liq. Prandtl No.	4.84	4.83	4.82	4.8	4.81	4.81	4.81	4.82	4.83	4.81
Inlet Flow Rate-GPM	2.5									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	1.1									
Inlet Temperature-F	122.4									
Outlet Liq. Temperature-F	124.8									
Outlet Vap. Temperature-F	122.3									
Water Flow Rate-GPM										
Water inlet Temp.-F	83.6									
Water outlet Temp.-F	110.8									
Inlet G-lbm/hr/ft2	516585		Temp	123.5	Density	86.59				
Subcooling-F	5.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	287	288	293.2	292.5	296.2	290.2	289	286.1	289.9	291.3
Heat Loss-Watts	5	1.1	1.5	1.5	1.4	1	0.7	1.1	1.3	7.5
Heat Flux-Btu/hr/ft2	4975	4992	5082	5070	5134	5030	5010	4959	5025	5049
Wall Temp. #3-F	131.9	132.2	130.3	131.7	131.1	130.8	131.4	131	130.4	130
Wall Temp. #4-F	132.5	131.7	130.9	131.7	131.3	130.9	131.3	131.5	131	131.8
Wall Temp. #5-F	132.5	131.1	131.9	131.3	130.9	130.2	130.5	131.3	130.4	130.1
Wall Temp. #1-F	89.5	131.9	130.9	131.1	130.7	130.9	131.5	131.3	129.8	129.9
Wall Temp. #2-F	132.5	132.1	131.4	131.3	130.9	130.9	131.1	131.5	130	130.2
Instream Temp.-F	124.7	125.1	125.6	126.5	126.1	126	126.1	125.5	125.3	126
Avg. Wall Temp.-F	132.4	132	130.9	131.5	131	130.7	131.2	131.3	130.3	130.3
Avg. Wall DT.-F	7.4	6.8	5	4.7	4.6	4.5	4.8	5.6	4.8	4.1
Remaining Subcool-F	3.3									
Exit Quality	-0.02	-0.01	0.01	0.02	0.04	0.05	0.06	0.08	0.09	0.11
EXP. H-Btu/Hr/ft2/F	670	750.8	1007.4	1074	1111.8	1124.7	1036.4	886.3	1048.5	1246.2
COMPUTED H										
Jallouk	585.7	588.7	597.7	574.9	581.3	572.8	572.6	569.2	574.1	579.9
Szady1(Cudo tube)	901.4	905.7	917.4	924	928.4	919.8	920.1	913.1	919.4	927.9
Szady2	681.9	685.8	677	681.2	684.9	681.2	683.7	659.7	667.2	676.5
(RLIQ)	59678	59901	60188	59824	58795	57843	57013	55813	54833	54315
(F)	1.006	1.006	1.006	1.435	1.695	1.88	2.044	2.196	2.332	2.451
(HLIQ)	155.4	155.6	155.7	222.6	261.1	291.2	316.8	339.7	360.7	379.7
(HBOIL)	899.8	904.2	916.9	919.7	921.5	910	907.4	897.2	900.5	906.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	93.5									
DP Liquid Density-lbm/ft3	91.27									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.118	0.727	1.227	1.728	2.213					
Zero Corrections-psid	-0.009	-0.021	-0.06	0.023	-0.08					
Corrected DP-Psid	0.127	0.748	1.287	1.703	2.293					
Actual DP-ft	1.91	2.99	4.2	5.63	6.63					
Measured TP-Psig	87				86.8					
Measured Overall-ft	1.17									
Computed DP-ft	2.04	3.84	5.48	7.05	8.51					
Friction-ft	0.04	0.1	0.19	0.3	0.43					
Acceleration-ft	0	0.06	0.09	0.12	0.15					
Elevation-ft	2	3.69	5.2	6.63	7.93					

Run#	774									
Test Fluid	C4F8									
Date:	8/17/93									
Time:	11:17									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	84.4									
Sat. Temperature-F(inlet)	126									
Liq. Density-lbm/ft3	86.18	86.24	86.24	86.22	86.29	86.29	86.37	86.4	86.44	86.45
Latent Heat-Btu/lbm	38.91	38.95	38.95	38.94	38.99	38.99	39.06	39.09	39.11	39.13
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.56	0.561	0.561	0.561	0.563	0.563	0.566	0.567	0.568	0.568
Liq. Conductivity-Btu/hr-ft-F	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0325	0.0325	0.0325	0.0326
Liq. Prandtl No.	4.82	4.82	4.82	4.82	4.83	4.83	4.84	4.84	4.85	4.85
Inlet Flow Rate-GPM	4.8									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	2.3									
Inlet Temperature-F	123.1									
Outlet Liq. Temperature-F	123.9									
Outlet Vap. Temperature-F	120.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	82.9									
Water outlet Temp.-F	112									
Inlet G-lbm/hr/ft2	991843		Temp	123.5	Density	86.59				
Subcooling-F	2.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	480	286.1	290.6	289.4	284.2	283.7	281.5	285.4	291.8	290
Heat Loss-Watts	5.5	1.2	1.6	1.6	1.6	1.2	0.7	1.1	1.4	7.1
Heat Flux-Btu/hr/ft2	8320	4959	5037	5017	4926	4918	4880	4947	5058	5027
Wall Temp. #3-F	133.3	132.6	132.2	132.6	133.3	132.7	132.6	131.1	131	129.5
Wall Temp. #4-F	133.7	132.1	132.6	132.6	133.3	133.5	132.5	131.8	131.3	131.1
Wall Temp. #5-F	134.3	131.7	133.3	133.1	132.6	132.7	132.1	131.5	130.9	129.5
Wall Temp. #1-F	85.9	132.2	131.4	132	132.1	132.7	132.8	131.5	130.2	128.9
Wall Temp. #2-F	134.1	132.6	131.9	132.1	132.2	132.7	132.7	132.1	130.8	129.7
Instream Temp.-F	125.9	125.8	125.8	125.7	125.3	125.3	124.8	124.6	124.4	124.3
Avg. Wall Temp.-F	133.9	132.4	132	132.6	132.5	132.9	132.5	131.6	130.8	129.7
Avg. Wall DT.-F	7.6	6.5	6.2	6.6	7	7.4	7.5	6.8	6.2	5.2
Remaining Subcool-F	1.2									
Exit Quality	-0.01	0	0.01	0.01	0.02	0.03	0.04	0.04	0.05	0.06
EXP. H-Btu/Hr/ft2/F	1098.6	760	812.8	754.6	703.5	666.6	648.9	730.1	819.6	964.9
COMPUTED H										
Jallouk	763.9	570.5	572.4	577.8	579.4	588.4	585.5	594.5	605	610.5
Szady1(Cudo tube)	1186.6	909.2	918.8	921.5	914.4	917.4	914.6	923	935.1	938
Szady2	946.2	649.4	661.9	669.3	677.4	677.9	674.3	675.6	691.7	701.5
(RLIQ)	115898	115561	115205	114489	113128	112268	110881	109818	108744	107771
(F)	1.006	1.008	1.169	1.382	1.598	1.658	1.768	1.963	1.955	2.041
(HLIQ)	262.6	262.4	309.9	363.2	400.9	432.1	459.7	484.6	508.5	530.7
(HBOIL)	1182.2	901.8	906.9	902.3	888	884.2	874.1	876.1	882	875.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	88.3									
DP Liquid Density-lbm/ft3	92.02									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.061	0.518	0.904	1.153	1.442					
Zero Corrections-psid	-0.006	-0.016	-0.055	0.022	-0.032					
Corrected DP-Psid	0.067	0.534	0.959	1.131	1.474					
Actual DP-ft	2.02	3.97	4.79	6.63	8.06					
Measured TP-Psig	84.4				82.6					
Measured Overall-ft	3									
Computed DP-ft	2.12	4.17	6.07	7.94	9.68					
Friction-ft	0.12	0.3	0.54	0.83	1.14					
Acceleration-ft	0	0.17	0.25	0.32	0.38					
Elevation-ft	2	3.7	5.28	6.79	8.16					

Run#	775									
Test Fluid	C4F8									
Date:	8/17/93									
Time:	15:16									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	84.4									
Sat. Temperature-F(inlet)	126									
Liq. Density-lbm/ft3	86.25	86.29	86.27	86.22	86.25	86.29	86.35	86.39	86.4	86.42
Latent Heat-Btu/lbm	38.98	38.99	38.98	38.94	38.98	38.99	39.05	39.07	39.09	39.1
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.562	0.563	0.562	0.561	0.562	0.563	0.565	0.566	0.567	0.567
Liq. Conductivity-Btu/hr-ft-F	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0325	0.0325	0.0325	0.0325
Liq. Prandtl No.	4.82	4.83	4.83	4.82	4.82	4.83	4.84	4.84	4.84	4.84
Inlet Flow Rate-GPM	4.1									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	122.5									
Outlet Liq. Temperature-F	124.5									
Outlet Vap. Temperature-F	120.6									
Water Flow Rate-GPM										
Water inlet Temp.-F	84.9									
Water outlet Temp.-F	113.9									
Inlet G-lbm/hr/ft2	848837		Temp	122.8	Density	86.7				
Subcooling-F	3.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	285.7	288.4	292.4	291.8	285.4	284.8	283.8	287.4	294.1	292.2
Heat Loss-Watts	5.2	1.1	1.5	1.5	1.5	1.1	0.7	1	1.3	7
Heat Flux-Btu/Hr/ft2	4962	4999	5069	5058	4947	4937	4919	4982	5098	5065
Wall Temp. #3-F	133.8	132.8	132.4	132.7	133.3	133.2	132.9	131.2	131.2	129.8
Wall Temp. #4-F	133.8	132.4	132.8	133	133.6	133.8	133.1	132	131.8	131.3
Wall Temp. #5-F	134.5	131.7	133.5	133	132.6	133	132.5	131.8	131.2	129.9
Wall Temp. #1-F	86.3	132.3	131.5	132.1	132.4	133.1	133.4	131.8	130.9	129.1
Wall Temp. #2-F	134.3	132.7	132.1	132.2	132.3	133.2	133.3	132.3	131	130.1
Instream Temp.-F	125.5	125.3	125.4	125.7	125.5	125.3	124.9	124.7	124.8	124.5
Avg. Wall Temp.-F	134	132.6	132.2	132.7	132.7	133.3	133	131.8	131.2	130
Avg. Wall DT.-F	8.3	7	6.6	6.8	7	7.8	7.9	6.9	6.4	5.3
Remaining SubcoolF	2.3									
Exit Quality	-0.02	-0.01	0	0.01	0.02	0.03	0.04	0.05	0.05	0.06
EXP. H-Btu/Hr/ft2/F	598.4	711.7	771.4	747	706.6	638.9	621.3	722.6	797.9	953.7
COMPUTED H										
Jallouk	565.2	568.8	570.9	573.5	570	573.9	577.4	585.4	591.3	594.8
Szady1(Cudo tube)	906.6	909.6	916.5	920.4	912	912.6	911.4	918.7	931.2	931
Szady2	664.6	667.6	674.5	662	658.7	662.5	674.6	680.2	691.7	690.7
(RLIQ)	98747	98558	98663	98946	97282	96283	95008	93968	93006	92088
(F)	1.008	1.008	1.008	1.277	1.476	1.626	1.754	1.869	1.975	2.074
(HLIQ)	231.5	231.4	231.5	294.1	339.5	373.9	403.1	429.3	453.6	478.2
(HBOIL)	901.6	904.5	911.6	910.3	896	891.2	884.3	886.3	893.9	887.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	88.5									
DP Liquid Density-lbm/ft3	91.99									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.062	0.576	1.019	1.319	1.657					
Zero Corrections-psid	-0.006	-0.016	-0.055	0.022	-0.032					
Corrected DP-Psid	0.068	0.592	1.074	1.297	1.699					
Actual DP-ft	2.02	3.27	4.6	6.35	7.68					
Measured TP-Psig	84.4				82.9					
Measured Overall-ft	2.5									
Computed DP-ft	2.09	4.11	5.98	7.74	9.4					
Friction-ft	0.09	0.21	0.38	0.6	0.84					
Acceleration-ft	0	0.1	0.18	0.23	0.29					
Elevation-ft	2	3.8	5.39	6.9	8.27					

Run#	776									
Test Fluid	C4F8									
Date:	8/17/93									
Time:	15:16									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	84.5									
Sat. Temperature-F(inlet)	126.1									
Liq. Density-lbm/ft3	86.25	86.24	86.18	86.22	86.24	86.25	86.29	86.34	86.37	86.12
Latent Heat-Btu/lbm	38.96	38.95	38.91	38.94	38.95	38.96	38.99	39.03	39.06	38.86
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.279
Liq. Viscosity-lbm/ft-hr	0.562	0.561	0.56	0.561	0.561	0.562	0.563	0.565	0.568	0.558
Liq. Conductivity-Btu/hr-ft-F	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0325	0.0325	0.0323
Liq. Prandtl No.	4.82	4.82	4.82	4.82	4.82	4.82	4.83	4.83	4.84	4.81
Inlet Flow Rate-GPM	3.3									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	1.6									
Inlet Temperature-F	122.6									
Outlet Liq. Temperature-F	124.6									
Outlet Vap. Temperature-F	121									
Water Flow Rate-GPM										
Water Inlet Temp.-F	84.7									
Water outlet Temp.-F	114.2									
Inlet G-lbm/hr/ft2	682677		Temp	122.8	Density	86.69				
Subcooling-F	3.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	287.1	289.7	297.4	296.2	288.1	288	285.1	288.7	297.9	296.8
Heat Loss-Watts	5.2	1.1	1.5	1.5	1.5	1.1	0.7	1.1	1.4	7.3
Heat Flux-Btu/hr/ft2	4977	5022	5155	5134	4994	4982	4942	5004	5164	5141
Wall Temp. #3-F	133.8	132.9	132.6	133	133.7	133.6	133.4	131.8	131.8	130.5
Wall Temp. #4-F	133.8	132.3	133.1	133.4	133.9	134.3	133.6	132.5	132.9	132.2
Wall Temp. #5-F	134.4	131.9	133.6	133.5	133.1	133.6	133	132.3	131.8	130.5
Wall Temp. #1-F	86.7	132.5	131.5	132.4	132.8	133.6	133.9	132.4	131.2	129.5
Wall Temp. #2-F	134.3	132.5	132	132.4	132.7	133.6	133.7	133	131.8	130.6
Instream Temp.-F	125.5	125.6	125.9	125.7	125.6	125.5	125.9	125	124.8	126.3
Avg. Wall Temp.-F	134	132.6	132.3	133.1	133.1	133.8	133.5	132.4	131.8	130.7
Avg. Wall DT.-F	8.3	6.7	6.2	7.1	7.3	8	8	7.2	6.7	4.1
Remaining Subcool-F	2									
Exit Quality	-0.01	0	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.09
EXP. H-Btu/hr/ft2/F	599.6	748.9	835.9	718.8	684.2	620.2	618	697.6	765.4	1245.6
COMPUTED H										
Jallouk	577.4	581	577.3	583.8	570.6	572.9	573.1	579.1	589.9	597.1
Szady1(Cudo tube)	907.8	912.6	927.7	928.7	915.5	916.8	913.2	919.1	934.1	944.6
Szady2	656.7	671.4	686.4	686.6	659.8	663.8	663.1	683.2	697.2	704.5
(RLIQ)	78484	79540	79545	78490	77527	76579	75585	74482	73457	73610
(F)	1.006	1.006	1.177	1.462	1.65	1.804	1.939	2.062	2.178	2.272
(HLIQ)	194.6	194.6	227.8	282.8	319.3	348.9	374.8	398.4	420.5	440.2
(HBOIL)	904.8	909.6	923.1	917.8	902.3	899.6	891.6	893.4	904.9	911.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	89.2									
DP Liquid Density-lbm/ft3	91.89									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.102	0.711	1.244	1.605	2.023					
Zero Corrections-psid	-0.006	-0.016	-0.055	0.022	-0.032					
Corrected DP-Psid	0.108	0.727	1.299	1.583	2.055					
Actual DP-ft	1.95	3.05	4.23	5.89	7.1					
Measured TP-Psig	84.5				82.9					
Measured Overall-ft	2.68									
Computed DP-ft	2.08	3.92	5.84	7.32	8.87					
Friction-ft	0.06	0.16	0.3	0.47	0.68					
Acceleration-ft	0	0.1	0.14	0.18	0.22					
Elevation-ft	2	3.67	5.2	6.68	7.99					

Run#	777									
Test Fluid	C4F8									
Date:	8/18/93									
Time:	8:34									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	86.3									
Sat. Temperature-F(inlet)	127.3									
Liq. Density-lbm/ft3	86.18	86.15	86.18	86.18	86.24	86.24	86.22	86.25	86.3	85.96
Latent Heat-Btu/lbm	38.91	38.88	38.91	38.91	38.95	38.95	38.94	38.96	39.01	38.73
Specific Heat-Btu/lbm/F	0.278	0.279	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.279
Liq. Viscosity-lbm/ft-hr	0.56	0.559	0.56	0.56	0.561	0.561	0.561	0.562	0.564	0.553
Liq. Conductivity-Btu/hr-ft-F	0.0324	0.0323	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0325	0.0322
Liq. Prandtl No.	4.82	4.81	4.82	4.82	4.82	4.82	4.82	4.82	4.83	4.79
Inlet Flow Rate-GPM	4.8									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	2.1									
Inlet Temperature-F	121.7									
Outlet Liq. Temperature-F	124									
Outlet Vap. Temperature-F	121.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	75.8									
Water outlet Temp.-F	106.9									
Inlet G-lbm/hr/ft2	996394		Temp	121.1	Density	86.98				
Subcooling-F	5.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	584.7	586.8	589.5	584.8	583.3	582.9	589.2	587.1	586.7	585.3
Heat Loss-Watts	7.9	1.8	2.5	2.5	2.5	1.9	1.2	1.9	2.3	12.4
Heat Flux-Btu/Hr/ft2	10135	10172	10219	10137	10111	10104	10213	10177	10170	10146
Wall Temp. #3-F	134.7	136.1	135.8	135.7	137.4	137.9	137.7	135.6	135	132.9
Wall Temp. #4-F	135.7	134.7	138.9	136.2	137.3	138.1	137.9	136.9	135.9	136.5
Wall Temp. #5-F	135.9	133.9	137.2	136.2	136.2	137.3	136.9	135.8	134.4	132.1
Wall Temp. #1-F	83	135	134.2	134.6	135.5	137.9	137.9	136.4	133.9	131
Wall Temp. #2-F	136.5	135.2	135.3	135.1	135.9	137.9	138.1	137.3	134.8	132.7
Instream Temp.-F	125.9	126.1	125.9	125.9	125.6	125.6	125.7	125.5	125.2	127.2
Avg. Wall Temp.-F	135.7	135.3	135.6	135.7	136.2	137.7	137.7	136.4	134.9	133
Avg. Wall DT.-F	9.3	8.7	9.2	9.3	10.2	11.6	11.5	10.4	9.1	5.4
Remaining Subcool-F	3.5									
Exit Quality	-0.02	-0.01	0.01	0.02	0.04	0.05	0.07	0.08	0.1	0.11
EXP. H-Btu/Hr/ft2/F	1084.9	1170.5	1112.1	1088	994.4	871.5	885.2	974.8	1115.1	1885.3
COMPUTED H										
Jallouk	857.2	860.3	861.3	815.4	806.4	803.8	800.6	797.2	795.8	802.6
Szady1(Cudo tube)	1307.2	1311.6	1312.5	1311.8	1311.2	1315	1327.1	1327.5	1329.1	1351.6
Szady2	1078.3	1082.9	1084.1	1078.7	1074.8	1075.9	1068.9	1071.4	1074.9	1096.6
(RLIQ)	116425	116847	116425	114827	112722	110949	109273	107279	105195	105417
(F)	1.006	1.006	1.006	1.453	1.705	1.902	2.072	2.226	2.369	2.477
(HLIQ)	263.6	263.7	263.6	380.7	446.3	498	542.5	582.7	619.5	650.7
(HBOIL)	1303.6	1308	1309	1301	1293.7	1290.7	1296.2	1289	1282.6	1299.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	85.2									
DP Liquid Density-lbm/ft3	92.47									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.043	0.593	1.137	1.322	1.628					
Zero Corrections-psid	0.006	0.067	0.179	0.053	0.018					
Corrected DP-Psid	0.037	0.526	0.958	1.269	1.61					
Actual DP-ft	2.09	3.42	4.85	6.48	7.93					
Measured TP-Psig	86.8				84.6					
Measured Overall-ft	2.85									
Computed DP-ft	2.12	4.21	6.15	8.07	9.9					
Friction-ft	0.12	0.31	0.61	1	1.44					
Acceleration-ft	0	0.21	0.36	0.48	0.57					
Elevation-ft	2	3.68	5.19	6.61	7.9					

Run#	778									
Test Fluid	C4F8									
Date:	8/18/83									
Time:	8:34									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	86.1									
Sat. Temperature-F(inlet)	127.2									
Liq. Density-lbm/ft3	86.29	86.22	86.18	86.22	86.24	86.24	86.27	86.29	86.29	85.26
Latent Heat-Btu/lbm	38.99	38.94	38.91	38.94	38.95	38.95	38.98	38.99	38.99	38.16
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.281
Liq. Viscosity-lbm/ft-hr	0.563	0.561	0.56	0.561	0.561	0.561	0.562	0.563	0.563	0.532
Liq. Conductivity-Btu/hr-ft-F	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0317
Liq. Prandtl No.	4.83	4.82	4.82	4.82	4.82	4.82	4.83	4.83	4.83	4.71
Inlet Flow Rate-GPM	4.1									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	1.8									
Inlet Temperature-F	122.2									
Outlet Liq. Temperature-F	124.3									
Outlet Vap. Temperature-F	121.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	76.6									
Water outlet Temp.-F	106.4									
Inlet G-lbm/hr/ft2	849634		Temp	122	Density	86.84				
Subcooling-F	5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	568.3	579.1	578	575.4	570.1	572.4	579.5	574.7	570.6	572.9
Heat Loss-Watts	8.8	2	2.8	2.8	2.8	2.2	1.4	2.1	2.6	14.2
Heat Flux-Btu/Hr/ft2	9816	10038	10019	9974	9882	9922	10045	9962	9891	9931
Wall Temp. #3-F	134.5	136.2	135.8	135.8	137.5	137.9	137.5	135.4	135	133.3
Wall Temp. #4-F	135.4	134.7	137.1	136.4	137.5	138.3	137.7	136.7	135.7	136.8
Wall Temp. #5-F	135.6	134	137.5	136.4	136.4	137.5	136.8	135.7	134.5	132.5
Wall Temp. #1-F	83.8	134.9	134	134.8	135.5	137.5	137.7	135.9	133.9	131.4
Wall Temp. #2-F	136.1	135	195	135.2	135.8	137.9	137.7	137.3	134.8	133.1
Instream Temp.-F	126.3	125.7	125.9	125.7	125.8	125.8	125.4	125.3	125.3	131.3
Avg. Wall Temp.-F	135.4	135.2	135.5	135.9	136.3	137.9	137.5	136.2	134.8	133.4
Avg. Wall DT.-F	9.7	9	9.1	9.7	10.3	11.8	11.6	10.4	9	1.7
Remaining Subcool-F	2.5									
Exit Quality	-0.02	0	0.02	0.04	0.05	0.07	0.09	0.11	0.12	0.14
EXP. H-Btu/Hr/ft2/F	1016.6	1109.7	1098.3	1028.3	963.8	844.3	864	953.3	1095	5942.3
COMPUTED H										
Jallouk	851.3	865.3	832.7	807.6	798.7	798.1	795.2	790.2	787.4	811.4
Szady1(Cudo tube)	1280.1	1298.3	1301.2	1299.6	1296.1	1302.2	1311.6	1309.5	1309.2	1378
Szady2	1049.9	1069.5	1070.1	1066.3	1058.6	1062.6	1052	1051.5	1052.6	1111.4
(RLIQ)	98709	99087	98427	96484	94651	92915	90991	89156	87422	90781
(F)	1.006	1.006	1.349	1.684	1.897	2.091	2.265	2.423	2.568	2.628
(HLIQ)	231.7	231.9	309.7	393.6	437.2	481.9	521.7	557.9	590.9	613.3
(HBOIL)	1277.6	1295.8	1295.3	1288.4	1279.4	1279.8	1283.5	1274.8	1267.8	1330.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	86.2									
DP Liquid Density-lbm/ft3	92.32									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.086	0.714	1.335	1.578	2.028					
Zero Corrections-psid	0.006	0.067	0.179	0.053	0.016					
Corrected DP-Psid	0.08	0.647	1.156	1.525	2.012					
Actual DP-ft	2.08	3.24	4.54	6.09	7.29					
Measured TP-Psig	86.1				84.6					
Measured Overall-ft	2.53									
Computed DP-ft	2.09	4.08	5.87	7.69	9.4					
Friction-ft	0.09	0.27	0.53	0.87	1.23					
Acceleration-ft	0	0.2	0.3	0.39	0.48					
Elevation-ft	2	3.58	5.04	6.43	7.69					

Run#	779									
Test Fluid	C4F8									
Date:	8/18/93									
Time:	8:34									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	85.8									
Sat. Temperature-F(inlet)	127									
Liq. Density-lbm/ft3	86.25	86.24	86.22	86.24	86.24	86.25	86.25	86.3	86.32	86.19
Latent Heat-Btu/lbm	38.96	38.95	38.94	38.95	38.95	38.96	38.96	39.01	39.02	38.11
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.281
Liq. Viscosity-lbm/ft-hr	0.562	0.561	0.561	0.561	0.561	0.562	0.562	0.564	0.564	0.53
Liq. Conductivity-Btu/hr-ft-F	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0325	0.0325	0.0317
Liq. Prandtl No.	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.83	4.83	4.7
Inlet Flow Rate-GPM	3.3									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	1.3									
Inlet Temperature-F	121.7									
Outlet Liq. Temperature-F	124.8									
Outlet Vap. Temperature-F	121.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	77.3									
Water outlet Temp.-F	109.3									
Inlet G-lbm/hr/ft2	685021		Temp	121.1	Density	86.98				
Subcooling-F	5.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	586.8	584.3	578.1	578.7	587.8	587.4	589.2	581.4	580.2	576.7
Heat Loss-Watts	7.2	1.7	2.3	2.3	2.3	1.8	1.2	1.7	2.2	11.7
Heat Flux-Btu/Hr/ft2	10172	10128	10021	10031	10189	10182	10213	10078	10057	9997
Wall Temp. #3-F	134.4	135.8	135.6	135.5	137.3	138	137.7	135.4	135.3	133.6
Wall Temp. #4-F	135.1	134.4	136.7	136	137.7	138.5	137.8	136.9	135.9	136.7
Wall Temp. #5-F	135.6	133.9	137.3	136.2	136.4	137.7	136.9	135.9	134.7	132.8
Wall Temp. #1-F	84.3	134.6	133.8	134.4	135.2	137.6	137.9	136.9	133.9	131.4
Wall Temp. #2-F	135.7	134.8	134.9	135	135.5	137.9	138.1	137.2	134.9	133.1
Instream Temp.-F	125.5	125.6	125.7	125.6	125.6	125.6	125.5	125.2	125.1	131.7
Avg. Wall Temp.-F	135.2	134.9	135.3	135.5	136.2	137.9	137.7	136.3	134.9	133.5
Avg. Wall DT.-F	9.2	8.8	9.1	9.5	10.1	12	11.7	10.7	9.4	1.4
Remaining Subcool-F	2.1									
Exit Quality	-0.02	0.01	0.03	0.05	0.07	0.1	0.12	0.14	0.16	0.18
EXP. H-Btu/Hr/ft2/F	1100.8	1145.5	1101.6	1059.1	1004.9	851	871.6	943.2	1071.6	7306.3
COMPUTED H										
Jallouk	891.1	889.5	836.2	813.7	814.3	809.6	808.4	801.1	793.4	818.7
Szady1(Cudo tube)	1304.2	1302.5	1298.9	1301	1313.5	1314.8	1319.7	1311.5	1312.5	1376.7
Szady2	1053.9	1051.8	1068.2	1068.1	1079.6	1078.9	1082.1	1052.2	1054.8	1111.8
(RLIQ)	79737	79813	78454	76821	74849	72994	71208	69234	67413	69825
(F)	1.006	1.006	1.532	1.85	2.089	2.314	2.505	2.681	2.842	2.898
(HLIQ)	195.1	195.2	297.2	358.9	407.2	448.8	485.8	519.6	550.6	569.8
(HBOIL)	1302.8	1301	1293.7	1291.8	1300.3	1297.2	1297.4	1283.7	1279.4	1342.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	86.7									
DP Liquid Density-lbm/ft3	92.25									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.14	0.916	1.554	1.968	2.444					
Zero Corrections-psid	0.006	0.067	0.179	0.053	0.016					
Corrected DP-Psid	0.134	0.849	1.375	1.913	2.428					
Actual DP-ft	1.94	2.9	4.17	5.49	6.59					
Measured TP-Psig	85.8				84.6					
Measured Overall-ft	2.03									
Computed DP-ft	2	3.61	5.09	6.55	7.94					
Friction-ft	0.07	0.24	0.51	0.87	1.28					
Acceleration-ft	0.05	0.16	0.24	0.31	0.38					
Elevation-ft	1.87	3.2	4.34	5.37	6.28					

Run#	780									
Test Fluid	C4F8									
Date:	8/18/93									
Time:	8:34									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	85.2									
Sat. Temperature-F(inlet)	126.6									
Liq. Density-lbm/ft3	86.3	86.22	86.22	86.27	86.29	86.29	86.32	86.35	86.35	85.09
Latent Heat-Btu/lbm	39.01	38.94	38.94	38.98	38.99	38.99	39.02	39.05	39.05	38.02
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.281
Liq. Viscosity-lbm/ft-hr	0.564	0.561	0.561	0.562	0.563	0.563	0.564	0.565	0.565	0.527
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0324	0.0324	0.0324	0.0324	0.0324	0.0325	0.0325	0.0325	0.0316
Liq. Prandtl No.	4.83	4.82	4.82	4.83	4.83	4.83	4.83	4.84	4.84	4.69
Inlet Flow Rate-GPM	2.5									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	1									
Inlet Temperature-F	121.8									
Outlet Liq. Temperature-F	124.9									
Outlet Vap. Temperature-F	121.8									
Water Flow Rate-GPM										
Water inlet Temp.-F	77.7									
Water outlet Temp.-F	108.4									
Inlet G-lbm/hr/ft2	519063		Temp	121	Density	87				
Subcooling-F	4.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	584.7	582.7	576.5	576.1	582.2	580.4	587.5	580.8	578.2	573.8
Heat Loss-Watts	7.6	1.8	2.4	2.4	2.5	1.9	1.2	1.8	2.2	12.3
Heat Flux-Btu/Hr/ft2	10135	10101	9993	9988	10092	10061	10184	10068	10023	9948
Wall Temp. #3-F	134.1	135.7	135.2	135.1	137.2	137.5	137.4	135.3	135	133.2
Wall Temp. #4-F	135.1	134.3	136.5	135.8	137.1	138.1	137.5	136.5	135.7	136.8
Wall Temp. #5-F	135.6	133.7	137.4	136	135.9	137.2	136.5	135.7	134.3	132.7
Wall Temp. #1-F	85.4	134.5	133.5	134.1	135	137	137.6	136	133.6	131.2
Wall Temp. #2-F	135.7	134.6	134.6	134.7	135	137.4	137.6	136.9	134.2	132.8
Instream Temp.-F	125.2	125.7	125.7	125.4	125.3	125.3	125.1	124.9	124.9	132.3
Avg. Wall Temp.-F	135.1	134.8	135	135.3	135.8	137.5	137.3	136.1	134.6	133.3
Avg. Wall DT.-F	9.5	8.6	8.8	9.4	10	11.7	11.8	10.7	9.2	0.6
Remaining Subcool-F	0.6									
Exit Quality	0	0.02	0.05	0.08	0.11	0.14	0.17	0.2	0.23	0.26
EXP. H-Btu/Hr/ft2/F	1070.6	1172	1135.8	1062.5	1009.8	860.2	868	938.7	1088.6	******
COMPUTED H										
Jallouk	899.4	875.9	840.6	815.7	813.8	808.1	809	801.4	798.6	830
Szady1(Cudo tube)	1298.6	1302	1296.8	1295.1	1302.7	1302.8	1310.8	1303.9	1303.6	1378.2
Szady2	1047.9	1051.1	1066.3	1062.9	1069.5	1067.7	1074.9	1065.7	1048.6	1131.5
(RLIQ)	60245	59928	58167	56252	54444	52684	50820	48962	47217	48802
(F)	1.008	1.376	1.838	2.16	2.428	2.658	2.872	3.069	3.249	3.287
(HLIQ)	156.2	213.9	285.7	336.4	378.6	412.7	445.7	476.1	504	518.8
(HBOIL)	1297.7	1300.1	1292.1	1287.6	1292.2	1288.9	1293.4	1282.4	1278	1349.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	87									
DP Liquid Density-lbm/ft3	92.21									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.188	1.15	1.907	2.375	2.955					
Zero Corrections-psid	0.008	0.067	0.179	0.053	0.016					
Corrected DP-Psid	0.18	1.083	1.728	2.322	2.939					
Actual DP-ft	1.86	2.5	3.58	4.74	5.78					
Measured TP-Psig	85.2				84					
Measured Overall-ft	2.03									
Computed DP-ft	1.85	3.26	4.56	5.86	7.07					
Friction-ft	0.06	0.2	0.41	0.69	1					
Acceleration-ft	0.06	0.13	0.18	0.24	0.3					
Elevation-ft	1.73	2.93	3.98	4.93	5.77					

Run#	781									
Test Fluid	C4F8									
Date:	8/18/93									
Time:	8:34									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	85.4									
Sat. Temperature-F(inlet)	126.7									
Liq. Density-lbm/ft3	86.29	86.18	86.18	86.2	86.2	86.2	86.24	86.24	86.24	84.9
Latent Heat-Btu/lbm	38.99	38.91	38.91	38.92	38.92	38.92	38.95	38.95	38.95	37.87
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.282
Liq. Viscosity-lbm/ft-hr	0.563	0.56	0.56	0.56	0.56	0.56	0.561	0.561	0.561	0.521
Liq. Conductivity-Btu/hr-ft-F	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0315
Liq. Prandtl No.	4.83	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.67
Inlet Flow Rate-GPM	1.8									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	122.4									
Outlet Liq. Temperature-F	125.7									
Outlet Vap. Temperature-F	122.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	78.8									
Water outlet Temp.-F	110.1									
Inlet G-lbm/hr/ft2	374212		Temp	120.3	Density	87.12				
Subcooling-F	4.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	580.6	576.7	574.7	577.1	579.3	578.6	573.2	577.4	579.3	578.2
Heat Loss-Watts	6.7	1.5	2.1	2.1	2.2	1.7	1.1	1.6	2	11.1
Heat Flux-Btu/Hr/ft2	10064	9997	9962	10004	10042	10030	9936	10009	10042	10023
Wall Temp. #3-F	134.2	135.3	135.1	135.2	136.8	137.5	137.3	135.2	135.1	134.2
Wall Temp. #4-F	135.1	133.8	136.2	135.7	137	138	137.7	136.5	135.9	137.5
Wall Temp. #5-F	135.4	133.3	137.3	136	135.9	137	136.5	135.6	134.5	133.5
Wall Temp. #1-F	85.9	134.3	133.1	134.1	134.9	136.8	137.4	136	133.6	131.8
Wall Temp. #2-F	135.6	134.5	134.2	134.4	135	137.3	137.7	137.1	134.5	133.6
Instream Temp.-F	125.3	125.9	125.9	125.8	125.8	125.8	125.8	125.8	125.8	133.4
Avg. Wall Temp.-F	135.1	134.5	134.7	135.3	135.7	137.3	137.3	136.1	134.7	134.1
Avg. Wall DT.-F	9.3	8.1	8.3	9	9.4	11.1	11.3	10	8.7	0.3
Remaining Subcool-F	-1.4									
Exit Quality	0.01	0.05	0.09	0.13	0.17	0.21	0.25	0.29	0.33	0.37
EXP. H-Btu/Hr/ft2/F	1079.8	1230.6	1200.3	1111.8	1063.1	905.9	881.6	998.1	1158.7	******
COMPUTED H										
Jallouk	899.3	878.5	852.5	839.7	831.5	816.5	807.6	807.9	807	845.2
Szady1(Cudo tube)	1294.9	1297.2	1296	1296.9	1302.7	1303.4	1297.1	1303.4	1307.2	1384.6
Szady2	1043.8	1045.5	1066.1	1068	1070.8	1070.1	1061.8	1067.3	1070.1	1147
(RLIQ)	43263	42421	40666	38878	37111	35347	33529	31780	30023	30440
(F)	1.247	1.715	2.174	2.527	2.827	3.082	3.337	3.56	3.771	3.797
(HLIQ)	149	206.2	260.2	302.3	338.2	370	399.1	425.8	451	462.1
(HBOIL)	1294.2	1295.5	1292.5	1293.5	1295.1	1293.4	1284.4	1288	1289.1	1367.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	88.3									
DP Liquid Density-lbm/ft3	92.02									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.216	1.398	2.28	2.809	3.495					
Zero Corrections-psid	0.006	0.067	0.179	0.053	0.016					
Corrected DP-Psid	0.21	1.331	2.101	2.756	3.479					
Actual DP-ft	1.81	2.08	2.94	4	4.8					
Measured TP-Psig	85.4				84.9					
Measured Overall-ft	1.87									
Computed DP-ft	1.55	2.66	3.68	4.65	5.56					
Friction-ft	0.05	0.16	0.34	0.57	0.82					
Acceleration-ft	0.05	0.09	0.13	0.18	0.23					
Elevation-ft	1.46	2.41	3.19	3.91	4.5					

Run#	782									
Test Fluid	C4F8									
Date:	8/18/93									
Time:	14:44									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	84.4									
Sat. Temperature-F(inlet)	126									
Liq. Density-lbm/ft3	86.34	86.24	86.27	86.29	86.29	86.29	86.25	86.29	86.29	84.92
Latent Heat-Btu/lbm	39.03	38.85	38.98	38.99	38.99	38.99	38.96	38.99	38.99	37.88
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.282
Liq. Viscosity-lbm/ft-hr	0.565	0.561	0.562	0.563	0.563	0.563	0.562	0.563	0.563	0.522
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0315
Liq. Prandtl No.	4.83	4.82	4.83	4.83	4.83	4.83	4.82	4.83	4.83	4.67
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.5									
Inlet Temperature-F	120.6									
Outlet Liq. Temperature-F	125.4									
Outlet Vap. Temperature-F	122.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	80.7									
Water outlet Temp.-F	110.6									
Inlet G-lbm/hr/ft2	208481		Temp	118.8	Density	87.36				
Subcooling-F	5.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	571.6	571.6	570.7	569.9	564.7	568.2	575.1	577.3	573.6	568.8
Heat Loss-Watts	8.4	1.9	2.6	2.6	2.6	2	1.3	2	2.6	14.4
Heat Flux-Btu/Hr/ft2	9906	9908	9893	9878	9789	9849	9969	10007	9943	9860
Wall Temp. #3-F	132.7	133.7	132.6	133.4	134.6	136.1	135.9	134.6	134	133.6
Wall Temp. #4-F	133.6	132.2	134.1	133.9	135	136.3	136.5	136	135.1	136.8
Wall Temp. #5-F	133.9	131.7	135.7	134	133.9	135.2	135.2	135	133.5	132.6
Wall Temp. #1-F	87.5	132.6	131.5	132.2	133	135	136	135.3	132.5	131.2
Wall Temp. #2-F	134.3	132.9	132.3	132.6	133.1	135.5	136.4	136.2	133.5	132.8
Instream Temp.-F	125	125.6	125.4	125.3	125.3	125.3	125.5	125.3	125.3	133.3
Avg. Wall Temp.-F	133.6	132.9	132.6	133.4	133.8	135.7	136	135.4	133.7	133.4
Avg. Wall DT.-F	8.2	6.8	6.8	7.6	8	9.9	10	9.7	8	0
Remaining Subcool-F	-4.6									
Exit Quality	0.03	0.1	0.18	0.25	0.32	0.39	0.46	0.53	0.6	0.68
EXP. H-Btu/Hr/ft2/F	1211.7	1456.6	1459.5	1295	1222.4	994.4	992	1035.1	1247.4	******
COMPUTED H										
Jallouk	913.6	888	875	857.8	842.2	837	837.6	832.8	825.6	870.7
Szady1(Cudo tube)	1281.7	1288	1285.5	1284.3	1279.2	1284	1294.6	1295.9	1292.9	1387.6
Szady2	1029.7	1035.8	1033.6	1054.2	1047.9	1052.1	1062.6	1063.4	1059	1133.1
(RLIQ)	23756	22629	20865	19108	17391	15678	13978	12202	10459	9421
(F)	1.508	2.162	2.758	3.225	3.624	3.963	4.311	4.631	4.932	4.958
(HLIQ)	112.6	161.9	206.3	241.4	271.3	298.1	322.9	348.6	369.1	377.7
(HBOIL)	1281.4	1287.1	1283.9	1281.5	1276.2	1278.6	1287.8	1287.6	1282.9	1357.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	90.5									
DP Liquid Density-lbm/ft3	91.71									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.209	1.678	2.72	3.321	4.15					
Zero Corrections-psid	0.006	0.067	0.178	0.053	0.016					
Corrected DP-Psid	0.203	1.611	2.541	3.268	4.134					
Actual DP-ft	1.82	1.59	2.17	3.1	3.65					
Measured TP-Psig	84.4				83.9					
Measured Overall-ft	0.85									
Computed DP-ft	1.21	2.01	2.69	3.31	3.87					
Friction-ft	0.03	0.09	0.2	0.33	0.48					
Acceleration-ft	0.02	0.05	0.07	0.11	0.15					
Elevation-ft	1.16	1.87	2.42	2.87	3.24					

Run#	783									
Test Fluid	C4F8									
Date:	8/19/93									
Time:	8:17									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	86.4									
Sat. Temperature-F(inlet)	127.4									
Liq. Density-lbm/ft3	86.49	86.35	86.25	86.24	86.27	86.27	86.29	86.3	86.35	85.93
Latent Heat-Btu/lbm	39.15	39.05	38.98	38.95	38.98	38.98	38.99	39.01	39.05	38.71
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.279
Liq. Viscosity-lbm/ft-hr	0.57	0.565	0.562	0.561	0.562	0.562	0.563	0.564	0.565	0.562
Liq. Conductivity-Btu/hr-ft-F	0.0326	0.0325	0.0324	0.0324	0.0324	0.0324	0.0324	0.0325	0.0325	0.0322
Liq. Prandtl No.	4.85	4.84	4.82	4.82	4.83	4.83	4.83	4.83	4.84	4.79
Inlet Flow Rate-GPM	4.8									
Outlet Liq. Flow Rate-GPM	0.3									
Outlet Vap. Flow Rate-GPM	2.1									
Inlet Temperature-F	120.2									
Outlet Liq. Temperature-F	123.7									
Outlet Vap. Temperature-F	121.2									
Water Flow Rate-GPM										
Water inlet Temp.-F	73.1									
Water outlet Temp.-F	105.6									
Inlet G-lbm/hr/ft2	1003126		Temp	117.5	Density	87.67				
Subcooling-F	7.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	865.9	871.9	872.9	870.9	866.3	858.8	867.3	873	879.6	877.1
Heat Loss-Watts	8.3	2	2.7	2.7	2.7	2.1	1.3	2	2.5	13.5
Heat Flux-Btu/Hr/ft2	15010	15114	15131	15096	15017	14887	15034	15133	15247	15204
Wall Temp. #3-F	135.3	138.9	137.1	137	138.8	139.7	138.9	136.9	138.6	134.5
Wall Temp. #4-F	136.7	138.1	138.7	137.8	139.1	140	139.4	138.8	137.5	139.9
Wall Temp. #5-F	136.6	135.1	139.1	138.1	137.6	138.9	138	137.2	135.5	133.1
Wall Temp. #1-F	81.9	137	134.9	135.6	136.7	138.6	139.4	137.7	134.6	131.6
Wall Temp. #2-F	137.1	137	136.2	136.2	136.9	139.7	139.7	138.8	135.8	134.1
Instream Temp.-F	124.1	124.9	125.5	125.6	125.4	125.4	125.3	125.2	124.9	127.4
Avg. Wall Temp.-F	136.4	137.3	136.7	137.1	137.6	139.3	139.1	137.9	136	134.8
Avg. Wall DT.-F	11.6	11.7	10.5	10.8	11.5	13.2	13.1	12	10.4	6.6
Remaining Subcool-F	4									
Exit Quality	-0.03	-0.01	0.02	0.04	0.06	0.08	0.11	0.13	0.15	0.18
EXP. H-Btu/Hr/ft2/F	1288.8	1295.4	1435.4	1392.3	1306.2	1125.5	1147.6	1261.5	1464.5	2320.2
COMPUTED H										
Jallouk	1073.2	1084	1045.2	999.7	964.1	943.9	934.9	928.2	914.3	914.8
Szady1(Cudo tube)	1569	1584.1	1593.5	1596.8	1593.8	1591.1	1602	1610.6	1617.9	1649.6
Szady2	1389.3	1386.2	1395.9	1396.9	1388.7	1366.9	1379	1389.3	1398.2	1429.5
(RLIQ)	115218	116097	116180	119586	110745	108180	105414	102882	99748	99448
(F)	1.006	1.008	1.263	1.691	1.977	2.208	2.412	2.596	2.77	2.894
(HLIQ)	263.9	264.4	332.9	445.1	520.1	581	634.9	682.7	727.9	764.9
(HBOIL)	1568.5	1581.6	1588.7	1585	1575.2	1564.9	1568.2	1568.6	1567.2	1592.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.7									
DP Liquid Density-lbm/ft3	92.68									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.044	0.584	1.115	1.279	1.348					
Zero Corrections-psid	-0.005	0.062	0.179	0.011	-0.052					
Corrected DP-Psid	0.049	0.522	0.936	1.268	1.6					
Actual DP-ft	2.07	3.44	4.9	6.5	7.97					
Measured TP-Psig	86.4				85.2					
Measured Overall-ft	2.01									
Computed DP-ft	2.12	4.18	6.01	7.89	9.75					
Friction-ft	0.12	0.39	0.88	1.55	2.34					
Acceleration-ft	0	0.3	0.47	0.63	0.79					
Elevation-ft	2	3.48	4.65	5.7	6.62					

Run#	784									
Test Fluid	C4F8									
Date:	8/19/93									
Time:	8:17									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	86.2									
Sat. Temperature-F(inlet)	127.2									
Liq. Density-lbm/ft3	86.45	86.3	86.25	86.25	86.27	86.3	86.32	86.32	86.35	85.78
Latent Heat-Btu/lbm	39.13	39.01	38.96	38.96	38.98	39.01	39.02	39.02	39.05	38.54
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.28
Liq. Viscosity-lbm/ft-hr	0.568	0.564	0.562	0.562	0.562	0.564	0.564	0.564	0.565	0.546
Liq. Conductivity-Btu/hr-ft-F	0.0326	0.0325	0.0324	0.0324	0.0324	0.0325	0.0325	0.0325	0.0325	0.032
Liq. Prandtl No.	4.85	4.83	4.82	4.82	4.83	4.83	4.83	4.83	4.84	4.76
Inlet Flow Rate-GPM	4.1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	1.6									
Inlet Temperature-F	120.4									
Outlet Liq. Temperature-F	124.2									
Outlet Vap. Temperature-F	121.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	73.1									
Water outlet Temp.-F	106.7									
Inlet G-lbm/hr/ft2	855090		Temp		118.8	Density		87.39		
Subcooling-F	6.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	862.6	870.1	870.6	864.8	860.2	857.4	852.9	870.3	877.2	868.4
Heat Loss-Watts	7.9	1.9	2.6	2.6	2.6	2	1.3	1.9	2.4	13
Heat Flux-Btu/hr/ft2	14963	15083	15091	14991	14911	14862	14958	15086	15206	15053
Wall Temp. #3-F	135.2	136.9	137.1	136.8	139	139.7	138.8	138.8	136.5	134.8
Wall Temp. #4-F	136.6	136.1	139.1	137.8	139.2	140.1	139.3	138.7	137.6	140.3
Wall Temp. #5-F	136.5	135.1	139.3	139.1	137.7	139.1	138.2	137.1	135.4	133.4
Wall Temp. #1-F	82.2	136.9	134.9	135.5	136.6	138.8	139.4	137.6	134.7	131.8
Wall Temp. #2-F	137	137.1	136.4	136.2	137	139.7	139.6	138.7	135.9	134.2
Instream Temp.-F	124.3	125.2	125.6	125.6	125.4	125.2	125.1	125.1	124.9	128.8
Avg. Wall Temp.-F	136.3	137.3	136.9	137.1	137.6	139.4	139.1	137.8	136	134.9
Avg. Wall DT.-F	11.3	11.4	10.7	10.9	11.6	13.6	13.3	12	10.4	5.6
Remaining Subcool-F	3.1									
Exit Quality	-0.02	0	0.03	0.06	0.08	0.11	0.14	0.16	0.19	0.22
EXP. H-Btu/Hr/ft2/F	1317.5	1326.7	1411.3	1378.8	1290.9	1096.6	1126	1257.4	1457.5	2678.6
COMPUTED H										
Jallouk	1093.5	1106.6	1024.2	998.7	967.6	949.7	940.1	933.5	926.4	932.8
Szady1(Cudo tube)	1567.9	1585.6	1591.9	1589.6	1587.4	1586	1593.5	1604.1	1612.1	1651.4
Szady2	1368.4	1388.2	1393.7	1389	1381.1	1360.3	1369.5	1382	1391.7	1429
(RLIQ)	98398	99248	97806	95174	92468	89694	87010	84393	81600	81808
(F)	1.006	1.006	1.522	1.897	2.18	2.419	2.631	2.825	3.008	3.117
(HLIQ)	232.4	232.8	352.4	439.3	504.7	559.9	608.8	653.5	695.6	727
(HBOIL)	1566.2	1583.9	1598.1	1578.3	1570.2	1562.4	1563.3	1557.1	1567.7	1608.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	84.2									
DP Liquid Density-lbm/ft3	92.61									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.103	0.768	1.404	1.642	2.026					
Zero Corrections-psid	-0.005	0.062	0.179	0.011	-0.052					
Corrected DP-Psid	0.108	0.706	1.225	1.631	2.078					
Actual DP-ft	1.98	3.14	4.42	5.9	7.18					
Measured TP-Psig	86.2				85.1					
Measured Overall-ft	1.95									
Computed DP-ft	2.06	3.86	5.54	7.28	8.96					
Friction-ft	0.1	0.36	0.8	1.39	2.07					
Acceleration-ft	0.06	0.27	0.41	0.54	0.69					
Elevation-ft	1.9	3.22	4.33	5.33	6.21					

Run#	785									
Test Fluid	C4F8									
Date:	8/19/93									
Time:	8:17									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	85.4									
Sat. Temperature-F(inlet)	126.7									
Liq. Density-lbm/ft3	86.45	86.34	86.3	86.3	86.32	86.3	86.35	86.37	86.4	84.95
Latent Heat-Btu/lbm	39.13	39.03	39.01	39.01	39.02	39.01	39.06	39.06	39.09	37.91
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.282
Liq. Viscosity-lbm/ft-hr	0.568	0.565	0.564	0.564	0.564	0.564	0.565	0.566	0.567	0.623
Liq. Conductivity-Btu/hr-ft-F	0.0326	0.0325	0.0325	0.0325	0.0325	0.0325	0.0325	0.0325	0.0325	0.0315
Liq. Prandtl No.	4.85	4.83	4.83	4.83	4.83	4.83	4.84	4.84	4.84	4.68
Inlet Flow Rate-GPM	3.2									
Outlet Liq. Flow Rate-GPM	0.3									
Outlet Vap. Flow Rate-GPM	1.2									
Inlet Temperature-F	119.9									
Outlet Liq. Temperature-F	124.3									
Outlet Vap. Temperature-F	121.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	73.2									
Water outlet Temp.-F	107.7									
Inlet G-lbm/hr/ft2	668380		Temp	117.8	Density	87.52				
Subcooling-F	6.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	867.4	867.3	867.6	862.1	862.9	861.2	866.6	869.6	875.9	867
Heat Loss-Watts	7.8	1.8	2.5	2.5	2.6	2	1.3	1.9	2.3	12.9
Heat Flux-Btu/Hr/ft2	15036	15034	15039	14944	14958	14928	15022	15074	15183	15029
Wall Temp. #3-F	135.1	138.3	136.9	136.7	138.7	139.7	138.7	136.6	136.4	135.2
Wall Temp. #4-F	136.4	135.6	138.6	137.6	138.8	140	139.2	138.5	137.6	140.6
Wall Temp. #5-F	136.4	134.8	139.2	137.9	137.4	139	138.3	138.9	135.4	134
Wall Temp. #1-F	89.1	136.4	134.7	135.7	136.5	138.5	139.3	137.6	134.6	132.4
Wall Temp. #2-F	136.8	136.9	135.9	136.2	136.9	139.6	139.7	138.7	135.8	134.6
Instream Temp.-F	124.3	125	125.2	125.2	125.1	125.2	124.9	124.8	124.6	133.1
Avg. Wall Temp.-F	136.2	136.8	136.5	137	137.4	139.3	139	137.7	136	135.4
Avg. Wall DT.-F	11.2	11.1	10.6	11.1	11.6	13.4	13.5	12.2	10.7	1.6
Remaining Subcool-F	2									
Exit Quality	-0.01	0.02	0.05	0.09	0.12	0.15	0.19	0.22	0.26	0.29
EXP. H-Btu/Hr/ft2/F	1343	1351.9	1412.8	1346.3	1286.8	1112	1116	1237.7	1422.5	9507.1
COMPUTED H										
Jallouk	1129.2	1112.5	1038.4	1003.3	981.6	966.3	955.5	946.4	939.7	976.6
Szady1(Cudo tube)	1571.9	1580.5	1585.3	1582.5	1584.5	1586.8	1591.1	1595.7	1602.3	1697.2
Szady2	1373.1	1382.6	1386.5	1381.8	1358.4	1361.1	1367.1	1372.9	1381.2	1498.7
(RLIQ)	76913	77252	74782	72169	69496	66957	64162	61488	58751	60866
(F)	1.008	1.158	1.802	2.178	2.479	2.738	2.975	3.182	3.397	3.424
(HLIQ)	190.8	220	342.4	413.8	471	520.3	565	608	644.8	662.9
(HBOIL)	1571	1579.1	1580	1573	1570.5	1568	1567	1566.1	1566.8	1682.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	85									
DP Liquid Density-lbm/ft3	92.5									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.185	0.991	1.684	2.065	2.542					
Zero Corrections-psid	-0.005	0.062	0.179	0.011	-0.052					
Corrected DP-Psid	0.19	0.929	1.485	2.054	2.594					
Actual DP-ft	1.66	2.78	4.02	5.23	6.35					
Measured TP-Psig	85.4				84.4					
Measured Overall-ft	1.7									
Computed DP-ft	1.98	3.48	4.87	6.31	7.72					
Friction-ft	0.08	0.31	0.69	1.21	1.79					
Acceleration-ft	0.09	0.21	0.32	0.43	0.55					
Elevation-ft	1.81	2.93	3.85	4.67	5.38					

Run#	786									
Test Fluid	C4F8									
Date:	8/19/93									
Time:	8:17									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	86.2									
Sat. Temperature-F(inlet)	127.2									
Liq. Density-lbm/ft3	86.39	86.22	86.22	86.24	86.2	86.24	86.24	86.25	86.25	84.7
Latent Heat-Btu/lbm	39.07	38.94	38.94	38.95	38.92	38.95	38.95	38.96	38.96	37.71
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.289
Liq. Viscosity-lbm/ft-hr	0.668	0.661	0.661	0.661	0.66	0.661	0.661	0.662	0.662	0.616
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0319
Liq. Prandtl No.	4.84	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.65
Inlet Flow Rate-GPM	2.5									
Outlet Liq. Flow Rate-GPM	0.1									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	121.2									
Outlet Liq. Temperature-F	125.4									
Outlet Vap. Temperature-F	122.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	72.4									
Water outlet Temp.-F	108.2									
Inlet G-lbm/hr/ft2	523233		Temp		116.7	Density	87.7			
Subcooling-F	6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	884.6	875.3	875.3	868.6	880.2	878.8	858.3	856.3	868.9	867.5
Heat Loss-Watts	7.7	1.8	2.5	2.5	2.6	2	1.3	1.9	2.3	12.8
Heat Flux-Btu/Hr/ft2	15334	15173	15173	15022	15258	15233	14878	14848	15027	15038
Wall Temp. #3-F	135.4	138.4	138.9	137.2	139.4	140.6	139.3	137.3	137.2	135.7
Wall Temp. #4-F	136.8	135.7	138.9	137.7	139.6	140.8	139.8	139.1	138.2	141.1
Wall Temp. #5-F	136.9	134.8	139.6	138.2	138.1	139.8	138.7	137.6	136.2	134.4
Wall Temp. #1-F	89.7	136.7	134.8	135.7	137.1	139.2	139.9	138.1	135.8	132.6
Wall Temp. #2-F	137.1	136.8	136.2	136.4	137.4	140.3	140.2	139.4	136.4	135
Instream Temp.-F	124.7	125.7	125.7	125.6	125.9	125.6	125.6	125.5	125.5	134.5
Avg. Wall Temp.-F	136.6	136.9	136.7	137.2	138.1	140.1	139.6	138.3	136.7	135.7
Avg. Wall DT.-F	11.2	10.5	10.3	10.9	11.6	13.8	13.3	12.1	10.5	0.6
Remaining Subcool-F	-0.1									
Exit Quality	0	0.04	0.09	0.13	0.18	0.22	0.26	0.3	0.35	0.39
EXP. H-Btu/Hr/ft2/F	1374.4	1443.1	1471	1376.5	1319.8	1102.9	1118	1223.8	1433.8	******
COMPUTED H										
Jallouk	1177.1	1099.8	1053.7	1016	1012.3	992.9	968.6	957.4	955	1005.6
Szady1(Cudo tube)	1592.2	1596.6	1596.2	1590.7	1607.5	1606.9	1589.6	1589	1601.2	1710.6
Szady2	1396.1	1400.5	1401.1	1391.5	1409.2	1382.3	1363.2	1363	1377.5	1516.5
(RLIQ)	60410	59681	58978	54271	51716	48944	46304	43857	41042	41840
(F)	1.068	1.611	2.14	2.528	2.848	3.135	3.391	3.627	3.847	3.851
(HLIQ)	168.9	252	334.8	395	445.3	490.2	530.2	567	601.4	614.2
(HBOIL)	1591.6	1594.6	1593.3	1582.6	1596	1590.5	1569.6	1564.6	1572.4	1688.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	86.1									
DP Liquid Density-lbm/ft3	92.34									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.301	1.284	2.094	2.565	3.165					
Zero Corrections-psid	-0.006	0.062	0.178	0.011	-0.052					
Corrected DP-Psid	0.306	1.222	1.916	2.554	3.217					
Actual DP-ft	1.66	2.28	3.29	4.98	5.9					
Measured TP-Psig	86.2				85.1					
Measured Overall-ft	1.87									
Computed DP-ft	1.77	3.02	4.21	5.43	6.61					
Friction-ft	0.07	0.28	0.61	1.05	1.53					
Acceleration-ft	0.09	0.17	0.26	0.36	0.47					
Elevation-ft	1.61	2.57	3.34	4.02	4.61					

Run#	787									
Test Fluid	C4F8									
Date:	8/19/93									
Time:	8:17									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	85.7									
Sat. Temperature-F(inlet)	126.9									
Liq. Density-lbm/ft3	88.37	88.24	88.22	88.2	88.2	88.22	88.22	88.25	88.27	85.18
Latent Heat-Btu/lbm	39.06	38.95	38.94	38.92	38.92	38.94	38.94	38.96	38.96	38.09
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.281
Liq. Viscosity-lbm/ft-hr	0.566	0.561	0.561	0.56	0.56	0.561	0.561	0.562	0.562	0.529
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0317
Liq. Prandtl No.	4.84	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.83	4.7
Inlet Flow Rate-GPM	1.7									
Outlet Liq. Flow Rate-GPM	0									
Outlet Vap. Flow Rate-GPM	0.4									
Inlet Temperature-F	121.5									
Outlet Liq. Temperature-F	125.8									
Outlet Vap. Temperature-F	122.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	73.2									
Water outlet Temp.-F	108.5									
Inlet G-lbm/hr/ft2	355471		Temp	117.2	Density	87.62				
Subcooling-F	5.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	873.4	868.2	891.6	882.4	892.3	885.1	872.3	871.4	882.5	896.1
Heat Loss-Watts	7.3	1.7	2.4	2.4	2.5	2	1.3	1.9	2.2	12.4
Heat Flux-Btu/Hr/ft2	15140	15050	15455	15296	15467	15343	15121	15105	15298	15533
Wall Temp. #3-F	134.3	137	135.7	136.4	136.5	140.2	139.1	137.1	135.8	135.2
Wall Temp. #4-F	135.8	134.2	137.8	137.1	138.7	140.4	140	139	137.4	141.2
Wall Temp. #5-F	135.7	133.4	138.7	137.4	137.3	139.3	138.5	137.4	134.8	133.8
Wall Temp. #1-F	84	134.8	133.6	134.8	136.4	138.7	139.7	138.1	134.1	132.1
Wall Temp. #2-F	136	135.2	135.2	135.5	136.5	139.7	140.2	139.5	134.7	134.7
Instream Temp.-F	124.8	125.8	125.7	125.8	125.8	125.7	125.7	125.5	125.4	131.8
Avg. Wall Temp.-F	135.5	135.3	135.6	136.4	137.2	139.7	139.5	138.2	135.4	135.4
Avg. Wall DT.-F	10	9	9.2	9.9	10.7	13.3	13.1	12	9.3	2.9
Remaining Subcool-F	-3.6									
Exit Quality	0.03	0.09	0.15	0.22	0.28	0.35	0.41	0.48	0.54	0.61
EXP. H-Btu/Hr/ft2/F	1519.2	1668.5	1684.2	1539.8	1442.1	1157.4	1152.8	1254.9	1650.5	5360
COMPUTED H										
Jallouk	1157.9	1109.1	1091.1	1058.5	1046.2	1021.1	1007.4	999.5	990.8	1039.7
Szady1(Cudo tube)	1583.2	1588.7	1612.3	1606.3	1616.6	1610.3	1600.3	1598.8	1609.5	1700.8
Szady2	1386	1391.7	1417.7	1410.1	1420.9	1412.8	1400.2	1374.3	1387.4	1510.3
(RLIQ)	40578	39048	38411	33745	31042	28308	25634	22938	20256	18664
(F)	1.437	2.047	2.618	3.067	3.452	3.798	4.111	4.406	4.687	4.781
(HLIQ)	164.6	235	300.6	352.2	396.3	436	471.9	505.6	537.7	554.1
(HBOIL)	1582.6	1587	1608.8	1600.7	1608.6	1599.6	1586.5	1581.8	1589.3	1680.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	86.9									
DP Liquid Density-lbm/ft3	92.22									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.426	1.571	2.519	3.06	3.784					
Zero Corrections-psid	-0.005	0.062	0.179	0.011	-0.052					
Corrected DP-Psid	0.431	1.509	2.34	3.049	3.836					
Actual DP-ft	1.44	1.78	2.64	3.51	4.21					
Measured TP-Psig	85.7				84.6					
Measured Overall-ft	1.98									
Computed DP-ft	1.38	2.33	3.24	4.15	5.02					
Friction-ft	0.06	0.22	0.46	0.78	1.14					
Acceleration-ft	0.06	0.12	0.19	0.28	0.38					
Elevation-ft	1.24	1.99	2.59	3.09	3.5					

Run#	788									
Test Fluid	C4F8									
Date:	8/19/93									
Time:	13:42									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	85.3									
Sat. Temperature-F(inlet)	126.6									
Liq. Density-lbm/ft3	86.29	86.22	86.24	86.24	86.18	86.17	86.24	86.2	86.18	86.15
Latent Heat-Btu/lbm	38.99	38.94	38.95	38.95	38.91	38.9	38.95	38.92	38.91	38.88
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.279
Liq. Viscosity-lbm/ft-hr	0.563	0.561	0.561	0.561	0.56	0.559	0.561	0.56	0.56	0.559
Liq. Conductivity-Btu/hr-ft-F	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0323
Liq. Prandtl No.	4.83	4.82	4.82	4.82	4.82	4.81	4.82	4.82	4.82	4.81
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0.3									
Outlet Vap. Flow Rate-GPM	0.5									
Inlet Temperature-F	119.7									
Outlet Liq. Temperature-F	126.2									
Outlet Vap. Temperature-F	123.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	78.6									
Water outlet Temp.-F	111.9									
Inlet G-lbm/hr/ft2	208907		Temp	117.7	Density	87.54				
Subcooling-F	6.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	879.1	878	884.9	887.6	882.9	876.5	880.6	878.3	203.9	207
Heat Loss-Watts	8.4	2	2.7	2.7	2.8	2.2	1.4	2.1	2.1	12.4
Heat Flux-Btu/Hr/ft2	15239	15220	15339	15386	15304	15194	15265	15225	3534	3588
Wall Temp. #3-F	133.6	135.4	134.4	135.5	137.3	139.3	138.7	137.4	130.3	130.2
Wall Temp. #4-F	135.1	133.7	136.6	136.2	137.7	139.7	139.5	137.4	130.8	131.5
Wall Temp. #5-F	134.5	132.6	137.7	136	136.1	138.4	138.1	136.4	130	131.1
Wall Temp. #1-F	87.2	133.9	133.1	133.6	135.2	137.6	138.9	136.9	129.2	129.6
Wall Temp. #2-F	135.1	134.5	134.2	134.6	135.5	138.6	139.3	138.2	129.6	130.5
Instream Temp.-F	125.3	125.7	125.6	125.6	125.9	126	125.6	125.8	125.9	126.1
Avg. Wall Temp.-F	134.6	134.6	134.6	135.3	138.1	138.8	138.9	137.3	130	130.6
Avg. Wall DT.-F	8.6	8.2	8.3	9	9.5	12.1	12.6	10.8	3.9	4.4
Remaining Subcool-F	-8.4									
Exit Quality	0.06	0.17	0.28	0.39	0.5	0.61	0.72	0.83	0.86	0.88
EXP. H-Btu/Hr/ft2/F	1774.8	1847.7	1852.2	1703.9	1605.4	1254.3	1210.5	1413.4	897	823.4
COMPUTED H										
Jallouk	1198.8	1154.7	1124.8	1102.6	1083.3	1065.9	1056.2	1050.1	495	498.3
Szady1(Cudo tube)	1594.3	1598.5	1604.2	1607.3	1607.4	1603.7	1603.6	1606.1	795.1	802.9
Szady2	1396.6	1403	1409	1412.1	1411.7	1406.8	1406.1	1406.9	565.5	572.9
(RLIQ)	23540	21563	18866	16172	13521	10849	8135	5472	3828	3207
(F)	1.721	2.566	3.302	3.882	4.396	4.86	5.313	5.733	5.969	6.06
(HLIQ)	129	192.5	247.7	292	330.1	364.9	398.6	430.2	449.6	456.7
(HBOIL)	1594	1597.6	1602.2	1604.1	1602.8	1597.4	1595.4	1594.8	743.9	750.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	90.5									
DP Liquid Density-lbm/ft3	91.71									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.548	1.875	2.998	3.611	4.538					
Zero Corrections-psid	-0.005	0.062	0.179	0.011	-0.052					
Corrected DP-Psid	0.553	1.813	2.817	3.6	4.59					
Actual DP-ft	1.2	1.23	1.68	2.5	2.84					
Measured TP-Psig	85.3				85.1					
Measured Overall-ft	0.33									
Computed DP-ft	1.07	1.75	2.35	2.9	3.64					
Friction-ft	0.04	0.13	0.28	0.46	0.6					
Acceleration-ft	0.03	0.08	0.14	0.22	0.24					
Elevation-ft	0.99	1.54	1.93	2.23	2.81					

Run#	789									
Test Fluid	C4F8									
Date:	8/20/93									
Time:	7:31									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	86.6									
Sat. Temperature-F(inlet)	127.5									
Liq. Density-lbm/ft3	86.52	86.37	86.25	86.24	86.25	86.29	86.3	86.3	86.37	85.61
Latent Heat-Btu/lbm	39.18	39.08	38.96	38.95	38.96	38.99	39.01	39.01	39.06	38.44
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.28
Liq. Viscosity-lbm/ft-hr	0.571	0.566	0.562	0.561	0.562	0.563	0.564	0.564	0.566	0.542
Liq. Conductivity-Btu/hr-ft-F	0.0326	0.0325	0.0324	0.0324	0.0324	0.0324	0.0325	0.0325	0.0325	0.032
Liq. Prandtl No.	4.86	4.84	4.82	4.82	4.82	4.83	4.83	4.83	4.84	4.75
Inlet Flow Rate-GPM	4.8									
Outlet Liq. Flow Rate-GPM	0.3									
Outlet Vap. Flow Rate-GPM	2									
Inlet Temperature-F	120.1									
Outlet Liq. Temperature-F	123.7									
Outlet Vap. Temperature-F	121.1									
Water Flow Rate-GPM										
Water inlet Temp.-F	70.3									
Water outlet Temp.-F	104.6									
Inlet G-lbm/hr/ft2	989774		Temp	119.3	Density	87.28				
Subcooling-F	7.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1169	1172.1	1178.7	1174.9	1167	1164.1	1168.8	1163.8	1174.5	1177.2
Heat Loss-Watts	8.2	1.9	2.7	2.7	2.7	2.1	1.2	1.8	2.3	13.1
Heat Flux-Btu/Hr/ft2	20264	20318	20432	20366	20229	20179	20260	20174	20359	20406
Wall Temp. #3-F	137.2	141.8	139.2	139.3	141.2	141.9	136.9	138	137.6	135.8
Wall Temp. #4-F	139	137.5	141.6	140.3	141.5	142.1	136.8	139.2	139.3	144.2
Wall Temp. #5-F	138.4	136.1	141.5	140.9	139.9	141.1	135.1	137.7	136	134.5
Wall Temp. #1-F	84.3	138.6	138.9	137.6	139	140.8	138.6	138.6	135	132.6
Wall Temp. #2-F	139.2	138.8	138.8	138.6	139.5	142.4	140	137.5	136	135.7
Instream Temp.-F	123.9	124.8	125.5	125.6	125.5	125.3	125.2	125.2	124.8	129.3
Avg. Wall Temp.-F	138.5	139.2	139.1	139.5	140	141.5	137.5	137.8	136.8	136.5
Avg. Wall DT.-F	13.6	13.5	12.7	13	13.6	15.3	11.4	11.7	11.1	6.3
Remaining Subcool-F	3.1									
Exit Quality	-0.02	0.01	0.04	0.07	0.1	0.13	0.16	0.19	0.22	0.25
EXP. H-Btu/Hr/ft2/F	1486.2	1509.8	1606.6	1568.1	1491.7	1322.1	1782.8	1726	1840.8	3229.9
COMPUTED H										
Jallouk	1274.9	1285.6	1190	1122.9	1087.2	1055	1028.9	996.6	972.4	969.8
Szady1(Cudo tube)	1822.6	1837.6	1856.6	1857.5	1853.8	1853.1	1880	1861	1869.2	1936.7
Szady2	1689.5	1665.4	1679.6	1705.7	1700.5	1698	1704.2	1703.7	1710.5	1793.6
(RLIQ)	114608	115598	113627	110166	106507	102773	99147	95621	91785	92065
(F)	1.006	1.006	1.625	2.015	2.316	2.573	2.8	3.007	3.206	3.907
(HLIQ)	263.1	263.8	428.4	529	607.8	674.8	734.4	788.6	839.7	876.8
(HBOIL)	1820.8	1835.8	1849.1	1843.1	1831.8	1822.7	1821	1812.6	1810.9	1875.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	87.6									
DP Liquid Density-lbm/ft3	92.12									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.014	0.499	0.956	1.191	1.485					
Zero Corrections-psid	-0.007	0.061	0.169	0.022	-0.01					
Corrected DP-Psid	-0.007	0.438	0.787	1.169	1.495					
Actual DP-ft	2.16	3.57	5.18	6.64	8.11					
Measured TP-Psig	86.8				84.8					
Measured Overall-ft	3.36									
Computed DP-ft	2.14	4.04	5.91	7.94	10.01					
Friction-ft	0.15	0.56	1.25	2.2	3.31					
Acceleration-ft	0.13	0.42	0.63	0.86	1.08					
Elevation-ft	1.86	3.06	4.03	4.88	5.62					

Run#	790									
Test Fluid	C4F8									
Date:	8/20/93									
Time:	11:04									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	86.3									
Sat. Temperature-F(inlet)	127.3									
Liq. Density-lbm/ft3	86.55	86.34	86.25	86.2	86.22	86.24	86.29	86.29	86.35	86.68
Latent Heat-Btu/lbm	39.21	39.03	38.96	38.92	38.94	38.95	38.99	38.99	39.05	38.48
Specific Heat-Btu/lbm/F	0.277	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.28
Liq. Viscosity-lbm/ft-hr	0.572	0.565	0.562	0.56	0.561	0.561	0.563	0.563	0.565	0.544
Liq. Conductivity-Btu/hr-ft-F	0.0326	0.0325	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0325	0.032
Liq. Prandtl No.	4.86	4.83	4.82	4.82	4.82	4.82	4.83	4.83	4.84	4.75
Inlet Flow Rate-GPM	4.1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	1.5									
Inlet Temperature-F	120.5									
Outlet Liq. Temperature-F	124.6									
Outlet Vap. Temperature-F	121.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	70.7									
Water outlet Temp.-F	104.9									
Inlet G-lbm/hr/ft2	854612		Temp	118.9	Density	87.34				
Subcooling-F	6.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1149.4	1155.5	1162.5	1158.4	1150.4	1150.2	1154.1	1143.2	1160.3	1164.6
Heat Loss-Watts	7.4	1.8	2.5	2.4	2.5	1.9	1.1	1.7	2.1	11.8
Heat Flux-Btu/Hr/ft2	19924	20030	20151	20090	19941	19938	20006	19817	20113	20188
Wall Temp. #3-F	136.9	141.4	139.2	139.1	141	142.1	136.9	137.8	136.3	135.8
Wall Temp. #4-F	138.8	137.3	141.6	140.1	141.5	142.2	136.8	139.1	138.5	143.7
Wall Temp. #5-F	138.3	136.2	141.5	140.8	140.3	141.2	135.1	137.6	135.8	134.1
Wall Temp. #1-F	65.6	138.4	136.8	137.7	139.1	140.8	138.6	136.6	135	131.8
Wall Temp. #2-F	138.8	138.7	138.7	138.5	139.7	142.3	140.1	137.3	136.1	135.5
Instream Temp.-F	123.7	125	125.5	125.8	125.7	125.6	125.9	125.3	124.9	129
Avg. Wall Temp.-F	138.2	139	139.1	139.4	140.2	141.6	137.5	137.7	138.3	136.2
Avg. Wall DT.-F	13.6	13	12.7	12.7	13.5	15.1	11.3	11.5	10.5	6.3
Remaining Subcool-F	1.9									
Exit Quality	-0.01	0.02	0.06	0.09	0.13	0.16	0.2	0.23	0.27	0.3
EXP. H-Btu/Hr/ft2/F	1465.1	1535.5	1591.2	1578.9	1471.8	1322.7	1771	1725.5	1909.9	3220.9
COMPUTED H										
Jallouk	1284.2	1259.1	1183.8	1134.7	1094.1	1088.9	1044.3	1017	996.3	1000.5
Szady1(Cudo tube)	1804.1	1827.4	1842.7	1846.6	1842.2	1844.3	1847.2	1842.9	1856.4	1918
Szady2	1652.6	1647.7	1689.8	1694.6	1688.7	1689.7	1690.9	1684.6	1696.4	1774
(RLIQ)	97780	98585	95554	92900	88700	85118	81383	77905	74135	73450
(F)	1.006	1.227	1.844	2.222	2.527	2.782	3.033	3.25	3.46	3.572
(HLIQ)	232	283.9	428.8	514.6	586.3	648.4	701.8	752	799.8	833.3
(HBOIL)	1802.8	1825.1	1835.1	1838.2	1822.3	1817.4	1812.8	1800.2	1804.5	1884.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	88.5									
DP Liquid Density-lbm/ft3	91.99									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.061	0.715	1.282	1.6	2.018					
Zero Corrections-psid	-0.007	0.061	0.169	0.022	-0.01					
Corrected DP-Psid	0.068	0.654	1.113	1.578	2.028					
Actual DP-ft	2.03	3.2	4.57	5.94	7.2					
Measured TP-Psig	86.3				84.8					
Measured Overall-ft	2.62									
Computed DP-ft	2.04	3.73	5.43	7.28	9.13					
Friction-ft	0.14	0.51	1.13	1.96	2.92					
Acceleration-ft	0.16	0.36	0.54	0.74	0.96					
Elevation-ft	1.74	2.85	3.76	4.56	5.26					

Run#	791									
Test Fluid	C4F8									
Date:	8/20/93									
Time:	11:04									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	85									
Sat. Temperature-F(inlet)	126.4									
Liq. Density-lbm/ft3	86.54	86.4	86.34	86.29	86.32	86.34	86.39	86.4	86.45	86.29
Latent Heat-Btu/lbm	39.19	39.09	39.03	38.99	39.02	39.03	39.07	39.09	39.13	38.99
Specific Heat-Btu/lbm/F	0.277	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.571	0.567	0.565	0.563	0.564	0.565	0.566	0.567	0.568	0.563
Liq. Conductivity-Btu/hr-ft-F	0.0326	0.0325	0.0325	0.0324	0.0325	0.0325	0.0325	0.0325	0.0326	0.0324
Liq. Prandtl No.	4.86	4.84	4.83	4.83	4.83	4.83	4.84	4.84	4.85	4.83
Inlet Flow Rate-GPM	3.3									
Outlet Liq. Flow Rate-GPM	0.3									
Outlet Vap. Flow Rate-GPM	1.1									
Inlet Temperature-F	119.7									
Outlet Liq. Temperature-F	124.5									
Outlet Vap. Temperature-F	121									
Water Flow Rate-GPM										
Water inlet Temp.-F	70.7									
Water outlet Temp.-F	104.8									
Inlet G-lbm/hr/ft2	689777		Temp	117.4	Density	87.59				
Subcooling-F	6.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1163.3	1166.9	1151.2	1155.1	1163.5	1164.1	1155.1	1155.9	1151.5	721.9
Heat Loss-Watts	7.3	1.7	2.4	2.4	2.5	1.9	1.1	1.7	2.1	10.5
Heat Flux-Btu/Hr/ft2	20165	20227	19955	20023	20169	20179	20023	20037	19961	12514
Wall Temp. #3-F	138	140.5	138.2	138.4	140.4	141.5	138.4	137.2	135.5	133.9
Wall Temp. #4-F	138.1	136.2	140.5	139.3	140.7	141.6	136.2	138.7	138	138.3
Wall Temp. #5-F	137.6	135.1	140.8	140	139.4	140.6	134.6	137.2	135.4	132.7
Wall Temp. #1-F	86.1	137.6	135.8	138.9	138.4	139.9	138.2	138.1	134.5	130.1
Wall Temp. #2-F	137.7	137.8	137.6	137.8	138.9	141.5	139.5	136.9	135.5	132.7
Instream Temp.-F	123.8	124.6	125	125.3	125.1	125	124.7	124.6	124.3	125.3
Avg. Wall Temp.-F	137.4	138	138	138.7	139.4	140.9	137	137.2	135.8	133.5
Avg. Wall DT.-F	12.6	12.5	12.1	12.4	13.3	15	11.4	11.7	10.6	7.7
Remaining Subcool-F	0.6									
Exit Quality	0	0.04	0.08	0.13	0.17	0.21	0.26	0.3	0.35	0.37
EXP. H-Btu/Hr/ft2/F	1595.5	1616.8	1646	1608.9	1512	1346.3	1760.2	1710.4	1887	1630.6
COMPUTED H										
Jallouk	1348	1251.3	1189.1	1150	1113.7	1092.7	1088.7	1047.2	1024.9	852.9
Szady1(Cudo tube)	1816.2	1831.1	1825.3	1836	1842.6	1844.6	1836.7	1839.5	1835.8	1488.3
Szady2	1652.3	1657.8	1643.3	1681.5	1687.5	1688.9	1678.6	1680.5	1674.6	1269.2
(RLIQ)	78998	78170	74986	71716	68079	64503	60832	57305	53690	51379
(F)	1.006	1.536	2.098	2.492	2.825	3.117	3.385	3.628	3.861	4.012
(HLIQ)	195.5	296.9	408.6	485.7	550.3	607.2	658.8	706.1	750.8	782
(HBOIL)	1815.5	1828.5	1819.5	1824.6	1826	1822.4	1808	1804.1	1792.9	1412.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	89.3									
DP Liquid Density-lbm/ft3	91.88									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.147	0.97	1.688	2.057	2.617					
Zero Corrections-psid	-0.007	0.061	0.169	0.022	-0.01					
Corrected DP-Psid	0.154	0.909	1.517	2.036	2.627					
Actual DP-ft	1.87	2.74	3.86	5.12	6.13					
Measured TP-Psig	85				83.4					
Measured Overall-ft	2.67									
Computed DP-ft	1.92	3.37	4.83	6.41	8.02					
Friction-ft	0.11	0.44	0.98	1.7	2.48					
Acceleration-ft	0.14	0.3	0.45	0.62	0.79					
Elevation-ft	1.66	2.63	3.41	4.09	4.75					

Run#	792									
Test Fluid	C4F8									
Date:	8/20/93									
Time:	11:04									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	86									
Sat. Temperature-F(inlet)	127.1									
Liq. Density-lbm/ft3	86.55	86.2	86.24	86.25	86.24	86.25	86.27	86.29	86.29	86.34
Latent Heat-Btu/lbm	39.21	38.92	38.95	38.96	38.95	38.96	38.98	38.99	38.99	39.03
Specific Heat-Btu/lbm/F	0.277	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.572	0.56	0.561	0.562	0.561	0.562	0.562	0.563	0.563	0.565
Liq. Conductivity-Btu/hr-ft-F	0.0326	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0325
Liq. Prandtl No.	4.86	4.82	4.82	4.82	4.82	4.82	4.83	4.83	4.83	4.83
Inlet Flow Rate-GPM	2.5									
Outlet Liq. Flow Rate-GPM	0									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	120.9									
Outlet Liq. Temperature-F	125.5									
Outlet Vap. Temperature-F	122.1									
Water Flow Rate-GPM										
Water inlet Temp.-F	72.3									
Water outlet Temp.-F	105.6									
Inlet G-lbm/hr/ft2	522075		Temp	117.8	Density	87.51				
Subcooling-F	6.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1153	1159.1	1170.5	1168	1135.3	1138.7	1150.7	1159	498.3	356.9
Heat Loss-Watts	7.4	1.7	2.5	2.4	2.5	1.9	1.1	1.7	1.8	9.6
Heat Flux-Btu/Hr/ft2	19987	20092	20290	20247	19680	19739	19947	20091	8638	6187
Wall Temp. #3-F	136.1	140.5	138.2	138	140	141.7	137.1	138.2	133	131.7
Wall Temp. #4-F	138.2	136.3	140.8	139	140.6	142	137	139.7	133.7	133.8
Wall Temp. #5-F	137.7	135.4	141	139.8	139	140.8	135.6	138	132.1	131
Wall Temp. #1-F	86.4	137.4	135.6	136.6	137.9	140.3	139.1	138.9	131	129.5
Wall Temp. #2-F	137.8	137.7	137.7	137.6	138.4	141.5	140.3	137.8	131.8	130.7
Instream Temp.-F	123.7	125.8	125.6	125.5	125.6	125.5	125.4	125.3	125.3	125
Avg. Wall Temp.-F	137.5	138	138.1	138.4	139	141.2	137.8	138.1	132.3	131.3
Avg. Wall DT.-F	12.8	11.3	11.6	11.9	12.5	14.8	11.5	11.9	6.6	6.1
Remaining Subcool-F	-1.9									
Exit Quality	0.01	0.07	0.13	0.19	0.24	0.3	0.36	0.42	0.44	0.46
EXP. H-Btu/Hr/ft2/F	1555.8	1783.3	1755.5	1696.4	1576.2	1333	1731.7	1686.6	1302.9	1020.8
COMPUTED H										
Jallouk	1326.3	1268.4	1219.1	1186.6	1138.3	1116	1098.9	1087.7	751.6	679.1
Szady1(Cudo tube)	1806.7	1841.5	1849.4	1847.8	1825.1	1828.7	1839.3	1847.2	1248.4	1067
Szady2	1654	1690.1	1670.6	1667.4	1670.6	1678.6	1684.3	1692	997.2	832.7
(RLIQ)	59395	58379	54788	51196	47606	44189	40676	37141	34682	33242
(F)	1.3	1.875	2.447	2.886	3.249	3.572	3.869	4.148	4.337	4.44
(HLIQ)	202.1	292.8	382	450.4	507.2	557.4	603.6	647.1	676.6	692.2
(HBOIL)	1805.9	1839	1843.9	1838.8	1811.9	1811.3	1817.4	1820.3	1176.1	959.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	88.9									
DP Liquid Density-lbm/ft3	91.94									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.288	1.289	2.173	2.595	3.316					
Zero Corrections-psid	-0.007	0.081	0.169	0.022	-0.01					
Corrected DP-Psid	0.293	1.208	2.004	2.573	3.328					
Actual DP-ft	1.64	2.24	3.05	4.23	4.97					
Measured TP-Psig	86				84.5					
Measured Overall-ft	2.5									
Computed DP-ft	1.6	2.81	4.02	5.31	6.72					
Friction-ft	0.1	0.37	0.8	1.37	1.82					
Acceleration-ft	0.12	0.23	0.35	0.51	0.58					
Elevation-ft	1.39	2.21	2.87	3.43	4.32					

Run#	793									
Test Fluid	C4F8									
Date:	8/20/93									
Time:	11:04									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	84.6									
Sat. Temperature-F(inlet)	126.2									
Liq. Density-lbm/ft3	86.55	86.35	86.34	86.3	86.3	86.32	86.34	86.34	86.34	86.24
Latent Heat-Btu/lbm	39.21	39.05	39.03	39.01	39.01	39.02	39.03	39.03	39.03	38.95
Specific Heat-Btu/lbm/F	0.277	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.572	0.565	0.565	0.564	0.564	0.564	0.565	0.565	0.565	0.561
Liq. Conductivity-Btu/hr-ft-F	0.0326	0.0325	0.0325	0.0325	0.0325	0.0325	0.0325	0.0325	0.0325	0.0324
Liq. Prandtl No.	4.86	4.84	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.82
Inlet Flow Rate-GPM	1.7									
Outlet Liq. Flow Rate-GPM	0									
Outlet Vap. Flow Rate-GPM	0.4									
Inlet Temperature-F	120.6									
Outlet Liq. Temperature-F	125.1									
Outlet Vap. Temperature-F	122									
Water Flow Rate-GPM										
Water Inlet Temp.-F	72.6									
Water outlet Temp.-F	105.9									
Inlet G-lbm/hr/ft2	356582		Temp	116.5	Density	87.89				
Subcooling-F	5.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1141	1141.2	1156.5	1145.6	1148.4	1150.3	1161.2	806.1	392.6	304.5
Heat Loss-Watts	7	1.6	2.3	2.3	2.4	1.9	1.1	1.5	1.7	9
Heat Flux-Btu/Hr/ft2	19778	19782	20047	19858	19907	19940	20129	13973	6805	5278
Wall Temp. #3-F	134.6	138.5	136.3	136.8	139	141.5	136.7	136.1	132	129.9
Wall Temp. #4-F	136.8	134.8	138.9	137.9	139.5	141.3	138.6	136.9	132.9	132
Wall Temp. #5-F	136.2	133.7	139.7	138.1	137.9	140.2	135.5	135.4	131.6	130.3
Wall Temp. #1-F	87	135.7	134	135.2	138.8	139.4	138.8	133.6	130.7	128.8
Wall Temp. #2-F	136.6	136.1	135.7	136.2	137.5	140.9	140.3	134.2	130.9	130
Instream Temp.-F	123.7	124.9	125	125.2	125.2	125.1	125	125	125	125.8
Avg. Wall Temp.-F	136.1	136.3	136.2	137	137.9	140.6	137.6	135.2	131.6	130.2
Avg. Wall DT.-F	11.5	10.5	10.3	10.9	11.8	14.6	11.7	9.6	6.3	4.4
Remaining Subcool-F	-6.2									
Exit Quality	0.04	0.13	0.21	0.29	0.38	0.46	0.55	0.61	0.63	0.66
EXP. H-Btu/Hr/ft2/F	1726.5	1887.4	1942.7	1821.4	1683.4	1365.8	1724.8	1454.3	1078.1	1210.2
COMPUTED H										
Jallouk	1338.8	1269.2	1236.1	1200.6	1185.8	1163.9	1151.5	935.4	674.5	615.3
Szady1(Cudo tube)	1797.1	1814.4	1829.1	1824.4	1828	1829.7	1838.8	1537.5	1090.2	980.2
Szady2	1620	1630.1	1649.1	1669	1672.7	1673.9	1656.2	1304.6	849	743.8
(RLIQ)	39910	37760	34341	30990	27464	23987	20458	17492	15685	14718
(F)	1.603	2.324	2.961	3.467	3.905	4.304	4.676	4.975	5.152	5.234
(HLIQ)	183.7	267	340.9	398.5	448.9	494.6	537.3	571.7	592	602.2
(HBOIL)	1796.4	1812.5	1825.1	1818	1818.9	1817.6	1823.3	1510.7	1028.5	897.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	89.9									
DP Liquid Density-lbm/ft3	91.79									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.421	1.591	2.643	3.143	3.371					
Zero Corrections-psid	-0.007	0.061	0.169	0.022	-0.01					
Corrected DP-Psid	0.428	1.53	2.474	3.121	3.381					
Actual DP-ft	1.41	1.7	2.28	3.3	3.86					
Measured TP-Psig	84.8				83.2					
Measured Overall-ft	2.34									
Computed DP-ft	1.24	2.17	3.08	4.03	5.05					
Friction-ft	0.08	0.28	0.59	0.99	1.32					
Acceleration-ft	0.08	0.16	0.27	0.39	0.44					
Elevation-ft	1.09	1.73	2.22	2.65	3.29					

Run#	794									
Test Fluid	C4F8									
Date:	8/20/93									
Time:	11:04									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	84.6									
Sat. Temperature-F(inlet)	126.2									
Liq. Density-lbm/ft3	86.29	86.27	86.3	86.29	86.27	86.25	86.27	86.25	86.24	86.32
Latent Heat-Btu/lbm	38.99	38.98	39.01	38.99	38.98	38.96	38.98	38.96	38.95	39.02
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.563	0.562	0.564	0.563	0.562	0.562	0.562	0.562	0.561	0.564
Liq. Conductivity-Btu/hr-ft-F	0.0324	0.0324	0.0325	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0325
Liq. Prandtl No.	4.83	4.83	4.83	4.83	4.83	4.82	4.83	4.82	4.82	4.83
Inlet Flow Rate-GPM	0.9									
Outlet Liq. Flow Rate-GPM	0									
Outlet Vap. Flow Rate-GPM	0.3									
Inlet Temperature-F	119.7									
Outlet Liq. Temperature-F	125.9									
Outlet Vap. Temperature-F	122.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	77.8									
Water outlet Temp.-F	110.6									
Inlet G-lbm/hr/ft2	188641		Temp		116.9	Density	87.83			
Subcooling-F	6.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1147.9	1148.9	1151.7	1156.7	1143.1	264.8	167.6	185.8	0	0
Heat Loss-Watts	6.6	1.6	2.2	2.2	2.2	1.2	0.8	1.3	1.2	6.2
Heat Flux-Btu/hr/ft2	19898	19915	19964	20051	19815	4590	2905	3221	0	0
Wall Temp. #3-F	134	138.4	135.2	136.3	137	130.7	130.6	131.5	125.3	124.8
Wall Temp. #4-F	135.7	134.5	137.9	137.3	137.3	131.2	130.8	131.8	125.4	124.8
Wall Temp. #5-F	134.7	132.8	138.3	136.9	136	130.2	130.2	131.5	125.8	125.2
Wall Temp. #1-F	86.6	134.6	133.7	134.2	135.4	130.9	130.3	131	125.8	124.7
Wall Temp. #2-F	134.7	135.3	135.2	135.1	136.1	130.8	130.2	131.1	125.8	124.8
Instream Temp.-F	125.3	125.4	125.2	125.3	125.4	125.5	125.4	125.5	125.8	125.1
Avg. Wall Temp.-F	134.8	135.7	135.5	136.2	136.2	130.9	130.4	131.4	125.6	124.9
Avg. Wall DT.-F	8.6	9.4	9.4	10	9.9	5	4.9	5.7	0	0
Remaining Subcool-F	-15.8									
Exit Quality	0.11	0.27	0.43	0.59	0.75	0.78	0.81	0.83	0.83	0.83
EXP. H-Btu/hr/ft2/F	2320.3	2118.7	2124.3	2011.3	2000.6	910.3	594.3	561.6	0	0
COMPUTED H										
Jallouk	1421	1348.6	1288.5	1267.3	1242.8	548.6	444.4	468.5	288.6	289.3
Szady1(Cudo tube)	1824.5	1827	1827	1838.1	1824.4	884.6	718.3	753.2	412.3	413.2
Szady2	1669.9	1678	1644.9	1651.7	1669.9	846.1	497.6	524.8	412.2	413.1
(RLIQ)	20684	17730	14217	10787	7286	5137	4477	3945	3866	3849
(F)	2.039	3.106	3.975	4.69	5.332	5.707	5.828	5.917	5.963	5.982
(HLIQ)	140.9	214.5	274.5	324	368.5	394.5	402.6	409	412.2	413.1
(HBOIL)	1824.2	1826	1825	1829.7	1819.4	857.7	673.4	710.7	23.7	23.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	88.7									
DP Liquid Density-lbm/ft3	91.97									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.604	2.004	3.214	3.817	4.782					
Zero Corrections-psid	-0.007	0.061	0.169	0.022	-0.01					
Corrected DP-Psid	0.611	1.943	3.045	3.795	4.792					
Actual DP-ft	1.11	1.02	1.91	2.19	2.59					
Measured TP-Psig	84.6				83.1					
Measured Overall-ft	2.5									
Computed DP-ft	0.91	1.5	2.08	2.85	3.95					
Friction-ft	0.04	0.16	0.3	0.42	0.5					
Acceleration-ft	0.04	0.11	0.16	0.18	0.18					
Elevation-ft	0.82	1.24	1.63	2.25	3.27					

Run#	795									
Test Fluid	C4F8									
Date:	8/24/93									
Time:	7:35									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	88.3									
Sat. Temperature-F(inlet)	128.6									
Liq. Density-lbm/ft3	86.4	86.3	86.18	86.15	86.24	86.25	86.2	86.25	86.25	86.47
Latent Heat-Btu/lbm	39.09	39.01	38.91	38.88	38.95	38.96	38.92	38.96	38.96	39.14
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.279	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.567	0.564	0.56	0.559	0.561	0.562	0.56	0.562	0.562	0.569
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0325	0.0324	0.0323	0.0324	0.0324	0.0324	0.0324	0.0324	0.0326
Liq. Prandtl No.	4.84	4.83	4.82	4.81	4.82	4.82	4.82	4.82	4.82	4.85
Inlet Flow Rate-GPM	4.8									
Outlet Liq. Flow Rate-GPM	0.3									
Outlet Vap. Flow Rate-GPM	2.2									
Inlet Temperature-F	119.6									
Outlet Liq. Temperature-F	124.3									
Outlet Vap. Temperature-F	121.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	71.6									
Water outlet Temp.-F	108.8									
Inlet G-lbm/hr/ft2	997899		Temp	120.3	Density	87.12				
Subcooling-F	9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1441.2	1441.8	1437.1	1444	1440.6	1112.6	673.5	566.5	218.4	244.6
Heat Loss-Watts	7.6	1.8	2.5	2.5	2.3	1.5	0.8	1.2	1.3	7.1
Heat Flux-Btu/Hr/ft2	24982	24993	24911	25031	24972	19288	11675	9820	3786	4240
Wall Temp. #3-F	138.1	144.3	140.6	139.8	139.2	137.1	133.6	132.5	129.3	128.1
Wall Temp. #4-F	140.5	138.7	143.6	141.1	139.4	137.5	133.2	133	129.8	129.6
Wall Temp. #5-F	139.8	137.3	142.7	142	138	135.6	132.6	131.8	129.1	128.4
Wall Temp. #1-F	84.3	140	138	138.8	137.4	136.3	134.3	131.3	128.5	127.3
Wall Temp. #2-F	140.4	140.3	140.1	139.7	139.4	137.8	134.1	131.7	128.8	128.2
Instream Temp.-F	124.6	125.2	125.9	126.1	125.6	125.5	125.8	125.5	125.5	124.2
Avg. Wall Temp.-F	139.7	140.8	140.6	140.4	138.6	136.6	133.6	132.1	129.1	128.3
Avg. Wall DT.-F	14	14.5	13.5	13.2	11.8	10.3	7.2	6.1	3.4	3.9
Remaining Subcool-F	3.7									
Exit Quality	-0.03	0.01	0.05	0.09	0.12	0.15	0.17	0.19	0.19	0.2
EXP. H-Btu/Hr/ft2/F	1788.2	1724.2	1838.8	1897.2	2112.4	1881	1614.2	1605.6	1104.1	1079.3
COMPUTED H										
Jallouk	1474.6	1481.8	1322	1242.6	1186.6	1017	836.2	798.5	712.6	724.9
Szady1(Cuido tube)	2047.7	2057.9	2070	2082.6	2077.3	1818.6	1444.3	1343.5	941	971.5
Szady2	1933.4	1943.5	1928.3	1940.7	1932.9	1658.7	1219	1095.3	816.5	833.3
(RLIQ)	115161	115824	113145	108964	104056	100078	97647	95485	94293	92435
(F)	1.006	1.006	1.712	2.146	2.488	2.745	2.904	3.015	3.081	3.139
(HLIQ)	263.1	263.5	449.1	563.2	652.1	719.3	761.4	790.1	807.3	820.1
(HBOIL)	2046.3	2056.5	2062.9	2068.8	2055.6	1780.3	1370	1245.4	674.7	714.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	86.8									
DP Liquid Density-lbm/ft3	92.24									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.025	0.449	1.074	1.391	1.904					
Zero Corrections-psid	-0.037	-0.014	0.21	0.048	-0.028					
Corrected DP-Psid	0.012	0.463	0.864	1.343	1.932					
Actual DP-ft	2.11	3.5	4.96	6.3	7.32					
Measured TP-Psig	88.9				85.8					
Measured Overall-ft	4.16									
Computed DP-ft	2.15	4.08	6.04	8.1	10.01					
Friction-ft	0.15	0.61	1.36	2.01	2.68					
Acceleration-ft	0.15	0.47	0.71	0.82	0.87					
Elevation-ft	1.84	3	3.97	5.27	6.48					

Run#	796									
Test Fluid	C4F8									
Date:	8/24/93									
Time:	7:35									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	86.3									
Sat. Temperature-F(inlet)	127.3									
Liq. Density-lbm/ft3	86.52	86.42	86.34	86.32	86.37	86.39	86.4	86.44	86.44	86.55
Latent Heat-Btu/lbm	39.18	39.1	39.03	39.02	39.06	39.07	39.09	39.11	39.11	39.21
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.277
Liq. Viscosity-lbm/ft-hr	0.571	0.567	0.565	0.564	0.566	0.566	0.567	0.568	0.568	0.572
Liq. Conductivity-Btu/hr-ft-F	0.0326	0.0325	0.0325	0.0325	0.0325	0.0325	0.0325	0.0325	0.0325	0.0326
Liq. Prandtl No.	4.86	4.84	4.83	4.83	4.84	4.84	4.84	4.85	4.85	4.86
Inlet Flow Rate-GPM	4.1									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	1.7									
Inlet Temperature-F	119.5									
Outlet Liq. Temperature-F	123.9									
Outlet Vap. Temperature-F	120.8									
Water Flow Rate-GPM										
Water inlet Temp.-F	73.7									
Water outlet Temp.-F	108.1									
Inlet G-lbm/hr/ft2	853814		Temp	119.4	Density	87.26				
Subcooling-F	7.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1445.1	1444.1	1445.6	1453.2	1432.4	1433.4	403.2	50.5	42.6	178.3
Heat Loss-Watts	6.6	1.6	2.2	2.2	2	1.5	0.6	0.6	0.8	5.7
Heat Flux-Btu/hr/ft2	25050	25033	25059	25190	24830	24847	6989	875	738	3091
Wall Temp. #3-F	136.8	143	139.1	139	138.1	139.2	129.7	125.6	125.6	127.2
Wall Temp. #4-F	139.1	137.5	142.8	140.2	138.6	137.9	129.6	125.6	125.6	128.2
Wall Temp. #5-F	138.8	136.2	141.7	141.3	137.6	137	129	125.8	125.6	127.6
Wall Temp. #1-F	86.6	138.7	136.7	137.8	136.7	137.6	129.9	125.6	125	126.6
Wall Temp. #2-F	138.9	139	139.1	138.7	138.8	139.6	129.7	125.8	125.1	127.3
Instream Temp.-F	123.9	124.5	125	125.1	124.8	124.7	124.6	124.4	124.4	123.7
Avg. Wall Temp.-F	138.4	139.6	139.3	139.6	137.9	137.9	129.6	125.7	125.4	127.4
Avg. Wall DT.-F	13.4	13.9	13.2	13.3	12	12.1	4.7	1.2	0.9	3.5
Remaining Subcool-F	1.6									
Exit Quality	-0.01	0.03	0.08	0.12	0.16	0.21	0.22	0.22	0.22	0.23
EXP. H-Btu/hr/ft2/F	1873.9	1798.5	1903.1	1888.8	2068.6	2053.1	1498.5	705.7	780.1	873
COMPUTED H										
Jallouk	1503.9	1404.6	1308.8	1249.8	1190	1143.8	728.8	649.5	650.4	673
Szady1(Cudo tube)	2038.7	2048.9	2061.7	2072.5	2058.2	2062.3	1135.4	765.7	768	869.2
Szady2	1925.9	1934.7	1915	1927.5	1909.6	1913.4	901.3	761.3	763.3	772.6
(RLIQ)	97876	97402	93524	89244	84648	80259	77426	76589	76460	75621
(F)	1.006	1.391	2.022	2.44	2.784	3.08	3.255	3.3	3.308	3.34
(HLIQ)	231.9	321.1	467.1	563.9	642.9	711.2	751.4	761.3	763.3	769.4
(HBOIL)	2037.7	2048.3	2053.7	2059.5	2037.1	2033.7	1013	196.3	168.9	588
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	89.5									
DP Liquid Density-lbm/ft3	91.85									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.05	0.689	1.389	1.798	2.44					
Zero Corrections-psid	-0.037	-0.014	0.21	0.048	-0.028					
Corrected DP-Psid	0.087	0.703	1.179	1.75	2.468					
Actual DP-ft	1.98	3.08	4.41	5.58	6.37					
Measured TP-Psig	86.3				84.2					
Measured Overall-ft	3.49									
Computed DP-ft	2.04	3.73	5.51	7.4	9.15					
Friction-ft	0.15	0.61	1.38	1.96	2.51					
Acceleration-ft	0.2	0.44	0.67	0.71	0.73					
Elevation-ft	1.69	2.68	3.46	4.73	5.92					

Run#	797									
Test Fluid	C4F8									
Date:	8/24/93									
Time:	7:35									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	86.5									
Sat. Temperature-F(inlet)	127.4									
Liq. Density-lbm/ft3	86.6	86.35	86.29	86.29	86.34	86.34	86.39	86.39	86.39	86.44
Latent Heat-Btu/lbm	39.25	39.05	38.99	38.99	39.03	39.03	39.07	39.07	39.07	39.11
Specific Heat-Btu/lbm/F	0.277	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.573	0.565	0.563	0.563	0.565	0.565	0.566	0.566	0.566	0.569
Liq. Conductivity-Btu/hr-ft-F	0.0327	0.0325	0.0324	0.0324	0.0325	0.0325	0.0325	0.0325	0.0325	0.0325
Liq. Prandtl No.	4.87	4.84	4.83	4.83	4.83	4.83	4.84	4.84	4.84	4.85
Inlet Flow Rate-GPM	3.3									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	1.4									
Inlet Temperature-F	118.7									
Outlet Liq. Temperature-F	124.7									
Outlet Vap. Temperature-F	121.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	74.7									
Water outlet Temp.-F	109.9									
Inlet G-lbm/hr/ft2	688371		Temp		118.5	Density	87.41			
Subcooling-F	8.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1438	1441.8	1430.6	1445.5	1433.8	1441.8	404.7	50.8	36.2	177.7
Heat Loss-Watts	7.4	1.8	2.5	2.4	2.2	1.7	0.7	0.8	1	7.1
Heat Flux-Btu/Hr/ft2	24927	24993	24799	25057	24854	24993	7015	881	628	3080
Wall Temp. #3-F	136.9	143	139.4	138.8	138.4	139.2	130	125.8	125.8	127.7
Wall Temp. #4-F	139.4	137.6	142.4	140.2	138.8	138.2	129.8	125.9	125.8	128.8
Wall Temp. #5-F	138.7	138.1	142	141.5	137.8	137.7	129.2	126.3	125.8	128.1
Wall Temp. #1-F	88.7	138.8	136.9	137.7	136.9	138	130.1	125.8	125.3	127.2
Wall Temp. #2-F	138.9	139	139.1	138.8	138.9	139.8	129.9	126.3	125.3	127.7
Instream Temp.-F	123.4	124.8	125.3	125.3	125	125	124.7	124.7	124.7	124.4
Avg. Wall Temp.-F	138.5	139.6	139.5	139.6	138.1	138.3	129.8	126	125.6	127.9
Avg. Wall DT.-F	13.9	13.6	13	13.1	12	12.1	4.8	1.3	0.9	3.4
Remaining Subcool-F	1.1									
Exit Quality	-0.01	0.05	0.1	0.16	0.21	0.26	0.28	0.28	0.28	0.29
EXP. H-Btu/Hr/ft2/F	1787.1	1841.7	1903.3	1910.2	2075.2	2057.8	1466.7	687.8	719.9	916.5
COMPUTED H										
Jallouk	1539.2	1424.2	1338.2	1276.5	1230.2	1197.3	710.4	594.1	594	625.4
Szady1(Cudo tube)	2025.5	2053.6	2055.2	2068.5	2059.3	2068.7	1123.7	711.2	709.2	836.2
Szady2	1911.2	1938.8	1908	1923.3	1911.6	1922.1	883.4	705	706.7	717.6
(RLIQ)	78534	78119	74089	69740	65185	60858	57909	57224	57094	58610
(F)	1.006	1.56	2.214	2.671	3.051	3.381	3.581	3.627	3.636	3.664
(HLIQ)	196	303.3	430.9	519.7	593.4	657.5	696	706	706.7	711.5
(HBOIL)	2024.9	2051.3	2048.8	2057.5	2042.8	2046.4	1026.6	211.1	157.1	607.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	88.9									
DP Liquid Density-lbm/ft3	91.94									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.146	0.954	1.744	2.206	2.905					
Zero Corrections-psid	-0.037	-0.014	0.21	0.048	-0.028					
Corrected DP-Psid	0.183	0.968	1.534	2.158	2.933					
Actual DP-ft	1.82	2.64	3.83	4.91	5.82					
Measured TP-Psig	86.5				84.6					
Measured Overall-ft	3.17									
Computed DP-ft	1.91	3.37	4.89	6.62	8.23					
Friction-ft	0.12	0.5	1.13	1.59	2.03					
Acceleration-ft	0.16	0.34	0.54	0.58	0.59					
Elevation-ft	1.64	2.53	3.22	4.46	5.61					

Run#	798									
Test Fluid	C4F8									
Date:	8/24/93									
Time:	7:35									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	87.4									
Sat. Temperature-F(inlet)	128									
Liq. Density-lbm/ft3	86.93	86.22	86.2	86.2	86.2	86.22	86.22	86.2	86.25	86.39
Latent Heat-Btu/lbm	39.52	38.94	38.82	38.92	38.92	38.94	38.84	38.92	38.96	39.07
Specific Heat-Btu/lbm/F	0.276	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.584	0.561	0.56	0.56	0.56	0.561	0.561	0.56	0.562	0.566
Liq. Conductivity-Btu/hr-ft-F	0.0329	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0324	0.0325
Liq. Prandtl No.	4.91	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.84
Inlet Flow Rate-GPM	2.5									
Outlet Liq. Flow Rate-GPM	0.5									
Outlet Vap. Flow Rate-GPM	1									
Inlet Temperature-F	117.5									
Outlet Liq. Temperature-F	125.4									
Outlet Vap. Temperature-F	122									
Water Flow Rate-GPM										
Water Inlet Temp.-F	75									
Water outlet Temp.-F	110.2									
Inlet G-lbm/hr/ft2	521687		Temp	118.3	Density	87.44				
Subcooling-F	10.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1451.2	1450.4	1455.2	1457.7	1436.4	1432.5	397.5	51.1	35.9	175.9
Heat Loss-Watts	7.2	1.7	2.4	2.4	2.2	1.9	0.7	0.8	1.1	7.2
Heat Flux-Btu/Hr/ft2	25156	25142	25225	25268	24899	24831	6890	886	622	3049
Wall Temp. #3-F	138.9	142.9	139.2	139.1	138.9	147.8	130.9	126.8	126.7	128.3
Wall Temp. #4-F	139.2	137.3	142.7	140.2	139.6	145.3	130.9	126.9	126.8	129.3
Wall Temp. #5-F	138.7	138.1	142.3	141.1	138	138.6	130	126.9	126.4	128.2
Wall Temp. #1-F	84.7	138.7	136.7	137.7	137.2	138.7	131.3	126.8	126.3	127.6
Wall Temp. #2-F	139	139	139.2	138.8	139.2	140.6	130.9	126.9	126.8	128.1
Instream Temp.-F	121.4	125.7	125.8	125.8	125.8	125.7	125.7	125.8	125.5	124.7
Avg. Wall Temp.-F	138.5	139.5	139.5	139.5	138.5	142.6	130.8	126.9	126.5	128.3
Avg. Wall DT.-F	15.9	12.8	12.5	12.8	11.8	15.8	4.8	1	1	3.5
Remaining Subcool-F	0.3									
Exit Quality	0	0.07	0.14	0.21	0.29	0.36	0.38	0.38	0.38	0.39
EXP. H-Btu/Hr/ft2/F	1580.8	1989.3	2016.4	2008.1	2151.2	1573.8	1438.9	868.4	640.3	880.7
COMPUTED H										
Jallouk	1579.4	1468	1388.4	1339	1274.9	1250.7	689.7	529	528.2	574.8
Szady1(Cudo tube)	2002	2072.2	2079.1	2083.1	2071.3	2070	1108.8	651.9	645.9	801.9
Szady2	1891.6	1959.7	1937	1941.5	1927.2	1925	866.3	639.7	642	680
(RLIQ)	58380	58800	54484	50028	45620	41211	38428	37780	37540	36395
(F)	1.006	1.767	2.491	3.014	3.448	3.825	4.048	4.069	4.116	4.16
(HLIQ)	155.5	276.7	388.9	470.4	537.9	596.9	631.7	639.7	642	647.7
(HBOIL)	2001.7	2070.6	2074.5	2075.1	2059.1	2059.3	1035.7	248.1	170.4	624.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	87.3									
DP Liquid Density-lbm/ft3	92.17									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.281	1.256	2.149	2.72	3.505					
Zero Corrections-psid	-0.037	-0.014	0.21	0.048	-0.028					
Corrected DP-Psid	0.318	1.27	1.939	2.672	3.533					
Actual DP-ft	1.6	2.15	3.17	4.08	4.65					
Measured TP-Psig	87.4				85.8					
Measured Overall-ft	3.5									
Computed DP-ft	1.78	2.98	4.22	5.79	7.25					
Friction-ft	0.08	0.38	0.87	1.22	1.55					
Acceleration-ft	0.11	0.25	0.43	0.46	0.47					
Elevation-ft	1.58	2.35	2.92	4.12	5.24					

Run#	799									
Test Fluid	C4F8									
Date:	8/24/93									
Time:	7:35									
Note	Analytical df is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	84.6									
Sat. Temperature-F(inlet)	126.2									
Liq. Density-lbm/ft3	87.1	86.45	86.49	86.5	86.49	86.54	86.47	86.47	86.47	86.65
Latent Heat-Btu/lbm	39.65	39.13	39.15	39.17	39.15	39.19	39.14	39.14	39.14	39.29
Specific Heat-Btu/lbm/F	0.276	0.278	0.278	0.278	0.278	0.277	0.278	0.278	0.278	0.277
Liq. Viscosity-lbm/ft-hr	0.59	0.568	0.57	0.57	0.57	0.571	0.569	0.569	0.569	0.575
Liq. Conductivity-Btu/hr-ft-F	0.033	0.0326	0.0326	0.0326	0.0326	0.0326	0.0326	0.0326	0.0326	0.0327
Liq. Prandtl No.	4.93	4.85	4.85	4.85	4.85	4.86	4.85	4.85	4.85	4.87
Inlet Flow Rate-GPM	1.7									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.5									
Inlet Temperature-F	115.8									
Outlet Liq. Temperature-F	123.6									
Outlet Vap. Temperature-F	120.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	75.1									
Water outlet Temp.-F	109.3									
Inlet G-lbm/hr/ft2	355798		Temp	116.7	Density	87.7				
Subcooling-F	10.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1449.8	1439.2	1455.2	1447.5	1446.5	698.8	393.2	50.5	36.5	175.2
Heat Loss-Watts	6.8	1.6	2.3	2.2	2.2	1.3	0.7	0.8	1.1	6.8
Heat Flux-Btu/Hr/ft2	25131	24948	25225	25091	25074	12113	6816	875	633	3037
Wall Temp. #3-F	134.5	140.6	136.7	136.9	137.5	133.5	129.6	125.7	125.4	126.7
Wall Temp. #4-F	137.2	135.1	140.2	138.2	138	133.4	129.6	125.8	125.8	127.8
Wall Temp. #5-F	136.2	133.7	140.2	138.4	136.4	132.1	128.6	125.8	125.9	126.9
Wall Temp. #1-F	84.1	136.1	134.3	134.9	135.7	132.9	129.7	125.7	125.1	126
Wall Temp. #2-F	136.8	136.7	136.6	136.2	137.2	133.5	129.4	125.8	125.2	126.5
Instream Temp.-F	120.4	124.3	124.1	124	124.1	123.8	124.2	124.2	124.2	123.1
Avg. Wall Temp.-F	136.2	137.1	137	137.1	136.8	133	129.4	125.8	125.4	126.8
Avg. Wall DT.-F	14.6	11.7	11.7	12	11.6	8.6	4.9	1.5	1.1	3.5
Remaining Subcool-F	-4.6									
Exit Quality	0.03	0.14	0.24	0.35	0.45	0.5	0.53	0.54	0.54	0.55
EXP. H-Btu/Hr/ft2/F	1716.7	2137.3	2154.1	2096.9	2163.1	1404	1399	575.7	559.2	857.2
COMPUTED H										
Jallouk	1535.5	1474.9	1401.5	1362	1323.8	869.4	668.2	444.3	441.1	514.9
Szady1(Cudo tube)	1985.2	2041.5	2050.6	2045.4	2048.3	1418.1	1077.4	571.9	563.4	767.5
Szady2	1845.3	1926.7	1938.8	1930.3	1931.4	1171.2	839.8	552.6	554	588.1
(RLIQ)	38806	37499	33140	28787	24504	21247	19701	19040	18910	18399
(F)	1.517	2.321	3.107	3.719	4.237	4.597	4.757	4.826	4.839	4.905
(HLIQ)	172.2	265.8	355.7	425.6	485	525.9	544.7	552.6	554	560.2
(HBOIL)	1984.8	2040	2047	2039.2	2039.2	1393.6	1028.9	264.1	206.1	651.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	87.7									
DP Liquid Density-lbm/ft3	92.11									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.426	1.612	2.627	3.233	4.09					
Zero Corrections-psid	-0.037	-0.014	0.21	0.048	-0.028					
Corrected DP-Psid	0.463	1.626	2.417	3.185	4.118					
Actual DP-ft	1.36	1.55	2.36	3.21	3.65					
Measured TP-Psig	84.6				82.3					
Measured Overall-ft	3.82									
Computed DP-ft	1.28	2.2	3.13	4.36	5.68					
Friction-ft	0.08	0.3	0.65	0.92	1.14					
Acceleration-ft	0.08	0.2	0.31	0.33	0.35					
Elevation-ft	1.12	1.7	2.17	3.11	4.18					

Run#	800									
Test Fluid	C4F8									
Date:	8/24/93									
Time:	13:57									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	85.1									
Sat. Temperature-F(inlet)	126.5									
Liq. Density-lbm/ft3	86.52	86.37	86.37	86.37	86.34	86.35	86.35	86.34	86.35	86.42
Latent Heat-Btu/lbm	39.18	39.06	39.06	39.06	39.03	39.05	39.05	39.03	39.05	39.1
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.571	0.568	0.568	0.568	0.565	0.565	0.565	0.565	0.565	0.567
Liq. Conductivity-Btu/hr-ft-F	0.0326	0.0325	0.0325	0.0325	0.0325	0.0325	0.0325	0.0325	0.0325	0.0325
Liq. Prandtl No.	4.86	4.84	4.84	4.84	4.83	4.84	4.84	4.83	4.84	4.84
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.6									
Inlet Temperature-F	114.7									
Outlet Liq. Temperature-F	125.2									
Outlet Vap. Temperature-F	122.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	79.7									
Water outlet Temp.-F	116.2									
Inlet G-lbm/hr/ft2	209716		Temp		115.6	Density	87.88			
Subcooling-F	11.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1497.9	1444.2	1442.1	1436.9	680.9	171.5	96.1	54.4	39.1	176.4
Heat Loss-Watts	6.7	1.6	2.2	2.2	1.8	1	0.6	0.9	1.2	8
Heat Flux-Btu/Hr/ft2	24925	25034	24998	24890	11456	2973	1668	943	678	3058
Wall Temp. #3-F	134.6	140.7	138.2	137.5	133.6	129.1	128.3	127	126.9	129.5
Wall Temp. #4-F	137	135.1	139.6	138.5	133.8	129.8	128.3	127.2	127	130.4
Wall Temp. #5-F	135.4	133.2	139.4	137.3	133.3	128.6	128.1	127.3	126.9	129.6
Wall Temp. #1-F	84.1	135.5	134.6	134.8	132.9	128.6	128.3	126.9	126.4	128.4
Wall Temp. #2-F	136.9	136.5	136.4	136.2	133.5	128.5	128.3	127.1	126.4	129.1
Instream Temp.-F	123.9	124.8	124.8	124.8	125	124.9	124.9	125	124.9	124.5
Avg. Wall Temp.-F	138	137	138.7	137	133.4	129	128.3	127.1	126.7	129.4
Avg. Wall DT.-F	10.9	11	10.8	11.1	7.9	4	3.3	2.1	1.8	4.8
Remaining Subcool-F	-13.3									
Exit Quality	0.09	0.27	0.45	0.63	0.71	0.73	0.74	0.75	0.76	0.78
EXP. H-Btu/Hr/ft2/F	2276.6	2272	2321	2241.3	1458	745	507.1	458.3	378.8	642.1
COMPUTED H										
Jallouk	1620.8	1534.1	1453.1	1414.8	880.8	454.4	377.1	337.9	327.1	459.9
Szady1(Cudo tube)	2033.3	2052.7	2052.1	2048.5	1384.5	726.2	570.2	487.2	455.1	738.1
Szady2	1919	1939.4	1937.5	1931.3	1159.5	507.7	432.4	425.5	427	518.9
(RLIQ)	22908	19789	15467	11141	8004	6744	6341	6120	5974	5628
(F)	1.946	3.061	4.039	4.833	5.352	5.559	5.623	5.658	5.682	5.749
(HLIQ)	145.9	229.9	303.4	363	402.2	417.6	422.5	425	426.9	431.6
(HBOIL)	2033.1	2051.8	2049.9	2044.7	1373.1	676.9	479.1	338.7	254.5	682.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	87.1									
DP Liquid Density-lbm/ft3	92.2									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.598	2.009	3.245	3.848	4.811					
Zero Corrections-psid	-0.037	-0.014	0.21	0.048	-0.028					
Corrected DP-Psid	0.635	2.023	3.035	3.798	4.839					
Actual DP-ft	1.08	0.9	1.34	2.21	2.47					
Measured TP-Psig	85.1				82.8					
Measured Overall-ft	4.17									
Computed DP-ft	0.96	1.58	2.27	3.48	4.44					
Friction-ft	0.05	0.19	0.35	0.45	0.57					
Acceleration-ft	0.05	0.14	0.18	0.19	0.2					
Elevation-ft	0.86	1.24	1.74	2.84	3.68					

Run#	801									
Test Fluid	C4F8									
Date:	9/15/93									
Time:	8:53									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	127.3									
Sat. Temperature-F(inlet)	151.3									
Liq. Density-lbm/ft3	81.99	82.07	82.01	81.72	81.8	81.8	81.74	81.92	81.94	81.74
Latent Heat-Btu/lbm	35.5	35.56	35.52	35.28	35.34	35.34	35.3	35.44	35.45	35.3
Specific Heat-Btu/lbm/F	0.291	0.291	0.291	0.292	0.292	0.292	0.292	0.291	0.291	0.292
Liq. Viscosity-lbm/ft-hr	0.45	0.451	0.45	0.444	0.446	0.446	0.444	0.448	0.448	0.444
Liq. Conductivity-Btu/hr-ft-F	0.0295	0.0295	0.0295	0.0293	0.0293	0.0293	0.0293	0.0294	0.0294	0.0293
Liq. Prandtl No.	4.44	4.44	4.44	4.42	4.43	4.43	4.43	4.44	4.44	4.43
Inlet Flow Rate-GPM	5.1									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2.2									
Inlet Temperature-F	148.7									
Outlet Liq. Temperature-F	148.9									
Outlet Vap. Temperature-F	146.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	101.6									
Water outlet Temp.-F	144.1									
Inlet G-lbm/hr/ft2	1006211		Temp	146.7	Density	82.67				
Subcooling-F	2.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	291.4	288.2	292.5	292.7	292.3	290.7	291.9	289.9	289.3	290.1
Heat Loss-Watts	7.1	1.6	2.2	2.3	2.2	1.6	1.1	1.6	2	10.9
Heat Flux-Btu/Hr/ft2	5051	4998	5070	5074	5067	5039	5060	5025	5015	5029
Wall Temp. #3-F	156.7	156.7	156.8	157.8	157.6	157.4	157.3	155.5	154.7	154
Wall Temp. #4-F	156.8	156.6	156.9	157.6	157.7	157.6	157.4	156.2	155.3	155.2
Wall Temp. #5-F	157.4	156	157.7	157.4	156.8	156.8	157	155.8	155.3	154.2
Wall Temp. #1-F	148.7	156.3	155.2	156.9	156.8	157.2	157.6	156.4	154.2	153.8
Wall Temp. #2-F	157.3	156.5	158	157	156.6	156.9	157.7	156.9	154.7	154.4
Instream Temp.-F	149.3	148.9	149.2	150.7	150.3	150.3	150.6	149.7	149.6	150.6
Avg. Wall Temp.-F	157.1	156.5	156.1	157.3	157	157.3	157.4	156.2	154.9	154.2
Avg. Wall DT.-F	7.5	7.4	6.7	6.4	6.4	6.7	6.6	6.2	5	3.5
Remaining Subcool-F	1.6									
Exit Quality	-0.01	0	0	0.01	0.02	0.03	0.04	0.05	0.05	0.06
EXP. H-Btu/Hr/ft2/F	671.8	677.5	760.1	796.4	786	749.6	770	806.2	1000.3	1439.8
COMPUTED H										
Jallouk	684	658.4	685.1	684.5	683.2	683.4	687.9	688.5	682.7	688.3
Szady1(Cudo tube)	1081.7	1073.1	1083.1	1097.2	1096.5	1096.3	1103.1	1096.3	1097.3	1107.9
Szady2	807.9	799.4	809.9	818.6	818.3	817.4	823.8	818.8	820.4	829.8
(RLIQ)	146971	145888	146237	147104	145887	144106	143268	140678	139596	139590
(F)	1.005	1.005	1.005	1.274	1.422	1.539	1.637	1.73	1.812	1.881
(HLIQ)	278.8	278.6	278.7	364.4	395.2	427.5	455.1	480.3	502.9	523.1
(HBOIL)	1075.5	1066.8	1076.9	1084.7	1079.2	1074.2	1076.6	1064.7	1060.9	1067.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.2									
DP Liquid Density-lbm/ft3	93.31									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.177	0.353	0.498	0.912	0.911					
Zero Corrections-psid	0.019	-0.01	-0.016	-0.007	-0.007					
Corrected DP-Psid	-0.196	0.363	0.512	0.919	0.918					
Actual DP-ft	2.69	3.89	5.86	7.51	9.66					
Measured TP-Psig	127.3				126.5					
Measured Overall-ft	1.41									
Computed DP-ft	2.19	4.28	6.19	8.09	9.88					
Friction-ft	0.13	0.3	0.52	0.78	1.08					
Acceleration-ft	0	0.13	0.22	0.28	0.33					
Elevation-ft	2	3.8	5.45	7.03	8.47					

Run#	802									
Test Fluid	C4F8									
Date:	9/15/93									
Time:	8:53									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	128.5									
Sat. Temperature-F(inlet)	151.9									
Liq. Density-lbm/ft3	81.9	81.95	81.9	81.63	81.67	81.72	81.59	81.76	81.78	81.61
Latent Heat-Btu/lbm	35.42	35.47	35.42	35.2	35.23	35.28	35.17	35.31	35.33	35.19
Specific Heat-Btu/lbm/F	0.291	0.291	0.291	0.292	0.292	0.292	0.292	0.292	0.292	0.292
Liq. Viscosity-lbm/ft-hr	0.448	0.449	0.448	0.442	0.443	0.444	0.441	0.445	0.445	0.442
Liq. Conductivity-Btu/hr-ft-F	0.0294	0.0294	0.0294	0.0292	0.0293	0.0293	0.0292	0.0293	0.0293	0.0292
Liq. Prandtl No.	4.43	4.44	4.43	4.42	4.42	4.42	4.42	4.43	4.43	4.42
Inlet Flow Rate-GPM	4.3									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	149.1									
Outlet Liq. Temperature-F	149.7									
Outlet Vap. Temperature-F	147									
Water Flow Rate-GPM										
Water inlet Temp.-F	102.9									
Water outlet Temp.-F	144.9									
Inlet G-lbm/hr/ft2	846841		Temp		146.6	Density	82.5			
Subcooling-F	2.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	291.3	288.5	289.1	290.5	288.9	299.1	291.8	289.7	285.4	287.8
Heat Loss-Watts	7.3	1.7	2.2	2.3	2.3	1.7	1.1	1.6	2.1	11.3
Heat Flux-Btu/Hr/ft2	5049	5001	5011	5036	5008	5185	5058	5022	4947	4989
Wall Temp. #3-F	157.3	157.5	157	157.9	158.1	158	158.2	156.5	155.7	154.8
Wall Temp. #4-F	157.5	157.1	157.3	157.9	158.1	158.5	158.4	156.9	156.2	156.1
Wall Temp. #5-F	157.9	156.5	158.4	157.9	157.4	157.6	158	156.8	156.2	155
Wall Temp. #1-F	149.1	157.2	156.8	157.4	157.2	157.9	158.6	157.3	155.2	154.6
Wall Temp. #2-F	158.1	157.3	156.7	157.4	157.2	157.7	158.7	157.8	156.7	155.4
Instream Temp.-F	149.9	149.5	149.9	151.2	151	150.7	151.4	150.5	150.4	151.9
Avg. Wall Temp.-F	157.7	157.3	158.9	157.8	157.5	158	158.4	157.1	155.9	155.2
Avg. Wall DT.-F	7.7	7.5	6.8	6.3	6.2	7.1	6.8	6.3	5.2	3.7
Remaining Subcool-F	1.6									
Exit Quality	-0.01	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08
EXP. H-Btu/Hr/ft2/F	658.2	662.5	737.1	793.3	801.4	733.8	749.2	792.9	955.7	1350.9
COMPUTED H										
Jallouk	679.9	675.7	677.8	685.1	681.1	671.4	668.7	683.4	681	687.8
Szady1(Cudo tube)	1083.7	1076.5	1080.4	1094.8	1092.6	1111.4	1104.7	1097.1	1090.8	1103.1
Szady2	809.1	801.8	804.6	814.7	812.1	834	823.6	817.5	810.9	822.1
(RUQ)	123721	123383	123543	123897	122441	120658	120367	118154	116829	116567
(F)	1.005	1.005	1.103	1.341	1.492	1.618	1.723	1.824	1.911	1.986
(HUQ)	243	242.9	266.6	325	351.7	391.9	417.8	441.5	462.6	481.4
(HBOIL)	1079.6	1072.3	1074.9	1085.1	1079.2	1094.9	1084.4	1072.7	1062.3	1071.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.8									
DP Liquid Density-lbm/ft3	93.23									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.117	0.442	0.742	1.154	1.205					
Zero Corrections-psid	0.019	-0.01	-0.016	-0.007	-0.007					
Corrected DP-Psid	-0.136	0.452	0.758	1.161	1.212					
Actual DP-ft	2.52	9.77	5.52	7.09	9.14					
Measured TP-Psig	128.5				127.6					
Measured Overall-ft	1.59									
Computed DP-ft	2.09	4.09	5.95	7.76	9.44					
Friction-ft	0.09	0.23	0.4	0.61	0.83					
Acceleration-ft	0	0.11	0.17	0.22	0.28					
Elevation-ft	2	3.75	5.38	6.93	8.34					

Run#	803									
Test Fluid	C4F8									
Date:	9/15/93									
Time:	8:53									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	128.4									
Sat. Temperature-F(inlet)	151.9									
Liq. Density-lbm/ft3	82.01	82.05	81.94	81.7	81.72	81.7	81.67	81.82	81.84	81.59
Latent Heat-Btu/lbm	35.52	35.55	35.45	35.27	35.28	35.27	35.23	35.36	35.38	35.17
Specific Heat-Btu/lbm/F	0.291	0.291	0.291	0.292	0.292	0.292	0.292	0.292	0.292	0.292
Liq. Viscosity-lbm/ft-hr	0.45	0.451	0.448	0.444	0.444	0.444	0.443	0.448	0.446	0.441
Liq. Conductivity-Btu/hr-ft-F	0.0295	0.0295	0.0294	0.0293	0.0293	0.0293	0.0293	0.0294	0.0294	0.0292
Liq. Prandtl No.	4.44	4.44	4.44	4.42	4.42	4.42	4.42	4.43	4.43	4.42
Inlet Flow Rate-GPM	3.4									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	1.6									
Inlet Temperature-F	148.4									
Outlet Liq. Temperature-F	150.3									
Outlet Vap. Temperature-F	146.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	103.6									
Water outlet Temp.-F	144.7									
Inlet G-lbm/hr/ft2	672624		Temp	144.5	Density	82.9				
Subcooling-F	3.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	281.8	285.1	284	284.4	285.2	286.9	287.4	284.1	285.7	288.1
Heat Loss-Watts	7.2	1.7	2.2	2.3	2.2	1.7	1.1	1.6	2	11.3
Heat Flux-Btu/Hr/ft2	4885	4942	4923	4930	4944	4973	4982	4925	4952	4959
Wall Temp. #3-F	157	157.1	157	157.4	157.9	158.3	157.4	156.1	155.7	154.7
Wall Temp. #4-F	157.2	158.9	157.4	157.5	158.2	158.4	158	158.9	158	155.9
Wall Temp. #5-F	157.6	156.5	158.3	157.5	157.3	157.7	157.5	156.5	155.9	154.9
Wall Temp. #1-F	148.4	156.8	156	156.8	156.8	157.7	158.2	156.9	156.2	154.4
Wall Temp. #2-F	157.9	157	156.5	157	156.8	157.7	158	157.4	156.8	155
Instream Temp.-F	149.2	149	149.6	150.8	150.7	150.8	151	150.2	150.1	151.4
Avg. Wall Temp.-F	157.4	157	156.7	157.3	157.3	158	157.8	156.8	155.7	155
Avg. Wall DT.-F	8	7.7	6.9	6.3	6.4	7	6.6	6.3	5.4	3.4
Remaining Subcool-F	2									
Exit Quality	-0.02	0	0.01	0.02	0.03	0.04	0.06	0.07	0.08	0.09
EXP. H-Btu/Hr/ft2/F	610.3	639.6	713.2	785.4	778.4	710.4	755.4	777.1	924.6	1477.8
COMPUTED H										
Jallouk	669.4	671.7	672.5	680.9	658	658.8	659.5	653.3	655.4	660.6
Szady1(Cudo tube)	1060.9	1065.6	1068.2	1078.7	1081	1086.3	1090.1	1080.3	1084.2	1094.9
Szady2	785.3	791.9	791.9	798.3	800.8	806	809.1	800.3	804.7	812.6
(RLIQ)	97756	97577	97883	97810	96515	95388	94340	92449	91163	91029
(F)	1.005	1.005	1.118	1.387	1.558	1.697	1.817	1.93	2.029	2.111
(HLIQ)	202	201.9	224.8	279.5	313.9	341.9	366.2	388.4	408.4	425.9
(HBOIL)	1058.5	1063.3	1064.9	1072.4	1072.1	1074.9	1076.1	1063.3	1064.5	1073
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.7									
DP Liquid Density-lbm/ft3	93.52									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.107	0.523	0.879	1.382	1.485					
Zero Corrections-psid	0.019	-0.01	-0.016	-0.007	-0.007					
Corrected DP-Psid	-0.126	0.533	0.895	1.389	1.492					
Actual DP-ft	2.51	3.64	5.3	6.72	8.69					
Measured TP-Psig	128.4				126.9					
Measured Overall-ft	2.65									
Computed DP-ft	2.06	3.98	5.72	7.43	9					
Friction-ft	0.06	0.15	0.28	0.43	0.59					
Acceleration-ft	0	0.06	0.12	0.16	0.19					
Elevation-ft	2	3.73	5.32	6.85	8.23					

Run#	804									
Test Fluid	C4F8									
Date:	9/15/93									
Time:	8:53									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	127.3									
Sat. Temperature-F(inlet)	151.3									
Liq. Density-lbm/ft3	82.24	82.3	82.01	81.67	81.76	81.78	81.67	81.84	81.9	81.59
Latent Heat-Btu/lbm	35.7	35.76	35.52	35.29	35.31	35.33	35.29	35.88	35.42	35.17
Specific Heat-Btu/lbm/F	0.29	0.29	0.291	0.292	0.292	0.292	0.292	0.292	0.291	0.292
Liq. Viscosity-lbm/ft-hr	0.455	0.456	0.45	0.443	0.445	0.445	0.443	0.446	0.448	0.441
Liq. Conductivity-Btu/hr-ft-F	0.0296	0.0297	0.0295	0.0293	0.0293	0.0293	0.0293	0.0294	0.0294	0.0292
Liq. Prandtl No.	4.46	4.46	4.44	4.42	4.43	4.43	4.42	4.43	4.43	4.42
Inlet Flow Rate-GPM	2.6									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	1.4									
Inlet Temperature-F	147.2									
Outlet Liq. Temperature-F	150.2									
Outlet Vap. Temperature-F	146.2									
Water Flow Rate-GPM										
Water inlet Temp.-F	103.4									
Water outlet Temp.-F	144.1									
Inlet G-lbm/hr/ft2	516196		Temp	142.9	Density	83.19				
Subcooling-F	4.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	281.9	285.8	283.6	283.9	286.9	289.3	288.8	285	285.2	285.2
Heat Loss-Watts	7.6	1.7	2.3	2.4	2.4	1.8	1.2	1.7	2.2	12
Heat Flux-Btu/Hr/ft2	4887	4954	4916	4921	4973	5015	5006	4940	4944	4944
Wall Temp. #3-F	158.5	158.6	158.3	157.4	157.8	158	157.9	158.1	155.5	154.7
Wall Temp. #4-F	158.7	158.3	158.6	157.6	158	158.3	158.1	158.8	155.9	155.9
Wall Temp. #5-F	157.3	155.8	157.5	157.7	157.3	157.6	157.8	156.3	155.6	154.9
Wall Temp. #1-F	147.2	156.2	155.2	156.9	156.9	157.7	158.4	156.9	154.9	154.4
Wall Temp. #2-F	157.4	156.8	155.7	157	156.7	157.6	158.4	157.5	155.4	155.1
Instream Temp.-F	148	147.7	149.2	151	150.5	150.4	151	150.1	149.8	151.4
Avg. Wall Temp.-F	157	156.4	156	157.4	157.2	157.9	158.1	156.7	155.5	155
Avg. Wall DT.-F	8.8	8.4	6.5	6.2	6.5	7.3	6.9	6.4	5.5	3.4
Remaining Subcool-F	2.2									
Exit Quality	-0.02	0	0.01	0.03	0.05	0.06	0.08	0.09	0.11	0.13
EXP. H-Btu/Hr/ft2/F	558.2	588	753.1	796.6	765.1	689.5	726.2	772.3	902.7	1464.1
COMPUTED H										
Jallouk	668.7	671.1	671.5	678.6	684.7	684.2	683.6	654.5	653.1	658.3
Szady1(Cudo tube)	1052.4	1057.7	1064.3	1077.8	1081.2	1086.1	1090.2	1078.3	1077.8	1089.4
Szady2	802.8	803.6	789.3	797.2	802.6	806.1	810.1	799.2	799.3	806.8
(RLIQ)	74203	74000	74581	74619	73075	71790	70964	69165	67778	67558
(F)	1.005	1.005	1.236	1.498	1.689	1.846	1.98	2.109	2.224	2.313
(HLIQ)	163	163	200.9	244.4	275.2	300.8	322.9	343.5	362	377.6
(HBOIL)	1051.1	1056.4	1061.9	1073.6	1075.2	1078.3	1080.6	1068.5	1064	1074
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.1									
DP Liquid Density-lbm/ft3	93.33									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.091	0.59	1.008	1.618	1.798					
Zero Corrections-psid	0.019	-0.01	-0.016	-0.007	-0.007					
Corrected DP-Psid	-0.11	0.6	1.024	1.625	1 803					
Actual DP-ft	2.48	3.52	5.06	6.28	8.11					
Measured TP-Psig	127.3				126.2					
Measured Overall-ft	1.94									
Computed DP-ft	2.04	3.83	5.5	7.1	8.58					
Friction-ft	0.04	0.1	0.19	0.29	0.41					
Acceleration-ft	0	0.06	0.09	0.11	0.13					
Elevation-ft	2	3.67	5.22	6.7	8.04					

Run#	805									
Test Fluid	C4F8									
Date:	9/15/93									
Time:	13:35									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	127.2									
Sat. Temperature-F(inlet)	151.2									
Liq. Density-lbm/ft3	81.99	81.84	81.76	81.68	81.76	81.8	81.65	81.82	81.82	81.28
Latent Heat-Btu/lbm	35.5	35.38	35.31	35.25	35.31	35.34	35.22	35.96	35.44	34.92
Specific Heat-Btu/lbm/F	0.291	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.291	0.293
Liq. Viscosity-lbm/ft-hr	0.45	0.446	0.445	0.443	0.445	0.446	0.442	0.446	0.448	0.436
Liq. Conductivity-Btu/hr-ft-F	0.0295	0.0294	0.0293	0.0293	0.0293	0.0293	0.0292	0.0294	0.0294	0.029
Liq. Prandtl No.	4.44	4.43	4.43	4.42	4.43	4.43	4.42	4.43	4.44	4.4
Inlet Flow Rate-GPM	1.9									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	1.3									
Inlet Temperature-F	148.7									
Outlet Liq. Temperature-F	150.4									
Outlet Vap. Temperature-F	146.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	102.1									
Water outlet Temp.-F	144.8									
Inlet G-lbm/hr/ft2	378136		Temp		141.8	Density	83.4			
Subcooling-F	2.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	287.6	289.6	288.9	287	285.7	288.7	285.6	284.9	286.2	286.2
Heat Loss-Watts	7.2	1.6	2.2	2.3	2.2	1.7	1.1	1.6	2	11.3
Heat Flux-Btu/Hr/ft2	4985	5020	4973	4975	4952	5004	4951	4939	4961	4961
Wall Temp. #3-F	156.8	156.8	156.4	157.2	157.7	157.6	157.7	155.9	155.4	155
Wall Temp. #4-F	156.9	156.5	156.9	157.4	157.7	158.1	158.1	156.4	155.9	156
Wall Temp. #5-F	157.4	156.2	157.9	157.7	157	157.4	157.6	156.3	156.5	155
Wall Temp. #1-F	148.7	156.6	155.4	156.8	156.6	157.5	158.3	157	154.8	154.5
Wall Temp. #2-F	158	156.6	156	156.9	156.4	157.4	158.1	157.5	155.3	155.1
Instream Temp.-F	149.3	150.1	150.5	150.9	150.5	150.3	151.1	150.2	149.7	153
Avg. Wall Temp.-F	157.2	156.6	156.2	157.3	156.9	157.7	158	156.6	155.4	155.1
Avg. Wall DT.-F	7.7	6.3	5.5	6.2	6.2	7.1	6.6	6.2	5.5	1.9
Remaining Subcool-F	-0.1									
Exit Quality	0	0.02	0.04	0.07	0.09	0.11	0.13	0.15	0.18	0.2
EXP. H-Btu/Hr/ft2/F	647.5	800.2	912.5	808.9	798.6	702.5	746	797	909.3	2618.9
COMPUTED H										
Jallouk	693.9	687	681.3	681.6	677.8	687.2	683.6	657.5	655.9	667
Szady1(Cudo tube)	1071.5	1081.1	1079.3	1082.8	1078.4	1083.4	1083.6	1077.2	1077.1	1099.5
Szady2	823.5	805.8	801.5	803.6	799.6	805.9	802.6	798.2	799.8	842.5
(RLIQ)	54980	54748	53783	52711	51306	50001	49145	47540	46124	48291
(F)	1.054	1.355	1.649	1.862	2.044	2.205	2.34	2.48	2.608	2.68
(HLIQ)	133.6	172	209.5	236.7	259.7	280	297.6	314.9	330.9	342.1
(HBOIL)	1070.8	1079.6	1076.7	1079	1073.4	1077.2	1076.1	1068.1	1068.6	1089.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.4									
DP Liquid Density-lbm/ft3	93.28									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.028	0.827	1.365	2.127	2.407					
Zero Corrections-psid	0.019	-0.01	-0.016	-0.007	-0.007					
Corrected DP-Psid	-0.047	0.837	1.381	2.134	2.414					
Actual DP-ft	2.38	3.11	4.44	5.4	7.06					
Measured TP-Psig	127.2				126.8					
Measured Overall-ft	1.59									
Computed DP-ft	1.83	3.26	4.56	5.79	6.9					
Friction-ft	0.03	0.09	0.17	0.28	0.39					
Acceleration-ft	0.03	0.05	0.07	0.08	0.1					
Elevation-ft	1.77	3.12	4.32	5.43	6.41					

Run#	806									
Test Fluid	C4F8									
Date:	9/15/93									
Time:	13:45									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	126.6									
Sat. Temperature-F(inlet)	150.9									
Liq. Density-lbm/ft3	82.07	81.7	81.82	81.68	81.78	81.8	81.68	81.86	81.9	81.16
Latent Heat-Btu/lbm	35.56	35.27	35.36	35.25	35.33	35.34	35.25	35.39	35.42	34.82
Specific Heat-Btu/lbm/F	0.291	0.292	0.292	0.292	0.292	0.292	0.292	0.291	0.291	0.294
Liq. Viscosity-lbm/ft-hr	0.451	0.444	0.446	0.443	0.445	0.446	0.443	0.447	0.448	0.432
Liq. Conductivity-Btu/hr-ft-F	0.0295	0.0293	0.0294	0.0293	0.0293	0.0293	0.0293	0.0294	0.0294	0.0289
Liq. Prandtl No.	4.44	4.42	4.43	4.42	4.43	4.43	4.42	4.43	4.43	4.4
Inlet Flow Rate-GPM	1.1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	148.3									
Outlet Liq. Temperature-F	150.4									
Outlet Vap. Temperature-F	146.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	102									
Water outlet Temp.-F	144.8									
Inlet G-lbm/hr/ft2	220255		Temp	139	Density	83.9				
Subcooling-F	2.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	293.5	295.3	288.4	290.4	288.8	289.7	291.5	290.4	287.3	288.8
Heat Loss-Watts	7.1	1.6	2.2	2.2	2.2	1.6	1.1	1.6	2	11.2
Heat Flux-Btu/Hr/ft2	5088	5119	4999	5034	5006	5022	5053	5034	4980	5006
Wall Temp. #3-F	156.6	158.4	158.2	157.1	157.6	157.6	157.8	158.1	155.4	155
Wall Temp. #4-F	156.7	158	158.6	157.1	157.8	158.1	158.1	158.6	155.8	156
Wall Temp. #5-F	157.4	155.5	158.1	157.7	158.7	157	157.4	158.3	155.6	154.8
Wall Temp. #1-F	148.3	156.2	155.1	156.5	156.3	157.4	158	157	154.7	154.2
Wall Temp. #2-F	157.8	156.4	156.6	156.5	156.2	157	158.2	157.7	156.2	154.9
Instream Temp.-F	148.9	150.8	150.2	150.9	150.4	150.3	150.9	150	149.8	153.6
Avg. Wall Temp.-F	157.1	156.3	155.9	157.1	156.7	157.5	157.9	156.7	155.3	155
Avg. Wall DT.-F	8	5.2	5.4	6	6.1	7	6.8	6.5	5.3	1.2
Remaining Subcool-F	-2									
Exit Quality	0.02	0.05	0.09	0.13	0.17	0.21	0.24	0.28	0.32	0.36
EXP. H-Btu/Hr/ft2/F	636.3	980.9	917.4	842.8	824.2	717.6	746.2	773	937	4339
COMPUTED H										
Jallouk	733.8	726.9	689.6	691.4	684.2	682.9	686.8	680.4	676.1	696
Szady1(Cudo tube)	1079.6	1096	1078.4	1088.2	1082.2	1088.6	1091.3	1083.7	1077	1105.3
Szady2	824.6	821	803.6	810.6	805.4	807.2	813.7	808	800.7	849
(RLIQ)	31658	31920	29922	28884	27529	26282	25182	23761	22504	22048
(F)	1.289	1.669	2.018	2.281	2.515	2.721	2.898	3.065	3.25	3.329
(HLIQ)	106	137.7	168.3	188.2	207.3	224.2	239.1	254.1	267.6	278.1
(HBOIL)	1079.2	1095.3	1078.1	1088.3	1079.8	1080.4	1087.5	1079	1071.5	1099.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.7									
DP Liquid Density-lbm/ft3	93.24									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.033	1.077	1.757	2.617	3.049					
Zero Corrections-psid	0.019	-0.01	-0.016	-0.007	-0.007					
Corrected DP-Psid	0.014	1.087	1.773	2.624	3.056					
Actual DP-ft	2.27	2.67	3.75	4.54	5.92					
Measured TP-Psig	126.6				125.9					
Measured Overall-ft	1.24									
Computed DP-ft	1.54	2.69	3.7	4.62	5.45					
Friction-ft	0.02	0.05	0.1	0.17	0.24					
Acceleration-ft	0.01	0.03	0.04	0.05	0.06					
Elevation-ft	1.51	2.61	3.56	4.41	5.15					

Run#	807									
Test Fluid	C4F8									
Date:	9/20/93									
Time:	9:53									
Note	Analytical dl is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	128.3									
Sat. Temperature-F(inlet)	151.8									
Liq. Density-lbm/ft3	81.72	81.74	81.7	81.61	81.65	81.63	81.59	81.67	81.68	81.61
Latent Heat-Btu/lbm	35.28	35.3	35.27	35.19	35.22	35.2	35.17	35.23	35.25	35.19
Specific Heat-Btu/lbm/F	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.292
Liq. Viscosity-lbm/ft-hr	0.444	0.444	0.444	0.442	0.442	0.442	0.441	0.443	0.443	0.442
Liq. Conductivity-Btu/hr-ft-F	0.0293	0.0293	0.0293	0.0292	0.0292	0.0292	0.0292	0.0293	0.0293	0.0292
Liq. Prandtl No.	4.42	4.43	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42
Inlet Flow Rate-GPM	5									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	149.8									
Outlet Liq. Temperature-F	150.2									
Outlet Vap. Temperature-F	147.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	91									
Water outlet Temp.-F	140.5									
Inlet G-lbm/hr/ft2	982214		Temp	147.6	Density	82.32				
Subcooling-F	2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	574.6	571.4	580.3	576.4	575.4	579.4	573.2	575.7	576.8	580.2
Heat Loss-Watts	8.6	2	2.7	2.7	2.7	2.1	1.3	2	2.5	13.8
Heat Flux-Btu/Hr/ft2	9960	9905	10059	9992	9974	10044	9936	9979	9998	10057
Wall Temp. #3-F	158.3	159.8	159	159.3	160.4	161.2	160.5	159.3	158.9	156.9
Wall Temp. #4-F	159.2	158.3	160.1	159.8	160.7	161.3	160.9	160.5	159.6	160.1
Wall Temp. #5-F	159.3	157.6	161.1	159.8	159.5	160.2	160.2	159.6	158.6	156.3
Wall Temp. #1-F	149.8	158.5	157.5	158.2	159.2	160.6	161.1	159.8	157.9	156.2
Wall Temp. #2-F	160.1	158.6	158.3	158.8	159	160.6	161	160.8	158.6	156.6
Instream Temp.-F	150.7	150.6	150.8	151.3	151.1	151.2	151.4	151	150.9	151.3
Avg. Wall Temp.-F	159.2	158.8	158.7	159.3	159.6	160.8	160.7	160	158.7	157
Avg. Wall DT.-F	8.1	7.8	7.5	7.5	8	9.2	8.9	8.5	7.4	5.3
Remaining Subcool-F	0									
Exit Quality	0	0.02	0.03	0.05	0.07	0.08	0.1	0.12	0.14	0.15
EXP. H-Btu/Hr/ft2/F	1233.5	1277.7	1346.5	1328	1239.1	1095.1	1117.5	1167.3	1357	1910.1
COMPUTED H										
Jallouk	1008.3	961.4	933.8	923.9	915.2	912.7	895.3	889	883.9	882.7
Szady1(Cuido tube)	1548.3	1543.3	1559.7	1562.7	1562.4	1571.5	1568.8	1571.4	1575.1	1586.6
Szady2	1316.7	1309.6	1325.4	1324.4	1321.3	1297.3	1295.3	1299.4	1304.4	1317.2
(RLIQ)	144695	143333	141160	139325	136617	134275	132054	129125	126554	124544
(F)	1.025	1.293	1.551	1.737	1.894	2.031	2.153	2.271	2.379	2.475
(HLIQ)	279.5	352.6	423	474.2	517	554.5	588.1	619.7	649	675.7
(HBOIL)	1543.2	1537.1	1549.3	1548	1543.3	1548.2	1540.8	1538.6	1537.5	1544.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80									
DP Liquid Density-lbm/ft3	93.2									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.106	0.035	0.968	1.501	1.934					
Zero Corrections-psid	-0.042	0.036	-0.053	-0.01	0.061					
Corrected DP-Psid	0.148	-0.001	1.021	1.511	1.873					
Actual DP-ft	2.02	4.57	5.05	6.47	7.97					
Measured TP-Psig	128.3				128.1					
Measured Overall-ft	0.35									
Computed DP-ft	2.16	4.12	6.03	7.94	9.75					
Friction-ft	0.16	0.41	0.73	1.11	1.52					
Acceleration-ft	0.15	0.28	0.38	0.47	0.55					
Elevation-ft	1.85	3.43	4.93	6.37	7.68					

Run#	808									
Test Fluid	C4F8									
Date:	9/20/93									
Time:	12:31									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	127.9									
Sat. Temperature-F(inlet)	151.6									
Liq. Density-lbm/ft3	81.9	81.88	81.76	81.63	81.67	81.74	81.57	81.68	81.7	81.47
Latent Heat-Btu/lbm	35.42	35.41	35.31	35.2	35.23	35.3	35.16	35.25	35.27	35.08
Specific Heat-Btu/lbm/F	0.291	0.291	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.293
Liq. Viscosity-lbm/ft-hr	0.448	0.447	0.445	0.442	0.443	0.444	0.441	0.443	0.444	0.439
Liq. Conductivity-Btu/hr-ft-F	0.0294	0.0294	0.0293	0.0292	0.0293	0.0293	0.0292	0.0293	0.0293	0.0291
Liq. Prandtl No.	4.43	4.43	4.43	4.42	4.42	4.43	4.42	4.42	4.42	4.41
Inlet Flow Rate-GPM	4.3									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	2.1									
Inlet Temperature-F	149									
Outlet Liq. Temperature-F	150.3									
Outlet Vap. Temperature-F	147.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	90.5									
Water outlet Temp.-F	140.5									
Inlet G-lbm/hr/ft2	847027		Temp	146.4	Density	82.54				
Subcooling-F	2.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	579.8	576.9	583.6	580.1	584	585.9	579.2	582.6	580.8	582.3
Heat Loss-Watts	8.5	1.9	2.7	2.7	2.7	2	1.3	2	2.5	13.7
Heat Flux-Btu/Hr/ft2	10050	10000	10116	10056	10123	10156	10040	10099	10068	10094
Wall Temp. #3-F	158.2	159.8	158.8	159.4	160.4	161.2	160.7	159.3	158.9	157.1
Wall Temp. #4-F	159.1	158.2	159.8	159.8	160.8	161.4	161	160.6	159.7	160
Wall Temp. #5-F	159.3	157.3	160.9	159.9	159.6	160.3	160.3	159.5	158.7	156.8
Wall Temp. #1-F	149	158.3	157.1	158.4	159.2	160.4	161.3	160	157.7	155.4
Wall Temp. #2-F	160	158.3	158.2	158.9	159.1	160.8	161.4	160.9	158.6	157.1
Instream Temp.-F	149.8	149.9	150.5	151.2	151	150.6	151.5	150.9	150.8	152
Avg. Wall Temp.-F	159.2	158.7	158.5	159.4	159.7	160.8	160.9	160.1	158.7	157.3
Avg. Wall DT.-F	8.9	8.3	7.5	7.7	8.2	9.8	9	8.7	7.5	4.8
Remaining Subcool-F	0.2									
Exit Quality	0	0.02	0.04	0.06	0.08	0.1	0.12	0.14	0.16	0.18
EXP. H-Btu/Hr/ft2/F	1129.8	1205.1	1345.6	1302.5	1231.9	1040	1117.3	1160.3	1348.7	2092.5
COMPUTED H										
Jallouk	1011.8	984.8	961.6	935.1	929.6	922.8	916.8	911.8	896.9	897.9
Szady1(Cudo tube)	1543.3	1542.1	1559.1	1564	1569.4	1570.4	1573.4	1574.6	1574.1	1590.4
Szady2	1315.1	1311.4	1327.5	1329	1333.2	1332.5	1331.5	1301.6	1302.1	1319.6
(PLIQ)	123778	122896	121122	119421	116727	113820	112264	109181	106607	105276
(F)	1.005	1.282	1.579	1.785	1.96	2.116	2.245	2.376	2.495	2.59
(HLIQ)	243.1	310.1	382.3	432.9	475.2	512.6	544.8	576	604.5	628.9
(HBOIL)	1541.3	1537.9	1551.4	1552.8	1554.8	1552	1551.3	1548.4	1543.9	1556.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.8									
DP Liquid Density-lbm/ft3	93.09									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.134	0.036	1.091	1.733	2.236					
Zero Corrections-psid	-0.042	0.036	-0.053	-0.01	0.061					
Corrected DP-Psid	0.176	0	1.144	1.743	2.175					
Actual DP-ft	1.97	4.07	4.83	6.08	7.44					
Measured TP-Psig	127.8				127.8					
Measured Overall-ft	0.18									
Computed DP-ft	2.09	3.96	5.78	7.58	9.29					
Friction-ft	0.12	0.32	0.58	0.9	1.24					
Acceleration-ft	0.12	0.22	0.31	0.38	0.48					
Elevation-ft	1.84	3.41	4.89	6.3	7.6					

Run#	809									
Test Fluid	C4F8									
Date:	9/20/93									
Time:	13:31									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	127.4									
Sat. Temperature-F(inlet)	151.3									
Liq. Density-lbm/ft3	82.01	81.92	81.76	81.7	81.74	81.72	81.61	81.76	81.78	81.18
Latent Heat-Btu/lbm	35.52	35.44	35.31	35.27	35.3	35.28	35.19	35.31	35.31	34.82
Specific Heat-Btu/lbm/F	0.291	0.291	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.294
Liq. Viscosity-lbm/ft-hr	0.45	0.448	0.445	0.444	0.444	0.444	0.442	0.445	0.445	0.432
Liq. Conductivity-Btu/hr-ft-F	0.0295	0.0294	0.0293	0.0293	0.0293	0.0293	0.0292	0.0293	0.0293	0.0289
Liq. Prandtl No.	4.44	4.44	4.43	4.42	4.43	4.42	4.42	4.43	4.43	4.4
Inlet Flow Rate-GPM	3.5									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	148.3									
Outlet Liq. Temperature-F	150.6									
Outlet Vap. Temperature-F	147.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	92.1									
Water outlet Temp.-F	140.7									
Inlet G-lbm/hr/ft2	690537		Temp	145.7	Density	82.67				
Subcooling-F	3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	577.7	576.7	578	576.8	586.2	585.8	578.1	580.1	575.5	575
Heat Loss-Watts	10.3	2.4	3.2	3.3	3.3	2.5	1.6	2.4	3.1	17.1
Heat Flux-Btu/Hr/ft2	10014	9997	10019	9995	10161	10154	10021	10056	9976	9967
Wall Temp. #3-F	157.9	159.6	158.6	159.1	160.6	161.3	160.7	159.2	159	157.5
Wall Temp. #4-F	159	158	159.8	159.7	160.9	161.2	160.9	160.6	159.5	160.5
Wall Temp. #5-F	159.1	157.3	160.8	159.7	159.6	160.3	160.7	159.3	158.6	157
Wall Temp. #1-F	148.3	158.3	157	158.2	159	160.4	161.2	159.9	157.9	156.8
Wall Temp. #2-F	159.9	158.4	157.9	158.6	159	160.5	161.5	160.9	158.5	157.2
Instream Temp.-F	148.2	149.7	150.5	150.8	150.6	150.7	151.3	150.5	150.5	153.6
Avg. Wall Temp.-F	159	158.6	158.3	159.2	159.6	160.8	161	160	158.7	157.6
Avg. Wall DT.-F	9.3	8.4	7.4	7.9	8.6	9.6	9.2	9	7.7	3.5
Remaining Subcool-F	0.1									
Exit Quality	0	0.02	0.05	0.07	0.1	0.12	0.14	0.17	0.19	0.22
EXP. H-Btu/Hr/ft2/F	1074.2	1186.8	1359.1	1261.5	1186.3	1053.2	1083.7	1114.1	1287.4	2808
COMPUTED H										
Jallouk	1027.1	1004.9	976.8	957.6	950.9	933.5	925.1	918	910.7	921.3
Szady1(Cuido tube)	1534.1	1538.9	1550.4	1553.4	1585.6	1568	1566.2	1583.1	1559.5	1590.8
Szady2	1306.1	1309.2	1318.9	1319.6	1332.5	1333	1327.2	1322.8	1284.6	1317.2
(RLIQ)	100359	99713	98010	95834	93196	90785	88810	85711	83283	83182
(F)	1.005	1.339	1.662	1.882	2.067	2.257	2.403	2.552	2.682	2.759
(HLIQ)	206.3	276	341.7	389.3	429.3	464.4	495	524.8	551.5	570.8
(HBOIL)	1532.8	1536	1544.9	1545.2	1554.7	1554.4	1549.6	1543.1	1536.2	1568
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.2									
DP Liquid Density-lbm/ft3	93.17									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.172	0.035	1.251	2.013	2.598					
Zero Corrections-psid	-0.042	0.036	-0.053	-0.01	0.061					
Corrected DP-Psid	0.214	-0.001	1.304	2.023	2.535					
Actual DP-ft	1.92	4.59	4.57	5.59	6.84					
Measured TP-Psig	127.4				127.6					
Measured Overall-ft	-0.35									
Computed DP-ft	1.97	3.56	5.06	6.54	7.92					
Friction-ft	0.09	0.27	0.53	0.85	1.21					
Acceleration-ft	0.09	0.17	0.23	0.29	0.36					
Elevation-ft	1.79	3.12	4.3	5.39	6.36					

Run#	810									
Test Fluid	C4F8									
Date:	9/20/93									
Time:	13:31									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	127									
Sat. Temperature-F(inlet)	151.1									
Liq. Density-lbm/ft3	81.9	81.72	81.74	81.68	81.7	81.7	81.61	81.67	81.67	80.96
Latent Heat-Btu/lbm	35.42	35.28	35.3	35.25	35.27	35.27	35.19	35.23	35.28	34.66
Specific Heat-Btu/lbm/F	0.291	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.295
Liq. Viscosity-lbm/ft-hr	0.448	0.444	0.444	0.443	0.444	0.444	0.442	0.443	0.443	0.429
Liq. Conductivity-Btu/hr-ft-F	0.0294	0.0293	0.0293	0.0293	0.0293	0.0293	0.0292	0.0293	0.0293	0.0288
Liq. Prandtl No.	4.43	4.42	4.43	4.42	4.42	4.42	4.42	4.42	4.42	4.39
Inlet Flow Rate-GPM	2.7									
Outlet Liq. Flow Rate-GPM	0.6									
Outlet Vap. Flow Rate-GPM	1.8									
Inlet Temperature-F	148.8									
Outlet Liq. Temperature-F	150.6									
Outlet Vap. Temperature-F	147.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	91.2									
Water outlet Temp.-F	139.2									
Inlet G-lbm/hr/ft2	531612		Temp	146.6	Density	82.5				
Subcooling-F	2.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	584.4	578.3	582.2	580.9	583.5	582	579.3	580.7	579.7	581.1
Heat Loss-Watts	8.7	2	2.7	2.8	2.8	2.1	1.4	2.1	2.6	14.3
Heat Flux-Btu/Hr/ft2	10130	10024	10092	10070	10115	10089	10042	10068	10049	10078
Wall Temp. #3-F	157.9	159.7	158.7	159.3	160.8	161.5	160.8	159.4	159.3	157.4
Wall Temp. #4-F	159	158.1	159.6	159.7	160.8	161.5	161.1	160.6	159.9	160.6
Wall Temp. #5-F	159.2	157.2	160.9	159.7	159.6	160.6	160.6	159.9	158.8	156.9
Wall Temp. #1-F	148.8	158.1	157	158.3	159.2	160.6	161.8	160	158.1	155.8
Wall Temp. #2-F	159.7	158.1	157.9	158.8	159	160.8	161.6	161.1	158.9	157.2
Instream Temp.-F	149.8	150.7	150.6	150.9	150.8	150.9	151.3	151	151	154.6
Avg. Wall Temp.-F	159	158.5	158.3	159.3	159.7	161	161.2	160.2	159	157.6
Avg. Wall DT.-F	8.7	7.3	7.2	7.9	8.4	9.8	9.4	8.7	7.5	2.5
Remaining Subcool-F	-1.5									
Exit Quality	0.01	0.04	0.08	0.11	0.14	0.17	0.2	0.23	0.26	0.3
EXP. H-Btu/Hr/ft2/F	1165.4	1364.4	1393.2	1275.4	1205.1	1032.7	1065.3	1151.1	1335.2	3989.7
COMPUTED H										
Jallouk	1039.1	1024	998.4	980.1	967.6	954.7	938.1	931.2	926.4	942.1
Szady1(Cudo tube)	1548.7	1550.7	1556	1558.7	1562.4	1561.8	1564.9	1565.4	1565.8	1604
Szady2	1322.3	1321.8	1326.5	1327.3	1330.3	1328	1328.8	1328.1	1328.8	1364.4
(RLIQ)	77207	76137	73614	71844	68807	66331	64165	61510	59037	58487
(F)	1.242	1.581	1.897	2.14	2.35	2.536	2.698	2.857	3.003	3.079
(HLIQ)	206.9	263.8	316.5	357.3	392.4	423.4	450.8	477.2	501.5	517.6
(HBOIL)	1547.4	1548.2	1551.6	1552.4	1554.1	1551.5	1552.4	1550.4	1548.4	1585.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.2									
DP Liquid Density-lbm/ft3	93.03									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.247	0.036	1.583	2.452	3.135					
Zero Corrections-psid	-0.042	0.036	-0.053	-0.01	0.061					
Corrected DP-Psid	0.289	0	1.636	2.462	3.074					
Actual DP-ft	1.78	0	3.98	4.81	5.88					
Measured TP-Psig	127				127.4					
Measured Overall-ft	-0.71									
Computed DP-ft	1.71	3.07	4.33	5.56	6.7					
Friction-ft	0.08	0.23	0.44	0.71	1.01					
Acceleration-ft	0.08	0.13	0.18	0.22	0.28					
Elevation-ft	1.55	2.71	3.71	4.62	5.41					

Run#	811									
Test Fluid	C4F8									
Date:	9/20/93									
Time:	13:31									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	125.7									
Sat. Temperature-F(inlet)	150.5									
Liq. Density-lbm/ft3	81.94	81.74	81.86	81.78	81.82	81.84	81.74	81.8	81.8	80.58
Latent Heat-Btu/lbm	35.45	35.3	35.39	35.33	35.36	35.38	35.3	35.34	35.84	34.95
Specific Heat-Btu/lbm/F	0.291	0.292	0.291	0.292	0.292	0.292	0.292	0.292	0.292	0.296
Liq. Viscosity-lbm/ft-hr	0.448	0.444	0.447	0.445	0.446	0.446	0.444	0.446	0.446	0.421
Liq. Conductivity-Btu/hr-ft-F	0.0294	0.0293	0.0294	0.0293	0.0294	0.0294	0.0293	0.0293	0.0293	0.0285
Liq. Prandtl No.	4.44	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.37
Inlet Flow Rate-GPM	1.8									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	1									
Inlet Temperature-F	148.6									
Outlet Liq. Temperature-F	150.2									
Outlet Vap. Temperature-F	147.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	90.5									
Water outlet Temp.-F	138.1									
Inlet G-lbm/hr/ft2	355053		Temp	145.8	Density	82.65				
Subcooling-F	1.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	577.9	577.7	578.7	579.2	577.9	582.8	575	577.9	575.5	576.5
Heat Loss-Watts	8.7	2	2.7	2.8	2.8	2.1	1.4	2.1	2.6	14.4
Heat Flux-Btu/Hr/ft2	10018	10014	10049	10040	10018	10102	9967	10018	9978	9993
Wall Temp. #3-F	157.4	158.9	157.9	158.2	159.7	160.6	160.2	158.6	158.6	156.8
Wall Temp. #4-F	158.3	157.8	158.9	158.8	160.1	160.8	160.5	159.9	159.1	159.9
Wall Temp. #5-F	158.4	156.5	160.5	158.8	159	159.6	159.8	159.1	158.1	156.2
Wall Temp. #1-F	148.6	157.4	156.9	157.2	158.1	159.7	160.5	159.2	157	154.8
Wall Temp. #2-F	158.8	157.5	157.8	157.7	158.1	160.1	160.8	160.8	157.8	156.4
Instream Temp.-F	149.6	160.6	160	160.4	160.2	160.1	160.6	160.9	160.9	156.5
Avg. Wall Temp.-F	158.2	157.8	157.6	158.3	159.8	160.2	160.4	159.4	158.1	156.9
Avg. Wall DT.-F	8.2	6.7	7.1	7.4	8.2	9.6	9.3	8.7	7.4	0
Remaining Subcool-F	-3.8									
Exit Quality	0.03	0.08	0.12	0.17	0.22	0.27	0.31	0.36	0.41	0.45
EXP. H-Btu/Hr/ft2/F	1225.8	1489.6	1406.2	1357.4	1225.8	1050.3	1070.6	1155.8	1353.7	******
COMPUTED H										
Jallouk	1055	1031.5	1008.9	1008.2	990.4	982.7	968.4	960.9	951.5	986.4
Szady1(Cudo tube)	1538	1548.3	1545.6	1549.8	1547	1553.2	1549.2	1551	1549	1611.5
Szady2	1310.4	1319.7	1316.9	1319.9	1315.8	1322.4	1315.1	1316.7	1313	1374.6
(RLIQ)	60978	49406	46704	44428	41910	39427	37160	34826	32191	31476
(F)	1.418	1.856	2.223	2.51	2.763	2.99	3.186	3.382	3.562	3.595
(HLIQ)	171	224.2	268.2	303.1	333.6	360.9	385	408.4	430.2	439.1
(HBOIL)	1537.2	1548.7	1542.9	1545.9	1541.8	1546.7	1541.2	1541.5	1537.9	1600.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.8									
DP Liquid Density-lbm/ft3	93.09									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.295	0.035	1.972	2.955	3.759					
Zero Corrections-psid	-0.042	0.036	-0.053	-0.01	0.061					
Corrected DP-Psid	0.337	-0.001	2.025	2.965	3.698					
Actual DP-ft	1.71	4.62	3.91	3.94	4.8					
Measured TP-Psig	125.7				125.9					
Measured Overall-ft	-0.36									
Computed DP-ft	1.44	2.55	3.55	4.51	5.38					
Friction-ft	0.05	0.15	0.3	0.48	0.68					
Acceleration-ft	0.05	0.08	0.11	0.15	0.19					
Elevation-ft	1.34	2.32	3.14	3.87	4.5					

Run#	812									
Test Fluid	C4F8									
Date:	9/20/83									
Time:	13:31									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	124.7									
Sat. Temperature-F(inlet)	149.9									
Liq. Density-lbm/ft3	82.41	81.88	81.94	81.84	81.86	81.84	81.78	81.84	81.82	80.72
Latent Heat-Btu/lbm	35.84	35.41	35.45	35.38	35.39	35.38	35.33	35.38	35.36	34.46
Specific Heat-Btu/lbm/F	0.29	0.291	0.291	0.292	0.291	0.292	0.292	0.292	0.292	0.295
Liq. Viscosity-lbm/ft-hr	0.459	0.447	0.448	0.446	0.447	0.446	0.445	0.446	0.448	0.424
Liq. Conductivity-Btu/hr-ft-F	0.0298	0.0294	0.0294	0.0294	0.0294	0.0294	0.0293	0.0294	0.0294	0.0288
Liq. Prandtl No.	4.47	4.43	4.44	4.43	4.43	4.43	4.43	4.43	4.43	4.38
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	1.4									
Inlet Temperature-F	144.4									
Outlet Liq. Temperature-F	150.5									
Outlet Vap. Temperature-F	147.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	91.2									
Water outlet Temp.-F	137.2									
Inlet G-lbm/hr/ft2	199585		Temp	140.5	Density	83.63				
Subcooling-F	5.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	581.2	580.8	583.2	582.2	580.9	596.7	577.8	580.6	578.6	581.8
Heat Loss-Watts	8	1.8	2.5	2.5	2.5	1.9	1.3	1.9	2.4	13.3
Heat Flux-Btu/ft-hr/ft2	10076	10068	10109	10092	10070	10170	10018	10064	10030	10076
Wall Temp. #3-F	155.9	157.3	156	157.1	158.1	159.5	158.8	157.8	156.5	158
Wall Temp. #4-F	157.1	155.8	157.2	157.6	158.6	159.7	159.4	159.1	157.7	159.2
Wall Temp. #5-F	157.5	155.1	159.1	157.6	157.4	158.6	158.4	157.9	156.4	155.5
Wall Temp. #1-F	144.4	155.9	154.8	156.2	156.8	158.5	159.2	158.4	155.6	154.2
Wall Temp. #2-F	158.1	156.1	155.7	156.6	156.8	158.8	159.4	159.5	156.4	155.6
Instream Temp.-F	147.1	149.9	149.6	150.1	150	150.1	150.4	150.1	150.2	155.8
Avg. Wall Temp.-F	157.2	156.8	155.9	157.1	157.4	159.1	159	158.5	156.5	156.1
Avg. Wall DT.-F	9.6	5.9	5.9	6.6	6.9	8.5	8.2	8	5.9	0
Remaining Subcool-F	-4.7									
Exit Quality	0.04	0.12	0.2	0.29	0.37	0.46	0.54	0.62	0.71	0.79
EXP. H-Btu/f-hr/ft2/F	1050	1700.6	1722.8	1536.3	1449.9	1184.3	1223.3	1260.4	1709.6	******
COMPUTED H										
Jallouk	1116.4	1076.6	1052.4	1038.4	1029.9	1021	1021.4	1013.8	1006.1	1047.4
Szady1(Cudo tube)	1516.7	1544.6	1545	1549.1	1546.9	1555.8	1548	1549.2	1548.3	1607.4
Szady2	1290.8	1317.8	1318.5	1321.8	1318.8	1328.7	1317.7	1319.1	1316.9	1376.8
(RLIQ)	27917	26885	24391	22065	19593	17155	14746	12267	9836	7777
(F)	1.474	2.062	2.597	3.006	3.363	3.681	3.969	4.255	4.52	4.604
(HLIQ)	111.6	156.9	197.5	228.9	256	280.3	302.4	323.9	344.2	354.3
(HBOIL)	1516.5	1544	1543.9	1547.5	1544.6	1552.8	1544.1	1544.5	1542.6	1601.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.6									
DP Liquid Density-lbm/ft3	93.12									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.3	0.033	2.278	3.399	4.341					
Zero Corrections-psid	-0.042	0.036	-0.053	-0.01	0.061					
Corrected DP-Psid	0.342	-0.003	2.331	3.409	4.28					
Actual DP-ft	1.7	4.62	2.78	3.15	3.76					
Measured TP-Psig	124.7				124.8					
Measured Overall-ft	-0.18									
Computed DP-ft	1.28	2.12	2.81	3.42	3.94					
Friction-ft	0.02	0.07	0.16	0.25	0.36					
Acceleration-ft	0.02	0.04	0.06	0.09	0.13					

Run#	313									
Test Fluid	C4F8									
Date:	9/21/93									
Time:	8:59									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	126.6									
Sat. Temperature-F(inlet)	150.9									
Liq. Density-lbm/ft3	81.97	81.9	81.78	81.74	81.78	81.74	81.61	81.7	81.72	81.41
Latent Heat-Btu/lbm	35.49	35.42	35.33	35.3	35.33	35.3	35.19	35.27	35.28	35.09
Specific Heat-Btu/lbm/F	0.291	0.291	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.293
Liq. Viscosity-lbm/ft-hr	0.449	0.448	0.445	0.444	0.445	0.444	0.442	0.444	0.444	0.438
Liq. Conductivity-Btu/hr-ft-F	0.0295	0.0294	0.0293	0.0293	0.0293	0.0293	0.0292	0.0293	0.0293	0.0291
Liq. Prandtl No.	4.44	4.43	4.43	4.43	4.43	4.43	4.42	4.42	4.42	4.41
Inlet Flow Rate-GPM	5.1									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	2.5									
Inlet Temperature-F	148.3									
Outlet Liq. Temperature-F	149.6									
Outlet Vap. Temperature-F	147.7									
Water Flow Rate-GPM										
Water inlet Temp.-F	90.3									
Water outlet Temp.-F	130.6									
Inlet G-lbm/hr/ft2	1005299		Temp	146.1	Density	82.6				
Subcooling-F	2.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	874.3	874.2	868.7	869.4	867.7	868.6	871.9	868	869.3	868.7
Heat Loss-Watts	9.5	2.2	3	3	3	2.3	1.5	2.3	2.9	15.5
Heat Flux-Btu/Hr/ft2	15155	15154	15058	15070	15041	15057	15114	15046	15069	15058
Wall Temp. #3-F	159.8	162.9	160.8	160.9	162.9	164.5	163.6	161.6	161.3	158.7
Wall Temp. #4-F	161.3	159.9	162.4	161.5	163.4	164	163.6	163.6	162.5	163.8
Wall Temp. #5-F	161.3	158.9	162.8	161.6	162	163.6	162.9	162	160.8	158
Wall Temp. #1-F	148.3	160.8	158.7	159.4	160.8	163.3	164.3	162.1	159.6	156.8
Wall Temp. #2-F	162.3	160.8	160	160.1	161.1	164.3	164.2	163.6	160.9	159.9
Instream Temp.-F	149.4	149.8	150.4	150.6	150.4	150.6	151.3	150.8	150.7	152.3
Avg. Wall Temp.-F	161.2	161.1	160.5	160.9	161.8	163.9	163.7	162.6	161	159.1
Avg. Wall DT.-F	11.1	10.6	9.4	9.6	10.7	12.6	11.7	11.1	9.8	6.2
Remaining Subcool-F	-0.4									
Exit Quality	0	0.03	0.05	0.08	0.1	0.13	0.15	0.18	0.2	0.23
EXP. H-Btu/Hr/ft2/F	1366.6	1427.6	1602.9	1574.9	1399.8	1197.9	1287.7	1355.5	1563.3	2444.7
COMPUTED H										
Jallouk	1285.7	1188.6	1143.4	1115.5	1088.9	1069.8	1058.9	1034	1017.2	1004.1
Szady1(Cudo tube)	1884.5	1890.9	1894.8	1900.6	1899.4	1905.7	1920.4	1913.8	1917.4	1938.2
Szady2	1686.6	1693.7	1734.3	1737.7	1732.7	1736.8	1750.9	1739.6	1740.8	1761.7
(RLIQ)	146127	144586	141709	138294	134372	130941	128068	123780	119987	116000
(F)	1.112	1.42	1.723	1.949	2.141	2.307	2.452	2.587	2.729	2.629
(HLIQ)	308.3	393.8	478.4	541.4	594.6	640.9	682	721.8	759.3	788.4
(HBOIL)	1881.7	1885.2	1884.5	1885.9	1879.8	1881.2	1891.3	1878.9	1877	1893.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.1									
DP Liquid Density-lbm/ft3	93.19									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.093	0.035	0.915	1.563	2.002					
Zero Corrections-psid	-0.028	0.035	-0.036	0.058	0.068					
Corrected DP-Psid	0.121	0	0.951	1.507	1.934					
Actual DP-ft	2.08	4.08	5.19	6.49	7.88					
Measured TP-Psig	126.6				126.2					
Measured Overall-ft	0.71									
Computed DP-ft	2.11	3.96	5.78	7.65	9.47					
Friction-ft	0.2	0.58	1.1	1.76	2.49					
Acceleration-ft	0.22	0.38	0.52	0.65	0.79					
Elevation-ft	1.69	3	4.17	5.24	6.2					

Run#	814									
Test Fluid	C4F8									
Date:	9/21/93									
Time:	8:59									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	127.2									
Sat. Temperature-F(inlet)	151.2									
Liq. Density-lbm/ft3	81.92	81.8	81.72	81.68	81.7	81.7	81.55	81.65	81.65	81.28
Latent Heat-Btu/lbm	35.44	35.34	35.28	35.25	35.27	35.27	35.14	35.22	35.22	34.92
Specific Heat-Btu/lbm/F	0.291	0.292	0.292	0.292	0.292	0.292	0.293	0.292	0.292	0.293
Liq. Viscosity-lbm/ft-hr	0.448	0.446	0.444	0.443	0.444	0.444	0.44	0.442	0.442	0.435
Liq. Conductivity-Btu/hr-ft-F	0.0294	0.0293	0.0293	0.0293	0.0293	0.0293	0.0292	0.0292	0.0292	0.029
Liq. Prandtl No.	4.44	4.43	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.4
Inlet Flow Rate-GPM	4.3									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	2.2									
Inlet Temperature-F	148.7									
Outlet Liq. Temperature-F	150.2									
Outlet Vap. Temperature-F	148.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	90.2									
Water outlet Temp.-F	132									
Inlet G-lbm/hr/ft2	848566		Temp	145.6	Density	82.69				
Subcooling-F	2.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	869.7	860.7	865.2	864.4	868.7	874.6	868.9	859.9	869.4	860.5
Heat Loss-Watts	8.8	2	2.8	2.8	2.8	2.2	1.4	2.1	2.7	14.2
Heat Flux-Btu/hr/ft2	15076	14920	14998	14984	15058	15161	15062	14906	15070	14916
Wall Temp. #3-F	159.9	162.9	161.2	160.9	163.1	164.6	163.7	161.8	161.6	159
Wall Temp. #4-F	161.3	160.1	162.8	161.6	163.5	164.4	163.9	163.6	162.6	163.8
Wall Temp. #5-F	161.1	158.9	163	161.6	162.3	163.8	163	162.1	161	158.1
Wall Temp. #1-F	148.7	160.7	158.9	159.7	161	163.5	164.4	162.4	159.9	156.5
Wall Temp. #2-F	162.1	160.7	160.3	160.4	161.4	164.3	164.4	163.7	161.1	158.9
Instream Temp.-F	149.7	150.3	150.7	150.9	150.8	150.8	151.6	151.1	151.1	153
Avg. Wall Temp.-F	161.1	161.1	160.8	161	162.1	164.1	163.9	162.7	161.2	159.3
Avg. Wall DT.-F	10.7	10.1	9.4	9.4	10.6	12.6	11.6	10.9	9.5	5.6
Remaining Subcool-F	-1									
Exit Quality	0.01	0.04	0.07	0.1	0.13	0.16	0.18	0.21	0.24	0.27
EXP. H-Btu/hr/ft2/F	1406.5	1473.4	1591.7	1598.6	1424.7	1204.2	1298.5	1361.7	1593.3	2670.3
COMPUTED H										
Jallouk	1275.5	1211.7	1163.2	1136.3	1116	1099.9	1083.6	1058.9	1049.3	1041.9
Szady1(Cudo tube)	1882.8	1881.6	1893.3	1897	1902.8	1911.6	1917.3	1904.6	1917.5	1932.3
Szady2	1684.2	1681.9	1733.6	1735.2	1739.5	1747.3	1750.6	1732.1	1745.1	1758.8
(RLIQ)	123362	121696	118480	115084	111249	107545	104600	100438	96748	94678
(F)	1.195	1.521	1.833	2.073	2.278	2.48	2.615	2.772	2.918	3.015
(HLIQ)	289.3	368.8	444.8	503.2	552.9	597	635.6	673.1	707.4	734.7
(HBOIL)	1880.5	1876.9	1885.1	1885.1	1887.1	1892	1893.7	1876.1	1884.8	1898.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.4									
DP Liquid Density-lbm/ft3	93.15									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.149	0.035	1.171	1.897	2.434					
Zero Corrections-psid	-0.028	0.035	-0.036	0.058	0.068					
Corrected DP-Psid	0.177	0	1.207	1.841	2.366					
Actual DP-ft	1.96	4.68	4.74	5.81	7.13					
Measured TP-Psig	127.2				127.1					
Measured Overall-ft	0.18									
Computed DP-ft	1.96	3.66	5.33	7.02	8.68					
Friction-ft	0.17	0.48	0.91	1.46	2.06					
Acceleration-ft	0.18	0.31	0.42	0.53	0.66					
Elevation-ft	1.61	2.87	3.99	5.03	5.94					

Run#	815									
Test Fluid	C4F8									
Date:	9/21/93									
Time:	8:59									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	126.1									
Sat. Temperature-F(inlet)	150.7									
Liq. Density-lbm/ft3	82.07	81.88	81.76	81.68	81.7	81.74	81.67	81.74	81.74	81.39
Latent Heat-Btu/lbm	35.56	35.41	35.31	35.25	35.27	35.3	35.28	35.3	35.3	35.01
Specific Heat-Btu/lbm/F	0.291	0.291	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.293
Liq. Viscosity-lbm/ft-hr	0.451	0.447	0.445	0.443	0.444	0.444	0.443	0.444	0.444	0.437
Liq. Conductivity-Btu/hr-ft-F	0.0295	0.0294	0.0293	0.0293	0.0293	0.0293	0.0293	0.0293	0.0293	0.0291
Liq. Prandtl No.	4.44	4.43	4.43	4.42	4.42	4.43	4.42	4.43	4.43	4.41
Inlet Flow Rate-GPM	3.5									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	1.8									
Inlet Temperature-F	147.9									
Outlet Liq. Temperature-F	150.4									
Outlet Vap. Temperature-F	147.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	89.8									
Water outlet Temp.-F	131.7									
Inlet G-lbm/hr/ft2	692251		Temp		144.6	Density	82.88			
Subcooling-F	2.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	859.9	857.7	859	856.9	856.2	861.3	859.8	853.4	860.1	852.6
Heat Loss-Watts	9	2.1	2.8	2.9	2.9	2.2	1.4	2.1	2.6	14.3
Heat Flux-Btu/Hr/ft2	14906	14888	14890	14854	14842	14930	14904	14783	14909	14778
Wall Temp. #3-F	159.3	162.5	160.5	160.7	162.6	164.1	162.9	160.8	159	158.2
Wall Temp. #4-F	161	159.3	162.3	161.5	163.1	163.7	163.1	162.6	160.6	163
Wall Temp. #5-F	161	158.5	162.6	161.6	161.6	163.1	162.5	161.1	158.8	157.1
Wall Temp. #1-F	147.9	160.1	158.3	159.7	160.6	163	163.8	161.5	158.4	155.1
Wall Temp. #2-F	161.4	160.2	159.6	160.2	160.8	163.6	163.6	162.9	159.7	157.7
Instream Temp.-F	148.9	149.9	150.5	150.9	150.8	150.6	151	150.6	150.6	152.4
Avg. Wall Temp.-F	160.7	160.5	160.2	160.9	161.5	163.5	163.2	161.8	159.3	158.2
Avg. Wall DT.-F	11.1	10	9	9.3	10.1	12.2	11.5	10.5	8	5.2
Remaining Subcool-F	-1.6									
Exit Quality	0.01	0.05	0.08	0.12	0.16	0.19	0.23	0.26	0.3	0.33
EXP. H-Btu/Hr/ft2/F	1342.7	1493.8	1654.1	1596.5	1476.2	1223.7	1295.3	1407.3	1857.6	2868.6
COMPUTED H										
Jallouk	1289.1	1235	1196.7	1157.3	1134.9	1118.9	1104.3	1082.8	1078.8	1088.7
Szady1(Cudo tube)	1862.3	1872.9	1882.9	1887.1	1887	1892.1	1897.1	1887.8	1897.2	1911.8
Szady2	1680.6	1672	1683.3	1725.3	1722.8	1726.9	1730.2	1716.4	1725.5	1739.4
(RLIQ)	99688	98158	95062	91791	88071	84269	80916	76980	73358	70878
(F)	1.249	1.615	1.954	2.216	2.441	2.643	2.819	2.982	3.149	3.263
(HLIQ)	256.7	332.5	402.7	456.9	503.3	544.7	581.5	616.7	649	674.9
(HBOIL)	1860.7	1869.4	1876.8	1878.1	1875	1876.9	1878.7	1865.6	1871.5	1883.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.9									
DP Liquid Density-lbm/ft3	93.07									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.208	0.034	1.429	2.242	2.881					
Zero Corrections-psid	-0.028	0.035	-0.036	0.056	0.058					
Corrected DP-Psid	0.236	-0.001	1.465	2.186	2.813					
Actual DP-ft	1.87	4.68	4.27	5.28	6.32					
Measured TP-Psig	126.1				125.9					
Measured Overall-ft	0.35									
Computed DP-ft	1.81	3.29	4.72	6.17	7.56					
Friction-ft	0.13	0.39	0.76	1.23	1.76					
Acceleration-ft	0.14	0.23	0.33	0.42	0.53					
Elevation-ft	1.54	2.67	3.64	4.51	5.27					

Run#	816									
Test Fluid	C4F8									
Date:	9/21/93									
Time:	8:59									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	125.4									
Sat. Temperature-F(inlet)	150.3									
Liq. Density-lbm/ft3	82.09	81.8	81.8	81.76	81.78	81.78	81.68	81.76	81.76	81.02
Latent Heat-Btu/lbm	35.58	35.34	35.34	35.31	35.33	35.33	35.25	35.31	35.31	34.71
Specific Heat-Btu/lbm/F	0.291	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.294
Liq. Viscosity-lbm/ft-hr	0.452	0.446	0.446	0.445	0.445	0.445	0.443	0.445	0.445	0.43
Liq. Conductivity-Btu/hr-ft-F	0.0295	0.0293	0.0293	0.0293	0.0293	0.0293	0.0293	0.0293	0.0293	0.0288
Liq. Prandtl No.	4.45	4.43	4.43	4.43	4.43	4.43	4.42	4.43	4.43	4.39
Inlet Flow Rate-GPM	2.7									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	1.7									
Inlet Temperature-F	147.8									
Outlet Liq. Temperature-F	150.2									
Outlet Vap. Temperature-F	147.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	87.3									
Water outlet Temp.-F	130.9									
Inlet G-lbm/hr/ft2	535337		Temp		143.5	Density	83.08			
Subcooling-F	2.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	900	890.3	885.3	883.3	888.2	891.7	878.1	873.6	879.4	874.9
Heat Loss-Watts	9.5	2.2	3	3	3.1	2.4	1.5	2.3	2.8	15.6
Heat Flux-Btu/Hr/ft2	15601	15433	15348	15311	15362	15457	15221	15143	15244	15168
Wall Temp. #3-F	158.8	162	159.9	160.3	162.3	164	162.7	160.6	158.9	158.2
Wall Temp. #4-F	160.4	159	161.7	160.9	162.8	163.8	163.1	162.6	160.5	163
Wall Temp. #5-F	160.4	158	162.2	161.1	161.4	163.2	162.2	161	158.8	156.9
Wall Temp. #1-F	147.8	159.8	157.8	158.9	160.8	162.8	163.4	161.5	158.8	155.1
Wall Temp. #2-F	160.9	159.8	159.8	159.7	160.6	163.8	163.7	162.7	159.4	157.5
Instream Temp.-F	148.8	150.3	150.3	150.5	150.4	150.4	150.9	150.5	150.5	154.3
Avg. Wall Temp.-F	160.1	160.2	159.7	160.3	161.3	163.5	163	161.7	159.2	158.1
Avg. Wall DT.-F	10.6	9.2	8.7	9.1	10.2	12.4	11.4	10.5	8	3.2
Remaining Subcool-F	-3.4									
Exit Quality	0.03	0.08	0.12	0.17	0.22	0.27	0.31	0.36	0.41	0.45
EXP. H-Btu/Hr/ft2/F	1469	1688.2	1767.7	1681.1	1506.9	1251.4	1331.5	1442.8	1907.6	4807.5
COMPUTED H										
Jallouk	1350.4	1292.3	1244.4	1201	1161.8	1167.9	1145.6	1125.7	1117.4	1130.7
Szady1(Cudo tube)	1903.7	1912.3	1908.1	1909.6	1912.9	1920.2	1918.1	1905.3	1918.2	1953.7
Szady2	1710.6	1719	1713.9	1715.4	1757.6	1764.7	1758.4	1741.9	1749.7	1794.9
(RLIQ)	76452	74556	70823	67214	63416	59869	56175	52284	48663	46412
(F)	1.39	1.827	2.202	2.497	2.753	2.982	3.182	3.38	3.562	3.649
(HLIQ)	232.4	306.4	369.2	418.9	461.8	500.2	534.2	567.2	597.5	616.5
(HBOIL)	1902.6	1909.7	1903.5	1902.9	1903.9	1908.8	1899.1	1888.4	1893.6	1933.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.1									
DP Liquid Density-lbm/ft3	93.05									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.274	0.035	1.77	2.694	3.457					
Zero Corrections-psid	-0.028	0.035	-0.036	0.058	0.068					
Corrected DP-Psid	0.302	0	1.806	2.638	3.389					
Actual DP-ft	1.76	0.69	3.68	4.5	5.32					
Measured TP-Psig	125.4				125.8					
Measured Overall-ft	0.18									
Computed DP-ft	1.58	2.85	4.06	5.26	6.41					
Friction-ft	0.11	0.31	0.62	1	1.43					
Acceleration-ft	0.11	0.18	0.26	0.34	0.44					
Elevation-ft	1.37	2.35	3.18	3.91	4.54					

Run#	317										
Test Fluid	C4F8										
Date:	9/21/93										
Time:	14:00										
Note	Analytical dt is used										
Flow Area-ft2	0.00336										
Heat Flow Area-ft2	0.19695										
Sat. Pressure-Psig	124.8										
Sat. Temperature-F(inlet)	150										
Liq. Density-lbm/ft3	82.05	81.78	81.82	81.8	81.78	81.78	81.7	81.78	81.76	81.78	
Latent Heat-Btu/lbm	35.55	35.33	35.36	35.34	35.33	35.33	35.27	35.33	35.81	35.33	
Specific Heat-Btu/lbm/F	0.291	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.292	
Liq. Viscosity-lbm/ft-hr	0.451	0.445	0.446	0.446	0.445	0.445	0.444	0.445	0.445	0.445	
Liq. Conductivity-Btu/hr-ft-F	0.0295	0.0293	0.0294	0.0293	0.0293	0.0293	0.0293	0.0293	0.0293	0.0293	
Liq. Prandtl No.	4.44	4.43	4.43	4.43	4.43	4.43	4.42	4.43	4.43	4.43	
Inlet Flow Rate-GPM	1.8										
Outlet Liq. Flow Rate-GPM	0.4										
Outlet Vap. Flow Rate-GPM	0.9										
Inlet Temperature-F	147.8										
Outlet Liq. Temperature-F	150.3										
Outlet Vap. Temperature-F	148.2										
Water Flow Rate-GPM											
Water inlet Temp.-F	87.7										
Water outlet Temp.-F	131.9										
Inlet G-lbm/hr/ft2	358470		Temp	141.5	Density	83.45					
Subcooling-F	2.2										
Flow Observation											
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10	
Heat Input-Watts(net)	864.7	869.6	869.5	866.3	865.6	865.7	862.6	857.5	867.5	195.6	
Heat Loss-Watts	10.3	2.4	3.2	3.2	3.3	2.5	1.6	2.5	3.1	14.7	
Heat Flux-Btu/Hr/ft2	14989	15074	15072	15017	15005	15006	14953	14864	15038	3391	
Wall Temp. #3-F	158.1	161	158.9	159.2	161.3	163.1	162	160.6	161.1	153.1	
Wall Temp. #4-F	159.9	158.2	160.6	160	161.7	162.9	162.6	162.4	161.5	154.4	
Wall Temp. #5-F	160	157.3	161.6	160.1	160.3	162.2	161.6	160.8	158.6	153.9	
Wall Temp. #1-F	147.8	158.7	156.9	158	159.3	161.7	162.6	161.2	157.9	152.3	
Wall Temp. #2-F	160	158.6	158.2	158.6	159.7	162.5	162.7	162.4	159.4	153	
Instream Temp.-F	149	150.4	150.2	150.3	150.4	150.4	150.8	150.4	150.5	150.4	
Avg. Wall Temp.-F	159.5	159.2	158.7	159.3	160.3	162.5	162.3	161.5	159.7	153.3	
Avg. Wall DT.-F	9.8	8.1	7.8	8.3	9.2	11.4	10.8	10.4	8.5	2.8	
Remaining Subcool-F	-6.2										
Exit Quality	0.05	0.12	0.19	0.26	0.33	0.4	0.47	0.54	0.61	0.62	
EXP. H-Btu/Hr/ft2/F	1526	1862.4	1940.1	1799.2	1635.9	1316.7	1381.4	1428.1	1784.9	1216.7	
COMPUTED H											
Jallouk	1345.2	1328.3	1281	1249.4	1226.9	1208.5	1194.2	1162.8	1162.5	565.2	
Szady1(Cuido tube)	1868.1	1890.5	1888.8	1887.3	1888.6	1889.7	1892	1882.9	1896.1	929.5	
Szady2	1687.4	1692.6	1690.7	1688.8	1690.2	1691.5	1731.6	1719.3	1733.9	671.2	
(RLIQ)	50677	48158	44415	40784	37175	33519	29977	26281	22805	20388	
(F)	1.558	2.108	2.551	2.906	3.212	3.489	3.736	3.985	4.213	4.364	
(HLIQ)	189.1	256.5	310.3	353.6	390.9	424.6	455	485	512.9	529.9	
(HBOIL)	1867.5	1889	1886	1883.2	1883	1882.5	1883.2	1872.2	1883.5	868.2	
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10						
DP liquid Temp.-F	81.7										
DP Liquid Density-lbm/ft3	92.96										
Elevation-ft	2	4	6	8	9.875						
Measured DP-Psid	0.305	0.036	2.152	3.203	4.107						
Zero Corrections-psid	-0.028	0.035	-0.036	0.056	0.068						
Corrected DP-Psid	0.333	0.001	2.188	3.147	4.039						
Actual DP-ft	1.69	4.65	2.87	3.55	4.11						
Measured TP-Psig	124.8				125						
Measured Overall-ft	-0.35										
Computed DP-ft	1.33	2.33	3.25	4.13	5.17						
Friction-ft	0.07	0.21	0.41	0.67	0.89						
Acceleration-ft	0.06	0.11	0.17	0.24	0.3						
Elevation-ft	1.2	2.01	2.67	3.22	3.98						

2650
- 77
25817

-7252
- 771
2648

Run#	818									
Test Fluid	C4F8									
Date:	9/21/93									
Time:	14:00									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	125									
Sat. Temperature-F(inlet)	150.1									
Liq. Density-lbm/ft3	81.76	81.74	81.78	81.68	81.7	81.7	81.59	81.65	81.65	81.7
Latent Heat-Btu/lbm	35.81	35.8	35.33	35.25	35.27	35.27	35.17	35.22	35.22	35.27
Specific Heat-Btu/lbm/F	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282	0.282
Liq. Viscosity-lbm/ft-hr	0.445	0.444	0.445	0.443	0.444	0.444	0.441	0.442	0.442	0.444
Liq. Conductivity-Btu/hr-ft-F	0.0293	0.0293	0.0293	0.0293	0.0293	0.0293	0.0292	0.0292	0.0292	0.0293
Liq. Prandtl No.	4.43	4.43	4.43	4.42	4.42	4.42	4.42	4.42	4.42	4.42
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.6									
Inlet Temperature-F	147.2									
Outlet Liq. Temperature-F	150.7									
Outlet Vap. Temperature-F	149									
Water Flow Rate-GPM										
Water inlet Temp.-F	92.3									
Water outlet Temp.-F	138									
Inlet G-lbm/hr/ft2	199685		Temp		140.5	Density	83.63			
Subcooling-F	2.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	848.6	835.6	868.2	868.2	875	873.1	858.3	143.1	105.5	55.6
Heat Loss-Watts	9.9	2.3	3.1	3.1	3.1	2.4	1.7	2	2.6	14.2
Heat Flux-Btu/hr/ft2	14710	14485	15050	15015	15168	15135	14878	2481	1829	964
Wall Temp. #3-F	157.3	160.5	157.8	158.6	159.8	162.1	164.1	154.7	154.8	152.7
Wall Temp. #4-F	158.9	157.3	159.6	159.6	160.2	161.8	163.6	154.8	155.8	153.1
Wall Temp. #5-F	158.7	156.4	160.8	159.1	158.8	160.5	161.2	154.6	155	153.7
Wall Temp. #1-F	147.2	157.7	156.2	157.5	158.1	160.4	162.4	154.4	154	152.7
Wall Temp. #2-F	159.8	157.9	157.5	158	158.6	161	162.6	154.7	154.1	152.8
Instream Temp.-F	150.5	150.6	150.4	150.9	150.8	150.8	151.4	151.1	151.1	150.8
Avg. Wall Temp.-F	158.7	158.4	157.8	158.7	158.9	161.2	162.8	154.6	154.6	153
Avg. Wall DT.-F	7.5	7.1	6.7	7.1	7.4	9.7	10.7	3.4	3.5	2.2
Remaining Subcool-F	-11.9									
Exit Quality	0.1	0.22	0.34	0.47	0.6	0.72	0.85	0.87	0.88	0.89
EXP. H-Btu/Hr/ft2/F	1958.7	2041.4	2247.9	2108.4	2038.8	1557.7	1389.5	723.6	529	448.9
COMPUTED H										
Jallouk	1402	1335.9	1332	1328.1	1313.3	1296.5	46.2	46.2	46.2	46.1
Szady1(Cudo tube)	1868	1856.1	1888.8	1883	1901.8	1900.8	46.2	46.2	46.2	46.1
Szady2	1666.3	1649.8	1690.6	1694.9	1705.7	1703.9	46.2	46.2	46.2	46.1
(PLIQ)	27908	24719	21078	17487	13775	10062	10062	10062	10062	10062
(F)	1.806	2.565	3.158	3.638	4.076	4.484	4.484	4.484	4.484	4.484
(HLIQ)	137.6	195.5	240.6	277.4	310.7	341.8	341.8	341.8	341.8	341.8
(HBOIL)	1857.8	1854.4	1887.5	1891	1899.1	1896.6	1896.6	1896.6	1896.6	1896.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	26.7									
DP Liquid Density-lbm/ft3	100.08									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.561	0.036	2.631	3.808	4.839					
Zero Corrections-psid	-0.028	0.036	-0.036	0.058	0.068					
Corrected DP-Psid	0.589	0.001	2.667	3.752	4.771					
Actual DP-ft	1.41	49	2.65	3.19	3.69					
Measured TP-Psig	125				125.3					
Measured Overall-ft	-0.53									
Computed DP-ft	1.07	1.78	2.34	2.98	4.08					
Friction-ft	0.03	0.11	0.22	0.33	0.39					
Acceleration-ft	0.03	0.06	0.11	0.15	0.16					
Elevation-ft	1	1.59	2.01	2.5	3.54					

20112

21168
- 568
20600

Run#	318									
Test Fluid	C4F8									
Date:	9/22/93									
Time:	7:45									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	126.6									
Sat. Temperature-F(inlet)	150.9									
Liq. Density-lbm/ft3	82.11	81.94	81.88	81.82	81.86	81.92	81.74	81.88	81.88	82.03
Latent Heat-Btu/lbm	35.6	35.45	35.41	35.96	35.39	35.44	35.3	35.41	35.41	35.59
Specific Heat-Btu/lbm/F	0.291	0.291	0.291	0.292	0.291	0.291	0.292	0.291	0.291	0.291
Liq. Viscosity-lbm/ft-hr	0.452	0.448	0.447	0.446	0.447	0.448	0.444	0.447	0.447	0.45
Liq. Conductivity-Btu/hr-ft-F	0.0296	0.0294	0.0294	0.0294	0.0294	0.0294	0.0293	0.0294	0.0294	0.0295
Liq. Prandtl No.	4.45	4.44	4.43	4.43	4.43	4.44	4.43	4.43	4.43	4.44
Inlet Flow Rate-GPM	5.1									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	147.8									
Outlet Liq. Temperature-F	149.7									
Outlet Vap. Temperature-F	146.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	84									
Water outlet Temp.-F	133.2									
Inlet G-lbm/hr/ft2	1009839		Temp	144.1	Density	82.97				
Subcooling-F	3.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1152.8	1153.5	1156.2	1159.1	1153.6	1151.2	1158.2	1154.6	206.3	0.7
Heat Loss-Watts	10	2.4	3.2	3.2	3.2	2.3	1.4	2.2	2.3	10.7
Heat Flux-Btu/Hr/ft2	19983	19995	20042	20092	19997	19955	20077	20014	3576	12
Wall Temp. #3-F	160.4	165.3	161.8	161.6	163.5	161.5	161.3	161.3	153.8	149
Wall Temp. #4-F	162.4	160.8	164.1	162.5	164.3	161	161.2	162.1	154.3	148.8
Wall Temp. #5-F	161.6	159.1	164	162.7	162.7	162	159.8	160.7	154	149.6
Wall Temp. #1-F	147.8	161.8	159.5	160	161.5	163.3	161.2	159.7	153.4	149.6
Wall Temp. #2-F	162.8	161.8	161.3	161.1	162.1	164.9	161	161	153.8	149.8
Instream Temp.-F	148.7	149.6	149.9	150.2	150	149.7	150.6	149.9	149.9	149.1
Avg. Wall Temp.-F	161.8	162.4	161.7	161.7	162.7	162	160.9	161	153.9	149.3
Avg. Wall DT.-F	12.2	11.9	10.9	10.6	11.7	11.3	9.4	10.2	3.8	0.2
Remaining Subcool-F	-0.9									
Exit Quality	0.01	0.04	0.07	0.11	0.14	0.17	0.2	0.24	0.24	0.24
EXP. H-Btu/Hr/ft2/F	1638.4	1677.3	1843.9	1896.9	1702.4	1758.5	2137.5	1970.8	941.5	76.1
COMPUTED H										
Jallouk	1470.8	1389.7	1320.3	1269.1	1227.8	1180	1153.9	1111.2	714.3	688.2
Szady1(Cudo tube)	2155.2	2169.7	2178.8	2188.2	2183.2	2180	2201.5	2192.3	1034.2	836.1
Szady2	2062.8	2078.8	2087.1	2095.7	2086.1	2078.6	2102.4	2087.1	857.1	836
(RLIQ)	145682	143862	139426	134940	129835	124649	120789	115175	112312	111065
(F)	1.175	1.527	1.873	2.133	2.355	2.553	2.718	2.89	2.961	3.007
(HLIQ)	326.5	425.1	521.4	594.2	655.9	710.6	757.7	804.7	830	836
(HBOIL)	2152.7	2164.2	2168.8	2173.5	2163.3	2154.5	2171.2	2155.5	811.5	36
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.9									
DP Liquid Density-lbm/ft3	93.77									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.121	0.583	0.943	1.61	2.308					
Zero Corrections-psid	-0.029	-0.02	-0.047	0.041	0.037					
Corrected DP-Psid	0.15	0.603	0.99	1.569	2.271					
Actual DP-ft	2.02	3.51	5.12	6.89	7.3					
Measured TP-Psig	126.6				126					
Measured Overall-ft	1.05									
Computed DP-ft	2.09	3.93	5.79	7.75	9.8					
Friction-ft	0.23	0.71	1.39	2.26	2.86					
Acceleration-ft	0.26	0.48	0.64	0.83	0.85					
Elevation-ft	1.6	2.76	3.76	4.66	5.89					

>845

31512
306
23412

Run#	820									
Test Fluid	C4F8									
Date:	9/22/93									
Time:	7:45									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19686									
Sat. Pressure-Psig	127									
Sat. Temperature-F(inlet)	151.1									
Liq. Density-lbm/ft3	82.09	81.88	81.82	81.72	81.78	81.76	81.68	81.8	81.78	81.86
Latent Heat-Btu/lbm	35.58	35.41	35.36	35.28	35.33	35.31	35.25	35.34	35.33	35.39
Specific Heat-Btu/lbm/F	0.291	0.291	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.291
Liq. Viscosity-lbm/ft-hr	0.452	0.447	0.446	0.444	0.445	0.445	0.443	0.446	0.445	0.447
Liq. Conductivity-Btu/hr-ft-F	0.0295	0.0294	0.0294	0.0293	0.0293	0.0293	0.0293	0.0293	0.0293	0.0294
Liq. Prandtl No.	4.45	4.43	4.43	4.42	4.43	4.43	4.42	4.43	4.43	4.43
Inlet Flow Rate-GPM	4.3									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	2.1									
Inlet Temperature-F	147.5									
Outlet Liq. Temperature-F	149.6									
Outlet Vap. Temperature-F	147.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	85									
Water outlet Temp.-F	133.1									
Inlet G-lbm/hr/ft2	850671		Temp		144.5	Density	82.9			
Subcooling-F	3.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1169.8	1169	1165.8	1170.2	1155	1166.7	1167.8	1169.8	205.8	47.4
Heat Loss-Watts	9.1	2.1	2.9	2.9	2.9	2.1	1.3	2	2	10
Heat Flux-Btu/hr/ft2	20170	20091	20200	20285	20021	20051	20066	20175	3564	822
Wall Temp. #3-F	160.4	165.3	161.7	162.1	164.2	162.1	161.8	162.9	154.5	150.8
Wall Temp. #4-F	162.3	160.7	164.2	163	164.7	161.7	161.7	162.5	154.8	150.9
Wall Temp. #5-F	161.8	159.3	164.2	163.3	163.1	162.4	160.3	161.3	154.5	151.6
Wall Temp. #1-F	147.5	161.8	159.5	160.6	162	164	161.6	160.4	153.1	151
Wall Temp. #2-F	162.7	161.8	161.3	161.6	162.5	165.3	161.4	161.5	153.7	151
Instream Temp.-F	148.8	149.9	150.2	150.7	150.4	150.5	150.9	150.3	150.4	150
Avg. Wall Temp.-F	161.8	162.4	161.7	162.3	163.1	162.6	161.4	161.7	154.1	151.1
Avg. Wall DT.-F	12.1	11.6	10.8	10.8	11.8	11.1	9.6	10.5	3.6	1
Remaining Subcool-F	-1.1									
Exit Quality	0.01	0.05	0.09	0.13	0.17	0.21	0.24	0.28	0.29	0.29
EXP. H-Btu/Hr/ft2/F	1668.6	1733.1	1912.5	1907.7	1701	1799.3	2100.5	1920	1001.4	803.3
COMPUTED H										
Jallouk	1513.6	1433.3	1368.7	1324.3	1267.9	1239.1	1205.9	1173.2	677.9	637.7
Szady1(Cudo tube)	2168.3	2178.2	2190.2	2203.6	2187.6	2193	2201.6	2202.3	1010.4	787.9
Szady2	2077.1	2090.4	2102.9	2117.3	2094.2	2098.1	2106.2	2104.1	818.2	778.9
(RLIQ)	122608	120839	116291	111882	106685	101871	97330	91895	89060	88224
(F)	1.207	1.595	1.972	2.255	2.5	2.711	2.897	3.085	3.183	3.208
(HLIQ)	292.4	387.1	476.9	548.3	607.4	658.7	704.5	749.3	773.3	778.8
(HBOIL)	2184.5	2174.1	2182.5	2192.3	2171.9	2173	2177.3	2173	828.6	255.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.2									
DP Liquid Density-lbm/ft3	83.59									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.205	0.755	1.228	2.008	2.76					
Zero Corrections-psid	-0.029	-0.02	-0.047	0.041	0.037					
Corrected DP-Psid	0.234	0.775	1.275	1.967	2.723					
Actual DP-ft	1.88	3.21	4.62	5.69	6.5					
Measured TP-Psig	127				126.8					
Measured Overall-ft	0.35									
Computed DP-ft	1.95	3.61	5.28	7.02	8.74					
Friction-ft	0.18	0.57	1.13	1.85	2.34					
Acceleration-ft	0.21	0.37	0.52	0.68	0.71					
Elevation-ft	1.56	2.68	3.63	4.49	5.69					

>8518

3221 4
2714
2722

Run#	821									
Test Fluid	C4F8									
Date:	9/22/93									
Time:	7:45									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	125									
Sat. Temperature-F(inlet)	150.1									
Liq. Density-lbm/ft3	82.24	81.99	82.01	81.95	81.97	81.97	81.97	82.05	82.06	82.06
Latent Heat-Btu/lbm	35.7	35.5	35.52	35.47	35.49	35.49	35.49	35.55	35.55	35.55
Specific Heat-Btu/lbm/F	0.29	0.291	0.291	0.291	0.291	0.291	0.291	0.291	0.291	0.291
Liq. Viscosity-lbm/ft-hr	0.455	0.45	0.45	0.449	0.449	0.449	0.449	0.451	0.451	0.451
Liq. Conductivity-Btu/hr-ft-F	0.0296	0.0295	0.0295	0.0294	0.0295	0.0295	0.0295	0.0295	0.0295	0.0295
Liq. Prandtl No.	4.46	4.44	4.44	4.44	4.44	4.44	4.44	4.44	4.44	4.44
Inlet Flow Rate-GPM	3.5									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	1.8									
Inlet Temperature-F	147									
Outlet Liq. Temperature-F	148.8									
Outlet Vap. Temperature-F	148.1									
Water Flow Rate-GPM										
Water inlet Temp.-F	85.4									
Water outlet Temp.-F	132.5									
Inlet G-lbm/hr/ft2	693337		Temp	143.9	Density	83.01				
Subcooling-F	3.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1149.7	1147.3	1153.9	1146.2	1146.2	1147.6	1154.2	419.6	97.5	47.9
Heat Loss-Watts	9.1	2.1	2.9	2.9	3	2.2	1.3	1.7	1.9	10.6
Heat Flux-Btu/Hr/ft2	19929	19888	20002	19869	19869	19893	20007	7273	1690	830
Wall Temp. #3-F	159.1	163.9	160.9	160.8	162.9	161.1	159.5	155.2	151.2	150.2
Wall Temp. #4-F	161.1	159.6	163	161.6	163.4	160.7	159.5	155.6	151.6	150.3
Wall Temp. #5-F	160.4	158.2	163	162	162	161.6	158	154.8	151.6	151.1
Wall Temp. #1-F	147	160.4	158.4	159.3	160.6	162.8	159.6	153.6	150.9	150.1
Wall Temp. #2-F	161.3	160.4	160.4	160.3	161.4	164.2	159.4	154	151	150.1
Instream Temp.-F	148	149.3	149.2	149.5	149.4	149.4	149.4	149	149	149
Avg. Wall Temp.-F	160.5	161.1	160.7	160.9	161.9	161.6	159.2	154.6	151.3	150.4
Avg. Wall DT.-F	11.6	10.9	10.6	10.5	11.6	11.3	8.9	5.3	2.2	1.3
Remaining Subcool-F	-2.7									
Exit Quality	0.02	0.07	0.12	0.16	0.21	0.26	0.31	0.32	0.33	0.33
EXP. H-Btu/Hr/ft2/F	1721.9	1828.5	1892.2	1887.4	1712.5	1768.1	2249.1	1369.4	774	627.8
COMPUTED H										
Jallouk	1509.7	1442.3	1384.3	1335.1	1288.2	1262.7	1242	772.2	582.7	568.6
Szady1(Cudo tube)	2142.2	2158.7	2165.1	2163.6	2164.1	2167.4	2175.7	1328.1	782.6	713.1
Szady2	2047.3	2066.6	2072.6	2068.5	2067	2068.8	2076.8	1066.2	694.6	696.4
(RLIQ)	96570	95261	91402	86858	82003	77222	72425	68894	67821	67519
(F)	1.344	1.778	2.17	2.474	2.735	2.968	3.18	3.324	3.368	3.38
(HLIQ)	276	366.1	446.7	509.4	563.2	611	654.8	683.9	692.9	695.4
(HBOIL)	2140.7	2155.1	2158.8	2154.2	2151.3	2151.1	2155.7	1264.7	527.3	297.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.6									
DP Liquid Density-lbm/ft3	93.67									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.262	0.968	1.554	2.437	3.25					
Zero Corrections-psid	-0.029	-0.02	-0.047	0.041	0.037					
Corrected DP-Psid	0.291	0.988	1.601	2.396	3.213					
Actual DP-ft	1.77	2.83	4.04	4.93	5.64					
Measured TP-Psig	125				124.6					
Measured Overall-ft	0.7									
Computed DP-ft	1.73	3.17	4.61	6.21	7.78					
Friction-ft	0.16	0.49	0.97	1.45	1.83					
Acceleration-ft	0.17	0.3	0.43	0.52	0.53					
Elevation-ft	1.4	2.39	3.22	4.23	5.42					

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Run#	822									
Test Fluid	C4F8									
Date:	9/22/93									
Time:	7:45									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	126.9									
Sat. Temperature-F(inlet)	151.1									
Liq. Density-lbm/ft3	82.24	81.74	81.76	81.74	81.76	81.76	81.72	81.78	81.78	81.86
Latent Heat-Btu/lbm	35.7	35.31	35.81	35.31	35.31	35.81	35.28	35.33	35.83	35.89
Specific Heat-Btu/lbm/F	0.29	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.291
Liq. Viscosity-lbm/ft-hr	0.455	0.444	0.445	0.444	0.445	0.445	0.444	0.445	0.445	0.447
Liq. Conductivity-Btu/hr-ft-F	0.0296	0.0293	0.0293	0.0293	0.0293	0.0293	0.0293	0.0293	0.0293	0.0294
Liq. Prandtl No.	4.46	4.43	4.43	4.43	4.43	4.43	4.42	4.43	4.43	4.43
Inlet Flow Rate-GPM	2.6									
Outlet Liq. Flow Rate-GPM	0.6									
Outlet Vap. Flow Rate-GPM	1.7									
Inlet Temperature-F	147.3									
Outlet Liq. Temperature-F	150.4									
Outlet Vap. Temperature-F	147.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	87.6									
Water outlet Temp.-F	137.1									
Inlet G-lbm/hr/ft2	515050		Temp	143.8	Density	83.01				
Subcooling-F	3.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1159	1158.1	1154.1	1154.1	1164.8	1170.2	1147.9	418.2	96.3	45
Heat Loss-Watts	9.8	2.3	3.2	3.2	3.2	2.4	1.4	1.8	2.2	12
Heat Flux-Btu/Hr/ft2	20091	20075	20006	20006	20191	20285	19898	7249	1669	780
Wall Temp. #3-F	159.7	164.4	161	161.2	163.2	162.4	160.3	155.5	152.4	151.3
Wall Temp. #4-F	161.7	160.1	163.3	162.2	163.9	162	160	155.6	152.9	151.3
Wall Temp. #5-F	161.3	158.9	163.9	162.3	162.4	162.6	159.3	155.1	152.9	152.4
Wall Temp. #1-F	147.3	160.9	158.8	160	161.4	163.5	161.1	154.6	152	151.3
Wall Temp. #2-F	161.6	160.9	160.8	160.8	161.9	164.9	160.8	154.9	152.3	151.5
Instream Temp.-F	148	150.6	150.5	150.6	150.5	150.5	150.7	150.4	150.4	150
Avg. Wall Temp.-F	161.1	161.6	161	161.4	162.4	162.6	160.3	155.1	152.5	151.6
Avg. Wall DT.-F	12.2	10.1	9.6	9.9	11	11.2	8.7	4.4	2	1.5
Remaining Subcool-F	-4.1									
Exit Quality	0.03	0.1	0.16	0.23	0.29	0.36	0.42	0.44	0.45	0.45
EXP. H-Btu/Hr/ft2/F	1651.2	1994	2090.2	2016.5	1837.6	1809.8	2286.9	1642.9	824.5	511.6
COMPUTED H										
Jallouk	1582	1497.2	1450.2	1407.5	1378.6	1351.6	1308.5	778.9	521.5	497.3
Szady1(Cudo tube)	2150.6	2186.8	2181.7	2184.2	2194.3	2200.7	2183.9	1326.6	737.3	644.6
Szady2	2058.1	2058.8	2094.7	2096.4	2107.4	2118.9	2090.7	1051.8	621.1	620.5
(PLIQ)	72807	70867	65888	61110	56148	51208	46389	42958	41865	41415
(F)	1.438	1.947	2.396	2.751	3.058	3.332	3.577	3.743	3.794	3.818
(HLIQ)	232.8	316.8	390	447.6	497.4	542	582.1	608.8	617.1	620.4
(HBOIL)	2149.7	2183.5	2177.5	2177.9	2185.7	2189.7	2170	1282.4	549.4	307.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.8									
DP Liquid Density-lbm/ft3	93.51									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.29	1.163	1.881	2.873	3.76					
Zero Corrections-psid	-0.029	-0.02	-0.047	0.041	0.037					
Corrected DP-Psid	0.319	1.183	1.928	2.832	3.723					
Actual DP-ft	1.72	2.49	3.48	4.16	4.78					
Measured TP-Psig	126.9				126.6					
Measured Overall-ft	0.53									
Computed DP-ft	1.51	2.71	3.87	5.09	6.5					
Friction-ft	0.11	0.35	0.71	1.13	1.39					
Acceleration-ft	0.11	0.21	0.32	0.4	0.41					
Elevation-ft	1.29	2.15	2.84	3.56	4.71					

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Run#	823									
Test Fluid	C4F8									
Date:	9/22/93									
Time:	7:45									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	124.9									
Sat. Temperature-F(inlet)	150									
Liq. Density-lbm/ft3	82.35	81.92	81.95	81.92	81.94	81.92	81.9	81.97	81.97	81.94
Latent Heat-Btu/lbm	35.8	35.44	35.47	35.44	35.45	35.44	35.42	35.49	35.49	35.45
Specific Heat-Btu/lbm/F	0.29	0.291	0.291	0.291	0.291	0.291	0.291	0.291	0.291	0.291
Liq. Viscosity-lbm/ft-hr	0.458	0.448	0.449	0.448	0.448	0.448	0.448	0.449	0.449	0.448
Liq. Conductivity-Btu/hr-ft-F	0.0297	0.0294	0.0294	0.0294	0.0294	0.0294	0.0294	0.0295	0.0295	0.0294
Liq. Prandtl No.	4.46	4.44	4.44	4.44	4.44	4.44	4.43	4.44	4.44	4.44
Inlet Flow Rate-GPM	1.8									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	146.1									
Outlet Liq. Temperature-F	149.8									
Outlet Vap. Temperature-F	146.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	88.5									
Water outlet Temp.-F	136.3									
Inlet G-lbm/hr/ft2	358783		Temp	141.1	Density	83.52				
Subcooling-F	3.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1157	1157	1160.6	1153.7	1164.4	1163.4	828.2	98	76.4	6
Heat Loss-Watts	10.2	2.4	3.2	3.2	3.3	2.5	1.8	1.8	2.3	12.4
Heat Flux-Btu/Hr/ft2	20056	20056	20118	19998	20184	20167	14356	1699	1324	104
Wall Temp. #3-F	158.1	162.9	159.3	159.8	162.1	162.4	177.2	151.8	151.3	149.5
Wall Temp. #4-F	160.3	158.5	161.7	160.7	162.5	161.7	176.8	151.9	151.8	149.5
Wall Temp. #5-F	159.9	157.3	162.5	161.1	160.9	162.1	164.5	151.9	151.8	150.6
Wall Temp. #1-F	148.1	159.2	157.1	158.6	159.9	162.5	159.2	152	151	149.8
Wall Temp. #2-F	160.4	159.3	159.2	159.5	160.6	164.1	158.6	152.2	151.2	149.8
Instream Temp.-F	147.4	149.7	149.5	149.7	149.6	149.7	149.8	149.4	149.4	149.6
Avg. Wall Temp.-F	159.7	160	159.3	160.1	161	162.2	167.3	152	151.4	149.9
Avg. Wall DT.-F	11.4	9.4	8.9	9.4	10.5	11.6	16.8	2.5	2	0.2
Remaining Subcool-F	-7.4									
Exit Quality	0.06	0.15	0.24	0.34	0.43	0.52	0.59	0.6	0.6	0.6
EXP. H-Btu/Hr/ft2/F	1764.1	2140.7	2256.5	2117.1	1929.1	1744	854	684.1	675.6	442
COMPUTED H										
Jallouk	1597.3	1547.1	1498.9	1455.9	1432.4	1406.9	1127.4	461.8	440.6	400.2
Szady1(Cudo tube)	2140.3	2172.1	2173.5	2170.5	2180.1	2181.5	1845.2	692.6	643.8	528.1
Szady2	2045.6	2041.1	2085.5	2080.7	2091.7	2092.2	1671.9	537.6	530.2	527.6
(RLIQ)	49764	46863	41962	37198	32320	27480	23335	21918	20954	20620
(F)	1.617	2.252	2.784	3.206	3.577	3.911	4.178	4.311	4.334	4.339
(HLIQ)	195.8	273.9	338.5	389.9	435	475.7	508.3	524.1	526.9	527.6
(HBOIL)	2139.8	2170.7	2170.8	2168.3	2174.3	2174	1832.2	573.2	494.1	73.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.9									
DP Liquid Density-lbm/ft3	93.49									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.313	1.43	2.292	3.405	4.355					
Zero Corrections-psid	-0.029	-0.02	-0.047	0.041	0.037					
Corrected DP-Psid	0.342	1.45	2.339	3.364	4.318					
Actual DP-ft	1.68	2.02	2.74	3.22	3.68					
Measured TP-Psig	124.9				124.8					
Measured Overall-ft	0.18									
Computed DP-ft	1.28	2.23	3.11	4.22	5.49					
Friction-ft	0.06	0.25	0.5	0.73	0.9					
Acceleration-ft	0.07	0.15	0.24	0.28	0.29					
Elevation-ft	1.13	1.83	2.37	3.2	4.3					

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Run#	824									
Test Fluid	C4F8									
Date:	9/22/93									
Time:	13:38									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	124									
Sat. Temperature-F(inlet)	149.6									
Liq. Density-lbm/ft3	81.99	81.94	82.01	81.86	81.88	81.92	81.86	81.94	81.94	81.97
Latent Heat-Btu/lbm	35.5	35.45	35.52	35.39	35.41	35.44	35.39	35.45	35.45	35.49
Specific Heat-Btu/lbm/F	0.291	0.291	0.291	0.291	0.291	0.291	0.291	0.291	0.291	0.291
Liq. Viscosity-lbm/ft-hr	0.45	0.448	0.45	0.447	0.447	0.448	0.447	0.448	0.448	0.449
Liq. Conductivity-Btu/hr-ft-F	0.0295	0.0294	0.0295	0.0294	0.0294	0.0294	0.0294	0.0294	0.0294	0.0295
Liq. Prandtl No.	4.44	4.44	4.44	4.43	4.43	4.44	4.43	4.44	4.44	4.44
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	144.9									
Outlet Liq. Temperature-F	149.8									
Outlet Vap. Temperature-F	147.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	92.2									
Water outlet Temp.-F	136.8									
Inlet G-lbm/hr/ft2	200189		Temp	139.1	Density	83.89				
Subcooling-F	4.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1129.1	1143.2	1142	1146.1	1126.7	161.8	83.4	39.8	45.9	0
Heat Loss-Watts	10.3	2.4	3.2	3.3	3.4	2	1.3	1.9	2.5	13
Heat Flux-Btu/Hr/ft2	19572	19817	19796	19867	19531	2805	1446	690	796	0
Wall Temp. #3-F	156.8	161.9	157.4	159.2	161.2	154	153.9	151.8	151.2	148.9
Wall Temp. #4-F	159.1	157.4	160.1	160.4	161.3	154.4	154.1	151.8	151.4	148.9
Wall Temp. #5-F	158.3	155.8	160.6	159.7	159.6	152.6	154	152	151.7	150.1
Wall Temp. #1-F	144.9	157.5	156.1	157.4	159.1	153.2	154	152.1	151	149.7
Wall Temp. #2-F	159.4	157.9	157.4	158.7	159.6	153.1	154.1	152.5	151.2	149.4
Instream Temp.-F	149.3	149.6	149.2	150	149.9	149.7	150	149.6	149.6	149.4
Avg. Wall Temp.-F	158.4	158.7	157.8	159.2	159.9	153.6	154	152	151.3	149.4
Avg. Wall DT.-F	8.2	8.2	7.7	8.3	9.1	3.7	4	2.4	1.7	0
Remaining Subcool-F	(15)									
Exit Quality	0.12	0.29	0.45	0.61	0.78	0.8	0.81	0.82	0.82	0.82
EXP. H-Btu/Hr/ft2/F	2382.4	2422.7	2585.9	2400.2	2142.1	753.3	365.6	286.4	478.1	0
COMPUTED H										
Jallouk	1672.3	1596.5	1583.8	1533.8	46.1	46.1	46.2	46.1	46.1	46.1
Szady1(Cudo tube)	2139.5	2157.3	2151.1	2166.2	46.1	46.1	46.2	46.1	46.1	46.1
Szady2	2000.8	2022.6	2015.4	2033.1	46.1	46.1	46.2	46.1	46.1	46.1
(RLIQ)	27329	23220	18361	13722	13722	13722	13722	13722	13722	13722
(F)	1.825	2.619	3.531	4.096	4.096	4.096	4.096	4.096	4.096	4.096
(HLIQ)	146.7	216	269.1	312.6	312.6	312.6	312.6	312.6	312.6	312.6
(HBOIL)	2139.3	2156.6	2149.7	2164.1	2164.1	2164.1	2164.1	2164.1	2164.1	2164.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	82.2									
DP Liquid Density-lbm/ft3	92.89									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.645	1.757	2.775	3.949	4.98					
Zero Corrections-psid	-0.029	-0.02	-0.047	0.041	0.037					
Corrected DP-Psid	0.674	1.777	2.822	3.908	4.343					
Actual DP-ft	1.08	1.41	1.84	2.2	2.51					
Measured TP-Psig	124				124.8					
Measured Overall-ft	-1.41									
Computed DP-ft	1	1.63	2.3	3.49	4.6					
Friction-ft	0.04	0.13	0.24	0.31	0.38					
Acceleration-ft	0.04	0.09	0.13	0.14	0.14					
Elevation-ft	0.92	1.41	1.92	3.04	4.09					

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Runs	o25									
Test Fluid	C4F8									
Date:	9/22/93									
Time:	13:38									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	127.5									
Sat. Temperature-F(inlet)	151.4									
Liq. Density-lbm/ft3	81.99	81.84	81.76	81.7	81.78	81.76	81.63	81.74	81.76	81.88
Latent Heat-Btu/lbm	35.5	35.38	35.31	35.27	35.33	35.31	35.2	35.3	35.81	35.41
Specific Heat-Btu/lbm/F	0.291	0.292	0.292	0.292	0.282	0.292	0.292	0.292	0.292	0.291
Liq. Viscosity-lbm/ft-hr	0.45	0.446	0.445	0.444	0.446	0.445	0.442	0.444	0.445	0.447
Liq. Conductivity-Btu/hr-ft-F	0.0295	0.0294	0.0293	0.0293	0.0293	0.0293	0.0292	0.0293	0.0293	0.0294
Liq. Prandtl No.	4.44	4.43	4.43	4.42	4.43	4.43	4.42	4.43	4.43	4.43
Inlet Flow Rate-GPM	5.1									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2.6									
Inlet Temperature-F	148.3									
Outlet Liq. Temperature-F	149.9									
Outlet Vap. Temperature-F	147.8									
Water Flow Rate-GPM										
Water inlet Temp.-F	90.6									
Water outlet Temp.-F	133.8									
Inlet G-lbm/hr/ft2	1006439		Temp	145.6	Density	82.69				
Subcooling-F	3.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1447.6	1445.1	1442	1447.6	1077.5	420.1	210.2	191.8	117.5	87.5
Heat Loss-Watts	10.8	2.5	3.4	3.4	3.2	2.1	1.3	2.1	2.5	13.9
Heat Flux-Btu/Hr/ft2	25093	25050	24996	25093	18678	7282	3644	3325	2037	1517
Wall Temp. #3-F	159.2	165.9	159.6	161.3	160.1	155.8	155.1	156.1	152.9	151.8
Wall Temp. #4-F	162.2	159.6	162.9	162.4	160.5	156	155.2	156.2	153.5	152
Wall Temp. #5-F	160.8	157.8	162.8	161.7	158.8	155.6	154.1	156.2	153.5	152.6
Wall Temp. #1-F	148.3	160.1	158.4	159	159	156.1	154.2	155.7	152.9	151.5
Wall Temp. #2-F	162.3	160.8	160.3	160.2	160.3	156.1	154.1	156.2	152.9	151.7
Instream Temp.-F	149.3	150.1	150.5	150.8	150.4	150.5	151.2	150.6	150.5	149.9
Avg. Wall Temp.-F	161.1	161.6	160.3	161.1	159.7	155.9	154.5	156.1	153.1	151.9
Avg. Wall DT.-F	10.7	10.3	8.7	9.2	8.4	5	3.2	5.3	2.5	2
Remaining Subcool-F	-1.9									
Exit Quality	0.02	0.06	0.1	0.14	0.17	0.18	0.19	0.19	0.2	0.2
EXP. H-Btu/Hr/ft2/F	2347.1	2421.9	2882.9	2737.6	2222	1443.2	1147.5	623.8	799.4	777.2
COMPUTED H										
Jallouk	1648.7	1548.7	1487.2	1397.5	1148.5	780.4	677.2	674.6	654.8	651.4
Szady1(Cudo tube)	2426.7	2438.4	2444.2	2456	2119.1	1349.7	1030.1	982.6	865.3	819.2
Szady2	2404.9	2418.4	2423.4	2435.9	2001	1104.4	808	793.9	769.8	773.3
(RLIQ)	145248	142116	136548	130787	124983	121927	121368	119851	119087	118007
(F)	1.281	1.679	2.045	2.328	2.546	2.661	2.699	2.736	2.76	2.783
(HLIQ)	355.2	466.5	568.5	647.5	707.7	739.8	751.3	760.8	767.3	772.8
(HBOIL)	2424.2	2432.7	2433.9	2440.9	2092.5	1271.1	874.6	798.1	581.1	445.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	82.5									
DP Liquid Density-lbm/ft3	92.85									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.09	0.557	1.086	1.824	2.415					
Zero Corrections-psid	-0.029	-0.02	-0.047	0.041	0.037					
Corrected DP-Psid	0.119	0.577	1.133	1.783	2.378					
Actual DP-ft	2.06	3.52	4.81	5.94	7.02					
Measured TP-Psig	127.5				128.2					
Measured Overall-ft	-1.23									
Computed DP-ft	2.09	3.94	5.84	7.77	9.57					
Friction-ft	0.28	0.85	1.47	2.01	2.54					
Acceleration-ft	0.32	0.55	0.67	0.7	0.71					
Elevation-ft	1.49	2.54	3.7	5.06	6.32					

Run#	826									
Test Fluid	C4F8									
Date:	9/22/93									
Time:	13:38									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	127.3									
Sat. Temperature-F(inlet)	151.3									
Liq. Density-lbm/ft3	81.92	81.81	81.76	81.71	81.74	81.76	81.67	81.74	81.74	81.82
Latent Heat-Btu/lbm	35.44	35.34	35.31	35.27	35.3	35.31	35.23	35.3	35.3	35.36
Specific Heat-Btu/lbm/F	0.291	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.292	0.292
Liq. Viscosity-lbm/ft-hr	0.448	0.446	0.445	0.444	0.444	0.445	0.443	0.444	0.444	0.446
Liq. Conductivity-Btu/hr-ft-F	0.0294	0.0293	0.0293	0.0293	0.0293	0.0293	0.0293	0.0293	0.0293	0.0294
Liq. Prandtl No.	4.44	4.43	4.43	4.42	4.43	4.43	4.42	4.43	4.43	4.43
Inlet Flow Rate-GPM	4.3									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	2.1									
Inlet Temperature-F	148.5									
Outlet Liq. Temperature-F	150									
Outlet Vap. Temperature-F	147.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	90.9									
Water outlet Temp.-F	133.9									
Inlet G-lbm/hr/ft2	848758		Temp		145.5	Density	82.71			
Subcooling-F	2.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1637.7	1433.8	1443.5	1436.4	751.4	415.6	199	188.4	110.4	81.7
Heat Loss-Watts	10.9	2.6	3.4	3.5	3.1	2.1	1.3	2.2	2.6	14.2
Heat Flux-Btu/Hr/ft2	28388	24854	25022	24889	13025	7204	3450	3268	1914	1416
Wall Temp. #3-F	159.3	165.9	159.8	161.3	158.2	156.1	154.9	158.3	153.1	152.1
Wall Temp. #4-F	162.3	159.7	163.3	162.4	158.5	156.3	155.3	158.4	153.3	152.6
Wall Temp. #5-F	161	157.8	163.3	161.8	157.3	155.8	153.9	158.4	153.3	153.2
Wall Temp. #1-F	148.5	160.2	158.7	159.1	157.5	156.1	154	155.9	152.8	152.1
Wall Temp. #2-F	162.4	160.8	160.3	160.5	158.4	156.1	154	156.3	153.1	152.3
Instream Temp.-F	149.7	150.3	150.5	150.8	150.6	150.5	151	150.6	150.6	150.2
Avg. Wall Temp.-F	161.3	161.7	160.5	161.2	157.9	156.1	154.4	156.3	153.1	152.5
Avg. Wall DT.-F	10.3	10.2	8.9	9.2	6.7	5.2	3.3	5.5	2.4	2.2
Remaining SubcoolF	-3.9									
Exit Quality	0.03	0.08	0.13	0.18	0.2	0.22	0.22	0.23	0.23	0.24
EXP. H-Btu/Hr/ft2/F	2765	2430.3	2813.3	2699.2	1933.5	1372.4	1056.8	592.4	786.4	644.9
COMPUTED H										
Jallouk	1796.9	1562.1	1502.2	1433	998.4	774.1	644.9	643	610.2	604.4
Szady1(Cuido tube)	2589.1	2431.6	2444.8	2446.4	1779.4	1334.4	989.9	956.4	819.9	769.7
Szady2	2614	2410	2424.9	2428.4	1576.9	1078.8	761.8	758.4	716.2	718.4
(RLIQ)	121912	117545	111686	105886	101060	98497	97689	96464	95830	95077
(F)	1.426	1.875	2.243	2.537	2.737	2.836	2.879	2.916	2.939	2.961
(HLIQ)	345.4	454.6	544.2	615.8	664	688	699	707.4	713.2	717.9
(HBOIL)	2587.1	2426.2	2435.8	2432.3	1748	1270.4	856.5	803.1	573.2	441.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	82.5									
DP Liquid Density-lbm/ft3	92.85									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.199	0.788	1.385	2.174	2.848					
Zero Corrections-psid	-0.029	-0.02	-0.047	0.041	0.037					
Corrected DP-Psid	0.228	0.788	1.432	2.133	2.809					
Actual DP-ft	1.87	3.15	4.29	5.82	6.28					
Measured TP-Psig	127.3				128.2					
Measured Overall-ft	-1.58									
Computed DP-ft	1.88	3.52	5.27	7.07	8.74					
Friction-ft	0.25	0.75	1.25	1.69	2.12					
Acceleration-ft	0.28	0.47	0.54	0.57	0.58					
Elevation-ft	1.33	2.3	3.48	4.8	6.04					

19937
2226
2323
14937

Run#	827									
Test Fluid	C4F8									
Date:	9/22/93									
Time:	13:38									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	125.5									
Sat. Temperature-F(inlet)	150.4									
Liq. Density-lbm/ft3	82.09	81.92	81.95	81.92	81.95	81.92	81.82	81.9	81.9	81.97
Latent Heat-Btu/lbm	35.58	35.44	35.47	35.44	35.47	35.44	35.36	35.42	35.42	35.49
Specific Heat-Btu/lbm/F	0.291	0.291	0.291	0.291	0.291	0.291	0.292	0.291	0.291	0.291
Liq. Viscosity-lbm/ft-hr	0.452	0.448	0.449	0.448	0.449	0.448	0.446	0.448	0.448	0.449
Liq. Conductivity-Btu/hr-ft-F	0.0295	0.0294	0.0294	0.0294	0.0294	0.0294	0.0294	0.0294	0.0294	0.0295
Liq. Prandtl No.	4.45	4.44	4.44	4.44	4.44	4.44	4.43	4.43	4.43	4.44
Inlet Flow Rate-GPM	3.5									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	147.5									
Outlet Liq. Temperature-F	149.3									
Outlet Vap. Temperature-F	147									
Water Flow Rate-GPM										
Water Inlet Temp.-F	90.8									
Water outlet Temp.-F	132.8									
Inlet G-lbm/hr/ft2	691785		Temp	144.9	Density	82.82				
Subcooling-F	2.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1431.4	1432.1	1431.8	1426.9	636.6	414.3	200.1	173.6	110.9	83.5
Heat Loss-Watts	9.6	2.2	3	3	2.6	1.8	1.1	1.8	2.2	12.2
Heat Flux-Btu/Hr/ft2	24812	24825	24819	24734	11035	7182	3469	3009	1922	1447
Wall Temp. #3-F	158.5	165.2	159.1	160.6	158.9	155.4	154.5	155.5	152.4	151.9
Wall Temp. #4-F	161.5	159.1	162.4	161.6	157.1	155.4	154.6	155.7	152.8	152
Wall Temp. #5-F	160	157.2	162.2	161.1	158.1	155.1	153.8	155.5	152.8	152.6
Wall Temp. #1-F	147.5	159.6	157.6	158.6	156	155.7	153.8	155.1	152.4	151.6
Wall Temp. #2-F	161.5	160	159.5	159.6	156.9	155.6	153.8	155.5	152.4	151.8
Instream Temp.-F	148.8	149.7	149.5	149.7	149.5	149.7	150.2	149.8	149.8	149.4
Avg. Wall Temp.-F	160.4	161	159.7	160.5	156.5	155.4	153.8	155.5	152.6	152
Avg. Wall DT.-F	10.5	10.2	9	9.7	6.5	5.4	3.4	5.5	2.7	2.5
Remaining Subcool-F	-4.4									
Exit Quality	0.04	0.09	0.15	0.21	0.24	0.26	0.27	0.27	0.28	0.28
EXP. H-Btu/Hr/ft2/F	2373.6	2445	2749	2561.2	1690.9	1336	1013.3	544.8	719.2	575.6
COMPUTED H										
Jallouk	1699.9	1610.4	1533.1	1483.6	939.5	773.8	613.1	598.1	561.8	551.9
Szady1(Cudo tube)	2404.9	2420.2	2418.5	2419	1629	1316.9	964.8	917.2	779.8	732.4
Szady2	2377.4	2396.1	2392.2	2391.1	1396.8	1045.1	732.3	694.5	651.5	651.4
(RLIQ)	98384	94404	88283	82445	77968	75882	74988	73932	73385	72662
(F)	1.454	1.954	2.377	2.711	2.826	3.023	3.072	3.118	3.138	3.163
(HLIQ)	298.5	401.8	488.8	557.5	601.4	621.8	632.4	640.3	645.6	650.1
(HBOIL)	2403.4	2416.5	2411.8	2409.1	1601.2	1269	864.1	798.5	588.9	490.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.1									
DP Liquid Density-lbm/ft3	92.77									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.259	0.969	1.686	2.554	3.303					
Zero Corrections-psid	-0.029	-0.02	-0.047	0.041	0.037					
Corrected DP-Psid	0.288	1.009	1.733	2.513	3.266					
Actual DP-ft	1.76	2.75	3.75	4.64	5.44					
Measured TP-Psig	125.5				126.4					
Measured Overall-ft	-1.58									
Computed DP-ft	1.68	3.12	4.71	6.37	7.93					
Friction-ft	0.19	0.58	0.97	1.32	1.65					
Acceleration-ft	0.2	0.36	0.42	0.44	0.45					
Elevation-ft	1.29	2.18	3.32	4.62	5.83					

1990.1
2186
196
1990.7

Run#	828									
Test Fluid	C4F8									
Date:	9/22/93									
Time:	13:38									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	125									
Sat. Temperature-F(inlet)	150.1									
Liq. Density-lbm/ft3	82.24	81.92	81.96	81.94	81.95	81.95	81.84	81.9	81.92	82.03
Latent Heat-Btu/lbm	35.7	35.44	35.47	35.45	35.47	35.47	35.38	35.42	35.44	35.53
Specific Heat-Btu/lbm/F	0.29	0.291	0.291	0.291	0.291	0.291	0.292	0.291	0.291	0.291
Liq. Viscosity-lbm/ft-hr	0.455	0.448	0.449	0.448	0.449	0.449	0.446	0.448	0.448	0.45
Liq. Conductivity-Btu/hr-ft-F	0.0296	0.0294	0.0294	0.0294	0.0294	0.0294	0.0294	0.0294	0.0294	0.0295
Liq. Prandtl No.	4.46	4.44	4.44	4.44	4.44	4.44	4.43	4.43	4.44	4.44
Inlet Flow Rate-GPM	2.7									
Outlet Liq. Flow Rate-GPM	0.6									
Outlet Vap. Flow Rate-GPM	1.7									
Inlet Temperature-F	146.8									
Outlet Liq. Temperature-F	149.4									
Outlet Vap. Temperature-F	147									
Water Flow Rate-GPM										
Water Inlet Temp.-F	90.8									
Water outlet Temp.-F	132.6									
Inlet G-lbm/hr/ft2	534860		Temp	143.9	Density	83.01				
Subcooling-F	3.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1448.1	1448.2	1447.1	1449.9	627.9	417.5	202.6	176.3	112.1	84.6
Heat Loss-Watts	9.6	2.2	3	3	2.6	1.8	1.1	1.9	2.2	12.3
Heat Flux-Btu/Hr/ft2	25067	25104	25085	25133	10884	7237	3512	3056	1943	1466
Wall Temp. #3-F	158.3	165.1	159	160.3	156.4	155.3	154.5	155.9	152.5	152
Wall Temp. #4-F	161.4	158.7	162.3	161.4	156.7	155.4	154.6	156.2	152.9	152
Wall Temp. #5-F	159.9	156.9	162.3	160.8	155.6	154.8	153.1	155.9	152.9	152.8
Wall Temp. #1-F	148.8	159.8	157.5	158.1	155.7	155.8	153.2	155.7	152.5	151.7
Wall Temp. #2-F	161.3	159.8	159.4	159.4	156.5	155.8	153.1	156.9	152.6	151.8
Instream Temp.-F	148	149.7	149.5	149.6	149.5	149.5	150.1	149.8	149.7	149.1
Avg. Wall Temp.-F	160.2	160.7	159.6	160.2	156.1	155.2	153.7	156	152.7	152.1
Avg. Wall DT.-F	11.1	9.9	8.9	9.4	6.1	5.4	3.4	6.1	2.9	2.9
Remaining Subcool-F	-6.2									
Exit Quality	0.05	0.13	0.2	0.28	0.32	0.34	0.35	0.36	0.36	0.37
EXP. H-Btu/Hr/ft2/F	2259.9	2538.2	2813.3	2669.7	1774.7	1347	1020.5	504.1	671.9	506.8
COMPUTED H										
Jallouk	1752.2	1672.8	1597.3	1548.4	948.2	776.3	593.5	569.4	522.2	504.1
Szady1(Cudo tube)	2404.9	2438.3	2430.5	2436.7	1613.6	1313.4	952	901.8	751.7	695.8
Szady2	2377.2	2418.5	2408.6	2418.9	1385	1066	701.2	682.2	598.5	592.6
(RLIQ)	74958	71166	65011	59016	54628	52444	51431	50497	49846	49165
(F)	1.556	2.136	2.619	3.004	3.249	3.364	3.418	3.464	3.496	3.529
(HLIQ)	259.6	357.4	438.2	502.7	543.7	562.9	572.7	580	585.2	590
(HBOIL)	2403.9	2430.7	2425.8	2428.5	1592.7	1278	877.2	813.4	607.6	508.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.1									
DP Liquid Density-lbm/ft3	92.77									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.302	1.229	2.024	2.998	3.826					
Zero Corrections-psid	-0.029	-0.02	-0.047	0.041	0.037					
Corrected DP-Psid	0.331	1.249	2.071	2.945	3.789					
Actual DP-ft	1.68	2.39	3.16	3.68	4.52					
Measured TP-Psig	125				126					
Measured Overall-ft	-1.76									
Computed DP-ft	1.47	2.68	3.94	5.47	6.9					
Friction-ft	0.14	0.45	0.81	1.07	1.32					
Acceleration-ft	0.15	0.27	0.33	0.35	0.36					
Elevation-ft	1.18	1.96	2.8	4.06	5.23					

20113
21838
- 1720
20118

Run#	329									
Test Fluid	C4F8									
Date:	9/22/93									
Time:	15:26									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	125.1									
Sat. Temperature-F(inlet)	150.1									
Liq. Density-lbm/ft3	82.16	81.9	81.94	81.9	81.92	81.92	81.74	81.8	81.8	81.94
Latent Heat-Btu/lbm	35.64	35.42	35.45	35.42	35.44	35.44	35.3	35.34	35.84	35.45
Specific Heat-Btu/lbm/F	0.29	0.291	0.291	0.291	0.291	0.291	0.282	0.292	0.282	0.291
Liq. Viscosity-lbm/ft-hr	0.453	0.448	0.448	0.448	0.448	0.448	0.444	0.446	0.446	0.449
Liq. Conductivity-Btu/hr-ft-F	0.0296	0.0294	0.0294	0.0294	0.0294	0.0294	0.0293	0.0293	0.0293	0.0294
Liq. Prandtl No.	4.45	4.43	4.44	4.43	4.44	4.44	4.43	4.43	4.43	4.44
Inlet Flow Rate-GPM	1.8									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	1									
Inlet Temperature-F	147									
Outlet Liq. Temperature-F	150									
Outlet Vap. Temperature-F	147.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	91.4									
Water outlet Temp.-F	132.7									
Inlet G-lbm/hr/ft2	357919		Temp	142.2	Density	83.32				
Subcooling-F	3.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1444.6	1447.3	1445.4	1435.2	620.1	417.1	203	176.7	111.7	84
Heat Loss-Watts	9.5	2.2	3	3	2.6	1.8	1.1	1.9	2.3	12.6
Heat Flux-Btu/Hr/ft2	25041	25088	25055	24878	10749	7230	3519	3063	1936	1456
Wall Temp. #3-F	158.1	165.1	159	160.6	156.9	155.6	155	155.9	153.2	152.6
Wall Temp. #4-F	161.4	158.6	162.4	161.6	157.1	155.7	155.4	158.4	153.4	152.9
Wall Temp. #5-F	160.1	157.1	162.4	161.1	156.1	155.2	153.9	155.9	153.4	153.4
Wall Temp. #1-F	147	159.4	157.6	158.4	156.3	155.8	153.8	156.3	153.8	152.4
Wall Temp. #2-F	161.2	159.7	159.4	159.5	156.9	155.4	153.9	156.5	153.4	152.6
Instream Temp.-F	148.4	149.8	149.6	149.8	149.7	149.7	150.6	150.3	150.3	149.6
Avg. Wall Temp.-F	160.2	160.7	159.6	160.4	156.6	155.6	154.4	156.2	153.3	152.8
Avg. Wall DT.-F	10.7	9.8	8.9	9.5	6.4	5.5	3.6	5.8	3	3.1
Remaining Subcool-F	-11									
Exit Quality	0.09	0.2	0.32	0.44	0.49	0.52	0.53	0.55	0.56	0.56
EXP. H-Btu/Hr/ft2/F	2347.2	2568.9	2825.4	2618.6	1675.8	1303.1	966.6	531.6	655.8	467.6
COMPUTED H										
Jallouk	1828.3	1740.8	1689.8	1618.1	977	785.4	568.3	540.8	469.8	444.3
Szady1(Cudo tube)	2409.5	2433.6	2429.6	2424.8	1601	1307.6	938	883.8	721.7	653.8
Szady2	2383.5	2414.4	2408.5	2401.6	1376.1	1067.2	687.7	629.3	539.1	518.5
(RLIQ)	49382	44614	38502	32589	28210	26039	24945	24077	23468	22909
(F)	1.774	2.509	3.089	3.556	3.858	4.002	4.063	4.122	4.16	4.205
(HLIQ)	214.9	304.6	375	431.7	468.3	485.8	494.1	500.9	505.6	510.3
(HBOIL)	2409	2432	2426.7	2420.2	1587.5	1284.8	889.9	826.6	627.2	527.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	82.9									
DP Liquid Density-lbm/ft3	92.79									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.377	1.528	2.434	3.503	4.439					
Zero Corrections-psid	-0.029	-0.02	-0.047	0.041	0.037					
Corrected DP-Psid	0.406	1.548	2.481	3.462	4.402					
Actual DP-ft	1.55	1.81	2.48	2.98	3.45					
Measured TP-Psig	125.1				126.2					
Measured Overall-ft	-1.93									
Computed DP-ft	1.21	2.12	3.06	4.43	5.7					
Friction-ft	0.09	0.3	0.55	0.71	0.87					
Acceleration-ft	0.09	0.19	0.24	0.25	0.26					
Elevation-ft	1.02	1.63	2.27	3.46	4.57					

2072
-481
-1081
2073

Run#	830									
Test Fluid	C4F8									
Date:	9/22/93									
Time:	15:26									
Note	Analytical ct is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	123.9									
Sat. Temperature-F(inlet)	149.5									
Liq. Density-lbm/ft3	81.97	82.01	82.05	81.95	81.99	81.95	81.86	81.92	81.92	81.12
Latent Heat-Btu/lbm	35.49	35.52	35.55	35.47	35.5	35.47	35.39	35.44	35.44	34.79
Specific Heat-Btu/lbm/F	0.291	0.291	0.291	0.291	0.291	0.291	0.291	0.291	0.291	0.294
Liq. Viscosity-lbm/ft-hr	0.449	0.45	0.451	0.449	0.45	0.449	0.447	0.448	0.448	0.432
Liq. Conductivity-Btu/hr-ft-F	0.0295	0.0295	0.0295	0.0294	0.0295	0.0294	0.0294	0.0294	0.0294	0.0289
Liq. Prandtl No.	4.44	4.44	4.44	4.44	4.44	4.44	4.43	4.44	4.44	4.39
Inlet Flow Rate-GPM	0.9									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.4									
Inlet Temperature-F	144.1									
Outlet Liq. Temperature-F	149.9									
Outlet Vap. Temperature-F	147.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	91.6									
Water outlet Temp.-F	132.9									
Inlet G-lbm/hr/ft2	179899		Temp		139.8	Density	83.76			
Subcooling-F	5.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1496.4	1498.8	1457.4	662.7	629.2	428.6	208	177.6	114.4	84
Heat Loss-Watts	9.3	2.2	2.9	2.6	3.7	2.8	1.4	2.3	2.5	13.5
Heat Flux-Btu/hr/ft2	24882	24932	25263	11487	10907	7343	3519	3079	1983	1456
Wall Temp. #3-F	157.5	164.5	158.6	183.5	174.1	168.1	159.5	159.8	155.8	153.5
Wall Temp. #4-F	160.8	158.2	162.2	183.9	174.4	168	159.5	159.9	156	153.5
Wall Temp. #5-F	159.2	156.5	162.2	165.4	169.4	167.8	157.8	159.8	155.1	154.5
Wall Temp. #1-F	144.1	158.8	157	156	170.1	169.2	158.3	159.9	154	153.6
Wall Temp. #2-F	160.6	159.2	158.9	157	170.2	168.6	158.2	160.1	154.1	153.6
Instream Temp.-F	149.4	149.2	149	149.5	149.3	149.5	150	149.7	149.7	153.8
Avg. Wall Temp.-F	159.5	160.2	159.2	172.2	171	168.3	158.7	159.9	155	153.7
Avg. Wall DT.-F	9	9.8	9	22.2	21.2	18.4	8.5	10.1	5.2	0
Remaining Subcool-F	-22.4									
Exit Quality	0.18	0.41	0.64	0.75	0.85	0.92	0.96	0.98	0.99	0.99
EXP. H-Btu/Hr/ft2/F	2764.5	2531.6	2796.7	517.9	513.7	398.1	413.9	306	380.6	******
COMPUTED H										
Jallouk	1946.1	1840.3	1789.4	42.3	42.3	42.3	42.4	42.3	42.3	42.7
Szady1(Cudo tube)	2416.7	2416.4	2429.8	42.3	42.3	42.3	42.4	42.3	42.3	42.7
Szady2	2393.4	2392.7	2409.3	42.3	42.3	42.3	42.4	42.3	42.3	42.7
(RLIQ)	23784	18344	12301	12301	12301	12301	12301	12301	12301	12301
(F)	2.162	3.251	4.112	4.112	4.112	4.112	4.112	4.112	4.112	4.112
(HLIQ)	151.3	227.4	287.5	287.5	287.5	287.5	287.5	287.5	287.5	287.5
(HBOIL)	2416.5	2415.7	2428.5	2428.5	2428.5	2428.5	2428.5	2428.5	2428.5	2428.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.3									
DP Liquid Density-lbm/ft3	82.74									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.727	1.913	2.992	4.25	5.285					
Zero Corrections-psid	-0.029	-0.02	-0.047	0.041	0.037					
Corrected DP-Psid	0.756	1.933	3.039	4.209	5.248					
Actual DP-ft	0.94	1.14	1.46	1.67	1.97					
Measured TP-Psig	123.9				124.8					
Measured Overall-ft	-1.6									
Computed DP-ft	0.89	1.43	1.9	2.55	3.6					
Friction-ft	0.04	0.14	0.24	0.32	0.36					
Acceleration-ft	0.05	0.1	0.13	0.15	0.15					
Elevation-ft	0.8	1.19	1.53	2.09	3.1					

18232
17831
.808
17831
150
17231

Run#	331									
Test Fluid	C4F8									
Date:	9/23/93									
Time:	8:14									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	180.2									
Sat. Temperature-F(inlet)	175.5									
Liq. Density-lbm/ft3	76.78	76.87	76.68	76.5	76.55	76.48	76.29	76.34	76.36	76.73
Latent Heat-Btu/lbm	31.2	31.28	31.13	30.97	31.01	30.96	30.8	30.84	30.96	31.16
Specific Heat-Btu/lbm/F	0.312	0.311	0.312	0.313	0.313	0.313	0.314	0.314	0.314	0.312
Liq. Viscosity-lbm/ft-hr	0.358	0.361	0.358	0.355	0.356	0.355	0.353	0.353	0.354	0.359
Liq. Conductivity-Btu/hr-ft-F	0.0261	0.0261	0.026	0.0259	0.0259	0.0259	0.0258	0.0258	0.0258	0.0261
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	5.4									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2.8									
Inlet Temperature-F	173.4									
Outlet Liq. Temperature-F	174.6									
Outlet Vap. Temperature-F	172.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	120.6									
Water outlet Temp.-F	167.8									
Inlet G-lbm/hr/ft2	1001376		Temp		170	Density	77.74			
Subcooling-F	2.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	307.1	286.2	290.8	283.1	285.2	286.9	289	288.9	287.5	291.8
Heat Loss-Watts	10	2.3	3.1	3.2	3.1	2.3	1.5	2.3	3	15.8
Heat Flux-Btu/Hr/ft2	5323	4961	5041	4907	4944	4973	5010	5008	4984	5059
Wall Temp. #3-F	180.1	179.8	179.9	180.3	180.7	180.8	179.5	180	179.5	177
Wall Temp. #4-F	180.1	179.9	180.4	180.5	180.9	181.2	179.7	180.1	180.3	178.3
Wall Temp. #5-F	180.5	179.3	181.3	180.4	180.2	180.2	179.2	179.8	179.6	177.3
Wall Temp. #1-F	173.4	179.8	179	179.8	179.9	180.9	180.3	179.6	179	178.3
Wall Temp. #2-F	180.3	180.1	179.5	179.9	179.8	180.6	180.2	180.1	179.3	176.9
Instream Temp.-F	174.3	173.9	174.7	175.5	175.3	175.6	176.4	176.2	176.1	174.5
Avg. Wall Temp.-F	180.3	179.9	179.7	180.2	180.2	180.7	179.8	179.9	179.5	177.2
Avg. Wall DT.-F	5.7	5.8	4.8	4.5	4.7	4.9	3.2	3.5	3.2	2.4
Remaining Subcool-F	1.1									
Exit Quality	-0.01	0	0.01	0.02	0.03	0.04	0.05	0.05	0.06	0.07
EXP. H-Btu/Hr/ft2/F	932.4	858.9	1056.3	1095.8	1051.5	1014.9	1588.5	1433.4	1550.2	2080.3
COMPUTED H										
Jallouk	773.4	740.8	745	730.5	730.4	732.1	738	734.9	733	733.8
Szady1(Cudo tube)	1272.6	1226.6	1242.6	1233.5	1238.9	1248.3	1257.4	1257.9	1256.4	1258
Szady2	988.6	939.8	957.1	948.6	955.8	964.4	976.5	978.2	977.6	1010.9
(RLIQ)	182371	181713	182471	182082	180044	178808	178366	176280	174962	170106
(F)	1.004	1.004	1.135	1.304	1.42	1.515	1.595	1.671	1.74	1.815
(HLIQ)	290.1	289.9	328.2	377.4	410.9	438.5	462.3	484.2	504.2	524.4
(HBOIL)	1267.6	1221.2	1234.9	1221.7	1223.7	1227.9	1236.2	1233.5	1228.7	1226.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.2									
DP Liquid Density-lbm/ft3	93.45									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.151	0.361	0.611	1.107	1.49					
Zero Corrections-psid	-0.029	-0.033	-0.057	-0.004	0.048					
Corrected DP-Psid	0.18	0.394	0.668	1.111	1.444					
Actual DP-ft	2.1	4.18	6.05	7.66	9.32					
Measured TP-Psig	180.2				178.7					
Measured Overall-ft	2.82									
Computed DP-ft	2.14	4.26	6.24	8.19	9.99					
Friction-ft	0.14	0.32	0.54	0.78	1.04					
Acceleration-ft	0	0.13	0.19	0.24	0.29					
Elevation-ft	2	3.81	5.52	7.16	8.66					

Run#	832									
Test Fluid	C4F8									
Date:	9/23/93									
Time:	8:14									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	180.1									
Sat. Temperature-F(inlet)	175.5									
Liq. Density-lbm/ft3	76.78	76.82	76.71	76.57	76.48	76.5	76.31	76.38	76.41	76.68
Latent Heat-Btu/lbm	31.16	31.24	31.15	31.03	30.95	30.97	30.82	30.88	30.9	31.18
Specific Heat-Btu/lbm/F	0.312	0.312	0.312	0.313	0.313	0.313	0.314	0.314	0.314	0.312
Liq. Viscosity-lbm/ft-hr	0.359	0.36	0.358	0.356	0.355	0.355	0.353	0.354	0.354	0.358
Liq. Conductivity-Btu/hr-ft-F	0.0261	0.0261	0.026	0.026	0.0259	0.0259	0.0258	0.0258	0.0259	0.026
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	4.6									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	173.5									
Outlet Liq. Temperature-F	174.7									
Outlet Vap. Temperature-F	172.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	120.3									
Water outlet Temp.-F	168.2									
Inlet G-lbm/hr/ft2	854662		Temp	169.5	Density	77.85				
Subcooling-F	2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	299	285.6	290	282.4	287.6	289.2	288.7	288.1	289.9	289.2
Heat Loss-Watts	11	2.5	3.5	3.5	3.4	2.5	1.6	2.5	3.3	17.4
Heat Flux-Btu/hr/ft2	5183	4961	5027	4895	4986	5013	5004	4994	5025	5013
Wall Temp. #3-F	180	179.7	180.1	180.1	180.5	180.4	179.4	179.8	179.6	177.3
Wall Temp. #4-F	180.2	179.9	180.4	180.5	181.1	181.2	179.6	180.2	180.3	178.4
Wall Temp. #5-F	180.5	179.5	181.3	180.1	180.4	180.3	179.2	179.6	179.7	177.3
Wall Temp. #1-F	178.5	180	179.1	179.6	180.1	181	180.4	179.7	179	176.3
Wall Temp. #2-F	180.6	180	178.7	179.8	180.1	180.4	180.3	180.2	179.3	177
Instream Temp.-F	174.5	174.1	174.6	175.2	175.6	175.5	176.3	176	175.9	174.7
Avg. Wall Temp.-F	180.3	179.9	179.8	180.1	180.4	180.7	179.8	179.9	179.6	177.3
Avg. Wall DT.-F	5.6	5.6	5	4.7	4.6	5	3.3	3.7	3.5	2.3
Remaining Subcool-F	0.8									
Exit Quality	-0.01	0	0.01	0.02	0.04	0.05	0.06	0.07	0.08	0.09
EXP. H-Btu/Hr/ft2/F	927.1	887.8	1005.8	1051.9	1083.8	1002.9	1538	1359.2	1455.4	2148.4
COMPUTED H										
Jallouk	771.5	748.8	745.8	731.7	737.2	738.9	737.3	734.7	735.9	731.4
Szady1(Cudo tube)	1256.1	1225.5	1239.8	1229	1244	1248.4	1253.6	1252.2	1256.9	1250.1
Szady2	970	937.8	953.8	943.2	959.8	965.4	971.3	970.8	976.6	971
(RLIQ)	156856	155293	154709	153843	152688	150809	150156	147882	146100	142776
(F)	1.004	1.004	1.242	1.392	1.505	1.604	1.687	1.768	1.841	1.918
(HLIQ)	255.6	255.4	316	354.5	383.8	408.9	430.7	450.9	469.6	488.1
(HBOIL)	1252.6	1221.8	1232.9	1219.1	1231.7	1233.6	1236.4	1232.4	1234.7	1224.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.5									
DP Liquid Density-lbm/ft3	93.41									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.188	0.456	0.781	1.335	1.783					
Zero Corrections-psid	-0.029	-0.033	-0.057	-0.004	0.048					
Corrected DP-Psid	0.217	0.489	0.838	1.339	1.737					
Actual DP-ft	2.03	3.95	5.74	7.29	8.77					
Measured TP-Psig	180.1				178.8					
Measured Overall-ft	2.44									
Computed DP-ft	2.1	4.09	5.99	7.84	9.56					
Friction-ft	0.11	0.26	0.43	0.63	0.84					
Acceleration-ft	0.03	0.11	0.16	0.2	0.24					
Elevation-ft	1.96	3.72	5.4	7.01	8.48					

Run#	333									
Test Fluid	C4F8									
Date:	9/23/93									
Time:	8:14									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	180									
Sat. Temperature-F(inlet)	175.4									
Liq. Density-lbm/ft3	76.78	76.82	76.68	76.5	76.45	76.48	76.41	76.45	76.45	76.64
Latent Heat-Btu/lbm	31.2	31.24	31.13	30.97	30.83	30.95	30.9	30.83	30.83	31.09
Specific Heat-Btu/lbm/F	0.312	0.312	0.312	0.313	0.313	0.313	0.314	0.313	0.313	0.313
Liq. Viscosity-lbm/ft-hr	0.359	0.36	0.358	0.355	0.355	0.355	0.354	0.355	0.355	0.357
Liq. Conductivity-Btu/hr-ft-F	0.0261	0.0261	0.026	0.0259	0.0259	0.0259	0.0259	0.0259	0.0259	0.026
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	3.7									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2.1									
Inlet Temperature-F	173.4									
Outlet Liq. Temperature-F	174.9									
Outlet Vap. Temperature-F	172.2									
Water Flow Rate-GPM										
Water inlet Temp.-F	118.7									
Water outlet Temp.-F	169.1									
Inlet G-lbm/hr/ft2	688416		Temp		169	Density	77.96			
Subcooling-F	2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	303.5	289.3	291	277.9	289.2	290.6	292.1	292.2	289.4	290
Heat Loss-Watts	10.5	2.4	3.3	3.3	3.3	2.4	1.5	2.3	3.1	16.7
Heat Flux-Btu/ft-hr/ft2	5261	5015	5044	4817	5013	5038	5063	5065	5017	5027
Wall Temp. #3-F	180.1	179.8	180.2	180.4	180.8	180.8	179.4	179.7	179.5	177.7
Wall Temp. #4-F	180.2	179.9	180.6	180.5	181.1	181.5	179.5	180.2	180.2	178.9
Wall Temp. #5-F	180.7	179.6	181.5	180.4	180.6	180.6	179.1	179.6	179.6	178
Wall Temp. #1-F	173.4	180.1	179.2	179.9	180.3	181.1	180.5	179.6	178.9	176.8
Wall Temp. #2-F	180.7	180.1	179.8	180	180.4	180.8	180.4	180	179.2	177.6
Instream Temp.-F	174.3	174.1	174.7	175.5	175.7	175.6	175.9	175.7	175.7	174.9
Avg. Wall Temp.-F	180.4	180	180	180.3	180.6	181	179.8	179.8	179.5	177.8
Avg. Wall DT.-F	5.9	5.6	5	4.6	4.7	5.2	3.7	3.9	3.6	2.7
Remaining Subcool-F	0.6									
Exit Quality	-0.01	0.01	0.02	0.03	0.05	0.06	0.08	0.09	0.1	0.12
EXP. H-Btu/hr-ft2/F	893.6	887.8	1004.4	1051.3	1072.7	973.6	1386.8	1301.7	1411.8	1890.8
COMPUTED H										
Jallouk	792.4	767.4	754.8	732	745.8	744.4	745.3	742.9	737.8	735.1
Szady1(Cudo tube)	1283.4	1232.7	1241.4	1219.5	1245.9	1249.2	1255.5	1255.7	1251	1243.8
Szady2	977.5	944.8	954.7	931.7	950.4	954.7	971.9	972.9	968.7	967.6
(RLIQ)	125312	124950	123908	123104	121618	119755	118317	116382	114571	112000
(F)	1.004	1.074	1.339	1.488	1.608	1.716	1.809	1.897	1.977	2.058
(HLIQ)	214.9	229.7	286.6	319	345	367.9	388.1	406.9	424	440.9
(HBOIL)	1261.3	1230.1	1236.3	1212.2	1237.1	1238.5	1243.1	1241.3	1234.6	1230.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.8									
DP Liquid Density-lbm/ft3	93.37									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.219	0.546	0.964	1.574	2.095					
Zero Corrections-psid	-0.029	-0.033	-0.057	-0.004	0.048					
Corrected DP-Psid	0.248	0.579	1.021	1.578	2.049					
Actual DP-ft	1.97	3.79	5.39	6.78	8.18					
Measured TP-Psig	180				178.8					
Measured Overall-ft	2.25									
Computed DP-ft	2.04	3.92	5.71	7.46	9.08					
Friction-ft	0.08	0.19	0.32	0.46	0.62					
Acceleration-ft	0.04	0.09	0.12	0.15	0.18					
Elevation-ft	1.92	3.64	5.27	6.85	8.28					

Run#	834									
Test Fluid	C4F8									
Date:	9/23/93									
Time:	8:14									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	178.2									
Sat. Temperature-F(inlet)	174.7									
Liq. Density-lbm/ft3	76.87	76.96	76.73	76.73	76.75	76.71	76.57	76.64	76.64	76.75
Latent Heat-Btu/lbm	31.28	31.85	31.16	31.16	31.18	31.15	31.03	31.09	31.09	31.18
Specific Heat-Btu/lbm/F	0.311	0.311	0.312	0.312	0.312	0.312	0.313	0.313	0.313	0.312
Liq. Viscosity-lbm/ft-hr	0.361	0.362	0.359	0.359	0.359	0.358	0.356	0.357	0.357	0.359
Liq. Conductivity-Btu/hr-ft-F	0.0261	0.0262	0.0261	0.0261	0.0261	0.026	0.026	0.026	0.026	0.0261
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	2.8									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	1.8									
Inlet Temperature-F	172.9									
Outlet Liq. Temperature-F	173.3									
Outlet Vap. Temperature-F	171.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	117.3									
Water outlet Temp.-F	167.6									
Inlet G-lbm/hr/ft2	523585		Temp		167.2	Density		78.36		
Subcooling-F	1.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	289.9	284.8	282.4	284.7	284.8	286.2	287.4	286.6	281.8	294.1
Heat Loss-Watts	10.4	2.4	3.2	3.2	3.2	2.4	1.5	2.3	3	16.6
Heat Flux-Btu/Hr/ft2	5025	4937	4895	4935	4937	4961	4982	4968	4885	5098
Wall Temp. #3-F	179.4	179.2	179.4	179.4	179.8	179.7	178.6	179	178.8	177.1
Wall Temp. #4-F	179.6	179.3	179.7	179.7	180.3	180.5	178.8	179.4	179.4	178.2
Wall Temp. #5-F	180.1	178.8	180.9	179.6	179.7	179.7	178.7	178.9	178.9	177.3
Wall Temp. #1-F	172.9	179.3	178.4	178.8	179.2	180.2	179.7	178.9	178	176.1
Wall Temp. #2-F	179.9	178.4	179	179	179.2	179.7	179.5	179.2	178.5	176.9
Instream Temp.-F	173.9	173.5	174.5	174.5	174.4	174.6	175.2	174.9	174.9	174.4
Avg. Wall Temp.-F	179.8	179.3	179.1	179.4	179.6	180	179.1	179.1	178.7	177.1
Avg. Wall DT.-F	5.6	5.6	4.4	4.7	5	5.2	3.6	4	3.6	2.5
Remaining Subcool-F	0									
Exit Quality	0	0.02	0.04	0.05	0.07	0.09	0.11	0.12	0.14	0.16
EXP. H-Btu/Hr/ft2/F	893.7	885.2	1111.6	1060.9	991.9	953.9	1370.6	1258	1357.2	2047.7
COMPUTED H										
Jallouk	784.4	760	749.8	747.9	743.5	743	744.2	739.7	731	744.8
Szady1(Cudo tube)	1231.9	1219.9	1221	1226.7	1227.1	1232.1	1239	1236.9	1227	1250.7
Szady2	943.4	930.8	932.4	939.1	940.2	945.9	953.8	951.3	942.1	967.9
(RLIQ)	84949	93754	92828	91248	89474	87889	86708	84751	83050	80660
(F)	1.025	1.259	1.477	1.636	1.769	1.884	1.984	2.082	2.17	2.259
(HLIQ)	176	216	253.9	281.2	304.1	323.9	341.4	358.2	373.4	388.4
(HBOIL)	1230.7	1217.1	1217.3	1221.8	1220.9	1224.6	1230.3	1226.2	1215.4	1238.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.7									
DP Liquid Density-lbm/ft3	93.24									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.251	0.738	1.17	1.856	2.46					
Zero Corrections-psid	-0.029	-0.033	-0.057	-0.004	0.048					
Corrected DP-Psid	0.28	0.771	1.227	1.86	2.414					
Actual DP-ft	1.9	3.41	4.99	6.23	7.47					
Measured TP-Psig	178.2				177.2					
Measured Overall-ft	1.88									
Computed DP-ft	1.97	3.73	5.42	7.06	8.58					
Friction-ft	0.05	0.13	0.22	0.32	0.43					
Acceleration-ft	0.04	0.07	0.09	0.11	0.13					
Elevation-ft	1.88	3.54	5.11	6.64	8.02					

Run#	335									
Test Fluid	C4F8									
Date:	9/23/93									
Time:	12:51									
Note	Analytical dl is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	178.9									
Sat. Temperature-F(inlet)	175									
Liq. Density-lbm/ft3	77.12	76.94	76.64	76.61	76.61	76.61	76.48	76.52	76.52	76.52
Latent Heat-Btu/lbm	31.49	31.34	31.09	31.07	31.07	31.07	30.95	30.99	30.99	30.99
Specific Heat-Btu/lbm/F	0.31	0.311	0.313	0.313	0.313	0.313	0.313	0.313	0.313	0.313
Liq. Viscosity-lbm/ft-hr	0.364	0.362	0.357	0.357	0.357	0.357	0.355	0.356	0.356	0.356
Liq. Conductivity-Btu/hr-ft-F	0.0263	0.0262	0.026	0.026	0.026	0.026	0.0259	0.0259	0.0259	0.0259
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	1.9									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	1.5									
Inlet Temperature-F	171.8									
Outlet Liq. Temperature-F	174.1									
Outlet Vap. Temperature-F	172.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	119.6									
Water outlet Temp.-F	168.6									
Inlet G-lbm/hr/ft2	357816		Temp	164.6	Density	78.91				
Subcooling-F	3.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	290.8	286	277.7	287.4	286	287.2	288.6	287.7	281.6	294.5
Heat Loss-Watts	10.7	2.5	3.4	3.4	3.3	2.5	1.5	2.4	3.2	17.1
Heat Flux-Btu/Hr/ft2	5041	4958	4814	4982	4958	4978	5003	4987	4881	5105
Wall Temp. #3-F	179.5	179.3	179.7	179.7	180.3	180.2	179	179.3	179.1	177.2
Wall Temp. #4-F	179.8	179.5	180.1	180	180.9	181.1	179	179.8	179.8	178.6
Wall Temp. #5-F	180.3	179.2	181.4	180	180.2	180.2	178.8	179.3	179.3	177.7
Wall Temp. #1-F	171.8	179.5	178.7	178.9	179.4	180.8	180	179	178.6	176.4
Wall Temp. #2-F	180.1	179.6	179.2	179.4	179.4	180.2	179.7	179.7	178.8	177.4
Instream Temp.-F	172.8	173.6	174.9	175	175	175	175.6	175.4	175.4	175.4
Avg. Wall Temp.-F	179.9	179.5	179.4	179.7	180	180.6	179.3	179.4	179.1	177.5
Avg. Wall DT.-F	6.9	5.7	4.3	4.4	4.8	5.4	3.5	3.8	3.5	1.8
Remaining Subcool-F	0.5									
Exit Quality	0	0.02	0.05	0.07	0.1	0.12	0.15	0.18	0.2	0.23
EXP. H-Btu/Hr/ft2/F	730.9	877.3	1117.5	1125.9	1043.5	930.5	1440.1	1314.3	1394.9	2780.7
COMPUTED H										
Jallouk	804.7	785.7	761.7	772.3	764.1	761.7	762.5	757	744.5	782.4
Szady1(Cudo tube)	1226.7	1221.6	1212	1233.9	1231.4	1234.4	1241.6	1238.8	1226.3	1254.2
Szady2	938.7	932.5	921.4	945.1	942.8	946.4	953.7	951.5	938.6	968.6
(RLIQ)	64257	64207	63298	61671	59954	58238	56823	54984	53268	51532
(F)	1.006	1.238	1.54	1.745	1.914	2.06	2.185	2.306	2.414	2.517
(HLIQ)	127	156.8	195.4	221.4	242.9	261.4	277.5	292.8	306.6	319.7
(HBOIL)	1226.3	1220.8	1210.3	1231.5	1228.2	1230.5	1236.8	1233.4	1219.9	1247.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.3									
DP Liquid Density-lbm/ft3	93.3									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.258	0.798	1.308	2.076	2.763					
Zero Corrections-psid	-0.029	-0.033	-0.057	-0.004	0.048					
Corrected DP-Psid	0.287	0.829	1.365	2.08	2.717					
Actual DP-ft	1.9	3.32	4.75	5.84	6.83					
Measured TP-Psig	178.9				177.7					
Measured Overall-ft	2.26									
Computed DP-ft	1.89	3.42	4.81	6.12	7.29					
Friction-ft	0.03	0.07	0.14	0.22	0.3					
Acceleration-ft	0.02	0.04	0.05	0.06	0.08					
Elevation-ft	1.84	3.31	4.62	5.84	6.91					

Run#	836									
Test Fluid	C4F8									
Date:	9/23/93									
Time:	12:57									
Note	Analysical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	177.2									
Sat. Temperature-F(inlet)	174.3									
Liq. Density-lbm/ft3	77.12	76.71	76.71	76.68	76.75	76.68	76.59	76.61	76.57	76.48
Latent Heat-Btu/lbm	31.49	31.15	31.15	31.13	31.18	31.13	31.05	31.07	31.03	30.95
Specific Heat-Btu/lbm/F	0.31	0.312	0.312	0.312	0.312	0.312	0.313	0.313	0.313	0.313
Liq. Viscosity-lbm/ft-hr	0.364	0.358	0.358	0.358	0.359	0.358	0.357	0.357	0.356	0.355
Liq. Conductivity-Btu/hr-ft-F	0.0283	0.026	0.026	0.026	0.0261	0.026	0.026	0.026	0.026	0.0259
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	1.1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	171.9									
Outlet Liq. Temperature-F	174.3									
Outlet Vap. Temperature-F	172.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	116.9									
Water outlet Temp.-F	168.4									
Inlet G-lbm/hr/ft2	209352		Temp		160.6	Density	79.75			
Subcooling-F	2.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	288.9	284.3	280.5	290.8	284.5	285.5	286.5	285.2	285.9	294.4
Heat Loss-Watts	10.4	2.4	3.3	3.3	3.2	2.4	1.5	2.3	3.1	16.9
Heat Flux-Btu/Hr/ft2	5008	4928	4862	5041	4932	4949	4966	4944	4956	5103
Wall Temp. #3-F	179.1	179	179.4	179	179.8	179.8	178.6	178.9	178.8	177.3
Wall Temp. #4-F	179.3	179.1	179.9	179.5	180	180.6	178.8	179.4	179.4	178.4
Wall Temp. #5-F	179.9	178.7	180.8	179.5	179.5	179.8	178.5	178.9	178.9	177.3
Wall Temp. #1-F	171.9	178.9	178.3	178.6	179	180.2	179.7	178.8	178.4	176.3
Wall Temp. #2-F	179.7	179.2	178.8	178.9	179	179.8	179.5	179.4	178.4	177
Instream Temp.-F	172.8	174.6	174.6	174.7	174.4	174.7	175.1	175	175.2	175.6
Avg. Wall Temp.-F	179.5	179.1	179.1	179.2	179.4	180.1	179	179.1	178.8	177.3
Avg. Wall DT.-F	6.5	4.2	4.3	4.2	4.8	5.2	3.7	3.9	3.4	1.4
Remaining Subcool-F	-2.2									
Exit Quality	0.02	0.07	0.11	0.16	0.2	0.24	0.29	0.33	0.38	0.42
EXP. H-Btu/Hr/ft2/F	773.6	1165.8	1136	1193.9	1037.8	956.1	1343.9	1281.9	1476.7	3570.3
COMPUTED H										
Jallouk	845.8	826.5	805.6	796.1	777.4	776	775.5	769.4	768.5	782.3
Szady1(Cudo tube)	1222.6	1223.8	1215.8	1238.7	1223.7	1227.9	1232.6	1229.5	1232.5	1253.2
Szady2	934.1	933.7	925.3	949.9	934.4	938.7	943.7	940.6	943.8	965.8
(FLIQ)	37198	36562	34890	33220	31420	29806	28207	26470	24804	23148
(F)	1.283	1.628	1.928	2.183	2.389	2.542	2.696	2.848	2.982	3.108
(HLIQ)	105.7	134.3	159.1	178.7	195.5	210	222.9	235.3	248.5	257.1
(HBOIL)	1222.3	1223.2	1214.9	1237.4	1222	1225.8	1230.2	1226.6	1229.2	1249.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.2									
DP Liquid Density-lbm/ft3	83.31									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.289	0.972	1.736	2.638	3.428					
Zero Corrections-psid	-0.029	-0.033	-0.057	-0.004	0.048					
Corrected DP-Psid	0.318	1.005	1.793	2.642	3.38					
Actual DP-ft	1.84	2.99	3.94	4.79	5.68					
Measured TP-Psig	177.2				178.3					
Measured Overall-ft	1.69									
Computed DP-ft	1.57	2.77	3.82	4.77	5.6					
Friction-ft	0.02	0.04	0.06	0.13	0.19					
Acceleration-ft	0.01	0.02	0.03	0.04	0.05					
Elevation-ft	1.64	2.71	3.71	4.61	5.37					

Run#	837									
Test Fluid	C4F8									
Date:	9/24/93									
Time:	8:20									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	178.6									
Sat. Temperature-F(inlet)	174.8									
Liq. Density-lbm/ft3	77.03	77.03	76.89	76.68	76.68	76.68	76.52	76.61	76.64	76.48
Latent Heat-Btu/lbm	31.41	31.41	31.3	31.13	31.13	31.13	30.99	31.07	31.09	30.95
Specific Heat-Btu/lbm/F	0.311	0.311	0.311	0.312	0.312	0.312	0.313	0.313	0.313	0.313
Liq. Visocsity-lbm/ft-hr	0.363	0.363	0.361	0.358	0.358	0.358	0.358	0.357	0.357	0.355
Liq. Conductivity-Btu/hr-ft-F	0.0262	0.0262	0.0262	0.026	0.026	0.026	0.0259	0.026	0.026	0.0259
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	5.5									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	2.7									
Inlet Temperature-F	172.5									
Outlet Liq. Temperature-F	173.9									
Outlet Vap. Temperature-F	171.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	105.7									
Water outlet Temp.-F	165.5									
Inlet G-lbm/hr/ft2	1024185		Temp	168.7	Density	78.03				
Subcooling-F	2.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	575.3	575.8	576.1	579.4	583.2	580.6	575.9	582.3	576.1	575.7
Heat Loss-Watts	10.3	2.4	3.2	3.2	3.2	2.4	1.6	2.5	3.2	17.1
Heat Flux-Btu/Hr/ft2	9972	9981	9986	10044	10109	10064	9983	10094	9986	9979
Wall Temp. #3-F	180.7	181.7	181.2	181.3	182.3	181.4	183.5	182.4	182.4	180.2
Wall Temp. #4-F	181.3	180.8	182.2	181.9	182.8	181.7	183.5	183.3	183.2	182.8
Wall Temp. #5-F	181.6	179.9	182.9	181.9	181.9	181.9	183.1	182.3	181.9	179.7
Wall Temp. #1-F	172.5	181.2	179.6	180.6	181.2	182.8	183.6	182.6	181.3	178.3
Wall Temp. #2-F	181.6	181.2	180.7	181.2	181.3	182.7	183.5	183.4	181.9	179.5
Instream Temp.-F	173.2	173.2	173.8	174.7	174.7	174.7	175.4	175	174.9	175.6
Avg. Wall Temp.-F	181.4	181.2	180.9	181.4	181.8	182	183.4	182.8	182.1	180.1
Avg. Wall DT.-F	7.7	7.5	6.7	6.3	6.6	6.8	7.6	7.3	6.8	4
Remaining Subcool-F	0.5									
Exit Quality	0	0.01	0.03	0.05	0.07	0.09	0.11	0.12	0.14	0.16
EXP. H-Btu/Hr/ft2/F	1295.2	1328.6	1498.4	1601.6	1521.8	1481.1	1315.5	1374.5	1475.4	2484.6
COMPUTED H										
Jallouk	1132.3	1105.4	1063.3	1035.3	1028	1016.5	1007.7	1003	980.4	974.5
Szady1(Cudo tube)	1761.6	1763.4	1772.1	1787.5	1795.2	1762.9	1763.3	1771.5	1763.1	1770.1
Szady2	1539.9	1540.7	1544.6	1519.9	1528.3	1528.8	1540.3	1545	1541.2	1556.1
(RLIQ)	184589	183828	181449	179513	176057	172587	170218	168131	162510	160080
(F)	1.005	1.163	1.432	1.604	1.748	1.869	1.973	2.076	2.169	2.247
(HLIQ)	294.7	341.2	420.6	471.8	513.6	549.9	581.1	610.9	638.2	662.1
(HBOIL)	1758.8	1759.2	1764.2	1776.4	1781	1744.9	1742	1746.9	1734.9	1738.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.5									
DP Liquid Density-lbm/ft3	93.83									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.139	0.558	0.81	1.448	1.91					
Zero Corrections-psid	0.021	-0.009	-0.241	0.09	0.042					
Corrected DP-Psid	0.118	0.567	1.051	1.358	1.868					
Actual DP-ft	2.23	3.84	5.38	7.28	8.6					
Measured TP-Psig	178.6				177.4					
Measured Overall-ft	2.26									
Computed DP-ft	2.18	4.22	6.19	8.14	9.87					
Friction-ft	0.17	0.41	0.71	1.05	1.42					
Acceleration-ft	0.12	0.25	0.34	0.42	0.49					
Elevation-ft	1.9	3.57	5.15	6.67	8.06					

Run#	838									
Test Fluid	C4F8									
Date:	9/24/93									
Time:	8:20									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	180									
Sat. Temperature-F(inlet)	175.4									
Liq. Density-lbm/ft3	76.96	76.96	76.78	76.5	76.55	76.52	76.36	76.43	76.45	76.31
Latent Heat-Btu/lbm	31.35	31.35	31.2	30.97	31.01	30.99	30.86	30.92	30.93	30.82
Specific Heat-Btu/lbm/F	0.311	0.311	0.312	0.313	0.313	0.313	0.314	0.314	0.313	0.314
Liq. Viscosity-lbm/ft-hr	0.362	0.362	0.359	0.355	0.356	0.356	0.354	0.354	0.355	0.353
Liq. Conductivity-Btu/hr-ft-F	0.0262	0.0262	0.0261	0.0259	0.0259	0.0259	0.0258	0.0259	0.0259	0.0258
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	4.6									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	2.3									
Inlet Temperature-F	172.6									
Outlet Liq. Temperature-F	174.4									
Outlet Vap. Temperature-F	172.5									
Water Flow Rate-GPM										
Water inlet Temp.-F	105.4									
Water outlet Temp.-F	165.8									
Inlet G-lbm/hr/ft2	857071		Temp	168.5	Density	78.07				
Subcooling-F	2.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	575.7	576.7	576.2	580.1	590.8	585.8	576.2	589.5	575.8	575.7
Heat Loss-Watts	10.2	2.4	3.2	3.2	3.2	2.4	1.6	2.4	3.2	17
Heat Flux-Btu/Hr/ft2	9979	9997	9989	10056	10241	10151	9989	10115	9981	9979
Wall Temp. #3-F	181.2	182.5	181.7	182	183	182.2	184.3	183.1	183	180.5
Wall Temp. #4-F	181.8	181.1	182.8	182.5	183.4	182.5	184.3	183.9	183.8	183.5
Wall Temp. #5-F	182.1	180.3	183.3	182.5	182.8	182.8	183.8	182.8	182.6	180
Wall Temp. #1-F	172.6	181.8	180.2	181.3	182	183.3	184.3	183.4	181.8	178.8
Wall Temp. #2-F	182.5	181.8	181.2	181.8	182.1	183.3	184.3	184.1	182.8	180.2
Instream Temp.-F	173.5	173.5	174.3	175.5	175.3	175.4	176.1	175.8	175.7	176.3
Avg. Wall Temp.-F	181.9	181.8	181.5	182.1	182.6	182.7	184.2	183.5	182.7	180.6
Avg. Wall DT.-F	7.9	7.8	6.7	6.1	6.8	6.8	7.6	7.2	6.5	3.8
Remaining Subcool-F	0.6									
Exit Quality	-0.01	0.02	0.04	0.06	0.08	0.1	0.13	0.15	0.17	0.19
EXP. H-Btu/Hr/ft2/F	1255.4	1273.8	1486.5	1642.9	1503.4	1483.8	1305.9	1404.2	1524.1	2592.7
COMPUTED H										
Jallouk	1143.4	1140.1	1095.4	1081.6	1072.6	1040.6	1028.1	1025.6	1012.1	1008.7
Szady1(Cudo tube)	1764.2	1768.4	1775.2	1793.6	1808.7	1804.2	1768.8	1776.8	1785.8	1772
Szady2	1542.8	1544.8	1502.4	1530	1541.7	1541	1545.7	1552	1545.5	1558.6
(RLIQ)	154889	154150	151869	150076	148289	142878	140270	136372	132733	129956
(F)	1.005	1.177	1.475	1.663	1.822	1.957	2.071	2.182	2.284	2.37
(HLIQ)	255.7	299.6	376.1	424.9	465.2	499.9	528.6	557.8	583.6	606.3
(HBOIL)	1762.4	1763.8	1769.5	1785.6	1798.4	1791.3	1750.8	1758.3	1744.3	1748
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.3									
DP Liquid Density-lbm/ft3	93.72									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.183	0.67	1.047	1.718	2.268					
Zero Corrections-psid	0.021	-0.009	-0.241	0.09	0.042					
Corrected DP-Psid	0.162	0.679	1.288	1.628	2.224					
Actual DP-ft	2.15	3.63	4.94	6.75	7.93					
Measured TP-Psig	180				178.9					
Measured Overall-ft	2.08									
Computed DP-ft	2.1	3.82	5.63	7.29	8.86					
Friction-ft	0.12	0.33	0.62	0.96	1.33					
Acceleration-ft	0.09	0.19	0.28	0.33	0.39					
Elevation-ft	1.89	3.4	4.75	6.01	7.12					

Run#	839									
Test Fluid	C4F8									
Date:	9/24/93									
Time:	8:20									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	180.2									
Sat. Temperature-F(inlet)	175.5									
Liq. Density-lbm/ft3	76.91	76.94	76.64	76.43	76.48	76.48	76.43	76.48	76.48	76.24
Latent Heat-Btu/lbm	31.32	31.34	31.09	30.92	30.95	30.95	30.92	30.95	30.95	30.76
Specific Heat-Btu/lbm/F	0.311	0.311	0.313	0.314	0.313	0.313	0.314	0.313	0.313	0.315
Liq. Viscosity-lbm/ft-hr	0.361	0.362	0.357	0.354	0.355	0.355	0.354	0.355	0.355	0.352
Liq. Conductivity-Btu/hr-ft-F	0.0262	0.0262	0.026	0.0259	0.0259	0.0259	0.0259	0.0259	0.0259	0.0258
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	3.7									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	2									
Inlet Temperature-F	172.8									
Outlet Liq. Temperature-F	175									
Outlet Vap. Temperature-F	172									
Water Flow Rate-GPM										
Water Inlet Temp.-F	103.6									
Water outlet Temp.-F	164.7									
Inlet G-lbm/hr/ft2	690539		Temp	167.9	Density	78.21				
Subcooling-F	2.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	567.7	573.5	579.6	582.8	587.3	587	575	574	579.4	578.6
Heat Loss-Watts	10.1	2.3	3.2	3.2	3.2	2.4	1.6	2.4	3.1	16.8
Heat Flux-Btu/Hr/ft2	9841	9941	10047	10102	10180	10175	9967	9950	10044	10030
Wall Temp. #3-F	181.3	182.3	181.9	182.3	183.4	182.5	183.8	182.6	182.4	180.8
Wall Temp. #4-F	182.1	181.4	182.9	182.9	183.8	182.8	183.9	183.6	183.5	183.5
Wall Temp. #5-F	182.2	180.6	183.6	182.8	183	183	183.3	182.5	182	180.4
Wall Temp. #1-F	172.8	181.9	180.4	181.7	182.2	183.8	183.9	183	181.4	179
Wall Temp. #2-F	182.5	182	181.5	182.1	182.3	183.9	183.8	183.6	181.9	180.2
Instream Temp.-F	173.7	173.6	174.9	175.8	175.6	175.6	175.8	175.6	175.6	176.6
Avg. Wall Temp.-F	182	181.9	181.7	182.4	182.8	183	183.7	183.1	182.2	180.9
Avg. Wall DT.-F	7.9	7.9	6.3	6.2	6.8	7	7.5	7	6.2	3.7
Remaining Subcool-F	0									
Exit Quality	0	0.03	0.05	0.08	0.11	0.14	0.16	0.19	0.22	0.25
EXP. H-Btu/Hr/ft2/F	1248.8	1266.3	1589.5	1637.8	1504.9	1460.9	1330.8	1419.3	1623.6	2691.3
COMPUTED H										
Jallouk	1164.4	1131	1129.4	1114.2	1098.8	1082.6	1057.8	1033.1	1032	1030.8
Szady1(Cudo tube)	1754.1	1762.5	1784.6	1798.8	1804.6	1805.6	1760.4	1758.3	1767.8	1775.8
Szady2	1527	1538.6	1514.3	1535.4	1539.4	1541.6	1534.4	1532.6	1541.1	1559.3
(RLIQ)	125019	123238	121272	118778	115031	111480	108165	104494	101008	98399
(F)	1.005	1.322	1.601	1.799	1.969	2.116	2.244	2.364	2.473	2.563
(HLIQ)	215.2	283.1	343.8	388.9	423.2	454.8	482.5	508.1	531.7	551.9
(HBOIL)	1753	1760	1780.3	1792.8	1796.8	1795.9	1748.3	1744.1	1751.5	1757.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.8									
DP Liquid Density-lbm/ft3	93.51									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.218	0.783	1.259	2.003	2.63					
Zero Corrections-psid	0.021	-0.009	-0.241	0.09	0.042					
Corrected DP-Psid	0.197	0.792	1.5	1.913	2.588					
Actual DP-ft	2.08	3.41	4.53	6.2	7.22					
Measured TP-Psig	180.2				178.4					
Measured Overall-ft	1.51									
Computed DP-ft	2	3.68	5.23	6.74	8.14					
Friction-ft	0.09	0.25	0.47	0.74	1.03					
Acceleration-ft	0.08	0.15	0.2	0.25	0.31					
Elevation-ft	1.82	3.26	4.55	5.75	6.8					

Run#	840									
Test Fluid	C4F8									
Date:	9/24/93									
Time:	8:20									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	178.7									
Sat. Temperature-F(inlet)	174.9									
Liq. Density-lbm/ft3	77.12	76.94	76.78	76.57	76.64	76.64	76.57	76.61	76.61	76.06
Latent Heat-Btu/lbm	31.49	31.34	31.2	31.03	31.09	31.09	31.03	31.07	31.07	30.6
Specific Heat-Btu/lbm/F	0.31	0.311	0.312	0.313	0.313	0.313	0.313	0.313	0.313	0.315
Liq. Viscosity-lbm/ft-hr	0.364	0.362	0.359	0.356	0.357	0.357	0.356	0.357	0.357	0.349
Liq. Conductivity-Btu/hr-ft-F	0.0263	0.0262	0.0261	0.026	0.026	0.026	0.026	0.026	0.026	0.0256
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	2.8									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	172									
Outlet Liq. Temperature-F	174.6									
Outlet Vap. Temperature-F	171.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	103.4									
Water outlet Temp.-F	163.5									
Inlet G-lbm/hr/ft2	525455		Temp		165.9	Density		78.64		
Subcooling-F	2.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	572.3	574.4	576.7	580.9	576	576.1	575.7	575.3	576.4	576.5
Heat Loss-Watts	10	2.3	3.2	3.2	3.2	2.4	1.6	2.4	3.1	16.8
Heat Flux-Btu/Hr/ft2	9920	9957	9997	10070	9985	9986	9979	9972	9992	9993
Wall Temp. #3-F	180.5	181.5	181.2	181.6	182.5	181.9	183.3	182.1	181.9	180.3
Wall Temp. #4-F	181.2	180.7	182.1	182.2	183.1	182.2	183.5	183.1	182.8	183
Wall Temp. #5-F	181.2	179.8	182.8	182.2	182.2	182.4	182.9	182	181.5	179.6
Wall Temp. #1-F	172	181	179.7	181.2	181.6	182.9	183.4	182.5	180.8	178.6
Wall Temp. #2-F	181.9	181.1	180.6	181.6	181.6	183.1	183.4	183.1	181.4	179.8
Instream Temp.-F	172.8	173.6	174.3	175.2	174.9	174.9	175.2	176	176	177.4
Avg. Wall Temp.-F	181.2	181.1	180.9	181.8	182.1	182.4	183.3	182.6	181.7	180.3
Avg. Wall DT.-F	8	7	6.1	6.1	6.8	7	7.6	7.1	6.2	2.4
Remaining Subcool-F	-0.7									
Exit Quality	0.01	0.04	0.08	0.11	0.15	0.19	0.22	0.26	0.29	0.33
EXP. H-Btu/Hr/ft2/F	1247.6	1417.3	1626	1638.7	1474	1426.9	1304.7	1402.7	1604.2	4081.6
COMPUTED H										
Jallouk	1185	1158.6	1136.3	1144.5	1117.3	1101.8	1090.1	1076.8	1087.9	1074.7
Szady1(Cudo tube)	1762.2	1763.2	1773.9	1789.1	1780.3	1781.5	1784.7	1783.3	1788	1776.2
Szady2	1531.5	1540.7	1549.7	1520.6	1511.9	1513.9	1520.2	1518.4	1521.5	1563.7
(RLIQ)	94043	92725	89828	87212	83619	80071	76896	73249	69798	67814
(F)	1.145	1.456	1.754	1.972	2.162	2.325	2.468	2.606	2.731	2.81
(HLIQ)	196.9	250.5	302.3	340.4	373	401.2	426.1	449.6	471.3	486.9
(HBOIL)	1751.4	1761.5	1770.9	1785	1774.9	1774.7	1776.5	1773.8	1775	1784
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.8									
DP Liquid Density-lbm/ft3	93.37									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.255	0.929	1.505	2.333	3.05					
Zero Corrections-psid	0.021	-0.009	-0.241	0.09	0.042					
Corrected DP-Psid	0.234	0.938	1.746	2.243	3.008					
Actual DP-ft	2.01	3.18	4.06	5.57	6.43					
Measured TP-Psig	178.7				178					
Measured Overall-ft	1.33									
Computed DP-ft	1.81	3.28	4.61	5.88	7.04					
Friction-ft	0.07	0.19	0.38	0.57	0.8					
Acceleration-ft	0.06	0.1	0.14	0.18	0.23					
Elevation-ft	1.69	2.98	4.11	5.13	6.02					

Run#	841									
Test Fluid	C4F8									
Date:	9/24/93									
Time:	8:20									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	179.8									
Sat. Temperature-F(inlet)	175.3									
Liq. Density-lbm/ft3	76.84	76.57	76.59	76.45	76.52	76.45	76.31	76.36	76.36	75.89
Latent Heat-Btu/lbm	31.26	31.03	31.05	30.93	30.99	30.93	30.82	30.86	30.86	30.47
Specific Heat-Btu/lbm/F	0.312	0.313	0.313	0.313	0.313	0.313	0.314	0.314	0.314	0.316
Liq. Viscosity-lbm/ft-hr	0.36	0.356	0.357	0.356	0.356	0.355	0.353	0.354	0.354	0.347
Liq. Conductivity-Btu/hr-ft-F	0.0261	0.026	0.026	0.0259	0.0259	0.0259	0.0258	0.0258	0.0258	0.0255
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	1.9									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	1.1									
Inlet Temperature-F	173.1									
Outlet Liq. Temperature-F	175.4									
Outlet Vap. Temperature-F	173.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	104.1									
Water outlet Temp.-F	159.4									
Inlet G-lbm/hr/ft2	357141		Temp	165.3	Density	78.77				
Subcooling-F	2.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	573.8	575.7	573.2	571.3	571.8	574.3	573.4	573.6	571.6	573.1
Heat Loss-Watts	10.1	2.4	3.2	3.2	3.2	2.4	1.6	2.4	3.1	16.7
Heat Flux-Btu/hr/ft2	9946	9979	9938	9903	9912	9955	9940	9943	9908	9934
Wall Temp. #3-F	181	182.1	181.6	182.1	183	182.3	183.6	182.5	182.4	180.5
Wall Temp. #4-F	181.8	181	182.5	182.4	183.3	182.7	184.2	183.5	183.1	182.9
Wall Temp. #5-F	181.9	180.5	183.6	182.6	182.3	182.8	183.6	182.6	182.1	180.1
Wall Temp. #1-F	179.1	181.5	180.1	181	181.8	183.2	183.7	183.1	181.2	178.5
Wall Temp. #2-F	182.3	181.5	181.1	181.5	181.8	183.2	184.1	184	182	180
Instream Temp.-F	174	175.2	175.1	175.7	176.4	175.7	176.3	176.1	176.1	178.1
Avg. Wall Temp.-F	181.8	181.5	181.3	182	182.3	182.8	183.8	183.1	182.2	180.4
Avg. Wall DT.-F	7.3	5.9	5.8	5.9	6.5	6.6	7.1	6.6	5.6	1.9
Remaining Subcool-F	-3									
Exit Quality	0.03	0.08	0.13	0.19	0.24	0.29	0.35	0.4	0.45	0.5
EXP. H-Btu/hr/ft2/F	1362.4	1698.9	1720.2	1684.9	1536.2	1508.3	1401.7	1508.6	1765.5	5368.9
COMPUTED H										
Jallouk	1221	1197.8	1169.4	1153.8	1138.4	1150.3	1140.6	1128	1115.8	1123.8
Szady1(Cudo tube)	1765.2	1779.4	1775.5	1778.8	1777.4	1784.3	1789.2	1788.3	1786.2	1774.4
Szady2	1542	1510.7	1507.3	1516.3	1512.9	1521.8	1532.1	1530.1	1529.2	1566.5
(RLIQ)	63862	61861	58369	55236	51642	48317	45082	41519	38029	35182
(F)	1.343	1.722	2.044	2.289	2.505	2.691	2.853	3.017	3.167	3.257
(HLIQ)	169.9	218.3	259	290.4	317.7	341.4	362.4	383	402.1	416.3
(HBOIL)	1764.6	1778.3	1773.6	1776.3	1774	1780.2	1784.2	1782.4	1779.3	1766.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79									
DP Liquid Density-lbm/ft3	93.34									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.29	1.154	1.865	2.797	3.633					
Zero Corrections-psid	0.021	-0.009	-0.241	0.09	0.042					
Corrected DP-Psid	0.269	1.163	2.106	2.707	3.591					
Actual DP-ft	1.95	2.71	3.38	4.7	5.38					
Measured TP-Psig	179.8				179.2					
Measured Overall-ft	1.14									
Computed DP-ft	1.56	2.77	3.84	4.82	5.7					
Friction-ft	0.05	0.13	0.24	0.39	0.54					
Acceleration-ft	0.04	0.07	0.09	0.13	0.16					
Elevation-ft	1.48	2.57	3.5	4.31	5					

Run#	842									
Test Fluid	C4F8									
Date:	9/24/93									
Time:	14:17									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	179.8									
Sat. Temperature-F(inlet)	175.3									
Liq. Density-lbm/ft3	77.07	76.5	76.55	76.41	76.48	76.48	76.34	76.38	76.38	70.82
Latent Heat-Btu/lbm	31.45	30.97	31.01	30.9	30.95	30.95	30.84	30.88	30.88	26.22
Specific Heat-Btu/lbm/F	0.311	0.313	0.313	0.314	0.313	0.313	0.314	0.314	0.314	0.35
Liq. Viscosity-lbm/ft-hr	0.364	0.355	0.356	0.354	0.355	0.355	0.353	0.354	0.354	0.285
Liq. Conductivity-Btu/hr-ft-F	0.0263	0.0259	0.0259	0.0259	0.0259	0.0259	0.0258	0.0258	0.0258	0.0226
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.41
Inlet Flow Rate-GPM	1.1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.6									
Inlet Temperature-F	171.9									
Outlet Liq. Temperature-F	175.8									
Outlet Vap. Temperature-F	173.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	105.2									
Water outlet Temp.-F	161.2									
Inlet G-lbm/hr/ft2	209352		Temp		160.6	Density	79.75			
Subcooling-F	3.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	969	579	575.6	580.3	579.9	580.8	583.1	581.3	579.3	506.3
Heat Loss-Watts	9.8	2.3	3.1	3.1	3.1	2.3	1.5	2.3	2.9	26
Heat Flux-Btu/Hr/ft2	48397	10037	9978	10059	10052	10068	10108	10076	10042	8778
Wall Temp. #3-F	180.7	181.6	180.8	181.4	182.2	182.6	183.2	182.8	182.1	200.2
Wall Temp. #4-F	181.6	180.6	182	181.8	182.7	182.8	183.6	183.5	183.1	202.4
Wall Temp. #5-F	181.6	180	183.2	181.9	181.9	182.6	182.9	182.4	182	196.9
Wall Temp. #1-F	171.9	181.2	179.6	180.7	181.3	182.8	183.2	182.8	180.8	190
Wall Temp. #2-F	182.1	181.2	180.4	181.2	181.4	182.8	183.4	183.5	181.5	191.3
Instream Temp.-F	173	175.5	175.3	175.9	175.6	175.6	176.2	176	176	197.4
Avg. Wall Temp.-F	181.6	181.2	180.7	181.5	181.8	182.7	183.3	182.9	181.9	196.6
Avg. Wall DT.-F	7.8	5.2	4.9	5.1	5.8	6.6	6.6	6.4	5.4	0
Remaining Subcool-F	-11.7									
Exit Quality	0.12	0.2	0.3	0.39	0.48	0.57	0.66	0.75	0.84	0.92
EXP. H-Btu/Hr/ft2/F	2156	1931.4	2016.1	1974.2	1741.9	1526.6	1530.7	1563.5	1843.8	******
COMPUTED H										
Jallouk	1794	1235.8	1209.4	1204.7	1189.9	1181.4	1181.2	1171.7	50.9	54
Szady1(Cudo tube)	2259.8	1786.6	1780.2	1792.7	1789.7	1791.4	1800.6	1796.6	50.9	54
Szady2	2184.5	1519	1512.3	1528.3	1523.3	1524.9	1538.4	1538.7	50.9	54
(RLIQ)	35486	32349	28839	25499	21923	18412	14976	11410	11410	11410
(F)	1.747	2.288	2.641	2.927	3.197	3.441	3.659	3.89	3.89	3.89
(HLIQ)	143.9	189.2	218.4	242.3	264.5	284.7	303	322.1	322.1	322.1
(HBOIL)	2259.6	1785.9	1779.1	1791.3	1787.8	1789	1797.7	1793.1	1793.1	1793.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.4									
DP Liquid Density-lbm/ft3	93.42									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.444	1.388	2.242	3.323	4.314					
Zero Corrections-psid	0.021	-0.009	-0.241	0.09	0.042					
Corrected DP-Psid	0.423	1.397	2.483	3.233	4.272					
Actual DP-ft	1.78	2.44	2.87	3.98	4.84					
Measured TP-Psig	179.8				179.8					
Measured Overall-ft	1.02									
Computed DP-ft	1.2	2.08	2.81	3.44	4.01					
Friction-ft	0.03	0.08	0.15	0.24	0.31					
Acceleration-ft	0.02	0.04	0.06	0.09	0.12					
Elevation-ft	1.15	1.95	2.59	3.12	3.59					

20290
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Run#	843									
Test Fluid	C4F8									
Date:	9/27/93									
Time:	8:28									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	179.6									
Sat. Temperature-F(inlet)	175.2									
Liq. Density-lbm/ft3	76.57	76.61	76.66	76.5	76.57	76.52	76.43	76.52	76.52	76.73
Latent Heat-Btu/lbm	31.03	31.07	31.11	30.97	31.03	30.99	30.92	30.99	30.99	31.16
Specific Heat-Btu/lbm/F	0.313	0.313	0.312	0.313	0.313	0.313	0.314	0.313	0.313	0.312
Liq. Viscosity-lbm/ft-hr	0.356	0.357	0.358	0.355	0.356	0.356	0.354	0.356	0.356	0.359
Liq. Conductivity-Btu/hr-ft-F	0.026	0.026	0.026	0.0259	0.026	0.0259	0.0259	0.0259	0.0259	0.0261
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	1.1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	173									
Outlet Liq. Temperature-F	175.2									
Outlet Vap. Temperature-F	172.9									
Water Flow Rate-GPM										
Water inlet Temp.-F	107.7									
Water outlet Temp.-F	163.3									
Inlet G-lbm/hr/ft2	208918		Temp		161.4	Density	79.58			
Subcooling-F	2.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	865.7	874.3	863.7	861.7	875.3	451.1	120.8	107.7	103.5	0
Heat Loss-Watts	11.6	2.7	3.6	3.6	3.7	2.5	1.5	2.3	3.1	15.4
Heat Flux-Btu/Hr/ft2	15006	15155	14972	14937	15173	7820	2094	1867	1794	0
Wall Temp. #3-F	180.9	183.4	181.2	182.1	183.5	180.8	177.6	177.5	177.6	172.6
Wall Temp. #4-F	182.3	181	182.8	182.8	184.3	181.4	177.6	177.3	178	172
Wall Temp. #5-F	182.5	180.2	184	182.6	182.7	180.2	177.7	177.3	178	174.2
Wall Temp. #1-F	173	181.8	179.9	180.8	182	181.1	177.8	177	177	174.2
Wall Temp. #2-F	183	181.8	181	181.6	182.3	180.9	177.6	177.5	177.1	173.9
Instream Temp.-F	175.2	175	174.8	175.5	175.2	175.4	175.8	175.4	175.4	174.5
Avg. Wall Temp.-F	182.2	182	181.2	182.1	182.8	180.9	177.7	177.3	177.5	173.4
Avg. Wall DT.-F	6.3	6.3	5.7	5.9	6.9	5.1	1.8	1.8	2.1	0
Remaining Subcool-F	-11.2									
Exit Quality	0.11	0.25	0.39	0.52	0.66	0.73	0.75	0.76	0.78	0.78
EXP. H-Btu/Hr/ft2/F	2383.2	2399.9	2604.5	2531.7	2188.5	1526.8	1186.1	1017	871.4	0
COMPUTED H										
Jallouk	1691.5	1627.3	1542.2	1521.4	1515.3	1014.2	482.7	447.1	438.7	232.1
Szady1(Cudo tube)	2161.2	2169.8	2155	2160.3	2174	1551.1	831.7	762.5	748.6	339.8
Szady2	2049.6	2061.1	2041.3	2048.7	2065.1	1326.9	564.7	506.7	500.5	339.6
(RLIQ)	36175	31928	26071	21050	15777	11809	10124	9398	8761	8381
(F)	1.725	2.383	2.875	3.257	3.621	3.875	3.975	4.031	4.072	4.119
(HLIQ)	142.4	196.6	237.1	269	298.9	320	328.4	332.8	336.2	339.6
(HBOIL)	2161	2169.3	2154.1	2158.9	2172.1	1546.6	814.2	740.8	725.3	43.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	71.9									
DP Liquid Density-lbm/ft3	94.32									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.563	0.034	2.59	3.796	4.797					
Zero Corrections-psid	-0.175	0.032	0.126	0.061	0.061					
Corrected DP-Psid	0.738	0.002	2.464	3.735	4.736					
Actual DP-ft	1.07	4.91	2.75	2.82	3.25					
Measured TP-Psig	179.6				179.2					
Measured Overall-ft	0.75									
Computed DP-ft	1.19	1.97	2.61	3.88	5.02					
Friction-ft	0.03	0.09	0.18	0.23	0.28					
Acceleration-ft	0.03	0.06	0.09	0.09	0.1					
Elevation-ft	1.13	1.82	2.35	3.54	4.65					

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Run#	844									
Test Fluid	C4F8									
Date:	9/27/93									
Time:	8:28									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	179.7									
Sat. Temperature-F(inlet)	175.3									
Liq. Density-lbm/ft3	76.82	76.68	76.8	76.34	76.59	76.59	76.2	76.48	76.48	76.64
Latent Heat-Btu/lbm	31.24	31.13	31.22	30.84	31.05	31.05	30.72	30.95	30.95	31.09
Specific Heat-Btu/lbm/F	0.312	0.312	0.312	0.314	0.313	0.313	0.315	0.313	0.313	0.313
Liq. Viscosity-lbm/ft-hr	0.36	0.358	0.36	0.353	0.357	0.357	0.351	0.355	0.355	0.357
Liq. Conductivity-Btu/hr-ft-F	0.0261	0.026	0.0261	0.0258	0.026	0.026	0.0257	0.0259	0.0259	0.026
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	2									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	173.4									
Outlet Liq. Temperature-F	174.9									
Outlet Vap. Temperature-F	172.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	105.8									
Water outlet Temp.-F	157.1									
Inlet G-lbm/hr/ft2	374916		Temp	166.3	Density	78.55				
Subcooling-F	1.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	862.4	876	866	866.1	868.4	871.3	868.8	323.7	104.9	0
Heat Loss-Watts	9.2	2.1	2.8	3	2.9	2.1	1.4	1.9	2.3	11.8
Heat Flux-Btu/Hr/ft2	14949	15185	15012	15013	15018	15103	15060	5611	1818	0
Wall Temp. #3-F	181.5	183.4	180.5	183	183.4	183.8	184.9	179.9	177.6	174.2
Wall Temp. #4-F	182.9	180.9	182.3	183.6	183.8	183.9	184.9	179.8	178	173.7
Wall Temp. #5-F	183	179.9	183.2	183.3	182.6	182.7	183.7	179.4	177.9	175
Wall Temp. #1-F	178.4	182	179.4	182.3	182.5	183.6	185.4	179.7	177.1	175.6
Wall Temp. #2-F	183.4	182	180.5	182.9	182.8	184	185.1	180	177.3	175.2
Instream Temp.-F	174.1	174.7	174.2	176.2	175.1	175.1	176.8	175.6	175.6	174.9
Avg. Wall Temp.-F	182.7	182.1	180.7	183.1	182.9	183.5	184.8	179.8	177.6	174.7
Avg. Wall DT.-F	7.9	6.7	5.8	6.2	7.1	7.7	7.3	3.9	1.9	0
Remaining Subcool-F	-5.6									
Exit Quality	0.06	0.13	0.21	0.28	0.36	0.43	0.51	0.54	0.55	0.55
EXP. H-Btu/Hr/ft2/F	1886.5	2270.2	2589.7	2432.7	2101.6	1957.1	2057.6	1436.4	958.1	0
COMPUTED H										
Jallouk	1554.5	1519.8	1465.8	1455.8	1423.1	1428.2	1423.5	783.3	475.2	341.8
Szady1(Cudo tube)	2145.7	2169.1	2152.2	2174.2	2163.4	2170.1	2185.8	1322.5	775.4	484.3
Szady2	2030.6	2060	2037.5	2062.5	2049.3	2057.2	2074.4	1045.5	547.4	464.2
(RLIQ)	66217	62059	58619	52431	46709	41480	36827	32823	31520	31005
(F)	1.49	1.866	2.343	2.608	2.879	3.106	3.283	3.447	3.498	3.524
(HLIQ)	196	258.9	308.1	344.5	379.3	409.5	433.9	454.6	461	464.2
(HBOIL)	2145.1	2167.9	2150.1	2171.3	2159.5	2165.2	2180.1	1304.4	716.7	43.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	84.1									
DP Liquid Density-lbm/ft3	92.62									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.278	0.033	2.139	3.15	4.06					
Zero Corrections-psid	-0.176	0.032	0.126	0.061	0.061					
Corrected DP-Psid	0.453	0.001	2.013	3.089	3.999					
Actual DP-ft	1.57	4.88	3.47	3.86	4.42					
Measured TP-Psig	178.7				180.8					
Measured Overall-ft	-2.07									
Computed DP-ft	1.44	2.54	3.52	4.52	5.82					
Friction-ft	0.06	0.18	0.35	0.53	0.65					
Acceleration-ft	0.06	0.1	0.15	0.19	0.2					
Elevation-ft	1.32	2.26	3.01	3.8	4.97					

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Run#	845									
Test Fluid	C4F8									
Date:	9/27/93									
Time:	8:28									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	179.2									
Sat. Temperature-F(inlet)	175.1									
Liq. Density-lbm/ft3	76.94	76.71	76.68	76.55	76.64	76.68	76.48	76.64	76.64	76.8
Latent Heat-Btu/lbm	31.34	31.16	31.11	31.01	31.09	31.11	30.95	31.09	31.09	31.22
Specific Heat-Btu/lbm/F	0.311	0.312	0.312	0.313	0.313	0.312	0.313	0.313	0.313	0.312
Liq. Viscosity-lbm/ft-hr	0.362	0.358	0.358	0.356	0.357	0.358	0.355	0.357	0.357	0.36
Liq. Conductivity-Btu/hr-ft-F	0.0262	0.026	0.026	0.0259	0.026	0.026	0.0259	0.026	0.026	0.0261
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	2.8									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	1.7									
Inlet Temperature-F	172.7									
Outlet Liq. Temperature-F	174.8									
Outlet Vap. Temperature-F	172.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	105.9									
Water outlet Temp.-F	157.1									
Inlet G-lbm/hr/ft2	524162		Temp	166.8	Density	78.44				
Subcooling-F	2.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	869.5	861.3	867.8	867.4	864.5	869.8	859.1	864.4	104.7	0
Heat Loss-Watts	10	2.3	3.1	3.1	3.1	2.3	1.5	2.3	2.5	12.8
Heat Flux-Btu/Hr/ft2	15072	14930	15043	15036	14986	15077	14892	14984	1815	0
Wall Temp. #3-F	181.3	183.4	180.9	182.1	182.7	183.5	183.1	182.9	177	173.3
Wall Temp. #4-F	182.7	181.1	182.7	182.7	183.5	183.7	183.1	183.4	177.3	172.8
Wall Temp. #5-F	182.8	180.2	183.8	182.6	182	182.4	182	182.4	177.3	174.4
Wall Temp. #1-F	172.7	181.9	179.6	181.3	181.7	183.2	183.3	182.3	176.5	174.4
Wall Temp. #2-F	183.1	181.9	180.9	181.6	182.1	183.7	183.1	182.7	176.6	174.2
Instream Temp.-F	173.6	174.6	174.8	175.3	174.9	174.8	175.6	174.9	174.9	174.2
Avg. Wall Temp.-F	182.5	182.1	181	182.2	182.3	183.2	182.9	182.7	176.9	173.8
Avg. Wall DT.-F	8.2	6.8	5.5	6.2	6.7	7.7	6.6	7.2	2	0
Remaining Subcool-F	-3									
Exit Quality	0.03	0.08	0.14	0.19	0.25	0.3	0.35	0.41	0.41	0.41
EXP. H-Btu/Hr/ft2/F	1839.5	2195.5	2712.8	2426.9	2220.8	1953.4	2240.4	2091.9	926.9	0
COMPUTED H										
Jallouk	1515.1	1460.5	1428.1	1419.7	1383	1362.1	1338.4	1318.4	501.7	414.2
Szady1(Cudo tube)	2149.2	2150.6	2161.5	2167.2	2160.3	2166.7	2163.1	2163.2	795.1	546.3
Szady2	2035.8	2034.8	2047.9	2053.4	2043.6	2050.9	2043.5	2043.4	593	546.2
(RLIQ)	93385	90244	85267	80455	74980	69724	65082	59457	56548	55880
(F)	1.345	1.73	2.056	2.308	2.531	2.726	2.889	3.064	3.152	3.176
(HLIQ)	231	297.7	353.9	397.6	435.8	469.4	498.1	527.7	542.8	546.2
(HBOIL)	2148.3	2148.7	2158.3	2162.7	2154.4	2159.3	2154.3	2152.7	699.8	43.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.1									
DP Liquid Density-lbm/ft3	93.33									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.261	0.033	1.778	2.672	3.512					
Zero Corrections-psid	-0.175	0.032	0.126	0.061	0.061					
Corrected DP-Psid	0.436	0.001	1.652	2.611	3.451					
Actual DP-ft	1.61	4.86	4.19	4.83	5.53					
Measured TP-Psig	179.2				180.1					
Measured Overall-ft	-1.69									
Computed DP-ft	1.64	2.96	4.17	5.33	6.75					
Friction-ft	0.09	0.26	0.5	0.79	0.98					
Acceleration-ft	0.09	0.15	0.21	0.28	0.28					
Elevation-ft	1.46	2.55	3.46	4.26	5.48					

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1314

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Run#	846									
Test Fluid	C4F8									
Date:	9/27/93									
Time:	8:28									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	180									
Sat. Temperature-F(inlet)	175.4									
Liq. Density-lbm/ft3	76.94	76.78	76.68	76.45	76.55	76.57	76.43	76.52	76.55	76.71
Latent Heat-Btu/lbm	31.34	31.2	31.13	30.83	31.01	31.03	30.92	30.89	31.01	31.15
Specific Heat-Btu/lbm/F	0.311	0.312	0.312	0.313	0.313	0.313	0.314	0.313	0.313	0.312
Liq. Viscosity-lbm/ft-hr	0.362	0.359	0.358	0.355	0.356	0.356	0.354	0.356	0.356	0.358
Liq. Conductivity-Btu/hr-ft-F	0.0262	0.0261	0.026	0.0259	0.0259	0.026	0.0259	0.0259	0.0259	0.026
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	3.7									
Outlet Liq. Flow Rate-GPM	1.4									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	172.9									
Outlet Liq. Temperature-F	175.5									
Outlet Vap. Temperature-F	172.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	104.4									
Water outlet Temp.-F	153.3									
Inlet G-lbm/hr/ft2	690347		Temp		168	Density	78.18			
Subcooling-F	2.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	877.9	883	868	868.8	845.3	854.9	870.7	871.3	864.9	0
Heat Loss-Watts	10.1	2.3	3.1	3.2	3.1	2.4	1.5	2.3	3.1	13
Heat Flux-Btu/hr/ft2	15218	15308	15048	15060	14653	14819	15093	15103	14992	0
Wall Temp. #3-F	181.2	183.6	181.2	182.3	183	183.7	183.3	183	183.2	173.5
Wall Temp. #4-F	182.6	181.2	182.8	182.9	183.6	183.7	183.3	183.7	184.5	173.2
Wall Temp. #5-F	182.8	180.4	183.9	182.7	182.3	182.7	182.3	182.5	182.9	174.5
Wall Temp. #1-F	172.9	182	179.9	181.3	182	183.6	183.5	182.4	181.8	174.7
Wall Temp. #2-F	183.2	182.3	181.2	182	182.2	183.7	183.4	182.9	182.5	174.6
Instream Temp.-F	173.6	174.3	174.7	175.7	175.3	175.2	175.8	175.4	175.3	174.6
Avg. Wall Temp.-F	182.5	182.3	181.3	182.3	182.5	183.4	183.2	182.9	183	174.1
Avg. Wall DT.-F	8.2	7.3	5.9	5.9	6.5	7.5	6.7	6.8	7	0
Remaining Subcool-F	-1.6									
Exit Quality	0.02	0.06	0.1	0.14	0.18	0.22	0.26	0.3	0.34	0.34
EXP. H-Btu/hr/ft2/F	1853.1	2101.6	2552.4	2544.2	2241.2	1967.9	2260.1	2215.4	2141	0
COMPUTED H										
Jallouk	1485.7	1440	1398.7	1370.2	1315.1	1298	1294.4	1271.1	1236.2	487.6
Szady1(Cudo tube)	2159.7	2174.2	2161.6	2174.6	2142.8	2154.9	2181.7	2179.7	2172.4	635.5
Szady2	2049.3	2068.2	2048.9	2060.6	2017.2	2031.6	2064.9	2060.9	2049.3	635.4
(RLIQ)	123855	121012	116255	112098	106588	101324	96866	91063	85747	82617
(F)	1.241	1.575	1.873	2.083	2.288	2.466	2.602	2.751	2.886	2.962
(HLIQ)	265.8	337.6	401.9	449.9	491.4	527.6	559.4	591	619.9	635.4
(HBOIL)	2158.3	2171.5	2157	2168	2134.2	2144.3	2169.4	2165.1	2155.4	43.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.9									
DP Liquid Density-lbm/ft3	93.49									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.218	0.033	1.496	2.298	3.06					
Zero Corrections-psid	-0.175	0.032	0.126	0.061	0.061					
Corrected DP-Psid	0.393	0.001	1.37	2.237	2.999					
Actual DP-ft	1.7	4.87	4.74	5.55	6.41					
Measured TP-Psig	180				180.7					
Measured Overall-ft	-1.31									
Computed DP-ft	1.85	3.36	4.79	6.19	7.6					
Friction-ft	0.13	0.35	0.67	1.06	1.41					
Acceleration-ft	0.12	0.2	0.28	0.36	0.41					
Elevation-ft	1.6	2.8	3.84	4.76	5.78					

>478
26585
1803
>478

Run#	847									
Test Fluid	C4F8									
Date:	9/29/93									
Time:	9:42									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	181.4									
Sat. Temperature-F(inlet)	176									
Liq. Density-lbm/ft3	76.75	76.8	76.68	76.41	76.5	76.52	76.24	76.41	76.41	76.36
Latent Heat-Btu/lbm	31.18	31.22	31.13	30.9	30.97	30.99	30.76	30.9	30.9	30.86
Specific Heat-Btu/lbm/F	0.312	0.312	0.312	0.314	0.313	0.313	0.315	0.314	0.314	0.314
Liq. Viscosity-lbm/ft-hr	0.359	0.36	0.358	0.354	0.355	0.356	0.352	0.354	0.354	0.354
Liq. Conductivity-Btu/hr-ft-F	0.0261	0.0261	0.026	0.0259	0.0259	0.0259	0.0258	0.0259	0.0259	0.0258
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	4.6									
Outlet Liq. Flow Rate-GPM	1.4									
Outlet Vap. Flow Rate-GPM	2.2									
Inlet Temperature-F	173.5									
Outlet Liq. Temperature-F	174.8									
Outlet Vap. Temperature-F	172.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	100.1									
Water outlet Temp.-F	149.8									
Inlet G-lbm/hr/ft2	855628		Temp	169.1	Density	77.84				
Subcooling-F	2.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	856.6	858.2	861	857.5	855.5	860.3	856.4	847.6	852.6	851.8
Heat Loss-Watts	10.2	2.4	3.2	3.3	3.3	2.5	1.6	2.4	3	16.8
Heat Flux-Btu/Hr/ft2	14849	14876	14925	14864	14830	14913	14845	14693	14779	14765
Wall Temp. #3-F	182.4	184.9	182.8	183.9	185.2	186.3	186.2	183.9	182.3	181.9
Wall Temp. #4-F	183.7	182.5	184.3	184.5	185.7	186.6	186.2	185.5	184.1	188.1
Wall Temp. #5-F	183.3	181.3	184.9	184.5	184.3	185.8	185.7	183.8	183	180.5
Wall Temp. #1-F	173.5	183.3	181.3	182.9	183.8	185.8	187	184.5	181.9	179.4
Wall Temp. #2-F	184.1	183.3	182.6	183.5	183.9	186.3	187.1	185.5	183.1	181.2
Instream Temp.-F	174.4	174.2	174.7	175.9	175.5	175.4	176.8	175.9	175.9	176.1
Avg. Wall Temp.-F	183.4	183.5	182.8	184	184.4	186.1	186.4	184.6	182.9	181.8
Avg. Wall DT.-F	8.3	8.6	7.4	7.4	8.3	10.1	9.2	8.1	6.3	5.1
Remaining Subcool-F	-0.8									
Exit Quality	0.01	0.04	0.07	0.11	0.14	0.17	0.2	0.24	0.27	0.3
EXP. H-Btu/Hr/ft2/F	1788.1	1724.3	2023.6	2014.6	1796.5	1483.7	1619	1819.3	2341.4	2922.3
COMPUTED H										
Jallouk	1441.1	1399.9	1350.6	1318.6	1282.7	1259.4	1231	1201.5	1188.4	1173.1
Szady1(Cudo tube)	2142.7	2143.7	2154.1	2164.2	2159.2	2165.7	2175.4	2159.2	2167.1	2170.2
Szady2	2024.8	2024.8	2036.4	2044.6	2036.3	2043	2051.6	2028.6	2037	1984.8
(RLIQ)	155285	151857	147433	143879	138183	132888	129119	123120	117947	112978
(F)	1.156	1.45	1.73	1.932	2.111	2.268	2.391	2.527	2.645	2.752
(HLIQ)	294.3	369.1	440.7	493.2	538.5	578.1	611.2	645	675.2	703
(HBOIL)	2140.8	2140	2147.9	2155.6	2148	2151.9	2159.2	2139.8	2145.1	2145.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.3									
DP Liquid Density-lbm/ft3	93.3									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.274	0.847	1.32	2.068	2.624					
Zero Corrections-psid	0.001	-0.059	-0.184	0.02	0.028					
Corrected DP-Psid	0.273	0.906	1.484	2.048	2.596					
Actual DP-ft	1.93	3.18	4.58	5.91	7.17					
Measured TP-Psig	181.4				180.7					
Measured Overall-ft	1.32									
Computed DP-ft	2	3.71	5.34	6.98	8.5					
Friction-ft	0.16	0.45	0.83	1.31	1.83					
Acceleration-ft	0.15	0.26	0.36	0.45	0.56					
Elevation-ft	1.69	3	4.15	5.2	6.12					

Run#	848									
Test Fluid	C4F8									
Date:	9/29/93									
Time:	9:42									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	180.6									
Sat. Temperature-F(inlet)	175.7									
Liq. Density-lbm/ft3	76.66	76.82	76.82	76.43	76.61	76.61	76.22	76.48	76.52	76.5
Latent Heat-Btu/lbm	31.11	31.24	31.24	30.92	31.07	31.07	30.74	30.95	30.89	30.97
Specific Heat-Btu/lbm/F	0.312	0.312	0.312	0.314	0.313	0.313	0.315	0.313	0.313	0.313
Liq. Viscosity-lbm/ft-hr	0.358	0.36	0.36	0.354	0.357	0.357	0.352	0.355	0.356	0.355
Liq. Conductivity-Btu/hr-ft-F	0.026	0.0261	0.0261	0.0259	0.026	0.026	0.0257	0.0259	0.0259	0.0259
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	5.5									
Outlet Liq. Flow Rate-GPM	1.4									
Outlet Vap. Flow Rate-GPM	2.5									
Inlet Temperature-F	174.2									
Outlet Liq. Temperature-F	174.1									
Outlet Vap. Temperature-F	172.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	98.3									
Water outlet Temp.-F	148									
Inlet G-lbm/hr/ft2	1022456		Temp	169.3	Density	77.9				
Subcooling-F	1.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	867.7	862	859.1	856.8	875.4	868.4	865.3	863.3	857.6	855
Heat Loss-Watts	10.1	2.3	3.1	3.3	3.2	2.4	1.6	2.4	3	16.5
Heat Flux-Btu/ft-hr/ft2	15041	14942	14892	14852	15174	15018	14999	14965	14868	14821
Wall Temp. #3-F	182.1	184.6	182.3	183.8	184.8	185.7	186.4	183.9	182	181.5
Wall Temp. #4-F	183.6	182	183.8	184.6	185.3	185.8	188.4	185.3	183.8	185.9
Wall Temp. #5-F	183.2	181	184.4	184.5	183.8	185.2	185.8	183.7	182.7	180
Wall Temp. #1-F	174.2	183	180.6	183.1	183.6	185.3	187.4	184.5	181.6	179.1
Wall Temp. #2-F	184.1	182.9	182	183.6	183.7	185.7	187.4	185.6	182.9	181.2
Instream Temp.-F	174.8	174.1	174.1	175.8	175	175	176.7	175.6	175.4	175.5
Avg. Wall Temp.-F	183.3	183.1	182.2	184	184.1	185.5	186.7	184.6	182.6	181.5
Avg. Wall DT.-F	7.8	8.3	7.4	7.5	8.4	9.8	9.3	8.3	6.5	5.4
Remaining Subcool-F	-1.3									
Exit Quality	0.01	0.04	0.07	0.1	0.12	0.15	0.18	0.21	0.23	0.26
EXP. H-Btu/Hr/ft2/F	1935.7	1789.5	2011.9	1972.7	1803.4	1529.2	1612.5	1797.8	2277.2	2759.8
COMPUTED H										
Jallouk	1418.3	1341.7	1290	1264.7	1233.3	1202.8	1192	1162.3	1137.5	1117.6
Szady1(Cudo tube)	2161.4	2148.7	2147.4	2184.7	2180.9	2172.3	2191	2178.4	2172.9	2173.2
Szady2	2047.7	2029.5	2024.9	2042.2	2062.5	2048	2067.8	2051	1987.7	1988.4
(RLIQ)	185740	180783	175698	173282	168840	161611	158867	152048	148562	141527
(F)	1.21	1.479	1.715	1.886	2.048	2.188	2.294	2.421	2.531	2.63
(HLIQ)	356.7	434.1	503.2	556	602	643	676.3	712.5	744.6	773.7
(HBOIL)	2158.2	2142.8	2138.1	2152.4	2165.5	2153.3	2169.3	2153.7	2143.4	2140
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	84.9									
DP Liquid Density-lbm/ft3	92.51									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.257	0.739	1.13	1.794	2.253					
Zero Corrections-psid	0.001	-0.059	-0.164	0.02	0.028					
Corrected DP-Psid	0.256	0.798	1.294	1.774	2.225					
Actual DP-ft	1.94	3.34	4.82	6.34	7.75					
Measured TP-Psig	180.6				180.3					
Measured Overall-ft	0.56									
Computed DP-ft	2.12	4	5.85	7.7	9.48					
Friction-ft	0.23	0.59	1.06	1.62	2.24					
Acceleration-ft	0.22	0.35	0.47	0.58	0.7					
Elevation-ft	1.67	3.06	4.32	5.5	6.54					

Run#	849									
Test Fluid	C4F8									
Date:	9/29/93									
Time:	9:42									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	179.8									
Sat. Temperature-F(inlet)	175.3									
Liq. Density-lbm/ft3	77	76.96	76.84	76.64	76.75	76.68	76.45	76.55	76.57	76.66
Latent Heat-Btu/lbm	31.39	31.35	31.26	31.09	31.18	31.13	30.93	31.01	31.03	31.11
Specific Heat-Btu/lbm/F	0.311	0.311	0.312	0.313	0.312	0.312	0.313	0.313	0.313	0.312
Liq. Viscosity-lbm/ft-hr	0.363	0.362	0.36	0.357	0.359	0.358	0.355	0.356	0.356	0.358
Liq. Conductivity-Btu/hr-ft-F	0.0262	0.0262	0.0261	0.026	0.0261	0.026	0.0259	0.0259	0.026	0.026
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	5.5									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2.6									
Inlet Temperature-F	172.4									
Outlet Liq. Temperature-F	174.1									
Outlet Vap. Temperature-F	172.4									
Water Flow Rate-GPM										
Water inlet Temp.-F	101.4									
Water outlet Temp.-F	147.2									
Inlet G-lbm/hr/ft2	1023322		Temp	169	Density	77.96				
Subcooling-F	2.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1149.3	1153.8	1147.8	1156.9	1152.7	1156.2	481	102.6	96.8	99.9
Heat Loss-Watts	10.6	2.5	3.4	3.4	3.3	2.5	1.4	2	2.6	14.1
Heat Flux-Btu/Hr/ft2	19922	20000	19896	20054	19981	20042	8338	1777	1678	1732
Wall Temp. #3-F	182.3	186.9	183.6	184.1	184.1	185	179.8	176.7	176.5	175.2
Wall Temp. #4-F	184.3	182.7	185.7	184.9	184.9	184.7	179.7	176.7	177	175.7
Wall Temp. #5-F	183.7	181.5	185.7	184.9	182.9	183.8	179.3	176.7	177.1	175.7
Wall Temp. #1-F	172.4	183.9	181.7	182.7	184	185.5	180.1	176.6	176.2	175.9
Wall Temp. #2-F	184.6	183.8	183.3	183.7	184.4	186.4	179.9	176.9	176.3	175.4
Instream Temp.-F	173.3	173.5	174	174.9	174.4	174.7	175.7	175.3	176.2	174.8
Avg. Wall Temp.-F	183.7	184.3	183.6	184.2	184.1	184.8	179.8	176.7	176.6	175.5
Avg. Wall DT.-F	9.5	9.9	8.7	8.3	8.7	9.1	3.7	1.3	1.3	0.6
Remaining Subcool-F	-0.7									
Exit Quality	0.01	0.04	0.08	0.12	0.16	0.19	0.21	0.21	0.21	0.22
EXP. H-Btu/Hr/ft2/F	2091.7	2015.9	2293.3	2403.5	2284.4	2191.8	2263.7	1326.2	1248.3	2976.8
COMPUTED H										
Jallouk	1689.2	1574.1	1502.4	1462.9	1407.7	1369.4	885.3	605.1	604.5	608.9
Szady1(Cudo tube)	2484.8	2473.4	2475	2497.5	2489	2498.4	1628.4	874.4	864.5	872.7
Szady2	2394.5	2405.3	2486	2492.1	2477.9	2487.5	1383.2	737.8	739.8	744.9
(RLIQ)	183924	180203	174254	168887	161218	154778	151270	148970	148285	147109
(F)	1.152	1.468	1.771	1.991	2.185	2.347	2.442	2.484	2.497	2.514
(HLIQ)	337.7	430.7	519.9	595.4	641.9	690.1	719.2	730.9	734.8	739.3
(HBOIL)	2462.7	2469	2467.3	2486.7	2474.7	2480.8	1580.2	652.8	629.5	638.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.4									
DP Liquid Density-lbm/ft3	93.42									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.255	0.742	1.168	1.935	2.513					
Zero Corrections-psid	0.001	-0.059	-0.164	0.02	0.028					
Corrected DP-Psid	0.254	0.801	1.332	1.915	2.486					
Actual DP-ft	1.96	3.37	4.81	6.15	7.37					
Measured TP-Psig	179.8				179.5					
Measured Overall-ft	0.56									
Computed DP-ft	2.14	4.01	5.85	7.77	9.55					
Friction-ft	0.23	0.64	1.21	1.68	2.09					
Acceleration-ft	0.23	0.4	0.58	0.8	0.61					
Elevation-ft	1.68	2.97	4.08	5.51	6.84					

Run#	850									
Test Fluid	C4F8									
Date:	9/29/93									
Time:	9:42									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	182.4									
Sat. Temperature-F(inlet)	176.4									
Liq. Density-lbm/ft3	76.78	76.66	76.55	76.38	76.48	76.43	76.17	76.27	76.27	76.36
Latent Heat-Btu/lbm	31.2	31.11	31.01	30.88	30.95	30.92	30.7	30.78	30.78	30.86
Specific Heat-Btu/lbm/F	0.312	0.312	0.313	0.314	0.313	0.314	0.315	0.314	0.314	0.314
Liq. Viscosity-lbm/ft-hr	0.359	0.358	0.356	0.354	0.355	0.354	0.351	0.352	0.352	0.354
Liq. Conductivity-Btu/hr-ft-F	0.0261	0.026	0.0259	0.0258	0.0259	0.0259	0.0257	0.0258	0.0258	0.0258
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	4.6									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2.3									
Inlet Temperature-F	173.4									
Outlet Liq. Temperature-F	174.8									
Outlet Vap. Temperature-F	173.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	103.8									
Water outlet Temp.-F	148.6									
Inlet G-lbm/hr/ft2	855145		Temp	169.3	Density	77.9				
Subcooling-F	3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1159.3	1156.1	1155.7	1151.4	1184.3	630.1	96.8	95.9	93.6	96.5
Heat Loss-Watts	10.8	2.5	3.4	3.4	3.4	2.3	1.3	1.9	2.6	14.3
Heat Flux-Btu/Hr/ft2	20096	20040	20033	19959	20182	10922	1678	1662	1622	1673
Wall Temp. #3-F	183.3	187.9	184.6	185	185.2	182.2	178.2	177.9	177.5	176.4
Wall Temp. #4-F	185.4	183.8	188.7	185.9	188	182.4	178.3	177.8	178.1	176.6
Wall Temp. #5-F	184.8	182.4	186.8	186	184.2	181.5	178.4	177.8	178.3	177
Wall Temp. #1-F	173.4	185	182.7	183.7	185	182.6	178.7	177.7	177.4	176.4
Wall Temp. #2-F	185.5	185	184.4	184.6	185.4	183.1	178.5	177.9	177.5	176.5
Instream Temp.-F	174.3	174.8	175.3	176	175.6	175.9	176.9	176.5	176.5	176.1
Avg. Wall Temp.-F	184.9	185.4	184.6	185.2	185.2	182.2	178.4	177.8	177.8	176.6
Avg. Wall DT.-F	9.5	9.7	8.4	8.2	8.6	5.9	1.4	1.2	1.2	0.4
Remaining Subcool-F	-1.4									
Exit Quality	0.01	0.06	0.1	0.15	0.19	0.22	0.22	0.22	0.23	0.23
EXP. H-Btu/Hr/ft2/F	2106.1	2061.9	2386.4	2419.8	2336.5	1857.1	1161.9	1335.4	1367.3	4138.4
COMPUTED H										
Jallouk	1746.3	1650.4	1562.4	1516.3	1480.5	1042.4	548.6	548.2	548.1	552.6
Szady1(Cudo tube)	2487.3	2491	2496.1	2503.4	2514.1	1878.2	817.4	816.2	812.1	820.5
Szady2	2423.7	2428.2	2497.1	2501.6	2514	1689.1	655	658	659.7	665
(RLIQ)	164553	150697	144460	138409	130805	125702	124748	123702	123121	122082
(F)	1.222	1.566	1.882	2.116	2.324	2.461	2.5	2.519	2.538	2.551
(HLIQ)	311	398.8	479.7	540.2	592.6	628	639.1	643.5	647	651.3
(HBOIL)	2485.7	2487.6	2492.2	2495	2503	1854.5	658.1	652	642.2	651.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.2									
DP Liquid Density-lbm/ft3	93.31									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.276	0.869	1.424	2.222	2.858					
Zero Corrections-psid	0.001	-0.069	-0.164	0.02	0.028					
Corrected DP-Psid	0.275	0.928	1.588	2.202	2.83					
Actual DP-ft	1.93	3.14	4.34	5.62	6.78					
Measured TP-Psig	182.4				181.9					
Measured Overall-ft	0.94									
Computed DP-ft	1.98	3.65	5.29	7.06	8.72					
Friction-ft	0.18	0.52	0.98	1.3	1.62					
Acceleration-ft	0.18	0.32	0.42	0.43	0.44					
Elevation-ft	1.61	2.81	3.91	5.33	6.65					

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Run#	851									
Test Fluid	C4F8									
Date:	9/29/93									
Time:	9:42									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	181.7									
Sat. Temperature-F(inlet)	176.1									
Liq. Density-lbm/ft3	76.84	76.64	76.59	76.43	76.52	76.5	76.34	76.43	76.52	76.36
Latent Heat-Btu/lbm	31.26	31.09	31.05	30.92	30.99	30.97	30.84	30.92	30.99	30.86
Specific Heat-Btu/lbm/F	0.312	0.313	0.313	0.314	0.313	0.313	0.314	0.314	0.313	0.314
Liq. Viscosity-lbm/ft-hr	0.36	0.357	0.357	0.354	0.356	0.355	0.353	0.354	0.356	0.354
Liq. Conductivity-Btu/hr-ft-F	0.0261	0.026	0.026	0.0259	0.0259	0.0259	0.0258	0.0259	0.0259	0.0258
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	3.7									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	173.3									
Outlet Liq. Temperature-F	174.7									
Outlet Vap. Temperature-F	172.5									
Water Flow Rate-GPM										
Water inlet Temp.-F	103.6									
Water outlet Temp.-F	151.8									
Inlet G-lbm/hr/ft2	689769		Temp	168.3	Density	78.12				
Subcooling-F	2.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1158.1	1162.9	1159.2	1158.6	1159.2	644.9	98.2	97.2	94.2	97.5
Heat Loss-Watts	10.3	2.4	3.3	3.3	3.3	2.2	1.2	1.8	2.4	13.8
Heat Flux-Btu/Hr/ft2	20075	20158	20094	20084	20094	11179	1702	1685	1633	1690
Wall Temp. #3-F	183.1	187.5	184.2	184.9	185	182	177.4	177.2	176.7	176.4
Wall Temp. #4-F	185.1	183.5	186.9	185.8	185.8	182.4	177.7	177.2	177.3	176.6
Wall Temp. #5-F	184.6	182.2	186.5	185	184	181.4	178	177.2	177.7	177
Wall Temp. #1-F	173.3	184.7	182.9	183.6	184.6	182.5	178.2	177	176.6	176.4
Wall Temp. #2-F	185.2	184.7	184.1	184.5	185.1	182.8	178	177.3	176.7	176.6
Instream Temp.-F	174	174.9	176.1	176.8	176.4	176.5	176.2	175.8	176.4	176.1
Avg. Wall Temp.-F	184.5	185.1	184.2	185.1	184.9	182.1	177.9	177.2	177	176.6
Avg. Wall DT.-F	9.6	9.3	8.2	8.4	8.6	6.1	1.6	1.3	1.5	0.4
Remaining Subcool-F	-2.7									
Exit Quality	0.03	0.08	0.14	0.19	0.25	0.28	0.28	0.29	0.29	0.3
EXP. H-Btu/Hr/ft2/F	2092.7	2170.1	2445.4	2400.2	2331.9	1841.7	1075.3	1292.2	1069.9	3989.7
COMPUTED H										
Jallouk	1759.7	1705.6	1631.6	1569.6	1529.1	1075	520.5	521.4	520.5	524
Szady1(Cudo tube)	2482.2	2499.1	2498.6	2507.6	2504.6	1891.4	796.3	794.1	788.7	798.2
Szady2	2417.1	2438.8	2438	2509.2	2503.6	1698	611.9	613.9	614.3	619.1
(RLIQ)	123553	119426	112706	106435	99062	93703	92047	91120	90210	90205
(F)	1.32	1.708	2.045	2.299	2.526	2.679	2.728	2.75	2.771	2.775
(HLIQ)	282.7	366.4	438.8	494	542.2	575.2	586.5	590.7	594.9	596.5
(HBOIL)	2481	2496.4	2494.1	2501.2	2496.1	1873.5	671.8	665.5	651.3	668.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.8									
DP Liquid Density-lbm/ft3	93.37									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.287	1.019	1.688	2.557	3.272					
Zero Corrections-psid	-0.024	-0.081	-0.296	0.073	0.097					
Corrected DP-Psid	0.311	1.1	1.984	2.484	3.175					
Actual DP-ft	1.86	2.82	3.6	5.1	6.09					
Measured TP-Psig	181.7				181.1					
Measured Overall-ft	1.13									
Computed DP-ft	1.78	3.26	4.67	6.32	7.86					
Friction-ft	0.15	0.42	0.79	1.05	1.3					
Acceleration-ft	0.15	0.25	0.34	0.35	0.35					
Elevation-ft	1.49	2.58	3.55	4.92	6.21					

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Run#	852									
Test Fluid	C4F8									
Date:	9/30/93									
Time:	10:01									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	178.8									
Sat. Temperature-F(inlet)	174.9									
Liq. Density-lbm/ft3	76.87	76.68	76.82	76.29	76.61	76.59	76.22	76.57	76.61	76.36
Latent Heat-Btu/lbm	31.28	31.13	31.24	30.8	31.07	31.05	30.74	31.03	31.07	30.86
Specific Heat-Btu/lbm/F	0.311	0.312	0.312	0.314	0.313	0.313	0.315	0.313	0.313	0.314
Liq. Viscosity-lbm/ft-hr	0.361	0.359	0.36	0.353	0.357	0.357	0.352	0.356	0.357	0.354
Liq. Conductivity-Btu/hr-ft-F	0.0261	0.026	0.0261	0.0258	0.026	0.026	0.0257	0.026	0.026	0.0258
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	2.8									
Outlet Liq. Flow Rate-GPM	0.5									
Outlet Vap. Flow Rate-GPM	1.7									
Inlet Temperature-F	173.4									
Outlet Liq. Temperature-F	174.7									
Outlet Vap. Temperature-F	172.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	100.8									
Water outlet Temp.-F	157.7									
Inlet G-lbm/hr/ft2	524882		Temp	168.3	Density	78.55				
Subcooling-F	1.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1154	1154	1154	1154	1154	784.6	184	11.1	10	5.2
Heat Loss-Watts	11	2.5	3.4	3.6	3.5	2.3	1.4	2	2.6	15.7
Heat Flux-Btu/Hr/ft2	20004	20004	20004	20004	20004	13601	3190	192	173	90
Wall Temp. #3-F	183.5	187.1	183.3	185.9	185.1	182.4	179.9	177.5	176.6	178.2
Wall Temp. #4-F	185.2	183.1	185.2	188.5	188.1	182.9	179.7	177.2	176.9	178.6
Wall Temp. #5-F	184.7	181.5	185.5	186.4	184.8	182.1	179.3	177.4	177.1	178.2
Wall Temp. #1-F	179.4	184.6	181.3	185.1	184.8	182.5	181	177.8	176.2	178.6
Wall Temp. #2-F	185.5	184.3	183.1	185.7	185.3	182.9	180.5	177.8	176.3	178.4
Instream Temp.-F	173.9	174.7	174.1	176.4	176	176.1	176.7	176.2	176	176.1
Avg. Wall Temp.-F	184.7	184.9	183.2	188	185.3	182.5	180.1	177.5	176.6	178.4
Avg. Wall DT.-F	9.9	9.2	8.2	8.7	9.3	6.8	3.2	2.3	1.6	2.3
Remaining Subcool-F	-5.7									
Exit Quality	0.06	0.13	0.2	0.27	0.34	0.39	0.4	0.4	0.41	0.41
EXP. H-Btu/Hr/ft2/F	2016.3	2181.2	2433.3	2307	2140.4	2011.8	985.7	82.5	107.5	39.3
COMPUTED H										
Jallouk	1794.9	1745.1	1672	1650.6	106	106	106.4	106	106	106.2
Szady1(Cudo tube)	2476.4	2496.7	2480.3	2508.8	106	106	106.4	106	106	106.2
Szady2	2409.6	2422.9	2414.3	2512.1	106	106	106.4	106	106	106.2
(RLIQ)	92521	87072	79774	74484	74484	74484	74484	74484	74484	74484
(F)	1.493	1.956	2.317	2.572	2.572	2.572	2.572	2.572	2.572	2.572
(HLIQ)	258.9	338.9	398.9	444.6	444.6	444.6	444.6	444.6	444.6	444.6
(HBOIL)	2476.5	2484.7	2476.9	2504.2	2504.2	2504.2	2504.2	2504.2	2504.2	2504.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.6									
DP Liquid Density-lbm/ft3	93.81									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.307	1.198	1.969	2.925	3.719					
Zero Corrections-psid	-0.024	-0.081	-0.296	0.073	0.097					
Corrected DP-Psid	0.331	1.277	2.265	2.852	3.622					
Actual DP-ft	1.83	2.51	3.1	4.45	5.3					
Measured TP-Psig	178.8				178.4					
Measured Overall-ft	0.75									
Computed DP-ft	1.55	2.79	3.97	5.48	6.9					
Friction-ft	0.11	0.33	0.61	0.81	0.99					
Acceleration-ft	0.11	0.19	0.27	0.28	0.28					
Elevation-ft	1.32	2.27	3.08	4.4	5.62					

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Run#	853									
Test Fluid	C4F8									
Date:	9/30/93									
Time:	10:01									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	179.2									
Sat. Temperature-F(inlet)	175.1									
Liq. Density-lbm/ft3	76.87	76.57	76.75	76.31	76.52	76.55	76.17	76.43	76.45	76.31
Latent Heat-Btu/lbm	31.28	31.03	31.18	30.82	30.99	31.01	30.7	30.92	30.93	30.82
Specific Heat-Btu/lbm/F	0.311	0.313	0.312	0.314	0.313	0.313	0.315	0.314	0.313	0.314
Liq. Viscosity-lbm/ft-hr	0.361	0.356	0.359	0.353	0.356	0.356	0.351	0.354	0.356	0.353
Liq. Conductivity-Btu/hr-ft-F	0.0261	0.026	0.0261	0.0258	0.0259	0.0259	0.0257	0.0259	0.0259	0.0258
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	2									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	173.1									
Outlet Liq. Temperature-F	175.9									
Outlet Vap. Temperature-F	173									
Water Flow Rate-GPM										
Water Inlet Temp.-F	101.4									
Water outlet Temp.-F	158.9									
Inlet G-lbm/hr/ft2	376141		Temp		165.1	Density	78.81			
Subcooling-F	2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1152.7	1153.4	1157.5	1157.5	1153	691.4	307.2	96.5	87.5	99.4
Heat Loss-Watts	11.5	2.7	3.6	3.7	3.7	2.5	1.5	2.2	2.9	16.5
Heat Flux-Btu/Hr/ft2	19981	19993	20065	20065	19987	11985	5325	1673	1517	1723
Wall Temp. #3-F	183	186.9	183.1	184.7	188.1	182.8	180.3	177.9	177.2	177.6
Wall Temp. #4-F	184.9	183	185.5	185.4	188.2	182.9	180.3	178.1	177.7	177.8
Wall Temp. #5-F	184.6	181.7	185.9	185.5	184.6	182.1	179.9	178.4	177.8	177.8
Wall Temp. #1-F	173.1	184.1	181.4	184.1	184.1	183	181.6	177.9	176.9	178.3
Wall Temp. #2-F	185.3	184	183	184.7	184.6	182.8	181	178.1	177.1	178
Instream Temp.-F	173.9	175.2	174.4	176.3	175.4	175.3	176.9	175.8	175.7	176.3
Avg. Wall Temp.-F	184.5	184.5	183.3	184.9	185.4	182.7	180.6	178.1	177.3	177.9
Avg. Wall DT.-F	9.6	8.4	7.9	7.7	9	6.9	3.5	2.2	1.6	1.5
Remaining Subcool-F	-8									
Exit Quality	0.08	0.18	0.28	0.38	0.48	0.54	0.57	0.58	0.58	0.59
EXP. H-Btu/Hr/ft2/F	2071.2	2381.2	2526	2599.6	2209.2	1747.5	1530.5	758.8	965.2	1132
COMPUTED H										
Jallouk	1859.7	1794.6	1758.7	1734.6	81.2	81.2	81.6	81.3	81.3	81.4
Szady1(Cudo tube)	2474.8	2491.6	2496.9	2510.4	81.2	81.2	81.6	81.3	81.3	81.4
Szady2	2407.6	2429.4	2423.1	2453.6	81.2	81.2	81.6	81.3	81.3	81.4
(RLIQ)	65501	60066	52788	46701	46701	46701	46701	46701	46701	46701
(F)	1.601	2.149	2.58	2.889	2.889	2.889	2.889	2.889	2.889	2.889
(HLIQ)	211.1	283.9	340.4	382.4	382.4	382.4	382.4	382.4	382.4	382.4
(HBOIL)	2474.2	2490.4	2484.8	2507.4	2507.4	2507.4	2507.4	2507.4	2507.4	2507.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.6									
DP Liquid Density-lbm/ft3	93.81									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.527	1.421	2.323	3.385	4.291					
Zero Corrections-psid	-0.024	-0.081	-0.296	0.073	0.097					
Corrected DP-Psid	0.551	1.502	2.619	3.312	4.184					
Actual DP-ft	1.42	2.08	2.43	3.58	4.23					
Measured TP-Psig	179.2				178.9					
Measured Overall-ft	0.57									
Computed DP-ft	1.37	2.4	3.32	4.55	5.84					
Friction-ft	0.07	0.22	0.42	0.57	0.7					
Acceleration-ft	0.07	0.13	0.2	0.21	0.22					
Elevation-ft	1.23	2.04	2.7	3.77	4.93					

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Run#	854									
Test Fluid	C4F8									
Date:	9/30/93									
Time:	10:01									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	178.8									
Sat. Temperature-F(inlet)	174.9									
Liq. Density-lbm/ft3	76.55	76.57	76.68	76.41	76.55	76.52	76.22	76.41	76.41	76.36
Latent Heat-Btu/lbm	31.01	31.03	31.13	30.9	31.01	30.99	30.74	30.9	30.9	30.86
Specific Heat-Btu/lbm/F	0.313	0.313	0.312	0.314	0.313	0.313	0.315	0.314	0.314	0.314
Liq. Viscosity-lbm/ft-hr	0.356	0.356	0.358	0.354	0.356	0.356	0.352	0.354	0.354	0.354
Liq. Conductivity-Btu/hr-ft-F	0.0259	0.026	0.026	0.0259	0.0259	0.0259	0.0257	0.0259	0.0259	0.0258
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	1.1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	172.5									
Outlet Liq. Temperature-F	175.5									
Outlet Vap. Temperature-F	173.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	104.3									
Water outlet Temp.-F	163									
Inlet G-lbm/hr/ft2	208591		Temp		162	Density	79.46			
Subcooling-F	2.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1168	1166.2	1163.4	1160.8	495.7	176.3	85.2	83.1	83.5	200.5
Heat Loss-Watts	11.4	2.6	3.5	4.2	3.3	2.2	1.4	2.2	3	17.3
Heat Flux-Btu/f-hr/ft2	20247	20215	20167	20122	8593	3056	1477	1440	1447	3478
Wall Temp. #3-F	181.9	186.1	181.7	196.1	181.6	178.1	178.2	177.7	178.2	178.9
Wall Temp. #4-F	183.8	181.9	184	196.3	181.8	178.9	178.2	177.7	178.5	179.4
Wall Temp. #5-F	183.4	180.4	184.2	183.8	180.7	177.7	178.1	177.6	178.5	178.7
Wall Temp. #1-F	172.5	182.8	180.4	182.2	181	178.3	178.9	177.7	177.3	178.3
Wall Temp. #2-F	184.4	183	181.9	183.2	181.1	177.7	178.4	177.9	177.3	178.5
Instream Temp.-F	175.3	175.2	174.7	175.9	175.3	175.4	176.7	175.9	175.9	178.1
Avg. Wall Temp.-F	183.4	183.5	182	189.6	181.2	178.3	178.4	177.7	178	178.8
Avg. Wall DT.-F	7.2	7.3	6.4	12.8	5.5	2.7	1.6	1.8	2	2.5
Remaining Subcool-F	-15.8									
Exit Quality	0.16	0.34	0.52	0.71	0.78	0.81	0.83	0.84	0.85	0.88
EXP. H-Btu/Hr/ft2/F	2827.7	2755.5	3156.7	1573.2	1573.3	1126.9	927	820.8	725.7	1388.6
COMPUTED H										
Jallouk	2035.4	1902.1	1843.4	50.8	50.7	50.7	50.9	50.8	50.8	50.8
Szady1(Cudo tube)	2507.9	2505	2496.2	50.8	50.7	50.7	50.9	50.8	50.8	50.8
Szady2	2450.8	2448.9	2436.4	50.8	50.7	50.7	50.9	50.8	50.8	50.8
(RLIQ)	35270	28689	21682	21592	21592	21592	21592	21592	21592	21582
(F)	1.877	2.644	3.221	3.221	3.221	3.221	3.221	3.221	3.221	3.221
(HLIQ)	164.7	218	265.3	265.3	265.3	265.3	265.3	265.3	265.3	265.3
(HBOIL)	2507.7	2504.4	2496.2	2496.2	2496.2	2496.2	2496.2	2496.2	2496.2	2496.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.5									
DP Liquid Density-lbm/ft3	93.83									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.65	1.749	2.788	3.949	4.96					
Zero Corrections-psid	-0.024	-0.081	-0.296	0.073	0.097					
Corrected DP-Psid	0.674	1.83	3.082	3.876	4.863					
Actual DP-ft	1.19	1.46	1.56	2.52	2.96					
Measured TP-Psig	178.8				178.6					
Measured Overall-ft	0.38									
Computed DP-ft	1.1	1.79	2.51	3.74	4.65					
Friction-ft	0.04	0.11	0.19	0.24	0.3					
Acceleration-ft	0.04	0.08	0.1	0.11	0.11					
Elevation-ft	1.02	1.59	2.22	3.39	4.23					

Run#	855									
Test Fluid	C4F8									
Date:	9/30/93									
Time:	10:01									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	179.6									
Sat. Temperature-F(inlet)	175.2									
Liq. Density-lbm/ft3	76.75	76.73	76.71	76.43	76.57	76.57	76.24	76.38	76.41	76.5
Latent Heat-Btu/lbm	31.18	31.16	31.15	30.92	31.03	31.03	30.76	30.88	30.9	30.97
Specific Heat-Btu/lbm/F	0.312	0.312	0.312	0.314	0.313	0.313	0.315	0.314	0.314	0.313
Liq. Viscosity-lbm/ft-hr	0.359	0.359	0.358	0.354	0.356	0.356	0.352	0.354	0.354	0.355
Liq. Conductivity-Btu/hr-ft-F	0.0261	0.0261	0.026	0.0259	0.026	0.026	0.0258	0.0258	0.0259	0.0259
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	5.5									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	2.6									
Inlet Temperature-F	173.5									
Outlet Liq. Temperature-F	174.6									
Outlet Vap. Temperature-F	173.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	103.6									
Water outlet Temp.-F	160.4									
Inlet G-lbm/hr/ft2	1021589		Temp	169.6	Density	77.83				
Subcooling-F	1.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1446	1442.1	1445.3	1304.9	335.5	100.3	99.1	99.3	95	206.4
Heat Loss-Watts	11.9	2.8	3.6	5.4	3.8	2.2	1.5	2.2	3	16.8
Heat Flux-Btu/Hr/ft2	25065	24998	25053	22620	5816	1739	1718	1721	1647	3578
Wall Temp. #3-F	183	188.8	182.9	206.3	182.1	176.7	178.2	177.5	177.8	177.6
Wall Temp. #4-F	185.7	183	185.8	206.6	182.4	177.5	178.2	177.5	178.2	178.4
Wall Temp. #5-F	184.6	181	183.9	185.6	185.6	176.7	178.2	177.5	178.2	177.7
Wall Temp. #1-F	173.5	184.1	181.7	183.7	191.6	177.3	178.7	177.8	177.2	177.2
Wall Temp. #2-F	186	184.6	183.4	184.7	191.3	176.7	178.4	177.9	177.2	177.4
Instream Temp.-F	174.4	174.5	174.6	175.8	175.2	175.2	176.6	176	175.9	175.5
Avg. Wall Temp.-F	184.8	185.1	183.5	195.6	187.7	177.1	178.3	177.6	177.7	177.7
Avg. Wall DT.-F	9.3	9.5	7.7	18.7	12.3	1.8	1.7	1.6	1.7	2
Remaining Subcool-F	-2.9									
Exit Quality	0.03	0.07	0.12	0.16	0.17	0.18	0.18	0.18	0.19	0.19
EXP. H-Btu/Hr/ft2/F	2697.5	2632.7	3246.2	1207.8	474.3	981.5	1033.4	1101.8	943.4	1790.4
COMPUTED H										
Jallouk	1861.7	1770	1678.6	180.9	180.6	180.6	181.2	181	180.9	180.7
Szady1(Cudo tube)	2780.8	2779.9	2788.1	180.9	180.6	180.6	181.2	181	180.9	180.7
Szady2	2812.7	2810.9	2818.7	180.9	180.6	180.6	181.2	181	180.9	180.7
(RLIQ)	183465	176681	168255	168255	168255	168255	168255	168255	168255	168255
(F)	1.333	1.693	1.988	1.988	1.988	1.988	1.988	1.988	1.988	1.988
(HLIQ)	391.1	496.7	583.6	583.6	583.6	583.6	583.6	583.6	583.6	583.6
(HBOIL)	2778.2	2774.6	2777.6	2777.6	2777.6	2777.6	2777.6	2777.6	2777.6	2777.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.5									
DP Liquid Density-lbm/ft3	93.55									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.254	0.807	1.407	2.092	2.633					
Zero Corrections-psid	-0.024	-0.081	-0.298	0.073	0.097					
Corrected DP-Psid	0.278	0.888	1.703	2.019	2.536					
Actual DP-ft	1.92	3.22	4.13	5.98	7.3					
Measured TP-Psig	179.6				179.9					
Measured Overall-ft	-0.56									
Computed DP-ft	2.09	3.94	5.84	7.73	9.51					
Friction-ft	0.29	0.8	1.22	1.64	2.04					
Acceleration-ft	0.3	0.49	0.52	0.53	0.55					
Elevation-ft	1.5	2.65	4.1	5.56	6.91					

1787
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Run#	856									
Test Fluid	C4F8									
Date:	9/30/93									
Time:	10:01									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	180									
Sat. Temperature-F(inlet)	175.4									
Liq. Density-lbm/ft3	76.78	76.73	76.66	76.41	76.5	76.52	76.17	76.31	76.34	76.45
Latent Heat-Btu/lbm	31.2	31.16	31.11	30.9	30.97	30.99	30.7	30.82	30.84	30.93
Specific Heat-Btu/lbm/F	0.312	0.312	0.312	0.314	0.313	0.313	0.315	0.314	0.314	0.313
Liq. Viscosity-lbm/ft-hr	0.359	0.359	0.358	0.354	0.355	0.356	0.351	0.353	0.353	0.355
Liq. Conductivity-Btu/hr-ft-F	0.0261	0.0261	0.026	0.0259	0.0259	0.0259	0.0257	0.0258	0.0258	0.0259
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	4.6									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	2.2									
Inlet Temperature-F	173.5									
Outlet Liq. Temperature-F	174.9									
Outlet Vap. Temperature-F	173.5									
Water Flow Rate-GPM										
Water inlet Temp.-F	104.6									
Water outlet Temp.-F	162.5									
Inlet G-lbm/hr/ft2	856628		Temp	169.1	Density	77.94				
Subcooling-F	1.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1446.2	1445.4	1445	1253.8	326.8	96.1	94.9	95.4	94.4	198.8
Heat Loss-Watts	11.8	2.8	3.6	3.8	3.2	2.2	1.4	2.2	3	16.6
Heat Flux-Btu/Hr/ft2	25069	25055	25048	21734	5665	1668	1645	1654	1636	3448
Wall Temp. #3-F	182.8	188.8	182.9	185.7	179.2	177	178.3	177.8	178	177.7
Wall Temp. #4-F	185.7	183.1	186.1	186.5	179.6	177.8	178.3	177.7	178.5	178.3
Wall Temp. #5-F	184.5	181.4	183.9	185.1	179.2	177	178.3	177.7	178.5	177.7
Wall Temp. #1-F	173.5	184.5	181.9	183.9	179.9	177.5	178.7	177.8	177.4	177.2
Wall Temp. #2-F	185.9	184.5	183.4	184.8	179.8	177	178.6	178.1	177.5	177.4
Instream Temp.-F	174.3	174.5	174.8	175.9	176.5	175.4	176.9	176.3	176.2	175.7
Avg. Wall Temp.-F	184.7	185.2	183.6	185.3	179.6	177.3	178.4	177.8	178	177.7
Avg. Wall DT.-F	9.3	9.6	7.6	8.4	3.9	1.8	1.5	1.4	1.7	1.8
Remaining Subcool-F	-3.6									
Exit Quality	0.04	0.09	0.15	0.19	0.21	0.21	0.21	0.22	0.22	0.23
EXP. H-Btu/Hr/ft2/F	2697.9	2611.9	3277.3	2581.9	1464.2	900.6	1122.4	1144.2	959.2	1910
COMPUTED H										
Jallouk	1940.8	1834.2	1750.3	157	156.8	156.8	157.4	157.2	157.1	156.9
Szady1(Cudo tube)	2779.2	2782.3	2787.4	157	156.8	156.8	157.4	157.2	157.1	156.9
Szady2	2810.7	2814.5	2820.8	157	156.8	156.8	157.4	157.2	157.1	156.9
(RLIQ)	152954	146137	137927	137927	137927	137927	137927	137927	137927	137927
(F)	1.38	1.778	2.097	2.097	2.097	2.097	2.097	2.097	2.097	2.097
(HLIQ)	351.2	452.7	534.4	534.4	534.4	534.4	534.4	534.4	534.4	534.4
(HBOIL)	2777.4	2778.3	2780.8	2780.8	2780.8	2780.8	2780.8	2780.8	2780.8	2780.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78									
DP Liquid Density-lbm/ft3	93.48									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.278	0.829	1.588	2.348	2.964					
Zero Corrections-psid	-0.024	-0.081	-0.296	0.073	0.097					
Corrected DP-Psid	0.302	0.911	1.884	2.275	2.867					
Actual DP-ft	1.88	3.18	3.78	5.5	6.67					
Measured TP-Psig	180				180.1					
Measured Overall-ft	-0.19									
Computed DP-ft	1.91	3.56	5.34	7.11	8.77					
Friction-ft	0.23	0.64	0.97	1.3	1.62					
Acceleration-ft	0.24	0.39	0.42	0.43	0.44					
Elevation-ft	1.44	2.52	3.95	5.38	6.7					

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Run#	857									
Test Fluid	C4F8									
Date:	9/30/93									
Time:	15:05									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	181.4									
Sat. Temperature-F(inlet)	176									
Liq. Density-lbm/ft3	76.61	76.43	76.43	76.24	76.36	76.34	76.2	76.31	76.41	76.24
Latent Heat-Btu/lbm	31.07	30.92	30.92	30.76	30.86	30.84	30.72	30.82	30.9	30.76
Specific Heat-Btu/lbm/F	0.313	0.314	0.314	0.315	0.314	0.314	0.315	0.314	0.314	0.315
Liq. Viscosity-lbm/ft-hr	0.357	0.354	0.354	0.352	0.354	0.353	0.351	0.353	0.354	0.352
Liq. Conductivity-Btu/hr-ft-F	0.026	0.0259	0.0259	0.0258	0.0258	0.0258	0.0257	0.0258	0.0259	0.0258
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	3.6									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	174									
Outlet Liq. Temperature-F	175.4									
Outlet Vap. Temperature-F	173.3									
Water Flow Rate-GPM										
Water inlet Temp.-F	104.7									
Water outlet Temp.-F	162.4									
Inlet G-lbm/hr/ft2	669811		Temp	169	Density	77.86				
Subcooling-F	2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1443.4	1442.5	1443.4	994.7	329.3	97.2	106.9	101.9	95.5	204.2
Heat Loss-Watts	11.4	2.6	3.5	3.5	3	2.1	1.4	2.1	2.8	16.2
Heat Flux-Btu/Hr/ft2	25020	25005	25020	17242	5708	1685	1853	1766	1655	3540
Wall Temp. #3-F	183.6	189.5	183.7	184	179.9	177.6	178.6	177.9	178.4	178.8
Wall Temp. #4-F	188.3	183.8	186.7	184.8	180.3	178.4	178.6	178	178.7	179.6
Wall Temp. #5-F	185.3	182	184.8	184.2	179.7	177.6	178.6	177.9	178.7	179
Wall Temp. #1-F	174	184.8	182.4	183.5	179.9	178.2	179.1	177.9	177.5	178.4
Wall Temp. #2-F	186.4	185.1	184.2	184	179.9	177.6	178.8	178.4	177.8	178.6
Instream Temp.-F	175	175.8	175.8	176.6	176.1	176.2	176.8	176.3	175.9	176.6
Avg. Wall Temp.-F	185.4	185.8	184.3	184.1	180	178	178.7	178	178.2	178.9
Avg. Wall DT.-F	9.3	8.9	7.3	6.7	3.6	1.7	1.9	1.6	2.2	2.1
Remaining Subcool-F	-5									
Exit Quality	0.05	0.12	0.19	0.24	0.26	0.26	0.27	0.27	0.28	0.29
EXP. H-Btu/Hr/ft2/F	2699.3	2819	3418.4	2556	1589.1	1006.6	998.3	1076.9	737.3	1669.6
COMPUTED H										
Jallouk	2000.7	1910.4	129	129.3	129.1	129.2	129.4	129.2	129.1	129.3
Szady1(Cudo tube)	2785.6	2798.2	129	129.3	129.1	129.2	129.4	129.2	129.1	129.3
Szady2	2819.3	2833.4	129	129.3	129.1	129.2	129.4	129.2	129.1	129.3
(RLIQ)	119603	113003	113003	113003	113003	113003	113003	113003	113003	113003
(F)	1.459	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91
(HLIQ)	305.8	400.9	400.9	400.9	400.9	400.9	400.9	400.9	400.9	400.9
(HBOIL)	2784.3	2793.5	2793.5	2793.5	2793.5	2793.5	2793.5	2793.5	2793.5	2793.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77									
DP Liquid Density-lbm/ft3	93.62									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.3	1.017	1.841	2.681	3.377					
Zero Corrections-psid	-0.024	-0.081	-0.296	0.073	0.097					
Corrected DP-Psid	0.324	1.098	2.137	2.608	3.28					
Actual DP-ft	1.84	2.84	3.33	4.9	5.93					
Measured TP-Psig	181.4				181.5					
Measured Overall-ft	-0.19									
Computed DP-ft	1.7	3.11	4.76	6.4	7.94					
Friction-ft	0.17	0.48	0.71	0.95	1.18					
Acceleration-ft	0.17	0.28	0.3	0.31	0.32					
Elevation-ft	1.35	2.36	3.75	5.14	6.43					

Run#	858									
Test Fluid	C4F8									
Date:	9/30/93									
Time:	15:05									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	181.7									
Sat. Temperature-F(inlet)	176.1									
Liq. Density-lbm/ft3	76.57	76.27	76.38	76.17	76.31	76.31	76.06	76.22	76.22	76.15
Latent Heat-Btu/lbm	31.03	30.78	30.88	30.7	30.82	30.82	30.6	30.74	30.74	30.68
Specific Heat-Btu/lbm/F	0.313	0.314	0.314	0.315	0.314	0.314	0.315	0.315	0.315	0.315
Liq. Viscosity-lbm/ft-hr	0.356	0.352	0.354	0.351	0.353	0.353	0.349	0.352	0.352	0.351
Liq. Conductivity-Btu/hr-ft-F	0.026	0.0258	0.0258	0.0257	0.0258	0.0258	0.0256	0.0257	0.0257	0.0257
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	2.9									
Outlet Liq. Flow Rate-GPM	0.6									
Outlet Vap. Flow Rate-GPM	1.8									
Inlet Temperature-F	174.1									
Outlet Liq. Temperature-F	175.6									
Outlet Vap. Temperature-F	173.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	104.8									
Water outlet Temp.-F	162.4									
Inlet G-lbm/hr/ft2	540328		Temp	168.5	Density	78.07				
Subcooling-F	2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1437.4	1436.7	1435.3	988.5	326.9	96.8	105.9	101.1	95.1	202.9
Heat Loss-Watts	11.5	2.7	3.5	3.5	3.1	2.1	1.4	2.1	2.8	16.5
Heat Flux-Btu/Hr/ft2	24916	24904	24880	17135	5667	1678	1836	1753	1648	3517
Wall Temp. #3-F	183.7	189.7	184	184.2	180.1	177.9	179.2	178.6	179	178.3
Wall Temp. #4-F	188.6	183.9	188.9	185	180.4	178.7	179.2	178.6	179.1	178.8
Wall Temp. #5-F	185.7	182.2	185.1	184.3	179.9	177.9	179.3	178.5	179.1	179.4
Wall Temp. #1-F	174.1	185.2	182.6	183.8	180.1	178.4	179.6	178.6	178	178.9
Wall Temp. #2-F	186.6	185.4	184.6	184.4	180.1	177.9	179.3	178	178	178.1
Instream Temp.-F	175.2	176.5	176	176.9	176.3	176.3	177.4	176.7	176.7	177
Avg. Wall Temp.-F	185.7	186.1	184.5	184.3	180.1	178.2	179.3	178.7	178.6	179.3
Avg. Wall DT.-F	9.3	8.4	7.4	6.7	3.6	1.8	1.8	1.9	1.9	2.1
Remaining Subcool-F	-6.6									
Exit Quality	0.07	0.15	0.24	0.3	0.32	0.33	0.33	0.34	0.35	0.36
EXP. H-Btu/Hr/ft2/F	2672.3	2956.2	3361.9	2576.4	1587.8	907.4	999.3	931.8	883.7	1642.7
COMPUTED H										
Jallouk	2087.5	1965.9	108.7	109	108.8	108.8	109.1	108.9	108.9	109
Szady1(Cudo tube)	2782.2	2799.5	108.7	109	108.8	108.8	109.1	108.9	108.9	109
Szady2	2814.8	2838	108.7	109	108.8	108.8	109.1	108.9	108.9	109
(RLIQ)	95847	89266	89266	89266	89266	89266	89266	89266	89266	89266
(F)	1.538	2.041	2.041	2.041	2.041	2.041	2.041	2.041	2.041	2.041
(HLIQ)	271.6	361.1	361.1	361.1	361.1	361.1	361.1	361.1	361.1	361.1
(HBOIL)	2781.3	2797.5	2797.5	2797.5	2797.5	2797.5	2797.5	2797.5	2797.5	2797.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.8									
DP Liquid Density-lbm/ft3	93.54									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.304	1.178	2.075	2.987	3.754					
Zero Corrections-psid	-0.024	-0.061	-0.296	0.073	0.097					
Corrected DP-Psid	0.328	1.259	2.371	2.914	3.657					
Actual DP-ft	1.84	2.53	2.89	4.82	5.21					
Measured TP-Psig	181.7				181.8					
Measured Overall-ft	-0.19									
Computed DP-ft	1.55	2.78	4.21	5.75	7.2					
Friction-ft	0.13	0.37	0.58	0.77	0.94					
Acceleration-ft	0.13	0.22	0.24	0.24	0.26					
Elevation-ft	1.29	2.19	3.39	4.74	5.99					

1700?
1814.5
113.6
1700?

Run#	859									
Test Fluid	C4F8									
Date:	9/30/93									
Time:	15:05									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	179									
Sat. Temperature-F(inlet)	175									
Liq. Density-lbm/ft3	76.57	76.61	76.68	76.41	76.52	76.55	76.29	76.45	76.48	76.41
Latent Heat-Btu/lbm	31.03	31.07	31.13	30.9	30.99	31.01	30.8	30.93	30.95	30.9
Specific Heat-Btu/lbm/F	0.313	0.313	0.312	0.314	0.313	0.313	0.314	0.313	0.313	0.314
Liq. Viscosity-lbm/ft-hr	0.356	0.357	0.358	0.354	0.358	0.356	0.353	0.355	0.355	0.354
Liq. Conductivity-Btu/hr-ft-F	0.026	0.026	0.026	0.0259	0.0259	0.0259	0.0258	0.0259	0.0259	0.0259
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	2									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	173.8									
Outlet Liq. Temperature-F	174.8									
Outlet Vap. Temperature-F	173									
Water Flow Rate-GPM										
Water Inlet Temp.-F	103.8									
Water outlet Temp.-F	160.2									
Inlet G-lbm/hr/ft2	3738791		Temp		167.5	Density	78.29			
Subcooling-F	1.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE6	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1449.4	1451.1	1452	991.6	327.6	96.8	106.3	102.2	96	203.9
Heat Loss-Watts	11	2.6	3.4	3.4	2.9	2	1.3	2	2.7	16.7
Heat Flux-Btu/Hr/ft2	25124	25154	25169	17189	5678	1678	1843	1772	1664	3534
Wall Temp. #3-F	182.6	188.8	183	184.2	179.4	177	178.3	177.7	178.1	178.5
Wall Temp. #4-F	185.5	182.9	186.2	184.6	179.6	177.9	178.3	177.7	178.6	179.2
Wall Temp. #5-F	184.4	181.1	184.1	183.2	178.9	177.1	178.2	177.6	178.5	178.6
Wall Temp. #1-F	173.8	184	181.6	182.3	179.3	177.6	178.7	177.7	177.3	178
Wall Temp. #2-F	185.6	184.3	183.4	183.1	179.3	177	178.4	177.9	177.4	178.3
Instream Temp.-F	175.2	175	174.7	175.9	175.4	175.3	176.4	175.7	175.6	175.9
Avg. Wall Temp.-F	184.5	185	183.6	183.6	179.3	177.4	178.4	177.7	178	178.5
Avg. Wall DT.-F	8.2	8.9	7.7	6.9	3.6	2	1.9	1.9	2.3	2.5
Remaining Subcool-F	-11.4									
Exit Quality	0.11	0.24	0.37	0.46	0.48	0.49	0.5	0.51	0.52	0.54
EXP. H-Btu/Hr/ft2/F	3067.9	2838	3263.6	2491.8	1569.4	829	971.5	913.2	722	1436.6
COMPUTED H										
Jallouk	2159.6	2062.8	80.7	80.9	80.8	80.8	81	80.9	80.9	80.9
Szady1(Cudo tube)	2793.7	2793.1	80.7	80.9	80.8	80.8	81	80.9	80.9	80.9
Szady2	2830.3	2829.4	80.7	80.9	80.8	80.8	81	80.9	80.9	80.9
(RLIQ)	64640	56241	56241	56241	56241	56241	56241	56241	56241	56241
(F)	1.731	2.371	2.371	2.371	2.371	2.371	2.371	2.371	2.371	2.371
(HLIQ)	227.5	311.4	311.4	311.4	311.4	311.4	311.4	311.4	311.4	311.4
(HBOIL)	2793.1	2791.8	2791.8	2791.8	2791.8	2791.8	2791.8	2791.8	2791.8	2791.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.3									
DP Liquid Density-lbm/ft3	93.44									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.559	1.562	2.439	3.522	4.417					
Zero Corrections-psid	-0.024	-0.081	-0.296	0.073	0.097					
Corrected DP-Psid	0.583	1.643	2.735	3.449	4.32					
Actual DP-ft	1.35	1.8	2.18	3.28	3.93					
Measured TP-Psig	179				179.5					
Measured Overall-ft	-0.94									
Computed DP-ft	1.3	2.28	3.53	4.93	6.24					
Friction-ft	0.09	0.25	0.4	0.52	0.63					
Acceleration-ft	0.09	0.16	0.17	0.18	0.19					
Elevation-ft	1.13	1.88	2.96	4.23	5.41					

1768
181-
421
1768

Run#	860									
Test Fluid	C4F8									
Date:	10/1/93									
Time:	11:05									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	244.1									
Sat. Temperature-F(inlet)	199									
Liq. Density-lbm/ft3	70.01	70.34	70.31	70.28	70.25	70.19	70.04	70.04	70.04	70.31
Latent Heat-Btu/lbm	25.64	25.82	25.79	25.77	25.74	25.69	25.56	25.56	25.56	25.79
Specific Heat-Btu/lbm/F	0.357	0.354	0.354	0.354	0.355	0.355	0.357	0.357	0.357	0.354
Liq. Viscosity-lbm/ft-hr	0.278	0.279	0.279	0.279	0.278	0.278	0.278	0.278	0.278	0.279
Liq. Conductivity-Btu/hr-ft-F	0.0222	0.0224	0.0224	0.0223	0.0223	0.0223	0.0222	0.0222	0.0222	0.0224
Liq. Prandtl No.	4.43	4.42	4.42	4.42	4.42	4.43	4.43	4.43	4.43	4.42
Inlet Flow Rate-GPM	5.9									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	3.5									
Inlet Temperature-F	198.8									
Outlet Liq. Temperature-F	198.5									
Outlet Vap. Temperature-F	197.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	180.5									
Water outlet Temp.-F	185.8									
Inlet G-lbm/hr/ft2	1004490		Temp	195.6	Density	71.34				
Subcooling-F	0.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	291.3	285.6	283.6	283.1	286.4	289.8	288.3	282.4	283.9	283.8
Heat Loss-Watts	14.9	3.5	4.6	4.9	4.9	3.9	2.7	3.9	4.7	26.1
Heat Flux-Btu/hr/ft2	5049	4951	4916	4907	4965	5023	4997	4895	4921	4919
Wall Temp. #3-F	203.5	202.4	201.3	202.3	201.5	202.3	203	202.4	202.2	200.7
Wall Temp. #4-F	203.4	202.6	201.9	202.6	201.9	202.8	203	202.8	203	202
Wall Temp. #5-F	203.9	202.8	202.6	201.8	201.5	201.8	202.4	202.2	202.9	200.7
Wall Temp. #1-F	198.8	202.6	201.3	201.8	201.7	202.6	203	202.3	201.6	200
Wall Temp. #2-F	203.7	202.6	201.9	201.9	201.7	201.8	203	202.8	201.8	200.4
Instream Temp.-F	200.1	199	199.1	199.2	199.3	199.5	200	200	200	199.1
Avg. Wall Temp.-F	203.6	202.6	201.6	202.1	201.7	202.4	202.9	202.5	202.3	200.8
Avg. Wall DT.-F	3.3	3.3	2.3	2.7	2.2	2.6	2.7	2.3	2.1	1.4
Remaining Subcool-F	-0.7									
Exit Quality	0.01	0.02	0.03	0.04	0.05	0.07	0.08	0.09	0.1	0.11
EXP. H-Btu/Hr/ft2/F	1531.6	1488.4	2158.2	1815.4	2281.9	1897.1	1882.9	2148.2	2368.7	3421.8
COMPUTED H										
Jallouk	838.9	815.9	809.2	805.9	808.5	811.8	810	800.5	800.9	795.7
Szady1(Cudo tube)	1421.5	1399.8	1397.8	1399.3	1409.6	1420.9	1423.6	1411.4	1416.5	1409.7
Szady2	1134.6	1113.3	1112.6	1115.4	1127.4	1140.5	1144.1	1132	1138.2	1132.1
(RLIQ)	237817	231685	229331	226997	224641	222522	221212	218531	215984	210614
(F)	1.14	1.279	1.384	1.468	1.542	1.607	1.665	1.72	1.771	1.827
(HLIQ)	361.5	392.7	425.1	451.1	472.8	494.3	513	530	545.8	561
(HBOIL)	1414.3	1389.4	1384.6	1383.5	1391.5	1400.7	1401	1396	1388.9	1379.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77									
DP Liquid Density-lbm/ft3	93.62									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.317	0.631	1.183	1.549	1.959					
Zero Corrections-psid	-0.051	-0.039	0.228	-0.003	0.022					
Corrected DP-Psid	0.368	0.67	0.955	1.552	1.937					
Actual DP-ft	1.91	3.86	6.03	7.47	9.18					
Measured TP-Psig	244.1				242.5					
Measured Overall-ft	3.28									
Computed DP-ft	2.16	4.21	6.22	8.21	10.05					
Friction-ft	0.19	0.4	0.64	0.89	1.14					
Acceleration-ft	0.1	0.15	0.19	0.23	0.26					
Elevation-ft	1.87	3.66	5.39	7.09	8.65					

Run#	861									
Test Fluid	C4F8									
Date:	10/1/83									
Time:	11:05									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	218.2									
Sat. Temperature-F(inlet)	190									
Liq. Density-lbm/ft3	73.03	73.13	73.05	72.87	72.84	72.87	72.62	72.62	72.71	72.97
Latent Heat-Btu/lbm	28.08	28.18	28.1	27.94	27.92	27.94	27.74	27.74	27.81	28.03
Specific Heat-Btu/lbm/F	0.333	0.332	0.333	0.334	0.334	0.334	0.336	0.336	0.335	0.334
Liq. Viscosity-lbm/ft-hr	0.311	0.312	0.311	0.309	0.309	0.309	0.306	0.306	0.307	0.31
Liq. Conductivity-Btu/hr-ft-F	0.0238	0.0239	0.0239	0.0238	0.0237	0.0238	0.0236	0.0236	0.0237	0.0238
Liq. Prandtl No.	4.34	4.34	4.34	4.35	4.35	4.35	4.35	4.35	4.35	4.34
Inlet Flow Rate-GPM	5.7									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	3									
Inlet Temperature-F	188.6									
Outlet Liq. Temperature-F	189									
Outlet Vap. Temperature-F	187.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	130.5									
Water outlet Temp.-F	182.3									
Inlet G-lbm/hr/ft2	1012383		Temp	184.1	Density	74.42				
Subcooling-F	1.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	292.4	284	291	288.2	281.8	284.8	286.5	283.3	281.7	289.5
Heat Loss-Watts	11.7	2.7	3.5	3.6	3.5	2.5	1.7	2.6	3.4	18.5
Heat Flux-Btu/Hr/ft2	5069	4923	5044	4996	4885	4937	4966	4911	4883	5018
Wall Temp. #3-F	194.3	193.2	192.2	193.5	192.7	193.1	193.9	193.5	193.4	191.5
Wall Temp. #4-F	194.3	193.3	192.9	193.7	193.1	194	193.9	193.7	194.1	192.7
Wall Temp. #5-F	195.1	193.1	193.4	193	192.8	192.7	193.5	193.4	193.7	191.5
Wall Temp. #1-F	188.6	193.4	192.2	192.6	192.8	193.5	193.7	193.3	192.7	190.4
Wall Temp. #2-F	194.8	193.6	192.6	193	192.9	192.7	193.7	193.7	193	190.9
Instream Temp.-F	189.5	189.1	189.4	190.1	190.2	190.1	191	191	190.7	189.7
Avg. Wall Temp.-F	194.8	193.4	192.5	193.2	192.9	193.3	193.7	193.5	193.4	191.4
Avg. Wall DT.-F	4.9	4.1	2.9	2.9	2.5	3	2.5	2.3	2.5	1.5
Remaining Subcool-F	0.5									
Exit Quality	-0.01	0	0.01	0.02	0.03	0.04	0.05	0.07	0.08	0.09
EXP. H-Btu/Hr/ft2/F	1035.3	1214.8	1741.2	1738.1	1970.3	1644.6	1974.2	2136.9	1935.5	3408.4
COMPUTED H										
Jallouk	801.1	786.2	788.3	781.9	770.5	772.1	775.7	770.2	768.3	771.6
Szady1(Cudo tube)	1337.8	1316.1	1336.6	1337.2	1325.4	1333.2	1345	1338.5	1335.6	1347.9
Szady2	1047.8	1024.7	1048.9	1050.8	1039.7	1049.2	1062.4	1057.7	1054.7	1068.8
(RLIQ)	219065	212189	210864	210286	208315	205816	205648	203428	200579	196294
(F)	1.004	1.004	1.225	1.349	1.444	1.525	1.593	1.658	1.719	1.782
(HLIQ)	301.5	301.2	367.7	405.6	434.4	459.7	480.2	499.9	517.9	535.6
(HBOIL)	1332.7	1310.8	1327.3	1324.7	1309.6	1314.9	1324.2	1315.9	1309.2	1319.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.7									
DP Liquid Density-lbm/ft3	93.24									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.279	0.537	1.067	1.38	1.767					
Zero Corrections-psid	-0.051	-0.039	0.228	-0.003	0.022					
Corrected DP-Psid	0.33	0.576	0.839	1.383	1.745					
Actual DP-ft	1.9	3.97	6.01	7.49	9.17					
Measured TP-Psig	218.2				218.6					
Measured Overall-ft	3.16									
Computed DP-ft	2.16	4.27	6.28	8.28	10.1					
Friction-ft	0.16	0.35	0.58	0.83	1.08					
Acceleration-ft	0.04	0.13	0.18	0.23	0.27					
Elevation-ft	1.97	3.78	5.52	7.21	8.75					

Run#	862									
Test Fluid	C4F8									
Date:	10/1/93									
Time:	11:05									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	218.4									
Sat. Temperature-F(inlet)	190.1									
Liq. Density-lbm/ft3	72.89	73	72.95	72.87	72.84	72.81	72.68	72.62	72.65	72.92
Latent Heat-Btu/lbm	27.98	28.05	28.01	27.94	27.92	27.9	27.78	27.74	27.76	27.99
Specific Heat-Btu/lbm/F	0.334	0.333	0.334	0.334	0.334	0.335	0.336	0.336	0.336	0.334
Liq. Viscosity-lbm/ft-hr	0.309	0.31	0.31	0.309	0.309	0.308	0.307	0.306	0.306	0.31
Liq. Conductivity-Btu/hr-ft-F	0.0238	0.0238	0.0238	0.0238	0.0237	0.0237	0.0236	0.0236	0.0236	0.0238
Liq. Prandtl No.	4.35	4.34	4.34	4.35	4.35	4.35	4.35	4.35	4.35	4.35
Inlet Flow Rate-GPM	4.8									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2.6									
Inlet Temperature-F	188.8									
Outlet Liq. Temperature-F	189.3									
Outlet Vap. Temperature-F	187.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	190.6									
Water outlet Temp.-F	183									
Inlet G-lbm/hr/ft2	851090		Temp		184.6	Density	74.3			
Subcooling-F	1.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	292.9	284	267.5	283.3	281.6	284.3	286.7	283.4	278.3	260
Heat Loss-Watts	11.6	2.6	3.5	3.5	3.4	2.5	1.6	2.6	3.4	18.3
Heat Flux-Btu/Hr/ft2	5077	4923	4637	4911	4881	4928	4970	4913	4824	4507
Wall Temp. #3-F	194.5	193.8	192.5	193.3	192.6	193.2	193.7	193.5	193.4	191.6
Wall Temp. #4-F	194.5	193.5	192.8	193.7	193	193.9	193.7	193.7	194.2	192.5
Wall Temp. #5-F	195.3	193.4	193.6	192.9	192.7	192.9	193.5	193.5	193.7	191.6
Wall Temp. #1-F	188.8	193.6	192.5	192.8	192.7	193.5	193.7	193.3	192.8	190.7
Wall Temp. #2-F	195	193.8	193	192.9	192.7	192.9	193.7	193.5	193	191.3
Instream Temp.-F	190	189.6	189.9	190.1	190.2	190.3	190.8	191	190.9	189.9
Avg. Wall Temp.-F	194.8	193.6	192.7	193.2	192.8	193.4	193.7	193.5	193.4	191.5
Avg. Wall DT.-F	4.6	3.8	2.7	2.9	2.4	2.9	2.6	2.3	2.3	1.4
Remaining Subcool-F	0.3									
Exit Quality	0	0.01	0.02	0.03	0.04	0.06	0.07	0.08	0.09	0.1
EXP. H-Btu/Hr/ft2/F	1104.8	1294.7	1728.5	1721.2	2073.3	1727.8	1895.8	2156.5	2095.8	3137.8
COMPUTED H										
Jallouk	814.9	793.7	759.6	781.1	775.8	777.6	780.7	775.1	768.6	738.5
Szady1(Cudo tube)	1341.3	1319.2	1284.5	1324.3	1322.5	1330.7	1340.8	1336.2	1325.3	1278.4
Szady2	1050.2	1027.5	992.8	1035.6	1034.8	1044.5	1056	1051.9	1041.5	998.9
(RLIQ)	180050	178761	177020	175459	173468	171466	170150	168286	165614	162104
(F)	1.004	1.12	1.301	1.419	1.517	1.602	1.676	1.744	1.808	1.872
(HLIQ)	262.8	292.9	340.4	371.5	397.3	419.8	439.5	457.8	474.2	489.9
(HBOIL)	1337.9	1314.4	1278.4	1314.5	1310.5	1316.6	1325	1318.1	1304.8	1253.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.2									
DP Liquid Density-lbm/ft3	93.17									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.285	0.606	1.17	1.583	2.044					
Zero Corrections-psid	-0.051	-0.039	0.228	-0.003	0.022					
Corrected DP-Psid	0.336	0.645	0.942	1.586	2.022					
Actual DP-ft	1.89	3.84	5.81	7.09	8.62					
Measured TP-Psig	218.4				216.9					
Measured Overall-ft	2.98									
Computed DP-ft	2.11	4.1	6.02	7.91	9.65					
Friction-ft	0.12	0.27	0.45	0.64	0.83					
Acceleration-ft	0.05	0.11	0.15	0.18	0.21					
Elevation-ft	1.94	3.72	5.43	7.09	8.6					

Run#	863									
Test Fluid	C4F8									
Date:	10/1/93									
Time:	11:05									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	217.7									
Sat. Temperature-F(inlet)	189.8									
Liq. Density-lbm/ft3	72.92	73.08	73.05	72.92	72.89	72.87	72.73	72.76	72.76	72.89
Latent Heat-Btu/lbm	27.99	28.12	28.1	27.99	27.98	27.94	27.83	27.85	27.85	27.98
Specific Heat-Btu/lbm/F	0.334	0.333	0.333	0.334	0.334	0.334	0.335	0.335	0.335	0.334
Liq. Viscosity-lbm/ft-hr	0.31	0.311	0.311	0.31	0.309	0.309	0.307	0.308	0.308	0.309
Liq. Conductivity-Btu/hr-ft-F	0.0238	0.0239	0.0239	0.0238	0.0238	0.0238	0.0237	0.0237	0.0237	0.0238
Liq. Prandtl No.	4.35	4.34	4.34	4.35	4.35	4.35	4.35	4.35	4.35	4.35
Inlet Flow Rate-GPM	3.9									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2.2									
Inlet Temperature-F	188.8									
Outlet Liq. Temperature-F	188.8									
Outlet Vap. Temperature-F	187.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	132.6									
Water outlet Temp.-F	183									
Inlet G-lbm/hr/ft2	689146		Temp	185.6	Density	74.04				
Subcooling-F	1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	289.1	290.6	220.3	232	289.4	293.8	289.2	285.9	220	289.8
Heat Loss-Watts	12.1	2.8	3.6	3.6	3.6	2.6	1.7	2.7	3.5	19.4
Heat Flux-Btu/Hr/ft2	5011	5037	3819	4022	5017	5093	5013	4956	3814	5020
Wall Temp. #3-F	194.4	193.3	191.9	193	192.5	193	193.6	193.4	192.6	191.8
Wall Temp. #4-F	194.5	193.4	192.2	193.2	192.9	193.8	193.9	193.7	193.4	193
Wall Temp. #5-F	195.1	193.3	193.1	192.5	192.6	192.8	193.4	193.2	193.1	191.8
Wall Temp. #1-F	188.8	193.5	192	192.2	192.5	193.3	193.9	192.9	192.1	190.8
Wall Temp. #2-F	194.9	193.5	192.4	192.5	192.6	192.8	193.6	193.6	192.3	191.5
Instream Temp.-F	189.9	189.3	189.4	189.9	190	190.1	190.6	190.5	190.5	190
Avg. Wall Temp.-F	194.7	193.4	192.1	192.7	192.7	193.2	193.7	193.4	192.7	191.9
Avg. Wall DT.-F	4.6	3.9	2.6	2.6	2.4	2.9	2.9	2.6	2	1.8
Remaining Subcool-F	-0.2									
Exit Quality	0	0.02	0.03	0.04	0.06	0.07	0.09	0.1	0.11	0.13
EXP. H-Btu/Hr/ft2/F	1089.8	1292.5	1496.1	1521.4	2070.1	1759.3	1756.9	1880.1	1880.8	3232.2
COMPUTED H										
Jallouk	843.5	809.6	685.8	705.8	795.9	799.8	791.9	784.3	686.5	784.3
Szady1(Cudo tube)	1331.4	1331.6	1166.3	1198.7	1336.5	1348	1342.2	1335.1	1180.3	1341.7
Szady2	1065.4	1040.5	869.1	904	1047.8	1061	1055.3	1048.5	889.8	1057.1
(RLIQ)	145442	143287	141499	140446	138594	136496	134956	132587	130624	127978
(F)	1.075	1.247	1.397	1.498	1.595	1.691	1.774	1.851	1.914	1.978
(HLIQ)	237.6	275.1	308.9	330.7	352.6	378.9	392.6	409.7	423.6	437.9
(HBOIL)	1328.9	1327.7	1159.1	1191.3	1328.2	1338.4	1330.9	1322.1	1161.9	1326
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	82.1									
DP Liquid Density-lbm/ft3	92.91									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.275	0.658	1.232	1.759	2.284					
Zero Corrections-psid	-0.051	-0.089	0.228	-0.003	0.022					
Corrected DP-Psid	0.326	0.697	1.004	1.762	2.262					
Actual DP-ft	1.91	3.72	5.66	6.72	8.12					
Measured TP-Psig	217.7				216.8					
Measured Overall-ft	1.78									
Computed DP-ft	2.02	3.91	5.75	7.54	9.19					
Friction-ft	0.09	0.2	0.33	0.47	0.61					
Acceleration-ft	0.05	0.08	0.11	0.14	0.16					
Elevation-ft	1.88	3.63	5.31	6.93	8.42					

Run#	864									
Test Fluid	C4F8									
Date:	10/1/93									
Time:	11:05									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19696									
Sat. Pressure-Psig	218.4									
Sat. Temperature-F(inlet)	190.1									
Liq. Density-lbm/ft3	72.87	72.97	72.89	72.81	72.81	72.79	72.68	72.68	72.68	72.79
Latent Heat-Btu/lbm	27.94	28.03	27.96	27.9	27.9	27.87	27.78	27.78	27.78	27.87
Specific Heat-Btu/lbm/F	0.334	0.334	0.334	0.335	0.335	0.335	0.336	0.336	0.336	0.335
Liq. Viscosity-lbm/ft-hr	0.309	0.31	0.309	0.308	0.308	0.308	0.307	0.307	0.307	0.308
Liq. Conductivity-Btu/hr-ft-F	0.0238	0.0238	0.0238	0.0237	0.0237	0.0237	0.0236	0.0236	0.0236	0.0237
Liq. Prandtl No.	4.35	4.34	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35
Inlet Flow Rate-GPM	3									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	188.9									
Outlet Liq. Temperature-F	189.5									
Outlet Vap. Temperature-F	187.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	191.7									
Water outlet Temp.-F	183									
Inlet G-lbm/hr/ft2	531931		Temp		184.6	Density		74.3		
Subcooling-F	1.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	288.8	288.7	287.7	289.8	286.2	286.7	287.7	288.6	291.2	288.7
Heat Loss-Watts	11.2	2.5	3.4	3.4	3.3	2.4	1.6	2.5	3.3	17.9
Heat Flux-Btu/hr/ft2	5006	5004	4987	5023	4961	4970	4987	5003	5048	5004
Wall Temp. #3-F	194.4	193.4	192.6	193.6	192.9	193.5	193.9	193.8	193.6	192.1
Wall Temp. #4-F	194.5	193.5	193.1	194	193.3	194.2	194.2	194.1	194.5	193.4
Wall Temp. #5-F	195.2	193.4	193.8	192.9	193.1	193	193.6	193.6	194	192.3
Wall Temp. #1-F	188.9	193.6	192.6	192.7	192.9	193.7	193.9	193.4	193	191.1
Wall Temp. #2-F	194.9	193.6	193	193	193	193.2	193.7	194	193	191.6
Instream Temp.-F	190.1	189.7	190	190.3	190.3	190.4	190.9	190.9	190.8	190.4
Avg. Wall Temp.-F	194.9	193.5	192.8	193.3	193.1	193.6	193.9	193.8	193.6	192.1
Avg. Wall DT.-F	4.4	3.6	2.6	2.8	2.6	3	2.8	2.8	2.6	1.5
Remaining Subcool-F	-0.5									
Exit Quality	0.01	0.03	0.04	0.06	0.08	0.1	0.12	0.14	0.16	0.18
EXP. H-Btu/-hr/ft2/F	1131.7	1390.8	1918.4	1811.6	1944.9	1670.3	1759.4	1816.6	1947.5	3395.5
COMPUTED H										
Jallouk	883.1	844.3	818	812.6	802.3	800.2	800.6	799.4	801.2	793.4
Szady1(Cudo tube)	1331.5	1329.1	1329.7	1337.2	1329.7	1332.3	1338	1340.7	1347.3	1339.6
Szady2	1066.3	1062.8	1037.8	1046.4	1039.1	1042.3	1048.9	1052.4	1060	1052.5
(RLIQ)	112348	110471	108602	106719	104496	102390	100589	98945	96084	93429
(F)	1.112	1.307	1.49	1.628	1.744	1.845	1.934	2.018	2.096	2.175
(HLIQ)	199.9	234.6	267.8	292.7	313.7	331.9	349.1	363.9	377.5	391.1
(HBOIL)	1330	1328.7	1328	1332.5	1323.9	1325.4	1330.1	1331.8	1337.9	1328.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.1									
DP Liquid Density-lbm/ft3	92.77									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.278	0.735	1.363	2.004	2.609					
Zero Corrections-psid	-0.051	-0.039	0.228	-0.003	0.022					
Corrected DP-Psid	0.33	0.774	1.135	2.007	2.587					
Actual DP-ft	1.9	3.57	5.4	6.28	7.47					
Measured TP-Psig	218.4				217.9					
Measured Overall-ft	0.99									
Computed DP-ft	1.94	3.74	5.48	7.17	8.63					
Friction-ft	0.06	0.13	0.22	0.32	0.44					
Acceleration-ft	0.04	0.06	0.09	0.1	0.12					
Elevation-ft	1.85	3.55	5.17	6.75	8.07					

Run#	865									
Test Fluid	C4F8									
Date:	10/1/93									
Time:	11:05									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	218.4									
Sat. Temperature-F(inlet)	190.1									
Liq. Density-lbm/ft3	72.81	72.84	72.87	72.81	72.81	72.79	72.57	72.57	72.57	72.78
Latent Heat-Btu/lbm	27.9	27.92	27.94	27.9	27.9	27.87	27.69	27.69	27.69	27.69
Specific Heat-Btu/lbm/F	0.335	0.334	0.334	0.335	0.335	0.335	0.336	0.336	0.336	0.335
Liq. Viscosity-lbm/ft-hr	0.308	0.309	0.309	0.308	0.308	0.308	0.305	0.305	0.305	0.307
Liq. Conductivity-Btu/hr-ft-F	0.0237	0.0237	0.0238	0.0237	0.0237	0.0237	0.0236	0.0236	0.0236	0.0237
Liq. Prandtl No.	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35
Inlet Flow Rate-GPM	2.1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	1.6									
Inlet Temperature-F	189.3									
Outlet Liq. Temperature-F	190.1									
Outlet Vap. Temperature-F	188.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	128.1									
Water outlet Temp.-F	183									
Inlet G-lbm/hr/ft2	374611		Temp	182.8	Density	74.75				
Subcooling-F	0.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	292.4	292	292.2	294.2	288.1	288.4	290.8	292.5	295.9	293
Heat Loss-Watts	11.7	2.7	3.5	3.6	3.5	2.6	1.7	2.6	3.4	18.9
Heat Flux-Btu/hr/ft2	5069	5062	5065	5100	4994	4999	5041	5070	5129	5079
Wall Temp. #3-F	194.4	193.7	192.8	193.8	193.2	193.6	194.3	194.2	194	192.5
Wall Temp. #4-F	194.5	193.7	193.2	194	193.3	194.3	194.4	194.2	194.7	193.7
Wall Temp. #5-F	195.4	193.6	193.8	193	193.2	193.1	193.8	194	194.1	192.5
Wall Temp. #1-F	189.3	193.7	192.8	193	193.1	193.7	194.3	193.7	193.1	191.4
Wall Temp. #2-F	195.1	193.9	193.3	193.2	193.2	193.2	194.2	194.2	193.5	192.1
Instream Temp.-F	190.3	190.2	190.1	190.9	190.3	190.4	191.2	191.2	191.2	190.6
Avg. Wall Temp.-F	194.9	193.9	193	193.5	193.2	193.7	194.2	194.1	193.9	192.4
Avg. Wall DT.-F	4.3	3.3	2.7	2.9	2.7	3	2.8	2.6	2.4	1.6
Remaining Subcool-F	-1.6									
Exit Quality	0.02	0.05	0.08	0.1	0.13	0.16	0.19	0.22	0.25	0.27
EXP. H-Btu/Hr/ft2/F	1173	1524	1878.7	1748.8	1887.4	1639.6	1818.4	1927.2	2095.1	3153.7
COMPUTED H										
Jallouk	895.2	878.4	864.3	860.3	842.7	817.6	822.2	822.2	825.4	815.2
Szady1(Cuido tube)	1340.7	1339.5	1339.6	1348	1332.6	1334.4	1345.9	1350.2	1358.8	1348
Szady2	1096.9	1095	1094.6	1101.1	1040.7	1043	1055.4	1060.4	1069.5	1059.1
(RLIQ)	78750	76783	74461	72354	70106	67949	66284	63980	61666	58978
(F)	1.231	1.474	1.671	1.826	1.958	2.073	2.17	2.267	2.359	2.454
(HLIQ)	167.3	200.2	226.9	248	268	281.7	295.4	308.7	321.2	333.6
(HBOIL)	1339.8	1338	1337.5	1343.2	1329.1	1330.2	1341.1	1344.8	1352.3	1341.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.3									
DP Liquid Density-lbm/ft3	92.74									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.289	0.864	1.556	2.331	3.084					
Zero Corrections-psid	-0.051	-0.039	0.228	-0.003	0.022					
Corrected DP-Psid	0.34	0.903	1.328	2.334	3.012					
Actual DP-ft	1.88	3.31	5.02	5.58	6.63					
Measured TP-Psig	218.4				217.8					
Measured Overall-ft	1.19									
Computed DP-ft	1.78	3.32	4.76	6.12	7.34					
Friction-ft	0.04	0.09	0.16	0.24	0.32					
Acceleration-ft	0.03	0.04	0.05	0.07	0.08					
Elevation-ft	1.72	3.19	4.54	5.81	6.94					

Run#	866									
Test Fluid	C4F8									
Date:	10/1/93									
Time:	15:20									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	215.3									
Sat. Temperature-F(inlet)	189									
Liq. Density-lbm/ft3	73.27	73.05	73.13	73.11	73.08	73.05	72.84	72.84	72.84	73
Latent Heat-Btu/lbm	28.28	28.1	28.16	28.14	28.12	28.1	27.92	27.92	27.92	28.05
Specific Heat-Btu/lbm/F	0.332	0.333	0.332	0.333	0.333	0.333	0.334	0.334	0.334	0.333
Liq. Viscosity-lbm/ft-hr	0.314	0.311	0.312	0.312	0.311	0.311	0.309	0.309	0.309	0.31
Liq. Conductivity-Btu/hr-ft-F	0.024	0.0239	0.0239	0.0239	0.0239	0.0239	0.0237	0.0237	0.0237	0.0239
Liq. Prandtl No.	4.34	4.34	4.34	4.34	4.34	4.34	4.35	4.35	4.35	4.34
Inlet Flow Rate-GPM	1.1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	187.8									
Outlet Liq. Temperature-F	189.2									
Outlet Vap. Temperature-F	187.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	126.4									
Water outlet Temp.-F	182.2									
Inlet G-lbm/hr/ft2	200022		Temp	178.8	Density	76.2				
Subcooling-F	1.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	287.7	287.6	287.5	284.1	287.8	285.9	287.9	288.3	287.4	288.1
Heat Loss-Watts	10.5	2.4	3.1	3.2	3.1	2.3	1.5	2.3	3.1	16.8
Heat Flux-Btu/Hr/ft2	4967	4965	4964	4925	4969	4958	4961	4967	4962	4964
Wall Temp. #3-F	193.1	192.5	191.8	192.7	192.1	192.7	193.2	193	192.9	191.4
Wall Temp. #4-F	193.5	192.5	192	193	192.4	193.2	193.3	193.2	193.5	192.5
Wall Temp. #5-F	194.1	192.6	193	192.2	191.9	192.3	192.7	192.9	193.2	191.6
Wall Temp. #1-F	187.6	192.5	191.5	192	192.1	192.8	193.2	192.5	192	190.1
Wall Temp. #2-F	193.8	192.8	192	192.2	192.1	192.2	193.2	193	192.4	190.8
Instream Temp.-F	188.6	189.4	189.1	189.2	189.3	189.4	190.2	190.2	190.2	189.6
Avg. Wall Temp.-F	193.6	192.6	191.8	192.5	192.1	192.8	193.1	192.9	192.8	191.9
Avg. Wall DT.-F	4.8	2.9	2.4	3.1	2.6	3.1	2.7	2.5	2.4	1.5
Remaining Subcool-F	-3.2									
Exit Quality	0.04	0.09	0.14	0.19	0.24	0.3	0.35	0.4	0.45	0.51
EXP. H-Btu/Hr/ft2/F	1039.1	1690.1	2034.3	1618.4	1919.1	1595.4	1852.2	2008.7	2097.8	3494
COMPUTED H										
Jallouk	932.4	915.1	897.9	881.4	880.6	870.7	878.5	889.1	868	858.6
Szady1(Cudo tube)	1317.9	1328.3	1321.2	1314.3	1328.6	1320.2	1330.4	1331.5	1328.7	1327.3
Szady2	1072	1077.9	1075.3	1067.6	1077.6	1078.6	1084.6	1085.8	1083.5	1080.5
(RLIQ)	40921	39377	37084	34957	32826	30682	28740	26525	24305	21848
(F)	1.35	1.689	1.956	2.165	2.343	2.5	2.632	2.768	2.899	3.028
(HLIQ)	110.5	138.6	160.4	177.6	192.2	205.1	216.4	227.4	237.8	248.4
(HBOIL)	1317.7	1322.8	1320.4	1313.3	1322.3	1318.5	1328.5	1329.3	1327.1	1324.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	84									
DP Liquid Density-lbm/ft3	82.64									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.296	1.035	1.852	2.74	3.534					
Zero Corrections-psid	-0.061	-0.039	0.228	-0.003	0.022					
Corrected DP-Psid	0.347	1.074	1.624	2.743	3.512					
Actual DP-ft	1.86	2.96	4.41	4.74	5.6					
Measured TP-Psig	215.9				214.6					
Measured Overall-ft	1.38									
Computed DP-ft	1.56	2.79	3.87	4.84	5.56					
Friction-ft	0.02	0.04	0.07	0.12	0.16					
Acceleration-ft	0.01	0.02	0.02	0.03	0.04					
Elevation-ft	1.53	2.73	3.77	4.69	5.48					

Run#	867									
Test Fluid	C4F8									
Date:	10/4/93									
Time:	9:30									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	220.4									
Sat. Temperature-F(inlet)	190.8									
Liq. Density-lbm/ft3	73.05	73.13	72.95	72.79	72.71	72.73	72.52	72.54	72.54	72.78
Latent Heat-Btu/lbm	28.1	28.16	28.01	27.87	27.81	27.83	27.65	27.67	27.67	27.87
Specific Heat-Btu/lbm/F	0.333	0.332	0.334	0.335	0.335	0.335	0.337	0.337	0.337	0.335
Liq. Viscosity-lbm/ft-hr	0.311	0.312	0.31	0.308	0.307	0.307	0.305	0.305	0.305	0.308
Liq. Conductivity-Btu/hr-ft-F	0.0239	0.0239	0.0238	0.0237	0.0237	0.0237	0.0236	0.0236	0.0236	0.0237
Liq. Prandtl No.	4.34	4.34	4.34	4.35	4.35	4.35	4.36	4.35	4.35	4.35
Inlet Flow Rate-GPM	5.7									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	2.6									
Inlet Temperature-F	188.5									
Outlet Liq. Temperature-F	189.6									
Outlet Vap. Temperature-F	188.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	120.1									
Water outlet Temp.-F	175.9									
Inlet G-lbm/hr/ft2	1011356		Temp	184.4	Density	74.35				
Subcooling-F	2.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	590	582.4	577.2	584.9	579.1	575.7	578.7	576.3	578.5	575.1
Heat Loss-Watts	12.5	2.9	3.9	4	3.9	2.9	1.9	2.9	3.7	20.9
Heat Flux-Btu/Hr/ft2	10227	10096	10005	10139	10038	9979	10031	9990	10028	9969
Wall Temp. #3-F	195.6	196.7	195.7	196.6	196.6	197.7	197.5	195.8	195.4	194.8
Wall Temp. #4-F	196.3	195.8	196.7	197	197.3	198.2	197.7	196.6	196.8	197.9
Wall Temp. #5-F	196.3	195	197.5	196.9	196.5	197.4	197.5	195.6	195.7	194.3
Wall Temp. #1-F	188.5	195.9	194.6	195.7	196.2	197.7	198.1	196.3	194.4	182.4
Wall Temp. #2-F	196.7	195.9	195.5	196.1	196.3	197.6	198.4	197.3	195.2	194.4
Instream Temp.-F	189.4	189.1	189.8	190.4	190.7	190.6	191.4	191.3	191.3	190.4
Avg. Wall Temp.-F	196.2	196.1	195.6	196.6	196.6	197.8	197.8	196.3	195.5	194.9
Avg. Wall DT.-F	6.4	6.5	5.4	5.7	5.4	6.7	6	4.5	3.7	3.9
Remaining Subcool-F	0.5									
Exit Quality	-0.01	0.01	0.04	0.06	0.08	0.1	0.12	0.14	0.16	0.18
EXP. H-Btu/Hr/ft2/F	1607.4	1548.7	1882.2	1781.3	1851.6	1489.7	1675.6	2196.9	2676.4	2550
COMPUTED H										
Jallouk	1244.1	1208.8	1157.3	1144.3	1105.5	1091.3	1089.3	1077.7	1071.2	1055.2
Szady1(Cudo tube)	1898.6	1884	1883.9	1903.7	1898.6	1898.5	1907.6	1904.1	1909.1	1896.4
Szady2	1741.2	1723.8	1726	1749.5	1744.4	1737.5	1755.5	1760.8	1755	1736.4
(RLIQ)	212629	211112	208223	205095	201202	196506	193648	188907	184359	178121
(F)	1.004	1.143	1.404	1.567	1.698	1.811	1.904	1.995	2.079	2.168
(HLIQ)	301.2	342.7	421.7	471.3	510.9	544.9	574.1	601.5	628.7	651.5
(HBOIL)	1898	1880.2	1876.8	1894	1886.2	1878.3	1890.1	1883.8	1886.3	1870.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.4									
DP Liquid Density-lbm/ft3	83.56									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.288	0.634	1.131	1.648	2.111					
Zero Corrections-psid	-0.049	-0.038	0.161	0.003	0.034					
Corrected DP-Psid	0.337	0.672	0.97	1.645	2.077					
Actual DP-ft	1.9	3.81	5.79	7.03	8.68					
Measured TP-Psig	220.4				218.6					
Measured Overall-ft	3.56									
Computed DP-ft	2.19	4.17	6.05	7.89	9.6					
Friction-ft	0.17	0.43	0.75	1.13	1.54					
Acceleration-ft	0.1	0.21	0.29	0.36	0.43					
Elevation-ft	1.92	3.53	5.01	6.39	7.63					

Run#	868									
Test Fluid	C4F8									
Date:	10/4/93									
Time:	9:30									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	220.1									
Sat. Temperature-F(Inlet)	190.7									
Liq. Density-lbm/ft3	73.05	73.19	73.05	72.76	72.76	72.79	72.49	72.54	72.57	72.76
Latent Heat-Btu/lbm	28.1	28.21	28.1	27.85	27.85	27.87	27.62	27.67	27.69	27.85
Specific Heat-Btu/lbm/F	0.333	0.332	0.333	0.335	0.335	0.335	0.337	0.337	0.336	0.335
Liq. Viscosity-lbm/ft-hr	0.311	0.313	0.311	0.308	0.308	0.308	0.304	0.305	0.305	0.308
Liq. Conductivity-Btu/hr-ft-F	0.0239	0.0239	0.0239	0.0237	0.0237	0.0237	0.0235	0.0236	0.0236	0.0237
Liq. Prandtl No.	4.34	4.34	4.34	4.35	4.35	4.35	4.36	4.35	4.35	4.35
Inlet Flow Rate-GPM	4.8									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	2.2									
Inlet Temperature-F	188.3									
Outlet Liq. Temperature-F	189.8									
Outlet Vap. Temperature-F	188.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	119.8									
Water outlet Temp.-F	175.1									
Inlet G-lbm/hr/ft2	852533		Temp	184.1	Density	74.42				
Subcooling-F	2.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	572.4	582.5	575.1	580.1	577.2	573.4	578.7	576.4	577.1	572.4
Heat Loss-Watts	13.1	3	4.1	4.2	4.2	3.2	2	3	3.9	22
Heat Flux-Btu/Hr/ft2	9922	10097	9969	10058	10005	9940	10031	9992	10004	9922
Wall Temp. #3-F	196	196.5	195.7	196.2	196.8	198	197.6	195.9	195.5	194.6
Wall Temp. #4-F	196.4	195.7	196.8	196.8	197.3	196.8	197.8	196.4	196.7	198
Wall Temp. #5-F	196.9	196	197.4	196.7	196.8	197.4	197.4	195.6	195.6	193.8
Wall Temp. #1-F	188.8	196	194.6	195.7	196	197.6	198.1	196.2	194.4	192.2
Wall Temp. #2-F	197.2	196	195.5	196	196.1	197.6	196.8	197.1	195.2	194.2
Instream Temp.-F	189.4	188.9	189.4	190.5	190.5	190.4	191.5	191.3	191.2	190.5
Avg. Wall Temp.-F	196.8	196.1	195.6	196.4	196.4	197.8	197.8	196.2	195.5	194.8
Avg. Wall DT.-F	6.8	6.7	5.7	5.4	5.5	7	5.9	4.5	3.8	3.8
Remaining Subcool-F	0.4									
Exit Quality	0	0.02	0.04	0.07	0.09	0.12	0.14	0.17	0.19	0.22
EXP. H-Btu/F-Hr/ft2/F	1464.2	1508.5	1733.9	1863.7	1828.2	1424.9	1704.1	2228	2618.3	2747.3
COMPUTED H										
Jallouk	1257.6	1232.1	1182.6	1171.2	1147.9	1128.4	1110.9	1099.4	1091.8	1076.2
Szady1(Cudo tube)	1869.3	1881.8	1875.7	1895.6	1892	1895.9	1906.4	1901.8	1903.1	1889.8
Szady2	1709.9	1720.8	1715.9	1741.7	1737.1	1729.4	1758	1749.4	1749.7	1731.4
(RLIQ)	178238	176878	173398	170961	168493	161861	159237	154965	149662	144076
(F)	1.004	1.214	1.474	1.642	1.782	1.904	2.001	2.101	2.192	2.284
(HLIQ)	262.7	317.3	385.7	430.9	467.7	499.4	526.5	552.9	576.1	599.9
(HBOIL)	1867.8	1878.3	1870.3	1889.2	1882.4	1874.1	1892.9	1898.1	1895.9	1889.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78									
DP Liquid Density-lbm/ft3	83.48									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.289	0.78	1.248	1.87	2.41					
Zero Corrections-psid	-0.049	-0.058	0.161	0.003	0.034					
Corrected DP-Psid	0.338	0.818	1.087	1.867	2.376					
Actual DP-ft	1.9	3.52	5.56	6.58	7.98					
Measured TP-Psig	220.1				218.4					
Measured Overall-ft	3.36									
Computed DP-ft	2.1	3.98	5.71	7.41	8.98					
Friction-ft	0.13	0.33	0.59	0.9	1.22					
Acceleration-ft	0.09	0.17	0.23	0.29	0.35					
Elevation-ft	1.88	3.45	4.88	6.23	7.41					

Run#	369									
Test Fluid	C4F8									
Date:	10/4/93									
Time:	9:30									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	219.1									
Sat. Temperature-F(inlet)	190.3									
Liq. Density-lbm/ft3	73.05	73.18	72.97	72.81	72.87	72.84	72.73	72.76	72.76	72.81
Latent Heat-Btu/lbm	28.1	28.16	28.03	27.9	27.94	27.92	27.83	27.85	27.85	27.9
Specific Heat-Btu/lbm/F	0.333	0.332	0.334	0.335	0.334	0.334	0.335	0.335	0.335	0.336
Liq. Viscosity-lbm/ft-hr	0.311	0.312	0.31	0.308	0.309	0.309	0.307	0.308	0.308	0.309
Liq. Conductivity-Btu/hr-ft-F	0.0239	0.0239	0.0238	0.0237	0.0238	0.0237	0.0237	0.0237	0.0237	0.0237
Liq. Prandtl No.	4.34	4.34	4.34	4.35	4.35	4.35	4.35	4.35	4.35	4.35
Inlet Flow Rate-GPM	3.9									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	1.8									
Inlet Temperature-F	188.4									
Outlet Liq. Temperature-F	189.4									
Outlet Vap. Temperature-F	187.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	118.4									
Water outlet Temp.-F	168.7									
Inlet G-lbm/hr/ft2	692689		Temp	184.1	Density	74.42				
Subcooling-F	1.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	579.7	578.5	579.2	580.5	578.9	578.5	577.3	577	581.3	586.7
Heat Loss-Watts	13.8	3.2	4.3	4.5	4.6	3.6	2.3	3.3	4.1	23.7
Heat Flux-Btu/hr/ft2	10049	10028	10040	10063	10035	10028	10007	10002	10076	10170
Wall Temp. #3-F	195.7	196.3	195.5	196.1	196.5	197.7	196.8	195.1	194.8	194.8
Wall Temp. #4-F	196.3	195.3	196.4	196.5	197.1	198.2	196.9	195.7	196	197.9
Wall Temp. #5-F	196.5	194.8	197.3	196.6	196.3	197.3	196.7	194.9	194.8	193.8
Wall Temp. #1-F	188.4	195.7	194.2	195.5	195.8	197.5	197.5	195.4	193.8	192.2
Wall Temp. #2-F	196.9	195.7	195.2	195.9	195.9	197.5	197.7	196.5	194.4	194.3
Instream Temp.-F	189.4	189.1	189.7	190.3	190.1	190.2	190.6	190.5	190.5	190.9
Avg. Wall Temp.-F	196.4	195.8	195.3	196.2	196.3	197.7	197.1	195.5	194.7	194.6
Avg. Wall DT.-F	6.5	6.2	5.2	5.4	5.7	7	6.1	4.8	3.7	3.8
Remaining Subcool-F	-0.6									
Exit Quality	0.01	0.04	0.07	0.1	0.13	0.16	0.19	0.22	0.25	0.28
EXP. H-Btu/Hr/ft2/F	1546.9	1618.2	1941.5	1858.5	1753.9	1428.1	1649.2	2189.8	2705.4	2848.2
COMPUTED H										
Jallouk	1252.5	1246.6	1218.1	1200.8	1178.3	1162.6	1150.3	1136.8	1130.5	1109.6
Szady1(Cudo tube)	1881.2	1877	1884.7	1893.5	1889.8	1890.9	1893.6	1893	1900.9	1908.7
Szady2	1722.7	1716.6	1727.2	1739	1738.6	1734.8	1739.1	1737.5	1745.7	1752.9
(RLIQ)	145112	141954	139427	134845	130105	125777	121830	117230	112786	107960
(F)	1.132	1.382	1.617	1.789	1.937	2.064	2.175	2.28	2.378	2.478
(HLIQ)	251	306.2	359.6	397.4	430.1	459.4	483.4	506.7	528.4	549.2
(HBOIL)	1879.7	1874.3	1880.4	1887.6	1882.3	1881.9	1883.1	1880.9	1887.2	1893.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.5									
DP Liquid Density-lbm/ft3	93.55									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.29	0.884	1.435	2.178	2.903					
Zero Corrections-psid	-0.049	-0.088	0.161	0.003	0.034					
Corrected DP-Psid	0.339	0.922	1.274	2.175	2.769					
Actual DP-ft	1.9	3.92	5.19	5.98	7.21					
Measured TP-Psig	219.1				217.9					
Measured Overall-ft	2.37									
Computed DP-ft	1.95	3.62	5.17	6.66	8.03					
Friction-ft	0.11	0.27	0.49	0.74	1.02					
Acceleration-ft	0.08	0.14	0.18	0.23	0.28					
Elevation-ft	1.76	3.21	4.5	5.69	6.72					

Run#	870									
Test Fluid	C4F8									
Date:	10/4/93									
Time:	9:30									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	216.2									
Sat. Temperature-F(inlet)	189.3									
Liq. Density-lbm/ft3	73.29	73.29	73.19	73.03	73.05	73.08	72.92	72.92	72.82	73.03
Latent Heat-Btu/lbm	28.3	28.3	28.21	28.08	28.1	28.12	27.99	27.99	27.99	28.08
Specific Heat-Btu/lbm/F	0.331	0.331	0.332	0.333	0.333	0.333	0.334	0.334	0.334	0.333
Liq. Viscosity-lbm/ft-hr	0.314	0.314	0.313	0.311	0.311	0.311	0.31	0.31	0.31	0.311
Liq. Conductivity-Btu/hr-ft-F	0.024	0.024	0.0239	0.0238	0.0239	0.0239	0.0238	0.0238	0.0238	0.0238
Liq. Prandtl No.	4.34	4.34	4.34	4.34	4.34	4.34	4.35	4.35	4.35	4.34
Inlet Flow Rate-GPM	2.9									
Outlet Liq. Flow Rate-GPM	0.6									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	187.4									
Outlet Liq. Temperature-F	188.9									
Outlet Vap. Temperature-F	186.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	118.2									
Water outlet Temp.-F	169.4									
Inlet G-lbm/hr/ft2	518347		Temp	182.2	Density	74.9				
Subcooling-F	1.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	572.8	576.7	581.5	582.5	579.7	579.7	578	575.3	583.4	590.7
Heat Loss-Watts	12.8	3	4	4.1	4.1	3.1	2	2.9	3.8	21.5
Heat Flux-Btu/Hr/ft2	9329	9997	10080	10097	10049	10049	9985	9972	10113	10239
Wall Temp. #3-F	194.8	195.2	194.8	195.3	195.9	197	196.4	194.5	193.9	193.8
Wall Temp. #4-F	195.4	194.9	195.5	195.8	196.8	197.5	196.4	195.2	195.6	197.1
Wall Temp. #5-F	195.6	194	196.3	195.7	195.7	196.7	196.2	194.9	194.1	192.9
Wall Temp. #1-F	187.4	194.6	193.2	194.8	195.1	197	196.9	194.7	193.2	191.8
Wall Temp. #2-F	195.8	194.6	194.9	195.2	195.1	196.9	196.9	195.8	194	193.2
Instream Temp.-F	188.5	188.5	188.9	189.5	189.4	189.9	189.9	189.9	189.9	189.5
Avg. Wall Temp.-F	195.4	194.7	194.4	195.4	195.6	197.1	196.6	194.9	194.2	193.6
Avg. Wall DT.-F	6.5	5.7	6	5.4	5.7	7.3	6.2	4.5	3.8	3.7
Remaining Subcool-F	-1.5									
Exit Quality	0.02	0.06	0.1	0.14	0.18	0.22	0.26	0.3	0.34	0.38
EXP. H-Btu/Hr/ft2/F	1539.1	1746.7	1996.2	1854.9	1784.2	1377.8	1608.1	2192.1	2659.2	2799.7
COMPUTED H										
Jallouk	1280.8	1252.7	1236.1	1244.1	1220.4	1208.5	1189.7	1176.6	1175.7	1171
Szady1(Cuido tube)	1861.1	1868	1890.1	1888	1888	1882.7	1882.9	1882.3	1896.2	1904.8
Szady2	1697.2	1704.3	1719	1729.9	1723.8	1722.7	1725.3	1724.4	1739.2	1746.6
(RLIQ)	107043	103951	100028	96244	91735	87287	83367	78962	74516	69726
(F)	1.224	1.515	1.771	1.963	2.19	2.276	2.399	2.518	2.63	2.744
(HLIQ)	214.6	265.7	310.8	345.1	374.3	400	422.1	443.1	462.8	482.4
(HBOIL)	1880.2	1868.2	1877.3	1884.1	1878.1	1876.6	1875.9	1874.1	1886.9	1894.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.9									
DP Liquid Density-lbm/ft3	93.95									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.291	1	1.65	2.47	3.183					
Zero Corrections-psid	-0.049	-0.038	0.161	0.003	0.034					
Corrected DP-Psid	0.34	1.038	1.489	2.467	3.149					
Actual DP-ft	1.89	3.07	4.78	5.36	6.41					
Measured TP-Psig	216.2				214.9					
Measured Overall-ft	2.56									
Computed DP-ft	1.81	3.29	4.63	5.9	7.05					
Friction-ft	0.07	0.19	0.34	0.53	0.74					
Acceleration-ft	0.06	0.1	0.13	0.17	0.21					
Elevation-ft	1.68	3	4.16	5.2	6.1					

Run#	871									
Test Fluid	C4F8									
Date:	10/4/93									
Time:	9:30									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	217.8									
Sat. Temperature-F(inlet)	189.9									
Liq. Density-lbm/ft3	73.29	72.97	73	72.89	72.92	72.87	72.79	72.84	72.84	72.84
Latent Heat-Btu/lbm	28.3	28.08	28.05	27.96	27.99	27.94	27.87	27.92	27.92	27.92
Specific Heat-Btu/lbm/F	0.331	0.334	0.333	0.334	0.334	0.334	0.335	0.334	0.334	0.334
Liq. Viscosity-lbm/ft-hr	0.314	0.31	0.31	0.309	0.31	0.309	0.309	0.309	0.309	0.309
Liq. Conductivity-Btu/hr-ft-F	0.024	0.0238	0.0238	0.0238	0.0238	0.0238	0.0237	0.0237	0.0237	0.0237
Liq. Prandtl No.	4.34	4.34	4.34	4.35	4.35	4.35	4.35	4.35	4.35	4.35
Inlet Flow Rate-GPM	2									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	1									
Inlet Temperature-F	187.6									
Outlet Liq. Temperature-F	189.7									
Outlet Vap. Temperature-F	187.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	119.2									
Water outlet Temp.-F	168.9									
Inlet G-lbm/hr/ft2	359350		Temp		180.6	Density		75.29		
Subcooling-F	2.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	569.2	580.8	581.9	583	580.6	581.1	578.9	577.7	584.2	580.4
Heat Loss-Watts	13.3	3.1	4.2	4.4	4.4	3.4	2.1	3.1	4	23
Heat Flux-Btu/hr/ft2	9887	10068	10087	10106	10064	10073	10035	10014	10127	10061
Wall Temp. #3-F	195.1	195.8	194.8	195.8	196.2	197.3	196.7	195	194.4	194.8
Wall Temp. #4-F	195.4	194.9	196	196.2	196.6	196	196.8	195.6	195.9	197.3
Wall Temp. #5-F	196	194.1	197	196.4	196	197	196.3	194.6	194.5	193.6
Wall Temp. #1-F	187.6	195.1	193.9	194.9	195.5	197.2	197.2	195.2	193.5	192
Wall Temp. #2-F	196.1	195.1	194.7	195.4	195.5	197.1	197.3	196.3	194.9	193.6
Instream Temp.-F	188.5	189.7	189.6	190	189.9	190.1	190.4	190.2	190.2	190.2
Avg. Wall Temp.-F	195.7	195.2	194.9	195.8	195.9	197.4	196.9	195.3	194.5	194.2
Avg. Wall DT.-F	6.7	5.1	4.8	5.4	5.5	6.8	6	4.7	3.9	3.5
Remaining Subcool-F	-2.6									
Exit Quality	0.03	0.09	0.15	0.21	0.26	0.32	0.38	0.44	0.5	0.56
EXP. H-Btu/hr/ft2/F	1471.7	1966.8	2104	1882.5	1815	1477	1670.7	2136.4	2821.9	2837.8
COMPUTED H										
Jallouk	1323.4	1313.7	1287.2	1272.8	1252.9	1287.1	1252.9	1287.5	1235.9	1221.5
Szady1(Cudo tube)	1854.9	1886.8	1886.8	1882.7	1888.2	1891.8	1890.9	1887.4	1898.5	1892.7
Szady2	1690.7	1729	1729.6	1737.8	1732.2	1736.3	1737.1	1732.2	1744	1737.5
(RLIQ)	78790	71905	66814	62628	58104	53759	49452	44886	40402	35910
(F)	1.307	1.659	1.961	2.19	2.386	2.556	2.707	2.855	2.992	3.124
(HLIQ)	171	217.7	257.2	287.5	313.2	335.6	355.7	375	393.1	410.4
(HBOIL)	1854.5	1884.8	1895.2	1890.5	1885.9	1887.8	1886.7	1882.5	1892.8	1886.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.2									
DP Liquid Density-lbm/ft3	93.17									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.37	1.139	1.898	2.725	3.695					
Zero Corrections-psid	-0.049	-0.038	0.161	0.003	0.034					
Corrected DP-Psid	0.419	1.177	1.732	2.722	3.661					
Actual DP-ft	1.73	2.79	4.26	4.86	5.51					
Measured TP-Psig	217.8				218.8					
Measured Overall-ft	1.98									
Computed DP-ft	1.64	2.89	4.07	5.12	6.03					
Friction-ft	0.04	0.12	0.22	0.34	0.48					
Acceleration-ft	0.03	0.06	0.09	0.12	0.15					
Elevation-ft	1.56	2.76	3.77	4.66	5.4					

Run#	872									
Test Fluid	C4F8									
Date:	10/4/93									
Time:	13:12									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	218.2									
Sat. Temperature-F(inlet)	190									
Liq. Density-lbm/ft3	73.08	72.89	72.95	72.81	72.84	72.79	72.82	72.65	72.68	72.78
Latent Heat-Btu/lbm	28.12	27.96	28.01	27.9	27.92	27.87	27.74	27.76	27.78	27.83
Specific Heat-Btu/lbm/F	0.333	0.334	0.334	0.335	0.334	0.335	0.336	0.336	0.336	0.335
Liq. Viscosity-lbm/ft-hr	0.311	0.309	0.31	0.308	0.309	0.308	0.306	0.306	0.307	0.307
Liq. Conductivity-Btu/hr-ft-F	0.0239	0.0238	0.0238	0.0237	0.0237	0.0237	0.0236	0.0236	0.0236	0.0237
Liq. Prandtl No.	4.34	4.35	4.34	4.35	4.35	4.35	4.35	4.35	4.35	4.35
Inlet Flow Rate-GPM	2.1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	1.1									
Inlet Temperature-F	188.3									
Outlet Liq. Temperature-F	190.1									
Outlet Vap. Temperature-F	187.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	119.4									
Water outlet Temp.-F	169.9									
Inlet G-lbm/hr/ft2	376340		Temp	181.4	Density	75.09				
Subcooling-F	1.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	555.2	567.9	572.2	572.4	567.5	567.1	565.5	563.5	574.8	570.4
Heat Loss-Watts	13.5	3.2	4.3	4.5	4.5	3.5	2.3	3.3	4.1	23.6
Heat Flux-Btu/Hr/ft2	9624	9844	9916	9922	9837	9830	9803	9768	9964	9888
Wall Temp. #3-F	195.1	196	195.2	196.1	196.5	197.4	197.1	195.3	195	194.6
Wall Temp. #4-F	195.8	194.9	196.2	196.4	197	198	197.1	195.9	196.2	197.7
Wall Temp. #5-F	196.1	194.3	197.2	196.7	196.3	197.1	196.9	195	195	194
Wall Temp. #1-F	188.3	195.3	194.1	195.3	195.7	197.2	197.7	195.7	188.9	192.4
Wall Temp. #2-F	196.2	195.3	194.9	195.8	195.6	197.4	197.7	196.8	194.8	194.2
Instream Temp.-F	189.2	190	189.8	190.2	190.2	190.4	191	190.9	190.8	190.6
Avg. Wall Temp.-F	195.8	195.4	195.1	196.1	196.2	197.4	197.8	195.7	195	194.8
Avg. Wall DT.-F	6.1	4.9	4.8	5.4	5.5	6.6	5.9	4.4	3.7	3.6
Remaining Subcool-F	-2.8									
Exit Quality	0.03	0.09	0.14	0.2	0.25	0.31	0.36	0.42	0.47	0.53
EXP. H-Btu/Hr/ft2/F	1596.8	1996.7	2054.9	1845.4	1786.8	1498.9	1678.7	2220.7	2671.5	2787.2
COMPUTED H										
Jallouk	1301.1	1290.3	1288	1254.9	1257	1242.9	1232.6	1217.5	1221.9	1205
Szady1(Cudo tube)	1839.2	1867.2	1872.8	1878.3	1869.6	1871.2	1874.7	1870.8	1889	1880.2
Szady2	1677.5	1710.6	1715.5	1723.5	1713.5	1715.9	1722.3	1717.3	1736.4	1725.7
(PLIQ)	77743	74831	70316	66275	61816	57558	53514	49054	44557	40005
(F)	1.321	1.684	1.948	2.165	2.362	2.513	2.652	2.781	2.924	3.053
(HLIQ)	179.7	228.7	265.3	295.1	320.6	342.7	362.2	381.1	399.1	416.6
(HBOIL)	1838.8	1866.1	1871	1875.9	1886.4	1887.9	1870.2	1865.5	1889	1878.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.5									
DP Liquid Density-lbm/ft3	93.13									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.316	1.144	1.897	2.807	3.63					
Zero Corrections-psid	-0.049	-0.038	0.161	0.003	0.034					
Corrected DP-Psid	0.365	1.182	1.736	2.804	3.596					
Actual DP-ft	1.84	2.78	4.25	4.69	6.62					
Measured TP-Psig	218.2				217.8					
Measured Overall-ft	1.79									
Computed DP-ft	1.84	2.95	4.12	5.19	6.18					
Friction-ft	0.05	0.13	0.23	0.36	0.5					
Acceleration-ft	0.04	0.06	0.09	0.12	0.15					
Elevation-ft	1.56	2.76	3.79	4.71	5.47					

Run#	873									
Test Fluid	C4F8									
Date:	10/4/93									
Time:	13:12									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	216.5									
Sat. Temperature-F(inlet)	189.4									
Liq. Density-lbm/ft3	73.05	73	73.08	72.92	72.95	72.95	72.76	72.79	72.79	72.97
Latent Heat-Btu/lbm	28.1	28.05	28.12	27.99	28.01	28.01	27.85	27.87	27.87	28.08
Specific Heat-Btu/lbm/F	0.333	0.333	0.333	0.334	0.334	0.334	0.335	0.335	0.335	0.334
Liq. Viscosity-lbm/ft-hr	0.311	0.31	0.311	0.31	0.31	0.31	0.306	0.306	0.306	0.31
Liq. Conductivity-Btu/hr-ft-F	0.0239	0.0238	0.0239	0.0238	0.0238	0.0238	0.0237	0.0237	0.0237	0.0239
Liq. Prandtl No.	4.34	4.34	4.34	4.35	4.34	4.34	4.35	4.35	4.35	4.34
Inlet Flow Rate-GPM	1.2									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	188.3									
Outlet Liq. Temperature-F	189.8									
Outlet Vap. Temperature-F	187.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	117.4									
Water outlet Temp.-F	177									
Inlet G-lbm/hr/ft2	216273		Temp	176.7	Density	76.22				
Subcooling-F	1.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	572.7	577.6	574.5	578.4	573.8	574.4	578.3	574	231.8	153.6
Heat Loss-Watts	14.8	3.4	4.6	5	5.1	4.1	2.9	4.5	5.3	28.9
Heat Flux-Btu/Hr/ft2	9927	10012	9959	10026	9948	9957	10024	9950	4018	2663
Wall Temp. #3-F	194	195.1	193.9	194.8	195.1	195.4	195.9	204.9	200.8	198.7
Wall Temp. #4-F	194.7	194.1	195.1	195.2	195.6	195.9	196	204.9	201.4	194.4
Wall Temp. #5-F	195.1	193.4	196.4	195	194.8	194.5	195.2	196	200.7	195.2
Wall Temp. #1-F	188.8	194.8	192.9	194	194.6	195.5	195.7	194.8	196.1	194.9
Wall Temp. #2-F	185.9	194.5	193.8	194.5	194.7	195.4	195.9	195.2	196.2	194.5
Instream Temp.-F	189.4	189.6	189.9	189.9	189.9	189.9	190.5	190.4	190.4	189.7
Avg. Wall Temp.-F	194.9	194.5	193.9	194.6	194.9	195.3	195.7	199.2	199.9	194.4
Avg. Wall DT.-F	4.9	4.4	4.2	4.4	4.7	5.1	4.8	8.3	9.3	4.6
Remaining Subcool-F	-6.9									
Exit Quality	0.09	0.18	0.27	0.37	0.46	0.56	0.66	0.76	0.79	0.82
EXP. H-Btu/Hr/ft2/F	2015.2	2251.2	2386.3	2280.3	2127.4	1961.9	2094.1	1197.3	434	578.9
COMPUTED H										
Jallouk	1390.1	1357.7	1324.1	1316.5	1294.6	1283.9	1298.6	54.7	54.7	54.6
Szady1(Cudo tube)	1869	1878.1	1871.4	1888.7	1875.3	1876.5	1889.9	54.7	54.7	54.6
Szady2	1710	1721.7	1711.9	1727.8	1718.3	1719.4	1737	54.7	54.7	54.6
(RLIQ)	44017	40082	35581	31346	26910	22518	18282	18282	18282	18282
(F)	1.538	2.013	2.363	2.632	2.875	3.096	3.296	3.296	3.296	3.296
(HLIQ)	135.8	177.2	207.8	231.9	253.2	272.6	289.9	289.9	289.9	289.9
(HSOIL)	1868.8	1878.8	1870.5	1882.5	1873.8	1874.6	1887.6	1887.6	1887.6	1887.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	82.8									
DP Liquid Density-lbm/ft3	92.68									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.5	1.388	2.318	3.448	4.38					
Zero Corrections-psid	-0.049	-0.038	0.161	0.003	0.034					
Corrected DP-Psid	0.549	1.426	2.157	3.443	4.346					
Actual DP-ft	1.46	2.28	3.38	3.89	3.99					
Measured TP-Psig	216.5				215.8					
Measured Overall-ft	1.38									
Computed DP-ft	1.39	2.4	3.24	3.96	4.75					
Friction-ft	0.02	0.07	0.13	0.2	0.28					
Acceleration-ft	0.02	0.04	0.06	0.08	0.09					
Elevation-ft	1.35	2.3	3.05	3.68	4.41					

Run#	874									
Test Fluid	C4F8									
Date:	10/5/93									
Time:	8:34									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19685									
Sat. Pressure-Psig	219.4									
Sat. Temperature-F(inlet)	190.5									
Liq. Density-lbm/ft3	73.08	73.29	73.29	72.87	73	73.03	72.68	72.79	72.81	72.89
Latent Heat-Btu/lbm	28.12	28.9	28.8	27.94	28.05	28.06	27.78	27.87	27.9	27.96
Specific Heat-Btu/lbm/F	0.333	0.331	0.331	0.334	0.333	0.333	0.336	0.335	0.335	0.334
Liq. Viscosity-lbm/ft-hr	0.311	0.314	0.314	0.309	0.31	0.311	0.307	0.308	0.309	0.309
Liq. Conductivity-Btu/hr-ft-F	0.0239	0.024	0.024	0.0238	0.0238	0.0238	0.0236	0.0237	0.0237	0.0239
Liq. Prandtl No.	4.34	4.34	4.34	4.35	4.34	4.34	4.35	4.35	4.35	4.35
Inlet Flow Rate-GPM	5.7									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	2.5									
Inlet Temperature-F	188									
Outlet Liq. Temperature-F	190									
Outlet Vap. Temperature-F	187.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	105.9									
Water outlet Temp.-F	161.8									
Inlet G-lbm/hr/ft2	1013749		Temp	183.7	Density	74.53				
Subcooling-F	2.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	873.5	861.6	856	859	852.5	850.7	858.3	868.1	862.7	861.1
Heat Loss-Watts	12.7	3	4	4	3.9	2.9	1.9	3	3.9	21.5
Heat Flux-Btu/hr/ft2	15142	14935	14838	14890	14778	14748	14878	15013	14954	14927
Wall Temp. #3-F	195.5	198.1	195.2	196.3	195.7	197	198.1	197.5	196.1	195.2
Wall Temp. #4-F	196.6	195.7	196.8	197.3	196.5	197.2	198.1	196.4	196	193.8
Wall Temp. #5-F	197.6	195.9	196.3	197.3	196.3	197.3	196.6	196.2	196.3	194.3
Wall Temp. #1-F	188	196.3	194.1	195.5	195.2	196.3	196.8	196.6	195.6	192.8
Wall Temp. #2-F	196.9	196.3	195.6	196.3	196.1	196.4	196.9	197.6	196.5	194.4
Instream Temp.-F	189.3	188.5	188.5	190.1	189.6	189.5	190.9	190.4	190.3	190
Avg. Wall Temp.-F	196.7	196.6	195.4	196.6	196	197	198.3	197.7	196.9	195.9
Avg. Wall DT.-F	6.7	7.4	6.3	5.8	5.8	6.8	6.8	6.6	5.9	4.6
Remaining Subcool-F	-0.2									
Exit Quality	0	0.03	0.06	0.09	0.12	0.15	0.19	0.22	0.25	0.28
EXP. H-Btu/hr/ft2/F	2271.6	2011.5	2372.4	2555.3	2566.9	2178.8	2186.5	2287.3	2524.9	3227.1
COMPUTED H										
Jallouk	1554.3	1484.5	1416.7	1390.7	1345.8	1313.9	1305.8	1272.9	186.9	186.7
Szady1(Cudo tube)	2330.3	2306.6	2301.4	2326.5	2318.6	2312.1	2339.7	2346.6	186.9	186.7
Szady2	2202.6	2171.5	2165	2199.6	2182.6	2243.1	2272.2	2283.5	186.9	186.7
(RLIQ)	212697	207504	201062	197884	190347	183648	179556	172142	172142	172142
(F)	1.063	1.334	1.593	1.767	1.922	2.054	2.158	2.27	2.27	2.27
(HLIQ)	319.6	400.1	477.7	532	577.9	617.5	650.8	683.9	683.9	683.9
(HBOIL)	2328.3	2302.6	2294.5	2317.2	2301.7	2297.3	2322.8	2327	2327	2327
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.1									
DP Liquid Density-lbm/ft3	93.93									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.285	0.752	1.197	1.836	2.359					
Zero Correctione-psid	-0.058	-0.062	0.02	0.021	0.024					
Corrected DP-Psid	0.343	0.814	1.177	1.815	2.335					
Actual DP-ft	1.66	3.51	5.56	6.66	8.08					
Measured TP-Psig	219.4				219					
Measured Overall-ft	0.79									
Computed DP-ft	2.17	4.08	5.9	7.7	9.4					
Friction-ft	0.19	0.52	0.94	1.45	2					
Acceleration-ft	0.16	0.29	0.39	0.49	0.6					
Elevation-ft	1.82	3.27	4.57	5.76	6.8					

Run#	875									
Test Fluid	C4F8									
Date:	10/5/93									
Time:	12:05									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19685									
Sat. Pressure-Psig	219									
Sat. Temperature-F(inlet)	190.3									
Liq. Density-lbm/ft3	72.97	73.08	73.08	72.76	72.87	72.92	72.54	72.6	72.62	72.76
Latent Heat-Btu/lbm	28.03	28.12	28.12	27.85	27.94	27.99	27.67	27.71	27.74	27.85
Specific Heat-Btu/lbm/F	0.334	0.333	0.333	0.335	0.334	0.334	0.337	0.336	0.336	0.335
Liq. Viscosity-lbm/ft-hr	0.31	0.311	0.311	0.306	0.309	0.31	0.305	0.306	0.306	0.308
Liq. Conductivity-Btu/hr-ft-F	0.0238	0.0239	0.0239	0.0237	0.0238	0.0238	0.0236	0.0236	0.0236	0.0237
Liq. Prandtl No.	4.34	4.34	4.34	4.35	4.35	4.35	4.35	4.35	4.35	4.35
Inlet Flow Rate-GPM	4.8									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	2.1									
Inlet Temperature-F	188.7									
Outlet Liq. Temperature-F	189.6									
Outlet Vap. Temperature-F	188.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	109.9									
Water outlet Temp.-F	171.1									
Inlet G-lbm/hr/ft2	851378		Temp	184.5	Density	74.32				
Subcooling-F	1.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	861	862.2	865.5	864.4	860.7	859.9	861.6	867.2	436.6	102.1
Heat Loss-Watts	12	2.8	3.7	3.8	3.7	2.7	1.8	2.8	3.4	17.4
Heat Flux-Btu/Hr/ft2	14925	14948	15008	14984	14920	14906	14936	15032	7551	1770
Wall Temp. #3-F	198	198.7	195.9	196.7	196.3	197.7	198.9	197.5	194.4	190.4
Wall Temp. #4-F	197.2	196.2	197.6	197.6	197.1	197.8	198.9	198.2	196.4	190.8
Wall Temp. #5-F	197.7	196.8	198.3	197.3	196.3	197.4	198.8	198	195.1	191.5
Wall Temp. #1-F	188.7	196.9	194.6	195.8	195.7	196.9	199	197.2	188.6	190.8
Wall Temp. #2-F	197.4	197	196.1	196.8	196.6	197.1	198.1	196.2	194.2	190.6
Instream Temp.-F	189.7	189.3	189.3	190.5	190.1	189.9	191.3	191.1	191	190.5
Avg. Wall Temp.-F	197.1	197.2	196.1	196.9	196.4	197.5	198.9	197.8	194.5	190.7
Avg. Wall DT.-F	6.7	7.2	6.1	5.7	5.7	6.9	7	6	3.2	0.1
Remaining Subcool-F	-1.5									
Exit Quality	0.02	0.05	0.09	0.13	0.18	0.2	0.24	0.28	0.29	0.3
EXP. H-Btu/Hr/ft2/F	2227.4	2068.7	2450.7	2641.3	2640.3	2167.7	2144.3	2488.5	2360.6	******
COMPUTED H										
Jallouk	1544.6	1488.9	1486.9	1437.6	1397.8	1367.3	1358	162.9	162.8	162.6
Szady1(Cudo tube)	2318.1	2316.9	2322.6	2337.5	2329.1	2327.1	2348.2	162.9	162.8	162.6
Szady2	2190.4	2186.4	2193	2214.4	2202.8	2199.5	2284.9	162.9	162.8	162.6
(RLIQ)	177987	172413	165848	161284	153962	147041	142513	142518	142518	142518
(F)	1.222	1.5	1.741	1.916	2.075	2.214	2.32	2.321	2.32	2.32
(HLIQ)	319.7	392	454.9	502.3	543.4	579.5	609.3	609.3	609.3	609.3
(HBOIL)	2317.1	2313.2	2316.8	2329.7	2319.2	2315	2334.4	2334.4	2334.4	2334.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.4									
DP Liquid Density-lbm/ft3	92.72									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.28	0.832	1.377	2.099	2.763					
Zero Corrections-psid	-0.058	-0.062	0.02	0.021	0.034					
Corrected DP-Psid	0.338	0.894	1.357	2.078	2.729					
Actual DP-ft	1.68	3.38	4.96	6.08	7.18					
Measured TP-Psig	219				219.8					
Measured Overall-ft	-0.59									
Computed DP-ft	2.01	3.75	5.41	7.04	8.72					
Friction-ft	0.17	0.44	0.79	1.21	1.52					
Acceleration-ft	0.15	0.24	0.33	0.42	0.45					
Elevation-ft	1.69	3.06	4.29	5.41	6.76					

Run#	878									
Test Fluid	C4F8									
Date:	10/5/93									
Time:	12:05									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19895									
Sat. Pressure-Psig	220.2									
Sat. Temperature-F(inlet)	190.7									
Liq. Density-lbm/ft3	73.05	73.11	73.11	72.68	72.81	72.71	72.62	72.73	72.76	72.68
Latent Heat-Btu/lbm	28.1	28.14	28.14	27.78	27.9	27.81	27.74	27.83	27.85	27.78
Specific Heat-Btu/lbm/F	0.339	0.333	0.333	0.336	0.335	0.335	0.336	0.335	0.335	0.336
Liq. Viscosity-lbm/ft-hr	0.311	0.312	0.312	0.307	0.308	0.307	0.308	0.307	0.308	0.307
Liq. Conductivity-Btu/hr-ft-F	0.0239	0.0239	0.0239	0.0236	0.0237	0.0237	0.0236	0.0237	0.0237	0.0236
Liq. Prandtl No.	4.34	4.34	4.34	4.35	4.35	4.35	4.35	4.35	4.35	4.35
Inlet Flow Rate-GPM	3.9									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	188.6									
Outlet Liq. Temperature-F	192.1									
Outlet Vap. Temperature-F	188.5									
Water Flow Rate-GPM										
Water inlet Temp.-F	111.8									
Water outlet Temp.-F	172.5									
Inlet G-lbm/hr/ft2	690804		Temp	184.6	Density	74.22				
Subcooling-F	2.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	866.4	870.8	868.5	859.6	863.9	862.7	861.3	571.5	98.9	97.2
Heat Loss-Watts	12.8	3	4	4.1	4	3	1.9	2.8	3.4	18.9
Heat Flux-Btu/Hr/ft2	15018	15095	15020	14904	14976	14954	14930	9907	1704	1685
Wall Temp. #3-F	198	198.8	195.7	197.3	198.9	198.4	197.5	195	191.3	190.5
Wall Temp. #4-F	197.1	198.2	197.3	197.9	197.5	198.3	197.7	195.4	191.9	190.7
Wall Temp. #5-F	198.1	198.1	198.6	197.8	197	198	198.2	195.9	193.4	191.9
Wall Temp. #1-F	188.6	196.8	194.7	196.6	196.5	198.1	198.7	194.1	191.4	190.6
Wall Temp. #2-F	197.3	198.8	195.9	197.3	197.2	197.9	198.7	194.4	191.4	190.4
Instream Temp.-F	189.4	189.2	189.2	190.8	190.9	190.7	191	190.6	190.5	190.9
Avg. Wall Temp.-F	197.1	197.2	195.9	197.4	197.1	198.2	198.2	195	191.9	190.9
Avg. Wall DT.-F	7	7.3	6	5.9	6.1	6.8	6.5	3.9	1.3	0
Remaining Subcool-F	-1.7									
Exit Quality	0.02	0.07	0.11	0.16	0.2	0.25	0.29	0.32	0.33	0.33
EXP. H-Btu/Hr/ft2/F	2191.4	2076.9	2494.6	2514.6	2485.8	2191.4	2302.2	2532.2	1307.7	*****
COMPUTED H										
Jallouk	1597.5	1548.8	1498.5	1496.8	1483.2	1438.4	1416	1089.9	518.9	518.3
Szady1(Cudo tube)	2321.9	2325.9	2321.5	2388.7	2388.8	2388.3	2341.4	1888	838.9	837.4
Szady2	2192.8	2197	2191.5	2277.5	2209.5	2281.9	2281.8	1790.5	639.1	638.7
(RLIQ)	143789	138745	132162	127734	120422	114215	107855	101825	93112	90664
(F)	1.241	1.553	1.825	2.017	2.195	2.342	2.475	2.596	2.695	2.644
(HLIQ)	274.4	349.2	402.4	447.7	496.5	519.7	549.5	578.7	594.4	598.7
(HBOIL)	2320.6	2328.4	2317.4	2328.2	2328.7	2329.8	2331.9	1870.1	731.2	727.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	82.8									
DP Liquid Density-lbm/ft3	82.81									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.907	0.983	1.571	2.384	3.1					
Zero Corrections-psid	-0.068	-0.082	0.02	0.021	0.034					
Corrected DP-Psid	0.365	0.995	1.551	2.363	3.066					
Actual DP-ft	1.83	3.14	4.59	6.59	8.54					
Measured TP-Psig	220.2				220.7					
Measured Overall-ft	-0.99									
Computed DP-ft	1.89	3.48	4.94	6.37	7.92					
Friction-ft	0.12	0.33	0.6	0.93	1.15					
Acceleration-ft	0.11	0.18	0.25	0.32	0.32					
Elevation-ft	1.66	2.95	4.08	5.12	8.45					

Run#	877									
Test Fluid	C4F8									
Date:	10/5/93									
Time:	14:36									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	220									
Sat. Temperature-F(inlet)	190.7									
Liq. Density-lbm/ft3	72.97	72.96	73.05	72.68	72.84	72.71	72.62	72.68	72.73	72.57
Latent Heat-Btu/lbm	28.09	28.01	28.1	27.78	27.92	27.81	27.74	27.78	27.83	27.69
Specific Heat-Btu/lbm/F	0.334	0.334	0.333	0.336	0.334	0.335	0.336	0.336	0.335	0.336
Liq. Viscosity-lbm/ft-hr	0.31	0.31	0.311	0.307	0.309	0.307	0.306	0.307	0.307	0.305
Liq. Conductivity-Btu/hr-ft-F	0.0238	0.0238	0.0239	0.0236	0.0237	0.0237	0.0236	0.0236	0.0237	0.0236
Liq. Prandtl No.	4.34	4.34	4.34	4.35	4.35	4.35	4.35	4.35	4.35	4.35
Inlet Flow Rate-GPM	3									
Outlet Liq. Flow Rate-GPM	0.6									
Outlet Vap. Flow Rate-GPM	1.8									
Inlet Temperature-F	188.7									
Outlet Liq. Temperature-F	192.3									
Outlet Vap. Temperature-F	188.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	113.8									
Water outlet Temp.-F	173.6									
Inlet G-lbm/hr/ft2	531750		Temp	184.7	Density	74.27				
Subcooling-F	2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	865.7	865.4	869.1	868.7	867.7	868.7	542.9	200.6	81.6	89.6
Heat Loss-Watts	12.7	3	4	4.1	4	2.9	1.8	2.6	3.4	18.8
Heat Flux-Btu/hr/ft2	15006	15001	15065	15058	15041	15024	9411	3477	1414	1553
Wall Temp. #3-F	198.1	198.7	198	197.5	197.1	198.1	195.5	192.7	191.4	190.7
Wall Temp. #4-F	197.1	196.2	197.5	198.1	197.7	198.2	195.8	192.6	191.8	190.8
Wall Temp. #5-F	198.1	196.8	199	198.8	197.1	197.9	196.8	193.7	193.5	192.2
Wall Temp. #1-F	188.7	196.9	194.7	196.7	196.5	198	195.8	192.5	191.2	190.7
Wall Temp. #2-F	197.8	196.9	196.1	197.4	197.3	198	196.1	193	191.8	190.6
Instream Temp.-F	189.7	189.8	189.4	190.8	190.2	190.7	191	190.8	190.5	191.2
Avg. Wall Temp.-F	197.2	197.2	196.1	197.7	197.2	198.1	195.9	192.9	191.8	191
Avg. Wall DT.-F	6.8	6.7	6	6.2	6.3	6.7	4.5	1.9	1.2	0
Remaining Subcool-F	-3									
Exit Quality	0.04	0.09	0.15	0.21	0.27	0.33	0.37	0.38	0.39	0.39
EXP. H-Btu/Hr/ft2/F	2216	2240	2518.3	2440.8	2398.8	2252.1	2103.1	1789.8	1202.7	*****
COMPUTED H										
Jallouk	1644.6	1591.9	1551.3	1594.5	1501.6	1508.7	1120.6	662.1	462.6	476.9
Szady1(Cudo tube)	2324.4	2325.8	2326.4	2344.1	2336	2341.8	1840.2	1142	756.3	786.6
Szady2	2196.8	2196.8	2196.2	2223.9	2212.1	2220.5	1682.3	880	554.9	571.3
(RLIQ)	110152	104961	97917	92644	85372	79080	73840	70785	69537	69306
(F)	1.395	1.695	1.992	2.206	2.408	2.57	2.692	2.759	2.787	2.79
(HLIQ)	239.6	304.3	357.2	397.1	432.5	462.5	494.9	496.7	501.4	502.7
(HBOIL)	2323.5	2324.1	2323.6	2340.3	2331.1	2335.7	1828.9	1109.7	674.2	711.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.5									
DP Liquid Density-lbm/ft3	92.71									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.292	1.101	1.861	2.759	3.597					
Zero Corrections-psid	-0.058	-0.062	0.02	0.021	0.034					
Corrected DP-Psid	0.35	1.163	1.841	2.738	3.563					
Actual DP-ft	1.66	2.8	4.01	4.79	5.66					
Measured TP-Psig	220				220.4					
Measured Overall-ft	-0.79									
Computed DP-ft	1.71	3.1	4.37	5.78	7.24					
Friction-ft	0.09	0.24	0.45	0.64	0.79					
Acceleration-ft	0.08	0.13	0.19	0.22	0.23					
Elevation-ft	1.54	2.73	3.73	4.93	6.22					

Run#	878									
Test Fluid	C4F8									
Date:	10/5/93									
Time:	14:36									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	217.7									
Sat. Temperature-F(inlet)	189.8									
Liq. Density-lbm/ft3	73.24	73.03	73.08	72.92	72.97	72.89	72.73	72.76	72.76	72.81
Latent Heat-Btu/lbm	28.25	28.08	28.12	27.99	28.03	27.96	27.83	27.85	27.85	27.9
Specific Heat-Btu/lbm/F	0.332	0.333	0.333	0.334	0.334	0.334	0.335	0.335	0.335	0.335
Liq. Viscosity-lbm/ft-hr	0.313	0.311	0.311	0.31	0.31	0.309	0.307	0.308	0.308	0.308
Liq. Conductivity-Btu/hr-ft-F	0.024	0.0238	0.0239	0.0238	0.0238	0.0238	0.0237	0.0237	0.0237	0.0237
Liq. Prandtl No.	4.34	4.34	4.34	4.35	4.34	4.35	4.35	4.35	4.35	4.35
Inlet Flow Rate-GPM	2.1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	1									
Inlet Temperature-F	187.7									
Outlet Liq. Temperature-F	191.2									
Outlet Vap. Temperature-F	188.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	113.6									
Water outlet Temp.-F	172.8									
Inlet G-lbm/hr/ft2	375231		Temp	182.3	Density	74.87				
Subcooling-F	2.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	851.5	867.9	884.3	888.2	864.1	870	396.1	83.8	78.9	90.1
Heat Loss-Watts	12.8	3	4	4.1	4	3	1.8	2.6	3.4	19
Heat Flux-Btu/Hr/ft2	14760	15044	14982	15060	14979	15081	6901	1453	1368	1582
Wall Temp. #3-F	195.8	196.1	195.7	196.2	196.1	197.9	194.2	191.4	191.2	189.9
Wall Temp. #4-F	196.5	195.7	197.4	197	196.9	198	194.5	191.4	191.8	190
Wall Temp. #5-F	197	195.6	196.4	197	196.1	197.5	194.8	192.8	192.9	191.2
Wall Temp. #1-F	187.7	196.3	194.4	195.4	195.5	197.1	194.3	191.3	190.8	189.8
Wall Temp. #2-F	196.6	196.4	195.7	196.1	196.1	197.2	194.6	191.7	191.1	189.8
Instream Temp.-F	188.7	189.5	189.8	189.9	189.7	190	190.6	190.5	190.5	190.3
Avg. Wall Temp.-F	196.4	196.6	195.8	196.4	196.2	197.6	194.5	191.6	191.6	190.1
Avg. Wall DT.-F	7	6.4	5.8	5.8	5.8	6.9	3.6	1.1	1	0
Remaining Subcool-F	-4.8									
Exit Quality	0.06	0.14	0.22	0.31	0.39	0.47	0.51	0.52	0.53	0.54
EXP. H-Btu/Hr/ft2/F	2113.7	2334.2	2572.9	2586.9	2594.6	2172	1934	1377.7	1370.2	*****
COMPUTED H										
Jallouk	1716.2	1651.3	1604.9	1586.4	1555.9	84.3	84.5	84.4	84.4	84.4
Szady1(Cudo tube)	2293.5	2324.9	2318.2	2331.1	2323.8	84.3	84.5	84.4	84.4	84.4
Szady2	2156.7	2196.7	2188.1	2205.4	2196	84.3	84.5	84.4	84.4	84.4
(RLIQ)	76116	71236	64529	58318	51578	51578	51578	51578	51578	51578
(F)	1.499	1.872	2.216	2.476	2.709	2.709	2.709	2.709	2.709	2.709
(HLIQ)	195	254.1	300.6	336.5	367.9	367.9	367.9	367.9	367.9	367.9
(HBOIL)	2293	2323.9	2316.5	2328.9	2320.8	2320.8	2320.8	2320.8	2320.8	2320.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.8									
DP Liquid Density-lbm/ft3	92.95									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.285	1.278	2.14	3.195	4.002					
Zero Corrections-psid	-0.058	-0.052	0.02	0.021	0.034					
Corrected DP-Psid	0.343	1.335	2.12	3.114	3.968					
Actual DP-ft	1.87	2.47	3.47	4.05	4.78					
Measured TP-Psig	217.7				217.7					
Measured Overall-ft	0									
Computed DP-ft	1.53	2.71	3.78	4.97	6.3					
Friction-ft	0.06	0.18	0.3	0.42	0.52					
Acceleration-ft	0.05	0.09	0.14	0.15	0.18					
Elevation-ft	1.43	2.46	3.29	4.4	5.63					

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377
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Run#	879									
Test Fluid	C4F8									
Date:	10/5/93									
Time:	14:36									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	219.2									
Sat. Temperature-F(inlet)	190.4									
Liq. Density-lbm/ft3	73	72.95	73.03	72.87	72.89	72.73	72.71	72.68	72.78	72.62
Latent Heat-Btu/lbm	28.05	28.01	28.06	27.94	27.96	27.83	27.81	27.78	27.83	27.74
Specific Heat-Btu/lbm/F	0.333	0.334	0.333	0.334	0.334	0.335	0.335	0.336	0.335	0.336
Liq. Viscosity-lbm/ft-hr	0.31	0.31	0.311	0.309	0.309	0.307	0.307	0.307	0.307	0.306
Liq. Conductivity-Btu/hr-ft-F	0.0238	0.0238	0.0238	0.0238	0.0238	0.0237	0.0237	0.0236	0.0237	0.0236
Liq. Prandtl No.	4.34	4.34	4.34	4.35	4.35	4.35	4.35	4.35	4.35	4.35
Inlet Flow Rate-GPM	1.1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	187.7									
Outlet Liq. Temperature-F	192.9									
Outlet Vap. Temperature-F	189									
Water Flow Rate-GPM										
Water Inlet Temp.-F	115.7									
Water outlet Temp.-F	171.5									
Inlet G-lbm/hr/ft2	198717		Temp	178.9	Density	75.7				
Subcooling-F	2.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	847.7	858.8	864	864.7	863.9	338.9	100.3	98	98.6	88.1
Heat Loss-Watts	13.7	3.2	4.3	4.8	5.5	3.5	1.9	2.9	3.8	21.3
Heat Flux-Btu/Hr/ft2	14694	14887	14977	14989	14976	5875	1739	1491	1501	1527
Wall Temp. #3-F	194.7	197.7	194.8	196.6	210	197.8	192.3	191.9	191.8	190.7
Wall Temp. #4-F	196.2	195.2	196.7	197	209.8	197.9	192.4	191.8	192.9	191.1
Wall Temp. #5-F	197.6	195.6	198.4	197.2	199	196.9	193.7	193.1	193.9	192.5
Wall Temp. #1-F	187.7	193	193.9	195.2	198.8	197.6	192.5	191.8	191.5	190.7
Wall Temp. #2-F	196.5	195	195	195.9	198.6	198.4	192.6	192.1	191.7	190.8
Instream Temp.-F	189.6	189.8	189.5	190.1	190	190.6	190.7	190.8	190.6	191
Avg. Wall Temp.-F	196.3	196.2	195.1	196.5	200.4	197.6	192.7	192.1	192.2	191.2
Avg. Wall DT.-F	6	5.8	4.9	5.7	9.7	6.7	1.9	1.3	1.6	0.1
Remaining Subcool-F	-10.3									
Exit Quality	0.12	0.28	0.44	0.59	0.75	0.81	0.83	0.85	0.86	0.88
EXP. H-Btu/Hr/ft2/F	2454.8	2588	3042.1	2619.3	1536.2	878.8	904.9	1171.4	954.9	*****
COMPUTED H										
Jallouk	1835	1781.8	1738.3	50.7	50.7	50.8	50.8	50.8	50.8	50.8
Szady1(Cudo tube)	2259.3	2316.4	2319.6	50.7	50.7	50.8	50.8	50.8	50.8	50.8
Szady2	2166.5	2187.6	2190.5	50.7	50.7	50.8	50.8	50.8	50.8	50.8
(RLIQ)	39300	33529	26855	26855	26855	26855	26855	26855	26855	26855
(F)	1.673	2.277	2.737	2.737	2.737	2.737	2.737	2.737	2.737	2.737
(HLIQ)	136.8	186.1	223.4	223.4	223.4	223.4	223.4	223.4	223.4	223.4
(HBOIL)	2299.1	2316	2318.9	2318.9	2318.9	2318.9	2318.9	2318.9	2318.9	2318.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.5									
DP Liquid Density-lbm/ft3	93.13									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.565	1.584	2.604	3.725	4.711					
Zero Corrections-psid	-0.068	-0.062	0.02	0.021	0.034					
Corrected DP-Psid	0.623	1.628	2.584	3.704	4.677					
Actual DP-ft	1.33	1.91	2.57	2.91	3.39					
Measured TP-Psig	219.2				219.1					
Measured Overall-ft	0.2									
Computed DP-ft	1.27	2.1	2.77	4.03	5.19					
Friction-ft	0.02	0.07	0.14	0.17	0.21					
Acceleration-ft	0.02	0.05	0.07	0.08	0.08					
Elevation-ft	1.22	1.98	2.58	3.78	4.9					

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Run#	880									
Test Fluid	C4F8									
Date:	10/8/93									
Time:	9:30									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	218.8									
Sat. Temperature-F(inlet)	190.2									
Liq. Density-lbm/ft3	73	73.05	72.96	72.65	72.68	72.76	72.32	72.43	72.49	72.78
Latent Heat-Btu/lbm	28.05	28.1	28.01	27.76	27.78	27.85	27.49	27.58	27.62	27.89
Specific Heat-Btu/lbm/F	0.333	0.333	0.334	0.336	0.336	0.335	0.338	0.337	0.337	0.335
Liq. Viscosity-lbm/ft-hr	0.31	0.311	0.31	0.306	0.307	0.309	0.302	0.304	0.304	0.307
Liq. Conductivity-Btu/hr-ft-F	0.0238	0.0239	0.0238	0.0236	0.0236	0.0237	0.0234	0.0235	0.0235	0.0237
Liq. Prandtl No.	4.34	4.34	4.34	4.35	4.35	4.35	4.36	4.36	4.36	4.35
Inlet Flow Rate-GPM	5.8									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	2.7									
Inlet Temperature-F	189.9									
Outlet Liq. Temperature-F	189.9									
Outlet Vap. Temperature-F	189.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	196.2									
Water outlet Temp.-F	193.8									
Inlet G-lbm/hr/ft2	1028050		Temp	184.7	Density	74.27				
Subcooling-F	1.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1152.9	1162.6	1153.8	1157.8	1163.6	607.1	63.1	54.9	61.4	80.8
Heat Loss-Watts	13.2	3.1	4.2	4.3	4.4	2.9	1.7	2.6	3.5	19.5
Heat Flux-Btu/Hr/ft2	19986	20153	20000	20070	20170	10524	1094	950	1064	1401
Wall Temp. #3-F	197.9	202.2	198.2	196.5	201.2	196.2	193.7	192.8	192.8	191.7
Wall Temp. #4-F	199.3	198.2	200.3	199.4	201.3	196.5	193.8	192.4	193.1	191.8
Wall Temp. #5-F	196.7	196.7	200.2	196.4	196.5	196.6	193.5	192.4	193.4	192.4
Wall Temp. #1-F	188.9	196.2	196.6	198	197.9	196.9	193.2	193	192.8	191.8
Wall Temp. #2-F	199.6	199.2	198.9	196.8	196.7	196.5	193.8	193.3	192.4	191.6
Instream Temp.-F	189.6	189.4	189.6	190.9	190.9	190.5	192.1	191.7	191.5	190.6
Avg. Wall Temp.-F	198.9	199.7	198.4	196.6	199.1	196.6	193.5	192.9	192.8	191.9
Avg. Wall DT.-F	8.4	9.4	7.7	6.8	7.4	5.6	1.4	1	1.3	1.2
Remaining Subcool-F	-2.1									
Exit Quality	0.02	0.07	0.11	0.15	0.19	0.21	0.21	0.21	0.22	0.22
EXP. H-Btu/Hr/ft2/F	2387.1	2148.4	2596.6	2985.4	2730	1871.1	809.9	916	850.2	1132.5
COMPUTED H										
Jallouk	1797.3	1708.5	1632.6	189.3	189.2	189.1	189.9	189.7	189.6	189.1
Szady1(Cudo tube)	2673.8	2683.6	2680.6	189.3	189.2	189.1	189.9	189.7	189.6	189.1
Szady2	2729.7	2741.6	2734.6	189.3	189.2	189.1	189.9	189.7	189.6	189.1
(RLIQ)	213918	206387	198396	198396	198396	198396	198396	198396	198396	198396
(F)	1.272	1.569	1.809	1.809	1.809	1.809	1.809	1.809	1.809	1.809
(HLIQ)	398.7	476.9	550.5	550.5	550.5	550.5	550.5	550.5	550.5	550.5
(HBOIL)	2671.1	2678.6	2673	2673	2673	2673	2673	2673	2678	2673
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.1									
DP Liquid Density-lbm/ft3	93.19									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.293	0.776	1.314	2.024	2.568					
Zero Corrections-psid	-0.019	-0.079	0.011	0.049	0.053					
Corrected DP-Psid	0.312	0.855	1.303	1.975	2.515					
Actual DP-ft	1.94	3.43	5.11	6.94	7.67					
Measured TP-Psig	218.8				217.7					
Measured Overall-ft	2.19									
Computed DP-ft	2.12	3.99	5.82	7.72	9.5					
Friction-ft	0.26	0.68	1.18	1.57	1.94					
Acceleration-ft	0.24	0.38	0.49	0.5	0.51					
Elevation-ft	1.62	2.93	4.15	5.65	7.05					

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Run#	881									
Test Fluid	C4F8									
Date:	10/6/93									
Time:	9:30									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	217.8									
Sat. Temperature-F(inlet)	189.9									
Liq. Density-lbm/ft3	73	73.08	72.97	72.68	72.84	72.81	72.43	72.57	72.6	72.78
Latent Heat-Btu/lbm	28.05	28.08	28.03	27.78	27.82	27.9	27.58	27.69	27.71	27.85
Specific Heat-Btu/lbm/F	0.333	0.333	0.334	0.336	0.334	0.335	0.337	0.336	0.336	0.335
Liq. Viscosity-lbm/ft-hr	0.31	0.311	0.31	0.307	0.309	0.308	0.304	0.305	0.306	0.308
Liq. Conductivity-Btu/hr-ft-F	0.0238	0.0238	0.0238	0.0236	0.0237	0.0237	0.0235	0.0236	0.0236	0.0237
Liq. Prandtl No.	4.34	4.34	4.34	4.35	4.35	4.35	4.36	4.35	4.35	4.35
Inlet Flow Rate-GPM	4.8									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	2.3									
Inlet Temperature-F	188.7									
Outlet Liq. Temperature-F	189.4									
Outlet Vap. Temperature-F	188.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	107.4									
Water outlet Temp.-F	183.9									
Inlet G-lbm/hr/ft2	852245		Temp	184.2	Density	74.4				
Subcooling-F	1.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1153.9	1152.7	1153.5	1155.7	843.3	306.6	63	54.9	63.7	79.6
Heat Loss-Watts	12.4	2.9	3.9	3.9	3.9	2.5	1.6	2.4	3.2	18
Heat Flux-Btu/hr/ft2	20002	19981	19995	20033	14618	5315	1092	952	1104	1380
Wall Temp. #3-F	197.7	201.8	197.8	198.4	201	194.3	193.6	192.5	192.7	191.6
Wall Temp. #4-F	198.8	197.7	199.9	199	200.8	194.8	193.6	192.4	193	191.9
Wall Temp. #5-F	198.5	198.4	199.8	198.2	199.9	194.8	193.2	192.3	193.2	192.5
Wall Temp. #1-F	198.7	198.8	198.4	197.7	198.1	195.5	192.6	192.7	192.2	192.2
Wall Temp. #2-F	199.5	198.8	197.9	198.5	198.1	194.4	192.9	193	192.2	191.6
Instream Temp.-F	189.6	189.5	189.7	190.9	190.2	190.9	191.7	191.2	191.1	190.5
Avg. Wall Temp.-F	198.8	199.3	198	198.9	199.2	194.9	193.2	192.6	192.7	192
Avg. Wall DT.-F	8.2	8.9	7.4	6.6	8.4	4.3	1.5	1.3	1.5	1.4
Remaining Subcool-F	-2.9									
Exit Quality	0.08	0.08	0.13	0.18	0.22	0.23	0.23	0.24	0.24	0.24
EXP. H-Btu/-hr/ft2/F	2425.7	2252.2	2703.4	3028.3	1747.7	1233.2	742.6	711.8	731.2	959.8
COMPUTED H										
Jallouk	1828	1785.4	1698.9	162.9	162.6	162.7	163.3	163.1	163	162.7
Szady1(Cudo tube)	2674.5	2672.9	2677.9	162.9	162.6	162.7	163.3	163.1	163	162.7
Szady2	2731.4	2727.6	2732.4	162.9	162.6	162.7	163.3	163.1	163	162.7
(RLIQ)	178411	168701	160249	160249	160249	160249	160249	160249	160249	160249
(F)	1.332	1.663	1.919	1.919	1.919	1.919	1.919	1.919	1.919	1.919
(HLIQ)	348.6	435.1	502.5	502.5	502.5	502.5	502.5	502.5	502.5	502.5
(HBOIL)	2672.5	2669.1	2672	2672	2672	2672	2672	2672	2672	2672
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.5									
DP Liquid Density-lbm/ft3	92.99									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.293	0.894	1.562	2.324	2.881					
Zero Corrections-psid	-0.019	-0.079	0.011	0.049	0.053					
Corrected DP-Psid	0.312	0.973	1.551	2.275	2.878					
Actual DP-ft	1.94	3.19	4.6	5.72	6.92					
Measured TP-Psig	217.6				217.2					
Measured Overall-ft	1.19									
Computed DP-ft	1.95	3.64	5.37	7.14	8.81					
Friction-ft	0.2	0.53	0.87	1.16	1.44					
Acceleration-ft	0.19	0.31	0.37	0.37	0.38					
Elevation-ft	1.56	2.81	4.18	5.61	6.99					

Run#	882									
Test Fluid	C4F8									
Date:	10/6/93									
Time:	9:30									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	216.9									
Sat. Temperature-F(inlet)	189.6									
Liq. Density-lbm/ft3	73.19	73.13	73.05	72.78	72.87	72.84	72.57	72.68	72.78	72.81
Latent Heat-Btu/lbm	28.21	28.16	28.1	27.89	27.94	27.92	27.69	27.78	27.89	27.9
Specific Heat-Btu/lbm/F	0.332	0.332	0.333	0.335	0.334	0.334	0.336	0.336	0.335	0.335
Liq. Viscosity-lbm/ft-hr	0.319	0.312	0.311	0.307	0.309	0.309	0.305	0.307	0.307	0.309
Liq. Conductivity-Btu/hr-ft-F	0.0239	0.0239	0.0239	0.0237	0.0238	0.0237	0.0236	0.0236	0.0237	0.0237
Liq. Prandtl No.	4.34	4.34	4.34	4.35	4.35	4.35	4.35	4.36	4.35	4.35
Inlet Flow Rate-GPM	3.9									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	2									
Inlet Temperature-F	187.8									
Outlet Liq. Temperature-F	189.3									
Outlet Vap. Temperature-F	187.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	109.9									
Water outlet Temp.-F	184.4									
Inlet G-lbm/hr/ft2	691275		Temp	184.7	Density	74.27				
Subcooling-F	1.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1150.9	1151.9	1148.3	1153.7	276.6	157.8	64.6	55.5	67.2	80.7
Heat Loss-Watts	12.1	2.9	3.8	3.9	3.3	2.3	1.5	2.4	3.2	17.8
Heat Flux-Btu/Hr/ft2	19950	19967	19905	19999	4795	2735	1120	962	1165	1399
Wall Temp. #3-F	196.9	201.3	197.5	198.4	193.4	191.9	193.2	192.4	192.7	191.8
Wall Temp. #4-F	196.7	197.2	199.4	199.1	193.8	192.7	193.2	192.3	193.1	192
Wall Temp. #5-F	196.1	196.9	199.3	196.4	193.4	191.8	192.7	192.3	193.2	192.5
Wall Temp. #1-F	187.8	196.2	195.7	197.6	193.6	192.5	192.2	192.5	192	192.1
Wall Temp. #2-F	196.7	196.8	197.5	196.5	193.6	191.8	192.4	192.9	192	192
Instream Temp.-F	189.9	189.1	189.4	190.6	190.1	190.2	191.2	190.6	190.6	190.8
Avg. Wall Temp.-F	193.1	196.8	197.5	198.4	193.7	192.2	192.7	192.5	192.6	192.1
Avg. Wall DT.-F	8.3	8.7	7.2	6.9	3.3	1.9	1.5	1.6	1.9	1.7
Remaining Subcool-F	-3.3									
Exit Quality	0.04	0.1	0.16	0.22	0.28	0.24	0.25	0.25	0.25	0.26
EXP. H-Btu/Hr/ft2/F	2404.1	2282.6	2754.9	2910.5	1438.4	1438.6	751.8	595.1	598.2	814.8
COMPUTED H										
Jallouk	1883.1	1808.6	1769.5	137.7	137.5	137.5	137.9	137.8	137.7	137.6
Szady1(Cudo tube)	2681	2686.7	2686.7	137.7	137.5	137.5	137.9	137.8	137.7	137.6
Szady2	2714	2719.1	2718.6	137.7	137.5	137.5	137.9	137.8	137.7	137.6
(RLIQ)	141755	134857	128560	128560	128560	128560	128560	128560	128560	128560
(F)	1.357	1.723	2.014	2.014	2.014	2.014	2.014	2.014	2.014	2.014
(HLIQ)	299.8	381	445.5	445.5	445.5	445.5	445.5	445.5	445.5	445.5
(HBOIL)	2659.7	2683.1	2682.5	2682.5	2682.5	2682.5	2682.5	2682.5	2682.5	2682.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	84									
DP Liquid Density-lbm/ft3	82.64									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.287	0.92	1.747	2.528	3.188					
Zero Corrections-psid	-0.019	-0.079	0.011	0.049	0.063					
Corrected DP-Psid	0.316	0.999	1.736	2.479	3.13					
Actual DP-ft	1.82	3.11	4.2	5.28	6.87					
Measured TP-Psig	216.9				216.8					
Measured Overall-ft	0.2									
Computed DP-ft	1.9	3.31	5.01	6.69	8.26					
Friction-ft	0.15	0.4	0.6	0.81	1.01					
Acceleration-ft	0.14	0.23	0.25	0.26	0.26					
Elevation-ft	1.52	2.68	4.15	5.62	6.99					

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Run#	883									
Test Fluid	C4F8									
Date:	10/6/93									
Time:	9:30									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	217.5									
Sat. Temperature-F(inlet)	189.8									
Liq. Density-lbm/ft3	73.24	72.95	72.97	72.65	72.79	72.79	72.49	72.62	72.62	72.73
Latent Heat-Btu/lbm	28.25	28.01	28.03	27.76	27.87	27.87	27.62	27.74	27.74	27.83
Specific Heat-Btu/lbm/F	0.332	0.334	0.334	0.336	0.335	0.335	0.337	0.336	0.336	0.335
Liq. Viscosity-lbm/ft-hr	0.313	0.31	0.31	0.306	0.308	0.308	0.304	0.306	0.306	0.307
Liq. Conductivity-Btu/hr-ft-F	0.024	0.0238	0.0238	0.0236	0.0237	0.0237	0.0235	0.0236	0.0236	0.0237
Liq. Prandtl No.	4.34	4.34	4.34	4.35	4.35	4.35	4.36	4.35	4.35	4.35
Inlet Flow Rate-GPM	3									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	2.1									
Inlet Temperature-F	187.8									
Outlet Liq. Temperature-F	189.6									
Outlet Vap. Temperature-F	188									
Water Flow Rate-GPM										
Water Inlet Temp.-F	110.9									
Water outlet Temp.-F	184.7									
Inlet G-lbm/hr/ft2	534448		Temp	183.2	Density	74.65				
Subcooling-F	2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1149	1149.4	1155.1	1150.1	274.6	155.7	63.9	55	66.4	79.9
Heat Loss-Watts	12.4	2.9	3.9	4	3.4	2.4	1.6	2.5	3.3	18.4
Heat Flux-Btu/Hr/ft2	19917	19924	20023	19936	4760	2699	1108	953	1151	1385
Wall Temp. #3-F	197.2	201.8	197.9	198.9	193.6	191.9	193.6	192.9	193.2	192
Wall Temp. #4-F	198.9	197.5	200	199.4	193.7	192.7	193.8	192.8	193.7	192.4
Wall Temp. #5-F	198.5	196.1	198.7	198.7	193.6	191.8	193	192.7	193.6	192.9
Wall Temp. #1-F	187.8	198.5	196.8	197.8	193.9	192.5	192.6	193	192.6	192.8
Wall Temp. #2-F	198.7	198.7	197.8	198.5	194	191.8	192.7	193.3	192.7	192.1
Instream Temp.-F	188.7	189.8	189.7	190.9	190.4	190.4	191.5	191	191	190.6
Avg. Wall Temp.-F	198.3	199.1	198	198.7	193.8	192.2	193.1	192.9	193.1	192.3
Avg. Wall DT.-F	8.7	8.4	7.4	6.9	3.2	1.7	1.6	1.9	2.1	1.7
Remaining Subcool-F	-4.6									
Exit Quality	0.05	0.13	0.21	0.29	0.31	0.32	0.32	0.33	0.33	0.34
EXP. H-Btu/Hr/ft2/F	2282.8	2378.1	2707.6	2889.7	1494.6	1584.8	696.7	502.6	551.3	825.7
COMPUTED H										
Jallouk	1942.8	1878.5	1828.6	112.2	112	112	112.4	112.2	112.2	112.1
Szady1(Cudo tube)	2655.8	2671.9	2677.8	112.2	112	112	112.4	112.2	112.2	112.1
Szady2	2707.4	2727.7	2735.1	112.2	112	112	112.4	112.2	112.2	112.1
(RLIQ)	106542	102364	93483	93483	93483	93483	93483	93483	93483	93483
(F)	1.429	1.844	2.173	2.173	2.173	2.173	2.173	2.173	2.173	2.173
(HLIQ)	256.9	332.4	391.8	391.8	391.8	391.8	391.8	391.8	391.8	391.8
(HBOIL)	2655	2670.2	2675	2675	2675	2675	2675	2675	2675	2675
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	85									
DP Liquid Density-lbm/ft3	92.5									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.328	1.067	1.984	2.816	3.544					
Zero Corrections-psid	-0.019	-0.079	0.011	0.049	0.053					
Corrected DP-Psid	0.342	1.146	1.953	2.767	3.491					
Actual DP-ft	1.87	2.82	3.76	4.7	5.85					
Measured TP-Psig	217.5				217.5					
Measured Overall-ft	0									
Computed DP-ft	1.65	2.97	4.55	6.12	7.6					
Friction-ft	0.1	0.29	0.43	0.58	0.72					
Acceleration-ft	0.1	0.17	0.19	0.19	0.2					
Elevation-ft	1.44	2.51	3.93	5.35	6.68					

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117
1550

Run#	884									
Test Fluid	C4F8									
Date:	10/6/93									
Time:	12:30									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	216.6									
Sat. Temperature-F(inlet)	189.5									
Liq. Density-lbm/ft3	73.29	72.84	72.97	72.81	72.92	72.87	72.57	72.71	72.78	72.76
Latent Heat-Btu/lbm	28.9	27.92	28.09	27.9	27.99	27.94	27.69	27.81	27.88	27.85
Specific Heat-Btu/lbm/F	0.331	0.334	0.334	0.335	0.334	0.334	0.336	0.335	0.335	0.335
Liq. Viscosity-lbm/ft-hr	0.314	0.309	0.31	0.308	0.31	0.309	0.305	0.307	0.307	0.308
Liq. Conductivity-Btu/hr-ft-F	0.024	0.0237	0.0238	0.0237	0.0238	0.0238	0.0236	0.0237	0.0237	0.0237
Liq. Prandtl No.	4.34	4.35	4.34	4.35	4.35	4.35	4.35	4.35	4.35	4.35
Inlet Flow Rate-GPM	2.1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	1.1									
Inlet Temperature-F	187.6									
Outlet Liq. Temperature-F	189.5									
Outlet Vap. Temperature-F	188									
Water Flow Rate-GPM										
Water Inlet Temp.-F	110.1									
Water outlet Temp.-F	184.4									
Inlet G-lbm/hr/ft2	376217		Temp	181.5	Density	75.07				
Subcooling-F	1.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1153.2	1152.2	1155	1158.3	274	154.4	64.6	55.4	66.8	80.7
Heat Loss-Watts	12.5	3	4	5	3.5	2.4	1.6	2.5	3.3	18.4
Heat Flux-Btu/Hr/ft2	19990	19978	20021	20078	4750	2676	1120	960	1158	1399
Wall Temp. #3-F	198.9	201.5	197.6	214.9	193.2	191.9	193.7	193	192.9	191.6
Wall Temp. #4-F	198.6	197.3	200	215.2	193.3	192.7	193.8	192.9	193.2	191.7
Wall Temp. #5-F	198.2	195.9	199.9	200.3	193.2	191.7	193	192.9	193.5	192.2
Wall Temp. #1-F	197.6	198.2	196	197.1	193.5	192.3	192.2	193.1	192.4	191.6
Wall Temp. #2-F	198.6	198.3	197.7	197.9	193.9	191.5	192.4	193.5	192.6	191.5
Instream Temp.-F	188.5	190.2	189.7	190.9	189.9	190.1	191.2	190.7	190.8	190.5
Avg. Wall Temp.-F	198.1	198.8	197.8	206.9	193.5	192.2	193	193.1	192.9	191.7
Avg. Wall DT.-F	8.7	7.7	7.2	15.7	3.3	1.9	1.8	2.3	2.3	1.2
Remaining Subcool-F	-7.5									
Exit Quality	0.09	0.2	0.31	0.42	0.45	0.48	0.47	0.47	0.48	0.49
EXP. H-Btu/Hr/ft2/F	2305.2	2586.3	2772.9	1281.5	1424	1387.4	632.9	411	510.6	1209.3
COMPUTED H										
Jallouk	2062.1	1961.1	84.4	84.6	84.5	84.5	84.8	84.7	84.6	84.6
Szady1(Cuido tube)	2657.7	2880.3	84.4	84.6	84.5	84.5	84.8	84.7	84.6	84.6
Szady2	2710.7	2739.6	84.4	84.6	84.5	84.5	84.8	84.7	84.6	84.6
(RLIQ)	74909	68326	68326	68326	68326	68326	68326	68326	68326	68326
(F)	1.566	2.064	2.064	2.064	2.064	2.064	2.064	2.064	2.064	2.064
(HLIQ)	212.6	281.2	281.2	281.2	281.2	281.2	281.2	281.2	281.2	281.2
(HBOIL)	2657.2	2679.3	2679.3	2679.3	2679.3	2679.3	2679.3	2679.3	2679.3	2679.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	85.5									
DP Liquid Density-lbm/ft3	92.42									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.395	1.384	2.288	3.248	4.085					
Zero Corrections-psid	-0.019	-0.079	0.011	0.049	0.053					
Corrected DP-Psid	0.414	1.463	2.277	3.199	4.032					
Actual DP-ft	1.72	2.19	3.12	3.83	4.56					
Measured TP-Psig	216.6				217					
Measured Overall-ft	-0.79									
Computed DP-ft	1.45	2.54	3.85	5.29	6.64					
Friction-ft	0.07	0.19	0.3	0.4	0.49					
Acceleration-ft	0.06	0.12	0.13	0.14	0.14					
Elevation-ft	1.32	2.22	3.41	4.76	6.01					

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15777

Run#	885									
Test Fluid	C4F8									
Date:	10/8/93									
Time:	12:30									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	218.9									
Sat. Temperature-F(inlet)	190.3									
Liq. Density-lbm/ft3	72.97	72.68	72.76	72.54	72.57	72.6	72.3	72.38	72.41	72.49
Latent Heat-Btu/lbm	28.03	27.78	27.85	27.67	27.69	27.71	27.46	27.53	27.55	27.62
Specific Heat-Btu/lbm/F	0.334	0.336	0.335	0.337	0.336	0.336	0.338	0.338	0.338	0.337
Liq. Viscosity-lbm/ft-hr	0.31	0.307	0.306	0.305	0.305	0.306	0.302	0.303	0.303	0.304
Liq. Conductivity-Btu/hr-ft-F	0.0238	0.0236	0.0237	0.0236	0.0236	0.0236	0.0234	0.0235	0.0235	0.0235
Liq. Prandtl No.	4.34	4.35	4.35	4.35	4.35	4.35	4.36	4.36	4.36	4.36
Inlet Flow Rate-GPM	1.1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	186.5									
Outlet Liq. Temperature-F	191									
Outlet Vap. Temperature-F	189.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	116.1									
Water outlet Temp.-F	185.7									
Inlet G-lbm/hr/ft2	199590		Temp		177.5	Density	76.03			
Subcooling-F	3.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1161.5	1158.4	1158.3	658.1	197.6	65.5	62	54.7	69.2	75.2
Heat Loss-Watts	13.1	3.1	4.2	4.1	3.7	2.6	1.8	2.7	3.6	19.9
Heat Flux-Btu/Hr/ft2	20134	19993	18992	11373	3425	1135	1075	948	1096	1304
Wall Temp. #3-F	196.7	201.4	198.7	197.5	193.6	192	194.6	193.6	193.6	192
Wall Temp. #4-F	198.5	197.3	201	197.8	193.7	192.9	194.6	193.6	193.9	192.2
Wall Temp. #5-F	198.2	198	199.9	196.6	193.8	192	194	193.5	194.3	192.7
Wall Temp. #1-F	186.5	198.2	196.3	196	193.7	192.7	193.2	193.9	193.3	192.8
Wall Temp. #2-F	196.6	198.3	197.8	196.6	193.8	191.9	193.3	194.4	193.3	192.2
Instream Temp.-F	189.7	190.8	190.5	191.3	191.2	191.1	192.2	191.9	191.8	191.5
Avg. Wall Temp.-F	198	198.8	198.5	197	193.7	192.4	193.9	193.8	193.7	192.3
Avg. Wall DT.-F	7.4	7.1	7	5.2	2.3	1.2	1.7	1.9	1.8	0.7
Remaining Subcool-F	-13.9									
Exit Quality	0.17	0.38	0.59	0.71	0.74	0.75	0.77	0.78	0.79	0.8
EXP. H-Btu/Hr/ft2/F	2724.4	2817.4	2837.1	2203.6	1460.5	909.3	635.4	510.6	598.5	1807.7
COMPUTED H										
Jallouk	2241.1	2147.2	51	51.1	51.1	51	51.2	51.2	51.1	51.1
Szady1(Cudo tube)	2683.5	2689.8	51	51.1	51.1	51	51.2	51.2	51.1	51.1
Szady2	2745.7	2752.6	51	51.1	51.1	51	51.2	51.2	51.1	51.1
(RLIQ)	38801	31056	31056	31056	31056	31056	31056	31056	31056	31056
(F)	1.795	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48	2.48
(HLIQ)	147.1	203.9	203.9	203.9	203.9	203.9	203.9	203.9	203.9	203.9
(HBOIL)	2689.3	2689.4	2689.4	2689.4	2689.4	2689.4	2689.4	2689.4	2689.4	2689.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	85.6									
DP Liquid Density-lbm/ft3	82.41									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.614	1.572	2.709	3.806	4.775					
Zero Corrections-psid	-0.019	-0.078	0.011	0.049	0.053					
Corrected DP-Psid	0.633	1.651	2.698	3.757	4.722					
Actual DP-ft	1.29	1.82	2.29	2.74	3.21					
Measured TP-Psig	218.9				219.3					
Measured Overall-ft	-0.79									
Computed DP-ft	1.19	1.95	2.99	4.27	5.48					
Friction-ft	0.03	0.08	0.18	0.17	0.2					
Acceleration-ft	0.03	0.08	0.07	0.07	0.07					
Elevation-ft	1.13	1.8	2.8	4.04	5.19					

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Run#	886									
Test Fluid	C4F8									
Date:	10/7/93									
Time:	8:43									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	179.4									
Sat. Temperature-F(inlet)	175.2									
Liq. Density-lbm/ft3	76.78	76.84	76.78	76.5	76.56	76.52	76.36	76.45	76.5	76.71
Latent Heat-Btu/lbm	31.2	31.26	31.2	30.97	31.01	30.98	30.86	30.96	30.97	31.18
Specific Heat-Btu/lbm/F	0.312	0.312	0.312	0.313	0.313	0.313	0.314	0.313	0.313	0.312
Liq. Viscosity-lbm/ft-hr	0.359	0.36	0.359	0.355	0.356	0.358	0.354	0.355	0.355	0.356
Liq. Conductivity-Btu/hr-ft-F	0.0261	0.0261	0.0261	0.0259	0.0259	0.0259	0.0259	0.0259	0.0259	0.026
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	5.5									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2.8									
Inlet Temperature-F	173.6									
Outlet Liq. Temperature-F	174.2									
Outlet Vap. Temperature-F	172.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	125.1									
Water Outlet Temp.-F	167.8									
Inlet G-lbm/hr/ft2	1021070		Temp	160.5	Density	77.85				
Subcooling-F	1.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	289.1	288.6	288.5	286	292.4	292.2	287	289.5	289.7	288.5
Heat Loss-Watts	10.4	2.4	3.3	3.3	3.2	2.4	1.6	2.3	3.1	16.2
Heat Flux-Btu/hr/ft2	5011	5003	5001	4958	5069	5065	4976	5018	5022	5001
Wall Temp. #3-F	180.3	180	180.1	180.6	180.9	180.8	180.7	179.3	179.8	176.9
Wall Temp. #4-F	180.3	180.1	180.6	181	181	181.6	180.9	179.5	180.3	178.1
Wall Temp. #5-F	180.7	179.8	181.7	180.7	180.8	180.7	181	179.2	179.7	176.9
Wall Temp. #1-F	173.6	180.3	179.3	180.2	180.8	180.8	181.2	179	179.7	176.4
Wall Temp. #2-F	180.6	180.3	179.8	180.4	180.2	180.7	181.2	179.6	180.2	176.6
Instream Temp.-F	174.3	174	174.3	175.5	175.3	175.4	176.1	175.7	175.5	174.6
Avg. Wall Temp.-F	180.5	180.2	180	180.6	180.5	181	181	179.9	179.4	177
Avg. Wall DT.-F	5.9	5.9	5.4	4.9	5	5.4	4.7	3.4	3.7	2.2
Remaining Subcool-F	0.6									
Exit Quality	-0.01	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08
EXP. H-Btu/hr/ft2/F	846	840.9	922	1011.6	1014.5	943	1084.1	1487.7	1352.5	2279.4
COMPUTED H										
Jallouk	745.4	743.7	735.7	732.6	738.2	737.1	732.6	734.2	734	731
Szady1(Cudo tube)	1236.3	1232.5	1236.9	1241	1256.4	1257.6	1252.9	1257.8	1259.1	1253.5
Szady2	948.8	946	952.3	957.4	973.7	977.1	972.8	979	1018.8	1004.8
(RUQ)	186012	185508	184646	184948	182876	181281	180685	178282	176208	173040
(F)	1.004	1.004	1.229	1.356	1.403	1.503	1.629	1.701	1.706	1.669
(LUQ)	294.8	294.6	359.6	555.4	466.3	458.6	476.6	555.4	555	555
(LBOT)	1229.7	1226.8	1236.6	1227.1	1226.9	1227.2	1226.1	1226.6	1226.6	1216.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.4									
DP Liquid Density-lbm/ft3	93.15									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.445	0.525	0.762	1.339	1.628					
Zero Corrections-psid	-0.166	-0.04	-0.199	0.17	0.121					
Corrected DP-Psid	0.611	0.565	0.961	1.169	1.507					
Actual DP-ft	1.28	3.6	5.9	7.52	9.16					
Measured TP-Psig	175.4				178.6					
Measured Overall-ft	1.5									
Computed DP-ft	2.15	4.24	6.22	8.17	9.98					
Friction-ft	0.15	0.35	0.58	0.84	1.11					
Acceleration-ft	0.04	0.15	0.21	0.28	0.31					
Elevation-ft	1.96	3.74	5.43	7.07	8.56					

Run#	887									
Test Fluid	C4F8									
Date:	10/7/93									
Time:	8:43									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	180.2									
Sat. Temperature-F(inlet)	175.5									
Liq. Density-lbm/ft3	76.68	76.62	76.62	76.66	76.78	76.66	76.55	76.61	76.64	76.61
Latent Heat-Btu/lbm	31.13	31.24	31.24	31.11	31.16	31.11	31.01	31.07	31.08	31.07
Specific Heat-Btu/lbm/F	0.312	0.312	0.312	0.312	0.312	0.312	0.313	0.313	0.313	0.313
Liq. Viscosity-lbm/ft-hr	0.358	0.36	0.36	0.358	0.359	0.358	0.356	0.357	0.357	0.357
Liq. Conductivity Btu/hr ft F	0.026	0.0261	0.0261	0.026	0.0261	0.026	0.0259	0.026	0.026	0.026
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	4.6									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	173.6									
Outlet Liq. Temperature-F	175.2									
Outlet Vap. Temperature-F	172.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	115.6									
Water Outlet Temp.-F	168.6									
Heat G-lbm/hr/ft2	955145		Temp	180.9	Density	77.0				
Subcooling F	1.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	288.3	291.1	290.9	289	290.4	291.4	289.2	290.5	288.5	289.8
Heat Loss-Watts	10.7	2.5	3.3	3.4	3.3	2.5	1.6	2.4	3.2	16.8
Heat Flux-Btu/Hr/ft2	4997	5048	5032	5010	5034	5051	5013	5036	5001	5023
Wall Temp. #3-F	179.2	179.2	179.4	180	180	180.2	179.9	178.5	178.8	178.6
Wall Temp. #4-F	179.6	179.4	179.6	180.1	180.3	180.8	180.3	178.7	179.6	177.9
Wall Temp. #5-F	181.2	180.2	182.1	181.1	180.8	180.9	181.8	179.8	180.8	177.9
Wall Temp. #1-F	173.6	179.3	178.5	179.5	179.7	180.7	180.5	176.2	178	175.6
Wall Temp. #2-F	179.9	179.6	179	179.6	179.6	179.8	180.7	176.6	178.2	176.4
Instream Temp.-F	174.7	174.1	174.1	174.8	174.5	174.8	175.3	175	174.6	176
Avg. Wall Temp.-F	180	179.4	179.1	180.2	180.1	180.7	180.6	179.8	179	176.9
Avg. Wall DT.-F	6	5	4.8	5.1	5.3	5.6	5.1	3.8	3.9	1.8
Remaining Subcool-F	0.8									
Exit Quality	-0.01	0	0.01	0.03	0.04	0.05	0.06	0.07	0.08	0.09
EXP. H-Btu/Hr/ft2/F	989.8	1004.8	1048.9	973	941.4	898.5	980.4	1409.6	1297.8	3076.9
COMPUTED H										
Jallouk	755	757.5	744.3	739.4	737.3	737.5	734.9	734.6	731.4	732.8
Szady1(Cudo tube)	1234.8	1237.1	1237.5	1240.7	1243.5	1248.9	1248.9	1251.4	1248.8	1253.1
Szady2	947	950	951.9	956.9	960.1	966.6	967.1	970.7	968.9	974.1
(FLUG)	156227	155381	154039	153296	151159	149835	148777	148066	147081	146169
(F)	1.004	1.004	1.245	1.388	1.516	1.613	1.697	1.776	1.851	1.919
(FLIG)	255.8	255.5	317.7	358.2	385.8	410.9	432.7	453	471.8	488.8
(HBOIL)	1231.2	1233.5	1230.5	1230.8	1231	1233.9	1231.9	1231.9	1232.4	1233.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.3									
DP Liquid Density-lbm/ft3	93.02									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.428	0.733	1.034	1.679	2.078					
Zero Corrections-psid	-0.166	-0.04	-0.199	0.17	0.121					
Corrected DP-Psid	0.594	0.773	1.233	1.509	1.957					
Actual DP-ft	1.31	3.4	4.97	6.88	8.31					
Measured TP-Psig	180.2				178.9					
Measured Overall-ft	0.56									
Computed DP-ft	2.1	4.09	5.98	7.83	9.54					
Friction-ft	0.11	0.26	0.43	0.63	0.84					
Acceleration-ft	0.03	0.12	0.17	0.2	0.24					
Elevation-ft	1.96	3.72	5.38	6.99	8.46					

Run#	009									
Test Fluid	C4F9									
Date:	10/7/93									
Time:	8:43									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	178.4									
Sat. Temperature-F(inlet)	174.8									
Liq. Density-lbm/ft3	76.82	77.03	76.94	76.73	76.8	76.78	76.71	76.82	76.82	76.88
Latent Heat-Btu/lbm	31.24	31.41	31.34	31.16	31.22	31.2	31.15	31.24	31.24	31.18
Specific Heat-Btu/lbm/F	0.312	0.311	0.311	0.312	0.312	0.312	0.312	0.312	0.312	0.312
Liq. Viscosity-lbm/ft-hr	0.36	0.363	0.362	0.359	0.36	0.359	0.359	0.36	0.36	0.359
Liq. Conductivity Btu/hr ft F	0.0361	0.0362	0.0362	0.0361	0.0361	0.0361	0.036	0.0361	0.0361	0.036
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	3.7									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	2									
Inlet Temperature-F	173									
Outlet Liq. Temperature-F	174.1									
Outlet Vap. Temperature-F	171.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	113.1									
Water Outlet Temp.-F	108.7									
Inlet G-lbm/hr/ft2	887058		Temp	180.7	Density	77.81				
Subcooling F	1.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	295.1	291.1	279	282	282.3	287	289.7	290.9	288.9	291.1
Heat Loss-Watts	11.1	2.6	3.4	3.5	3.4	2.5	1.6	2.4	3.2	17.8
Heat Flux-Btu/Hr/ft2	5115	5048	4836	5062	4893	4975	5022	5043	5006	5048
Wall Temp. #3-F	179.4	179.2	179	179.8	179.8	180	179.5	178	178.1	176.6
Wall Temp. #4-F	179.6	179.1	179.5	179.9	180.1	180.7	179.8	178.1	178.8	178
Wall Temp. #5-F	181	179.5	181.3	180.6	180.4	180.5	180.9	178.9	179.8	177.8
Wall Temp. #1-F	173	179.1	178.2	179.5	179.4	180.2	180.6	177.6	177.1	176
Wall Temp. #2-F	179.8	179.3	178.6	179.5	179.3	179.7	180.3	178.1	177.6	176.6
Interface Temp.-F	174.1	179.2	179.8	179.8	179.8	179.8	179.8	179.1	179.2	177
Avg. Wall Temp.-F	180	179.2	179.8	180	179.8	180.4	180.2	179.1	179.2	177
Avg. Wall DT.-F	5.6	5.7	5	5.2	5.4	5.8	5.3	3.8	3.9	2.1
Remaining Subcool-F	0.4									
Exit Quality	0	0.01	0.02	0.04	0.05	0.06	0.08	0.09	0.11	0.12
EXP. H-Btu/Hr/ft2/F	906.4	878	968	969.4	909.8	854	941.6	1322.8	1299.5	2435.4
COMPUTED H										
Jallouk	777.5	760.5	731.5	749	730.4	734.9	737.8	735.9	732.1	735.8
Szady1(Cudo tube)	1244.6	1231.4	1209.6	1243.7	1222.6	1234.3	1242.9	1243.6	1240.7	1250
Szady2	967.4	944.6	922	958.2	937.1	950	959.8	961.4	958	968.9
(FLIQ)	124839	123414	122188	121500	119478	117894	116602	114257	112542	111432
(F)	1.004	1.144	1.367	1.511	1.633	1.736	1.828	1.917	1.987	2.038
(HLIQ)	214.5	243.9	291.7	323	348.7	370.9	390.8	408.4	423.4	434.9
(HBOIL)	1242.5	1229.2	1203.9	1236.4	1213.1	1229	1239.9	1239.7	1239.7	1231.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	86.6									
DP Liquid Density-lbm/ft3	92.27									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.405	0.748	1.093	1.772	2.227					
Zero Corrections-psid	-0.166	-0.04	-0.189	0.17	0.121					
Corrected DP-Psid	0.571	0.786	1.282	1.602	2.106					
Actual DP-ft	1.33	3.34	4.79	6.62	7.83					
Measured IP-Psig	178.4				178.5					
Measured Overall-ft	-2.07									
Computed DP-ft	2.03	3.9	5.68	7.43	9.04					
Friction-ft	0.08	0.19	0.32	0.47	0.63					
Acceleration-ft	0.05	0.09	0.13	0.18	0.18					
Elevation-ft	1.91	3.61	5.24	6.8	8.23					

Run#	389									
Test Fluid	C4F9									
Date:	10/8/93									
Time:	8:35									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	179.8									
Sat. Temperature-F(inlet)	175.3									
Liq. Density-lbm/ft3	76.84	76.96	76.82	76.76	76.8	76.76	76.78	76.78	76.78	76.71
Latent Heat-Btu/lbm	31.26	31.35	31.24	31.16	31.22	31.16	31.16	31.2	31.2	31.16
Specific Heat-Btu/lbm/F	0.312	0.311	0.312	0.312	0.312	0.312	0.312	0.312	0.312	0.312
Liq. Viscosity-lbm/ft-hr	0.36	0.362	0.36	0.359	0.36	0.359	0.359	0.359	0.359	0.359
Liq. Conductivity-Btu/hr-ft-F	0.0261	0.0262	0.0261	0.0261	0.0261	0.0261	0.0261	0.0261	0.0261	0.026
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	2.9									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	2.3									
Inlet Temperature-F	173									
Outlet Liq. Temperature-F	174.7									
Outlet Vap. Temperature-F	171.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	113.2									
Water Outlet Temp.-F	107.8									
Inlet Q-lbm/hr/ft2	530266		Temp	169.2	Density	77.02				
Subcooling-F	2.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	287	289.9	288.8	290.3	288.2	289.4	290.2	288.6	295.3	289.8
Heat Loss-Watts	11.8	2.8	3.7	3.8	3.8	2.8	1.8	2.7	3.6	19.7
Heat Flux-Btu/Hr/ft2	4975	5025	5006	5032	4998	4918	5030	5003	5119	5023
Wall Temp. #3-F	178	178.4	178.8	179.5	180	180.2	179.9	178.8	178.8	177.5
Wall Temp. #4-F	178.5	178.6	179.4	179.6	180.3	180.9	180.4	179.1	179.5	179
Wall Temp. #5-F	180.2	179.5	181.9	181.1	181	181.3	181.7	180.5	180.5	178.8
Wall Temp. #1-F	173	178.5	177.8	179.1	179.4	180.7	180.4	179.1	178.6	176.2
Wall Temp. #2-F	179.1	178.5	178.5	179.3	179.3	180	180.6	179.6	178.6	176.7
Instream Temp.-F	174	173.5	174.1	174.4	174.2	174.4	174.5	174.6	174.6	174.4
Avg. Wall Temp.-F	179	178.5	178.6	179.9	180	180.9	180.6	179.4	179.2	177.6
Avg. Wall DT.-F	4.7	4.9	4.3	5.2	5.6	6.2	5.6	4.9	4.6	3.6
	0.6									
Exit Quality	-0.01	0.01	0.03	0.05	0.06	0.08	0.1	0.12	0.13	0.15
EXP. H-Btu/-hr/ft2/F	1052.9	1052.9	1164.6	968.2	896.2	798.4	856.6	1018.1	1105.9	1811.6
COMPUTED H										
Jallouk	777.7	775.2	760.2	758.9	748	737.9	745.6	740.1	747.5	739.2
Szady1(Cudo tube)	1228.4	1229.8	1232.1	1237.9	1233.1	1225	1240.7	1237.1	1251.9	1243.1
Szady2	957.4	961.8	944.4	951	946.7	938.6	956.7	952.6	966.7	964.8
[illegible]	976.7	971.1	960.9	949.2	950.9	941.2	959.2	957.9	969.6	944.8
[illegible]	1.009	1.13	1.407	1.36	1.72	1.668	1.949	2.049	2.109	2.219
[illegible]	176.7	180.5	239.5	276	328.5	388.5	448.1	500.5	578.4	660.2
[illegible]	1252.4	1256.4	1256.7	1256.2	1229	1217.4	1222	1226.9	1240.5	1220.1
[illegible]										
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.4									
DP Liquid Density-lbm/ft3	93.42									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.387	0.847	2.211	2.082	2.621					
Zero Corrections-psid	0.157	-0.002	0.956	0.159	0.11					
Corrected DP-Psid	0.23	0.849	1.256	1.918	2.511					
Actual DP-ft	2	3.28	4.95	6.15	7.31					
Measured TP-Psig	179.8				178.5					
Measured Overall-ft	2.44									
Computed DP-ft	1.98	3.77	5.48	7.14	8.68					
Friction-ft	0.05	0.13	0.22	0.32	0.44					
Acceleration-ft	0.03	0.07	0.09	0.11	0.13					
Elevation-ft	1.9	3.58	5.17	6.7	8.09					

Run#	890									
Test Fluid	C4F8									
Date:	10/8/93									
Time:	8:35									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	181									
Sat. Temperature-F(inlet)	175.8									
Liq. Density-lbm/ft3	76.84	76.78	76.73	76.59	76.66	76.59	76.59	76.71	76.71	76.55
Latent Heat-Btu/lbm	31.28	31.2	31.16	31.05	31.11	31.05	31.05	31.16	31.15	31.01
Specific Heat-Btu/lbm/F	0.312	0.312	0.312	0.313	0.312	0.313	0.313	0.312	0.312	0.313
Liq. Viscosity-lbm/ft-hr	0.36	0.359	0.359	0.357	0.358	0.357	0.357	0.358	0.358	0.356
Liq. Conductivity-Btu/hr-ft-F	0.0261	0.0261	0.0261	0.026	0.026	0.026	0.026	0.026	0.026	0.0259
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	2									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	1.5									
Inlet Temperature-F	172.9									
Outlet Liq. Temperature-F	175.7									
Outlet Vap. Temperature-F	172.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	117									
Water outlet Temp.-F	168.7									
Inlet G-lbm/hr/ft2	372640		Temp	168.5	Density	78.07				
Subcooling-F	2.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	287.7	290.7	292.2	294.7	291.5	292.3	291.4	292.4	290.8	267.8
Heat Loss-Watts	12	2.8	3.8	3.9	3.8	2.8	1.8	2.8	3.6	19.8
Heat Flux-Btu/Hr/ft2	4987	5039	5065	5108	5053	5067	5051	5069	5087	4642
Wall Temp. #3-F	178.5	178.9	179.2	180.1	180.7	180.9	180.3	178.9	178.8	177.8
Wall Temp. #4-F	178.9	179	179.7	180.3	180.8	181.6	180.8	179.5	179.4	178
Wall Temp. #5-F	180.9	180	182.2	181.6	181.3	181.7	181.9	180.7	180.7	179
Wall Temp. #1-F	172.9	179.1	178.2	179.7	179.9	181.2	180.6	179.6	178.2	176.6
Wall Temp. #2-F	179.5	179.1	178.8	179.9	179.6	180.7	180.9	180.4	178.6	177.2
Instream Temp.-F	174	174.3	174.5	175.1	174.8	175.1	175.1	174.6	174.6	175.3
Avg. Wall Temp.-F	179.5	179	179	180.4	180.4	181.4	180.9	179.8	179.1	177.9
Avg. Wall DT.-F	5.2	4.5	4.2	5.1	5.4	6	5.6	5	4.3	2.4
Remaining Subcool-F	0.4									
Exit Quality	0	0.02	0.05	0.07	0.1	0.12	0.15	0.18	0.2	0.22
EXP. H-Btu/Hr/ft2/F	954.5	1120.5	1192.9	1002.8	940.7	841.5	906.6	1015.6	1168.1	1942.1
COMPUTED H										
Jallouk	800.2	794.2	784.1	782.8	770.3	768.2	762.9	759.3	753.7	718.9
Szady1(Cuido tube)	1227.4	1235.9	1240.8	1250.1	1242.1	1246.1	1244.7	1244.3	1241.1	1196.8
Szady2	938.2	947.2	952.7	962.6	954.6	958.9	957.8	958.3	955.2	908.5
(RLIQ)	67848	67244	65637	64242	62318	60788	58969	56979	55242	53921
(F)	1.004	1.249	1.548	1.748	1.916	2.057	2.184	2.306	2.414	2.502
(HLIQ)	131.4	163.5	202.7	229.2	251.1	269.6	286.4	302.1	316.2	328.1
(HBOIL)	1226.9	1234.9	1239	1247.6	1238.6	1241.8	1239.6	1238.3	1234.2	1189.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80									
DP Liquid Density-lbm/ft3	93.2									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.373	0.933	2.396	2.357	2.996					
Zero Corrections-psid	0.157	-0.002	0.956	0.169	0.11					
Corrected DP-Psid	0.216	0.936	1.44	2.188	2.876					
Actual DP-ft	2.03	3.11	4.6	5.62	6.61					
Measured TP-Psig	181				179.9					
Measured Overall-ft	2.07									
Computed DP-ft	1.89	3.43	4.82	6.13	7.31					
Friction-ft	0.03	0.08	0.15	0.23	0.32					
Acceleration-ft	0.02	0.04	0.05	0.07	0.08					
Elevation-ft	1.84	3.31	4.62	5.83	6.9					

Run#	891									
Test Fluid	C4F8									
Date:	10/8/93									
Time:	8:35									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	181.5									
Sat. Temperature-F(inlet)	176									
Liq. Density-lbm/ft3	76.68	76.57	76.68	76.52	76.57	76.48	76.41	76.5	76.52	76.41
Latent Heat-Btu/lbm	31.11	31.03	31.11	30.99	31.03	30.95	30.9	30.97	30.99	30.9
Specific Heat-Btu/lbm/F	0.312	0.313	0.312	0.313	0.313	0.313	0.314	0.313	0.313	0.314
Liq. Viscosity-lbm/ft-hr	0.358	0.356	0.358	0.356	0.356	0.355	0.354	0.355	0.356	0.354
Liq. Conductivity-Btu/hr-ft-F	0.026	0.026	0.026	0.0259	0.026	0.0259	0.0259	0.0259	0.0259	0.0259
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	1.1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	173.9									
Outlet Liq. Temperature-F	176.4									
Outlet Vap. Temperature-F	173.4									
Water Flow Rate-GPM										
Water inlet Temp.-F	118.5									
Water outlet Temp.-F	169.6									
Inlet G-lbm/hr/ft2	205921		Temp		166.8	Density	78.44			
Subcooling-F	2.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	288.3	284.2	287.2	287.6	288.1	289.8	284	287.2	289.1	283.5
Heat Loss-Watts	12.1	2.8	3.8	3.9	3.8	2.8	1.8	2.8	3.6	20
Heat Flux-Btu/Hr/ft2	4997	4928	4978	4985	4994	5023	4923	4978	5011	4914
Wall Temp. #3-F	178.9	179.1	179.4	180.1	180.5	180.9	180.7	179.3	179.1	178
Wall Temp. #4-F	179.1	179.2	179.8	180.2	180.6	181.6	181.2	180	179.8	179.3
Wall Temp. #5-F	181	180	182.4	181.4	181.1	181.6	182.2	181.1	180.7	179
Wall Temp. #1-F	173.9	179.2	178.4	179.5	179.9	181.3	181	180.1	178.7	176.9
Wall Temp. #2-F	179.9	179.4	178.9	179.8	179.6	180.7	181.2	180.8	178.9	177.5
Instream Temp.-F	174.8	175.2	174.8	175.4	175.2	175.6	175.9	175.5	175.4	175.9
Avg. Wall Temp.-F	179.7	179.2	179.1	180.3	180.3	181.4	181.3	180.3	179.4	178.1
Avg. Wall DT.-F	4.7	3.8	4.1	4.7	4.9	5.5	5.1	4.5	3.8	2
Remaining Subcool-F	-2.4									
Exit Quality	0.02	0.07	0.12	0.18	0.21	0.25	0.3	0.34	0.39	0.43
EXP. H-Btu/Hr/ft2/F	1063.5	1295.6	1214.2	1068.5	1024.6	909.6	958.2	1097.8	1314.1	2436.3
COMPUTED H										
Jallouk	855.4	829.4	796.5	792.7	787.4	787.5	774.2	775.2	775.2	784.8
Szady1(Cudo tube)	1233.3	1227.1	1231.4	1236	1236.1	1242.4	1232	1236.8	1240.5	1231.7
Szady2	943.6	936.7	941.8	946.5	946.9	958.6	942.3	947.9	952.2	942.6
(RLIQ)	37195	36017	34179	32688	30851	29220	27563	25786	23978	22349
(F)	1.302	1.653	1.956	2.187	2.39	2.563	2.718	2.873	3.016	3.187
(HLIQ)	106.2	134.9	159.5	178.5	195	209.3	222.1	234.6	246.1	256.9
(HBOIL)	1233.1	1226.6	1230.5	1234.8	1234.5	1240.4	1229.6	1233.9	1237.2	1229
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.2									
DP Liquid Density-lbm/ft3	93.03									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.349	1.086	2.739	2.87	3.624					
Zero Corrections-psid	0.157	-0.002	0.956	0.169	0.11					
Corrected DP-Psid	0.192	1.088	1.783	2.701	3.514					
Actual DP-ft	2.07	2.82	3.95	4.65	5.4					
Measured TP-Psig	181.5				180.7					
Measured Overall-ft	1.51									
Computed DP-ft	1.55	2.75	3.79	4.74	5.55					
Friction-ft	0.02	0.04	0.08	0.13	0.18					
Acceleration-ft	0.01	0.02	0.03	0.04	0.05					
Elevation-ft	1.53	2.69	3.68	4.57	5.32					

Run#	892									
Test Fluid	C4F8									
Date:	10/8/93									
Time:	8:35									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	182.2									
Sat. Temperature-F(inlet)	176.3									
Liq. Density-lbm/ft3	76.64	76.78	76.73	76.48	76.55	76.45	76.31	76.43	76.48	76.38
Latent Heat-Btu/lbm	31.09	31.2	31.16	30.95	31.01	30.83	30.82	30.92	30.92	30.88
Specific Heat-Btu/lbm/F	0.313	0.312	0.312	0.313	0.313	0.313	0.314	0.314	0.314	0.314
Liq. Viscosity-lbm/ft-hr	0.357	0.359	0.359	0.355	0.356	0.355	0.353	0.354	0.354	0.354
Liq. Conductivity-Btu/hr-ft-F	0.026	0.0261	0.0261	0.0259	0.0259	0.0259	0.0258	0.0259	0.0259	0.0258
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	4.6									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	2.3									
Inlet Temperature-F	173.8									
Outlet Liq. Temperature-F	175.8									
Outlet Vap. Temperature-F	173.5									
Water Flow Rate-GPM										
Water inlet Temp.-F	109.3									
Water outlet Temp.-F	170.4									
Inlet G-lbm/hr/ft2	852477		Temp	170.4	Density	77.66				
Subcooling-F	2.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	403.5	402.6	406.8	402.3	403.6	405.9	400.7	403.1	404.3	400.1
Heat Loss-Watts	22.4	5.3	7.2	8.9	9.8	9.7	7.7	8.5	8.5	45.7
Heat Flux-Btu/Hr/ft2	6984	6979	7052	6974	6986	7036	6948	6967	7008	6936
Wall Temp. #3-F	180	180.6	180.4	181	181.5	181.9	181.9	180.7	180.1	178.1
Wall Temp. #4-F	180.6	180.1	181.2	181.2	181.8	182.6	182.5	181.3	180.9	181
Wall Temp. #5-F	182.5	180.9	183.5	182.5	182.2	182.8	183.3	182.1	181.6	179.8
Wall Temp. #1-F	173.8	180.4	179.2	180.3	180.6	182.1	182.5	181.2	179.5	177.5
Wall Temp. #2-F	181.2	180.5	180	180.6	180.5	181.9	182.7	182.2	180	178.4
Instream Temp.-F	174.9	174.3	174.5	175.6	175.3	175.7	176.3	175.8	175.8	176
Avg. Wall Temp.-F	181.1	180.4	180.2	181.3	181.3	182.4	182.6	181.5	180.4	179.2
Avg. Wall DT.-F	5.9	5.8	5.4	5.3	5.7	6.3	6	5.4	4.3	2.8
Remaining Subcool-F	1									
Exit Quality	-0.01	0.01	0.02	0.04	0.05	0.07	0.08	0.1	0.11	0.13
EXP. H-Btu/Hr/ft2/F	1193.8	1206.4	1310.4	1307.2	1236.3	1111.2	1164.2	1297.8	1628.6	2436.4
COMPUTED H										
Jallouk	919.6	915.4	902.5	898.3	891.5	876.1	868.5	862.1	859.1	851.7
Szady1(Cudo tube)	1461.9	1456	1466.9	1457.9	1459.6	1478	1474.2	1476.5	1480.1	1475.4
Szady2	1236.2	1228.7	1239.2	1242.2	1242.4	1251.1	1247.5	1247.9	1250.8	1245.3
(PLIQ)	158022	155176	153866	152477	149841	147740	146099	142994	140543	138356
(F)	1.004	1.004	1.321	1.494	1.632	1.746	1.845	1.941	2.027	2.105
(HLIQ)	255.2	255	335.4	380.1	415	444.3	469.9	494	515.8	535.9
(HBOIL)	1459.3	1453.4	1461	1459.4	1458.5	1464.5	1458.1	1457.8	1459.9	1451.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	85.8									
DP Liquid Density-lbm/ft3	92.41									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.391	0.714	1.978	1.734	2.175					
Zero Corrections-psid	0.157	-0.002	0.956	0.169	0.11					
Corrected DP-Psid	0.234	0.716	1.022	1.565	2.065					
Actual DP-ft	1.86	3.49	5.33	6.78	8.06					
Measured TP-Psig	182.2				182.1					
Measured Overall-ft	0.19									
Computed DP-ft	2.1	4.06	5.94	7.77	9.48					
Friction-ft	0.11	0.27	0.47	0.69	0.93					
Acceleration-ft	0.05	0.14	0.2	0.25	0.29					
Elevation-ft	1.93	3.65	5.27	6.83	8.26					

Run#	893									
Test Fluid	C4F8									
Date:	10/8/93									
Time:	15:41									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	181.5									
Sat. Temperature-F(inlet)	176									
Liq. Density-lbm/ft3	76.8	76.91	76.84	76.61	76.64	76.48	76.48	76.55	76.57	76.43
Latent Heat-Btu/lbm	31.22	31.32	31.26	31.07	31.09	30.95	30.95	31.01	31.03	30.92
Specific Heat-Btu/lbm/F	0.312	0.311	0.312	0.313	0.313	0.313	0.313	0.313	0.313	0.314
Liq. Viscosity-lbm/ft-hr	0.36	0.361	0.36	0.357	0.357	0.355	0.355	0.356	0.358	0.354
Liq. Conductivity-Btu/hr-ft-F	0.0261	0.0262	0.0261	0.026	0.026	0.0259	0.0259	0.0259	0.026	0.0259
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	4.6									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2.5									
Inlet Temperature-F	173.5									
Outlet Liq. Temperature-F	176.6									
Outlet Vap. Temperature-F	172.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	128.6									
Water outlet Temp.-F	169.6									
Inlet G-lbm/hr/ft2	852477		Temp	170.4	Density	77.66				
Subcooling-F	2.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	199.7	199.3	204.1	199.4	218.8	215	201.1	198.4	201.4	196.6
Heat Loss-Watts	18	4.3	5.8	6.8	7.2	6.6	4.9	5.9	6.3	34.7
Heat Flux-Btu/Hr/ft2	3482	3455	3538	3456	3793	3727	3486	3439	3491	3406
Wall Temp. #3-F	178.5	178.3	178.6	179.1	179.4	179.5	179.2	178.2	177.9	177.1
Wall Temp. #4-F	178.5	178.7	178.8	178	179.5	180.1	179.6	178.6	178.5	178
Wall Temp. #5-F	180.6	179.5	181.4	180.2	180.2	180.2	180.8	179.8	179.7	178.3
Wall Temp. #1-F	173.5	178.7	177.9	178.8	179	180.2	179.7	178.7	177.6	176.3
Wall Temp. #2-F	179	178.8	178.4	178.8	178.7	179.4	179.8	179.3	177.8	176.7
Instream Temp.-F	174.2	173.7	174	175	174.9	175.6	175.6	175.3	175.2	175.8
Avg. Wall Temp.-F	179.2	178.6	178.4	179.3	179.4	180	179.8	178.9	178.2	177.3
Avg. Wall DT.-F	4.8	4.8	4.3	4.1	4.3	4.2	4.1	3.5	2.9	1.3
Remaining Subcool-F	1.8									
Exit Quality	-0.02	-0.01	0	0.01	0.01	0.02	0.03	0.04	0.05	0.05
EXP. H-Btu/Hr/ft2/F	722.2	724.4	829.5	839.2	888.4	880.7	858.1	992.7	1186.6	2570.1
COMPUTED H										
Jallouk	609.4	607.4	616.1	611	641.1	638.1	620.1	617.6	623.1	620.1
Szady1(Cudo tube)	1029.7	1026.1	1039.4	1034	1082.8	1079.4	1047.7	1041.4	1049.9	1043.1
Szady2	736.7	733.5	748.5	741.8	792.5	790.5	761.1	756.6	766.1	767.8
(RLIQ)	155096	154337	154766	155914	154525	154206	152960	151829	149869	149607
(F)	1.004	1.005	1.004	1.092	1.263	1.375	1.464	1.54	1.607	1.665
(HLIQ)	254.9	254.7	254.8	277.6	320.9	349.9	372.5	391.5	408.8	423.8
(HBOIL)	1024.4	1020.8	1034.3	1027.3	1073.4	1067	1031.8	1022.6	1028.9	1019.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	85.4									
DP Liquid Density-lbm/ft3	92.44									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.382	0.491	1.709	1.34	1.668					
Zero Corrections-psid	0.157	-0.002	0.956	0.169	0.11					
Corrected DP-Psid	0.235	0.493	0.753	1.171	1.558					
Actual DP-ft	1.96	3.91	5.84	7.47	9.01					
Measured TP-Psig	181.5				181.4					
Measured Overall-ft	0.19									
Computed DP-ft	2.1	4.2	6.17	8.07	9.82					
Friction-ft	0.1	0.22	0.36	0.53	0.7					
Acceleration-ft	0	0.05	0.11	0.14	0.17					
Elevation-ft	2	3.94	5.71	7.4	8.95					

Run#	894									
Test Fluid	C4F8									
Date:	10/11/93									
Time:	8:52									
Note	Analytical dt is used									
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	90.2									
Sat. Temperature-F(inlet)	129.8									
Liq. Density-lbm/ft3	86.52	86.69	86.65	86.15	86.25	86.22	86.25	86.45	86.47	86.27
Latent Heat-Btu/lbm	39.18	39.32	39.29	38.88	38.96	38.94	38.96	39.13	39.14	38.98
Specific Heat-Btu/lbm/F	0.278	0.277	0.277	0.279	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.571	0.576	0.575	0.559	0.562	0.561	0.562	0.568	0.569	0.562
Liq. Conductivity-Btu/hr-ft-F	0.0326	0.0327	0.0327	0.0323	0.0324	0.0324	0.0324	0.0326	0.0328	0.0324
Liq. Prandtl No.	4.86	4.88	4.87	4.81	4.82	4.82	4.82	4.85	4.85	4.83
Inlet Flow Rate-GPM	4.9									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	2.6									
Inlet Temperature-F	124									
Outlet Liq. Temperature-F	125.9									
Outlet Vap. Temperature-F	121.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	85.3									
Water outlet Temp.-F	119.5									
Inlet G-lbm/hr/ft2	1020411		Temp	119.4	Density	87.26				
Subcooling-F	5.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	291	290.1	287.1	292	287	286.9	291.9	288.6	285.9	289
Heat Loss-Watts	6.4	1.5	1.9	2.2	2	1.4	1	1.3	1.6	9.6
Heat Flux-Btu/Hr/ft2	5044	5029	4977	5062	4975	4973	5058	5003	4954	5010
Wall Temp. #3-F	133.5	133.4	132.5	135	134.5	133.7	134.3	131.2	130.3	130.5
Wall Temp. #4-F	133.8	133	132.9	135	134.2	134.1	134.3	131.7	130.9	132.1
Wall Temp. #5-F	135.7	134	135.3	136.4	134.8	134.8	135.7	133.6	132.5	131.8
Wall Temp. #1-F	124	133.4	131.3	135.5	133.8	134	135.3	132.3	129.8	130.6
Wall Temp. #2-F	134	133.4	131.8	136	133.6	133.6	135.1	132.7	130.2	130.9
Instream Temp.-F	123.9	122.9	123.1	126.1	125.5	125.7	125.5	124.3	124.2	125.4
Avg. Wall Temp.-F	134.3	133.3	132.1	135.5	134.1	134.2	134.9	132.3	130.7	131.2
Avg. Wall DT.-F	10.1	10.2	8.8	9.1	8.4	8.2	9.2	7.8	6.3	5.6
Remaining Subcool-F	4.8									
Exit Quality	-0.03	-0.03	-0.02	-0.01	0	0	0.01	0.02	0.02	0.03
EXP. H-Btu/Hr/ft2/F	498.3	494.3	565.5	553.4	594	604.6	549.1	643.5	784.4	902.1
COMPUTED H										
Jallouk	568.9	564.1	562.4	578.7	571.9	572.6	576.3	577.3	582.7	591
Szady1(Cudo tube)	905.5	897.3	894	922.2	910.2	911.4	922.2	918.1	912.1	928.7
Szady2	683.8	656.5	653.1	678.4	650.8	651.9	668	679	674.5	688.2
(RLIQ)	116974	115860	116082	119459	118776	119004	118036	115820	114850	115307
(F)	1.006	1.006	1.006	1.006	1.006	1.006	1.286	1.456	1.586	1.695
(HLIQ)	267.4	268.8	268.9	268.8	268.4	268.5	342.8	387.4	422.8	452.1
(HBOIL)	897.6	889.3	886	914.5	902.8	903.6	906.1	889.2	880.8	891.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76									
DP Liquid Density-lbm/ft3	93.76									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.281	0.366	1.345	0.987	1.207					
Zero Corrections-psid	0.153	0.061	0.935	0.162	0.06					
Corrected DP-Psid	0.128	0.305	0.41	0.825	1.147					
Actual DP-ft	1.96	3.84	5.64	7.92	8.82					
Measured TP-Psig	90.2				87.1					
Measured Overall-ft	5.17									
Computed DP-ft	2.12	4.25	6.37	8.38	10.17					
Friction-ft	0.12	0.25	0.38	0.59	0.83					
Acceleration-ft	0	0	0.06	0.2	0.28					
Elevation-ft	2	4	5.93	7.59	9.06					

Run#	896									
Test Fluid	C4F8									
Date:	10/11/93									
Time:	15:20									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	86.4									
Sat. Temperature-F(inlet)	127.4									
Liq. Density-lbm/ft3	86.64	86.72	86.64	86.87	86.42	86.5	86.4	86.59	86.64	86.6
Latent Heat-Btu/lbm	39.28	39.34	39.28	39.06	39.1	39.17	39.09	39.24	39.28	39.25
Specific Heat-Btu/lbm/F	0.277	0.277	0.277	0.278	0.278	0.278	0.278	0.277	0.277	0.277
Liq. Viscosity-lbm/ft-hr	0.574	0.577	0.574	0.566	0.567	0.57	0.567	0.573	0.574	0.573
Liq. Conductivity-Btu/hr-ft-F	0.0327	0.0327	0.0327	0.0325	0.0325	0.0326	0.0325	0.0327	0.0327	0.0327
Liq. Prandtl No.	4.87	4.88	4.87	4.84	4.84	4.85	4.84	4.87	4.87	4.87
Inlet Flow Rate-GPM	4.8									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2.6									
Inlet Temperature-F	122.9									
Outlet Liq. Temperature-F	123.1									
Outlet Vap. Temperature-F	119.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	75									
Water outlet Temp.-F	118									
Inlet G-lbm/hr/ft2	1000521		Temp		118.9	Density	87.34			
Subcooling-F	4.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	288.5	291.6	290.3	289.6	292.7	289.2	283.3	291.4	293.4	292.8
Heat Loss-Watts	6.3	1.5	1.9	2.1	2	1.4	1	1.3	1.7	9.5
Heat Flux-Btu/Hr/ft2	5001	5055	5032	5020	5074	5013	4911	5051	5086	5067
Wall Temp. #3-F	132	132.9	132	134	133.4	132.4	133	130.6	129.8	129.6
Wall Temp. #4-F	132.5	132.3	132.6	134	133.5	133.1	132.9	131.3	130.3	131.2
Wall Temp. #5-F	132.6	131.7	133.1	134.6	132.4	132.4	132.5	131	130	129.1
Wall Temp. #1-F	122.9	132.5	131	134	132.6	132.4	134.1	131.6	129.2	129.5
Wall Temp. #2-F	132.7	132.5	131.5	133.9	132.3	132.4	133.7	131.9	129.8	130
Instream Temp.-F	123.2	122.7	123.2	124.8	124.5	124	124.6	123.5	123.2	123.4
Avg. Wall Temp.-F	132.4	132.6	131.8	134.2	132.7	132.6	133.2	131.3	129.8	129.9
Avg. Wall DT.-F	9	9.6	8.3	9.1	8	8.3	8.4	7.6	6.4	6.3
Remaining Subcool-F	3.4									
Exit Quality	-0.02	-0.02	-0.01	0	0.01	0.01	0.02	0.03	0.04	0.04
EXP. H-Btu/Hr/ft2/F	555.7	525.4	602.8	550.3	636.6	600.5	583.4	668.9	795.9	810.6
COMPUTED H										
Jallouk	563.2	563.9	564.8	570.6	570	571.7	578.3	587	590.4	596.9
Szady1(Cudo tube)	896.6	898	899.4	908.3	914.1	909.5	908.2	917	921.8	925.6
Szady2	655.8	657.5	658.5	666.9	657.3	658.7	672	679.8	683.4	676.7
(RLIQ)	113928	113385	113829	115685	115096	113679	113476	111437	110254	109600
(F)	1.006	1.006	1.006	1.006	1.158	1.378	1.522	1.65	1.762	1.861
(HLIQ)	262.8	262.5	262.8	263.8	303	360.1	396.9	431.3	460.2	486.3
(HBOIL)	889.1	890.5	891.9	901.8	902.9	890.2	881.8	884	881.9	878.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	71.9									
DP Liquid Density-lbm/ft3	94.32									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.288	0.414	1.458	1.164	1.435					
Zero Corrections-psid	0.153	0.051	0.935	0.162	0.06					
Corrected DP-Psid	0.135	0.363	0.523	1.002	1.375					
Actual DP-ft	1.95	3.77	5.66	7.05	8.47					
Measured TP-Psig	86.4				83.5					
Measured Overall-ft	4.82									
Computed DP-ft	2.12	4.24	6.3	8.21	9.98					
Friction-ft	0.12	0.24	0.42	0.66	0.94					
Acceleration-ft	0	0	0.17	0.25	0.32					
Elevation-ft	2	4	5.71	7.29	8.71					

Run#	896									
Test Fluid	C4F8									
Date:	10/12/93									
Time:	8:40									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	87.5									
Sat. Temperature-F(inlet)	128.1									
Liq. Density-lbm/ft3	86.49	86.6	86.55	86.15	86.18	86.22	86.18	86.39	86.4	86.4
Latent Heat-Btu/lbm	39.16	39.25	39.21	38.88	38.91	38.94	38.91	39.07	39.09	39.09
Specific Heat-Btu/lbm/F	0.278	0.277	0.277	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.57	0.573	0.572	0.559	0.56	0.561	0.56	0.566	0.567	0.567
Liq. Conductivity-Btu/hr-ft-F	0.0326	0.0327	0.0326	0.0323	0.0324	0.0324	0.0324	0.0325	0.0325	0.0325
Liq. Prandtl No.	4.85	4.87	4.86	4.81	4.82	4.82	4.82	4.84	4.84	4.84
Inlet Flow Rate-GPM	4.9									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2.6									
Inlet Temperature-F	124.5									
Outlet Liq. Temperature-F	125.4									
Outlet Vap. Temperature-F	120.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	83.7									
Water outlet Temp.-F	119.3									
Inlet G-lbm/hr/ft2	1019072		Temp	120.1	Density	87.15				
Subcooling-F	3.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	273.6	276.8	285.2	288.7	289.7	289.6	299	282.7	288	269.1
Heat Loss-Watts	10.3	2.3	3	3.2	3.1	2.2	1.5	2.1	2.7	15.4
Heat Flux-Btu/Hr/ft2	4743	4798	4944	5004	5022	5020	5183	4900	4648	4665
Wall Temp. #3-F	136.3	135.4	135.1	136.1	136.1	135.2	136.2	133.2	133.2	132.2
Wall Temp. #4-F	136.5	134.9	135.5	136.2	136.1	135.8	136.1	133.8	133.8	133.8
Wall Temp. #5-F	137.8	134.1	136.2	136.6	135.8	135.3	135.3	133.3	132.8	131.7
Wall Temp. #1-F	124.5	135.2	133.8	136.6	135.4	135.7	137.3	134.2	131.8	131.9
Wall Temp. #2-F	137.5	135.2	134.4	136.2	135.3	135.6	136.9	134.6	132.2	132.2
Instream Temp.-F	124.1	123.4	123.7	126.1	125.9	125.7	125.9	124.7	124.6	124.6
Avg. Wall Temp.-F	137	135.2	134.7	136.4	135.5	135.5	136.4	133.8	132.7	132.4
Avg. Wall DT.-F	12.7	11.6	10.8	10	9.4	9.6	10.2	8.9	7.9	7.5
Remaining Subcool-F	2.6									
Exit Quality	-0.02	-0.01	0	0	0.01	0.02	0.03	0.03	0.04	0.05
EXP. H-Btu/Hr/ft2/F	373.1	415.1	458.8	498	534.3	524.4	506.9	550.7	587.3	617.9
COMPUTED H										
Jallouk	554.7	554.7	563.1	575.7	576.2	582.8	596.1	585.3	581.7	589.7
Szady1(Cudo tube)	879.4	879.9	895.1	917	921.9	924.3	943.7	916.1	896.2	902
Szady2	628.7	624	653.7	656.8	668.1	688.7	705.6	675	659	671.9
(RLIQ)	117044	116283	116597	119302	118268	117160	116487	114283	113345	112540
(F)	1.006	1.006	1.006	1.006	1.299	1.463	1.594	1.711	1.809	1.894
(HLIQ)	267.3	268.8	267	268.5	348.4	390	425.1	456.2	480.7	503.6
(HBOIL)	871.1	871.6	887.1	909.2	905.3	900.5	914	875.8	847.5	848.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	19.7									
DP Liquid Density-lbm/ft3	100.9									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.277	0.362	1.425	0.989	1.24					
Zero Corrections-psid	0.156	0.04	0.896	0.143	0.103					
Corrected DP-Psid	0.121	0.322	0.529	0.846	1.137					
Actual DP-ft	2.13	4.13	6.13	7.93	9.64					
Measured TP-Psig	87.5				85.9					
Measured Overall-ft	2.67									
Computed DP-ft	2.12	4.25	6.25	8.15	9.91					
Friction-ft	0.12	0.26	0.47	0.73	1.02					
Acceleration-ft	0	0.07	0.2	0.28	0.34					
Elevation-ft	2	3.92	5.58	7.14	8.55					

Run#	897									
Test Fluid	C4F8									
Date:	10/12/93									
Time:	8:40									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	86.7									
Sat. Temperature-F(inlet)	127.6									
Liq. Density-lbm/ft3	86.52	86.64	86.64	86.17	86.24	86.3	86.29	86.52	86.57	86.42
Latent Heat-Btu/lbm	39.18	39.28	39.28	38.9	38.95	39.01	38.99	39.18	39.22	39.1
Specific Heat-Btu/lbm/F	0.278	0.277	0.277	0.278	0.278	0.278	0.278	0.278	0.277	0.278
Liq. Viscosity-lbm/ft-hr	0.571	0.574	0.574	0.559	0.561	0.564	0.563	0.571	0.572	0.567
Liq. Conductivity-Btu/hr-ft-F	0.0326	0.0327	0.0327	0.0324	0.0324	0.0325	0.0324	0.0326	0.0326	0.0325
Liq. Prandtl No.	4.86	4.87	4.87	4.81	4.82	4.83	4.83	4.86	4.86	4.84
Inlet Flow Rate-GPM	4.1									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	124.2									
Outlet Liq. Temperature-F	125.1									
Outlet Vap. Temperature-F	119.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	85.1									
Water outlet Temp.-F	119.3									
Inlet G-lbm/hr/ft2	855408		Temp	118.4	Density	87.43				
Subcooling-F	3.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	290.7	292	290.2	291.1	288	287.9	290.3	290.3	291	289.5
Heat Loss-Watts	11.4	2.5	3.4	3.6	3.4	2.5	1.6	2.4	3.1	17.6
Heat Flux-Btu/Hr/ft2	5039	5062	5030	5046	4958	4991	5032	5032	5044	5018
Wall Temp. #3-F	135.3	134.3	134.2	135.8	135.6	134.7	135.2	132.4	132.2	132
Wall Temp. #4-F	135.3	133.9	134.6	135.8	135.4	135.3	135.2	132.8	132.7	133.6
Wall Temp. #5-F	136.9	133.3	135.3	136	134.5	134.8	134.4	132.4	131.8	131.6
Wall Temp. #1-F	124.2	134.3	132.7	136	134.9	135.1	136.4	133.4	131	131.7
Wall Temp. #2-F	137.7	134.3	133.5	135.9	134.7	135.1	136	133.8	131.8	132
Instream Temp.-F	123.9	123.2	123.2	126	125.6	125.2	125.3	123.9	123.6	124.5
Avg. Wall Temp.-F	136.3	134.2	133.8	135.9	134.9	135	135.4	133	131.9	132.2
Avg. Wall DT.-F	12.2	10.8	10.3	9.7	9.1	9.5	9.9	8.8	8	7.5
Remaining Subcool-F	2.1									
Exit Quality	-0.02	-0.01	0	0.01	0.02	0.03	0.04	0.05	0.06	0.06
EXP. H-Btu/Hr/ft2/F	414	469.9	487.3	521.7	547.7	522.6	507.7	569.7	632.7	678.3
COMPUTED H										
Jallouk	563.4	561.7	560.1	574.1	571.7	577.2	584.9	588.9	587.8	594.3
Szady1(Cudo tube)	903.6	900.8	898	921.8	914.1	917.3	924.6	918.5	920.9	927.8
Szady2	668	660.8	658.1	683.9	681.1	687.2	687.6	680.8	682	676.8
(RLIQ)	98059	97405	97405	99349	98087	96854	96071	93827	92795	92729
(F)	1.006	1.006	1.006	1.304	1.492	1.64	1.765	1.887	1.988	2.082
(HLIQ)	232.2	231.9	231.9	302.3	345.7	379.6	408.8	435.4	459.6	481.2
(HBOIL)	898.6	895.7	892.8	910.9	897.2	895.1	897.2	884.7	881	882.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.3									
DP Liquid Density-lbm/ft3	93.02									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.274	0.435	1.602	1.251	1.588					
Zero Corrections-psid	0.156	0.04	0.896	0.143	0.103					
Corrected DP-Psid	0.118	0.395	0.706	1.108	1.485					
Actual DP-ft	1.96	3.65	5.28	6.76	8.15					
Measured TP-Psig	86.7				85.7					
Measured Overall-ft	1.67									
Computed DP-ft	2.09	4.09	5.94	7.72	9.38					
Friction-ft	0.09	0.22	0.4	0.62	0.87					
Acceleration-ft	0	0.11	0.19	0.24	0.29					
Elevation-ft	2	3.77	5.35	6.86	8.22					

Run#	898									
Test Fluid	C4F8									
Date:	10/12/93									
Time:	8:40									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	86.8									
Sat. Temperature-F(inlet)	127.6									
Liq. Density-lbm/ft3	86.55	86.65	86.57	88.1	86.24	86.29	86.18	86.4	86.44	86.87
Latent Heat-Btu/lbm	39.21	39.29	39.22	38.84	38.95	38.99	38.91	39.09	39.11	39.06
Specific Heat-Btu/lbm/F	0.277	0.277	0.277	0.279	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.572	0.575	0.572	0.557	0.561	0.563	0.56	0.567	0.568	0.568
Liq. Conductivity-Btu/hr-ft-F	0.0326	0.0327	0.0326	0.0323	0.0324	0.0324	0.0324	0.0325	0.0325	0.0325
Liq. Prandtl No.	4.86	4.87	4.86	4.81	4.82	4.83	4.82	4.84	4.85	4.84
Inlet Flow Rate-GPM	3.3									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	2.1									
Inlet Temperature-F	124.2									
Outlet Liq. Temperature-F	125.2									
Outlet Vap. Temperature-F	120.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	85.6									
Water outlet Temp.-F	119.8									
Inlet G-lbm/hr/ft2	688499		Temp	118.4	Density	87.43				
Subcooling-F	3.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	291.4	292.2	291	290.1	287.1	288.5	290.8	291.3	290	289.3
Heat Loss-Watts	11.2	2.5	3.3	3.5	3.4	2.4	1.6	2.4	3.1	17.4
Heat Flux-Btu/Hr/ft2	5051	5065	5044	5029	4977	5001	5041	5049	5027	5015
Wall Temp. #3-F	135.2	134.4	134.2	135.8	135.7	134.6	136	133.1	132.9	132.4
Wall Temp. #4-F	135.4	133.9	134.7	136.7	135.3	135.3	135.9	133.8	133.2	133.8
Wall Temp. #5-F	136.3	133.2	135.6	138	134.5	134.6	135	133.1	132.6	131.6
Wall Temp. #1-F	124.2	134.8	132.8	138	134.8	134.9	136.9	134.1	131.6	131.8
Wall Temp. #2-F	137.7	134.2	133.5	135.6	134.6	134.8	136.7	134.7	132	132.2
Instream Temp.-F	123.7	123.1	123.6	126.4	125.6	125.3	125.9	124.6	124.4	124.9
Avg. Wall Temp.-F	136.2	134.2	133.8	135.8	134.8	134.9	136.1	133.7	132.5	132.4
Avg. Wall DT.-F	12.2	10.9	10	9.2	9	9.3	10	8.9	7.8	7.4
Remaining Subcool-F	1.9									
Exit Quality	-0.01	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.09
EXP. H-Btu/Hr/ft2/F	413.3	465.9	505.8	548.7	554.5	536.4	505.5	567.9	641.8	680.1
COMPUTED H										
Jallouk	574.7	573.1	562.5	574.2	569.7	572.8	580.2	580.5	588.1	588
Szady1(Cudo tube)	902.2	915.4	902	922	914	916.3	926.2	920.6	919.8	928.9
Szady2	662.8	680.5	681.7	662.6	658.6	663.5	674.6	686.1	682.3	684.6
(RLIQ)	78775	78324	78456	79699	78218	77121	76662	74859	73844	73257
(F)	1.006	1.006	1.181	1.456	1.645	1.786	1.93	2.061	2.176	2.277
(HLIQ)	196.1	194.9	231	284.4	320.4	350.2	376.2	400.5	422.6	442.6
(HBOIL)	899.2	912.5	896.9	912.9	900.7	898.9	905	894.6	889	888.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	82									
DP Liquid Density-lbm/ft3	92.92									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.285	0.516	1.779	1.511	1.928					
Zero Corrections-psid	0.156	0.04	0.896	0.148	0.103					
Corrected DP-Psid	0.129	0.476	0.883	1.368	1.825					
Actual DP-ft	1.94	3.51	4.98	6.33	7.58					
Measured TP-Psig	86.8				85.7					
Measured Overall-ft	1.83									
Computed DP-ft	2.06	3.93	5.65	7.33	8.88					
Friction-ft	0.06	0.16	0.3	0.48	0.67					
Acceleration-ft	0	0.1	0.15	0.19	0.23					
Elevation-ft	2	3.67	5.2	6.66	7.99					

Run#	899									
Test Fluid	C4F8									
Date:	10/12/93									
Time:	8:40									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	86.3									
Sat. Temperature-F(inlet)	127.3									
Liq. Density-lbm/ft3	88.34	86.42	86.39	86.1	86.24	86.29	86.27	86.47	88.49	86.42
Latent Heat-Btu/lbm	39.03	39.11	39.07	38.84	38.96	38.99	38.98	39.14	39.16	39.1
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.279	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.566	0.567	0.566	0.557	0.561	0.563	0.562	0.569	0.57	0.567
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0325	0.0325	0.0323	0.0324	0.0324	0.0324	0.0326	0.0326	0.0325
Liq. Prandtl No.	4.83	4.84	4.84	4.81	4.82	4.83	4.83	4.85	4.85	4.84
Inlet Flow Rate-GPM	2.5									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	2.3									
Inlet Temperature-F	124.8									
Outlet Liq. Temperature-F	125.7									
Outlet Vap. Temperature-F	120.4									
Water Flow Rate-GPM										
Water inlet Temp.-F	84.6									
Water outlet Temp.-F	119.7									
Inlet G-lbm/hr/ft2	522761		Temp	117.2	Density	87.62				
Subcooling-F	2.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	289.3	290.2	277.6	290.3	286.9	288.8	289.8	291	288.8	283
Heat Loss-Watts	10.7	2.4	3.2	3.4	3.2	2.3	1.5	2.2	2.8	16.6
Heat Flux-Btu/Hr/ft2	5015	5030	4812	5032	4973	5008	5023	5044	4997	5079
Wall Temp. #3-F	134.5	133.9	133.7	135	135	134.2	134.9	131.9	131.8	131.7
Wall Temp. #4-F	134.8	133.3	134.2	135	134.9	134.7	134.9	132.6	132.1	133.4
Wall Temp. #5-F	135.4	132.9	135	135.5	133.9	134.1	134	132.2	131.4	130.9
Wall Temp. #1-F	124.8	133.7	132.1	135.1	133.9	134.4	135.9	133.2	130.2	131.2
Wall Temp. #2-F	136.6	133.7	132.7	135	133.5	134.3	135.5	133.5	130.7	131.6
Instream Temp.-F	125	124.5	124.7	126.4	125.6	125.3	125.4	124.2	124.1	124.5
Avg. Wall Temp.-F	135.3	133.7	133.2	135.2	134.1	134.4	135	132.7	131.2	131.9
Avg. Wall DT.-F	10.1	8.9	8.3	8.5	8.2	8.8	9.4	8.3	6.9	7
Remaining Subcool-F	0.5									
Exit Quality	0	0.01	0.02	0.04	0.05	0.07	0.08	0.1	0.11	0.13
EXP. H-Btu/Hr/ft2/F	497.8	563.8	582.7	590.5	604.6	567.4	533.7	611.3	727	722.4
COMPUTED H										
Jallouk	589.4	577.7	556.2	579.1	568.1	570.1	573.2	572.6	572.6	580.6
Szady1(Cudo tube)	907.1	905.7	888.6	921.8	912.4	915	918.8	914.4	911.4	923.1
Szady2	687.8	686.7	647.2	681.4	656.5	660.1	666.6	663.9	677.4	687.4
(RLIQ)	60559	60041	59303	59407	58078	57039	56217	54706	53788	53125
(F)	1.006	1.214	1.534	1.743	1.927	2.067	2.229	2.372	2.496	2.609
(HLIQ)	157	189.3	239.3	272.8	301.2	325.9	348.2	369.5	388.6	406.5
(HBOIL)	905.5	902.9	882.8	913.7	901.4	901	901.9	893.8	887.2	896.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	82.9									
DP Liquid Density-lbm/ft3	92.79									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.32	0.728	2.144	1.988	2.504					
Zero Corrections-psid	0.156	0.04	0.896	0.143	0.103					
Corrected DP-Psid	0.164	0.688	1.248	1.843	2.401					
Actual DP-ft	1.87	3.15	4.96	5.52	6.6					
Measured TP-Psig	86.3				85.5					
Measured Overall-ft	1.33									
Computed DP-ft	1.93	3.61	5.2	6.76	8.21					
Friction-ft	0.05	0.13	0.24	0.37	0.52					
Acceleration-ft	0.04	0.08	0.11	0.14	0.17					
Elevation-ft	1.84	3.39	4.85	6.25	7.52					

Run#	900									
Test Fluid	C4F8									
Date:	10/12/93									
Time:	8:40									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	87									
Sat. Temperature-F(inlet)	127.8									
Liq. Density-lbm/ft3	86.3	86.22	86.25	85.98	86.1	86.17	86.08	86.25	86.3	86.24
Latent Heat-Btu/lbm	39.01	38.94	38.96	38.75	38.84	38.9	38.83	38.96	39.01	38.95
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.279	0.279	0.278	0.279	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.564	0.561	0.562	0.553	0.557	0.559	0.557	0.562	0.564	0.561
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0324	0.0324	0.0322	0.0323	0.0324	0.0323	0.0324	0.0325	0.0324
Liq. Prandtl No.	4.83	4.82	4.82	4.79	4.81	4.81	4.8	4.82	4.83	4.82
Inlet Flow Rate-GPM	1.7									
Outlet Liq. Flow Rate-GPM	0.3									
Outlet Vap. Flow Rate-GPM	1.7									
Inlet Temperature-F	125.2									
Outlet Liq. Temperature-F	126.3									
Outlet Vap. Temperature-F	121.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	86.2									
Water outlet Temp.-F	120.6									
Inlet G-lbm/hr/ft2	355536		Temp	117.1	Density	87.64				
Subcooling-F	2.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	289.7	291.4	296.8	294.5	296	294.4	290.9	290.5	290.9	267.1
Heat Loss-Watts	10.6	2.4	3.2	3.3	3.2	2.3	1.6	2.3	2.9	16.7
Heat Flux-Btu/Hr/ft2	5022	5051	5145	5105	5131	5103	5043	5036	5043	4630
Wall Temp. #3-F	134.7	134	133.7	135.1	135.3	134.8	135.7	132.7	131.8	132.1
Wall Temp. #4-F	134.9	133.4	134.2	135.2	135.1	135.1	135.8	133	132.5	133.6
Wall Temp. #5-F	135.4	132.8	135.4	135.5	134.3	134.3	134.7	132.7	131.8	131.4
Wall Temp. #1-F	125.2	133.8	132.4	135.1	133.9	134.7	136.3	134.1	130.9	131.4
Wall Temp. #2-F	135.9	133.8	132.8	135.1	133.7	134.6	136.2	134.5	131.8	131.8
Instream Temp.-F	125.2	125.7	125.5	127.1	126.4	126	126.5	125.5	125.2	125.6
Avg. Wall Temp.-F	135.2	133.8	133.3	135.2	134.3	134.7	135.7	133.4	131.7	132.1
Avg. Wall DT.-F	9.8	7.8	7.5	7.9	7.6	8.4	9	7.7	6.2	6.3
Remaining Subcool-F	-0.4									
Exit Quality	0	0.02	0.05	0.07	0.09	0.11	0.13	0.15	0.18	0.19
EXP. H-Btu/Hr/ft2/F	512.5	645.8	682.1	648.7	673.5	604.3	559.5	656.3	809.1	740.7
COMPUTED H										
Jallouk	591	590.9	586.8	579.7	580.9	580.7	582.4	571.5	571.6	551.2
Szady1(Cudo tube)	908.7	916.4	928.3	931.7	930.1	925.8	924.8	918.6	918.3	884.6
Szady2	669.2	674.7	682	688	686.4	685.7	686.4	662.5	664	650
(RLIQ)	41207	40901	39681	39684	38464	37413	36698	35480	34478	33763
(F)	1.12	1.451	1.789	2.032	2.251	2.445	2.61	2.779	2.931	3.058
(HLIQ)	128.5	166.8	205.3	234.1	258.9	280.9	300.2	318.9	336.1	351.1
(HBOIL)	907.9	913.5	919.9	926.7	923.4	917.1	914.2	905.5	903	885.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	84									
DP Liquid Density-lbm/ft3	92.64									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.343	0.914	2.405	2.396	3.017					
Zero Corrections-psid	0.156	0.04	0.896	0.143	0.103					
Corrected DP-Psid	0.187	0.874	1.509	2.253	2.914					
Actual DP-ft	1.84	2.84	3.93	4.83	5.74					
Measured TP-Psig	87				86.2					
Measured Overall-ft	1.34									
Computed DP-ft	1.71	3.03	4.24	5.38	6.56					
Friction-ft	0.03	0.1	0.19	0.31	0.42					
Acceleration-ft	0.03	0.06	0.07	0.09	0.11					
Elevation-ft	1.65	2.88	3.98	4.99	6.03					

Run#	901									
Test Fluid	C4F8									
Date:	10/12/93									
Time:	15:13									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19685									
Sat. Pressure-Psig	86									
Sat. Temperature-F(inlet)	127.1									
Liq. Density-lbm/ft3	86.34	86.24	86.34	86.05	86.17	86.24	86.13	86.3	86.32	86.25
Latent Heat-Btu/lbm	39.03	38.95	39.03	38.8	38.9	38.95	38.87	39.01	39.02	38.96
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.279	0.278	0.278	0.279	0.278	0.278	0.278
Liq. Visosity-lbm/ft-hr	0.565	0.561	0.565	0.556	0.559	0.561	0.558	0.564	0.564	0.562
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0324	0.0325	0.0323	0.0324	0.0324	0.0323	0.0325	0.0325	0.0324
Liq. Prandtl No.	4.83	4.82	4.83	4.8	4.81	4.82	4.81	4.83	4.83	4.82
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	124.7									
Outlet Liq. Temperature-F	126.4									
Outlet Vap. Temperature-F	121.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	85.9									
Water outlet Temp.-F	120.6									
Inlet G-lbm/hr/ft2	209945		Temp		115	Density	87.97			
Subcooling-F	2.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	291.7	293.2	289.9	295.2	296.2	295.4	291.9	291	295.3	288.4
Heat Loss-Watts	10.6	2.3	3.1	3.3	3.2	2.4	1.6	2.3	2.9	17.1
Heat Flux-Btu/hr/ft2	5056	5082	5025	5117	5134	5121	5060	5044	5119	4999
Wall Temp. #3-F	133.7	132.3	132.1	133.8	134.2	133.9	134.5	131.9	131	131.8
Wall Temp. #4-F	133.9	131.7	132.6	133.9	134	134.4	134.8	132.4	131.6	132.9
Wall Temp. #5-F	134.6	131.2	134.4	134.4	133.1	133.5	133.8	132	131	130.9
Wall Temp. #1-F	124.7	132.4	130.7	133.9	133	133.8	135.6	133.1	130.1	131
Wall Temp. #2-F	135	132.6	131.2	133.8	132.8	133.7	135.6	133.7	130.5	131.3
Instream Temp.-F	125	125.6	125	126.7	126	125.6	126.2	125.2	125.1	125.5
Avg. Wall Temp.-F	134.3	132.3	131.7	134	133.2	133.9	134.9	132.6	130.8	131.5
Avg. Wall DT.-F	9.1	6.4	6.4	7.1	7	8	8.4	7.2	5.5	5.8
Remaining Subcool-F	-2.7									
Exit Quality	0.02	0.06	0.09	0.13	0.16	0.2	0.24	0.27	0.31	0.35
EXP. H-Btu/hr/ft2/F	557.4	791.6	782.4	729.9	734.2	698.8	600.1	701.4	929.2	859.8
COMPUTED H										
Jallouk	599.9	594.1	588.1	596	589.3	583.3	573.4	570.2	575.2	572.3
Szady1(Cudo tube)	910.3	917.1	908.2	928.8	926	922.5	921.8	914.2	920.9	913.5
Szady2	671.2	677	668.2	688.7	684	680.4	678.6	671.4	677.7	665.6
(RLIQ)	24090	23550	22536	22007	20958	19977	19184	18128	17224	16406
(F)	1.367	1.815	2.215	2.514	2.796	3.048	3.262	3.486	3.684	3.86
(HLIQ)	102.8	136.7	166.8	189.8	210.8	229.8	246	262.3	277.1	290.6
(HBOIL)	909.8	916.1	906.3	926.1	922.4	917.8	915.9	906.9	912.4	903.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	84.5									
DP Liquid Density-lbm/ft3	92.57									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.368	1.191	2.873	2.953	3.705					
Zero Corrections-psid	0.158	0.04	0.896	0.143	0.103					
Corrected DP-Psid	0.21	1.151	1.977	2.81	3.602					
Actual DP-ft	1.8	2.37	3.14	3.89	4.58					
Measured TP-Psig	86				85.6					
Measured Overall-ft	0.67									
Computed DP-ft	1.44	2.48	3.4	4.25	5.01					
Friction-ft	0.02	0.06	0.12	0.19	0.28					
Acceleration-ft	0.02	0.03	0.04	0.05	0.07					
Elevation-ft	1.41	2.4	3.24	4.01	4.66					

Run#	902									
Test Fluid	C4F8									
Date:	10/13/93									
Time:	8:30									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	87.6									
Sat. Temperature-F(inlet)	128.2									
Liq. Density-lbm/ft3	86.32	86.34	86.35	88	86.18	86.24	86.13	86.35	86.4	86.3
Latent Heat-Btu/lbm	39.02	39.03	39.05	38.76	38.87	38.95	38.87	39.05	39.09	39.01
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.279	0.279	0.278	0.279	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.564	0.565	0.565	0.554	0.558	0.561	0.558	0.565	0.567	0.564
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0325	0.0325	0.0322	0.0323	0.0324	0.0323	0.0325	0.0325	0.0325
Liq. Prandtl No.	4.83	4.83	4.84	4.79	4.81	4.82	4.81	4.84	4.84	4.83
Inlet Flow Rate-GPM	4.9									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	2.6									
Inlet Temperature-F	125									
Outlet Liq. Temperature-F	125.4									
Outlet Vap. Temperature-F	120.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	75.9									
Water outlet Temp.-F	106.3									
Inlet G-lbm/hr/ft2	1020984		Temp	119.1	Density	87.31				
Subcooling-F	3.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	570.8	576.5	577.1	579	575.6	581.6	574.8	575.4	580.2	579.4
Heat Loss-Watts	9.8	2.2	3	3.1	3	2.2	1.5	2.1	2.7	15.4
Heat Flux-Btu/Hr/ft2	9894	9993	10004	10037	9978	10082	9964	9974	10057	10044
Wall Temp. #3-F	137	137.6	138.5	137.7	138.5	138.3	139.1	135.9	135.4	135.4
Wall Temp. #4-F	137.8	138.1	137.6	138.3	138.3	138.7	139	136.9	136.1	139
Wall Temp. #5-F	138.2	135.2	138.5	138.8	136.7	137.8	137.9	135.9	134.8	134.2
Wall Temp. #1-F	125	136.7	134.8	137.7	137	137.8	140	136.7	134	134
Wall Temp. #2-F	139	136.7	135.7	137.7	136.9	138.3	139.8	137.6	134.6	134.8
Instream Temp.-F	125.1	125	124.9	127	126.2	125.6	126.2	124.9	124.6	125.2
Avg. Wall Temp.-F	138	136.8	136.2	138.1	137.2	138.2	139.2	136.6	135	135.5
Avg. Wall DT.-F	12.5	11.3	10.8	10.7	10.6	12.1	12.5	11.2	9.9	9.8
Remaining Subcool-F	1.1									
Exit Quality	-0.01	0.01	0.02	0.04	0.05	0.07	0.08	0.1	0.11	0.12
EXP. H-Btu/Hr/ft2/F	794.6	882.5	926.4	940.5	943.6	833.6	795.2	886.7	1013.3	1022.1
COMPUTED H										
Jallouk	838.1	842.4	803.5	809.8	802	795.4	793.2	789.3	792.2	782.8
Szady1(Cudo tube)	1284	1289.3	1293.9	1320.9	1313.5	1318.8	1322.1	1315.3	1322.8	1332.9
Szady2	1053.3	1059.2	1059.5	1083.7	1073.2	1080.6	1064.7	1061	1070.2	1097.7
(RLIQ)	118390	118277	116506	117089	114482	112014	110889	107783	105786	104594
(F)	1.006	1.006	1.462	1.695	1.89	2.059	2.202	2.349	2.479	2.561
(HLIQ)	268.3	268.2	389.7	453.8	505.1	549.7	588.7	626	660.1	691
(HBOIL)	1280.1	1285.4	1282	1302.8	1288.3	1286.2	1282	1266.3	1265.5	1267.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.7									
DP Liquid Density-lbm/ft3	93.52									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.306	0.583	1.68	1.507	1.818					
Zero Corrections-psid	0.172	0.041	0.841	0.21	0.116					
Corrected DP-Psid	0.134	0.522	0.819	1.297	1.697					
Actual DP-ft	1.94	3.46	5.14	6.51	7.67					
Measured TP-Psig	87.8				84.9					
Measured Overall-ft	4.67									
Computed DP-ft	2.14	4.15	6.09	8.04	9.91					
Friction-ft	0.15	0.41	0.77	1.21	1.7					
Acceleration-ft	0.12	0.3	0.42	0.53	0.64					
Elevation-ft	1.87	3.44	4.9	6.31	7.58					

Run#	903									
Test Fluid	C4F8									
Date:	10/13/93									
Time:	8:30									
Note	Analytical dl is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	87.2									
Sat. Temperature-F(inlet)	127.9									
Liq. Density-lbm/ft3	86.34	86.3	86.3	86.05	86.22	86.27	86.2	86.37	86.42	86.32
Latent Heat-Btu/lbm	39.03	39.01	39.01	38.8	38.94	38.98	38.92	39.06	39.1	39.02
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.279	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.565	0.564	0.564	0.566	0.561	0.562	0.56	0.566	0.567	0.564
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0325	0.0325	0.0323	0.0324	0.0324	0.0324	0.0325	0.0325	0.0325
Liq. Prandtl No.	4.83	4.83	4.83	4.8	4.82	4.83	4.82	4.84	4.84	4.83
Inlet Flow Rate-GPM	4.1									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	2.2									
Inlet Temperature-F	124.3									
Outlet Liq. Temperature-F	123.3									
Outlet Vap. Temperature-F	121									
Water Flow Rate-GPM										
Water Inlet Temp.-F	76.8									
Water outlet Temp.-F	108.6									
Inlet G-lbm/hr/ft2	854452		Temp		119	Density	87.33			
Subcooling-F	3.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	572.2	577.2	577.5	578.6	574.3	570.9	574.2	575.3	580	581.5
Heat Loss-Watts	8	1.8	2.4	2.5	2.5	1.8	1.2	1.8	2.2	12.7
Heat Flux-Btu/hr/ft2	9919	10005	10011	10030	9955	9896	9953	9972	10054	10080
Wall Temp. #3-F	136.9	137.4	136.9	137.5	138	137.7	138.6	135.8	135.8	135
Wall Temp. #4-F	137.2	135.4	137.4	137.8	137.8	138.3	138.8	136.4	136	138.8
Wall Temp. #5-F	137.7	134.7	138.9	138.2	136.4	137.6	137.7	135.4	134.6	133.9
Wall Temp. #1-F	124.9	136.3	134.6	136.7	136.6	137.4	139.2	136.6	133.7	133
Wall Temp. #2-F	138.1	136.3	135.6	137.1	136.4	137.6	139.3	137.6	134.5	134.9
Instream Temp.-F	125	125.2	125.2	126.7	125.7	125.4	125.8	124.8	124.5	125.1
Avg. Wall Temp.-F	137.3	136.4	136	137.6	136.8	137.8	138.7	136.4	134.9	135
Avg. Wall DT.-F	11.9	10.7	10.3	10.4	10.7	11.9	12.5	11.1	9.9	9.4
Remaining Subcool-F	1.2									
Exit Quality	-0.01	0.01	0.03	0.04	0.06	0.08	0.1	0.11	0.13	0.15
EXP. H-Btu/hr/ft2/F	835.1	935.3	969.8	964.7	934.7	831.4	798.2	897.7	1019.1	1067.3
COMPUTED H										
Jallouk	854	859.8	810.2	811.6	800.4	795.8	792.5	788.1	789.8	793.1
Szady1(Cudo tube)	1283.7	1291.6	1295.5	1314.9	1303.8	1300.8	1312.1	1307.8	1314.1	1325.8
Szady2	1054	1062.1	1062.6	1079.5	1065.3	1039.8	1052.8	1051.4	1059.9	1072.2
(RLIQ)	98985	99119	97374	97006	94329	92319	90890	88332	86345	85091
(F)	1.006	1.069	1.537	1.781	2.005	2.188	2.345	2.504	2.648	2.77
(HLIQ)	232.6	247.2	355.4	416.5	464.3	506.2	543.1	578.8	611.1	640.5
(HBOIL)	1281.2	1288.5	1286.6	1300.9	1283.8	1274.8	1280.3	1268.9	1268.5	1273.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.9									
DP Liquid Density-lbm/ft3	93.49									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.332	0.709	1.912	1.86	2.259					
Zero Corrections-psid	0.172	0.041	0.841	0.21	0.116					
Corrected DP-Psid	0.16	0.668	1.071	1.65	2.153					
Actual DP-ft	1.9	3.22	4.71	5.91	7.1					
Measured TP-Psig	87.2				84.9					
Measured Overall-ft	4.84									
Computed DP-ft	2.07	3.95	5.76	7.58	9.32					
Friction-ft	0.11	0.32	0.6	0.96	1.36					
Acceleration-ft	0.1	0.24	0.33	0.42	0.51					
Elevation-ft	1.85	3.39	4.82	6.2	7.45					

Run#	904									
Test Fluid	C4F8									
Date:	10/13/93									
Time:	12:10									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	87									
Sat. Temperature-F(inlet)	127.8									
Liq. Density-lbm/ft3	86.42	86.25	86.27	86.1	86.2	86.29	86.24	86.34	86.35	86.84
Latent Heat-Btu/lbm	39.1	38.96	38.98	38.84	38.92	38.99	38.95	39.03	39.05	39.03
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.279	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.567	0.562	0.562	0.557	0.56	0.563	0.561	0.565	0.565	0.565
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0324	0.0324	0.0323	0.0324	0.0324	0.0324	0.0325	0.0325	0.0325
Liq. Prandtl No.	4.84	4.82	4.83	4.81	4.82	4.83	4.82	4.83	4.84	4.83
Inlet Flow Rate-GPM	3.3									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	123.9									
Outlet Liq. Temperature-F	123.9									
Outlet Vap. Temperature-F	121.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	77.7									
Water outlet Temp.-F	109									
Inlet G-lbm/hr/ft2	687601		Temp	119.1	Density	87.31				
Subcooling-F	3.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	577.5	577.9	577.8	577	577.9	577.8	577.2	577.1	577	577
Heat Loss-Watts	7.1	1.6	2.2	2.2	2.2	1.7	1.1	1.6	2	11.2
Heat Flux-Btu/hr/ft2	10011	10016	10016	10002	10016	10016	10005	10004	10002	10002
Wall Temp. #3-F	135.5	136.8	136.2	136.5	137.7	137.9	138	135.5	135.2	134.6
Wall Temp. #4-F	136.4	135	137.4	136.9	137.8	138.3	138.1	136.7	135.8	133.4
Wall Temp. #5-F	136.9	134.4	138.4	137.5	136.4	137.5	137.1	135.7	134.6	133.5
Wall Temp. #1-F	123.9	135.7	134.3	135.8	136	137.4	138.6	136.4	133.7	132.7
Wall Temp. #2-F	137.1	135.8	135.3	136	136	137.9	138.6	137.4	134.4	134.1
Instream Temp.-F	124.5	125.5	125.4	126.4	125.8	125.3	125.6	125	124.9	125
Avg. Wall Temp.-F	136.5	135.8	135.8	136.7	136.6	137.8	138.1	136.3	134.7	134.7
Avg. Wall DT.-F	11.5	9.9	9.9	9.8	10.3	12	12	10.9	9.4	9.2
Remaining Subcool-F	0.8									
Exit Quality	-0.01	0.02	0.04	0.06	0.08	0.1	0.13	0.15	0.17	0.19
EXP. H-Btu/l-hr/ft2/F	869.8	1014.7	1006.9	1018.2	972.8	833.1	831.9	919.8	1085.4	1086.2
COMPUTED H										
Jallouk	875.1	855.3	817.1	819.7	806.5	801.3	800.9	792	790.1	789.9
Szady1(Cudo tube)	1284	1295.3	1296.6	1308.1	1305.8	1303.7	1309	1306.2	1308.5	1318
Szady2	1038.3	1066	1064.9	1074.2	1069.9	1065.7	1069.1	1047.5	1051.4	1057.1
(RLIQ)	79278	79617	77783	76772	74574	72485	70318	68770	68986	65289
(F)	1.006	1.258	1.678	1.952	2.185	2.389	2.566	2.739	2.894	3.038
(HLIQ)	195.3	244.6	326.4	380.4	425.2	464.5	499.3	532.1	562.2	590.8
(HBOIL)	1282.5	1282.3	1289.7	1297.3	1290.6	1283.7	1284.3	1276.1	1278	1272
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.9									
DP Liquid Density-lbm/ft3	83.49									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.362	0.867	2.175	2.252	2.782					
Zero Corrections-psid	0.172	0.041	0.841	0.21	0.116					
Corrected DP-Psid	0.19	0.826	1.334	2.042	2.616					
Actual DP-ft	1.85	2.95	4.27	5.26	6.33					
Measured TP-Psig	87				84.2					
Measured Overall-ft	4.67									
Computed DP-ft	1.99	3.55	5.08	6.49	7.9					
Friction-ft	0.06	0.28	0.57	0.94	1.38					
Acceleration-ft	0.09	0.18	0.25	0.33	0.4					
Elevation-ft	1.82	3.09	4.21	5.22	6.12					

Run#	905									
Test Fluid	C4F8									
Date:	10/13/93									
Time:	12:10									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	87.1									
Sat. Temperature-F(inlet)	127.8									
Liq. Density-lbm/ft3	86.3	86.17	86.22	86.07	86.13	86.22	86.17	86.29	86.3	86.24
Latent Heat-Btu/lbm	39.01	38.9	38.94	38.81	38.87	38.94	38.9	38.99	39.01	38.95
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.279	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.564	0.559	0.561	0.556	0.558	0.561	0.559	0.563	0.564	0.561
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0324	0.0324	0.0323	0.0323	0.0324	0.0324	0.0324	0.0325	0.0324
Liq. Prandtl No.	4.83	4.81	4.82	4.8	4.81	4.82	4.81	4.83	4.83	4.82
Inlet Flow Rate-GPM	2.5									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	1.7									
Inlet Temperature-F	124.5									
Outlet Liq. Temperature-F	125.1									
Outlet Vap. Temperature-F	121.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	78.3									
Water outlet Temp.-F	109.3									
Inlet G-lbm/hr/ft2	521105		Temp	118.9	Density	87.34				
Subcooling-F	3.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	574.1	572.3	574.7	571.9	575.8	572.6	574.4	572.9	570.6	573.1
Heat Loss-Watts	6.7	1.5	2.1	2.1	2.1	1.6	1.1	1.5	1.9	10.8
Heat Flux-Btu/hr/ft2	9952	9920	9962	9914	9981	9928	9957	9931	9891	9934
Wall Temp. #3-F	135.5	136.7	135.9	136.7	136.1	136.1	136.2	135.7	135.1	135
Wall Temp. #4-F	136.5	135	137.2	137	137.9	136.7	136.3	136.7	135.9	136.7
Wall Temp. #5-F	137	134.5	136.3	137.5	136.9	137.9	137.3	135.8	134.5	133.8
Wall Temp. #1-F	124.5	135.6	134.1	135.9	136.2	137.7	136.5	136.4	133.7	132.9
Wall Temp. #2-F	137.1	135.7	135.2	136.1	135.9	137.9	136.7	137.4	134.4	134.1
Instream Temp.-F	125.2	126	125.7	126.6	126.2	125.7	126	125.3	125.2	125.6
Avg. Wall Temp.-F	136.5	135.8	135.6	136.8	136.7	136.1	136.2	136.4	134.7	134.9
Avg. Wall DT.-F	10.9	9.3	9.4	9.7	10.1	12	11.8	10.7	9.1	8.9
Remaining Subcool-F	-0.7									
Exit Quality	0	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.23	0.26
EXP. H-Btu/Hr/ft2/F	915.1	1068.5	1054.2	1019.2	990.8	830.5	847.4	932.4	1090.2	1122.4
COMPUTED H										
Jallouk	888.2	855.2	833.7	816.7	812.2	803.6	804	797.9	795.1	798
Szady1(Cudo tube)	1287	1293.9	1295.3	1302.9	1305.2	1298.9	1306	1300	1299	1308.2
Szady2	1035.4	1064.2	1064.1	1069.7	1070.8	1062.4	1068.1	1060.4	1038.5	1048.7
(RLIQ)	60335	59776	57861	56800	54828	52616	51016	48936	47159	45604
(F)	1.164	1.552	1.944	2.232	2.485	2.712	2.909	3.106	3.281	3.438
(HLIQ)	181.3	242.1	303	348.6	387.8	422.8	453.8	483.7	511	535.9
(HBOIL)	1285.8	1291.1	1289.8	1294.5	1293.7	1283.8	1287.5	1277.2	1272.1	1277.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76									
DP Liquid Density-lbm/ft3	93.76									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.388	1.07	2.447	2.845	3.202					
Zero Corrections-psid	0.172	0.041	0.841	0.21	0.116					
Corrected DP-Psid	0.216	1.029	1.606	2.635	3.086					
Actual DP-ft	1.81	2.69	3.84	4.63	5.58					
Measured TP-Psig	87.1				84.5					
Measured Overall-ft	4.34									
Computed DP-ft	1.73	3.11	4.42	5.71	6.93					
Friction-ft	0.07	0.22	0.44	0.73	1.06					
Acceleration-ft	0.07	0.13	0.19	0.24	0.31					
Elevation-ft	1.59	2.76	3.79	4.73	5.56					

Run#	906									
Test Fluid	C4F8									
Date:	10/13/93									
Time:	12:10									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	84.8									
Sat. Temperature-F(inlet)	126.3									
Liq. Density-lbm/ft3	88.52	86.39	86.45	86.32	86.37	86.4	86.42	86.49	86.52	86.45
Latent Heat-Btu/lbm	39.18	39.07	39.13	39.02	39.06	39.09	39.1	39.15	39.18	39.18
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.571	0.566	0.568	0.564	0.566	0.567	0.567	0.57	0.571	0.568
Liq. Conductivity-Btu/hr-ft-F	0.0326	0.0325	0.0326	0.0325	0.0325	0.0325	0.0325	0.0326	0.0326	0.0326
Liq. Prandtl No.	4.86	4.84	4.85	4.83	4.84	4.84	4.84	4.85	4.86	4.85
Inlet Flow Rate-GPM	1.8									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	1.3									
Inlet Temperature-F	123									
Outlet Liq. Temperature-F	123.8									
Outlet Vap. Temperature-F	121									
Water Flow Rate-GPM										
Water Inlet Temp.-F	77.8									
Water outlet Temp.-F	108.1									
Inlet G-lbm/hr/ft2	376520		Temp		117	Density	87.65			
Subcooling-F	3.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	573.2	572.3	576.3	573	574.4	571.9	573.3	572.4	572.4	574.7
Heat Loss-Watts	6.7	1.5	2.1	2.1	2.1	1.6	1.1	1.5	1.9	- 10.9
Heat Flux-Btu/hr/ft2	9936	9920	9990	9933	9957	9914	9938	9922	9922	9962
Wall Temp. #3-F	133.6	134.7	133.8	134.6	136.1	136.4	136.1	133.6	133.6	133.5
Wall Temp. #4-F	134.6	133	135.1	135	136.1	136.9	136.6	135.1	134.4	137.2
Wall Temp. #5-F	135.1	132.4	136.5	135.6	134.8	136	135.4	134.1	132.9	132.1
Wall Temp. #1-F	123	133.7	132	133.7	134.2	135.7	136.5	134.8	131.9	131.2
Wall Temp. #2-F	135.2	133.8	133	134.1	134.2	136.1	136.8	135.8	132.6	132.6
Instream Temp.-F	123.9	124.7	124.3	125.1	124.8	124.6	124.5	124.1	123.9	124.3
Avg. Wall Temp.-F	134.6	133.8	133.5	134.7	134.8	136.3	136.3	134.7	133.1	133.3
Avg. Wall DT.-F	10.3	8.7	8.7	9.2	9.6	11.2	11.3	10.2	8.7	8.6
Remaining Subcool-F	-2.3									
Exit Quality	0.02	0.06	0.1	0.13	0.17	0.21	0.25	0.29	0.33	0.37
EXP. H-Btu/hr/ft2/F	968.9	1146.7	1145.2	1062.4	1039.9	885	877.1	975.5	1136.4	1162.5
COMPUTED H										
Jallouk	888	860.3	840.1	829.8	811.5	804	801.3	796.1	793.2	795.5
Szady1(Cudo tube)	1272.9	1280.6	1282.2	1287.7	1287.7	1284.5	1288.7	1283.6	1283.5	1291.8
Szady2	1022	1029.3	1051.9	1056	1054.8	1050.1	1051.1	1046.6	1045.3	1052.7
(RLIQ)	42814	41934	40068	38636	38800	35008	33259	31422	29659	28061
(F)	1.336	1.802	2.241	2.574	2.669	3.133	3.378	3.602	3.814	4.008
(HLIQ)	159.9	216.2	268.5	309	344.2	376.7	404.3	431.4	456.8	479.7
(HBOIL)	1272.1	1278.5	1278.2	1281.7	1279.4	1273.7	1273.2	1267.1	1264	1269.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.9									
DP Liquid Density-lbm/ft3	93.77									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.449	1.295	2.788	3.093	3.81					
Zero Corrections-psid	0.172	0.041	0.841	0.21	0.116					
Corrected DP-Psid	0.277	1.254	1.947	2.883	3.694					
Actual DP-ft	1.71	2.25	3.26	3.88	4.56					
Measured TP-Psig	84.8				82.4					
Measured Overall-ft	4									
Computed DP-ft	1.52	2.66	3.7	4.73	5.68					
Friction-ft	0.05	0.17	0.35	0.58	0.84					
Acceleration-ft	0.05	0.09	0.13	0.18	0.23					
Elevation-ft	1.42	2.39	3.22	3.97	4.61					

Run#	907									
Test Fluid	C4F8									
Date:	10/13/93									
Time:	12:10									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	85.6									
Sat. Temperature-F(inlet)	126.8									
Liq. Density-lbm/ft3	86.24	86.29	86.35	86.18	86.24	86.29	86.29	86.34	86.39	86.29
Latent Heat-Btu/lbm	38.95	38.99	39.05	38.91	38.95	38.99	38.99	39.03	39.07	38.99
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.561	0.563	0.565	0.56	0.561	0.563	0.563	0.565	0.568	0.563
Liq. Conductivity-Btu/hr-ft-F	0.0324	0.0324	0.0325	0.0324	0.0324	0.0324	0.0324	0.0325	0.0325	0.0324
Liq. Prandtl No.	4.82	4.83	4.84	4.82	4.82	4.83	4.83	4.83	4.84	4.83
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	0.6									
Inlet Temperature-F	123.4									
Outlet Liq. Temperature-F	124.8									
Outlet Vap. Temperature-F	122.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	79.5									
Water outlet Temp.-F	109.6									
Inlet G-lbm/hr/ft2	209677		Temp	115.7	Density	87.86				
Subcooling-F	3.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	572.6	575.9	579.3	578.1	577	582.6	575.1	574	576.9	572.6
Heat Loss-Watts	7	1.6	2.1	2.2	2.2	1.7	1.1	1.7	2	11.8
Heat Flux-Btu/Hr/ft2	9926	9983	10042	10021	10002	10097	9969	9950	10000	9926
Wall Temp. #3-F	132.7	134	132.7	134.2	135	136.3	135.9	134.2	133.6	134
Wall Temp. #4-F	134	132.3	134.2	134.6	135.4	136.8	136.6	135.5	134.9	137.4
Wall Temp. #5-F	134.4	131.7	136	134.6	134.2	135.4	135.1	134.4	133	132.6
Wall Temp. #1-F	123.4	132.6	131.5	133.1	133.5	135.4	136.3	135	132	131.6
Wall Temp. #2-F	134.9	132.9	132.2	133.7	133.6	136	136.6	136	132.9	132.9
Instream Temp.-F	125.6	125.3	124.9	125.9	125.6	125.3	125.3	125	124.7	125.3
Avg. Wall Temp.-F	134	133	132.7	134.1	134.2	136	136.1	135	133.1	133.7
Avg. Wall DT.-F	8	7.2	7.3	7.8	8.1	10.2	10.3	9.6	8	8
Remaining Subcool-F	-6.5									
Exit Quality	0.05	0.12	0.19	0.26	0.33	0.41	0.48	0.55	0.62	0.69
EXP. H-Btu/Hr/ft2/F	1248.3	1386.7	1376.3	1289.3	1231.3	988.1	963.2	1039.7	1251.9	1248.3
COMPUTED H										
Jallouk	912.3	897.8	874.7	866.3	852.6	847	834.4	828.6	823.1	812.1
Szady1(Cudo tube)	1288.8	1289.9	1290.3	1299.6	1296.1	1300	1292.8	1289.7	1291	1293.4
Szady2	1036.6	1038.4	1039.6	1070.3	1065.9	1069.5	1060.6	1056.4	1057.1	1058
(RLIQ)	23860	22350	20522	18959	17151	15345	13582	11819	10055	8376
(F)	1.62	2.297	2.865	3.304	3.702	4.066	4.396	4.713	5.019	5.285
(HLIQ)	121.9	172.7	215.2	248.7	278.5	305.7	330.5	354.1	376.8	397.4
(HBOIL)	1288.4	1288.9	1288.3	1296.5	1291.8	1294.4	1285.6	1280.7	1280.2	1280.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.9									
DP Liquid Density-lbm/ft3	93.77									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.359	1.594	3.154	3.686	4.547					
Zero Corrections-psid	0.172	0.041	0.841	0.21	0.116					
Corrected DP-Psid	0.187	1.553	2.313	3.476	4.431					
Actual DP-ft	1.66	1.76	2.66	2.89	3.34					
Measured TP-Psig	85.6				83.4					
Measured Overall-ft	3.67									
Computed DP-ft	1.15	1.92	2.6	3.22	3.78					
Friction-ft	0.03	0.1	0.21	0.35	0.51					
Acceleration-ft	0.03	0.05	0.08	0.12	0.16					
Elevation-ft	1.09	1.77	2.31	2.75	3.1					

Run#	908									
Test Fluid	C4F8									
Date:	10/14/93									
Time:	8:21									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	86.6									
Sat. Temperature-F(inlet)	127.5									
Liq. Density-lbm/ft3	86.37	86.27	86.3	86.17	86.24	86.29	86.3	86.37	86.42	86.44
Latent Heat-Btu/lbm	39.06	38.98	39.01	38.9	38.95	38.99	39.01	39.06	39.1	39.11
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.566	0.562	0.564	0.559	0.561	0.563	0.564	0.566	0.567	0.568
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0324	0.0325	0.0324	0.0324	0.0324	0.0325	0.0325	0.0325	0.0325
Liq. Prandtl No.	4.84	4.83	4.83	4.81	4.82	4.83	4.83	4.84	4.84	4.85
Inlet Flow Rate-GPM	4.9									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	2.5									
Inlet Temperature-F	123.9									
Outlet Liq. Temperature-F	123.6									
Outlet Vap. Temperature-F	121.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	80									
Water outlet Temp.-F	102.9									
Inlet G-lbm/hr/ft2	1019647		Temp	119.8	Density	87.2				
Subcooling-F	3.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	869.6	870.3	865.5	869.3	868.5	861.9	862.6	864.7	866.2	865.9
Heat Loss-Watts	7.5	1.7	2.4	2.4	2.5	1.9	1.2	1.8	2.2	11.9
Heat Flux-Btu/hr/ft2	15072	15088	15003	14965	15020	14940	14963	14989	14998	15010
Wall Temp. #3-F	136.5	139.8	138.1	138.4	140.5	141	140.3	137.7	137.2	135.7
Wall Temp. #4-F	138.1	138.4	140	139.2	140.5	141.4	140.4	139.4	138.4	141.8
Wall Temp. #5-F	138.2	135.6	140.4	139.6	139	140.8	139.3	138	136.8	134
Wall Temp. #1-F	123.9	137.2	135.8	137.8	138.2	140.5	141	138.4	135.8	132.9
Wall Temp. #2-F	138.5	137.4	137.2	137.8	138.4	141.4	141.1	139.7	136.7	135.1
Instream Temp.-F	124.8	125.4	125.2	126	125.6	125.3	125.2	124.8	124.5	124.4
Avg. Wall Temp.-F	137.8	137.7	137.8	138.6	139	140.9	140.4	138.6	136.9	135.9
Avg. Wall DT.-F	12.3	11.6	11.9	11.9	12.7	14.9	14.5	13.2	11.8	10.8
Remaining Subcool-F	0.5									
Exit Quality	0	0.02	0.04	0.06	0.09	0.11	0.13	0.15	0.17	0.2
EXP. H-Btu/-hr/ft2/F	1221	1304.1	1261.1	1252.4	1178.4	999.4	1028.1	1138.8	1275.1	1387
COMPUTED H										
Jallouk	1079	1022.7	981.8	962.9	946.2	930	919.7	906	896.7	889.2
Szady1(Cudo tube)	1580.7	1590.4	1587.4	1596.9	1601.2	1598.1	1602.8	1604.7	1607.1	1612.3
Szady2	1382.4	1392.1	1361.5	1373	1377.2	1374.5	1379.7	1383.1	1386.2	1412.8
(RLIQ)	117896	117688	114821	113068	110009	107074	104363	101984	98479	95793
(F)	1.006	1.322	1.718	1.987	2.218	2.417	2.587	2.767	2.926	3.078
(HLIQ)	267.8	352.3	457.6	530.2	590.8	644.1	691.9	736.5	778.2	817.2
(HBOIL)	1578.2	1584.6	1574.7	1579.2	1573.9	1562.4	1558.1	1551.2	1543.9	1539.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.8									
DP Liquid Density-lbm/ft3	93.65									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.325	0.637	1.751	1.604	1.88					
Zero Corrections-psid	0.177	0.011	0.822	0.162	0.168					
Corrected DP-Psid	0.148	0.626	0.929	1.442	1.712					
Actual DP-ft	1.92	3.29	4.96	6.26	7.85					
Measured TP-Psig	86.6				84.2					
Measured Overall-ft	4									
Computed DP-ft	2.19	4.06	5.93	7.88	9.84					
Friction-ft	0.18	0.58	1.18	1.96	2.86					
Acceleration-ft	0.21	0.41	0.57	0.73	0.9					
Elevation-ft	1.81	3.07	4.17	5.18	6.07					

Run#	909									
Test Fluid	C4F8									
Date:	10/14/93									
Time:	8:21									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	86.7									
Sat. Temperature-F(inlet)	127.6									
Liq. Density-lbm/ft3	86.34	86.24	86.25	86.2	86.22	86.27	86.34	86.4	86.4	86.39
Latent Heat-Btu/lbm	39.03	38.95	38.96	38.92	38.94	38.98	39.03	39.09	39.09	39.07
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.565	0.561	0.562	0.56	0.561	0.562	0.565	0.567	0.567	0.568
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0324	0.0324	0.0324	0.0324	0.0324	0.0325	0.0325	0.0325	0.0325
Liq. Prandtl No.	4.83	4.82	4.82	4.82	4.82	4.83	4.83	4.84	4.84	4.84
Inlet Flow Rate-GPM	4.1									
Outlet Liq. Flow Rate-GPM	0.6									
Outlet Vap. Flow Rate-GPM	2.1									
Inlet Temperature-F	124									
Outlet Liq. Temperature-F	124									
Outlet Vap. Temperature-F	121									
Water Flow Rate-GPM										
Water Inlet Temp.-F	76.9									
Water outlet Temp.-F	105.1									
Inlet G-lbm/hr/ft2	853334		Temp	119.7	Density	87.21				
Subcooling-F	3.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	866.2	870	867.1	872.7	860.4	865.8	860.3	860.5	867.2	868.7
Heat Loss-Watts	7.2	1.7	2.3	2.3	2.4	1.9	1.2	1.7	2.1	11.7
Heat Flux-Btu/hr/ft2	15015	15081	15031	15128	14914	15005	14913	14916	15032	15058
Wall Temp. #3-F	136.4	139.6	138.2	138.1	140.3	141.2	139.6	137.1	136.9	136
Wall Temp. #4-F	138	138.4	139.9	138.9	140.3	141.5	139.9	138.9	137.9	142.2
Wall Temp. #5-F	138	135.6	140.3	139.4	138.9	140.8	138.9	137.7	136.4	134.4
Wall Temp. #1-F	124	137.1	135.8	136.8	137.9	140.3	140.5	137.8	135.1	133
Wall Temp. #2-F	138.3	137.3	137.2	137.5	138.1	141.3	140.6	139.3	136.1	135.1
Instream Temp.-F	125	125.6	125.5	125.8	125.7	125.4	125	124.6	124.8	124.7
Avg. Wall Temp.-F	137.7	137.6	137.8	138.3	138.8	141	139.9	138.2	136.5	136.1
Avg. Wall DT.-F	12	11.3	11.6	11.8	12.4	14.9	14.2	12.9	11.2	10.8
Remaining Subcool-F	-0.1									
Exit Quality	0	0.03	0.05	0.08	0.11	0.13	0.16	0.19	0.21	0.24
EXP. H-Btu/hr/ft2/F	1251.6	1332.4	1296.2	1280.2	1200.3	1008.9	1048.3	1157.6	1342.1	1399.5
COMPUTED H										
Jallouk	1102	1040.1	1002	979.7	955.9	944.4	929.5	919	910.8	904.2
Szady1(Cudo tube)	1579.8	1592.2	1591.3	1603.1	1594.2	1598	1593.6	1593.4	1603.8	1610.9
Szady2	1381.6	1394.3	1391.3	1378.5	1368.5	1375.2	1370	1370.7	1382.5	1390.3
(RLIQ)	98807	98006	95279	92904	90180	87303	84363	81456	78863	76339
(F)	1.064	1.464	1.86	2.15	2.394	2.611	2.81	2.995	3.163	3.321
(HLIQ)	245.7	338.6	430.1	497.3	553.6	603.5	648.9	691	729.9	768.5
(HBOIL)	1577.8	1587.1	1590.8	1587	1571.6	1569.9	1556.9	1548.8	1551.7	1550.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.3									
DP Liquid Density-lbm/ft3	93.72									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.377	0.802	2.023	1.969	2.379					
Zero Corrections-psid	0.177	0.011	0.822	0.162	0.168					
Corrected DP-Psid	0.2	0.791	1.201	1.827	2.211					
Actual DP-ft	1.84	3.02	4.61	5.63	7.03					
Measured TP-Psig	86.7				84.6					
Measured Overall-ft	3.5									
Computed DP-ft	2.02	3.72	5.4	7.17	8.92					
Friction-ft	0.15	0.49	0.99	1.65	2.4					
Acceleration-ft	0.18	0.33	0.47	0.6	0.75					
Elevation-ft	1.69	2.89	3.95	4.91	5.76					

Run#	310									
Test Fluid	C4F8									
Date:	10/14/93									
Time:	8:21									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	85.3									
Sat. Temperature-F(inlet)	126.6									
Liq. Density-lbm/ft3	86.47	86.39	86.4	86.32	86.35	86.39	86.45	86.54	86.54	86.52
Latent Heat-Btu/lbm	39.14	39.07	39.09	39.02	39.05	39.07	39.13	39.19	39.19	39.18
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.277	0.277	0.278
Liq. Viscosity-lbm/ft-hr	0.569	0.566	0.567	0.564	0.565	0.566	0.568	0.571	0.571	0.571
Liq. Conductivity-Btu/hr-ft-F	0.0326	0.0325	0.0325	0.0325	0.0325	0.0325	0.0326	0.0326	0.0326	0.0326
Liq. Prandtl No.	4.85	4.84	4.84	4.83	4.84	4.84	4.85	4.86	4.86	4.86
Inlet Flow Rate-GPM	3.3									
Outlet Liq. Flow Rate-GPM	0.5									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	123.1									
Outlet Liq. Temperature-F	123.6									
Outlet Vap. Temperature-F	120.7									
Water Flow Rate-GPM										
Water inlet Temp.-F	74.7									
Water outlet Temp.-F	104									
Inlet G-lbm/hr/ft2	688371		Temp	118.5	Density	87.41				
Subcooling-F	3.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	873	872.6	872.6	874.7	875.5	873.6	871.2	870.7	873.3	872.4
Heat Loss-Watts	7	1.6	2.3	2.3	2.3	1.8	1.1	1.7	2.1	11.5
Heat Flux-Btu/Hr/ft2	15133	15126	15124	15162	15176	15143	15102	15093	15138	15122
Wall Temp. #3-F	135.3	138.7	137.1	137.3	139.4	140.8	138.7	136.5	136.2	135.8
Wall Temp. #4-F	137.1	135.5	138.9	137.8	139.6	140.5	139.2	138.2	137.3	141.4
Wall Temp. #5-F	137.2	134.7	139.3	138.4	138.2	139.9	138.2	137.1	135.6	133.5
Wall Temp. #1-F	123.1	136.3	134.7	135.9	137	139.5	140	137.1	134.4	132.1
Wall Temp. #2-F	137.3	136.3	136	136.7	137.3	140.3	140.1	138.5	135.4	134.3
Instream Temp.-F	124.2	124.7	124.6	125.1	124.9	124.7	124.3	123.8	123.9	123.9
Avg. Wall Temp.-F	136.7	136.7	136.7	137.4	138	140.1	139.2	137.5	135.8	135.3
Avg. Wall DT.-F	11.8	11.3	11.4	11.6	12.4	14.7	14.3	13	11.3	10.7
Remaining Subcool-F	-1.1									
Exit Quality	0.01	0.04	0.07	0.11	0.14	0.17	0.21	0.24	0.27	0.3
EXP. H-Btu/Hr/ft2/F	1278	1336.6	1327.7	1311.1	1220	1032.6	1059.2	1161.2	1340.1	1408.5
COMPUTED H										
Jallouk	1098.9	1047.9	1006.8	998	974.3	958.8	944.6	932.8	926.5	920
Szady1(Cudo tube)	1576.3	1583.3	1584.3	1594.7	1595.8	1594.7	1591	1588.2	1594.1	1598.3
Szady2	1377.7	1384.7	1384.3	1370.5	1372.5	1371.9	1368.7	1366.6	1373.4	1377.8
(HLIQ)	78828	77583	74893	72619	69648	67068	64217	61319	58728	56102
(F)	1.219	1.639	2.055	2.368	2.64	2.882	3.106	3.316	3.508	3.684
(HLIQ)	236.6	318.6	399.2	460.6	513.3	560.1	603.1	643.2	680	714.6
(HBOIL)	1574.5	1579	1575.8	1581.8	1577.9	1571.3	1561.6	1552.2	1551.7	1549.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.2									
DP Liquid Density-lbm/ft3	93.59									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.449	0.991	2.319	2.388	2.69					
Zero Corrections-psid	0.177	0.011	0.822	0.162	0.168					
Corrected DP-Psid	0.272	0.98	1.497	2.226	2.722					
Actual DP-ft	1.71	2.7	4	4.95	6.15					
Measured TP-Psig	85.8				83.2					
Measured Overall-ft	3.5									
Computed DP-ft	1.78	3.23	4.67	6.17	7.67					
Friction-ft	0.13	0.43	0.87	1.46	2.14					
Acceleration-ft	0.15	0.26	0.37	0.49	0.63					
Elevation-ft	1.51	2.55	3.43	4.22	4.9					

Run#	911									
Test Fluid	C4F8									
Date:	10/14/93									
Time:	8:21									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	84.2									
Sat. Temperature-F(inlet)	125.9									
Liq. Density-lbm/ft3	86.52	86.49	86.52	86.39	86.39	86.42	86.54	86.57	86.59	86.6
Latent Heat-Btu/lbm	39.18	39.15	39.18	39.07	39.07	39.1	39.19	39.22	39.24	39.25
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.277	0.277	0.277	0.277
Liq. Viscosity-lbm/ft-hr	0.571	0.57	0.571	0.566	0.566	0.567	0.571	0.572	0.573	0.573
Liq. Conductivity-Btu/hr-ft-F	0.0326	0.0326	0.0326	0.0325	0.0325	0.0325	0.0326	0.0326	0.0327	0.0327
Liq. Prandtl No.	4.86	4.85	4.86	4.84	4.84	4.84	4.86	4.86	4.87	4.87
Inlet Flow Rate-GPM	2.5									
Outlet Liq. Flow Rate-GPM	0.3									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	123									
Outlet Liq. Temperature-F	124.7									
Outlet Vap. Temperature-F	120.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	72.3									
Water outlet Temp.-F	102.1									
Inlet G-lbm/hr/ft2	523040		Temp	116.9	Density	87.67				
Subcooling-F	2.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	870.8	865.4	870.5	874.1	875.4	871.1	870	868.1	864.9	869.2
Heat Loss-Watts	7.4	1.7	2.4	2.4	2.5	1.9	1.2	1.8	2.2	12.5
Heat Flux-Btu/Hr/ft2	15095	15001	15090	15152	15174	15100	15081	15048	14992	15067
Wall Temp. #3-F	134.2	137.3	135.5	136.3	138.7	139.6	137.9	135.7	135.4	134.8
Wall Temp. #4-F	136	134.1	137.4	137.1	138.8	139.8	138.4	137.6	136.5	140.9
Wall Temp. #5-F	136	133.5	138.1	137.5	137.4	138.9	137.4	136.2	134.8	132.9
Wall Temp. #1-F	123	134.9	133.3	134.9	136.4	138.6	138.7	138.3	133.6	131.6
Wall Temp. #2-F	136	134.9	134.6	135.7	138.8	139.5	139.2	137.9	134.6	133.8
Instream Temp.-F	123.9	124.1	123.9	124.7	124.7	124.6	123.8	123.6	123.5	123.4
Avg. Wall Temp.-F	135.6	135.3	136.2	136.6	137.4	139.2	138.3	136.7	134.9	134.8
Avg. Wall DT.-F	11	10.6	10.6	11.1	12	14	13.8	12.6	10.8	10.7
Remaining Subcool-F	-3.2									
Exit Quality	0.02	0.07	0.11	0.15	0.2	0.24	0.28	0.33	0.37	0.41
EXP. H-Btu/Hr/ft2/F	1376.3	1425.7	1421.1	1369.3	1268.3	1075.3	1089.8	1207.7	1393	1405.8
COMPUTED H										
Jallouk	1103.9	1052.7	1021.8	1006.2	996.7	974.7	958.7	947.8	938.8	933.5
Szady1(Cudo tube)	1570.5	1569.1	1573	1587.7	1590.9	1586.9	1580.1	1576.7	1577.5	1583.2
Szady2	1371.4	1369.1	1348.3	1363.3	1367.2	1363.2	1357.2	1356.1	1355	1361.7
(RLIQ)	59277	57419	54729	52536	49918	47200	44294	41632	39029	36490
(F)	1.411	1.91	2.353	2.697	3	3.275	3.537	3.773	3.988	4.203
(HLIQ)	219.7	297.8	368.4	420.7	468	510.7	550.8	587.1	621.3	653.8
(HSOIL)	1569	1565.6	1566.4	1577.8	1577.3	1569.1	1557.5	1551.2	1544.7	1545.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.6									
DP Liquid Density-lbm/ft3	93.54									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.556	1.218	2.686	2.846	3.463					
Zero Corrections-psid	0.177	0.011	0.822	0.162	0.168					
Corrected DP-Psid	0.379	1.207	1.844	2.684	3.295					
Actual DP-ft	1.53	2.31	3.41	4.18	5.19					
Measured TP-Psig	84.2				82.8					
Measured Overall-ft	3.16									

Run#	912									
Test Fluid	C4F8									
Date:	10/14/93									
Time:	16:33									
Note	Analytical dt is used									
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	85.1									
Sat. Temperature-F(inlet)	126.5									
Liq. Density-lbm/ft3	86.34	86.35	86.37	86.27	86.32	86.3	86.32	86.39	86.42	86.39
Latent Heat-Btu/lbm	39.03	39.05	39.06	38.98	39.02	39.01	39.02	39.07	39.1	39.07
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.565	0.565	0.566	0.562	0.564	0.564	0.564	0.566	0.567	0.566
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0325	0.0325	0.0324	0.0325	0.0325	0.0325	0.0325	0.0325	0.0325
Liq. Prandtl No.	4.83	4.84	4.84	4.83	4.83	4.83	4.83	4.84	4.84	4.84
Inlet Flow Rate-GPM	1.7									
Outlet Liq. Flow Rate-GPM	0.1									
Outlet Vap. Flow Rate-GPM	1.1									
Inlet Temperature-F	123.8									
Outlet Liq. Temperature-F	124.3									
Outlet Vap. Temperature-F	121.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	72.4									
Water outlet Temp.-F	106									
Inlet G-lbm/hr/ft2	354879		Temp		118.1	Density	87.47			
Subcooling-F	2.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	865.4	866.5	870.6	871.6	875.8	869.1	871	868.6	872.2	870.4
Heat Loss-Watts	7.4	1.7	2.3	2.4	2.4	1.9	1.2	1.8	2.2	12.9
Heat Flux-Btu/hr/ft2	15001	15020	15091	15109	15181	15065	15098	15057	15119	15088
Wall Temp. #3-F	134.2	137.1	135.8	136	138.1	139.4	138.8	136.8	136.5	136.9
Wall Temp. #4-F	136.2	134	137.4	136.7	138.4	139.7	139.3	138.7	137.6	141.7
Wall Temp. #5-F	136.3	133.3	138.4	137.3	136.8	138.9	138.2	137	135.4	133.9
Wall Temp. #1-F	123.8	134.8	133.1	134.8	135.9	138.1	139.4	137.6	134.3	132.6
Wall Temp. #2-F	136.4	135.1	134.4	135.5	136.3	139.1	139.8	138.9	135.4	134.8
Instream Temp.-F	125	124.9	124.8	125.4	125.1	125.2	125.1	124.7	124.5	124.7
Avg. Wall Temp.-F	135.8	135.3	135.1	136.2	136.9	139	139.1	137.8	135.8	135.8
Avg. Wall DT.-F	10.1	9.7	9.6	10.1	11.1	13.1	13.3	12.4	10.7	10.4
Remaining Subcool-F	-6.2									
Exit Quality	0.04	0.11	0.17	0.24	0.3	0.36	0.43	0.49	0.56	0.62
EXP. H-Btu/hr/ft2/F	1486.7	1553.1	1577.3	1493.4	1372.2	1146.2	1133.7	1212.3	1418.7	1458.8
COMPUTED H										
Jallouk	1136.9	1089.1	1058.1	1041.9	1018.1	1007.3	1000.7	991	978.9	971.2
Szady1(Cudo tube)	1578.4	1579	1582.6	1591.9	1593.5	1590.1	1592.3	1587.2	1580	1592.9
Szady2	1380.5	1380.6	1384	1393.6	1394.5	1389.6	1367.7	1362.9	1368.9	1369.9
(RLIQ)	40202	37949	35300	32868	30136	27528	24874	22163	19511	16932
(F)	1.604	2.241	2.763	3.177	3.551	3.881	4.19	4.488	4.769	5.027
(HLIQ)	183.6	256.4	316.2	364	406.6	444.5	479.7	513.4	545.2	576.1
(HBOIL)	1577.6	1576.7	1578.4	1585.6	1584.7	1578.5	1577.7	1569.1	1568.4	1567.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.6									
DP Liquid Density-lbm/ft3	93.4									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.667	1.456	3.03	3.391	4.071					
Zero Corrections-psid	0.177	0.011	0.822	0.162	0.168					
Corrected DP-Psid	0.49	1.444	2.208	3.169	3.903					
Actual DP-ft	1.35	1.92	2.81	3.37	4.17					
Measured TP-Psig	85.1				83.3					
Measured Overall-ft	3									
Computed DP-ft	1.26	2.21	3.12	4.03	4.91					
Friction-ft	0.07	0.24	0.5	0.83	1.2					
Acceleration-ft	0.07	0.13	0.2	0.29	0.4					
Elevation-ft	1.11	1.84	2.42	2.91	3.3					
Computed DP-ft	1.52	2.73	3.93	5.16	6.38					
Friction-ft	0.11	0.36	0.71	1.19	1.73					
Acceleration-ft	0.11	0.2	0.29	0.39	0.51					
Elevation-ft	1.29	2.19	2.93	3.59	4.14					

Run#	913									
Test Fluid	C4F8									
Date:	10/14/93									
Time:	16:33									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	85									
Sat. Temperature-F(inlet)	126.4									
Liq. Density-lbm/ft3	86.25	86.34	86.37	86.32	86.32	86.3	86.35	86.35	86.36	86.37
Latent Heat-Btu/lbm	38.98	39.03	39.06	39.02	39.02	39.01	39.05	39.05	39.05	39.06
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.562	0.565	0.566	0.564	0.564	0.564	0.565	0.565	0.565	0.566
Liq. Conductivity-Btu/hr-ft-F	0.0324	0.0325	0.0325	0.0325	0.0325	0.0325	0.0325	0.0325	0.0325	0.0325
Liq. Prandtl No.	4.82	4.83	4.84	4.83	4.83	4.83	4.84	4.84	4.84	4.84
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0									
Outlet Vap. Flow Rate-GPM	0.6									
Inlet Temperature-F	123.5									
Outlet Liq. Temperature-F	124.7									
Outlet Vap. Temperature-F	122.4									
Water Flow Rate-GPM										
Water inlet Temp.-F	74.6									
Water outlet Temp.-F	114.4									
Inlet G-lbm/hr/ft2	209409		Temp		116.4	Density	87.75			
Subcooling-F	2.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	868.2	867.5	865.7	867.3	870.6	870.9	869	864.1	95.6	99
Heat Loss-Watts	7.3	1.7	2.3	2.3	2.4	1.9	1.2	2	1.6	9.3
Heat Flux-Btu/hr/ft2	15050	15038	15006	15034	15091	15096	15064	14979	1657	1716
Wall Temp. #3-F	133.2	136.3	133.7	135.1	137.1	138.8	138.2	140.7	128.2	128.1
Wall Temp. #4-F	135	133.3	135.8	135.8	137.2	139.1	139.1	141.3	128.5	129
Wall Temp. #5-F	134.7	132.4	137.3	135.7	135.6	137.9	137.4	137.3	128.2	128.9
Wall Temp. #1-F	123.5	133.5	132.3	133.6	134.6	137.3	138.7	138	127.4	127.9
Wall Temp. #2-F	135.7	133.9	133.6	134.2	135	138.3	139.2	139	127.5	128.4
Instream Temp.-F	125.5	125	124.8	125.1	125.1	125.2	124.9	124.9	124.9	124.8
Avg. Wall Temp.-F	134.7	134.3	133.9	135.1	135.6	138.3	138.5	139.3	128	128.5
Avg. Wall DT.-F	8.5	8.6	8.4	9.3	9.8	12.4	12.9	13.7	3	3.6
Remaining Subcool-F	-12.2									
Exit Quality	0.09	0.2	0.3	0.41	0.52	0.63	0.74	0.84	0.95	0.97
EXP. H-Btu/hr/ft2/F	1776.8	1754.6	1792.5	1621.7	1537.1	1218.2	1164.2	1094.7	555.1	479
COMPUTED H										
Jallouk	1176.9	1128.1	1095.1	1077.4	1064	1052.9	1040.2	1031.4	379.8	382.8
Szady1(Cudo tube)	1586.8	1580.5	1577.1	1582.9	1586.7	1589.1	1584.9	1581.7	582.2	590.2
Szady2	1390	1382.7	1378.4	1384.4	1388.2	1390.3	1384.8	1380.3	480.9	484.7
(RLIQ)	23313	20834	18186	15623	13001	10383	7731	5121	3678	3390
(F)	1.894	2.771	3.453	4.006	4.5	4.954	5.397	5.818	6.049	6.1
(HLIQ)	142.4	208	259.1	300.7	337.9	372	405	436.6	453.9	457.7
(HBOIL)	1586.4	1579.3	1574.8	1579.3	1581.6	1582.3	1576	1570.5	469.9	478.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.1									
DP Liquid Density-lbm/ft3	93.47									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.832	1.775	3.502	3.961	4.911					
Zero Corrections-psid	0.177	0.011	0.822	0.162	0.168					
Corrected DP-Psid	0.655	1.764	2.68	3.799	4.743					
Actual DP-ft	1.07	1.99	2.02	2.32	2.78					
Measured TP-Psig	85				83.2					
Measured Overall-ft	3									
Computed DP-ft	0.99	1.67	2.27	2.82	3.94					
Friction-ft	0.04	0.15	0.3	0.48	0.58					
Acceleration-ft	0.04	0.08	0.14	0.22	0.23					
Elevation-ft	0.91	1.44	1.83	2.12	3.13					

Run#	914									
Test Fluid	C4F8									
Date:	10/15/93									
Time:	8:44									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	87.2									
Sat. Temperature-F(inlet)	127.9									
Liq. Density-lbm/ft3	86.4	86.25	86.22	86.12	86.17	86.24	86.24	86.3	86.32	86.4
Latent Heat-Btu/lbm	39.09	38.96	38.94	38.86	38.9	38.95	38.95	39.01	39.02	39.09
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.279	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.567	0.562	0.561	0.558	0.559	0.561	0.561	0.564	0.564	0.567
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0324	0.0324	0.0323	0.0324	0.0324	0.0324	0.0325	0.0325	0.0325
Liq. Prandtl No.	4.84	4.82	4.82	4.81	4.81	4.82	4.82	4.83	4.83	4.84
Inlet Flow Rate-GPM	4.8									
Outlet Liq. Flow Rate-GPM	0.3									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	123.6									
Outlet Liq. Temperature-F	123.8									
Outlet Vap. Temperature-F	121.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	73.6									
Water outlet Temp.-F	100.7									
Inlet G-lbm/hr/ft2	988463		Temp		120	Density	87.16			
Subcooling-F	4.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1149.8	1150.9	1158.4	1153	1150.1	1150.6	1154.7	1148.5	1153	1155.4
Heat Loss-Watts	8	1.9	2.6	2.6	2.7	2	1.3	1.9	2.3	13
Heat Flux-Btu/hr/ft2	19931	19950	20045	19987	19936	19945	20016	19909	19967	20028
Wall Temp. #3-F	137.8	142.7	140	140.1	142.4	142.9	141.2	139.1	138.3	137.5
Wall Temp. #4-F	140	138.1	142.1	140.9	142.4	142.7	141.7	141.3	139.7	148.3
Wall Temp. #5-F	139.9	136.9	142.1	141.4	140.8	142.4	140.5	139.2	137.5	135.3
Wall Temp. #1-F	123.6	139	137.4	138.7	140	141.8	142.4	139.5	136.4	134
Wall Temp. #2-F	140.3	139.2	139	139.4	140.3	143.4	142.7	141	137.5	136.8
Instream Temp.-F	124.6	125.5	125.7	126.3	126	125.6	125.6	125.2	125.1	124.6
Avg. Wall Temp.-F	139.5	139.8	139.6	140.3	140.9	142.5	141.7	140	137.9	138
Avg. Wall DT.-F	14	13.3	13	13.1	14	15.9	15.2	13.9	11.9	12.5
Remaining Subcool-F	0.1									
Exit Quality	0	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27
EXP. H-Btu/hr/ft2/F	1423.7	1494.6	1539.7	1529	1426.7	1250.6	1317.2	1430.2	1682.8	1605.5
COMPUTED H										
Jallouk	1269	1201.5	1136.8	1097.1	1064.7	1034	1007.4	975.7	953.1	927.7
Szady1(Cudo tube)	1817.1	1832.4	1843	1852.3	1850	1849.4	1857.4	1852.4	1860	1861.2
Szady2	1637.7	1678.9	1690.5	1701.8	1697	1698.8	1701.1	1692.6	1696.9	1697.2
(RLIQ)	115226	114557	111274	108381	104554	100854	97149	93293	89728	85880
(F)	1.006	1.468	1.903	2.215	2.481	2.717	2.928	3.128	3.311	3.492
(HLIQ)	263.2	384.3	499.1	581.7	651.1	712.5	767.7	819.4	867.2	913.5
(HBOIL)	1815.3	1826.8	1830.8	1833	1822.7	1813.5	1812.6	1797.4	1795	1784.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.5									
DP Liquid Density-lbm/ft3	93.41									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.32	0.598	1.686	1.543	1.848					
Zero Corrections-psid	0.156	-0.127	0.684	0.211	0.111					
Corrected DP-Psid	0.164	0.723	1.001	1.332	1.737					
Actual DP-ft	1.89	3.12	4.82	6.43	7.78					
Measured TP-Psig	87.2				85.1					
Measured Overall-ft	3.5									
Computed DP-ft	2.17	4	5.91	8	10.15					
Friction-ft	0.19	0.7	1.48	2.48	3.65					
Acceleration-ft	0.25	0.49	0.7	0.92	1.16					
Elevation-ft	1.72	2.81	3.74	4.62	5.33					

Run#	915									
Test Fluid	C4F8									
Date:	10/15/93									
Time:	8:44									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	86.6									
Sat. Temperature-F(inlet)	127.5									
Liq. Density-lbm/ft3	86.37	86.25	86.25	86.17	86.2	86.27	86.3	86.35	86.42	86.42
Latent Heat-Btu/lbm	39.06	38.96	38.96	38.9	38.92	38.98	39.01	39.05	39.1	39.1
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.566	0.562	0.562	0.559	0.56	0.562	0.564	0.565	0.567	0.567
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0324	0.0324	0.0324	0.0324	0.0324	0.0325	0.0325	0.0325	0.0325
Liq. Prandtl No.	4.84	4.82	4.82	4.81	4.82	4.83	4.83	4.84	4.84	4.84
Inlet Flow Rate-GPM	4.1									
Outlet Liq. Flow Rate-GPM	0.6									
Outlet Vap. Flow Rate-GPM	2.1									
Inlet Temperature-F	123.9									
Outlet Liq. Temperature-F	123.9									
Outlet Vap. Temperature-F	121									
Water Flow Rate-GPM										
Water Inlet Temp.-F	74.9									
Water outlet Temp.-F	99.6									
Inlet G-lbm/hr/ft2	854133		Temp		119.2	Density	87.3			
Subcooling-F	3.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1161.2	1151.5	1158.4	1152.2	1144	1150.8	1161	1159	1158.5	1160.6
Heat Loss-Watts	7.5	1.8	2.4	2.5	2.5	1.9	1.2	1.8	2	12.5
Heat Flux-Btu/Hr/ft2	20129	19961	20080	19973	19830	19948	20125	20081	20082	20118
Wall Temp. #3-F	137.2	142.1	139.3	139.6	141.6	142.1	140.9	138.5	135.7	139.9
Wall Temp. #4-F	139.5	137.4	141.6	140.3	141.6	142.2	141.1	140.8	138	145.7
Wall Temp. #5-F	139.3	138.3	141.8	141.2	140.5	141.4	140.1	138.8	135.2	134.5
Wall Temp. #1-F	123.9	138.3	136.7	138.2	139.3	140.8	141.8	139.1	134.1	133.1
Wall Temp. #2-F	139.4	138.6	138.4	139.1	139.7	142.4	142	140.8	136.8	136.2
Instream Temp.-F	124.8	125.5	125.5	126	125.8	125.4	125.2	124.9	124.5	124.5
Avg. Wall Temp.-F	138.9	139.1	139	139.8	140.3	141.6	141.2	139.6	135.9	137.9
Avg. Wall DT.-F	13.1	12.7	12.6	12.9	13.6	15.3	15.1	13.8	10.5	12.5
Remaining Subcool-F	-1.4									
Exit Quality	0.01	0.04	0.08	0.12	0.15	0.19	0.22	0.26	0.29	0.33
EXP. H-Btu/Hr/ft2/F	1531.8	1571.9	1594.6	1545.6	1460.4	1301.8	1335.4	1456.7	1921.3	1613.2
COMPUTED H										
Jakouk	1257.3	1201.5	1147.2	1106	1076.3	1052.4	1030.7	1004.1	978.1	959.8
Szady1(Cudo tube)	1829.3	1833	1841.4	1846.5	1840.8	1844.5	1854	1852.8	1851.9	1858.5
Szady2	1652.7	1679.5	1688.1	1694.7	1686.7	1688.8	1697.4	1694	1690.8	1696.3
(RLIQ)	98279	96712	93212	90135	86467	82654	78997	75274	71509	68084
(F)	1.247	1.68	2.103	2.423	2.7	2.95	3.178	3.393	3.598	3.783
(HLIQ)	288.1	388.7	486.5	561.4	625.2	682.5	734.9	783.9	830.2	873.2
(HBOIL)	1826.9	1827.1	1830	1829.1	1816.4	1812.9	1814.6	1804.8	1794.5	1791.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.7									
DP Liquid Density-lbm/ft3	93.38									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.372	0.808	2.018	1.99	2.436					
Zero Corrections-psid	0.156	-0.127	0.684	0.211	0.111					
Corrected DP-Psid	0.216	0.935	1.334	1.779	2.325					
Actual DP-ft	1.8	2.78	4.28	5.68	6.8					
Measured TP-Psig	86.8				84.9					
Measured Overall-ft	2.83									
Computed DP-ft	1.92	3.59	5.32	7.21	9.15					
Friction-ft	0.2	0.68	1.34	2.25	3.29					
Acceleration-ft	0.24	0.42	0.6	0.81	1.04					
Elevation-ft	1.48	2.51	3.38	4.15	4.82					

Run#	916									
Test Fluid	C4F8									
Date:	10/15/93									
Time:	8:44									
Note	Analytical dt is used									
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	84.3									
Sat. Temperature-F(inlet)	126									
Liq. Density-lbm/ft3	86.4	86.49	86.52	86.32	86.44	86.44	86.49	86.54	86.59	86.64
Latent Heat-Btu/lbm	39.09	39.15	39.18	39.02	39.11	39.11	39.15	39.19	39.24	39.28
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.277	0.277	0.277
Liq. Viscosity-lbm/ft-hr	0.567	0.57	0.571	0.564	0.568	0.568	0.57	0.571	0.573	0.574
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0326	0.0326	0.0325	0.0325	0.0325	0.0326	0.0326	0.0327	0.0327
Liq. Prandtl No.	4.84	4.85	4.86	4.83	4.85	4.85	4.85	4.86	4.87	4.87
Inlet Flow Rate-GPM	3.3									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	1.8									
Inlet Temperature-F	123.1									
Outlet Liq. Temperature-F	122.9									
Outlet Vap. Temperature-F	120.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	74.3									
Water outlet Temp.-F	96.5									
Inlet G-lbm/hr/ft2	688499		Temp	118.4	Density	87.43				
Subcooling-F	2.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1133.8	1122.9	1164.6	1171	1151.8	1152.8	1144.7	1144.3	1153.4	143
Heat Loss-Watts	6.8	1.6	2.2	2.3	2.3	1.8	1.1	1.6	1.9	6.4
Heat Flux-Btu/Hr/ft2	19654	19486	20188	20289	19967	19983	19843	19836	19993	2479
Wall Temp. #3-F	135.5	140.5	137.2	138.1	139.8	140.8	139.7	136.2	136.7	128.4
Wall Temp. #4-F	137.6	135.8	139.8	138.9	140.1	141.1	140.2	138.6	137.3	128.1
Wall Temp. #5-F	137.5	134.8	140.2	139.8	138.8	140.1	139	137.3	134.2	126.8
Wall Temp. #1-F	123.1	136.6	135	136.7	137.8	139.3	140.8	137.5	133.8	126
Wall Temp. #2-F	137.3	136.8	136.7	137.8	138.3	140.8	141	139.4	134.2	126.7
Instream Temp.-F	124.6	124.1	123.9	125.1	124.4	124.4	124.1	123.8	123.5	123.2
Avg. Wall Temp.-F	137	137.4	137.2	138.4	138.8	140.3	140.1	137.8	135.2	126.8
Avg. Wall DT.-F	11.5	12.4	12.4	12.4	13.4	16	15.1	13.1	10.8	3.5
Remaining Subcool-F	-3.2									
Exit Quality	0.02	0.06	0.11	0.15	0.2	0.24	0.28	0.33	0.37	0.38
EXP. H-Btu/Hr/ft2/F	1711	1564	1632.9	1642.6	1484.8	1330.3	1310.3	1518.8	1851.9	710.7
COMPUTED H										
Jallouk	1247.1	1177.1	1159.7	1137.2	1091.2	1072	1047.7	1027.2	1010.4	689
Szady1(Cudo tube)	1804.4	1780.4	1828.1	1847.3	1825.5	1828.4	1822.4	1821.8	1828.8	850.6
Szady2	1619	1602.6	1676.1	1668.1	1641	1670	1660.7	1658.4	1640	800
(PLIQ)	78561	75620	72071	69391	65463	62002	58398	54828	51259	49210
(F)	1.407	1.804	2.36	2.694	3.01	3.282	3.537	3.774	4	4.126
(HLIQ)	273.3	369.7	455.8	524.2	584.6	637.5	686.5	732.1	776.3	799.2
(HBOIL)	1802.3	1785.2	1813.6	1833.1	1805.3	1803.2	1789.4	1781.5	1781.1	471.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	23.7									
DP Liquid Density-lbm/ft3	100.43									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.398	1.034	2.369	2.477	3.106					
Zero Corrections-psid	0.156	-0.127	0.694	0.211	0.111					
Corrected DP-Psid	0.242	1.161	1.685	2.266	2.995					
Actual DP-ft	1.92	2.71	4.15	5.51	6.47					
Measured TP-Psig	84.3				82.8					
Measured Overall-ft	2.49									
Computed DP-ft	1.67	3.1	4.6	6.21	7.86					
Friction-ft	0.18	0.57	1.16	1.95	2.66					
Acceleration-ft	0.19	0.34	0.5	0.68	0.79					
Elevation-ft	1.3	2.19	2.93	3.59	4.41					

Run#	917									
Test Fluid	C4F8									
Date:	10/15/93									
Time:	8:44									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	84.1									
Sat. Temperature-F(inlet)	125.8									
Liq. Density-lbm/ft3	86.52	86.47	86.56	86.39	86.4	86.42	86.45	86.49	86.54	86.57
Latent Heat-Btu/lbm	39.18	39.14	39.21	39.07	39.09	39.1	39.13	39.15	39.19	39.22
Specific Heat-Btu/lbm/F	0.278	0.278	0.277	0.278	0.278	0.278	0.278	0.278	0.277	0.277
Liq. Viscosity-lbm/ft-hr	0.571	0.569	0.572	0.566	0.567	0.567	0.568	0.57	0.571	0.572
Liq. Conductivity-Btu/hr-ft-F	0.0326	0.0326	0.0326	0.0325	0.0325	0.0325	0.0326	0.0326	0.0326	0.0326
Liq. Prandtl No.	4.86	4.85	4.86	4.84	4.84	4.84	4.85	4.85	4.86	4.86
Inlet Flow Rate-GPM	2.5									
Outlet Liq. Flow Rate-GPM	0.1									
Outlet Vap. Flow Rate-GPM	1.8									
Inlet Temperature-F	122.8									
Outlet Liq. Temperature-F	123.3									
Outlet Vap. Temperature-F	121									
Water Flow Rate-GPM										
Water inlet Temp.-F	74.9									
Water outlet Temp.-F	101.6									
Inlet G-lbm/hr/ft2	522075		Temp	117.9	Density	87.51				
Subcooling-F	3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1151.7	1156.1	1159.3	1159.3	1154.8	1149.3	1155.9	1156.1	238.9	173.5
Heat Loss-Watts	7.4	1.7	2.4	2.4	2.5	1.9	1.3	1.8	1.5	7.8
Heat Flux-Btu/hr/ft2	19964	20040	20096	20096	20018	19922	20037	20040	4141	3008
Wall Temp. #3-F	134.7	139.8	136.4	137	139.2	140.8	140.2	137.3	128.5	126.5
Wall Temp. #4-F	137.2	135.1	139.1	138.2	139.6	140.8	140.6	139.2	129.1	127.9
Wall Temp. #5-F	136.9	134.2	139.5	138.5	138	139.7	139.2	137.7	128	128.9
Wall Temp. #1-F	122.8	136.1	133.9	136	137	139	140.9	138	127.3	126.4
Wall Temp. #2-F	137.1	135.1	135.6	136.9	137.5	140.6	141.3	140	127.8	126.7
Instream Temp.-F	123.9	124.2	123.7	124.7	124.6	124.5	124.3	124.1	123.8	123.6
Avg. Wall Temp.-F	136.5	136.8	136.3	137.4	138	140.1	140.4	138.4	128.1	126.9
Avg. Wall DT.-F	11.7	11.7	11.6	11.8	12.5	14.7	15.2	13.4	4.1	3.1
Remaining Subcool-F	-5.1									
Exit Quality	0.04	0.09	0.15	0.21	0.27	0.32	0.38	0.44	0.45	0.48
EXP. H-Btu/Hr/ft2/F	1710.3	1717.3	1726.2	1700.6	1598.8	1357.6	1315.2	1491.7	1006.9	956.6
COMPUTED H										
Jallouk	1279.4	1225	1188.1	1161.8	1131	1100.3	1087.4	1072	620.9	597.3
Szady1(Cudo tube)	1808.7	1817.6	1814.9	1830.6	1827.8	1824.5	1828.5	1829.8	911.5	821
Szady2	1659.8	1641.9	1684.6	1650.6	1645.2	1638.8	1645.4	1644.8	725.5	704.3
(RLIQ)	58776	56147	52443	49474	45962	42466	38938	35416	33241	32566
(F)	1.537	2.134	2.644	3.038	3.39	3.706	4.001	4.279	4.444	4.486
(HLIQ)	239	332	411	473.2	527.9	577.1	622.7	665.6	690.9	698.5
(HBOIL)	1807.3	1813.9	1807.8	1820	1813	1805	1805.1	1799.9	753.3	598.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.6									
DP Liquid Density-lbm/ft3	93.12									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.405	1.25	2.709	2.908	3.882					
Zero Corrections-psid	0.156	-0.127	0.684	0.211	0.111					
Corrected DP-Psid	0.249	1.377	2.025	2.697	3.571					
Actual DP-ft	1.74	2.01	3.09	4.12	4.68					
Measured TP-Psig	84.1				82.8					
Measured Overall-ft	2.16									
Computed DP-ft	1.44	2.64	3.87	5.18	6.69					
Friction-ft	0.14	0.44	0.9	1.51	1.89					
Acceleration-ft	0.14	0.25	0.39	0.55	0.58					
Elevation-ft	1.17	1.95	2.58	3.12	4.22					

Run#	918									
Test Fluid	C4F8									
Date:	10/15/93									
Time:	8:44									
Note	Analytical dt is used									
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	85.3									
Sat. Temperature-F(inlet)	126.6									
Liq. Density-lbm/ft3	86.37	86.32	86.42	86.25	86.29	86.32	86.25	86.94	86.94	86.94
Latent Heat-Btu/lbm	39.06	39.02	39.1	38.96	38.99	39.02	38.96	39.03	39.03	39.03
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.566	0.564	0.567	0.562	0.563	0.564	0.562	0.565	0.565	0.565
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0325	0.0325	0.0324	0.0324	0.0325	0.0324	0.0325	0.0325	0.0325
Liq. Prandtl No.	4.84	4.83	4.84	4.82	4.83	4.83	4.82	4.83	4.83	4.83
Inlet Flow Rate-GPM	1.7									
Outlet Liq. Flow Rate-GPM	0									
Outlet Vap. Flow Rate-GPM	1.3									
Inlet Temperature-F	123.7									
Outlet Liq. Temperature-F	124.5									
Outlet Vap. Temperature-F	122.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	75.7									
Water outlet Temp.-F	107.5									
Inlet G-lbm/hr/ft2	354813		Temp		118.2	Density	87.46			
Subcooling-F	2.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1155.5	1153.1	1149	1148.7	1156.6	1153.1	1154	209.3	107.3	102.1
Heat Loss-Watts	7.4	1.7	2.4	2.4	2.5	2	1.3	1.2	1.4	7.8
Heat Flux-Btu/Hr/ft2	20030	19968	19917	19912	20049	19968	20004	3628	1860	1770
Wall Temp. #3-F	135.1	139.6	136.2	137.2	139.7	141.5	140.9	129.3	127.7	127
Wall Temp. #4-F	137.3	135.1	139	138.2	139.9	141.5	141.4	129.4	128.2	127.6
Wall Temp. #5-F	137	134.2	139.7	138.5	138	140.5	140.2	129.8	128	127.4
Wall Temp. #1-F	123.7	136	134	135.8	137.2	139.7	141.6	130.3	127.2	127
Wall Temp. #2-F	137.2	136	135.5	136.7	137.7	141.2	141.9	130.9	127.5	127.1
Instream Temp.-F	124.9	125.1	124.6	125.5	125.3	125.1	125.5	125	125	125
Avg. Wall Temp.-F	136.7	136.7	136.2	137.4	138.2	140.8	141.2	129.9	127.7	127.2
Avg. Wall DT.-F	10.9	10.7	10.8	11	12	14.8	14.8	4.8	2.6	2.1
Remaining Subcool-F	-9									
Exit Quality	0.06	0.15	0.23	0.32	0.4	0.49	0.57	0.59	0.59	0.6
EXP. H-Btu/Hr/ft2/F	1830.1	1873	1848.5	1806.1	1671.6	1350.9	1352	759.6	705.6	827
COMPUTED H										
Jallouk	1345.5	1268.9	1218.3	1199.6	1186.3	1161.3	1148.9	545.1	478.5	478.2
Szady1(Cudo tube)	1823.9	1826.9	1816.5	1831.3	1836.3	1832.4	1840.3	831.3	686.3	681.1
Szady2	1645.9	1645.7	1636.3	1677.6	1681.9	1676.7	1686.4	624.5	577.8	590.8
(RLIQ)	39716	38778	33114	29855	26412	22872	19463	17314	16896	16521
(F)	1.749	2.502	3.111	3.582	4.014	4.41	4.763	4.964	5.082	5.063
(HLIQ)	200.1	288.4	355.6	410.4	459.7	504.8	545.7	570.5	576.5	579.4
(HBOIL)	1823.1	1824.6	1811.9	1824.4	1826.6	1819.5	1824.2	729.8	471.4	455.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.7									
DP Liquid Density-lbm/ft3	93.1									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.385	1.525	3.124	3.498	4.334					
Zero Corrections-psid	0.156	-0.127	0.684	0.211	0.111					
Corrected DP-Psid	0.229	1.652	2.44	3.275	4.223					
Actual DP-ft	1.77	1.58	2.4	3.16	3.61					
Measured TP-Psig	85.3				84					
Measured Overall-ft	2.17									
Computed DP-ft	1.18	2.1	3.01	4.17	5.47					
Friction-ft	0.09	0.31	0.63	0.94	1.16					
Acceleration-ft	0.09	0.17	0.29	0.37	0.38					
Elevation-ft	1	1.62	2.09	2.86	3.92					

Run#	919									
Test Fluid	C4F8									
Date:	10/15/93									
Time:	15:26									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	84.4									
Sat. Temperature-F(inlet)	126									
Liq. Density-lbm/ft3	86.27	86.4	86.47	86.34	86.35	86.34	86.25	86.3	86.32	86.37
Latent Heat-Btu/lbm	38.98	39.09	39.14	39.03	39.06	39.03	38.96	39.01	39.02	39.06
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.562	0.567	0.569	0.565	0.565	0.565	0.562	0.564	0.564	0.566
Liq. Conductivity-Btu/hr-ft-F	0.0324	0.0325	0.0326	0.0325	0.0325	0.0325	0.0324	0.0325	0.0325	0.0325
Liq. Prandtl No.	4.83	4.84	4.85	4.83	4.84	4.83	4.82	4.83	4.83	4.84
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	123.1									
Outlet Liq. Temperature-F	124.4									
Outlet Vap. Temperature-F	122.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	76.9									
Water outlet Temp.-F	112.7									
Inlet G-lbm/hr/ft2	209332		Temp		116.6	Density	87.72			
Subcooling-F	2.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1160.9	1166.4	1164.8	1166.1	1161.1	234	108.5	105.5	109.5	104
Heat Loss-Watts	7.2	1.7	2.3	2.4	2.4	1.3	0.8	1.2	1.6	8.9
Heat Flux-Btu/Hr/ft2	20123	20219	20191	20214	20127	4056	1881	1829	1898	1803
Wall Temp. #3-F	133.7	138.7	134.6	138.6	138.7	129.7	129.1	128.5	129.2	128.4
Wall Temp. #4-F	136.2	133.8	137.3	137.5	138.9	130.2	129	128.7	129.8	129.3
Wall Temp. #5-F	135.2	132.5	138	137.1	137	129.1	128.8	128.7	129.2	128.9
Wall Temp. #1-F	123.1	134.3	133	134.4	136	130.2	129.2	128.2	128.2	128.3
Wall Temp. #2-F	136.3	135	134.6	135.5	136.7	130.2	129	128.3	128.3	128.4
Instream Temp.-F	125.4	124.6	124.2	125	124.9	125	125.5	125.2	125.1	124.9
Avg. Wall Temp.-F	135.4	135.5	134.9	136.4	137.2	129.8	129	128.5	128.9	128.7
Avg. Wall DT.-F	9	10	9.8	10.5	11.3	4.6	3.4	3.2	3.8	3.8
Remaining Subcool-F	-17.3									
Exit Quality	0.12	0.27	0.41	0.56	0.7	0.73	0.74	0.76	0.77	0.78
EXP. H-Btu/Hr/ft2/F	2225.9	2029.7	2068.2	1927.6	1774.8	878.6	547.5	572	505.6	477.1
COMPUTED H										
Jallouk	1411	1330.5	1271.7	1258.1	1234.6	519.2	389.4	386.8	391.2	386.1
Szady1(Cudo tube)	1836.3	1830.1	1823.9	1836.8	1832.4	834.4	597.8	591.9	601.3	590.5
Szady2	1657.1	1657.1	1677	1660.3	1653.8	600.7	438.6	439.8	445.5	445.6
(RLIQ)	22838	19416	15855	12470	8958	6864	6378	6037	5706	5368
(F)	2.097	3.145	3.951	4.595	5.196	5.535	5.599	5.662	5.718	5.781
(HLIQ)	157.5	235.8	295.9	344.8	389.8	415.3	420.6	425.1	429.1	433.6
(HBOIL)	1835.9	1828.7	1821.3	1832.7	1826.5	798.5	518.2	507.3	517.2	499.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.9									
DP Liquid Density-lbm/ft3	92.93									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.417	1.876	3.405	4.095	5.079					
Zero Corrections-psid	0.156	-0.127	0.684	0.211	0.111					
Corrected DP-Psid	0.261	2.003	2.721	3.884	4.968					
Actual DP-ft	1.72	0.96	1.82	2.13	2.94					
Measured TP-Psig	84.4				83.3					
Measured Overall-ft	1.83									
Computed DP-ft	0.91	1.54	2.24	3.45	4.58					
Friction-ft	0.05	0.19	0.35	0.45	0.54					
Acceleration-ft	0.05	0.12	0.18	0.19	0.2					
Elevation-ft	0.81	1.23	1.71	2.81	3.83					

Run#	920									
Test Fluid	C4F8									
Date:	10/18/93									
Time:	10:06									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	86.1									
Sat. Temperature-F(inlet)	127.2									
Liq. Density-lbm/ft3	86.32	86.3	86.4	86.35	86.4	86.45	86.39	86.45	86.49	86.52
Latent Heat-Btu/lbm	39.02	39.01	39.09	39.05	39.09	39.13	39.07	39.13	39.15	39.18
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.564	0.564	0.567	0.565	0.567	0.568	0.566	0.568	0.57	0.571
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0325	0.0325	0.0325	0.0325	0.0326	0.0325	0.0326	0.0326	0.0326
Liq. Prandtl No.	4.83	4.83	4.84	4.84	4.84	4.85	4.84	4.85	4.85	4.86
Inlet Flow Rate-GPM	4.9									
Outlet Liq. Flow Rate-GPM	1.3									
Outlet Vap. Flow Rate-GPM	2.5									
Inlet Temperature-F	123.9									
Outlet Liq. Temperature-F	122.7									
Outlet Vap. Temperature-F	120.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	73.7									
Water outlet Temp.-F	101.8									
Inlet G-lbm/hr/ft2	1020783		Temp		119.2	Density		87.3		
Subcooling-F	3.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1432.8	1432.7	1434.1	1433.1	1430.4	1429.6	551	97.2	98.4	274.6
Heat Loss-Watts	9.3	2.1	2.9	2.9	2.9	2.2	1	1.2	1.6	11.3
Heat Flux-Btu/hr/ft2	24837	24835	24859	24842	24795	24781	9551	1685	1708	4760
Wall Temp. #3-F	138.1	143.6	139.1	139.1	141	142.4	132.3	126.3	127	130.9
Wall Temp. #4-F	140.6	137.6	142.3	140.2	141.2	141.2	131.8	126.3	127.1	132.4
Wall Temp. #5-F	140.1	136.2	141.1	141.1	139.2	139.7	130.9	126.3	126.8	130.8
Wall Temp. #1-F	123.9	138.5	136.4	137.9	138.2	140.6	133.5	126.3	125.9	130
Wall Temp. #2-F	140.8	138.6	138.5	138.7	139	142.6	132.8	126.5	126	130.3
Instream Temp.-F	125.1	125.2	124.6	124.9	124.6	124.3	124.7	124.3	124.1	123.9
Avg. Wall Temp.-F	139.9	139.6	139.1	139.6	139.4	141	132.3	126.3	126.6	130.9
Avg. Wall DT.-F	13.7	13.3	13.4	13.6	13.7	15.8	7.1	2	2.4	6.8
Remaining Subcool-F	-1.9									
Exit Quality	0.01	0.05	0.09	0.12	0.16	0.2	0.21	0.21	0.21	0.22
EXP. H-Btu/-hr/ft2/F	1815.9	1874	1861.9	1833	1812.6	1598.1	1339.9	858	715.8	703.6
COMPUTED H										
Jallouk	1384.9	1300.3	1222.5	1168.6	1115	1065.8	802.3	738.1	741.5	762.7
Szady1(Cudo tube)	2061.4	2056	2052.2	2061.7	2061	2044.9	1320.6	878.3	882.8	1031.1
Szady2	1933.7	1908.7	1902.8	1913.6	1911.4	1911	1076.4	862.4	866.9	890
(RLIQ)	117584	114748	109783	105782	101183	96815	94013	92585	92217	91486
(F)	1.286	1.742	2.166	2.492	2.776	3.03	3.184	3.24	3.259	3.291
(HLIQ)	345.6	464.4	576.9	664.1	739.2	806.3	847.9	862.3	866.8	874.9
(HBOIL)	2048.1	2048.1	2036.8	2038.5	2028.8	2002.2	1191.9	331.3	332.5	752.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.1									
DP Liquid Density-lbm/ft3	93.6									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.242	~~0.0941~~	1.705	1.702	2.285					
Zero Corrections-psid	0.192	0.007	0.703	0.194	0.093					
Corrected DP-Psid	0.05	0.027	1.002	1.508	2.192					
Actual DP-ft	2.08	~~4.69~~	4.82	6.16	7.04					
Measured TP-Psig	86.1				84					
Measured Overall-ft	3.5									
Computed DP-ft	2.1	4.04	6.16	8.27	10.24					
Friction-ft	0.3	0.96	1.96	2.78	3.47					
Acceleration-ft	0.36	0.63	0.91	0.97	1.01					
Elevation-ft	1.45	2.45	3.3	4.57	5.76					

Run#	921									
Test Fluid	C4F8									
Date:	10/18/93									
Time:	10:06									
Note	Analytical dt is used									
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	84.3									
Sat. Temperature-F(inlet)	126									
Liq. Density-lbm/ft3	86.52	86.54	86.59	86.49	86.55	86.6	86.69	86.74	86.8	86.7
Latent Heat-Btu/lbm	39.18	39.19	39.24	39.16	39.21	39.25	39.32	39.36	39.41	39.33
Specific Heat-Btu/lbm/F	0.278	0.277	0.277	0.278	0.277	0.277	0.277	0.277	0.277	0.277
Liq. Viscosity-lbm/ft-hr	0.571	0.571	0.573	0.57	0.572	0.573	0.576	0.578	0.58	0.577
Liq. Conductivity-Btu/hr-ft-F	0.0326	0.0326	0.0327	0.0326	0.0326	0.0327	0.0327	0.0328	0.0328	0.0327
Liq. Prandtl No.	4.86	4.86	4.87	4.85	4.86	4.87	4.88	4.88	4.89	4.88
Inlet Flow Rate-GPM	4.1									
Outlet Liq. Flow Rate-GPM	1.3									
Outlet Vap. Flow Rate-GPM	2.1									
Inlet Temperature-F	122.7									
Outlet Liq. Temperature-F	121.8									
Outlet Vap. Temperature-F	119.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	71.2									
Water outlet Temp.-F	100.3									
Inlet G-lbm/hr/ft2	854930		Temp	118.7	Density	87.38				
Subcooling-F	3.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1448.4	1447.7	1457.4	1455	1447.8	1447.6	556.9	98.2	99.8	103
Heat Loss-Watts	7.7	1.8	2.5	2.5	2.4	2	0.8	0.8	1.1	6.7
Heat Flux-Btu/hr/ft2	25107	25095	25263	25221	25097	25093	9654	1702	1730	1785
Wall Temp. #3-F	136.2	142.7	138.1	137.8	139.6	143	130.4	124.5	125.3	125.4
Wall Temp. #4-F	139	138.5	141.4	138	140	142.9	130.1	124.7	125.5	126
Wall Temp. #5-F	138.2	135	140.2	140	138.1	139.7	138.8	124.7	125.5	125.4
Wall Temp. #1-F	122.8	137.7	135.8	138.9	137.2	139.9	131.9	124.5	124.4	125.3
Wall Temp. #2-F	138.6	137.7	137.4	137.7	137.8	141.5	130.8	124.9	124.4	125.4
Instream Temp.-F	123.9	123.8	123.5	124.1	123.7	123.4	122.9	122.6	122.2	122.8
Avg. Wall Temp.-F	138	138.7	138.1	138.4	138.3	141.4	132.4	124.7	125	125.5
Avg. Wall DT.-F	13	13.7	13.5	13.2	13.4	16.8	9.1	2	2.7	2.6
Remaining Subcool-F	-2.9									
Exit Quality	0.02	0.06	0.11	0.15	0.2	0.24	0.28	0.26	0.28	0.27
EXP. H-Btu/hr/ft2/F	1936.5	1829.6	1873.7	1912.9	1867.2	1490	1065.1	858.4	631	681.6
COMPUTED H										
Jallouk	1400.9	1319.3	1251.6	1206.7	1152.4	1109.1	790.5	693.7	697.4	698.9
Szady1(Cudo tube)	2042.1	2042.6	2048.3	2060.9	2054.7	2055.2	1314.1	836.1	840.9	845.1
Szady2	1929.1	1927.3	1932.3	1912.3	1904	1903.7	1065.2	817.1	822	824.4
(RLIQ)	96861	93717	89149	85329	80700	76187	72876	71707	71145	71258
(F)	1.391	1.896	2.354	2.706	3.022	3.303	3.49	3.552	3.577	3.582
(HLIQ)	320.8	437.2	542.6	625	696.9	761.3	803.4	817	821.9	824.3
(HBOIL)	2039.4	2035.9	2035.6	2041.6	2027.6	2019.8	1205.3	339.2	340.5	351.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.1									
DP Liquid Density-lbm/ft3	93.6									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.334	-0.693	2.089	2.127	2.826					
Zero Corrections-psid	0.192	0.007	0.703	0.194	0.093					
Corrected DP-Psid	0.142	0.026	1.386	1.933	2.733					
Actual DP-ft	1.92	-4.29	4.18	5.43	6.12					
Measured TP-Psig	84.3				82.2					
Measured Overall-ft	3.49									
Computed DP-ft	1.86	3.57	5.44	7.4	9.21					
Friction-ft	0.26	0.85	1.73	2.39	3.02					
Acceleration-ft	0.3	0.53	0.77	0.84	0.85					
Elevation-ft	1.31	2.2	2.94	4.18	5.34					

Run#	922									
Test Fluid	C4F8									
Date:	10/18/93									
Time:	10:06									
Note	Analytical dl is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	86									
Sat. Temperature-F(inlet)	127.1									
Liq. Density-lbm/ft3	86.45	86.37	86.44	86.32	86.37	86.4	86.4	86.49	86.52	86.47
Latent Heat-Btu/lbm	39.13	39.06	39.11	39.02	39.06	39.09	39.09	39.15	39.18	39.14
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.568	0.566	0.568	0.564	0.566	0.567	0.567	0.57	0.571	0.569
Liq. Conductivity-Btu/hr-ft-F	0.0326	0.0325	0.0325	0.0325	0.0325	0.0325	0.0325	0.0326	0.0326	0.0326
Liq. Prandtl No.	4.85	4.84	4.85	4.83	4.84	4.84	4.84	4.85	4.86	4.85
Inlet Flow Rate-GPM	3.3									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	122.8									
Outlet Liq. Temperature-F	123.1									
Outlet Vap. Temperature-F	120.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	70.1									
Water outlet Temp.-F	104.4									
Inlet G-lbm/hr/ft2	688627		Temp		118.3	Density	87.44			
Subcooling-F	4.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1449.6	1447.3	1443.9	1445.6	1442.9	1444.2	564.8	101.9	102.2	104.8
Heat Loss-Watts	7.5	1.8	2.4	2.4	2.3	1.9	0.8	0.9	1.2	7.2
Heat Flux-Btu/hr/ft2	25128	25068	25029	25059	25012	25034	9790	1756	1772	1817
Wall Temp. #3-F	136.4	143.4	138.2	138.8	138.7	142.9	131.6	126.9	126.9	127
Wall Temp. #4-F	139.4	138.9	141.6	139.4	138.8	141.9	131.4	126.9	127.3	127.6
Wall Temp. #5-F	138.7	135.7	140.9	140.2	138	138.3	130.7	126.2	127	127.4
Wall Temp. #1-F	122.8	138.1	135.9	137.1	137.2	139.6	131.9	126.2	126.1	126.8
Wall Temp. #2-F	138.8	138.3	137.9	138.3	138.2	141.3	131.6	126.3	126.1	127
Instream Temp.-F	124.3	124.8	124.4	125.1	124.8	124.8	124.6	124.1	123.9	124.2
Avg. Wall Temp.-F	138.3	139.2	138.4	138.8	138.1	140.7	131.4	126.3	126.7	127.2
Avg. Wall DT.-F	12.9	13.2	12.9	12.5	12.1	14.9	6.4	2.1	2.7	2.9
Remaining Subcool-F	-3.4									
Exit Quality	0.02	0.08	0.13	0.19	0.24	0.3	0.32	0.32	0.33	0.33
EXP. H-Btu/hr/ft2/F	1949.5	1894.7	1944.9	2001.9	2063.7	1675.2	1590.9	844	656.2	631.2
COMPUTED H										
Jallouk	1444.5	1365	1295.3	1252.1	1210.8	1172.5	785.2	629.1	632.1	634.3
Szady1(Cudo tube)	2048.7	2057.3	2051.5	2067.5	2064.6	2066.5	1320.7	777.6	781.7	786.4
Szady2	1936.5	1942.8	1933.8	1921.5	1917.3	1918.7	1077.5	747	751.2	754.3
(PLIQ)	78287	75529	70916	67087	62503	58049	55085	53779	53378	53218
(F)	1.424	1.989	2.508	2.906	3.257	3.571	3.772	3.847	3.871	3.884
(HLIQ)	276.6	388.8	487.9	565.2	633.2	694.1	733.1	746.8	751.1	754.2
(HBOIL)	2047.1	2052.7	2042.3	2053.3	2044.6	2040.1	1240.7	377.4	377.7	385.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.2									
DP Liquid Density-lbm/ft3	93.73									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.353	~~0.569~~	2.461	2.6	3.349					
Zero Corrections-psid	0.192	0.007	0.703	0.194	0.063					
Corrected DP-Psid	0.161	0.026	1.758	2.406	3.256					
Actual DP-ft	1.9	~~4.29~~	3.58	4.66	5.28					
Measured TP-Psig	86				83.6					
Measured Overall-ft	4									
Computed DP-ft	1.67	3.12	4.7	6.39	8.03					
Friction-ft	0.19	0.65	1.36	1.97	2.46					
Acceleration-ft	0.22	0.4	0.61	0.67	0.68					
Elevation-ft	1.26	2.07	2.73	3.75	4.89					

Run#	923									
Test Fluid	C4F8									
Date:	10/18/93									
Time:	10:06									
Note	Analytical dt is used									
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	86.5									
Sat. Temperature-F(inlet)	127.4									
Liq. Density-lbm/ft3	86.37	86.29	86.37	86.12	86.24	86.3	86.24	86.4	86.42	86.32
Latent Heat-Btu/lbm	39.06	38.99	39.06	38.86	38.95	39.01	38.95	39.09	39.1	39.02
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.279	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.566	0.563	0.566	0.558	0.561	0.564	0.561	0.567	0.567	0.564
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0324	0.0325	0.0323	0.0324	0.0325	0.0324	0.0325	0.0325	0.0325
Liq. Prandtl No.	4.84	4.83	4.84	4.81	4.82	4.83	4.82	4.84	4.84	4.83
Inlet Flow Rate-GPM	2.6									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2									
Inlet Temperature-F	124.1									
Outlet Liq. Temperature-F	124.3									
Outlet Vap. Temperature-F	121.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	72.7									
Water outlet Temp.-F	108									
Inlet G-lbm/hr/ft2	542857		Temp		118	Density	87.49			
Subcooling-F	3.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1441	1442	1440.2	1446.6	1445.4	514.4	192.7	97.9	99.5	99.8
Heat Loss-Watts	7.6	1.8	2.4	2.5	2.4	1.5	0.7	0.9	1.2	7.7
Heat Flux-Btu/hr/ft2	24979	24998	24966	25059	25055	8917	3340	1697	1725	1730
Wall Temp. #3-F	137	143.5	138.3	139.3	139.7	135	130.2	127.1	127.7	128.2
Wall Temp. #4-F	140	137.3	141.6	140.4	139.7	135.8	130	126.8	128	128.8
Wall Temp. #5-F	139.2	135.8	140.9	141	138.8	135.8	129.5	126.7	127.9	128.6
Wall Temp. #1-F	124.1	138.4	135.9	138.2	138.1	135.1	131.1	127.1	126.7	128.4
Wall Temp. #2-F	139.5	138.5	138	139.4	139	135.3	130.7	127.2	126.7	128.3
Instream Temp.-F	124.8	125.3	124.8	126.3	125.8	125.2	125.6	124.6	124.5	125.1
Avg. Wall Temp.-F	138.9	139.4	138.5	139.7	138.9	135.4	130.3	127	127.4	128.5
Avg. Wall DT.-F	13	13	12.5	12.3	12.1	9.8	4.5	2.3	2.8	3.3
Remaining Subcool-F	-6.4									
Exit Quality	0.05	0.11	0.18	0.25	0.32	0.35	0.36	0.36	0.37	0.37
EXP. H-Btu/Hr/ft2/F	1922	1923.5	1993.7	2038.5	2067.6	912.5	734.3	738.8	611.2	527.1
COMPUTED H										
Jallouk	1478.3	1388.1	1328.8	1299.5	1255.9	756.3	583	548.9	551.7	553
Szady1(Cudo tube)	2050.8	2061.3	2054.3	2086.1	2076.6	1253.5	837	695.7	700.1	703.2
Szady2	1936.4	1945.7	1936.5	1944.4	1932.8	995.4	660.8	647.6	651.5	653.8
(RLIQ)	61948	58083	53420	49785	45062	41919	41006	40179	39844	39778
(F)	1.613	2.273	2.829	3.25	3.648	3.898	3.97	4.027	4.052	4.061
(HLIQ)	259.2	365.8	454.8	524.2	587.4	626.9	639.4	647.1	651	653.3
(HBOIL)	2049.4	2057.5	2046.9	2074	2060.8	1198.9	687.4	403.5	406.8	409.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.4									
DP Liquid Density-lbm/ft3	93.15									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.38	-0.892	2.77	3.045	3.834					
Zero Corrections-psid	0.192	0.007	0.703	0.194	0.093					
Corrected DP-Psid	0.188	0.025	2.067	2.851	3.741					
Actual DP-ft	1.84	-4.27	3.03	3.88	4.42					
Measured TP-Psig	86.5				84.5					
Measured Overall-ft	3.34									
Computed DP-ft	1.44	2.68	4.01	5.59	7.07					
Friction-ft	0.16	0.54	1.05	1.41	1.75					
Acceleration-ft	0.17	0.32	0.45	0.47	0.48					
Elevation-ft	1.1	1.81	2.51	3.72	4.84					

Run#	924									
Test Fluid	C4F8									
Date:	10/18/93									
Time:	15:03									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	86									
Sat. Temperature-F(inlet)	127.1									
Liq. Density-lbm/ft3	86.37	86.3	86.4	86.22	86.24	86.3	86.29	86.39	86.39	86.3
Latent Heat-Btu/lbm	39.06	39.01	39.09	38.94	38.95	39.01	38.99	39.07	39.07	39.01
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.566	0.564	0.567	0.561	0.561	0.564	0.563	0.566	0.566	0.564
Liq. Conductivity-Btu/hr-ft-F	0.0325	0.0325	0.0325	0.0324	0.0324	0.0325	0.0324	0.0325	0.0325	0.0325
Liq. Prandtl No.	4.84	4.83	4.84	4.82	4.82	4.83	4.83	4.84	4.84	4.83
Inlet Flow Rate-GPM	1.7									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	1.2									
Inlet Temperature-F	123.7									
Outlet Liq. Temperature-F	124.6									
Outlet Vap. Temperature-F	122.1									
Water Flow Rate-GPM										
Water inlet Temp.-F	74									
Water outlet Temp.-F	109.2									
Inlet G-lbm/hr/ft2	365274		Temp	117.5	Density	87.57				
Subcooling-F	3.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1445.2	1447.5	1442	1447.5	1447.3	500.6	198.4	98	98.1	98.1
Heat Loss-Watts	7.8	1.8	2.5	2.5	2.5	1.6	0.8	1	1.5	8.6
Heat Flux-Btu/hr/ft2	25052	25091	24996	25091	25088	8678	3439	1699	1700	1700
Wall Temp. #3-F	135.7	142.5	137.3	138.4	139.9	135.2	130.1	127.4	128.2	128.4
Wall Temp. #4-F	138.7	138.3	140.7	139.8	139.9	135.6	130	127.4	128.7	129
Wall Temp. #5-F	138.1	135	140.6	139.8	138.8	135.7	129.8	127.3	128.5	128.9
Wall Temp. #1-F	123.7	137.1	134.9	136.6	137.8	135.2	130.7	126.9	127.3	128.4
Wall Temp. #2-F	138.3	137.6	137.1	137.8	138.9	135.3	130.4	127.3	127.4	128.5
Instream Temp.-F	124.8	125.2	124.6	125.7	125.8	125.2	125.3	124.7	124.7	125.2
Avg. Wall Temp.-F	137.7	138.4	137.5	138.7	138.9	135.4	130.2	127.3	128	128.6
Avg. Wall DT.-F	11.8	12	11.8	11.8	12.1	9.8	4.7	2.5	3.2	3.4
Remaining Subcool-F	-11.5									
Exit Quality	0.08	0.19	0.29	0.4	0.51	0.54	0.56	0.58	0.57	0.58
EXP. H-Btu/Hr/ft2/F	2128.8	2083.8	2123.6	2123.5	2070.6	882.5	724.9	684.1	524.9	505.6
COMPUTED H										
Jallouk	1539	1439.6	1376.7	1382.7	1328.7	744.9	531.6	469.9	471.3	472.2
Szady1(Cudo tube)	2053.3	2062.5	2050.5	2073.9	2074.2	1225.9	811.6	644.2	645.5	649.1
Szady2	1940.3	1949.1	1934.8	1930.6	1930.5	963.6	607.1	564.4	567.7	570
(RLIQ)	39408	35687	31144	27090	22878	19638	18598	18048	17751	17540
(F)	1.865	2.721	3.408	3.942	4.433	4.751	4.855	4.918	4.948	4.961
(HLIQ)	213.5	311.8	390.1	452.3	508.5	544.5	556.6	563	568.4	568.7
(HBOIL)	2052.5	2060.1	2045.8	2066.7	2063.9	1189	712.9	448.3	445.7	447.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.8									
DP Liquid Density-lbm/ft3	93.65									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.357	-0.992	3.238	3.615	4.501					
Zero Corrections-psid	0.192	0.007	0.703	0.194	0.093					
Corrected DP-Psid	0.165	0.028	2.535	3.421	4.408					
Actual DP-ft	1.89	-4.31	2.28	2.97	3.36					
Measured TP-Psig	86				84.1					
Measured Overall-ft	3.17									
Computed DP-ft	1.14	2.06	3.02	4.4	5.7					
Friction-ft	0.11	0.37	0.72	0.95	1.16					
Acceleration-ft	0.11	0.23	0.33	0.35	0.36					
Elevation-ft	0.93	1.46	1.97	3.11	4.17					

Run#	925									
Test Fluid	C4F8									
Date:	10/18/93									
Time:	15:03									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19635									
Sat. Pressure-Psig	85.7									
Sat. Temperature-F(inlet)	126.9									
Liq. Density-lbm/ft3	86.2	86.34	86.4	86.2	86.25	86.29	86.24	86.32	86.34	86.24
Latent Heat-Btu/lbm	38.92	39.03	39.09	38.92	38.96	38.99	38.95	39.02	39.03	38.95
Specific Heat-Btu/lbm/F	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278	0.278
Liq. Viscosity-lbm/ft-hr	0.56	0.565	0.567	0.56	0.562	0.563	0.561	0.564	0.565	0.561
Liq. Conductivity-Btu/hr-ft-F	0.0324	0.0325	0.0325	0.0324	0.0324	0.0324	0.0324	0.0325	0.0325	0.0324
Liq. Prandtl No.	4.82	4.83	4.84	4.82	4.82	4.83	4.82	4.83	4.83	4.82
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	0.5									
Inlet Temperature-F	123.1									
Outlet Liq. Temperature-F	125									
Outlet Vap. Temperature-F	122.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	77.5									
Water outlet Temp.-F	113.8									
Inlet G-lbm/hr/ft2	209524		Temp		116.1	Density	87.8			
Subcooling-F	3.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1437.2	1442.7	1448.8	1448.7	897.2	273.1	98.8	96.9	102.7	101.5
Heat Loss-Watts	8.1	1.9	2.6	2.7	2.7	1.8	0.8	1.2	1.6	9.6
Heat Flux-Btu/Hr/ft2	24913	25008	25114	25112	15552	4734	1713	1680	1780	1759
Wall Temp. #3-F	135.1	141.8	136.2	138.5	144.5	134.8	128.6	128.1	128.2	128.2
Wall Temp. #4-F	138	135.6	139.7	139.6	143.5	135.4	128.4	128.1	128.4	128.7
Wall Temp. #5-F	136.1	133.6	139.2	139.1	135.3	135.6	128	127.8	128.3	128.5
Wall Temp. #1-F	123.1	136	134.6	136	135.5	137.4	128.8	127.8	127.4	128.2
Wall Temp. #2-F	137.4	136.7	136.2	137.5	136	137.1	128.6	128.1	127.8	128.2
Instream Temp.-F	125.8	125	124.6	125.8	125.5	125.3	125.6	125.1	125	125.6
Avg. Wall Temp.-F	138.7	137.5	138.7	138.3	137.6	135.8	128.5	128	128	128.4
Avg. Wall DT.-F	9.7	11.4	10.9	11.4	11.4	10.3	2.8	2.8	2.9	2.7
Remaining Subcool-F	-21.2									
Exit Quality	0.15	0.33	0.51	0.69	0.8	0.84	0.85	0.86	0.87	0.89
EXP. H-Btu/Hr/ft2/F	2562	2194.7	2295.6	2209.6	1387.8	460.2	611.1	599	614	656.4
COMPUTED H										
Jallouk	1616.2	1510.1	1442	1426.5	45.4	45.3	45.4	45.3	45.3	45.4
Szady1(Cudo tube)	2063.9	2055.2	2053.8	2074.4	45.4	45.3	45.4	45.3	45.3	45.4
Szady2	1919.4	1941.2	1940.7	1931.5	45.4	45.3	45.4	45.3	45.3	45.4
(RLIQ)	22602	18406	13988	9751	9751	9751	9751	9751	9751	9751
(F)	2.232	3.409	4.322	5.05	5.05	5.05	5.05	5.05	5.05	5.05
(HLIQ)	167.9	258	324.2	379.9	379.9	379.9	379.9	379.9	379.9	379.9
(HBOIL)	2063.5	2053.9	2051.1	2070.2	2070.2	2070.2	2070.2	2070.2	2070.2	2070.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.2									
DP Liquid Density-lbm/ft3	93.73									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.759	1.953	3.883	4.352	5.317					
Zero Corrections-psid	0.192	0.007	0.703	0.194	0.093					
Corrected DP-Psid	0.567	1.946	3.18	4.158	5.224					
Actual DP-ft	1.23	1.1	1.24	1.75	2.01					
Measured TP-Psig	85.7				83.5					
Measured Overall-ft	3.67									
Computed DP-ft	0.87	1.48	2.09	3.28	4.4					
Friction-ft	0.06	0.22	0.39	0.5	0.59					
Acceleration-ft	0.08	0.16	0.22	0.29	0.24					
Elevation-ft	0.75	1.1	1.48	2.58	3.56					

Run#	926									
Test Fluid	C4F10									
Date:	11/10/93									
Time:	11:17.									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	107.3									
Sat. Temperature-F(inlet)	151.1									
Liq. Density-lbm/ft3	81.98	82.13	82.13	81.49	81.74	81.83	81.53	81.83	81.83	81.79
Latent Heat-Btu/lbm	29.65	29.76	29.76	29.29	29.47	29.54	29.32	29.54	29.54	29.51
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.286	0.286	0.286	0.286	0.286	0.286	0.286
Liq. Viscosity-lbm/ft-hr	0.433	0.436	0.436	0.423	0.428	0.43	0.424	0.43	0.43	0.429
Liq. Conductivity-Btu/hr-ft-F	0.0251	0.0252	0.0252	0.0248	0.025	0.025	0.0248	0.025	0.025	0.025
Liq. Prandtl No.	4.92	4.92	4.92	4.89	4.9	4.91	4.89	4.91	4.91	4.91
Inlet Flow Rate-GPM	5.1									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2.7									
Inlet Temperature-F	149.1									
Outlet Liq. Temperature-F	149.6									
Outlet Vap. Temperature-F	145.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	91.4									
Water outlet Temp.-F	113.4									
Inlet G-lbm/hr/ft2	1002036		Temp	144.6	Density	82.33				
Subcooling-F	2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	575.2	577	576	572.7	577.5	575.3	576.4	576.9	575	577.7
Heat Loss-Watts	8.7	1.9	2.6	2.8	2.7	2	1.4	2	2.5	14.3
Heat Flux-Btu/Hr/ft2	9971	10002	9985	9927	10011	9972	9992	10000	9967	10014
Wall Temp. #3-F	160.4	160.8	159.4	162	162	161.5	162.8	160.9	159.6	159.9
Wall Temp. #4-F	160.8	159.2	160.3	162.1	162.2	161.8	162.9	161.3	160.1	163.3
Wall Temp. #5-F	161.3	158.5	161.4	162.5	160.8	161.3	162.1	160.1	159.1	158.5
Wall Temp. #1-F	149.1	160	157.8	161	160.9	161.3	164	161.4	158.4	158.5
Wall Temp. #2-F	162.3	159.9	158.7	161.5	160.9	161.3	163.7	162.2	159	159.5
Instream Temp.-F	149.7	148.9	148.9	162.3	151	160.6	152.1	160.6	160.6	160.7
Avg. Wall Temp.-F	161.2	160	159.1	161.9	161.2	161.5	163.1	161.2	159.2	159.9
Avg. Wall DT.-F	11	10.6	9.7	9.2	9.7	10.5	10.5	10.2	8.3	8.8
Remaining Subcool-F	0									
Exit Quality	0	0.02	0.04	0.06	0.08	0.1	0.12	0.14	0.16	0.18
EXP. H-Btu/Hr/ft2/F	902.4	941.5	1029.5	1084.8	1027	947.6	947.2	977.7	1202.4	1139.6
COMPUTED H										
Jallouk	949.4	905.1	868.6	870	859.2	848.3	849.2	830.9	823.3	819.9
Szady1(Cudo tube)	1456.6	1454.6	1457.8	1488.2	1486.8	1484.3	1504.1	1495.8	1498.6	1508.4
Szady2	1256.3	1251.5	1250.1	1275.9	1272.3	1241.6	1262.5	1256.2	1259.8	1270.7
(RLIQ)	151423	148908	145948	147137	142513	138885	137707	132840	129815	127013
(F)	1.028	1.327	1.612	1.8	1.979	2.134	2.256	2.396	2.513	2.62
(HLIQ)	291.1	375.4	456.1	511.3	561.1	604.8	640.5	679.1	712.3	742.9
(HBOIL)	1452.7	1446.3	1442.8	1467.8	1459.7	1450.1	1464.4	1447.6	1442.9	1445.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.3									
DP Liquid Density-lbm/ft3	92.8									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.121	0.571	0.881	1.377	1.432					
Zero Corrections-psid	0.04	-0.015	-0.006	-0.036	-0.02					
Corrected DP-Psid	-0.161	0.586	0.887	1.413	1.452					
Actual DP-ft	2.55	3.51	5.25	6.59	8.65					
Measured TP-Psig	107.3				0.3					
Measured Overall-ft	188.38									
Computed DP-ft	2.17	4.13	6.06	7.97	9.79					
Friction-ft	0.16	0.41	0.73	1.1	1.51					
Acceleration-ft	0.16	0.29	0.39	0.49	0.6					
Elevation-ft	1.85	3.43	4.93	6.38	7.69					

Run#	927									
Test Fluid	C4F10									
Date:	11/10/93									
Time:	11:17									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	105.8									
Sat. Temperature-F(inlet)	150.2									
Liq. Density-lbm/ft3	82.24	82.28	82.13	81.78	81.89	82	81.72	81.94	81.98	81.92
Latent Heat-Btu/lbm	29.84	29.86	29.76	29.5	29.58	29.66	29.46	29.62	29.65	29.61
Specific Heat-Btu/lbm/F	0.284	0.284	0.285	0.286	0.285	0.285	0.286	0.285	0.285	0.285
Liq. Viscosity-lbm/ft-hr	0.438	0.439	0.436	0.429	0.431	0.433	0.428	0.432	0.433	0.432
Liq. Conductivity-Btu/hr-ft-F	0.0253	0.0253	0.0252	0.025	0.025	0.0251	0.0249	0.0251	0.0251	0.0251
Liq. Prandtl No.	4.93	4.93	4.92	4.9	4.91	4.92	4.9	4.91	4.92	4.91
Inlet Flow Rate-GPM	4.3									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	147.3									
Outlet Liq. Temperature-F	149.5									
Outlet Vap. Temperature-F	145.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	90.8									
Water outlet Temp.-F	112.7									
Inlet G-lbm/hr/ft2	848167		Temp	142.9	Density	82.65				
Subcooling-F	2.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	576.5	578.8	576.8	573.5	578.2	575.2	577.8	577.2	575.8	577.4
Heat Loss-Watts	9	2	2.8	2.9	2.9	2.1	1.4	2.1	2.6	15.1
Heat Flux-Btu/Hr/ft2	9993	10033	9998	9941	10023	9971	10016	10005	9981	10009
Wall Temp. #3-F	159.1	160.1	159	160.7	161.2	161	161.5	160.2	158.8	159.1
Wall Temp. #4-F	159.7	158.7	160.2	160.7	161.5	161	161.8	160.9	159.6	162.3
Wall Temp. #5-F	160.1	157.8	161.2	161.2	160.3	160.4	161.1	159.6	158.4	157.7
Wall Temp. #1-F	147.9	159.2	157.6	159.6	159.6	160.9	162.6	160.5	157.8	157.6
Wall Temp. #2-F	160.9	159.2	158.2	160.1	159.9	161	162.5	161.5	158.4	158.6
Instream Temp.-F	148.3	148.1	148.9	150.8	150.2	149.6	151.1	149.9	149.7	150
Avg. Wall Temp.-F	160	159.3	158.8	160.6	160.3	160.8	161.9	160.5	158.6	159.1
Avg. Wall DT.-F	11.2	10.7	9.4	9.3	9.7	10.8	10.3	10.2	8.4	8.6
Remaining Subcool-F	0.5									
Exit Quality	0	0.02	0.04	0.06	0.09	0.11	0.13	0.16	0.18	0.21
EXP. H-Btu/Hr/ft2/F	892.4	933.6	1063.9	1068.9	1036.3	925.4	968	982.1	1181.3	1162.8
COMPUTED H										
Jallouk	951.1	932.8	899.4	887.6	869.3	856.9	858.9	847.7	841	838.7
Szady1(Cudo tube)	1444.8	1447.4	1455.6	1471.8	1475.7	1470.5	1490.5	1483.3	1484.1	1492.7
Szady2	1246	1247.3	1251.2	1263.2	1265.2	1256.3	1247	1241.8	1243.9	1253.6
(RLIQ)	126705	125601	123487	122473	118883	115274	113707	109565	106388	103659
(F)	1.005	1.265	1.617	1.845	2.043	2.219	2.357	2.509	2.642	2.76
(HLIQ)	248.7	313	400.3	457.7	506.6	549.8	585	622	654.8	684.3
(HBOIL)	1442.3	1442.5	1445.4	1456.9	1455.5	1444.5	1459.8	1445.9	1440.3	1443.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76									
DP Liquid Density-lbm/ft3	93.57									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.059	0.701	1.113	1.704	1.851					
Zero Corrections-psid	0.04	-0.015	-0.006	-0.036	-0.02					
Corrected DP-Psid	-0.099	0.716	1.119	1.74	1.871					
Actual DP-ft	2.46	3.31	4.89	6.08	7.99					
Measured TP-Psig	105.8				0.3					
Measured Overall-ft	185.44									
Computed DP-ft	2.08	3.81	5.45	7.06	8.59					
Friction-ft	0.12	0.34	0.66	1.04	1.47					
Acceleration-ft	0.11	0.22	0.31	0.39	0.48					
Elevation-ft	1.85	3.25	4.48	5.63	6.63					

Run#	928									
Test Fluid	C4F10									
Date:	11/10/93									
Time:	11:17									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	106									
Sat. Temperature-F(inlet)	150.3									
Liq. Density-lbm/ft3	82.31	82.24	82.02	81.74	81.85	81.96	81.76	81.91	81.98	81.83
Latent Heat-Btu/lbm	29.89	29.84	29.68	29.47	29.55	29.69	29.49	29.59	29.65	29.54
Specific Heat-Btu/lbm/F	0.284	0.284	0.285	0.286	0.285	0.285	0.286	0.285	0.285	0.286
Liq. Viscosity-lbm/ft-hr	0.439	0.438	0.434	0.428	0.43	0.432	0.428	0.431	0.433	0.43
Liq. Conductivity-Btu/hr-ft-F	0.0253	0.0253	0.0251	0.025	0.025	0.0251	0.025	0.0251	0.0251	0.025
Liq. Prandtl No.	4.93	4.93	4.92	4.9	4.91	4.91	4.9	4.91	4.92	4.91
Inlet Flow Rate-GPM	3.5									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2									
Inlet Temperature-F	147.1									
Outlet Liq. Temperature-F	150.1									
Outlet Vap. Temperature-F	145.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	92									
Water outlet Temp.-F	116.7									
Inlet G-lbm/hr/ft2	691000		Temp	142.5	Density	82.73				
Subcooling-F	3.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	577	577	577	577	577	577	577	577	577	577
Heat Loss-Watts	9.4	2.2	2.9	3	3	2.2	1.5	2.2	2.7	15.9
Heat Flux-Btu/Hr/ft2	10002	10002	10002	10002	10002	10002	10002	10002	10002	10002
Wall Temp. #3-F	158.9	160.1	159.2	160.5	161.5	161.3	161.5	160	158.9	159.1
Wall Temp. #4-F	159.5	158.9	160.1	160.7	161.6	161.4	161.7	161.1	159.9	162.7
Wall Temp. #5-F	159.9	158	161.4	161	160.3	160.8	161.1	159.8	158.4	158.1
Wall Temp. #1-F	147.1	159.3	157.4	159.5	159.8	161.1	162.4	160.6	157.8	157.6
Wall Temp. #2-F	160.3	159.2	158.4	160	159.9	161.2	162.2	161.7	158.4	158.8
Instream Temp.-F	147.9	148.3	149.5	151	150.4	149.8	150.9	150.1	149.7	150.5
Avg. Wall Temp.-F	159.7	159.4	158.8	160.4	160.4	161.2	161.8	160.6	158.7	159.3
Avg. Wall DT.-F	11.3	10.6	8.8	9	9.5	10.9	10.4	10.1	8.5	8.3
Remaining Subcool-F	0.2									
Exit Quality	0	0.03	0.05	0.08	0.11	0.14	0.17	0.2	0.23	0.26
EXP. H-Btu/Hr/ft2/F	885.3	941.5	1133.6	1114.7	1047.5	917.8	959.1	991.5	1172.8	1203.9
COMPUTED H										
Jallouk	970.7	949.3	921.8	910.7	893	871.1	869.8	860.6	853.9	853
Szady1(Cudo tube)	1441.2	1446.2	1459.4	1475.4	1472.8	1470.3	1482.9	1479.1	1478.9	1489.1
Szady2	1212.7	1246.6	1256.9	1270.1	1264.9	1259.8	1270.1	1235.1	1236.5	1247.6
(RLIQ)	102884	102001	100063	98318	94811	91333	89154	85552	82268	79809
(F)	1.005	1.359	1.725	1.975	2.194	2.388	2.544	2.709	2.859	2.982
(HLIQ)	211	285.4	362.8	416.1	461.9	502.3	535.9	570	601.3	627.9
(HBOIL)	1439.7	1442.5	1451.9	1464.3	1457.5	1450.5	1459.2	1450.3	1445	1450.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.5									
DP Liquid Density-lbm/ft3	93.64									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.014	0.834	1.34	2.022	2.252					
Zero Corrections-psid	0.04	-0.015	-0.006	-0.036	-0.02					
Corrected DP-Psid	-0.054	0.849	1.346	2.058	2.272					
Actual DP-ft	2.38	3.08	4.5	5.53	7.3					
Measured TP-Psig	106				0.3					
Measured Overall-ft	186									
Computed DP-ft	1.96	3.56	5.06	6.52	7.9					
Friction-ft	0.09	0.26	0.51	0.81	1.15					
Acceleration-ft	0.09	0.17	0.24	0.31	0.39					
Elevation-ft	1.79	3.13	4.31	5.4	6.36					

Run#	929									
Test Fluid	C4F10									
Date:	11/10/93									
Time:	11:17									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	106.1									
Sat. Temperature-F(inlet)	150.4									
Liq. Density-lbm/ft3	82.13	81.96	81.94	81.74	81.87	81.92	81.74	81.94	81.98	81.79
Latent Heat-Btu/lbm	29.76	29.63	29.62	29.47	29.57	29.61	29.47	29.62	29.65	29.51
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.286	0.285	0.285	0.286	0.285	0.285	0.286
Liq. Viscosity-lbm/ft-hr	0.436	0.432	0.432	0.428	0.431	0.432	0.428	0.432	0.433	0.429
Liq. Conductivity-Btu/hr-ft-F	0.0252	0.0251	0.0251	0.025	0.025	0.0251	0.025	0.0251	0.0251	0.025
Liq. Prandtl No.	4.92	4.91	4.91	4.9	4.91	4.91	4.9	4.91	4.92	4.91
Inlet Flow Rate-GPM	2.6									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	1.8									
Inlet Temperature-F	147.8									
Outlet Liq. Temperature-F	150.4									
Outlet Vap. Temperature-F	145.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	91.5									
Water outlet Temp.-F	113.3									
Inlet G-lbm/hr/ft2	514830	Temp		141.2	Density	82.97				
Subcooling-F	2.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	771.2	577.9	576.7	573.8	573.9	571.4	576	576.2	575.1	576.7
Heat Loss-Watts	9.7	2.2	3	3.1	3.1	2.3	1.5	2.3	2.9	16.5
Heat Flux-Btu/Hr/ft2	13368	10018	9997	9946	9948	9905	9985	9988	9969	9997
Wall Temp. #3-F	158.6	159.9	159.1	160.3	161	161.3	161.3	159.9	159.1	159.2
Wall Temp. #4-F	159.5	158.6	160.1	160.5	161.2	161.5	161.7	160.8	159.7	162.4
Wall Temp. #5-F	159.9	157.9	161.4	160.6	160	160.9	160.9	159.7	158.6	157.9
Wall Temp. #1-F	147.8	159	157.4	159.2	159.4	160.9	162.1	160.5	157.5	157
Wall Temp. #2-F	160.1	159.2	158.5	159.7	159.4	161.1	162.1	161.3	158.3	158.3
Instream Temp.-F	148.9	149.8	149.9	151	150.3	150	151	149.9	149.7	150.7
Avg. Wall Temp.-F	159.5	159.2	158.8	160.2	160	161.2	161.6	160.4	158.6	159
Avg. Wall DT.-F	10	8.9	8.4	8.7	9.3	10.7	10.2	10.1	8.5	7.8
Remaining Subcool-F	-2.8									
Exit Quality	0.03	0.06	0.1	0.14	0.18	0.22	0.26	0.29	0.33	0.37
EXP. H-Btu/Hr/ft2/F	1334	1122.8	1186.8	1143.2	1075.4	925.5	981.9	990	1174.3	1280.3
COMPUTED H										
Jallouk	1184	961.7	937.2	924.6	907.7	893.4	894.4	872.5	866.4	868.4
Szady1(Cudo tube)	1673.6	1460.9	1462.1	1470.2	1466.1	1462.5	1479.1	1472	1471.4	1484.4
Szady2	1483.2	1261.1	1260	1265.4	1259.3	1253	1268.9	1259.8	1257	1240.3
(RLIQ)	76273	74327	71399	69047	65646	62496	60012	56463	53378	50817
(F)	1.381	1.777	2.101	2.351	2.583	2.788	2.957	3.146	3.312	3.446
(HLIQ)	229.3	295.4	349.3	391.4	429.6	463.6	492.3	523.1	550.5	573.5
(HBOIL)	1672.1	1456.9	1455.4	1460.9	1453.7	1446.8	1460.6	1449.6	1445.2	1455.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.8									
DP Liquid Density-lbm/ft3	93.6									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.048	1.075	1.713	2.507	2.84					
Zero Corrections-psid	0.04	-0.015	-0.006	-0.036	-0.02					
Corrected DP-Psid	0.008	1.09	1.719	2.543	2.86					
Actual DP-ft	2.27	2.68	3.84	4.68	6.28					
Measured TP-Psig	106.1				0.3					
Measured Overall-ft	186.26									
Computed DP-ft	1.61	2.93	4.15	5.34	6.45					
Friction-ft	0.08	0.23	0.43	0.68	0.96					
Acceleration-ft	0.08	0.13	0.19	0.25	0.32					
Elevation-ft	1.44	2.56	3.53	4.41	5.17					

Run#	930									
Test Fluid	C4F10									
Date:	11/10/93									
Time:	15:24									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	106.5									
Sat. Temperature-F(inlet)	150.6									
Liq. Density-lbm/ft3	81.98	81.78	81.85	81.61	81.74	81.76	81.62	81.78	81.79	81.68
Latent Heat-Btu/lbm	29.65	29.5	29.55	29.38	29.47	29.49	29.39	29.5	29.51	29.43
Specific Heat-Btu/lbm/F	0.285	0.286	0.285	0.286	0.286	0.286	0.286	0.286	0.286	0.286
Liq. Viscosity-lbm/ft-hr	0.433	0.429	0.43	0.426	0.428	0.428	0.426	0.429	0.429	0.427
Liq. Conductivity-Btu/hr-ft-F	0.0251	0.025	0.025	0.0249	0.025	0.025	0.0249	0.025	0.025	0.0249
Liq. Prandtl No.	4.92	4.9	4.91	4.9	4.9	4.9	4.9	4.9	4.91	4.9
Inlet Flow Rate-GPM	1.8									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	1.3									
Inlet Temperature-F	148.5									
Outlet Liq. Temperature-F	151.4									
Outlet Vap. Temperature-F	146.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	91.9									
Water outlet Temp.-F	113.1									
Inlet G-lbm/hr/ft2	356903	Temp		140.6	Density	83.09				
Subcooling-F	2.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	572.8	577.2	574.9	571.5	573.5	570.9	575.7	574.4	572.8	573.8
Heat Loss-Watts	10.2	2.4	3.2	3.3	3.2	2.4	1.6	2.4	3	17.3
Heat Flux-Btu/Hr/ft2	9929	10005	9966	9907	9941	9896	9979	9957	9929	9946
Wall Temp. #3-F	158.8	160.1	158.8	160.5	161.4	161.8	161.7	160.4	159.5	159.3
Wall Temp. #4-F	159.4	158.7	159.8	160.5	161.7	162	162	161.5	160.4	162.5
Wall Temp. #5-F	159.9	158	161.5	161	160.4	161.3	161.5	160.1	159	158.2
Wall Temp. #1-F	148.5	159	157.3	159.4	159.8	161.4	162.5	160.9	158.3	157.4
Wall Temp. #2-F	160.2	159.2	158.3	159.7	159.8	161.5	162.6	162	158.7	158.6
Instream Temp.-F	149.7	150.8	150.4	151.7	151	150.9	151.6	150.8	150.7	161.3
Avg. Wall Temp.-F	159.6	159.3	158.6	160.4	160.4	161.6	162.1	161	159.2	159.2
Avg. Wall DT.-F	9.4	8	7.7	8.2	9	10.3	10	9.7	8	7.5
Remaining Subcool-F	-3.6									
Exit Quality	0.03	0.09	0.15	0.2	0.26	0.31	0.37	0.42	0.48	0.53
EXP. H-Btu/Hr/ft2/F	1053.3	1251	1294.3	1207.8	1107.6	962.9	997	1023.3	1236.3	1335
COMPUTED H										
Jallouk	1003.2	985.2	960	962.6	945.7	931.2	930.9	916.8	908.1	907.1
Szady1(Cudo tube)	1451.7	1467.8	1462.5	1471.1	1468.6	1465.8	1479.4	1472.2	1471	1479.3
Szady2	1253.1	1269.2	1262.1	1268.4	1265	1260.2	1273.6	1264.5	1261.4	1268.4
(RLIQ)	53011	51054	47875	45369	42088	39037	36233	32964	29920	27048
(F)	1.443	1.922	2.328	2.633	2.916	3.164	3.377	3.604	3.806	3.962
(HLIQ)	178.9	238.7	288.9	327.2	362.1	392.8	419.6	447.4	472.4	494.7
(HBOIL)	1450.8	1465.7	1458.7	1465.7	1461.2	1456.4	1468.1	1458.3	1454.6	1460.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.5									
DP Liquid Density-lbm/ft3	93.5									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.083	1.321	2.086	2.997	3.452					
Zero Corrections-psid	0.04	-0.015	-0.006	-0.036	-0.02					
Corrected DP-Psid	0.043	1.336	2.092	3.033	3.472					
Actual DP-ft	2.21	2.22	3.18	3.81	5.18					
Measured TP-Psig	106.5				0.3					
Measured Overall-ft	187.23									
Computed DP-ft	1.44	2.54	3.51	4.42	5.24					
Friction-ft	0.05	0.15	0.28	0.45	0.64					
Acceleration-ft	0.05	0.08	0.12	0.17	0.23					
Elevation-ft	1.35	2.31	3.1	3.79	4.36					

Run#	931									
Test Fluid	C4F10									
Date:	11/10/93									
Time:	15:24									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	104.8									
Sat. Temperature-F(inlet)	149.6									
Liq. Density-lbm/ft3	82.05	81.92	81.98	81.76	81.85	81.91	81.76	81.89	81.87	81.76
Latent Heat-Btu/lbm	29.7	29.61	29.65	29.49	29.55	29.59	29.49	29.58	29.57	29.49
Specific Heat-Btu/lbm/F	0.285	0.285	0.285	0.286	0.285	0.285	0.286	0.285	0.285	0.286
Liq. Viscosity-lbm/ft-hr	0.434	0.432	0.433	0.428	0.43	0.431	0.428	0.431	0.431	0.428
Liq. Conductivity-Btu/hr-ft-F	0.0252	0.0251	0.0251	0.025	0.025	0.0251	0.025	0.025	0.025	0.025
Liq. Prandtl No.	4.92	4.91	4.92	4.9	4.91	4.91	4.9	4.91	4.91	4.9
Inlet Flow Rate-GPM	1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	147.1									
Outlet Liq. Temperature-F	150.9									
Outlet Vap. Temperature-F	147.1									
Water Flow Rate-GPM										
Water Inlet Temp.-F	93.8									
Water outlet Temp.-F	120.1									
Inlet G-lbm/hr/ft2	199999		Temp		136.7	Density		83.81		
Subcooling-F	2.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	574	577.6	573.6	580.5	576	573.9	575.7	574.5	569.6	243.9
Heat Loss-Watts	11.4	2.6	3.5	3.7	3.6	2.7	1.8	2.7	3.5	18.6
Heat Flux-Btu/Hr/ft2	9950	10012	9943	10063	9985	9948	9979	9959	9874	4228
Wall Temp. #3-F	157	158.3	156.8	158.7	159.4	160.3	160.5	159.7	159.5	156.3
Wall Temp. #4-F	158	156.9	158	159	159.6	160.6	160.8	160.7	160.2	157.4
Wall Temp. #5-F	158.5	156	159.5	158.8	158.5	159.6	159.8	159.1	158.1	155.9
Wall Temp. #1-F	147.1	157.3	155.4	157.5	158.1	159.8	160.7	160.2	157.2	155.4
Wall Temp. #2-F	158.8	157.4	156.4	158	158.1	159.8	160.8	160.9	158	155.7
Instream Temp.-F	149.3	150	149.7	150.9	150.4	150.1	150.9	150.2	150.3	150.9
Avg. Wall Temp.-F	158.1	157.5	156.7	158.5	158.6	160.1	160.5	160.1	158.6	156.1
Avg. Wall DT.-F	8.3	7	6.5	7.1	7.7	9.5	9.2	9.5	7.9	5
Remaining Subcool-F	-7.7									
Exit Quality	0.07	0.17	0.27	0.37	0.47	0.57	0.67	0.77	0.86	0.91
EXP. H-Btu/Hr/ft2/F	1195.1	1425.7	1529.5	1408.3	1292.7	1044.4	1088.4	1051.6	1257.2	837.4
COMPUTED H										
Jallouk	1063.3	1018	991.5	993	974.6	962.7	963.9	968.9	77.8	77.8
Szady1(Cudo tube)	1449.2	1460.3	1453.3	1473.2	1463.8	1459.3	1469.6	1462.8	77.8	77.8
Szady2	1219.9	1262.9	1254.2	1275	1263.7	1257.8	1267.5	1259.4	77.8	77.8
(RLIQ)	29008	26556	23510	20727	17620	14576	11660	8590	8590	8590
(F)	1.693	2.37	2.907	3.319	3.707	4.059	4.363	4.697	4.697	4.697
(HLIQ)	132	184.9	226.8	259.3	289.4	316.8	340.8	366.6	366.6	366.6
(HBOIL)	1448.8	1459.4	1451.4	1470.5	1460	1454.3	1463.4	1455.1	1455.1	1455.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.4									
DP Liquid Density-lbm/ft3	93.61									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.078	1.621	2.54	3.599	4.193					
Zero Corrections-psid	0.04	-0.015	-0.006	-0.036	-0.02					
Corrected DP-Psid	0.038	1.636	2.546	3.635	4.213					
Actual DP-ft	2.22	1.69	2.38	2.75	3.87					
Measured TP-Psig	104.8				0.3					
Measured Overall-ft	184.06									
Computed DP-ft	1.18	1.97	2.62	3.17	3.66					
Friction-ft	0.03	0.08	0.15	0.24	0.32					
Acceleration-ft	0.02	0.05	0.08	0.12	0.16					
Elevation-ft	1.13	1.85	2.39	2.81	3.18					

Run#	332									
Test Fluid	C4F10									
Date:	11/11/93									
Time:	10:01									
Note	Analytical dl is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	154.1									
Sat. Temperature-F(inlet)	176									
Liq. Density-lbm/ft3	76.72	76.93	76.83	76.39	76.51	76.56	76.25	76.49	76.49	76.56
Latent Heat-Btu/lbm	25.7	25.86	25.79	25.45	25.54	25.58	25.34	25.52	25.52	25.58
Specific Heat-Btu/lbm/F	0.299	0.299	0.299	0.3	0.3	0.3	0.301	0.3	0.3	0.3
Liq. Viscosity-lbm/ft-hr	0.345	0.348	0.347	0.34	0.342	0.343	0.338	0.342	0.342	0.343
Liq. Conductivity-Btu/hr-ft-F	0.0218	0.0219	0.0219	0.0216	0.0217	0.0217	0.0215	0.0217	0.0217	0.0217
Liq. Prandtl No.	4.74	4.74	4.74	4.73	4.73	4.73	4.73	4.73	4.73	4.73
Inlet Flow Rate-GPM	5.4									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	2.7									
Inlet Temperature-F	174.3									
Outlet Liq. Temperature-F	175.5									
Outlet Vap. Temperature-F	172.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	110.5									
Water outlet Temp.-F	167.3									
Inlet G-lbm/hr/ft2	991949	Temp		170.4	Density	76.97				
Subcooling-F	1.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	289	291.5	289.5	289.9	290.2	289.4	290.5	289.9	289	289
Heat Loss-Watts	14.1	3.2	4.3	4.6	4.4	3.3	2	3.4	4.2	23.3
Heat Flux-Btu/Hr/ft2	5010	5053	5018	5025	5030	5017	5036	5025	5010	5010
Wall Temp. #3-F	182.4	180.5	180.4	181.6	180.9	180.6	180.8	181.6	180.7	179.2
Wall Temp. #4-F	182.6	180.6	180.7	181.6	181.4	181	181.1	181.6	181.5	180.5
Wall Temp. #5-F	183.5	180.2	181.9	181.6	180.2	180.5	180.3	181.1	181.1	178.7
Wall Temp. #1-F	174.3	180.7	179.5	181.2	180.4	181.3	180.9	180.7	180.2	178.1
Wall Temp. #2-F	183.4	180.9	179.9	181.4	180.5	180.8	180.8	181.2	180.5	178.6
Instream Temp.-F	175.2	174.3	174.7	176.6	176.1	175.9	177.2	176.2	176.2	175.9
Avg. Wall Temp.-F	183	180.7	180.1	181.5	180.6	180.9	180.8	181.2	180.8	179
Avg. Wall DT.-F	7.5	6.1	5.2	4.7	4.3	4.7	3.4	4.8	4.4	2.9
Remaining Subcool-F	0.8									
Exit Quality	-0.01	0	0.01	0.03	0.04	0.05	0.06	0.07	0.08	0.1
EXP. H-Btu/Hr/ft2/F	663.6	822.1	965.4	1075.4	1170.5	1062.1	1502.1	1044.1	1145.4	1731.3
COMPUTED H										
Jallouk	716.2	716.7	702.7	703.3	698	693.6	696.8	691.4	689.1	687.2
Szady1(Cudo tube)	1195.1	1193.7	1195.7	1213	1212.5	1212.1	1226	1220.3	1221.1	1221.6
Szady2	926.6	926.5	929.7	946.8	948.3	981.9	994.9	985.6	984	982.3
(RLIQ)	188057	188445	185553	186789	183688	181180	181199	177233	175020	172318
(F)	1.004	1.005	1.249	1.402	1.524	1.627	1.71	1.797	1.872	1.944
(HLIQ)	289.6	289.4	360	404.7	439.7	469.3	493.7	518.5	540.1	560.7
(HBOIL)	1189.4	1188	1184.7	1197.7	1193	1188.2	1198.7	1188.3	1184.8	1180.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.5									
DP Liquid Density-lbm/ft3	93.06									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.092	0.429	0.711	1.093	1.149					
Zero Corrections-psid	-0.215	0.087	0.033	0.018	-0.303					
Corrected DP-Psid	0.123	0.342	0.678	1.075	1.452					
Actual DP-ft	2.2	4.22	6.02	7.7	9.27					
Measured TP-Psig	154.1				0.3					
Measured Overall-ft	289.29									
Computed DP-ft	2.14	4.21	6.18	8.1	9.89					
Friction-ft	0.14	0.32	0.54	0.78	1.03					
Acceleration-ft	0.03	0.14	0.2	0.25	0.29					
Elevation-ft	1.97	3.75	5.44	7.07	8.56					

Run#	333									
Test Fluid	C4F10									
Date:	11/11/93									
Time:	10:01									
Note	Anaytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	152.6									
Sat. Temperature-F(inlet)	163.6									
Liq. Density-lbm/ft3	76.82	76.98	76.89	76.48	76.55	76.61	76.27	76.45	76.43	76.59
Latent Heat-Btu/lbm	31.24	31.37	31.3	30.95	31.01	31.07	30.78	30.93	30.92	31.05
Specific Heat-Btu/lbm/F	0.312	0.311	0.311	0.313	0.313	0.313	0.314	0.313	0.314	0.313
Liq. Viscosity-lbm/ft-hr	0.36	0.362	0.361	0.355	0.356	0.357	0.352	0.355	0.354	0.357
Liq. Conductivity-Btu/hr-ft-F	0.0261	0.0262	0.0262	0.0259	0.0259	0.026	0.0258	0.0259	0.0259	0.026
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	4.6									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	173.3									
Outlet Liq. Temperature-F	174.7									
Outlet Vap. Temperature-F	171.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	111.4									
Water outlet Temp.-F	166.4									
Inlet G-lbm/hr/ft2	855869		Temp		169	Density	77.96			
Subcooling-F	-9.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	288.3	290.9	286.4	287.2	288.1	287.2	289.7	288.9	281.8	287.5
Heat Loss-Watts	14.2	3.2	4.3	4.7	4.5	3.4	2.1	3.4	4.3	23.8
Heat Flux-Btu/Hr/ft2	4997	5043	4965	4978	4994	4978	5022	5008	4885	4984
Wall Temp. #3-F	181.3	179.8	179.6	181	180.3	179.7	180.4	180.9	180.2	178.5
Wall Temp. #4-F	181.3	180	180.1	181.1	180.3	180.5	180.4	181.1	180.8	179.9
Wall Temp. #5-F	182.3	179.6	181.3	181	179.2	179.7	179.8	180.5	180.7	178
Wall Temp. #1-F	173.3	180.1	178.9	180.5	179.8	180.2	180.5	180.3	179.7	177.4
Wall Temp. #2-F	182.1	180.2	179.1	180.5	179.9	179.7	180.3	180.6	179.9	178
Instream Temp.-F	174.1	173.4	173.8	175.6	175.3	175	176.5	175.7	175.8	175.1
Avg. Wall Temp.-F	181.8	180	179.4	180.9	179.8	180	180.3	180.7	180.3	178.4
Avg. Wall DT.-F	7.4	6.4	5.4	5.1	4.3	4.8	3.6	4.8	4.2	3
Remaining Subcool-F	-10.8									
Exit Quality	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.19	0.2	0.21
EXP. H-Btu/Hr/ft2/F	673.1	788.3	919.3	981	1168.4	1037.2	1413.4	1053.5	1152.3	1642.2
COMPUTED H										
Jallouk	156.3	156	156.2	156.9	156.8	156.7	157.3	156.9	157	156.7
Szady1(Cudo tube)	156.3	156	156.2	156.9	156.8	156.7	157.3	156.9	157	156.7
Szady2	156.3	156	156.2	156.9	156.8	156.7	157.3	156.9	157	156.7
(RLIQ)	0	0	0	0	0	0	0	0	0	0
(F)	0	0	0	0	0	0	0	0	0	0
(HLIQ)	0	0	0	0	0	0	0	0	0	0
(HBOIL)	0	0	0	0	0	0	0	0	0	0
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.2									
DP Liquid Density-lbm/ft3	93.31									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.053	0.516	0.858	1.304	1.428					
Zero Corrections-psid	-0.215	0.087	0.033	0.018	-0.303					
Corrected DP-Psid	0.162	0.429	0.825	1.286	1.731					
Actual DP-ft	2.13	4.07	5.76	7.33	8.78					
Measured TP-Psig	152.6				0.3					
Measured Overall-ft	286.34									
Computed DP-ft	1.96	3.76	5.55	7.34	9.02					
Friction-ft	0.26	0.53	0.82	1.13	1.43					
Acceleration-ft	0.28	0.32	0.35	0.38	0.41					
Elevation-ft	1.41	2.91	4.38	5.83	7.18					

Run#	934									
Test Fluid	C4F10									
Date:	11/11/93									
Time:	10:01									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	152									
Sat. Temperature-F(inlet)	175									
Liq. Density-lbm/ft3	76.83	76.95	76.86	76.67	76.72	76.7	76.65	76.77	76.72	76.77
Latent Heat-Btu/lbm	25.79	25.88	25.81	25.67	25.7	25.68	25.65	25.74	25.7	25.74
Specific Heat-Btu/lbm/F	0.299	0.299	0.299	0.3	0.299	0.3	0.3	0.299	0.299	0.299
Liq. Viscosity-lbm/ft-hr	0.347	0.348	0.347	0.344	0.345	0.345	0.344	0.346	0.345	0.346
Liq. Conductivity-Btu/hr-ft-F	0.0219	0.022	0.0219	0.0218	0.0218	0.0218	0.0218	0.0218	0.0218	0.0218
Liq. Prandtl No.	4.74	4.74	4.74	4.74	4.74	4.74	4.73	4.74	4.74	4.74
Inlet Flow Rate-GPM	3.7									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2.									
Inlet Temperature-F	173.8									
Outlet Liq. Temperature-F	174.9									
Outlet Vap. Temperature-F	171.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	113.7									
Water outlet Temp.-F	166.6									
Inlet G-lbm/hr/ft2	682467		Temp		169	Density	77.29			
Subcooling-F	1.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	288.6	291.7	277.8	287.8	291.3	290.7	291.3	290.5	276.2	289.3
Heat Loss-Watts	14.5	3.4	4.5	4.8	4.7	3.7	2.3	3.6	4.4	24.8
Heat Flux-Btu/Hr/ft2	5003	5056	4815	4989	5049	5039	5049	5036	4788	5015
Wall Temp. #3-F	180.8	180	179.9	180.3	180	179.8	179.3	180.1	179.6	178.4
Wall Temp. #4-F	181.1	180.2	180.2	180.5	180.4	180.7	179.4	180.3	180.3	179.8
Wall Temp. #5-F	181.9	179.8	181.5	180.5	179.4	179.8	178.9	179.7	180	177.9
Wall Temp. #1-F	173.8	180.3	179.3	179.9	179.5	180.3	179.4	179.2	179	177.3
Wall Temp. #2-F	181.6	180.3	179.7	180.1	179.6	179.8	179.3	179.8	179.2	178.1
Instream Temp.-F	174.7	174.2	174.6	175.4	175.2	175.3	175.5	175	175.2	175
Avg. Wall Temp.-F	181.4	180.2	179.8	180.3	179.7	180.2	179.3	179.8	179.6	178.3
Avg. Wall DT.-F	6.4	5.8	5	4.7	4.3	4.6	3.5	4.6	4.2	3.1
Remaining Subcool-F	-0.2									
Exit Quality	0.	0.02	0.04	0.05	0.07	0.09	0.1	0.12	0.14	0.15
EXP. H-Btu/Hr/ft2/F	778.8	876.1	971.4	1067.2	1175.2	1090.2	1429.7	1096.5	1139	1631.7
COMPUTED H										
Jallouk	739.8	727	698.1	710.4	710.1	706.1	704.7	699.3	679.8	694.1
Szady1(Cudo tube)	1189	1192.9	1168.9	1196.6	1203.8	1204.8	1209	1205.4	1179.5	1206.2
Szady2	919.7	925.5	900.1	929.4	938.1	939.8	944.7	942.2	915.6	974.4
(RLIQ)	128819	126780	125154	124005	121801	119534	117578	114835	112931	110602
(F)	1.077	1.284	1.485	1.63	1.758	1.87	1.97	2.067	2.149	2.23
(HLIQ)	230	274.3	317.2	348.6	375.9	399.8	421.2	441.8	459.5	476.7
(HBOIL)	1186.1	1188	1161	1186.7	1191.5	1190	1191.7	1185.3	1155.8	1180.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.4									
DP Liquid Density-lbm/ft3	93.51									
Elevation-ft	2	4	6	8.	9.875					
Measured DP-Psid	0.004	0.661	1.119	1.667	1.873					
Zero Corrections-psid	-0.215	0.087	0.033	0.018	-0.303					
Corrected DP-Psid	0.219	0.574	1.086	1.649	2.176					
Actual DP-ft	2.03	3.8	5.27	6.65	7.95					
Measured TP-Psig	152				0.3					
Measured Overall-ft	284.57									
Computed DP-ft	2	3.84	5.61	7.34	8.94					
Friction-ft	0.08	0.19	0.32	0.47	0.62					
Acceleration-ft	0.06	0.1	0.13	0.16	0.19					
Elevation-ft	1.86	3.55	5.16	6.71	8.13					

Run#	935									
Test Fluid	C4F10									
Date:	11/11/93									
Time:	15:51									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	151.9									
Sat. Temperature-F(inlet)	163.3									
Liq. Density-lbm/ft3	76.57	76.75	76.66	76.38	76.55	76.61	76.31	76.57	76.57	76.5
Latent Heat-Btu/lbm	31.03	31.18	31.11	30.88	31.01	31.07	30.82	31.03	31.03	30.97
Specific Heat-Btu/lbm/F	0.313	0.312	0.312	0.314	0.313	0.313	0.314	0.313	0.313	0.313
Liq. Viscosity-lbm/ft-hr	0.356	0.359	0.358	0.354	0.356	0.357	0.353	0.356	0.356	0.355
Liq. Conductivity-Btu/hr-ft-F	0.026	0.0261	0.026	0.0258	0.0259	0.026	0.0258	0.026	0.026	0.0259
Liq. Prandtl No.	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Inlet Flow Rate-GPM	2.9									
Outlet Liq. Flow Rate-GPM	0.8									
Outlet Vap. Flow Rate-GPM	1.8									
Inlet Temperature-F	174.1									
Outlet Liq. Temperature-F	174.7									
Outlet Vap. Temperature-F	171.5									
Water Flow Rate-GPM										
Water Inlet Temp.-F	113.9									
Water outlet Temp.-F	167.7									
Inlet G-lbm/hr/ft2	539113		Temp	169.3	Density	77.9				
Subcooling-F	****									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	290.9	290.5	287	288.4	290.5	290.3	290.3	289.8	282.6	293.6
Heat Loss-Watts	14.3	3.3	4.4	4.7	4.6	3.5	2.3	3.6	4.4	24.6
Heat Flux-Btu/Hr/ft2	5043	5036	4975	4999	5036	5032	5032	5023	4899	5089
Wall Temp. #3-F	181	179.9	179.9	180.9	180.3	180.1	180.1	180.6	179.7	179.2
Wall Temp. #4-F	181.1	180	180.1	181	180.6	180.5	180.1	180.5	180.5	180.3
Wall Temp. #5-F	181.8	179.6	181.5	180.9	179.5	180	179.5	179.9	180	178.6
Wall Temp. #1-F	174.1	180.2	179	180.5	179.9	180.7	180.2	179.9	179.2	178.2
Wall Temp. #2-F	182	180.2	179.6	180.6	179.9	180.2	180.1	180.3	179.5	178.6
Instream Temp.-F	175.2	174.4	174.8	176	175.3	175	176.3	175.2	175.2	175.5
Avg. Wall Temp.-F	181.5	180.1	179.7	180.8	180	180.3	180	180.2	179.8	179
Avg. Wall DT.-F	6	5.4	4.6	4.6	4.4	5.1	3.5	4.8	4.4	3.2
Remaining Subcool-F	-12.6									
Exit Quality	0.13	0.14	0.16	0.18	0.2	0.21	0.23	0.25	0.27	0.29
EXP. H-Btu/Hr/ft2/F	833.9	924.4	1075.6	1087	1132.3	987.2	1449.1	1043.7	1123.9	1566
COMPUTED H										
Jallouk	108.3	108.1	108.2	108.5	108.3	108.2	108.6	108.3	108.3	108.4
Szady1(Cudo tube)	108.3	108.1	108.2	108.5	108.3	108.2	108.6	108.3	108.3	108.4
Szady2	108.3	108.1	108.2	108.5	108.3	108.2	108.6	108.3	108.3	108.4
(RLIQ)	0	0	0	0	0	0	0	0	0	0
(F)	0	0	0	0	0	0	0	0	0	0
(HLIQ)	0	0	0	0	0	0	0	0	0	0
(HBOIL)	0	0	0	0	0	0	0	0	0	0
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.5									
DP Liquid Density-lbm/ft3	93.41									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.033	0.79	1.354	1.99	2.274					
Zero Corrections-psid	-0.215	0.087	0.033	0.018	-0.303					
Corrected DP-Psid	0.248	0.703	1.321	1.972	2.577					
Actual DP-ft	1.98	3.56	4.84	6.06	7.21					
Measured TP-Psig	151.9				0.3					
Measured Overall-ft	285.37									
Computed DP-ft	1.63	3.24	4.83	6.41	7.88					
Friction-ft	0.12	0.25	0.4	0.55	0.71					
Acceleration-ft	0.13	0.15	0.17	0.19	0.21					
Elevation-ft	1.38	2.84	4.27	5.67	6.96					

Run#	936									
Test Fluid	C4F10									
Date:	11/11/93									
Time:	15:51									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	151.8									
Sat. Temperature-F(inlet)	174.9									
Liq. Density-lbm/ft3	76.97	76.88	76.81	76.56	76.7	76.72	76.46	76.72	76.7	76.63
Latent Heat-Btu/lbm	25.9	25.83	25.77	25.58	25.68	25.7	25.51	25.7	25.68	25.63
Specific Heat-Btu/lbm/F	0.299	0.299	0.299	0.3	0.3	0.299	0.3	0.299	0.3	0.3
Liq. Viscosity-lbm/ft-hr	0.349	0.347	0.346	0.343	0.345	0.345	0.341	0.345	0.345	0.344
Liq. Conductivity-Btu/hr-ft-F	0.022	0.0219	0.0219	0.0217	0.0218	0.0218	0.0217	0.0218	0.0218	0.0218
Liq. Prandtl No.	4.74	4.74	4.74	4.73	4.74	4.74	4.73	4.74	4.74	4.73
Inlet Flow Rate-GPM	2									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	1.4									
Inlet Temperature-F	173.3									
Outlet Liq. Temperature-F	175.4									
Outlet Vap. Temperature-F	171.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	114.6									
Water outlet Temp.-F	167.2									
Inlet G-lbm/hr/ft2	370291	Temp		167.7	Density	77.58				
Subcooling-F	1.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	288.9	289	289.3	288.8	283	281.3	288.4	287.8	291.8	286.8
Heat Loss-Watts	14.6	3.3	4.5	4.9	4.8	3.7	2.5	3.7	4.5	25.5
Heat Flux-Btu/Hr/ft2	5008	5010	5015	5006	4906	4876	4999	4989	5058	4971
Wall Temp. #3-F	180.6	179.7	179.6	181	180.3	179.8	180	180.3	179.8	179
Wall Temp. #4-F	181	179.9	180	181.1	180.4	180.5	180.3	180.7	180.6	180.4
Wall Temp. #5-F	181.7	179.5	181.5	181.1	179.3	179.7	179.3	180.2	180.2	178.5
Wall Temp. #1-F	173.3	180.1	178.8	180.5	179.8	180.4	180.1	179.8	179.2	178.2
Wall Temp. #2-F	181.5	180.1	179.4	180.6	179.9	179.9	180	180.3	179.7	178.6
Instream Temp.-F	174.1	174.5	174.8	175.9	175.3	175.2	176.3	175.2	176.3	175.6
Avg. Wall Temp.-F	181.2	180	179.5	180.9	179.9	180.1	179.9	180.3	179.9	178.9
Avg. Wall DT.-F	6.9	5.2	4.4	4.8	4.3	4.7	3.4	4.8	4.4	3.1
Remaining Subcool-F	-1									
Exit Quality	0.01	0.04	0.07	0.1	0.13	0.16	0.19	0.23	0.26	0.29
EXP. H-Btu/Hr/ft2/F	728.6	959	1133.7	1043.2	1133.4	1042	1464.3	1031.9	1157.1	1595.8
COMPUTED H										
Jallouk	769.2	757.1	748.5	745.2	727.3	719.8	732.1	723	726.5	717.5
Szady1(Cudo tube)	1184.1	1187.7	1191.1	1198.7	1183	1179.5	1202.7	1194.3	1203.9	1196.6
Szady2	914.7	918.2	921.8	928.6	913.2	910	933.5	926.6	937.1	929.3
(RLIQ)	69063	67852	65902	64430	61913	59783	58212	55431	53303	51280
(F)	1.199	1.483	1.742	1.935	2.107	2.254	2.375	2.513	2.628	2.733
(HLIQ)	157.1	194.3	228.3	253.8	276.2	296.5	311.6	329.3	344.5	358.4
(HBOIL)	1183.2	1185.9	1188.3	1194.9	1178	1173.2	1195.7	1185.9	1194.4	1185.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.5									
DP Liquid Density-lbm/ft3	93.5									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.055	0.904	1.565	2.295	2.667					
Zero Corrections-psid	-0.215	0.087	0.033	0.018	-0.303					
Corrected DP-Psid	0.27	0.817	1.532	2.277	2.97					
Actual DP-ft	1.93	3.35	4.44	5.48	6.47					
Measured TP-Psig	151.8				0.3					
Measured Overall-ft	284.71									
Computed DP-ft	1.75	3.18	4.47	5.67	6.74					
Friction-ft	0.03	0.09	0.16	0.25	0.35					
Acceleration-ft	0.03	0.04	0.06	0.08	0.09					
Elevation-ft	1.69	3.04	4.24	5.34	6.3					

Run#	937									
Test Fluid	C4F10									
Date:	11/11/93									
Time:	15:51									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	153									
Sat. Temperature-F(inlet)	175.5									
Liq. Density-lbm/ft3	76.79	76.63	76.72	76.44	76.63	76.67	76.39	76.65	76.65	76.37
Latent Heat-Btu/lbm	25.76	25.63	25.7	25.49	25.63	25.67	25.45	25.65	25.65	25.43
Specific Heat-Btu/lbm/F	0.299	0.3	0.299	0.3	0.3	0.3	0.3	0.3	0.3	0.301
Liq. Viscosity-lbm/ft-hr	0.346	0.344	0.345	0.341	0.344	0.344	0.34	0.344	0.344	0.34
Liq. Conductivity-Btu/hr-ft-F	0.0219	0.0218	0.0218	0.0216	0.0218	0.0218	0.0216	0.0218	0.0218	0.0216
Liq. Prandtl No.	4.74	4.73	4.74	4.73	4.73	4.74	4.73	4.73	4.73	4.73
Inlet Flow Rate-GPM	1.1									
Outlet Liq. Flow Rate-GPM	0.4									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	174									
Outlet Liq. Temperature-F	175.7									
Outlet Vap. Temperature-F	172.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	113.3									
Water outlet Temp.-F	168.7									
Inlet G-lbm/hr/ft2	204184		Temp	166.8	Density	77.78				
Subcooling-F	1.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	289.4	286.9	283.6	289.2	283.8	284.8	288.2	289.5	281.8	296.5
Heat Loss-Watts	14.3	3.3	4.4	4.8	4.7	3.6	2.3	3.5	4.3	25.3
Heat Flux-Btu/Hr/ft2	5017	4973	4916	5013	4919	4937	4996	5018	4885	5140
Wall Temp. #3-F	180.9	179.9	179.7	181.2	180.7	180.3	180.4	180.5	179.7	180
Wall Temp. #4-F	181.1	180.1	180.3	181.3	181	180.9	180.7	180.7	180.5	181.1
Wall Temp. #5-F	181.9	179.7	181.9	181.3	179.9	180.2	179.6	180.2	179.9	179.5
Wall Temp. #1-F	174	180.3	179	180.8	180.1	180.9	180.8	180	178.9	179.2
Wall Temp. #2-F	181.9	180.3	179.4	180.8	180.2	180.4	180.5	180.6	179.5	179.7
Instream Temp.-F	174.9	175.6	175.2	176.4	175.6	175.4	176.6	175.5	175.5	176.7
Avg. Wall Temp.-F	181.5	180.2	179.6	181.2	180.3	180.6	180.4	180.4	179.7	179.9
Avg. Wall DT.-F	6.3	4.3	4.2	4.5	4.5	5	3.6	4.7	4	3
Remaining Subcool-F	-3.3									
Exit Quality	0.04	0.09	0.15	0.2	0.26	0.32	0.37	0.43	0.48	0.54
EXP. H-Btu/Hr/ft2/F	793.3	1149.8	1176.7	1108.2	1098.7	997	1397.7	1073.8	1227.6	1731.8
COMPUTED H										
Jallouk	799.7	784.1	766.6	775.6	756.4	752.8	760.4	754.3	737.8	766.4
Szady1(Cudo tube)	1190.6	1190.7	1181.3	1201.9	1185.2	1186.1	1202.2	1197.2	1181.7	1221
Szady2	920.1	919.2	909.9	930.4	913.9	915.5	931	927.7	911.3	952
(RLIQ)	37881	36296	34019	32241	29829	27626	25767	23312	21153	19197
(F)	1.396	1.796	2.119	2.362	2.591	2.788	2.947	3.134	3.291	3.417
(HLIQ)	113.6	146.3	172.6	192.5	211	227	240.2	255.2	268	278.6
(HBOIL)	1190.2	1190	1180	1200.2	1182.9	1183.3	1199	1193.4	1177.1	1216.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.9									
DP Liquid Density-lbm/ft3	93.15									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.079	1.181	1.99	2.877	3.383					
Zero Corrections-psid	-0.215	0.087	0.033	0.018	-0.303					
Corrected DP-Psid	0.294	1.094	1.957	2.859	3.686					
Actual DP-ft	1.89	2.82	3.69	4.37	5.09					
Measured TP-Psig	153				0.3					
Measured Overall-ft	287.93									
Computed DP-ft	1.5	2.65	3.63	4.51	5.26					
Friction-ft	0.02	0.04	0.08	0.13	0.18					
Acceleration-ft	0.01	0.02	0.03	0.04	0.06					
Elevation-ft	1.47	2.58	3.52	4.34	5.03					

Run#	938									
Test Fluid	C4F10									
Date:	11/12/93									
Time:	9:27									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	151.9									
Sat. Temperature-F(inlet)	175									
Liq. Density-lbm/ft3	76.79	76.95	76.9	76.44	76.72	76.79	76.32	76.65	76.58	76.67
Latent Heat-Btu/lbm	25.76	25.88	25.84	25.49	25.7	25.76	25.4	25.65	25.59	25.67
Specific Heat-Btu/lbm/F	0.299	0.299	0.299	0.3	0.299	0.299	0.301	0.3	0.3	0.3
Liq. Viscosity-lbm/ft-hr	0.346	0.348	0.348	0.341	0.345	0.346	0.339	0.344	0.343	0.344
Liq. Conductivity-Btu/hr-ft-F	0.0219	0.022	0.0219	0.0216	0.0218	0.0219	0.0216	0.0218	0.0217	0.0218
Liq. Prandtl No.	4.74	4.74	4.74	4.73	4.74	4.74	4.73	4.73	4.73	4.74
Inlet Flow Rate-GPM	5.5									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2.6									
Inlet Temperature-F	174									
Outlet Liq. Temperature-F	174.5									
Outlet Vap. Temperature-F	171.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	103.3									
Water outlet Temp.-F	167.5									
Inlet G-lbm/hr/ft2	1016541		Temp		168.3	Density	77.45			
Subcooling-F	1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	580.3	576.1	577.1	575.7	580.3	577.8	575.8	578.3	578.5	576.5
Heat Loss-Watts	13.1	3	4	4.3	4.2	2.9	2.1	3.1	4	22.4
Heat Flux-Btu/Hr/ft2	10059	9986	10004	9979	10059	10016	9981	10024	10028	9993
Wall Temp. #3-F	182.5	182.7	181.4	183.4	183.7	182.1	185.3	183.8	183.1	181.7
Wall Temp. #4-F	183.1	181.7	182.3	183.8	183.7	182.4	184.9	184.1	184.2	184.9
Wall Temp. #5-F	183.5	180.8	183.1	183.4	182.6	180.7	184.5	183	183.1	180.9
Wall Temp. #1-F	174	182.5	180.2	182.4	182.8	183.9	185.4	183.6	182.3	180.1
Wall Temp. #2-F	184.2	182.5	181.2	182.9	182.8	183.1	185.4	184.3	182.9	181.4
Instream Temp.-F	174.8	174.2	174.4	176.4	175.2	174.9	176.9	175.5	175.8	175.4
Avg. Wall Temp.-F	183.3	182.4	181.3	183.3	183	182.1	185.1	183.8	183.1	181.8
Avg. Wall DT.-F	8	7.7	6.4	6.4	7.3	6.8	7.7	7.8	6.9	5.9
Remaining Subcool-F	-0.9									
Exit Quality	0.01	0.03	0.06	0.08	0.1	0.12	0.15	0.17	0.19	0.21
EXP. H-Btu/Hr/ft2/F	1262.1	1297.1	1557.5	1559.5	1374.1	1478.9	1288.1	1284	1460.3	1680
COMPUTED H										
Jallouk	1071.3	1024.1	999.2	990.2	963	949.8	949.3	935.9	929.6	918.6
Szady1(Cudo tube)	1715.7	1704.9	1711.6	1734.6	1730.9	1727.5	1719.9	1712.1	1717.9	1713.7
Szady2	1481.4	1469	1517.1	1529.1	1528.5	1520.5	1500	1484.9	1495.9	1493.4
(RLIQ)	191109	186651	182739	181943	175514	170665	169601	162963	159045	154085
(F)	1.192	1.433	1.644	1.797	1.945	2.074	2.168	2.286	2.381	2.477
(HLIQ)	350.3	421	482.9	528.8	572	609.6	638.5	672.4	700.4	728.5
(HBOIL)	1710.8	1696.3	1698.7	1718.1	1709.8	1701.8	1690	1676.8	1678.1	1668.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.3									
DP Liquid Density-lbm/ft3	92.94									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.064	0.653	0.987	1.498	1.637					
Zero Corrections-psid	-0.209	-0.09	-0.044	0.062	-0.189					
Corrected DP-Psid	0.145	0.743	1.031	1.436	1.826					
Actual DP-ft	2.15	3.45	5.34	7	8.54					
Measured TP-Psig	151.9				0.3					
Measured Overall-ft	284.72									
Computed DP-ft	2.1	3.97	5.78	7.57	9.25					
Friction-ft	0.2	0.5	0.87	1.31	1.77					
Acceleration-ft	0.17	0.27	0.37	0.46	0.55					
Elevation-ft	1.72	3.2	4.54	5.8	6.92					

Run#	939									
Test Fluid	C4F10									
Date:	11/12/93									
Time:	9:27									
Note	Analytical dl is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	153									
Sat. Temperature-F(inlet)	175.5									
Liq. Density-lbm/ft3	76.88	76.97	76.93	76.34	76.6	76.65	76.2	76.51	76.46	76.56
Latent Heat-Btu/lbm	25.83	25.9	25.86	25.41	25.61	25.65	25.31	25.54	25.51	25.58
Specific Heat-Btu/lbm/F	0.299	0.299	0.299	0.301	0.3	0.3	0.301	0.3	0.3	0.3
Liq. Viscosity-lbm/ft-hr	0.347	0.349	0.348	0.34	0.343	0.344	0.338	0.342	0.341	0.343
Liq. Conductivity-Btu/hr-ft-F	0.0219	0.022	0.0219	0.0216	0.0217	0.0218	0.0215	0.0217	0.0217	0.0217
Liq. Prandtl No.	4.74	4.74	4.74	4.73	4.73	4.73	4.73	4.73	4.73	4.73
Inlet Flow Rate-GPM	4.6									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2.3									
Inlet Temperature-F	173.8									
Outlet Liq. Temperature-F	175.1									
Outlet Vap. Temperature-F	172.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	102.9									
Water outlet Temp.-F	167.3									
Inlet G-lbm/hr/ft2	850934		Temp		168	Density	77.52			
Subcooling-F	1.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	580.1	579.8	575.4	574.7	579	586.3	576.4	579.3	576.4	576.3
Heat Loss-Watts	12.7	2.9	3.9	4.1	4	2.8	2	3	3.9	21.4
Heat Flux-Btu/Hr/ft2	10056	10050	9974	9962	10037	10163	9992	10042	9992	9990
Wall Temp. #3-F	183	183	181.9	184	184.3	182.6	185.7	184.4	183.5	181.9
Wall Temp. #4-F	183.4	181.9	182.5	184.2	184.4	183	185.7	184.6	184.4	185.1
Wall Temp. #5-F	183.9	181.1	183.3	184	183.2	181.5	185.3	183.5	183.6	181.1
Wall Temp. #1-F	173.8	182.5	180.3	183.1	183.3	184.2	186.1	184.2	182.7	180.6
Wall Temp. #2-F	184.3	182.5	181.4	183.4	183.4	183.8	186.1	185	183.1	181.6
Instream Temp.-F	174.5	174.1	174.3	176.8	175.7	175.5	177.4	176.1	176.3	175.9
Avg. Wall Temp.-F	183.7	182.5	181.5	183.8	183.6	182.8	185.8	184.3	183.5	182.1
Avg. Wall DT.-F	8.7	7.9	6.8	6.6	7.4	6.9	7.9	7.8	6.7	5.7
Remaining Subcool-F	-0.6									
Exit Quality	0.01	0.03	0.06	0.09	0.11	0.14	0.17	0.2	0.22	0.25
EXP. H-Btu/Hr/ft2/F	1156.4	1268.9	1472.4	1515.2	1352.4	1480.3	1260.2	1289.7	1489.4	1750
COMPUTED H										
Jallouk	1090.7	1067.6	1032.2	1026.4	1006.4	997.6	975.2	963.2	954.7	945.8
Szady1(Cudo tube)	1709.5	1706.5	1705.1	1734	1730.2	1740.5	1750.2	1742.6	1714.6	1712.5
Szady2	1474.1	1470.7	1469.3	1530.7	1530.7	1543.5	1499.7	1533.3	1489.8	1487.8
(RLIQ)	159694	156395	152429	151794	145834	141143	139302	133149	128983	124108
(F)	1.146	1.412	1.664	1.838	2.005	2.149	2.257	2.387	2.493	2.6
(HLIQ)	292.2	359.7	424	469.4	511.5	548.2	576.7	609.2	636.4	663.4
(HBOIL)	1706.7	1701.2	1696.3	1722.5	1715.2	1722.2	1729.1	1717.4	1684.8	1678.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.8									
DP Liquid Density-lbm/ft3	92.87									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.016	0.764	1.186	1.78	1.996					
Zero Corrections-psid	-0.209	-0.09	-0.044	0.062	-0.189					
Corrected DP-Psid	0.193	0.854	1.23	1.718	2.185					
Actual DP-ft	2.06	3.25	4.97	6.47	7.87					
Measured TP-Psig	153				0.3					
Measured Overall-ft	287.22									
Computed DP-ft	2.01	3.78	5.45	7.1	8.63					
Friction-ft	0.14	0.37	0.65	0.99	1.35					
Acceleration-ft	0.12	0.21	0.28	0.36	0.44					
Elevation-ft	1.75	3.2	4.52	5.75	6.84					

Run#	940									
Test Fluid	C4F10									
Date:	11/12/93									
Time:	9:27									
Note	Analytical dl is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	151.6									
Sat. Temperature-F(inlet)	174.8									
Liq. Density-lbm/ft3	76.88	76.93	76.88	76.56	76.7	76.79	76.53	76.74	76.74	76.6
Latent Heat-Btu/lbm	25.83	25.86	25.83	25.58	25.68	25.76	25.56	25.72	25.72	25.61
Specific Heat-Btu/lbm/F	0.299	0.299	0.299	0.3	0.3	0.299	0.3	0.299	0.299	0.3
Liq. Viscosity-lbm/ft-hr	0.347	0.348	0.347	0.343	0.345	0.346	0.342	0.345	0.345	0.343
Liq. Conductivity-Btu/hr-ft-F	0.0219	0.0219	0.0219	0.0217	0.0218	0.0219	0.0217	0.0218	0.0218	0.0217
Liq. Prandtl No.	4.74	4.74	4.74	4.73	4.74	4.74	4.73	4.74	4.74	4.73
Inlet Flow Rate-GPM	3.7									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	1.9									
Inlet Temperature-F	173.7									
Outlet Liq. Temperature-F	175.1									
Outlet Vap. Temperature-F	171.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	102.3									
Water outlet Temp.-F	167.4									
Inlet G-lbm/hr/ft2	685038		Temp	167.7	Density	77.58				
Subcooling-F	1.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	574.6	579	575.4	578.6	569.8	573.9	575.7	579.5	580.7	575.7
Heat Loss-Watts	12.5	2.9	3.8	4	3.9	2.8	1.9	2.9	3.7	21.2
Heat Flux-Btu/Hr/ft2	9960	10037	9974	10030	9877	9948	9979	10045	10066	9979
Wall Temp. #3-F	181.9	182.7	181.3	183.1	183.4	182.2	184	183.3	182.3	181.7
Wall Temp. #4-F	182.6	181.4	182.4	183.4	183.8	182.7	184	183.8	183.3	184.6
Wall Temp. #5-F	183	180.9	183.3	183.1	182.8	181	183.5	182.7	182.3	181
Wall Temp. #1-F	173.7	181.9	179.9	182.2	182.3	183.6	184.4	182.8	181.5	180
Wall Temp. #2-F	183.4	181.9	180.8	182.5	182.6	183.3	184.5	183.7	182.3	181.2
Instream Temp.-F	174.6	174.3	174.6	175.8	175.3	174.9	176	175.1	175.1	175.7
Avg. Wall Temp.-F	182.7	182	181.1	183	182.9	182.4	184.1	183.3	182.3	181.7
Avg. Wall DT.-F	7.8	7.2	6.1	6.6	7.1	7	7.6	7.7	6.8	5.5
Remaining Subcool-F	-1.7									
Exit Quality	0.02	0.05	0.09	0.12	0.15	0.19	0.22	0.25	0.29	0.32
EXP. H-Btu/Hr/ft2/F	1281.1	1389.8	1622	1520.4	1385.6	1416	1308.1	1303.6	1483.6	1798.4
COMPUTED H										
Jallouk	1099.6	1072.8	1060.4	1053.4	1023.1	1010.9	1008.3	995.2	986.7	966.4
Szady1(Cudo tube)	1701.5	1706.9	1706	1727.5	1710.7	1713.9	1730.3	1727.7	1731.4	1733.2
Szady2	1465.1	1471.2	1470.3	1532.5	1509.2	1514.1	1526	1526.3	1528.3	1522.8
(RLIQ)	127735	124083	120047	117342	112380	107848	104453	99221	94868	91066
(F)	1.27	1.574	1.826	2.015	2.19	2.345	2.469	2.608	2.728	2.831
(HLIQ)	272.2	337.2	391.3	432.4	469.6	502.7	529.8	559.2	585	607.4
(HBOIL)	1699.2	1702.5	1699.1	1718.5	1698.8	1699.4	1713.5	1707.9	1708.9	1707.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77									
DP Liquid Density-lbm/ft3	93.42									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.033	0.932	1.471	2.153	2.458					
Zero Corrections-psid	-0.209	-0.09	-0.044	0.062	-0.189					
Corrected DP-Psid	0.242	1.022	1.515	2.091	2.647					
Actual DP-ft	1.98	2.96	4.47	5.83	7.07					
Measured TP-Psig	151.6				0.3					
Measured Overall-ft	284.42									
Computed DP-ft	1.85	3.41	4.87	6.28	7.59					
Friction-ft	0.12	0.3	0.53	0.82	1.12					
Acceleration-ft	0.1	0.16	0.22	0.29	0.36					
Elevation-ft	1.63	2.95	4.11	5.18	6.1					

Run#	941									
Test Fluid	C4F10									
Date:	11/12/93									
Time:	9:27									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	152.9									
Sat. Temperature-F(inlet)	175.5									
Liq. Density-lbm/ft3	76.97	76.83	76.77	76.46	76.65	76.72	76.39	76.67	76.63	76.49
Latent Heat-Btu/lbm	25.9	25.79	25.74	25.51	25.65	25.7	25.45	25.67	25.63	25.52
Specific Heat-Btu/lbm/F	0.299	0.299	0.299	0.3	0.3	0.299	0.3	0.3	0.3	0.3
Liq. Viscosity-lbm/ft-hr	0.349	0.347	0.346	0.341	0.344	0.345	0.34	0.344	0.344	0.342
Liq. Conductivity-Btu/hr-ft-F	0.022	0.0219	0.0218	0.0217	0.0218	0.0218	0.0216	0.0218	0.0218	0.0217
Liq. Prandtl No.	4.74	4.74	4.74	4.73	4.73	4.74	4.73	4.74	4.73	4.73
Inlet Flow Rate-GPM	2.8									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	1.6									
Inlet Temperature-F	173.5									
Outlet Liq. Temperature-F	175.9									
Outlet Vap. Temperature-F	172.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	102.3									
Water outlet Temp.-F	167.9									
Inlet G-lbm/hr/ft2	518704		Temp		167.5	Density	77.63			
Subcooling-F	2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	574.6	578.2	575.1	577.1	571.1	574.8	575.9	578.8	576.5	574.7
Heat Loss-Watts	12.6	2.9	3.9	4	4	2.8	1.9	2.9	3.8	21.4
Heat Flux-Btu/Hr/ft2	9960	10023	9969	10004	9900	9964	9983	10033	9993	9962
Wall Temp. #3-F	182.5	182.8	181.8	183.5	183.9	182.5	184.6	183.4	182.7	182.2
Wall Temp. #4-F	183.1	182	182.7	183.7	184.5	182.9	184.6	184.4	183.5	185.1
Wall Temp. #5-F	183.6	181.2	183.6	183.7	183.2	181.4	184.4	183.2	182.8	181
Wall Temp. #1-F	173.5	182.4	180.3	182.8	182.9	183.8	185.2	183.4	181.9	180.9
Wall Temp. #2-F	183.9	182.4	181.2	183	183	183.6	185.2	184.1	182.5	181.8
Instream Temp.-F	174.1	174.7	175	176.3	175.5	175.2	176.6	175.4	175.6	176.2
Avg. Wall Temp.-F	183.3	182.4	181.5	183.4	183.4	182.7	184.8	183.7	182.7	182.2
Avg. Wall DT.-F	8.7	7.2	6	6.7	7.5	7	7.7	7.8	6.6	5.5
Remaining Subcool-F	-1.8									
Exit Quality	0.02	0.06	0.11	0.15	0.2	0.24	0.28	0.33	0.37	0.42
EXP. H-Btu/Hr/ft2/F	1141.6	1383	1647.9	1499.1	1328.3	1423.5	1288.3	1278.7	1507.6	1795
COMPUTED H										
Jallouk	1134.8	1111.7	1086.4	1080.7	1068.8	1056.1	1055.4	1038.5	1027.8	1021.9
Szady1(Cudo tube)	1696.3	1708.8	1709.1	1727.4	1711.6	1714.7	1733	1725.3	1725.8	1731.3
Szady2	1459	1473.4	1473.9	1533.1	1514.2	1519.3	1531.8	1528.3	1524.7	1525.4
(RLIQ)	96303	93703	89683	86481	81469	76921	73592	68389	64151	60160
(F)	1.279	1.626	1.929	2.153	2.361	2.541	2.682	2.848	2.985	3.105
(HLIQ)	219.3	279	331	370	405.3	436.2	460.9	489	512.5	533.4
(HBOIL)	1695.1	1706.3	1704.9	1721.8	1704	1705.3	1722.1	1712.1	1710.6	1714.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.4									
DP Liquid Density-lbm/ft3	93.08									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.077	1.044	1.667	2.424	2.811					
Zero Corrections-psid	-0.209	-0.09	-0.044	0.062	-0.189					
Corrected DP-Psid	0.286	1.134	1.711	2.362	3					
Actual DP-ft	1.9	2.73	4.08	5.29	6.37					
Measured TP-Psig	152.9				0.3					
Measured Overall-ft	287.3									
Computed DP-ft	1.72	3.11	4.38	5.58	6.66					
Friction-ft	0.07	0.2	0.37	0.57	0.79					
Acceleration-ft	0.06	0.11	0.16	0.21	0.27					
Elevation-ft	1.58	2.8	3.86	4.8	5.6					

Run#	942									
Test Fluid	C4F10									
Date:	11/12/93									
Time:	13:44									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	152.7									
Sat. Temperature-F(inlet)	175.4									
Liq. Density-lbm/ft3	76.88	76.58	76.72	76.42	76.63	76.63	76.37	76.58	76.56	76.49
Latent Heat-Btu/lbm	25.83	25.59	25.7	25.47	25.63	25.63	25.43	25.59	25.58	25.52
Specific Heat-Btu/lbm/F	0.299	0.3	0.299	0.3	0.3	0.3	0.301	0.3	0.3	0.3
Liq. Viscosity-lbm/ft-hr	0.347	0.343	0.345	0.341	0.344	0.344	0.34	0.343	0.343	0.342
Liq. Conductivity-Btu/hr-ft-F	0.0219	0.0217	0.0218	0.0216	0.0218	0.0218	0.0216	0.0217	0.0217	0.0217
Liq. Prandtl No.	4.74	4.73	4.74	4.73	4.73	4.73	4.73	4.73	4.73	4.73
Inlet Flow Rate-GPM	2									
Outlet Liq. Flow Rate-GPM	1.2									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	173.6									
Outlet Liq. Temperature-F	176.5									
Outlet Vap. Temperature-F	172.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	102.5									
Water outlet Temp.-F	167.9									
Inlet G-lbm/hr/ft2	372296		Temp	165.8	Density	78				
Subcooling-F	1.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	569.6	575.4	574.7	577.2	575.8	574.5	572.2	575.1	575.2	572.4
Heat Loss-Watts	12.8	3	4	4.2	4.1	2.9	2	3	3.9	23.4
Heat Flux-Btu/Hr/ft2	9874	9974	9962	10005	9981	9959	9919	9969	9971	9922
Wall Temp. #3-F	182.1	182.7	182.1	183.4	183.9	183	184.2	183.4	182.3	186.7
Wall Temp. #4-F	182.8	181.9	183	183.4	184.4	183.4	184.2	184	183.4	189.4
Wall Temp. #5-F	183	181.1	184	183.6	183.1	181.7	184.1	182.9	182.4	181.2
Wall Temp. #1-F	173.6	182.4	180.4	182.5	182.7	184.2	184.8	183.4	181.5	180.7
Wall Temp. #2-F	183.4	182.4	181.5	182.9	182.8	183.7	184.7	184	182.2	181.6
Instream Temp.-F	174.5	175.8	175.2	176.5	175.6	175.6	176.7	175.8	175.9	176.2
Avg. Wall Temp.-F	182.8	182.4	181.8	183.2	183.3	183.1	184.4	183.5	182.4	183.9
Avg. Wall DT.-F	7.9	6.1	6.1	6.3	7.2	7	7.3	7.3	6	7.3
Remaining Subcool-F	-3.4									
Exit Quality	0.04	0.1	0.16	0.22	0.28	0.35	0.41	0.47	0.53	0.59
EXP. H-Btu/Hr/ft2/F	1253.2	1635.3	1633.2	1595	1386.5	1417.6	1367.8	1367.6	1659.2	1364.5
COMPUTED H										
Jallouk	1163	1147.9	1119.6	1115.9	1094.1	1081.6	1077.9	1082.6	129.5	129.5
Szady1(Cudo tube)	1693.4	1716.5	1709.6	1728.3	1717.2	1716.4	1726.2	1721.3	129.5	129.5
Szady2	1455.9	1526.9	1474.6	1535.2	1525.4	1522.4	1525.4	1524.5	129.5	129.5
(RLIQ)	68722	66021	61334	57729	52873	48522	44870	39930	39930	39930
(F)	1.405	1.822	2.168	2.425	2.668	2.875	3.044	3.236	3.236	3.236
(HLIQ)	184.8	239.9	285.6	319.6	351.4	378.6	401.2	426.3	426.3	426.3
(HBOIL)	1692.7	1714.9	1707	1724.7	1712.3	1710.2	1719	1712.6	1712.6	1712.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77									
DP Liquid Density-lbm/ft3	93.42									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.074	1.277	2.028	2.904	3.426					
Zero Corrections-psid	-0.209	-0.09	-0.044	0.062	-0.189					
Corrected DP-Psid	0.283	1.367	2.072	2.842	3.615					
Actual DP-ft	1.91	2.31	3.43	4.42	5.26					
Measured TP-Psig	152.7				0.3					
Measured Overall-ft	286.92									
Computed DP-ft	1.55	2.74	3.78	4.74	5.58					
Friction-ft	0.05	0.13	0.25	0.39	0.55					
Acceleration-ft	0.04	0.08	0.11	0.16	0.21					
Elevation-ft	1.45	2.53	3.42	4.19	4.82					

Run#	943									
Test Fluid	C4F10									
Date:	11/12/93									
Time:	16:26									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	150.2									
Sat. Temperature-F(inlet)	174.2									
Liq. Density-lbm/ft3	76.83	76.79	76.97	76.63	76.81	76.88	76.46	76.74	76.74	76.53
Latent Heat-Btu/lbm	25.79	25.76	25.9	25.63	25.77	25.83	25.51	25.72	25.72	25.56
Specific Heat-Btu/lbm/F	0.299	0.299	0.299	0.3	0.299	0.299	0.3	0.299	0.299	0.3
Liq. Viscosity-lbm/ft-hr	0.347	0.346	0.349	0.344	0.346	0.347	0.341	0.345	0.345	0.342
Liq. Conductivity-Btu/hr-ft-F	0.0219	0.0219	0.022	0.0218	0.0219	0.0219	0.0217	0.0218	0.0218	0.0217
Liq. Prandtl No.	4.74	4.74	4.74	4.73	4.74	4.74	4.73	4.74	4.74	4.73
Inlet Flow Rate-GPM	1.1									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	0.7									
Inlet Temperature-F	173.1									
Outlet Liq. Temperature-F	175.1									
Outlet Vap. Temperature-F	172.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	105.3									
Water outlet Temp.-F	154.4									
Inlet G-lbm/hr/ft2	205394		Temp	164.7	Density	78.24				
Subcooling-F	1.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	577	577	577	577	577	577	577	~~577~~	~~577~~	~~577~~
Heat Loss-Watts	12.9	3	4	4.2	4.1	3	2	2.8	3.5	20.6
Heat Flux-Btu/Hr/ft2	10002	10002	10002	10002	10002	10002	10002	~~10002~~	10002	~~10002~~
Wall Temp. #3-F	180.5	181.3	179.7	181.7	182	181.7	183.3	179.7	176.9	177.2
Wall Temp. #4-F	181.2	180.2	180.8	181.9	182.5	182.4	183.3	179.6	177.4	177.3
Wall Temp. #5-F	181.7	179.4	182.1	181.7	181.2	181	181.8	179	177.4	177.6
Wall Temp. #1-F	173.1	180.6	178.7	180.9	181.1	182.6	182.9	178.9	176.4	178.2
Wall Temp. #2-F	182	180.7	179.5	181.3	181.3	182.2	182.8	179.1	176.5	177.7
Instream Temp.-F	174.7	174.9	174.1	175.6	174.8	174.5	176.3	175.1	175.1	176
Avg. Wall Temp.-F	181.4	180.7	179.7	181.6	181.5	181.9	182.8	179.3	176.9	177.6
Avg. Wall DT.-F	6.2	5.3	5.1	5.5	6.3	7	5.1	3.7	1.4	1.1
Remaining Subcool-F	-8.5									
Exit Quality	0.1	0.21	0.32	0.43	0.54	0.65	0.76	~~0.87~~	0.99	0.99
EXP. H-Btu/Hr/ft2/F	1613.7	1870.2	1952.4	1819.2	1594.4	1434.4	1648.3	~~2697.4~~	~~7311.4~~	~~8712.6~~
COMPUTED H										
Jallouk	1258.8	1193.5	1164.7	1161.9	1143.9	80.5	80.5	80.5	80.5	80.5
Szady1(Cudo tube)	1705.6	1708.1	1699.7	1716.6	1708.2	80.5	80.5	80.5	80.5	80.5
Szady2	1469.7	1472.6	1462.8	1482.7	1472.8	80.5	80.5	80.5	80.5	80.5
(RLIQ)	36852	32868	28352	24443	19959	19959	19959	19959	19959	19959
(F)	1.679	2.277	2.727	3.059	3.389	3.389	3.389	3.389	3.389	3.389
(HLIQ)	137.3	186.2	222.8	250.3	277.2	277.2	277.2	277.2	277.2	277.2
(HBOIL)	1705.3	1707.4	1698.4	1714.8	1705.8	1705.8	1705.8	1705.8	1705.8	1705.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.3									
DP Liquid Density-lbm/ft3	93.53									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.1	1.611	2.546	3.585	4.218					
Zero Corrections-psid	-0.209	-0.09	-0.044	0.062	-0.189					
Corrected DP-Psid	0.309	1.701	2.59	3.523	4.407					
Actual DP-ft	1.86	1.69	2.46	3.15	3.78					
Measured TP-Psig	150.2				0.3					
Measured Overall-ft	282.04									
Computed DP-ft	1.26	2.13	2.82	3.39	4.12					
Friction-ft	0.02	0.07	0.13	0.19	0.24					
Acceleration-ft	0.02	0.04	0.07	0.11	0.14					
Elevation-ft	1.22	2.02	2.62	3.08	3.75					

Run#	944									
Test Fluid	C4F10									
Date:	11/15/93									
Time:	12:33									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	151.8									
Sat. Temperature-F(inlet)	174.9									
Liq. Density-lbm/ft3	76.79	76.72	76.63	76.23	76.34	76.42	76.08	76.37	76.34	76.3
Latent Heat-Btu/lbm	25.76	25.7	25.63	25.32	25.41	25.47	25.21	25.43	25.41	25.38
Specific Heat-Btu/lbm/F	0.299	0.299	0.3	0.301	0.301	0.3	0.301	0.301	0.301	0.301
Liq. Viscosity-lbm/ft-hr	0.346	0.345	0.344	0.338	0.34	0.341	0.336	0.34	0.34	0.339
Liq. Conductivity-Btu/hr-ft-F	0.0219	0.0218	0.0218	0.0215	0.0216	0.0216	0.0214	0.0216	0.0216	0.0216
Liq. Prandtl No.	4.74	4.74	4.73	4.73	4.73	4.73	4.73	4.73	4.73	4.73
Inlet Flow Rate-GPM	5.4									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2.7									
Inlet Temperature-F	174.1									
Outlet Liq. Temperature-F	175.9									
Outlet Vap. Temperature-F	173.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	103									
Water outlet Temp.-F	148.6									
Inlet G-lbm/hr/ft2	993120		Temp		170	Density	77.06			
Subcooling-F	0.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	877	867.8	874.6	870.4	874.6	877.3	869.7	195.4	53.8	59.8
Heat Loss-Watts	13.7	3.2	4.3	4.6	4.7	3.7	2.3	2.8	3.5	19.8
Heat Flux-Btu/Hr/ft2	15202	15043	15161	15088	15161	15207	15076	3387	933	1037
Wall Temp. #3-F	184.7	187	185.1	186.2	187.3	187.6	186.5	180	177.9	177.5
Wall Temp. #4-F	185.5	184.6	186.3	186.7	187.9	187.8	186.2	180.1	178.1	177.5
Wall Temp. #5-F	185.8	183.6	187.2	186.7	186.4	187.1	185.3	180	178.5	177.9
Wall Temp. #1-F	174.1	185.6	183.5	185.1	185.6	188.1	187.9	180.9	177.7	178.3
Wall Temp. #2-F	186.5	185.5	184.8	185.6	185.9	188.2	187.3	180.6	177.9	178
Instream Temp.-F	174.9	176.2	176.6	177.3	176.8	176.6	177.9	176.7	176.8	177
Avg. Wall Temp.-F	185.6	185.7	184.9	186.2	186.5	187.7	186.6	180.2	178	177.8
Avg. Wall DT.-F	10	9.8	8.6	8.2	9	10.5	8.1	3.3	1.2	0.8
Remaining Subcool-F	-2.2									
Exit Quality	0.03	0.06	0.09	0.13	0.16	0.2	0.23	0.24	0.24	0.25
EXP. H-Btu/Hr/ft2/F	1514.5	1535.7	1754.7	1841.5	1691.1	1453.5	1870.7	1012	791.8	1306.9
COMPUTED H										
Jallouk	1355.8	1286.4	1250.5	284	284	284	284.1	284	284	284
Szady1(Cudo tube)	2092.6	2088.1	2103.9	284	284	284	284.1	284	284	284
Szady2	2002.2	1991.9	2008.2	284	284	284	284.1	284	284	284
(RLIQ)	185390	180322	174470	174470	174470	174470	174470	174470	174470	174470
(F)	1.31	1.621	1.867	1.867	1.867	1.867	1.867	1.867	1.867	1.867
(HLIQ)	377.9	467.9	539.1	539.1	539.1	539.1	539.1	539.1	539.1	539.1
(HBOIL)	2088.5	2080.2	2092	2092	2092	2092	2092	2092	2092	2092
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.1									
DP Liquid Density-lbm/ft3	93.7									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.054	0.725	1.14	1.74	2.022					
Zero Corrections-psid	-0.209	-0.09	-0.044	0.062	-0.189					
Corrected DP-Psid	0.155	0.815	1.184	1.678	2.211					
Actual DP-ft	2.16	3.37	5.13	6.66	7.95					
Measured TP-Psig	151.8				0.3					
Measured Overall-ft	285.83									
Computed DP-ft	2.04	3.84	5.6	7.41	9.13					
Friction-ft	0.24	0.6	1.08	1.54	1.92					
Acceleration-ft	0.22	0.36	0.49	0.58	0.59					
Elevation-ft	1.58	2.88	4.04	5.29	6.63					

Run#	945									
Test Fluid	C4F10									
Date:	11/17/93									
Time:	9:21									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	151.9									
Sat. Temperature-F(inlet)	175									
Liq. Density-lbm/ft3	76.67	76.58	76.39	76.25	76.32	76.3	76.11	76.27	76.18	76.18
Latent Heat-Btu/lbm	25.67	25.59	25.45	25.34	25.4	25.38	25.23	25.36	25.29	25.29
Specific Heat-Btu/lbm/F	0.3	0.3	0.3	0.301	0.301	0.301	0.301	0.301	0.301	0.301
Liq. Viscosity-lbm/ft-hr	0.344	0.343	0.34	0.338	0.339	0.339	0.336	0.339	0.337	0.337
Liq. Conductivity-Btu/hr-ft-F	0.0218	0.0217	0.0216	0.0215	0.0216	0.0216	0.0214	0.0215	0.0215	0.0215
Liq. Prandtl No.	4.74	4.73	4.73	4.73	4.73	4.73	4.73	4.73	4.73	4.73
Inlet Flow Rate-GPM	4.6									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	174.5									
Outlet Liq. Temperature-F	176.7									
Outlet Vap. Temperature-F	173.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	107.6									
Water outlet Temp.-F	169.9									
Inlet G-lbm/hr/ft2	845243		Temp		170.3	Density	77			
Subcooling-F	0.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	868.7	871.1	867.5	870.3	862.7	862.5	340.2	44.4	26	41.1
Heat Loss-Watts	15.5	3.7	4.9	5.4	5.7	4.8	2.6	3.3	4.1	23.8
Heat Flux-Btu/Hr/ft2	15058	15100	15038	15086	14954	14951	5897	770	451	712
Wall Temp. #3-F	184.5	187.2	185.3	185.8	186.6	186.4	182.1	178.3	177.9	177.2
Wall Temp. #4-F	185.4	184.6	186.8	186.3	187.6	186.4	182.4	178.3	178.1	177.2
Wall Temp. #5-F	185.4	183.6	187.3	186.3	186.5	185.9	181.3	178.4	178.4	177.7
Wall Temp. #1-F	174.5	185.7	183.5	184.2	185.6	186.5	181.8	178.6	177.7	177.5
Wall Temp. #2-F	186.2	185.5	184.8	185.2	185.7	186.3	181.7	178.9	177.8	177.4
Instream Temp.-F	175.4	175.8	176.6	177.2	176.9	177	177.8	177.1	177.6	177.6
Avg. Wall Temp.-F	185.4	185.8	185.1	185.7	186.4	186.3	181.9	178.5	178	177.4
Avg. Wall DT.-F	9.3	9.3	7.8	7.8	8.8	8.6	3.8	1.4	0.5	0
Remaining Subcool-F	-3									
Exit Quality	0.03	0.08	0.12	0.16	0.2	0.24	0.26	0.26	0.26	0.26
EXP. H-Btu/Hr/ft2/F	1620.1	1629.3	1922.9	1942	1704.4	1733.6	1554.5	563.8	980.6	******
COMPUTED H										
Jallouk	1366.6	1328.6	1289.4	249.7	249.6	249.6	249.7	249.7	249.7	249.7
Szady1(Cudo tube)	2088.8	2098.7	2106.9	249.7	249.6	249.6	249.7	249.7	249.7	249.7
Szady2	1996.5	2005.8	2011.5	249.7	249.6	249.6	249.7	249.7	249.7	249.7
(RLIQ)	157747	152251	146813	146813	146813	146813	146813	146813	146813	146813
(F)	1.374	1.72	1.974	1.974	1.974	1.974	1.974	1.974	1.974	1.974
(HLIQ)	348.7	436.6	501.4	501.4	501.4	501.4	501.4	501.4	501.4	501.4
(HBOIL)	2085.5	2092.4	2097.4	2097.4	2097.4	2097.4	2097.4	2097.4	2097.4	2097.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76									
DP Liquid Density-lbm/ft3	93.57									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.069	0.778	1.266	2.034	2.314					
Zero Corrections-psid	0.015	0.031	-0.031	-0.014	0.091					
Corrected DP-Psid	-0.084	0.747	1.297	2.048	2.223					
Actual DP-ft	2.62	3.5	4.92	5.95	7.93					
Measured TP-Psig	151.9				0.3					
Measured Overall-ft	286.57									
Computed DP-ft	1.89	3.52	5.1	6.85	8.47					
Friction-ft	0.2	0.5	0.9	1.21	1.49					
Acceleration-ft	0.19	0.3	0.41	0.44	0.45					
Elevation-ft	1.51	2.72	3.78	5.2	6.53					

Run#	346									
Test Fluid	C4F10									
Date:	11/17/93									
Time:	9:21									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	149.4									
Sat. Temperature-F(inlet)	173.8									
Liq. Density-lbm/ft3	76.97	76.74	76.56	76.39	76.46	76.42	76.32	76.49	76.42	76.39
Latent Heat-Btu/lbm	25.9	25.72	25.58	25.45	25.51	25.47	25.4	25.52	25.47	25.45
Specific Heat-Btu/lbm/F	0.299	0.299	0.3	0.3	0.3	0.3	0.301	0.3	0.3	0.3
Liq. Viscosity-lbm/ft-hr	0.349	0.345	0.343	0.34	0.341	0.341	0.339	0.342	0.341	0.34
Liq. Conductivity-Btu/hr-ft-F	0.022	0.0218	0.0217	0.0216	0.0217	0.0216	0.0216	0.0217	0.0216	0.0216
Liq. Prandtl No.	4.74	4.74	4.73	4.73	4.73	4.73	4.73	4.73	4.73	4.73
Inlet Flow Rate-GPM	3.7									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	2									
Inlet Temperature-F	173									
Outlet Liq. Temperature-F	176.2									
Outlet Vap. Temperature-F	173									
Water Flow Rate-GPM										
Water Inlet Temp.-F	108.2									
Water outlet Temp.-F	168.7									
Inlet G-lbm/hr/ft2	681072		Temp	169.7	Density	77.13				
Subcooling-F	0.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	861.5	859.4	859	867.1	860.2	864.8	337.4	44.7	26.4	40.5
Heat Loss-Watts	15.5	3.7	5	5.5	5.8	4.9	2.6	3.3	4.2	24.2
Heat Flux-Btu/Hr/ft2	14934	14897	14890	15031	14911	14991	5849	775	458	702
Wall Temp. #3-F	183.4	186	184.4	185	185.9	185.7	181	177.4	177.3	176.7
Wall Temp. #4-F	184.2	183.6	185.8	185.6	187.1	185.9	181.2	177.4	177.5	176.8
Wall Temp. #5-F	184.5	182.7	186.7	185.6	185.8	185.3	180.6	177.9	177.9	177.3
Wall Temp. #1-F	173	184.6	182.6	183.6	184.8	185.9	180.8	177.9	176.7	177
Wall Temp. #2-F	185	184.5	183.9	184.4	184.9	185.7	180.8	177.9	176.8	176.6
Instream Temp.-F	174.1	175.1	175.9	176.6	176.3	176.5	176.9	176.2	176.5	176.6
Avg. Wall Temp.-F	184.3	184.7	184.2	185	185.7	185.7	180.9	177.7	177.2	176.9
Avg. Wall DT.-F	9.5	8.9	7.6	7.7	8.7	8.5	3.7	1.5	0.7	0.2
Remaining Subcool-F	-3.5									
Exit Quality	0.04	0.09	0.14	0.19	0.24	0.29	0.31	0.31	0.32	0.32
EXP. H-Btu/Hr/ft2/F	1571.9	1673.5	1958.7	1959.5	1718.6	1759	1574	528.9	636.2	2827.7
COMPUTED H										
Jallouk	1393.5	1366.3	1329.9	210	210	210	210	210	210	210
Szady1(Cudo tube)	2062.9	2074.6	2086	210	210	210	210	210	210	210
Szady2	1966.8	1977.5	1988.1	210	210	210	210	210	210	210
(RLIQ)	125189	120591	115068	115068	115068	115068	115068	115068	115068	115068
(F)	1.411	1.794	2.081	2.081	2.081	2.081	2.081	2.081	2.081	2.081
(HLIQ)	300.8	382.8	444.3	444.3	444.3	444.3	444.3	444.3	444.3	444.3
(HBOIL)	2060.7	2070.2	2079.2	2079.2	2079.2	2079.2	2079.2	2079.2	2079.2	2079.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	74.5									
DP Liquid Density-lbm/ft3	93.78									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.011	0.926	1.524	2.383	2.71					
Zero Corrections-psid	0.015	0.031	-0.031	-0.014	0.091					
Corrected DP-Psid	-0.026	0.895	1.555	2.377	2.619					
Actual DP-ft	2.5	3.22	4.43	5.34	7.19					
Measured TP-Psig	149.4				0.3					
Measured Overall-ft	281.06									
Computed DP-ft	1.74	3.21	4.59	6.22	7.73					
Friction-ft	0.14	0.37	0.68	0.91	1.12					
Acceleration-ft	0.14	0.23	0.32	0.35	0.35					
Elevation-ft	1.47	2.61	3.58	4.96	6.26					

Run#	947									
Test Fluid	C4F10									
Date:	11/17/93									
Time:	9:21									
Note	Analytical dl is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	147.4									
Sat. Temperature-F(inlet)	172.8									
Liq. Density-lbm/ft3	77.18	76.74	76.79	76.63	76.74	76.72	76.51	76.67	76.65	76.6
Latent Heat-Btu/lbm	26.05	25.72	25.76	25.63	25.72	25.7	25.54	25.67	25.65	25.61
Specific Heat-Btu/lbm/F	0.298	0.299	0.299	0.3	0.299	0.299	0.3	0.3	0.3	0.3
Liq. Viscosity-lbm/ft-hr	0.352	0.345	0.346	0.344	0.345	0.345	0.342	0.344	0.344	0.343
Liq. Conductivity-Btu/hr-ft-F	0.0221	0.0218	0.0219	0.0218	0.0218	0.0218	0.0217	0.0218	0.0218	0.0217
Liq. Prandtl No.	4.74	4.74	4.74	4.73	4.74	4.74	4.73	4.74	4.73	4.73
Inlet Flow Rate-GPM	2.8									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	1.8									
Inlet Temperature-F	172.1									
Outlet Liq. Temperature-F	174.5									
Outlet Vap. Temperature-F	172.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	100.9									
Water outlet Temp.-F	167									
Inlet G-lbm/hr/ft2	517811		Temp	168.1	Density	77.49				
Subcooling-F	0.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	873.1	870.2	878.2	881.3	865.2	860.6	343.6	45.1	26.5	40.4
Heat Loss-Watts	15.4	3.6	4.9	5.5	5.7	4.7	2.6	3.3	4.2	24.4
Heat Flux-Btu/Hr/ft2	15135	15084	15223	15277	14998	14918	5956	782	459	700
Wall Temp. #3-F	182.4	185.1	183.3	184.1	184.8	184.4	180.7	176.6	176.2	176.2
Wall Temp. #4-F	183.4	182.7	184.8	184.6	185.8	184.5	180.9	176.5	176.6	176.2
Wall Temp. #5-F	183.8	181.8	185.9	185	184.7	183.7	179.9	176.9	177.1	176.8
Wall Temp. #1-F	172.1	183.4	181.5	182.8	183.7	184.5	180.2	176.8	176.1	176.6
Wall Temp. #2-F	184.1	183.4	182.8	183.4	183.8	184.4	180.2	177.1	176.1	176.4
Instream Temp.-F	173.2	175.1	174.9	175.6	175.1	175.2	176.1	175.4	175.5	175.7
Avg. Wall Temp.-F	183.4	183.7	183.1	184.1	184.5	184.3	180.4	176.8	176.4	176.4
Avg. Wall DT.-F	9.5	7.9	7.5	7.8	8.7	8.4	4	1.4	0.9	0.7
Remaining Subcool-F	-5									
Exit Quality	0.06	0.12	0.19	0.26	0.32	0.39	0.42	0.42	0.42	0.42
EXP. H-Btu/Hr/ft2/F	1586.3	1917.1	2026.5	1949.9	1719.5	1775.8	1485	572.9	510.8	988.6
COMPUTED H										
Jallouk	1442.8	1404.3	1394.7	168.6	168.6	168.6	168.6	168.6	168.6	168.6
Szady1(Cudo tube)	2064.5	2086.4	2094.4	168.6	168.6	168.6	168.6	168.6	168.6	168.6
Szady2	1972.1	1994.6	2004	168.6	168.6	168.6	168.6	168.6	168.6	168.6
(RLIQ)	93549	89226	82570	82570	82570	82570	82570	82570	82570	82570
(F)	1.506	1.952	2.291	2.291	2.291	2.291	2.291	2.291	2.291	2.291
(HLIQ)	257.7	334.6	392.6	392.6	392.6	392.6	392.6	392.6	392.6	392.6
(HBOIL)	2063.1	2083.5	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8	2089.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.1									
DP Liquid Density-lbm/ft3	93.41									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.024	1.113	1.834	2.754	3.183					
Zero Corrections-psid	0.015	0.031	-0.031	-0.014	0.091					
Corrected DP-Psid	0.009	1.082	1.865	2.768	3.092					
Actual DP-ft	2.42	2.84	3.81	4.55	6.23					
Measured TP-Psig	147.4				0.3					
Measured Overall-ft	276.52									
Computed DP-ft	1.57	2.83	3.99	5.35	6.75					
Friction-ft	0.1	0.27	0.5	0.69	0.84					
Acceleration-ft	0.1	0.17	0.25	0.27	0.28					
Elevation-ft	1.37	2.39	3.23	4.39	5.63					

Run#	348									
Test Fluid	C4F10									
Date:	11/17/93									
Time:	9:21									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	146.1									
Sat. Temperature-F(inlet)	172.2									
Liq. Density-lbm/ft3	77.38	76.77	76.81	76.74	76.77	76.74	76.63	76.77	76.7	76.65
Latent Heat-Btu/lbm	26.21	25.74	25.77	25.72	25.74	25.72	25.63	25.74	25.68	25.65
Specific Heat-Btu/lbm/F	0.297	0.299	0.299	0.299	0.299	0.299	0.3	0.299	0.3	0.3
Liq. Viscosity-lbm/ft-hr	0.355	0.346	0.346	0.345	0.346	0.345	0.344	0.346	0.345	0.344
Liq. Conductivity-Btu/hr-ft-F	0.0222	0.0218	0.0219	0.0218	0.0218	0.0218	0.0218	0.0218	0.0218	0.0218
Liq. Prandtl No.	4.75	4.74	4.74	4.74	4.74	4.74	4.73	4.74	4.74	4.73
Inlet Flow Rate-GPM	2									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	1.2									
Inlet Temperature-F	171.5									
Outlet Liq. Temperature-F	175.1									
Outlet Vap. Temperature-F	172.4									
Water Flow Rate-GPM										
Water Inlet Temp.-F	104.7									
Water outlet Temp.-F	165.4									
Inlet G-lbm/hr/ft2	372610		Temp	165.5	Density	78.07				
Subcooling-F	0.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	871.1	882.8	862.8	854.9	858.8	858.6	44.3	41.7	26.3	39
Heat Loss-Watts	15.9	3.8	5.1	5.7	6	5.8	2.4	3.6	4.4	25.6
Heat Flux-Btu/Hr/ft2	15100	15303	14956	14819	14887	14883	768	723	456	676
Wall Temp. #3-F	181.8	184.7	182.8	183.1	183.9	192.3	176.3	176	175.9	175.7
Wall Temp. #4-F	182.8	182.1	184.3	183.6	185.1	192	176.4	176.2	176.2	175.7
Wall Temp. #5-F	183.1	181.3	185.2	183.7	183.8	185.4	176.5	176.3	176.7	176.5
Wall Temp. #1-F	171.5	182.9	181.2	182	182.9	184.7	176.7	176.1	175.7	175.9
Wall Temp. #2-F	183.5	182.8	182.5	182.5	183.1	184.5	176.8	176.3	175.7	176
Instream Temp.-F	172.3	175	174.8	175.1	176	175.1	175.6	175	175.3	175.6
Avg. Wall Temp.-F	182.8	183.1	182.7	183.1	183.7	188.6	176.5	176.2	176	176
Avg. Wall DT.-F	9.8	7.4	7.2	7.3	8.1	12.8	0.9	1.1	0.7	0.4
Remaining Subcool-F	-7.3									
Exit Quality	0.08	0.17	0.27	0.36	0.45	0.54	0.54	0.55	0.55	0.55
EXP. H-Btu/Hr/ft2/F	1538	2058.6	2070.3	2021.6	1848.8	1160.3	848.2	630	633.7	1574.2
COMPUTED H										
Jallouk	1482	1467.2	1409.3	129.6	129.6	129.6	129.6	129.6	129.6	129.6
Szady1(Cudo tube)	2050.4	2099.2	2073.9	129.6	129.6	129.6	129.6	129.6	129.6	129.6
Szady2	1956.4	2012.9	1978.7	129.6	129.6	129.6	129.6	129.6	129.6	129.6
(RLIQ)	65878	61432	54868	54868	54868	54868	54868	54868	54868	54868
(F)	1.627	2.159	2.556	2.556	2.556	2.556	2.556	2.556	2.556	2.556
(HLIQ)	213.8	284.3	336.6	336.6	336.6	336.6	336.6	336.6	336.6	336.6
(HBOIL)	2049.6	2097.5	2070.9	2070.9	2070.9	2070.9	2070.9	2070.9	2070.9	2070.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	124.7									
DP Liquid Density-lbm/ft3	85.94									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.049	1.352	2.199	3.214	3.73					
Zero Corrections-psid	0.015	0.031	-0.031	-0.014	0.091					
Corrected DP-Psid	0.034	1.321	2.23	3.228	3.639					
Actual DP-ft	2.18	2	2.54	2.9	4.23					
Measured TP-Psig	146.1				0.3					
Measured Overall-ft	273.91									
Computed DP-ft	1.39	2.44	3.36	4.73	6.02					
Friction-ft	0.06	0.18	0.34	0.44	0.54					
Acceleration-ft	0.06	0.12	0.19	0.2	0.2					
Elevation-ft	1.26	2.14	2.83	4.1	5.28					

Run#	949									
Test Fluid	C4F10									
Date:	11/17/93									
Time:	15:51									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	145.4									
Sat. Temperature-F(inlet)	171.8									
Liq. Density-lbm/ft3	77	76.7	76.77	76.65	76.72	76.67	76.51	76.63	76.58	76.56
Latent Heat-Btu/lbm	25.91	25.68	25.74	25.65	25.7	25.67	25.54	25.63	25.59	25.58
Specific Heat-Btu/lbm/F	0.299	0.3	0.299	0.3	0.299	0.3	0.3	0.3	0.3	0.3
Liq. Viscosity-lbm/ft-hr	0.349	0.345	0.346	0.344	0.345	0.344	0.342	0.344	0.343	0.343
Liq. Conductivity-Btu/hr-ft-F	0.022	0.0218	0.0218	0.0218	0.0218	0.0218	0.0217	0.0218	0.0217	0.0217
Liq. Prandtl No.	4.74	4.74	4.74	4.73	4.74	4.74	4.73	4.73	4.73	4.73
Inlet Flow Rate-GPM	1.1									
Outlet Liq. Flow Rate-GPM	0.7									
Outlet Vap. Flow Rate-GPM	0.9									
Inlet Temperature-F	171.2									
Outlet Liq. Temperature-F	175.8									
Outlet Vap. Temperature-F	172.8									
Water Flow Rate-GPM										
Water Inlet Temp.-F	109.8									
Water outlet Temp.-F	168.7									
Inlet G-lbm/hr/ft2	202777		Temp	169.2	Density	77.25				
Subcooling-F	0.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	874.8	866.3	898.4	894.8	328.6	57.1	47.5	42.9	26.9	41.4
Heat Loss-Watts	15.5	3.6	4.9	5.6	5.2	3.6	2.4	3.6	4.4	25.5
Heat Flux-Btu/Hr/ft2	15164	15017	15573	15511	5696	990	823	744	466	718
Wall Temp. #3-F	181	183.7	181.6	183.8	180.3	176.7	177.2	176.8	176.6	176.3
Wall Temp. #4-F	182.1	181.4	183.3	184.2	180.4	177.5	177.3	176.7	177.1	176.3
Wall Temp. #5-F	182.4	180.3	184.3	183	179.8	176.7	177.3	176.8	177.3	176.9
Wall Temp. #1-F	171.2	181.8	180.4	181.7	179.7	177.4	177.2	176.8	176.4	176.3
Wall Temp. #2-F	182.8	181.9	181.7	182.4	179.6	176.7	177.3	177.2	176.5	176.5
Instream Temp.-F	174	175.3	175	175.5	175.2	175.4	176.1	175.6	175.8	175.9
Avg. Wall Temp.-F	182.1	182.2	181.8	183.2	179.9	177.1	177.3	176.9	176.8	176.5
Avg. Wall DT.-F	7.4	6.2	6	7	4.4	1.6	1.1	1.2	1	0.5
Remaining Subcool-F	-14									
Exit Quality	0.16	0.33	0.5	0.68	0.74	0.75	0.76	0.77	0.78	0.78
EXP. H-Btu/Hr/ft2/F	2052.1	2413.7	2575.7	2224.1	1289.4	607.1	733.3	606.4	486.3	1360.3
COMPUTED H										
Jallouk	1626.4	1563.6	79.6	79.7	79.6	79.6	79.7	79.7	79.7	79.7
Szady1(Cudo tube)	2076	2083	79.6	79.7	79.6	79.6	79.7	79.7	79.7	79.7
Szady2	1986.2	1991.5	79.6	79.7	79.6	79.6	79.7	79.7	79.7	79.7
(RLIQ)	34932	29035	29035	29035	29035	29035	29035	29035	29035	29035
(F)	1.903	2.643	2.643	2.643	2.643	2.643	2.643	2.643	2.643	2.643
(HLIQ)	153.9	214	214	214	214	214	214	214	214	214
(HBOIL)	2075.7	2082.3	2082.3	2082.3	2082.3	2082.3	2082.3	2082.3	2082.3	2082.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	74.2									
DP Liquid Density-lbm/ft3	93.83									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.065	1.622	2.67	3.758	4.346					
Zero Corrections-psid	0.015	0.031	-0.031	-0.014	0.091					
Corrected DP-Psid	0.05	1.591	2.701	3.772	4.255					
Actual DP-ft	2.36	1.91	2.27	2.71	4.1					
Measured TP-Psig	145.4				0.3					
Measured Overall-ft	272.93									
Computed DP-ft	1.13	1.84	2.78	4.01	5.16					
Friction-ft	0.03	0.09	0.14	0.17	0.21					
Acceleration-ft	0.03	0.08	0.09	0.09	0.09					
Elevation-ft	1.07	1.68	2.55	3.74	4.86					

Run#	950									
Test Fluid	C4F10									
Date:	11/17/93									
Time:	15:51									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	148.6									
Sat. Temperature-F(inlet)	173.4									
Liq. Density-lbm/ft3	77.09	76.88	76.7	76.44	76.49	76.49	76.34	76.46	76.44	76.53
Latent Heat-Btu/lbm	25.98	25.83	25.68	25.49	25.52	25.52	25.41	25.51	25.49	25.56
Specific Heat-Btu/lbm/F	0.298	0.299	0.3	0.3	0.3	0.3	0.301	0.3	0.3	0.3
Liq. Viscosity-lbm/ft-hr	0.35	0.347	0.345	0.341	0.342	0.342	0.34	0.341	0.341	0.342
Liq. Conductivity-Btu/hr-ft-F	0.022	0.0219	0.0218	0.0216	0.0217	0.0217	0.0216	0.0217	0.0216	0.0217
Liq. Prandtl No.	4.74	4.74	4.74	4.73	4.73	4.73	4.73	4.73	4.73	4.73
Inlet Flow Rate-GPM	5.4									
Outlet Liq. Flow Rate-GPM	1.1									
Outlet Vap. Flow Rate-GPM	2.8									
Inlet Temperature-F	172.8									
Outlet Liq. Temperature-F	175.8									
Outlet Vap. Temperature-F	173									
Water Flow Rate-GPM										
Water Inlet Temp.-F	114.2									
Water outlet Temp.-F	167.3									
Inlet G-lbm/hr/ft2	992828		Temp	170.1	Density	77.04				
Subcooling-F	0.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1154	1156.6	1150.3	206.1	47.1	61.3	53.5	56.9	57.4	83.8
Heat Loss-Watts	15.6	3.7	4.9	4.7	4.5	3.3	2.1	3.3	4.3	24.6
Heat Flux-Btu/Hr/ft2	20004	20049	19940	3573	816	1063	927	986	995	1453
Wall Temp. #3-F	183.3	187.5	183.8	179.6	177.3	177.3	177.6	177.4	177.7	177.2
Wall Temp. #4-F	184.8	183.7	186	179.6	177.5	178.2	177.8	177.5	178	177.4
Wall Temp. #5-F	184.6	182.4	185.5	179	177.4	177.4	177.8	177.7	178.3	177.4
Wall Temp. #1-F	172.8	184.5	182.5	179.2	177.5	177.9	177.8	177.4	177.4	177.1
Wall Temp. #2-F	185.6	184.6	184	179.5	177.4	177.2	177.7	177.6	177.4	177
Instream Temp.-F	173.6	174.5	175.3	176.4	176.2	176.2	176.8	176.3	176.4	176
Avg. Wall Temp.-F	184.6	185.1	184.1	179.4	177.5	177.7	177.7	177.5	177.8	177.2
Avg. Wall DT.-F	10.1	9.7	7.9	2.8	1.2	1.5	0.9	1.2	1.3	1.2
Remaining Subcool-F	-3.3									
Exit Quality	0.04	0.08	0.13	0.14	0.14	0.14	0.14	0.15	0.15	0.15
EXP. H-Btu/Hr/ft2/F	1986.3	2073.5	2532.4	1281.2	673	731.8	1032.6	839.1	756.6	1258.4
COMPUTED H										
Jallouk	1552	283.8	283.8	283.9	283.9	283.9	283.9	283.9	283.9	283.9
Szady1(Cudo tube)	2379.3	283.8	283.8	283.9	283.9	283.9	283.9	283.9	283.9	283.9
Szady2	2328	283.8	283.8	283.9	283.9	283.9	283.9	283.9	283.9	283.9
(RLIQ)	181812	181812	181812	181812	181812	181812	181812	181812	181812	181812
(F)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
(HLIQ)	403.5	403.5	403.5	403.5	403.5	403.5	403.5	403.5	403.5	403.5
(HBOIL)	2375.4	2375.4	2375.4	2375.4	2375.4	2375.4	2375.4	2375.4	2375.4	2375.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	73.3									
DP Liquid Density-lbm/ft3	93.95									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.12	0.593	1.115	1.678	1.797					
Zero Corrections-psid	0.015	0.031	-0.031	-0.014	0.091					
Corrected DP-Psid	-0.135	0.562	1.146	1.692	1.706					
Actual DP-ft	2.71	3.85	5.21	6.64	8.91					
Measured TP-Psig	148.6				0.3					
Measured Overall-ft	279.03									
Computed DP-ft	2.03	3.86	5.71	7.55	9.27					
Friction-ft	0.27	0.63	0.95	1.26	1.57					
Acceleration-ft	0.28	0.38	0.39	0.4	0.41					
Elevation-ft	1.48	2.85	4.37	5.89	7.3					

Run#	351									
Test Fluid	C4F10									
Date:	11/17/93									
Time:	16:50									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	147.8									
Sat. Temperature-F(inlet)	173									
Liq. Density-lbm/ft3	77.22	76.95	76.72	76.53	76.56	76.6	76.42	76.56	76.53	76.58
Latent Heat-Btu/lbm	26.09	25.88	25.7	25.56	25.58	25.61	25.47	25.58	25.56	25.59
Specific Heat-Btu/lbm/F	0.298	0.299	0.299	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Liq. Viscosity-lbm/ft-hr	0.352	0.348	0.345	0.342	0.343	0.343	0.341	0.343	0.342	0.343
Liq. Conductivity-Btu/hr-ft-F	0.0221	0.022	0.0218	0.0217	0.0217	0.0217	0.0216	0.0217	0.0217	0.0217
Liq. Prandtl No.	4.74	4.74	4.74	4.73	4.73	4.73	4.73	4.73	4.73	4.73
Inlet Flow Rate-GPM	4.5									
Outlet Liq. Flow Rate-GPM	1									
Outlet Vap. Flow Rate-GPM	2.4									
Inlet Temperature-F	172									
Outlet Liq. Temperature-F	175.7									
Outlet Vap. Temperature-F	172.7									
Water Flow Rate-GPM										
Water Inlet Temp.-F	112.5									
Water outlet Temp.-F	168.1									
Inlet G-lbm/hr/ft2	829301		Temp	169.3	Density	77.22				
Subcooling-F	1									
Flow Observation										

	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1154	1154	1154	175	50	50	50	50	50	50
Heat Loss-Watts	14.4	3.4	4.6	4.2	3.9	2.8	1.8	2.9	3.8	21.9
Heat Flux-Btu/Hr/ft2	20004	20004	20004	3034	867	867	867	867	867	867
Wall Temp. #3-F	182.9	187.1	183.3	179	177	177.1	177.5	177.1	177.5	177.3
Wall Temp. #4-F	184.5	183.3	185.7	179	177.4	178	177.6	177.5	177.9	177.4
Wall Temp. #5-F	184.3	181.8	184.8	178.5	177.3	177.2	177.6	177.6	178.1	177.4
Wall Temp. #1-F	172	184.1	182.1	178.9	177.3	177.6	177.8	177.1	177.3	177.3
Wall Temp. #2-F	185.3	184.4	183.5	178.9	177	177	177.6	177.5	177.4	177.2
Instream Temp.-F	173	174.2	175.2	176	175.9	175.7	176.5	175.9	176	175.8
Avg. Wall Temp.-F	184.3	184.7	183.7	178.9	177.3	177.5	177.6	177.4	177.6	177.3
Avg. Wall DT.-F	10.3	9.6	7.5	2.7	1.3	1.7	1.1	1.4	1.6	1.5
Remaining Subcool-F	-3.7									
Exit Quality	0.04	0.1	0.15	0.16	0.16	0.16	0.17	0.17	0.17	0.17
EXP. H-Btu/Hr/ft2/F	1933.5	2079.2	2650.9	1118.2	661.2	499.3	801.9	610	541.4	585.3
COMPUTED H										
Jallouk	1594.4	245.7	245.8	245.8	245.8	245.8	245.8	245.8	245.8	245.8
Szady1(Cudo tube)	2369.9	245.7	245.8	245.8	245.8	245.8	245.8	245.8	245.8	245.8
Szady2	2316.9	245.7	245.8	245.8	245.8	245.8	245.8	245.8	245.8	245.8
(RLIQ)	150693	150693	150693	150693	150693	150693	150693	150693	150693	150693
(F)	1.426	1.426	1.426	1.426	1.426	1.426	1.426	1.426	1.426	1.426
(HLIQ)	355.6	355.6	355.6	355.6	355.6	355.6	355.6	355.6	355.6	355.6
(HBOIL)	2367.3	2367.3	2367.3	2367.3	2367.3	2367.3	2367.3	2367.3	2367.3	2367.3

	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10
DP liquid Temp.-F	72.9				
DP Liquid Density-lbm/ft3	94.01				
Elevation-ft	2	4	6	8	9.875
Measured DP-Psid	-0.055	0.739	1.345	1.982	2.169
Zero Corrections-psid	0.015	0.031	-0.031	-0.014	0.091
Corrected DP-Psid	-0.07	0.708	1.376	1.996	2.078
Actual DP-ft	2.59	3.58	4.78	6.07	8.22
Measured TP-Psig	147.8				0.3
Measured Overall-ft	277.36				
Computed DP-ft	1.86	3.55	5.29	7.03	8.66
Friction-ft	0.21	0.49	0.73	0.98	1.21
Acceleration-ft	0.21	0.3	0.3	0.31	0.32
Elevation-ft	1.44	2.77	4.26	5.75	7.14

Run#	952									
Test Fluid	C4F10									
Date:	11/17/93									
Time:	17:47									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	147.8									
Sat. Temperature-F(inlet)	173									
Liq. Density-lbm/ft3	77.09	76.67	76.6	76.46	76.58	76.58	76.37	76.56	76.53	76.49
Latent Heat-Btu/lbm	25.98	25.67	25.61	25.51	25.59	25.59	25.43	25.58	25.56	25.52
Specific Heat-Btu/lbm/F	0.298	0.3	0.3	0.3	0.3	0.3	0.301	0.3	0.3	0.3
Liq. Viscosity-lbm/ft-hr	0.35	0.344	0.343	0.341	0.343	0.343	0.34	0.343	0.342	0.342
Liq. Conductivity-Btu/hr-ft-F	0.022	0.0218	0.0217	0.0217	0.0217	0.0217	0.0216	0.0217	0.0217	0.0217
Liq. Prandtl No.	4.74	4.74	4.73	4.73	4.73	4.73	4.73	4.73	4.73	4.73
Inlet Flow Rate-GPM	3.7									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	2									
Inlet Temperature-F	172.5									
Outlet Liq. Temperature-F	175.3									
Outlet Vap. Temperature-F	172.6									
Water Flow Rate-GPM										
Water Inlet Temp.-F	110.5									
Water outlet Temp.-F	168.7									
Inlet G-lbm/hr/ft2	680872		Temp		169.8	Density	77.11			
Subcooling-F	0.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1155.2	1151.8	1155.2	198.5	49	63.5	55.2	58.2	57.7	87.1
Heat Loss-Watts	14.5	3.4	4.6	4.3	3.9	2.9	1.9	2.9	3.9	22.3
Heat Flux-Btu/Hr/ft2	20025	19966	20025	3441	849	1101	957	1009	1000	1510
Wall Temp. #3-F	183.1	187.5	183.7	179.5	177	177	177.8	177.3	177.6	177.5
Wall Temp. #4-F	184.8	183.5	186	179.5	177.3	177.9	177.9	177.3	178	177.8
Wall Temp. #5-F	184.6	182	185.1	178.8	177.1	177.1	177.9	177.4	178.3	177.7
Wall Temp. #1-F	172.5	184.4	182.3	179.1	177.5	177.6	177.9	177.4	177.5	177.2
Wall Temp. #2-F	185.4	184.6	183.9	179.3	177.2	176.9	177.9	177.7	177.5	177.3
Instream Temp.-F	173.6	175.4	175.7	176.3	175.8	175.8	176.7	175.9	176	176.2
Avg. Wall Temp.-F	184.5	185	184	179.2	177.3	177.4	177.9	177.4	177.8	177.5
Avg. Wall DT.-F	10	8.7	7.4	2.8	1.4	1.6	1.1	1.5	1.7	1.2
Remaining Subcool-F	-5.3									
Exit Quality	0.06	0.13	0.19	0.21	0.21	0.21	0.21	0.22	0.22	0.23
EXP. H-Btu/Hr/ft2/F	2008.5	2295.5	2717	1242.4	591.2	710	841.7	684.2	576.5	1225.7
COMPUTED H										
Jallouk	1671.2	209.9	209.9	210	209.9	209.9	210	209.9	209.9	209.9
Szady1(Cuido tube)	2379.5	209.9	209.9	210	209.9	209.9	210	209.9	209.9	209.9
Szady2	2328.5	209.9	209.9	210	209.9	209.9	210	209.9	209.9	209.9
(RLIQ)	123293	123293	123293	123293	123293	123293	123293	123293	123293	123293
(F)	1.519	1.519	1.519	1.519	1.519	1.519	1.519	1.519	1.519	1.519
(HLIQ)	323.6	323.6	323.6	323.6	323.6	323.6	323.6	323.6	323.6	323.6
(HBOIL)	2377.5	2377.5	2377.5	2377.5	2377.5	2377.5	2377.5	2377.5	2377.5	2377.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	72.4									
DP Liquid Density-lbm/ft3	94.08									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.01	0.927	1.646	2.386	2.656					
Zero Corrections-psid	0.015	0.031	-0.031	-0.014	0.091					
Corrected DP-Psid	-0.005	0.896	1.677	2.4	2.565					
Actual DP-ft	2.47	3.23	4.22	5.32	7.32					
Measured TP-Psig	147.8				0.3					
Measured Overall-ft	277.7									
Computed DP-ft	1.7	3.25	4.9	6.54	8.08					
Friction-ft	0.16	0.39	0.58	0.77	0.95					
Acceleration-ft	0.17	0.24	0.25	0.25	0.26					
Elevation-ft	1.36	2.63	4.08	5.52	6.87					

Run#	953									
Test Fluid	C4F10									
Date:	11/17/93									
Time:	17:47									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	146.6									
Sat. Temperature-F(inlet)	172.4									
Liq. Density-lbm/ft3	77.4	76.77	76.79	76.56	76.7	76.74	76.46	76.67	76.7	76.56
Latent Heat-Btu/lbm	26.23	25.74	25.76	25.58	25.68	25.72	25.51	25.67	25.68	25.58
Specific Heat-Btu/lbm/F	0.297	0.299	0.299	0.3	0.3	0.299	0.3	0.3	0.3	0.3
Liq. Viscosity-lbm/ft-hr	0.355	0.346	0.346	0.343	0.345	0.345	0.341	0.344	0.345	0.343
Liq. Conductivity-Btu/hr-ft-F	0.0222	0.0218	0.0219	0.0217	0.0218	0.0218	0.0217	0.0218	0.0218	0.0217
Liq. Prandtl No.	4.75	4.74	4.74	4.73	4.74	4.74	4.73	4.74	4.74	4.73
Inlet Flow Rate-GPM	2.8									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	2.1									
Inlet Temperature-F	171.5									
Outlet Liq. Temperature-F	175.1									
Outlet Vap. Temperature-F	171.9									
Water Flow Rate-GPM										
Water Inlet Temp.-F	110.9									
Water outlet Temp.-F	168									
Inlet G-lbm/hr/ft2	518853		Temp		167.4	Density		77.65		
Subcooling-F	0.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1151.6	1148.3	1157.2	203.7	48.1	62.4	54.6	57.9	57.2	86.7
Heat Loss-Watts	14.5	3.4	4.6	4.3	3.9	2.8	1.9	2.9	3.8	22.5
Heat Flux-Btu/Hr/ft2	19962	19905	20059	3531	834	1082	946	1004	992	1503
Wall Temp. #3-F	182.5	186.7	182.9	179.5	176.7	176.6	177.5	177	177	177.4
Wall Temp. #4-F	184	182.7	185.4	179.5	176.9	177.4	177.6	177	177.5	177.8
Wall Temp. #5-F	183.9	181.3	184.4	178.8	176.6	176.6	177.6	177	177.8	177.7
Wall Temp. #1-F	171.5	183.5	181.6	178.9	177.3	177.1	177.8	177	177	177.3
Wall Temp. #2-F	184.8	183.8	183	179.3	176.8	176.6	177.6	177.2	177	177.4
Instream Temp.-F	172.2	175	174.9	175.9	175.3	175.1	176.3	175.4	175.3	175.9
Avg. Wall Temp.-F	183.8	184.2	183.2	179.2	176.9	176.9	177.6	177	177.3	177.5
Avg. Wall DT.-F	10.7	8.3	7.4	3.1	1.6	1.8	1.3	1.6	1.9	1.6
Remaining Subcool-F	-6.6									
Exit Quality	0.08	0.16	0.25	0.26	0.27	0.27	0.28	0.28	0.29	0.29
EXP. H-Btu/Hr/ft2/F	1866	2405.3	2704	1133.4	533.7	609	741	629.4	517.7	968.3
COMPUTED H										
Jallouk	1727.6	168.9	168.9	168.9	168.9	168.9	168.9	168.9	168.9	168.9
Szady1(Cudo tube)	2355.2	168.9	168.9	168.9	168.9	168.9	168.9	168.9	168.9	168.9
Szady2	2299	168.9	168.9	168.9	168.9	168.9	168.9	168.9	168.9	168.9
(RLIQ)	92003	92003	92003	92003	92003	92003	92003	92003	92003	92003
(F)	1.595	1.595	1.595	1.595	1.595	1.595	1.595	1.595	1.595	1.595
(HLIQ)	273.1	273.1	273.1	273.1	273.1	273.1	273.1	273.1	273.1	273.1
(HBOIL)	2353.9	2353.9	2353.9	2353.9	2353.9	2353.9	2353.9	2353.9	2353.9	2353.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.5									
DP Liquid Density-lbm/ft3	93.64									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.049	1.108	1.922	2.744	3.083					
Zero Corrections-psid	0.015	0.031	-0.031	-0.014	0.091					
Corrected DP-Psid	0.034	1.077	1.953	2.758	2.992					
Actual DP-ft	2.38	2.87	3.67	4.6	6.45					
Measured TP-Psig	146.6				0.3					
Measured Overall-ft	275.19									
Computed DP-ft	1.52	2.92	4.46	6	7.44					
Friction-ft	0.11	0.27	0.4	0.53	0.66					
Acceleration-ft	0.12	0.17	0.18	0.19	0.19					
Elevation-ft	1.29	2.48	3.88	5.28	6.58					

Run#	354									
Test Fluid	C4F10									
Date:	11/17/93									
Time:	17:47									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	146.1									
Sat. Temperature-F(inlet)	172.2									
Liq. Density-lbm/ft3	77.22	76.65	76.77	76.56	76.63	76.67	76.49	76.7	76.65	76.49
Latent Heat-Btu/lbm	26.09	25.65	25.74	25.58	25.63	25.67	25.52	25.68	25.65	25.52
Specific Heat-Btu/lbm/F	0.298	0.3	0.299	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Liq. Viscosity-lbm/ft-hr	0.352	0.344	0.346	0.343	0.344	0.344	0.342	0.345	0.344	0.342
Liq. Conductivity-Btu/hr-ft-F	0.0221	0.0218	0.0218	0.0217	0.0218	0.0218	0.0217	0.0218	0.0218	0.0217
Liq. Prandtl No.	4.74	4.73	4.74	4.73	4.73	4.74	4.73	4.74	4.73	4.73
Inlet Flow Rate-GPM	2									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	1.3									
Inlet Temperature-F	171.7									
Outlet Liq. Temperature-F	175.2									
Outlet Vap. Temperature-F	172.3									
Water Flow Rate-GPM										
Water Inlet Temp.-F	109.7									
Water outlet Temp.-F	168.6									
Inlet G-lbm/hr/ft2	372191		Temp	165.9	Density	77.98				
Subcooling-F	0.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1153.7	1155.4	1155.9	198.3	47.6	61.7	55.8	57.9	56.8	85.7
Heat Loss-Watts	14.5	3.4	4.6	4.3	3.9	2.9	1.9	2.9	3.9	22.6
Heat Flux-Btu/Hr/ft2	19999	20028	20037	3437	825	1070	967	1004	985	1486
Wall Temp. #3-F	182.5	186.8	183.7	179.3	177	176.9	177.4	177.1	177.2	177.5
Wall Temp. #4-F	184	182.8	186.1	179.3	177	177.7	177.5	176.9	177.8	178
Wall Temp. #5-F	183.9	181.4	185	178.7	176.9	176.8	177.5	177	178.1	177.9
Wall Temp. #1-F	171.7	183.7	181.9	178.9	177.2	177.4	177.6	177.1	177.2	177.4
Wall Temp. #2-F	184.8	183.9	183.4	179.3	177.1	176.7	177.5	177.3	177.3	177.5
Instream Temp.-F	173	175.5	175	175.9	175.6	175.4	176.2	175.3	175.6	176.2
Avg. Wall Temp.-F	183.8	184.3	183.8	179.1	177.1	177.2	177.5	177.1	177.5	177.7
Avg. Wall DT.-F	9.9	7.9	7.9	3	1.4	1.8	1.3	1.7	2	1.4
Remaining Subcool-F	-10.1									
Exit Quality	0.12	0.24	0.36	0.38	0.39	0.39	0.4	0.4	0.41	0.42
EXP. H-Btu/Hr/ft2/F	2020.8	2536.8	2546.1	1147.8	584.1	610.6	769.9	578.6	498.4	1066.5
COMPUTED H										
Jallouk	1776	129.5	129.5	129.5	129.5	129.5	129.5	129.5	129.5	129.5
Szady1(Cudo tube)	2368.5	129.5	129.5	129.5	129.5	129.5	129.5	129.5	129.5	129.5
Szady2	2315.3	129.5	129.5	129.5	129.5	129.5	129.5	129.5	129.5	129.5
(RLIQ)	65123	65123	65123	65123	65123	65123	65123	65123	65123	65123
(F)	1.752	1.752	1.752	1.752	1.752	1.752	1.752	1.752	1.752	1.752
(HLIQ)	230.1	230.1	230.1	230.1	230.1	230.1	230.1	230.1	230.1	230.1
(HBOIL)	2367.8	2367.8	2367.8	2367.8	2367.8	2367.8	2367.8	2367.8	2367.8	2367.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	73.5									
DP Liquid Density-lbm/ft3	93.93									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.074	1.366	2.293	3.224	3.66					
Zero Corrections-psid	0.015	0.031	-0.031	-0.014	0.091					
Corrected DP-Psid	0.059	1.335	2.324	3.238	3.569					
Actual DP-ft	2.34	2.4	2.99	3.73	5.41					
Measured TP-Psig	146.1				0.3					
Measured Overall-ft	274.5									
Computed DP-ft	1.33	2.41	3.84	5.26	6.59					
Friction-ft	0.07	0.19	0.28	0.37	0.45					
Acceleration-ft	0.08	0.13	0.13	0.14	0.14					
Elevation-ft	1.17	2.09	3.42	4.76	6					

Run#	955									
Test Fluid	C4F10									
Date:	11/17/93									
Time:	17:47									
Note	Analytical dt is used									
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	145									
Sat. Temperature-F(inlet)	171.6									
Liq. Density-lbm/ft3	77.04	76.81	76.88	76.65	76.81	76.79	76.56	76.77	76.72	76.63
Latent Heat-Btu/lbm	25.95	25.77	25.83	25.65	25.77	25.76	25.58	25.74	25.7	25.63
Specific Heat-Btu/lbm/F	0.298	0.299	0.299	0.3	0.299	0.299	0.3	0.299	0.299	0.3
Liq. Viscosity-lbm/ft-hr	0.35	0.346	0.347	0.344	0.346	0.346	0.343	0.346	0.345	0.344
Liq. Conductivity-Btu/hr-ft-F	0.022	0.0219	0.0219	0.0218	0.0219	0.0219	0.0217	0.0218	0.0218	0.0218
Liq. Prandtl No.	4.74	4.74	4.74	4.73	4.74	4.74	4.73	4.74	4.74	4.73
Inlet Flow Rate-GPM	1.2									
Outlet Liq. Flow Rate-GPM	0.9									
Outlet Vap. Flow Rate-GPM	0.8									
Inlet Temperature-F	170.5									
Outlet Liq. Temperature-F	175.1									
Outlet Vap. Temperature-F	172.2									
Water Flow Rate-GPM										
Water Inlet Temp.-F	110.2									
Water outlet Temp.-F	166.9									
Inlet G-lbm/hr/ft2	223252		Temp		166	Density	77.96			
Subcooling-F	1.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	1156.5	1159	1157.5	207.3	46.4	61.1	54.6	57.9	56.8	86.2
Heat Loss-Watts	14.1	3.4	4.6	4.2	3.8	2.8	1.9	2.9	3.8	22
Heat Flux-Btu/Hr/ft2	20047	20091	20065	3593	804	1059	946	1004	981	1494
Wall Temp. #3-F	181.7	186.6	184.1	179	176.5	176.5	177.2	176.8	177	176.8
Wall Temp. #4-F	183.1	182.6	186.4	179.1	176.4	177.3	177.3	176.5	177.4	177.2
Wall Temp. #5-F	182.8	180.7	184.2	178.3	176.2	176.4	177.1	176.5	177.8	177.1
Wall Temp. #1-F	170.5	183	181.8	178.4	176.9	176.9	177.1	176.7	177	176.4
Wall Temp. #2-F	183.7	183.3	183.2	178.8	176.6	176.2	177.3	177.1	177.1	176.6
Instream Temp.-F	173.8	174.8	174.5	175.5	174.8	174.9	175.9	175	175.2	175.6
Avg. Wall Temp.-F	182.8	183.9	183.9	178.7	176.5	176.8	177.2	176.7	177.3	176.8
Avg. Wall DT.-F	8.1	8.2	8.5	3	1.7	1.8	1.3	1.7	2	1.2
Remaining Subcool-F	-16.5									
Exit Quality	0.19	0.39	0.6	0.63	0.64	0.65	0.66	0.67	0.68	0.7
EXP. H-Btu/Hr/ft2/F	2469.2	2459.9	2369.4	1183	476.3	579.7	752.8	599.3	486.8	1296.5
COMPUTED H										
Jallouk	1912.2	86	86	86	86	86	86	86	86	86
✓ Szady1(Cudo tube)	2382.7	86	86	86	86	86	86	86	86	86
✓ Szady2	2332.7	86	86	86	86	86	86	86	86	86
(RLIQ)	37805	37805	37805	37805	37805	37805	37805	37805	37805	37805
(F)	1.988	1.988	1.988	1.988	1.988	1.988	1.988	1.988	1.988	1.988
(HLIQ)	173.6	173.6	173.6	173.6	173.6	173.6	173.6	173.6	173.6	173.6
(HBOIL)	2382.4	2382.4	2382.4	2382.4	2382.4	2382.4	2382.4	2382.4	2382.4	2382.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	74.7									
DP Liquid Density-lbm/ft3	93.75									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.147	1.654	2.667	3.78	4.342					
Zero Corrections-psid	0.015	0.031	-0.031	-0.014	0.091					
Corrected DP-Psid	0.132	1.623	2.698	3.794	4.251					
Actual DP-ft	2.2	1.84	2.27	2.66	4.09					
Measured TP-Psig	145				0.3					
Measured Overall-ft	271.93									
Computed DP-ft	1.09	1.87	3.15	4.42	5.61					
Friction-ft	0.04	0.11	0.15	0.19	0.23					
Acceleration-ft	0.05	0.09	0.09	0.09	0.1					
Elevation-ft	1.01	1.68	2.91	4.13	5.27					

Run#	956									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/7/83									
Time:	13:05									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	76.7									
Sat. Temperature-F(inlet)	130.5									
Inlet Flowrate-GPM	4.8									
Inlet Temperature-F	129.1									
Inlet G-lbm/hr/ft2	987868		Temp	124.2	Density	86.24				
Subcooling-F	1.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	290.3	290.8	281.1	288.7	284.5	288.9	290.7	289.1	289.8	287.3
Heat Loss-Watts	7.8	1.6	2.1	2.3	2.1	1.5	1.1	1.5	1.9	10.6
Heat Flux-Btu/Hr/ft2	5032	5041	4873	4970	4932	5008	5039	5011	5023	4980
Wall Temp. #3-F	139.7	137.3	136.7	138.7	138.1	137	137.7	135	134.7	134.5
Wall Temp. #4-F	140	136.9	137.2	138.6	138	137.7	137.7	135.7	135.1	135.9
Wall Temp. #5-F	140.8	136.6	137.9	138.5	137.4	136.8	137.3	135.1	134.6	134.2
Wall Temp. #1-F	129.1	137.5	135.7	138.3	137.3	137.3	138.6	135.6	134	134.9
Wall Temp. #2-F	140.9	137.5	136.2	138.3	137.3	137.1	138.4	136.1	134.4	134.9
Instream Temp.-F	129.4	128.8	128.3	130	129.2	128.5	129	127.7	127.6	127.9
Avg. Wall Temp.-F	140.4	137.3	136.5	138.5	137.5	137.2	137.9	135.5	134.6	134.9
Avg. Wall DT.-F	10.7	8.3	7.9	8.3	8.1	8.5	8.7	7.6	6.7	6.8
EXP. H-Btu/Hr/ft2/F	469.3	609.4	614.5	596.7	610.6	591	578.4	661.7	746.1	737.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.3									
DP Liquid Density-lbm/ft3	92.91									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.28	0.37	0.606	1.114	1.126					
Zero Corrections-psid	-0.316	-0.008	-0.04	-0.055	-0.324					
Corrected DP-Psid	0.036	0.378	0.646	1.169	1.45					
Actual DP-ft	2.09	3.68	5.39	6.67	8.22					

Run#	957									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/7/93									
Time:	13:05									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	77.6									
Sat. Temperature-F(inlet)	131.1									
Inlet Flowrate-GPM	3.6									
Inlet Temperature-F	130.4									
Inlet G-lbm/hr/ft2	739682		Temp	125.1	Density	86.1				
Subcooling-F	0.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	289.1	290.7	289.1	288.1	285.7	288.9	289.4	288.7	290.4	286.7
Heat Loss-Watts	7.6	1.6	2.2	2.3	2.2	1.6	1.1	1.5	1.9	11
Heat Flux-Btu/Hr/ft2	5011	5039	5011	4959	4952	5008	5017	4970	5034	4970
Wall Temp. #3-F	139.9	138.7	138.5	140.1	139.7	138.6	139.5	136.6	136.3	136.4
Wall Temp. #4-F	140.5	138.2	138.9	140.2	139.5	139.3	139.7	137.1	136.7	137.9
Wall Temp. #5-F	141	138	139.3	140.1	138.8	138.5	139.2	136.5	136.4	136.2
Wall Temp. #1-F	130.4	138.7	137.3	139.5	138.9	138.9	140.1	137.5	135.7	136.4
Wall Temp. #2-F	141.1	138.9	137.9	139.5	139	138.6	140.2	138	136.1	136.4
Instream Temp.-F	131.2	130.6	130.2	131.5	130.6	129.9	130.5	129.1	129.2	129.9
Avg. Wall Temp.-F	140.6	138.6	138.2	140	139.1	138.8	139.7	137.1	136.2	136.7
Avg. Wall DT.-F	9.2	7.8	7.7	8.3	8.2	8.7	9	7.8	6.8	6.5
EXP. H-Btu/Hr/ft2/F	544.8	646.3	648.8	601.1	602	575.7	558.6	635.9	738.9	760.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	72.3									
DP Liquid Density-lbm/ft3	93.25									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.181	0.622	1.013	1.67	1.804					
Zero Corrections-psid	-0.316	-0.006	-0.04	-0.055	-0.324					
Corrected DP-Psid	0.135	0.628	1.053	1.725	2.128					
Actual DP-ft	1.94	3.28	4.74	5.78	7.14					

Run#	958									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/7/93									
Time:	13:06									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	77.8									
Sat. Temperature-F(inlet)	131.3									
Inlet Flowrate-GPM	2.4									
Inlet Temperature-F	130.8									
Inlet G-lbm/hr/ft2	493282		Temp	124.9	Density	86.13				
Subcooling-F	0.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	286.2	288.2	288.4	285.3	284.3	287.4	286.8	284.2	290.8	285.9
Heat Loss-Watts	7.6	1.7	2.2	2.4	2.3	1.7	1.1	1.6	2	11.6
Heat Flux-Btu/Hr/ft2	4961	4998	4999	4945	4928	4982	4971	4926	5041	4956
Wall Temp. #3-F	139.8	138.8	139.1	140.3	140.5	139.7	140.2	137.5	137.2	137.2
Wall Temp. #4-F	140.1	138.5	139.3	140.3	140.3	140.3	140.3	138.1	137.6	138.7
Wall Temp. #5-F	140.9	138.2	140	140.5	139.4	139.4	139.8	137.5	137.2	137.1
Wall Temp. #1-F	130.8	138.9	137.5	140	139.3	139.7	140.7	138.4	136.8	137
Wall Temp. #2-F	141	139.1	138.1	140	139.3	139.6	140.8	139	137	137.2
Instream Temp.-F	131.5	131.1	130.2	131.7	130.9	130.5	131	129.6	129.7	130.3
Avg. Wall Temp.-F	140.5	138.8	138.5	140.3	139.6	139.8	140.4	138.1	137.1	137.4
Avg. Wall DT.-F	8.7	7.5	8.1	8.4	8.5	9	9.1	8.3	7.2	6.9
EXP. H-Btu/Hr/ft2/F	568.6	668.2	619.2	592.2	583.1	550.5	544.2	595.2	700.9	716.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	71									
DP Liquid Density-lbm/ft3	93.39									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.078	0.876	1.422	2.217	2.472					
Zero Corrections-psid	-0.316	-0.006	-0.04	-0.055	-0.324					
Corrected DP-Psid	0.238	0.882	1.462	2.272	2.796					
Actual DP-ft	1.77	2.86	4.06	4.88	6.03					

Run#	959									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/7/93									
Time:	13:05									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	76.5									
Sat. Temperature-F(inlet)	130.4									
Inlet Flowrate-GPM	4.7									
Inlet Temperature-F	129									
Inlet G-lbm/hr/ft2	970854		Temp	122.2	Density	86.56				
Subcooling-F	1.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	580.9	578.8	578.9	580.1	582	581.9	584.9	580.3	576.8	577.5
Heat Loss-Watts	8.9	2	2.7	2.8	2.7	2	1.3	1.9	2.4	13.7
Heat Flux-Btu/Hr/ft2	10070	10033	10035	10056	10089	10087	10139	10059	9998	10011
Wall Temp. #3-F	140.5	140.9	139.7	141.8	141.9	141.2	141.7	138.7	138	137.7
Wall Temp. #4-F	141.2	139.2	140.7	142.1	141.9	141.6	141.7	139.4	138.8	141.5
Wall Temp. #5-F	141.7	138.3	141.7	142.2	140.5	140.8	140.8	138.1	137.6	136.6
Wall Temp. #1-F	129	140.1	138	140.5	140.2	141.2	142.2	139.4	136.7	136.5
Wall Temp. #2-F	142.4	140.1	138.8	140.9	140.6	141.5	142.5	140.3	137.6	137.4
Instream Temp.-F	129.5	128.7	128.1	129.9	128.8	128.3	128.8	127.4	127.4	127.5
Avg. Wall Temp.-F	141.5	140.1	139.3	141.7	140.8	141.2	141.8	139.2	137.7	137.9
Avg. Wall DT.-F	11.5	10.9	10.7	11.3	11.5	12.4	12.5	11.3	9.9	10
EXP. H-Btu/Hr/ft2/F	876	918.7	933.6	890.2	873.9	810.6	809.7	888.2	1011.2	1002.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.9									
DP Liquid Density-lbm/ft3	92.38									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.247	0.518	0.884	1.413	1.413					
Zero Corrections-psid	-0.316	-0.008	-0.04	-0.055	-0.324					
Corrected DP-Psid	0.069	0.524	0.924	1.468	1.737					
Actual DP-ft	2.02	3.4	4.87	6.1	7.65					

Run#	960									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/7/93									
Time:	13:05									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	76.1									
Sat. Temperature-F(inlet)	130.1									
Inlet Flowrate-GPM	3.6									
Inlet Temperature-F	129									
Inlet G-lbm/hr/ft2	743768		Temp	122.1	Density	86.57				
Subcooling-F	1.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	579.2	576.5	579.3	579.4	582.9	582	582.2	577.8	576.7	578
Heat Loss-Watts	7.9	1.7	2.3	2.5	2.4	1.8	1.2	1.7	2.1	12.5
Heat Flux-Btu/Hr/ft2	10040	9993	10042	10044	10104	10089	10082	10016	9997	10019
Wall Temp. #3-F	140.6	140.8	139.6	141.6	142.1	141.5	142	138.9	138.4	138.9
Wall Temp. #4-F	141.3	139.2	140.8	141.8	142.2	142.1	142.1	140.2	139.2	142.6
Wall Temp. #5-F	141.8	138.6	141.7	142.1	141	141.3	141.3	138.9	138.1	137.5
Wall Temp. #1-F	129	139.9	137.6	140.5	140.2	141.4	142.9	139.8	137.2	137.8
Wall Temp. #2-F	142.1	140	138.5	140.9	140.3	141.5	142.8	140.6	138	138.6
Instream Temp.-F	129.6	128.7	128	129.8	128.9	128.3	128.6	127.5	127.4	128.2
Avg. Wall Temp.-F	141.5	140	139.1	141.5	140.9	141.6	142.2	139.7	138.2	139.1
Avg. Wall DT.-F	11.5	10.8	10.7	11.2	11.6	12.8	13.2	11.7	10.8	10.4
EXP. H-Btu/Hr/ft2/F	873.3	923.3	941	893.1	873.4	787	766.6	854.1	967.9	960.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.7									
DP Liquid Density-lbm/ft3	92.87									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.123	0.815	1.36	1.999	2.137					
Zero Corrections-psid	-0.316	-0.006	-0.04	-0.055	-0.324					
Corrected DP-Psid	0.193	0.821	1.4	2.054	2.461					
Actual DP-ft	1.82	2.93	4.11	5.17	6.5					

Run#	961									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/7/93									
Time:	17:31									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	76.9									
Sat. Temperature-F(inlet)	130.6									
Inlet Flowrate-GPM	2.4									
Inlet Temperature-F	129.2									
Inlet G-lbm/hr/ft2	496116		Temp	121.8	Density	88.62				
Subcooling-F	1.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	574.4	573.1	570.5	567.5	567.2	568	571.7	570.3	567.9	566.4
Heat Loss-Watts	9.4	2.2	2.9	3	3	2.2	1.5	2.1	2.7	15.8
Heat Flux-Btu/Hr/ft2	9957	9934	9889	9837	9832	9846	9910	9886	9844	9818
Wall Temp. #3-F	140	141.2	140.1	141.9	142.8	142.6	142.9	140.2	139.7	140
Wall Temp. #4-F	141	139.6	141.3	142.1	142.8	143.2	143.3	141.4	140.5	143.5
Wall Temp. #5-F	141.5	139.1	142.4	142.6	141.7	142.3	142.2	140	139.4	138.8
Wall Temp. #1-F	129.2	140.5	138.3	140.7	140.9	142.3	143.5	141.1	138.3	138.4
Wall Temp. #2-F	141.7	140.5	139.4	141.1	140.9	142.3	143.8	142.2	139	139.3
Instream Temp.-F	130.2	130	129.4	130.8	130	129.6	130.2	128.8	129	129.8
Avg. Wall Temp.-F	141.1	140.6	139.8	141.8	141.6	142.6	143.1	141	138.4	140
Avg. Wall DT.-F	10.4	10	9.9	10.6	11.1	12.6	12.5	11.7	9.9	9.8
EXP. H-Btu/Hr/ft2/F	957.4	993.3	996.1	929.8	883.3	784.2	793.3	842.5	990.8	1006.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	72.7									
DP Liquid Density-lbm/ft3	93.21									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.003	1.099	1.753	2.61	2.874					
Zero Corrections-psid	-0.316	-0.006	-0.04	-0.055	-0.324					
Corrected DP-Psid	0.319	1.105	1.793	2.665	3.198					
Actual DP-ft	1.62	2.47	3.48	4.18	5.31					

Run#	962									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/8/93									
Time:	10:00									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	78.8									
Sat. Temperature-F(inlet)	132									
Inlet Flowrate-GPM	4.8									
Inlet Temperature-F	129.5									
Inlet G-lbm/hr/ft2	988052		Temp	124.1	Density	86.26				
Subcooling-F	2.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	870.9	872	865.5	867.1	863.1	864.6	862.7	867.8	872.8	869.5
Heat Loss-Watts	7.8	1.7	2.3	2.5	2.5	1.9	1.2	1.7	2	11.9
Heat Flux-Btu/Hr/ft2	15096	15118	15003	15031	14961	14967	14954	15043	15129	15072
Wall Temp. #3-F	143.1	145.3	142.8	145.6	146.7	146.6	146.1	142.8	140.6	140.9
Wall Temp. #4-F	144	142.4	144.4	148	146.6	146.6	146.2	144.2	142.7	147.3
Wall Temp. #5-F	144.4	141.4	145.1	148	144.7	145.6	145.5	142.2	140.7	138.8
Wall Temp. #1-F	129.5	143.5	140.8	144.3	144.8	148	147.6	143.6	140.1	138.8
Wall Temp. #2-F	145.4	143.3	141.9	144.5	144.9	146.6	147.8	144.9	141	140.4
Instream Temp.-F	130.2	130.1	129.7	132	130.8	130.1	130.8	129.2	129.3	129.4
Avg. Wall Temp.-F	144.2	143.6	142.5	145.6	145.3	146.2	146.6	143.5	141	141.2
Avg. Wall DT.-F	13.3	12.8	12.1	12.8	13.8	15.4	15.2	13.7	11	11.2
EXP. H-Btu/Hr/ft2/F	1131.4	1177.1	1240.2	1174.7	1096.2	971.8	986.2	1101.2	1370.9	1360.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.8									
DP Liquid Density-lbm/ft3	92.16									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.228	0.483	0.879	1.324	1.322					
Zero Corrections-psid	-0.252	-0.033	-0.037	-0.051	-0.325					
Corrected DP-Psid	0.024	0.516	0.916	1.375	1.647					
Actual DP-ft	2.1	3.41	4.88	6.25	7.8					

Run#	963									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/8/93									
Time:	10:00									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	77.6									
Sat. Temperature-F(inlet)	131.1									
Inlet Flowrate-GPM	3.6									
Inlet Temperature-F	128.9									
Inlet G-lbm/hr/ft2	742953		Temp	122.7	Density	86.48				
Subcooling-F	2.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	861.3	864.5	860	863.2	858.2	857.3	861.3	858.1	862.7	864.3
Heat Loss-Watts	8.1	1.9	2.6	2.7	2.7	2	1.3	1.9	2.3	13.3
Heat Flux-Btu/Hr/ft2	14930	14986	14908	14963	14876	14861	14930	14875	14954	14982
Wall Temp. #3-F	141.5	144.3	142.5	143.9	145.7	145.5	144.9	142.8	140.1	140.9
Wall Temp. #4-F	142.4	141.3	144.3	144.5	145.8	145.9	145.5	143.9	142.8	147.2
Wall Temp. #5-F	143	140.5	145.1	144.9	144.1	145	144.5	142	140.5	138.8
Wall Temp. #1-F	128.9	142.1	140.1	142.9	143.5	145.1	146.3	143.2	139.6	138.6
Wall Temp. #2-F	143.3	142.1	141.6	143.3	143.6	145.5	145.5	144.5	140.7	139.9
Instream Temp.-F	129.7	129.9	129.5	130.8	130	129.4	130.1	128.8	128.7	129.3
Avg. Wall Temp.-F	142.6	142.5	142.1	144.1	144.8	145.4	145.5	143.2	140.6	141.1
Avg. Wall DT.-F	12.2	11.9	12	12.8	13.6	15.3	14.8	13.7	11.3	11.1
EXP. H-Btu/Hr/ft2/F	1226.3	1262.2	1247.4	1190	1095.6	971.1	1011.2	1085.1	1327.8	1349.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.2									
DP Liquid Density-lbm/ft3	92.81									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.069	0.83	1.389	2.035	2.232					
Zero Corrections-psid	-0.252	-0.033	-0.037	-0.051	-0.325					
Corrected DP-Psid	0.183	0.863	1.426	2.088	2.557					
Actual DP-ft	1.84	2.86	4.06	5.11	6.34					

Run#	964									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/8/93									
Time:	10:00									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	78									
Sat. Temperature-F(inlet)	131.4									
Inlet Flowrate-GPM	2.4									
Inlet Temperature-F	129.4									
Inlet G-lbm/hr/ft2	495302		Temp	122.7	Density	86.48				
Subcooling-F	2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	866	866	866	866	866	866	866	866	866	866
Heat Loss-Watts	8	1.8	2.5	2.7	2.7	2	1.4	2	2.3	14
Heat Flux-Btu/Hr/ft2	15012	15012	15012	15012	15012	15012	15012	15012	15012	15012
Wall Temp. #3-F	141.4	144.1	142	144	145.3	145.8	148.1	143.5	141.8	142.9
Wall Temp. #4-F	142.6	141.3	143.9	144.4	145.6	145.9	148.7	145.1	143.8	148.3
Wall Temp. #5-F	143.1	140.4	145	144.7	144	144.9	145.6	143	141.3	140.1
Wall Temp. #1-F	129.4	142	139.9	143.6	143.4	145	147.3	144.4	140.5	139.8
Wall Temp. #2-F	143.4	141.9	141.3	143.7	143.5	145.4	147.5	145.6	141.6	141.3
Instream Temp.-F	130	130.4	129.7	131.3	130.6	130.1	131.2	129.6	129.7	130.4
Avg. Wall Temp.-F	142.6	142.3	141.8	144.2	144.1	145.4	146.6	144.3	141.6	142.4
Avg. Wall DT.-F	11.9	11.2	11.4	12.2	12.8	14.6	14.8	14	11.2	11.3
EXP. H-Btu/Hr/ft2/F	1256.6	1334.8	1317.2	1230.8	1168.5	1026.7	1016.9	1069.1	1337.7	1330.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	24.1									
DP Liquid Density-lbm/ft3	97.45									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.049	1.181	1.933	2.784	3.09					
Zero Corrections-psid	-0.252	-0.033	-0.037	-0.051	-0.325					
Corrected DP-Psid	0.301	1.214	1.97	2.785	3.415					
Actual DP-ft	1.75	2.49	3.48	4.38	5.44					

Run#	965									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/8/83									
Time:	10:00									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	109.1									
Sat. Temperature-F(inlet)	150.3									
Inlet Flowrate-GPM	5									
Inlet Temperature-F	148.9									
Inlet G-lbm/hr/ft2	985369		Temp	145.7	Density	82.58				
Subcooling-F	1.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	860.3	870.6	868.5	868.8	871.5	869.9	871.1	860.6	874.7	867.6
Heat Loss-Watts	10	2.3	3.1	3.2	3.2	2.5	1.6	2.3	2.9	16.4
Heat Flux-Btu/Hr/ft2	14913	15091	15020	15025	15107	15079	15100	14918	15162	15039
Wall Temp. #3-F	161.7	164.1	162	163.4	165.1	165.7	165.3	162.6	161	160.7
Wall Temp. #4-F	162.6	161.4	163.6	163.8	165.6	165.6	165.5	163.9	162.5	167.1
Wall Temp. #5-F	162.9	160.1	164.4	164.3	163.9	165.2	164.8	162.1	160.8	159.4
Wall Temp. #1-F	148.9	162.1	159.8	162.6	163	165.5	166.7	163.2	160	158.7
Wall Temp. #2-F	164.5	162	161.2	162.8	163.1	165.8	166.8	164.4	160.8	160.7
Instream Temp.-F	149.5	149.7	149.7	151.1	150.3	149.9	151.2	149.7	149.5	150.6
Avg. Wall Temp.-F	162.9	162.4	161.7	163.6	163.9	165.6	165.8	163.2	161	161.3
Avg. Wall DT.-F	12.8	12	11.3	11.7	12.9	14.9	13.9	12.9	10.8	10
EXP. H-Btu/Hr/ft2/F	1169.5	1255.7	1332.6	1279.2	1169.5	1010.8	1086.5	1159.5	1389.4	1497.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.5									
DP Liquid Density-lbm/ft3	92.2									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.185	0.524	0.88	1.468	1.589					
Zero Corrections-psid	-0.252	-0.033	-0.037	-0.051	-0.325					
Corrected DP-Psid	0.067	0.557	0.917	1.517	1.914					
Actual DP-ft	2.12	3.49	5.1	6.29	7.89					

Run#	968									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/8/93									
Time:	16:15									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	108.7									
Sat. Temperature-F(inlet)	150.1									
Inlet Flowrate-GPM	3.7									
Inlet Temperature-F	148.5									
Inlet G-lbm/hr/ft2	730445		Temp	144.9	Density	82.72				
Subcooling-F	1.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	859.4	867.5	864.9	864.7	865.8	865.6	867.3	855	872.1	868.8
Heat Loss-Watts	9.2	2.2	3	3	3.1	2.3	1.5	2.2	2.8	15.6
Heat Flux-Btu/Hr/ft2	14897	15038	14992	14989	15008	15005	15034	14821	15117	15025
Wall Temp. #3-F	160.8	163.9	162.3	163.3	165.1	165.8	164.7	162.9	161.5	161
Wall Temp. #4-F	161.9	161.1	163.9	163.8	165.6	165.8	164.9	164.1	163	168.7
Wall Temp. #5-F	162	160	164.8	164.1	164	165.5	164.3	162.4	161.3	159.4
Wall Temp. #1-F	148.5	161.9	159.9	162.2	163	165.8	165.9	163.3	160.3	158.3
Wall Temp. #2-F	163.1	161.9	161.4	162.7	163.2	168	166	164.6	161.3	160.7
Instream Temp.-F	149.5	150.1	150.5	151.1	150.6	150.3	151.1	150.1	150	150.9
Avg. Wall Temp.-F	162	162.2	161.9	163.4	164	165.7	165.2	163.5	161.5	161.2
Avg. Wall DT.-F	11.8	11.4	10.7	11.6	12.7	14.7	13.4	12.7	10.8	9.6
EXP. H-Btu/Hr/ft2/F	1265	1316.7	1401.5	1296.2	1184.4	1020.9	1123.6	1167.9	1400.2	1558.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.2									
DP Liquid Density-lbm/ft3	92.7									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.057	0.813	1.337	2.088	2.368					
Zero Corrections-psid	-0.252	-0.033	-0.037	-0.051	-0.325					
Corrected DP-Psid	0.195	0.846	1.374	2.137	2.693					
Actual DP-ft	1.9	3.01	4.38	5.24	6.38					

Run#	967									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/8/93									
Time:	16:15									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	107.3									
Sat. Temperature-F(inlet)	149.3									
Inlet Flowrate-GPM	2.5									
Inlet Temperature-F	148.1									
Inlet G-lbm/hr/ft2	495146		Temp	143.4	Density	82.99				
Subcooling-F	1.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	863.3	870.1	884	862.1	868.9	862.9	868.7	869.1	862.1	57.8
Heat Loss-Watts	10.6	2.5	3.4	3.5	3.5	2.6	1.7	2.6	3.8	14.7
Heat Flux-Btu/Hr/ft2	14965	15083	14977	14944	15027	14958	15024	15065	14944	1002
Wall Temp. #3-F	159.5	162.9	160.8	161.6	163.7	164.8	164	162.7	180.4	151.9
Wall Temp. #4-F	160.8	160	162.4	162.2	164.1	164.8	164.5	163.7	180	152.4
Wall Temp. #5-F	160.8	158.9	164.1	162.7	162.5	163.6	163.4	161.9	160.5	152.7
Wall Temp. #1-F	148.1	160.6	158.7	160.9	161.5	163.9	164.9	163.2	159.4	156.3
Wall Temp. #2-F	161.6	160.4	160.1	161.3	161.7	164.1	165	164.3	160.4	156.4
Instream Temp.-F	148.9	150.1	149.7	150.7	150.1	149.8	150.8	149.8	149.6	150.6
Avg. Wall Temp.-F	160.7	161	160.6	161.9	162.6	164.2	164.4	163.2	168.1	153.9
Avg. Wall DT.-F	11.1	10.2	10.1	10.5	11.7	13.7	12.9	12.7	17.9	9.9
EXP. H-Btu/Hr/ft2/F	1348.3	1479.6	1479.5	1426.7	1287.6	1091.9	1166.3	1188.2	836.5	304.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.1									
DP Liquid Density-lbm/ft3	92.71									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.039	1.154	1.848	2.774	3.264					
Zero Corrections-psid	-0.252	-0.033	-0.037	-0.051	-0.325					
Corrected DP-Psid	0.291	1.187	1.885	2.825	3.589					
Actual DP-ft	1.73	2.41	3.43	4.04	4.8					

Run#	968									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/9/83									
Time:	12:16									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	106.2									
Sat. Temperature-F(inlet)	148.7									
Inlet Flowrate-GPM	4.9									
Inlet Temperature-F	147.8									
Inlet G-lbm/hr/ft2	971319		Temp	143	Density	83.06				
Subcooling-F	0.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	583.2	579.7	579.2	576.6	579.1	578.1	580.8	580.1	575.2	581
Heat Loss-Watts	10	2.3	3.1	3.2	3.2	2.3	1.4	2.1	2.8	15.9
Heat Flux-Btu/Hr/ft2	10109	10049	10040	9995	10038	10021	10068	10056	9971	10071
Wall Temp. #3-F	159	160.1	159.1	160.3	161.2	161	158.1	157.9	157.6	157.1
Wall Temp. #4-F	159.5	158.4	160.2	160.7	161.4	161.1	157.9	157.8	158.7	160.9
Wall Temp. #5-F	159.8	157.8	161.4	160.7	160.3	160.5	158.4	157.3	157.5	158.1
Wall Temp. #1-F	147.8	159.2	157.5	159.3	159.6	161.2	161.1	157.4	155.6	155.2
Wall Temp. #2-F	160.9	159.1	158.5	159.8	159.8	161.1	161.3	157.9	156.1	156.6
Instream Temp.-F	148.6	148.7	149.2	150.3	149.9	149.8	150.6	149.5	149.5	149.5
Avg. Wall Temp.-F	159.8	159.2	158.8	160.3	160.3	161	159.4	157.7	157.1	157.2
Avg. Wall DT.-F	10.7	10	9.2	9.5	9.9	10.7	8.3	7.7	7.1	7.2
EXP. H-Btu/Hr/ft2/F	941	1000.3	1094.7	1052.3	1011.8	936.8	1212.3	1305	1394.6	1394
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	73.2									
DP Liquid Density-lbm/ft3	93.15									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.234	0.465	0.819	1.352	1.49					
Zero Corrections-psid	-0.291	-0.043	-0.043	-0.052	-0.328					
Corrected DP-Psid	0.057	0.508	0.862	1.404	1.818					
Actual DP-ft	2.14	3.61	5.23	6.54	7.82					

Run#	969									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/9/93									
Time:	12:16									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	108.1									
Sat. Temperature-F(inlet)	149.7									
Inlet Flowrate-GPM	3.7									
inlet Temperature-F	149.7									
Inlet G-lbm/hr/ft2	731554		Temp	144.2	Density	82.85				
Subcooling-F	0									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	581.4	577.6	572.7	570	579.4	578.8	579.8	577.4	569.1	574
Heat Loss-Watts	10.2	2.3	3.2	3.2	3.2	2.4	1.5	2.2	2.8	16.4
Heat Flux-Btu/Hr/ft2	10078	10012	9927	9881	10044	10033	10050	10009	9885	9950
Wall Temp. #3-F	160.1	161.2	160.5	161.4	162.6	162.1	159.2	159.2	158.9	158.6
Wall Temp. #4-F	160.7	159.9	161.6	161.7	162.9	162.3	159	159.4	159.9	162.3
Wall Temp. #5-F	160.8	159.2	162.7	161.7	161.6	161.9	159.9	159	158.8	157.7
Wall Temp. #1-F	149.7	160.1	158.6	160.7	160.7	162.5	162.7	158.7	156.9	157.1
Wall Temp. #2-F	162	160.1	159.6	161	161.2	162.5	162.5	159.1	157.4	158.2
Instream Temp.-F	150.5	150.7	151	151.4	151.1	150.9	151.8	150.7	150.6	151
Avg. Wall Temp.-F	160.9	160.3	160.1	161.4	161.6	162.2	160.7	159.1	158.4	158.8
Avg. Wall DT.-F	9.9	9.2	8.6	9.5	10	10.8	8.4	7.9	7.9	7.9
EXP. H-Btu/Hr/ft2/F	1013.4	1091.6	1150.8	1037	999.7	925	1195.7	1262.5	1345.1	1357.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	71.4									
DP Liquid Density-lbm/ft3	93.35									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.116	0.711	1.217	1.889	2.153					
Zero Corrections-psid	-0.291	-0.043	-0.043	-0.052	-0.328					
Corrected DP-Psid	0.175	0.754	1.28	1.941	2.481					
Actual DP-ft	1.95	3.2	4.57	5.64	6.81					

Run#	970									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/9/93									
Time:	12:16									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	107.3									
Sat. Temperature-F(inlet)	149.3									
Inlet Flowrate-GPM	2.5									
Inlet Temperature-F	148.5									
Inlet G-lbm/hr/ft2	498524		Temp	142.1	Density	83.22				
Subcooling-F	0.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	585.1	581.8	573.7	571.4	580.8	580.1	584	581.7	570.1	574
Heat Loss-Watts	10.3	2.4	3.2	3.3	3.3	2.5	1.5	2.3	2.9	17.1
Heat Flux-Btu/Hr/ft2	10142	10082	9945	9905	10064	10058	10123	10083	9882	9950
Wall Temp. #3-F	159.6	160.8	160.2	161	162.3	162.3	159	159.1	159	159
Wall Temp. #4-F	160.2	159.2	161.3	161.1	162.4	162.4	159	159.4	160	162.7
Wall Temp. #5-F	160.3	158.6	162.4	161.3	161.2	161.8	159.6	159	159	158
Wall Temp. #1-F	148.5	159.8	158.2	159.9	160.4	162.1	162.6	158.7	158.8	157.1
Wall Temp. #2-F	161.5	159.8	159.3	160.5	160.5	162.1	162.6	159	157.5	158.6
Instream Temp.-F	149.3	150.8	150.6	150.9	150.8	150.6	151.4	150.6	150.5	151.2
Avg. Wall Temp.-F	160.4	159.9	159.8	160.8	161.1	162.2	160.6	159	158.5	159.1
Avg. Wall DT.-F	10.6	8.6	8.7	9.5	9.9	11.1	8.7	8	7.5	7.4
EXP. H-Btu/Hr/ft2/F	953.1	1166.3	1143	1045.1	1019.7	906.3	1163.3	1262.9	1315.3	1339.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	70.4									
DP Liquid Density-lbm/ft3	93.46									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.015	0.979	1.639	2.466	2.871					
Zero Corrections-psid	-0.291	-0.043	-0.043	-0.052	-0.328					
Corrected DP-Psid	0.276	1.022	1.682	2.518	3.199					
Actual DP-ft	1.77	2.72	3.83	4.63	5.55					

Run#	971									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/9/93									
Time:	12:16									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	106.5									
Sat. Temperature-F(inlet)	148.9									
Inlet Flowrate-GPM	5									
Inlet Temperature-F	148.5									
Inlet G-lbm/hr/ft2	986444		Temp		145.2	Density	82.67			
Subcooling-F	0.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	284.1	284.2	286.4	290.2	288.8	290	288.9	287.8	291.1	288.5
Heat Loss-Watts	9.2	2.1	2.7	2.8	2.7	2	1.3	1.8	2.4	13.8
Heat Flux-Btu/Hr/ft2	4926	4926	4965	5030	5008	5027	5008	4989	5048	5001
Wall Temp. #3-F	158.1	157.1	156.6	157.4	157.8	157.1	155.3	154.8	154.6	154.2
Wall Temp. #4-F	158.3	157	156.9	157.4	157.7	157.8	155.1	154.8	155.3	155.7
Wall Temp. #5-F	158.8	156.7	158.2	157.4	157.1	157.1	155.7	154.6	154.8	154.1
Wall Temp. #1-F	148.5	157.2	155.6	156.9	156.7	157.5	157.5	154.5	153.4	153.8
Wall Temp. #2-F	158.7	157.2	156.3	157.2	156.7	157.1	157.5	154.8	153.7	154.2
Instream Temp.-F	149.3	148.9	149.2	150.3	150.1	149.7	150.5	149.2	149.1	149.6
Avg. Wall Temp.-F	158.5	157.1	156.4	157.3	157.1	157.4	156.2	154.7	154.4	154.4
Avg. Wall DT.-F	9	8	6.9	6.7	6.7	7.4	5.5	5.8	6	4.6
EXP. H-Btu/Hr/ft2/F	550.1	615.6	716.8	745.5	744.5	675	911.6	945.8	1002.8	1093.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	71.1									
DP Liquid Density-lbm/ft3	93.38									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.236	0.312	0.517	0.951	1.032					
Zero Corrections-psid	-0.291	-0.043	-0.043	-0.052	-0.328					
Corrected DP-Psid	0.055	0.355	0.56	1.003	1.36					
Actual DP-ft	2.16	3.9	5.8	7.29	8.79					

Run#	972									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/9/93									
Time:	12:16									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	107.8									
Sat. Temperature-F(inlet)	149.6									
Inlet Flowrate-GPM	3.7									
Inlet Temperature-F	149.5									
Inlet G-lbm/hr/ft2	731395		Temp		144.3	Density	82.83			
Subcooling-F	0.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	289.5	287.8	290.9	295.2	296.9	298	293.9	292.3	296.7	292.7
Heat Loss-Watts	8.7	2	2.6	2.7	2.6	1.9	1.2	1.8	2.3	13.4
Heat Flux-Btu/Hr/ft2	5018	4989	5043	5117	5129	5166	5095	5067	5128	5074
Wall Temp. #3-F	158.5	157.7	157.2	158.4	158.6	158	156.4	155.7	155.3	155.6
Wall Temp. #4-F	158.5	157.4	157.5	158.3	158.8	158.4	156.3	155.8	156	157
Wall Temp. #5-F	159.1	157.2	158.6	158.3	157.9	157.8	156.9	155.4	155.4	155.1
Wall Temp. #1-F	149.5	157.7	156.1	158.3	157.4	158.1	159	155.4	154.1	155.3
Wall Temp. #2-F	159.8	157.8	156.6	158.3	157.4	158	158.8	155.8	154.4	155.8
Instream Temp.-F	150	149.5	149.8	151.1	150.4	150.1	151.3	149.9	149.8	150.2
Avg. Wall Temp.-F	159	157.7	156.9	158.3	157.8	158.1	157.5	155.6	155	155.8
Avg. Wall DT.-F	8.7	7.9	6.8	7	7.2	7.7	5.9	5.5	5.2	5.3
EXP. H-Btu/Hr/ft2/F	573.6	629.5	739.1	731.7	713.1	667.3	856.3	922.7	984.1	951.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76									
DP Liquid Density-lbm/ft3	92.84									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.168	0.5	0.855	1.414	1.612					
Zero Corrections-psid	-0.291	-0.043	-0.043	-0.052	-0.328					
Corrected DP-Psid	0.123	0.543	0.898	1.466	1.94					
Actual DP-ft	2.03	3.54	5.16	6.42	7.69					

Run#	973									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/9/93									
Time:	12:16									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	107.8									
Sat. Temperature-F(inlet)	149.6									
Inlet Flowrate-GPM	2.5									
Inlet Temperature-F	148.7									
Inlet G-lbm/hr/ft2	498418		Temp		142.2	Density		83.21		
Subcooling-F	0.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	288.4	287.4	291	295.4	293.3	296.3	293	291.7	295.9	291.8
Heat Loss-Watts	8.8	2	2.7	2.7	2.7	2	1.2	1.8	2.4	13.6
Heat Flux-Btu/Hr/ft2	4999	4982	5044	5121	5084	5119	5079	5056	5129	5068
Wall Temp. #3-F	158.3	157.7	157.3	158.8	158.8	158.5	156.6	156.2	158.1	155.9
Wall Temp. #4-F	158.4	157.5	157.9	158.8	159.1	159	156.5	156.3	156.7	157.4
Wall Temp. #5-F	159.2	157.2	159.2	158.8	158.3	158.1	157.2	156.1	158.3	155.6
Wall Temp. #1-F	148.7	157.7	156.2	158.2	157.6	158.5	159.2	155.9	154.8	155.4
Wall Temp. #2-F	159.6	157.7	156.7	158.2	157.6	158.5	159.1	156.3	155.1	155.9
Instream Temp.-F	149.3	149.3	150.5	151.3	150.8	150.5	151.5	150.5	150.3	150.8
Avg. Wall Temp.-F	158.9	157.7	157	158.7	158.2	158.5	157.7	156.2	156.8	156
Avg. Wall DT.-F	9.3	8.1	6.3	7.1	7.1	7.8	6	5.4	5.3	5
EXP. H-Btu/Hr/ft2/F	534.7	613.2	801.1	719.3	714	656.8	847.8	930.9	973.6	1009.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	74.6									
DP Liquid Density-lbm/ft3	92.99									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.118	0.655	1.138	1.828	2.144					
Zero Corrections-psid	-0.291	-0.043	-0.043	-0.052	-0.328					
Corrected DP-Psid	0.173	0.698	1.181	1.88	2.472					
Actual DP-ft	1.94	3.26	4.66	5.69	6.76					

Run#	974									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/17/93									
Time:	10:29									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	149.6									
Sat. Temperature-F(inlet)	169									
Inlet Flowrate-GPM	5.3									
Inlet Temperature-F	170.1									
Inlet G-lbm/hr/ft2	997173		Temp		165.4	Density	78.84			
Subcooling-F	-1.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	868	866	866	868	868	868	868	868	868	868
Heat Loss-Watts	13.2	3.1	4.1	4.4	4.4	3.3	2.4	3.2	3.4	19
Heat Flux-Btu/Hr/ft2	15012	15012	15012	15012	15012	15012	15012	15012	15012	15012
Wall Temp. #3-F	182.7	184.5	182.2	184.5	185.4	183.7	188.2	185.1	182.2	175.5
Wall Temp. #4-F	183.7	181.9	183.6	185	185.7	183.8	188.2	185.9	183.4	175.5
Wall Temp. #5-F	183.8	180.5	184.5	185.1	184.5	184.6	187.2	184.1	182.8	175.4
Wall Temp. #1-F	170.1	183.3	180.2	183.7	183.5	185.8	188.4	185.8	181.5	176.1
Wall Temp. #2-F	185	183.2	181.6	184.2	184	186.2	188.6	186.8	182.8	175.9
Instream Temp.-F	170.6	170.4	171.4	174	173.1	172.9	175.2	173.3	173.4	173.9
Avg. Wall Temp.-F	183.8	183.2	181.9	184.6	184.4	184.5	188.1	185.5	182.5	175.7
Avg. Wall DT.-F	12.5	12.1	9.8	9.9	10.6	10.9	12.2	11.8	8.5	1.1
EXP. H-Btu/Hr/ft2/F	1188.9	1235.9	1528.4	1516.8	1410	1377.6	1226.3	1298.4	1774.1	******
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	73.4									
DP Liquid Density-lbm/ft3	93.13									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.179	0.521	0.868	1.482	1.711					
Zero Corrections-psid	-0.354	-0.045	-0.053	-0.024	-0.361					
Corrected DP-Psid	0.175	0.566	0.921	1.506	2.072					
Actual DP-ft	2.04	3.69	5.41	6.7	7.88					

Run#	975									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/17/93									
Time:	14:13									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	144.8									
Sat. Temperature-F(inlet)	167									
Inlet Flowrate-GPM	3.9									
Inlet Temperature-F	168.2									
Inlet G-lbm/hr/ft2	738562		Temp	162.8	Density	79.35				
Subcooling-F	-1.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	870.5	875.5	871.1	863.9	863.6	863.4	871.6	871	199.3	94.2
Heat Loss-Watts	13.2	3.1	4.1	4.4	4.4	3.3	2.4	3.2	3.4	19
Heat Flux-Btu/Hr/ft2	15090	15176	15100	14975	14970	14966	15109	15098	3456	1633
Wall Temp. #3-F	181.1	182.9	180.9	182.4	183.8	182.4	185.2	181.3	174.9	173.9
Wall Temp. #4-F	181.9	180.6	182.3	182.9	184.4	182.5	185.3	183	175.5	174
Wall Temp. #5-F	182.2	179.6	183.1	183	182.9	182.9	184.6	181.5	176.1	173.9
Wall Temp. #1-F	168.2	181.7	178.8	182	181.7	184.3	186.3	182.2	174.2	175.2
Wall Temp. #2-F	183.4	181.5	180.2	182.1	182.2	184.6	188	183.4	174.3	174.8
Instream Temp.-F	168.5	169.1	170.4	172.1	171.3	171.2	172.6	171.3	171.3	172.3
Avg. Wall Temp.-F	182.2	181.7	180.6	182.6	182.8	183	185.5	182.3	174.8	174.3
Avg. Wall DT.-F	13	11.9	9.5	9.8	10.8	11.1	12.2	10.3	3.3	1.9
EXP. H-Btu/Hr/ft2/F	1163.6	1276.5	1594.9	1528.4	1383.1	1342.5	1238.7	1468.2	1033.2	839
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	73.4									
DP Liquid Density-lbm/ft3	93.13									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.099	0.739	1.25	1.973	2.346					
Zero Corrections-psid	-0.354	-0.045	-0.053	-0.024	-0.361					
Corrected DP-Psid	0.255	0.784	1.303	1.997	2.707					
Actual DP-ft	1.88	3.27	4.68	5.76	6.68					

Run#	976									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/17/93									
Time:	14:13									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	142.1									
Sat. Temperature-F(inlet)	165.9									
Inlet Flowrate-GPM	2.6									
Inlet Temperature-F	166.6									
Inlet G-lbm/hr/ft2	497093		Temp		158.9	Density		80.11		
Subcooling-F	-0.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	857.6	864.5	863.1	860	871.2	862.7	857.8	148.7	94.5	87.2
Heat Loss-Watts	13.1	3.1	4.1	4.4	4.4	3.2	2.3	2.6	3.2	19
Heat Flux-Btu/Hr/ft2	14868	14986	14961	14908	15102	14954	14869	2578	1638	1512
Wall Temp. #3-F	179.1	181.4	179.6	181.2	182.6	180.8	183.5	174.1	172.4	172.6
Wall Temp. #4-F	180.1	179	181.1	181.6	183	180.9	183.7	173.9	172.7	172.9
Wall Temp. #5-F	180.2	177.7	181.8	181.8	181.4	180.9	182.9	173.8	172.5	172.8
Wall Temp. #1-F	166.6	180.1	177.5	180.1	180.7	182.5	184	174.9	171.9	173.2
Wall Temp. #2-F	180.9	179.9	178.9	180.7	181.1	182.7	184.1	175.2	171.9	173.1
Instream Temp.-F	167.6	169.7	169.5	171	170	169.8	171.5	170.1	169.9	171.3
Avg. Wall Temp.-F	180.1	180.1	179.3	181.2	181.6	181.3	183.6	174.4	172.3	172.9
Avg. Wall DT.-F	11.8	9.7	9.1	9.5	10.9	10.8	11.5	4.2	2.3	1.6
EXP. H-Btu/Hr/ft2/F	1259.5	1541.3	1644.3	1569	1389.6	1384.8	1296.6	618.1	710.4	974.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	73.5									
DP Liquid Density-lbm/ft3	93.12									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.005	1.078	1.784	2.702	3.171					
Zero Corrections-psid	-0.354	-0.045	-0.053	-0.024	-0.361					
Corrected DP-Psid	0.359	1.123	1.837	2.726	3.532					
Actual DP-ft	1.68	2.63	3.67	4.4	5.13					

Run#	977									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/20/93									
Time:	9:25									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	142.8									
Sat. Temperature-F(inlet)	166.2									
Inlet Flowrate-GPM	5.3									
Inlet Temperature-F	169									
Inlet G-lbm/hr/ft2	1004931		Temp	162.3	Density	79.45				
Subcooling-F	-2.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	582.3	577.3	578.2	580.1	580.4	581.2	579.6	576.3	575.9	573.4
Heat Loss-Watts	9.4	2.1	2.7	3	2.8	1.9	1.4	1.9	2.5	14.8
Heat Flux-Btu/Hr/ft2	10094	10007	10023	10056	10061	10075	10047	9990	9983	9940
Wall Temp. #3-F	180	179.4	177.9	180.9	179.3	177.8	179.9	178.1	177.2	177.9
Wall Temp. #4-F	180.3	178.3	178.7	181.1	179.7	178.2	179.9	177.9	178.1	180.9
Wall Temp. #5-F	180.7	177	179.8	180.7	179.1	177.4	179.1	177.1	176.6	176.3
Wall Temp. #1-F	169	179.2	176.6	181.3	179.4	178.2	181.1	178	175.3	176.8
Wall Temp. #2-F	182	178.9	177.3	181.2	179.5	177.8	180.9	178	175.6	177.5
Instream Temp.-F	169.1	167.8	168.1	171.7	170.3	170.1	172.4	170.1	170	171.2
Avg. Wall Temp.-F	180.8	179	177.6	181	179.4	177.9	180.2	177.8	176.8	177.9
Avg. Wall DT.-F	11.2	10.7	9.1	8.8	8.7	7.3	7.3	7.3	6.1	6.2
EXP. H-Btu/Hr/ft2/F	901.7	935.4	1104.8	1136.8	1160.4	1371.7	1371.4	1374.4	1634.2	1595.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.5									
DP Liquid Density-lbm/ft3	92.66									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.18	0.468	0.747	1.269	1.394					
Zero Corrections-psid	-0.296	-0.025	-0.064	-0.031	-0.343					
Corrected DP-Psid	0.116	0.493	0.811	1.3	1.737					
Actual DP-ft	2.12	3.77	5.53	6.97	8.37					

Run#	978									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/20/93									
Time:	9:25									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	141.5									
Sat. Temperature-F(inlet)	165.6									
Inlet Flowrate-GPM	4									
Inlet Temperature-F	169.4									
Inlet G-lbm/hr/ft2	759561		Temp	161.7	Density	79.57				
Subcooling-F	-3.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	577.1	578.2	581.2	576.2	581.5	583.2	586.3	580.2	590	581.6
Heat Loss-Watts	10.2	2.3	3	3.2	3.1	2.1	1.5	2.1	2.7	16.3
Heat Flux-Btu/Hr/ft2	10004	10023	10075	9988	10080	10109	10148	10057	10054	10082
Wall Temp. #3-F	179.6	179.3	178.5	179.9	179.1	178	178.8	177.5	177	177.9
Wall Temp. #4-F	180	178.1	179.4	180.2	179.6	178.4	178.6	177.4	178	180.9
Wall Temp. #5-F	180.5	177.2	180.4	180.2	179.2	177.5	178.4	176.8	176.3	176.3
Wall Temp. #1-F	169.4	179.1	176.8	179.7	178.9	178.4	180.5	177.2	174.9	176.7
Wall Temp. #2-F	181.5	178.8	177.7	179.7	179.2	178	180	177.2	175.3	177.5
Instream Temp.-F	169.5	168.7	169.5	171.3	170.2	170.1	171.3	169.6	169.6	170.8
Avg. Wall Temp.-F	180.4	178.8	178.1	180	179.2	178.1	179.3	177.2	176.3	177.9
Avg. Wall DT.-F	10.4	9.7	8.1	8.2	8.6	7.5	7.5	7.2	6.2	6.6
EXP. H-Btu/Hr/ft2/F	957.5	1036.3	1237	1210.9	1176.3	1344.7	1352.5	1403.6	1609.8	1526.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.9									
DP Liquid Density-lbm/ft3	92.62									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.089	0.7	1.152	1.818	2.061					
Zero Corrections-psid	-0.296	-0.025	-0.064	-0.031	-0.343					
Corrected DP-Psid	0.207	0.725	1.216	1.849	2.404					
Actual DP-ft	1.95	3.34	4.78	5.97	7.14					

Run#	979									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/20/93									
Time:	9:25									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	141.4									
Sat. Temperature-F(inlet)	165.6									
Inlet Flowrate-GPM	2.6									
Inlet Temperature-F	169.8									
Inlet G-lbm/hr/ft2	494927		Temp		160.7	Density	79.77			
Subcooling-F	-4.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	577.1	575.1	581.5	577.2	583.1	584.6	581.8	577.1	580.8	580.3
Heat Loss-Watts	11.2	2.5	3.4	3.5	3.4	2.4	1.6	2.4	3.1	18.3
Heat Flux-Btu/Hr/ft2	10004	9969	10080	10005	10108	10134	10085	10004	10068	10059
Wall Temp. #3-F	179.4	179.1	178.3	180.2	179.4	178.2	179.3	178	177.8	178.2
Wall Temp. #4-F	180	178	179.4	180.5	179.9	178.5	179.1	178	178.7	181.2
Wall Temp. #5-F	180.1	176.8	180.4	180.5	179.4	177.7	178.7	177.4	177.2	176.8
Wall Temp. #1-F	169.8	178.7	176.5	180	179.1	178.5	180.9	177.8	175.7	177.2
Wall Temp. #2-F	181.2	178.5	177.6	180	179.2	178.2	180.5	177.8	178	177.9
Instream Temp.-F	169.6	169.8	169.7	171.4	170.4	170.3	171.8	170.3	170.4	171
Avg. Wall Temp.-F	180.2	178.6	178	180.3	179.4	178.2	179.7	177.8	177.1	178.3
Avg. Wall DT.-F	10.1	8.3	7.8	8.4	8.5	7.5	7.4	7	6.2	6.8
EXP. H-Btu/Hr/ft2/F	988.2	1197.6	1293.2	1184.4	1183.1	1357.1	1354.8	1419.4	1617.3	1478.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78									
DP Liquid Density-lbm/ft3	92.61									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.003	0.985	1.61	2.422	2.808					
Zero Corrections-psid	-0.296	-0.025	-0.064	-0.031	-0.343					
Corrected DP-Psid	0.299	1.01	1.674	2.453	3.151					
Actual DP-ft	1.78	2.82	3.94	4.86	5.78					

Run#	980									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/20/83									
Time:	9:25									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	137.4									
Sat. Temperature-F(inlet)	163.8									
Inlet Flowrate-GPM	2.6									
Inlet Temperature-F	169.8									
Inlet G-lbm/hr/ft2	494806		Temp		160.8	Density	79.75			
Subcooling-F	-6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	293.2	289.5	290.3	280	290.7	290.5	294.3	288.5	278.1	282.1
Heat Loss-Watts	10.5	2.3	3.1	3.3	3.1	2.1	1.5	2.1	2.8	16.6
Heat Flux-Btu/Hr/ft2	5082	5018	5032	4854	5039	5036	5101	5001	4821	4890
Wall Temp. #3-F	176	174.5	174.2	175.7	174.5	173	174.4	173.1	172.6	173.3
Wall Temp. #4-F	176.1	174.3	174.4	175.7	175	173.8	174.2	172.8	173.2	174.6
Wall Temp. #5-F	176.6	173.7	175.9	175.6	174.6	172.8	173.9	172.5	172.5	172.6
Wall Temp. #1-F	169.8	174.9	173.1	176	174.7	173.4	175.7	173	171.3	173.2
Wall Temp. #2-F	176.9	174.8	173.6	175.7	174.6	172.9	175.3	173.1	171.5	173.4
Instream Temp.-F	169.7	168.2	167.9	169.2	168.1	167.9	169.5	167.7	167.8	168.8
Avg. Wall Temp.-F	176.4	174.6	173.8	175.8	174.7	173.2	174.7	172.9	172.2	173.4
Avg. Wall DT.-F	6.5	6.2	5.7	6.3	6.4	5.1	5	5	4.2	4.4
EXP. H-Btu/Hr/ft2/F	785.5	809.6	883.2	768.7	787.7	992.7	1026.6	1005.4	1147.2	1111.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.8									
DP Liquid Density-lbm/ft3	92.63									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.026	0.76	1.36	2.069	2.37					
Zero Corrections-psid	-0.296	-0.025	-0.064	-0.031	-0.343					
Corrected DP-Psid	0.27	0.785	1.424	2.1	2.713					
Actual DP-ft	1.84	3.23	4.4	5.5	6.57					

Run#	981									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/20/93									
Time:	17.37									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	142.5									
Sat. Temperature-F(inlet)	166									
Inlet Flowrate-GPM	4									
Inlet Temperature-F	169.5									
Inlet G-lbm/hr/ft2	754671		Temp	164.3	Density	79.06				
Subcooling-F	-3.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	289.9	286.1	292.3	289.2	290.2	287.3	291	284.6	285.9	279.4
Heat Loss-Watts	11	2.5	3.3	3.4	3.3	2.3	1.5	2.3	3	17.3
Heat Flux-Btu/Hr/ft2	5025	4959	5067	5013	5030	4980	5044	4933	4958	4843
Wall Temp. #3-F	177.3	176.1	176.3	176.8	176.1	175	175.4	175	174.8	174.2
Wall Temp. #4-F	177.4	176.2	176.8	177.2	176.6	175.7	175.4	175	175.4	175.6
Wall Temp. #5-F	178	175.8	177.7	177.1	176.6	174.9	175.3	174.9	174.6	173.9
Wall Temp. #1-F	169.5	176.5	175.3	176.8	176.1	175.5	176.3	174.5	173.4	173.9
Wall Temp. #2-F	177.8	176.4	175.8	176.8	176.2	174.9	176.1	174.9	173.9	174.2
Instream Temp.-F	169.8	169.4	169.7	170.6	170.3	170.4	171.1	170.2	170.1	170.5
Avg. Wall Temp.-F	177.6	176.3	176.1	177	176.4	175.3	175.7	174.9	174.4	174.4
Avg. Wall DT.-F	7.6	6.7	6.1	6.1	5.8	4.6	4.4	4.4	4.1	3.8
EXP. H-Btu/Hr/ft2/F	661.4	742.9	827.8	815.3	860.2	1071	1153.8	1111.9	1209.9	1330.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	74.4									
DP Liquid Density-lbm/ft3	93.02									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.128	0.457	0.87	1.418	1.587					
Zero Corrections-psid	-0.296	-0.025	-0.064	-0.031	-0.343					
Corrected DP-Psid	0.168	0.482	0.934	1.449	1.93					
Actual DP-ft	2.05	3.83	5.36	6.77	8.1					

Run#	982									
Test Fluid	75% C4F10 - 25% R114									
Date:	12/20/93									
Time:	17:37									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	142.4									
Sat. Temperature-F(inlet)	166									
Inlet Flowrate-GPM	5.3									
Inlet Temperature-F	170.3									
Inlet G-lbm/hr/ft2	1000441		Temp	164.1	Density	79.1				
Subcooling-F	-4.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	295.8	291.6	292	294.6	282.3	287.3	296.9	292.4	288.6	288.1
Heat Loss-Watts	10.4	2.4	3.2	3.2	3.1	2.2	1.5	2.2	2.9	16.2
Heat Flux-Btu/Hr/ft2	5128	5055	5062	5107	4893	4980	5147	5069	4988	4994
Wall Temp. #3-F	177.1	176.1	176	176.8	175.7	174.8	175.6	175.1	174.7	173.9
Wall Temp. #4-F	177.2	176.1	176.4	176.8	176.4	175.4	175.6	175.2	175.4	175.1
Wall Temp. #5-F	177.8	175.6	177.7	176.8	176.1	174.6	175.5	174.9	174.7	173.3
Wall Temp. #1-F	170.3	176.4	175.1	176.7	175.8	175.3	176.5	174.8	173.6	173.3
Wall Temp. #2-F	177.7	176.4	175.6	176.7	175.7	174.8	176.2	175.1	173.9	173.6
Instream Temp.-F	170.6	169.8	169.9	170.8	170.2	170.2	171.4	170.3	170.3	170.1
Avg. Wall Temp.-F	177.5	176.3	175.8	176.8	176	175	175.9	175	174.5	173.8
Avg. Wall DT.-F	6.6	6.2	5.6	5.7	5.6	4.6	4.2	4.5	3.9	3.5
EXP. H-Btu/Hr/ft2/F	774.7	812.4	896.5	889	877.1	1082.7	1211.7	1128.6	1262.4	1421.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76									
DP Liquid Density-lbm/ft3	92.84									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.188	0.321	0.649	1.102	1.177					
Zero Corrections-psid	-0.296	-0.025	-0.064	-0.031	-0.343					
Corrected DP-Psid	0.108	0.346	0.713	1.133	1.52					
Actual DP-ft	2.15	4.06	5.74	7.33	8.82					

Run#	983									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/27/93									
Time:	12:24									
Note										
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	75.3									
Sat. Temperature-F(inlet)	131.7									
Inlet Flowrate-GPM	4.9									
Inlet Temperature-F	129.6									
Inlet G-lbm/hr/ft2	1005847		Temp	124.2	Density	86.02				
Subcooling-F	2.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	869.9	870.3	872.9	868	873.9	878.6	867.4	876.2	873.8	875.3
Heat Loss-Watts	8	1.8	2.4	2.6	2.6	2	1.3	1.7	2.1	11.8
Heat Flux-Btu/Hr/ft2	15079	15086	15131	15046	15148	15230	15036	15188	15147	15173
Wall Temp. #3-F	145	146.8	144.6	147.3	148.8	149.1	148.9	144.1	142	141.6
Wall Temp. #4-F	145.9	143.7	146.5	147.6	148.7	149.1	148.9	145.2	144.1	147.9
Wall Temp. #5-F	148.1	142.2	147.2	148.2	147.7	148.8	147.9	143.6	141.9	140
Wall Temp. #1-F	129.6	145	143	146.4	146.2	148.9	150.9	145.5	140.9	139.5
Wall Temp. #2-F	147.7	144.6	143.9	146.9	147	149.3	150.6	146.6	142	141.5
Instream Temp.-F	130	130.1	129.8	131.5	130.4	129.8	131	129.1	128.9	129.7
Avg. Wall Temp.-F	146.2	145	144.5	147.4	147.4	149	149.4	145	142.2	142.1
Avg. Wall DT.-F	16.5	14.2	14	16.2	16.8	18.5	17.8	15.2	12.6	11.7
EXP. H-Btu/Hr/ft2/F	973.3	1059.2	1078.5	980.2	928.5	823.8	846.6	996.3	1202.6	1295.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	84.4									
DP Liquid Density-lbm/ft3	91.16									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.286	0.41	0.674	1.176	1.152					
Zero Corrections-psid	-0.293	-0.023	-0.039	-0.032	-0.335					
Corrected DP-Psid	0.007	0.433	0.713	1.208	1.487					
Actual DP-ft	2.11	3.51	5.17	6.48	7.98					

Run#	984									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/27/93									
Time:	13:01									
Note										
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	74.8									
Sat. Temperature-F(inlet)	131.3									
Inlet Flowrate-GPM	3.7									
Inlet Temperature-F	129.5									
Inlet G-lbm/hr/ft2	759001		Temp	124.6	Density	85.96				
Subcooling-F	1.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	868.9	868.2	869.3	871.2	873.5	866.1	869	867.8	868.3	869.6
Heat Loss-Watts	7.9	1.8	2.5	2.7	2.7	2.1	1.3	1.8	2.2	12.3
Heat Flux-Btu/Hr/ft2	15062	15050	15069	15102	15142	15018	15064	15043	15051	15077
Wall Temp. #3-F	143.9	148.8	145.4	147.3	149.1	149.3	148.4	144.8	143.1	142.4
Wall Temp. #4-F	145.1	143.6	147.2	147.6	149.3	149.5	148.8	148.2	145.3	148.8
Wall Temp. #5-F	145.4	142.5	148.1	148.3	147.8	148.9	147.9	144.6	142.9	140.8
Wall Temp. #1-F	129.5	144.7	143	146	146.6	148.9	150.2	146.1	142	139.9
Wall Temp. #2-F	146.2	144.4	144.3	146.8	147	149.5	150.2	147.4	143.1	142.2
Instream Temp.-F	130.4	130.9	130.4	131.6	131	130.6	131.2	129.8	129.9	130.2
Avg. Wall Temp.-F	145.2	144.9	145	147.3	147.7	149.2	149.1	145.8	143.3	142.8
Avg. Wall DT.-F	14.1	13.3	13.9	15	16	17.9	17.2	15.9	12.7	11.9
EXP. H-Btu/Hr/ft2/F	1070.5	1132	1084.6	1005.6	946.9	840.1	874.8	980.6	1185.2	1262.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.6									
DP Liquid Density-lbm/ft3	92.02									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.138	0.777	1.244	1.949	2.091					
Zero Corrections-psid	-0.293	-0.023	-0.039	-0.032	-0.335					
Corrected DP-Psid	0.155	0.8	1.283	1.981	2.426					
Actual DP-ft	1.88	2.94	4.27	5.25	6.51					

Run#	985									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/27/83									
Time:	13:01									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	72.1									
Sat. Temperature-F(inlet)	129.4									
Inlet Flowrate-GPM	2.4									
Inlet Temperature-F	129.1									
Inlet G-lbm/hr/ft2	495145		Temp	121.2	Density	86.45				
Subcooling-F	0.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	868.7	868.3	868	868.2	860.7	857.6	867.8	869.3	870.3	869.4
Heat Loss-Watts	9.3	2.1	2.8	3.2	3	2.3	1.6	2.2	2.6	15.5
Heat Flux-Btu/Hr/ft2	14972	15051	14960	14963	14920	14866	15043	15069	15066	15070
Wall Temp. #3-F	143.9	148.1	143.7	147.3	148.1	147.6	149.4	145.1	143.1	143.8
Wall Temp. #4-F	145	142.9	145.6	147.5	147.8	147.8	149.8	145.8	145.2	150.2
Wall Temp. #5-F	145.1	141.2	146.6	147.8	145.8	146.8	148.1	144.1	142.8	141.9
Wall Temp. #1-F	129.1	144.1	141.4	146.5	146	147	151	146.9	142.1	141.6
Wall Temp. #2-F	146.2	143.7	142.7	146.9	146.1	147.4	151.1	148	143.2	143.7
Instream Temp.-F	129.4	130.1	129.2	132.2	130.6	130	131.8	129.5	129.7	131.1
Avg. Wall Temp.-F	145.1	144.2	143.4	147.3	146.4	147.3	149.9	148	143.3	144.2
Avg. Wall DT.-F	15	13.4	13.5	14.4	15.2	16.6	17.4	15.8	12.9	12.5
EXP. H-Btu/Hr/ft2/F	999.9	1121.6	1110.3	1039.2	984.7	894	864.5	953.8	1169.6	1209.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	70.9									
DP Liquid Density-lbm/ft3	82.61									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.024	1.148	1.839	2.698	2.982					
Zero Corrections-psid	-0.293	-0.023	-0.039	-0.032	-0.335					
Corrected DP-Psid	0.317	1.171	1.878	2.73	3.317					
Actual DP-ft	1.61	2.33	3.3	4.02	5.05					

Run#	988									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/28/93									
Time:	10:40									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	75.9									
Sat. Temperature-F(inlet)	132.1									
Inlet Flowrate-GPM	4.9									
Inlet Temperature-F	130.5									
Inlet G-lbm/hr/ft2	1008058		Temp	122.9	Density	86.21				
Subcooling-F	1.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	579.3	578.5	572.6	572.9	576.6	575.9	580.8	575.4	580.7	578.9
Heat Loss-Watts	8.5	1.8	2.4	2.7	2.5	1.9	1.4	1.8	2.2	13.1
Heat Flux-Btu/hr/ft2	10042	10028	9928	9931	9995	9983	10068	9974	10066	10035
Wall Temp. #3-F	145.2	144.9	142.8	148	145.4	145.8	148.3	143.8	142.2	142.8
Wall Temp. #4-F	145.3	143	143.9	148.3	145.6	148	148.2	144.5	143.8	148.2
Wall Temp. #5-F	148.3	141.9	144.7	148.3	144.7	145.2	147.1	143.3	141.7	141.3
Wall Temp. #1-F	130.5	144.3	141.8	148.5	144.4	145	150	145.5	141	141.9
Wall Temp. #2-F	148	144	142.8	148.3	144.5	145.2	149.7	148	142.1	142.5
Instream Temp.-F	130.3	130.4	129.9	133.1	131.6	131	132.8	130.2	130.1	131.3
Avg. Wall Temp.-F	148.2	144.1	142.8	148.3	144.8	145.5	148.7	144.6	142.1	142.9
Avg. Wall DT.-F	15.4	13.2	12.6	12.7	12.7	14	15.4	14	11.5	11.2
EXP. H-Btu/hr/ft2/F	650.1	759.9	795.8	780.9	784	710.6	653.5	714	874.9	897.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.7									
DP Liquid Density-lbm/ft3	92.01									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.182	0.419	0.735	1.17	1.151					
Zero Corrections-psid	-0.218	0.014	0.058	0.009	-0.331					
Corrected DP-Psid	0.036	0.405	0.679	1.161	1.482					
Actual DP-ft	2.07	3.59	5.27	6.6	8.06					

Run#	987									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/28/93									
Time:	10:40									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	75.1									
Sat. Temperature-F(inlet)	131.6									
Inlet Flowrate-GPM	3.7									
Inlet Temperature-F	129.1									
Inlet G-lbm/hr/ft2	761185		Temp	122.9	Density	86.21				
Subcooling-F	2.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	580.9	580.1	577.9	578.4	581.2	580.8	583	577.3	587.1	585
Heat Loss-Watts	7.8	1.7	2.3	2.5	2.4	1.8	1.3	1.7	2.1	12.5
Heat Flux-Btu/Hr/ft2	10070	10056	10018	10026	10075	10068	10106	10007	10177	10141
Wall Temp. #3-F	144	144.5	143.1	145.5	145.6	146	147.3	143.7	142.8	143
Wall Temp. #4-F	144.4	142.6	144.3	145.6	145.9	146.5	147.3	144.9	143.9	146.5
Wall Temp. #5-F	145.3	141.8	145.3	145.9	145.1	145.8	146.5	143.5	142.1	141.7
Wall Temp. #1-F	129.1	143.6	141.8	145.6	144.3	145.4	149.1	145	141.3	141.9
Wall Temp. #2-F	146.6	143.4	142.8	145.4	144.5	145.8	148.7	145.7	142.7	142.6
Instream Temp.-F	129.4	130.3	130.3	132.4	131.3	130.9	132	130	130	131.1
Avg. Wall Temp.-F	145.1	143.5	143	145.7	145	145.9	147.8	144.8	142.6	143.1
Avg. Wall DT.-F	15.2	12.8	12.2	12.8	13.2	14.6	15.3	14.1	12.1	11.6
EXP. H-Btu/Hr/ft2/F	661.6	787.4	817.9	783.5	763.5	691	659.5	709.3	841.1	875.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	72.3									
DP Liquid Density-lbm/ft3	92.47									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.088	0.673	1.17	1.76	1.89					
Zero Corrections-psid	-0.218	0.014	0.058	0.009	-0.331					
Corrected DP-Psid	0.13	0.659	1.114	1.751	2.221					
Actual DP-ft	1.93	3.19	4.57	5.66	6.88					

Run#	988									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/28/83									
Time:	10:40									
Note										
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	74.4									
Sat. Temperature-F(inlet)	131									
Inlet Flowrate-GPM	2.4									
Inlet Temperature-F	128.9									
Inlet G-lbm/hr/ft2	495983		Temp	120.2	Density	86.59				
Subcooling-F	2.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	581.2	580.7	578.7	578.8	580	579.4	582.6	577.4	576.8	584
Heat Loss-Watts	8.1	1.7	2.3	2.7	2.5	1.9	1.4	1.8	2.2	13.6
Heat Flux-Btu/Hr/ft2	10075	10066	10031	10030	10054	10044	10099	10009	9998	10123
Wall Temp. #3-F	143.7	144	142.4	145.9	145.9	145.7	148	143.8	142.5	144
Wall Temp. #4-F	144.4	142.1	143.6	146.2	145.7	145.9	148.1	144.8	143.5	147.4
Wall Temp. #5-F	145	140.9	144.6	146.2	144.3	145.1	147	143.1	141.7	142.6
Wall Temp. #1-F	128.9	143.3	140.8	148	144.4	145.1	149.8	145.5	141	142.7
Wall Temp. #2-F	148	143	141.8	145.7	144.4	145.1	149.4	148.2	142.1	143.5
Instream Temp.-F	129	130.1	129.7	132.6	130.9	130.5	132.2	129.7	129.6	131.5
Avg. Wall Temp.-F	144.8	143.1	142.2	146.1	144.7	145.5	148.5	144.6	142.2	144
Avg. Wall DT.-F	15.3	12.5	12	13	13.9	14.5	15.8	14.5	12.1	12.1
EXP. H-Btu/Hr/ft2/F	657.6	802.4	836.2	770.2	753.3	692.8	639	690.9	825.8	837.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.1									
DP Liquid Density-lbm/ft3	92.07									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.017	0.996	1.672	2.425	2.704					
Zero Corrections-psid	-0.218	0.014	0.058	0.009	-0.331					
Corrected DP-Psid	0.235	0.982	1.616	2.416	3.035					
Actual DP-ft	1.74	2.62	3.69	4.49	5.45					

Run#	989									
Test Fluid	50% C[illegible] - 50% R114									
Date:	[illegible]									
Time:	14:07									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	75.8									
Sat. Temperature-F(inlet)	132.1									
Inlet Flowrate-GPM	4.9									
Inlet Temperature-F	130.5									
Inlet G-lbm/hr/ft2	1008733		Temp	122.5	Density	88.26				
Subcooling-F	1.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	288.8	285.9	284.9	287.6	284.1	284.9	293.9	290.8	287.7	291.9
Heat Loss-Watts	8.2	1.7	2.3	2.6	2.3	1.7	1.2	1.6	2	12.3
Heat Flux-Btu/Hr/ft2	5006	4956	4939	4986	4925	4939	5095	5041	4987	5060
Wall Temp. #3-F	144.4	142.4	141.7	144.5	143.4	141.8	144.3	141.5	140.3	140.7
Wall Temp. #4-F	144.7	142	141.8	144.5	142.9	142.2	144.2	141.2	141	142.3
Wall Temp. #5-F	145.4	140.9	142.1	144.6	142.4	142	143.1	140.4	140.2	140.4
Wall Temp. #1-F	130.5	142.6	140.7	145	142.7	142.7	145.1	142.1	139	141.2
Wall Temp. #2-F	145	142.7	141.2	144.8	142.6	142.4	144.8	142.3	139.3	141.3
Instream Temp.-F	130.5	129.3	129.3	132.6	131.5	131	132.3	129.8	129.8	131.1
Avg. Wall Temp.-F	144.9	142.4	141.4	144.7	142.7	142.2	144.3	141.5	140	141.2
Avg. Wall DT.-F	14.1	12.9	11.8	11.8	10.9	11	11.8	11.5	9.9	9.9
EXP. H-Btu/Hr/ft2/F	353.8	384.1	417.6	421.6	450.7	450.9	432.9	439.4	502	513.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.5									
DP Liquid Density-lbm/ft3	92.13									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.19	0.274	0.451	0.843	0.834					
Zero Corrections-psid	-0.218	0.014	0.056	0.009	-0.331					
Corrected DP-Psid	0.028	0.26	0.395	0.834	1.165					
Actual DP-ft	2.09	3.84	5.75	7.15	8.6					

Run#	990									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/28/93									
Time:	14:07									
Note										
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	75.8									
Sat. Temperature-F(inlet)	132.1									
Inlet Flowrate-GPM	3.6									
Inlet Temperature-F	131.1									
Inlet G-lbm/hr/ft2	741482		Temp	122.2	Density	88.91				
Subcooling-F	1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	292.8	289.6	288.8	290.1	285.9	287.5	292.9	293.7	288.8	290.7
Heat Loss-Watts	7.4	1.6	2	2.5	2.2	1.6	1.1	1.5	1.9	11.4
Heat Flux-Btu/Hr/ft2	5076	5020	4983	5029	4958	4984	5077	5091	5008	5039
Wall Temp. #3-F	144	142.8	141.6	145.4	144	142.3	145.6	141.9	141	142
Wall Temp. #4-F	144.1	142.3	142	145.3	143.7	142.9	145.6	142	141.3	143.2
Wall Temp. #5-F	145.2	141.1	142.5	145.5	142.8	142.6	144.5	141	140.7	141
Wall Temp. #1-F	131.1	142.9	140.6	146.3	143.5	143.1	147.3	143	140.1	142.5
Wall Temp. #2-F	146.4	143	141	145.8	143.1	142.8	146.7	143.2	140.2	142.2
Instream Temp.-F	130.8	129.2	129.1	133.2	131.6	130.8	133.1	130.1	129.9	131.6
Avg. Wall Temp.-F	144.9	142.8	141.3	145.6	143.3	142.7	145.9	142.2	140.7	142.2
Avg. Wall DT.-F	13.9	13.3	12	12.2	11.5	11.7	12.6	11.9	10.5	10.4
EXP. H-Btu/f-hr/ft2/F	365.3	376.8	414.4	412.3	432.8	428	402.6	428.2	475.2	486.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.2									
DP Liquid Density-lbm/ft3	91.95									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.145	0.436	0.759	1.276	1.379					
Zero Corrections-psid	-0.218	0.014	0.056	0.009	-0.331					
Corrected DP-Psid	0.073	0.422	0.703	1.267	1.71					
Actual DP-ft	2.01	3.56	5.22	6.41	7.67					

Run#	991									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/28/89									
Time:	14:07									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	76.7									
Sat. Temperature-F(inlet)	132.7									
Inlet Flowrate-GPM	2.4									
Inlet Temperature-F	131.4									
Inlet G-lbm/hr/ft2	495309		Temp	121	Density	86.48				
Subcooling-F	1.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	293.4	290	288.3	290.7	286.1	287.9	293.2	294.1	289.2	290.9
Heat Loss-Watts	7.6	1.6	2.1	2.5	2.2	1.6	1.2	1.6	1.9	11.9
Heat Flux-Btu/Hr/ft2	5086	5027	4963	5039	4959	4991	5082	5098	5018	5043
Wall Temp. #3-F	144.2	143	142.4	146.1	144.8	143	146.3	142.3	141.3	142.7
Wall Temp. #4-F	144.5	142.6	142.7	145.9	144.5	143.7	146.3	142.5	141.9	144.2
Wall Temp. #5-F	145.4	141.6	143.3	146.2	143.3	143.1	145	141.8	140.8	141.8
Wall Temp. #1-F	131.4	143.4	141	146.9	143.8	143.6	147.8	143.9	140.1	142.9
Wall Temp. #2-F	146.9	143.3	141.6	146.3	143.5	143.5	147.3	144	140.3	142.7
Instream Temp.-F	131.4	130.3	130.9	134.2	132.2	131.6	133.7	130.8	130.8	132.9
Avg. Wall Temp.-F	145.3	143.1	141.9	146.3	143.8	143.4	146.5	142.9	140.9	142.9
Avg. Wall DT.-F	13.6	12.5	10.8	11.8	11.4	11.5	12.6	11.9	9.9	9.7
EXP. H-Btu/Hr/ft2/F	373.4	400.6	459.5	425.3	436.9	433	403	429.5	508.8	518.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.5									
DP Liquid Density-lbm/ft3	91.92									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.083	0.662	1.164	1.834	2.065					
Zero Corrections-psid	-0.218	0.014	0.056	0.009	-0.331					
Corrected DP-Psid	0.135	0.648	1.108	1.825	2.396					
Actual DP-ft	1.9	3.17	4.53	5.46	6.51					

Run#	992									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/29/93									
Time:	9:51									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	105									
Sat. Temperature-F(inlet)	150									
Inlet Flowrate-GPM	5									
Inlet Temperature-F	149.6									
Inlet G-lbm/hr/ft2	990789		Temp	143.6	Density	83.03				
Subcooling-F	0.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	859.1	869.8	867.6	861.1	875.7	875.2	859.8	860.5	864.4	871
Heat Loss-Watts	9.3	2.1	2.8	3	3	2.3	1.5	1.9	2.7	15.9
Heat Flux-Btu/Hr/ft2	14882	15077	15039	14927	15180	15171	14904	14916	14984	15098
Wall Temp. #3-F	165.1	167	164.6	167.5	168.7	169.4	167.9	163.7	165.4	166
Wall Temp. #4-F	166.2	163.9	166.2	167.8	169	169.3	167.4	163.8	168.5	171.8
Wall Temp. #5-F	166.4	162	167.1	168.2	167.3	169.1	168.7	162.3	165.2	163.9
Wall Temp. #1-F	149.6	165	162.1	167.2	168.3	169.1	172.6	162.8	163.6	163.9
Wall Temp. #2-F	168.7	164.8	163.6	167.2	168.6	169.5	172.4	163	164.4	165.4
Instream Temp.-F	149.7	149.4	150	153.2	151.9	151.3	153.7	151.3	150.9	152.2
Avg. Wall Temp.-F	166.6	165.2	164.1	167.7	167.3	169.2	169.8	163.1	165	166.2
Avg. Wall DT.-F	16.2	15.1	13.4	13.8	14.7	17.2	15.4	11.1	13.4	13.3
EXP. H-Btu/Hr/ft2/F	917.7	998.9	1118.5	1081.6	1031.7	880	968.1	1338.3	1114.6	1133.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.7									
DP Liquid Density-lbm/ft3	91.68									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.164	0.475	0.839	1.319	1.381					
Zero Corrections-psid	-0.223	-0.017	0.019	0.012	-0.336					
Corrected DP-Psid	0.059	0.492	0.82	1.307	1.697					
Actual DP-ft	2.11	3.56	5.2	6.57	7.96					

Run#	993									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/29/93									
Time:	12:38									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	104.4									
Sat. Temperature-F(inlet)	149.7									
Inlet Flowrate-GPM	3.8									
Inlet Temperature-F	149.3									
Inlet G-lbm/hr/ft2	753695		Temp	143.1	Density	83.11				
Subcooling-F	0.4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	884.7	876.1	867.1	881	874.5	875.4	863.9	865.5	863.1	870.9
Heat Loss-Watts	9	2	2.6	3	2.9	2.2	1.5	1.8	2.5	15.7
Heat Flux-Btu/Hr/ft2	14969	15169	15031	14925	15159	15174	14975	15003	14961	15098
Wall Temp. #3-F	165	168.7	164.1	167.6	168.7	169.4	167.9	163.5	164.5	168.3
Wall Temp. #4-F	166.1	163.7	166	168	169.1	169.2	167.2	163.6	165.6	172
Wall Temp. #5-F	166.2	161.6	166.6	168.1	166.9	168.6	168.6	161.9	164.1	164.1
Wall Temp. #1-F	149.3	165	161.6	167.5	166.5	169	172.8	162.9	162.8	164.2
Wall Temp. #2-F	168.2	164.6	163.3	167	168.5	169.3	172.5	162.9	163.5	165.6
Instream Temp.-F	149.5	149.8	150.1	153.1	151.4	151	153.3	150.7	150.5	152.3
Avg. Wall Temp.-F	166.4	165	163.8	167.8	167.3	169.1	169.8	163	164.1	166.4
Avg. Wall DT.-F	16.2	14.5	13	14	15.2	17.4	15.8	11.6	12.9	13.5
EXP. H-Btu/Hr/ft2/F	925.4	1045.1	1158.8	1064.1	998.6	873.9	948.4	1295.4	1157.6	1121.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.3									
DP Liquid Density-lbm/ft3	91.51									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.071	0.728	1.26	1.886	2.077					
Zero Corrections-psid	-0.223	-0.017	0.019	0.012	-0.336					
Corrected DP-Psid	0.152	0.745	1.241	1.874	2.413					
Actual DP-ft	1.94	3.11	4.46	5.56	6.69					

Run#	994									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/29/93									
Time:	12:38									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	103.9									
Sat. Temperature-F(inlet)	149.4									
Inlet Flowrate-GPM	2.5									
Inlet Temperature-F	147.4									
Inlet G-lbm/hr/ft2	497861		Temp	140.9	Density	83.46				
Subcooling-F	2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	864.3	868.7	866.7	863.7	865.6	864.9	864.4	863.4	869.9	861.9
Heat Loss-Watts	9.2	2.1	2.8	3.1	3	2.3	1.5	2	2.6	16.6
Heat Flux-Btu/Hr/ft2	14982	15058	15008	14972	15005	14982	14984	14968	15062	14940
Wall Temp. #3-F	164	168.1	163.4	168.9	167.9	167.9	168.2	163.8	164.1	166.5
Wall Temp. #4-F	165.1	162.9	165.1	167.4	168.1	168	167.5	163.9	165.4	172.3
Wall Temp. #5-F	165.4	160.9	166.2	167.8	166.2	167.3	168.3	162.3	163.5	164.1
Wall Temp. #1-F	147.4	164	160.7	168.9	165.8	167.8	172.2	162.9	162.4	164.3
Wall Temp. #2-F	166.7	164	162.4	166.9	165.8	167.8	171.9	162.9	163	165.7
Instream Temp.-F	147.7	149.9	149.6	152.9	151.1	150.6	153.2	150.4	150.3	152.3
Avg. Wall Temp.-F	165.3	164.3	162.9	167.3	166.5	167.7	169.6	163.2	163.7	166.6
Avg. Wall DT.-F	16.9	13.7	12.6	13.7	14.7	16.4	16.7	12.1	12.7	13.6
EXP. H-Btu/Hr/ft2/F	886.3	1101.6	1188.9	1094.9	1020.9	912.9	961.8	1238.6	1186	1098.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	82.2									
DP Liquid Density-lbm/ft3	91.41									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.018	1.017	1.739	2.491	2.869					
Zero Corrections-psid	-0.223	-0.017	0.019	0.012	-0.336					
Corrected DP-Psid	0.241	1.034	1.72	2.479	3.205					
Actual DP-ft	1.77	2.6	3.8	4.48	5.29					

Run#	995									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/29/93									
Time:	12:38									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	104.8									
Sat. Temperature-F(inlet)	149.9									
Inlet Flowrate-GPM	5.1									
Inlet Temperature-F	149.3									
Inlet G-lbm/hr/ft2	1007982		Temp	144.9	Density	82.82				
Subcooling-F	0.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	575.8	571.5	567.5	568.3	574.8	570.2	571	567.9	571.9	568.3
Heat Loss-Watts	8.6	1.9	2.4	2.6	2.4	1.7	1.2	1.7	2.2	13.7
Heat Flux-Btu/Hr/ft2	9981	9907	9837	9851	9964	9884	9898	9844	9914	9851
Wall Temp. #3-F	160.9	162.3	160.2	162.2	160.9	159.4	161.2	159.9	159.6	160.6
Wall Temp. #4-F	161.4	160.9	161.3	162.7	161	159.7	160.9	159.9	161	164.1
Wall Temp. #5-F	162.3	159	160.2	161.2	159.9	159.4	159.8	158.9	158.4	159
Wall Temp. #1-F	149.3	160.3	158	161.2	160	160.7	162	159	157.5	159
Wall Temp. #2-F	166.9	160.9	158.8	161.4	160	160.4	161.2	159.3	158	159.8
Instream Temp.-F	149.4	149.1	149.5	151.9	151.2	150.9	152.4	150.5	150.3	151.4
Avg. Wall Temp.-F	162.9	161.1	159.6	161.8	160.2	159.8	161	159.4	158.9	160.5
Avg. Wall DT.-F	13	11.6	9.6	9.5	8.6	8.5	8.2	8.5	8.2	8.7
EXP. H-Btu/Hr/ft2/F	768.4	857.5	1021.5	1039.2	1162	1169.3	1211.1	1164.3	1216.1	1138.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75.8									
DP Liquid Density-lbm/ft3	92.1									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.193	0.399	0.677	1.105	1.166					
Zero Corrections-psid	-0.223	-0.017	0.019	0.012	-0.336					
Corrected DP-Psid	0.03	0.416	0.658	1.093	1.502					
Actual DP-ft	2.17	3.72	5.53	7	8.37					

Run#	996									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/29/93									
Time:	12:38									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	104.1									
Sat. Temperature-F(inlet)	149.6									
Inlet Flowrate-GPM	3.8									
Inlet Temperature-F	149.1									
Inlet G-lbm/hr/ft2	753402		Temp	143.3	Density	83.08				
Subcooling-F	0.5									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	571.2	568.9	563	563.8	573.4	568.7	567.9	565.8	568.9	563.9
Heat Loss-Watts	8.7	1.9	2.5	2.7	2.5	1.8	1.2	1.8	2.4	14.3
Heat Flux-Btu/Hr/ft2	9901	9862	9759	9773	9940	9858	9844	9808	9862	9775
Wall Temp. #3-F	160.5	162.1	160.5	162.2	161	159.7	161.5	160.3	160.3	161.2
Wall Temp. #4-F	161.1	160.8	161.1	162.6	161.2	159.9	161.1	160.2	161.8	164.9
Wall Temp. #5-F	162.1	159	160.5	161.3	160.3	159.7	160.1	159.3	159.1	159.8
Wall Temp. #1-F	149.1	160	158.1	160.8	160	160.9	162.1	159.3	158	159.5
Wall Temp. #2-F	165.8	160.7	159	161.1	160.4	160.8	161.5	159.5	158.4	160.3
Instream Temp.-F	149.6	149.3	150.5	152.3	151.2	151	152.3	150.8	150.6	151.9
Avg. Wall Temp.-F	162.4	160.9	159.7	161.7	160.5	160.1	161.3	159.7	159.5	161.1
Avg. Wall DT.-F	12.3	11.1	8.7	9	8.8	8.6	8.5	8.5	8.4	8.8
EXP. H-Btu/Hr/ft2/F	803.2	888.1	1117.4	1087.8	1126.2	1145.7	1156.1	1157	1169.2	1111
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	74.1									
DP Liquid Density-lbm/ft3	92.28									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.095	0.648	1.121	1.709	1.915					
Zero Corrections-psid	-0.223	-0.017	0.019	0.012	-0.338					
Corrected DP-Psid	0.128	0.683	1.102	1.697	2.251					
Actual DP-ft	2	3.29	4.75	5.94	7.07					

Run#	997									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/29/93									
Time:	14:46									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	103.4									
Sat. Temperature-F(inlet)	149.2									
Inlet Flowrate-GPM	2.5									
Inlet Temperature-F	148.3									
Inlet G-lbm/hr/ft2	497961		Temp	140.9	Density	83.46				
Subcooling-F	0.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	570.4	567	565	565.7	570.5	568.2	565.2	562.5	571.5	568.2
Heat Loss-Watts	8.4	1.8	2.4	2.7	2.5	1.7	1.2	1.8	2.3	14.4
Heat Flux-Btu/Hr/ft2	9888	9829	9794	9808	9889	9815	9797	9751	9907	9815
Wall Temp. #3-F	160.7	162	159.8	163	161.3	159.3	162.2	160.5	160.2	161.9
Wall Temp. #4-F	161.2	160.5	160.7	163.3	161.4	159.4	161.8	160.2	161.6	165.6
Wall Temp. #5-F	161.9	158.7	159.6	161.8	160.4	159.3	160.5	159.2	159.1	160.4
Wall Temp. #1-F	148.3	159.9	157.7	161.7	160.5	160.7	163.1	159.7	158	160.5
Wall Temp. #2-F	165.4	160.5	158.2	161.9	160.8	160.5	162.2	159.8	158.6	161
Instream Temp.-F	148.5	149.7	150	152.3	151.2	150.6	152.7	150.4	150.3	152.1
Avg. Wall Temp.-F	162.3	160.7	159.1	162.5	160.7	159.7	162	159.9	159.5	161.9
Avg. Wall DT.-F	13.4	10.6	8.7	9.7	9.1	8.6	8.8	9	8.6	9.3
EXP. H-Btu/Hr/ft2/F	740.5	928.9	1131.3	1010.2	1089.4	1137.1	1111.2	1078.7	1131.9	1051.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.2									
DP Liquid Density-lbm/ft3	91.85									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.015	0.887	1.526	2.25	2.596					
Zero Corrections-psid	-0.223	-0.017	0.019	0.012	-0.336					
Corrected DP-Psid	0.208	0.904	1.507	2.238	2.932					
Actual DP-ft	1.84	2.84	4	4.84	5.81					

Run#	998									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/29/93									
Time:	14:46									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	104.6									
Sat. Temperature-F(inlet)	149.8									
Inlet Flowrate-GPM	5									
Inlet Temperature-F	149.7									
Inlet G-lbm/hr/ft2	988023		Temp	145	Density	82.8				
Subcooling-F	0.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	287.7	295.3	278.7	294.3	286	289.4	288.9	293.3	293.3	297.3
Heat Loss-Watts	8.2	1.8	2.3	2.6	2.3	1.6	1.2	1.7	2.1	12.8
Heat Flux-Btu/Hr/ft2	4987	5119	4831	5101	4958	5017	5008	5084	5084	5154
Wall Temp. #3-F	162.3	160.8	159.4	162.4	160.1	159	162.2	159.8	159.1	158.9
Wall Temp. #4-F	162.4	160.6	159.6	162.4	160	159.5	161.9	159.4	159.7	160.5
Wall Temp. #5-F	162.3	159.2	160.1	161.8	159.4	158.9	161.2	158.8	158.8	159.1
Wall Temp. #1-F	149.7	160.6	159	162.4	159.8	159.8	163	159.8	157.8	159.9
Wall Temp. #2-F	162.5	160.7	159.5	162	159.6	159.2	162.5	159.8	157.9	159.9
Instream Temp.-F	149.6	148	148.3	151.5	151	151	152.8	150.5	150.3	151.4
Avg. Wall Temp.-F	162.4	160.7	159.4	162.3	159.7	159.3	162.2	159.5	158.6	159.7
Avg. Wall DT.-F	12.6	12.4	10.8	10.5	8.5	8	9.1	8.8	8.1	8
EXP. H-Btu/Hr/ft2/F	394.2	411.4	445	486	584.9	626.2	548.3	578.4	628.4	642
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.8									
DP Liquid Density-lbm/ft3	91.78									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.209	0.225	0.344	0.658	0.648					
Zero Corrections-psid	-0.223	-0.017	0.019	0.012	-0.338					
Corrected DP-Psid	0.014	0.242	0.325	0.646	0.982					
Actual DP-ft	2.19	4.01	6.09	7.74	9.24					

Run#	999									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/29/83									
Time:	14:46									
Note										
Flow Area-ft2	0.00338									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	101.2									
Sat. Temperature-F(inlet)	148									
Inlet Flowrate-GPM	3.8									
Inlet Temperature-F	147.9									
Inlet G-lbm/hr/ft2	753549		Temp	143.2	Density	83.1				
Subcooling-F	0.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	287.2	295.2	291	295.4	286.5	290	287.8	292.1	295.8	290.7
Heat Loss-Watts	8.4	1.8	2.4	2.6	2.3	1.7	1.2	1.7	2.2	13
Heat Flux-Btu/Hr/ft2	4978	5117	5044	5121	4968	5027	4989	5063	5128	5039
Wall Temp. #3-F	160.3	159.3	158.1	160.9	158.8	157.7	160.7	158.1	157.6	157.4
Wall Temp. #4-F	160.5	158.9	158.4	160.8	158.6	158.3	160.6	157.8	158.1	159.2
Wall Temp. #5-F	161	157.6	158.9	160.4	157.7	157.5	159.7	157.3	157.4	157.7
Wall Temp. #1-F	147.9	159	157.7	160.5	158.4	158.3	161.1	158.2	156.3	157.9
Wall Temp. #2-F	161.8	159.2	158.2	160.5	158.2	157.7	160.8	158.3	158.5	158.1
Instream Temp.-F	148.1	147.1	147.2	150.4	149.6	149.3	150.8	148.7	148.5	150
Avg. Wall Temp.-F	160.9	159.1	158.1	160.7	158.2	158	160.6	157.9	157.2	158.1
Avg. Wall DT.-F	12.8	11.8	10.7	10	8.4	8.4	9.8	9	8.4	7.8
EXP. H-Btu/Hr/ft2/F	395.9	434.8	472.7	511.1	591.2	596.8	522.1	561.9	606.9	643.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	75									
DP Liquid Density-lbm/ft3	92.19									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.137	0.414	0.727	1.221	1.349					
Zero Corrections-psid	-0.223	-0.017	0.019	0.012	-0.336					
Corrected DP-Psid	0.088	0.431	0.708	1.209	1.685					
Actual DP-ft	2.07	3.69	5.43	6.78	8.04					

Run#	1000									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/29/93									
Time:	14:46									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	104									
Sat. Temperature-F(inlet)	149.5									
Inlet Flowrate-GPM	2.5									
Inlet Temperature-F	148.8									
Inlet G-lbm/hr/ft2	495756		Temp	143.2	Density	83.1				
Subcooling-F	0.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	283.9	292.1	284.9	289.9	286.1	289.5	284.3	289.2	290.6	290.3
Heat Loss-Watts	8.3	1.8	2.3	2.6	2.4	1.7	1.2	1.7	2.2	13
Heat Flux-Btu/Hr/ft2	4921	5063	4939	5025	4958	5018	4928	5013	5037	5032
Wall Temp. #3-F	161.9	161	159.9	162.9	161.2	160.3	163	160.2	159.5	159.6
Wall Temp. #4-F	162	160.5	160.1	162.7	161	160.7	162.8	159.9	160	161.2
Wall Temp. #5-F	162.6	159.5	160.7	162.5	160.1	159.9	162	159.4	159.3	159.5
Wall Temp. #1-F	148.8	160.7	159.1	162.8	160.7	160.8	163.8	160.7	158.8	159.7
Wall Temp. #2-F	163.7	160.9	159.5	162.5	160.5	160.2	163.5	160.7	158.5	160
Instream Temp.-F	149	147.8	149.4	152.7	151.4	151.1	152.9	150.7	150.8	152
Avg. Wall Temp.-F	162.6	160.8	159.7	162.7	160.6	160.4	163	160.2	159.1	160
Avg. Wall DT.-F	13.3	12.7	10	9.8	9	9	9.9	9.3	8.3	7.8
EXP. H-Btu/Hr/ft2/F	369.3	397.2	492.5	512.9	554.1	554.8	497.9	541.8	607.5	647.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.4									
DP Liquid Density-lbm/ft3	92.04									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.095	0.54	0.993	1.611	1.856					
Zero Corrections-psid	-0.223	-0.017	0.019	0.012	-0.336					
Corrected DP-Psid	0.128	0.557	0.974	1.599	2.192					
Actual DP-ft	1.99	3.47	4.98	6.09	7.14					

Run#	1001									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/30/93									
Time:	13:18									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	136.8									
Sat. Temperature-F(inlet)	165.2									
Inlet Flowrate-GPM	5.3									
Inlet Temperature-F	169									
Inlet G-lbm/hr/ft2	1009121		Temp	162.7	Density	79.78				
Subcooling-F	-3.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	865.7	872.7	874.4	878	875.4	877.9	878.7	862.8	875.9	873.4
Heat Loss-Watts	10.9	2.4	3.3	3.4	3.4	2.6	1.6	2.3	3	17.1
Heat Flux-Btu/Hr/ft2	15006	15128	15157	15185	15174	15218	15232	14956	15183	15140
Wall Temp. #3-F	182.9	183.8	182.5	184	185.7	186.5	185	182.3	180.5	180.7
Wall Temp. #4-F	183.6	180.9	184	184.3	185.9	186.7	183.8	182.3	182.3	186.5
Wall Temp. #5-F	183.3	179.6	185.1	184.6	184.3	186.1	182.7	181.3	180.7	178.3
Wall Temp. #1-F	169	182.5	180.4	182.7	182.9	186.4	187.4	181.2	179.1	178.3
Wall Temp. #2-F	188	182.1	181.5	183.6	183.5	186.6	187.1	182.4	179.7	180.1
Instream Temp.-F	168.7	168.6	169.4	171.3	170.6	170.8	171.8	170.5	170.7	170.7
Avg. Wall Temp.-F	184	182.3	182.1	183.9	184.2	186.4	185.2	181.9	180.5	180.8
Avg. Wall DT.-F	14.6	18	12	11.9	12.9	14.9	12.7	10.7	9.1	9.4
EXP. H-Btu/Hr/ft2/F	1029.8	1160	1261.5	1274.6	1179.6	1018.8	1198.2	1394.6	1673.3	1611.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.9									
DP Liquid Density-lbm/ft3	91.98									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.149	0.51	0.893	1.383	1.517					
Zero Corrections-psid	-0.302	-0.02	-0.016	0.006	-0.333					
Corrected DP-Psid	0.153	0.53	0.909	1.377	1.85					
Actual DP-ft	2.03	3.68	5.28	6.74	8.05					

Run#	1002									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/30/93									
Time:	13:18									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	138.6									
Sat. Temperature-F(inlet)	165.1									
Inlet Flowrate-GPM	3.9									
Inlet Temperature-F	169.1									
Inlet G-lbm/hr/ft2	743223		Temp	162.3	Density	79.98				
Subcooling-F	-4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	868.9	867.2	874.5	876.7	872.7	874.4	869.5	862	876	871.8
Heat Loss-Watts	11	2.4	3.3	3.5	3.5	2.7	1.7	2.4	3	17.8
Heat Flux-Btu/Hr/ft2	15027	15032	15159	15197	15128	15157	15072	14942	15168	15112
Wall Temp. #3-F	182.9	183.9	182.5	184.1	186	187	185.2	182.4	181	181.6
Wall Temp. #4-F	183.6	181.2	184.3	184.6	186.4	187.2	184	182.6	182.7	187.3
Wall Temp. #5-F	183.5	179.6	185.1	184.7	184.6	186.4	183.1	181.5	180.8	179.1
Wall Temp. #1-F	169.1	182.8	180.4	183.4	183.1	188.7	188	181.2	179.4	179.4
Wall Temp. #2-F	185.9	182.3	181.6	183.9	183.7	187	187.5	182.5	180.1	181
Instream Temp.-F	168.9	169.2	169.9	171.4	170.6	170.3	171.8	170.5	170.6	171.1
Avg. Wall Temp.-F	184	182.6	182.2	184.2	184.5	186.8	185.6	182	180.8	181.7
Avg. Wall DT.-F	14.4	12.7	11.6	12.1	13.2	15.8	13.1	10.9	9.5	9.9
EXP. H-Btu/Hr/ft2/F	1043.9	1186.4	1306.1	1254.6	1149	958.9	1152.4	1375.3	1594.1	1526.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76									
DP Liquid Density-lbm/ft3	92.08									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.038	0.774	1.337	1.985	2.272					
Zero Corrections-psid	-0.302	-0.02	-0.016	0.006	-0.333					
Corrected DP-Psid	0.264	0.794	1.353	1.979	2.605					
Actual DP-ft	1.83	3.18	4.48	5.66	6.69					

Run#	1003									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/30/93									
Time:	13:18									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	135.5									
Sat. Temperature-F(inlet)	164.6									
Inlet Flowrate-GPM	2.6									
Inlet Temperature-F	168.2									
Inlet G-lbm/hr/ft2	499199		Temp	158.9	Density	80.45				
Subcooling-F	-3.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	870.7	867.2	873.2	871.4	876.9	881.9	872.1	862.8	872.2	615
Heat Loss-Watts	10.6	2.4	3.3	3.4	3.4	2.6	1.6	2.4	3	16.6
Heat Flux-Btu/Hr/ft2	15093	15032	15136	15105	15200	15287	15117	14956	15119	10681
Wall Temp. #3-F	181.8	183.2	181.8	183.8	185.4	185.9	184.8	182.4	181.2	179.9
Wall Temp. #4-F	182.7	180.4	183.5	184.1	185.4	186.2	183.7	182.2	182.9	183.3
Wall Temp. #5-F	182.6	178.8	184.6	184.2	183.7	185.3	182.4	180.9	180.8	178.2
Wall Temp. #1-F	168.2	182.1	179.8	182.6	182.9	185.7	186.7	181.1	179.3	178.2
Wall Temp. #2-F	184.2	181.6	180.9	183.3	183.4	185.9	186.6	182.5	180	179.4
Instream Temp.-F	168.3	169.5	169.8	171	170	170.1	171.4	170.1	170.3	171
Avg. Wall Temp.-F	182.8	181.8	181.5	183.7	183.9	185.8	184.8	181.8	180.8	179.8
Avg. Wall DT.-F	13.8	11.6	11.2	12	13.2	15	12.8	11	9.9	8.3
EXP. H-Btu/Hr/ft2/F	1090.3	1290.8	1355.6	1259.6	1154.8	1020.2	1185	1354.2	1533.9	1281.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77									
DP Liquid Density-lbm/ft3	91.97									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.041	1.088	1.827	2.63	3.085					
Zero Corrections-psid	-0.302	-0.02	-0.016	0.006	-0.333					
Corrected DP-Psid	0.343	1.108	1.843	2.624	3.418					
Actual DP-ft	1.67	2.59	3.56	4.45	5.17					

Run#	1004									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/30/93									
Time:	15:04									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19696									
Sat. Pressure-Psig	137.6									
Sat. Temperature-F(inlet)	165.5									
Inlet Flowrate-GPM	5.3									
Inlet Temperature-F	168.7									
Inlet G-lbm/hr/ft2	1007318		Temp	163.5	Density	79.64				
Subcooling-F	-3.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	575.8	582.4	587.6	583.2	586.4	584.1	584.3	579.8	585.3	584.4
Heat Loss-Watts	10.3	2.3	3.1	3.3	3.2	2.4	1.6	2.3	2.9	16.1
Heat Flux-Btu/Hr/ft2	9961	10096	10186	10109	10165	10125	10128	10050	10148	10130
Wall Temp. #3-F	182	182.2	181.9	182.9	183.6	183.7	184.8	182.2	180.2	179.7
Wall Temp. #4-F	182.5	180.8	182.7	183.2	183.7	184	184.7	182.8	181.5	182.9
Wall Temp. #5-F	183	178.5	183.5	183.4	182.6	183.7	183.7	181.5	180.1	178.6
Wall Temp. #1-F	168.7	181.9	179.9	182.9	181.8	184.2	185.9	182.9	179.6	178.8
Wall Temp. #2-F	184.4	181.8	180.8	182.6	181.9	184.1	185.8	183.6	180	179.8
Instream Temp.-F	168.4	167.8	168.8	171	170.5	170.7	172	170.5	170.7	170.8
Avg. Wall Temp.-F	183	181.7	181.3	183.1	182.5	183.9	185	182.6	180.3	179.9
Avg. Wall DT.-F	14.1	13.4	12.3	11.6	11.5	12.7	12.5	11.6	9.1	8.7
EXP. H-Btu/Hr/ft2/F	706.7	752.3	830.5	868.3	880.8	794.8	808.8	869	1112.3	1169.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.7									
DP Liquid Density-lbm/ft3	91.79									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.203	0.421	0.722	1.207	1.262					
Zero Corrections-psid	-0.302	-0.02	-0.016	0.006	-0.333					
Corrected DP-Psid	0.099	0.441	0.738	1.201	1.595					
Actual DP-ft	2.13	3.81	5.58	7.05	8.5					

Run#	1005									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/30/93									
Time:	15:04									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	136.7									
Sat. Temperature-F(inlet)	165.1									
Inlet Flowrate-GPM	3.9									
Inlet Temperature-F	169									
Inlet G-lbm/hr/ft2	742892		Temp	162.5	Density	79.82				
Subcooling-F	-3.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	572.7	572.4	578.1	579.4	576.8	571.4	574.6	574.2	574.3	577.9
Heat Loss-Watts	10.5	2.3	3.2	3.3	3.3	2.5	1.6	2.4	2.9	16.4
Heat Flux-Btu/Hr/ft2	9927	9922	10021	10044	9981	9905	9960	9953	9955	10018
Wall Temp. #3-F	182.2	182.1	181.8	183.5	184	184	185	182.4	180.1	179.8
Wall Temp. #4-F	182.7	180.8	182.4	183.6	184.1	184.5	185	182.6	181.3	183
Wall Temp. #5-F	183	179.3	183.6	183.7	182.8	184.1	183.8	181.5	180	178.6
Wall Temp. #1-F	169	181.9	179.8	183	182.3	184.6	185.7	183.2	179.3	178.2
Wall Temp. #2-F	184.7	181.8	180.8	183	182.3	184.5	185.8	183.9	179.7	179.3
Instream Temp.-F	169	168.1	169.6	171.8	170.8	170.7	171.8	170.4	170.6	171
Avg. Wall Temp.-F	183.2	181.7	181.2	183.5	182.9	184.3	185.1	182.7	180.1	179.8
Avg. Wall DT.-F	13.7	13.1	11.1	11.2	11.6	13.2	12.6	11.9	9	8.9
EXP. H-Btu/h-ft/ft2/F	724.6	757.3	899	897.1	858.7	753.1	777.6	838.5	1102.4	1203
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.3									
DP Liquid Density-lbm/ft3	91.94									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.115	0.641	1.121	1.759	1.934					
Zero Corrections-psid	-0.302	-0.02	-0.016	0.006	-0.333					
Corrected DP-Psid	0.187	0.661	1.137	1.753	2.267					
Actual DP-ft	1.97	3.42	4.86	6.05	7.28					

Run#	1006									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/30/93									
Time:	15:04									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	136.4									
Sat. Temperature-F(inlet)	165									
Inlet Flowrate-GPM	2.6									
Inlet Temperature-F	167.1									
Inlet G-lbm/hr/ft2	497129		Temp	160.8	Density	80.12				
Subcooling-F	-2.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	576.2	573.4	576.9	577.4	576.8	578.9	579.9	579.5	577.7	577.1
Heat Loss-Watts	10.4	2.3	3.2	3.3	3.3	2.5	1.6	2.4	3	16.9
Heat Flux-Btu/Hr/ft2	9968	9940	10000	10009	9998	10036	10052	10045	10014	10004
Wall Temp. #3-F	181.8	181.5	181.5	183	183.7	183.8	184.7	182.3	180.8	180.2
Wall Temp. #4-F	182.3	180.5	182.2	183.1	183.8	184.6	184.7	183	181.7	183.4
Wall Temp. #5-F	182.4	179.3	183.7	183.3	182.8	183.8	183.6	181.6	180.5	179
Wall Temp. #1-F	167.1	181.3	179.4	182.7	182.1	184.2	185.6	183	179.6	179
Wall Temp. #2-F	184.1	181.2	180.2	182.7	182.1	184.3	185.5	183.7	180.1	179.9
Instream Temp.-F	168.9	168	170.1	171.4	170.6	170.7	171.7	170.5	170.9	171.1
Avg. Wall Temp.-F	182.7	181.1	180.8	183	182.7	184.1	184.8	182.7	180.5	180.3
Avg. Wall DT.-F	15.8	12.7	10.3	11.2	11.6	12.9	12.7	11.8	9.1	8.7
EXP. H-Btu/Hr/ft2/F	652.9	784.1	973.4	896.8	858.4	775.1	793.7	853.8	1094.7	1143.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.5									
DP Liquid Density-lbm/ft3	91.81									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.054	0.821	1.458	2.227	2.534					
Zero Corrections-psid	-0.302	-0.02	-0.016	0.006	-0.333					
Corrected DP-Psid	0.248	0.841	1.474	2.221	2.867					
Actual DP-ft	1.85	3.07	4.23	5.18	6.16					

Run#	1007									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/31/83									
Time:	9:24									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	136.4									
Sat. Temperature-F(inlet)	165									
Inlet Flowrate-GPM	5.3									
Inlet Temperature-F	169									
Inlet G-lbm/hr/ft2	1008896		Temp	162.8	Density	79.77				
Subcooling-F	-4									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	292.8	290.6	285.4	295.5	293.1	286.2	289.2	286.8	283.8	298.7
Heat Loss-Watts	10	2.2	2.8	3.1	3	2	1.4	2	2.5	15.4
Heat Flux-Btu/Hr/ft2	5075	5037	4947	5122	5081	4961	5013	4968	4919	5178
Wall Temp. #3-F	179.7	177.6	176.8	179.5	178.7	175.8	177.6	175.6	175	176.6
Wall Temp. #4-F	179.5	177.6	177	179.5	178.9	176.2	177.4	175.5	175.8	178
Wall Temp. #5-F	180.1	176.5	178	179.3	178.2	176	176.6	175.5	176.1	175.6
Wall Temp. #1-F	169	178	175.9	180.3	177.9	178	179.2	176.2	174.4	176.6
Wall Temp. #2-F	180.6	178.1	176.3	179.7	178	177.5	178.5	176.4	174.4	176.3
Instream Temp.-F	168.7	167	166.9	170.4	169.9	169.8	172.6	170.4	170.2	171
Avg. Wall Temp.-F	180	177.8	176.5	179.7	178.3	176.5	177.9	175.8	174.9	176.6
Avg. Wall DT.-F	11	10.6	9.4	9	8.1	8.4	5	5.2	4.5	5.4
EXP. H-Btu/Hr/ft2/F	459.5	475.3	527.6	568	625.7	772.1	996	952.6	1098.7	961.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	72.7									
DP Liquid Density-lbm/ft3	92.42									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.207	0.205	0.438	0.746	0.719					
Zero Corrections-psid	-0.305	0.02	-0.009	-0.028	-0.336					
Corrected DP-Psid	0.098	0.185	0.445	0.774	1.055					
Actual DP-ft	2.14	4.3	6.15	7.87	9.54					

Run#	1008									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/31/93									
Time:	9:24									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	137.1									
Sat. Temperature-F(inlet)	165.3									
Inlet Flowrate-GPM	3.9									
Inlet Temperature-F	169.9									
Inlet G-lbm/hr/ft2	741400		Temp	163.4	Density	79.68				
Subcooling-F	-4.8									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	294.9	291.1	283.4	294.3	291	283.8	290.3	287.4	286.6	297
Heat Loss-Watts	9.9	2.1	2.7	3.1	2.9	2	1.3	1.9	2.5	14.9
Heat Flux-Btu/Hr/ft2	5112	5046	4913	5101	5044	4911	5032	4982	4968	5148
Wall Temp. #3-F	180.8	178.3	177.6	180.7	179.7	176.5	178.3	176.2	175.3	177.4
Wall Temp. #4-F	180.8	178.3	177.7	180.6	179.6	176.8	178.2	175.9	176.1	178.7
Wall Temp. #5-F	181.2	177.1	178.7	180.4	178.9	177	177.4	176	175.6	176.1
Wall Temp. #1-F	169.9	178.7	176.6	181.4	179.2	178.6	179.8	177	174.7	176.6
Wall Temp. #2-F	182.1	178.8	177	180.9	179.2	178.2	179.1	177	175	176.8
Instream Temp.-F	170	168.3	168.3	172.1	170.9	170.7	173	170.5	170.5	171.6
Avg. Wall Temp.-F	181.2	178.5	177.2	180.8	179.2	177.2	178.6	176.4	175.3	177.1
Avg. Wall DT.-F	11	10	8.7	8.4	8.1	6.8	5.3	5.7	4.8	5.9
EXP. H-Btu/Hr/ft2/F	465	504.8	564.5	604.1	623	779.1	943.7	874.8	1076.4	973.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.1									
DP Liquid Density-lbm/ft3	92.07									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.144	0.459	0.739	1.207	1.325					
Zero Corrections-psid	-0.305	0.02	-0.009	-0.028	-0.336					
Corrected DP-Psid	0.161	0.439	0.748	1.235	1.661					
Actual DP-ft	2.02	3.83	5.58	7.01	8.41					

Run#	1009									
Test Fluid	50% C4F10 - 50% R114									
Date:	12/31/93									
Time:	12:19									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	137.8									
Sat. Temperature-F(inlet)	165.4									
Inlet Flowrate-GPM	2.6									
Inlet Temperature-F	169.7									
Inlet G-lbm/hr/ft2	496910		Temp		161	Density	80.09			
Subcooling-F	-4.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	293.4	291.3	288.1	292.1	292.7	285.7	290.8	288.1	286.7	291
Heat Loss-Watts	9.9	2.1	2.7	3.1	2.9	2	1.3	1.9	2.5	15.1
Heat Flux-Btu/Hr/ft2	5086	5049	4969	5063	5074	4952	5041	4994	4970	5044
Wall Temp. #3-F	180.8	178.4	177.2	181	179.9	176.5	178.6	176.4	175.6	177.5
Wall Temp. #4-F	180.7	178.1	177.7	180.9	179.9	177	178.5	175.9	176.3	178.9
Wall Temp. #5-F	181.3	176.9	178.7	180.5	179	177	177.5	176.1	176.7	178.4
Wall Temp. #1-F	169.7	178.8	176.2	181.5	179.5	179	180.2	177.3	174.9	177
Wall Temp. #2-F	182.6	178.8	176.6	181.1	179.4	178.5	179.5	177.3	175.2	177.1
Instream Temp.-F	170	168.3	169.3	173	171	170.5	173	170.5	170.5	171.9
Avg. Wall Temp.-F	181.4	178.5	176.9	181	179.5	177.4	178.9	176.6	175.5	177.4
Avg. Wall DT.-F	11.1	10	7.4	7.7	8.2	6.7	5.6	5.9	4.8	5.3
EXP. H-Btu/Hr/ft2/F	457.4	505.1	670.1	659.7	617.2	744.6	895	850.1	1032.1	960.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.6									
DP Liquid Density-lbm/ft3	91.8									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.094	0.621	1.069	1.684	1.931					
Zero Corrections-psid	-0.305	0.02	-0.009	-0.028	-0.336					
Corrected DP-Psid	0.211	0.601	1.078	1.712	2.267					
Actual DP-ft	1.91	3.5	4.94	6.09	7.24					

Run#	1010									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/11/94									
Time:	8:29									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	127.5									
Sat. Temperature-F(inlet)	165.6									
Inlet Flowrate-GPM	5.2									
Inlet Temperature-F	168.3									
Inlet G-lbm/hr/ft2	996099		Temp	162.3	Density	80.27				
Subcooling-F	-2.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	873.3	865.8	863.5	865	862.6	870.6	872.6	869.1	868.9	868.5
Heat Loss-Watts	12.1	2.8	3.8	3.9	3.8	2.9	1.9	2.8	3.6	19.8
Heat Flux-Btu/Hr/ft2	15138	15008	14968	14994	14953	15091	15126	15065	15027	15055
Wall Temp. #3-F	183.3	185.4	184.1	185.4	186.5	187.4	188.2	184.9	183.3	182.2
Wall Temp. #4-F	184.1	182.8	185.8	186	188.8	187.6	188.2	186	184.8	188.6
Wall Temp. #5-F	184.3	181.1	186.9	186.4	185.1	188.7	187.2	184	183.2	180.5
Wall Temp. #1-F	168.3	184.1	181.6	184.3	183.8	187.2	189.3	185.5	182.4	179.8
Wall Temp. #2-F	186.3	183.7	183.1	184.9	184.3	187.3	189.4	186.8	183.1	182.1
Instream Temp.-F	168.8	169.1	169.4	171	170	170	171.7	170.4	170.4	170.7
Avg. Wall Temp.-F	184.5	184	183.7	185.5	185	187.2	188.5	185.4	183.4	182.6
Avg. Wall DT.-F	15	14.2	13.6	13.8	14.3	16.5	16.1	14.4	12.8	11.9
EXP. H-Btu/Hr/ft2/F	1008.1	1056.3	1102.7	1082.8	1043.9	912.2	940.9	1049.2	1223.6	1337.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.7									
DP Liquid Density-lbm/ft3	90.79									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.185	0.523	0.903	1.438	1.45					
Zero Corrections-psid	-0.317	0.101	-0.078	0.049	-0.366					
Corrected DP-Psid	0.132	0.422	0.981	1.389	1.816					
Actual DP-ft	2.03	3.77	5.03	6.56	7.91					

Run#	1011									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/11/94									
Time:	8:29									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	127.9									
Sat. Temperature-F(inlet)	165.8									
Inlet Flowrate-GPM	3.9									
Inlet Temperature-F	168.8									
Inlet G-lbm/hr/ft2	747515		Temp		162	Density	80.32			
Subcooling-F	-3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	877.4	869.5	868.2	869.2	869.3	874.4	876.1	869.8	869.4	872.4
Heat Loss-Watts	11.4	2.6	3.5	3.8	3.7	2.8	1.9	2.7	3.4	19.2
Heat Flux-Btu/Hr/ft2	15209	15072	15015	15067	15069	15157	15187	15077	15070	15122
Wall Temp. #3-F	184	185.9	184.6	186.8	187.9	188.5	189	185.6	184.3	183.6
Wall Temp. #4-F	184.8	183.4	188.2	187.5	188.2	188.5	189	187	185.6	190.1
Wall Temp. #5-F	185.2	181.5	187.3	187.9	186.3	188	188	184.8	184.1	181.9
Wall Temp. #1-F	168.8	184.7	182	185.9	185.3	188.4	190.4	186.4	183.2	181.5
Wall Temp. #2-F	187	184.3	183.5	186.4	185.7	188.5	190.3	187.7	184.1	183.7
Instream Temp.-F	169.2	169.5	169.8	172.2	170.8	170.6	172.3	170.8	170.8	171.7
Avg. Wall Temp.-F	185.3	184.6	184.1	187	186.4	188.4	189.3	186.3	184.3	184.2
Avg. Wall DT.-F	15.4	14.4	13.6	14.1	14.9	17.1	16.4	14.8	12.8	11.8
EXP. H-Btu/Hr/ft2/F	990	1047.1	1104.3	1065.3	1011.7	888.2	928.6	1017.5	1179.3	1284.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.8									
DP Liquid Density-lbm/ft3	90.78									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.08	0.776	1.314	1.987	2.151					
Zero Corrections-psid	-0.317	0.101	-0.078	0.049	-0.366					
Corrected DP-Psid	0.237	0.675	1.392	1.938	2.517					
Actual DP-ft	1.84	3.31	4.29	5.57	6.65					

Run#	1012									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/11/94									
Time:	8:29									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	127.4									
Sat. Temperature-F(inlet)	165.5									
Inlet Flowrate-GPM	2.6									
Inlet Temperature-F	168.2									
Inlet G-lbm/hr/ft2	500295		Temp		160	Density	80.63			
Subcooling-F	-2.7									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	863.7	863.9	860.6	865.4	874.6	865.5	862.7	861.7	864.3	868.3
Heat Loss-Watts	12.7	2.9	4.1	4.2	4.2	3.3	2.3	3.2	3.9	22.4
Heat Flux-Btu/Hr/ft2	14972	14975	14918	15001	15161	15003	14954	14937	14982	15051
Wall Temp. #3-F	183	185.3	184.3	185.8	187.3	188.1	188.9	186.1	185	184
Wall Temp. #4-F	184.1	182.7	188	188.3	187.4	188.2	188.9	187.1	186.2	190.2
Wall Temp. #5-F	184.4	181.3	187.5	186.8	185.8	187.3	187.9	185.3	184.5	182.3
Wall Temp. #1-F	168.2	184	181.8	184.8	184.7	187.6	189.8	186.8	183.5	181.6
Wall Temp. #2-F	185.5	183.6	183.4	185.3	185	187.9	189.9	188.2	184.4	183.8
Instream Temp.-F	168.9	169.7	170	171.2	170.5	170.5	172.4	171.1	171.2	172
Avg. Wall Temp.-F	184.3	183.9	183.9	185.9	185.7	187.8	189.1	186.7	184.7	184.4
Avg. Wall DT.-F	14.7	13.5	13.2	14	14.5	16.6	16	14.9	12.8	11.7
EXP. H-Btu/Hr/ft2/F	1020.3	1107.4	1130.1	1067.9	1042.7	902.6	934.4	1000.8	1168.6	1286.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.9									
DP Liquid Density-lbm/ft3	90.87									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.026	1.1	1.81	2.653	2.899					
Zero Corrections-psid	-0.317	0.101	-0.078	0.049	-0.368					
Corrected DP-Psid	0.343	0.999	1.888	2.604	3.265					
Actual DP-ft	1.64	2.72	3.39	4.37	5.3					

Run#	1013									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/11/94									
Time:	13:28									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	128									
Sat. Temperature-F(inlet)	165.8									
Inlet Flowrate-GPM	5.3									
Inlet Temperature-F	168.9									
Inlet G-lbm/hr/ft2	1012445		Temp	163.7	Density	80.05				
Subcooling-F	-3.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	581.1	581.4	580.7	582.7	578.3	586.8	583.8	581.3	581.9	578.8
Heat Loss-Watts	10.7	2.4	3.3	3.5	3.4	2.6	1.7	2.5	3.2	17.6
Heat Flux-Btu/Hr/ft2	10073	10078	10066	10101	10024	10172	10120	10076	10087	9998
Wall Temp. #3-F	182.2	182.6	183.1	184.2	184.7	184.9	186.2	183.6	183.3	181.2
Wall Temp. #4-F	182.7	181.7	184.1	184.4	185.1	185.5	186.2	184.2	184.2	183.8
Wall Temp. #5-F	183.5	180.7	185.2	184.9	184.3	185.4	185.3	183.1	182.9	180.8
Wall Temp. #1-F	168.9	182.4	180.6	183.3	182.9	185.4	187.1	184	181.6	180.3
Wall Temp. #2-F	184.9	182.4	181.7	183.7	182.8	185.5	187.1	184.5	182.2	181.3
Instream Temp.-F	169.3	169.1	169.4	171.1	170.3	170.3	172.1	170.8	170.7	171
Avg. Wall Temp.-F	183.3	182.3	182.4	184.2	183.8	185.3	186.4	183.9	182.8	181.5
Avg. Wall DT.-F	13.6	12.7	12.5	12.6	13	14.5	13.8	12.6	11.7	10
EXP. H-Btu/Hr/ft2/F	742.3	792.3	804	798.9	769.8	696.6	732.1	798.2	863.3	987
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.1									
DP Liquid Density-lbm/ft3	90.85									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.231	0.344	0.736	1.25	1.278					
Zero Corrections-psid	-0.306	0.106	-0.027	-0.005	-0.335					
Corrected DP-Psid	0.075	0.238	0.763	1.255	1.613					
Actual DP-ft	2.13	4.11	5.44	6.82	8.31					

Run#	1014									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/11/94									
Time:	13:32									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	126.6									
Sat. Temperature-F(inlet)	165.1									
Inlet Flowrate-GPM	3.9									
Inlet Temperature-F	169									
Inlet G-lbm/hr/ft2	745451		Temp	163.4	Density	80.09				
Subcooling-F	-3.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	576.2	577.3	573.9	574	572.6	578.7	578.7	574.7	574.8	574.5
Heat Loss-Watts	10.8	2.4	3.3	3.5	3.4	2.6	1.7	2.5	3.2	17.8
Heat Flux-Btu/Hr/ft2	9988	10007	9948	9950	9926	10031	10031	9962	9964	9959
Wall Temp. #3-F	182.2	182.3	182.6	184.3	184.9	184.6	185.8	183.1	182.7	181.6
Wall Temp. #4-F	182.6	181.1	183.6	184.8	185.2	185.2	185.7	183.6	183.6	184.3
Wall Temp. #5-F	183.7	180.4	184.7	185.3	184.1	185.1	184.9	182.6	182.3	181.2
Wall Temp. #1-F	169	182.2	180.1	183.6	183	185.3	186.7	183.6	180.9	180.4
Wall Temp. #2-F	184.7	182.2	181.1	183.9	182.9	185.2	186.7	184.2	181.4	181.5
Instream Temp.-F	169.5	168.9	169.4	171.2	169.8	169.8	171.6	170.1	170	171.2
Avg. Wall Temp.-F	183.3	182	181.9	184.6	183.8	185.1	186	183.4	182.2	181.8
Avg. Wall DT.-F	13.3	12.6	12	12.9	13.6	14.8	13.9	12.9	11.7	10.1
EXP. H-Btu/Hr/ft2/F	748.2	794.4	829	774.3	732.4	677.9	721.3	774.1	849.4	981.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.4									
DP Liquid Density-lbm/ft3	90.82									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.145	0.582	1.14	1.785	1.941					
Zero Corrections-psid	-0.306	0.106	-0.027	-0.005	-0.335					
Corrected DP-Psid	0.161	0.476	1.167	1.79	2.276					
Actual DP-ft	1.98	3.68	4.71	5.85	7.11					

Run#	1015									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/11/94									
Time:	13:32									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	127.4									
Sat. Temperature-F(inlet)	165.5									
Inlet Flowrate-GPM	2.6									
Inlet Temperature-F	168.4									
Inlet G-lbm/hr/ft2	498344		Temp		162	Density	80.32			
Subcooling-F	-2.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	580.2	581.1	577.2	576.8	576.3	578.6	578.6	577.7	578.3	577.1
Heat Loss-Watts	10.8	2.4	3.4	3.5	3.5	2.6	1.7	2.5	3.2	18.2
Heat Flux-Btu/Hr/ft2	10057	10073	10005	9998	9990	10030	10030	10014	10024	10004
Wall Temp. #3-F	182.2	182.6	183.1	184.3	185	185.3	186.4	183.9	183.3	182.2
Wall Temp. #4-F	182.7	181.6	184.1	184.7	185.5	185.8	186.5	184.5	184.4	185
Wall Temp. #5-F	183.6	180.7	185.6	185.4	184.6	185.7	185.8	183.5	183.1	181.4
Wall Temp. #1-F	168.4	182.3	180.5	183.7	183.3	185.6	187.2	184.5	181.7	180.8
Wall Temp. #2-F	184.4	182.3	181.6	183.9	183.1	185.5	187.3	185.2	182.2	181.6
Instream Temp.-F	168.8	169.6	170.1	171.4	170.5	170.6	172.2	171	170.9	171.7
Avg. Wall Temp.-F	183.2	182.2	182.3	184.5	184.1	185.6	186.6	184.3	182.9	182.2
Avg. Wall DT.-F	14	12.1	11.8	12.7	13.2	14.5	14	12.9	11.6	10
EXP. H-Btu/Hr/ft2/F	719.9	829.4	849.8	788.9	758.3	689.5	717.1	778.2	865.1	995.8
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.9									
DP Liquid Density-lbm/ft3	90.77									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.056	0.822	1.529	2.317	2.606					
Zero Corrections-psid	-0.306	0.106	-0.027	-0.005	-0.335					
Corrected DP-Psid	0.25	0.716	1.556	2.322	2.941					
Actual DP-ft	1.81	3.24	3.99	4.88	5.89					

Run#	1016									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/11/94									
Time:	13:32									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	128									
Sat. Temperature-F(inlet)	165.8									
Inlet Flowrate-GPM	5.2									
Inlet Temperature-F	168.7									
Inlet G-lbm/hr/ft2	992750		Temp	164	Density	80				
Subcooling-F	-2.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	290.9	290.9	283.9	282.6	283.4	290	289.2	287.7	294.2	283.9
Heat Loss-Watts	10	2.2	3	3	3	2.2	1.4	2.2	2.9	15.8
Heat Flux-Btu/Hr/ft2	5043	5043	4921	5072	5088	5027	5013	4987	5100	5095
Wall Temp. #3-F	180.6	179.6	179.7	179.5	180	179.7	180.4	179.7	179.9	178.2
Wall Temp. #4-F	180.8	179.7	180	179.6	180.2	180.5	180.6	179.9	180.6	179.2
Wall Temp. #5-F	181.4	178.9	181	179.6	179.7	179.7	180	179.6	179.8	178.1
Wall Temp. #1-F	168.7	179.8	178.7	179.4	179.3	180.1	180.7	180.1	178.6	177.4
Wall Temp. #2-F	180.9	180	179.2	179.4	179	179.7	180.8	180.5	178.8	177.9
Instream Temp.-F	169.4	168.8	169.4	170.7	170.5	170.7	171.7	170.6	170.5	170.8
Avg. Wall Temp.-F	180.9	179.8	179.4	179.5	179.6	180	180.5	180	179.5	178.2
Avg. Wall DT.-F	11.3	10.7	9.8	8.6	8.8	9.1	8.6	9.1	8.8	7.1
EXP. H-Btu/Hr/ft2/F	446.4	469.2	503.3	590.1	576.6	554.1	584.7	548	578.9	714.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77									
DP Liquid Density-lbm/ft3	91.26									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.252	0.178	0.462	0.833	0.682					
Zero Corrections-psid	-0.305	0.118	-0.009	-0.051	-0.345					
Corrected DP-Psid	0.053	0.06	0.471	0.884	1.027					
Actual DP-ft	2.19	4.46	6	7.54	9.42					

Run#	1017									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/11/94									
Time:	16:55									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	127.1									
Sat. Temperature-F(inlet)	165.4									
Inlet Flowrate-GPM	3.9									
Inlet Temperature-F	169.3									
Inlet G-lbm/hr/ft2	745155		Temp		163.8	Density	80.06			
Subcooling-F	-3.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	289.9	290.1	281.8	288	288.3	288.1	287.4	288.1	289.2	288.2
Heat Loss-Watts	10	2.2	2.9	3.1	2.9	2.1	1.5	2.2	2.8	15.8
Heat Flux-Btu/Hr/ft2	5025	5029	4885	4992	4997	4994	4982	4959	5013	4996
Wall Temp. #3-F	181.2	179.9	179.7	180.8	180.7	179.9	181.6	180.3	179.9	179.3
Wall Temp. #4-F	181.4	179.9	179.9	180.8	180.6	180.4	181.7	180.2	180.5	180.2
Wall Temp. #5-F	182.2	178.8	180.9	180.6	179.6	179.6	181	179.6	179.7	178.9
Wall Temp. #1-F	169.3	180.2	178.7	180.6	180.2	180.3	182.1	180.9	178.8	178.5
Wall Temp. #2-F	182.5	180.3	179.1	180.5	179.9	180	182.1	181.4	179	179
Instream Temp.-F	169.9	168.9	169.2	171.6	170.4	170.4	171.9	170.4	170.4	171.4
Avg. Wall Temp.-F	181.8	180.1	179.4	180.7	180.1	180.1	181.7	180.5	179.6	179.2
Avg. Wall DT.-F	11.7	10.9	9.9	8.9	9.4	9.4	9.6	9.9	9	7.6
EXP. H-Btu/Hr/ft2/F	429.6	459.3	492	562.6	528.9	529.9	520.3	503.2	559.9	661.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.9									
DP Liquid Density-lbm/ft3	90.87									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.189	0.374	0.785	1.28	1.273					
Zero Corrections-psid	-0.305	0.118	-0.009	-0.051	-0.345					
Corrected DP-Psid	0.116	0.256	0.794	1.331	1.618					
Actual DP-ft	2.06	4.08	5.38	6.69	8.3					

Run#	1018									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/11/94									
Time:	16:55									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	126.3									
Sat. Temperature-F(inlet)	165									
Inlet Flowrate-GPM	2.6									
Inlet Temperature-F	167.9									
Inlet G-lbm/hr/ft2	498637		Temp		161.7	Density	80.36			
Subcooling-F	-2.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	287.6	288.3	282.8	286.2	285.7	284.8	285.1	283.8	287.4	287.2
Heat Loss-Watts	10.2	2.3	3.1	3.2	3.1	2.3	1.5	2.3	3	16.4
Heat Flux-Btu/Hr/ft2	4985	4997	4902	4961	4952	4937	4942	4919	4982	4978
Wall Temp. #3-F	180.5	179.6	179.9	180.4	180.9	180.3	181.3	180.2	180	178.9
Wall Temp. #4-F	180.7	179.6	180.1	180.4	181.1	181.1	181.3	180.3	180.6	179.9
Wall Temp. #5-F	181.6	178.7	181.1	180.4	180.3	180.4	180.9	179.9	179.7	178.5
Wall Temp. #1-F	167.9	179.9	178.7	180	180	180.9	181.7	180.8	178.7	178
Wall Temp. #2-F	182.2	180	179.1	180	179.8	180.6	181.7	181.2	179	178.4
Instream Temp.-F	168.6	168.3	169.7	170.9	170.2	170.2	171.2	170.1	170.1	171
Avg. Wall Temp.-F	181.3	179.8	179.5	180.3	180.3	180.7	181.4	180.5	179.6	178.7
Avg. Wall DT.-F	12.4	11.2	9.5	9.2	9.9	10.3	10	10.2	9.3	7.5
EXP. H-Btu/Hr/ft2/F	401.2	444.3	514.6	640.7	501.5	481.6	496.4	484.3	637.1	662.5
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	74.9									
DP Liquid Density-lbm/ft3	91.47									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.133	0.54	1.089	1.717	1.823					
Zero Corrections-psid	-0.305	0.118	-0.009	-0.051	-0.345					
Corrected DP-Psid	0.172	0.422	1.098	1.768	2.168					
Actual DP-ft	1.97	3.8	4.86	5.94	7.36					

Run#	1019									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/12/94									
Time:	12.23									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	97.2									
Sat. Temperature-F(inlet)	150									
Inlet Flowrate-GPM	5									
Inlet Temperature-F	148.8									
Inlet G-lbm/hr/ft2	992861		Temp	142.9	Density	83.21				
Subcooling-F	1.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	874	862.1	867.7	867.5	863.6	861	868.3	865.1	869.4	870.2
Heat Loss-Watts	12.3	2.8	3.9	4	4	3	2.1	2.9	3.6	21.4
Heat Flux-Btu/Hr/ft2	15150	14944	15041	15038	14970	14925	15051	14996	15070	15084
Wall Temp. #3-F	165.6	167.6	166.4	168	170.1	170.3	171.6	167.2	166.2	166.9
Wall Temp. #4-F	166.5	164.7	168.3	168.6	170.3	170.3	171.6	168.4	167.2	172.6
Wall Temp. #5-F	167.3	163.2	169.4	169.4	168.6	170.3	170.3	166.3	165.2	165.1
Wall Temp. #1-F	148.8	165.7	163.5	166.9	167.3	170.3	172.9	168.4	164.4	164.3
Wall Temp. #2-F	169.1	165.6	165.2	167.8	167.5	170.7	172.8	169.6	165.3	166.2
Instream Temp.-F	149	149.8	150.1	151.6	151	150.6	152.6	150.7	150.5	151.8
Avg. Wall Temp.-F	167.1	165.9	165.9	168.2	168.4	170.3	171.8	168	165.7	167
Avg. Wall DT.-F	17.4	15.4	15.1	15.9	16.7	19	18.6	16.6	14.5	14.5
EXP. H-Btu/Hr/ft2/F	868.7	968.8	998.1	943.1	893.8	784.5	811	903.2	1040.9	1037.6
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	83.3									
DP Liquid Density-lbm/ft3	90.62									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.242	0.32	0.766	1.248	1.233					
Zero Corrections-psid	-0.296	-0.097	-0.005	0.038	-0.168					
Corrected DP-Psid	0.054	0.417	0.771	1.21	1.401					
Actual DP-ft	2.08	3.63	5.2	6.62	8.33					

Run#	1020									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/12/94									
Time:	14:27									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	96.3									
Sat. Temperature-F(inlet)	149.5									
Inlet Flowrate-GPM	3.8									
Inlet Temperature-F	148.4									
Inlet G-lbm/hr/ft2	755754		Temp		142	Density	83.34			
Subcooling-F	1.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	865.7	864.6	861.6	861.4	862.8	866.8	868.5	862.9	867.5	861.5
Heat Loss-Watts	12.1	2.7	3.8	4	4	3	2	2.8	3.6	21.3
Heat Flux-Btu/Hr/ft2	15006	14987	14935	14932	14956	15025	15055	14958	15038	14934
Wall Temp. #3-F	165.2	167.5	166.3	168	170.3	170.5	171.1	167.2	168.4	167.2
Wall Temp. #4-F	166.2	164.6	168.1	168.7	170.3	170.6	171.1	168.1	167.3	172.7
Wall Temp. #5-F	166.5	162.9	169.1	169	168.5	170.3	169.7	168	165.3	165.3
Wall Temp. #1-F	148.4	165.6	163.4	167	167.6	170.4	172.1	168.2	164.5	164.4
Wall Temp. #2-F	168.2	165.4	165	167.4	167.7	170.9	171.9	169.6	165.4	166.4
Instream Temp.-F	148.8	149.8	150.3	151.7	150.8	150.6	152.1	150.3	150.2	151.9
Avg. Wall Temp.-F	166.5	165.8	165.7	168.2	168.5	170.5	171.2	167.8	165.8	167.2
Avg. Wall DT.-F	17	15.3	14.7	15.8	17	19.2	18.4	16.8	14.8	14.6
EXP. H-Btu/Hr/ft2/F	880.3	978.7	1014.3	945	877.2	783.8	818.2	888	1006.2	1021.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.2									
DP Liquid Density-lbm/ft3	90.94									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.139	0.611	1.226	1.867	2.016					
Zero Corrections-psid	-0.296	-0.097	-0.005	0.038	-0.168					
Corrected DP-Psid	0.157	0.708	1.231	1.829	2.184					
Actual DP-ft	1.91	3.14	4.42	5.57	7					

Run#	1021									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/12/94									
Time:	14:27									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	95.6									
Sat. Temperature-F(inlet)	149.1									
Inlet Flowrate-GPM	2.5									
Inlet Temperature-F	147.5									
Inlet G-lbm/hr/ft2	498407		Temp	140.6	Density	83.54				
Subcooling-F	1.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	870.1	869.3	864.7	867.5	865.7	872.6	871.5	865.2	868.9	867.9
Heat Loss-Watts	12	2.8	3.8	4	4	3.1	2	2.9	3.7	22
Heat Flux-Btu/Hr/ft2	15083	15069	14989	15038	15006	15126	15107	14998	15062	15044
Wall Temp. #3-F	163.7	166.5	165.7	166.7	169.3	170.2	170.3	167.1	166.6	167.3
Wall Temp. #4-F	164.9	163.8	167.6	167.2	169.8	170.4	170.4	168.7	167.6	172.8
Wall Temp. #5-F	165.3	162.5	168.8	168	167.8	169.8	169.3	166.6	165.4	165.2
Wall Temp. #1-F	147.5	164.4	162.8	166.2	166.4	169.6	171.9	168.2	164.5	164.7
Wall Temp. #2-F	166.6	164.2	164.4	166.3	166.7	169.9	171.6	169.3	165.4	166.4
Instream Temp.-F	147.8	149.9	149.9	151.2	150.6	150.6	151.8	150.4	150.3	151.9
Avg. Wall Temp.-F	165.1	164.7	165.1	167	167.7	170	170.7	168	165.9	167.3
Avg. Wall DT.-F	16.6	14.1	14.5	15.1	16.4	18.7	18.2	16.9	14.9	14.7
EXP. H-Btu/Hr/ft2/F	906.2	1065.4	1030.3	992.9	915.2	808.2	829.3	887.3	1009.6	1023.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.1									
DP Liquid Density-lbm/ft3	91.25									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.005	0.949	1.733	2.535	2.834					
Zero Corrections-psid	-0.296	-0.097	-0.005	0.038	-0.168					
Corrected DP-Psid	0.291	1.046	1.738	2.497	3.002					
Actual DP-ft	1.68	2.57	3.56	4.43	5.61					

Run#	1022									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/13/94									
Time:	9:58									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	95.6									
Sat. Temperature-F(inlet)	149.1									
Inlet Flowrate-GPM	5									
Inlet Temperature-F	148.5									
Inlet G-lbm/hr/ft2	992342		Temp		143.2	Density	83.16			
Subcooling-F	0.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	582.1	581	581.8	583.5	580.8	582.2	582.8	581.7	583	588.2
Heat Loss-Watts	12.1	2.7	3.7	3.9	3.8	2.7	1.9	2.7	3.5	19.9
Heat Flux-Btu/Hr/ft2	10090	10071	10085	10115	10068	10092	10102	10083	10106	10196
Wall Temp. #3-F	164.5	164.9	164.6	166	166.8	165.7	167.4	164.8	164.4	163.8
Wall Temp. #4-F	165.2	163.2	165.6	166.3	166.9	168	167.5	165.6	165.4	166.8
Wall Temp. #5-F	166.2	162.5	167	167.4	165.9	165.9	166.8	164.7	164.7	163.2
Wall Temp. #1-F	148.5	163.9	162.4	165.3	164.9	165.8	168.8	165.4	162.8	162.2
Wall Temp. #2-F	167.2	163.9	163.3	165.4	165	165.9	168.5	166.2	163.6	163.4
Instream Temp.-F	149	148.9	149.2	151.4	150.4	150.4	151.7	150.5	150.2	150.5
Avg. Wall Temp.-F	165.8	164	164	166.3	165.7	165.9	167.8	165.3	164.2	163.9
Avg. Wall DT.-F	16.3	14.6	14.3	14.4	14.8	15	15.6	14.4	13.5	12.9
EXP. H-Btu/Hr/ft2/F	618.3	688.9	704.3	702.7	679.3	673.1	645.8	701	747.9	789.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.4									
DP Liquid Density-lbm/ft3	90.92									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.218	0.298	0.71	1.194	1.189					
Zero Corrections-psid	-0.246	-0.114	0.01	0.015	-0.332					
Corrected DP-Psid	0.028	0.412	0.7	1.179	1.521					
Actual DP-ft	2.14	3.66	5.35	6.7	8.16					

Run#	1023										
Test Fluid	25% C4F10 - 75% R114										
Date:	1/13/94										
Time:	9:58										
Note											
Flow Area-ft2	0.00336										
Heat Flow Area-ft2	0.19695										
Sat. Pressure-Psig	95.6										
Sat. Temperature-F(inlet)	149.1										
Inlet Flowrate-GPM	3.8										
Inlet Temperature-F	148.6										
Inlet G-lbm/hr/ft2	754443		Temp		143	Density	83.19				
Subcooling-F	0.5										
Flow Observation											
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10	
Heat Input-Watts(net)	583.3	580.4	578.9	581.2	581.2	582.9	583	581.9	579.3	587.9	
Heat Loss-Watts	10	2.2	3	3.2	3.2	2.3	1.5	2.2	2.8	16.5	
Heat Flux-Btu/Hr/ft2	10111	10061	10035	10075	10075	10104	10106	10087	10042	10191	
Wall Temp. #3-F	164.4	164.7	164.2	166.4	167.4	166	167.5	164.8	164.3	164.3	
Wall Temp. #4-F	165.1	163	165.3	166.8	167.4	166.1	167.5	165.6	165.3	167.4	
Wall Temp. #5-F	166.2	162.5	167.1	167.8	166.3	166.6	166.9	164.7	164.6	163.5	
Wall Temp. #1-F	148.6	163.8	161.9	165.6	165.3	166.3	169	165.4	162.6	162.7	
Wall Temp. #2-F	167.2	163.8	162.8	165.9	165.2	166.6	168.4	166.3	163.5	164	
Instream Temp.-F	149.1	149.3	149.4	152	150.4	150.2	151.8	150.4	150	151.2	
Avg. Wall Temp.-F	165.7	163.8	163.6	166.7	166.1	166.3	167.9	165.4	164.1	164.4	
Avg. Wall DT.-F	16.2	14.1	13.7	14.2	15.2	15.6	15.8	14.5	13.6	12.7	
EXP. H-Btu/Hr/ft2/F	625.4	715	732.7	709.8	663	648	639.5	695.4	738	801.2	
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10						
DP liquid Temp.-F	81.3										
DP Liquid Density-lbm/ft3	90.83										
Elevation-ft	2	4	6	8	9.875						
Measured DP-Psid	-0.134	0.523	1.086	1.705	1.829						
Zero Corrections-psid	-0.246	-0.114	0.01	0.015	-0.332						
Corrected DP-Psid	0.112	0.637	1.076	1.69	2.161						
Actual DP-ft	1.99	3.26	4.69	5.81	7.04						

Run#	1024									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/13/94									
Time:	9:58									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	95.7									
Sat. Temperature-F(inlet)	149.2									
Inlet Flowrate-GPM	2.5									
Inlet Temperature-F	147.6									
Inlet G-lbm/hr/ft2	497808		Temp		141.3	Density	83.44			
Subcooling-F	1.6									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	574.3	578.4	578.7	581.6	575.8	578.8	577.9	581.7	579.8	576.8
Heat Loss-Watts	10.1	2.2	3	3.3	3.2	2.4	1.6	2.3	2.9	17
Heat Flux-Btu/Hr/ft2	9955	10026	10031	10082	9981	10033	10018	10083	10050	9998
Wall Temp. #3-F	163.7	164.2	163.4	166.1	168.8	166.2	167.8	164.6	164	164.4
Wall Temp. #4-F	164.6	162.6	164.8	166.3	166.8	166.5	167.9	165.3	164.9	167.2
Wall Temp. #5-F	165.8	161.8	166.4	167.5	165.6	166.7	167.1	164.7	164.2	163.5
Wall Temp. #1-F	147.6	163.5	161.3	165.4	164.7	166.1	169.7	165.7	162.2	162.9
Wall Temp. #2-F	166.3	163.2	162.1	165.8	164.7	166.2	169	166.5	162.9	163.7
Instream Temp.-F	148	149	149.3	152.1	150.4	150.4	151.9	150.4	150.3	151.8
Avg. Wall Temp.-F	165.1	163.4	162.9	166.3	165.5	166.4	168.3	165.4	163.6	164.3
Avg. Wall DT.-F	16.7	13.9	13.1	13.8	14.6	15.5	15.9	14.5	12.9	12.1
EXP. H-Btu/Hr/ft2/F	597.9	720.2	763	732.2	683.7	646.4	628.2	695.2	780	827.1
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.8									
DP Liquid Density-lbm/ft3	90.78									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.048	0.784	1.511	2.281	2.548					
Zero Corrections-psid	-0.246	-0.114	0.01	0.015	-0.332					
Corrected DP-Psid	0.198	0.898	1.501	2.268	2.88					
Actual DP-ft	1.83	2.8	3.94	4.79	5.77					

Run#	1025									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/13/94									
Time:	15:57									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	95.9									
Sat. Temperature-F(inlet)	149.3									
Inlet Flowrate-GPM	5									
Inlet Temperature-F	150.6									
Inlet G-lbm/hr/ft2	989387		Temp		144.9	Density	82.92			
Subcooling-F	-1.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	295.8	296.7	239.1	284	297.6	290.7	288.4	291.9	241.5	254.9
Heat Loss-Watts	8.7	1.9	2.4	2.6	2.5	1.8	1.2	1.8	2.2	12.5
Heat Flux-Btu/Hr/ft2	5128	5143	4145	4923	5159	5039	4999	5060	4188	4419
Wall Temp. #3-F	162.9	162.2	159.9	162.3	161.8	160.6	161.9	160.4	159.3	158.5
Wall Temp. #4-F	163	161.9	160.3	162.3	161.9	161.2	161.8	160.8	159.9	159.5
Wall Temp. #5-F	164.6	161	160.8	162.5	161.2	161.2	161.2	160.4	159.3	158.5
Wall Temp. #1-F	150.6	162	158.9	161.8	160.8	161.5	162.7	160.7	157.7	158.7
Wall Temp. #2-F	164	162	159.4	161.9	160.7	161.2	162.3	160.9	157.9	158.9
Instream Temp.-F	151.2	150.3	150.2	151.5	150.6	150.2	151.4	150.3	149.9	150.2
Avg. Wall Temp.-F	163.6	162	159.6	162.2	161.2	161.1	162	160.6	158.8	158.8
Avg. Wall DT.-F	12.2	11.5	9.2	10.5	10.3	10.7	10.4	10.1	8.7	8.4
EXP. H-Btu/Hr/ft2/F	420.6	447.5	448.7	468.7	500	471.1	482.8	500.4	479.5	524.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	79.6									
DP Liquid Density-lbm/ft3	91									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.238	0.235	0.577	1.012	1.01					
Zero Corrections-psid	-0.264	-0.096	-0.013	0.011	-0.282					
Corrected DP-Psid	0.026	0.331	0.59	1.001	1.292					
Actual DP-ft	2.15	3.82	5.56	7.04	8.59					

Run#	1026									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/13/94									
Time:	15:57									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	95									
Sat. Temperature-F(inlet)	149.3									
Inlet Flowrate-GPM	3.8									
Inlet Temperature-F	150.5									
Inlet G-lbm/hr/ft2	754048		Temp	143.3	Density	83.15				
Subcooling-F	-1.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	289.8	291.9	287.7	293.1	292.3	290.5	289	292.2	288.7	283.9
Heat Loss-Watts	8.9	2.	2.6	2.8	2.7	2	1.3	2	2.5	14.3
Heat Flux-Btu/Hr/ft2	5023	5060.	4987	5081	5067	5036	5010	5065	4970	4921
Wall Temp. #3-F	162.3	162.1	161.5	163.2	162.7	161.5	162.6	161.1	161	160.5
Wall Temp. #4-F	162.4	161.7	161.8	163.2	162.8	162.1	162.6	161.3	161.4	161.5
Wall Temp. #5-F	163.3	161.1	162.6	163.4	162	162.1	161.9	161	160.7	160.5
Wall Temp. #1-F	150.5	161.7	160.2	162.7	161.6	162.5	163.3	161.5	159.4	160.4
Wall Temp. #2-F	163.6	161.9	160.6	162.7	161.5	162.3	162.8	161.7	159.6	160.7
Instream Temp.-F	151.1	150.2	150.2	151.9	151	150.5	151.5	150.2	150	151.2
Avg. Wall Temp.-F	162.9	161.9	161	163.1	162	162.1	162.6	161.3	160.4	160.7
Avg. Wall DT.-F	11.6	11.4	10.6	11	10.7	11.3	10.9	10.9	10.2	9.3
EXP. H-Btu/Hr/ft2/F	434.1	443	470.6	462.1	471.5	444.7	459	466.1	487.5	529.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	76.8									
DP Liquid Density-lbm/ft3	91.28									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.159	0.424	0.891	1.446	1.544					
Zero Corrections-psid	-0.264	-0.096	-0.013	0.011	-0.282					
Corrected DP-Psid	0.105	0.52	0.904	1.435	1.826					
Actual DP-ft	2.01	3.49	5.02	6.3	7.68					

Run#	1027									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/13/94									
Time:	15:57									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	95.5									
Sat. Temperature-F(inlet)	149									
Inlet Flowrate-GPM	2.5									
inlet Temperature-F	150.1									
Inlet G-lbm/hr/ft2	497293		Temp	141.9	Density	83.35				
Subcooling-F	-1.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	288.6	288.4	291.6	291.5	285.6	284.4	286.3	285.8	290.3	288.4
Heat Loss-Watts	9.1	2.	2.7	2.9	2.8	2	1.4	2.	2.6	14.5
Heat Flux-Btu/Hr/ft2	5003	4999	5055	5053	4951	4930	4963	4954	5032	4999
Wall Temp. #3-F	161.7	161.1	161.6	162.9	162.5	161.8	163.1	161	161.2	160.2
Wall Temp. #4-F	161.9	161.1	162	163	162.8	162.4	163.1	161.7	161.7	161.3
Wall Temp. #5-F	162.8	160.5	163	163.4	162.1	162.3	162.6	161.5	161	159.8
Wall Temp. #1-F	150.1	161.1	159.8	162.6	161.4	162.5	164.2	161.9	159.7	160
Wall Temp. #2-F	163.3	161.2	160.4	162.5	161.3	162.2	163.6	162.3	159.9	160.2
Instream Temp.-F	150.6	150.1	150.1	151.3	150.6	150.4	151.7	150.6	150.4	150.9
Avg. Wall Temp.-F	162.4	161.1	161	163	161.9	162.3	163.3	161.7	160.7	160.3
Avg. Wall DT.-F	11.6	10.8	10.6	11.4	11.1	11.6	11.4	10.9	10.1	9.2
EXP. H-Btu/Hr/ft2/F	431.3	462.9	475.9	441.4	447	424	435.5	456.3	499.6	544.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.4									
DP Liquid Density-lbm/ft3	91.12									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.093	0.63	1.232	1.917	2.13					
Zero Corrections-psid	-0.264	-0.096	-0.013	0.011	-0.282					
Corrected DP-Psid	0.171	0.726	1.245	1.906	2.412					
Actual DP-ft	1.89	3.12	4.41	5.45	6.63					

Run#	1028									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/24/94									
Time:	12:30									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	70.2									
Sat. Temperature-F(inlet)	132.1									
Inlet Flowrate-GPM	4.9									
Inlet Temperature-F	131.2									
Inlet G-lbm/hr/ft2	1002967		Temp		124.4	Density	85.77			
Subcooling-F	0.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	870.9	874.7	864.9	869.5	873.6	875	869.4	868.6	872.9	868.4
Heat Loss-Watts	8.7	1.9	2.6	2.9	2.9	2.1	1.4	2	2.5	14.1
Heat Flux-Btu/Hr/ft2	15096	15162	14992	15072	15143	15168	15070	15057	15131	15053
Wall Temp. #3-F	146.9	149.4	147.3	150.2	151.3	150.6	151.6	147.9	147.5	146.6
Wall Temp. #4-F	148	146.3	149.2	150.9	151.3	150.6	151.5	149.3	148.8	152.6
Wall Temp. #5-F	148.8	144.7	150.4	151.8	150	151	150.4	147.6	147.2	145.1
Wall Temp. #1-F	131.2	147.3	144.8	149.1	149.1	150.8	153.4	148.4	145.1	144.4
Wall Temp. #2-F	149.8	147.1	146	149.6	149.4	151.1	152.9	149.5	148.5	146.1
Instream Temp.-F	131.3	130.6	130.1	132.4	130.9	130.4	131.5	130.1	130.1	130.1
Avg. Wall Temp.-F	148.4	147.5	146.8	150.5	150	150.8	152	148.6	147	147
Avg. Wall DT.-F	16.4	16.2	16	17.4	18.4	19.7	19.8	17.8	16.2	16.2
EXP. H-Btu/Hr/ft2/F	920.9	933.7	934.3	866.3	824.5	771.3	761.8	847.8	931.9	930.4
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.5									
DP Liquid Density-lbm/ft3	90.81									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.236	0.299	0.708	1.133	1.046					
Zero Corrections-psid	-0.258	-0.134	0.012	0.013	-0.34					
Corrected DP-Psid	0.022	0.433	0.696	1.12	1.386					
Actual DP-ft	2.08	3.511	5.18	6.59	8.13					

Run#	1029									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/24/94									
Time:	12:34									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	69.3									
Sat. Temperature-F(inlet)	131.4									
Inlet Flowrate-GPM	3.7									
Inlet Temperature-F	130.3									
Inlet G-lbm/hr/ft2	755703		Temp	125.8	Density	85.58				
Subcooling-F	1.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	862.9	863.2	869.1	870.8	869	868.5	870.8	870.5	863.6	872.3
Heat Loss-Watts	8.4	1.9	2.6	2.8	2.8	2.1	1.4	1.9	2.4	13.8
Heat Flux-Btu/Hr/ft2	14958	14963	15065	15095	15064	15055	15095	15090	14970	15121
Wall Temp. #3-F	146.3	149.3	147.2	149.9	151.1	150.8	150.9	147.5	148.8	146.7
Wall Temp. #4-F	147.8	146.2	149	150.3	151	151	151	148.8	147.9	152.6
Wall Temp. #5-F	148.7	144.8	149.9	151.4	149.2	150.7	150	146.9	146.2	144.6
Wall Temp. #1-F	130.3	147.1	144.8	148.9	149	150.5	152.8	148.2	144.6	144.2
Wall Temp. #2-F	149	146.9	145.8	149.3	149.1	150.9	152.6	149.4	146	145.9
Instream Temp.-F	131	130.5	130.1	132.4	130.7	130.6	131.2	129.8	130	130.2
Avg. Wall Temp.-F	148	147.4	146.7	150.1	149.6	150.8	151.5	148.2	148.8	146.8
Avg. Wall DT.-F	16.3	16.2	15.9	17	18.2	19.5	19.6	17.7	15.6	15.9
EXP. H-Btu/Hr/ft2/F	919.1	923.7	946.4	885.7	827.9	773.2	771	853.6	958.2	950
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	82.4									
DP Liquid Density-lbm/ft3	90.72									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.101	0.624	1.205	1.802	1.87					
Zero Corrections-psid	-0.258	-0.134	0.012	0.013	-0.34					
Corrected DP-Psid	0.157	0.758	1.193	1.789	2.21					
Actual DP-ft	1.86	2.96	4.35	5.47	6.75					

Run#	1030									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/24/84									
Time:	12:34									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	68.9									
Sat. Temperature-F(inlet)	131.1									
Inlet Flowrate-GPM	2.5									
Inlet Temperature-F	129.2									
Inlet G-lbm/hr/ft2	511481		Temp	124.7	Density	85.73				
Subcooling-F	1.9									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	870.5	868.8	862.3	868.1	866	867	866.6	872.8	868	884
Heat Loss-Watts	7.9	1.8	2.5	2.7	2.7	2.1	1.4	2	2.5	14.1
Heat Flux-Btu/Hr/ft2	15090	15060	14947	15048	15012	15029	15022	15129	15046	14977
Wall Temp. #3-F	144.8	148.1	146.2	148.9	150.7	151	151.1	148.4	147.7	147.4
Wall Temp. #4-F	146.1	144.9	148.1	149.3	150.4	151.2	151.4	149.4	148.7	153.1
Wall Temp. #5-F	146.8	143.5	149.2	150	148.4	150.4	150	147.2	148.5	145.2
Wall Temp. #1-F	129.2	145.8	143.6	147.5	148.5	150.3	152.6	149.2	145.4	144.5
Wall Temp. #2-F	147.3	145.6	145.1	148.1	148.3	150.6	152.7	150.5	146.6	146.4
Instream Temp.-F	130.2	130.4	129.9	132.2	130.9	130.9	131.7	130.2	130.4	130.8
Avg. Wall Temp.-F	148.3	146.1	145.8	148.9	148.9	150.7	151.6	148.9	147	147.3
Avg. Wall DT.-F	15.4	15	15.2	16	17.3	19.1	19.2	18.1	15.9	15.8
EXP. H-Btu/Hr/ft2/F	981.9	1002.7	985	937.9	866.6	785	783.2	837.9	946.3	945.3
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.4									
DP Liquid Density-lbm/ft3	90.82									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.048	1.002	1.772	2.547	2.785					
Zero Corrections-psid	-0.258	-0.134	0.012	0.013	-0.34					
Corrected DP-Psid	0.306	1.136	1.76	2.534	3.125					
Actual DP-ft	1.6	2.33	3.4	4.22	5.21					

Run#	1031									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/25/94									
Time:	9.41									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	68.4									
Sat. Temperature-F(inlet)	130.7									
Inlet Flowrate-GPM	4.9									
Inlet Temperature-F	129.7									
Inlet G-lbm/hr/ft2	1003739		Temp	123.9	Density	85.84				
Subcooling-F	1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	582.3	582.5	578.1	579.7	575.8	576.6	582.6	582.3	581.2	578.8
Heat Loss-Watts	14	3.1	4.1	4.6	4.3	3.3	2.5	3.1	3.9	23
Heat Flux-Btu/Hr/ft2	10094	10097	10021	10049	9981	9995	10099	10094	10075	10033
Wall Temp. #3-F	146	144.9	143.4	146.5	145.9	145.7	147.5	143.2	143	143.4
Wall Temp. #4-F	146.9	143.1	144.3	146.7	145.7	146.4	147.4	143.8	143.7	146.6
Wall Temp. #5-F	147.9	141.9	145.1	147.3	144.4	145.1	146.5	142.7	142.2	142.4
Wall Temp. #1-F	129.7	144	141.7	146	144.2	145.5	148.7	144.2	141.1	142
Wall Temp. #2-F	149.2	144.4	142.3	146.3	144.8	145.7	148.5	145	141.7	142.9
Instream Temp.-F	130.1	130.1	129.8	132.6	130.9	130.3	131.6	129.6	129.5	130.4
Avg. Wall Temp.-F	147.5	144.1	142.9	146.6	144.8	145.7	147.7	143.8	142.3	143.5
Avg. Wall DT.-F	16.9	13.5	12.7	13.6	13.4	14.9	15.7	13.7	12.4	12.6
EXP. H-Btu/Hr/ft2/F	595.7	745.5	790.8	740.5	743.5	669.8	644.7	735.5	813.5	795.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	78.6									
DP Liquid Density-lbm/ft3	91.1									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.234	0.261	0.704	1.169	1.154					
Zero Corrections-psid	-0.273	-0.15	-0.015	0.019	-0.314					
Corrected DP-Psid	0.039	0.411	0.719	1.15	1.468					
Actual DP-ft	2.06	3.56	5.16	6.56	8.02					

Run#	1032									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/25/94									
Time:	8.41									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	69.3									
Sat. Temperature-F(inlet)	131.4									
Inlet Flowrate-GPM	3.7									
Inlet Temperature-F	130.4									
Inlet G-lbm/hr/ft2	756992	Temp		124.7	Density		85.73			
Subcooling-F	1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	579.3	577.1	580.6	579	581.2	581.4	579	580	579	580.2
Heat Loss-Watts	12	2.6	3.5	3.8	3.6	2.6	1.8	2.6	3.3	19.5
Heat Flux-Btu/Hr/ft2	10042	10004	10064	10037	10075	10078	10037	10054	10037	10057
Wall Temp. #3-F	146.3	145.6	144.2	147.6	146.9	146.6	148.7	143.9	143.7	144.9
Wall Temp. #4-F	146.8	143.9	145.3	147.6	146.7	147	148.4	144.7	144.5	147.9
Wall Temp. #5-F	147.7	142.8	146.2	148.8	145.5	146	147.7	143.8	143.4	143.8
Wall Temp. #1-F	130.4	144.7	142.2	147.1	145.4	146.1	150	145.3	142	143.3
Wall Temp. #2-F	148.7	144.8	143.1	147.6	145.8	146.2	149.5	146.1	142.8	144.2
Instream Temp.-F	130.9	130.7	130.1	133.1	131.3	130.7	131.9	130	129.9	131.2
Avg. Wall Temp.-F	147.4	144.8	143.7	147.8	145.9	146.4	148.9	144.8	143.3	144.8
Avg. Wall DT.-F	16	13.6	13.1	14.2	14.1	15.3	16.5	14.3	12.9	13.2
EXP. H-Btu/Hr/ft2/F	626.8	735.7	765.6	705.7	714.8	660	608	702.8	776.4	763.9
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.5									
DP Liquid Density-lbm/ft3	90.91									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.12	0.545	1.138	1.765	1.892					
Zero Corrections-psid	-0.273	-0.15	-0.015	0.019	-0.314					
Corrected DP-Psid	0.153	0.695	1.153	1.746	2.206					
Actual DP-ft	1.86	3.07	4.43	5.55	6.77					

Run#	1033									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/25/94									
Time:	9:41									
Note										
Flow Area-ft2	0.00326									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	68.4									
Sat. Temperature-F(inlet)	130.7									
Inlet Flowrate-GPM	2.5									
Inlet Temperature-F	129.4									
Inlet G-lbm/hr/ft2	513052	Temp	122.7	Density	85.99					
Subcooling-F	1.3									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	584.4	581.1	584.8	582.8	583.4	583.5	582.5	583.1	583.2	585.6
Heat Loss-Watts	10.5	2.3	3.1	3.4	3.2	2.4	1.7	2.3	3	17.6
Heat Flux-Btu/Hr/ft2	10130	10073	10137	10102	10113	10115	10097	10108	10109	10151
Wall Temp. #3-F	144.7	145	143.8	147.2	147	147	148.7	144.3	144.1	145.1
Wall Temp. #4-F	145.7	143.1	144.8	147.3	146.7	147.6	148.7	145	144.8	148.1
Wall Temp. #5-F	146.5	141.9	146.1	148.4	145.2	146.5	147.6	143.9	143.7	143.8
Wall Temp. #1-F	129.4	144	141.7	146.4	145.1	146.5	150.1	145.7	142.6	143.4
Wall Temp. #2-F	146.9	144.1	142.7	146.9	145.5	146.6	149.8	146.7	143.3	144.3
Instream Temp.-F	130.2	130.2	129.6	132.7	130.8	130.4	131.6	129.7	129.8	131
Avg. Wall Temp.-F	146	144.1	143.3	147.3	145.8	146.9	149	145.1	143.7	144.9
Avg. Wall DT.-F	15.3	13.4	13.2	14.2	14.4	16	16.9	15	13.4	13.5
EXP. H-Btu/Hr/ft2/F	662.4	752	768.4	713	703.8	630.5	596.6	675.5	752	753
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	81.1									
DP Liquid Density-lbm/ft3	90.95									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	0.001	0.876	1.644	2.42	2.688					
Zero Corrections-psid	-0.273	-0.15	-0.015	0.019	-0.314					
Corrected DP-Psid	0.274	1.026	1.659	2.401	3.002					
Actual DP-ft	1.65	2.51	3.56	4.43	5.41					

Run#	1034									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/25/94									
Time:	3:41									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	68.7									
Sat. Temperature-F(inlet)	131									
Inlet Flowrate-GPM	4.9									
Inlet Temperature-F	131.1									
Inlet G-lbm/hr/ft2	1002967		Temp		124.4	Density	85.77			
Subcooling-F	-0.1									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	292.5	290.1	292.7	290	291.3	290.9	290	289.6	285.4	279.3
Heat Loss-Watts	8.2	1.7	2.1	2.4	2.2	1.6	1.1	1.5	1.8	11
Heat Flux-Btu/Hr/ft2	5070	5029	5074	5027	5049	5043	5027	5020	4947	4841
Wall Temp. #3-F	144.8	141.8	140.2	143.5	142.4	140.3	142.5	140	139	139
Wall Temp. #4-F	144.9	141.4	140.7	143.5	141.7	141	142.4	139.5	139.3	140.1
Wall Temp. #5-F	146	140.6	140.9	143.7	140.7	140.6	141.2	139	138.5	138.6
Wall Temp. #1-F	131.1	142.3	139.1	143.3	141.9	141.1	143.2	140.5	137.5	138.9
Wall Temp. #2-F	145.5	142.2	139.4	143.3	141.7	141	143.1	140.9	137.7	139.1
Instream Temp.-F	131.6	130.5	129.7	132.7	130.6	129.7	131.5	129.3	129.2	130
Avg. Wall Temp.-F	145.3	141.9	139.9	143.6	141.6	140.8	142.6	140	138.4	139.1
Avg. Wall DT.-F	13.5	11.2	9.9	10.6	10.7	10.8	10.8	10.5	9	8.9
EXP. H-Btu/Hr/ft2/F	376.4	449.1	511.4	475.5	473.2	465.9	467.5	480.2	551.1	542.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	82.9									
DP Liquid Density-lbm/ft3	90.66									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.267	0.186	0.582	1.043	1.06					
Zero Corrections-psid	-0.268	-0.173	-0.025	0.011	-0.189					
Corrected DP-Psid	0.001	0.359	0.607	1.032	1.249					
Actual DP-ft	2.11	3.63	5.32	6.72	8.34					

Run#	1035									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/25/94									
Time:	9.41									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	68.7									
Sat. Temperature-F(inlet)	131									
Inlet Flowrate-GPM	3.7									
Inlet Temperature-F	131.2									
Inlet G-lbm/hr/ft2	757809		Temp		124	Density	85.82			
Subcooling-F	-0.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	285.5	283.7	284.4	285.9	289.4	291.2	285.8	289	287	282.8
Heat Loss-Watts	8	1.7	2.2	2.5	2.3	1.6	1.1	1.5	1.9	11.3
Heat Flux-Btu/Hr/ft2	4949	4918	4930	4956	5017	5048	4954	5010	4975	4902
Wall Temp. #3-F	144.1	142.3	141	144	143.3	141.5	143.1	140.9	139.9	139.8
Wall Temp. #4-F	144.4	141.7	141.4	144.1	142.7	142.2	143.1	140.4	140.4	140.9
Wall Temp. #5-F	145	141	141.5	144.1	141.4	141.4	141.9	139.8	139.4	139.4
Wall Temp. #1-F	131.2	142.7	139.6	143.7	142.8	142.2	143.5	141.4	138.6	139.3
Wall Temp. #2-F	144.9	142.6	140	143.8	142.6	142	143.6	141.9	138.9	139.7
Instream Temp.-F	131.9	130.9	130.4	132.7	130.9	130.3	131.4	129.5	129.5	130.3
Avg. Wall Temp.-F	144.6	142.3	140.5	144	142.4	141.8	143	140.9	139.4	139.8
Avg. Wall DT.-F	12.5	11.2	9.9	11.1	11.2	11.3	11.4	11.2	9.7	9.3
EXP. H-Btu/Hr/ft2/F	396.7	439	459.1	448.5	446	446.8	434	449.1	512.1	527.2
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	80.8									
DP Liquid Density-lbm/ft3	90.88									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.16	0.421	0.944	1.542	1.684					
Zero Corrections-psid	-0.268	-0.173	-0.025	0.011	-0.189					
Corrected DP-Psid	0.108	0.594	0.969	1.531	1.873					
Actual DP-ft	1.94	3.24	4.73	5.9	7.31					

Run#	1036									
Test Fluid	25% C4F10 - 75% R114									
Date:	1/25/94									
Time:	15:51									
Note										
Flow Area-ft2	0.00336									
Heat Flow Area-ft2	0.19695									
Sat. Pressure-Psig	67.6									
Sat. Temperature-F(inlet)	130.1									
Inlet Flowrate-GPM	2.5									
Inlet Temperature-F	129.9									
Inlet G-lbm/hr/ft2	511875		Temp		124.2	Density	85.8			
Subcooling-F	0.2									
Flow Observation										
	ZONE1	ZONE2	ZONE3	ZONE4	ZONE5	ZONE6	ZONE7	ZONE8	ZONE9	ZONE10
Heat Input-Watts(net)	290.1	287.4	291.7	292.7	293.3	295.4	290.4	293.5	289.9	288.9
Heat Loss-Watts	8	1.7	2.3	2.5	2.4	1.8	1.2	1.7	2.1	12.3
Heat Flux-Btu/Hr/ft2	5029	4982	5056	5074	5084	5121	5034	5088	5025	5006
Wall Temp. #3-F	142.4	141.4	141	143.3	143	142.2	142.8	140.6	140.1	140.8
Wall Temp. #4-F	142.6	141.1	141.5	143.3	142.9	142.8	142.8	140.9	140.5	141.5
Wall Temp. #5-F	143.4	140.5	141.8	143.7	141.6	142.1	141.9	140.4	139.5	139.7
Wall Temp. #1-F	129.9	141.5	139.2	143.3	141.9	142.5	143.8	141.2	138.8	140.2
Wall Temp. #2-F	143.8	141.5	139.7	143.2	141.8	142.3	143.5	141.7	139	140.2
Instream Temp.-F	130.2	129.7	129.1	131.2	129.9	129.5	130	128.4	128.6	129.8
Avg. Wall Temp.-F	143.1	141.4	140.4	143.4	142.1	142.4	143	141	139.6	140.4
Avg. Wall DT.-F	12.6	11.4	11	12	11.9	12.7	12.7	12.3	10.8	10.4
EXP. H-Btu/Hr/ft2/F	398.4	435.1	458.8	423.8	426.5	403.4	395.4	412.6	467.3	483.7
	ZONE2	ZONE4	ZONE6	ZONE8	ZONE10					
DP liquid Temp.-F	77.7									
DP Liquid Density-lbm/ft3	91.19									
Elevation-ft	2	4	6	8	9.875					
Measured DP-Psid	-0.062	0.657	1.322	2.048	2.308					
Zero Corrections-psid	-0.268	-0.173	-0.025	0.011	-0.189					
Corrected DP-Psid	0.216	0.83	1.347	2.037	2.497					
Actual DP-ft	1.76	2.86	4.12	5.08	6.31					

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