PACKAGE ID - 000737IBMPC00 THCIF

KWIC TITLE - Thermal Hydraulic Calculations for Single-Phase Flow of Incompressible Fluids

AUTHORS - Longest, A.W.
Oak Ridge National Lab., TN (United States)

LIMITATION CODE -COPY **AUDIENCE CODE -** LIM

COMPLETION DATE - 02/01/1987 **PUBLICATION DATE -** 01/01/1987

DESCRIPTION - The LOTUS(TM) 1-2-3(TM) based THCIF program is a convenient engineering tool for flow channel design and evaluation. It can be used to size flow channels to give desired flow rates and heat transfer characteristics, calculate flow rates and heat transfer coefficients for existing channels, calculate pressure drops across flow channel components (e.g., flow contraction, channel friction, flow expansion, and orifice), and calculate coolant temperature distributions for known heat input distributions. The program provides rapid calculations and, being enhanced by the many features of LOTUS(TM) it is easy to use, understand, and modify to suit the user's needs.

PACKAGE CONTENTS - Software Abstract; Media Directory; User's Guide; Media Includes Source Code, Executables, Sample Problem Input and Output;

SOURCE CODE INCLUDED? - No

MEDIA QUANTITY - 1 5.25 Diskette

METHOD OF SOLUTION - THCIF calculates new values of pressure drops and convective heat transfer coefficients whenever a change is made in input dimensions, coolant properties, or coolant flow rate. Explicit mathematical expressions, most of which are standard textbook formulas, are used for the various calculations: no numerical methods are used.

COMPUTER - IBM PC

OPERATING SYSTEMS - DOS Version 2.0 or higher

PROGRAMMING LANGUAGES - LOTUS (TM) 1-2-3 (TM)

SOFTWARE LIMITATIONS - THCIF is limited to simplified thermal hydraulic calculations for fully-developed flow of near-constant-property incompressible Newtonian fluids through circular ducts for Reynolds Numbers Re>10 (laminar, transitional, and turbulent flow regimes) and noncircular ducts (concentric annular, flat, rectangular, and triangular ducts) for Re>10 to the fourth (turbulent flow regime only). A single worksheet provides for one flow area contraction, friction in a single channel with fully-developed flow (where

PACKAGE ID - 000737IBMPC00 THCIF

SOFTWARE LIMITATIONS -(CONT) fittings may be included as equivalent lengths of channel), one flow area expansion, one orifice, and five local flow resistances characterized by user-supplied resistance coefficients.

SOURCE CODE AVAILABLE (Y/N) - N

UNIQUE FEATURES - THCIF can be used for many practical calculations associated with fluid flow and heat transfer equipment. Standard formulas are used for most of the calculations. The program has provisions for user-supplied alternative formulas for cases in which the user may feel he needs to improve the predictions for specific noncircular ducts. THCIF features include a built-in description of the program, an index giving the location of input data and various computational results, and descriptive labels with units for all the quantities input and calculated. Another useful aspect of the program is that it benefits from the many features of LOTUS (TM) 1-2-3 (TM). The ease of moving up and down the worksheet is important for these typically trial-and-error type calculations. Also, the various individual computations are organized on a single worksheet that makes the program easy to use, understand, and modify to suit the user's needs.

RELATED SOFTWARE - This software requires LOTUS (TM) 1-2-3 (TM), release 2 or higher, by LOTUS Development Corporation (or some other compatible spreadsheet program) in order to operate.

OTHER PROG/OPER SYS INFO - THCIF operates as a single LOTUS (TM) 1-2-3 (TM) worksheet (or template). A User's guide for THCIF is available and should be consulted before using the software for real calculations.

HARDWARE REQS - IBM compatible PC with at least 320 KB of RAM, hard disk and diskette drive or two diskette drives, color or monochrome monitor, keyboard.

TIME REQUIREMENTS - THCIF is an off-line analytical system. There is no provision for real-time data capturing and processing. Run time following a change in input data is practically instantaneous.

REFERENCES - A.W. Longest, User's Guide for the Computer Program THCIF, Thermal Hydraulic Calculations for Single-Phase Flow of Incompressible Fluids, Version 1.0, 1987.

ABSTRACT STATUS - Submitted August 19, 1994. Released AS-IS December 7, 1994.

SUBJECT CLASS CODE - HOT

KEYWORDS -
COMPUTER PROGRAM DOCUMENTATION

PACKAGE ID - 000737IBMPC00 THCIF

T CODES
HEAT TRANSFER
HEAT TRANSFER FLUIDS
INCOMPRESSIBLE FLOW
PRESSURE DROP
HYDRAULICS
FLOW RATE
DESIGN
ENGINEERING
PERSONAL COMPUTERS

EDB SUBJECT CATEGORIES -
990200 420400

SPONSOR - DOE/ER

PACKAGE TYPE - AS - IS