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W-27-0, 3-2
Project No. ET-3256-11
Case No. 689.00
Completed 6-28-57

TO: DISTRIBUTION

Re: Test of Pressure Lag Through Desiccant Container for the W-27-0 Warhead

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
Document Title (Classification Determined)
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6. Other
Reviewer: 7/9/98
Reviewer Date: 7/14/98
Supervisor: W Hoyt

Object of Test

To enable certain components of the W-27 Warhead to function properly, it is necessary for the internal pressure to be equivalent to or greater than the pressure at 30,000 feet. It is also necessary that humidity in this Warhead be controlled during storage. This is accomplished by using a desiccant, vented through a single intake port, to filter the air. The object of this test is to evaluate the pressure lag caused by the dessicant and its attachment plumbing during a simulated drop from 50,000 feet to sea level, and to find what altitude the weapon would reach before the internal pressure attains the critical value of 30,000 feet. The consultant for this test was R. D. Hogue, 1215.

Summary of Results

It was found that the internal pressure reached 30,000 feet when the weapon had dropped to 23,500 feet.

Equipment and Instrumentation

The Hieatt Altitude Chamber was used to simulate a free fall drop from 50,000 feet to sea level in 60 seconds. The chamber's snorkel attachment was altered to contain a volume of 3 cubic feet, simulating the internal Warhead volume of the W-27 weapon.

Inlet and outlet pressure (altitude) to and from the desiccant container were measured by 2 Statham pickups, 0-50 psi gauge. Pressure versus time curves were obtained by using two Brush Analyzers and a dual channel Brush Recorder.

After several trial drops, it was decided that the test piping inserted between the Statham pickups and the desiccant container introduced unnecessary error. This error was evaluated by making several simulated drops with the test piping connected without the desiccant container. This error was then subtracted from the data obtained during a drop with the desiccant container attached.

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The tests were run by evacuating the altitude chamber and Snorkel attachment to a simulated altitude of 50,000 feet. When the pressure reservoir had reached a pressure of 130 P.S.I. Gauge, the recorders were started and the simulated drop was performed.

Tests of 4 desiccant containers showed marked similarity. Combined data from these runs appears on figure #1 in the curves: "Simulated Atmospheric Pressure" and "Warhead Pressure." It should be noted that the afterbody pressure is identical to desiccant exhaust pressure and was measured down stream from the desiccant container as shown in figure #2.

The two curves of figure #1: "Desired Atmospheric Pressure" and "Simulated Atmospheric Pressure" are a comparison of the desired drop profile as it appears in field test data and the curve actually obtained during the chamber drop.

These curves show that the Warhead internal pressure reaches 30,000 feet (4.35 psi) when the external pressure reached 23,500 feet (5.9 psi). This amounts to an altitude lag of 6,500 feet when the weapon is at 23,500 feet. Altitude or pressure lags at different altitudes may be readily obtained from the curves.

Floyd H. Mathews

Test Performed by Floyd H. Mathews - 1611-1

Ernest D. Graves
Test Engineer Ernest Graves - 1611-1

Approved by R. S. Hodper - 1611-1

FHM:1611-1:dsr

Enc. Figures 1 and 2

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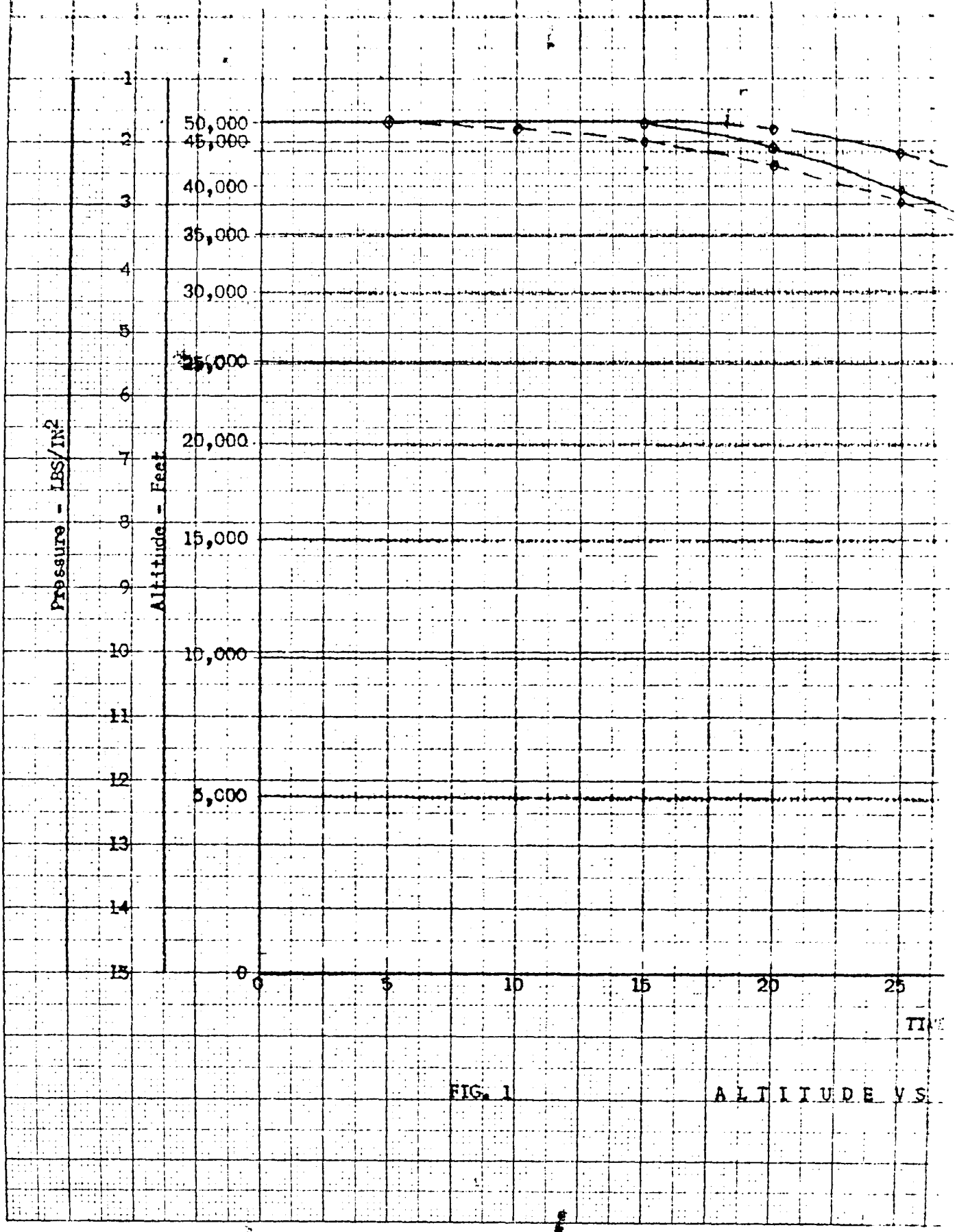

FIG. 1 ALTITUDE VS

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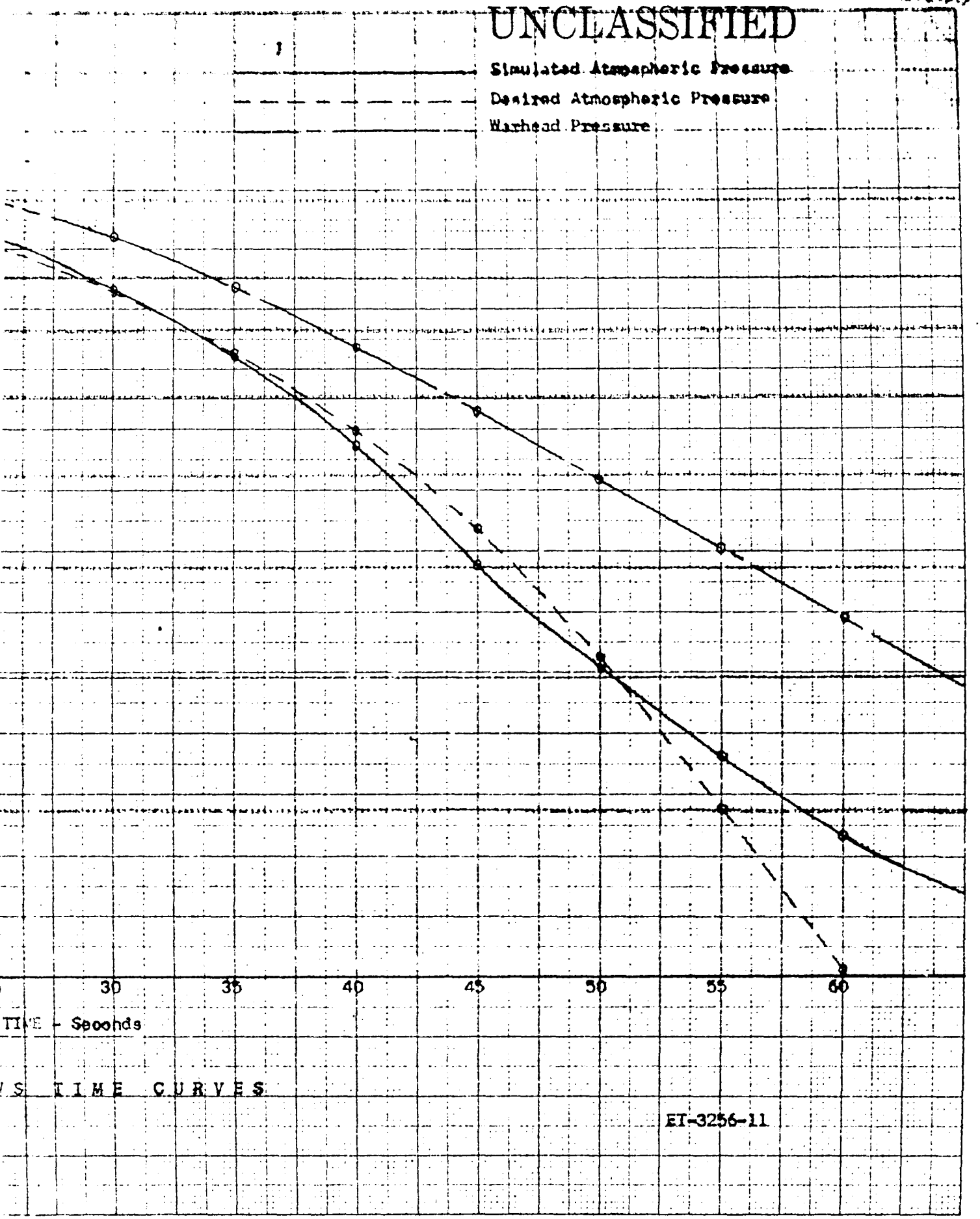

S TIME CURVES

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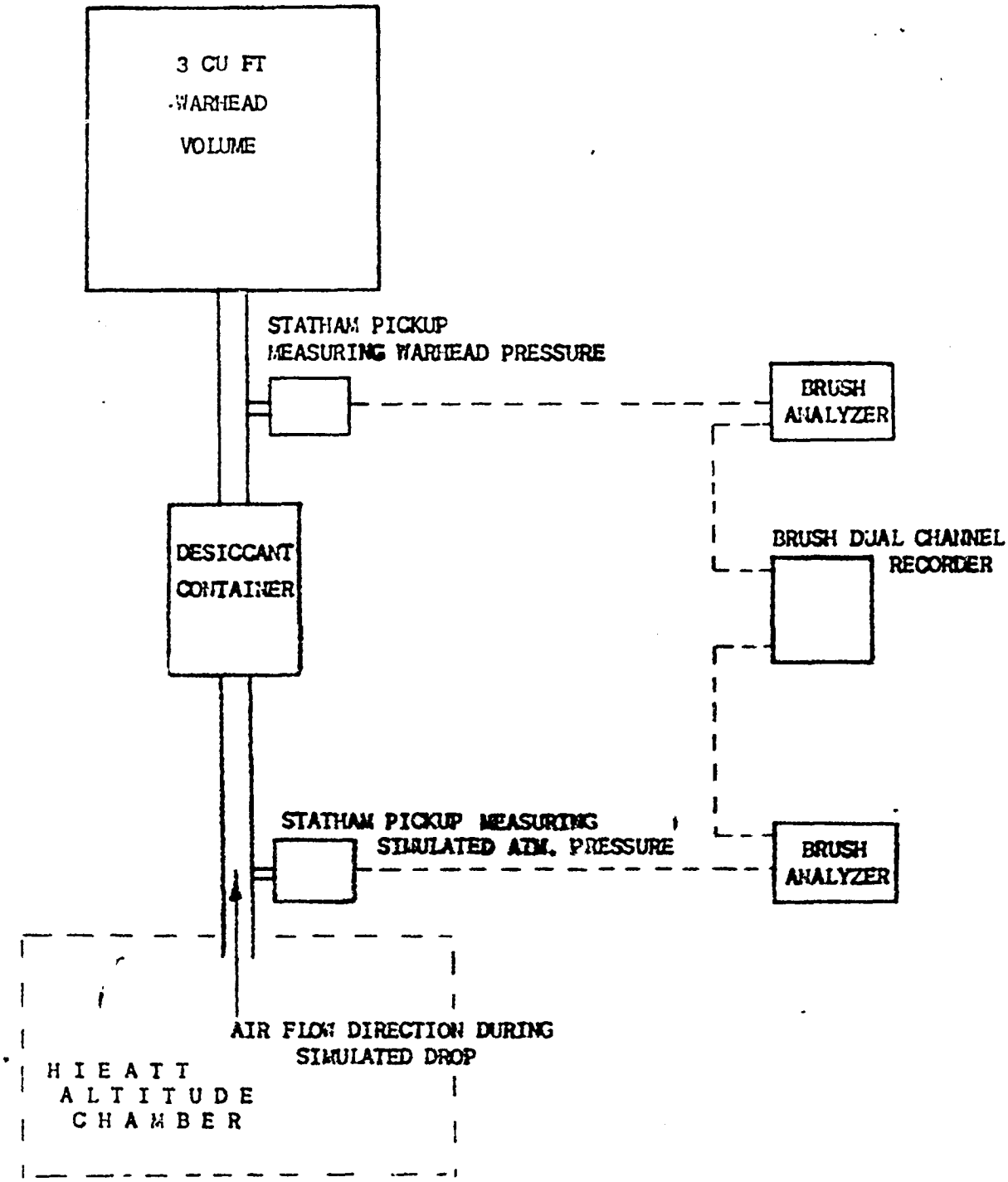

FIG. 2 PRESSURE LAG TEST SET-UP ET-3256-11

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