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PREFACE

The Babcock & Wilcox Company and the United States Atomic Energy Commission, acting for the Joint U.S.-Euratom Research and Development Board, signed an agreement for a nonuniform heat generation experimental program.

The program includes experimental and analytical investigations to determine how nonuniformly distributed heat flux along lengths of tubular and annular channels affects the onset of burnout (departure from nucleate boiling). The experimental program is being conducted in the 1.8-MW heat transfer facility at B&W's Research Center, Alliance, Ohio. The analytical program is being conducted by the Atomic Energy Division, Lynchburg, Virginia.

ABSTRACT

The Babcock & Wilcox Company, as part of the Joint U.S.-Euratom Research and Development Program, is conducting experimental and analytical investigations to determine how irregular heat flow through reactor channels affects the operating conditions that cause burnout (critical heat flux). This program seeks to improve design correlations that will be suitable for direct use by reactor designers. Tubular specimens with four axial power shapes and annular specimens with five power shapes are being used, and an effort to correlate the experimental data with empirical and analytical models will be made.

During the seventh quarter the tubular data were revised slightly, using the latest heat balances. The data were carefully reviewed for self-consistency and compared with data of other investigators. The data have been compared with previous burnout correlations, and progress on a correlation for nonuniform data is reported. Tests on the first annular test section have begun.

SUMMARY

A serious design problem still facing the reactor designer is the phenomenon called burnout (critical heat flux). Although considerable attention has been given to this problem in recent years, the predictability of the occurrence of burnout conditions is still quite uncertain. In fact, there is still much disagreement as to how the channel geometry and operating conditions affect burnout.

In an effort to clarify some of the areas of disagreement, Babcock & Wilcox, as part of the Joint U.S. -Euratom Research and Development Program, is conducting an experimental and analytical program to determine how nonuniform heat generation rates in tubular and annular flow channels affect the operating conditions causing burnout, under experimental conditions representative of water reactor systems. The objective of the program is to seek improved design correlations suitable for direct use by reactor designers; the technical approach to the work emphasizes the development of an improved understanding of the physical phenomena involved and their relation to design variables.

The scope of the experimental program includes data taken on tubular test sections with these conditions:

<u>Axial flux shape</u>	<u>Pressure, psia</u>	<u>Mass velocity, lb/hr-ft² × 10⁻⁶</u>	<u>Inlet subcooling, F</u>
Uniform	2000	0.5	20
Peak near inlet	1500	1.5	50
Peak near midpoint	1000	2.5	100
Peak near outlet	--	--	150

In addition, corresponding data will be taken on five annular test sections involving uniform and cosine axial flux shapes.

During the seventh quarter the data runs for all four tubular test sections, which had been completed during previous periods, were

rerun through the data reduction computer program using the latest information from the experimental heat balances. The revised data are appended to this report. Also presented is a current review of the data which shows that, while it occupies its own unique place among burnout data, it is consistent with data of other investigators. The tubular data from this program are compared with some previously published burnout correlations, and progress in correlating the data from the various flux shapes with a single correlation is reported. It is demonstrated that a quantity called "the integrated average heat flux" may prove useful for the latter purpose. Future efforts will be made to test this concept.

Experimental work on the annular test sections has begun.

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1. INTRODUCTION

Nuclear reactors and modern boilers require more and more knowledge about the limitations on the transfer rates of heat from channel walls to flowing liquids. Burnout (departure from nucleate boiling, or critical heat flux) is a serious design problem still facing the reactor designer. As a result of this phenomenon, the heat transfer conductance is reduced considerably, causing the metal and fuel temperatures to rise and initiate failure of the fuel element. Although considerable attention has been given to this problem in recent years, the predictability of the occurrence of burnout conditions is quite uncertain. In fact, there is still much disagreement as to how the channel geometry and operating conditions affect burnout.

In an effort to clarify some of the areas of disagreement, Babcock & Wilcox (B&W), as part of the Joint U.S.-Euratom Research and Development Program, is conducting an experimental and analytical program to determine the effects of nonuniform heat generation rates in tubular and annular flow channels on the operating conditions causing burnout under experimental conditions representative of water reactor systems. The objective of the program is to seek improved design correlations suitable for direct use by reactor designers. The technical approach to the work emphasizes the development of an improved understanding of the physical phenomena involved and their relation to design variables.

The experimental program, which was discussed in the first quarterly report¹, is being conducted on a heat transfer facility at B&W's Research Center in Alliance, Ohio. The controlled variables for the tests are pressure, inlet subcooling, and mass velocity. The tests are being performed in 6-foot-long tubular and annular test sections having both uniform and nonuniform axial heat flux distributions. The analytical program is being conducted by the Atomic Energy Division in Lynchburg, Virginia.

Previous reports relating to this program are listed as references
1 through 6.

2. PROGRAM

2.1. Test Facility Modifications

2.1.1. Burnout Detector

The detector has been connected to both tubes of the annular test section. The thermocouple monitoring system has also been connected, and the recording procedure will be similar to that used for the tubular test section. In other words, the thermocouple at the outlet of the inside tube will always be monitored when that tube is heated, and selected thermocouples on the outside tube will be monitored when that tube is heated; the choice of thermocouples is based on prior experience about where critical heat flux occurred.

2.1.2. Bus-Bar System

This system has been completely installed and should require no further work for the remainder of the program.

2.1.3. Flow Control and Measurement

The new flow control valve and flow nozzle installed for the annular test sections are operating satisfactorily. The turbine flowmeter has operated erratically, but work with the manufacturer is expected to improve its operation.

2.2. Test Sections

The first annular test section was installed in the test loop and will provide data on the configurations of test sections 5, 6, and 7; that is, for the cases of uniform flux when the inside tube is heated alone, when the outside tube is heated alone, and when both tubes are heated at the same average heat input rate. The only change required for converting from one configuration to another is to connect the d-c power supply to the proper tube(s). Spare parts for the test section were also completed during the quarter.

The remaining two annular test section configurations, which utilize a nonuniform longitudinal heat input rate on the outside tube, have been designed so that one test section can be used for both. The design has been approved and material procurement has begun.

3. TEST OPERATION

When the test section was first installed, it was apparent that the spacer piece design was unsatisfactory in two respects: the stainless steel spacer piece gasket was unable to maintain a pressure seal, and the zirconium oxide layer on the tip of the spacer was too thin and broke down with only moderate contact pressure. The stainless steel spacer gaskets were replaced with Durabla (a commercial gasket material), which gave acceptable performance. The zirconium oxide spacer pin was replaced with a previously prepared alternate pin having an aluminum oxide coating as electrical insulation. Originally, the aluminum oxide was sprayed on the stainless steel pins in a thin layer and machined to the proper thickness, as shown in Figure 1(A).

After making these changes, loop checkout began by initially obtaining isothermal pressure drop and no-power heat loss information. Then, while making initial power supply and burnout detector checks with d-c power applied to the inside tube of the test section, the spacer pieces shorted out from inside tube to outside tube, and the inside tube failed at about 27 inches from the outlet of the heated length. When the test section was disassembled, it was discovered that all of the aluminum oxide coating on all spacer pins was gone, and that all spacer pieces had shorted out. The apparent cause of this failure was that the aluminum oxide coatings on several spacers were too thin and cracked. This resulted in an electrical short and test section burn-through. The failure, together with a short delay in getting the d-c power supply turned off, caused destruction of the aluminum oxide on the other spacers and short-out of the tubes at all locations.

Spare test section parts, which were fabricated earlier for use in case a test section failure did occur, were used to assemble another test section immediately. The spacer piece was redesigned to incorporate an aluminum oxide cylinder in the tip of each pin; this provided a thicker,

stronger insulation layer than could be obtained with flame spraying. Details of the present design are shown in Figure 1(B).

The test section was again installed in the loop and power supply and burnout detector checks were completed with no further delay. Testing was then started and is in progress at the end of the quarter, with initial data taken at 1000 and 1500 psia.

Figure 1. Annular Test Section Spacer Pins

A - Original Design

B - Present Design

4. REVIEW OF TUBULAR TEST DATA

4.1. Presentation of Test Data

All of the test data obtained have been rerun through the computer using the revised data-reduction program. The computer output is in a form that can be used directly for reporting the reduced data (see Tables A-1 through A-4, Appendix). These data are a revised version of that presented in earlier quarterly progress reports. (The test data have been revised to consider our latest findings from heat balance data; the corrections are small.)

The same data are presented graphically in references 4, 5, and 6 and in Figures 2 through 13, where the plotted points represent the condition at which critical heat flux occurred during the tests. Two systems of coordinates are used here. The first is average heat input rate versus inlet subcooling (Figures 3 to 5 in reference 5, and 6 to 11 in reference 6), where the heat input rate is averaged over the entire test section length and based on the inside diameter of the test section, and the inlet subcooling is the degree of subcooling (in degrees F below the saturation temperature for the pressure indicated) of the fluid entering the heated length of the test section.

The second system of coordinates is average heat input rate versus exit steam quality (Figures 2 through 13), where the heat input rate is the same as that given above, and the exit steam quality is the wt% of steam leaving the heated length of the test section. The plotted points shown as "negative" qualities are actually at a subcooled fluid condition; the degree of subcooling has been converted to quality by the equation

$$X = \frac{h - h_f}{h_{fg}} (100)$$

4.2. Interpretation of Test Data, Uniformly Heated Tube

The first tests were conducted on a uniformly heated tube (test section 1) in order to check out the test apparatus and procedures by comparing test results with the same kind of data obtained by other investigators. The data are compared first with that obtained at Columbia University's heat transfer facility¹¹ on a 76-inch-long, 0.504-inch-ID test section at pressures of 1000 and 1500 psia. (Our data are from a 72-inch-long, 0.446-inch-ID test section.) The comparison, made on Figures 2 and 3, shows excellent agreement between the Columbia data and that obtained for the range of variables covered during this program.

The data are compared next with that obtained earlier at B&W's Research Center¹² on a 72-inch-long, 0.412-inch-ID test section at 2000 psia. The comparison, made on Figure 4, again shows excellent agreement for the range of variables covered.

To evaluate further the test data obtained, it is important to consider the effects that changes in the independent testing variables have on the average critical heat input rate (or the total power applied to the tube at critical conditions). These effects for the uniformly heated tube over the range of variables tested are summarized in Sections 4.2.1 - 4.2.3.

4.2.1. Effect of Mass Velocity

There appear to be two separate effects of mass velocity on the average critical heat input rate. Referring to Figures 5 through 7, it can be seen that at the lower range of mass velocity an increase in mass velocity causes a decrease in the critical heat input rate for a given outlet steam quality. At some higher mass velocity (and always at a low steam quality) the effect is reversed, and an increase in mass velocity causes an increase in the critical heat input rate. Note that this effect was apparent with the subject data only at 2000 psia, but by combining the subject data at 1000 and 1500 psia with additional Columbia data¹¹ at higher mass velocities, the effect is apparent at all three pressures covered. Also, the mass velocity at which the reversal effect occurs decreases with increasing pressure. These effects were also noted by references 13 and 14.

4.2.2. Effect of Inlet Subcooling

Figure 2 of reference 4 shows that one can reasonably assume that a linear relationship exists between the critical heat input rate and inlet subcooling. Also, at low values of inlet subcooling (10 to 40 degrees F below saturation), increases in the mass velocity in general have a relatively small effect on the critical heat input rate as compared to higher values of inlet subcooling. These same findings were reported by Columbia University¹¹ and others^{13,14}.

4.2.3. Effect of Pressure

Figures 8 through 10 show that at all mass velocities covered, increases in system pressure cause a decrease in the average critical heat input rate for a given exit steam quality. However, this effect is considerably less pronounced as the mass velocity is increased. This effect is also described by the Columbia data¹¹. Based on these comparisons, it is concluded that the test apparatus and testing procedures used provide reliable data for heat transfer programs of this nature.

4.3. Interpretation of Test Data, Nonuniformly Heated Tubes

The next tests were conducted on three nonuniformly heated tubes to determine how the critical heat input rate is affected by the distribution along the length of the test section. The shapes of the longitudinal heat input rate were chopped cosine (test section 2), inlet peak (test section 3), and outlet peak (test section 4).

In order to show how the data compare with that from tests by other investigators, Figures 11, 12, and 13 show the subject data at 2000 psia compared with data obtained earlier at B&W's Research Center¹². The earlier data that are compared with the subject chopped cosine data (Figure 11) were obtained on a 72-inch-long, 0.417-inch-ID tube with a non-uniform heat input rate (ratio of maximum to minimum heat input rate equals 3.6 as compared to a ratio of 5.0 for the present chopped cosine tube). The inlet peak and outlet peak data from the earlier tests and these tests (Figures 12 and 13) are from tubes with essentially the same geometry. As can be seen from this comparison, there is good agreement in all cases.

A comparison between each of the nonuniformly heated tubes and the uniformly heated tube is made in Figures 3 to 5 in reference 5 and in

Figures 6 to 11 in reference 6 using coordinates of average critical heat input rate and inlet subcooling. The result is that the allowable average heat input rates for the cosine and inlet peak tubes are in general equal to or somewhat higher than those for the uniform tube for the same test section inlet temperature. Exceptions to this occur at 1000 psia at mass velocities of 1.5 and 2.5×10^6 lb/hr-ft², where the average rate is lower for both nonuniformly heated tubes. The allowable average rate for the outlet peak tube in all cases was lower than that for the uniformly heated tube.

A second comparison of all data is made on Figures 14 through 16 using coordinates of average critical heat input rate versus exit steam quality. The results again show that the allowable average heat input rates for the cosine and inlet peak tubes are in general equal to or higher than those for the uniform tube for the same test section exit steam quality. Exceptions to this occur at 1000 psia at mass velocities of 1.5 and 2.5×10^6 lb/hr-ft², where the average rate is lower for both nonuniformly heated tubes. The allowable average rate for the outlet peak tube in all cases was lower than that for the uniform tube.

Based on these comparisons, it can be concluded that the allowable average heat input rate to a tube (which is the same as the allowable channel power) is affected by the heat input rate distribution on the tube. The degree of the effect depends on the particular distribution, with the uniform chopped cosine and inlet peak distributions in general having the highest allowable rates, and the outlet peak distribution having the lowest allowable rate for comparable operating conditions. The same conclusion was drawn in the test program conducted earlier at the B&W Research Center¹².

Although the distribution affects the allowable heat input rate, the degree of the effect varies with changes in the independent variables. These effects are summarized below.

4.3.1. Effect of Mass Velocity

As shown in Figures 14 through 16, there appear to be two different effects of mass velocity on the allowable average heat input rate for nonuniformly heated tubes and uniformly heated tubes for the same exit steam quality. At 1000 psia, an increase in mass velocity above 0.5×10^6 lb/hr-ft² tends to cause the uniform tube to have higher allowable

rates than those for all of the nonuniform tubes. At 1500 psia, mass velocity has little effect on the relative performance of all tubes, but at 2000 psia a decrease in mass velocity below 2.5×10^5 lb/hr-ft² tends to cause the uniform tube to have slightly lower allowable rates than those for the cosine and inlet peak tubes.

4.3.2. Effect of Inlet Subcooling

Figures 3 to 5 in reference 5 and Figures 6 to 11 in reference 6 show that inlet subcooling has the most noticeable effect on the relative performance of uniformly and nonuniformly heated tubes at 1000 psia. At this pressure, and for all nonuniform tubes tested, low values of subcooling (10 to 60 degrees F) cause the uniform tube to have relatively higher allowable average heat input rates than do the nonuniform tubes. Increases in pressure reduce the effect of subcooling on the relative performance.

4.3.3. Effect of Pressure

Figures 8 through 10 show the effect of pressure on the difference between allowable average heat input rate for the uniform and nonuniform tubes. For simplicity of comparison, only data from the cosine tube are shown. At a mass velocity of 0.5×10^6 lb/hr-ft², there is little pressure effect. At the higher mass velocities covered, increases in pressure tend to reduce the difference between allowable rate for the uniform and nonuniform tubes.

4.4. Local Conditions

In the discussion so far, average heat input rate has been used as the basis for comparing the various data obtained. Because the average heat flux is proportional to overall channel performance, a study of results from this viewpoint is very important. However, in describing the physical occurrence of critical flux, the local heat input rate and the local fluid conditions at the location of critical flux on the test section are often considered. Figures 17 through 19 show a comparison of the uniform and nonuniform tube data on coordinates of local critical heat flux versus local steam quality. All nonuniform data are again represented by data from the cosine tube in order to simplify the comparison.

The most significant conclusions that can be drawn from this comparison are as follows:

1. For a given local steam quality, the uniform tube had considerably higher allowable local heat input rates than did all of the nonuniform tubes. This is in agreement with the conclusion reached in reference 12.
2. In the lower range of mass velocity covered, an increase in the mass velocity causes a decrease in the local critical heat flux for a given local steam quality, whereas with the higher mass velocity at 2000 psia an increase in mass velocity causes an increase in the local critical heat flux. This conclusion is true for both the uniform and nonuniform tubes and is in agreement with the conclusion reached in reference 12.
3. For a given local steam quality, an increase in pressure causes a reduction in the local critical heat flux for both uniform and nonuniform tubes, and causes a reduction in the difference between the local critical heat fluxes for the two types of tubes.

4.5. Other Observations

Other data concerning the stability of test section metal temperature, flow rate, and inlet pressure during critical conditions were obtained. In all cases, provision was made for the determination of metal temperature stability by thermocouples attached to the outside surface of the test section. During tests on test section 1 (uniform), a Bailey High-Speed Recorder was used for this determination. For all other test sections, the thermocouple monitoring system described in reference 5 was used. The temperature recordings obtained, indicated that the critical condition in nonuniformly heated test sections may occur initially at any of several axial positions other than the outlet. In fact, many of the nonuniform tube test runs showed that the location of the thermocouple at the outlet of the tube did not experience critical heat flux at any time during the test run. Flow stability data indicate that at no time did the test section flow rate change by more than $\pm 1\%$ when critical conditions occurred. This change was random in nature and is considered insignificant.

Figure 2. Burnout Points for Uniform Heat Flux Distribution — Test Section 1

Figure 3. Burnout Points for Uniform Heat Flux Distribution — Test Section 1

Figure 4. Burnout Points for Uniform Heat Flux Distribution — Test Section 1

Figure 5. Effect of Mass Velocity on Critical Heat Input Rate — Test Section 1

Figure 6. Effect of Mass Velocity on Critical Heat Input Rate — Test Section 1

Figure 7. Effect of Mass Velocity on Critical Heat Input Rate — Test Section 1

Figure 8. Effect of Pressure on Critical Heat Input Rate — Tubular Test Sections

Figure 9. Effect of Pressure on Critical Heat Input Rate — Tubular Test Sections

Figure 10. Effect of Pressure on Critical Heat Input Rate — Tubular Test Sections

Figure 11. Burnout Points for Chopped Cosine Heat Flux Distribution — Test Section 2

Figure 12. Burnout Points for Inlet Peak Heat Flux Distribution — Test Section 3

Figure 13. Burnout Points for Outlet Peak Heat Flux Distribution — Test Section 4

Figure 14. Comparison of All Tubular Test Section Data

Figure 15. Comparison of All Tubular Test Section Data

Figure 16. Comparison of All Tubular Test Section Data

Figure 17. Burnout Test Results

Figure 18. Burnout Test Results

Figure 19. Burnout Test Results

5. ANALYSIS OF TUBULAR DATA

5.1. Comparison of Experimental Data With Various Predictions

Using the computer program written for this purpose, the data from the four tubular sections have been compared with the burnout correlations from references 7, 8, and 9. The data have been grouped according to nominal pressure and axial heat flux shape within each pressure. For each group and correlation, the mean ratio of experimental-to-calculated heat flux and the standard deviation have been computed by

$$\bar{R} = \frac{\sum R}{N}$$

where

R is $\frac{\text{experimental burnout heat flux}}{\text{predicted burnout heat flux}}$.

N is number of ratios.

$\bar{R}$ is mean ratio.

$$S \text{ (standard deviation)}^* = \sqrt{\frac{\sum (R - \bar{R})^2}{N}}$$

The results are shown in Figure 20. The agreement of a group of data with a specific correlation can be estimated by noting the proximity of the plotted point to the coordinates (1.0, 0). Perfect agreement between the data and a correlation would show a mean ratio of 1.0 and a standard deviation of 0.0. The agreement of the data with the correlations of references 8 and 9 appears to be somewhat mixed, but is superior to the agreement of the data with the correlation of reference 7. It is also apparent that better correlations are needed for uniform as well as for

* Many authors in statistics use $N-1$ instead of N to compute standard deviation in an effort to remove bias. Here, the computation complies with reference 10.

nonuniform flux, since it can be seen that points of poor correlation are not limited to the nonuniform data.

5.2. Exploration of Data Behavior Patterns

The data were studied in order to observe the effects of the various parameters on the critical heat flux and the associated channel power. As a beginning, the pressures and mass velocities were treated as being held constant at their nominal values. On the other hand, the inlet condition varied sufficiently from run to run, so that it was decided to plot all the runs for interpolation of desired fixed values. During this process it was observed that inlet subcooling (expressed as Btu/lb below the enthalpy of saturated liquid) was a more useful parameter than inlet enthalpy was. As a result, the following parameters were considered in all combinations:

Flux shape	Mass velocity, lb/hr-ft ² × 10 ⁻⁶	Pressure, psia	Inlet subcooling, Btu/lb
Uniform	0.5	1000	40
Peak near inlet	1.5	1500	110
Peak near midpoint	2.5	2000	170
Peak near outlet	--	--	--

One approach was to select a given flux shape, pressure, and inlet subcooling. With these fixed, the local heat flux, integrated average heat flux, and the burnout location were plotted as dependent variables versus the mass velocity as the independent variable. The integrated average heat flux is defined by

$$\phi_0 = \frac{1}{L} \int_0^L \phi dL,$$

where

ϕ_0 is integrated average heat flux.

L is distance from inlet of heated channel to the point of interest.

ϕ is local heat flux as a function of distance from the inlet of the heat channel.

The relationship between the local heat flux and integrated average is shown in Figure 21 for flux shape 3. An example of these plots is shown

in Figure 22. A decision had to be made regarding the burnout length to be considered because most of the nonuniform runs exhibited multiple burnout locations. In this initial study the distance from the inlet of the heated portion of the tube to the burnout location nearest the inlet end was taken as a measure of the burnout location. This assumption is based on the reasoning that for a given run this was the burnout occurring at the highest heat flux and hence was the most significant, since the high heat fluxes are more likely to be destructive under critical conditions.

The heat flux information from the foregoing plots was condensed in tabular form (Table 1) in order to make further observations. All values are shown to two significant digits only, which are sufficient for preliminary observations.

One may examine Table 1 for general hypotheses of behavior. The most striking observation is the relatively constant behavior of the integrated average heat flux at a given pressure and inlet subcooling associated with the low mass velocity (0.5×10^6 lb/hr-ft²). A notable exception is one measurement on flux shape 3 (peak near inlet) at inlet subcooling of 110 Btu/lb and 2000 psia. However, the relative independence of the integrated heat flux in relation to the flux shape for most of these low-mass-velocity runs is remarkable. One may also observe that as the values of the mass velocity are increased the integrated average flux acquires a dependence on the flux shape. This dependence is further increased as the pressure and mass velocity are increased. The foregoing observations may be a basis for correlating the data. This effort will be pursued during the next quarter.

The question of correlating the local burnout heat flux naturally arises. A brief examination of the local values in Table 1 reveals no consistent pattern of behavior such as that observed with the integrated average. Though it may be possible at a later date to correlate the local heat fluxes, it appears more useful at present to pursue the correlation of integrated average heat fluxes.

Table 1. Tabulated Parametric Observations

ΔH_{si} , Btu/lb	P, psia	G, lb/hr-ft ² $\times 10^{-6}$	Integrated avg heat flux, Btu/hr-ft ² $\times 10^{-6}$				Local heat flux, Btu/hr-ft ² $\times 10^{-6}$			
			Flux shape							
			1	3	2	4	1	3	2	4
40	1000	0.5	0.43	0.43	0.42	0.39	0.43	0.16	0.17	0.36
		1.5	.61	.67	.55	.47	.61	.33	.22	.53
		2.5	.65	.67	.59	.46	.65	.33	.39	.43
	1500	0.5	.28	.28	.28	.27	.28	.10	.11	.15
		1.5	.39	.37	.38	.32	.39	.13	.24	.26
		2.5	.42	.45	.39	.33	.42	.17	.15	.28
	2000	0.5	.19	.20	.18	.17	.19	.07	.12	.23
		1.5	.27	.32	.27	.23	.27	.12	.18	.34
		2.5	.40	.55	.41	.31	.40	.43	.35	.45
110	1000	0.5	.47	.47	.47	.43	.47	.17	.19	.40
		1.5	.69	.75	.62	.50	.69	.33	.25	.28
		2.5	.75	.91	.69	.56	.75	.51	.28	.52
	1500	0.5	.33	.32	.32	.30	.33	.11	.12	.17
		1.5	.47	.52	.46	.39	.47	.19	.18	.21
		2.5	.56	.81	.59	.50	.56	.42	.23	.40
	2000	0.5	.23	.36	.22	.19	.23	.28	.15	.27
		1.5	.39	.57	.41	.33	.39	.38	.27	.48
		2.5	.58	0.89	.60	.47	.58	.81	.38	.68
170	1000	0.5	.51	0.52	.51	.46	.51	.18	.21	.43
		1.5	.76	0.97	.71	.57	.76	.56	.28	.50
		2.5	.84	1.18	.81	.71	.84	.68	.33	.67
	1500	0.5	.36	0.37	.36	.33	.36	.13	.14	.25
		1.5	.57	0.80	.57	.49	.57	.40	.23	.39
		2.5	.74	1.18	.77	.64	.74	0.87	.31	.83
	2000	0.5	.25	0.31	.27	.22	.25	0.11	.18	.32
		1.5	.49	0.79	.53	.41	.49	0.65	.35	.60
		2.5	0.74	1.14	0.79	0.62	0.74	1.28	0.53	0.90

Figure 20. Comparison of Burnout Equations and Data

Figure 21. Heat Flux Distribution T-3

Figure 22. Critical Heat Fluxes and Location

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APPENDIX

Tables A-1, A-2, A-3, and A-4

Tubular Test Section — Tabulation
of Results

Definition of Symbols Used in Tables

DNB	Departure from nucleate boiling (critical heat flux)—0 indicates the station number at which DNB occurred
P	Test section outlet pressure, psia
ΔP	Total test section pressure drop, psid
G	Test section mass velocity, lb/hr-ft ²
kw	Net electrical power input to the test section, kilowatts
Sta No.	Location on test section for which local operating conditions are calculated
ΔT_s	Fluid subcooling at center of station number indicated, degrees F
h	Fluid enthalpy at center of station number indicated, Btu/lb
x	Steam quality, by weight, at center of station number indicated, %
V_m	Fluid mixture velocity at center of station number indicated (assuming zero slip), ft/sec
$\phi_{1,0}$	Local average heat input rate at station number indicated, for <u>tubular test sections</u> and <u>outside tube</u> in annular test sections, Btu/hr-ft ²
ϕ_0	Integrated average heat input rate from test section inlet to center of station number indicated, for <u>tubular test sections</u> and <u>outside tube</u> in annular test sections, Btu/hr-ft ²

Table A-1. Data From Flux Shape 1 (Uniform)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\frac{\phi_o}{10^6}$	$\frac{\phi_i}{10^6}$	$\frac{\phi_w}{10^6}$	$\frac{\phi_j}{10^6}$
1		5- 4-64	13155	995	9.87	2.546	78.9	INLET	24.4	511.3	-4.66	14.7				
								12	.0	605.0	9.75	44.7	.378	.385		
								EXIT	.0	609.0	10.37	46.5		.385		
2		5- 4-64	14129	1015	12.05	2.532	100.6	INLET	21.8	517.5	-4.20	14.7				
								12	.0	637.7	14.38	57.4	.488	.491		
								EXIT	.0	642.8	15.18	59.7		.491		
3		5- 4-64	15101	1015	14.49	2.548	128.9	INLET	21.2	518.2	-4.10	14.8				
								1	15.8	524.8	-3.08	15.0	.621	.621		
								2	5.2	538.0	-1.03	15.2	.629	.625		
								3	.0	550.9	.97	18.2	.632	.619		
								4	.0	564.6	3.08	24.4	.631	.627		
								5	.0	577.6	5.10	30.4	.631	.624		
								6	.0	591.3	7.21	36.6	.628	.628		
								7	.0	604.6	9.27	42.7	.629	.629		
								8	.0	618.0	11.34	48.8	.631	.629		
								9	.0	631.3	13.40	54.8	.631	.629		
								10	.0	644.9	15.51	61.1	.634	.631		
								11	.0	658.3	17.57	67.2	.632	.631		
4	0	5- 4-64	15126	1015	15.30	2.528	130.9	INLET	26.1	512.2	-5.02	14.7				
								12	.0	668.7	19.19	71.4	.638	.638		
								EXIT	.0	675.5	20.24	74.4		.638		
5	0	5- 4-64	15136	1015	15.30	2.528	130.9	INLET	29.4	508.1	-5.66	14.6				
								12	.0	664.6	18.55	69.5	.638	.638		
								EXIT	.0	671.4	19.60	72.8		.638		
6	0	5- 5-64	10120	1000	4.28	1.526	60.6	INLET	21.6	515.5	-4.14	8.9				
								12	.0	635.5	14.34	34.9	.294	.296		
								EXIT	.0	640.7	15.14	36.4		.296		
7		5- 5-64	11101	1020	5.71	1.507	82.7	INLET	22.7	517.1	-4.39	8.8				
								12	.0	682.9	21.28	46.0	.402	.403		
								EXIT	.0	690.0	22.40	47.9		.403		
8		5- 5-64	11132	1000	7.11	1.511	96.2	INLET	21.2	516.0	-4.06	8.8				
								12	.0	708.5	25.57	54.6	.464	.469		
								EXIT	.0	716.7	26.85	56.9		.469		
9		5- 5-64	11147	1015	7.86	1.504	105.4	INLET	24.4	514.3	-4.70	8.7				
								12	.0	726.2	28.08	57.9	.507	.514		
								EXIT	.0	735.3	29.48	60.4		.514		
10		5- 5-64	12104	1005	8.36	1.471	114.5	INLET	22.9	514.7	-4.39	8.5				
								12	.0	750.2	31.93	63.8	.552	.559		
								EXIT	.0	760.3	33.48	66.5		.559		
11		5- 5-64	12111	1000	8.74	1.512	117.9	INLET	20.7	516.5	-3.98	8.8				
								12	.0	752.4	32.35	66.7	.565	.575		
								EXIT	.0	762.5	33.90	69.4		.575		

Table A-1. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\frac{\phi_o}{10^6}$	$\frac{\phi_i}{10^6}$	$\frac{\phi_{11}}{10^6}$	$\frac{\phi_i}{10^6}$
12		5- 5-64	12:17	1000		1,504	119.9	INLET	19.5	518.1	-3.74	8.8				
	0							12	.0	758.9	33.34	68.1	.585	.585		
	0							EXIT	.0	769.4	34.96	71.0		.585		
13		5- 5-64	15:17	1000	1.02	.504	72.3	INLET	28.5	507.1	-5.44	2.9				
								12	.0	940.5	61.30	39.4	.351	.352		
								EXIT	.0	959.2	64.18	41.1		.352		
14		5- 5-64	15:47	1000	1.20	.502	77.3	INLET	24.5	511.9	-4.69	2.9				
								12	.0	977.4	66.99	42.6	.377	.377		
								EXIT	.0	997.7	70.11	44.4		.377		
15		5- 5-64	15:58	995	1.25	.503	79.9	INLET	24.1	511.7	-4.59	2.9				
								12	.0	992.0	69.25	44.3	.382	.390		
								EXIT	.0	1012.5	72.40	46.2		.389		
16		5- 5-64	16:14	1000	1.27	.502	85.1	INLET	25.2	511.1	-4.81	2.9				
	0							12	.0	1024.6	74.25	46.9	.406	.416		
	0							EXIT	.0	1046.4	77.61	48.9		.415		
17		5- 6-64	13:00	1000	5.53	1,533	98.0	INLET	54.7	475.8	-10.25	8.6				
								12	.0	669.1	19.51	44.4	.474	.478		
								EXIT	.0	677.4	20.79	46.7		.478		
18		5- 6-64	13:30	1000	7.93	1,528	129.8	INLET	49.4	482.0	-9.30	8.6				
	0							12	.0	738.9	30.25	63.4	.632	.633		
	0							EXIT	.0	750.0	31.97	66.7		.633		
19		5- 6-64	14:45	1025	9.56	2,494	121.8	INLET	58.1	475.4	-10.99	13.9				
								12	.0	623.1	11.92	49.1	.589	.594		
								EXIT	.0	629.4	12.91	51.9		.594		
20		5- 6-64	15:22	1000	12.05	2,491	141.8	INLET	55.4	475.0	-10.38	13.9				
	0							12	.0	646.9	16.10	62.2	.706	.691		
	0							EXIT	.0	654.6	17.27	65.6		.692		
21		5- 7-64	10:23	1000	.29	.500	60.1	INLET	60.4	469.3	-11.26	2.8				
								12	.0	832.1	44.62	29.3	.294	.293		
								EXIT	.0	848.0	47.05	30.7		.293		
22		5- 7-64	10:52	1000	1.22	.512	85.4	INLET	60.9	468.8	-11.34	2.8				
								12	.0	972.5	66.23	43.0	.414	.416		
								EXIT	.0	994.3	69.58	45.0		.416		
23		5- 7-64	11:12	995	1.36	.513	93.4	INLET	59.7	469.4	-11.10	2.9				
	0							12	.0	1019.5	73.48	47.8	.448	.456		
	0							EXIT	.0	1043.0	77.09	50.0		.455		
24		5- 7-64	13:22	1000	.86	.534	80.7	INLET	104.3	419.7	-18.89	2.8				
								12	.0	876.6	51.46	35.6	.389	.394		
								EXIT	.0	896.2	54.49	37.5		.393		
25		5- 7-64	14:15	1000		.506	100.0	INLET	107.4	416.2	-19.43	2.7				
	0							12	.0	1013.9	72.60	46.3	.486	.488		
	0							EXIT	.0	1039.7	76.58	48.6		.487		
26		5- 7-64	15:15	1000	5.30	1,509	121.8	INLET	99.5	425.0	-18.07	8.1				
								12	.0	669.2	19.53	43.8	.585	.595		
								EXIT	.0	679.7	21.14	46.6		.594		

Table A-1. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\frac{\phi_{i,0}}{10^6}$	$\frac{\phi_o}{10^6}$	$\frac{\phi_{i,1}}{10^6}$	$\frac{\phi_{i,2}}{10^6}$
27		5-7-64	15:30	1000	6.79	1.510	142.9	INLET	97.9	426.8	-17.80	8.1				
								12	.0	712.9	26.26	55.8	.692	.697		
								EXIT	.0	725.3	28.16	56.1		.697		
28		5-7-64	15:43	1005		1.517	147.6	INLET	102.4	422.5	-18.61	8.1				
0								12	.0	716.6	26.75	56.6	.713	.720		
0								EXIT	.0	729.3	28.71	60.1		.720		
29		5-8-64	11:5	1000	8.15	2.419	147.5	INLET	99.5	425.1	-18.07	13.0				
								12	.0	609.4	10.31	43.9	.715	.719		
								EXIT	.0	617.3	11.54	47.4		.719		
30		5-8-64	15:15	1000	8.38	2.497	147.5	INLET	100.6	423.8	-18.27	13.4				
								12	.0	602.4	9.24	42.1	.713	.719		
								EXIT	.0	610.1	10.42	45.6		.719		
31		5-8-64	15:28	1000	8.79	2.499	153.2	INLET	98.9	425.7	-17.98	13.4				
								12	.0	611.1	10.58	46.1	.736	.748		
								EXIT	.0	619.1	11.80	49.7		.747		
32		5-8-64	15:41	1005	8.79	2.495	155.2	INLET	100.0	425.2	-18.20	13.4				
0								12	.0	612.7	10.73	46.3	.793	.755		
0								EXIT	.0	621.3	12.05	50.2		.757		
33		5-11-64	10:43	1000	3.31	1.438	121.6	INLET	148.9	371.2	-26.37	7.4				
								12	.0	626.8	13.00	30.6	.590	.593		
								EXIT	.0	637.9	14.70	33.5		.593		
34		5-11-64	11:12	1000	5.30	1.432	150.5	INLET	147.3	372.9	-26.10	7.4				
								12	.0	690.8	22.85	47.1	.726	.734		
								EXIT	.0	704.5	24.96	50.7		.734		
35		5-11-64	11:24	1010		1.428	153.5	INLET	146.2	375.3	-26.03	7.4				
0								12	.0	700.3	24.15	48.8	.741	.749		
0								EXIT	.0	714.3	26.31	52.3		.749		
36		5-11-64	14:15	980	4.94	2.455	147.5	INLET	143.5	374.3	-25.25	12.6				
								12	.0	555.9	2.54	22.2	.719	.719		
								EXIT	.0	563.8	3.75	25.8		.719		
37		5-11-64	15:01	995	5.73	2.392	156.3	INLET	143.0	376.8	-25.34	12.3				
								12	.0	574.3	5.03	28.6	.763	.762		
								EXIT	.0	582.9	6.35	32.3		.762		
38		5-11-64	15:23	1000	6.07	2.462	159.7	INLET	143.7	376.8	-25.51	12.7				
								12	.0	572.7	4.67	28.3	.779	.779		
								EXIT	.0	581.2	5.98	32.1		.779		
39		5-11-64	15:34	1000	6.21	2.466	161.9	INLET	143.3	377.2	-25.44	12.7				
								12	.0	575.6	5.12	29.7	.789	.790		
								EXIT	.0	584.2	6.44	33.5		.790		
40		5-11-64	15:47	1000	6.70	2.461	166.8	INLET	145.2	375.2	-25.74	12.7				
								12	.0	580.0	5.80	31.6	.814	.813		
								EXIT	.0	588.9	7.17	35.5		.813		
41		5-11-64	15:57	1000	6.98	2.461	173.5	INLET	145.2	375.2	-25.74	12.7				
0								12	.0	588.3	7.06	35.2	.845	.846		
0								EXIT	.0	597.5	8.49	39.4		.846		

Table A-1. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\frac{\phi_{i,e}}{10^6}$	$\frac{\phi_o}{10^6}$	$\frac{\phi_{i,i}}{10^6}$	$\frac{\phi_i}{10^6}$
43		5-18-64	11102	995	5.30	2.456	157.4	INLET	152.5	366.7	-26.90	12.6				
								12	.0	560.5	2.91	23.2	.755	.768		
								EXIT	.0	568.8	4.18	26.9		.768		
44		5-18-64	13133	995	6.32	2.466	166.2	INLET	151.7	367.6	-26.76	12.6				
								12	.0	571.4	4.59	28.2	.793	.811		
								EXIT	.0	580.1	5.92	32.1		.810		
45		5-18-64	13156	1000	6.64	2.468	172.6	INLET	152.3	367.5	-26.93	12.6				
								1	143.9	376.6	-25.53	12.7	.829	.829		
								2	127.0	394.8	-22.73	12.9	.843	.832		
								3	110.1	413.3	-19.88	13.1	.845	.838		
								4	93.8	431.3	-17.10	13.3	.846	.835		
								5	77.1	450.1	-14.21	13.5	.848	.841		
								6	61.0	468.6	-11.36	13.7	.843	.842		
								7	45.5	486.7	-8.58	13.9	.848	.839		
								8	29.8	505.5	-5.68	14.2	.845	.842		
								9	14.7	524.0	-2.84	14.5	.841	.843		
								10	.0	542.4	-.00	14.8	.845	.843		
								11	.0	560.5	2.78	22.9	.843	.842		
								12	.0	579.1	5.66	31.3	.824	.843		
								EXIT	.0	588.1	7.04	35.3		.842		
46		5-19-64	11109	1000	1.20	.506	101.3	INLET	157.8	361.7	-27.82	2.6				
								12	.0	967.4	65.45	42.0	.485	.495		
								EXIT	.0	993.3	69.43	44.4		.494		
47		5-19-64	11135	1002	1.29	.506	104.7	INLET	157.4	362.4	-27.78	2.6				
								12	.0	988.6	68.70	43.9	.500	.511		
								EXIT	.0	1015.2	72.80	46.3		.511		
48		5-19-64	11145	1002	1.31	.506	105.9	INLET	158.0	361.7	-27.88	2.6				
								12	.0	994.7	69.64	44.4	.507	.517		
								EXIT	.0	1021.7	73.81	46.9		.516		
49		5-19-64	11155	1002	1.31	.506	106.3	INLET	157.5	362.3	-27.80	2.6				
								12	.0	997.9	70.14	44.7	.509	.519		
								EXIT	.0	1025.0	74.31	47.2		.519		
50		5-19-64	14123	1505		.504	73.2	INLET	157.5	418.7	-34.84	2.7				
								12	.0	898.2	44.30	18.9	.351	.357		
								EXIT	.0	877.0	47.68	20.1		.357		
51		5-19-64	14137	1502		.505	75.6	INLET	156.5	419.6	-34.58	2.7				
								12	.0	872.6	46.91	19.9	.357	.369		
								EXIT	.0	891.6	50.33	21.1		.369		
52		5-19-64	14149	1502		.505	76.1	INLET	155.6	420.6	-34.41	2.7				
								12	.0	875.8	47.47	20.1	.361	.371		
								EXIT	.0	895.0	50.94	21.4		.371		
53		5-20-64	10126	1500	1.81	1.513	113.3	INLET	153.7	422.4	-34.00	8.0				
								12	.0	649.1	6.74	17.0	.541	.553		
								EXIT	.0	658.7	8.47	18.9		.553		

Table A-1. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\frac{\phi_o}{10^6}$	$\frac{\phi_i}{10^6}$	$\frac{\phi_o}{10^6}$	$\frac{\phi_i}{10^6}$
94		5-20-64	11:00	1503	2.11	1.498	118.4	INLET	149.7	427.1	-33.26	8.0				
								12	.0	666.1	9.74	20.0	.568	.578		
								EXIT	.0	676.3	11.58	21.9		.577		
95		5-20-64	11:44	1502	2.17	1.511	121.3	INLET	153.0	423.4	-33.90	8.0				
								12	.0	666.2	9.77	20.2	.580	.592		
								EXIT	.0	676.5	11.63	22.2		.592		
96		5-20-64	11:52	1502	2.22	1.513	123.1	INLET	146.8	430.2	-32.68	8.1				
	0							12	.0	676.2	11.58	22.2	.590	.600		
	0							EXIT	.0	686.7	13.47	24.2		.600		
97		5-20-64	14:55	1493	3.10	2.510	138.9	INLET	152.2	423.4	-33.59	13.4				
								12	14.1	590.9	-3.55	15.9	.660	.678		
								EXIT	9.0	598.0	-2.28	16.1		.677		
98		5-20-64	15:17	1492	3.24	2.517	146.9	INLET	153.1	422.3	-33.75	13.4				
								12	8.2	599.0	-2.08	16.1	.697	.717		
								EXIT	3.1	606.4	-.75	16.3		.716		
99		5-20-64	15:49	1495	4.40	2.513	164.5	INLET	154.8	420.8	-34.13	13.4				
	0							12	.0	618.8	1.40	18.9	.782	.803		
	0							EXIT	.0	627.2	2.91	21.5		.802		
60		5-21-64	12:56	1500	3.65	2.517	114.3	INLET	107.1	474.9	-24.57	14.0				
								12	.0	612.2	.11	16.6	.549	.558		
								EXIT	.0	618.1	1.17	18.5		.557		
61		5-21-64	13:20	1500	4.08	2.528	121.3	INLET	108.3	473.6	-24.81	14.0				
								12	.0	618.7	1.28	18.8	.583	.592		
								EXIT	.0	624.9	2.40	20.8		.592		
62		5-21-64	13:31	1500	4.39	2.517	126.8	INLET	106.6	475.5	-24.47	14.0				
								12	.0	627.8	2.91	21.6	.608	.619		
								EXIT	.0	634.3	4.08	23.7		.618		
63		5-21-64	13:48	1500	4.71	2.508	130.1	INLET	107.6	474.3	-24.69	13.9				
								12	.0	631.0	3.49	22.9	.630	.635		
								EXIT	.0	637.8	4.71	24.7		.634		
64		5-21-64	13:56	1500	4.85	2.506	133.6	INLET	111.9	469.4	-25.57	13.9				
	0							12	.0	630.6	3.41	22.4	.645	.652		
	0							EXIT	.0	637.5	4.66	24.6		.652		
65		5-22-64	10:22	1535		.921	67.6	INLET	115.2	469.1	-26.71	2.9				
								12	.0	861.2	44.60	19.3	.323	.330		
								EXIT	.0	877.9	47.63	20.3		.329		
66		5-22-64	10:36	1503		.903	69.8	INLET	111.1	470.6	-25.44	2.8				
	0							12	.0	869.8	50.00	20.9	.338	.340		
	0							EXIT	.0	907.9	53.25	22.1		.340		
67		5-22-64	12:55	1495	1.81	1.504	81.6	INLET	97.5	485.5	-22.52	8.4				
								12	.0	649.6	6.94	17.2	.395	.398		
								EXIT	.0	656.7	8.21	18.5		.398		
68		5-22-64	13:47	1505	2.33	1.523	97.5	INLET	106.3	476.3	-24.48	8.5				
								12	.0	669.8	10.37	21.0	.472	.476		
								EXIT	.0	678.2	11.88	22.6		.475		

Table A-1. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA. NO.	ΔT_s	h	X	V_m	$\frac{\phi_o}{10^6}$	$\frac{\phi_o}{10^6}$	$\frac{\phi_{i,1}}{10^6}$	$\frac{\phi_i}{10^6}$
69		5-22-64	14108	1502	1.04	1.506	97.3	INLET	108.1	474.0	-24.80	8.4				
								12	.0	669.3	10.33	20.7	.469	.475		
								EXIT	.0	677.6	11.83	22.3		.474		
70		5-22-64	14116	1500	1.04	1.502	98.6	INLET	105.5	476.8	-24.24	8.4				
								12	.0	675.2	11.43	21.9	.479	.481		
								EXIT	.0	683.8	12.97	23.5		.481		
71		5-22-64	14125	1495	1.09	1.496	103.1	INLET	105.5	476.2	-24.18	8.3				
0								12	.0	684.6	13.22	23.7	.496	.503		
0								EXIT	.0	693.6	14.83	25.4		.503		
72		5-25-64	10105	1495		.498	59.2	INLET	58.7	532.7	-14.04	2.9				
								12	.0	892.2	50.48	21.0	.285	.289		
								EXIT	.0	907.7	53.25	22.0		.289		
73		5-25-64	10116	1502		.502	61.3	INLET	59.1	533.1	-14.17	3.0				
0								12	.0	902.0	52.19	21.7	.297	.299		
0								EXIT	.0	917.9	55.05	22.7		.299		
74		5-25-64	12107	1503	2.54	1.494	77.1	INLET	54.5	538.9	-13.14	8.9				
								12	.0	695.0	14.94	25.4	.369	.376		
								EXIT	.0	701.6	16.13	26.6		.376		
75		5-25-64	12138	1501	2.90	1.487	88.0	INLET	53.6	539.8	-12.93	8.9				
0								12	.0	718.8	19.26	29.8	.422	.430		
0								EXIT	.0	726.5	20.64	31.3		.429		
76		5-25-64	13126	1501	5.30	2.452	91.6	INLET	56.7	536.0	-13.62	14.6				
								12	.0	649.1	6.71	27.6	.436	.447		
								EXIT	.0	653.9	7.58	29.1		.447		
77		5-25-64	14122	1503	5.46	2.458	96.0	INLET	54.3	539.2	-13.09	14.6				
								12	.0	657.2	8.13	30.1	.471	.468		
								EXIT	.0	662.3	9.06	31.7		.468		
78		5-25-64	15101	1503	5.48	2.450	100.2	INLET	55.0	538.3	-13.25	14.6				
0								12	.0	661.8	8.97	31.4	.492	.488		
0								EXIT	.0	667.3	9.95	33.1		.488		
79		5-26-64	10148	1503		.509	53.7	INLET	28.1	573.1	-6.99	3.1				
								12	.0	892.2	50.42	21.3	.258	.262		
								EXIT	.0	905.8	52.88	22.2		.262		
80		5-26-64	10159	1503		.508	56.8	INLET	29.0	572.0	-7.20	3.1				
								12	.0	910.0	53.63	22.4	.269	.277		
								EXIT	.0	924.3	56.20	23.3		.277		
81		5-26-64	11106	1502		.508	58.0	INLET	27.7	573.6	-6.87	3.1				
0								12	.0	919.1	55.27	23.0	.277	.283		
0								EXIT	.0	933.8	57.91	23.9		.283		
82		5-26-64	11156	1502	3.17	1.499	73.4	INLET	24.6	577.7	-6.14	9.3				
								12	.0	725.7	20.49	31.3	.352	.358		
								EXIT	.0	732.1	21.63	32.5		.358		
83		5-26-64	12116	1509	3.31	1.504	81.8	INLET	26.5	576.0	-6.63	9.3				
								12	.0	740.6	23.05	34.0	.391	.399		
								EXIT	.0	747.6	24.32	35.3		.399		

Table A-1. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\frac{\phi_o}{10^6}$	$\frac{\phi_i}{10^6}$	$\frac{\phi_o}{10^6}$	$\frac{\phi_i}{10^6}$
84		5-26-64	12:25	1509	3.35	1.505	82.4	INLET	26.6	575.8	-6.65	9.4				
	0							12	.0	741.5	23.21	34.2	.395	.402		
	0							EXIT	.0	748.6	24.49	35.5		.402		
85		5-26-64	14:05	1503	6.32	2.467	80.4	INLET	24.1	578.6	-6.01	15.4				
								12	.0	677.2	11.73	36.4	.386	.393		
								EXIT	.0	681.4	12.49	37.7		.392		
86		5-26-64	14:20	1503	6.43	2.468	83.9	INLET	24.2	578.3	-6.05	15.4				
	0							12	.0	681.1	12.44	37.6	.406	.409		
	0							EXIT	.0	685.5	13.24	39.0		.409		
87		5-26-64	15:42	1515	5.48	2.435	97.3	INLET	52.3	543.0	-12.73	14.6				
	0							12	.0	663.7	9.08	31.3	.472	.474		
	0							EXIT	.0	669.0	10.02	32.9		.474		
88		5-28-64	11:20	2003		.501	36.2	INLET	27.8	626.8	-9.78	3.3				
								12	.0	844.8	37.32	12.0	.178	.176		
								EXIT	.0	854.3	39.39	12.4		.176		
89		5-28-64	11:37	2003		.507	38.5	INLET	27.1	627.8	-9.55	3.3				
	0							12	.0	857.6	40.08	12.7	.186	.188		
	0							EXIT	.0	867.4	42.22	13.2		.188		
90		5-28-64	13:14	2003		1.492	50.9	INLET	23.7	633.0	-8.43	9.9				
								12	.0	736.1	13.84	19.9	.246	.248		
								EXIT	.0	740.6	14.81	20.6		.248		
91		5-28-64	13:30	2003	1.77	1.504	53.1	INLET	23.5	633.2	-8.39	10.0				
								12	.0	740.1	14.70	20.7	.255	.259		
								EXIT	.0	744.6	15.68	21.3		.259		
92		5-28-64	13:36	2003	1.74	1.510	55.9	INLET	24.4	632.0	-8.65	10.0				
	0							12	.0	744.0	15.55	21.3	.267	.273		
	0							EXIT	.0	748.8	16.58	22.0		.273		
93		5-28-64	14:27	2003	5.16	2.482	58.6	INLET	22.6	634.7	-8.08	16.6				
								12	.0	706.1	7.37	25.9	.280	.286		
								EXIT	.0	709.2	8.02	26.7		.286		
94		5-28-64	14:47	2003	5.18	2.477	62.5	INLET	20.1	638.6	-7.23	16.6				
								12	.0	714.8	9.25	28.0	.302	.305		
								EXIT	.0	718.1	9.96	28.8		.305		
95		5-28-64	15:11	2003	5.30	2.520	67.0	INLET	25.2	630.7	-8.94	16.7				
								12	.0	711.0	8.41	27.5	.327	.327		
								EXIT	.0	714.5	9.17	28.4		.327		
96		5-28-64	15:22	2003	5.52	2.518	73.9	INLET	28.7	625.4	-10.08	16.6				
								12	.0	714.1	9.09	28.3	.360	.361		
								EXIT	.0	718.0	9.93	29.2		.361		
97		5-28-64	15:36	2003	5.86	2.495	79.4	INLET	28.3	626.1	-9.93	16.4				
								12	.0	722.3	10.86	30.0	.381	.387		
								EXIT	.0	726.4	11.75	31.0		.387		
98		5-28-64	15:51	2003	5.86	2.484	66.1	INLET	28.7	625.4	-10.07	16.4				
	0							12	.0	730.2	12.56	31.8	.418	.420		
	0							EXIT	.0	734.7	13.54	32.9		.420		

Table A-1. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	X	V_m	$\frac{\phi_{16}}{10^6}$	$\frac{\phi_o}{10^6}$	$\frac{\phi_{11}}{10^6}$	$\frac{\phi_{12}}{10^6}$
99		6- 1-64	12:18	2000		.495	37.5	INLET	54.2	589.0	-17.25	3.1				
								12	.0	818.0	31.57	10.6	.187	.183		
								EXIT	.0	828.2	33.77	11.1		.183		
100		6- 2-64	9:24	2000	1.04	1.392	49.5	INLET	52.5	591.3	-17.35	8.7				
								12	.0	698.7	5.82	13.6	.244	.241		
								EXIT	.0	703.4	6.84	14.2		.241		
101		6- 2-64	9:51	2000	1.31	1.505	56.5	INLET	51.9	592.1	-17.18	9.5				
								12	.0	705.4	7.28	15.7	.279	.275		
								EXIT	.0	710.4	8.36	16.4		.275		
102		6- 2-64	10:08	2010	1.47	1.486	66.1	INLET	53.0	591.6	-17.60	9.3				
	0							12	.0	725.9	11.50	18.3	.328	.322		
	0							EXIT	.0	731.9	12.79	19.1		.322		
103		6- 2-64	12:48	2005	4.17	2.508	87.6	INLET	54.2	589.5	-17.90	15.7				
								12	.0	695.0	4.91	23.4	.428	.427		
								EXIT	.0	699.6	5.91	24.6		.427		
104		6- 2-64	13:13	2005	4.48	2.479	91.8	INLET	53.6	590.3	-17.73	15.5				
								12	.0	702.2	6.48	24.9	.447	.448		
								EXIT	.0	707.1	7.53	26.1		.448		
105		6- 2-64	13:28	2005	4.69	2.495	95.7	INLET	53.2	590.9	-17.60	15.7				
								12	.0	706.8	7.46	26.2	.467	.467		
								EXIT	.0	711.8	8.55	27.4		.467		
106		6- 2-64	14:05	2005	5.03	2.507	103.5	INLET	54.8	588.7	-18.07	15.7				
								12	.0	713.5	8.92	27.9	.503	.505		
								EXIT	.0	718.9	10.09	29.3		.505		
107		6- 2-64	14:20	2005	5.12	2.510	105.8	INLET	55.0	588.4	-18.15	15.7				
	0							12	.0	715.7	9.39	28.5	.516	.516		
	0							EXIT	.0	721.3	10.59	29.9		.516		
108		6- 2-64	15:50	2000		.506	37.4	INLET	57.7	584.2	-18.87	3.1				
								12	.0	807.5	29.31	10.3	.183	.182		
								EXIT	.0	817.3	31.41	10.8		.182		
109		6- 2-64	16:02	2000		.506	42.5	INLET	55.6	587.1	-18.26	3.2				
								12	.0	840.8	36.50	11.9	.207	.207		
								EXIT	.0	851.9	38.88	12.5		.207		
110		6- 2-64	16:09	2000		.503	44.7	INLET	55.4	587.4	-18.19	3.1				
	0							12	.0	856.1	39.79	12.6	.218	.218		
	0							EXIT	.0	867.8	42.32	13.2		.218		
111		6- 3-64	9:44	2005		.499	49.0	INLET	107.1	521.9	-32.51	2.9				
								12	.0	818.7	31.66	10.7	.236	.239		
								EXIT	.0	831.4	34.41	11.3		.239		
112		6- 3-64	10:02	2005		.497	50.7	INLET	106.8	522.3	-32.43	2.9				
	0							12	.0	831.2	34.36	11.2	.243	.248		
	0							EXIT	.0	844.3	37.20	11.8		.247		
113		6- 3-64	11:19	2005	1.25	1.501	82.2	INLET	99.1	531.7	-30.39	8.8				
								12	.0	697.4	5.43	14.4	.399	.401		
								EXIT	.0	704.6	6.98	15.4		.401		

Table A-1. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h'	X	V_m	$\frac{\phi_o}{10^6}$	$\frac{\phi_s}{10^6}$	$\frac{\phi_{i,h}}{10^6}$	$\frac{\phi_i}{10^6}$
114		6-3-64	11:45	2000	1.47	1.513	90.3	INLET	102.5	527.1	-31.20	8.8				
								12	.0	707.7	7.77	16.1	.433	.441		
								EXIT	.0	719.4	9.43	17.2		.440		
115		6-3-64	11:52	2000	1.52	1.513	94.0	INLET	105.8	523.1	-32.08	8.8				
	0							12	.0	710.3	8.33	16.5	.485	.457		
	0							EXIT	.0	718.9	10.20	17.7		.458		
116		6-3-64	13:24	2005	3.40	2.510	115.0	INLET	105.4	524.0	-32.06	14.6				
								12	5.7	662.5	-2.12	17.6	.556	.561		
								EXIT	2.2	668.5	-.83	17.8		.561		
117		6-3-64	13:44	2005	3.85	2.486	125.0	INLET	103.8	525.9	-31.65	14.5				
								12	.0	678.0	1.24	19.1	.603	.610		
								EXIT	.0	684.5	2.65	20.7		.610		
118		6-3-64	14:05	2000	4.08	2.491	129.5	INLET	104.8	524.3	-31.80	14.5				
								12	.0	681.6	2.13	20.2	.624	.632		
								EXIT	.0	688.3	3.59	21.8		.632		
119		6-3-64	14:21	2005	4.37	2.499	134.2	INLET	104.8	524.8	-31.90	14.5				
								12	.0	687.0	3.19	21.4	.649	.654		
								EXIT	.0	694.0	4.71	23.1		.654		
120		6-3-64	14:30	2000		2.498	139.4	INLET	104.2	525.1	-31.64	14.5				
	0							12	.0	693.6	4.73	23.1	.691	.679		
	0							EXIT	.0	701.1	6.34	25.0		.680		
121		6-04-64	11:00	2005	1.13	1.504	104.7	INLET	153.8	467.2	-44.35	8.3				
								12	.0	677.6	1.14	11.5	.509	.511		
								EXIT	.0	686.7	3.11	12.8		.510		
122		6-04-64	11:26	2003	1.31	1.507	112.1	INLET	153.8	467.1	-44.29	8.3				
								12	.0	691.9	4.30	13.7	.541	.547		
								EXIT	.0	701.6	6.39	15.1		.547		
123		6-04-64	11:35	2005	1.29	1.505	113.5	INLET	154.3	466.6	-44.48	8.3				
	0							12	.0	694.7	4.84	14.0	.547	.554		
	0							EXIT	.0	704.5	6.96	15.5		.554		
124		6-04-64	13:37	2005		.501	56.1	INLET	157.9	462.5	-45.36	2.7				
	0							12	.0	801.2	27.87	9.8	.272	.274		
	0							EXIT	.0	815.8	31.04	10.6		.274		
125		6-04-64	15:36	2003	3.19	2.521	144.7	INLET	152.2	468.9	-43.90	13.9				
								12	17.6	642.5	-6.39	17.1	.701	.706		
								EXIT	13.0	650.0	-4.77	17.3		.706		
126		6-04-64	16:02	2005	3.31	2.520	149.9	INLET	153.3	467.7	-44.23	13.9				
								12	14.5	647.6	-5.35	17.2	.719	.731		
								EXIT	9.9	655.2	-3.68	17.5		.731		
127		6-04-64	16:14	2005	3.60	2.515	156.8	INLET	153.3	467.7	-44.23	13.8				
								12	9.4	656.2	-3.49	17.4	.767	.765		
								EXIT	4.6	664.4	-1.71	17.7		.765		
128		6-04-64	16:24	2005	3.80	2.519	161.9	INLET	155.2	465.6	-44.69	13.8				
								12	7.2	659.9	-2.69	17.6	.790	.789		
								EXIT	2.3	668.3	-.86	17.8		.789		

Table A-1. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	X	V_m	$\frac{\phi_{10}}{10^6}$	$\frac{\phi_o}{10^6}$	$\frac{\phi_{11}}{10^6}$	$\frac{\phi_i}{10^6}$
129		6-14-64	14:32	2005	4.08	2.513	169.8	INLET	153.2	467.8	-44.21	13.8				
	0							12	.8	670.9	-4.30	17.9	.818	.823		
	0							EXIT	.0	679.7	1.60	19.8		.823		
130		6-10-64	11:45	1010	3.90	1.017	107.0	INLET	82.1	445.9	-15.14	5.5				
								12	.0	763.9	33.98	46.4	.515	.522		
								EXIT	.0	777.6	36.09	48.9		.522		
131		6-10-64	12:43	1007	4.55	1.005	120.6	INLET	82.9	444.5	-15.26	5.5				
								12	.0	807.6	40.76	53.9	.577	.589		
								EXIT	.0	823.1	43.15	56.7		.588		
132		6-10-64	12:55	1007	4.67	1.005	123.8	INLET	81.8	445.8	-15.07	5.5				
	0							12	.0	818.5	42.43	55.9	.592	.604		
	0							EXIT	.0	834.3	44.88	58.7		.604		
133		6-10-64	14:29	1015	8.65	1.997	140.5	INLET	82.5	446.1	-15.25	10.9				
								12	.0	658.9	17.67	52.9	.671	.686		
								EXIT	.0	668.0	19.07	56.1		.685		
134		6-10-64	14:41	1010	8.83	1.991	144.0	INLET	81.0	447.1	-14.96	10.9				
	0							12	.0	665.9	18.84	55.6	.682	.703		
	0							EXIT	.0	675.1	20.27	58.9		.702		
135		6-11-64	10:33	1010	12.23	2.002	114.6	INLET	21.7	516.9	-4.18	11.8				
								12	.0	689.9	22.55	64.4	.550	.559		
								EXIT	.0	697.3	23.69	67.3		.559		
136		6-11-64	10:51	1010	11.78	1.979	121.8	INLET	20.9	517.8	-4.03	11.5				
								12	.0	704.0	24.72	68.9	.586	.595		
								EXIT	.0	712.0	25.96	71.7		.594		
137		6-11-64	11:00	1005	11.73	1.977	125.6	INLET	22.1	515.7	-4.24	11.5				
	0							12	.0	707.8	25.39	70.7	.601	.613		
	0							EXIT	.0	716.0	26.65	73.6		.612		
138		6-11-64	12:50	995	4.77	.986	95.6	INLET	21.6	514.8	-4.13	5.7				
								12	.0	807.8	40.92	53.7	.458	.466		
								EXIT	.0	820.3	42.84	56.0		.466		
139		6-11-64	13:14	995	4.91	.976	99.1	INLET	22.1	514.1	-4.23	5.7				
								12	.0	821.0	42.96	55.5	.476	.483		
								EXIT	.0	834.2	44.98	57.9		.483		
140		6-11-64	13:38	1000	5.25	.994	104.3	INLET	23.6	513.0	-4.52	5.8				
								12	.0	830.3	44.33	57.9	.500	.509		
								EXIT	.0	843.9	46.42	60.3		.508		
141		6-11-64	13:50	1000	5.37	1.002	107.9	INLET	20.1	517.4	-3.85	5.8				
	0							12	.0	843.4	46.35	60.7	.515	.527		
	0							EXIT	.0	857.2	48.48	63.2		.526		
143		6-12-64	11:18	1500	3.48	1.500	72.8	INLET	13.2	593.0	-3.33	5.5				
								12	.0	739.8	23.04	34.1	.348	.355		
								EXIT	.0	746.1	24.17	35.3		.355		
144		6-12-64	11:31	1500	3.56	1.498	78.6	INLET	13.2	593.0	-3.34	5.5				
	0							12	.0	751.8	25.21	36.3	.379	.384		
	0							EXIT	.0	758.7	26.44	37.6		.383		

Table A-1. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\frac{\phi_o}{10^6}$	$\frac{\phi_e}{10^6}$	$\frac{\phi_{ij}}{10^6}$	$\frac{\phi_i}{10^6}$
145		6-12-64	12:44	1500	5.01	1.974	75.3	INLET	11.7	595.1	-2.97	12.6				
								12	.0	710.4	17.76	37.9	.363	.367		
								EXIT	.0	715.4	18.66	38.8		.367		
146	0	6-12-64	12:53	1500	5.14	1.970	78.8	INLET	10.0	597.5	-2.54	12.6				
	0							12	.0	718.5	19.21	39.9	.380	.385		
								EXIT	.0	723.7	20.15	40.8		.384		
147		6-12-64	13:39	1500	6.91	2.460	76.9	INLET	16.2	588.9	-4.07	15.6				
								12	.0	683.4	12.91	38.4	.372	.375		
								EXIT	.0	687.5	13.64	39.6		.375		
148		6-12-64	13:51	1500	6.88	2.465	79.4	INLET	18.0	586.5	-4.52	15.5				
								12	.0	683.9	13.00	38.6	.383	.388		
								EXIT	.0	688.1	13.75	39.9		.387		
149	0	6-12-64	14:38	1500	6.77	2.494	84.7	INLET	21.8	581.3	-5.45	15.6				
	0							12	.0	684.0	13.01	39.1	.410	.413		
								EXIT	.0	688.4	13.80	40.9		.413		
150		6-15-64	11:28	1500	.86	1.000	92.3	INLET	153.3	422.9	-33.93	5.3				
								12	.0	701.8	16.21	17.9	.446	.450		
								EXIT	.0	713.8	18.37	19.4		.450		
151		6-15-64	11:50	1505	1.04	.999	97.9	INLET	152.2	424.5	-33.79	5.3				
								12	.0	720.9	19.57	20.2	.473	.478		
								EXIT	.0	733.7	21.87	21.8		.478		
152		6-15-64	13:10	1500	1.22	.997	102.0	INLET	152.9	423.4	-33.84	5.3				
								12	.0	732.7	21.76	21.8	.490	.498		
								EXIT	.0	745.9	24.15	23.4		.497		
153		6-15-64	13:25	1505	1.29	.997	105.4	INLET	152.6	424.1	-33.87	5.3				
								12	.0	743.7	23.67	23.0	.507	.514		
								EXIT	.0	757.4	26.13	24.7		.514		
154	0	6-15-64	13:37	1500	1.29	.996	107.5	INLET	151.0	425.4	-33.48	5.3				
	0							12	.0	751.5	25.16	24.1	.516	.524		
								EXIT	.0	765.5	27.66	25.9		.524		
155		6-15-64	15:14	1510	3.49	1.500	76.3	INLET	20.7	583.9	-5.22	9.4				
								12	.0	737.7	22.52	33.3	.367	.372		
								EXIT	.0	744.3	23.71	34.6		.372		
156	0	6-15-64	15:24	1512	3.53	1.504	79.4	INLET	22.0	582.4	-5.55	9.4				
	0							12	.0	742.1	23.28	34.2	.383	.388		
								EXIT	.0	748.9	24.52	35.5		.387		
157		6-17-64	11:11	1992		.502	66.8	INLET	251.7	359.5	-66.95	2.5				
								12	.0	762.1	19.65	8.1	.318	.326		
								EXIT	.0	779.2	23.33	8.9		.326		
158	0	6-17-64	11:25	1990		.498	68.5	INLET	253.6	357.4	-67.30	2.5				
	0							12	.0	773.5	22.12	8.5	.329	.334		
								EXIT	.0	791.3	25.96	9.4		.334		
159		6-17-64	13:40	1995	.23	1.005	105.4	INLET	250.8	360.8	-66.84	5.1				
								12	.0	677.8	1.43	7.8	.503	.514		
								EXIT	.0	691.3	4.34	9.1		.514		

Table A-1. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\frac{\phi_{i,o}}{10^6}$	$\frac{\phi_o}{10^6}$	$\frac{\phi_{i,i}}{10^6}$	$\frac{\phi_i}{10^6}$
160		6-17-64	13:55	1995	.34	1.005	109.1	INLET	250.3	361.2	-66.74	5.1				
	0							12	.0	689.5	3.96	-9.0	.522	.532		
	0							EXIT	.0	703.5	6.97	10.3		.532		

Table A-2. Data From Flux Shape 2 (Chopped Cosine)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\phi_{i,0}$ 10 ⁶	ϕ_o 10 ⁶	$\phi_{i,1}$ 10 ⁶	ϕ_i 10 ⁶
161		08-26-64	11115	1015	.59	1496	64.7	INLET	22.8	516.2	-4.41	2.9				
								1	17.0	523.3	-3.31	2.9	.131	.131		
								2	1.8	542.5	-0.34	3.0	.221	.142		
								3	.0	571.0	4.07	5.3	.306	.263		
								4	.0	606.6	9.58	8.5	.368	.239		
								5	.0	649.2	16.17	12.3	.410	.274		
								6	.0	694.6	23.18	16.3	.436	.300		
								7	.0	742.2	30.55	20.5	.437	.322		
								8	.0	787.6	37.57	24.6	.411	.335		
								9	.0	831.0	44.28	28.4	.370	.343		
								10	.0	867.3	49.89	31.7	.304	.342		
								11	.0	895.9	54.33	34.2	.222	.335		
								12	.0	915.8	57.41	36.0	.130	.322		
								EXIT	.0	922.9	58.49	36.6		.314		
162		08-26-64	11146	1020	1.22	.521	83.2	INLET	26.1	512.9	-5.04	3.0				
								12	.0	1002.4	70.77	45.6	.171	.414		
								EXIT	.0	1011.1	72.13	46.4		.403		
163		08-26-64	12133	1005	1.25	.506	86.2	INLET	24.9	512.2	-4.77	2.9				
0								12	.0	1034.3	75.73	48.0	.174	.429		
0								EXIT	.0	1043.4	77.15	48.8		.418		
164		08-26-64	13157	1010	7.20	1.477	112.2	INLET	20.0	518.9	-3.86	8.6				
0								12	.0	751.7	32.09	64.1	.228	.558		
0								EXIT	.0	755.8	32.73	65.2		.544		
165		08-26-64	15105	1010	12.75	2.504	115.3	INLET	17.7	521.8	-3.42	14.7				
0								11	.0	656.5	17.38	65.7	.398	.599		
								12	.0	662.9	18.38	68.6	.234	.573		
								EXIT	.0	665.4	18.76	69.8		.559		
166		08-26-64	15159	1025	8.97	2.535	119.2	INLET	52.6	481.8	-9.99	14.2				
0								11	.0	619.2	11.33	48.1	.411	.619		
								12	.0	625.9	12.37	51.2	.243	.593		
								EXIT	.0	628.5	12.77	52.3		.578		
167		08-27-64	12139	1025	5.01	2.513	120.3	INLET	100.5	427.2	-18.46	13.5				
								1	98.3	429.7	-18.07	13.5	.239	.239		
								2	92.0	436.6	-16.99	13.6	.407	.296		
								3	83.2	446.6	-15.44	13.7	.568	.365		
								4	71.1	460.4	-13.31	13.9	.687	.445		
								5	57.7	475.8	-10.92	14.0	.768	.507		
								6	43.5	492.6	-8.31	14.3	.814	.558		
								7	28.9	510.2	-5.59	14.5	.815	.599		
								8	15.2	527.0	-2.99	14.8	.767	.624		
								9	2.9	542.6	-0.56	15.1	.689	.636		
								10	.0	555.9	1.50	19.5	.566	.635		
								11	.0	566.5	3.15	24.2	.416	.622		
								12	.0	573.8	4.29	27.5	.245	.598		
								EXIT	.0	576.4	4.69	28.6		.583		

Table A-2. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^6$	KW	STA NO.	ΔT_s	h	X	V_m	$\frac{\phi_{i0}}{10^6}$	$\frac{\phi_o}{10^6}$	$\frac{\phi_{i1}}{10^6}$	$\frac{\phi_i}{10^6}$
166		08-27-64	13:04	1005	5.30	2.529	123.5	INLET	101.0	424.0	-18.38	13.5				
								12	.0	573.6	4.70	29.1	.251	.614		
								EXIT	.0	576.3	5.11	30.3		.599		
169		08-27-64	14:28	1020	5.93	2.494	128.6	INLET	97.4	430.0	-17.88	13.4				
								12	.0	587.9	6.58	33.0	.261	.639		
								EXIT	.0	590.7	7.01	35.2		.624		
170		08-27-64	14:56	1015	6.30	2.512	132.8	INLET	101.8	424.5	-18.59	13.4				
								12	.0	586.5	6.47	33.9	.270	.660		
								EXIT	.0	589.4	6.92	35.2		.644		
171		08-27-64	15:15	1020	6.93	2.524	141.8	INLET	99.9	427.3	-18.30	13.5				
	0							12	.0	599.5	8.37	39.5	.286	.705		
	0							EXIT	.0	602.5	8.84	40.9		.688		
172		08-28-64	11:12	1030	4.10	2.486	147.7	INLET	149.2	374.8	-26.75	12.8				
								12	.0	556.9	1.54	19.4	.300	.734		
								EXIT	.0	560.1	2.04	20.8		.716		
173		08-28-64	11:58	1003	4.46	2.484	152.9	INLET	149.2	371.3	-26.44	12.8				
								12	.0	559.9	2.63	22.6	.311	.760		
								EXIT	.0	563.3	3.15	24.1		.741		
174		08-28-64	12:10	1030	4.90	2.488	156.0	INLET	150.5	373.4	-26.96	12.8				
								12	.0	565.6	2.89	23.2	.318	.776		
								EXIT	.0	569.0	3.43	24.7		.757		
175		08-28-64	12:21	1000	5.44	2.472	160.2	INLET	147.9	372.3	-26.20	12.7				
								12	.0	570.8	4.37	27.6	.326	.796		
								EXIT	.0	574.3	4.92	29.2		.777		
176		08-28-64	12:42	1005	5.98	2.437	164.8	INLET	146.9	374.0	-26.08	12.5				
	0							12	.0	581.3	5.88	31.4	.334	.820		
	0							EXIT	.0	585.0	6.45	33.0		.799		
177		08-28-64	13:13	1025	5.89	1.467	117.7	INLET	56.3	477.5	-10.66	8.2				
	0							12	.0	723.3	27.48	55.0	.238	.585		
	0							EXIT	.0	727.7	28.15	56.1		.571		
178		08-31-64	10:22	1010	4.69	1.534	118.5	INLET	101.1	424.6	-18.43	8.2				
								12	.0	661.3	18.12	41.6	.240	.589		
								EXIT	.0	665.5	18.77	42.8		.575		
179		08-31-64	10:37	1015	5.30	1.520	129.9	INLET	100.8	425.6	-18.42	8.1				
	0							12	.0	687.4	22.07	48.0	.264	.646		
	0							EXIT	.0	692.0	22.79	49.3		.630		
180		08-31-64	11:55	1005	4.46	1.512	143.3	INLET	147.7	373.2	-26.21	7.8				
	0							12	.0	663.7	18.58	42.0	.291	.713		
	0							EXIT	.0	668.8	19.38	43.4		.695		
181		08-31-64	13:35	1005	1.11	.506	101.1	INLET	154.1	366.3	-27.28	2.6				
								12	.0	978.1	67.07	42.8	.205	.502		
								EXIT	.0	988.9	68.74	43.8		.490		
182		08-31-64	13:45	1005	1.16	.510	106.1	INLET	154.4	366.0	-27.33	2.6				
	0							12	.0	1003.2	70.95	45.5	.216	.527		
	0							EXIT	.0	1014.6	72.70	46.5		.514		

Table A-2. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	X	V_m	$\frac{\phi_{10}}{10^6}$	$\frac{\phi_0}{10^6}$	$\frac{\phi_{11}}{10^6}$	$\frac{\phi_i}{10^6}$
183		09-31-64	14:50	1000	1.18	.504	109.1	INLET	105.1	418.8	-19.03	2.7				
	0							12	.0	1027.4	74.69	47.4	.203	.498		
	0							EXIT	.0	1038.2	76.35	48.4		.486		
184		08-31-64	17:04	1005	1.16	.494	89.1	INLET	49.3	482.8	-9.30	2.8				
	0							12	.0	1036.3	76.05	46.9	.181	.443		
	0							EXIT	.0	1046.1	77.56	47.8		.432		
185		09-01-64	09:27	1515	2.69	1.502	73.2	INLET	21.4	583.6	-5.41	9.4				
	0							10	.0	715.1	18.35	29.0	.345	.388		
	0							11	.0	726.1	20.35	31.0	.252	.381		
	0							12	.0	732.9	21.57	32.3	.148	.364		
	0							EXIT	.0	735.5	22.04	32.8		.355		
186		09-01-64	10:23	1510	2.38	1.513	82.7	INLET	49.5	546.1	-12.04	9.1				
	0							12	.0	713.6	18.18	29.1	.167	.411		
	0							EXIT	.0	716.6	18.71	29.6		.401		
187		09-01-64	11:25	1510	2.08	1.752	98.5	INLET	98.5	485.9	-22.89	9.8				
	0							12	.0	658.2	8.18	21.4	.201	.490		
	0							EXIT	.0	661.3	8.74	22.1		.478		
188		09-01-64	11:45	1510	2.08	1.491	101.8	INLET	101.0	483.0	-23.42	8.3				
	0							12	.0	692.2	14.32	24.6	.207	.506		
	0							EXIT	.0	695.9	14.99	25.3		.494		
189		09-01-64	12:48	1505	2.02	1.506	121.9	INLET	147.4	429.9	-32.84	8.0				
	0							12	.0	677.8	11.81	22.3	.249	.606		
	0							EXIT	.0	682.2	12.61	23.1		.591		
190		09-01-64	14:43	1510		.487	75.9	INLET	158.9	417.7	-35.19	2.6				
	0							12	.0	894.7	50.83	20.4	.155	.377		
	0							EXIT	.0	903.2	52.37	21.0		.368		
191		09-01-64	16:02	1508		.509	70.7	INLET	109.2	473.2	-25.12	2.8				
	0							12	.0	899.3	51.67	21.7	.144	.352		
	0							EXIT	.0	906.8	53.03	22.1		.343		
192		09-02-64	10:34	1508		.496	63.4	INLET	97.0	536.3	-13.76	2.9				
	0							12	.0	928.0	56.85	22.9	.129	.315		
	0							EXIT	.0	935.0	58.10	23.3		.307		
193		09-02-64	11:05	1510		.489	58.9	INLET	33.4	566.9	-8.29	3.0				
	0							12	.0	936.3	58.33	23.1	.120	.293		
	0							EXIT	.0	942.9	59.52	23.5		.286		

Table A-2. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\frac{\phi_{i,0}}{10^6}$	$\frac{\phi_o}{10^6}$	$\frac{\phi_{i,j}}{10^6}$	$\frac{\phi_{i,i}}{10^6}$
194		09-02-64	12:07	1505	5.30	2.518	78.1	INLET	26.2	576.0	-6.53	15.6				
								1	24.9	577.6	-6.23	15.7	.158	.158		
								2	21.5	582.2	-5.41	15.8	.266	.195		
								3	16.6	588.9	-4.20	15.9	.368	.244		
								4	10.3	597.6	-2.63	16.1	.446	.291		
								5	3.4	607.4	-.87	16.3	.495	.328		
								6	.0	618.3	1.10	16.4	.526	.362		
								7	.0	629.6	3.13	22.0	.530	.388		
								8	.0	640.8	5.15	25.5	.497	.406		
								9	.0	650.9	6.96	28.7	.445	.414		
								10	.0	659.6	8.52	31.5	.366	.413		
								11	.0	666.1	9.69	33.5	.269	.403		
	0							12	.0	671.1	10.59	35.1	.158	.388		
	0							EXIT	.0	672.7	10.90	35.6		.379		
195		09-02-64	13:47	1500	4.98	2.511	93.3	INLET	46.3	549.1	-11.23	15.1				
	0							12	.0	663.0	9.24	32.7	.190	.464		
	0							EXIT	.0	665.0	9.60	33.3		.453		
196		09-02-64	15:06	1503	4.37	2.519	121.5	INLET	95.8	488.4	-22.24	14.2				
								12	.0	636.2	4.35	24.1	.247	.604		
								EXIT	.0	638.8	4.83	25.0		.589		
197		09-02-64	15:23	1503	4.44	2.537	125.1	INLET	99.3	484.2	-22.99	14.2				
								12	.0	635.4	4.21	24.1	.255	.622		
								EXIT	.0	638.0	4.69	24.9		.607		
198		09-02-64	15:37	1510	4.73	2.545	129.8	INLET	96.2	488.6	-22.41	14.3				
	0							12	.0	645.0	5.79	26.9	.264	.646		
	0							EXIT	.0	647.7	6.29	27.8		.630		
199		09-03-64	09:08	1505	3.37	2.539	154.2	INLET	149.2	427.9	-33.20	13.6				
								12	.0	614.0	.32	17.2	.314	.767		
								EXIT	.0	617.3	.91	18.2		.748		
200		09-03-64	09:42	1518	4.03	2.468	158.8	INLET	146.1	432.5	-32.79	13.2				
								12	.0	629.7	2.86	21.0	.323	.789		
								EXIT	.0	633.2	3.50	22.1		.770		
201		09-03-64	09:53	1518	4.05	2.510	168.1	INLET	152.6	425.3	-34.09	13.4				
	0							12	.0	630.6	3.03	21.7	.343	.836		
	0							EXIT	.0	634.3	3.69	22.8		.815		
202		09-03-64	12:53	2005	1.27	1.484	54.4	INLET	24.1	632.6	-8.59	9.9				
	0							11	.0	739.3	14.49	20.2	.185	.281		
	0							12	.0	745.0	15.72	21.1	.108	.271		
	0							EXIT	.0	746.9	16.14	21.3		.264		
203		09-03-64	14:19	2008	1.29	1.508	67.5	INLET	48.4	597.7	-16.21	9.6				
	0							11	.0	728.5	12.11	19.0	.233	.351		
	0							12	.0	734.9	13.48	19.9	.137	.336		
	0							EXIT	.0	737.3	14.01	20.2		.327		

Table A-2. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\frac{\phi_{10}}{10^6}$	$\frac{\phi_o}{10^6}$	$\frac{\phi_{11}}{10^6}$	$\frac{\phi_i}{10^6}$
204		09-03-64	15:18	2005	1.38	1.544	95.6	INLET	100.5	530.0	-30.78	9.0				
	0							11	.0	712.1	8.60	17.0	.333	.500		
	0							12	.0	719.5	10.20	18.1	.196	.475		
	0							EXIT	.0	722.9	10.94	18.6		.464		
205		09-03-64	17:01	1970	1.40	1.565	117.5	INLET	143.3	476.2	-40.93	8.7				
	0							11	.0	695.2	5.75	15.3	.405	.609		
	0							12	.0	706.3	8.12	17.0	.239	.584		
	0							EXIT	.0	710.4	8.99	17.6		.570		
206		09-04-64	13:16	2015		.509	29.8	INLET	31.7	622.2	-11.12	3.3				
								1	29.5	625.4	-10.43	3.3	.060	.060		
								2	23.8	634.1	-8.55	3.4	.102	.075		
								3	15.6	646.9	-5.76	3.5	.141	.094		
								4	5.7	663.5	-2.16	3.6	.172	.112		
								5	.0	681.8	1.82	4.1	.190	.126		
								6	.0	702.8	6.38	5.1	.202	.139		
								7	.0	724.4	11.07	6.1	.202	.149		
								8	.0	744.8	15.49	7.1	.190	.155		
								9	.0	764.3	19.73	8.1	.172	.159		
								10	.0	780.1	23.16	8.9	.140	.158		
								11	.0	793.8	26.13	9.6	.103	.155		
								12	.0	801.5	27.81	9.9	.060	.148		
								EXIT	.0	804.7	28.51	10.1		.144		
207		09-04-64	14:06	2003		.489	35.0	INLET	32.6	619.7	-11.32	3.2				
								12	.0	838.9	36.04	11.4	.071	.174		
								EXIT	.0	842.6	36.88	11.6		.170		
208		09-04-64	14:33	2003		.478	37.7	INLET	29.6	624.1	-10.35	3.1				
	0							11	.0	854.9	39.51	11.9	.128	.196		
	0							12	.0	865.9	41.88	12.4	.077	.186		
	0							EXIT	.0	870.2	42.81	12.6		.183		
209		09-08-64	10:39	2005		.504	60.6	INLET	155.8	465.0	-44.83	2.8				
	0							11	.0	816.8	31.25	10.7	.209	.315		
	0							12	.0	833.7	34.90	11.5	.123	.301		
	0							EXIT	.0	840.2	36.32	11.8		.294		
210		09-08-64	11:58	1995		.508	50.8	INLET	103.8	925.1	-31.44	3.0				
	0							11	.0	815.7	31.14	10.8	.176	.262		
	0							12	.0	831.5	34.55	11.6	.104	.253		
	0							EXIT	.0	837.0	35.73	11.8		.246		
211		09-08-64	13:11	1990		.491	41.4	INLET	52.1	590.9	-17.11	3.1				
	0							11	.0	835.4	35.43	11.4	.143	.213		
	0							12	.0	849.1	38.37	12.1	.085	.206		
	0							EXIT	.0	853.7	39.36	12.3		.201		
212		09-08-64	14:50	1990	4.89	2.478	96.5	INLET	90.2	541.5	-27.74	14.7				
								11	9.0	655.1	-3.32	17.2	.332	.500		
								12	5.6	660.9	-2.08	17.3	.196	.480		
								EXIT	4.5	663.0	-1.62	17.4		.468		

Table A-2. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\frac{\phi_o}{10^6}$	$\frac{\phi_i}{10^6}$	$\frac{\phi_o}{10^6}$	$\frac{\phi_i}{10^6}$
213		09-08-64	15102	1995	4.87	2.475	99.9	INLET	90.5	593.5	-16.71	15.6				
	0							11	.0	711.4	8.68	27.4	.344	.518		
	0							12	.0	717.3	9.94	28.8	.204	.497		
	0							EXIT	.0	719.5	10.42	29.3		.485		
214		09-08-64	16105	2005	5.43	2.489	78.9	INLET	22.2	635.5	-7.95	16.6				
	0							10	.0	721.1	10.55	29.6	.369	.418		
	0							11	.0	727.9	12.02	31.2	.268	.408		
								12	.0	732.7	13.07	32.4	.160	.392		
								EXIT	.0	734.4	13.44	32.8		.383		
215		09-09-64	09157	2005	3.92	2.496	131.3	INLET	97.9	533.2	-30.08	14.7				
								11	.0	686.4	3.05	21.3	.454	.680		
								12	.0	694.4	4.78	23.2	.268	.653		
								EXIT	.0	697.3	5.40	23.9		.637		
216		09-09-64	13110	2010	3.80	2.502	131.1	INLET	101.2	529.6	-31.05	14.6				
								11	.0	682.9	2.19	20.3	.454	.682		
								12	.0	690.1	3.74	22.1	.268	.652		
								EXIT	.0	693.0	4.37	22.8		.636		
217		09-09-64	13128	1995	4.12	2.505	134.2	INLET	99.1	530.9	-30.21	14.7				
								11	.0	687.6	3.54	21.9	.462	.698		
								12	.0	695.1	5.16	23.7	.273	.668		
								EXIT	.0	698.0	5.79	24.4		.651		
218	0	09-09-64	13140	2000	4.21	2.495	136.8	INLET	99.3	531.0	-30.36	14.6				
								11	.0	691.4	4.26	22.6	.472	.711		
								12	.0	699.1	5.90	24.4	.279	.680		
								EXIT	.0	702.1	6.55	25.2		.663		
219		09-09-64	15121	2000	3.40	2.505	163.2	INLET	147.3	474.2	-42.62	13.9				
								11	4.4	664.2	-1.63	17.6	.561	.846		
								12	.0	673.8	.46	18.4	.330	.811		
								EXIT	.0	677.4	1.22	19.3		.791		
220		09-09-64	15131	2000	3.71	2.484	167.6	INLET	146.7	474.9	-42.47	13.7				
								11	.1	671.5	-.04	17.7	.579	.868		
								12	.0	681.8	2.17	20.2	.341	.833		
								EXIT	.0	685.4	2.96	21.0		.813		
221	0	09-09-64	15149	2010	3.94	2.504	172.4	INLET	147.6	474.6	-42.96	13.8				
								11	.0	675.3	.54	18.5	.595	.893		
								12	.0	685.6	2.77	21.0	.351	.857		
								EXIT	.0	689.4	3.58	21.9		.836		
222		09-10-64	09144	2000	1.31	1.503	92.6	INLET	99.9	530.4	-30.50	8.8				
	0							11	.0	710.1	8.28	16.3	.316	.480		
	0							12	.0	719.3	10.27	17.7	.187	.461		
	0							EXIT	.0	722.6	10.98	18.2		.449		
223		09-10-64	12123	1510		.478	57.1	INLET	29.4	572.3	-7.32	3.0				
	0							12	.0	638.7	58.76	22.7	.116	.284		
	0							EXIT	.0	645.2	59.94	23.1		.277		

Table A-2. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\frac{\phi_{i0}}{10^6}$	$\frac{\phi_o}{10^6}$	$\frac{\phi_{i1}}{10^6}$	$\frac{\phi_{o1}}{10^6}$
224		09-10-64	14:43	1005	7.47	1.499	111.2	INLET	17.5	521.3	-3.38	8.8				
	0							12	.0	748.8	31.71	64.7	.221	.553		
	0							EXIT	.0	752.7	32.32	65.7		.539		
225		09-11-64	10:21	995	12.37	2.484	116.9	INLET	17.9	519.3	-3.44	14.5				
	0							11	.0	656.9	17.73	67.1	.402	.608		
								12	.0	663.5	18.75	70.1	.232	.581		
								EXIT	.0	666.0	19.13	71.2		.567		

Table A-3. Data From Flux Shape 3 (Peak Near Inlet)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\frac{\phi_{10}}{10^6}$	$\frac{\phi_0}{10^6}$	$\frac{\phi_{11}}{10^6}$	$\frac{\phi_i}{10^6}$
228		09-21-64	11:43	998	1.31	.493	81.7	INLET	25.1	510.9	-4.20	2.9				
								12	.0	1016.9	73.38	45.7	.153	.407		
								EXIT	.0	1027.2	74.66	46.5		.396		
229		09-21-64	12:07	998	1.49	.509	87.0	INLET	27.1	508.5	-5.17	2.9				
0								12	.0	1033.4	75.60	46.5	.162	.435		
0								EXIT	.0	1041.9	76.92	49.3		.422		
230		09-21-64	13:39	1005	6.66	1.503	101.1	INLET	22.0	515.7	-4.23	8.7				
0								7	.0	677.5	20.71	45.5	.403	.698		
0								8	.0	690.0	22.65	48.9	.301	.651		
0								9	.0	700.3	24.23	51.7	.247	.609		
0								10	.0	708.4	25.48	53.9	.211	.568		
0								11	.0	714.7	26.45	55.6	.196	.531		
0								12	.0	722.3	27.62	57.6	.188	.504		
0								EXIT	.0	725.6	28.14	58.5		.490		
231		09-21-64	15:30	1010	5.89	1.494	106.6	INLET	49.3	483.6	-9.31	8.4				
0								8	.0	667.8	19.13	42.3	.315	.685		
0								9	.0	678.9	20.84	45.2	.259	.640		
0								10	.0	687.7	22.21	47.6	.222	.599		
0								11	.0	695.2	23.36	49.6	.208	.562		
0								12	.0	702.6	24.50	51.6	.198	.531		
0								EXIT	.0	706.1	25.05	52.6		.517		
232		09-22-64	10:28	1008	5.84	1.483	107.0	INLET	47.8	485.0	-9.05	8.4				
0								8	.0	671.8	19.78	43.2	.318	.689		
0								9	.0	682.5	21.44	46.0	.261	.643		
0								10	.0	690.5	22.68	48.2	.222	.599		
0								11	.0	699.1	24.00	50.5	.207	.564		
0								12	.0	706.5	25.14	52.4	.199	.533		
0								EXIT	.0	710.1	25.70	53.4		.519		
233		09-22-64	15:01	1005	4.87	1.512	121.4	INLET	99.4	425.8	-18.09	8.1				
0								8	.0	632.9	13.84	33.6	.360	.779		
0								9	.0	645.2	15.73	36.9	.296	.728		
0								10	.0	654.5	17.18	39.5	.253	.679		
0								11	.0	664.0	18.63	42.1	.234	.640		
0								12	.0	672.2	19.90	44.3	.225	.604		
0								EXIT	.0	676.2	20.52	45.4		.589		
234		09-22-64	16:27	1003	4.60	1.510	140.8	INLET	146.5	374.2	-25.99	7.8				
0								7	.0	598.0	8.51	24.1	.560	.970		
0								8	.0	614.7	11.07	28.7	.419	.903		
0								9	.0	628.6	13.21	32.5	.343	.843		
0								10	.0	639.8	14.94	35.6	.291	.788		
0								11	.0	650.0	16.51	38.3	.271	.740		
0								12	.0	660.5	18.13	41.2	.262	.701		
0								EXIT	.0	665.1	18.84	42.5		.683		

Table A-3. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	ϕ_{10} 10 ⁶	ϕ_o 10 ⁶	ϕ_{11} 10 ⁶	ϕ_i 10 ⁶
235		09-23-64	12:47	1000	1.27	.504	106.3	INLET	149.6	370.5	-26.48	2.6				
	0							12	.0	1018.5	73.31	46.9	.198	.530		
	0							EXIT	.0	1029.0	74.93	47.9		.516		
236		09-23-64	13:52	1000	1.29	.499	99.5	INLET	103.6	420.4	-18.78	2.7				
	0							12	.0	1032.5	75.47	47.4	.186	.496		
	0							EXIT	.0	1042.4	77.00	48.3		.483		
237		09-23-64	15:05	1000	1.34	.497	91.0	INLET	52.9	478.0	-9.92	2.8				
	0							12	.0	1040.3	76.67	47.9	.169	.453		
	0							EXIT	.0	1049.4	78.07	48.7		.441		
238		09-24-64	10:50	990	10.55	2.478	98.9	INLET	17.5	519.0	-3.35	14.5				
	0							7	.0	615.1	11.40	48.5	.396	.684		
	0							8	.0	622.3	12.51	51.8	.295	.637		
	0							9	.0	628.2	13.42	54.5	.243	.594		
	0							10	.0	633.7	14.25	56.9	.206	.558		
	0							11	.0	638.0	14.92	58.9	.194	.524		
	0							12	.0	641.4	15.44	60.5	.186	.492		
	0							EXIT	.0	643.4	15.75	61.4		.480		
239		09-24-64	11:41	1008	8.52	2.497	105.2	INLET	46.9	486.1	-8.88	14.1				
	0							8	.0	594.9	7.91	38.1	.311	.676		
	0							9	.0	601.2	8.88	40.9	.255	.631		
	0							10	.0	605.5	9.55	42.8	.220	.586		
	0							11	.0	611.1	10.41	45.3	.204	.554		
	0							12	.0	615.4	11.08	47.3	.196	.524		
	0							EXIT	.0	617.5	11.41	48.2		.510		
240		09-24-64	13:38	1010	7.18	2.513	140.6	INLET	101.7	423.9	-18.54	13.4				
	0							7	.0	557.7	2.13	21.3	.563	.965		
	0							8	.0	568.4	3.78	26.2	.419	.903		
	0							9	.0	576.7	5.06	29.9	.343	.843		
	0							10	.0	583.5	6.11	33.0	.293	.788		
	0							11	.0	589.6	7.05	35.7	.273	.740		
	0							12	.0	595.6	7.98	38.4	.262	.700		
	0							EXIT	.0	598.4	8.41	39.7		.682		
241		09-24-64	16:47	1010	6.02	2.520	168.9	INLET	152.2	369.0	-27.01	12.9				
								7	11.0	530.0	-2.15	14.9	.675	1.164		
								8	1.2	542.5	-.22	15.1	.504	1.087		
								9	.0	552.3	1.30	19.0	.413	1.014		
								10	.0	560.8	2.61	22.8	.353	.949		
								11	.0	568.2	3.74	26.1	.329	.892		
								12	.0	574.7	4.75	29.1	.316	.841		
								EXIT	.0	578.1	5.27	30.6		.819		

Table A-3. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\phi_{i,0}$ 10 ⁶	ϕ_o 10 ⁶	$\phi_{i,1}$ 10 ⁶	$\phi_{o,1}$ 10 ⁶
242		09-24-64	14106	1005	6.84	2.462	175.0	INLET	149.0	371.8	-26.43	12.7				
	0							7	1.0	541.9	-2.28	14.8	.695	1.202		
								8	.0	555.3	1.87	20.2	.519	1.124		
								9	.0	566.3	3.97	25.1	.427	1.051		
								10	.0	575.1	4.93	29.0	.364	.943		
								11	.0	582.8	6.11	32.4	.340	.923		
								12	.0	590.0	7.22	35.6	.327	.872		
								EXIT	.0	593.5	7.77	37.2		.849		
243		09-25-64	10145	1495	2.23	1.516	130.6	INLET	151.0	425.0	-33.38	8.1				
	0							6	1.8	608.7	-2.40	9.9	.752	.945		
	0							7	.0	631.5	3.69	13.8	.520	.899		
	0							8	.0	648.4	6.72	17.1	.389	.843		
	0							9	.0	660.6	8.90	19.4	.317	.784		
								10	.0	670.7	10.72	21.4	.273	.732		
								11	.0	680.4	12.45	23.2	.255	.688		
								12	.0	689.4	14.07	25.0	.244	.651		
								EXIT	.0	693.7	14.85	25.8		.634		
244		09-25-64	12127	1498	2.22	1.509	107.3	INLET	103.4	478.9	-23.79	8.4				
	0							10	.0	681.5	12.60	23.2	.225	.600		
	0							11	.0	689.8	14.10	24.8	.209	.565		
	0							12	.0	697.1	15.40	26.2	.200	.534		
	0							EXIT	.0	700.6	16.04	26.9		.520		
245		09-25-64	14110	1495	2.17	1.499	76.7	INLET	46.1	548.8	-11.16	9.0				
	0							10	.0	696.6	15.36	26.0	.161	.435		
	0							11	.0	701.6	16.27	27.0	.150	.407		
	0							12	.0	705.8	17.02	27.8	.143	.382		
	0							EXIT	.0	708.4	17.48	28.3		.372		
246		09-25-64	15108	1500	2.40	1.489	66.7	INLET	21.0	582.4	-5.25	9.3				
	0							11	.0	715.2	18.61	29.2	.129	.351		
	0							12	.0	719.8	19.45	30.1	.125	.332		
	0							EXIT	.0	722.1	19.86	30.9		.323		
247		09-28-64	11100	1495		.483	56.3	INLET	20.7	582.2	-5.16	3.0				
	0							12	.0	939.7	59.00	23.3	.106	.280		
	0							EXIT	.0	945.6	60.05	23.7		.273		
248		09-28-64	11149	1500		.496	62.0	INLET	59.2	532.7	-14.18	2.9				
	0							12	.0	916.4	54.79	22.3	.116	.309		
	0							EXIT	.0	922.7	55.92	22.7		.301		
249		09-28-64	13106	1495		.508	69.8	INLET	103.3	478.8	-23.72	2.8				
	0							12	.0	900.5	51.96	22.0	.131	.348		
	0							EXIT	.0	907.4	53.20	22.4		.339		
250		09-28-64	14106	1495		.511	79.3	INLET	149.3	426.8	-33.86	2.7				
	0							12	.0	902.7	52.36	22.2	.150	.395		
	0							EXIT	.0	910.6	53.77	22.7		.384		

Table A-3. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\frac{\phi_{i,o}}{10^6}$	$\frac{\phi_o}{10^6}$	$\frac{\phi_{i,i}}{10^6}$	$\frac{\phi_i}{10^6}$
251		09-29-64	10:07	1495	5.84	2.513	70.2	INLET	18.6	584.9	-4.67	19.8				
	0							9	.0	660.9	8.97	32.3	.171	.419		
	0							10	.0	664.2	9.56	33.4	.146	.391		
	0							11	.0	667.1	10.08	34.3	.136	.367		
	0							12	.0	670.6	10.71	35.4	.132	.349		
	0							EXIT	.0	672.1	10.66	35.8		.340		
252		09-29-64	12:03	1495	5.30	2.512	90.8	INLET	51.9	541.4	-12.48	19.0				
								9	.0	640.5	5.30	25.8	.223	.546		
								10	.0	644.5	6.02	27.1	.189	.509		
								11	.0	648.6	6.75	28.4	.177	.478		
								12	.0	652.3	7.42	29.6	.170	.452		
								EXIT	.0	654.1	7.75	30.1		.440		
253		09-29-64	12:26	1500	5.21	2.487	97.5	INLET	51.9	541.9	-12.52	14.8				
	0							9	.0	649.0	6.73	28.0	.240	.585		
	0							10	.0	654.1	7.64	29.6	.203	.548		
	0							11	.0	657.8	8.31	30.8	.190	.512		
	0							12	.0	662.3	9.12	32.2	.182	.486		
	0							EXIT	.0	664.3	9.47	32.8		.473		
254		09-29-64	15:07	1490	5.12	2.500	137.1	INLET	99.3	482.9	-22.83	14.0				
	0							7	.0	615.2	.88	17.8	.548	.950		
								8	.0	625.1	2.65	21.0	.409	.884		
								9	.0	633.0	4.06	23.5	.337	.823		
								10	.0	639.6	5.25	25.6	.289	.769		
								11	.0	645.3	6.27	27.4	.267	.721		
								12	.0	651.2	7.32	29.3	.258	.683		
								EXIT	.0	654.0	7.82	30.2		.665		
255		09-30-64	12:25	1490	4.26	2.563	164.2	INLET	150.5	425.0	-33.21	13.7				
								1	144.9	431.2	-32.10	13.7	.593	.593		
								2	128.4	449.5	-28.81	13.9	1.158	.784		
								3	104.3	477.1	-23.87	14.3	1.509	.997		
								4	77.4	509.2	-18.13	14.8	1.525	1.150		
								5	53.6	538.7	-12.84	15.3	1.296	1.208		
								6	35.0	562.5	-8.57	15.7	.953	1.196		
								7	22.4	579.3	-5.56	16.0	.657	1.135		
								8	13.6	591.3	-3.41	16.3	.490	1.061		
								9	7.0	600.4	-1.77	16.5	.403	.987		
								10	1.9	608.3	-.37	16.6	.342	.923		
								11	.0	615.3	.90	16.3	.321	.867		
								12	.0	621.6	2.03	20.4	.308	.818		
								EXIT	.0	624.8	2.60	21.4		.796		

Table A-3. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\frac{\phi_{10}}{10^6}$	$\frac{\phi_o}{10^6}$	$\frac{\phi_{10}}{10^6}$	$\frac{\phi_i}{10^6}$
296	0	09-30-64	13:08	1490	4.85	2.518	175.3	INLET	147.2	428.6	-32.55	13.4				
								6	23.8	577.4	-5.89	15.7	1.014	1.271		
								7	10.3	595.9	-2.59	16.1	.702	1.209		
								8	1.5	608.9	-.25	16.4	.924	1.129		
								9	.0	619.3	1.60	19.3	.429	1.054		
								10	.0	627.1	3.01	21.8	.368	.982		
								11	.0	634.9	4.41	24.3	.341	.923		
								12	.0	642.3	5.73	26.6	.328	.873		
								EXIT	.0	645.8	6.35	27.8		.850		
297	0	10-01-64	09:46	1995	1.36	1.491	53.8	INLET	21.8	635.1	-7.75	10.0				
								4	.0	682.4	2.42	12.3	.498	.375		
								5	.0	699.1	6.03	14.7	.423	.396		
								6	.0	712.4	8.90	16.6	.310	.391		
								7	.0	721.7	10.89	18.0	.215	.370		
								8	.0	728.1	12.27	18.9	.161	.345		
	0							9	.0	733.1	13.34	19.6	.132	.321		
	0							10	.0	737.9	14.37	20.3	.112	.301		
	0							11	.0	742.1	15.28	20.9	.104	.283		
	0							12	.0	745.9	16.10	21.5	.100	.268		
	0							EXIT	.0	747.7	16.49	21.8		.261		
298	0	10-01-64	11:30	1995	1.40	1.508	69.2	INLET	47.6	597.6	-15.84	9.8				
								4	7.8	657.7	-2.90	10.5	.638	.483		
								5	.0	678.5	1.59	11.8	.541	.506		
								6	.0	695.2	5.19	14.3	.395	.500		
								7	.0	706.9	7.70	16.0	.275	.473		
	0							8	.0	716.1	9.70	17.4	.205	.445		
	0							9	.0	722.5	11.06	18.3	.169	.414		
	0							10	.0	727.5	12.14	19.0	.145	.385		
	0							11	.0	732.6	13.25	19.8	.134	.362		
	0							12	.0	738.4	14.49	20.6	.130	.345		
	0							EXIT	.0	740.7	14.99	21.0		.336		
299	0	10-01-64	13:05	2000	1.54	1.504	96.0	INLET	97.2	533.7	-29.79	8.8				
								1	92.1	539.9	-28.44	8.9	.392	.392		
								2	77.8	558.1	-24.52	9.1	.677	.457		
								3	56.9	585.4	-18.62	9.4	.879	.581		
								4	34.0	617.2	-11.76	9.8	.888	.670		
								5	15.1	646.1	-5.52	10.2	.753	.701		
	0							6	1.3	669.5	-.48	10.7	.554	.693		
	0							7	.0	686.0	3.08	12.8	.383	.657		
								8	.0	698.5	5.78	14.7	.286	.617		
								9	.0	707.9	7.82	16.0	.235	.575		
								10	.0	715.3	9.40	17.1	.201	.536		
								11	.0	722.7	11.01	18.2	.186	.505		
								12	.0	729.6	12.49	19.2	.179	.478		
								EXIT	.0	732.7	13.17	19.7		.465		

Table A-3. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\frac{\phi_{i,0}}{10^6}$	$\frac{\phi_{e,0}}{10^6}$	$\frac{\phi_{i,i}}{10^6}$	$\frac{\phi_{e,i}}{10^6}$
261		10-02-64	10:13	2000		.501	38.0	INLET	27.8	626.5	-9.76	3.3				
								4	.0	725.2	11.55	6.2	.351	.263		
								5	.0	759.0	16.83	7.8	.298	.275		
								6	.0	787.2	24.93	9.2	.219	.273		
								7	.0	806.2	29.03	10.1	.152	.258		
								8	.0	821.1	32.24	10.8	.113	.242		
								9	.0	832.4	34.68	11.4	.093	.226		
	0							10	.0	842.5	36.87	11.9	.080	.212		
	0							11	.0	851.4	38.77	12.3	.074	.200		
	0							12	.0	859.2	40.46	12.7	.072	.189		
	0							EXIT	.0	863.0	41.28	12.9		.184		
262		10-02-64	11:42	2000		.503	45.2	INLET	54.7	588.4	-17.97	3.2				
								4	.0	705.4	7.27	5.2	.416	.314		
								5	.0	746.8	16.20	7.3	.353	.331		
	0							6	.0	779.6	23.29	8.9	.259	.327		
								7	.0	803.2	28.38	10.0	.181	.310		
								8	.0	819.6	31.91	10.8	.134	.290		
								9	.0	832.8	34.77	11.5	.110	.270		
								10	.0	844.8	37.34	12.1	.094	.253		
								11	.0	853.4	39.20	12.5	.088	.237		
	0							12	.0	863.7	41.43	13.0	.085	.225		
	0							EXIT	.0	868.2	42.41	13.2		.219		
263		10-02-64	13:51	1995		.509	56.5	INLET	106.9	521.4	-32.25	2.9				
								1	98.0	532.2	-29.92	3.0	.206	.206		
								2	73.0	563.8	-23.12	3.1	.397	.268		
								3	36.9	612.4	-12.64	3.3	.516	.346		
								4	3.4	665.6	-1.19	3.6	.522	.391		
								5	.0	716.1	9.68	5.9	.442	.411		
								6	.0	759.3	18.98	8.0	.325	.411		
								7	.0	788.2	25.21	9.4	.224	.390		
								8	.0	810.6	30.04	10.5	.168	.366		
								9	.0	826.6	33.48	11.3	.137	.341		
								10	.0	839.9	36.34	12.0	.119	.318		
	0							11	.0	851.5	38.85	12.6	.111	.298		
	0							12	.0	862.0	41.11	13.1	.106	.281		
	0							EXIT	.0	867.6	42.31	13.4		.274		

Table A-3. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_0	h	x	V_m	$\frac{\phi_{1,0}}{10^6}$	$\frac{\phi_0}{10^6}$	$\frac{\phi_{1,i}}{10^6}$	$\frac{\phi_i}{10^6}$
264		10-02-64	15146	2000		.512	66.8	INLET	151.4	469.5	-43.64	2.8				
								4	17.7	642.0	-6.41	3.5	.617	.471		
								5	.0	700.1	6.12	5.1	.523	.490		
								6	.0	747.2	16.28	7.4	.384	.482		
								7	.0	779.9	23.39	9.0	.265	.456		
								8	.0	805.4	28.26	10.3	.199	.428		
								9	.0	824.9	33.06	11.3	.165	.400		
								10	.0	842.7	36.91	12.2	.140	.375		
	0							11	.0	855.4	39.63	12.8	.131	.351		
	0							12	.0	870.0	42.79	13.5	.125	.333		
	0							EXIT	.0	876.5	44.20	13.8		.324		
265		10-05-64	10154	2000	5.50	2.517	74.0	INLET	20.1	638.3	-7.21	16.9				
								4	.0	676.8	1.11	19.2	.688	.517		
								5	.0	690.3	4.01	22.5	.581	.542		
	0							6	.0	701.4	6.40	25.2	.426	.538		
	0							7	.0	708.9	8.02	27.1	.296	.510		
	0							8	.0	714.4	9.21	28.4	.222	.477		
	0							9	.0	718.8	10.17	29.5	.180	.445		
	0							10	.0	722.4	10.94	30.4	.155	.416		
	0							11	.0	725.6	11.63	31.1	.145	.390		
	0							12	.0	728.5	12.25	31.9	.139	.368		
	0							EXIT	.0	729.9	12.57	32.2		.359		
266		10-05-64	11157	1998	5.23	2.534	102.2	INLET	47.9	597.5	-15.95	16.0				
								4	12.1	650.8	-4.45	17.4	.947	.721		
								5	1.5	669.1	-.50	18.0	.805	.793		
	0							6	.0	683.8	2.66	21.1	.590	.742		
	0							7	.0	694.5	4.97	23.8	.409	.706		
								8	.0	702.2	6.63	25.7	.306	.660		
								9	.0	708.0	7.88	27.1	.251	.615		
								10	.0	712.8	8.91	28.3	.213	.574		
								11	.0	717.3	9.89	29.4	.199	.540		
								12	.0	721.3	10.74	30.4	.192	.509		
								EXIT	.0	723.3	11.17	30.9		.496		

Table A-3. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\frac{\phi_{10}}{10^6}$	$\frac{\phi_o}{10^6}$	$\frac{\phi_{11}}{10^6}$	$\frac{\phi_i}{10^6}$
267		10-05-64	14:46	1995	3.83	2.49A	126.3	INLET	96.7	533.9	-29.55	14.7				
								1	92.7	538.8	-28.49	14.7	.460	.460		
								2	81.1	553.3	-25.37	15.0	.890	.604		
								3	64.4	575.0	-20.70	15.3	1.158	.766		
								4	45.9	600.0	-15.32	15.9	1.171	.879		
								5	29.2	623.9	-10.18	16.4	.992	.931		
								6	17.6	641.6	-6.36	16.9	.728	.912		
								7	9.5	654.8	-3.51	17.3	.503	.866		
								8	4.0	664.5	-1.42	17.6	.377	.811		
								9	.0	672.1	.20	18.0	.308	.757		
								10	.0	678.1	1.50	19.5	.263	.707		
								11	.0	683.5	2.67	20.8	.246	.664		
								12	.0	689.2	3.89	22.2	.236	.629		
268		10-05-64	15:10	1995	3.80	2.501	131.1	EXIT	.0	691.7	4.44	22.8		.613		
								INLET	103.2	525.8	-31.30	14.6				
								4	49.9	594.4	-16.52	15.8	1.218	.915		
								5	32.7	618.7	-11.29	16.3	1.033	.963		
								6	19.9	638.0	-7.14	16.8	.756	.952		
								7	11.3	651.8	-4.16	17.2	.521	.904		
								8	5.7	661.4	-2.10	17.5	.391	.843		
								9	1.3	669.3	-.39	17.8	.322	.788		
								10	.0	675.4	.93	18.9	.275	.735		
								11	.0	681.3	2.19	20.3	.256	.691		
								12	.0	686.7	3.36	21.6	.246	.653		
								EXIT	.0	689.4	3.93	22.3		.636		
269		10-05-64	15:25	1995	4.30	2.491	136.3	INLET	98.9	531.1	-30.15	14.6				
								4	43.6	603.0	-14.66	15.9	1.267	.955		
								5	26.3	628.3	-9.23	16.5	1.073	1.003		
								6	13.6	648.1	-4.96	17.0	.787	.988		
								7	5.0	662.6	-1.84	17.5	.544	.940		
								8	.0	673.1	.42	18.2	.406	.879		
								9	.0	681.2	2.17	20.2	.334	.821		
								10	.0	687.5	3.53	21.7	.285	.765		
								11	.0	693.5	4.82	23.2	.265	.719		
								12	.0	699.1	6.02	24.5	.255	.679		
								EXIT	.0	701.8	6.61	25.2		.661		

Table A-3.. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	X	V_m	$\frac{\phi_{i,0}}{10^6}$	$\frac{\phi_o}{10^6}$	$\frac{\phi_{i,1}}{10^6}$	$\frac{\phi_i}{10^6}$
270		10-05-64	15:39	2000	4.60	2.505	141.3	INLET	98.0	532.7	-30.00	14.7				
	0							4	41.1	607.0	-13.56	16.0	1.310	.992		
	0							5	23.8	632.5	-8.46	16.7	1.113	1.037		
								6	10.8	653.3	-3.68	17.3	.812	1.024		
								7	2.0	668.2	-.75	17.7	.564	.975		
								8	.0	678.5	1.47	19.5	.421	.909		
								9	.0	686.8	3.26	21.6	.345	.847		
								10	.0	693.5	4.70	23.2	.295	.791		
								11	.0	700.2	6.14	24.8	.276	.745		
								12	.0	705.8	7.36	26.2	.265	.703		
								EXIT	.0	708.6	7.97	26.9		.685		
271		10-06-64	10:00	1995	3.24	2.525	159.6	INLET	148.6	472.3	-42.83	13.0				
								4	79.8	555.0	-25.01	15.2	1.482	1.114		
								5	57.4	584.2	-18.72	15.7	1.247	1.172		
								6	40.7	607.1	-13.78	16.2	.920	1.155		
								7	29.9	622.8	-10.41	16.6	.636	1.091		
								8	21.4	635.8	-7.62	16.9	.476	1.027		
								9	15.3	645.2	-5.58	17.2	.389	.939		
								10	10.8	652.6	-3.98	17.4	.333	.894		
								11	6.6	659.7	-2.46	17.6	.312	.841		
								12	3.0	666.3	-1.04	17.8	.299	.795		
								EXIT	1.2	669.5	-.35	18.0		.774		
272		10-06-64	10:17	1995	3.46	2.513	165.6	INLET	147.7	473.3	-42.60	13.9				
								4	76.1	559.7	-23.99	15.2	1.540	1.158		
								5	53.2	589.9	-17.49	15.8	1.299	1.215		
								6	35.9	613.8	-12.34	16.2	.958	1.198		
								7	24.5	631.0	-8.64	16.7	.660	1.137		
								8	16.5	643.2	-6.00	17.0	.495	1.062		
								9	10.6	652.9	-3.92	17.3	.406	.991		
								10	5.8	661.2	-2.13	17.6	.345	.928		
								11	2.0	668.1	-.65	17.8	.322	.870		
								12	.0	675.6	.96	19.0	.309	.825		
								EXIT	.0	678.9	1.67	19.8		.803		
273		10-06-64	10:40	1998	3.76	2.526	176.7	INLET	147.9	473.4	-42.72	14.0				
	0							4	72.2	565.1	-22.94	15.3	1.644	1.235		
								5	48.0	597.3	-16.00	16.0	1.384	1.298		
								6	30.5	622.3	-10.60	16.6	1.020	1.276		
								7	17.9	641.5	-6.47	17.1	.704	1.219		
								8	9.9	654.4	-3.67	17.5	.527	1.138		
								9	4.1	664.4	-1.52	17.8	.433	1.059		
								10	.0	673.3	.40	18.5	.368	.992		
								11	.0	680.8	2.00	20.3	.345	.931		
								12	.0	688.1	3.98	22.1	.331	.880		
								EXIT	.0	691.6	4.34	23.0		.857		

Table A-3. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\frac{\phi_{10}}{10^6}$	$\frac{\phi_0}{10^6}$	$\frac{\phi_{11}}{10^6}$	$\frac{\phi_i}{10^6}$
274		10-06-64	12:53	1995	1.11	1.506	110.3	INLET	149.1	471.7	-42.94	8.3				
								4	69.9	567.8	-22.26	9.2	1.025	.771		
								5	44.5	601.9	-14.92	9.6	.863	.812		
								6	26.5	627.9	-9.30	9.9	.638	.798		
								7	14.0	647.3	-5.13	10.3	.441	.759		
								8	5.8	661.2	-2.13	10.5	.330	.710		
								9	.0	671.9	.16	10.9	.271	.662		
								10	.0	680.7	2.07	12.1	.231	.618		
								11	.0	688.7	3.78	13.3	.219	.580		
								12	.0	696.5	5.46	14.5	.207	.549		
								EXIT	.0	700.1	6.25	15.0		.535		
275	0 0	10-06-64	14:12	1995	1.34	1.514	123.1	INLET	148.9	472.0	-42.88	8.4				
								4	61.4	578.8	-19.87	9.4	1.146	.862		
								5	34.9	615.4	-12.00	9.8	.962	.900		
								6	15.1	645.6	-5.50	10.3	.711	.691		
								7	2.5	667.1	-.87	10.7	.491	.648		
								8	.0	682.4	2.43	12.5	.367	.792		
								9	.0	694.1	4.95	14.2	.301	.738		
								10	.0	703.9	7.07	15.6	.259	.689		
								11	.0	713.8	9.20	17.1	.240	.650		
								12	.0	721.5	10.86	18.2	.230	.613		
								EXIT	.0	725.6	11.74	18.8		.597		
276	0 0	10-07-64	10:45	1000	8.56	2.020	104.5	INLET	30.6	504.5	-5.84	11.6				
								4	.0	569.0	4.09	21.9	.972	.694		
								5	.0	591.9	7.62	30.2	.816	.732		
								6	.0	610.3	10.45	37.0	.603	.725		
								7	.0	628.3	13.22	43.6	.418	.716		
								8	.0	638.2	14.74	47.2	.311	.672		
								9	.0	646.3	16.00	50.2	.255	.629		
								10	.0	652.1	16.89	52.3	.218	.585		
								11	.0	657.6	17.73	54.3	.203	.549		
								12	.0	663.3	18.62	56.4	.195	.520		
								EXIT	.0	665.9	19.02	57.4		.507		
277	0 0	10-07-64	12:38	1000	11.87	2.454	99.8	INLET	10.3	529.4	-2.00	14.5				
								4	.0	582.7	6.21	32.7	.928	.697		
								5	.0	601.2	9.05	40.9	.778	.730		
								6	.0	615.9	11.32	47.4	.574	.720		
								7	.0	626.7	12.97	52.2	.396	.685		
								8	.0	634.0	14.10	55.5	.297	.638		
								9	.0	640.3	15.07	58.3	.242	.597		
								10	.0	645.2	15.83	60.5	.208	.558		
								11	.0	649.6	16.51	62.4	.194	.524		
								12	.0	654.2	17.22	64.5	.187	.497		
								EXIT	.0	656.2	17.53	65.4		.484		

Table A-3. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\frac{\phi_{i,0}}{10^6}$	$\frac{\phi_o}{10^6}$	$\frac{\phi_{i,1}}{10^6}$	$\frac{\phi_i}{10^6}$
278		10-07-64	15:11	995	1.27	.514	119.2	INLET	219.0	296.9	-37.62	2.5				
								4	.0	558.9	8.81	8.5	1.108	.831		
								5	.0	706.7	25.38	18.4	.934	.677		
								6	.0	790.2	38.22	26.5	.688	.664		
								7	.0	852.7	47.83	32.3	.476	.823		
								8	.0	894.3	54.22	36.3	.356	.767		
								9	.0	928.5	59.48	39.9	.292	.715		
								10	.0	957.2	63.89	42.2	.249	.669		
								11	.0	981.6	67.65	44.5	.232	.628		
	0							12	.0	1005.6	71.34	46.7	.222	.593		
	0							EXIT	.0	1017.1	73.12	47.8		.578		
279		10-08-64	10:44	1997		.507	52.7	INLET	88.6	544.2	-27.42	3.0				
								4	.0	679.5	1.75	4.0	.490	.366		
								5	.0	728.5	12.32	6.4	.409	.387		
	0							6	.0	764.9	20.17	8.2	.304	.380		
								7	.0	792.8	26.17	9.6	.210	.362		
								8	.0	812.5	30.42	10.6	.156	.338		
								9	.0	827.8	33.72	11.3	.128	.316		
								10	.0	839.7	36.28	11.9	.110	.294		
	0							11	.0	851.0	38.72	12.5	.102	.276		
	0							12	.0	863.1	41.32	13.1	.098	.262		
	0							EXIT	.0	868.3	42.44	13.3		.255		
280		10-08-64	14:06	1995		.509	94.9	INLET	311.9	297.2	-80.52	2.5				
								4	.0	541.5	-27.91	3.0	.882	.663		
								5	.0	625.6	-9.80	3.4	.740	.694		
								6	.0	693.9	4.91	4.8	.546	.685		
								7	.0	742.4	15.34	7.2	.378	.651		
								8	.0	776.3	22.66	8.9	.283	.607		
								9	.0	805.4	28.92	10.3	.232	.568		
								10	.0	828.2	33.83	11.4	.199	.531		
								11	.0	850.0	38.53	12.5	.185	.500		
	0							12	.0	868.9	42.59	13.4	.178	.472		
	0							EXIT	.0	878.2	44.60	13.9		.460		

Table A-4. Data From Flux Shape 4 (Peak Near Outlet)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	X	V_m	$\frac{\phi_o}{10^6}$	$\frac{\phi_s}{10^6}$	$\frac{\phi_{in}}{10^6}$	$\frac{\phi_i}{10^6}$
281		10-26-64	15:45	1012	3.78	2.517	133.0	INLET	150.7	370.8	-26.20	12.9				
								12	12.4	528.5	-2.43	14.9	.616	.658		
								13	8.3	533.7	-1.63	15.0	.358	.651		
								EXIT	6.8	535.6	-1.33	15.0		.649		
282		10-26-64	15:58	1005	4.35	2.499	142.2	INLET	148.9	371.9	-26.41	12.8				
0								12	1.0	541.9	-.20	15.0	.659	.704		
0								13	.0	547.3	.64	16.9	.382	.696		
0								EXIT	.0	549.3	.95	17.8		.690		
283		10-27-64	10:17	1015	5.07	2.528	117.5	INLET	105.3	420.6	-19.19	13.5				
0								12	.0	559.4	2.28	21.9	.544	.582		
0								13	.0	563.9	2.98	23.9	.313	.575		
0								EXIT	.0	565.6	3.23	24.7		.570		
284		10-27-64	13:30	1010	6.66	2.486	95.9	INLET	52.0	480.4	-9.81	14.0				
0								12	.0	595.6	7.98	38.0	.440	.475		
0								13	.0	599.3	8.56	39.7	.257	.469		
0								EXIT	.0	600.7	8.77	40.3		.465		
285		10-27-64	15:14	997	9.47	2.489	86.3	INLET	22.0	514.5	-4.21	14.5				
								1	20.6	516.3	-3.94	14.5	.164	.164		
								2	17.6	519.9	-3.38	14.5	.171	.167		
								3	14.4	523.8	-2.79	14.6	.186	.172		
								4	11.0	528.1	-2.12	14.7	.219	.180		
								5	6.8	533.4	-1.31	14.8	.265	.195		
								6	1.7	540.0	-.30	14.9	.353	.215		
								7	.0	549.2	1.11	18.2	.512	.247		
								8	.0	562.3	3.14	24.1	.701	.296		
								9	.0	578.7	5.65	31.5	.815	.350		
								10	.0	596.4	8.37	39.6	.802	.400		
								11	.0	611.3	10.67	46.3	.627	.428		
								12	.0	620.4	12.07	50.4	.408	.437		
								13	.0	624.0	12.62	52.0	.237	.432		
								EXIT	.0	625.2	12.81	52.6		.428		
286		10-27-64	15:44	1000	9.92	2.494	93.7	INLET	21.3	515.9	-4.08	14.5				
0								12	.0	628.1	13.20	53.7	.431	.464		
								13	.0	631.8	13.77	55.4	.251	.459		
								EXIT	.0	633.1	13.97	56.0		.455		
287		10-29-64	14:14	1000	2.58	1.507	116.4	INLET	152.5	367.3	-26.96	7.7				
0								12	.0	597.9	8.54	24.2	.539	.576		
0								13	.0	605.4	9.70	26.3	.313	.570		
0								EXIT	.0	608.2	10.13	27.0		.564		
288		10-29-64	15:31	1000	3.35	1.512	99.3	INLET	99.8	424.6	-18.13	8.1				
								12	.0	620.8	12.08	30.6	.458	.492		
								13	.0	627.2	13.06	32.3	.264	.486		
								EXIT	.0	629.5	13.42	33.0		.482		

Table A-4. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	X	V_m	$\phi_{i,0}$ 10 ⁶	ϕ_o 10 ⁶	$\phi_{i,i}$ 10 ⁶	ϕ_i 10 ⁶
289		11-29-64	15:49	1000	3.53	1.504	103.7	INLET	99.0	425.5	-18.00	8.1				
	0							12	.0	631.5	13.72	33.3	.478	.514		
	0							13	.0	638.1	14.73	35.1	.275	.508		
	0							EXIT	.0	640.5	15.11	35.8		.503		
290		11-02-64	10:44	1007	4.73	1.583	96.5	INLET	47.7	485.1	+9.01	8.9				
	0							12	.0	667.1	19.08	44.8	.442	.478		
	0							13	.0	673.0	19.99	46.5	.258	.472		
	0							EXIT	.0	675.2	20.33	47.1		.468		
291		11-02-64	12:20	993	5.93	1.477	93.3	INLET	18.9	517.8	-3.61	8.6				
	0							11	.0	690.1	22.86	49.0	.658	.452		
	0							12	.0	706.4	25.37	53.4	.429	.462		
	0							13	.0	712.6	26.32	55.0	.248	.457		
	0							EXIT	.0	714.9	26.67	55.6		.453		
292		11-02-64	14:51	998	.84	.497	78.1	INLET	25.0	511.0	-4.78	2.9				
	0							12	.0	579.7	67.34	42.5	.357	.387		
	0							13	.0	995.0	69.70	43.9	.210	.382		
	0							EXIT	.0	1000.6	70.57	44.4		.379		
293		11-03-64	10:36	1010	.82	.504	81.9	INLET	52.6	479.7	+9.91	2.8				
	0							12	.0	965.0	65.03	41.2	.375	.406		
	0							13	.0	980.6	67.45	42.6	.217	.401		
	0							EXIT	.0	986.4	68.34	43.1		.397		
294		11-03-64	11:50	998	.82	.507	83.2	INLET	101.1	422.9	-18.34	2.7				
	0							12	.0	913.1	57.10	37.2	.382	.412		
	0							13	.0	928.7	59.50	38.7	.223	.407		
	0							EXIT	.0	934.6	60.41	39.2		.404		
295		11-03-64	12:06	998	.88	.507	88.7	INLET	101.7	422.3	-18.44	2.7				
	0							12	.0	943.8	61.81	40.1	.407	.439		
	0							13	.0	961.4	64.53	41.7	.236	.434		
	0							EXIT	.0	967.6	65.48	42.3		.430		
296		11-03-64	13:20	995	.84	.505	93.9	INLET	150.0	369.4	-26.49	2.6				
	0							12	.0	924.7	58.90	38.3	.433	.465		
	0							13	.0	943.0	61.71	40.0	.252	.460		
	0							EXIT	.0	949.7	62.74	40.6		.456		
297		11-03-64	14:55	1500		.501	68.7	INLET	152.4	423.8	-33.75	2.7				
	0							12	.0	834.0	39.98	17.3	.315	.341		
	0							13	.0	846.9	42.29	18.2	.183	.337		
	0							EXIT	.0	851.8	43.17	18.5		.333		
298		11-05-64	10:18	1505		.490	62.4	INLET	104.4	478.6	-24.07	2.7				
	0							12	.0	858.6	44.37	18.4	.285	.309		
	0							13	.0	871.0	46.59	19.2	.166	.306		
	0							EXIT	.0	875.5	47.40	19.5		.303		
299		11-05-64	12:39	1500		.494	57.4	INLET	55.6	537.3	+13.36	2.9				
	0							12	.0	883.7	48.91	20.2	.264	.284		
	0							13	.0	895.4	51.01	20.9	.154	.281		
	0							EXIT	.0	899.5	51.76	21.2		.278		

Table A-4. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\frac{\phi_o}{10^6}$	$\frac{\phi_i}{10^6}$	$\frac{\phi_{i,i}}{10^6}$	$\frac{\phi_i}{10^6}$
300		11-05-64	13:47	1498		.511	53.7	INLET	26.7	574.4	-6.63	3.2				
								12	.0	688.6	49.85	21.3	.246	.266		
	0							13	.0	698.7	51.61	21.9	.143	.263		
	0							EXIT	.0	602.4	52.29	22.1		.260		
301		11-05-64	15:26	1498	2.27	1.474	63.6	INLET	22.2	580.5	-5.54	9.2				
	0							12	.0	709.3	17.61	27.9	.293	.315		
	0							13	.0	713.5	18.35	28.7	.170	.312		
	0							EXIT	.0	715.1	18.63	29.0		.309		
302		11-06-64	10:37	1495	1.95	1.495	65.8	INLET	47.7	546.7	-11.54	9.0				
								1	46.0	548.8	-11.15	9.0	.120	.120		
								2	42.5	553.3	-10.35	9.0	.127	.123		
								3	38.8	558.2	-9.48	9.1	.139	.128		
								4	34.7	563.6	-8.51	9.2	.159	.135		
								5	29.8	570.0	-7.35	9.2	.199	.145		
								6	23.5	578.4	-5.84	9.3	.263	.161		
								7	15.2	589.6	-3.83	9.5	.381	.184		
								8	3.4	606.3	-.84	9.7	.522	.222		
								9	.0	626.3	2.75	12.7	.606	.261		
								10	.0	647.9	6.63	16.8	.600	.297		
								11	.0	667.2	10.08	20.4	.468	.320		
								12	.0	678.2	12.06	22.5	.304	.326		
								13	.0	682.4	12.82	23.3	.177	.322		
								EXIT	.0	684.0	13.10	23.6		.319		
303		11-06-64	10:54	1495	1.95	1.500	68.9	INLET	47.6	546.8	-11.51	9.0				
								12	.0	683.8	13.07	23.6	.319	.341		
	0							13	.0	688.5	13.91	24.5	.185	.337		
	0							EXIT	.0	690.1	14.21	24.8		.334		
304		11-06-64	12:59	1495	1.52	1.510	79.8	INLET	98.8	484.0	-22.79	8.5				
								12	.0	641.8	5.54	15.8	.368	.395		
								13	.0	646.9	6.45	16.7	.213	.391		
								EXIT	.0	648.8	6.79	17.1		.387		
305		11-06-64	13:25	1493	1.63	1.507	85.4	INLET	98.0	484.8	-22.58	8.4				
								12	.0	654.2	7.81	18.1	.393	.423		
	0							13	.0	659.6	8.77	19.2	.228	.418		
	0							EXIT	.0	661.6	9.13	19.6		.414		
306		11-06-64	19:16	1508	1.43	1.515	102.3	INLET	147.0	430.6	-32.81	8.1				
								12	.0	632.5	3.59	13.7	.472	.507		
	0							13	.0	638.9	4.74	14.9	.274	.501		
	0							EXIT	.0	641.3	5.18	15.4		.496		
307		11-09-64	10:01	1500	4.80	2.489	64.5	INLET	22.5	580.3	-5.62	15.6				
								12	.0	657.8	8.30	30.8	.298	.320		
	0							13	.0	660.3	8.75	31.6	.173	.316		
	0							EXIT	.0	661.2	8.92	31.9		.313		

Table A-4. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	X	V_m	$\frac{\phi_o}{10^6}$	$\frac{\phi_i}{10^6}$	$\frac{\phi_o}{10^6}$	$\frac{\phi_i}{10^6}$
308		11-09-64	11:32	1500	4.30	2.504	79.2	INLET	49.9	544.5	-12.07	15.0				
	0							12	.0	638.8	4.89	25.0	.366	.392		
	0							13	.0	641.9	5.44	26.0	.214	.388		
	0							EXIT	.0	643.0	5.64	26.3		.384		
309		11-09-64	13:25	1493	3.65	2.497	112.0	INLET	100.0	482.4	-23.02	14.0				
	0							12	.0	616.2	.99	18.0	.516	.554		
	0							13	.0	620.6	1.78	19.4	.296	.548		
	0							EXIT	.0	622.2	2.06	19.9		.543		
310		11-09-64	14:45	1500	3.26	2.522	138.4	INLET	151.6	424.7	-33.60	13.4				
	0							11	26.9	574.5	-6.68	15.6	.986	.671		
	0							12	16.4	588.6	-4.13	15.9	.639	.686		
								13	12.6	593.9	-3.18	16.1	.369	.678		
								EXIT	11.2	595.9	-2.83	16.1		.671		
311		11-10-64	09:40	2005	1.31	1.513	46.8	INLET	22.7	634.7	-8.13	10.1				
	0							11	.0	719.2	10.15	17.7	.333	.227		
	0							12	.0	727.0	11.83	18.8	.217	.232		
								13	.0	730.0	12.49	19.3	.125	.229		
								EXIT	.0	731.2	12.73	19.4		.227		
312		11-10-64	10:46	2000	1.18	1.524	57.2	INLET	48.6	596.7	-16.18	9.6				
	0							11	.0	699.0	5.89	14.9	.405	.277		
	0							12	.0	708.7	7.99	16.4	.262	.283		
								13	.0	712.4	8.79	16.9	.155	.280		
								EXIT	.0	713.8	9.09	17.1		.277		
313		11-10-64	13:40	2005	.86	1.523	71.3	INLET	100.9	529.6	-30.86	8.9				
								1	99.0	531.8	-30.37	8.9	.130	.130		
								2	95.2	536.5	-29.36	9.0	.136	.132		
								3	91.2	541.6	-28.26	9.0	.149	.137		
								4	86.7	547.2	-27.84	9.1	.172	.143		
								5	81.2	554.0	-25.57	9.1	.214	.155		
								6	74.4	562.8	-23.67	9.2	.286	.172		
								7	65.0	575.0	-21.03	9.4	.414	.199		
								8	52.2	592.2	-17.33	9.6	.568	.237		
								9	36.6	613.9	-12.62	9.8	.657	.282		
								10	21.2	637.0	-7.63	10.2	.649	.321		
								11	8.4	657.8	-3.14	10.6	.507	.347		
								12	1.8	669.2	-.66	10.8	.329	.393		
								13	.0	673.9	.36	11.1	.192	.349		
								EXIT	.0	675.6	.72	11.4		.346		
314		11-10-64	13:56	2000	1.02	1.513	78.2	INLET	98.6	532.0	-30.15	8.9				
	0							11	.0	673.6	.42	11.1	.555	.381		
	0							12	.0	686.4	3.17	13.0	.363	.387		
								13	.0	691.4	4.25	13.7	.212	.363		
								EXIT	.0	693.3	4.66	14.0		.379		

Table A-4. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\phi_{i,0}$ 10 ⁶	$\phi_{i,1}$ 10 ⁶	$\phi_{i,2}$ 10 ⁶	$\phi_{i,3}$ 10 ⁶
315	0	11-10-64	19:01	2005	.75	1.514	92.4	INLET	150.4	471.0	-43.53	8.3				
								11	21.5	636.5	-7.73	10.1	.655	.445		
								12	11.1	653.2	-4.12	10.4	.425	.456		
								13	7.6	659.2	-2.82	10.6	.247	.453		
								EXIT	6.3	661.4	-2.35	10.6		.448		
316	0	11-11-64	11:43	2005		.518	33.0	INLET	26.3	629.2	-9.31	3.4				
	0							11	.0	604.1	28.50	10.3	.233	.161		
	0							12	.0	619.3	31.78	11.1	.153	.163		
	0							13	.0	625.6	33.16	11.4	.089	.162		
	0							EXIT	.0	627.9	33.66	11.5		.160		
318	0	11-11-64	13:14	2005		.514	36.5	INLET	58.8	583.2	-19.26	3.2				
	0							11	.0	776.5	22.54	8.9	.259	.176		
	0							12	.0	795.6	26.67	9.8	.167	.181		
								13	.0	802.4	28.15	10.2	.097	.179		
								EXIT	.0	805.0	28.69	10.3		.177		
319	0	11-11-64	14:37	2007		.517	42.8	INLET	106.1	523.3	-32.29	3.0				
	0							11	.0	749.2	16.61	7.5	.302	.207		
	0							12	.0	770.5	21.21	8.6	.198	.212		
								13	.0	778.9	23.03	9.0	.115	.210		
								EXIT	.0	781.9	23.67	9.2		.208		
320		11-11-64	16:11	2000		.506	44.6	INLET	154.9	465.6	-44.48	2.8				
								11	.0	706.1	7.41	5.3	.317	.216		
								12	.0	728.6	12.28	6.4	.206	.221		
								13	.0	737.4	14.18	6.6	.119	.219		
								EXIT	.0	740.5	14.86	7.0		.216		
321	0	11-11-64	16:30	2000		.503	49.5	INLET	155.0	465.5	-44.51	2.8				
								11	.0	735.8	13.84	6.7	.353	.242		
								12	.0	759.3	18.91	7.9	.229	.245		
								13	.0	768.8	20.95	8.3	.133	.242		
								EXIT	.0	772.3	21.71	8.5		.240		
322		11-12-64	09:46	2010	4.19	2.491	56.5	INLET	23.0	634.8	-8.26	16.6				
								11	.0	696.6	5.14	23.5	.398	.274		
								12	.0	702.4	6.41	24.9	.259	.280		
								13	.0	704.7	6.90	25.9	.152	.277		
								EXIT	.0	705.5	7.08	25.7		.274		
323	0	11-12-64	10:03	2005	4.30	2.480	60.8	INLET	20.6	637.9	-7.43	16.7				
	0							11	.0	705.3	7.14	25.7	.432	.297		
	0							12	.0	711.1	8.40	27.1	.280	.301		
								13	.0	713.5	8.92	27.6	.163	.298		
								EXIT	.0	714.4	9.11	27.8		.295		
324	0	11-12-64	12:05	2005	3.74	2.534	79.8	INLET	47.9	598.2	-16.03	16.1				
	0							11	.0	684.5	2.64	21.1	.566	.389		
	0							12	.0	692.3	4.32	23.0	.366	.395		
								13	.0	695.3	4.97	23.8	.214	.391		
								EXIT	.0	696.4	5.22	24.0		.387		

Table A-4. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\frac{\phi_{i,0}}{10^6}$	$\frac{\phi_o}{10^6}$	$\frac{\phi_{i,1}}{10^6}$	$\frac{\phi_{i,2}}{10^6}$
325	0	11-12-64	13:50	2005	3.08	2,512	111.7	INLET	98.6	532.4	-30.26	14.7				
								11	10.7	653.8	-3.69	17.4	.794	.542		
								12	4.2	665.1	-1.56	17.7	.519	.553		
								13	1.6	669.5	-.61	17.8	.300	.547		
								EXIT	.7	671.1	-.27	17.9		.542		
326	0	11-12-64	13:05	2002	2.90	2,539	141.9	INLET	151.0	470.2	-43.58	14.0				
								11	30.4	622.9	-10.60	16.7	1.010	.689		
								12	20.9	637.1	-7.52	17.0	.658	.703		
								13	17.5	642.5	-6.37	17.2	.380	.695		
								EXIT	16.2	644.5	-5.93	17.2		.688		
327		11-13-64	12:58	1998	5.98	3,542	134.9	INLET	98.1	532.3	-30.00	20.8				
								11	21.0	636.7	-7.50	23.7	.961	.657		
								12	15.0	646.1	-5.47	24.1	.625	.668		
								13	12.7	649.8	-4.67	24.3	.359	.661		
								EXIT	11.9	651.1	-4.38	24.3		.654		
328	0	11-13-64	13:17	1998	6.07	3,544	141.4	INLET	98.4	532.0	-30.07	20.8				
								11	17.7	641.7	-6.42	24.0	1.008	.691		
								12	11.9	651.2	-4.37	24.4	.656	.701		
								13	9.6	655.0	-3.55	24.5	.379	.692		
								EXIT	8.8	656.4	-3.24	24.6		.686		
329	0	11-13-64	13:07	2000	8.42	3,536	80.8	INLET	24.8	631.0	-8.79	23.5				
								11	.0	693.2	4.63	32.6	.568	.391		
								12	.0	699.3	5.95	34.7	.370	.400		
								13	.0	701.4	6.42	35.5	.218	.395		
								EXIT	.0	702.3	6.59	35.7		.392		
330	0	11-16-64	10:00	1495	6.05	3,497	138.6	INLET	99.9	482.8	-23.00	19.6				
	0							11	14.2	591.0	-3.58	22.2	.984	.673		
	0							12	6.9	601.2	-1.75	22.5	.642	.687		
								13	4.2	605.0	-1.06	22.6	.369	.679		
								EXIT	3.2	606.5	-.81	22.6		.672		
331	0	11-16-64	12:16	1500	8.65	3,507	71.3	INLET	20.4	583.2	-5.10	22.0				
	0							12	.0	643.9	5.80	37.2	.326	.353		
	0							13	.0	645.9	6.17	38.1	.191	.349		
	0							EXIT	.0	646.7	6.30	38.4		.346		
332	0	11-16-64	13:30	1500	5.64	2,481	61.0	INLET	8.7	599.3	-2.22	15.9				
	0							12	.0	672.7	10.98	35.3	.280	.302		
	0							13	.0	675.1	11.41	36.1	.164	.299		
	0							EXIT	.0	676.0	11.57	36.4		.296		
333		11-16-64	15:02	1500	1.97	1,515	58.1	INLET	11.3	595.7	-2.86	9.7				
								12	.0	710.0	17.69	28.7	.265	.287		
								13	.0	713.8	18.37	29.5	.157	.284		
								EXIT	.0	715.2	18.62	29.7		.282		

Table A-4. (Cont'd)

RUN NO.	DNB	DATE	TIME	P	ΔP	$G \times 10^{-6}$	KW	STA NO.	ΔT_s	h	x	V_m	$\frac{\phi_o}{10^6}$	$\frac{\phi_i}{10^6}$	$\frac{\phi_{i,j}}{10^6}$	$\frac{\phi_i}{10^6}$
334		11-16-64	15:21	1503	1.99	1.516	61.7	INLET	10.6	557.1	-2.69	5.7				
0								12	.0	718.6	19.19	30.3	.283	.306		
0								13	.0	722.6	10.90	31.0	.165	.302		
0								EXIT	.0	724.0	20.16	31.3		.299		
342		11-20-64	11:48	2000	.68	1.495	89.1	INLET	147.5	473.9	-42.67	8.3				
0								11	21.1	636.6	-7.57	10.0	.634	.432		
								12	11.6	651.8	-4.29	10.3	.413	.441		
								13	8.1	657.7	-3.02	10.4	.243	.436		
								EXIT	6.8	659.9	-2.55	10.4		.432		
343		11-20-64	13:20	2000	2.85	2.515	140.9	INLET	146.7	474.9	-42.48	13.9				
0								11	26.8	627.9	-9.45	16.6	1.002	.684		
								12	17.5	642.2	-6.36	17.0	.653	.698		
								13	14.2	647.6	-5.20	17.2	.376	.690		
								EXIT	13.0	649.6	-4.77	17.2		.683		
344		11-20-64	15:28	1998	3.10	2.503	112.6	INLET	99.5	530.6	-30.37	14.6				
0								11	10.2	653.9	-3.78	17.3	.800	.548		
								12	3.8	665.0	-1.40	17.6	.521	.558		
								13	1.3	669.4	-.45	17.8	.301	.551		
								EXIT	.4	671.0	-.10	17.8		.546		
345		11-23-64	11:12	2005	1.02	1.515	78.4	INLET	99.5	531.3	-30.49	8.9				
0								11	.3	671.9	-.09	10.8	.555	.379		
0								12	.0	685.8	2.93	12.8	.360	.386		
								13	.0	690.9	4.02	13.6	.210	.384		
								EXIT	.0	692.7	4.42	13.8		.380		

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