THE UNIVERSITY OF MANITOBA

HEAT TRANSFER AND HYDRODYNAMICS IN TWO-PHASE TWO-COMPONENT FLOW IN A VERTICAL TUBE

by

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A THESIS

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Appendix A

DETAILED INFORMATION ON THE COMPONENTS USED IN THE EXPERIMENTAL FACILITY

This appendix gives details of the apparatus and the measuring equipment, including that for measuring the fluid properties. Some of these components, like thermocouples and the heat-transfer test section, were calibrated only once (93) before installing in the facility. Others, like the electrical-power-measuring meters, fluid flow meters, temperature-measuring instruments, were calibrated from time to time during the course of the present investigation. Most of the material presented in this appendix was taken from References (93,1) and is given here for the sake of completeness.

Table A.1 lists the manufacturer, model number, etc., of the equipment used. The numbers appearing in the table (the item number) correspond with the circled numbers in Figs. (3.2 to 3.9).

TABLE A.1

Information on the Components of the Experimental Facility

Part No. in Figs. 3.2 to 3.9	Name of the Component	Remarks
MIXING CHAMBER		
1	Stainless steel strainer	3.0 in. dia., 1/32 in. perforated stainless steel type 304 Sarco strainer; Sarco Canada Limited, Agincourt, Ontario, Canada.
2	Porosint bronze tube	0.460 in. I.D. x 0.740 in.O.D. x 8.0 in. grade E; Sintered Products Limited, Sutton-in-Ashfield, Notts, England, U.K.
HEATED TEST SECTION		
3	Heated test tube	Stainless steel type 304; 0.460 in. I.D. x 0.020 in. thick; Atlas Alloys, L = 2 ft.; Atlas Steels Limited, Welland, Ontario, Canada.
4	Bus bars	Brass, 6.75 x 3.0 x 0.94 in.
5	Supporting bar	1.0 x 1.0 in Permali insulating material; Permali (Canada) Limited, Toronto, Ontario, Canada.
6	Guard heater tube	1.5 in.I.D. x 0.0625 in. thick split copper tube retained by Permali rings.
7	Heating elements	Two Briskeat silicone rubber embedded heating tapes (0.5 in. wide x 8 ft. & 0.5 in. x 10 ft.); Briscoe Manufacturing Co., Columbus, Ohio, U.S.A.
OBSERVATION SECTION		
8	Visual section	3.0 x 3.0 in. x 1 ft. cast acrylic rectangular prism with 0.460 in. precision-bored hole.

Part No.	Name of the Component	Remarks
TEMPERATURE MEASURING INSTRUMENTS		
9	Digital voltmeter	Keithley 191 digital multimeter, model 191, 5-1/2 digit, 0.0005% resolution, accuracy 0.007% + 3 digits; Keithley Instruments, Inc., Cleveland, Ohio, U.S.A.
10	Strip recorder	Honeywell Two-Pen Electronik 104 Multi-Range Lab/Test Wide Chart Recorder, model no. 104112-002-002 ; specified accuracy: span: $\pm$0.25% of span or 1 microvolt, whichever is greater; zero position: $\pm$ (0.25 + 0.1 x suppresion ratio)% of span or 1 microvolt, whichever is greater; Honeywell Controls Ltd., Scarborough, Ontario, Canada.
11	Data logger	Fluke Data Logger model 2240A, 60 channel capacity (could be extended up to 1000 channels), scanning speed up to 15 channel/sec., accuracy $\pm$ 2 uv programmable, equipped with a digital display and printer, displays and prints date, time (hour, min., sec.), channel no., reading (mV or ^{o}C) and units ; John Fluke Mfg. Co., Inc., Mountlake Terrace, Washington, 98043.
12	Voltage standard	Fluke DC Voltage Standard-Differential Voltmeter -(model 335A); John Fluke Mfg. Co., Inc., Seattle, Washington, U.S.A.

Part No.	Name of the Component	Remarks
13	Ice bath	Omega Ice Point Cell, a completely automatized ice bath (Model TRC III); OMEGA Engineering Inc., Stanford, Conn., U.S.A. Accuracy: 0.0 to 0.1 C. Stability ± 0.04 C for any constant ambient.
14	Selector switch	Thermo-Electric Selector Switch; 96 points, 48 switches, custom key palladium contact switches, model No. 33212. Double pole, double throw, center OFF type.
15	Constant temperature bath	Gebruder Haake Model FS/FT Constant Temperature Bath; specified accuracy: ± 0.02 °C; Gebruder Haake, Karlsruhe, W. Germany.
LIQUID FLOW LOOP		
16	Pump	Waukesha Positive Displacement Pump, Model No. 25 DO-1 1/2. All nickel-bronze construction (Waukesha Metal). Complete assembly supplied with a 5 hp (220 volt,DP) motor and a V-belt drive. Max. flow =24 USGPM (water); max. pressure =150 psi and max. temp. = 225 °F. Buna-N seals; Waukesha Foundry Company, Waukesha, Wisconsin, U.S.A.
17	Flowmeters	Fischer & Porter Indicating Type Flowrator (variable area flowmeters "Rotameters"), model no.10A3537A, 316 stainless steel float (½ - GUSVT-40),tube: FP = 1/2-21-G-10/83, percent scale. Flowrate: Max. = 0.328 USGPM liquid sp. gr. = 1.0.

Part No.	Name of the Component	Remarks
17 - continued		
	B	Model No. 10A3537A, 216 stainless steel float (3/4 27-G-10/83), % scale, flowrate: max.=3.55 USGPM liquid sp.gr.-1.0.
	C	Model No. 10A3537A, 316 stainless steel float (2-GSVGT-98). Tube: FP-2-27-G-10/83, % scale, flowrate: max.=30 USGPM liquid sp.gr.1.0.
	D	Model No. 10A3537P, 316 stainless steel float (NSVT-622). Tube: PP-1-60-P 8/83, % scale, flowrate: max.=20 USGPM liquid sp.gr.=1.0. (Used for controlling the cooling water rate in the heat exchanger.) All flow rates were calibrated in laboratory for water for the present investigation; Fischer and Porter (Canada) Ltd., Downsview, Ontario.
18	Differential pressure transmitters	Three Rosemount Differential Pressure Transmitters with ranges 0.0-30.0,0.0-100.0 and 0.0-750.0 in. of water, solid state with up to 600% elevation or 500% suppresion and adjustable damping. Output: 4-20 mADC; stability: $\pm$0.2% of upper range limit; linearity: $\pm$0.1% of calibrated range; accuracy: $\pm$0.2% of calibrated span; Rosemount Inc., Minneapolis, Minn., U.S.A.
19	Gauge pressure transmitter	One Rosemount Gauge Pressure Transmitter. Range 0.0-100.0 psig. Accuracy: $\pm$0.25% of calibrated span; includes combined effects of linearity, hysteresis and repeatability. Other features are the same as in 18.

Part No.	Name of the Component	Remarks
20	Gas-liquid separator tank	1 1/2 x 1.0 ft. stainless steel tank with 3 in. outlet in the cover plate and 1 1/2 in. drain; Greensteel Industries Ltd., Winnipeg, Manitoba, Canada.
21	Liquid storage tank	1 1/2 x 3 ft. stainless steel tank with 3 holes in the cover plate (3 in. diameter). 1 1/2 in. drain and a side mounted 1/2 in. I.D. glass lever indicator; Greensteel Industries Ltd.
22	Heat exchanger	Liquid-to-liquid shell and tube type exchanger. All copper 0.625 in. I.D. tubes by 4 ft. long shell diameter 2 ft; Automedic Instruments Ltd., Winnipeg, Manitoba, Canada.
POWER SUPPLY CIRCUIT		
23	Variac	Powerstat variable auto-transformer, model No. P1156-4PS. Single-phase, 240 volt-100 amps-24 kvA; American Superior Electric Company, U.S.A.
24	Transformer	Single-phase Dry Type Distribution Transformer. Open-ventilated, class-F. Primary: 240 volt-100 amps, secondary: 1200 amps, Pioneer Electric Manitoba Ltd., Winnipeg, Manitoba, Canada.
25	Current transformer	Weston Model 327, Type 2. Primary: 100 amps, secondary: 5 amps, Weston Electrical Instrument Corp., Newark, N.J., U.S.A. Calibrated in the laboratory (Reference 93).
26	Ammeter	Weston A.C. Ammeter, Model 433 (25-500 cycles). Range: 5/2.5/1 amp. Calibrated in the laboratory (Reference 93).
27	Voltmeter	Weston A.C. R.M.S. Voltmeters. Range: 0 to 10 volts and 0 to 30 volts. Calibrated in the laboratory (Reference 93).

Part No.	Name of the Component	Remarks
28	Potential transformer	Weston Potential Transformer, model 311, Type 1. 2300/1150: 115V, 15VA, 25-133 CPS. Calibrated in the laboratory(Reference 93).
29	Wattmeter	Weston Portable Wattmeter, model 432. 5 amp capacity. Voltage range: 75/150/300 v. Calibrated in the laboratory.
30	Temperature controller	Honeywell Servotronik Temperature Controller, model No. 5500101-2-05-02. Type T-couple. Range: 0-200°C
PHOTOGRAPHIC SECTION		
31	Camera	Pentax Spotmatic Single Lens Reflex Camera equipped with Super-Takumar 50mm f/4 Macro (close up) lens.
32	Camera	Nikon Protomatic FTN equipped with Nikkor-S lens, 50mm f/1.4 lens.
33	Strobotac	General Radio Type 1538-A Strobotac Electronic Stroboscope. Flashing-rate range: 110 to 150,000 flashes per minute, flash duration: 0.5 to 3 μs; General Radio Company, West Concord, Mass., U.S.A.
34	Flash unit	EG&G 549 Microflash System consisting of the model 549-11 Flash Unit and the model 549-21 Driver Unit. Flash duration 0.5 μs; peak light: 50×10^6 beam candle power, Edgerton, Germeshausen & Grier, Inc., Boston, Mass., U.S.A.
AIR FLOW LOOP		
35	Compressor	7 x 7 in. double acting, single cylinder, type ES-1 and serial no. 14415; 1.375 in. diameter of piston rod; dual control; water cooled, single pass, center-flow; electrical drive, 15 hp, 220-440 V, 3-phase, 1750 rpm motor; 92CFM capacity at 300 rpm at 100 psi; Canadian Ingersoll Rand Co. Ltd., Canada.

Part No.	Name of the Component	Remarks
36	Orifice plates	Three sharp-edged plates of 0.418, 0.141, and 0.046 in. diameter, designed and manufactured in the laboratory according to ASME Power Test Code. All orifice plates were calibrated in the laboratory (Reference 93).
37	Rotameter	Tube No. 3-15-4; Glass Float; Brooks Instrument Co. Inc., Hatfield, Penn., U.S.A.
38	Manometer	Meriam Model 30EB25TM, Range 100", well-type manometer. Equipped with standard scale and 303 stainless steel wetted parts.
FLUID-PROPERTY MEASURING EQUIPMENT		
39	Surface tension analyzer	Fisher Model 215 Autotensiomat surface tension analyzer (operates on the principles of the du Nouy ring and Wilhelmy plate methods); analog panel meter readout (or potentiometric recorder); 0 to 100 dynes/cm range; 0.02 dynes/cm sensitivity $\pm$ 2% relative accuracy; 0.02 dynes/cm resolution (on 0-5 dynes/cm range, using the recorder). Calibrated in laboratory several times during each run; supplied by Fisher Scientific Canada., Ltd.
40	Potentiometer recorder (accessory for surface tension meter)	Fisher Recordall series 500, single-pen wide chart recorder, 1 MV to 10V range; 12 chart speeds; maximum error 0.1% of 1 MV full scale; repeatability $\pm$ 0.01% of full scale, Houston Instrument, Austin, Texas.
41	Viscometer	Haake Falling-Ball Viscometer Model B, used with a constant temperature circulator; measuring range of 0.01 to 5 x 10^5 CP; accuracy of -0.1 to 0.5%; temperature range of -60 to + 150^{o}C, Supplied by Fisher Scientific Co.Ltd., Edmonton, Alta., Canada.

Appendix B

CALIBRATION OF INSTRUMENTS

B.1 INTRODUCTORY REMARKS

This appendix gives the results of the calibration of the measuring instruments and other sensing elements in the experimental facility. As previously mentioned in Appendix A, some components were calibrated only once by Vijay (93) before installation into the facility. Examples of such components are the thermocouples and the resistivity of the heat-transfer test section, the current and potential transformers (used in the power supply circuit), and the orifice plates and rotameter used to measure the air flow rates. Methods and results of calibrating these components are given in detail in Ref.(93) and were used in the computer program for the reduction of the data. In this section, results of the calibrations performed in the present study are presented.

B.2 CALIBRATION OF POWER MEASURING INSTRUMENTS

B.2.1 Ammeter

The ammeter was calibrated initially by (93) against a high precision Cambridge Standard instruments. The results are listed below.

Range (amps)	Max.Dev. (%)	Min.Dev. (%)	Mean Dev. (%)
1-5	2.6	0.40	0.9
0.5-2.5	2.6	0.25	0.8
0.2-1.0	3.2	0.10	0.9

Similar results were obtained when the meter was calibrated regularly in the present investigation against the standards.

The current reading was corrected before the heat-transfer calculations were made.

B.2.2 Wattmeter

As mentioned in Chapter 4, the wattmeter reading was not used for the reduction of the heat-transfer data; it was only used to compare against the power obtained from the current and resistance measurements. The maximum deviations between the standard and the wattmeter were in the order of 1.0% or less.

B.2.3 Voltmeter

The voltmeter reading together with the ammeter reading was used as another check on the power input to the test section. The maximum deviation obtained between the standard and the voltmeter was 1.3%.

B.3 CALIBRATION OF LIQUID FLOW METERS

The Fischer and Porter rotameters used for liquid flow measurement were calibrated in the laboratory at room temperature. The water flow results were compared against the calibration curves supplied by the manufacturer as shown in Fig. B.1. The manufacturer's calibration curves were used for water flow rate calculations as the agreement between these curves and the measurements was excellent. Figure B.1 also shows the calibration results for the glycerine & water solution (58%-42% by weight) and the silicone liquid. As no calibration curves were available from the manufacturer for these two liquids, careful measurements were made in the laboratory and the mean of several readings were taken as the true flow rate.

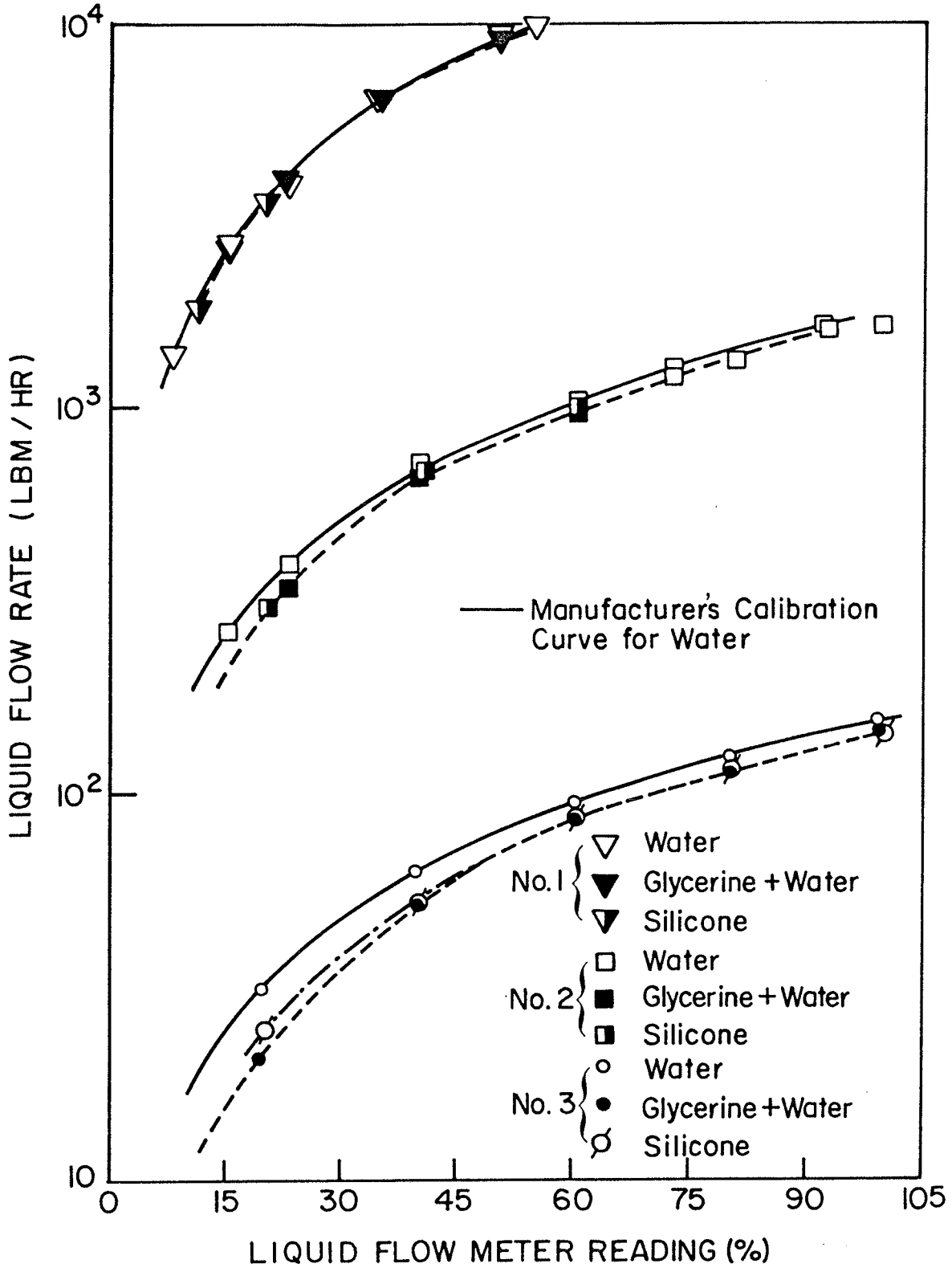

Fig. B.1 Calibration of Liquid Flow Meters

B.4 CALIBRATION OF THE PRESSURE TRANSMITTERS

The four pressure transmitters (three differential and one gauge) were calibrated in the laboratory over their ranges, and the results were compared against the manufacturer's curves, as shown in Figs. B.2 to B.5. The pressure transmitter with the smallest range (-25 to 5 in. of water) was calibrated using a water manometer; negative pressures were applied using a vacum pump. The second and third transmitters (ranges 0.0 to 100 and 0.0 to 750 in. of water) were calibrated using water and mercury manometers, respectively. The gauge pressure transmitter (range 0.0 to 100 psig) was calibrated against the readings of a calibrated pressure gauge mounted on a pressure cylinder that contained compressed air. The manufacturer's curves were used in the total pressure drop calculation, as the agreement between them and the measurements was excellent.

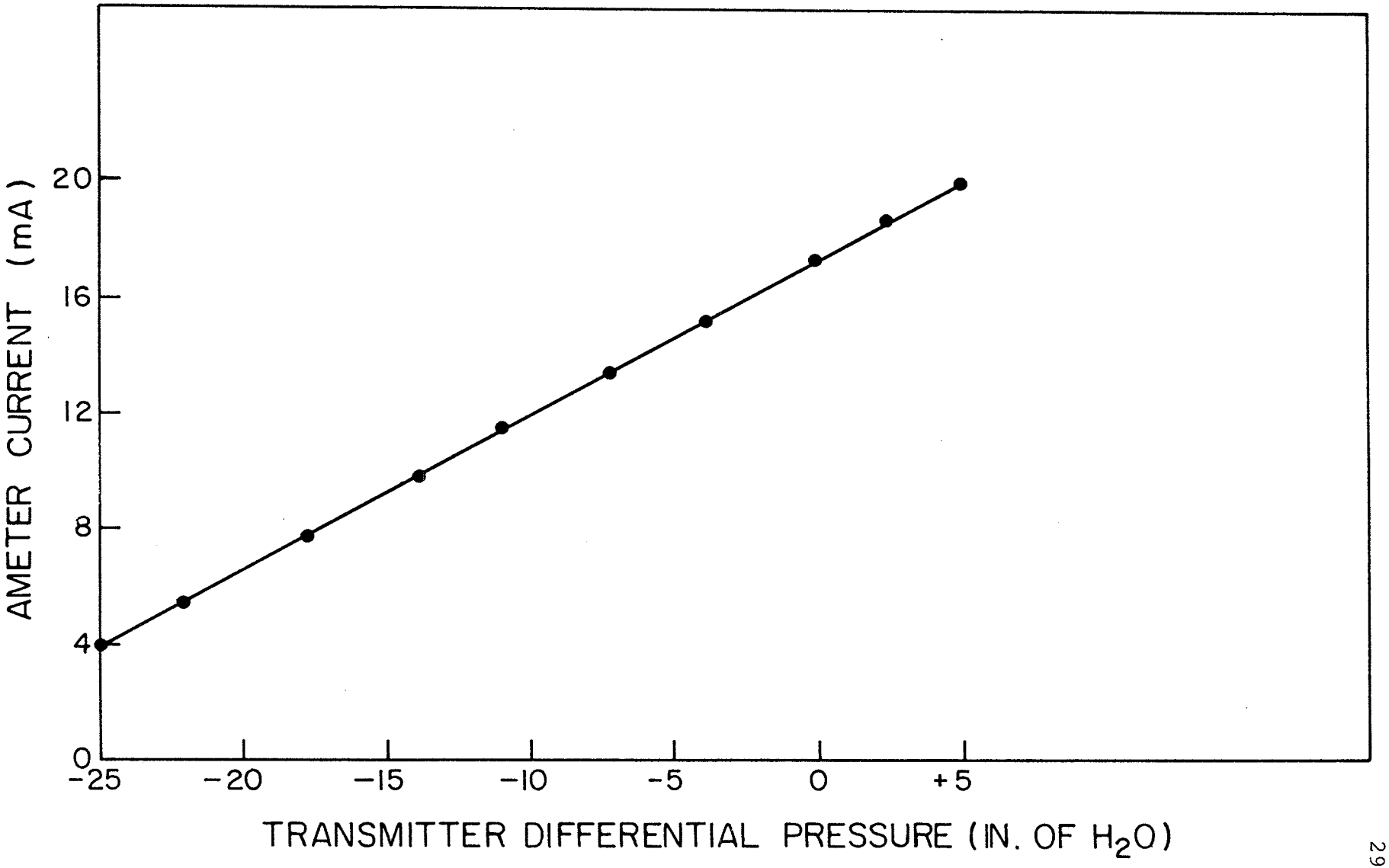

Fig. B.2 Calibration of Differential Pressure Transmitter No.1 (-25 to +5 in H_2O Range)

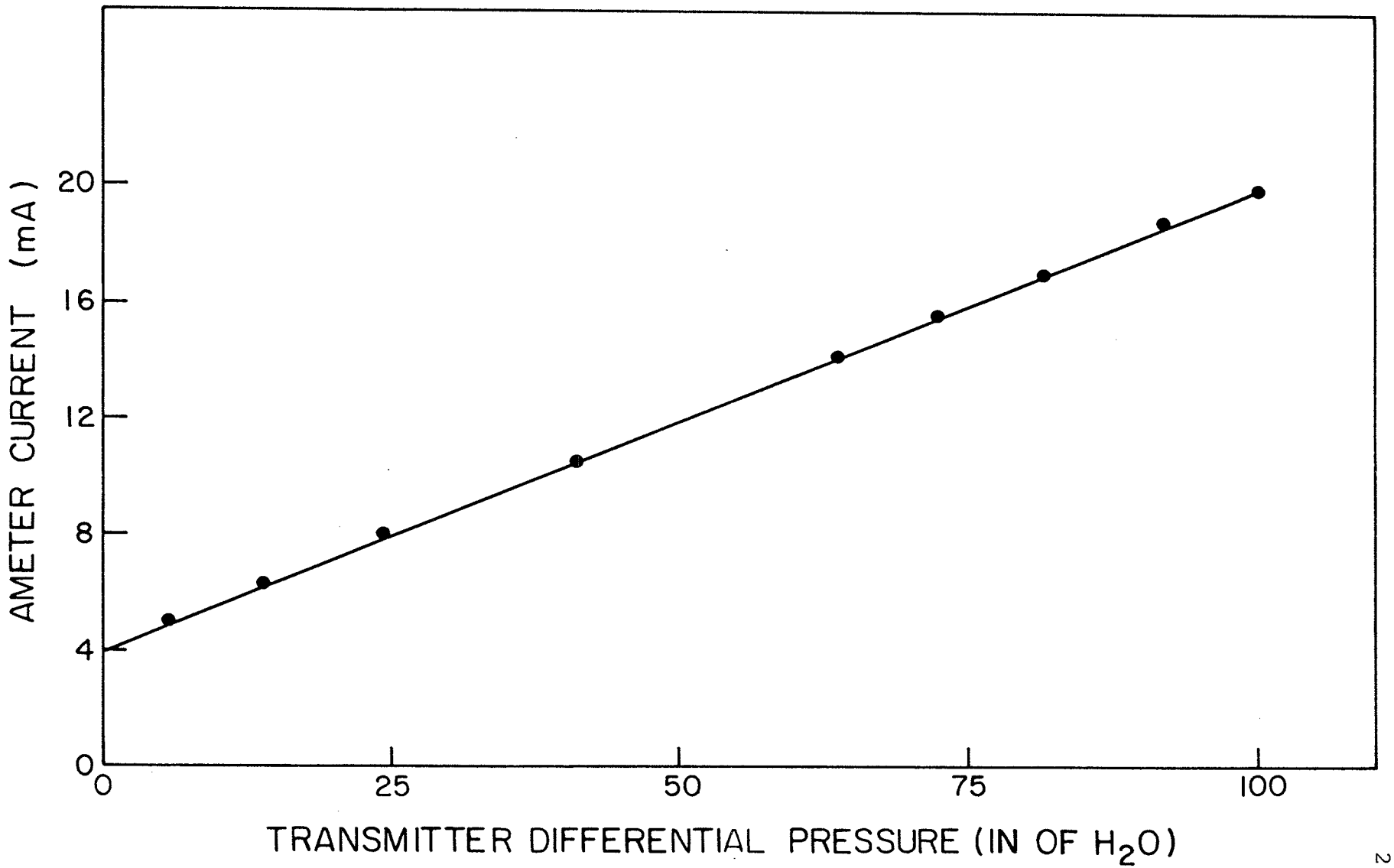

Fig. B.3 Calibration of Differential Pressure Transmitter No. 2 (0 to 100 in. H_2O Range)

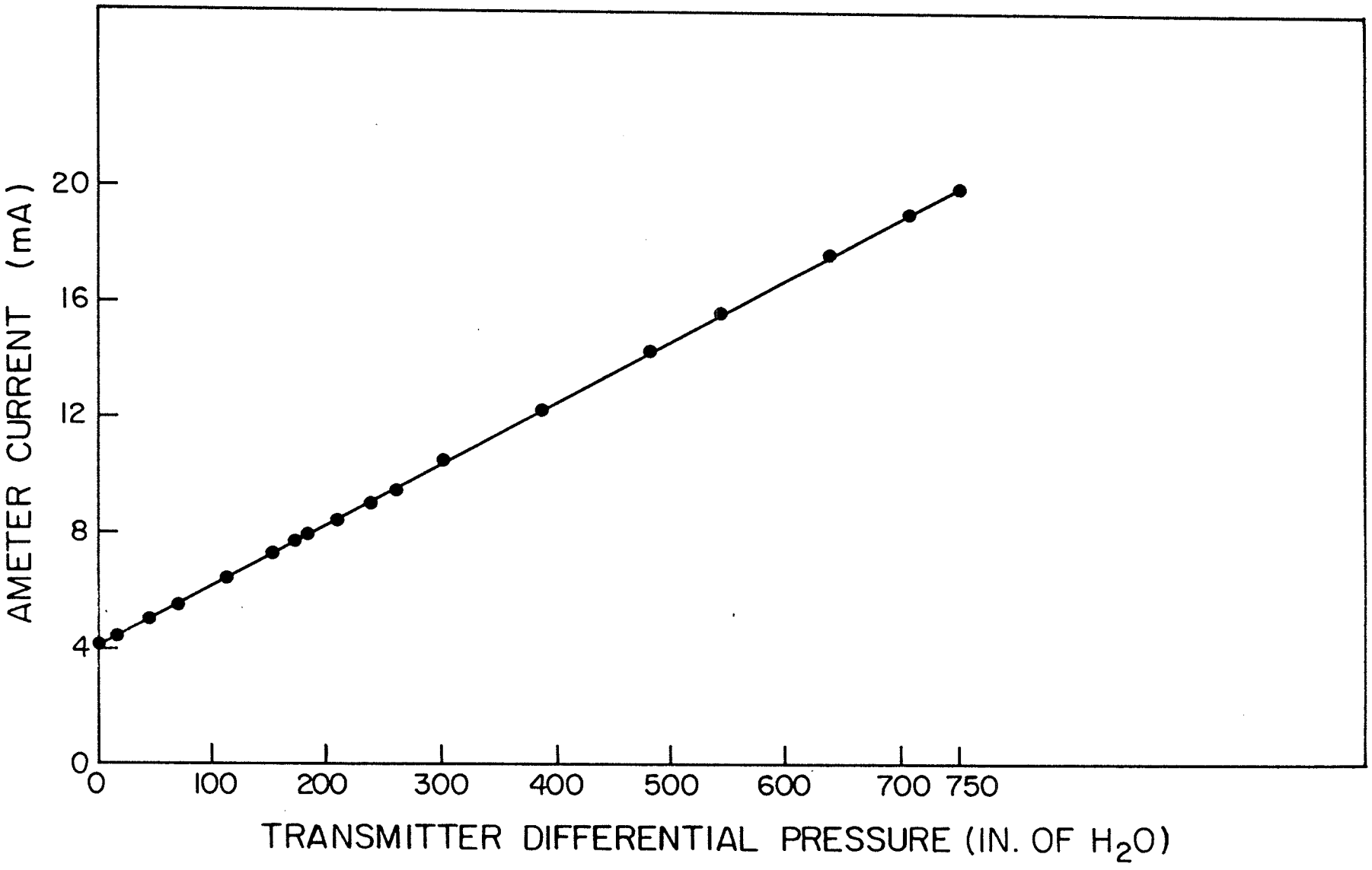

Fig. B.4 Calibration of Differential Pressure Transmitter No. 3 (0 to 750 in. H_2O Range)

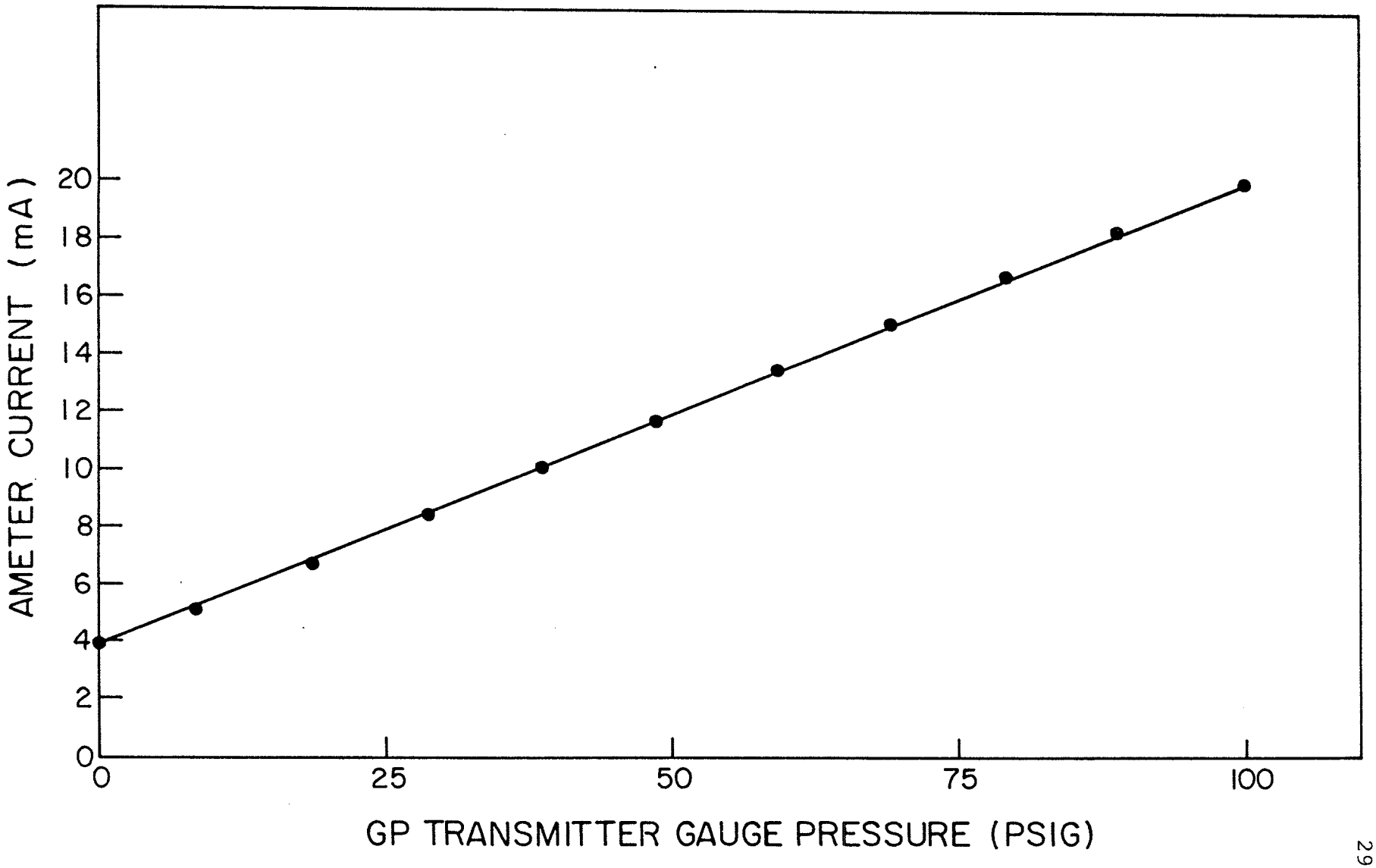

Fig. B. 5 Calibration of Gauge Pressure Transmitter (0 to 100 psig Range)

Appendix C

PHYSICAL PROPERTIES OF FLUIDS USED IN THE PRESENT INVESTIGATION

The physical properties necessary for the reduction of heat-transfer data presented in the thesis are summarized in this appendix. Since the reduction of the data was performed by computer, the physical properties were obtained from the equations describing them; these are given in Table C.1. The equations for water and air were taken from(C.1) and(C.2)respectively, while those for glycerine & water solution and silicone liquid were obtained directly from the manufacturer's information sheets or by applying the standard curve-fitting techniques to the tabulated data taken from the literature (Refs. C.3, C.4 with glycerine & water solution and Refs. C.5 to C.7 with silicone). Some properties, where possible, were measured in the laboratory to check against the tabulated values. These properties are the liquid viscosity and surface tension. Table C.1 lists the maximum deviations between the value obtained from the equation and the tabulated and/or the measured value of the property.

In obtaining the equations listed in the table, it was assumed that the pressure has no effect on viscosity, thermal conductivity, and specific heat.

Table C.1 Physical Properties of Fluids Used in the Present Investigation

Definitions and Units

ρ = Density (lb_m/ft^3)

C_p = Specific heat at constant pressure ($Btu/lb_m{}^oF$)

k = Thermal Conductivity ($Btu/hr.ft.{}^oF$)

T = Temperature ^oF

σ = Surface tension (lb_f/ft)

R = Gas constant = 53.34 ($ft.lb_f/lb_m.{}^oR$)

P = Pressure (lb_f/ft^2)

μ = Viscosity ($lb_m/ft.hr$)

Substance	Value of Equation for the Physical Property (T=temperature ^oF, except where noted)	Range of Validity	Max. Deviation and Remarks
Air	$\rho = P/RT$, T = absolute temperature (^oR)	Accurate in the range of pressures investigated	
	$C_p = 7.54 \times 10^{-6}T + 0.2401$	$-10 \leq T \leq 242$	0.2% between calculated & tabulated value

Substance	Value of Equation for the Physical Property (T=temperature ^{o}F, except where noted)	Range of Validity	Max. Deviation and Remarks
Air (cont.)	$k = -6.154 \times 10^{-9}T^2 + 2.591 \times 10^{-5} + 0.01313$	$-10 \leqslant T \leqslant 242$	0.1%
	$\mu = -2.673 \times 10^{-8}T^2 + 6.819 \times 10^{-5}T + 0.03936$	$-10 \leqslant T \leqslant 242$	0.1%
Water	$\rho = (2.101 \times 10^{-8}T^2 - 1.303 \times 10^{-6}T + 0.01602)^{-1}$	$32 \leqslant T \leqslant 212$	0.1%
	$C_p = 1.337 \times 10^{-6}T^2 - 3.374 \times 10^{-4}T + 1.018$	$32 \leqslant T \leqslant 212$	0.3%
	$k = 4.722 \times 10^{-4}T + 0.3149$	$32 \leqslant T \leqslant 176$	0.2%
	$\mu = (1.207 \times 10^{-5}T^2 + 3.863 \times 10^{-3}T + 0.09461)^{-1}$	$32 \leqslant T \leqslant 212$	0.65% between calculated & measured value
	$\sigma = 5.52288 \times 10^{-12}T^3 - 8.05936 \times 10^{-9}T^2$ $-4.75886 \times 10^{-6}T + 5.346 \times 10^{-3}$ against air	$68 \leqslant T \leqslant 150$	Taken from (C.2)
Mixture of 58% Glycerine and 42% Water by Weight	$\rho = 72.86 - 0.01838T$	$59 \leqslant T \leqslant 86$	0.1% between calculated & tabulated value
	$C_p = 0.71635 - 1.075 \times 10^{-4}T$	$77 \leqslant T \leqslant 108$	

Substance	Value of Equation for the Physical Property (T=temperature ^{o}F, except where noted)	Range of Validity	Max. Deviation and Remarks
Mixture of 58% Glycerine and 42% Water by Weight (cont.)	$k = 0.21324 + 1.432 \times 10^{-4}T$	$50 \leq T \leq 176$	0.68% between calculated & tabulated value
	$\mu = -6.9 \times 10^{-5}T^3 + 2.4969 \times 10^{-2}T^2 - 3.0565T + 137.5$ +1.6	$40 \leq T \leq 160$	2.1% between calculated & measured value
	$\sigma = -0.27 \times 10^{-5}T + 0.0045937$ (against air)	$40 \leq T \leq 160$	3.7% between calculated & measured value
Silicone Liquid "Dow Corning 200, 5CS"	Specific gravity = 0.92	@ $T=77^{o}F$	Spec. gravity was given by manufacturer. No information was given on the density change with temperature.
	$C_p = 0.3839 + 1.80178 \times 10^{-4}T$	$70 \leq T \leq 130$	Taken from (C.6)
	$k = 0.06773$	@ $T=77^{o}F$	No other information was given by the manufac.

Substance	Value of Equation for the Physical Property (T=temperature ^{o}F, except where noted)	Range of Validity	Max. Deviation and Remarks
Silicone Liquid "Dow Corning 200, 5CS" (cont.)	$\mu = -5.1 \times 10^{-6}T^{3} + 2.41 \times 10^{-3}T^{2} - 0.41076T + 31.18$	$40 \leq T \leq 200$	2.4% between calculated & measured value
	$\sigma = 4.59 \times 10^{-3} - 2.7 \times 10^{-6}T$ against air	@ $T=77^{o}F$	0.85% between calculated & measured value

Table C.2 summarizes the properties of the glycerine & water solution and the silicone liquid at room temperature (25°C). As mentioned earlier, the glycerine & water solution (58%-42% by weight) was chosen because it essentially has the same Prandtl number as that of the silicone liquid.

Table C.2

Summary of Physical Properties for the Glycerine & Water Solution and the Silicone Liquid

Properties at 77°F (25°C)	Glycerine&Water Sol. (58% - 42% by weight)	Silicone Liquid (Dow Corning 200, 5CS)
Boiling point °F (°C)	227(108) @ 760mm	>200(93) @ 0.5mm
Flash point (open cup test) °F (°C)	350(177)	272(133)
Density lb_m/ft^3 (gm/cm^3)	71.5(1.15)	57.3(0.92)
Viscosity $lb_f/ft.hr$ (CP)	19.9(8.22)	11.1(4.55)
Thermal conductivity Btu/hr.ft. °F (W/m.K)	0.38807 (0.2243)	0.1172 (0.0677)
Specific heat Btu/lb_m. °F (J/kg . K)	0.70807 (2964.5)	0.40065 (1677.4)
Surface tension lb_f/ft (Dynes/cm)	0.00459 (67.0)	0.00135 (19.7)
Prandtl number	63	63

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Appendix D

CALCULATION PROCEDURE

This appendix gives the definitions and procedure for obtaining the heat-transfer coefficients and the hydrodynamics quantities of interest in the present investigation. It should be noted that most of the material presented here was initially presented in (93).

Due to the length of this appendix, the section headings are listed below in order to facilitate access to any desired material.

D.11 Determination of Surface Tension

References for Appendix D

D.1 DEFINITION OF THE HEAT-TRANSFER COEFFICIENTS

The local heat-transfer coefficients were calculated from:

$$h(Z) = \frac{q''_W}{T_W - T_B} \qquad (D.1)$$

where q''_W, T_W and T_B are the heat flux, wall temperature, and the bulk fluid temperature at the location Z, from the start of the test section.

The mean heat-transfer coefficients were calculated from the local values by applying a length mean integration, as follows:

$$\bar{h} = \frac{1}{\Delta L} \int_{L_1}^{L_2} h(Z)\,dZ \qquad (D.2)$$

The local values of the heat-transfer coefficients were calculated from Eq. (D.1) at 16 horizontal planes along the test section, as shown in Fig. D.1. However, only the values at seven planes (denoted by circles) were used to calculate $\bar{h}$; this was done due to the following reasons:

1. Points 1 and 16 were close to the bus bars (which act like heat sinks) which were silver soldered to the test section. The local heat flux and the

thermocouple output were influenced by the presence of these materials in uncertain ways.

2. At points marked by crosses, there was only one thermocouple at each plane in contrast to the points denoted by circles where there were four thermocouples placed around the circumference on the same plane. Vijay (93) reported that the values of h around the tube at a certain plane varied by as much as 10%, which was attributed to the nonuniformity of the tube thickness [maximum deviation was measured by (93) and was found ~ 5.0%]. To be consistent, therefore, only the values at points denoted by circles were used to calculate the overall mean values. Equation D.2 was solved numerically on the computer by using the trapezoidal rule for integration.

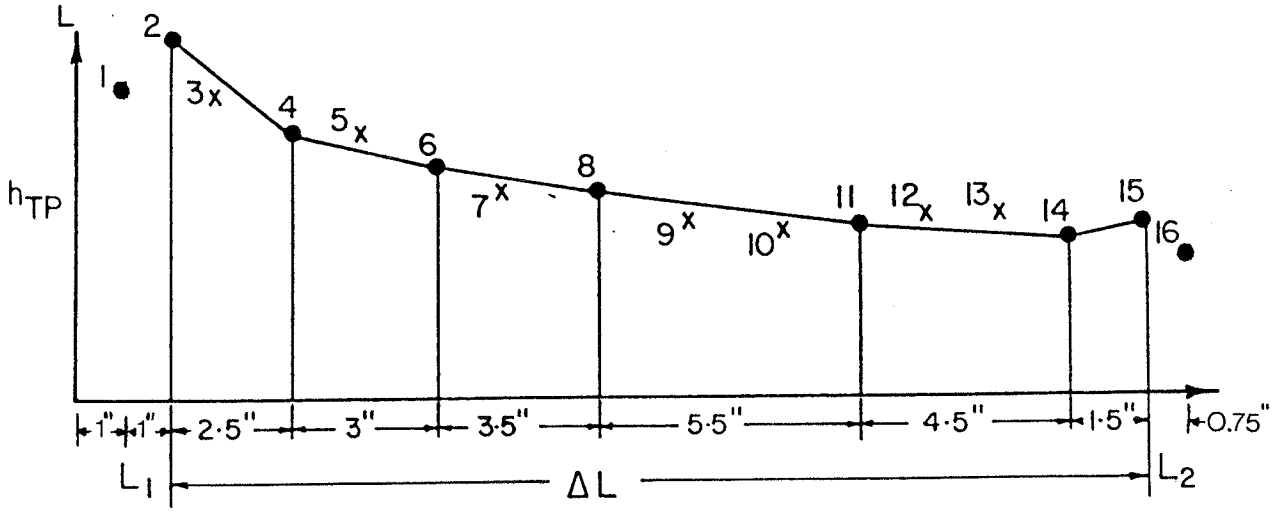


Fig. D.1 Local Heat-Transfer Planes

D.2 CALCULATION OF THE LOCAL HEAT-FLUX (q''_W)

The local heat flux at the wall at location Z along the test section was calculated from the knowledge of the local resistivity and the current flowing through the tube as follows:

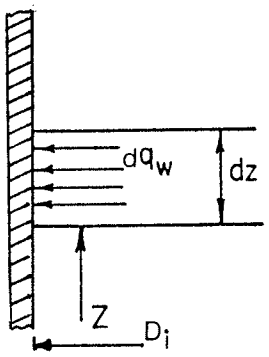


Fig. D.2 Heat Flux on the Tube

Consider the elemental length dZ of the tube at location Z. The heat generated in this elemental length is given by

$$dq_W = GI^2 dR_t \qquad (D.3)$$

where

dR_t is the resistance of the elemental length dZ of the tube and is given by

$$dR_t = \bar{\rho}' \frac{dZ}{A_c}$$

where

$\bar{\rho}'$ is the average resistivity of the tube at location Z,

A_c is the cross-sectional area of the tube-wall,

I is the electric current flowing through the tube,

G is the conversion factor = 3.413 Btu/watt.hr.

Therefore

$$q''_W = \frac{dq_W}{dA_s} = \frac{GI^2\bar{\rho}'dZ}{A_c(\pi D_i)dZ} \qquad (D.4)$$

where

$dA_s = \pi DdZ$, is the elemental surface area of the tube.

Hence

$$q''_W = \frac{GI^2\bar{\rho}'}{\pi D_i A_c} \qquad \text{Btu/hr.ft}^2 \qquad (D.5)$$

The thermal losses from the outside of the heated section are negligible due to the presence of guard heaters and insulation. Therefore Eq. (D.5) represents the net heat flux transferred to the fluid.

D.3 CALCULATION OF THE INNER WALL TEMPERATURE FROM THE MEASURED OUTER WALL TEMPERATURE

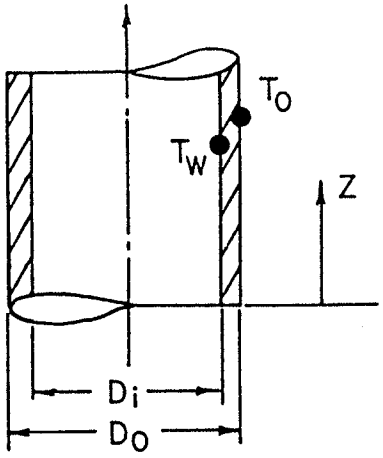


Fig D.3 Temperature Drop Across the Wall of the Tube

The local temperature T_W (Fig. D.3) at the fluid-wall interface (inner wall temperature) is required in order to obtain the local heat-transfer coefficients from Eq.(D.1). The outer wall temperature T_o was first measured, and the inner wall temperature was then calculated from the following:

$$T_W = T_o - \Delta T_W \tag{D.6}$$

where

ΔT_W is the temperature drop across the wall.

The method developed by Kreith and Summerfield (D.1) for the temperature distribution in an electrically heated resistor of tubular shape with the total energy dissipated to the fluid flowing inside was used in Ref.(93) to calculate ΔT_W; the same method was adopted here.

The expression for ΔT_W as given by the authors (D.1) is as follows:

$$\Delta T_W = B_0 t^2 + B_1 t^3 + (B_2 + B_3)\, t^4 \tag{D.7}$$

where

t is the wall thickness, given by $t = R_o - R_i$,

$B_1 = m/(1 + \beta' T_o)\,(1 + \alpha' T_o)$,

$B_2 = 2m/3D_o\,(1 + \beta' T_o)\,(1 + \alpha' T_o)$,

$B_3 = m^2(3\alpha' + 4\alpha'\beta' T_o + \beta')/6(1 + \beta' T_o)^3(1 + \alpha' T_o)^3$,

$B_4 = m/D_o^2(1 + \beta' T_o)\,(1 + \alpha' T_o)$,

D_o = is the outer diameter of the tube,

R_o = is the outer radius of the tube,

R_i = is the inner radius of the tube,

$$m = G\,(de/dZ)^2/2\rho'_o k'_o \qquad (D.8)$$

β' is the temperature coefficient of resistivity of the tube material, given by

$$\rho' = \rho_o(1 + \beta' T)$$

ρ' is the electrical resistivity of the tube material,

α' is the temperature coefficient of thermal conductivity of the tube material defined by

$$k_t = k'_o(1 + \alpha' T)$$

k_t is the thermal conductivity of the tube material,

(de/dZ) is the voltage gradient in the tube.

Equation (D.8) for m can be expressed in terms of the measured current I flowing through the tube as follows.

For the elemental length dZ, the voltage gradient can be obtained from

$$\frac{\partial e}{\partial Z} = -\rho' i = -\rho' \frac{I}{A_c}$$

Hence

$$m = \frac{G}{2\rho'_o k'_o}\,\rho'^2\,\left(\frac{I}{A_c}\right)^2 \qquad (D.9)$$

where

$$A_c = \frac{\pi}{4}(D_o^2 - D_i^2)$$

In calculating m from Eq.(D.9), ρ' was assumed to be constant within the wall at a particular location of interest and was evaluated at the mean temperature T_{AVG} of the wall at that particular location. Then ρ' was designated by $\overline{\rho'}$ and is given by

$$\rho' = \overline{\rho'} = \rho'_o \ (1 + \beta' \ T_{AVG}) \tag{D.10}$$

where

$$T_{AVG} = \frac{T_o + T_w}{2} \tag{D.11}$$

Therefore

$$m = \frac{G}{2\rho'_o k'_o} \ \overline{\rho'}^2 \ \left(\frac{I}{A_c}\right)^2 \tag{D.12}$$

The electrical resistivity of the tube was measured by Vijay (93) in the laboratory and the following equation was used to calculate ρ' (T in $^\circ$F)

$$\rho' = 0.216581 \times 10^{-5} \ (1 + 0.650408 \times 10^{-3} T) \quad \text{ohm.ft}$$

$$65 < T < 220 \ ^0F \tag{D.13}$$

The thermal conductivity of the tube material (type-304 stainless steel) was calculated from the equation reported by Bergles and Rohsenow (D.2) which agreed within ±2% with the data obtained from the manufacturer (93, page 302) in the temperature range of 75-150°F. The expression for k_t is given by (T in $^\circ$F)

$$k_t = 8.46 \ (1 + 5.26 \times 10^{-4} T) \quad \text{Btu/hr.ft.}^0F \tag{D.14}$$

As Eq. (D.7) now contains two unknowns, ΔT_W and implicitly T_W, the iteration method given below was used for ΔT_W.

1. To start with, T_W was assumed to be equal to T_o,
2. $\overline{\rho'}$ and m were calculated from Eqs. (D.10) and (D.12) respectively,
3. ΔT_W was calculated from Eq. (D.7) and then T_W from Eq. (D.6),
4. This new value of T_W was then used to obtain a new value for T_{AVG} and the above steps were repeated until two successive values of ΔT_W agreed within ±0.0005°F.

D.4 CALCULATION OF THE MIXTURE INLET TEMPERATURE (T_{IN})

A general equation for the mixture inlet temperature T_{IN} was derived by Vijay (93) for the glycerine & water solution-air systems by performing a conservation of mass and energy on the control volume indicated by dashed lines in Fig. (D.4). This equation was used here to obtain expressions pertaining to the present water-air, glycerine & water (58%-42%)-air and silicone-air systems. The general equation is:

$$T_{IN} = \frac{\frac{\dot{m}_{L1}}{\dot{m}_{a2}} C_{PL} T_{L1} + C_{PG} T_{G2} + (w_3^{H_2O} - w_2^{H_2O}) h_{L3} + w_2^{H_2O} h_{v2}^{H_2O}}{\frac{\dot{m}_{L1}}{\dot{m}_{a2}} C_{PL} + C_{PG}}$$

$$\frac{- w_3^{H_2O} h_{v3}^{H_2O} - w_3^{GL} (h_{v3}^{GL} - h_{L3})}{\frac{\dot{m}_{L1}}{\dot{m}_{a2}} C_{PL} + C_{PG}} \qquad (D.15)$$

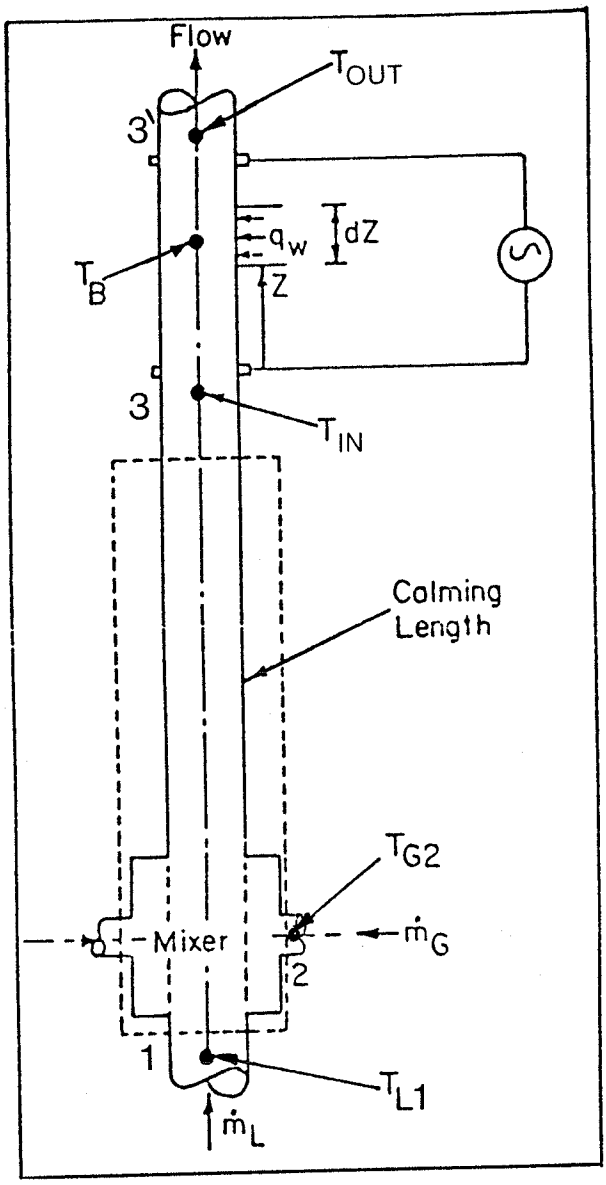


Fig. D.4 Heat Balance Control Volume, From Ref.(107)

where

$\dot{m}_{L1}$ is the liquid flow rate at the inlet to the mixer,

$\dot{m}_{a2}$ is the flow rate of dry air= $\dot{m}_{a3}$,

T_{L1} is the liquid-phase temperature at the inlet to the mixer,

T_{G2} is the gas-phase temperature at the inlet to the mixer,

C_{PL}, are the specific heats at constant pressure for

C_{PG} the liquid and gas, respectively,

h is the specific enthalpy per unit mass of fluid,

w is the mass of liquid vapour per unit mass of dry air

The superscripts H_2O and GL refer to water and glycerine, respectively, while the subscript v refer to vapour (of the fluid indicated by the superscript).

In Eq. (D.15) T_{L1}, T_{G2}, $\dot{m}_{L1}$ and $\dot{m}_{a2}$ are known from measurements; C_{PL}, C_{PG} and h_{L3} can be found from property equations or thermodynamics tables. By definition (D.3),

$$w_2 = R_M \phi_2 P_{v2}/P_{Dg2} \qquad (D.16)$$

$$w_3 = R_M \phi_3 P_{v3}/P_{Dg3} \qquad (D.17)$$

where

R_M is the ratio of the molecular weight of the liquid to that of dry gas,

ϕ is the relative humidity,

P_{v2} is the saturation pressure of liquid vapour in the

gas at the temperature T_{G2},

P_{Dg2} is the partial pressure of dry gas in the gas-liquid vapour mixture=$P_{G2}-P_{v2}$,

P_{G2} is the total pressure of gas-liquid vapour mixture,

P_{v3} is the saturation pressure of the liquid vapour at T_{IN} ,

P_{Dg3} is the partial pressure of dry gas = $P_{IN}-P_{v3}$,and

P_{IN} is the total pressure measured at the test section inlet.

It can be seen that among all the quantities described above, only P_{v3} is a function of T_{IN}. Therefore, Eq.(D.15) has two unknowns i.e. T_{IN} and $w_3(T_{IN})$ and it was solved by an iterative procedure on the computer.

Equation (D.15) can be simplified for the liquid-gas mixtures used in the present study as follows.

(I) WATER-AIR

$$T_{IN}=\frac{\frac{\dot{m}_{L1}}{\dot{m}_{a2}} C_{PL}T_L + C_{PG}T_{G1} - w_3 h_{fg3} + w_2(H_{v2} - h_{L3})}{C_{PG} + \frac{\dot{m}_{L1}}{\dot{m}_{a2}} C_{PL}} \qquad (D.18)$$

where:

$h_{fg3}= h_{v3}- h_{L3}= h_{g3}- h_{f3}$(because at section 3 the mixture is saturated by assumption)

$w_2=0.622\phi_2 P_{g2}/P_{a2}$, $w_3=0.622\ P_{g3}/P_{a3}$ where

ϕ_2 = relative humidity of air, which was taken equal to 1, Calculations are given in (107)

P_{g2} = saturation pressure of water vapour in air at temperature T_{G2} [obtained from thermodynamics tables, Ref. (D.3)]

P_{a2} = partial pressure of dry air = $P_{G2} - P_{g2}$

$P_{a3} = P_{IN} - P_{g3}$

(II) GLYCERINE & WATER (58% - 42%) - AIR:

The vapour pressure of water in contact with glycerine at a fixed temperature decreases as the glycerine percentage (by weight) increases in the solution, values are given in a tabulated form in Ref.(D.4). From a plot of these values, it can be shown that w_3 (for the 58% glycerine solution) $=0.773\ w_3$ (for 100% water). Also, from the same plot, w_3^{GL} (for pure glycerine) is a very small quantity (almost zero) because the partial pressure of glycerine is very low compared to that of water.

Inserting these quantities of $w_3^{H_2O}$ and w_3^{GL} in Eq.(D.15) yields:

$$T_{IN} = \frac{\frac{\dot{m}_{L1}}{\dot{m}_{a2}} C_{PL} T_L + C_{PG} T_{G1} - 0.773\ w_3^{H_2O} h_{fg3} + w_2 (h_{v2}^{H_2O} - h_{L3})}{C_{PG} + \frac{\dot{m}_{L1}}{\dot{m}_{a2}} C_{PL}} \qquad (D.19)$$

(III) SILICONE-AIR:

In this case, $w_3^{H_2O} = w_2^{H_2O}$ and it is also assumed that

$h_{v2}^{H_2O} \approx h_{v3}^{H_2O}$. Also the partial pressure of the silicone liquid is very low for the range of temperature involved in the present study (less than 5 mm Hg). It is assumed, therefore, that there is no flashing from the silicone into vapour in the mixer. Hence, the equation for T_{IN} reduces to:

$$T_{IN} = \frac{\frac{\dot{m}_{L1}}{\dot{m}_{a2}} C_{PL} T_L + C_{PG} T_{G1}}{C_{PG} + \frac{\dot{m}_{L1}}{\dot{m}_{a2}} C_{PL}} \qquad (D.20)$$

D.5 CALCULATION OF THE LOCAL BULK TEMPERATURE (T_B)

In deriving the equations for T_B, it is assumed that the gas-liquid mixture enters the test section fully saturated, that is, the saturation process is complete in the calming length. Calculations and experiments done by Sims (D.5) show that this assumption is valid.

There are two cases under consideration here. The first is at very low liquid flow rates (V_{SL}<0.400 ft/s or 0.122 m/s) and medium-to-high gas flow rates (V_{SG}>30.0 ft/s or 9.14 m/s). For these cases of high gas-to-liquid flow rate ratios and large temperature rise along the heated test section, the saturation vapour content of the gas phase changes considerably along the heated length. Hence, part of the

liquid-phase evaporates rendering the gas-liquid mixture saturated again.

The second case, at higher liquid flow rates, where the temperature rise along the test section is much smaller than that for the first case, there is essentially no evaporation in the heated test section.

The first case involves the lowest water-air liquid velocity (V_{SL}= 0.185 ft/s or 0.056 m/s) and the lowest three liquid velocities for glycerine & water-air. No evaporation takes place with the silicone liquid due to its very small vapour pressure at the operating temperature range. In total, the data points associated with the first case represent 17.1% of the present data.

In the following sections, the methods of calculating T_B in both cases are discussed. The criterion of using which method is presented later.

D.5.1 Calculation of T_B for the Case When Evaporation Takes Place in the Test Section

For this case, the mixture temperature at the outlet of the heated test section T_{OUT} is first calculated from the relations given below. Then, from the calculated inlet and outlet temperatures of the mixture (T_{IN} and T_{OUT}), local values of T_B were obtained by assuming a linear temperature rise along the test section.

The equations for the mixture outlet temperature T_{OUT} can be obtained in a manner similar to that used for T_{IN} (given in the previous section). In this case, the control volume surrounds the system from the point the liquid and gas enter the mixer [points 1 and 2 in Fig.(D.4)] until the point where the mixture leaves the heated test section (point 3'). A term which involves the heat flux at the wall will then appear in the equations for T_{OUT} (q''_w is the average of the local values of the heat flux). These equations are:

(I) Water-Air:

$$T_{OUT} = \frac{\frac{q''_w A_s}{\dot{m}_{a2}} + \frac{\dot{m}_{L1}}{\dot{m}_{a2}} C_{PL} T_L + C_{PG} T_{G1} - w_{3'} h_{fg3'} + w_2 (H_{v2} - h_{L3'})}{C_{PG} + \frac{\dot{m}_{L1}}{\dot{m}_{a2}} C_{PL}} \qquad (D.21)$$

(II) Glycerine & Water(58%-42%)-Air:

$$T_{OUT} = \frac{\frac{q''_w A_s}{\dot{m}_{a2}} + \frac{\dot{m}_{L1}}{\dot{m}_{a2}} C_{PL} T_L + C_{PG} T_{G1} - 0.773\, w_{3'}^{H_2O} h_{fg3'} + w_2 (h_{v2}^{H_2O} - h_{L3'})}{C_{PG} + \frac{\dot{m}_{L1}}{\dot{m}_{a2}} C_{PL}} \qquad (D.22)$$

(III) Silicone-Air:

$$T_{OUT} = \frac{\frac{q''_w A_s}{\dot{m}_{a2}} + \frac{\dot{m}_{L1}}{\dot{m}_{a2}} C_{PL} T_L + C_{PG} T_{G1}}{C_{PG} + \frac{\dot{m}_{L1}}{\dot{m}_{a2}} C_{PL}} \qquad (D.23)$$

(This equation was not used in the calculations because of of the very small vapour pressure of the silicone liquid.)

D.5.2 Calculation of T_B with No Evaporation in the Test Section

Consider the elemental volume of the heated tube, having a surface area of dA (Fig. D.2). Let the temperature rise of the mixture in this length be dT . The amount of heat transferred to the fluid in this section is given by

$$dq''_f = q''_W \, dA_s$$

where

$$dA_s = \pi D dZ = p dZ$$

(d, p are the inside diameter and perimeter, respectively)

Applying the principal of conservation of energy on this elemental volume, and assuming the steady state conditions, the following expression is obtained.

$$q''_W (p dZ) = \dot{m}_L C_{PL} dT_B + \dot{m}_G C_{PG} dT_B$$

Hence

$$dT_B = \frac{q''_W \, p dZ}{\dot{m}_L C_{PL} + \dot{m}_G C_{PG}} \qquad (D.24)$$

Equation (D.24) was integrated step-by-step and it was assumed that the specific heats and the wall heat flux remained constant in the interval between two successive locations. Integrating Eq. (D.24) between Z_i and Z_{i+1} gives

$$\int_{Z_i}^{Z_{i+1}} dT_B = \frac{p \, q''_W}{\dot{m}_L C_{PL} + \dot{m}_G C_{PG}} \int_{Z_i}^{Z_{i+1}} dZ$$

Therefore

$$(T_B)_i = (T_B)_{i-1} + \frac{pq''_W}{\dot{m}_L C_{PL} + \dot{m}_G C_{PG}} (Z_i - Z_{i-1}) \qquad (D.25)$$

To obtain T_B at successive locations along the test section by Eq. (D.25), an initial value of T_B is required. The mixture inlet temperature T_{IN}, calculated from Eqs.(D.18, D.19 or D.20), was used as the initial value in Eq.(D.25).

The criterion for using the first method to obtain T_B depended on a test of the heat balance in the test section. The calculated outlet temperature was compared with the measured value (mean of two thermocouple readings at the test section outlet). A difference of 1^0F (0.55^0C) or 10% between the two values was taken as the criterion for the first method to be used.

D.6 SUMMARY OF THE CALCULATION PROCEDURE FOR THE HEAT-TRANSFER COEFFICIENTS

In connection with the calculation of the heat-transfer coefficients, the following quantities were measured: I (electric current flowing through the tube); T_o (outer wall temperature at 16 planes), only the values at the seven planes mentioned earlier were used; T_L (liquid temperature at inlet to the mixer); T_{G2} (gas temperature at the mixer

inlet); $\dot{m}_{L1}$ and $\dot{m}_{G2}$ (liquid and gas flow rates respectively); and P_{IN} (pressure at inlet to the test section).

The calculation procedure was as follows:

1. The local values of the heat flux (q''_W) were calculated first from Eq.(D.5),
2. The local values of the inner wall temperature (T_W) were calculated from Eq. (D.7), as explained in Section D.3,
3. The mixture inlet temperature was calculated from Eqs. (D.18) to (D.20), depending on the liquid-gas mixture,
4. The local values of the bulk temperature (T_B) were then calculated using one of the two methods described in Sec. D.5, and
5. Finally, the local and mean heat-transfer coefficients were calculated using Eqs. (D.1) and (D.2).

D.7 CALCULATION OF THE FRICTIONAL PRESSURE DROP

The frictional pressure drop was estimated from the measured total pressure drop across the test section. The latter was measured using three differential pressure transmitters which covered wide ranges of readings (-25 to +5, 0 to 100, and 0 to 750 in. of water). The gauge

pressure at the inlet of the heated test section was measured by a gauge pressure transmitter (range 0 - 100 psig). The equations for calculating the frictional pressure drop from the measured total pressure drop are as follows:

The total pressure drop includes three terms, mainly given by

$$\Delta P(\text{total}) = P_{IN} - P_{OUT} = \Delta P_H + \Delta P_A + \Delta P_F \qquad (D.26)$$

where

ΔP_H , ΔP_A and ΔP_F are the hydraulic, accelerational, and frictional pressure drops.

The hydraulic pressure gradient is simply the head of liquid in the test section, and is given by

$$\Delta P_G = \frac{g}{g_c} L\rho \qquad (D.27)$$

where $\rho = \rho_L$ and ρ_{MIX} for single-phase and two-phase flow, respectively.

The mixture density is calculated from

$$\rho_{MIX} = (1-\alpha)\rho_L + \alpha\rho_G \qquad (D.28)$$

where α is the void fraction.

The accelerational pressure drop is negligible (93) in this case. Therefore (D.26) reduces to:

$$\Delta P(\text{total}) = \Delta P_H + \Delta P_F$$

$$\text{or} \quad \Delta P_F = \Delta P(\text{total}) - \Delta P_H$$

D.8 CALCULATION OF THE MEAN PRESSURE AND TEMPERATURE IN THE TEST SECTION

The mean pressure in the test section was calculated from:

$$P_{MIX} = P_{IN} - \Delta P \text{ (total)}/2 \qquad (D.29)$$

The average mixture temperature was evaluated from the following equation:

$$T_{MIX} = (T_{IN} + T_{OUT})/2 \qquad (D.30)$$

where T_{IN} and T_{OUT} are the bulk temperatures at the inlet and outlet of the test section, respectively. (T_{OUT} is the calculated outlet temperature.)

D.9 CALCULATION OF VOID FRACTION

A knowledge of void fraction was required in order to calculate the frictional pressure drop (as shown in Section D.7) and also to use in the comparisons with the correlations of (15,24,46,90) where it appears as a dependent variable.

Vijay (93) conducted an extensive study and comparisons with available correlations in the literature [Ref.(D.6)] and found that the correlation by Chisholm(14) was the most appropriate to the experimental setup. The application of Eq. (D.35), introduced below ,to correlate the mean heat-transfer data was found (93) to be very successful.

The calculation of the void fraction using the correlation of Chisholm(14) follows the following procedure:

The ratio of the mean velocities of the two-phases, usually termed as slip ratio is given by

$$S = V_G / V_L \tag{D.31}$$

In the paper (14), the author showed that S can be approximated by

$$S \approx (\rho_L / \rho_{MIX})^{\frac{1}{2}} \tag{D.32}$$

where

$$\frac{1}{\rho_{MIX}} = \frac{1-x}{\rho_L} + \frac{x}{\rho_G} \tag{D.33}$$

and

x, the flow quality is given by

$$x = \dot{m}_G / (\dot{m}_L + \dot{m}_G) \tag{D.34}$$

From the definition of flow quality and void fraction it can be shown that

$$R_L = 1-\alpha = \frac{S(1-x)/\rho_L}{(x/\rho_G) + S(1-x)\rho_L} \tag{D.35}$$

where

R_L is the liquid volume fraction

Since x, ρ_G and ρ_L were known, ρ_{MIX} and S were calculated from the Eqs. (D.33) and (D.32) respectively, and the void fraction was then determined from Eq. (D.35).

D.10 CALCULATION OF THE LIQUID AND GAS FLOW RATES AND SUPERFICIAL VELOCITIES

D.10.1 Liquid Flow Rate and Superficial Velocity

i. Flow Rate ($\dot{m}_L$)

The liquid flow rates were measured by means of three rotameters which were calibrated *in situ* in the laboratory. The flow rate of water was determined by the appropriate equation below:

-For meter number 1 (high flow range)

$$\dot{m}_L = 0.274286 + 179.914\ Rm \qquad (D.36)$$

-For meter number 2 (medium flow range)

$$\dot{m}_L = 4.14875 + 17.560\ Rm \qquad (D.37)$$

-For meter number 3 (low flow range)

$$\dot{m}_L = 1.05622 + 1.565\ Rm \qquad (D.38)$$

(Rm is the percentage of the meter reading)

For other liquids than water, correction factors were obtained from the calibration curves given in Fig. B.1

ii. Superficial Velocity (V_{SL})

By definition, the superficial liquid velocity was calculated from the following equation:

$$V_{SL} = \dot{m}_L / \rho_L A_T \qquad (D.39)$$

where $A_T = (\pi/4)D^2$ is the cross-sectional area of the tube.

D.10.2 Gas Flow Rates and Superficial Velocity

i. Flow Rate ($\dot{m}_G$)

The air flow rate was measured by means of three orifice plates and a rotameter. The following equations were used to determine the air flow rate (93).

The mass flow rate from the rotameter, which was used for the lowest flow rates, was calculated from the following equation

$$\dot{m}_G = 0.27364\ (\rho_{G1})^{\frac{1}{2}}\ Q_o \qquad (D.40)$$

where

ρ_{G1} is the gas density at the rotameter inlet,

Q_o is the volumetric flow rate (ft^3/hr) at standard conditions and was obtained from the calibration curve (93) and is given by

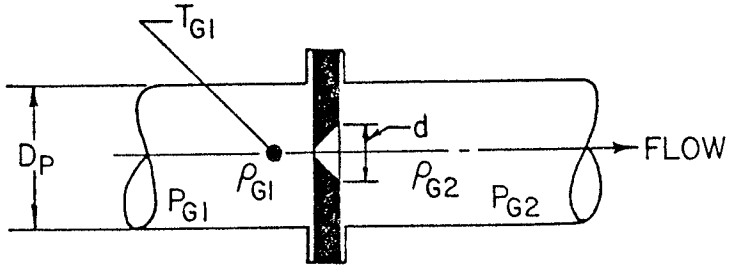
$$Q_o = -0.1825 + 0.0813\ R_G \qquad (D.41)$$

where

R_G is the meter reading.

The mass flow rate through the orifice plates was calculated from the following equation

$$\dot{m}_G = 359.052\ d^2\ F\ Y\ C\ F_a\ (\rho_{G1} h_w)^{\frac{1}{2}} \qquad (D.42)$$



where

d is the orifice throat diameter,

F $= (1 - \beta^4)^{-\frac{1}{2}}$ is the velocity of approach factor

where $\beta = d/D_p$ = throat diameter/pipe diameter

Y is the expansion factor, given by

$$Y = 1 - (0.41 + 0.35\beta^4) \frac{\Delta P_{OR}}{kP_{G1}} \qquad (D.43)$$

F_a is the thermal expansion factor ≈ 1.0 in the temperature range involved in the experiments,

h_w is the pressure drop across the orifice plate (in. of H_2O),

k is the ratio of specific heats = 1.4 for air,

ΔP_{OR} is the pressure drop across the orifice plate, $= P_{G1} - P_{G2}$,

C is the coefficient of discharge which was determined (93) from

Orifice Plate No.	Throat Diameter (inches)	C
1	0.418	$0.687 \exp(-3.83 \times 10^{-7} Re_d^*)$
2	0.141	$0.689 \exp(-9.45 \times 10^{-7} Re_d)$
3	0.048	$0.732 \exp(-3.06 \times 10^{-6} Re_d)$

* Re_d is the Reynolds number based on the throat diameter

i.e. $\dfrac{4\dot{m}_G}{\pi d \mu_G}$

The following procedure was employed to calculate $\dot{m}_G$.

1. Assuming an ideal gas, ρ_{Gl} was calculated from the measured values of P_{Gl} and T_{Gl}

$$\rho_{Gl} = P_{Gl}/RT_{Gl}$$

R is the characteristic gas constant.

2. Y was calculated from Eq. (D.43) where ΔP_{OR} was calculated with the knowledge of h_w from this relation

$$\Delta P_{OR} = \frac{g}{g_c} \frac{\rho_w}{1728} h_w (psi) \qquad (D.44)$$

3. An arbitrary value for C was chosen (0.6 to start with) and $\dot{m}_G$ was determined from Eq. (D.42), then Re_d was evaluated and a new value for C was obtained.
4. Based on this new value of C, a new $\dot{m}_G$ was determined.
5. The procedure was repeated until two successive values of $\dot{m}_G$ agreed within ±0.1%.

ii. Superficial Velocity (V_{SG})

The superficial velocity of gas was determined by the following equation.

$$V_{SG} = \dot{m}_G/\rho_G A_T \qquad (D.45)$$

The gas-phase density changes along the length of the heated test section due to changes in the temperature and pressure. Therefore, a mean value was calculated from the following relation

$$V_{SG} = \frac{V_{SG}(\text{inlet}) + V_{SG}(\text{outlet})}{2} \qquad (D.46)$$

For the case of evaporation in the test section, described earlier in Sec. D.5, V_{SG} was corrected to include the liquid vapour content in the gas phase.

D.11 DETERMINATION OF SURFACE TENSION

The measurements of static surface tension made by the surface tension analyzer indicate the apparent surface tension. These readings were corrected for absolute surface tension by the following relationship.

$$\sigma_{abs} = F \times \sigma_{app} \qquad (D.47)$$

where

σ_{abs} is the absolute surface tension

σ_{app} is the apparent surface tension

F is the correction factor as mentioned in (D.7) and given by

$$F = 0.725 + \left(\frac{0.01452\ \sigma_{app}}{C^2(\rho_{LP} - \rho_{VP})} + 0.04534 - 1.679\ \frac{r}{R}\right)^{\frac{1}{2}} \qquad (D.48)$$

where

R is the radius of the ring (cm)

r is the radius of the wire of the ring (cm)

ρ_{LP} is the density of the lower phase in the measuring vessel (gm/cm^3)

ρ_{UP} is the density of the upper phase in the measuring vessel (gm/cm^3)

C is the circumference of the ring (cm).

For the ring used in the present work,

$C = 6.0$ cm

$R/r = 53.7489$

REFERENCES FOR APPENDIX D

D.1 Kreith, F. and Summerfield, M., "Investigation of Heat Transfer at High Heat-Flux Densities: Experimental Study with Water of Friction Drop and Forced Convection With and Without Surface Boiling in Tubes," Prog. Report No. 4-68, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California, April, 1948.

D.2 Bergles, A.E., and Rohsenow, W.M.,"Forced Convection Surface Boiling Heat Transfer and Burnout in Tubes of Small Diameter", Technical Report No. 8767-21, MIT, 1962.

D.3 VanWylen, G.J. and Sonntag, R.E.,"Fundamentals of Thermodynamics", 3 rd edition, John Wiley & Sons, 1985.

D.4 Anon, "Physical Properties of Glycerine and Its Solutions," Glycerine Producers Association, 295 Madison Ave., New York, N.Y., U.S.A.

D.5 Sims, G.E., "Forced Convection Heat Transfer to Water with Air Injection Through One Porous Heated Wall of a Rectangular Duct," Ph.D. Thesis, Imperial College of Science and Technology, University of London, London, U.K., p. 239, 1969.

D.6 Butterworth, D., "A Comparison of Some Void-Fraction Relationships for Co-Current Gas-Liquid Flow," Int. J. Multiphase Flow, Vol. 1, pp. 845-850, 1975.

D.7 Zuidema, H.H. and Walters, G.W., "Ring Method for Determination of Interfacial Tension," Ind. Eng. Chem., Vol. 13, No. 3, pp. 312-313, 1941.

Appendix E

ERROR ANALYSIS AND REPEATABILITY

E.1 ERROR ANALYSIS

The main quantities measured during the present investigation, as discussed earlier in Chapter 4, were the power to the test section and guard heaters, the wall temperatures at sixteen levels along the test section length, the guard heater temperatures at nine levels along the guard heater tube, the liquid and gas flow rates and the total pressure drop across the test section. Using these measured independent variables, dependent variables (eg. V_{SL}, V_{SG}, Re_{SL}, Re_{SG}, ΔT_W, h, ΔP_{TPF}, etc.) were calculated.

The accuracy of the measured quantities and of the calculated dependent variables was estimated according to the method of Kline and McClintock (E.1). In this method, if R (the calculated result) is a function of independent measured variables v_1, v_2..... v_n, each of which is normally distributed, then the relation between the uncertainty[5] interval ω_i for the variables, and the uncertainty interval ω_R for the result is:

[5] The authors (E.1) used this term to mean the possible value the "error" might have. In the present appendix and throughout this thesis, the terms "error" and "uncertainty" are used synonymously.

$$\omega_R = \left\{ \left(\frac{\partial R}{\partial v_1}\omega_1\right)^2 + \left(\frac{\partial R}{\partial v_2}\omega_2\right)^2 + \ldots\ldots + \left(\frac{\partial R}{\partial v_n}\omega_n\right)^2 \right\}^{\frac{1}{2}} \qquad (E.1)$$

or

$$\frac{\omega_R}{R} = \left\{ \left\{ \omega_1 \frac{\partial}{\partial v_1}(\ln R) \right\}^2 + \left\{ \omega_2 \frac{\partial}{\partial v_2}(\ln R) \right\}^2 + \ldots\ldots + \left\{ \omega_n \frac{\partial}{\partial v_n}(\ln R) \right\}^2 \right\}^{\frac{1}{2}} \qquad (E.2)$$

The uncertainty intervals ω_i are known or estimated, based on certain "odds" that the experimenter is willing to wager that any given reading lies within $\pm \omega_i$ of the true value. The estimated errors in the main measured variables are summarized in Table E.1. Table E.2 gives the uncertainties in the variables affecting the mean heat-transfer coefficient. Definitions of variables are given in the Nomenclature.

Table E.1

Summary of Estimated Uncertainties in the Main Measured Variables

Variable	Uncertainties (±)
Local heat-transfer coefficient (h)	6.8 - 21.0%
Mean heat-transfer coefficient ($\bar{h}$)	6.9 - 21.1%
Liquid superficial velocity (V_{SL})	5.8 - 7.3%
Gas superficial velocity (V_{SG})	3.8 - 7.5%
Total pressure drop across the test section heated length (ΔP)	0.5 - 5.0%

Table E.2

Uncertainties in the Variables Affecting the Mean Heat-Transfer Coefficient

Variable v_i	Uncertainty interval based on approximately 20 to 1 odds ω_i or ω_i/v_i (±)	Comments
D_o	0.2%	Measured by (93)
D	0.5%	Eq.(E.1) applied to: $D=D_o-2t$
A_c	5.5%	Eq.(E.1) applied to: $A_c=\frac{\pi}{4}(D_o^2 - D^2)$
A_s	0.5%	Eq.(E.1) applied to: $A_s=\frac{\pi}{4} D^2$
t	5.0%	Measured by (93)
L	0.1%	Measured by (93)
Z	0.2-1%	Measured by (93)
I	0.6-10.0%	For the range of readings taken during the study. The largest errors were associated with the readings in the range of 0.1-0.2 amp. (only three data points were taken in this range). The majority of the data were taken in the range 0.4-1.0 amp. where the error averaged ± 1.5%.
T_o	0.2^0F	Thermocouples were calibrated by Vijay (93), potentials were read on a data logger which has an accuracy of ± 5μV.
ΔT_W	0.3^0F	Eq.(E.1) applied to the following equation, used by Heineman, Ref.(E.2): $\Delta T_W = \frac{q''_W}{2k_t}\left\{\frac{D_o^2}{4}\ln\frac{D_o}{D} - \left(\frac{D_o^2 - D^2}{8}\right)\right\}$. Eq.(D.7) was very complicated to use. Errors in q''_W and k_t were estimated by applying Eq.(E.1) to Eqs.(D.5) and (D.14), respectively.

Table E.2 (Cont'd)

Variable v_i	Uncertainty interval based on approximately 20 to 1 odds ω_i or ω_i/v_i (±)	Comments
T_{IN}	0.2-0.8 ^{0}F	Eq.(E.1) applied to Eq.(D.15)
T_B	0.1-1.3 ^{0}F	Eq.(E.1) applied to Eq.(D.25)
q''_W	1.2-20.0%	Eq.(E.2) applied to Eq.(D.5). The large errors resulted from the ammeter readings in the range below 0.2 amps. This was the case with the lowest two liquid velocities for the silicone-air system (only three data points). For the majority of the data, the error in q''_W averaged ± 2.5%.
h	6.8-21.0%	Eq.(E.2) applied to Eq.(D.1). The smallest uncertainties occur with the large heat-transfer coefficient, where the uncertainties in q''_W were minimum. The large errors occurred with the maximum error in q''_W (three data points). For most of the data, the error averaged ± 7.2%
$\bar{h}$	6.9-21.1%	Eq.(E.2) applied to Eq.(D.2). Errors in Z are very small, as shown earlier.

E.2 REPEATABILITY OF THE RESULTS

Water-air repeatability tests were performed during and at the end of the present investigation, mainly to ensure the continuous satisfactory performance of the experimental facility. As shown in Figs. E.1 and E.2, heat-transfer and pressure-drop repeatability results were taken at V_{SL} = 10.4 ft/s (3.18 m/s). The overall algebraic and r.m.s. deviations between the base data and the repeated data were -4.9% and 6.6% (with $\bar{h}_{TP}$) and -2.6% and 6.2% (with ΔP_{TPF}), respectively. Repeated data were also taken at V_{SL} = 34.7 ft/s (10.6 m/s); the r.m.s. deviation (with $\bar{h}_{TP}$) was 5.6% in this case.

The repeatability tests for the glycerine & water-air data were done at superficial liquid velocities V_{SL} = 18.1 & 24.2 ft/s (5.52 & 7.38 m/s). The results of these tests are given in Figs. E.3 and E.4. The overall algebraic and r.m.s. deviations were 1.5% and 8.3% (with $\bar{h}_{TP}$) and 1.4% and 7.5% (with ΔP_{TPF}).

With the silicone-air system, a total of 12 velocities were taken originally with a range of V_{SL} from 0.074 ft/s (0.022 m/s) to 30.2 ft/s (9.20 m/s). Two repeatability heat-transfer tests were performed at V_{SL} = 0.910 ft/s (0.277 m/s) and 16.6 ft/s (5.07 m/s). The first V_{SL} was of special interest as it fell in the range of the liquid superficial velocities during which the new trend of $\bar{h}_{TP}$ against V_{SG} was observed (as discussed earlier in Chapter 7).

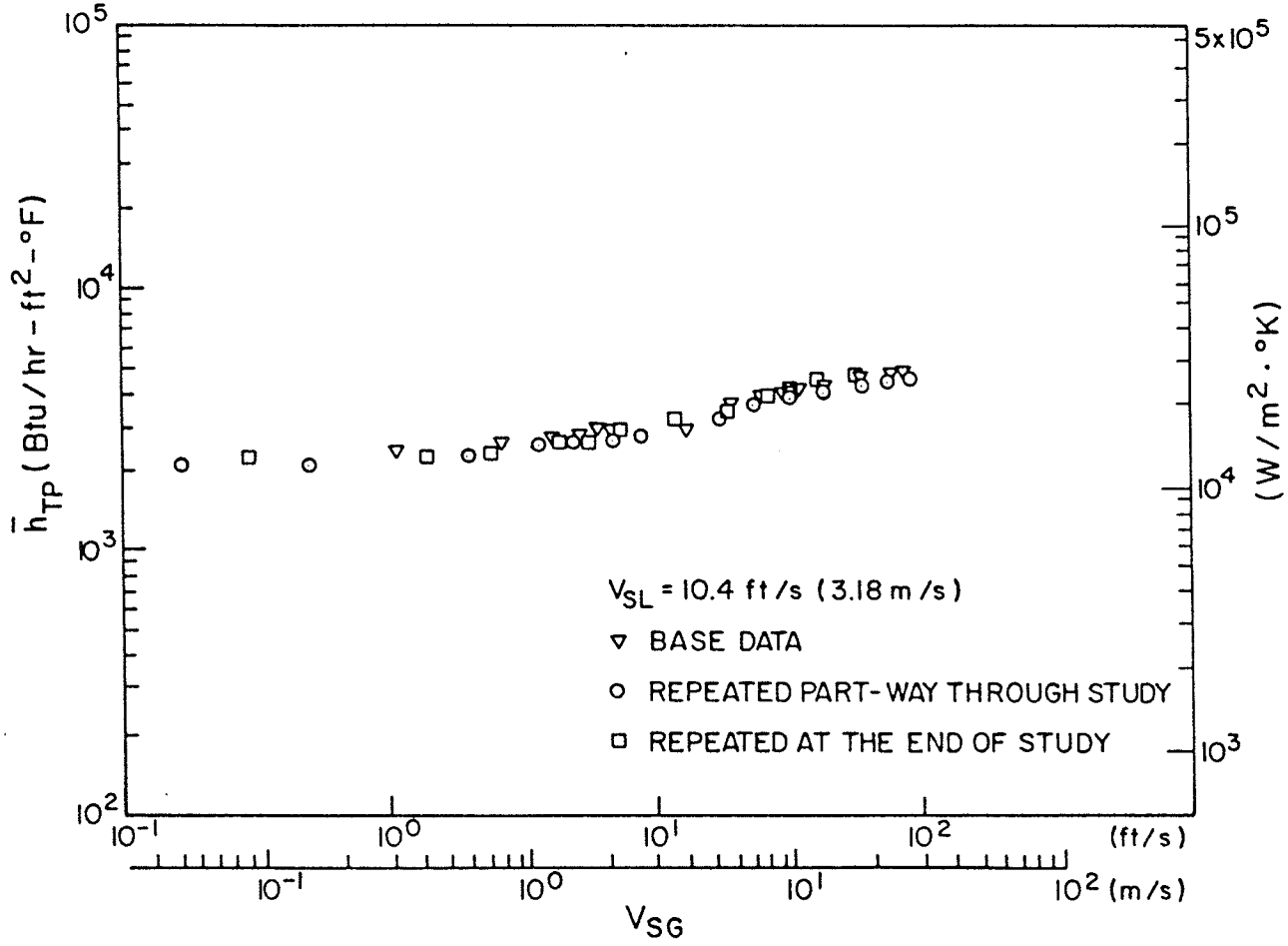


Fig. E.1 Repeatability Test Results for $\bar{h}_{TP}$ (water-Air)

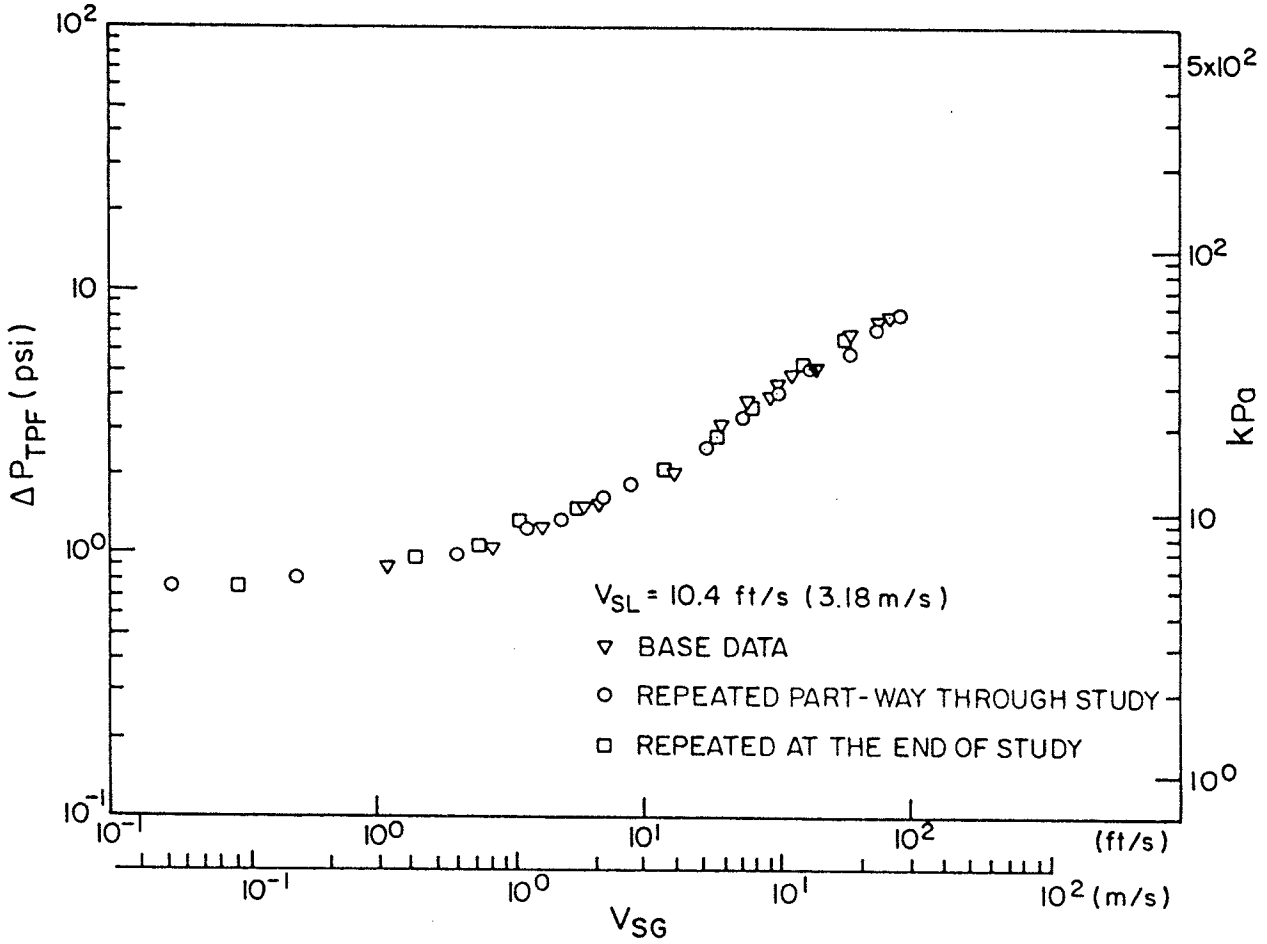


Fig. E.2 Repeatability Test Results for ΔP_{TPF} (Water-Air)

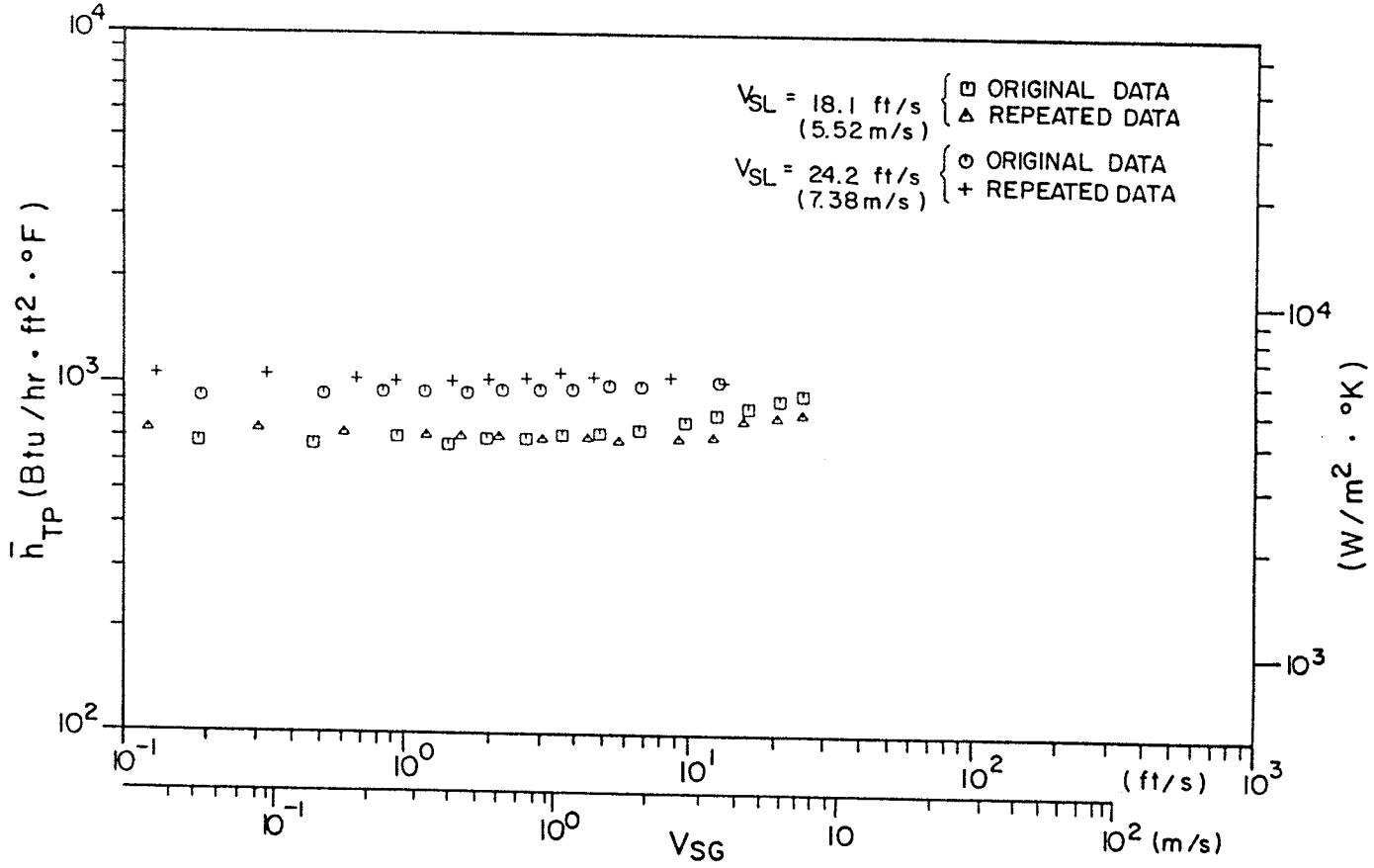


Fig. E.3 Repeatability Test Results for $\bar{h}_{TP}$ (Glycerine & Water-Air)

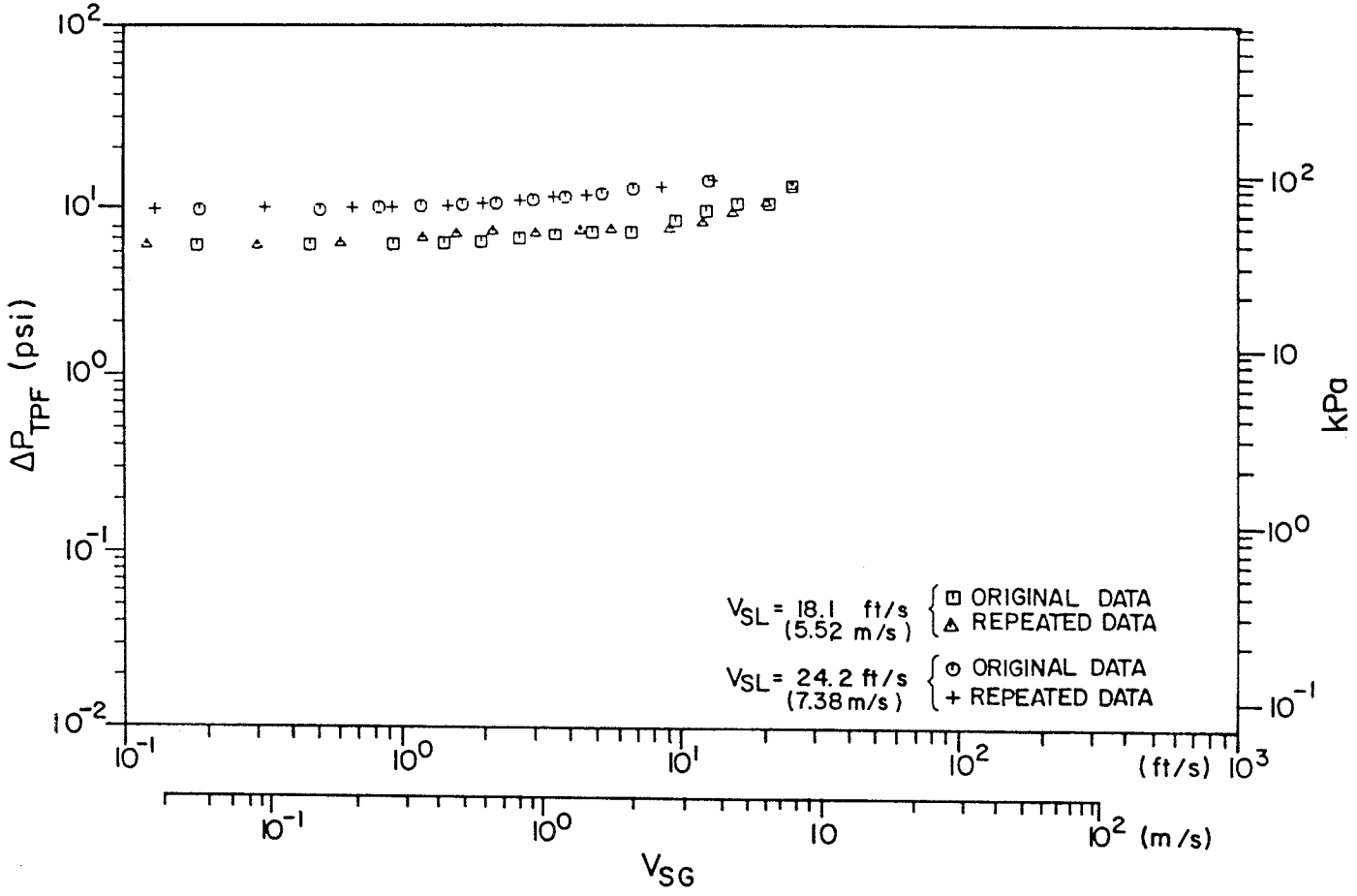


Fig. E.4 Repeatability Test Results for ΔP_{TPF} (Glycerine & Water-Air)

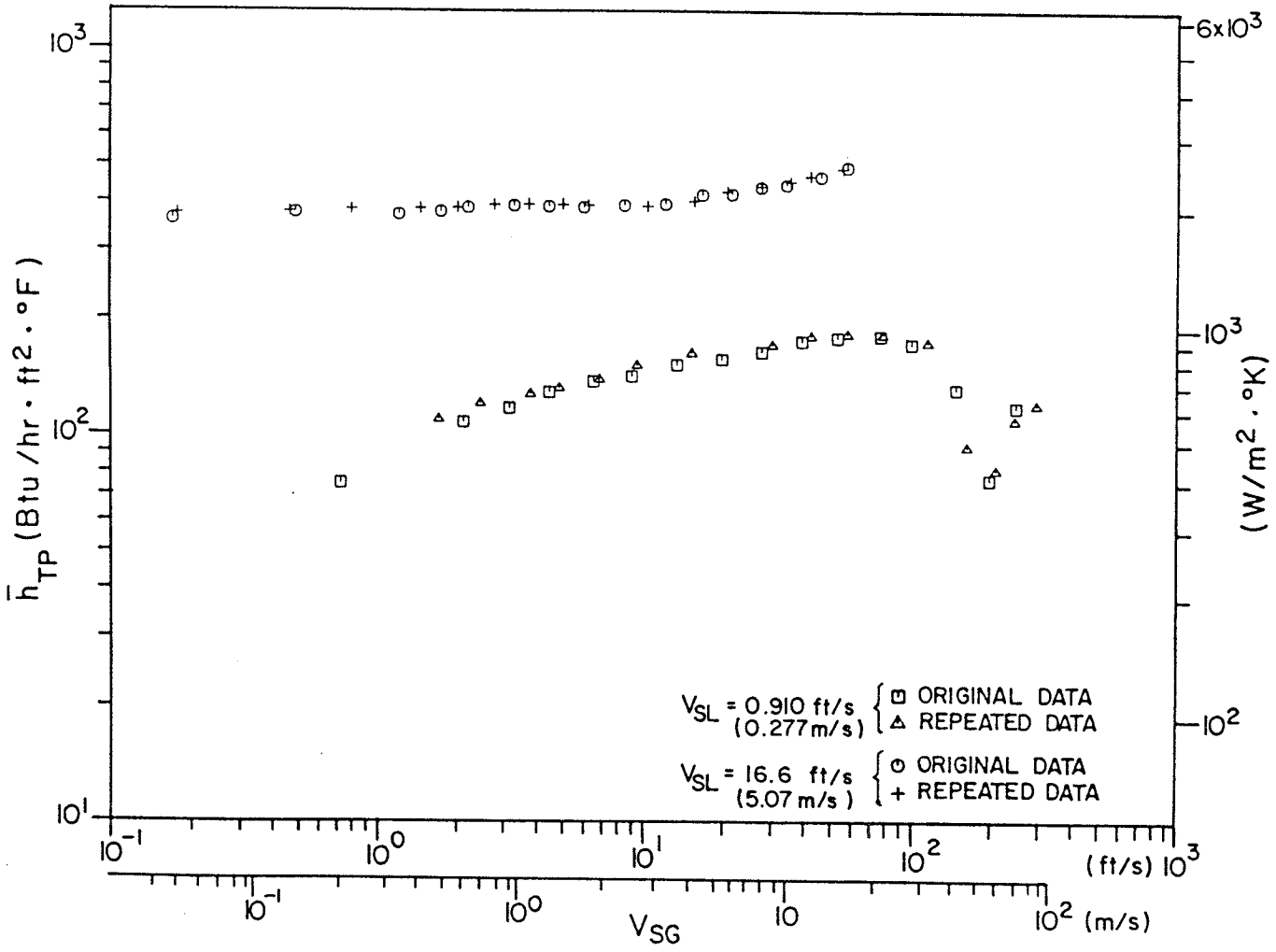


Fig. E.5 Repeatability Test Results for $\bar{h}_{TP}$ (Silicone-Air)

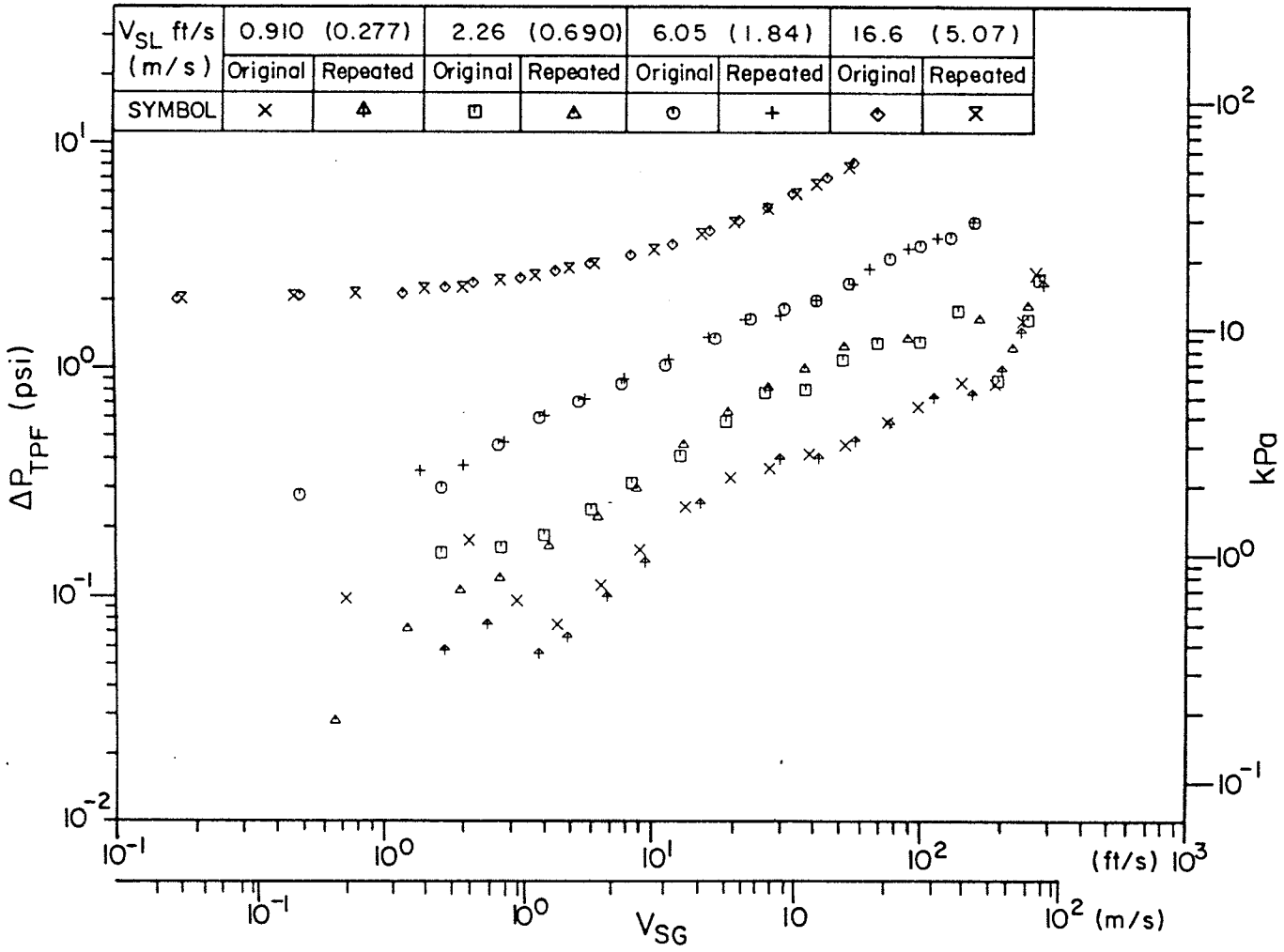


Fig. E.6 Repeatability Test Results for ΔP_{TPF} (Silicone-Air)

The results of these tests are shown in Fig. E.5, which shows extremely small deviations between both sets of data points (base and repeated).

The frictional- pressure-drop data were obtained at the above-mentioned two liquid velocities and also isothermally at V_{SL} = 2.26 ft/s (0.690 m/s) and V_{SL} = 6.05 ft/s (1.84 m/s). As shown in Fig. E.6, the data repeated very well, especially at the high liquid velocites.

REFERENCES FOR APPENDIX E

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Appendix F

TABULATED DATA

This appendix presents the two-phase experimental data. The water-air data are given in Table F.1, the glycerine & water-air data in Table F.2 and the silicone-air data in Table F.3. The data for each liquid-air mixture are given in the order of increasing air flow rate for each liquid mass flow rate. For each test the data are tabulated in the following order:

-The first two lines give the values of the following quantities:

ML = water mass flow rate — lb_m/hr

MG = gas mass flow rate — lb_m/hr

QFLUX = average heat flux — $Btu/hr.ft^2$

NUTP = average Nusselt number = $\frac{\bar{h}_{TP}D}{k_L}$

HTP = average two-phase heat-transfer coefficient — $Btu/hr.ft^2.^oF$

PTD = total pressure drop across the heated test section — $lb_f/in^2.$

PDF = frictional pressure drop across the heated test section — $lb_f/in^2.$

ALFA = void fraction [by using Chisholm's(14) correlation]

WE = Weber number

and

TOUT = measured outlet temperature (at two locations) of the mixture leaving the heated test section °F

-The next three lines give respectively the inlet, outlet and mean values [(inlet + outlet)/2] of the following quantities:

TMIX = mixture temperature [T_o (calculated)] °F

RESL = superficial liquid Reynolds number

RESG = superficial gas Reynolds number

P = pressure lb /in^2.

PRL = liquid Prandtl number

PRG = gas Prandtl number

VSL = superficial liquid velocity ft/s

VSG = superficial gas velocity ft/s

All properties are taken at mean bulk temperatures

-Then, the local values of the quantities listed below are given at seven locations (Z in.) along the test section

RESL = superficial liquid Reynold number

VSG = superficial gas velocity ft/s

TBULK = bulk temperature of the mixture °F

TW = wall temperature °F

NUTP = two-phase Nusselt number

HTP = two-phase heat-transfer coefficient Btu/hr.ft^2.°F

Table F.1

Water-Air Tabulated Data

TEST NO: W1.1 FLOW PATTERN:SLUG

ML= 48 MG= 0.54 QFLUX= 6490 NUTP= 45.4 HTP= 418 PDT= 0.213

PDF=-0.027 ALFA=0.759 WE= 0.52 TOUT(MEAS)= 95.2, 95.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	66.5	645	407.5	15.1	7.0	0.710	0.185	1.75
OUTLET	98.6	946	389.2	14.9	4.8	0.707	0.186	1.95
MEAN	82.6	796	398.4	15.0	5.8	0.709	0.185	1.84

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	667	1.68	69.0	83.8	48.0	435.0
4.5	695	1.69	72.1	86.3	49.9	454.0
7.5	728	1.70	75.8	91.2	45.8	418.0
11.0	768	1.72	80.1	96.7	42.6	392.0
16.5	832	1.75	87.0	104.2	40.8	378.0
21.0	886	1.77	92.6	107.4	47.1	440.0
22.5	904	1.78	94.4	105.3	64.0	600.0

TEST NO: W1.2 FLOW PATTERN:SLUG

ML= 48 MG= 1.06 QFLUX= 7012 NUTP= 44.9 HTP= 418 PDT= 0.130

PDF=-0.049 ALFA=0.821 WE= 0.53 TOUT(MEAS)=103.6,103.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.9	684	798.8	15.0	6.6	0.710	0.185	3.49
OUTLET	105.1	1011	761.2	14.8	4.4	0.706	0.186	3.94
MEAN	88.0	847	780.0	14.9	5.4	0.708	0.186	3.70

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	709	3.37	73.6	94.7	36.4	331.0
4.5	740	3.40	77.1	99.7	33.9	310.0
7.5	779	3.43	81.3	102.8	35.4	326.0
11.0	825	3.46	86.2	106.1	38.1	353.0
16.5	899	3.52	93.9	110.2	46.0	430.0
21.0	961	3.57	100.2	111.5	65.8	621.0
22.5	982	3.58	102.3	110.5	90.1	853.0

TEST NO: W1.3 FLOW PATTERN:SLUG

ML= 48 MG= 1.56 QFLUX= 7184 NUTP= 44.1 HTP= 411 PDT= 0.110

PDF=-0.040 ALFA=0.849 WE= 0.53 TOUT(MEAS)=103.6,103.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.9	685	1175.0	14.8	6.6	0.710	0.185	5.14
OUTLET	105.6	1016	1119.2	14.7	4.4	0.706	0.186	5.82
MEAN	88.3	850	1147.1	14.8	5.4	0.708	0.186	5.44

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	710	5.00	73.8	98.8	31.3	285.0
4.5	741	5.04	77.2	101.1	32.8	300.0
7.5	780	5.08	81.4	103.0	36.1	332.0
11.0	826	5.14	86.3	107.9	35.9	333.0
16.5	900	5.22	94.0	111.3	44.6	417.0
21.0	962	5.28	100.3	111.7	66.7	630.0
22.5	983	5.31	102.4	110.2	97.7	925.0

TEST NO: W1.4 FLOW PATTERN:SLUG

ML= 48 MG= 2.01 QFLUX= 5988 NUTP= 45.5 HTP= 422 PDT= 0.130

PDF=-0.005 ALFA=0.865 WE= 0.52 TOUT(MEAS)= 97.3, 97.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.0	676	1515.0	14.9	6.7	0.710	0.185	6.59
OUTLET	98.6	946	1454.7	14.7	4.7	0.707	0.186	7.25
MEAN	84.3	811	1484.9	14.8	5.6	0.708	0.186	6.87

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	697	6.42	72.3	92.6	32.3	294.0
4.5	723	6.46	75.2	95.2	32.7	299.0
7.5	755	6.51	78.8	97.1	35.6	326.0
11.0	793	6.56	82.9	100.9	35.9	331.0
16.5	854	6.65	89.3	102.6	48.2	449.0
21.0	905	6.73	94.5	103.5	71.4	669.0
22.5	922	6.75	96.3	103.2	92.3	867.0

TEST NO: W1.5 FLOW PATTERN:SLUG

ML= 48 MG= 2.41 QFLUX= 5784 NUTP= 52.1 HTP= 483 PDT= 0.155

PDF= 0.031 ALFA=0.876 WE= 0.52 TOUT(MEAS)= 95.7, 95.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.0	668	1819.0	14.9	6.8	0.710	0.185	7.93
OUTLET	96.5	925	1750.1	14.8	4.8	0.707	0.186	8.69
MEAN	82.8	796	1785.0	14.8	5.7	0.708	0.185	8.25

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	688	7.66	71.3	87.4	39.4	358.0
4.5	713	7.71	74.2	91.4	36.8	335.0
7.5	744	7.77	77.6	93.5	39.5	362.0
11.0	781	7.84	81.6	97.8	38.8	357.0
16.5	840	7.94	87.8	99.5	53.4	496.0
21.0	889	8.03	92.9	100.2	85.6	801.0
22.5	906	8.06	94.6	99.7	122.6	1149.0

TEST NO: W1.6 FLOW PATTERN:SLUG-CHURN

ML= 48 MG= 2.77 QFLUX= 6351 NUTP= 53.2 HTP= 492 PDT= 0.173

PDF= 0.057 ALFA=0.884 WE= 0.52 TOUT(MEAS)= 97.3, 97.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.2	660	2095.0	14.9	6.8	0.710	0.185	9.10
OUTLET	98.1	940	2008.4	14.8	4.7	0.707	0.186	10.00
MEAN	83.2	800	2052.0	14.9	5.7	0.708	0.185	9.48

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	682	8.78	70.7	86.9	42.9	389.0
4.5	710	8.84	73.8	89.1	45.4	414.0
7.5	744	8.92	77.5	92.0	47.6	436.0
11.0	784	9.01	81.9	96.1	48.6	448.0
16.5	849	9.14	88.7	101.7	52.8	491.0
21.0	903	9.26	94.3	104.1	69.6	652.0
22.5	921	9.30	96.2	103.9	87.6	823.0

TEST NO: W1.7 FLOW PATTERN:SLUG-CHURN

ML= 48 MG= 3.00 QFLUX= 6342 NUTP= 59.9 HTP= 553 PDT= 0.175

PDF= 0.063 ALFA=0.889 WE= 0.52 TOUT(MEAS)= 96.4, 96.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	67.5	654	2272.0	14.8	6.9	0.710	0.185	9.83
OUTLET	97.2	932	2178.6	14.6	4.8	0.707	0.186	10.82
MEAN	82.3	793	2225.8	14.7	5.8	0.708	0.185	10.27

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	676	9.58	69.9	81.4	60.7	551.0
4.5	703	9.65	73.1	84.7	59.5	542.0
7.5	737	9.73	76.8	89.4	54.6	499.0
11.0	777	9.83	81.1	93.3	56.3	519.0
16.5	841	9.98	87.9	99.4	59.8	556.0
21.0	895	10.10	93.5	103.7	67.3	630.0
22.5	914	10.14	95.4	104.4	75.3	706.0

TEST NO: W1.8 FLOW PATTERN:CHURN

ML= 48 MG= 8.11 QFLUX= 8252 NUTP= 81.2 HTP= 750 PDT= 0.151

PDF= 0.083 ALFA=0.932 WE= 0.52 TOUT(MEAS)= 99.7, 99.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.1	633	6166.0	14.8	7.1	0.710	0.185	26.31
OUTLET	99.9	958	5868.1	14.7	4.6	0.706	0.186	29.53
MEAN	82.5	796	6017.1	14.8	5.8	0.708	0.185	27.77

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	659	25.76	68.1	79.5	78.9	714.0
4.5	692	25.97	71.8	83.1	79.5	723.0
7.5	732	26.22	76.3	87.4	80.3	734.0
11.0	780	26.52	81.4	92.7	79.6	733.0
16.5	857	26.98	89.6	100.2	84.3	785.0
21.0	922	27.36	96.3	107.1	82.2	772.0
22.5	945	27.49	98.5	109.5	80.6	759.0

TEST NO: W1.9 FLOW PATTERN:CHURN-ANNULAR

ML= 48 MG= 13.03 QFLUX= 8289 NUTP= 82.8 HTP= 763 PDT= 0.148

PDF= 0.095 ALFA=0.948 WE= 0.52 TOUT(MEAS)= 97.6, 97.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	64.5	628	9914.0	14.8	7.2	0.711	0.185	42.32
OUTLET	96.7	926	9468.2	14.7	4.7	0.706	0.186	46.99
MEAN	80.6	777	9691.4	14.7	5.9	0.708	0.185	44.39

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	653	41.39	67.3	77.8	86.5	782.0
4.5	684	41.72	70.9	81.6	84.6	769.0
7.5	722	42.10	75.1	86.3	80.6	736.0
11.0	768	42.56	80.1	91.1	81.7	752.0
16.5	841	43.27	87.9	98.8	82.6	768.0
21.0	903	43.86	94.3	105.0	83.4	781.0
22.5	924	44.06	96.4	106.9	85.1	800.0

TEST NO: W1.10 FLOW PATTERN:ANNULAR

ML= 48 MG= 18.08 QFLUX= 9893 NUTP= 87.4 HTP= 808 PDT= 0.184

PDF= 0.140 ALFA=0.957 WE= 0.52 TOUT(MEAS)=100.8,100.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.4	636	13733.0	14.9	7.1	0.710	0.185	58.64
OUTLET	100.2	961	13071.1	14.7	4.5	0.706	0.186	65.81
MEAN	82.8	799	13402.3	14.8	5.7	0.708	0.186	61.89

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	663	57.24	68.5	79.2	101.1	915.0
4.5	697	57.72	72.3	83.5	95.9	873.0
7.5	738	58.31	76.9	88.9	89.3	818.0
11.0	787	58.99	82.2	94.7	85.3	786.0
16.5	866	60.07	90.6	103.4	83.1	775.0
21.0	933	60.96	97.4	110.2	83.0	781.0
22.5	956	61.26	99.7	112.2	84.7	799.0

TEST NO: W1.11 FLOW PATTERN:ANNULAR

ML= 48 MG= 24.67 QFLUX= 11354 NUTP= 89.1 HTP= 824 PDT= 0.259

PDF= 0.224 ALFA=0.965 WE= 0.52 TOUT(MEAS)=102.4,102.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.7	639	18730.0	15.1	7.1	0.710	0.185	80.45
OUTLET	101.4	973	17805.6	14.8	4.4	0.706	0.186	90.17
MEAN	83.6	806	18268.1	14.9	5.6	0.708	0.186	84.73

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	666	77.22	68.9	79.4	118.1	1070.0
4.5	701	77.94	72.8	84.7	104.5	952.0
7.5	744	78.80	77.6	90.8	93.2	854.0
11.0	796	79.81	83.1	97.4	86.2	795.0
16.5	878	81.41	91.8	107.0	80.5	752.0
21.0	948	82.73	98.9	114.1	79.7	751.0
22.5	972	83.17	101.3	116.4	80.2	758.0

TEST NO: W1.12 FLOW PATTERN:ANNULAR

ML= 48 MG= 41.17 QFLUX= 12867 NUTP= 90.6 HTP= 835 PDT= 0.472

PDF= 0.446 ALFA=0.975 WE= 0.52 TOUT(MEAS)=100.0, 99.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.4	636	31272.0	15.6	7.1	0.710	0.185	133.63
OUTLET	98.2	941	29844.6	15.2	4.6	0.706	0.186	145.57
MEAN	81.8	789	30558.8	15.4	5.7	0.708	0.185	141.09

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	662	124.25	68.4	78.4	140.2	1270.0
4.5	695	125.52	72.1	84.2	115.8	1053.0
7.5	735	127.06	76.6	91.0	97.1	888.0
11.0	783	128.86	81.8	98.1	85.1	785.0
16.5	860	131.73	89.9	108.0	76.8	716.0
21.0	925	134.10	96.6	115.0	74.9	704.0
22.5	948	134.90	98.8	117.1	75.4	711.0

TEST NO: W1.13 FLOW PATTERN:ANNULAR

ML= 48 MG= 70.03 QFLUX= 15308 NUTP= 72.1 HTP= 662 PDT= 0.902

PDF= 0.883 ALFA=0.982 WE= 0.52 TOUT(MEAS)= 96.3, 94.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.2	634	53218.0	17.0	7.1	0.710	0.185	212.90
OUTLET	94.6	906	51023.6	16.1	4.8	0.707	0.186	232.92
MEAN	79.9	770	52121.2	16.6	5.9	0.709	0.185	222.50

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	657	194.21	67.8	80.2	134.8	1219.0
4.5	686	196.50	71.1	88.8	94.0	854.0
7.5	721	199.29	75.0	97.3	74.9	683.0
11.0	763	202.58	79.6	105.4	64.5	593.0
16.5	830	207.86	86.7	114.9	59.0	547.0
21.0	886	212.29	92.6	120.6	59.2	553.0
22.5	906	213.78	94.6	122.3	59.6	559.0

TEST NO: W1.14 FLOW PATTERN:ANNULAR

ML= 48 MG= 92.28 QFLUX= 17080 NUTP= 68.2 HTP= 625 PDT= 1.201

PDF= 1.185 ALFA=0.985 WE= 0.52 TOUT(MEAS)= 94.6, 92.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.3	635	70109.0	18.1	7.1	0.710	0.185	259.77
OUTLET	92.8	888	67396.2	16.9	4.9	0.707	0.186	294.96
MEAN	79.1	762	68752.8	17.5	6.0	0.709	0.185	282.96

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	656	240.61	67.7	81.3	136.6	1236.0
4.5	683	243.68	70.8	91.4	90.0	817.0
7.5	715	247.42	74.4	101.1	69.7	636.0
11.0	754	251.87	78.6	110.1	59.3	544.0
16.5	816	259.04	85.3	119.0	55.0	510.0
21.0	868	265.07	90.7	123.7	56.0	522.0
22.5	886	267.12	92.5	125.1	56.6	529.0

TEST NO: W1.15 FLOW PATTERN:ANNULAR-MIST

ML= 48 MG=113.17 QFLUX= 15668 NUTP= 65.1 HTP= 594 PDT= 1.464

PDF= 1.451 ALFA=0.987 WE= 0.52 TOUT(MEAS)= 87.9, 85.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	63.4	619	86220.0	19.3	7.4	0.711	0.185	313.03
OUTLET	87.3	835	83292.8	17.9	5.4	0.708	0.186	339.05
MEAN	75.4	727	84756.6	18.6	6.3	0.709	0.185	322.12

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	636	275.99	65.4	78.1	135.7	1224.0
4.5	658	279.53	68.0	88.2	84.7	766.0
7.5	685	283.87	71.0	97.3	65.4	594.0
11.0	717	289.03	74.5	104.8	56.9	519.0
16.5	768	297.38	80.1	112.5	52.8	486.0
21.0	810	304.45	84.6	116.9	52.9	490.0
22.5	824	306.85	86.1	118.2	53.3	494.0

TEST NO: W1.16 FLOW PATTERN:ANNULAR-MIST

ML= 48 MG=156.90 QFLUX= 15659 NUTP= 62.7 HTP= 571 PDT= 3.132

PDF= 3.121 ALFA=0.990 WE= 0.52 TOUT(MEAS)= 83.0, 82.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	63.7	621	119502.0	21.7	7.4	0.711	0.185	383.02
OUTLET	83.4	799	116114.0	18.5	5.7	0.708	0.185	436.66
MEAN	73.6	710	117808.2	20.1	6.5	0.710	0.185	425.12

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	635	342.98	65.3	77.4	141.9	1279.0
4.5	653	349.65	67.4	88.6	80.7	729.0
7.5	674	357.93	69.8	97.8	61.4	557.0
11.0	700	367.99	72.7	104.6	53.9	491.0
16.5	741	384.75	77.2	111.1	50.6	464.0
21.0	775	399.41	80.9	114.6	50.9	468.0
22.5	786	404.50	82.1	115.6	51.1	471.0

TEST NO: W2.1 FLOW PATTERN:SLUG

ML= 267 MG= 0.62 QFLUX= 7312 NUTP= 76.1 HTP= 687 PDT= 0.449

PDF= 0.003 ALFA=0.553 WE= 15.88 TOUT(MEAS)= 73.2, 73.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	63.6	3461	471.4	14.9	7.4	0.711	1.033	2.01
OUTLET	70.2	3782	466.8	14.4	6.8	0.710	1.032	2.05
MEAN	66.9	3621	469.1	14.6	7.1	0.710	1.032	2.03

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3487	1.95	64.2	74.3	79.9	719.0
4.5	3520	1.96	64.9	74.9	80.6	726.0
7.5	3560	1.97	65.7	76.1	77.8	702.0
11.0	3607	1.98	66.7	77.2	77.1	696.0
16.5	3680	2.00	68.2	79.2	73.4	664.0
21.0	3741	2.02	69.4	80.4	73.2	663.0
22.5	3762	2.02	69.8	81.4	69.9	634.0

TEST NO: W2.2 FLOW PATTERN:SLUG

ML= 267 MG= 0.91 QFLUX= 7311 NUTP= 72.3 HTP= 652 PDT= 0.406

PDF= 0.021 ALFA=0.614 WE= 15.87 TOUT(MEAS)= 72.8, 72.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	63.0	3429	695.8	14.7	7.5	0.711	1.033	2.97
OUTLET	69.5	3748	689.0	14.3	6.8	0.710	1.032	3.01
MEAN	66.3	3588	692.4	14.5	7.2	0.710	1.032	2.98

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3455	2.90	63.5	73.7	79.2	712.0
4.5	3488	2.91	64.2	74.5	78.5	707.0
7.5	3527	2.93	65.0	76.1	73.3	661.0
11.0	3574	2.94	66.0	77.2	72.4	653.0
16.5	3647	2.97	67.5	79.1	69.9	632.0
21.0	3708	2.99	68.7	80.7	67.6	612.0
22.5	3728	3.00	69.1	81.1	67.6	612.0

TEST NO: W2.3 FLOW PATTERN:SLUG

ML= 267 MG= 1.29 QFLUX= 7305 NUTP= 81.4 HTP= 735 PDT= 0.406

PDF= 0.068 ALFA=0.661 WE= 15.86 TOUT(MEAS)= 70.2, 70.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	62.7	3417	981.0	14.7	7.5	0.711	1.033	4.18
OUTLET	69.3	3736	971.6	14.3	6.9	0.710	1.032	4.13
MEAN	66.0	3577	976.3	14.5	7.2	0.710	1.032	4.19

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3443	4.08	63.3	73.3	81.2	729.0
4.5	3476	4.10	64.0	74.0	80.5	725.0
7.5	3516	4.12	64.8	74.7	81.6	735.0
11.0	3562	4.15	65.7	75.5	83.0	749.0
16.5	3635	4.18	67.3	77.3	80.2	725.0
21.0	3696	4.22	68.5	78.4	81.7	739.0
22.5	3716	4.23	68.9	78.8	81.7	740.0

TEST NO: W2.4 FLOW PATTERN:SLUG

ML= 267 MG= 1.49 QFLUX= 8839 NUTP= 85.6 HTP= 773 PDT= 0.425

PDF= 0.107 ALFA=0.681 WE= 15.88 TOUT(MEAS)= 72.0, 72.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	62.9	3426	1135.0	14.7	7.5	0.711	1.033	4.84
OUTLET	70.9	3813	1122.1	14.3	6.7	0.710	1.032	4.91
MEAN	66.9	3619	1128.8	14.5	7.1	0.710	1.032	4.88

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3457	4.73	63.6	75.3	83.2	748.0
4.5	3497	4.75	64.4	76.0	84.7	763.0
7.5	3545	4.78	65.4	77.0	84.2	759.0
11.0	3601	4.81	66.5	77.8	86.6	782.0
16.5	3690	4.86	68.4	79.7	86.3	781.0
21.0	3764	4.90	69.9	81.3	85.3	774.0
22.5	3788	4.91	70.4	81.4	88.5	803.0

TEST NO: W2.5 FLOW PATTERN:SLUG-CHURN

ML= 267 MG= 2.18 QFLUX= 8836 NUTP= 87.8 HTP= 793 PDT= 0.303

PDF= 0.030 ALFA=0.726 WE= 15.88 TOUT(MEAS)= 71.5, 71.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	62.8	3420	1663.0	14.7	7.5	0.711	1.033	7.09
OUTLET	70.7	3807	1644.3	14.4	6.7	0.710	1.032	7.19
MEAN	66.8	3614	1654.0	14.5	7.1	0.710	1.032	7.15

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3452	6.95	63.5	75.0	85.1	765.0
4.5	3492	6.98	64.3	75.3	89.3	803.0
7.5	3540	7.01	65.3	76.5	87.0	784.0
11.0	3596	7.05	66.4	77.7	87.1	787.0
16.5	3685	7.10	68.3	79.5	87.1	789.0
21.0	3758	7.15	69.8	80.6	89.9	815.0
22.5	3783	7.17	70.3	81.0	91.0	826.0

TEST NO: W2.6 FLOW PATTERN:SLUG-CHURN

ML= 267 MG= 2.56 QFLUX= 8833 NUTP= 90.7 HTP= 819 PDT= 0.314

PDF= 0.057 ALFA=0.743 WE= 15.87 TOUT(MEAS)= 71.0, 71.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	62.5	3407	1955.0	14.8	7.6	0.711	1.033	8.33
OUTLET	70.4	3793	1933.0	14.4	6.8	0.710	1.032	8.44
MEAN	66.5	3600	1944.4	14.6	7.1	0.710	1.032	8.36

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3438	8.12	63.2	73.7	93.1	836.0
4.5	3478	8.15	64.0	74.3	94.8	853.0
7.5	3526	8.18	65.0	75.5	93.2	840.0
11.0	3582	8.23	66.1	77.2	88.9	802.0
16.5	3671	8.30	68.0	79.1	87.8	794.0
21.0	3744	8.35	69.5	80.3	90.3	818.0
22.5	3768	8.37	70.0	80.4	93.6	849.0

TEST NO: W2.7 FLOW PATTERN:SLUG-CHURN

ML= 267 MG= 2.85 QFLUX= 9643 NUTP= 93.4 HTP= 843 PDT= 0.330

PDF= 0.084 ALFA=0.754 WE= 15.88 TOUT(MEAS)= 72.0, 71.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	62.4	3400	2177.0	14.8	7.6	0.711	1.033	9.19
OUTLET	71.0	3822	2149.5	14.4	6.7	0.710	1.032	9.40
MEAN	66.7	3611	2163.3	14.6	7.1	0.710	1.032	9.34

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3435	9.01	63.1	74.6	92.9	835.0
4.5	3478	9.05	64.0	75.5	92.8	835.0
7.5	3530	9.09	65.1	76.5	93.3	841.0
11.0	3591	9.15	66.3	77.8	93.1	841.0
16.5	3688	9.23	68.3	79.7	93.6	847.0
21.0	3768	9.30	69.9	81.3	93.8	851.0
22.5	3795	9.32	70.5	81.7	95.0	863.0

TEST NO: W2.8 FLOW PATTERN:CHURN

ML= 267 MG= 5.41 QFLUX= 9628 NUTP=116.6 HTP=1052 PDT= 0.422

PDF= 0.233 ALFA=0.811 WE= 15.87 TOUT(MEAS)= 71.8, 72.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	62.0	3383	4131.0	15.0	7.6	0.711	1.033	17.43
OUTLET	70.6	3802	4079.2	14.6	6.7	0.710	1.032	17.82
MEAN	66.3	3592	4105.4	14.8	7.2	0.710	1.032	17.64

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3417	16.81	62.7	71.6	120.5	1082.0
4.5	3460	16.89	63.6	72.6	119.4	1074.0
7.5	3512	16.98	64.7	73.8	117.7	1061.0
11.0	3573	17.09	66.0	75.2	115.6	1043.0
16.5	3669	17.27	67.9	77.3	114.2	1033.0
21.0	3749	17.41	69.6	78.6	117.0	1061.0
22.5	3775	17.46	70.1	79.3	115.1	1044.0

TEST NO: W2.9 FLOW PATTERN:CHURN-ANNULAR

ML= 267 MG= 9.35 QFLUX= 12934 NUTP=145.7 HTP=1323 PDT= 0.451

PDF= 0.303 ALFA=0.852 WE= 15.96 TOUT(MEAS)= 77.3, 77.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	64.9	3522	7106.0	15.1	7.3	0.711	1.033	30.32
OUTLET	76.4	4094	6987.0	14.6	6.2	0.709	1.033	31.46
MEAN	70.7	3808	7046.5	14.8	6.7	0.710	1.032	30.79

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3568	29.16	65.9	75.6	147.4	1330.0
4.5	3626	29.32	67.1	76.8	147.1	1329.0
7.5	3697	29.51	68.5	78.3	145.7	1320.0
11.0	3780	29.73	70.2	79.9	146.0	1325.0
16.5	3911	30.09	72.8	82.6	145.6	1326.0
21.0	4021	30.39	75.0	84.9	143.9	1315.0
22.5	4057	30.49	75.7	85.7	142.5	1303.0

TEST NO: W2.10 FLOW PATTERN:ANNULAR

ML= 267 MG= 13.19 QFLUX= 12924 NUTP=165.6 HTP=1504 PDT= 0.498

PDF= 0.370 ALFA=0.872 WE= 15.96 TOUT(MEAS)= 77.1, 77.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	64.7	3512	10028.0	15.5	7.3	0.711	1.033	42.77
OUTLET	76.2	4082	9861.0	15.0	6.2	0.709	1.033	44.39
MEAN	70.5	3797	9944.7	15.3	6.7	0.710	1.032	43.45

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3559	39.96	65.7	74.1	169.1	1525.0
4.5	3617	40.19	66.9	75.2	170.3	1539.0
7.5	3687	40.46	68.3	77.0	163.1	1477.0
11.0	3769	40.78	70.0	78.6	165.2	1499.0
16.5	3900	41.30	72.6	81.1	166.4	1516.0
21.0	4009	41.72	74.8	83.5	162.7	1486.0
22.5	4045	41.86	75.5	84.2	162.4	1485.0

TEST NO: W2.11 FLOW PATTERN:ANNULAR

ML= 267 MG= 17.20 QFLUX= 14931 NUTP=188.7 HTP=1716 PDT= 0.617

PDF= 0.503 ALFA=0.887 WE= 15.98 TOUT(MEAS)= 78.8, 78.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	64.8	3517	13079.0	15.7	7.3	0.711	1.033	55.79
OUTLET	78.0	4175	12829.3	15.1	6.1	0.709	1.033	58.18
MEAN	71.4	3846	12954.6	15.4	6.6	0.710	1.032	56.67

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3570	51.59	65.9	74.4	193.5	1746.0
4.5	3637	51.93	67.3	75.8	193.8	1752.0
7.5	3718	52.36	68.9	77.5	190.8	1729.0
11.0	3813	52.85	70.9	79.6	187.8	1706.0
16.5	3965	53.65	73.9	82.7	186.3	1700.0
21.0	4090	54.31	76.4	85.2	186.2	1705.0
22.5	4132	54.54	77.2	86.1	183.1	1678.0

TEST NO: W2.12 FLOW PATTERN:ANNULAR

ML= 267 MG= 18.69 QFLUX= 14920 NUTP=197.0 HTP=1789 PDT= 0.673

PDF= 0.563 ALFA=0.890 WE= 15.96 TOUT(MEAS)= 77.8, 77.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	63.9	3476	14228.0	16.0	7.4	0.711	1.033	57.78
OUTLET	77.2	4130	13955.8	15.3	6.2	0.709	1.033	60.32
MEAN	70.6	3803	14092.0	15.7	6.7	0.710	1.032	60.79

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3529	54.85	65.1	73.5	195.5	1762.0
4.5	3595	55.23	66.4	74.8	196.0	1770.0
7.5	3676	55.70	68.1	76.5	195.3	1767.0
11.0	3771	56.26	70.0	78.3	197.8	1795.0
16.5	3921	57.14	73.0	81.3	197.6	1800.0
21.0	4046	57.88	75.5	83.8	198.0	1811.0
22.5	4088	58.12	76.4	84.6	197.4	1807.0

TEST NO: W2.13 FLOW PATTERN:ANNULAR

ML= 267 MG= 21.19 QFLUX= 16106 NUTP=202.5 HTP=1840 PDT= 0.700

PDF= 0.596 ALFA=0.897 WE= 15.97 TOUT(MEAS)= 79.2, 79.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	64.0	3478	16134.0	16.1	7.4	0.711	1.033	65.51
OUTLET	78.2	4184	15801.9	15.4	6.1	0.709	1.033	68.37
MEAN	71.1	3831	15968.0	15.8	6.7	0.710	1.032	68.92

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3535	61.64	65.2	73.7	209.8	1891.0
4.5	3606	62.10	66.6	75.2	208.8	1887.0
7.5	3693	62.65	68.4	77.2	203.1	1839.0
11.0	3795	63.30	70.5	79.4	200.3	1819.0
16.5	3958	64.34	73.8	82.6	200.3	1827.0
21.0	4093	65.21	76.4	85.2	200.8	1838.0
22.5	4139	65.50	77.3	86.2	198.3	1817.0

TEST NO: W2.14 FLOW PATTERN:ANNULAR

ML= 267 MG= 22.68 QFLUX= 18626 NUTP=248.0 HTP=2259 PDT= 0.783

PDF= 0.682 ALFA=0.900 WE= 16.00 TOUT(MEAS)= 79.9, 80.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	64.0	3479	17267.0	16.3	7.3	0.711	1.033	70.11
OUTLET	80.4	4298	16859.0	15.5	5.9	0.709	1.033	73.52
MEAN	72.2	3889	17063.4	15.9	6.6	0.710	1.032	71.91

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3545	65.62	65.4	73.9	242.4	2186.0
4.5	3628	66.17	67.1	75.5	243.2	2198.0
7.5	3728	66.83	69.1	77.6	242.0	2193.0
11.0	3846	67.62	71.5	79.9	244.9	2227.0
16.5	4036	68.87	75.3	83.4	251.6	2299.0
21.0	4193	69.93	78.4	86.3	258.0	2368.0
22.5	4246	70.28	79.4	87.3	257.2	2364.0

TEST NO: W2.15 FLOW PATTERN:ANNULAR

ML= 267 MG= 39.74 QFLUX= 22578 NUTP=315.0 HTP=2875 PDT= 1.295

PDF= 1.216 ALFA=0.921 WE= 16.03 TOUT(MEAS)= 82.0, 82.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	64.0	3478	30250.0	18.1	7.3	0.711	1.033	116.64
OUTLET	83.6	4464	29400.3	16.8	5.7	0.708	1.034	122.97
MEAN	73.8	3971	29825.4	17.5	6.4	0.709	1.032	119.75

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3557	103.34	65.6	73.7	308.5	2783.0
4.5	3656	104.53	67.7	75.7	309.1	2797.0
7.5	3776	105.97	70.1	78.2	305.7	2775.0
11.0	3918	107.69	73.0	81.0	308.3	2809.0
16.5	4146	110.47	77.5	85.2	319.2	2926.0
21.0	4336	112.82	81.2	88.6	331.0	3050.0
22.5	4400	113.62	82.4	89.7	337.2	3112.0

TEST NO: W2.16 FLOW PATTERN:ANNULAR

ML= 267 MG= 58.27 QFLUX= 28153 NUTP=317.4 HTP=2905 PDT= 1.872

PDF= 1.804 ALFA=0.933 WE= 16.08 TOUT(MEAS)= 85.5, 84.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	63.9	3476	44363.0	20.2	7.3	0.711	1.033	158.90
OUTLET	88.1	4696	42845.3	18.3	5.4	0.708	1.034	178.18
MEAN	76.0	4086	43604.3	19.3	6.3	0.709	1.033	163.79

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3572	136.27	65.9	74.8	349.3	3152.0
4.5	3694	138.26	68.4	77.5	340.5	3084.0
7.5	3842	140.70	71.4	81.1	319.6	2906.0
11.0	4018	143.63	75.0	84.9	310.0	2832.0
16.5	4300	148.41	80.5	90.5	307.3	2828.0
21.0	4537	152.49	85.0	94.9	310.6	2876.0
22.5	4617	153.88	86.6	96.4	310.3	2879.0

TEST NO: W2.17 FLOW PATTERN:ANNULAR-MIST

ML= 267 MG=101.62 QFLUX= 19593 NUTP=181.8 HTP=1649 PDT= 2.815

PDF= 2.766 ALFA=0.952 WE= 15.95 TOUT(MEAS)= 78.8, 74.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	62.1	3389	77570.0	20.0	7.6	0.711	1.033	259.50
OUTLET	78.3	4188	75755.2	17.2	6.1	0.709	1.033	302.45
MEAN	70.2	3788	76662.7	18.6	6.8	0.710	1.032	280.00

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3452	239.35	63.5	70.8	293.4	2639.0
4.5	3533	243.72	65.1	74.2	238.1	2147.0
7.5	3631	249.15	67.1	77.8	202.3	1829.0
11.0	3746	255.75	69.5	81.8	175.0	1587.0
16.5	3931	266.72	73.2	87.6	149.8	1365.0
21.0	4084	276.30	76.3	92.0	137.2	1255.0
22.5	4136	279.62	77.3	93.4	134.0	1228.0

TEST NO: W2.18 FLOW PATTERN:ANNULAR-MIST

ML= 267 MG=115.50 QFLUX= 19693 NUTP=148.7 HTP=1348 PDT= 2.951

PDF= 2.905 ALFA=0.955 WE= 15.94 TOUT(MEAS)= 78.8, 73.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	61.7	3369	88223.0	20.4	7.6	0.711	1.033	291.80
OUTLET	77.8	4162	86169.6	17.5	6.1	0.709	1.033	343.83
MEAN	69.8	3765	87196.5	18.9	6.8	0.710	1.032	313.35

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3433	267.00	63.1	71.4	259.9	2336.0
4.5	3513	272.00	64.7	75.7	197.1	1776.0
7.5	3610	278.21	66.7	80.2	161.2	1457.0
11.0	3724	285.76	69.1	84.6	139.8	1267.0
16.5	3907	298.34	72.8	90.8	120.2	1095.0
21.0	4059	309.35	75.8	94.9	113.1	1034.0
22.5	4111	313.17	76.8	95.1	118.0	1080.0

TEST NO: W3.1 FLOW PATTERN:BUBBLE

ML= 2699 MG= 0.42 QFLUX= 28042 NUTP=272.7 HTP=2469 PDT= 1.790

PDF= 0.897 ALFA=0.101 WE= 1619.00 TOUT(MEAS)= 69.6, 69.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	67.0	36542	318.4	19.2	7.1	0.710	10.416	1.03
OUTLET	69.5	37779	317.2	17.4	6.8	0.710	10.410	1.14
MEAN	68.2	37161	317.8	18.3	7.0	0.710	10.408	1.08

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	36645	1.04	67.2	78.3	278.1	2514.0
4.5	36773	1.05	67.4	78.5	279.1	2524.0
7.5	36927	1.06	67.8	79.2	270.6	2448.0
11.0	37108	1.08	68.1	79.6	269.7	2441.0
16.5	37392	1.10	68.7	80.1	271.4	2459.0
21.0	37624	1.12	69.2	80.5	272.0	2466.0
22.5	37702	1.13	69.3	80.5	277.9	2519.0

TEST NO: W3.2 FLOW PATTERN:BUBBLE

ML= 2699 MG= 1.06 QFLUX= 28053 NUTP=290.5 HTP=2635 PDT= 1.849

PDF= 1.062 ALFA=0.208 WE= 1621.00 TOUT(MEAS)= 70.9, 71.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.3	37201	798.1	19.2	6.9	0.710	10.416	2.58
OUTLET	70.8	38446	795.2	17.4	6.7	0.710	10.411	2.86
MEAN	69.6	37823	796.7	18.3	6.8	0.710	10.410	2.72

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	37304	2.61	68.5	79.1	293.7	2660.0
4.5	37433	2.63	68.8	79.4	292.2	2647.0
7.5	37588	2.67	69.1	79.8	289.1	2621.0
11.0	37770	2.71	69.5	80.2	287.8	2610.0
16.5	38055	2.78	70.0	80.7	289.9	2631.0
21.0	38290	2.83	70.5	81.0	293.8	2668.0
22.5	38368	2.85	70.7	81.2	291.9	2651.0

TEST NO: W3.3 FLOW PATTERN:BUBBLE

ML= 2699 MG= 1.61 QFLUX= 28043 NUTP=305.4 HTP=2770 PDT= 1.985

PDF= 1.262 ALFA=0.273 WE= 1621.00 TOUT(MEAS)= 70.8, 70.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.1	37112	1218.0	19.5	6.9	0.710	10.416	3.89
OUTLET	70.6	38355	1213.7	17.5	6.7	0.710	10.411	4.34
MEAN	69.4	37734	1215.9	18.5	6.8	0.710	10.410	4.11

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	37215	3.92	68.3	78.4	308.8	2796.0
4.5	37344	3.97	68.6	78.7	307.7	2787.0
7.5	37499	4.02	68.9	79.1	303.0	2746.0
11.0	37680	4.09	69.3	79.4	304.8	2763.0
16.5	37965	4.20	69.9	80.0	304.8	2765.0
21.0	38199	4.29	70.3	80.4	306.8	2785.0
22.5	38278	4.32	70.5	80.6	305.3	2772.0

TEST NO: W3.4 FLOW PATTERN:BUBBLE-SLUG

ML= 2699 MG= 2.08 QFLUX= 29239 NUTP=313.9 HTP=2845 PDT= 2.067

PDF= 1.383 ALFA=0.313 WE= 1621.00 TOUT(MEAS)= 70.6, 70.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	67.8	36957	1573.0	20.0	7.0	0.710	10.416	4.89
OUTLET	70.4	38252	1567.2	17.9	6.7	0.710	10.411	5.46
MEAN	69.1	37605	1570.2	18.9	6.9	0.710	10.409	5.18

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	37065	4.94	68.0	78.3	315.3	2854.0
4.5	37199	4.99	68.3	78.5	315.6	2858.0
7.5	37360	5.06	68.6	79.0	311.3	2820.0
11.0	37549	5.15	69.0	79.4	310.9	2818.0
16.5	37846	5.29	69.6	79.8	315.6	2862.0
21.0	38090	5.40	70.1	80.3	316.2	2870.0
22.5	38171	5.44	70.3	80.6	312.9	2841.0

TEST NO: W3.5 FLOW PATTERN:BUBBLE-SLUG

ML= 2699 MG= 2.45 QFLUX= 29239 NUTP=328.0 HTP=2975 PDT= 2.180

PDF= 1.524 ALFA=0.340 WE= 1621.00 TOUT(MEAS)= 70.9, 71.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.2	37133	1853.0	20.2	6.9	0.710	10.416	5.70
OUTLET	70.8	38430	1846.2	18.1	6.7	0.710	10.411	6.39
MEAN	69.5	37781	1849.8	19.1	6.8	0.710	10.410	6.05

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	37240	5.75	68.4	78.1	331.9	3006.0
4.5	37375	5.82	68.7	78.4	330.4	2993.0
7.5	37537	5.91	69.0	78.9	325.7	2952.0
11.0	37725	6.01	69.4	79.3	326.0	2956.0
16.5	38023	6.18	70.0	79.8	327.1	2969.0
21.0	38267	6.32	70.5	80.2	330.4	3000.0
22.5	38349	6.37	70.6	80.4	330.0	2998.0

TEST NO: W3.6 FLOW PATTERN:SLUG-FROTH

ML= 2699 MG= 2.75 QFLUX= 29234 NUTP=326.8 HTP=2963 PDT= 2.225

PDF= 1.588 ALFA=0.359 WE= 1621.00 TOUT(MEAS)= 70.7, 70.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	67.8	36957	2080.0	20.5	7.0	0.710	10.416	6.31
OUTLET	70.4	38251	2072.6	18.3	6.7	0.710	10.411	7.09
MEAN	69.1	37604	2076.6	19.4	6.9	0.710	10.409	6.70

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	37064	6.37	68.0	77.8	331.0	2996.0
4.5	37198	6.45	68.3	78.1	329.8	2986.0
7.5	37360	6.54	68.6	78.5	325.4	2948.0
11.0	37548	6.66	69.0	79.0	324.0	2936.0
16.5	37845	6.85	69.6	79.5	326.5	2962.0
21.0	38089	7.01	70.1	79.9	328.6	2983.0
22.5	38170	7.06	70.3	80.1	327.6	2974.0

TEST NO: W3.7 FLOW PATTERN:SLUG-FROTH

ML= 2699 MG= 5.64 QFLUX= 29220 NUTP=335.1 HTP=3035 PDT= 2.565

PDF= 2.048 ALFA=0.480 WE= 1619.00 TOUT(MEAS)= 70.7, 70.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	67.3	36691	4275.0	21.6	7.0	0.710	10.416	12.26
OUTLET	69.9	37981	4259.4	19.1	6.8	0.710	10.410	13.92
MEAN	68.6	37336	4267.6	20.4	6.9	0.710	10.409	13.09

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	36798	12.39	67.5	76.8	345.4	3124.0
4.5	36931	12.55	67.8	77.2	342.1	3096.0
7.5	37092	12.75	68.1	77.7	334.4	3027.0
11.0	37280	13.00	68.5	78.2	331.7	3004.0
16.5	37577	13.40	69.1	78.8	332.8	3016.0
21.0	37820	13.74	69.6	79.2	334.2	3031.0
22.5	37901	13.86	69.7	79.4	333.1	3022.0

TEST NO: W3.8 FLOW PATTERN:SLUG-FROTH

ML= 2699 MG= 9.31 QFLUX= 31596 NUTP=411.5 HTP=3733 PDT= 3.585

PDF= 3.133 ALFA=0.546 WE= 1621.00 TOUT(MEAS)= 71.1, 71.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.1	37106	7045.0	24.7	6.9	0.710	10.416	17.76
OUTLET	70.9	38507	7016.8	21.1	6.7	0.710	10.411	20.77
MEAN	69.5	37807	7031.3	22.9	6.8	0.710	10.410	19.25

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	37222	17.98	68.4	76.7	415.3	3761.0
4.5	37367	18.27	68.6	77.0	414.7	3757.0
7.5	37542	18.63	69.0	77.6	405.9	3679.0
11.0	37746	19.07	69.4	77.9	410.4	3722.0
16.5	38067	19.80	70.1	78.5	411.6	3736.0
21.0	38331	20.44	70.6	79.0	414.6	3765.0
22.5	38419	20.66	70.8	79.2	412.0	3743.0

TEST NO: W3.9 FLOW PATTERN:FROTH-ANNULAR

ML= 2699 MG= 12.88 QFLUX= 31643 NUTP=429.6 HTP=3898 PDT= 4.265

PDF= 3.852 ALFA=0.585 WE= 1622.00 TOUT(MEAS)= 71.3, 71.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.4	37238	9738.0	26.8	6.9	0.710	10.416	22.60
OUTLET	71.2	38642	9698.6	22.6	6.7	0.710	10.411	26.85
MEAN	69.8	37940	9718.7	24.7	6.8	0.710	10.410	24.70

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	37354	22.91	68.6	76.6	437.8	3966.0
4.5	37499	23.32	68.9	76.9	434.2	3935.0
7.5	37674	23.82	69.3	77.5	423.5	3840.0
11.0	37879	24.43	69.7	77.8	426.7	3871.0
16.5	38201	25.47	70.3	78.5	428.6	3892.0
21.0	38466	26.37	70.9	78.9	433.0	3935.0
22.5	38554	26.69	71.0	79.0	434.3	3947.0

TEST NO: W3.10 FLOW PATTERN:FROTH-ANNULAR

ML= 2699 MG= 16.17 QFLUX= 31641 NUTP=440.9 HTP=4002 PDT= 4.446

PDF= 4.064 ALFA=0.616 WE= 1622.00 TOUT(MEAS)= 71.7, 72.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.5	37281	12231.0	27.5	6.9	0.710	10.416	27.67
OUTLET	71.3	38685	12180.8	23.1	6.7	0.710	10.412	32.97
MEAN	69.9	37983	12206.1	25.3	6.8	0.710	10.410	30.28

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	37397	28.06	68.7	76.4	455.1	4123.0
4.5	37543	28.56	69.0	76.7	452.5	4101.0
7.5	37718	29.19	69.4	77.3	438.5	3976.0
11.0	37922	29.95	69.8	77.8	433.6	3934.0
16.5	38244	31.24	70.4	78.3	441.5	4009.0
21.0	38509	32.37	70.9	78.9	438.9	3988.0
22.5	38597	32.77	71.1	79.1	434.9	3953.0

TEST NO: W3.11 FLOW PATTERN:FROTH-ANNULAR

ML= 2699 MG= 18.32 QFLUX= 31787 NUTP=455.3 HTP=4132 PDT= 4.900

PDF= 4.528 ALFA=0.627 WE= 1623.00 TOUT(MEAS)= 71.8, 72.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.6	37369	13850.0	29.1	6.9	0.710	10.416	29.68
OUTLET	71.5	38780	13793.6	24.2	6.6	0.710	10.412	35.66
MEAN	70.1	38074	13822.3	26.6	6.8	0.710	10.410	32.62

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	37485	30.12	68.9	76.4	468.8	4249.0
4.5	37632	30.68	69.2	76.7	462.8	4195.0
7.5	37808	31.38	69.5	77.3	452.1	4100.0
11.0	38013	32.24	69.9	77.7	450.1	4085.0
16.5	38337	33.69	70.6	78.3	453.0	4115.0
21.0	38603	34.98	71.1	78.8	457.4	4157.0
22.5	38692	35.43	71.3	79.0	456.9	4154.0

TEST NO: W3.12 FLOW PATTERN:FROTH-ANNULAR

ML= 2699 MG= 19.85 QFLUX= 31787 NUTP=470.5 HTP=4272 PDT= 5.081

PDF= 4.717 ALFA=0.635 WE= 1623.00 TOUT(MEAS)= 71.8, 72.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.9	37502	15001.0	29.7	6.9	0.710	10.416	31.47
OUTLET	71.8	38915	14939.2	24.6	6.6	0.710	10.412	37.91
MEAN	70.3	38208	14970.3	27.2	6.7	0.710	10.411	34.63

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	37619	31.94	69.1	76.3	492.1	4461.0
4.5	37765	32.55	69.4	76.8	476.8	4324.0
7.5	37941	33.30	69.8	77.3	468.1	4247.0
11.0	38147	34.23	70.2	77.8	462.7	4200.0
16.5	38471	35.79	70.9	78.4	467.1	4244.0
21.0	38737	37.18	71.4	78.8	475.2	4321.0
22.5	38826	37.67	71.6	79.0	471.9	4293.0

TEST NO: W3.13 FLOW PATTERN:FROTH-ANNULAR

ML= 2699 MG= 20.90 QFLUX= 31780 NUTP=478.4 HTP=4342 PDT= 5.262

PDF= 4.904 ALFA=0.640 WE= 1623.00 TOUT(MEAS)= 71.3, 71.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.6	37360	15805.0	30.2	6.9	0.710	10.416	32.58
OUTLET	71.5	38771	15740.2	25.0	6.6	0.710	10.412	39.39
MEAN	70.1	38065	15772.9	27.6	6.8	0.710	10.410	35.92

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	37477	33.07	68.9	75.9	496.5	4499.0
4.5	37623	33.71	69.2	76.3	488.2	4426.0
7.5	37799	34.51	69.5	76.8	477.6	4332.0
11.0	38004	35.49	69.9	77.3	473.3	4295.0
16.5	38328	37.15	70.6	78.0	474.4	4309.0
21.0	38594	38.61	71.1	78.4	477.7	4342.0
22.5	38682	39.13	71.3	78.7	474.4	4314.0

TEST NO: W3.14 FLOW PATTERN:FROTH-ANNULAR

ML= 2699 MG= 25.27 QFLUX= 34528 NUTP=479.3 HTP=4350 PDT= 5.534

PDF= 5.201 ALFA=0.666 WE= 1622.00 TOUT(MEAS)= 71.6, 72.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.5	37280	19113.0	30.5	6.9	0.710	10.416	39.08
OUTLET	71.5	38812	19027.2	24.9	6.6	0.710	10.412	47.70
MEAN	70.0	38046	19070.1	27.7	6.8	0.710	10.410	43.30

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	37407	39.70	68.7	76.4	496.2	4496.0
4.5	37565	40.50	69.0	76.9	486.2	4407.0
7.5	37756	41.51	69.4	77.4	476.4	4321.0
11.0	37979	42.74	69.9	77.9	472.0	4283.0
16.5	38331	44.84	70.6	78.5	479.0	4351.0
21.0	38620	46.71	71.2	79.1	481.0	4372.0
22.5	38716	47.36	71.4	79.3	476.9	4336.0

TEST NO: W3.15 FLOW PATTERN:FROTH-ANNULAR

ML= 2699 MG= 40.73 QFLUX= 34522 NUTP=518.8 HTP=4710 PDT= 7.302

PDF= 7.006 ALFA=0.703 WE= 1623.00 TOUT(MEAS)= 71.5, 72.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.7	37379	30791.0	36.8	6.9	0.710	10.416	52.20
OUTLET	71.7	38910	30653.1	29.5	6.6	0.710	10.412	65.01
MEAN	70.2	38145	30722.1	33.1	6.8	0.710	10.411	58.43

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	37506	53.11	68.9	75.8	550.1	4985.0
4.5	37665	54.28	69.2	76.4	530.4	4809.0
7.5	37855	55.76	69.6	77.0	519.5	4712.0
11.0	38078	57.59	70.1	77.5	512.7	4654.0
16.5	38430	60.70	70.8	78.2	510.9	4642.0
21.0	38718	63.51	71.4	78.7	518.4	4714.0
22.5	38814	64.50	71.6	79.0	512.2	4658.0

TEST NO: W3.16 FLOW PATTERN:FROTH-ANNULAR

ML= 2699 MG= 64.86 QFLUX= 34498 NUTP=547.4 HTP=4965 PDT= 8.254

PDF= 7.990 ALFA=0.736 WE= 1621.00 TOUT(MEAS)= 70.5, 71.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	67.9	37023	49086.0	43.8	7.0	0.710	10.416	69.68
OUTLET	71.0	38545	48866.1	35.5	6.7	0.710	10.411	85.73
MEAN	69.5	37784	48976.0	39.7	6.8	0.710	10.410	77.51

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	37149	70.82	68.2	74.5	601.0	5442.0
4.5	37307	72.31	68.5	75.1	574.6	5204.0
7.5	37496	74.17	68.9	75.8	549.4	4979.0
11.0	37718	76.47	69.4	76.4	541.6	4911.0
16.5	38067	80.37	70.1	77.2	532.8	4836.0
21.0	38354	83.87	70.6	77.7	534.2	4853.0
22.5	38449	85.10	70.8	77.9	535.5	4866.0

TEST NO: W3.17 FLOW PATTERN:FROTH-ANNULAR

ML= 2699 MG= 73.21 QFLUX= 34510 NUTP=543.8 HTP=4935 PDT= 8.390

PDF= 8.136 ALFA=0.747 WE= 1622.00 TOUT(MEAS)= 70.9, 71.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.5	37278	55360.0	44.8	6.9	0.710	10.416	76.95
OUTLET	71.5	38802	55113.3	36.4	6.6	0.710	10.412	94.54
MEAN	70.0	38040	55237.1	40.6	6.8	0.710	10.410	85.54

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	37404	78.21	68.7	75.0	607.4	5503.0
4.5	37562	79.84	69.0	75.6	576.6	5226.0
7.5	37752	81.89	69.4	76.3	553.8	5023.0
11.0	37974	84.41	69.9	77.0	529.5	4805.0
16.5	38324	88.68	70.6	77.8	529.0	4805.0
21.0	38611	92.51	71.1	78.3	527.3	4793.0
22.5	38707	93.86	71.3	78.6	523.8	4763.0

TEST NO: W4.1 FLOW PATTERN:BUBBLE

ML= 8996 MG= 0.45 QFLUX= 54842 NUTP=692.0 HTP=6286 PDT= 8.277

PDF= 7.306 ALFA=0.023 WE= 18043.00 TOUT(MEAS)= 71.5, 71.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.8	126505	341.7	33.9	6.8	0.710	34.719	0.63
OUTLET	71.3	128950	341.0	25.6	6.6	0.710	34.703	0.83
MEAN	70.6	127728	341.3	29.7	6.7	0.710	34.700	0.73

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	126708	0.64	69.9	78.6	696.8	6324.0
4.5	126962	0.66	70.1	78.8	697.7	6333.0
7.5	127268	0.68	70.3	79.0	691.6	6279.0
11.0	127624	0.71	70.5	79.3	685.4	6225.0
16.5	128185	0.76	70.8	79.6	691.1	6279.0
21.0	128645	0.81	71.1	79.8	697.4	6340.0
22.5	128798	0.82	71.2	80.0	689.3	6266.0

TEST NO: W4.2 FLOW PATTERN:BUBBLE

ML= 8996 MG= 0.87 QFLUX= 57941 NUTP=685.8 HTP=6230 PDT= 8.299

PDF= 7.346 ALFA=0.041 WE= 18043.00 TOUT(MEAS)= 71.6, 71.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.8	126432	652.5	35.1	6.8	0.710	34.719	1.16
OUTLET	71.3	129014	651.0	26.8	6.6	0.710	34.703	1.51
MEAN	70.6	127723	651.8	30.9	6.7	0.710	34.700	1.33

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	126646	1.19	69.9	79.2	689.6	6259.0
4.5	126914	1.22	70.1	79.3	689.5	6259.0
7.5	127237	1.26	70.3	79.6	683.1	6202.0
11.0	127613	1.31	70.5	79.9	679.8	6174.0
16.5	128206	1.39	70.9	80.2	685.0	6225.0
21.0	128691	1.47	71.1	80.3	694.5	6313.0
22.5	128853	1.50	71.2	80.5	684.9	6227.0

TEST NO: W4.3 FLOW PATTERN:BUBBLE

ML= 8996 MG= 1.30 QFLUX= 57945 NUTP=674.4 HTP=6126 PDT= 8.707

PDF= 7.770 ALFA=0.057 WE= 18042.00 TOUT(MEAS)= 71.6, 71.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.7	126358	984.4	37.1	6.8	0.710	34.719	1.66
OUTLET	71.3	128940	982.1	28.4	6.7	0.710	34.703	2.15
MEAN	70.5	127649	983.2	32.8	6.7	0.710	34.700	1.89

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	126572	1.69	69.9	79.2	686.4	6229.0
4.5	126840	1.73	70.0	79.3	685.5	6222.0
7.5	127163	1.79	70.2	79.8	666.2	6048.0
11.0	127539	1.86	70.4	80.0	666.1	6049.0
16.5	128132	1.98	70.8	80.3	674.9	6132.0
21.0	128617	2.09	71.1	80.5	679.4	6176.0
22.5	128779	2.13	71.2	80.6	677.0	6155.0

TEST NO: W4.4 FLOW PATTERN:BUBBLE

ML= 8996 MG= 1.80 QFLUX= 58497 NUTP=717.3 HTP=6516 PDT= 8.957

PDF= 8.035 ALFA=0.073 WE= 18042.00 TOUT(MEAS)= 71.5, 71.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.7	126358	1358.0	38.9	6.8	0.710	34.719	2.19
OUTLET	71.3	128964	1355.8	29.9	6.6	0.710	34.703	2.83
MEAN	70.5	127661	1357.3	34.4	6.7	0.710	34.700	2.49

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	126574	2.23	69.9	78.8	724.0	6570.0
4.5	126845	2.29	70.0	78.9	723.1	6564.0
7.5	127170	2.36	70.2	79.3	713.7	6480.0
11.0	127550	2.45	70.5	79.5	714.6	6490.0
16.5	128148	2.61	70.8	79.8	717.9	6523.0
21.0	128638	2.75	71.1	80.1	718.0	6527.0
22.5	128802	2.80	71.2	80.3	711.2	6466.0

TEST NO: W4.5 FLOW PATTERN:BUBBLE

ML= 8996 MG= 2.28 QFLUX= 58494 NUTP=725.6 HTP=6591 PDT= 9.025

PDF= 8.117 ALFA=0.087 WE= 18042.00 TOUT(MEAS)= 71.5, 71.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.7	126357	1722.0	40.3	6.8	0.710	34.719	2.68
OUTLET	71.3	128964	1718.3	31.2	6.6	0.710	34.703	3.43
MEAN	70.5	127661	1720.3	35.7	6.7	0.710	34.700	3.04

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	126574	2.73	69.9	78.6	734.6	6667.0
4.5	126845	2.80	70.0	78.9	729.3	6620.0
7.5	127170	2.88	70.2	79.1	723.1	6566.0
11.0	127550	2.99	70.5	79.4	717.1	6513.0
16.5	128148	3.17	70.8	79.7	727.4	6610.0
21.0	128638	3.34	71.1	79.9	730.2	6638.0
22.5	128802	3.40	71.2	80.1	727.6	6615.0

TEST NO: W4.6 FLOW PATTERN:BUBBLE-FROTH

ML= 8996 MG= 2.61 QFLUX= 58495 NUTP=716.0 HTP=6503 PDT= 9.206

PDF= 8.307 ALFA=0.096 WE= 18040.00 TOUT(MEAS)= 71.5, 71.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.6	126210	1968.0	41.1	6.8	0.710	34.719	2.99
OUTLET	71.2	128816	1963.7	31.9	6.7	0.710	34.703	3.84
MEAN	70.4	127513	1966.0	36.5	6.7	0.710	34.700	3.40

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	126426	3.05	69.8	78.7	723.0	6560.0
4.5	126697	3.13	69.9	78.9	723.0	6562.0
7.5	127022	3.22	70.1	79.2	708.5	6432.0
11.0	127402	3.34	70.4	79.4	710.2	6449.0
16.5	128000	3.55	70.7	79.7	716.0	6505.0
21.0	128490	3.73	71.0	79.9	723.0	6571.0
22.5	128653	3.80	71.1	80.1	718.7	6533.0

TEST NO: W4.7 FLOW PATTERN:BUBBLE-FROTH

ML= 8996 MG= 2.84 QFLUX= 58459 NUTP=716.8 HTP=6500 PDT= 9.251

PDF= 8.358 ALFA=0.101 WE= 18014.00 TOUT(MEAS)= 70.4, 70.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.6	124444	2146.0	41.8	6.9	0.710	34.719	3.20
OUTLET	70.1	127036	2141.8	32.5	6.8	0.710	34.699	4.09
MEAN	69.4	125740	2144.2	37.1	6.8	0.710	34.696	3.63

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	124659	3.26	68.7	77.6	727.3	6589.0
4.5	124928	3.34	68.9	77.8	726.4	6583.0
7.5	125252	3.45	69.1	78.1	716.8	6498.0
11.0	125629	3.57	69.3	78.4	708.3	6423.0
16.5	126224	3.79	69.7	78.7	713.9	6476.0
21.0	126711	3.98	69.9	78.9	720.8	6541.0
22.5	126874	4.06	70.1	79.0	718.2	6519.0

TEST NO: W4.8 FLOW PATTERN:BUBBLE-FROTH

ML= 8996 MG= 4.12 QFLUX= 57927 NUTP=731.6 HTP=6646 PDT= 9.727

PDF= 8.862 ALFA=0.130 WE= 18044.00 TOUT(MEAS)= 71.5, 71.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.8	126505	3110.0	44.9	6.8	0.710	34.719	4.34
OUTLET	71.4	129087	3103.5	35.1	6.6	0.710	34.703	5.51
MEAN	70.6	127796	3107.0	40.0	6.7	0.710	34.701	4.90

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	126719	4.42	70.0	78.6	739.5	6712.0
4.5	126987	4.53	70.1	78.7	739.4	6712.0
7.5	127310	4.66	70.3	79.1	726.6	6597.0
11.0	127686	4.82	70.5	79.3	726.4	6598.0
16.5	128279	5.11	70.9	79.6	731.3	6646.0
21.0	128764	5.37	71.2	79.9	734.8	6680.0
22.5	128926	5.46	71.3	80.0	732.1	6656.0

TEST NO: W4.9 FLOW PATTERN:FROTH

ML= 8996 MG= 6.56 QFLUX= 57894 NUTP=722.6 HTP=6555 PDT=10.430

PDF= 9.604 ALFA=0.170 WE= 18018.00 TOUT(MEAS)= 70.7, 70.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.8	124738	4959.0	50.4	6.9	0.710	34.719	6.14
OUTLET	70.3	127306	4948.6	39.9	6.8	0.710	34.699	7.71
MEAN	69.5	126022	4954.2	45.1	6.8	0.710	34.697	6.90

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	124951	6.25	68.9	77.6	734.9	6660.0
4.5	125218	6.39	69.1	77.8	727.5	6594.0
7.5	125538	6.57	69.2	78.1	719.4	6523.0
11.0	125913	6.79	69.5	78.4	716.6	6499.0
16.5	126502	7.18	69.8	78.7	721.1	6544.0
21.0	126985	7.52	70.1	78.9	728.0	6609.0
22.5	127146	7.64	70.2	79.0	723.6	6569.0

TEST NO: W4.10 FLOW PATTERN:FROTH

ML= 8996 MG= 10.25 QFLUX= 57891 NUTP=741.1 HTP=6723 PDT=11.246

PDF=10.471 ALFA=0.222 WE= 18020.00 TOUT(MEAS)= 70.7, 70.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.9	124885	7748.0	54.4	6.9	0.710	34.719	8.89
OUTLET	70.4	127454	7730.7	43.1	6.7	0.710	34.700	11.15
MEAN	69.6	126169	7739.5	48.7	6.8	0.710	34.697	9.99

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	125098	9.05	69.0	77.5	749.9	6797.0
4.5	125365	9.25	69.1	77.7	749.7	6797.0
7.5	125686	9.51	69.3	78.0	734.7	6662.0
11.0	126060	9.84	69.6	78.2	735.4	6670.0
16.5	126650	10.39	69.9	78.6	737.4	6692.0
21.0	127133	10.88	70.2	78.7	751.2	6820.0
22.5	127294	11.06	70.3	78.9	740.8	6727.0

TEST NO: W4.11 FLOW PATTERN:FROTH

ML= 8996 MG= 13.65 QFLUX= 57561 NUTP=731.3 HTP=6623 PDT=12.401

PDF=11.659 ALFA=0.254 WE= 17990.00 TOUT(MEAS)= 69.5, 69.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	67.6	122831	10337.0	58.9	7.0	0.710	34.719	10.91
OUTLET	69.1	125371	10313.8	46.4	6.9	0.710	34.695	13.75
MEAN	68.4	124101	10325.4	52.6	6.9	0.710	34.693	12.28

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	123042	11.11	67.7	76.3	744.5	6736.0
4.5	123306	11.36	67.9	76.5	734.9	6651.0
7.5	123623	11.69	68.1	76.9	724.7	6561.0
11.0	123993	12.09	68.3	77.1	722.6	6543.0
16.5	124576	12.78	68.7	77.4	730.4	6617.0
21.0	125054	13.41	68.9	77.5	742.9	6733.0
22.5	125213	13.63	69.1	77.7	737.2	6683.0

TEST NO: W4.12 FLOW PATTERN:FROTH

ML= 8996 MG= 16.16 QFLUX= 57886 NUTP=754.9 HTP=6849 PDT=12.537

PDF=11.817 ALFA=0.277 WE= 18021.00 TOUT(MEAS)= 70.8, 70.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.9	124961	12210.0	60.9	6.9	0.710	34.719	12.51
OUTLET	70.4	127530	12182.4	48.3	6.7	0.710	34.700	15.68
MEAN	69.7	126245	12196.3	54.6	6.8	0.710	34.697	14.05

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	125174	12.74	69.0	77.3	769.6	6976.0
4.5	125441	13.03	69.2	77.5	763.4	6922.0
7.5	125761	13.39	69.4	77.9	747.8	6782.0
11.0	126136	13.84	69.6	78.1	746.7	6773.0
16.5	126725	14.61	70.0	78.4	756.4	6865.0
21.0	127208	15.31	70.3	78.7	758.1	6883.0
22.5	127369	15.55	70.4	78.8	758.0	6883.0

TEST NO: W4.13 FLOW PATTERN:FROTH

ML= 8996 MG= 22.80 QFLUX= 60551 NUTP=748.7 HTP=6803 PDT=13.603

PDF=12.931 ALFA=0.325 WE= 18049.00 TOUT(MEAS)= 71.9, 72.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.0	126800	17207.0	65.3	6.8	0.710	34.719	16.50
OUTLET	71.6	129501	17166.7	51.7	6.6	0.710	34.704	20.74
MEAN	70.8	128151	17187.1	58.5	6.7	0.710	34.701	18.55

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	127024	16.80	70.1	78.8	770.4	6994.0
4.5	127305	17.18	70.3	79.1	760.6	6906.0
7.5	127642	17.67	70.5	79.5	745.6	6772.0
11.0	128036	18.27	70.8	79.7	742.7	6748.0
16.5	128655	19.30	71.1	80.1	742.0	6745.0
21.0	129163	20.24	71.4	80.3	750.1	6822.0
22.5	129333	20.57	71.5	80.3	756.8	6884.0

Table F.2

Glycerine & Water-Air Tabulated Data

TEST NO: G1.1 FLOW PATTERN:SLUG

ML= 21 MG= 0.40 QFLUX= 1640 NUTP= 9.6 HTP= 56 PDT= 0.073

PDF=-0.128 ALFA=0.798 WE= 0.09 TOUT(MEAS)=111.0,110.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	73.0	35	299.6	16.3	58.5	0.709	0.073	1.16
OUTLET	98.1	56	289.2	16.3	33.0	0.705	0.074	1.25
MEAN	85.6	45	294.4	16.3	42.7	0.707	0.074	1.20

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	37	1.17	76.3	108.0	8.8	51.0
4.5	41	1.18	80.3	115.5	7.9	46.0
7.5	45	1.19	85.1	120.6	7.9	46.0
11.0	50	1.20	90.8	125.1	8.2	47.0
16.5	57	1.22	99.7	129.7	9.4	55.0
21.0	61	1.24	107.0	127.5	13.7	80.0
22.5	62	1.24	109.4	125.1	17.9	104.0

TEST NO: G1.2 FLOW PATTERN:SLUG

ML= 21 MG= 0.75 QFLUX= 853 NUTP= 12.6 HTP= 74 PDT= 0.001

PDF=-0.144 ALFA=0.854 WE= 0.09 TOUT(MEAS)= 94.0, 93.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.7	34	561.6	14.3	60.1	0.710	0.073	2.48
OUTLET	85.9	46	551.1	14.3	39.3	0.707	0.074	2.58
MEAN	79.3	40	556.3	14.3	48.4	0.708	0.073	2.53

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	36	2.49	74.5	92.2	8.2	48.0
4.5	38	2.50	76.8	95.1	8.0	46.0
7.5	40	2.51	79.6	96.0	8.9	51.0
11.0	43	2.53	82.8	97.1	10.2	59.0
16.5	48	2.55	87.8	98.9	13.1	76.0
21.0	51	2.57	91.9	98.6	21.7	127.0
22.5	52	2.58	93.3	98.4	28.7	167.0

TEST NO: G1.3 FLOW PATTERN:SLUG

ML= 21 MG= 1.05 QFLUX= 1332 NUTP= 18.3 HTP= 107 PDT=-0.025

PDF=-0.148 ALFA=0.876 WE= 0.09 TOUT(MEAS)= 97.0, 96.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.6	34	788.0	14.2	60.1	0.710	0.073	3.50
OUTLET	92.6	52	765.9	14.3	37.7	0.707	0.074	3.65
MEAN	82.6	43	777.0	14.2	47.3	0.708	0.073	3.58

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	36	3.51	74.7	94.0	11.7	68.0
4.5	38	3.53	77.3	95.0	12.8	75.0
7.5	41	3.55	80.4	97.7	13.1	76.0
11.0	44	3.57	84.0	99.7	14.5	85.0
16.5	49	3.61	89.8	101.4	19.6	114.0
21.0	53	3.63	94.5	102.1	29.7	173.0
22.5	54	3.64	96.0	101.7	40.0	234.0

TEST NO: G1.4 FLOW PATTERN:SLUG

ML= 21 MG= 1.46 QFLUX= 1952 NUTP= 18.9 HTP= 110 PDT=-0.027

PDF=-0.133 ALFA=0.894 WE= 0.09 TOUT(MEAS)=103.5,103.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.1	34	1097.0	14.2	60.4	0.710	0.073	4.87
OUTLET	100.4	57	1054.4	14.2	35.0	0.706	0.074	5.15
MEAN	86.2	45	1075.9	14.2	45.2	0.708	0.073	5.02

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	36	4.90	74.8	100.6	12.9	75.0
4.5	39	4.93	78.1	102.3	13.8	80.0
7.5	43	4.96	82.2	106.8	13.6	79.0
11.0	47	5.00	86.9	109.0	15.1	88.0
16.5	53	5.07	94.4	111.2	19.9	116.0
21.0	57	5.12	100.4	111.4	30.4	178.0
22.5	58	5.14	102.4	110.5	41.6	243.0

TEST NO: G1.5 FLOW PATTERN:SLUG-CHURN

ML= 21 MG= 2.04 QFLUX= 1954 NUTP= 13.8 HTP= 80 PDT=-0.035

PDF=-0.124 ALFA=0.910 WE= 0.09 TOUT(MEAS)=110.4,110.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.7	33	1535.0	14.2	60.5	0.710	0.073	6.82
OUTLET	99.3	57	1476.3	14.2	33.1	0.705	0.074	7.30
MEAN	85.5	45	1505.7	14.2	43.4	0.707	0.073	7.07

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	36	6.86	75.0	111.8	9.1	52.0
4.5	40	6.92	79.1	114.3	9.5	55.0
7.5	45	6.98	84.1	118.6	9.7	56.0
11.0	50	7.05	89.9	119.7	11.2	65.0
16.5	56	7.16	99.0	121.8	14.7	86.0
21.0	60	7.25	106.5	121.3	22.6	132.0
22.5	61	7.28	109.0	120.1	30.2	176.0

TEST NO: G1.6 FLOW PATTERN:SLUG-CHURN

ML= 21 MG= 2.83 QFLUX= 1713 NUTP= 16.8 HTP= 98 PDT= 0.005

PDF=-0.071 ALFA=0.924 WE= 0.09 TOUT(MEAS)=104.6,104.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.6	33	2131.0	14.2	61.0	0.710	0.073	9.44
OUTLET	95.3	54	2061.3	14.2	34.7	0.706	0.074	10.02
MEAN	83.4	44	2096.5	14.2	45.2	0.708	0.073	9.74

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	36	9.49	74.4	96.0	13.5	79.0
4.5	39	9.55	77.9	97.9	14.6	85.0
7.5	43	9.62	82.1	102.0	14.7	85.0
11.0	47	9.71	87.1	106.0	15.5	90.0
16.5	53	9.85	94.8	112.4	16.7	97.0
21.0	58	9.96	101.1	114.3	22.3	130.0
22.5	59	10.00	103.2	114.1	27.1	158.0

TEST NO: G1.7 FLOW PATTERN:CHURN

ML= 21 MG= 4.22 QFLUX= 2194 NUTP= 15.5 HTP= 90 PDT= 0.014

PDF=-0.048 ALFA=0.939 WE= 0.10 TOUT(MEAS)=116.2,115.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.0	33	3175.0	14.2	61.1	0.710	0.073	14.06
OUTLET	99.1	56	3052.1	14.2	32.0	0.704	0.074	15.26
MEAN	85.1	45	3114.0	14.2	42.4	0.707	0.074	14.68

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	36	14.16	74.9	97.0	16.8	98.0
4.5	41	14.29	79.7	104.1	15.3	89.0
7.5	46	14.44	85.5	112.2	14.0	82.0
11.0	51	14.62	92.2	119.1	14.0	81.0
16.5	59	14.91	102.8	128.6	14.6	85.0
21.0	62	15.14	111.4	131.9	18.5	108.0
22.5	63	15.22	114.3	130.7	23.1	135.0

TEST NO: G1.8 FLOW PATTERN:CHURN

ML= 327 MG= 5.94 QFLUX= 2849 NUTP= 18.1 HTP= 106 PDT= 0.006

PDF=-0.186 ALFA=0.807 WE= 20.95 TOUT(MEAS)=107.8,107.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	74.1	541	4453.0	14.2	59.1	0.709	1.099	19.88
OUTLET	77.0	580	4434.3	14.2	55.3	0.709	1.102	19.99
MEAN	75.6	561	4443.7	14.2	57.2	0.709	1.101	19.94

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	544	19.89	74.3	87.4	36.9	216.0
4.5	548	19.90	74.6	92.8	26.6	155.0
7.5	553	19.91	75.0	98.0	21.1	123.0
11.0	559	19.93	75.4	104.3	16.9	98.0
16.5	568	19.96	76.1	113.3	13.1	76.0
21.0	575	19.98	76.7	119.5	11.5	67.0
22.5	578	19.99	76.9	121.6	11.0	64.0

TEST NO: G1.9 FLOW PATTERN:CHURN-ANNULAR

ML= 21 MG= 8.34 QFLUX= 3281 NUTP= 24.3 HTP= 142 PDT=-0.034

PDF=-0.076 ALFA=0.959 WE= 0.09 TOUT(MEAS)=111.2,110.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.2	30	6313.0	14.1	66.0	0.710	0.073	27.77
OUTLET	103.1	59	6008.7	14.2	33.0	0.705	0.074	29.95
MEAN	85.6	45	6160.9	14.2	45.2	0.707	0.073	28.90

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	34	27.96	71.8	90.7	29.4	171.0
4.5	38	28.19	76.4	98.0	25.7	150.0
7.5	43	28.48	81.9	105.4	23.8	139.0
11.0	48	28.80	88.3	112.8	22.9	134.0
16.5	56	29.32	98.4	122.7	23.3	136.0
21.0	60	29.74	106.7	129.6	24.7	144.0
22.5	62	29.88	109.4	131.6	25.6	149.0

TEST NO: G1.10 FLOW PATTERN:ANNULAR

ML= 21 MG= 13.03 QFLUX= 3902 NUTP= 24.9 HTP= 145 PDT=-0.034

PDF=-0.066 ALFA=0.969 WE= 0.09 TOUT(MEAS)=107.8,107.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	66.0	29	9888.0	14.1	70.2	0.710	0.073	43.34
OUTLET	101.7	58	9400.4	14.1	33.8	0.705	0.074	46.65
MEAN	83.8	43	9644.7	14.1	47.5	0.708	0.073	45.06

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	32	43.62	69.6	90.0	32.1	187.0
4.5	35	43.98	74.0	98.4	27.1	158.0
7.5	40	44.41	79.4	106.9	24.1	141.0
11.0	46	44.91	85.6	114.6	23.0	134.0
16.5	54	45.69	95.4	123.7	23.8	139.0
21.0	59	46.33	103.5	130.2	25.2	147.0
22.5	60	46.54	106.2	132.1	26.0	152.0

TEST NO: G1.11 FLOW PATTERN:ANNULAR

ML= 21 MG= 18.15 QFLUX= 3880 NUTP= 28.9 HTP= 169 PDT=-0.017

PDF=-0.042 ALFA=0.975 WE= 0.09 TOUT(MEAS)= 98.0, 98.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	64.4	28	13810.0	14.2	74.0	0.711	0.073	59.88
OUTLET	96.4	55	13192.9	14.2	37.2	0.706	0.074	63.65
MEAN	80.4	41	13501.7	14.2	52.1	0.708	0.073	61.83

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	30	60.21	67.3	85.2	36.6	213.0
4.5	33	60.61	70.9	91.8	31.6	184.0
7.5	36	61.10	75.2	98.6	28.3	165.0
11.0	41	61.67	80.3	105.4	26.5	155.0
16.5	48	62.56	88.3	112.8	27.1	158.0
21.0	53	63.28	94.8	117.1	29.9	175.0
22.5	55	63.53	96.9	118.7	30.8	179.0

TEST NO: G1.12 FLOW PATTERN:ANNULAR

ML= 21 MG= 25.11 QFLUX= 4547 NUTP= 31.6 HTP= 185 PDT= 0.070

PDF= 0.050 ALFA=0.980 WE= 0.09 TOUT(MEAS)= 98.5, 98.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	63.0	26	19145.0	14.3	76.8	0.711	0.073	81.75
OUTLET	95.1	54	18283.0	14.3	37.0	0.706	0.074	87.70
MEAN	79.0	40	18714.4	14.3	53.0	0.709	0.073	84.83

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	29	82.26	66.0	84.2	42.2	247.0
4.5	32	82.90	69.8	91.9	34.9	204.0
7.5	36	83.67	74.4	99.6	30.7	179.0
11.0	41	84.56	79.7	106.6	28.9	169.0
16.5	48	85.97	88.1	114.2	30.0	175.0
21.0	54	87.12	94.9	119.7	31.7	185.0
22.5	55	87.51	97.2	121.5	32.4	189.0

TEST NO: G1.13 FLOW PATTERN:ANNULAR

ML= 21 MG= 60.13 QFLUX= 4691 NUTP= 35.0 HTP= 204 PDT= 0.682

PDF= 0.671 ALFA=0.990 WE= 0.09 TOUT(MEAS)= 84.2, 84.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	60.1	24	46040.0	15.6	84.3	0.711	0.073	178.07
OUTLET	84.2	45	44456.9	15.0	46.9	0.708	0.073	194.50
MEAN	72.2	35	45248.8	15.3	63.4	0.710	0.073	186.48

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	26	179.43	62.2	79.4	46.2	270.0
4.5	28	181.14	64.8	86.6	36.6	214.0
7.5	30	183.22	67.9	92.0	33.3	194.0
11.0	33	185.67	71.5	96.3	32.4	189.0
16.5	38	189.58	77.2	101.0	33.8	197.0
21.0	42	192.85	81.8	104.2	36.1	211.0
22.5	44	193.95	83.4	105.1	37.1	217.0

TEST NO: G1.14 FLOW PATTERN:ANNULAR

ML= 21 MG= 84.30 QFLUX= 6176 NUTP= 40.9 HTP= 239 PDT= 1.215

PDF= 1.206 ALFA=0.992 WE= 0.09 TOUT(MEAS)= 84.0, 83.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	59.8	24	64571.0	17.1	85.1	0.711	0.073	228.48
OUTLET	83.8	44	62356.1	15.9	47.2	0.708	0.073	256.75
MEAN	71.8	34	63464.0	16.5	63.9	0.710	0.073	242.82

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	26	230.75	61.9	81.7	52.9	309.0
4.5	28	233.64	64.5	89.4	42.1	246.0
7.5	30	237.16	67.6	94.9	38.5	225.0
11.0	33	241.35	71.2	99.0	38.0	222.0
16.5	38	248.12	76.9	103.5	39.8	233.0
21.0	42	253.83	81.6	106.6	42.4	248.0
22.5	44	255.77	83.1	107.5	43.5	254.0

TEST NO: G1.15 FLOW PATTERN:ANNULAR

ML= 21 MG=117.77 QFLUX= 6011 NUTP= 41.2 HTP= 240 PDT= 1.966

PDF= 1.958 ALFA=0.994 WE= 0.09 TOUT(MEAS)= 78.7, 79.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	60.8	25	90081.0	19.2	83.4	0.711	0.073	284.07
OUTLET	80.6	41	87510.6	17.3	52.8	0.709	0.073	326.23
MEAN	70.7	33	88796.2	18.3	66.8	0.710	0.073	305.26

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	26	287.36	62.4	82.4	50.9	297.0
4.5	27	291.57	64.3	88.5	42.2	247.0
7.5	29	296.73	66.6	92.6	39.6	231.0
11.0	31	302.93	69.4	95.6	39.2	229.0
16.5	35	313.07	73.6	99.2	40.3	235.0
21.0	38	321.75	77.1	101.8	41.8	244.0
22.5	39	324.73	78.3	102.6	42.5	248.0

TEST NO: G1.16 FLOW PATTERN:ANNULAR

ML= 21 MG=149.33 QFLUX= 7206 NUTP= 47.1 HTP= 275 PDT= 3.021

PDF= 3.015 ALFA=0.995 WE= 0.09 TOUT(MEAS)= 78.5, 79.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	62.4	26	113941.0	22.1	79.8	0.711	0.073	314.72
OUTLET	80.4	41	110992.0	19.1	52.8	0.709	0.073	374.21
MEAN	71.4	34	112466.7	20.6	65.3	0.710	0.073	344.28

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	27	319.21	63.9	84.9	58.2	340.0
4.5	28	324.97	65.6	91.3	47.9	279.0
7.5	30	332.11	67.7	95.2	44.8	262.0
11.0	32	340.77	70.2	98.2	44.1	258.0
16.5	35	355.14	74.1	101.5	45.0	263.0
21.0	38	367.67	77.3	100.8	52.6	307.0
22.5	39	372.01	78.3	104.7	47.0	275.0

TEST NO: G2.1 FLOW PATTERN:SLUG

ML= 42 MG= 0.53 QFLUX= 2413 NUTP= 25.2 HTP= 147 PDT= 0.103

PDF=-0.125 ALFA=0.772 WE= 0.36 TOUT(MEAS)= 89.0, 88.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.6	66	399.7	14.6	62.1	0.710	0.144	1.73
OUTLET	90.6	99	389.0	14.5	42.7	0.708	0.145	1.79
MEAN	81.1	83	394.3	14.5	51.5	0.709	0.145	1.76

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	69	1.73	73.1	89.2	25.5	149.0
4.5	72	1.74	75.0	90.3	26.9	157.0
7.5	76	1.75	77.2	92.2	27.5	161.0
11.0	81	1.76	79.8	94.1	28.8	168.0
16.5	88	1.77	83.9	98.0	29.4	171.0
21.0	94	1.79	87.3	99.0	35.1	205.0
22.5	96	1.79	88.4	83.3	80.4	470.0

TEST NO: G2.2 FLOW PATTERN:SLUG

ML= 42 MG= 0.75 QFLUX= 2414 NUTP= 30.8 HTP= 180 PDT= 0.051

PDF=-0.155 ALFA=0.793 WE= 0.36 TOUT(MEAS)= 88.4, 88.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.5	64	562.9	16.3	63.9	0.710	0.144	2.17
OUTLET	89.3	97	547.9	16.2	43.3	0.708	0.145	2.25
MEAN	79.9	81	555.4	16.3	52.6	0.709	0.144	2.21

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	67	2.17	72.0	86.7	27.9	163.0
4.5	70	2.18	73.9	88.3	28.6	167.0
7.5	74	2.19	76.2	91.1	27.8	162.0
11.0	79	2.21	78.9	92.9	29.5	172.0
16.5	87	2.22	83.1	96.7	30.4	177.0
21.0	93	2.24	86.6	97.8	36.7	214.0
22.5	95	2.25	87.7	97.1	44.2	258.0

TEST NO: G2.3 FLOW PATTERN:SLUG

ML= 42 MG= 1.05 QFLUX= 3256 NUTP= 31.9 HTP= 186 PDT= 0.013

PDF=-0.156 ALFA=0.831 WE= 0.36 TOUT(MEAS)= 95.2, 94.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.3	64	790.1	14.4	63.8	0.710	0.144	3.45
OUTLET	95.4	107	762.2	14.4	38.7	0.707	0.145	3.61
MEAN	82.9	85	776.1	14.4	49.4	0.708	0.145	3.53

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	67	3.46	72.4	92.6	27.5	160.0
4.5	72	3.48	75.1	94.5	28.4	166.0
7.5	78	3.50	78.2	97.3	29.1	170.0
11.0	84	3.52	82.0	100.2	30.6	179.0
16.5	95	3.56	87.8	105.4	31.8	185.0
21.0	103	3.59	92.6	107.2	38.3	224.0
22.5	105	3.61	94.2	106.0	47.2	276.0

TEST NO: G2.4 FLOW PATTERN:SLUG

ML= 42 MG= 1.47 QFLUX= 3571 NUTP= 29.4 HTP= 171 PDT=-0.003

PDF=-0.148 ALFA=0.855 WE= 0.37 TOUT(MEAS)=101.9,101.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.2	64	1105.0	14.3	63.4	0.710	0.144	4.85
OUTLET	97.5	110	1063.0	14.3	35.6	0.706	0.145	5.14
MEAN	83.9	87	1084.0	14.3	46.8	0.708	0.145	5.00

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	68	4.88	72.9	97.2	25.0	146.0
4.5	74	4.91	76.3	100.2	25.4	148.0
7.5	82	4.95	80.4	103.1	26.8	156.0
11.0	90	4.99	85.1	110.1	24.5	143.0
16.5	103	5.06	92.6	112.8	30.2	176.0
21.0	111	5.11	98.7	114.7	38.4	224.0
22.5	114	5.13	100.7	113.1	49.3	288.0

TEST NO: G2.5 FLOW PATTERN:SLUG-CHURN

ML= 42 MG= 2.04 QFLUX= 3559 NUTP= 34.0 HTP= 199 PDT=-0.018

PDF=-0.143 ALFA=0.875 WE= 0.36 TOUT(MEAS)= 96.4, 96.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.0	64	1537.0	14.3	64.1	0.710	0.144	6.73
OUTLET	96.9	109	1480.2	14.3	38.1	0.707	0.145	7.05
MEAN	83.4	86	1508.9	14.3	49.1	0.708	0.145	6.89

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	67	6.75	72.3	92.1	30.5	178.0
4.5	72	6.79	75.1	96.1	28.8	168.0
7.5	78	6.83	78.5	98.3	30.7	179.0
11.0	85	6.88	82.4	102.2	30.8	180.0
16.5	96	6.96	88.6	106.2	34.7	202.0
21.0	104	7.02	93.7	107.9	43.0	251.0
22.5	107	7.04	95.4	106.9	52.8	308.0

TEST NO: G2.6 FLOW PATTERN:SLUG-CHURN

ML= 42 MG= 2.82 QFLUX= 4205 NUTP= 38.7 HTP= 226 PDT= 0.027

PDF=-0.079 ALFA=0.893 WE= 0.37 TOUT(MEAS)= 99.7, 99.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.2	64	2129.0	14.2	63.5	0.710	0.144	9.37
OUTLET	101.1	114	2038.1	14.2	36.4	0.706	0.145	9.91
MEAN	85.7	89	2083.7	14.2	47.6	0.708	0.145	9.65

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	68	9.41	72.8	94.0	33.6	196.0
4.5	74	9.47	75.9	98.0	32.4	189.0
7.5	80	9.54	79.7	100.2	35.1	205.0
11.0	88	9.62	84.2	103.3	37.5	219.0
16.5	100	9.75	91.1	109.1	40.1	234.0
21.0	109	9.86	96.9	112.5	46.4	271.0
22.5	111	9.89	98.8	112.5	52.6	307.0

TEST NO: G2.7 FLOW PATTERN:CHURN

ML= 42 MG= 4.21 QFLUX= 4726 NUTP= 38.7 HTP= 226 PDT= 0.062

PDF=-0.026 ALFA=0.912 WE= 0.37 TOUT(MEAS)=103.7,104.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.6	63	3180.0	14.3	64.2	0.710	0.144	13.94
OUTLET	103.1	116	3034.1	14.2	34.8	0.706	0.145	14.91
MEAN	86.3	90	3107.5	14.2	46.4	0.708	0.145	14.44

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	68	14.03	72.6	91.2	42.9	251.0
4.5	74	14.13	76.3	95.6	41.5	242.0
7.5	82	14.26	80.7	101.0	39.7	232.0
11.0	91	14.40	85.9	107.7	37.1	216.0
16.5	105	14.63	94.0	116.2	36.5	213.0
21.0	114	14.82	100.6	121.7	38.8	227.0
22.5	116	14.88	102.9	122.3	42.0	245.0

TEST NO: G2.8 FLOW PATTERN:CHURN

ML= 42 MG= 6.62 QFLUX= 5464 NUTP= 44.9 HTP= 262 PDT= 0.076

PDF= 0.006 ALFA=0.930 WE= 0.37 TOUT(MEAS)=112.4,111.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.9	62	5004.0	14.3	64.8	0.710	0.144	21.80
OUTLET	105.1	118	4754.6	14.2	32.7	0.705	0.146	23.70
MEAN	87.0	90	4879.3	14.3	44.4	0.707	0.145	22.78

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	68	21.96	72.6	93.7	43.8	256.0
4.5	76	22.16	77.2	98.9	42.8	250.0
7.5	86	22.41	82.8	104.3	43.3	253.0
11.0	97	22.69	89.3	110.4	44.3	259.0
16.5	112	23.15	99.5	120.3	45.1	263.0
21.0	121	23.51	107.9	127.5	48.2	282.0
22.5	123	23.64	110.7	129.8	49.5	289.0

TEST NO: G2.9 FLOW PATTERN:CHURN-ANNULAR

ML= 42 MG= 9.30 QFLUX= 6026 NUTP= 48.8 HTP= 285 PDT= 0.070

PDF= 0.012 ALFA=0.942 WE= 0.37 TOUT(MEAS)=106.9,106.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.1	60	7036.0	14.4	66.5	0.710	0.144	30.44
OUTLET	105.6	119	6674.3	14.3	34.0	0.705	0.145	32.82
MEAN	86.8	90	6855.5	14.3	46.4	0.708	0.145	31.67

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	66	30.64	71.4	93.1	47.1	275.0
4.5	73	30.90	75.6	97.2	47.3	276.0
7.5	82	31.20	80.5	102.4	46.9	274.0
11.0	92	31.56	86.4	107.9	47.8	279.0
16.5	107	32.12	95.5	116.6	49.0	286.0
21.0	116	32.59	103.0	122.5	53.1	310.0
22.5	119	32.74	105.4	125.0	53.3	311.0

TEST NO: G2.10 FLOW PATTERN:CHURN-ANNULAR

ML= 42 MG= 13.02 QFLUX= 7030 NUTP= 48.4 HTP= 283 PDT= 0.073

PDF= 0.024 ALFA=0.952 WE= 0.37 TOUT(MEAS)=109.8,109.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	67.2	59	9864.0	14.3	67.8	0.710	0.144	42.72
OUTLET	107.3	120	9323.0	14.3	33.3	0.705	0.146	46.38
MEAN	87.3	90	9593.8	14.3	46.1	0.708	0.145	44.61

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	65	43.03	70.9	94.9	49.5	289.0
4.5	73	43.42	75.4	100.4	47.7	279.0
7.5	83	43.89	80.9	106.3	47.1	275.0
11.0	94	44.44	87.3	112.8	47.1	275.0
16.5	109	45.31	97.3	122.4	48.2	282.0
21.0	119	46.02	105.5	129.3	51.0	298.0
22.5	121	46.26	108.2	131.3	52.6	307.0

TEST NO: G2.11 FLOW PATTERN:ANNULAR

ML= 42 MG= 18.15 QFLUX= 7683 NUTP= 51.6 HTP= 302 PDT= 0.135

PDF= 0.095 ALFA=0.961 WE= 0.37 TOUT(MEAS)=107.8,107.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	66.1	57	13769.0	14.5	69.9	0.710	0.144	58.80
OUTLET	105.8	119	13019.0	14.3	33.7	0.705	0.146	64.02
MEAN	85.9	88	13394.3	14.4	47.3	0.708	0.145	61.50

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	63	59.24	69.7	93.7	54.1	316.0
4.5	71	59.80	74.1	99.0	52.3	306.0
7.5	80	60.47	79.5	105.4	50.6	296.0
11.0	91	61.26	85.8	112.2	49.6	290.0
16.5	107	62.49	95.6	121.3	51.4	300.0
21.0	117	63.51	103.6	128.4	53.5	313.0
22.5	119	63.85	106.3	130.5	54.8	320.0

TEST NO: G2.12 FLOW PATTERN:ANNULAR

ML= 42 MG= 25.16 QFLUX= 8349 NUTP= 53.1 HTP= 310 PDT= 0.247

PDF= 0.210 ALFA=0.964 WE= 0.37 TOUT(MEAS)=107.5,107.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	66.7	58	19079.0	19.0	68.9	0.710	0.144	62.11
OUTLET	103.4	117	18114.6	18.8	33.8	0.705	0.146	67.75
MEAN	85.0	87	18597.1	18.9	47.1	0.708	0.145	65.02

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	64	62.59	70.2	92.0	64.5	377.0
4.5	71	63.19	74.6	98.6	58.7	343.0
7.5	81	63.92	79.8	106.3	53.6	313.0
11.0	91	64.76	85.9	114.0	50.7	296.0
16.5	107	66.10	95.5	124.1	50.2	293.0
21.0	116	67.20	103.3	131.4	51.4	300.0
22.5	119	67.56	105.9	133.5	52.4	306.0

TEST NO: G2.13 FLOW PATTERN:ANNULAR

ML= 42 MG= 60.13 QFLUX= 8727 NUTP= 67.5 HTP= 394 PDT= 1.060

PDF= 1.041 ALFA=0.982 WE= 0.36 TOUT(MEAS)= 92.9, 93.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	62.4	52	45883.0	16.6	78.5	0.711	0.144	168.52
OUTLET	90.9	100	44037.5	15.6	39.9	0.707	0.145	190.13
MEAN	76.6	76	44960.4	16.1	56.1	0.709	0.144	179.51

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	56	170.27	65.0	82.8	82.9	485.0
4.5	61	172.49	68.3	88.4	73.8	431.0
7.5	67	175.19	72.2	94.3	67.3	393.0
11.0	75	178.40	76.8	100.1	64.0	374.0
16.5	88	183.57	84.1	107.5	63.8	373.0
21.0	98	187.91	90.0	112.5	66.6	389.0
22.5	102	189.39	91.9	114.1	67.9	397.0

TEST NO: G2.14 FLOW PATTERN:ANNULAR

ML= 42 MG= 84.30 QFLUX= 9918 NUTP= 70.0 HTP= 409 PDT= 1.728

PDF= 1.713 ALFA=0.986 WE= 0.36 TOUT(MEAS)= 90.7, 90.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	62.2	51	64351.0	18.5	79.2	0.711	0.144	212.41
OUTLET	88.5	96	61944.1	16.7	41.4	0.707	0.145	246.36
MEAN	75.3	74	63147.6	17.6	57.5	0.709	0.144	229.52

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	55	215.09	64.6	82.7	92.8	542.0
4.5	60	218.49	67.7	89.1	78.6	460.0
7.5	66	222.67	71.4	95.5	70.0	409.0
11.0	73	227.67	75.7	101.5	65.7	384.0
16.5	85	235.82	82.4	108.6	65.0	380.0
21.0	95	242.78	87.9	113.2	67.6	395.0
22.5	98	245.16	89.8	114.6	69.0	403.0

TEST NO: G2.15 FLOW PATTERN:ANUULAR-MIST

ML= 42 MG=123.27 QFLUX= 11396 NUTP= 65.1 HTP= 380 PDT= 2.528

PDF= 2.516 ALFA=0.989 WE= 0.36 TOUT(MEAS)= 88.9, 88.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	62.7	52	94026.0	21.0	78.4	0.711	0.144	273.53
OUTLET	86.0	92	90895.7	18.5	42.9	0.708	0.145	325.09
MEAN	74.3	72	92461.2	19.7	58.3	0.709	0.144	299.29

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	55	277.49	64.9	85.2	94.7	554.0
4.5	60	282.55	67.7	93.9	73.8	431.0
7.5	65	288.80	71.1	101.4	64.0	374.0
11.0	72	296.34	75.0	107.5	60.0	351.0
16.5	83	308.77	81.1	113.8	60.0	350.0
21.0	92	319.51	86.1	117.6	62.4	365.0
22.5	95	323.21	87.8	118.7	63.6	372.0

TEST NO: G2.16 FLOW PATTERN:ANNULAR-MIST

ML= 42 MG=147.99 QFLUX= 12523 NUTP= 56.2 HTP= 328 PDT= 3.022

PDF= 3.011 ALFA=0.990 WE= 0.36 TOUT(MEAS)= 89.8, 90.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	64.4	55	112593.0	23.0	74.7	0.711	0.144	300.96
OUTLET	85.7	91	109166.6	20.0	42.0	0.707	0.145	361.72
MEAN	75.0	73	110880.0	21.5	56.2	0.709	0.144	331.20

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	58	305.57	66.6	94.3	76.2	446.0
4.5	62	311.48	69.3	105.4	58.9	344.0
7.5	68	318.80	72.6	112.1	54.1	316.0
11.0	75	327.65	76.5	117.1	52.9	309.0
16.5	85	342.33	82.5	122.2	54.2	317.0
21.0	94	355.08	87.4	126.0	55.9	327.0
22.5	97	359.48	89.1	127.3	56.6	331.0

TEST NO: G3.1 FLOW PATTERN:SLUG

ML= 112 MG= 0.41 QFLUX= 2510 NUTP= 29.1 HTP= 170 PDT=-0.020

PDF=-0.397 ALFA=0.621 WE= 2.49 TOUT(MEAS)= 78.4, 78.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.5	166	311.6	15.0	66.3	0.710	0.379	1.30
OUTLET	77.1	200	308.1	15.0	53.5	0.709	0.380	1.32
MEAN	73.3	183	309.9	15.0	59.6	0.709	0.380	1.31

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	169	1.30	70.3	82.7	34.3	200.0
4.5	173	1.31	71.2	82.0	39.4	230.0
7.5	178	1.31	72.3	88.2	27.1	158.0
11.0	184	1.31	73.6	90.7	25.3	147.0
16.5	194	1.32	75.7	92.0	26.5	154.0
21.0	202	1.32	77.4	92.3	29.0	169.0
22.5	204	1.32	78.0	90.8	33.6	196.0

TEST NO: G3.2 FLOW PATTERN:SLUG

ML= 112 MG= 0.75 QFLUX= 3087 NUTP= 35.2 HTP= 206 PDT= 0.179

PDF=-0.117 ALFA=0.702 WE= 2.49 TOUT(MEAS)= 78.2, 78.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.5	162	565.5	14.8	68.0	0.710	0.379	2.39
OUTLET	77.8	204	557.9	14.6	53.6	0.709	0.380	2.46
MEAN	73.2	183	561.7	14.7	60.4	0.710	0.380	2.42

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	165	2.39	69.3	85.4	32.8	191.0
4.5	170	2.40	70.4	86.1	33.5	195.0
7.5	175	2.41	71.6	87.1	34.1	199.0
11.0	182	2.42	73.1	88.4	34.4	201.0
16.5	192	2.44	75.4	90.1	36.1	211.0
21.0	201	2.45	77.3	91.4	37.6	220.0
22.5	204	2.46	77.9	91.3	39.5	231.0

TEST NO: G3.3 FLOW PATTERN:SLUG

ML= 112 MG= 1.05 QFLUX= 4012 NUTP= 39.2 HTP= 229 PDT= 0.093

PDF=-0.165 ALFA=0.741 WE= 2.49 TOUT(MEAS)= 80.9, 80.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.3	161	794.1	14.7	68.1	0.710	0.379	3.37
OUTLET	80.4	216	780.4	14.6	50.4	0.709	0.380	3.47
MEAN	74.4	188	787.3	14.6	58.7	0.709	0.380	3.42

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	165	3.38	69.4	87.8	37.2	217.0
4.5	171	3.39	70.8	88.9	37.7	220.0
7.5	178	3.40	72.4	90.3	38.2	223.0
11.0	187	3.41	74.3	92.0	38.7	226.0
16.5	201	3.44	77.2	94.6	39.6	231.0
21.0	212	3.46	79.6	95.9	42.2	246.0
22.5	216	3.46	80.4	96.7	42.3	247.0

TEST NO: G3.4 FLOW PATTERN:SLUG

ML= 112 MG= 1.47 QFLUX= 4903 NUTP= 41.9 HTP= 244 PDT= 0.082

PDF=-0.141 ALFA=0.776 WE= 2.50 TOUT(MEAS)= 83.2, 83.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.5	162	1110.0	14.5	67.6	0.710	0.379	4.76
OUTLET	83.2	229	1087.2	14.4	47.9	0.708	0.381	4.92
MEAN	75.9	195	1098.9	14.5	57.0	0.709	0.380	4.85

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	167	4.78	69.8	90.9	39.6	231.0
4.5	174	4.80	71.4	92.3	39.9	233.0
7.5	182	4.82	73.2	93.9	40.5	237.0
11.0	193	4.84	75.4	96.0	40.7	238.0
16.5	209	4.88	78.9	98.8	42.2	246.0
21.0	222	4.91	81.7	100.2	45.6	266.0
22.5	227	4.92	82.7	100.0	48.7	284.0

TEST NO: G3.5 FLOW PATTERN:SLUG-CHURN

ML= 112 MG= 2.04 QFLUX= 4884 NUTP= 44.9 HTP= 262 PDT= 0.094

PDF=-0.100 ALFA=0.805 WE= 2.50 TOUT(MEAS)= 85.2, 84.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.5	161	1545.0	14.5	67.5	0.710	0.379	6.63
OUTLET	83.1	229	1513.2	14.4	46.1	0.708	0.381	6.88
MEAN	75.8	195	1529.4	14.5	55.9	0.709	0.380	6.76

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	168	6.65	69.9	89.9	41.6	243.0
4.5	175	6.68	71.7	91.3	42.5	248.0
7.5	185	6.71	73.8	93.3	42.7	250.0
11.0	196	6.75	76.3	95.3	43.9	256.0
16.5	215	6.81	80.2	98.9	44.7	261.0
21.0	230	6.86	83.4	100.0	50.5	295.0
22.5	235	6.87	84.5	100.1	53.6	313.0

TEST NO: G3.6 FLOW PATTERN:SLUG-CHURN

ML= 112 MG= 2.82 QFLUX= 5209 NUTP= 44.0 HTP= 257 PDT= 0.117

PDF=-0.052 ALFA=0.831 WE= 2.50 TOUT(MEAS)= 83.4, 83.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.4	161	2134.0	14.6	67.8	0.710	0.379	9.11
OUTLET	83.9	232	2087.4	14.5	47.6	0.708	0.381	9.44
MEAN	76.1	197	2111.0	14.5	57.0	0.709	0.380	9.28

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	166	9.14	69.7	89.8	44.0	257.0
4.5	174	9.17	71.3	92.4	42.1	246.0
7.5	182	9.22	73.2	93.8	43.3	253.0
11.0	193	9.27	75.5	96.5	42.4	248.0
16.5	209	9.35	79.1	99.3	44.1	258.0
21.0	223	9.41	82.0	101.0	47.0	274.0
22.5	228	9.43	82.9	101.0	49.5	289.0

TEST NO: G3.7 FLOW PATTERN:CHURN

ML= 112 MG= 4.23 QFLUX= 5793 NUTP= 48.3 HTP= 282 PDT= 0.149

PDF= 0.007 ALFA=0.859 WE= 2.50 TOUT(MEAS)= 86.3, 86.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.4	161	3197.0	14.7	67.6	0.710	0.379	13.57
OUTLET	85.4	239	3119.6	14.5	44.9	0.708	0.381	14.17
MEAN	76.9	200	3158.4	14.6	55.2	0.709	0.380	13.88

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	168	13.62	69.9	91.0	46.7	273.0
4.5	176	13.69	71.8	92.6	47.6	278.0
7.5	187	13.76	74.1	94.9	47.7	279.0
11.0	199	13.85	76.9	97.8	47.3	276.0
16.5	219	13.99	81.1	101.2	49.4	289.0
21.0	235	14.11	84.6	104.8	49.1	286.0
22.5	241	14.15	85.7	105.2	51.1	299.0

TEST NO: G3.8 FLOW PATTERN:CHURN

ML= 112 MG= 6.64 QFLUX= 5863 NUTP= 52.9 HTP= 309 PDT= 0.190

PDF= 0.076 ALFA=0.885 WE= 2.50 TOUT(MEAS)= 85.8, 86.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.1	160	5027.0	14.7	68.1	0.710	0.379	21.27
OUTLET	85.2	238	4905.3	14.5	45.3	0.708	0.381	22.27
MEAN	76.6	199	4966.3	14.6	55.6	0.709	0.380	21.79

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	166	21.36	69.6	89.2	51.0	298.0
4.5	175	21.46	71.6	91.4	50.5	295.0
7.5	185	21.59	73.9	93.7	50.3	294.0
11.0	198	21.74	76.5	95.8	52.0	304.0
16.5	217	21.98	80.7	99.1	54.8	320.0
21.0	234	22.17	84.2	102.2	56.0	327.0
22.5	239	22.24	85.3	103.2	56.4	329.0

TEST NO: G3.9 FLOW PATTERN:CHURN-ANNULAR

ML= 112 MG= 9.33 QFLUX= 6391 NUTP= 58.4 HTP= 341 PDT= 0.244

PDF= 0.147 ALFA=0.903 WE= 2.50 TOUT(MEAS)= 87.2, 87.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	67.7	158	7064.0	14.6	68.7	0.710	0.379	29.95
OUTLET	85.9	242	6881.5	14.4	44.2	0.708	0.381	31.57
MEAN	76.8	200	6973.1	14.5	55.2	0.709	0.380	30.79

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	165	30.09	69.4	89.2	54.9	321.0
4.5	174	30.26	71.5	91.1	55.4	323.0
7.5	186	30.47	74.0	93.6	55.6	325.0
11.0	199	30.71	76.9	96.3	56.3	329.0
16.5	221	31.09	81.5	99.5	60.8	355.0
21.0	239	31.41	85.3	102.6	63.2	370.0
22.5	245	31.52	86.5	103.6	64.3	375.0

TEST NO: G3.10 FLOW PATTERN:CHURN-ANNULAR

ML= 112 MG= 13.06 QFLUX= 7212 NUTP= 63.3 HTP= 370 PDT= 0.303

PDF= 0.220 ALFA=0.918 WE= 2.51 TOUT(MEAS)= 88.7, 88.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	67.2	156	9897.0	14.8	69.4	0.710	0.379	41.44
OUTLET	87.2	248	9617.6	14.5	42.9	0.708	0.381	43.99
MEAN	77.2	202	9757.8	14.7	54.7	0.709	0.380	42.76

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	164	41.66	69.1	89.6	59.6	348.0
4.5	174	41.93	71.4	91.8	60.1	351.0
7.5	187	42.25	74.1	94.4	60.8	355.0
11.0	202	42.64	77.4	97.3	61.9	362.0
16.5	225	43.24	82.4	101.2	65.9	385.0
21.0	245	43.74	86.6	105.0	67.1	392.0
22.5	251	43.91	88.0	106.2	67.8	396.0

TEST NO: G3.11 FLOW PATTERN:ANNULAR

ML= 112 MG= 18.12 QFLUX= 8094 NUTP= 69.9 HTP= 408 PDT= 0.405

PDF= 0.335 ALFA=0.930 WE= 2.51 TOUT(MEAS)= 89.9, 89.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	66.7	154	13735.0	15.1	70.3	0.710	0.379	56.43
OUTLET	88.2	252	13317.3	14.7	42.0	0.707	0.381	60.49
MEAN	77.4	203	13526.4	14.9	54.4	0.709	0.380	58.52

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	162	56.77	68.7	89.7	65.5	383.0
4.5	173	57.20	71.2	92.0	66.2	387.0
7.5	187	57.72	74.2	94.8	66.9	391.0
11.0	203	58.33	77.7	97.8	68.9	402.0
16.5	229	59.29	83.2	102.5	71.7	419.0
21.0	250	60.09	87.7	106.1	75.2	439.0
22.5	256	60.36	89.1	107.4	76.0	444.0

TEST NO: G3.12 FLOW PATTERN:ANNULAR

ML= 112 MG= 25.18 QFLUX= 9411 NUTP= 81.4 HTP= 476 PDT= 0.617

PDF= 0.557 ALFA=0.941 WE= 2.51 TOUT(MEAS)= 91.4, 91.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	66.3	152	19105.0	15.4	70.9	0.710	0.379	76.48
OUTLET	89.8	259	18471.7	14.8	41.0	0.707	0.382	83.34
MEAN	78.0	206	18788.4	15.1	53.9	0.709	0.380	80.00

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	161	77.05	68.4	89.3	76.7	448.0
4.5	173	77.77	71.1	91.9	77.2	451.0
7.5	188	78.64	74.4	94.9	78.1	456.0
11.0	205	79.66	78.1	98.3	79.6	465.0
16.5	233	81.29	84.1	103.4	83.4	487.0
21.0	255	82.65	88.9	107.2	88.4	517.0
22.5	262	83.11	90.5	108.5	90.0	526.0

TEST NO: G3.13 FLOW PATTERN:ANNULAR

ML= 112 MG= 38.41 QFLUX= 10329 NUTP= 92.8 HTP= 543 PDT= 1.103

PDF= 1.055 ALFA=0.953 WE= 2.50 TOUT(MEAS)= 89.8, 89.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.8	150	29166.0	16.6	72.1	0.710	0.379	108.71
OUTLET	89.1	256	28201.1	15.4	42.1	0.707	0.381	121.54
MEAN	77.4	203	28683.9	16.0	55.1	0.709	0.380	115.23

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	159	109.75	67.8	87.3	90.0	526.0
4.5	170	111.07	70.4	90.0	89.7	524.0
7.5	184	112.67	73.5	93.2	89.5	523.0
11.0	200	114.57	77.1	96.6	90.7	530.0
16.5	227	117.64	82.8	101.5	94.9	555.0
21.0	249	120.22	87.5	105.5	98.7	577.0
22.5	256	121.10	89.0	106.9	99.7	583.0

TEST NO: G3.14 FLOW PATTERN:ANNULAR

ML= 112 MG= 60.26 QFLUX= 11336 NUTP=100.4 HTP= 587 PDT= 1.731

PDF= 1.692 ALFA=0.963 WE= 2.50 TOUT(MEAS)= 88.8, 88.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	64.9	147	45811.0	18.3	73.8	0.711	0.379	154.20
OUTLET	87.4	248	44350.3	16.6	42.8	0.708	0.381	177.51
MEAN	76.1	198	45080.9	17.4	56.4	0.709	0.380	165.94

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	155	156.04	67.0	85.6	103.4	604.0
4.5	166	158.37	69.5	88.6	100.9	590.0
7.5	180	161.24	72.6	92.3	98.4	575.0
11.0	196	164.67	76.2	95.9	98.2	574.0
16.5	223	170.27	81.9	101.3	100.3	586.0
21.0	244	175.05	86.5	105.4	103.3	604.0
22.5	251	176.68	88.1	106.7	104.5	611.0

TEST NO: G3.15 FLOW PATTERN:ANNULAR

ML= 112 MG= 84.57 QFLUX= 11869 NUTP=101.6 HTP= 594 PDT= 2.482

PDF= 2.450 ALFA=0.969 WE= 2.50 TOUT(MEAS)= 87.6, 87.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	64.7	146	64313.0	20.4	74.3	0.711	0.379	193.46
OUTLET	85.4	239	62417.8	18.0	43.9	0.708	0.381	228.75
MEAN	75.1	193	63365.5	19.2	57.3	0.709	0.380	211.08

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	154	196.16	66.7	84.1	115.7	676.0
4.5	164	199.62	69.1	87.7	108.6	635.0
7.5	177	203.90	72.1	91.3	105.0	614.0
11.0	193	209.06	75.5	96.0	98.7	577.0
16.5	218	217.57	80.9	101.7	97.4	570.0
21.0	239	224.93	85.3	106.0	98.4	576.0
22.5	245	227.46	86.7	108.4	94.5	552.0

TEST NO: G3.16 FLOW PATTERN:ANNULAR-MIST

ML= 112 MG=109.65 QFLUX= 12667 NUTP=103.3 HTP= 604 PDT= 3.228

PDF= 3.199 ALFA=0.973 WE= 2.50 TOUT(MEAS)= 86.6, 85.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.4	149	83297.0	22.9	73.1	0.710	0.379	223.88
OUTLET	84.5	235	81021.3	19.7	45.0	0.708	0.381	269.54
MEAN	74.9	192	82159.4	21.3	57.5	0.709	0.380	246.54

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	156	227.32	67.2	83.8	129.4	757.0
4.5	165	231.72	69.4	87.8	116.9	683.0
7.5	177	237.19	72.1	92.4	106.4	622.0
11.0	192	243.83	75.3	96.9	99.9	584.0
16.5	215	254.87	80.2	102.8	96.0	561.0
21.0	234	264.50	84.2	107.1	95.4	558.0
22.5	240	267.85	85.6	108.3	95.9	560.0

TEST NO: G3.17 FLOW PATTERN:ANNULAR-MIST

ML= 112 MG=137.85 QFLUX= 13714 NUTP= 97.9 HTP= 573 PDT= 3.919

PDF= 3.893 ALFA=0.976 WE= 2.50 TOUT(MEAS)= 86.6, 85.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	66.2	152	104601.0	25.7	71.6	0.710	0.379	251.37
OUTLET	83.9	232	101945.5	21.8	45.1	0.708	0.381	306.07
MEAN	75.0	192	103273.3	23.8	57.0	0.709	0.380	278.41

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	159	255.44	67.9	84.7	137.8	806.0
4.5	168	260.66	70.0	90.1	116.1	679.0
7.5	179	267.16	72.6	95.6	101.6	594.0
11.0	193	275.09	75.6	100.7	93.4	546.0
16.5	215	288.33	80.3	107.0	88.1	515.0
21.0	233	299.96	84.1	111.3	86.8	507.0
22.5	239	304.01	85.4	112.5	87.0	508.0

TEST NO: G4.1 FLOW PATTERN:SLUG

ML= 390 MG= 0.53 QFLUX= 2582 NUTP= 36.5 HTP= 213 PDT= 0.679

PDF= 0.135 ALFA=0.453 WE= 29.70 TOUT(MEAS)= 72.4, 72.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.9	582	400.0	15.7	66.0	0.710	1.313	1.59
OUTLET	72.2	616	398.7	15.1	62.4	0.710	1.314	1.67
MEAN	71.1	599	399.4	15.4	64.2	0.710	1.314	1.63

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	584	1.60	70.1	81.5	38.7	226.0
4.5	588	1.60	70.4	82.3	37.1	216.0
7.5	592	1.61	70.6	82.7	36.5	213.0
11.0	597	1.63	71.0	83.2	36.1	210.0
16.5	605	1.64	71.5	83.6	36.4	212.0
21.0	612	1.66	71.9	84.1	36.3	212.0
22.5	614	1.66	72.0	84.2	36.4	212.0

TEST NO: G4.2 FLOW PATTERN:SLUG

ML= 390 MG= 0.75 QFLUX= 3527 NUTP= 40.7 HTP= 238 PDT= 0.603

PDF= 0.120 ALFA=0.515 WE= 29.71 TOUT(MEAS)= 73.1, 73.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.7	578	563.3	15.6	66.3	0.710	1.313	2.26
OUTLET	72.8	625	560.8	15.0	61.5	0.710	1.315	2.36
MEAN	71.2	602	562.0	15.3	63.9	0.710	1.314	2.31

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	582	2.27	70.0	84.3	42.1	246.0
4.5	587	2.28	70.3	85.4	39.8	232.0
7.5	593	2.29	70.7	85.8	39.9	233.0
11.0	599	2.31	71.1	85.9	40.9	239.0
16.5	610	2.33	71.8	86.6	40.9	239.0
21.0	619	2.35	72.4	87.0	41.2	241.0
22.5	622	2.36	72.6	87.3	41.0	240.0

TEST NO: G4.3 FLOW PATTERN:SLUG

ML= 390 MG= 1.05 QFLUX= 4163 NUTP= 45.0 HTP= 263 PDT= 0.547

PDF= 0.120 ALFA=0.571 WE= 29.70 TOUT(MEAS)= 73.3, 73.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.4	573	791.4	15.5	66.9	0.710	1.313	3.19
OUTLET	73.0	629	787.2	15.0	61.2	0.710	1.315	3.32
MEAN	71.2	601	789.3	15.2	64.0	0.710	1.314	3.26

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	578	3.20	69.7	85.2	45.8	268.0
4.5	583	3.21	70.1	86.1	44.3	258.0
7.5	590	3.23	70.5	86.4	44.8	262.0
11.0	598	3.25	71.0	86.9	44.9	263.0
16.5	611	3.28	71.9	87.7	45.1	263.0
21.0	622	3.31	72.6	88.3	45.2	264.0
22.5	625	3.32	72.8	88.3	45.8	268.0

TEST NO: G4.4 FLOW PATTERN:SLUG

ML= 390 MG= 1.46 QFLUX= 4498 NUTP= 48.2 HTP= 282 PDT= 0.509

PDF= 0.133 ALFA=0.622 WE= 29.71 TOUT(MEAS)= 73.7, 73.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.4	573	1104.0	15.4	66.9	0.710	1.313	4.48
OUTLET	73.3	633	1098.4	14.9	60.8	0.710	1.315	4.66
MEAN	71.3	603	1101.6	15.1	63.8	0.710	1.314	4.57

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	578	4.50	69.7	85.4	49.0	286.0
4.5	584	4.51	70.1	86.2	47.7	279.0
7.5	591	4.54	70.6	86.8	47.4	277.0
11.0	600	4.56	71.1	87.2	48.0	281.0
16.5	614	4.61	72.1	87.8	48.7	284.0
21.0	625	4.64	72.8	88.6	48.6	284.0
22.5	629	4.66	73.0	88.7	49.0	286.0

TEST NO: G4.5 FLOW PATTERN:SLUG-CHURN

ML= 390 MG= 2.00 QFLUX= 4845 NUTP= 52.0 HTP= 304 PDT= 0.498

PDF= 0.165 ALFA=0.665 WE= 29.74 TOUT(MEAS)= 74.3, 74.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.9	581	1507.0	15.4	65.9	0.710	1.313	6.13
OUTLET	74.1	647	1498.0	14.9	59.5	0.709	1.315	6.38
MEAN	72.0	614	1502.6	15.1	62.6	0.710	1.314	6.26

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	587	6.15	70.3	85.9	53.0	309.0
4.5	593	6.18	70.7	86.7	51.7	302.0
7.5	601	6.21	71.2	87.4	51.2	299.0
11.0	611	6.25	71.9	88.0	51.3	299.0
16.5	626	6.31	72.8	88.6	52.5	307.0
21.0	638	6.36	73.6	89.3	52.9	309.0
22.5	642	6.37	73.9	89.6	52.8	309.0

TEST NO: G4.6 FLOW PATTERN:SLUG-CHURN

ML= 390 MG= 2.90 QFLUX= 4842 NUTP= 55.7 HTP= 326 PDT= 0.551

PDF= 0.263 ALFA=0.711 WE= 29.73 TOUT(MEAS)= 74.3, 74.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.7	578	2193.0	15.5	66.3	0.710	1.313	8.86
OUTLET	73.9	643	2179.7	14.9	59.8	0.709	1.315	9.25
MEAN	71.8	611	2186.4	15.2	63.0	0.710	1.314	9.06

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	583	8.89	70.1	84.6	56.8	332.0
4.5	590	8.93	70.5	85.4	55.3	323.0
7.5	598	8.98	71.0	85.8	56.0	327.0
11.0	607	9.04	71.6	86.6	55.4	324.0
16.5	622	9.13	72.6	87.5	55.5	324.0
21.0	635	9.21	73.4	88.1	56.1	328.0
22.5	639	9.24	73.6	88.4	56.2	328.0

TEST NO: G4.7 FLOW PATTERN:CHURN

ML= 390 MG= 4.72 QFLUX= 4873 NUTP= 60.1 HTP= 351 PDT= 0.671

PDF= 0.434 ALFA=0.762 WE= 29.72 TOUT(MEAS)= 74.0, 74.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.5	575	3560.0	15.7	66.6	0.710	1.313	14.15
OUTLET	73.7	640	3538.3	15.1	60.1	0.710	1.315	14.87
MEAN	71.6	608	3549.2	15.4	63.3	0.710	1.314	14.52

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	580	14.21	69.9	83.3	61.9	362.0
4.5	587	14.28	70.3	84.2	59.7	349.0
7.5	595	14.37	70.8	84.7	59.9	350.0
11.0	604	14.48	71.4	85.5	59.2	346.0
16.5	619	14.65	72.4	86.2	60.6	354.0
21.0	632	14.80	73.2	87.0	60.5	353.0
22.5	636	14.85	73.5	87.2	60.7	355.0

TEST NO: G4.8 FLOW PATTERN:CHURN

ML= 390 MG= 6.64 QFLUX= 4926 NUTP= 61.8 HTP= 361 PDT= 0.801

PDF= 0.596 ALFA=0.794 WE= 29.73 TOUT(MEAS)= 74.1, 74.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.6	577	5010.0	15.8	66.4	0.710	1.313	19.89
OUTLET	73.9	642	4979.3	14.9	59.9	0.709	1.315	21.08
MEAN	71.7	609	4994.9	15.4	63.1	0.710	1.314	20.50

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	582	19.99	69.9	83.3	62.9	368.0
4.5	589	20.11	70.4	84.0	61.7	360.0
7.5	597	20.26	70.9	84.9	60.4	353.0
11.0	606	20.44	71.6	85.4	60.8	355.0
16.5	621	20.72	72.5	86.1	62.2	363.0
21.0	634	20.96	73.3	86.6	63.6	372.0
22.5	638	21.04	73.6	86.8	63.6	372.0

TEST NO: G4.9 FLOW PATTERN:CHURN-ANNULAR

ML= 390 MG= 9.32 QFLUX= 4924 NUTP= 64.5 HTP= 377 PDT= 0.901

PDF= 0.722 ALFA=0.821 WE= 29.73 TOUT(MEAS)= 73.9, 74.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.5	576	7039.0	16.1	66.6	0.710	1.313	27.41
OUTLET	73.8	641	6995.5	15.1	60.0	0.709	1.315	29.22
MEAN	71.7	608	7017.3	15.6	63.2	0.710	1.314	28.33

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	581	27.56	69.9	82.2	68.1	398.0
4.5	588	27.75	70.3	83.2	65.4	382.0
7.5	596	27.97	70.9	84.0	64.0	374.0
11.0	605	28.24	71.5	84.7	63.6	372.0
16.5	620	28.67	72.5	85.6	64.1	374.0
21.0	633	29.03	73.3	86.3	64.6	378.0
22.5	637	29.16	73.5	86.5	64.9	379.0

TEST NO: G4.10 FLOW PATTERN:CHURN-ANNULAR

ML= 390 MG= 13.05 QFLUX= 5564 NUTP= 68.3 HTP= 399 PDT= 1.191

PDF= 1.036 ALFA=0.846 WE= 29.75 TOUT(MEAS)= 74.9, 75.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.8	579	9853.0	16.3	66.1	0.710	1.313	37.76
OUTLET	74.6	654	9784.8	15.1	58.9	0.709	1.315	40.99
MEAN	72.2	616	9819.0	15.7	62.4	0.710	1.314	39.40

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	585	38.02	70.2	83.5	71.4	417.0
4.5	593	38.35	70.7	84.5	68.6	401.0
7.5	602	38.75	71.3	85.4	67.1	392.0
11.0	613	39.23	72.0	86.1	67.5	394.0
16.5	630	40.00	73.1	87.0	68.5	400.0
21.0	644	40.65	74.0	87.7	69.1	404.0
22.5	649	40.88	74.3	88.1	68.8	402.0

TEST NO: G4.11 FLOW PATTERN:ANNULAR

ML= 390 MG= 18.09 QFLUX= 5560 NUTP= 75.7 HTP= 443 PDT= 1.472

PDF= 1.337 ALFA=0.865 WE= 29.75 TOUT(MEAS)= 74.9, 75.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.9	581	13654.0	16.9	65.9	0.710	1.313	50.40
OUTLET	74.6	655	13559.9	15.5	58.7	0.709	1.315	55.51
MEAN	72.3	618	13607.1	16.2	62.3	0.710	1.314	52.98

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	587	50.80	70.3	82.3	78.8	461.0
4.5	594	51.32	70.8	83.2	76.1	445.0
7.5	603	51.95	71.4	84.0	75.1	439.0
11.0	614	52.70	72.1	84.8	74.8	437.0
16.5	631	53.93	73.1	85.8	75.4	441.0
21.0	645	54.97	74.0	86.5	76.6	448.0
22.5	650	55.33	74.3	87.0	75.4	441.0

TEST NO: G4.12 FLOW PATTERN:ANNULAR

ML= 390 MG= 25.22 QFLUX= 6350 NUTP= 81.5 HTP= 476 PDT= 1.665

PDF= 1.547 ALFA=0.882 WE= 29.76 TOUT(MEAS)= 75.5, 75.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.8	579	19035.0	17.7	66.1	0.710	1.313	67.11
OUTLET	75.2	663	18885.7	16.1	58.0	0.709	1.315	74.55
MEAN	72.5	621	18960.4	16.9	62.0	0.710	1.314	70.86

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	586	67.70	70.2	82.8	86.1	503.0
4.5	594	68.44	70.8	83.8	83.3	487.0
7.5	605	69.36	71.4	84.7	81.6	477.0
11.0	617	70.46	72.2	85.7	80.4	470.0
16.5	636	72.24	73.5	87.0	80.0	468.0
21.0	652	73.77	74.5	87.8	81.6	477.0
22.5	658	74.29	74.8	88.1	81.9	479.0

TEST NO: G4.13 FLOW PATTERN:ANNULAR

ML= 390 MG= 60.28 QFLUX= 7008 NUTP= 97.6 HTP= 570 PDT= 3.034

PDF= 2.951 ALFA=0.918 WE= 29.73 TOUT(MEAS)= 75.4, 74.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.8	564	45563.0	21.3	67.8	0.710	1.313	133.26
OUTLET	74.6	654	45179.9	18.3	58.9	0.709	1.315	156.22
MEAN	71.7	609	45371.8	19.8	63.3	0.710	1.314	144.65

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	571	134.98	69.3	80.7	104.1	609.0
4.5	581	137.20	69.9	81.6	101.6	594.0
7.5	591	139.94	70.6	82.7	98.7	577.0
11.0	604	143.28	71.4	83.8	96.9	567.0
16.5	625	148.83	72.8	85.3	95.4	558.0
21.0	642	153.68	73.9	86.5	95.1	556.0
22.5	648	155.37	74.2	86.9	94.6	553.0

TEST NO: G4.14 FLOW PATTERN:ANNULAR

ML= 390 MG= 85.07 QFLUX= 7594 NUTP=104.8 HTP= 613 PDT= 3.731

PDF= 3.658 ALFA=0.928 WE= 29.72 TOUT(MEAS)= 75.3, 74.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.5	561	64328.0	24.2	68.3	0.710	1.313	165.30
OUTLET	74.7	655	63752.7	20.5	58.8	0.709	1.315	196.47
MEAN	71.6	608	64040.4	22.4	63.4	0.710	1.314	180.69

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	568	167.61	69.0	80.4	114.1	667.0
4.5	578	170.58	69.7	81.4	110.4	645.0
7.5	589	174.28	70.4	82.6	106.8	625.0
11.0	603	178.80	71.3	83.8	104.3	610.0
16.5	625	186.35	72.8	85.5	101.6	594.0
21.0	643	192.98	73.9	86.8	100.8	589.0
22.5	649	195.29	74.3	87.2	100.5	587.0

TEST NO: G4.15 FLOW PATTERN:ANNULAR

ML= 390 MG=110.73 QFLUX= 8447 NUTP=111.5 HTP= 652 PDT= 4.764

PDF= 4.698 ALFA=0.934 WE= 29.75 TOUT(MEAS)= 76.1, 75.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.7	564	83703.0	27.6	67.8	0.710	1.313	188.85
OUTLET	75.4	668	82888.6	22.9	57.6	0.709	1.315	229.54
MEAN	72.1	616	83295.9	25.3	62.6	0.710	1.314	208.82

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	572	191.81	69.3	80.7	126.1	737.0
4.5	583	195.63	70.0	82.0	120.0	701.0
7.5	595	200.41	70.8	83.4	114.9	672.0
11.0	610	206.26	71.8	84.9	110.6	647.0
16.5	634	216.13	73.4	86.8	107.2	627.0
21.0	654	224.90	74.6	88.5	104.2	609.0
22.5	661	227.97	75.0	89.0	103.8	607.0

TEST NO: G4.16 FLOW PATTERN:ANNULAR

ML= 390 MG=134.94 QFLUX= 8446 NUTP=115.7 HTP= 677 PDT= 5.527

PDF= 5.464 ALFA=0.938 WE= 29.76 TOUT(MEAS)= 75.9, 74.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.0	568	101964.0	31.0	67.3	0.710	1.313	205.31
OUTLET	75.6	670	100991.0	25.5	57.4	0.709	1.315	251.22
MEAN	72.3	619	101477.5	28.2	62.2	0.710	1.314	227.80

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	576	208.63	69.6	80.1	137.0	801.0
4.5	586	212.92	70.2	81.5	127.7	747.0
7.5	599	218.28	71.1	83.0	120.8	706.0
11.0	614	224.88	72.0	84.7	113.8	665.0
16.5	637	236.03	73.5	86.8	109.2	638.0
21.0	657	245.95	74.8	88.3	106.6	623.0
22.5	664	249.44	75.2	88.9	105.6	617.0

TEST NO: G4.17 FLOW PATTERN:ANNULAR

ML= 390 MG=166.20 QFLUX= 8444 NUTP=119.0 HTP= 696 PDT= 5.799

PDF= 5.742 ALFA=0.944 WE= 29.76 TOUT(MEAS)= 75.4, 74.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.2	571	125544.0	32.4	66.9	0.710	1.313	242.19
OUTLET	75.6	671	124374.8	26.6	57.3	0.709	1.315	296.53
MEAN	72.4	621	124959.6	29.5	62.0	0.710	1.314	268.79

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	579	246.11	69.8	80.1	139.0	813.0
4.5	589	251.18	70.4	81.5	129.7	759.0
7.5	601	257.53	71.2	83.1	121.9	713.0
11.0	616	265.33	72.2	84.5	116.9	684.0
16.5	639	278.53	73.6	86.4	113.5	664.0
21.0	658	290.29	74.9	87.8	111.9	654.0
22.5	665	294.42	75.3	88.2	111.5	652.0

TEST NO: G5.1 FLOW PATTERN:BUBBLE-SLUG

ML= 973 MG= 0.24 QFLUX= 2137 NUTP= 28.9 HTP= 169 PDT= 1.241

PDF= 0.406 ALFA=0.161 WE= 184.15 TOUT(MEAS)= 70.8, 71.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.8	1444	180.7	17.0	66.4	0.710	3.272	0.66
OUTLET	70.5	1472	180.5	15.8	65.2	0.710	3.274	0.72
MEAN	70.1	1458	180.6	16.4	65.8	0.710	3.273	0.69

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1446	0.67	69.8	79.3	38.5	225.0
4.5	1449	0.67	69.9	81.3	32.1	187.0
7.5	1453	0.68	70.0	82.5	29.2	171.0
11.0	1457	0.69	70.1	83.3	27.8	162.0
16.5	1463	0.70	70.3	83.9	26.9	157.0
21.0	1469	0.71	70.4	83.9	27.1	158.0
22.5	1470	0.71	70.5	84.0	27.1	158.0

TEST NO: G5.2 FLOW PATTERN:SLUG

ML= 973 MG= 0.58 QFLUX= 2918 NUTP= 46.8 HTP= 273 PDT= 1.276

PDF= 0.575 ALFA=0.295 WE= 184.27 TOUT(MEAS)= 71.2, 71.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.1	1456	438.9	17.0	65.8	0.710	3.272	1.62
OUTLET	71.1	1494	438.3	15.7	64.2	0.710	3.274	1.75
MEAN	70.6	1475	438.6	16.4	65.0	0.710	3.274	1.68

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1459	1.63	70.2	79.7	52.0	304.0
4.5	1463	1.64	70.3	80.7	47.8	279.0
7.5	1468	1.66	70.4	81.1	46.7	273.0
11.0	1473	1.68	70.6	81.4	45.9	268.0
16.5	1482	1.71	70.8	81.6	46.0	269.0
21.0	1489	1.73	71.0	81.7	46.4	271.0
22.5	1492	1.74	71.0	81.8	46.4	271.0

TEST NO: G5.3 FLOW PATTERN:SLUG

ML= 973 MG= 0.83 QFLUX= 3689 NUTP= 52.3 HTP= 306 PDT= 1.261

PDF= 0.623 ALFA=0.358 WE= 184.37 TOUT(MEAS)= 71.7, 71.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.3	1464	626.8	17.0	65.4	0.710	3.272	2.31
OUTLET	71.6	1513	625.6	15.7	63.4	0.710	3.275	2.50
MEAN	70.9	1488	626.2	16.4	64.4	0.710	3.274	2.41

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1468	2.33	70.4	81.4	57.4	335.0
4.5	1473	2.35	70.5	82.4	53.1	310.0
7.5	1479	2.37	70.7	82.9	51.9	303.0
11.0	1486	2.40	70.9	83.1	51.6	301.0
16.5	1497	2.44	71.2	83.4	51.5	301.0
21.0	1507	2.48	71.4	83.5	52.5	306.0
22.5	1510	2.49	71.5	83.5	52.5	307.0

TEST NO: G5.4 FLOW PATTERN:SLUG

ML= 973 MG= 1.15 QFLUX= 3688 NUTP= 55.8 HTP= 326 PDT= 1.267

PDF= 0.687 ALFA=0.417 WE= 184.36 TOUT(MEAS)= 71.7, 71.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.3	1462	865.0	17.0	65.5	0.710	3.272	3.19
OUTLET	71.5	1511	863.3	15.7	63.5	0.710	3.275	3.45
MEAN	70.9	1486	864.1	16.3	64.5	0.710	3.274	3.32

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1466	3.21	70.4	80.7	60.9	356.0
4.5	1471	3.24	70.5	81.6	57.0	333.0
7.5	1477	3.27	70.6	82.0	55.4	324.0
11.0	1484	3.31	70.8	82.3	55.1	322.0
16.5	1495	3.37	71.1	82.6	55.1	322.0
21.0	1505	3.42	71.4	82.7	55.6	325.0
22.5	1508	3.44	71.5	82.8	55.8	326.0

TEST NO: G5.5 FLOW PATTERN:SLUG

ML= 973 MG= 1.63 QFLUX= 4218 NUTP= 59.6 HTP= 348 PDT= 1.279

PDF= 0.761 ALFA=0.479 WE= 184.39 TOUT(MEAS)= 71.8, 72.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.3	1463	1226.0	17.0	65.4	0.710	3.272	4.51
OUTLET	71.8	1519	1223.5	15.8	63.1	0.710	3.275	4.88
MEAN	71.0	1491	1224.9	16.4	64.3	0.710	3.274	4.70

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1468	4.54	70.4	81.7	64.0	374.0
4.5	1474	4.58	70.6	82.6	60.1	351.0
7.5	1481	4.62	70.8	83.0	58.9	344.0
11.0	1489	4.68	71.0	83.3	58.6	343.0
16.5	1502	4.76	71.3	83.5	59.2	346.0
21.0	1512	4.84	71.6	83.5	60.3	352.0
22.5	1516	4.86	71.7	83.6	60.6	354.0

TEST NO: G5.6 FLOW PATTERN:SLUG

ML= 973 MG= 2.27 QFLUX= 4249 NUTP= 64.4 HTP= 376 PDT= 1.343

PDF= 0.881 ALFA=0.535 WE= 184.39 TOUT(MEAS)= 71.9, 72.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.3	1463	1708.0	17.1	65.4	0.710	3.272	6.25
OUTLET	71.8	1520	1704.7	15.8	63.1	0.710	3.275	6.78
MEAN	71.0	1491	1706.6	16.5	64.3	0.710	3.274	6.52

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1468	6.29	70.4	81.0	68.5	401.0
4.5	1473	6.34	70.6	81.9	64.2	375.0
7.5	1480	6.41	70.7	82.2	63.5	371.0
11.0	1489	6.49	71.0	82.4	63.5	371.0
16.5	1502	6.62	71.3	82.6	64.1	375.0
21.0	1512	6.72	71.6	82.7	65.3	381.0
22.5	1516	6.76	71.7	82.8	65.2	381.0

TEST NO: G5.7 FLOW PATTERN:SLUG-CHURN

ML= 973 MG= 2.91 QFLUX= 4657 NUTP= 68.3 HTP= 399 PDT= 1.398

PDF= 0.975 ALFA=0.574 WE= 184.48 TOUT(MEAS)= 72.2, 72.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.5	1473	2197.0	17.3	65.0	0.710	3.272	7.95
OUTLET	72.2	1535	2192.8	15.9	62.5	0.710	3.275	8.65
MEAN	71.3	1504	2195.4	16.6	63.7	0.710	3.274	8.31

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1478	8.01	70.7	81.7	72.2	422.0
4.5	1484	8.08	70.8	82.6	67.7	396.0
7.5	1492	8.16	71.0	83.0	66.7	390.0
11.0	1501	8.27	71.3	83.1	67.4	394.0
16.5	1515	8.44	71.6	83.2	68.9	403.0
21.0	1527	8.58	71.9	83.5	69.0	403.0
22.5	1531	8.63	72.1	83.7	68.3	399.0

TEST NO: G5.8 FLOW PATTERN:CHURN

ML= 973 MG= 5.95 QFLUX= 4653 NUTP= 77.8 HTP= 455 PDT= 1.770

PDF= 1.442 ALFA=0.672 WE= 184.51 TOUT(MEAS)= 72.4, 72.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.6	1476	4484.0	18.1	64.8	0.710	3.272	15.52
OUTLET	72.2	1538	4473.9	16.4	62.3	0.710	3.275	17.20
MEAN	71.4	1507	4479.1	17.2	63.6	0.710	3.274	16.37

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1481	15.65	70.8	80.6	81.2	474.0
4.5	1488	15.82	70.9	81.0	78.9	461.0
7.5	1495	16.03	71.1	81.3	77.9	455.0
11.0	1504	16.27	71.4	81.7	77.0	450.0
16.5	1519	16.68	71.7	82.0	77.3	452.0
21.0	1530	17.02	72.0	82.3	77.2	451.0
22.5	1534	17.14	72.1	82.4	77.8	454.0

TEST NO: G5.9 FLOW PATTERN:CHURN-ANNULAR

ML= 973 MG= 8.36 QFLUX= 4967 NUTP= 85.7 HTP= 501 PDT= 2.073

PDF= 1.787 ALFA=0.714 WE= 184.56 TOUT(MEAS)= 72.6, 72.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.8	1481	6302.0	18.2	64.6	0.710	3.272	21.70
OUTLET	72.5	1548	6286.8	16.2	61.9	0.710	3.275	24.46
MEAN	71.6	1515	6294.8	17.2	63.3	0.710	3.275	23.08

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1487	21.91	70.9	80.5	88.9	519.0
4.5	1494	22.18	71.1	81.0	85.9	502.0
7.5	1502	22.52	71.3	81.3	84.8	496.0
11.0	1512	22.93	71.6	81.7	83.9	491.0
16.5	1527	23.59	71.9	81.8	86.0	503.0
21.0	1539	24.16	72.3	82.0	87.1	509.0
22.5	1544	24.36	72.4	82.2	86.4	505.0

TEST NO: G5.10 FLOW PATTERN:ANNULAR

ML= 973 MG= 12.24 QFLUX= 5055 NUTP= 90.3 HTP= 528 PDT= 2.680

PDF= 2.429 ALFA=0.749 WE= 184.56 TOUT(MEAS)= 72.6, 72.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.7	1480	9224.0	19.6	64.6	0.710	3.272	29.46
OUTLET	72.5	1547	9200.8	17.0	61.9	0.710	3.275	34.06
MEAN	71.6	1514	9212.6	18.3	63.3	0.710	3.275	31.75

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1485	29.81	70.9	80.1	93.3	546.0
4.5	1492	30.25	71.1	80.6	90.5	529.0
7.5	1501	30.81	71.3	80.9	89.5	523.0
11.0	1511	31.48	71.5	81.2	89.4	523.0
16.5	1526	32.59	71.9	81.5	90.3	528.0
21.0	1539	33.55	72.3	81.8	90.8	531.0
22.5	1543	33.89	72.4	81.8	91.3	534.0

TEST NO: G5.11 FLOW PATTERN:ANNULAR

ML= 973 MG= 17.73 QFLUX= 5474 NUTP= 95.4 HTP= 558 PDT= 3.333

PDF= 3.114 ALFA=0.781 WE= 184.56 TOUT(MEAS)= 72.5, 72.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.7	1478	13363.0	20.9	64.7	0.710	3.272	40.20
OUTLET	72.6	1551	13326.3	17.5	61.8	0.710	3.275	47.73
MEAN	71.6	1514	13344.8	19.2	63.3	0.710	3.275	43.92

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1484	40.76	70.8	80.4	97.6	571.0
4.5	1491	41.47	71.0	80.8	95.8	560.0
7.5	1500	42.36	71.3	81.2	94.1	550.0
11.0	1511	43.45	71.5	81.5	94.0	550.0
16.5	1528	45.28	72.0	81.8	95.4	558.0
21.0	1542	46.89	72.3	82.0	97.1	567.0
22.5	1546	47.45	72.4	82.1	96.7	566.0

TEST NO: G5.12 FLOW PATTERN:ANNULAR

ML= 973 MG= 24.82 QFLUX= 5985 NUTP=102.6 HTP= 600 PDT= 3.768

PDF= 3.573 ALFA=0.805 WE= 184.68 TOUT(MEAS)= 72.9, 73.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.0	1491	18704.0	22.2	64.1	0.710	3.272	52.84
OUTLET	73.1	1571	18647.9	18.5	61.0	0.710	3.276	63.46
MEAN	72.0	1531	18676.1	20.4	62.6	0.710	3.275	58.06

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1497	53.61	71.2	80.9	105.4	616.0
4.5	1505	54.61	71.4	81.4	102.6	600.0
7.5	1515	55.86	71.6	81.8	100.3	587.0
11.0	1527	57.39	71.9	82.0	101.9	596.0
16.5	1545	59.97	72.4	82.4	103.0	602.0
21.0	1561	62.25	72.8	82.7	103.7	606.0
22.5	1566	63.05	72.9	82.8	103.4	604.0

TEST NO: G5.13 FLOW PATTERN:ANNULAR

ML= 973 MG= 57.21 QFLUX= 6633 NUTP=113.0 HTP= 661 PDT= 5.728

PDF= 5.583 ALFA=0.856 WE= 184.65 TOUT(MEAS)= 73.0,116.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.8	1483	43114.0	26.9	64.5	0.710	3.272	100.49
OUTLET	73.1	1571	42971.7	21.2	61.0	0.710	3.276	127.11
MEAN	71.9	1527	43043.0	24.1	62.7	0.710	3.275	113.37

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1490	102.34	71.0	80.5	119.7	700.0
4.5	1499	104.75	71.2	81.1	115.1	673.0
7.5	1510	107.79	71.5	81.5	113.8	665.0
11.0	1523	111.57	71.9	82.0	111.6	652.0
16.5	1543	118.06	72.4	82.5	111.9	654.0
21.0	1560	123.94	72.8	82.9	111.9	654.0
22.5	1565	126.04	72.9	83.1	111.4	652.0

TEST NO: G5.14 FLOW PATTERN:ANNULAR

ML= 973 MG= 79.96 QFLUX= 7083 NUTP=119.3 HTP= 698 PDT= 6.471

PDF= 6.340 ALFA=0.869 WE= 184.70 TOUT(MEAS)= 73.2, 73.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.9	1487	60254.0	31.0	64.3	0.710	3.272	122.08
OUTLET	73.3	1580	60043.7	24.5	60.6	0.710	3.276	153.72
MEAN	72.1	1534	60149.3	27.8	62.4	0.710	3.275	137.40

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1495	124.29	71.1	80.7	125.8	736.0
4.5	1504	127.16	71.4	81.3	121.4	710.0
7.5	1516	130.79	71.7	81.7	120.1	702.0
11.0	1529	135.28	72.0	82.2	118.7	694.0
16.5	1551	142.99	72.6	82.9	117.6	688.0
21.0	1568	149.97	73.0	83.3	117.9	689.0
22.5	1574	152.45	73.2	83.4	118.3	691.0

TEST NO: G5.15 FLOW PATTERN:ANNULAR

ML= 973 MG=111.14 QFLUX= 7545 NUTP=124.5 HTP= 728 PDT= 7.128

PDF= 7.008 ALFA=0.881 WE= 184.79 TOUT(MEAS)= 73.9, 74.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.2	1497	83714.0	35.7	63.8	0.710	3.272	147.49
OUTLET	73.7	1596	83405.4	28.5	60.0	0.709	3.276	183.75
MEAN	72.4	1547	83559.8	32.1	61.9	0.710	3.275	165.11

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1505	150.04	71.4	81.0	133.9	783.0
4.5	1515	153.37	71.6	81.6	129.2	756.0
7.5	1528	157.55	72.0	82.2	126.0	737.0
11.0	1542	162.71	72.3	82.7	124.0	725.0
16.5	1565	171.54	72.9	83.5	121.7	712.0
21.0	1583	179.49	73.4	84.0	121.3	709.0
22.5	1590	182.31	73.6	84.3	120.3	703.0

TEST NO: G5.16 FLOW PATTERN:ANNULAR

ML= 973 MG=147.85 QFLUX= 8420 NUTP=130.8 HTP= 765 PDT= 8.074

PDF= 7.962 ALFA=0.890 WE= 184.97 TOUT(MEAS)= 74.9, 74.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.7	1517	111284.0	41.3	63.0	0.710	3.272	169.49
OUTLET	74.5	1626	110832.1	33.3	58.9	0.709	3.277	210.12
MEAN	73.1	1571	111058.0	37.3	60.9	0.710	3.276	189.27

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1526	172.37	71.9	81.7	147.2	861.0
4.5	1537	176.10	72.2	82.5	140.3	820.0
7.5	1550	180.80	72.6	83.4	133.2	779.0
11.0	1566	186.61	73.0	84.1	129.8	759.0
16.5	1591	196.49	73.6	85.0	125.9	736.0
21.0	1612	205.38	74.1	85.7	124.0	725.0
22.5	1619	208.52	74.3	86.0	123.4	721.0

TEST NO: G6.1 FLOW PATTERN:BUBBLE

ML= 2601 MG= 0.06 QFLUX= 2792 NUTP= 53.1 HTP= 310 PDT= 2.402

PDF= 1.428 ALFA=0.019 WE= 1316.00 TOUT(MEAS)= 71.2, 71.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.7	3949	48.9	18.7	64.9	0.710	8.742	0.16
OUTLET	71.0	3986	48.9	16.3	64.3	0.710	8.747	0.19
MEAN	70.9	3968	48.9	17.5	64.6	0.710	8.747	0.18

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3952	0.17	70.7	78.1	64.4	376.0
4.5	3956	0.17	70.7	79.2	56.6	331.0
7.5	3960	0.17	70.8	79.6	53.9	315.0
11.0	3966	0.17	70.8	80.0	52.3	305.0
16.5	3974	0.18	70.9	80.4	50.6	295.0
21.0	3981	0.18	71.0	80.5	50.3	294.0
22.5	3984	0.19	71.0	80.4	50.7	296.0

TEST NO: G6.2 FLOW PATTERN:BUBBLE

ML= 2601 MG= 0.19 QFLUX= 3219 NUTP= 53.8 HTP= 314 PDT= 2.420

PDF= 1.477 ALFA=0.051 WE= 1316.00 TOUT(MEAS)= 71.6, 71.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.9	3967	142.4	19.6	64.5	0.710	8.742	0.46
OUTLET	71.3	4010	142.4	17.1	63.9	0.710	8.748	0.52
MEAN	71.1	3988	142.4	18.3	64.2	0.710	8.747	0.49

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3970	0.46	70.9	79.4	64.7	378.0
4.5	3975	0.47	70.9	80.6	56.9	333.0
7.5	3980	0.48	71.0	81.2	54.0	315.0
11.0	3987	0.49	71.0	81.5	52.5	307.0
16.5	3996	0.50	71.1	81.7	52.1	304.0
21.0	4004	0.51	71.2	81.9	51.5	301.0
22.5	4007	0.52	71.2	82.0	51.4	300.0

TEST NO: G6.3 FLOW PATTERN:BUBBLE

ML= 2601 MG= 0.53 QFLUX= 3686 NUTP= 59.9 HTP= 350 PDT= 2.540

PDF= 1.671 ALFA=0.125 WE= 1316.00 TOUT(MEAS)= 71.4, 71.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.7	3949	400.9	19.9	64.8	0.710	8.742	1.26
OUTLET	71.1	3998	400.6	17.4	64.1	0.710	8.748	1.44
MEAN	70.9	3974	400.7	18.7	64.5	0.710	8.747	1.35

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3953	1.27	70.7	79.6	70.6	413.0
4.5	3958	1.29	70.8	80.8	62.9	368.0
7.5	3964	1.31	70.8	81.4	59.4	347.0
11.0	3971	1.34	70.9	81.7	58.3	341.0
16.5	3983	1.38	71.0	81.8	58.4	341.0
21.0	3992	1.42	71.1	81.9	58.5	342.0
22.5	3995	1.43	71.1	81.9	58.7	343.0

TEST NO: G6.4 FLOW PATTERN:BUBBLE-SLUG

ML= 2601 MG= 0.75 QFLUX= 4118 NUTP= 64.6 HTP= 377 PDT= 2.607

PDF= 1.776 ALFA=0.164 WE= 1317.00 TOUT(MEAS)= 72.1, 72.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.3	4016	567.5	20.2	63.7	0.710	8.742	1.77
OUTLET	71.9	4072	567.0	17.6	62.9	0.710	8.749	2.02
MEAN	71.6	4044	567.3	18.9	63.3	0.710	8.749	1.89

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	4021	1.78	71.4	80.9	73.9	432.0
4.5	4027	1.81	71.4	82.1	65.8	385.0
7.5	4034	1.84	71.5	82.6	63.7	372.0
11.0	4042	1.88	71.6	82.8	62.7	366.0
16.5	4054	1.94	71.7	82.8	63.6	371.0
21.0	4065	1.99	71.8	82.7	64.8	379.0
22.5	4068	2.01	71.8	82.7	65.1	380.0

TEST NO: G6.5 FLOW PATTERN:BUBBLE-SLUG

ML= 2601 MG= 1.05 QFLUX= 4552 NUTP= 72.2 HTP= 422 PDT= 2.733

PDF= 1.944 ALFA=0.207 WE= 1317.00 TOUT(MEAS)= 72.0, 72.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.3	4016	787.5	20.5	63.7	0.710	8.742	2.42
OUTLET	71.9	4077	786.8	17.7	62.8	0.710	8.749	2.78
MEAN	71.6	4047	787.1	19.1	63.3	0.710	8.749	2.60

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	4021	2.45	71.4	81.3	78.6	460.0
4.5	4027	2.48	71.4	82.2	72.6	424.0
7.5	4035	2.53	71.5	82.5	70.9	414.0
11.0	4044	2.58	71.6	82.6	70.6	412.0
16.5	4058	2.67	71.7	82.6	71.8	419.0
21.0	4069	2.74	71.9	82.5	73.2	428.0
22.5	4073	2.77	71.9	82.5	73.1	427.0

TEST NO: G6.6 FLOW PATTERN:BUBBLE-SLUG

ML= 2601 MG= 1.47 QFLUX= 4550 NUTP= 78.4 HTP= 458 PDT= 2.983

PDF= 2.244 ALFA=0.256 WE= 1317.00 TOUT(MEAS)= 72.2, 72.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.4	4025	1105.0	20.9	63.6	0.710	8.742	3.32
OUTLET	72.0	4086	1104.7	17.9	62.6	0.710	8.750	3.86
MEAN	71.7	4056	1105.2	19.4	63.1	0.710	8.749	3.59

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	4030	3.37	71.5	80.7	83.9	491.0
4.5	4036	3.42	71.5	81.4	78.9	461.0
7.5	4044	3.48	71.6	81.6	77.4	453.0
11.0	4053	3.56	71.7	81.8	76.9	450.0
16.5	4067	3.69	71.8	81.8	78.2	457.0
21.0	4078	3.80	71.9	81.8	79.0	462.0
22.5	4082	3.84	72.0	81.7	79.7	466.0

TEST NO: G6.7 FLOW PATTERN:BUBBLE-SLUG

ML= 2601 MG= 2.07 QFLUX= 4616 NUTP= 86.7 HTP= 507 PDT= 3.201

PDF= 2.516 ALFA=0.311 WE= 1317.00 TOUT(MEAS)= 72.1, 72.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.4	4020	1561.0	21.4	63.6	0.710	8.742	4.58
OUTLET	72.0	4082	1559.7	18.3	62.7	0.710	8.749	5.36
MEAN	71.7	4051	1560.4	19.9	63.2	0.710	8.749	4.96

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	4025	4.64	71.4	80.0	92.0	538.0
4.5	4032	4.71	71.5	80.5	87.3	510.0
7.5	4039	4.80	71.6	80.8	85.2	498.0
11.0	4048	4.92	71.6	80.9	85.4	499.0
16.5	4063	5.10	71.8	80.9	86.5	505.0
21.0	4074	5.27	71.9	80.9	87.6	512.0
22.5	4078	5.33	71.9	81.0	86.7	507.0

TEST NO: G6.8 FLOW PATTERN:BUBBLE-SLUG

ML= 2601 MG= 2.83 QFLUX= 4702 NUTP= 91.5 HTP= 535 PDT= 3.448

PDF= 2.814 ALFA=0.363 WE= 1317.00 TOUT(MEAS)= 72.2, 72.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.4	4020	2132.0	22.1	63.6	0.710	8.742	6.07
OUTLET	72.0	4083	2130.4	18.7	62.7	0.710	8.749	7.15
MEAN	71.7	4051	2131.4	20.4	63.2	0.710	8.749	6.60

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	4025	6.15	71.4	79.7	96.5	564.0
4.5	4032	6.25	71.5	80.2	92.2	539.0
7.5	4039	6.38	71.6	80.4	90.8	531.0
11.0	4049	6.54	71.6	80.5	90.6	530.0
16.5	4063	6.80	71.8	80.6	91.1	533.0
21.0	4075	7.03	71.9	80.7	91.7	536.0
22.5	4079	7.11	71.9	80.7	91.8	537.0

TEST NO: G6.9 FLOW PATTERN:SLUG-FROTH

ML= 2601 MG= 4.23 QFLUX= 4701 NUTP= 97.1 HTP= 568 PDT= 5.384

PDF= 4.821 ALFA=0.434 WE= 1318.00 TOUT(MEAS)= 72.4, 72.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.6	4042	3181.0	23.2	63.3	0.710	8.742	8.62
OUTLET	72.2	4105	3178.7	17.8	62.4	0.710	8.750	11.13
MEAN	71.9	4074	3180.1	20.5	62.8	0.710	8.749	9.83

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	4047	8.79	71.6	79.5	101.8	595.0
4.5	4054	9.02	71.7	79.9	97.9	572.0
7.5	4062	9.30	71.8	80.2	95.9	560.0
11.0	4071	9.65	71.9	80.3	95.4	558.0
16.5	4085	10.26	72.0	80.3	97.0	567.0
21.0	4097	10.83	72.1	80.3	98.3	575.0
22.5	4101	11.03	72.2	80.4	98.0	573.0

TEST NO: G6.10 FLOW PATTERN:SLUG-FROTH

ML= 2601 MG= 6.64 QFLUX= 4700 NUTP=104.2 HTP= 609 PDT= 4.436

PDF= 3.935 ALFA=0.497 WE= 1318.00 TOUT(MEAS)= 72.5, 72.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.7	4050	5000.0	24.9	63.1	0.710	8.742	12.62
OUTLET	72.3	4114	4996.0	20.5	62.2	0.710	8.750	15.26
MEAN	72.0	4082	4998.2	22.7	62.7	0.710	8.749	13.91

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	4056	12.81	71.7	79.1	108.2	633.0
4.5	4062	13.05	71.8	79.5	103.7	606.0
7.5	4070	13.36	71.9	79.7	103.0	602.0
11.0	4079	13.74	71.9	79.8	102.9	601.0
16.5	4094	14.39	72.1	79.8	104.8	612.0
21.0	4106	14.96	72.2	79.9	105.0	614.0
22.5	4110	15.16	72.2	79.9	104.9	614.0

TEST NO: G6.11 FLOW PATTERN:FROTH-ANNULAR

ML= 2601 MG= 9.77 QFLUX= 4699 NUTP=109.8 HTP= 642 PDT= 5.040

PDF= 4.594 ALFA=0.552 WE= 1319.00 TOUT(MEAS)= 72.8, 73.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.0	4086	7351.0	26.6	62.6	0.710	8.742	17.40
OUTLET	72.6	4150	7344.9	21.6	61.6	0.710	8.751	21.34
MEAN	72.3	4118	7348.2	24.1	62.1	0.710	8.750	19.32

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	4091	17.68	72.1	79.1	113.8	665.0
4.5	4098	18.05	72.1	79.5	109.3	639.0
7.5	4106	18.50	72.2	79.6	108.6	635.0
11.0	4115	19.07	72.3	79.7	108.5	634.0
16.5	4130	20.02	72.4	79.7	109.8	642.0
21.0	4142	20.88	72.6	79.8	111.2	650.0
22.5	4146	21.18	72.6	79.8	111.0	649.0

TEST NO: G6.12 FLOW PATTERN:FROTH-ANNULAR

ML= 2601 MG= 13.06 QFLUX= 4594 NUTP=117.5 HTP= 687 PDT= 5.767

PDF= 5.355 ALFA=0.586 WE= 1318.00 TOUT(MEAS)= 72.4, 72.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.7	4053	9833.0	28.8	63.1	0.710	8.742	21.49
OUTLET	72.3	4115	9824.9	23.0	62.2	0.710	8.750	26.70
MEAN	72.0	4084	9829.2	25.9	62.6	0.710	8.750	24.02

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	4058	21.86	71.7	78.2	120.8	706.0
4.5	4065	22.34	71.8	78.6	115.9	678.0
7.5	4073	22.94	71.9	78.6	116.6	682.0
11.0	4082	23.68	72.0	78.7	116.5	681.0
16.5	4096	24.94	72.1	78.8	117.3	686.0
21.0	4107	26.08	72.2	78.8	119.9	701.0
22.5	4111	26.49	72.3	78.8	119.4	698.0

TEST NO: G6.13 FLOW PATTERN:FROTH-ANNLAR

ML= 2601 MG= 18.22 QFLUX= 4820 NUTP=119.1 HTP= 696 PDT= 6.738

PDF= 6.364 ALFA=0.625 WE= 1318.00 TOUT(MEAS)= 72.6, 73.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.9	4071	13707.0	31.4	62.8	0.710	8.742	27.54
OUTLET	72.5	4136	13694.6	24.6	61.9	0.710	8.751	34.83
MEAN	72.2	4103	13700.8	28.0	62.4	0.710	8.750	31.06

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	4076	28.05	71.9	78.6	123.3	721.0
4.5	4083	28.71	72.0	78.9	119.5	699.0
7.5	4091	29.54	72.1	79.4	112.6	658.0
11.0	4100	30.57	72.1	79.1	118.3	692.0
16.5	4115	32.35	72.3	79.1	120.8	706.0
21.0	4127	33.96	72.4	79.2	121.9	713.0
22.5	4132	34.53	72.4	79.2	121.3	709.0

TEST NO: G6.14 FLOW PATTERN:FROTH-ANNULAR

ML= 2601 MG= 25.47 QFLUX= 4837 NUTP=124.4 HTP= 727 PDT= 7.682

PDF= 7.341 ALFA=0.659 WE= 1319.00 TOUT(MEAS)= 72.7, 73.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.1	4097	19159.0	34.5	62.4	0.710	8.742	35.03
OUTLET	72.8	4163	19141.7	26.8	61.5	0.710	8.751	44.73
MEAN	72.4	4130	19150.5	30.6	61.9	0.710	8.751	39.71

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	4103	35.70	72.2	78.6	127.7	747.0
4.5	4109	36.57	72.2	78.9	123.4	721.0
7.5	4117	37.67	72.3	79.1	122.6	717.0
11.0	4127	39.04	72.4	79.1	122.7	718.0
16.5	4142	41.41	72.6	79.2	125.0	731.0
21.0	4154	43.56	72.7	79.2	126.8	742.0
22.5	4158	44.33	72.7	79.3	126.1	737.0

TEST NO: G6.15 FLOW PATTERN:ANNULAR

ML= 2601 MG= 41.59 QFLUX= 4820 NUTP=129.3 HTP= 756 PDT= 8.832

PDF= 8.534 ALFA=0.702 WE= 1320.00 TOUT(MEAS)= 72.6, 73.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.5	4132	31266.0	40.0	61.9	0.710	8.742	49.33
OUTLET	73.1	4198	31237.9	31.2	60.9	0.710	8.752	62.83
MEAN	72.8	4165	31252.1	35.6	61.4	0.710	8.751	55.84

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	4138	50.26	72.5	78.6	135.2	791.0
4.5	4145	51.47	72.6	79.0	128.4	751.0
7.5	4153	53.01	72.6	79.1	128.4	751.0
11.0	4162	54.92	72.7	79.2	127.0	743.0
16.5	4177	58.21	72.9	79.2	129.6	758.0
21.0	4190	61.21	73.0	79.3	131.2	767.0
22.5	4194	62.28	73.0	79.3	131.3	768.0

TEST NO: G6.16 FLOW PATTERN:ANNULAR

ML= 2601 MG= 63.05 QFLUX= 4996 NUTP=137.5 HTP= 804 PDT= 9.814

PDF= 9.551 ALFA=0.737 WE= 1320.00 TOUT(MEAS)= 72.5, 74.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.7	4160	47384.0	45.0	61.4	0.710	8.742	66.51
OUTLET	73.4	4228	47339.8	35.2	60.5	0.710	8.753	84.44
MEAN	73.1	4194	47362.1	40.1	60.9	0.710	8.752	75.17

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	4166	67.75	72.8	78.8	141.5	828.0
4.5	4173	69.37	72.9	79.1	137.6	805.0
7.5	4181	71.41	72.9	79.3	134.7	788.0
11.0	4191	73.94	73.0	79.3	136.7	799.0
16.5	4207	78.31	73.2	79.4	137.8	806.0
21.0	4220	82.29	73.3	79.4	139.1	813.0
22.5	4224	83.71	73.3	79.5	139.5	816.0

TEST NO: G6.17 FLOW PATTERN:ANNULAR

ML= 2601 MG= 90.56 QFLUX= 5176 NUTP=141.2 HTP= 825 PDT=11.108

PDF=10.870 ALFA=0.763 WE= 1321.00 TOUT(MEAS)= 73.1, 74.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	73.1	4199	68026.0	50.7	60.8	0.710	8.742	84.80
OUTLET	73.8	4270	67959.9	39.6	59.9	0.709	8.753	107.76
MEAN	73.4	4234	67992.9	45.2	60.4	0.710	8.753	95.88

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	4205	86.38	73.1	79.2	146.9	859.0
4.5	4212	88.45	73.2	79.4	142.1	831.0
7.5	4221	91.06	73.3	79.6	140.6	822.0
11.0	4231	94.31	73.4	79.8	138.9	812.0
16.5	4247	99.91	73.6	79.9	140.4	821.0
21.0	4261	105.01	73.7	79.9	142.8	835.0
22.5	4265	106.83	73.7	79.9	142.5	833.0

TEST NO: G7.1 FLOW PATTERN:BUBBLE

ML= 5397 MG= 0.09 QFLUX= 2814 NUTP=116.4 HTP= 680 PDT= 6.470

PDF= 5.487 ALFA=0.010 WE= 5679.00 TOUT(MEAS)= 72.9, 73.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.5	8581	68.0	26.6	61.8	0.710	18.137	0.16
OUTLET	72.7	8619	68.0	20.1	61.6	0.710	18.157	0.21
MEAN	72.6	8600	68.0	23.4	61.7	0.710	18.156	0.19

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	8584	0.16	72.5	76.5	120.3	704.0
4.5	8588	0.17	72.5	76.6	117.7	688.0
7.5	8593	0.17	72.5	76.7	115.5	675.0
11.0	8598	0.18	72.6	76.8	114.7	671.0
16.5	8607	0.19	72.6	76.7	116.6	682.0
21.0	8614	0.21	72.6	76.8	116.6	682.0
22.5	8616	0.21	72.6	76.8	116.0	678.0

TEST NO: G7.2 FLOW PATTERN:BUBBLE

ML= 5397 MG= 0.24 QFLUX= 3664 NUTP=115.8 HTP= 677 PDT= 6.559

PDF= 5.591 ALFA=0.025 WE= 5680.00 TOUT(MEAS)= 72.9, 73.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.6	8609	176.9	27.1	61.6	0.710	18.137	0.41
OUTLET	72.9	8659	176.8	20.6	61.3	0.710	18.157	0.54
MEAN	72.7	8634	176.9	23.9	61.4	0.710	18.157	0.47

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	8613	0.42	72.6	77.8	120.7	706.0
4.5	8619	0.43	72.7	78.0	117.1	684.0
7.5	8625	0.45	72.7	78.1	115.6	676.0
11.0	8632	0.46	72.7	78.2	114.0	667.0
16.5	8643	0.49	72.8	78.2	115.5	675.0
21.0	8653	0.52	72.8	78.2	115.9	678.0
22.5	8656	0.53	72.8	78.2	116.0	678.0

TEST NO: G7.3 FLOW PATTERN:BUBBLE

ML= 5397 MG= 0.48 QFLUX= 4342 NUTP=121.4 HTP= 710 PDT= 6.610

PDF= 5.664 ALFA=0.048 WE= 5683.00 TOUT(MEAS)= 73.3, 73.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.9	8667	357.7	27.4	61.2	0.710	18.137	0.82
OUTLET	73.2	8726	357.5	20.8	60.8	0.710	18.159	1.08
MEAN	73.0	8696	357.6	24.1	61.0	0.710	18.158	0.95

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	8671	0.84	72.9	78.8	126.4	739.0
4.5	8678	0.86	72.9	79.0	122.7	718.0
7.5	8685	0.89	73.0	79.2	119.9	701.0
11.0	8694	0.93	73.0	79.2	120.1	702.0
16.5	8707	0.99	73.1	79.2	121.5	710.0
21.0	8718	1.05	73.1	79.2	121.7	711.0
22.5	8722	1.07	73.1	79.3	121.4	710.0

TEST NO: G7.4 FLOW PATTERN:BUBBLE

ML= 5397 MG= 0.75 QFLUX= 5567 NUTP=115.8 HTP= 677 PDT= 6.658

PDF= 5.735 ALFA=0.071 WE= 5685.00 TOUT(MEAS)= 73.7, 73.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	73.1	8715	567.0	28.4	60.8	0.710	18.137	1.26
OUTLET	73.5	8791	566.7	21.8	60.3	0.710	18.160	1.63
MEAN	73.3	8753	566.9	25.1	60.6	0.710	18.159	1.44

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	8721	1.29	73.1	81.0	120.5	704.0
4.5	8729	1.32	73.2	81.3	116.9	683.0
7.5	8738	1.36	73.2	81.5	115.0	673.0
11.0	8749	1.41	73.3	81.6	114.7	671.0
16.5	8767	1.51	73.4	81.6	115.3	674.0
21.0	8781	1.59	73.4	81.6	115.9	678.0
22.5	8786	1.62	73.4	81.6	116.1	679.0

TEST NO: G7.5 FLOW PATTERN:BUBBLE

ML= 5397 MG= 1.05 QFLUX= 6258 NUTP=120.3 HTP= 703 PDT= 6.777

PDF= 5.875 ALFA=0.092 WE= 5687.00 TOUT(MEAS)= 73.9, 73.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	73.3	8753	789.7	29.1	60.6	0.710	18.137	1.72
OUTLET	73.7	8839	789.3	22.3	60.0	0.709	18.161	2.22
MEAN	73.5	8796	789.5	25.7	60.3	0.710	18.160	1.96

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	8760	1.75	73.3	81.8	125.5	734.0
4.5	8769	1.80	73.4	82.2	121.1	708.0
7.5	8780	1.85	73.4	82.4	118.7	694.0
11.0	8792	1.92	73.5	82.4	119.3	698.0
16.5	8812	2.04	73.6	82.5	120.1	703.0
21.0	8828	2.16	73.6	82.5	120.7	706.0
22.5	8833	2.20	73.6	82.5	120.6	705.0

TEST NO: G7.6 FLOW PATTERN:BUBBLE-FROTH

ML= 5397 MG= 1.48 QFLUX= 7027 NUTP=120.7 HTP= 706 PDT= 6.996

PDF= 6.123 ALFA=0.121 WE= 5690.00 TOUT(MEAS)= 74.3, 74.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	73.6	8830	1109.0	29.8	60.0	0.709	18.137	2.36
OUTLET	74.1	8927	1108.4	22.8	59.4	0.709	18.163	3.06
MEAN	73.9	8878	1108.8	26.3	59.7	0.709	18.162	2.69

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	8838	2.41	73.7	83.2	126.1	737.0
4.5	8848	2.47	73.7	83.6	121.2	709.0
7.5	8860	2.55	73.8	83.8	120.2	703.0
11.0	8874	2.65	73.8	83.9	119.1	696.0
16.5	8896	2.82	73.9	83.9	120.6	705.0
21.0	8915	2.97	74.0	84.0	120.7	706.0
22.5	8921	3.03	74.1	84.0	120.8	706.0

TEST NO: G7.7 FLOW PATTERN:BUBBLE-FROTH

ML= 5397 MG= 2.03 QFLUX= 7877 NUTP=124.1 HTP= 726 PDT= 7.264

PDF= 6.422 ALFA=0.153 WE= 5694.00 TOUT(MEAS)= 74.8, 74.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	74.0	8917	1525.0	30.7	59.4	0.709	18.137	3.16
OUTLET	74.5	9026	1524.0	23.4	58.7	0.709	18.165	4.10
MEAN	74.3	8971	1524.6	27.0	59.1	0.709	18.164	3.61

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	8926	3.22	74.1	84.5	129.1	755.0
4.5	8937	3.30	74.1	84.9	125.2	732.0
7.5	8951	3.41	74.2	85.1	123.1	720.0
11.0	8967	3.54	74.3	85.2	122.6	717.0
16.5	8992	3.77	74.4	85.3	123.7	723.0
21.0	9012	3.98	74.5	85.3	124.9	730.0
22.5	9019	4.06	74.5	85.4	123.9	724.0

TEST NO: G7.8 FLOW PATTERN:BUBBLE-FROTH

ML= 5397 MG= 2.89 QFLUX= 8791 NUTP=125.7 HTP= 735 PDT= 7.464

PDF= 6.662 ALFA=0.192 WE= 5698.00 TOUT(MEAS)= 75.3, 75.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	74.5	9023	2169.0	32.2	58.7	0.709	18.137	4.29
OUTLET	75.1	9146	2167.9	24.7	57.9	0.709	18.168	5.54
MEAN	74.8	9085	2168.8	28.4	58.3	0.709	18.167	4.89

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	9033	4.37	74.6	86.0	131.4	768.0
4.5	9046	4.48	74.6	86.5	127.0	743.0
7.5	9061	4.62	74.7	86.7	125.1	732.0
11.0	9079	4.80	74.8	86.8	124.4	728.0
16.5	9107	5.10	74.9	86.9	125.0	731.0
21.0	9130	5.38	75.0	87.0	125.6	734.0
22.5	9138	5.48	75.0	87.0	126.0	737.0

TEST NO: G7.9 FLOW PATTERN:FROTH

ML= 5397 MG= 4.22 QFLUX= 9346 NUTP=128.3 HTP= 751 PDT= 7.404

PDF= 6.650 ALFA=0.241 WE= 5702.00 TOUT(MEAS)= 75.8, 75.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.0	9130	3162.0	33.6	57.9	0.709	18.137	5.99
OUTLET	75.6	9261	3160.2	26.2	57.2	0.709	18.170	7.62
MEAN	75.3	9196	3161.5	29.9	57.6	0.709	18.169	6.78

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	9141	6.10	75.1	87.0	133.3	779.0
4.5	9155	6.25	75.1	87.5	129.2	756.0
7.5	9171	6.43	75.2	87.8	126.8	741.0
11.0	9190	6.66	75.3	87.8	127.1	743.0
16.5	9220	7.06	75.4	87.9	128.0	749.0
21.0	9244	7.43	75.5	87.9	129.3	756.0
22.5	9253	7.56	75.6	87.9	129.4	757.0

TEST NO: G7.10 FLOW PATTERN:FROTH

ML= 5397 MG= 6.62 QFLUX= 9344 NUTP=135.8 HTP= 794 PDT= 8.511

PDF= 7.817 ALFA=0.302 WE= 5704.00 TOUT(MEAS)= 76.0, 76.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.2	9179	4955.0	36.7	57.6	0.709	18.137	8.59
OUTLET	75.8	9309	4951.1	28.2	56.9	0.709	18.171	11.09
MEAN	75.5	9244	4953.2	32.5	57.3	0.709	18.170	9.79

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	9189	8.76	75.3	86.7	139.7	817.0
4.5	9203	8.99	75.3	87.2	135.0	789.0
7.5	9219	9.27	75.4	87.4	133.5	781.0
11.0	9238	9.62	75.5	87.4	134.1	784.0
16.5	9268	10.23	75.6	87.3	136.6	799.0
21.0	9293	10.79	75.7	87.3	138.4	809.0
22.5	9301	10.99	75.8	87.3	138.1	807.0

TEST NO: G7.11 FLOW PATTERN:FROTH

ML= 5397 MG= 9.32 QFLUX= 9624 NUTP=142.9 HTP= 836 PDT= 9.513

PDF= 8.864 ALFA=0.347 WE= 5706.00 TOUT(MEAS)= 76.2, 76.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.4	9227	6979.0	40.3	57.3	0.709	18.137	11.04
OUTLET	76.0	9362	6973.2	30.8	56.5	0.709	18.172	14.33
MEAN	75.7	9294	6976.2	35.5	56.9	0.709	18.171	12.62

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	9238	11.26	75.5	86.7	146.3	856.0
4.5	9252	11.56	75.6	87.1	142.4	833.0
7.5	9269	11.93	75.6	87.3	141.1	825.0
11.0	9289	12.39	75.7	87.4	141.3	826.0
16.5	9320	13.19	75.9	87.3	143.2	837.0
21.0	9345	13.93	76.0	87.3	145.1	849.0
22.5	9353	14.20	76.0	87.3	145.9	853.0

TEST NO: G7.12 FLOW PATTERN:FROTH

ML= 5397 MG= 12.99 QFLUX= 10343 NUTP=149.4 HTP= 874 PDT=10.298

PDF= 9.695 ALFA=0.393 WE= 5710.00 TOUT(MEAS)= 76.6, 76.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.9	9324	9718.0	43.5	56.7	0.709	18.137	14.26
OUTLET	76.5	9470	9709.1	33.2	55.9	0.709	18.175	18.53
MEAN	76.2	9397	9713.7	38.4	56.3	0.709	18.173	16.31

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	9337	14.55	75.9	87.6	152.1	889.0
4.5	9352	14.93	76.0	87.9	148.4	868.0
7.5	9370	15.41	76.1	88.1	147.1	860.0
11.0	9391	16.01	76.2	88.2	147.4	862.0
16.5	9424	17.05	76.3	88.1	150.3	879.0
21.0	9452	18.01	76.4	88.0	152.5	892.0
22.5	9461	18.35	76.5	88.1	152.5	892.0

TEST NO: G7.13 FLOW PATTERN:FROTH

ML= 5397 MG= 19.03 QFLUX= 10982 NUTP=157.0 HTP= 918 PDT=10.298

PDF= 9.741 ALFA=0.441 WE= 5715.00 TOUT(MEAS)= 77.3, 77.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.4	9442	14229.0	48.5	56.0	0.709	18.137	18.75
OUTLET	77.1	9597	14214.9	38.2	55.1	0.709	18.177	23.63
MEAN	76.8	9519	14222.0	43.4	55.5	0.709	18.176	21.11

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	9455	19.09	76.5	88.3	158.5	927.0
4.5	9471	19.53	76.5	88.6	155.5	910.0
7.5	9490	20.09	76.6	88.8	154.4	903.0
11.0	9513	20.78	76.7	88.7	156.4	915.0
16.5	9548	21.97	76.9	88.8	157.7	922.0
21.0	9577	23.05	77.0	88.8	159.4	932.0
22.5	9587	23.43	77.1	88.8	159.4	932.0

TEST NO: G7.14 FLOW PATTERN:FROTH

ML= 5397 MG= 25.07 QFLUX= 11561 NUTP=163.3 HTP= 955 PDT=12.747

PDF=12.224 ALFA=0.474 WE= 5717.00 TOUT(MEAS)= 77.6, 77.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.6	9491	18737.0	53.8	55.7	0.709	18.137	22.30
OUTLET	77.4	9654	18717.8	41.0	54.8	0.709	18.178	28.99
MEAN	77.0	9572	18727.6	47.4	55.2	0.709	18.177	25.50

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	9504	22.75	76.7	88.6	165.3	967.0
4.5	9521	23.34	76.8	88.9	162.3	949.0
7.5	9542	24.09	76.9	89.1	161.6	945.0
11.0	9565	25.03	76.9	89.2	161.8	946.0
16.5	9603	26.67	77.1	89.2	164.0	959.0
21.0	9634	28.17	77.3	89.2	165.7	969.0
22.5	9644	28.71	77.3	89.2	166.2	972.0

TEST NO: G8.1 FLOW PATTERN:BUBBLE

ML= 7196 MG= 0.11 QFLUX= 12255 NUTP=157.2 HTP= 919 PDT= 9.799

PDF= 8.814 ALFA=0.008 WE= 10158.00 TOUT(MEAS)= 77.1, 77.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.3	12568	83.7	33.6	56.1	0.709	24.183	0.16
OUTLET	76.9	12741	83.6	23.8	55.3	0.709	24.235	0.22
MEAN	76.6	12655	83.7	28.7	55.7	0.709	24.233	0.19

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	12582	0.16	76.4	89.4	160.8	940.0
4.5	12600	0.17	76.4	89.7	158.0	924.0
7.5	12622	0.18	76.5	89.9	156.9	917.0
11.0	12647	0.18	76.6	90.0	156.1	913.0
16.5	12687	0.20	76.7	90.1	156.9	918.0
21.0	12719	0.21	76.8	90.1	157.5	921.0
22.5	12730	0.22	76.9	90.2	157.1	919.0

TEST NO: G8.2 FLOW PATTERN:BUBBLE

ML= 7196 MG= 0.31 QFLUX= 12102 NUTP=160.8 HTP= 940 PDT= 9.954

PDF= 8.982 ALFA=0.020 WE= 10168.00 TOUT(MEAS)= 77.7, 77.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.0	12765	231.6	34.1	55.2	0.709	24.183	0.43
OUTLET	77.6	12937	231.4	24.2	54.5	0.709	24.239	0.61
MEAN	77.3	12851	231.5	29.2	54.8	0.709	24.237	0.52

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	12779	0.45	77.0	89.6	164.5	962.0
4.5	12797	0.46	77.1	89.8	162.8	952.0
7.5	12819	0.48	77.2	90.0	160.8	941.0
11.0	12844	0.50	77.3	90.2	159.4	932.0
16.5	12883	0.54	77.4	90.3	160.2	937.0
21.0	12915	0.58	77.5	90.4	160.6	940.0
22.5	12926	0.60	77.5	90.4	160.4	938.0

TEST NO: G8.3 FLOW PATTERN:BUBBLE

ML= 7196 MG= 0.52 QFLUX= 12050 NUTP=163.8 HTP= 958 PDT=10.195

PDF= 9.235 ALFA=0.033 WE= 10171.00 TOUT(MEAS)= 77.8, 77.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.2	12831	385.0	34.8	54.9	0.709	24.183	0.71
OUTLET	77.8	13002	384.7	24.6	54.2	0.709	24.240	0.99
MEAN	77.5	12917	384.9	29.8	54.5	0.709	24.239	0.84

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	12845	0.73	77.3	89.6	167.2	978.0
4.5	12863	0.75	77.3	89.8	165.1	966.0
7.5	12885	0.78	77.4	90.0	163.6	957.0
11.0	12909	0.82	77.5	90.3	161.2	943.0
16.5	12949	0.89	77.6	90.2	164.0	959.0
21.0	12981	0.95	77.7	90.2	164.4	962.0
22.5	12991	0.98	77.8	90.3	164.8	964.0

TEST NO: G8.4 FLOW PATTERN:BUBBLE

ML= 7196 MG= 0.74 QFLUX= 12025 NUTP=164.2 HTP= 960 PDT=10.286

PDF= 9.339 ALFA=0.045 WE= 10171.00 TOUT(MEAS)= 77.9, 78.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.2	12831	555.4	35.5	54.9	0.709	24.183	1.00
OUTLET	77.8	13002	554.9	25.2	54.2	0.709	24.240	1.40
MEAN	77.5	12916	555.2	30.3	54.5	0.709	24.239	1.19

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	12845	1.03	77.3	89.5	167.7	981.0
4.5	12863	1.06	77.3	89.7	166.2	972.0
7.5	12884	1.10	77.4	90.0	163.2	954.0
11.0	12909	1.16	77.5	90.1	162.6	951.0
16.5	12948	1.25	77.6	90.1	163.9	959.0
21.0	12980	1.35	77.7	90.2	164.9	964.0
22.5	12991	1.38	77.7	90.3	164.1	960.0

TEST NO: G8.5 FLOW PATTERN:BUBBLE-FROTH

ML= 7196 MG= 1.09 QFLUX= 12405 NUTP=163.3 HTP= 955 PDT=10.488

PDF= 9.558 ALFA=0.062 WE= 10174.00 TOUT(MEAS)= 78.2, 78.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.4	12884	812.7	36.7	54.6	0.709	24.183	1.42
OUTLET	78.0	13060	812.0	26.2	53.9	0.709	24.241	1.97
MEAN	77.7	12972	812.4	31.4	54.3	0.709	24.240	1.68

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	12898	1.46	77.4	90.2	166.5	974.0
4.5	12917	1.50	77.5	90.4	164.2	960.0
7.5	12939	1.56	77.6	90.7	161.5	944.0
11.0	12964	1.64	77.7	90.8	161.5	945.0
16.5	13005	1.77	77.8	90.7	164.2	960.0
21.0	13038	1.90	77.9	90.8	164.1	960.0
22.5	13049	1.94	77.9	90.9	163.9	958.0

TEST NO: G8.6 FLOW PATTERN:BUBBLE-FROTH

ML= 7196 MG= 1.49 QFLUX= 13234 NUTP=166.2 HTP= 972 PDT=10.646

PDF= 9.733 ALFA=0.080 WE= 10180.00 TOUT(MEAS)= 78.5, 78.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.7	12989	1109.0	37.8	54.2	0.709	24.183	1.89
OUTLET	78.4	13178	1108.8	27.1	53.4	0.709	24.244	2.60
MEAN	78.1	13083	1109.3	32.5	53.8	0.709	24.242	2.22

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	13005	1.93	77.8	91.2	169.2	989.0
4.5	13025	1.99	77.9	91.5	165.9	970.0
7.5	13048	2.07	77.9	91.4	167.5	980.0
11.0	13076	2.17	78.0	91.8	164.2	960.0
16.5	13119	2.34	78.2	91.8	165.9	970.0
21.0	13154	2.51	78.3	91.8	167.1	977.0
22.5	13166	2.57	78.3	92.0	165.6	969.0

TEST NO: G8.7 FLOW PATTERN:BUBBLE-FROTH

ML= 7196 MG= 2.11 QFLUX= 13328 NUTP=167.1 HTP= 977 PDT=11.043

PDF=10.155 ALFA=0.104 WE= 10180.00 TOUT(MEAS)= 78.6, 78.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.8	13002	1575.0	39.5	54.1	0.709	24.183	2.56
OUTLET	78.4	13192	1573.6	28.4	53.4	0.709	24.244	3.52
MEAN	78.1	13097	1574.4	34.0	53.8	0.709	24.242	3.01

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	13018	2.62	77.8	91.3	169.7	992.0
4.5	13038	2.70	77.9	91.5	167.1	977.0
7.5	13061	2.81	78.0	91.8	165.4	968.0
11.0	13089	2.94	78.1	91.8	166.4	973.0
16.5	13133	3.17	78.2	91.8	167.4	979.0
21.0	13168	3.40	78.3	91.9	168.2	983.0
22.5	13180	3.48	78.4	91.9	168.1	983.0

TEST NO: G8.8 FLOW PATTERN:BUBBLE-FROTH

ML= 7196 MG= 2.87 QFLUX= 13327 NUTP=168.0 HTP= 983 PDT=11.459

PDF=10.596 ALFA=0.130 WE= 10182.00 TOUT(MEAS)= 78.8, 78.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.9	13029	2144.0	41.1	54.0	0.709	24.183	3.35
OUTLET	78.5	13218	2142.3	29.7	53.3	0.709	24.245	4.60
MEAN	78.2	13123	2143.3	35.4	53.6	0.709	24.243	3.94

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	13044	3.43	77.9	91.2	171.2	1001.0
4.5	13064	3.54	78.0	91.5	168.8	987.0
7.5	13088	3.67	78.1	91.7	167.0	977.0
11.0	13115	3.84	78.2	91.8	166.7	975.0
16.5	13159	4.15	78.3	91.9	168.2	984.0
21.0	13195	4.44	78.4	91.9	168.7	987.0
22.5	13206	4.54	78.5	92.0	168.4	985.0

TEST NO: G8.9 FLOW PATTERN:FROTH

ML= 7196 MG= 4.17 QFLUX= 13707 NUTP=172.7 HTP=1010 PDT=11.902

PDF=11.073 ALFA=0.164 WE= 10187.00 TOUT(MEAS)= 79.0, 79.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	78.2	13121	3106.0	44.0	53.6	0.709	24.183	4.54
OUTLET	78.8	13316	3103.6	32.1	52.9	0.709	24.247	6.16
MEAN	78.5	13219	3105.1	38.0	53.2	0.709	24.245	5.31

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	13137	4.65	78.2	91.6	175.2	1025.0
4.5	13157	4.79	78.3	91.9	172.7	1010.0
7.5	13182	4.96	78.4	92.0	171.8	1005.0
11.0	13210	5.19	78.5	92.1	171.9	1006.0
16.5	13255	5.58	78.6	92.2	172.4	1008.0
21.0	13292	5.96	78.7	92.2	174.1	1018.0
22.5	13304	6.09	78.8	92.4	172.8	1010.0

TEST NO: G8.10 FLOW PATTERN:FROTH

ML= 7196 MG= 5.53 QFLUX= 13771 NUTP=171.8 HTP=1005 PDT=12.578

PDF=11.783 ALFA=0.199 WE= 10187.00 TOUT(MEAS)= 79.0, 79.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	78.2	13121	4125.0	45.2	53.6	0.709	24.183	5.87
OUTLET	78.8	13317	4121.8	32.6	52.9	0.709	24.247	8.04
MEAN	78.5	13219	4123.7	38.9	53.2	0.709	24.245	6.89

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	13137	6.01	78.2	91.7	175.3	1025.0
4.5	13157	6.19	78.3	91.9	172.7	1010.0
7.5	13182	6.43	78.4	92.2	170.7	998.0
11.0	13210	6.73	78.5	92.3	170.6	998.0
16.5	13255	7.26	78.6	92.3	172.0	1006.0
21.0	13292	7.77	78.8	92.4	172.1	1006.0
22.5	13304	7.95	78.8	92.4	172.6	1009.0

TEST NO: G8.11 FLOW PATTERN:FROTH

ML= 7196 MG= 11.99 QFLUX= 13832 NUTP=177.4 HTP=1037 PDT=13.860

PDF=13.163 ALFA=0.299 WE= 10187.00 TOUT(MEAS)= 79.1, 79.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	78.2	13119	8942.0	52.1	53.6	0.709	24.183	11.05
OUTLET	78.8	13316	8933.8	38.2	52.9	0.709	24.247	14.90
MEAN	78.5	13218	8938.0	45.1	53.2	0.709	24.245	12.87

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	13136	11.30	78.2	91.3	181.3	1060.0
4.5	13156	11.63	78.3	91.6	178.0	1041.0
7.5	13181	12.05	78.4	91.8	176.3	1031.0
11.0	13210	12.59	78.5	91.9	175.8	1028.0
16.5	13255	13.53	78.6	92.0	177.1	1036.0
21.0	13292	14.41	78.7	92.0	178.9	1046.0
22.5	13304	14.74	78.8	92.0	178.5	1044.0

Table F.3

Silicone-Air Tabulated Data

TEST NO: S1.1 FLOW PATTERN:SLUG

ML=17.3 MG= 0.42 QFLUX= 500 NUTP= 19.2 HTP= 33 PDT= 0.220

PDF= 0.048 ALFA=0.828 WE= 0.07 TOUT(MEAS)= 84.3, 84.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.2	43	316.5	14.6	76.6	0.710	0.073	1.34
OUTLET	82.4	52	308.7	14.3	62.6	0.708	0.073	1.41
MEAN	73.8	48	312.6	14.4	69.3	0.709	0.072	1.38

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	44	1.35	66.8	84.4	16.1	28.0
4.5	45	1.35	68.9	86.4	16.1	28.0
7.5	46	1.36	71.4	89.6	15.6	27.0
11.0	48	1.37	74.3	92.6	15.5	27.0
16.5	50	1.39	78.8	96.0	16.5	29.0
21.0	52	1.40	82.5	95.8	21.3	37.0
22.5	53	1.41	83.7	87.1	83.3	47.0

TEST NO: S1.2 FLOW PATTERN:SLUG

ML=17.3 MG= 0.75 QFLUX= 703 NUTP= 17.3 HTP= 30 PDT= 0.037

PDF=-0.094 ALFA=0.869 WE= 0.07 TOUT(MEAS)= 90.8, 90.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.6	43	572.3	14.3	75.9	0.710	0.073	2.47
OUTLET	89.5	57	553.0	14.3	58.7	0.707	0.073	2.59
MEAN	77.6	50	562.6	14.3	66.8	0.709	0.072	2.53

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	44	2.48	67.8	94.0	15.2	26.0
4.5	46	2.49	70.5	97.1	15.0	26.0
7.5	48	2.51	73.8	101.1	14.6	25.0
11.0	50	2.53	77.5	104.6	14.8	26.0
16.5	53	2.56	83.5	106.6	17.4	30.0
21.0	56	2.58	88.4	105.0	24.1	42.0
22.5	57	2.59	90.0	103.4	29.6	52.0

TEST NO: S1.3 FLOW PATTERN:SLUG

ML=17.3 MG= 1.08 QFLUX= 858 NUTP= 18.4 HTP= 32 PDT= 0.138

PDF= 0.029 ALFA=0.890 WE= 0.07 TOUT(MEAS)= 95.9, 95.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.8	43	820.1	14.2	75.6	0.710	0.073	3.56
OUTLET	94.5	59	787.0	14.1	56.2	0.707	0.073	3.80
MEAN	80.1	51	803.6	14.1	65.2	0.709	0.073	3.68

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	45	3.58	68.3	100.0	15.3	26.0
4.5	46	3.61	71.5	103.5	15.2	26.0
7.5	48	3.64	75.4	107.6	15.1	26.0
11.0	51	3.67	79.9	111.0	15.7	27.0
16.5	55	3.73	86.9	113.3	18.5	32.0
21.0	58	3.78	92.7	111.3	26.2	46.0
22.5	59	3.79	94.6	109.3	33.2	58.0

TEST NO: S1.4 FLOW PATTERN:SLUG-CHURN

ML=17.3 MG= 1.48 QFLUX= 858 NUTP= 18.3 HTP= 32 PDT= 0.127

PDF= 0.033 ALFA=0.906 WE= 0.07 TOUT(MEAS)= 97.5, 96.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	66.1	43	1120.0	14.2	75.3	0.710	0.073	4.88
OUTLET	94.6	59	1075.6	14.1	55.4	0.707	0.073	5.22
MEAN	80.3	51	1097.9	14.1	64.6	0.708	0.073	5.06

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	45	4.91	68.8	101.8	14.7	25.0
4.5	47	4.95	72.1	104.8	14.9	26.0
7.5	49	4.99	76.1	108.8	14.9	26.0
11.0	52	5.04	80.8	111.9	15.7	27.0
16.5	56	5.12	88.2	114.4	18.6	32.0
21.0	59	5.18	94.2	112.1	26.4	46.0
22.5	60	5.21	96.2	110.9	33.1	58.0

TEST NO: S1.5 FLOW PATTERN:CHURN

ML=17.3 MG= 2.06 QFLUX= 859 NUTP= 17.5 HTP= 30 PDT= 0.138

PDF= 0.058 ALFA=0.920 WE= 0.07 TOUT(MEAS)= 98.5, 98.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.7	43	1564.0	14.2	75.5	0.710	0.073	6.79
OUTLET	93.6	59	1503.2	14.1	54.8	0.706	0.073	7.28
MEAN	79.7	51	1533.9	14.2	64.3	0.708	0.073	7.04

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	45	6.83	68.6	97.4	16.7	29.0
4.5	47	6.88	72.1	102.4	16.0	28.0
7.5	49	6.94	76.3	107.2	15.8	27.0
11.0	52	7.02	81.2	113.5	15.1	26.0
16.5	56	7.13	88.9	117.9	16.9	29.0
21.0	60	7.23	95.3	116.8	22.8	40.0
22.5	61	7.26	97.4	114.9	28.0	49.0

TEST NO: S1.6 FLOW PATTERN:CHURN

ML=17.3 MG= 2.85 QFLUX= 858 NUTP= 20.2 HTP= 35 PDT= 0.140

PDF= 0.072 ALFA=0.933 WE= 0.07 TOUT(MEAS)=101.4,100.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	66.1	43	2160.0	14.3	75.1	0.710	0.073	9.36
OUTLET	93.3	59	2078.0	14.1	53.5	0.706	0.073	10.08
MEAN	79.7	51	2119.3	14.2	63.4	0.708	0.073	9.73

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	45	9.42	69.1	89.2	23.9	42.0
4.5	47	9.50	72.9	95.0	21.8	38.0
7.5	50	9.59	77.4	101.4	20.2	35.0
11.0	53	9.70	82.7	109.5	18.2	32.0
16.5	57	9.87	91.0	118.8	17.6	31.0
21.0	61	10.01	97.8	119.7	22.4	39.0
22.5	63	10.06	100.0	117.8	27.6	48.0

TEST NO: S1.7 FLOW PATTERN:CHURN-ANNULAR

ML=17.3 MG= 4.31 QFLUX= 1027 NUTP= 24.2 HTP= 42 PDT= 0.141

PDF= 0.087 ALFA=0.947 WE= 0.07 TOUT(MEAS)=109.5,108.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	66.6	44	3266.0	14.2	74.4	0.710	0.073	14.22
OUTLET	97.7	61	3124.8	14.1	50.2	0.705	0.073	15.51
MEAN	82.1	52	3195.6	14.1	61.0	0.708	0.073	14.89

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	46	14.33	70.2	87.1	34.0	60.0
4.5	48	14.47	74.8	93.8	30.3	53.0
7.5	51	14.63	80.3	101.6	27.1	47.0
11.0	55	14.83	86.7	111.0	23.9	42.0
16.5	61	15.13	96.7	126.1	20.0	35.0
21.0	65	15.39	104.9	135.3	19.4	34.0
22.5	67	15.47	107.7	134.5	22.0	38.0

TEST NO: S1.8 FLOW PATTERN:ANNULAR

ML=17.3 MG= 5.99 QFLUX= 859 NUTP= 21.8 HTP= 38 PDT= 0.093

PDF= 0.048 ALFA=0.956 WE= 0.07 TOUT(MEAS)=105.2,104.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	66.9	44	4540.0	14.1	74.3	0.710	0.073	19.96
OUTLET	91.7	58	4381.9	14.0	51.9	0.706	0.073	21.53
MEAN	79.3	51	4461.1	14.0	62.1	0.708	0.073	20.77

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	46	20.10	70.2	85.3	31.7	56.0
4.5	48	20.27	74.2	91.7	27.6	48.0
7.5	51	20.47	79.1	99.3	24.0	42.0
11.0	54	20.70	84.8	107.4	21.5	38.0
16.5	59	21.08	93.8	120.1	18.6	32.0
21.0	63	21.38	101.1	130.0	17.1	30.0
22.5	65	21.48	103.6	132.1	17.3	30.0

TEST NO: S1.9 FLOW PATTERN:ANNULAR

ML=17.3 MG= 8.95 QFLUX= 1025 NUTP= 26.2 HTP= 46 PDT= 0.074

PDF= 0.039 ALFA=0.966 WE= 0.07 TOUT(MEAS)=103.4,102.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	67.1	44	6778.0	14.0	74.2	0.710	0.073	29.93
OUTLET	94.4	59	6519.9	14.0	52.7	0.706	0.073	32.13
MEAN	80.8	52	6649.3	14.0	62.5	0.708	0.073	31.07

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	46	30.12	70.2	84.6	39.8	70.0
4.5	48	30.36	74.1	91.5	33.1	58.0
7.5	50	30.64	78.7	98.9	28.6	50.0
11.0	53	30.97	84.1	106.8	25.6	45.0
16.5	58	31.49	92.6	118.7	22.3	39.0
21.0	62	31.92	99.5	127.9	20.7	36.0
22.5	64	32.06	101.8	130.9	20.2	35.0

TEST NO: S1.10 FLOW PATTERN:ANNULAR

ML=17.3 MG= 13.11 QFLUX= 1024 NUTP= 25.6 HTP= 45 PDT= 0.070

PDF= 0.043 ALFA=0.974 WE= 0.07 TOUT(MEAS)= 98.4, 97.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	67.4	44	9929.0	14.0	74.2	0.710	0.073	43.91
OUTLET	91.9	58	9587.0	14.0	54.9	0.706	0.073	46.70
MEAN	79.6	51	9758.3	14.0	63.9	0.708	0.073	45.35

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	45	44.15	70.0	83.7	41.9	73.0
4.5	47	44.45	73.3	90.6	33.3	58.0
7.5	49	44.81	77.3	98.1	27.7	49.0
11.0	52	45.23	81.9	105.8	24.2	42.0
16.5	56	45.89	89.1	116.4	21.4	37.0
21.0	60	46.43	95.1	124.7	19.8	35.0
22.5	61	46.61	97.1	127.3	19.4	34.0

TEST NO: S1.11 FLOW PATTERN:ANNULAR

ML=17.3 MG= 18.27 QFLUX= 1207 NUTP= 25.0 HTP= 44 PDT= 0.092

PDF= 0.070 ALFA=0.979 WE= 0.07 TOUT(MEAS)= 98.1, 97.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	67.7	44	13830.0	14.1	73.9	0.710	0.073	61.03
OUTLET	93.4	59	13330.8	14.0	55.1	0.706	0.073	64.90
MEAN	80.6	52	13580.6	14.0	63.9	0.708	0.073	63.03

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	46	61.36	70.3	85.0	45.8	80.0
4.5	47	61.78	73.5	94.0	33.1	58.0
7.5	50	62.27	77.4	102.8	26.8	47.0
11.0	52	62.86	81.9	111.3	23.2	41.0
16.5	56	63.77	89.0	122.6	20.5	36.0
21.0	60	64.53	94.8	131.3	18.9	33.0
22.5	61	64.78	96.7	134.1	18.6	32.0

TEST NO: S1.12 FLOW PATTERN:ANNULAR

ML=17.3 MG= 25.33 QFLUX= 1205 NUTP= 24.7 HTP= 43 PDT= 0.142

PDF= 0.125 ALFA=0.984 WE= 0.07 TOUT(MEAS)= 93.5, 92.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.2	44	19161.0	14.2	73.7	0.710	0.073	83.98
OUTLET	90.5	57	18557.1	14.1	57.5	0.707	0.073	88.79
MEAN	79.3	51	18859.2	14.1	65.1	0.709	0.073	86.47

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	46	84.39	70.3	84.9	46.0	81.0
4.5	47	84.90	73.0	94.1	32.0	56.0
7.5	49	85.52	76.2	102.5	25.9	45.0
11.0	51	86.24	79.9	110.1	22.7	40.0
16.5	54	87.38	85.8	119.1	20.6	36.0
21.0	57	88.32	90.6	126.9	19.0	33.0
22.5	58	88.63	92.2	129.1	18.7	33.0

TEST NO: S1.13 FLOW PATTERN:ANNULAR

ML=17.3 MG= 38.12 QFLUX= 1298 NUTP= 27.6 HTP= 48 PDT= 0.224

PDF= 0.212 ALFA=0.988 WE= 0.07 TOUT(MEAS)= 90.4, 88.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.2	45	28799.0	14.4	73.0	0.710	0.073	124.47
OUTLET	88.7	56	28006.2	14.2	59.4	0.707	0.073	131.24
MEAN	78.9	51	28403.0	14.3	65.9	0.709	0.073	127.96

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	46	125.04	70.9	85.2	50.8	89.0
4.5	47	125.76	73.1	94.1	34.8	61.0
7.5	49	126.63	75.8	101.4	28.6	50.0
11.0	50	127.64	78.8	107.7	25.5	45.0
16.5	53	129.25	83.6	115.6	23.1	40.0
21.0	55	130.57	87.6	121.5	21.9	38.0
22.5	56	131.01	88.9	123.3	21.6	38.0

TEST NO: S1.14 FLOW PATTERN:ANNULAR

ML=17.3 MG= 54.33 QFLUX= 1606 NUTP= 30.6 HTP= 54 PDT= 0.409

PDF= 0.399 ALFA=0.991 WE= 0.07 TOUT(MEAS)= 89.7, 88.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.0	45	41050.0	14.8	73.2	0.710	0.073	172.56
OUTLET	88.4	56	39923.7	14.4	59.7	0.708	0.073	184.01
MEAN	78.7	50	40487.1	14.6	66.1	0.709	0.072	178.44

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	46	173.52	70.7	89.0	49.1	86.0
4.5	47	174.72	72.9	98.0	36.1	63.0
7.5	48	176.18	75.5	104.5	31.3	55.0
11.0	50	177.90	78.5	110.0	28.9	51.0
16.5	53	180.62	83.2	116.8	27.3	48.0
21.0	55	182.87	87.1	121.9	26.4	46.0
22.5	56	183.63	88.4	123.6	26.1	46.0

TEST NO: S1.15 FLOW PATTERN:ANNULAR-MIST

ML=17.3 MG= 78.65 QFLUX= 1818 NUTP= 41.2 HTP= 72 PDT= 0.690

PDF= 0.682 ALFA=0.993 WE= 0.07 TOUT(MEAS)= 84.4, 83.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	67.7	44	59547.0	15.8	74.4	0.710	0.073	234.18
OUTLET	84.7	54	58105.0	15.1	62.7	0.708	0.073	252.15
MEAN	76.2	49	58826.1	15.4	68.4	0.709	0.072	243.37

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	45	235.67	69.1	85.1	63.8	112.0
4.5	46	237.54	70.9	92.5	47.4	83.0
7.5	47	239.81	73.0	97.6	41.8	73.0
11.0	48	242.49	75.5	101.8	39.1	69.0
16.5	51	246.77	79.4	107.1	37.3	65.0
21.0	52	250.34	82.5	111.1	36.3	64.0
22.5	53	251.54	83.6	112.4	36.0	63.0

TEST NO: S1.16 FLOW PATTERN:ANNULAR-MIST

ML=17.3 MG= 98.39 QFLUX= 2045 NUTP= 52.1 HTP= 92 PDT= 1.123

PDF= 1.116 ALFA=0.994 WE= 0.07 TOUT(MEAS)= 80.4, 80.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	67.0	44	74566.0	17.4	75.2	0.710	0.073	266.33
OUTLET	83.1	53	72844.9	16.2	65.1	0.709	0.073	291.42
MEAN	75.1	48	73705.6	16.8	70.0	0.709	0.072	279.09

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	44	268.37	68.2	82.9	78.0	137.0
4.5	45	270.94	69.6	89.1	59.2	104.0
7.5	46	274.08	71.3	93.1	53.1	93.0
11.0	47	277.80	73.4	96.6	49.9	88.0
16.5	49	283.80	76.6	101.0	47.6	84.0
21.0	51	288.85	79.2	104.3	46.4	81.0
22.5	51	290.56	80.0	105.4	45.9	81.0

TEST NO: S1.17 FLOW PATTERN:ANNULAR-MIST

ML=17.3 MG=153.03 QFLUX= 2282 NUTP= 65.6 HTP= 115 PDT= 2.169

PDF= 2.163 ALFA=0.996 WE= 0.07 TOUT(MEAS)= 75.0, 76.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	66.2	43	116118.0	21.0	76.0	0.710	0.073	341.18
OUTLET	78.8	50	114007.1	18.9	68.6	0.709	0.072	385.86
MEAN	72.5	47	115062.7	19.9	72.3	0.710	0.072	363.63

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	44	344.67	67.0	80.1	97.7	172.0
4.5	44	349.12	68.0	85.1	75.3	133.0
7.5	45	354.59	69.2	88.4	67.5	119.0
11.0	46	361.15	70.6	91.1	63.1	111.0
16.5	47	371.90	72.9	94.6	59.6	105.0
21.0	48	381.11	74.7	97.4	57.1	100.0
22.5	48	384.27	75.3	98.3	56.5	99.0

TEST NO: S2.1 FLOW PATTERN:SLUG

ML=23.5 MG= 0.62 QFLUX= 496 NUTP= 44.1 HTP= 77 PDT= 0.207

PDF= 0.043 ALFA=0.835 WE= .0.13 TOUT(MEAS)= 74.1, 74.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.7	61	465.3	14.4	74.0	0.710	0.099	2.01
OUTLET	81.2	71	457.0	14.2	69.8	0.709	0.099	2.06
MEAN	75.0	66	461.1	14.3	71.9	0.710	0.098	2.04

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	61	2.02	69.2	73.3	68.4	120.0
4.5	62	2.02	69.7	74.6	57.3	101.0
7.5	62	2.03	70.4	76.5	45.9	81.0
11.0	63	2.04	71.2	78.2	40.3	71.0
16.5	64	2.05	72.5	80.4	35.8	63.0
21.0	65	2.06	73.5	80.8	38.8	68.0
22.5	65	2.06	73.9	80.1	45.5	80.0

TEST NO: S2.2 FLOW PATTERN:SLUG

ML=23.5 MG= 1.07 QFLUX= 847 NUTP= 34.4 HTP= 60 PDT= 0.177

PDF= 0.049 ALFA=0.872 WE= 0.13 TOUT(MEAS)= 80.5, 80.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	64.6	58	812.7	14.3	77.2	0.711	0.099	3.50
OUTLET	85.7	74	788.2	14.1	65.1	0.709	0.099	3.65
MEAN	75.1	66	800.4	14.2	71.0	0.710	0.099	3.57

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	59	3.51	65.9	80.0	34.1	60.0
4.5	60	3.52	67.6	82.0	33.4	59.0
7.5	62	3.54	69.7	84.8	31.9	56.0
11.0	64	3.57	72.1	87.6	31.0	54.0
16.5	66	3.60	75.9	90.5	32.8	58.0
21.0	69	3.63	78.9	90.5	41.5	73.0
22.5	70	3.64	79.9	89.3	51.2	90.0

TEST NO: S2.3 FLOW PATTERN:SLUG

ML=23.5 MG= 1.48 QFLUX= 847 NUTP= 34.6 HTP= 61 PDT= 0.154

PDF= 0.045 ALFA=0.890 WE= 0.13 TOUT(MEAS)= 81.7, 81.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	64.7	58	1127.0	14.3	77.1	0.711	0.099	4.86
OUTLET	85.6	74	1094.0	14.1	64.4	0.708	0.099	5.07
MEAN	75.2	66	1110.8	14.2	70.5	0.710	0.099	4.97

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	59	4.88	66.1	80.5	33.4	59.0
4.5	60	4.90	68.0	82.6	32.8	57.0
7.5	62	4.93	70.1	85.0	32.3	57.0
11.0	64	4.96	72.7	88.1	31.2	55.0
16.5	67	5.01	76.6	91.1	33.2	58.0
21.0	69	5.05	79.9	91.3	42.3	74.0
22.5	70	5.06	81.0	90.4	51.1	90.0

TEST NO: S2.4 FLOW PATTERN:SLUG-CHURN

ML=23.5 MG= 2.06 QFLUX= 848 NUTP= 34.9 HTP= 61 PDT= 0.171

PDF= 0.078 ALFA=0.907 WE= 0.13 TOUT(MEAS)= 83.3, 83.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	64.7	58	1567.0	14.0	77.0	0.711	0.099	6.88
OUTLET	85.4	74	1521.0	13.8	63.3	0.708	0.099	7.20
MEAN	75.1	66	1544.1	13.9	69.9	0.709	0.099	7.05

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	59	6.90	66.3	78.9	38.1	67.0
4.5	61	6.94	68.3	81.8	35.5	62.0
7.5	62	6.98	70.7	85.2	33.1	58.0
11.0	65	7.03	73.5	88.6	31.7	56.0
16.5	68	7.11	77.8	92.9	32.1	56.0
21.0	71	7.17	81.4	93.2	40.7	71.0
22.5	72	7.19	82.6	92.3	49.4	87.0

TEST NO: S2.5 FLOW PATTERN:SLUG-CHURN

ML=23.5 MG= 2.85 QFLUX= 848 NUTP= 40.3 HTP= 71 PDT= 0.184

PDF= 0.105 ALFA=0.921 WE= 0.13 TOUT(MEAS)= 86.2, 85.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	64.9	58	2167.0	14.3	76.7	0.711	0.099	9.35
OUTLET	85.2	74	2104.7	14.1	61.5	0.708	0.099	9.85
MEAN	75.1	66	2136.0	14.2	68.8	0.709	0.099	9.61

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	60	9.39	66.7	76.6	48.4	85.0
4.5	61	9.44	69.0	79.2	47.1	83.0
7.5	63	9.51	71.7	82.7	43.6	77.0
11.0	66	9.58	74.9	86.8	40.5	71.0
16.5	69	9.70	79.9	93.9	34.4	60.0
21.0	73	9.80	84.0	97.4	36.1	63.0
22.5	74	9.83	85.4	96.9	41.9	74.0

TEST NO: S2.6 FLOW PATTERN:CHURN

ML=23.5 MG= 4.27 QFLUX= 848 NUTP= 43.6 HTP= 77 PDT= 0.186

PDF= 0.122 ALFA=0.936 WE= 0.13 TOUT(MEAS)= 87.2, 86.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	64.7	58	3244.0	14.3	76.8	0.711	0.099	13.99
OUTLET	84.3	73	3153.7	14.1	60.9	0.708	0.099	14.78
MEAN	74.5	66	3199.1	14.2	68.5	0.709	0.099	14.40

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	60	14.06	66.7	75.2	56.1	99.0
4.5	61	14.14	69.1	78.1	52.9	93.0
7.5	63	14.24	71.9	82.2	46.8	82.0
11.0	66	14.36	75.3	86.4	43.2	76.0
16.5	70	14.55	80.6	93.0	38.6	68.0
21.0	73	14.70	84.9	98.0	36.7	64.0
22.5	74	14.75	86.3	98.0	39.2	69.0

TEST NO: S2.7 FLOW PATTERN:CHURN-ANNULAR

ML=23.5 MG= 6.36 QFLUX= 930 NUTP= 41.2 HTP= 72 PDT= 0.151

PDF= 0.100 ALFA=0.949 WE= 0.13 TOUT(MEAS)= 90.4, 89.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	64.9	58	4838.0	14.2	76.6	0.710	0.099	21.03
OUTLET	85.4	74	4696.8	14.0	59.1	0.707	0.099	22.27
MEAN	75.1	66	4767.5	14.1	67.3	0.709	0.099	21.67

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	60	21.14	67.1	76.6	54.9	96.0
4.5	62	21.27	69.8	80.4	49.4	87.0
7.5	64	21.43	73.0	84.4	44.8	79.0
11.0	67	21.61	76.8	89.7	40.9	72.0
16.5	72	21.91	82.8	97.2	36.8	65.0
21.0	76	22.15	87.7	103.3	33.9	59.0
22.5	77	22.23	89.3	105.4	33.1	58.0

TEST NO: S2.8 FLOW PATTERN:ANNULAR

ML=23.5 MG= 9.01 QFLUX= 1033 NUTP= 40.7 HTP= 71 PDT= 0.133

PDF= 0.091 ALFA=0.959 WE= 0.13 TOUT(MEAS)= 91.5, 90.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	64.8	58	6852.0	14.1	76.6	0.711	0.099	29.88
OUTLET	86.3	75	6642.3	14.0	58.5	0.707	0.099	31.68
MEAN	75.5	66	6747.3	14.0	67.0	0.709	0.099	30.81

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	60	30.04	67.0	77.7	54.2	95.0
4.5	62	30.23	69.9	81.8	48.9	86.0
7.5	64	30.46	73.3	86.6	43.6	77.0
11.0	67	30.73	77.3	91.8	40.1	70.0
16.5	72	31.15	83.5	99.7	36.3	64.0
21.0	76	31.50	88.6	105.9	34.0	60.0
22.5	78	31.62	90.3	108.0	33.4	59.0

TEST NO: S2.9 FLOW PATTERN:ANNULAR

ML=23.5 MG= 13.19 QFLUX= 1105 NUTP= 36.0 HTP= 63 PDT= 0.131

PDF= 0.097 ALFA=0.967 WE= 0.13 TOUT(MEAS)= 92.1, 91.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	64.3	58	10038.0	14.1	77.1	0.711	0.099	43.75
OUTLET	85.4	74	9734.9	14.0	58.1	0.707	0.099	46.47
MEAN	74.9	66	9886.5	14.0	67.0	0.709	0.099	45.15

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	59	43.98	66.6	78.0	54.2	95.0
4.5	62	44.27	69.6	83.4	45.1	79.0
7.5	64	44.62	73.1	89.1	39.1	69.0
11.0	67	45.03	77.3	95.3	34.8	61.0
16.5	73	45.67	83.8	104.1	31.0	54.0
21.0	77	46.20	89.2	111.0	28.9	51.0
22.5	78	46.38	90.9	113.2	28.4	50.0

TEST NO: S2.10 FLOW PATTERN:ANNULAR

ML=23.5 MG= 18.32 QFLUX= 1192 NUTP= 46.8 HTP= 82 PDT= 0.185

PDF= 0.158 ALFA=0.974 WE= 0.13 TOUT(MEAS)= 87.1, 86.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	64.9	58	13924.0	14.3	76.7	0.711	0.099	60.14
OUTLET	85.7	74	13511.0	14.1	61.1	0.708	0.099	63.44
MEAN	75.3	66	13717.5	14.1	68.5	0.709	0.099	61.84

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	60	60.42	66.8	75.9	73.0	129.0
4.5	61	60.77	69.1	80.4	59.7	105.0
7.5	63	61.20	71.9	85.2	50.6	89.0
11.0	66	61.69	75.2	90.3	44.8	79.0
16.5	70	62.48	80.4	97.5	39.8	70.0
21.0	73	63.12	84.6	102.9	37.3	65.0
22.5	74	63.34	86.1	104.6	36.7	64.0

TEST NO: S2.11 FLOW PATTERN:ANNULAR

ML=23.5 MG= 25.38 QFLUX= 1289 NUTP= 41.6 HTP= 73 PDT= 0.235

PDF= 0.214 ALFA=0.979 WE= 0.13 TOUT(MEAS)= 86.7, 85.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.0	58	19292.0	14.4	76.6	0.711	0.099	82.68
OUTLET	85.1	74	18741.2	14.1	61.6	0.708	0.099	87.34
MEAN	75.1	66	19017.0	14.3	68.8	0.709	0.099	85.08

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	60	83.07	66.8	76.3	76.3	134.0
4.5	61	83.57	69.1	82.0	56.3	99.0
7.5	63	84.17	71.8	87.9	45.1	79.0
11.0	66	84.87	74.9	94.0	38.3	67.0
16.5	69	85.97	79.8	101.7	33.6	59.0
21.0	73	86.89	83.9	107.6	31.1	54.0
22.5	74	87.19	85.2	109.4	30.4	53.0

TEST NO: S2.12 FLOW PATTERN:ANNULAR

ML=23.5 MG= 39.27 QFLUX= 1289 NUTP= 36.2 HTP= 63 PDT= 0.331

PDF= 0.315 ALFA=0.985 WE= 0.13 TOUT(MEAS)= 83.8, 81.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.0	58	29847.0	14.6	76.8	0.711	0.099	125.54
OUTLET	81.5	71	29140.1	14.3	63.6	0.708	0.099	132.69
MEAN	73.2	65	29493.9	14.5	70.0	0.709	0.099	129.22

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	59	126.14	66.5	77.0	68.6	121.0
4.5	61	126.90	68.4	83.7	47.4	83.0
7.5	62	127.81	70.7	89.7	38.3	67.0
11.0	64	128.88	73.4	95.4	33.1	58.0
16.5	68	130.58	77.6	102.4	29.6	52.0
21.0	70	131.98	81.0	107.4	27.9	49.0
22.5	71	132.45	82.1	109.0	27.4	48.0

TEST NO: S2.13 FLOW PATTERN:ANNULAR

ML=23.5 MG= 59.05 QFLUX= 1288 NUTP= 34.6 HTP= 61 PDT= 0.358

PDF= 0.346 ALFA=0.989 WE= 0.13 TOUT(MEAS)= 79.1, 77.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.0	58	44888.0	15.1	77.0	0.711	0.099	182.53
OUTLET	78.1	68	44034.8	14.8	66.8	0.709	0.099	191.49
MEAN	71.5	63	44461.7	15.0	71.8	0.710	0.098	187.14

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	59	183.28	66.1	78.4	59.0	104.0
4.5	60	184.23	67.5	84.9	41.7	73.0
7.5	61	185.37	69.2	89.7	35.5	62.0
11.0	63	186.72	71.2	93.7	32.4	57.0
16.5	65	188.85	74.3	98.6	30.2	53.0
21.0	67	190.61	76.9	102.1	29.0	51.0
22.5	68	191.20	77.7	103.2	28.8	50.0

TEST NO: S2.14 FLOW PATTERN:ANNULAR-MIST

ML=23.5 MG= 82.17 QFLUX= 1380 NUTP= 47.5 HTP= 84 PDT= 0.672

PDF= 0.663 ALFA=0.992 WE= 0.13 TOUT(MEAS)= 75.1, 74.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.1	58	62454.0	16.1	77.0	0.711	0.099	238.74
OUTLET	76.5	67	61420.4	15.4	69.4	0.709	0.099	253.32
MEAN	70.8	63	61937.3	15.8	73.2	0.710	0.098	246.20

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	59	239.94	65.9	75.7	78.9	139.0
4.5	60	241.47	66.9	80.7	56.3	99.0
7.5	61	243.31	68.1	84.2	48.6	85.0
11.0	62	245.49	69.6	87.1	44.7	79.0
16.5	63	248.96	71.8	90.5	42.0	74.0
21.0	65	251.85	73.7	93.1	40.5	71.0
22.5	65	252.83	74.3	93.9	40.1	70.0

TEST NO: S2.15 FLOW PATTERN:ANNULAR-MIST

ML=23.5 MG=113.14 QFLUX= 1582 NUTP= 63.9 HTP= 112 PDT= 1.280

PDF= 1.272 ALFA=0.993 WE= 0.13 TOUT(MEAS)= 72.7, 72.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.4	59	85951.0	18.5	76.8	0.711	0.099	285.97
OUTLET	75.8	66	84651.3	17.3	70.9	0.710	0.099	310.76
MEAN	70.6	63	85301.5	17.9	73.8	0.710	0.098	298.56

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	59	287.97	66.0	74.3	108.0	190.0
4.5	60	290.50	66.8	78.6	76.1	134.0
7.5	60	293.59	67.8	81.5	65.4	115.0
11.0	61	297.27	68.9	83.8	60.1	106.0
16.5	62	303.20	70.6	86.6	56.2	99.0
21.0	63	308.21	72.0	88.7	53.8	95.0
22.5	64	309.91	72.5	89.4	53.1	93.0

TEST NO: S2.16 FLOW PATTERN:ANNULAR-MIST

ML=23.5 MG=155.10 QFLUX= 1796 NUTP= 82.4 HTP= 145 PDT= 2.461

PDF= 2.454 ALFA=0.995 WE= 0.13 TOUT(MEAS)= 70.5, 71.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.2	58	117869.0	22.6	77.1	0.711	0.099	320.94
OUTLET	74.4	65	116277.5	20.2	72.3	0.710	0.098	362.69
MEAN	69.8	62	117073.6	21.4	74.7	0.710	0.098	341.88

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	59	324.19	65.6	72.7	142.8	252.0
4.5	59	328.32	66.3	76.5	99.2	175.0
7.5	60	333.41	67.0	79.0	84.9	150.0
11.0	60	339.54	67.9	81.0	77.3	136.0
16.5	61	349.59	69.2	83.4	71.8	126.0
21.0	62	358.23	70.4	85.3	68.2	120.0
22.5	63	361.19	70.7	85.5	67.6	119.0

TEST NO: S3.1 FLOW PATTERN:SLUG

ML=61.8 MG= 0.24 QFLUX= 1101 NUTP= 56.3 HTP= 99 PDT= 0.477

PDF= 0.112 ALFA=0.633 WE= 0.94 TOUT(MEAS)= 82.9, 82.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	73.0	170	180.3	15.0	70.3	0.710	0.260	0.76
OUTLET	83.7	192	177.5	14.5	63.7	0.708	0.260	0.80
MEAN	78.4	181	178.9	14.8	66.9	0.709	0.259	0.78

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	172	0.76	73.9	84.8	57.0	100.0
4.5	174	0.77	74.9	86.2	54.9	96.0
7.5	176	0.77	76.1	86.5	59.8	105.0
11.0	179	0.78	77.6	87.8	61.1	108.0
16.5	184	0.79	79.9	91.4	54.3	95.0
21.0	187	0.79	81.7	93.9	51.1	90.0
22.5	189	0.80	82.3	94.6	51.1	90.0

TEST NO: S3.2 FLOW PATTERN:SLUG

ML=61.8 MG= 0.68 QFLUX= 1190 NUTP= 55.4 HTP= 98 PDT= 0.273

PDF= 0.034 ALFA=0.760 WE= 0.93 TOUT(MEAS)= 79.8, 79.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.3	165	510.9	14.5	72.5	0.710	0.260	2.21
OUTLET	81.8	188	502.4	14.2	65.7	0.709	0.259	2.29
MEAN	76.1	176	506.6	14.3	69.0	0.709	0.259	2.25

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	166	2.22	71.1	83.1	56.1	99.0
4.5	168	2.23	72.1	84.2	55.8	98.0
7.5	171	2.24	73.4	85.5	55.2	97.0
11.0	173	2.25	74.8	86.9	55.3	97.0
16.5	178	2.27	77.0	89.5	53.9	95.0
21.0	181	2.29	78.8	90.8	56.3	99.0
22.5	183	2.29	79.4	90.4	61.5	108.0

TEST NO: S3.3 FLOW PATTERN:SLUG

ML=61.8 MG= 1.00 QFLUX= 1284 NUTP= 54.3 HTP= 95 PDT= 0.233

PDF= 0.031 ALFA=0.797 WE= 0.93 TOUT(MEAS)= 79.0, 79.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.6	161	758.3	14.4	73.9	0.710	0.260	3.29
OUTLET	80.9	186	744.8	14.1	66.1	0.709	0.259	3.41
MEAN	74.7	173	751.5	14.2	70.0	0.709	0.259	3.35

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	163	3.30	69.4	82.7	54.6	96.0
4.5	165	3.31	70.6	83.7	55.4	97.0
7.5	168	3.33	71.9	85.2	54.6	96.0
11.0	171	3.35	73.5	87.0	54.0	95.0
16.5	176	3.37	76.0	89.9	52.3	92.0
21.0	180	3.40	78.0	91.3	55.1	97.0
22.5	181	3.40	78.7	90.7	61.0	107.0

TEST NO: S3.4 FLOW PATTERN:SLUG-CHURN

ML=61.8 MG= 1.40 QFLUX= 1283 NUTP= 56.4 HTP= 99 PDT= 0.216

PDF= 0.041 ALFA=0.825 WE= 0.93 TOUT(MEAS)= 78.7, 78.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.1	160	1062.0	14.3	74.3	0.710	0.260	4.62
OUTLET	80.4	185	1043.4	14.1	66.4	0.709	0.259	4.78
MEAN	74.3	173	1052.8	14.2	70.3	0.710	0.259	4.70

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	162	4.63	69.0	81.8	56.7	100.0
4.5	164	4.65	70.2	83.1	56.0	98.0
7.5	167	4.67	71.5	84.5	55.8	98.0
11.0	170	4.69	73.1	86.1	56.1	99.0
16.5	175	4.73	75.6	88.7	55.4	97.0
21.0	179	4.76	77.6	90.2	57.8	102.0
22.5	180	4.77	78.3	89.7	63.9	112.0

TEST NO: S3.5 FLOW PATTERN:CHURN

ML=61.8 MG= 2.06 QFLUX= 1283 NUTP= 59.4 HTP= 105 PDT= 0.219

PDF= 0.071 ALFA=0.852 WE= 0.93 TOUT(MEAS)= 79.2, 79.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.4	161	1557.0	14.4	74.1	0.710	0.260	6.75
OUTLET	80.6	185	1530.1	14.1	66.1	0.709	0.259	6.99
MEAN	74.5	173	1543.8	14.3	70.0	0.709	0.259	6.87

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	163	6.77	69.3	81.1	61.1	107.0
4.5	165	6.79	70.4	82.7	59.2	104.0
7.5	167	6.83	71.8	84.1	59.1	104.0
11.0	171	6.86	73.4	85.7	59.4	104.0
16.5	176	6.92	76.0	88.5	58.2	102.0
21.0	180	6.97	78.1	90.2	60.0	106.0
22.5	181	6.98	78.8	90.1	64.4	113.0

TEST NO: S3.6 FLOW PATTERN:CHURN

ML=61.8 MG= 2.92 QFLUX= 1283 NUTP= 62.3 HTP= 110 PDT= 0.239

PDF= 0.113 ALFA=0.874 WE= 0.93 TOUT(MEAS)= 79.7, 79.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.4	161	2207.0	14.4	74.0	0.710	0.260	9.56
OUTLET	80.6	185	2168.7	14.1	65.7	0.709	0.259	9.93
MEAN	74.5	173	2188.0	14.3	69.8	0.709	0.259	9.75

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	163	9.59	69.4	80.9	62.9	111.0
4.5	165	9.63	70.6	82.2	62.4	110.0
7.5	168	9.68	72.0	83.8	62.0	109.0
11.0	171	9.73	73.7	85.3	62.6	110.0
16.5	177	9.82	76.4	88.1	62.0	109.0
21.0	181	9.89	78.5	90.3	61.9	109.0
22.5	182	9.91	79.2	90.7	63.8	112.0

TEST NO: S3.7 FLOW PATTERN:CHURN-ANNULAR

ML=61.8 MG= 4.24 QFLUX= 1381 NUTP= 66.2 HTP= 117 PDT= 0.243

PDF= 0.138 ALFA=0.895 WE= 0.93 TOUT(MEAS)= 80.8, 80.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.4	163	3206.0	14.4	73.2	0.710	0.260	13.96
OUTLET	82.3	189	3146.9	14.1	64.9	0.709	0.260	14.50
MEAN	75.8	176	3176.5	14.2	69.0	0.709	0.259	14.23

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	165	14.00	70.3	81.7	68.9	121.0
4.5	167	14.06	71.6	82.8	69.2	122.0
7.5	170	14.13	73.0	84.7	66.9	118.0
11.0	173	14.21	74.8	86.4	67.1	118.0
16.5	179	14.34	77.5	89.6	64.8	114.0
21.0	183	14.44	79.7	92.2	62.8	110.0
22.5	185	14.48	80.4	92.4	65.8	116.0

TEST NO: S3.8 FLOW PATTERN:CHURN-ANNULAR

ML=61.8 MG= 6.27 QFLUX= 1381 NUTP= 71.0 HTP= 125 PDT= 0.244

PDF= 0.157 ALFA=0.913 WE= 0.93 TOUT(MEAS)= 80.8, 80.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.3	163	4731.0	14.3	73.2	0.710	0.260	20.63
OUTLET	82.0	188	4646.0	14.1	64.9	0.709	0.260	21.43
MEAN	75.7	175	4689.0	14.2	69.0	0.709	0.259	21.04

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	165	20.70	70.3	81.0	72.7	128.0
4.5	167	20.79	71.6	82.4	71.7	126.0
7.5	170	20.89	73.0	84.1	70.6	124.0
11.0	173	21.01	74.8	85.9	70.1	123.0
16.5	179	21.20	77.5	88.5	71.3	125.0
21.0	183	21.35	79.7	90.7	71.1	125.0
22.5	185	21.41	80.4	91.6	70.1	123.0

TEST NO: S3.9 FLOW PATTERN:ANNULAR

ML=61.8 MG= 8.90 QFLUX= 1381 NUTP= 74.1 HTP= 131 PDT= 0.248

PDF= 0.175 ALFA=0.927 WE= 0.93 TOUT(MEAS)= 81.3, 80.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.5	163	6719.0	14.4	73.1	0.710	0.260	29.24
OUTLET	81.9	188	6600.9	14.1	64.7	0.709	0.260	30.39
MEAN	75.7	175	6660.5	14.2	68.8	0.709	0.259	29.83

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	165	29.34	70.5	80.5	77.5	136.0
4.5	167	29.46	71.7	82.0	75.7	133.0
7.5	170	29.61	73.2	83.8	74.0	130.0
11.0	174	29.78	75.0	85.6	73.5	129.0
16.5	179	30.05	77.7	88.4	73.0	128.0
21.0	184	30.27	79.9	90.5	74.3	131.0
22.5	185	30.35	80.7	91.4	73.3	129.0

TEST NO: S3.10 FLOW PATTERN:ANNULAR

ML=61.8 MG= 12.50 QFLUX= 1587 NUTP= 77.3 HTP= 136 PDT= 0.266

PDF= 0.205 ALFA=0.939 WE= 0.93 TOUT(MEAS)= 82.8, 82.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.1	164	9433.0	14.4	72.6	0.710	0.260	40.99
OUTLET	83.9	192	9247.7	14.1	63.7	0.708	0.260	42.72
MEAN	77.0	178	9340.4	14.3	68.0	0.709	0.259	41.88

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	166	41.13	71.2	81.7	85.3	150.0
4.5	169	41.32	72.6	83.5	82.0	144.0
7.5	172	41.54	74.2	85.5	79.3	140.0
11.0	176	41.80	76.1	87.8	76.8	135.0
16.5	182	42.21	79.0	91.1	74.6	131.0
21.0	187	42.55	81.4	93.7	73.8	130.0
22.5	189	42.66	82.3	94.5	73.5	129.0

TEST NO: S3.11 FLOW PATTERN:ANNULAR

ML=61.8 MG= 17.45 QFLUX= 1587 NUTP= 79.5 HTP= 140 PDT= 0.301

PDF= 0.245 ALFA=0.944 WE= 0.93 TOUT(MEAS)= 83.1, 82.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.7	165	13150.0	17.8	72.1	0.710	0.260	46.24
OUTLET	83.9	192	12903.1	17.5	63.6	0.708	0.260	48.08
MEAN	77.3	179	13027.0	17.7	67.8	0.709	0.259	47.19

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	167	46.40	71.8	81.1	95.3	168.0
4.5	170	46.59	73.0	83.1	89.1	157.0
7.5	173	46.83	74.6	85.3	83.4	147.0
11.0	177	47.10	76.4	87.8	78.9	139.0
16.5	182	47.54	79.2	91.4	74.2	131.0
21.0	187	47.90	81.6	94.2	71.6	126.0
22.5	189	48.02	82.3	95.1	70.8	125.0

TEST NO: S3.12 FLOW PATTERN:ANNULAR

ML=61.8 MG= 25.54 QFLUX= 1806 NUTP= 86.7 HTP= 153 PDT= 0.398

PDF= 0.358 ALFA=0.960 WE= 0.94 TOUT(MEAS)= 84.1, 82.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.7	165	19252.0	14.6	72.1	0.710	0.260	82.84
OUTLET	84.8	194	18866.0	14.2	63.2	0.708	0.260	87.12
MEAN	77.8	180	19059.2	14.4	67.5	0.709	0.259	85.04

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	167	83.20	71.8	80.7	114.5	202.0
4.5	170	83.65	73.2	83.1	102.4	180.0
7.5	173	84.20	74.8	85.8	92.5	163.0
11.0	177	84.84	76.7	88.7	85.1	150.0
16.5	183	85.85	79.7	92.8	78.3	138.0
21.0	188	86.70	82.1	95.9	74.3	131.0
22.5	190	86.98	82.9	97.0	73.2	129.0

TEST NO: S3.13 FLOW PATTERN:ANNULAR

ML=61.8 MG= 34.49 QFLUX= 1807 NUTP= 84.4 HTP= 149 PDT= 0.475

PDF= 0.440 ALFA=0.967 WE= 0.94 TOUT(MEAS)= 84.0, 81.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.9	166	25988.0	15.0	71.9	0.710	0.260	108.56
OUTLET	84.1	192	25500.5	14.6	63.5	0.708	0.260	114.51
MEAN	77.5	179	25744.6	14.8	67.6	0.709	0.259	111.62

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	168	109.06	71.9	80.1	124.9	220.0
4.5	170	109.69	73.2	82.9	105.1	185.0
7.5	173	110.44	74.7	85.9	91.3	161.0
11.0	177	111.33	76.5	89.1	81.7	144.0
16.5	183	112.75	79.4	93.4	73.1	129.0
21.0	187	113.92	81.7	96.7	68.4	120.0
22.5	189	114.31	82.4	97.7	67.3	118.0

TEST NO: S3.14 FLOW PATTERN:ANNULAR

ML=61.8 MG= 51.76 QFLUX= 2045 NUTP= 70.0 HTP= 123 PDT= 0.719

PDF= 0.693 ALFA=0.974 WE= 0.94 TOUT(MEAS)= 86.4, 82.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.1	166	38990.0	15.7	71.7	0.710	0.260	155.77
OUTLET	84.4	193	38254.4	15.0	62.4	0.708	0.260	167.13
MEAN	77.7	180	38622.5	15.4	66.9	0.709	0.259	161.58

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	168	156.71	72.3	80.9	132.3	233.0
4.5	171	157.89	73.7	85.8	95.2	168.0
7.5	175	159.32	75.5	90.7	75.8	133.0
11.0	179	161.02	77.5	95.4	64.8	114.0
16.5	185	163.72	80.7	101.5	55.8	98.0
21.0	191	165.98	83.3	105.9	51.4	90.0
22.5	192	166.75	84.1	107.3	50.4	89.0

TEST NO: S3.15 FLOW PATTERN:ANNULAR-MIST

ML=61.8 MG= 74.61 QFLUX= 1815 NUTP= 49.1 HTP= 86 PDT= 0.936

PDF= 0.915 ALFA=0.980 WE= 0.93 TOUT(MEAS)= 82.1, 79.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.9	166	56221.0	16.5	72.0	0.710	0.260	213.87
OUTLET	81.2	186	55395.3	15.6	65.0	0.709	0.260	230.44
MEAN	76.1	176	55808.3	16.0	68.4	0.709	0.259	222.32

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	167	215.23	71.8	83.0	90.8	160.0
4.5	169	216.94	72.8	89.4	61.6	108.0
7.5	172	219.01	74.1	94.2	51.1	90.0
11.0	175	221.48	75.5	98.1	45.5	80.0
16.5	179	225.43	77.8	102.8	41.4	73.0
21.0	183	228.75	79.7	106.0	39.2	69.0
22.5	185	229.87	80.3	107.1	38.6	68.0

TEST NO: S3.16 FLOW PATTERN:ANNULAR=MIST

ML=61.8 MG=103.07 QFLUX= 1808 NUTP= 60.8 HTP= 107 PDT= 1.435

PDF= 1.418 ALFA=0.984 WE= 0.93 TOUT(MEAS)= 78.7, 77.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.1	166	77640.0	18.3	71.9	0.710	0.260	266.01
OUTLET	79.9	184	76658.8	16.9	66.7	0.709	0.259	291.66
MEAN	75.5	175	77149.8	17.6	69.3	0.709	0.259	279.00

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	167	268.07	71.7	81.4	105.1	185.0
4.5	169	270.67	72.5	86.4	73.6	130.0
7.5	171	273.85	73.4	89.8	62.5	110.0
11.0	173	277.65	74.5	92.5	56.9	100.0
16.5	176	283.79	76.1	95.6	52.8	93.0
21.0	179	289.00	77.5	97.9	50.5	89.0
22.5	180	290.77	78.0	98.6	49.9	88.0

TEST NO: S3.17 FLOW PATTERN:ANNULAR-MIST

ML=61.8 MG=147.92 QFLUX= 1802 NUTP= 87.6 HTP= 154 PDT= 2.653

PDF= 2.638 ALFA=0.987 WE= 0.93 TOUT(MEAS)= 75.4, 76.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.1	166	111432.0	22.5	72.0	0.710	0.260	311.14
OUTLET	78.3	181	110275.3	19.9	68.5	0.709	0.259	354.37
MEAN	74.7	173	110853.8	21.2	70.3	0.710	0.259	332.76

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	167	314.47	71.5	78.2	151.3	267.0
4.5	168	318.72	72.0	81.6	105.9	187.0
7.5	169	323.97	72.6	83.9	90.4	159.0
11.0	170	330.29	73.3	85.8	81.9	144.0
16.5	173	340.71	74.4	87.9	76.1	134.0
21.0	174	349.71	75.3	89.4	72.9	128.0
22.5	175	352.80	75.6	89.9	71.9	127.0

TEST NO: S4.1 FLOW PATTERN:SLUG

ML=90.3 MG= 0.24 QFLUX= 1370 NUTP= 41.7 HTP= 73 PDT= 0.574

PDF= 0.151 ALFA=0.575 WE= 2.00 TOUT(MEAS)= 84.4, 83.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	73.0	248	180.7	15.2	70.3	0.710	0.379	0.75
OUTLET	82.1	275	178.3	14.6	63.0	0.708	0.379	0.80
MEAN	77.6	262	179.5	14.9	66.6	0.709	0.379	0.77

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	251	0.75	73.9	87.7	55.9	98.0
4.5	254	0.76	75.1	91.0	48.4	85.0
7.5	258	0.77	76.4	94.3	43.4	76.0
11.0	263	0.77	78.1	97.4	40.1	70.0
16.5	271	0.78	80.6	101.5	37.2	65.0
21.0	277	0.79	82.7	103.2	38.0	67.0
22.5	279	0.79	83.4	102.9	39.9	70.0

TEST NO: S4.2 FLOW PATTERN:SLUG

ML=90.3 MG= 0.63 QFLUX= 1285 NUTP= 56.3 HTP= 99 PDT= 0.325

PDF= 0.035 ALFA=0.709 WE= 1.99 TOUT(MEAS)= 79.9, 79.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.5	247	474.2	14.8	70.8	0.710	0.379	2.02
OUTLET	81.0	272	468.4	14.5	65.6	0.709	0.379	2.10
MEAN	76.7	259	471.3	14.6	68.2	0.709	0.379	2.06

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	249	2.03	73.1	85.8	57.1	100.0
4.5	251	2.04	73.9	86.6	57.2	101.0
7.5	254	2.05	74.9	87.8	56.1	99.0
11.0	257	2.06	76.0	88.9	56.1	99.0
16.5	262	2.07	77.7	90.8	55.8	98.0
21.0	266	2.09	79.1	92.1	56.1	99.0
22.5	268	2.09	79.6	92.0	58.7	103.0

TEST NO: S4.3 FLOW PATTERN:SLUG

ML=90.3 MG= 0.89 QFLUX= 1485 NUTP= 59.5 HTP= 105 PDT= 0.277

PDF= 0.027 ALFA=0.748 WE= 1.99 TOUT(MEAS)= 80.5, 80.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.9	245	669.6	14.7	71.3	0.710	0.379	2.87
OUTLET	81.7	274	660.2	14.4	65.2	0.709	0.379	2.97
MEAN	76.8	260	664.9	14.5	68.2	0.709	0.379	2.93

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	247	2.88	72.6	86.5	60.4	106.0
4.5	250	2.89	73.5	87.3	60.7	107.0
7.5	253	2.91	74.6	88.8	59.2	104.0
11.0	257	2.92	75.9	90.1	59.0	104.0
16.5	263	2.95	77.9	92.3	58.5	103.0
21.0	267	2.97	79.5	93.7	59.6	105.0
22.5	269	2.97	80.1	93.5	62.6	110.0

TEST NO: S4.4 FLOW PATTERN:SLUG-CHURRN

ML=90.3 MG= 1.36 QFLUX= 1485 NUTP= 60.0 HTP= 106 PDT= 0.251

PDF= 0.042 ALFA=0.790 WE= 1.99 TOUT(MEAS)= 80.5, 80.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.9	245	1027.0	14.6	71.3	0.710	0.379	4.45
OUTLET	81.7	274	1012.6	14.3	65.2	0.709	0.379	4.59
MEAN	76.8	259	1019.9	14.4	68.2	0.709	0.379	4.52

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	247	4.46	72.6	86.4	60.8	107.0
4.5	250	4.47	73.5	87.5	60.1	106.0
7.5	253	4.49	74.6	88.8	59.4	104.0
11.0	257	4.51	75.9	90.1	59.4	104.0
16.5	263	4.55	77.9	92.1	59.5	105.0
21.0	267	4.58	79.5	93.4	61.0	107.0
22.5	269	4.59	80.1	93.0	65.1	115.0

TEST NO: S4.5 FLOW PATTERN:CHURN

ML=90.3 MG= 1.93 QFLUX= 1494 NUTP= 64.1 HTP= 113 PDT= 0.254

PDF= 0.073 ALFA=0.819 WE= 1.99 TOUT(MEAS)= 80.4, 80.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.8	245	1454.0	14.6	71.3	0.710	0.379	6.29
OUTLET	81.6	274	1434.3	14.3	65.2	0.709	0.379	6.50
MEAN	76.7	259	1444.5	14.4	68.2	0.709	0.379	6.40

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	247	6.31	72.6	85.5	65.3	115.0
4.5	250	6.33	73.5	86.4	65.1	115.0
7.5	253	6.35	74.6	87.8	63.8	112.0
11.0	257	6.39	75.8	89.2	63.5	112.0
16.5	262	6.44	77.9	91.2	63.3	111.0
21.0	267	6.48	79.5	92.7	64.1	113.0
22.5	269	6.49	80.1	92.7	67.2	118.0

TEST NO: S4.6 FLOW PATTERN:CHURN-ANNULAR

ML=90.3 MG= 2.68 QFLUX= 1589 NUTP= 67.9 HTP= 119 PDT= 0.259

PDF= 0.103 ALFA=0.844 WE= 1.99 TOUT(MEAS)= 81.5, 81.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.3	246	2017.0	14.6	70.9	0.710	0.379	8.74
OUTLET	82.6	277	1987.1	14.3	64.6	0.709	0.379	9.05
MEAN	77.4	261	2002.1	14.4	67.7	0.709	0.379	8.90

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	248	8.77	73.0	85.7	70.9	125.0
4.5	251	8.80	74.0	86.9	69.4	122.0
7.5	255	8.84	75.2	88.5	67.6	119.0
11.0	259	8.89	76.6	89.9	67.2	118.0
16.5	265	8.96	78.7	92.2	66.6	117.0
21.0	270	9.02	80.4	93.7	68.3	120.0
22.5	272	9.04	81.0	94.0	69.5	122.0

TEST NO: S4.7 FLOW PATTERN:CHURN-ANNULAR

ML=90.3 MG= 3.01 QFLUX= 1697 NUTP= 69.1 HTP= 122 PDT= 0.260

PDF= 0.112 ALFA=0.852 WE= 1.99 TOUT(MEAS)= 81.9, 81.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.1	246	2266.0	14.6	71.0	0.710	0.379	9.80
OUTLET	83.2	278	2230.4	14.3	64.2	0.708	0.379	10.15
MEAN	77.6	262	2248.3	14.4	67.6	0.709	0.379	9.98

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	248	9.83	72.9	86.5	70.5	124.0
4.5	251	9.87	74.0	87.6	70.7	124.0
7.5	255	9.91	75.2	89.0	69.7	123.0
11.0	259	9.97	76.7	90.7	68.7	121.0
16.5	266	10.05	79.0	93.1	68.3	120.0
21.0	271	10.12	80.9	94.9	68.9	121.0
22.5	273	10.14	81.5	95.5	68.8	121.0

TEST NO: S4.8 FLOW PATTERN:CHURN-ANNULAR

ML=90.3 MG= 5.15 QFLUX= 1808 NUTP= 77.2 HTP= 136 PDT= 0.291

PDF= 0.175 ALFA=0.884 WE= 1.99 TOUT(MEAS)= 82.4, 82.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.5	247	3870.0	14.7	70.7	0.710	0.379	16.65
OUTLET	84.1	281	3806.2	14.4	63.9	0.708	0.379	17.29
MEAN	78.3	264	3838.3	14.5	67.2	0.709	0.379	16.98

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	249	16.70	73.3	86.3	78.9	139.0
4.5	252	16.77	74.4	87.5	78.0	137.0
7.5	256	16.85	75.7	88.9	77.6	137.0
11.0	260	16.95	77.1	90.6	76.3	134.0
16.5	267	17.10	79.5	92.7	77.2	136.0
21.0	273	17.22	81.4	94.7	77.1	136.0
22.5	275	17.26	82.0	95.5	75.9	134.0

TEST NO: S4.9 FLOW PATTERN:ANNULAR

ML=90.3 MG= 7.91 QFLUX= 1807 NUTP= 79.8 HTP= 141 PDT= 0.295

PDF= 0.200 ALFA=0.906 WE= 1.99 TOUT(MEAS)= 81.6, 81.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.2	246	5945.0	14.7	70.9	0.710	0.379	25.46
OUTLET	83.6	280	5848.8	14.4	64.3	0.708	0.379	26.42
MEAN	77.9	263	5897.3	14.6	67.6	0.709	0.379	25.95

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	248	25.54	73.0	85.5	82.0	144.0
4.5	251	25.64	74.0	86.6	81.1	143.0
7.5	255	25.76	75.3	88.0	80.0	141.0
11.0	259	25.91	76.7	89.4	80.6	142.0
16.5	266	26.14	78.9	91.8	79.7	140.0
21.0	271	26.33	80.7	94.0	77.1	136.0
22.5	273	26.39	81.3	94.7	76.9	135.0

TEST NO: S4.10 FLOW PATTERN:ANNULAR

ML=90.3 MG= 11.41 QFLUX= 1806 NUTP= 83.6 HTP= 147 PDT= 0.312

PDF= 0.233 ALFA=0.922 WE= 1.99 TOUT(MEAS)= 81.5, 81.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.0	245	8583.0	14.7	71.2	0.710	0.379	36.73
OUTLET	83.1	278	8446.2	14.4	64.5	0.709	0.379	38.16
MEAN	77.6	262	8514.8	14.6	67.8	0.709	0.379	37.47

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	248	36.85	72.8	84.2	89.0	157.0
4.5	251	37.00	73.8	85.5	86.9	153.0
7.5	254	37.19	75.0	86.9	85.6	151.0
11.0	258	37.40	76.4	88.7	83.4	147.0
16.5	265	37.74	78.6	91.2	81.1	143.0
21.0	270	38.02	80.4	93.1	81.2	143.0
22.5	272	38.12	81.1	93.7	81.0	143.0

TEST NO: S4.11 FLOW PATTERN:ANNULAR

ML=90.3 MG= 16.56 QFLUX= 1807 NUTP= 83.5 HTP= 147 PDT= 0.348

PDF= 0.282 ALFA=0.935 WE= 1.99 TOUT(MEAS)= 82.8, 81.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.4	247	12449.0	14.8	70.8	0.710	0.379	53.00
OUTLET	83.2	279	12256.7	14.5	64.0	0.708	0.379	55.23
MEAN	77.8	263	12353.1	14.6	67.3	0.709	0.379	54.15

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	249	53.19	73.2	83.7	97.6	172.0
4.5	252	53.43	74.3	85.4	92.3	163.0
7.5	256	53.71	75.6	87.2	87.6	154.0
11.0	260	54.05	77.0	89.3	83.4	147.0
16.5	267	54.58	79.4	92.4	78.6	138.0
21.0	273	55.01	81.3	94.9	75.5	133.0
22.5	274	55.16	81.9	95.7	74.6	131.0

TEST NO: S4.12 FLOW PATTERN:ANNULAR

ML=90.3 MG= 23.07 QFLUX= 1922 NUTP= 83.8 HTP= 148 PDT= 0.414

PDF= 0.359 ALFA=0.946 WE= 1.99 TOUT(MEAS)= 83.4, 80.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.1	246	17358.0	15.0	71.0	0.710	0.379	73.08
OUTLET	83.2	278	17083.0	14.6	64.1	0.708	0.379	76.50
MEAN	77.6	262	17220.5	14.8	67.5	0.709	0.379	74.84

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	248	73.37	72.9	83.0	107.2	189.0
4.5	251	73.73	74.0	85.0	98.9	174.0
7.5	255	74.16	75.3	87.4	90.0	158.0
11.0	259	74.68	76.8	89.9	83.1	146.0
16.5	266	75.49	79.1	93.5	75.7	133.0
21.0	272	76.16	81.1	96.3	71.6	126.0
22.5	274	76.38	81.7	97.2	70.3	124.0

TEST NO: S4.13 FLOW PATTERN:ANNULAR

ML=90.3 MG= 26.90 QFLUX= 2039 NUTP= 85.7 HTP= 151 PDT= 0.457

PDF= 0.407 ALFA=0.951 WE= 1.99 TOUT(MEAS)= 83.6, 80.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.5	244	20252.0	15.1	71.5	0.710	0.379	84.46
OUTLET	83.1	278	19919.5	14.6	64.1	0.708	0.379	88.73
MEAN	77.3	261	20086.3	14.9	67.7	0.709	0.379	86.66

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	247	84.82	72.4	82.6	112.8	199.0
4.5	250	85.27	73.6	84.8	102.2	180.0
7.5	254	85.81	74.9	87.4	92.4	163.0
11.0	258	86.45	76.5	90.1	84.6	149.0
16.5	266	87.47	78.9	94.1	76.6	135.0
21.0	272	88.31	81.0	97.0	72.2	127.0
22.5	274	88.59	81.6	98.1	70.7	124.0

TEST NO: S4.14 FLOW PATTERN:ANNULAR

ML=90.3 MG= 50.71 QFLUX= 2047 NUTP= 77.3 HTP= 136 PDT= 0.779

PDF= 0.744 ALFA=0.966 WE= 2.01 TOUT(MEAS)= 87.8, 84.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.0	257	37930.0	16.1	68.0	0.709	0.379	150.75
OUTLET	86.2	288	37381.8	15.3	61.4	0.708	0.379	161.19
MEAN	81.1	272	37656.1	15.7	64.6	0.709	0.379	156.08

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	260	151.61	76.9	85.2	138.9	245.0
4.5	263	152.69	78.0	89.0	105.0	185.0
7.5	267	154.01	79.3	93.0	84.5	149.0
11.0	271	155.56	80.8	96.9	72.1	127.0
16.5	279	158.05	83.2	102.0	62.0	109.0
21.0	284	160.14	85.2	105.6	57.3	101.0
22.5	286	160.84	85.9	106.7	56.0	98.0

TEST NO: S4.15 FLOW PATTERN:ANNULAR-MIST

ML=90.3 MG= 71.75 QFLUX= 2047 NUTP= 53.9 HTP= 95 PDT= 0.965

PDF= 0.936 ALFA=0.972 WE= 1.99 TOUT(MEAS)= 81.0, 78.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.5	241	54098.0	16.9	72.4	0.710	0.379	201.18
OUTLET	79.7	268	53379.9	15.9	65.8	0.709	0.379	216.60
MEAN	75.1	255	53739.2	16.4	69.0	0.709	0.379	209.04

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	243	202.43	71.3	82.4	103.1	182.0
4.5	246	204.03	72.2	88.8	69.7	123.0
7.5	249	205.96	73.4	93.9	56.4	99.0
11.0	253	208.26	74.8	98.2	49.5	87.0
16.5	260	211.94	76.9	103.1	44.4	78.0
21.0	265	215.03	78.6	106.5	41.8	73.0
22.5	267	216.08	79.2	107.5	41.2	72.0

TEST NO: S4.16 FLOW PATTERN:ANNULAR-MIST

ML=90.3 MG=104.98 QFLUX= 2035 NUTP= 82.9 HTP= 146 PDT= 1.664

PDF= 1.640 ALFA=0.978 WE= 1.98 TOUT(MEAS)= 77.2, 76.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.4	241	79162.0	19.5	72.5	0.710	0.379	254.98
OUTLET	78.4	264	78250.8	17.8	67.7	0.709	0.379	281.41
MEAN	74.4	252	78706.8	18.6	70.1	0.709	0.379	268.33

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	242	257.08	71.0	79.0	142.2	251.0
4.5	244	259.75	71.7	83.0	101.6	179.0
7.5	247	263.02	72.5	86.0	85.4	150.0
11.0	250	266.92	73.5	88.4	77.3	136.0
16.5	254	273.26	75.0	91.2	71.5	126.0
21.0	258	278.65	76.3	93.0	69.3	122.0
22.5	259	280.48	76.7	93.5	68.7	121.0

TEST NO: S4.17 FLOW PATTERN:ANNULAR-MIST

ML= 90 MG=157.26 QFLUX= 2032 NUTP= 92.4 HTP= 163 PDT= 2.983

PDF= 2.963 ALFA=0.982 WE= 1.98 TOUT(MEAS)= 74.2, 74.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	69.6	238	118731.0	24.5	73.3	0.710	0.379	302.48
OUTLET	76.2	258	117593.0	21.6	69.5	0.709	0.379	346.03
MEAN	72.9	248	118162.2	23.1	71.4	0.710	0.379	324.23

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	240	305.81	70.0	77.8	147.5	260.0
4.5	241	310.09	70.5	81.0	109.4	193.0
7.5	243	315.36	71.1	83.3	94.3	166.0
11.0	245	321.73	71.9	85.1	86.9	153.0
16.5	248	332.23	73.0	87.1	82.0	144.0
21.0	251	341.31	74.0	88.4	80.3	141.0
22.5	252	344.45	74.3	88.8	79.7	140.0

TEST NO: S5.1 FLOW PATTERN:BUBBLE-SLUG

ML= 216 MG= 0.24 QFLUX= 1390 NUTP= 43.5 HTP= 76 PDT= 0.678

PDF= 0.098 ALFA=0.415 WE= 11.40 TOUT(MEAS)= 80.3, 81.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.3	619	176.1	15.8	67.9	0.709	0.908	0.71
OUTLET	80.2	646	175.1	15.1	64.8	0.709	0.908	0.75
MEAN	78.3	632	175.6	15.4	66.4	0.709	0.908	0.73

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	621	0.72	76.7	91.9	51.6	91.0
4.5	625	0.72	77.2	93.3	48.8	86.0
7.5	629	0.73	77.8	95.0	45.8	80.0
11.0	634	0.73	78.5	96.1	44.9	79.0
16.5	642	0.74	79.6	99.0	40.8	72.0
21.0	648	0.75	80.5	101.8	37.2	65.0
22.5	651	0.75	80.8	102.7	36.2	63.0

TEST NO: S5.2 FLOW PATTERN:SLUG

ML= 216 MG= 0.67 QFLUX= 1592 NUTP= 60.0 HTP= 106 PDT= 0.574

PDF= 0.174 ALFA=0.597 WE= 11.40 TOUT(MEAS)= 80.5, 80.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.7	621	502.6	15.4	67.7	0.709	0.908	2.09
OUTLET	81.1	652	499.4	14.8	65.1	0.709	0.908	2.18
MEAN	78.9	637	501.0	15.1	66.4	0.709	0.907	2.14

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	623	2.10	77.0	91.1	63.9	112.0
4.5	626	2.11	77.4	91.7	63.2	111.0
7.5	630	2.12	77.9	93.2	59.1	104.0
11.0	634	2.13	78.5	93.8	59.1	104.0
16.5	640	2.16	79.4	94.3	60.6	107.0
21.0	646	2.17	80.2	95.9	57.3	101.0
22.5	648	2.18	80.4	96.0	58.1	102.0

TEST NO: S5.3 FLOW PATTERN:SLUG-CHURN

ML= 216 MG= 1.00 QFLUX= 1590 NUTP= 65.6 HTP= 115 PDT= 0.439

PDF= 0.096 ALFA=0.655 WE= 11.40 TOUT(MEAS)= 79.8, 79.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.8	615	748.7	15.2	68.4	0.709	0.908	3.14
OUTLET	80.2	646	743.9	14.8	65.7	0.709	0.908	3.25
MEAN	78.0	630	746.3	15.0	67.0	0.709	0.907	3.20

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	617	3.15	76.1	88.9	70.6	124.0
4.5	620	3.16	76.6	89.8	67.9	119.0
7.5	624	3.18	77.1	90.8	65.4	115.0
11.0	628	3.19	77.6	91.8	63.7	112.0
16.5	634	3.22	78.6	92.4	65.2	115.0
21.0	640	3.24	79.3	93.2	65.2	115.0
22.5	642	3.25	79.6	93.5	64.6	114.0

TEST NO: S5.4 FLOW PATTERN:SLUG-CHURN

ML= 216 MG= 1.40 QFLUX= 1698 NUTP= 71.7 HTP= 126 PDT= 0.375

PDF= 0.075 ALFA=0.699 WE= 11.40 TOUT(MEAS)= 80.0, 79.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.8	615	1046.0	15.0	68.3	0.709	0.908	4.44
OUTLET	80.5	648	1039.0	14.7	65.5	0.709	0.908	4.58
MEAN	78.2	632	1042.5	14.9	66.9	0.709	0.907	4.51

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	617	4.45	76.2	89.4	72.9	128.0
4.5	621	4.47	76.6	90.1	71.5	126.0
7.5	624	4.48	77.2	90.6	71.7	126.0
11.0	629	4.51	77.8	91.2	71.7	126.0
16.5	636	4.54	78.8	92.2	71.6	126.0
21.0	641	4.57	79.5	93.0	71.7	126.0
22.5	643	4.58	79.8	93.1	72.3	127.0

TEST NO: S5.5 FLOW PATTERN:CHURN

ML= 216 MG= 2.05 QFLUX= 1696 NUTP= 76.3 HTP= 134 PDT= 0.369

PDF= 0.112 ALFA=0.742 WE= 11.40 TOUT(MEAS)= 79.3, 79.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.3	611	1532.0	15.0	68.8	0.709	0.908	6.50
OUTLET	79.9	644	1522.5	14.7	66.0	0.709	0.908	6.71
MEAN	77.6	628	1527.7	14.8	67.4	0.709	0.907	6.60

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	613	6.52	75.6	87.8	78.6	138.0
4.5	616	6.54	76.0	88.5	76.8	135.0
7.5	620	6.56	76.6	89.1	76.2	134.0
11.0	624	6.59	77.1	89.6	77.1	136.0
16.5	631	6.64	78.1	90.8	75.6	133.0
21.0	636	6.69	78.9	91.7	75.2	132.0
22.5	638	6.70	79.1	91.9	75.3	133.0

TEST NO: S5.6 FLOW PATTERN:CHURN

ML= 216 MG= 2.87 QFLUX= 1808 NUTP= 79.5 HTP= 140 PDT= 0.384

PDF= 0.160 ALFA=0.775 WE= 11.40 TOUT(MEAS)= 80.2, 80.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.7	614	2144.0	15.1	68.4	0.709	0.908	9.06
OUTLET	80.7	650	2129.6	14.7	65.3	0.709	0.908	9.37
MEAN	78.2	632	2137.3	14.9	66.9	0.709	0.907	9.22

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	617	9.09	76.1	88.5	82.3	145.0
4.5	620	9.12	76.6	89.1	81.8	144.0
7.5	624	9.16	77.2	90.0	80.0	141.0
11.0	629	9.20	77.9	90.9	78.7	139.0
16.5	637	9.28	78.9	91.9	78.6	138.0
21.0	643	9.34	79.8	92.8	78.5	138.0
22.5	645	9.36	80.1	93.2	78.1	137.0

TEST NO: S5.7 FLOW PATTERN:CHURN-ANNULAR

ML= 216 MG= 4.24 QFLUX= 1922 NUTP= 84.7 HTP= 149 PDT= 0.436

PDF= 0.247 ALFA=0.810 WE= 11.40 TOUT(MEAS)= 80.5, 80.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.8	615	3172.0	15.1	68.4	0.709	0.908	13.41
OUTLET	81.1	652	3148.1	14.7	65.1	0.709	0.908	13.92
MEAN	78.4	633	3160.1	14.9	66.8	0.709	0.907	13.67

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	617	13.46	76.2	88.8	86.0	152.0
4.5	621	13.51	76.7	89.3	86.0	151.0
7.5	625	13.57	77.3	90.1	85.2	150.0
11.0	630	13.65	78.0	90.8	84.7	149.0
16.5	638	13.77	79.1	92.1	84.0	148.0
21.0	645	13.87	80.0	93.0	83.8	147.0
22.5	647	13.90	80.3	93.4	83.6	147.0

TEST NO: S5.8 FLOW PATTERN:CHURN-ANNULAR

ML= 216 MG= 6.33 QFLUX= 1921 NUTP= 87.8 HTP= 155 PDT= 0.491

PDF= 0.331 ALFA=0.839 WE= 11.40 TOUT(MEAS)= 80.1, 80.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.3	611	4737.0	15.4	68.7	0.709	0.908	19.63
OUTLET	80.6	649	4701.4	14.9	65.4	0.709	0.908	20.43
MEAN	77.9	630	4719.2	15.1	67.0	0.709	0.907	20.04

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	614	19.69	75.7	87.7	90.5	159.0
4.5	618	19.78	76.2	88.5	88.6	156.0
7.5	622	19.88	76.9	89.3	87.7	154.0
11.0	627	20.00	77.6	90.0	87.3	154.0
16.5	635	20.19	78.7	91.2	87.3	154.0
21.0	642	20.35	79.6	92.1	87.5	154.0
22.5	644	20.41	79.9	92.4	87.4	154.0

TEST NO: S5.9 FLOW PATTERN:ANNULAR

ML= 216 MG= 8.89 QFLUX= 2039 NUTP= 91.8 HTP= 162 PDT= 0.503

PDF= 0.365 ALFA=0.862 WE= 11.40 TOUT(MEAS)= 80.6, 80.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.5	613	6654.0	15.4	68.6	0.709	0.908	27.54
OUTLET	81.0	652	6601.6	14.9	65.1	0.709	0.908	28.71
MEAN	78.3	632	6628.0	15.1	66.8	0.709	0.907	28.14

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	616	27.64	75.9	88.1	95.0	167.0
4.5	620	27.76	76.5	89.0	92.1	162.0
7.5	624	27.91	77.1	89.7	91.7	162.0
11.0	630	28.09	77.9	90.6	90.9	160.0
16.5	638	28.36	79.1	91.7	91.6	161.0
21.0	645	28.60	80.1	92.6	92.0	162.0
22.5	647	28.67	80.4	93.0	91.6	161.0

TEST NO: S5.10 FLOW PATTERN:ANNULAR

ML= 216 MG= 12.54 QFLUX= 2038 NUTP= 97.0 HTP= 171 PDT= 0.540

PDF= 0.423 ALFA=0.883 WE= 11.40 TOUT(MEAS)= 80.4, 80.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.5	613	9385.0	15.4	68.5	0.709	0.908	38.85
OUTLET	81.0	652	9312.4	14.9	65.3	0.709	0.908	40.58
MEAN	78.3	632	9349.1	15.1	66.9	0.709	0.907	39.74

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	616	39.00	75.9	86.9	104.9	185.0
4.5	619	39.18	76.5	87.9	100.6	177.0
7.5	624	39.40	77.1	88.8	98.2	173.0
11.0	629	39.65	77.8	89.7	97.0	171.0
16.5	637	40.06	78.9	91.2	94.2	166.0
21.0	643	40.40	79.8	92.0	94.4	166.0
22.5	645	40.52	80.1	92.5	93.3	164.0

TEST NO: S5.11 FLOW PATTERN:ANNULAR

ML= 216 MG= 17.37 QFLUX= 2062 NUTP= 99.7 HTP= 176 PDT= 0.563

PDF= 0.462 ALFA=0.899 WE= 11.40 TOUT(MEAS)= 80.9, 79.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.4	612	13004.0	15.6	68.6	0.709	0.908	53.21
OUTLET	80.9	651	12902.8	15.0	65.3	0.709	0.908	55.64
MEAN	78.1	631	12953.8	15.3	66.9	0.709	0.907	54.46

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	615	53.41	75.8	86.3	111.6	197.0
4.5	619	53.66	76.4	87.3	107.0	189.0
7.5	623	53.97	77.0	88.4	102.7	181.0
11.0	628	54.34	77.7	89.4	100.0	176.0
16.5	637	54.92	78.9	91.1	95.6	168.0
21.0	643	55.40	79.8	92.4	93.2	164.0
22.5	646	55.56	80.1	92.9	91.8	162.0

TEST NO: S5.12 FLOW PATTERN:ANNULAR

ML= 216 MG= 25.27 QFLUX= 2184 NUTP=102.8 HTP= 181 PDT= 0.665

PDF= 0.581 ALFA=0.916 WE= 11.40 TOUT(MEAS)= 82.6, 80.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.8	615	18906.0	15.8	68.3	0.709	0.908	76.36
OUTLET	81.5	655	18753.0	15.1	64.6	0.709	0.908	80.42
MEAN	78.6	635	18829.8	15.5	66.4	0.709	0.907	78.44

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	618	76.69	76.3	86.2	124.4	219.0
4.5	622	77.12	76.9	87.4	116.6	206.0
7.5	627	77.63	77.6	88.9	109.3	193.0
11.0	633	78.24	78.4	90.4	103.3	182.0
16.5	642	79.21	79.7	92.7	95.0	167.0
21.0	650	80.02	80.8	94.6	89.8	158.0
22.5	653	80.29	81.1	95.2	88.3	156.0

TEST NO: S5.13 FLOW PATTERN:ANNULAR

ML= 216 MG= 33.44 QFLUX= 2285 NUTP=100.6 HTP= 177 PDT= 0.753

PDF= 0.680 ALFA=0.927 WE= 11.40 TOUT(MEAS)= 83.8, 80.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.6	614	25025.0	16.1	68.4	0.709	0.908	99.21
OUTLET	81.5	655	24817.6	15.3	64.1	0.708	0.908	105.16
MEAN	78.6	634	24921.7	15.7	66.2	0.709	0.908	102.25

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	618	99.70	76.2	85.9	133.5	235.0
4.5	622	100.31	76.9	87.5	121.1	214.0
7.5	628	101.07	77.7	89.5	109.6	193.0
11.0	635	101.95	78.7	91.6	100.1	176.0
16.5	646	103.37	80.2	94.7	89.3	157.0
21.0	655	104.56	81.4	97.1	82.6	145.0
22.5	658	104.96	81.8	98.0	80.5	142.0

TEST NO: S5.14 FLOW PATTERN:ANNULAR

ML= 216 MG= 50.75 QFLUX= 2292 NUTP= 75.0 HTP= 132 PDT= 0.932

PDF= 0.872 ALFA=0.941 WE= 11.40 TOUT(MEAS)= 82.2, 80.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.8	615	37972.0	16.8	68.3	0.709	0.908	144.43
OUTLET	81.4	654	37669.3	15.9	64.6	0.709	0.908	154.21
MEAN	78.6	635	37821.0	16.3	66.4	0.709	0.907	149.41

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	618	145.23	76.3	85.6	137.8	243.0
4.5	622	146.24	76.8	89.4	102.7	181.0
7.5	627	147.46	77.6	93.1	83.1	146.0
11.0	633	148.92	78.4	96.9	70.0	123.0
16.5	642	151.25	79.7	101.6	59.3	104.0
21.0	650	153.21	80.7	104.9	54.1	95.0
22.5	652	153.87	81.1	105.9	52.6	93.0

TEST NO: S5.15 FLOW PATTERN:ANNULAR-MIST

ML= 216 MG= 71.24 QFLUX= 2178 NUTP= 43.6 HTP= 77 PDT= 0.910

PDF= 0.860 ALFA=0.950 WE= 11.40 TOUT(MEAS)= 79.6, 79.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.1	610	53354.0	17.5	68.9	0.709	0.908	193.65
OUTLET	80.1	646	52967.1	16.6	65.8	0.709	0.908	205.61
MEAN	77.6	628	53160.7	17.1	67.3	0.709	0.907	199.75

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	612	194.63	75.5	94.3	65.1	115.0
4.5	616	195.87	75.9	100.8	49.4	87.0
7.5	620	197.37	76.5	104.5	44.1	77.0
11.0	625	199.15	77.2	106.8	41.8	73.0
16.5	632	202.01	78.2	109.5	39.6	70.0
21.0	638	204.39	79.1	110.7	39.2	69.0
22.5	640	205.20	79.4	111.2	39.0	68.0

TEST NO: S5.16 FLOW PATTERN:ANNULAR-MIST

ML= 216 MG=103.99 QFLUX= 1808 NUTP= 67.1 HTP= 118 PDT= 1.679

PDF= 1.636 ALFA=0.958 WE= 11.40 TOUT(MEAS)= 77.3, 78.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	74.5	606	77949.0	20.6	69.4	0.709	0.908	240.78
OUTLET	78.4	633	77511.8	18.9	66.8	0.709	0.907	263.22
MEAN	76.5	620	77730.8	19.7	68.1	0.709	0.907	252.13

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	608	242.57	74.8	84.9	101.1	178.0
4.5	611	244.84	75.2	88.6	76.4	134.0
7.5	614	247.62	75.7	90.8	67.6	119.0
11.0	618	250.93	76.2	92.3	63.8	112.0
16.5	624	256.31	77.1	93.9	61.0	107.0
21.0	629	260.88	77.8	94.7	60.6	106.0
22.5	630	262.43	78.0	95.0	60.4	106.0

TEST NO: S5.17 FLOW PATTERN:ANNULAR-MIST

ML= 216 MG=148.07 QFLUX= 1803 NUTP= 95.3 HTP= 168 PDT= 2.681

PDF= 2.643 ALFA=0.963 WE= 11.41 TOUT(MEAS)= 75.9, 78.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	73.9	601	111093.0	25.5	69.9	0.709	0.908	276.16
OUTLET	77.4	626	110524.0	22.8	67.5	0.709	0.907	309.35
MEAN	75.7	614	110808.8	24.2	68.7	0.709	0.907	292.82

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	603	278.74	74.2	81.3	142.4	251.0
4.5	606	282.04	74.5	83.9	108.9	192.0
7.5	609	286.10	74.9	85.5	96.3	170.0
11.0	612	290.97	75.4	86.7	90.9	160.0
16.5	618	298.96	76.2	88.0	86.7	153.0
21.0	622	305.81	76.8	88.8	85.6	151.0
22.5	624	308.16	77.0	89.0	85.7	151.0

TEST NO: S6.1 FLOW PATTERN:BUBBLE

ML= 310 MG= 0.15 QFLUX= 1384 NUTP= 44.4 HTP= 78 PDT= 0.691

PDF=-0.032 ALFA=0.272 WE= 23.40 TOUT(MEAS)= 74.2, 74.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.1	836	114.9	15.7	72.1	0.710	1.304	0.46
OUTLET	73.8	862	114.4	15.1	69.7	0.709	1.302	0.48
MEAN	72.4	849	114.7	15.4	70.9	0.710	1.301	0.47

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	838	0.46	71.4	86.4	52.0	91.0
4.5	842	0.46	71.7	88.7	46.0	81.0
7.5	846	0.47	72.1	90.0	43.8	77.0
11.0	850	0.47	72.6	90.7	43.3	76.0
16.5	858	0.47	73.3	91.3	43.6	77.0
21.0	864	0.48	73.9	92.1	43.3	76.0
22.5	866	0.48	74.1	92.0	43.9	77.0

TEST NO: S6.2 FLOW PATTERN:BUBBLE-SLUG

ML= 310 MG= 0.48 QFLUX= 1383 NUTP= 50.2 HTP= 88 PDT= 0.640

PDF= 0.124 ALFA=0.481 WE= 23.43 TOUT(MEAS)= 74.6, 75.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.9	843	361.4	15.4	71.4	0.710	1.304	1.48
OUTLET	74.6	870	360.0	14.8	69.1	0.709	1.302	1.55
MEAN	73.2	857	360.7	15.1	70.2	0.710	1.301	1.52

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	846	1.48	72.2	85.5	58.8	103.0
4.5	849	1.49	72.5	87.7	51.6	91.0
7.5	853	1.50	72.9	88.9	49.0	86.0
11.0	858	1.51	73.4	89.0	50.2	88.0
16.5	866	1.53	74.1	89.9	49.8	88.0
21.0	872	1.54	74.7	91.3	47.5	83.0
22.5	874	1.55	74.9	91.2	48.1	85.0

TEST NO: S6.3 FLOW PATTERN:BUBBLE-SLUG

ML= 310 MG= 0.71 QFLUX= 1609 NUTP= 60.4 HTP= 106 PDT= 0.591

PDF= 0.142 ALFA=0.548 WE= 23.46 TOUT(MEAS)= 76.1, 75.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.7	851	535.5	15.4	70.8	0.710	1.304	2.20
OUTLET	75.8	883	533.1	14.8	68.4	0.709	1.302	2.30
MEAN	74.3	867	534.3	15.1	69.6	0.709	1.302	2.25

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	854	2.21	73.0	86.3	68.5	121.0
4.5	858	2.22	73.3	88.1	61.6	108.0
7.5	862	2.23	73.8	89.0	59.8	105.0
11.0	867	2.24	74.3	89.0	61.7	108.0
16.5	875	2.27	75.0	90.4	59.2	104.0
21.0	881	2.29	75.7	91.6	57.2	101.0
22.5	883	2.29	75.9	92.1	56.4	99.0

TEST NO: S6.4 FLOW PATTERN:BUBBLE-SLUG

ML= 310 MG= 1.00 QFLUX= 1608 NUTP= 66.0 HTP= 116 PDT= 0.525

PDF= 0.130 ALFA=0.603 WE= 23.45 TOUT(MEAS)= 75.7, 75.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.4	849	751.9	15.2	71.0	0.710	1.304	3.12
OUTLET	75.6	880	748.5	14.7	68.7	0.709	1.302	3.25
MEAN	74.0	864	750.2	14.9	69.8	0.709	1.301	3.19

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	851	3.13	72.7	85.3	72.4	128.0
4.5	855	3.14	73.0	86.3	68.6	121.0
7.5	859	3.16	73.4	87.4	65.4	115.0
11.0	864	3.18	73.9	88.2	63.9	112.0
16.5	871	3.21	74.7	88.4	66.1	116.0
21.0	877	3.23	75.3	89.3	65.2	115.0
22.5	879	3.24	75.5	89.8	63.8	112.0

TEST NO: S6.5 FLOW PATTERN:SLUG-CHURN

ML= 310 MG= 1.40 QFLUX= 1806 NUTP= 72.3 HTP= 127 PDT= 0.452

PDF= 0.107 ALFA=0.653 WE= 23.46 TOUT(MEAS)= 76.2, 76.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.8	853	1056.0	15.0	70.7	0.710	1.304	4.46
OUTLET	76.3	888	1050.7	14.5	68.2	0.709	1.302	4.62
MEAN	74.6	870	1053.4	14.8	69.4	0.709	1.302	4.54

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	856	4.47	73.1	87.0	73.6	130.0
4.5	859	4.49	73.5	87.4	73.4	129.0
7.5	863	4.51	73.9	88.1	72.1	127.0
11.0	869	4.53	74.4	88.7	71.9	126.0
16.5	877	4.57	75.2	89.4	72.2	127.0
21.0	883	4.60	75.9	90.0	72.2	127.0
22.5	885	4.61	76.1	90.3	71.8	126.0

TEST NO: S6.6 FLOW PATTERN:SLUG-CHURN

ML= 310 MG= 1.97 QFLUX= 1919 NUTP= 77.5 HTP= 137 PDT= 0.444

PDF= 0.143 ALFA=0.697 WE= 23.45 TOUT(MEAS)= 76.0, 76.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.5	849	1479.0	14.9	70.9	0.710	1.304	6.28
OUTLET	76.2	886	1471.6	14.4	68.3	0.709	1.302	6.51
MEAN	74.3	868	1475.5	14.7	69.6	0.709	1.302	6.39

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	852	6.29	72.8	86.5	79.4	140.0
4.5	856	6.32	73.2	87.1	77.9	137.0
7.5	861	6.35	73.6	87.7	77.4	136.0
11.0	866	6.38	74.2	88.2	77.3	136.0
16.5	874	6.44	75.0	89.1	77.3	136.0
21.0	881	6.48	75.7	89.7	77.5	136.0
22.5	884	6.50	75.9	90.1	76.9	135.0

TEST NO: S6.7 FLOW PATTERN:CHURN

ML= 310 MG= 2.75 QFLUX= 2037 NUTP= 82.9 HTP= 146 PDT= 0.470

PDF= 0.206 ALFA=0.734 WE= 23.48 TOUT(MEAS)= 77.0, 76.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	73.3	858	2062.0	15.0	70.3	0.710	1.304	8.68
OUTLET	77.3	897	2051.1	14.6	67.6	0.709	1.302	9.02
MEAN	75.3	877	2057.0	14.8	68.9	0.709	1.302	8.85

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	861	8.71	73.6	87.2	85.1	150.0
4.5	865	8.75	74.0	87.9	83.4	147.0
7.5	869	8.79	74.5	88.4	82.9	146.0
11.0	875	8.84	75.1	89.0	82.6	145.0
16.5	884	8.92	75.9	89.9	82.3	145.0
21.0	891	8.98	76.6	90.5	83.3	147.0
22.5	893	9.01	76.9	90.9	82.3	145.0

TEST NO: S6.8 FLOW PATTERN:CHURN

ML= 310 MG= 4.19 QFLUX= 2035 NUTP= 89.5 HTP= 158 PDT= 0.514

PDF= 0.291 ALFA=0.777 WE= 23.46 TOUT(MEAS)= 76.4, 76.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.6	850	3151.0	15.1	70.8	0.710	1.304	13.14
OUTLET	76.5	890	3133.5	14.6	68.1	0.709	1.302	13.68
MEAN	74.6	870	3142.4	14.9	69.4	0.709	1.302	13.41

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	854	13.18	72.9	85.6	91.3	161.0
4.5	858	13.24	73.3	86.1	90.5	159.0
7.5	863	13.31	73.8	86.9	88.3	155.0
11.0	868	13.39	74.4	87.3	89.4	157.0
16.5	877	13.52	75.3	88.1	89.8	158.0
21.0	885	13.62	76.0	88.9	89.4	157.0
22.5	887	13.66	76.3	89.2	89.0	157.0

TEST NO: S6.9 FLOW PATTERN:CHURN-ANNULAR

ML= 310 MG= 7.28 QFLUX= 2318 NUTP= 97.0 HTP= 171 PDT= 0.638

PDF= 0.462 ALFA=0.823 WE= 23.46 TOUT(MEAS)= 76.6, 76.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.5	850	5471.0	15.4	70.9	0.710	1.304	22.49
OUTLET	76.9	894	5436.6	14.7	67.8	0.709	1.302	23.61
MEAN	74.7	872	5454.1	15.0	69.4	0.709	1.302	23.06

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	853	22.58	72.9	86.1	99.1	175.0
4.5	858	22.70	73.3	86.7	98.2	173.0
7.5	863	22.84	73.9	87.5	96.3	170.0
11.0	869	23.01	74.5	88.1	96.6	170.0
16.5	879	23.28	75.5	89.0	96.9	171.0
21.0	887	23.50	76.3	89.9	96.6	170.0
22.5	890	23.58	76.6	90.2	96.1	169.0

TEST NO: S6.10 FLOW PATTERN:ANNULAR

ML= 310 MG= 11.44 QFLUX= 2564 NUTP=101.0 HTP= 178 PDT= 0.679

PDF= 0.534 ALFA=0.855 WE= 23.47 TOUT(MEAS)= 76.9, 76.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.4	848	8599.0	15.6	71.0	0.710	1.304	34.85
OUTLET	77.3	897	8539.3	14.9	67.7	0.709	1.302	36.70
MEAN	74.8	873	8569.5	15.2	69.3	0.709	1.302	35.80

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	852	35.01	72.8	86.4	106.6	188.0
4.5	857	35.20	73.3	87.4	102.6	181.0
7.5	863	35.43	73.9	88.2	100.8	178.0
11.0	870	35.71	74.5	89.0	100.0	176.0
16.5	880	36.15	75.6	90.0	100.9	178.0
21.0	889	36.52	76.5	91.1	99.5	175.0
22.5	892	36.64	76.8	91.5	98.7	174.0

TEST NO: S6.11 FLOW PATTERN:ANNULAR

ML= 310 MG= 16.46 QFLUX= 2576 NUTP=105.1 HTP= 185 PDT= 0.720

PDF= 0.597 ALFA=0.877 WE= 23.45 TOUT(MEAS)= 76.7, 75.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.8	842	12386.0	15.7	71.5	0.710	1.304	49.64
OUTLET	76.6	891	12300.1	15.0	68.1	0.709	1.302	52.40
MEAN	74.2	866	12343.4	15.4	69.8	0.709	1.301	51.05

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	846	49.87	72.1	84.9	114.6	202.0
4.5	851	50.16	72.6	85.9	110.0	194.0
7.5	857	50.50	73.2	86.9	106.7	188.0
11.0	863	50.91	73.9	87.9	104.6	184.0
16.5	874	51.57	75.0	89.3	101.8	179.0
21.0	883	52.12	75.9	90.2	102.0	180.0
22.5	886	52.30	76.2	90.6	101.0	178.0

TEST NO: S6.12 FLOW PATTERN:ANNULAR

ML= 310 MG= 23.65 QFLUX= 2536 NUTP=110.3 HTP= 194 PDT= 0.790

PDF= 0.685 ALFA=0.896 WE= 23.47 TOUT(MEAS)= 78.1, 76.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.5	849	17777.0	16.0	70.9	0.710	1.304	70.29
OUTLET	77.2	896	17656.4	15.2	67.4	0.709	1.302	74.50
MEAN	74.8	873	17716.7	15.6	69.1	0.709	1.302	72.44

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	853	70.64	72.9	84.3	125.9	222.0
4.5	858	71.08	73.4	85.4	119.6	211.0
7.5	864	71.61	74.0	86.5	114.5	202.0
11.0	872	72.23	74.7	87.7	110.4	195.0
16.5	883	73.24	75.9	89.5	105.3	186.0
21.0	893	74.08	76.8	91.0	101.6	179.0
22.5	896	74.36	77.1	91.5	99.8	176.0

TEST NO: S6.13 FLOW PATTERN:ANNULAR

ML= 310 MG= 29.23 QFLUX= 2536 NUTP=111.5 HTP= 197 PDT= 0.879

PDF= 0.784 ALFA=0.906 WE= 23.47 TOUT(MEAS)= 78.6, 76.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.2	846	21988.0	16.1	71.1	0.710	1.304	85.95
OUTLET	76.8	893	21840.5	15.3	67.3	0.709	1.302	91.63
MEAN	74.5	869	21914.4	15.7	69.2	0.709	1.302	88.84

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	851	86.41	72.6	83.6	130.4	230.0
4.5	856	87.00	73.2	84.9	122.5	216.0
7.5	863	87.71	73.9	86.1	116.9	206.0
11.0	871	88.56	74.6	87.4	112.5	198.0
16.5	883	89.91	75.9	89.6	104.8	185.0
21.0	893	91.05	76.9	91.2	100.6	177.0
22.5	897	91.44	77.2	91.8	98.7	174.0

TEST NO: S6.14 FLOW PATTERN:ANUULAR-MIST

ML= 310 MG= 46.66 QFLUX= 2537 NUTP=109.6 HTP= 193 PDT= 1.147

PDF= 1.070 ALFA=0.924 WE= 23.47 TOUT(MEAS)= 79.1, 76.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.0	845	35100.0	17.2	71.3	0.710	1.304	128.47
OUTLET	76.5	890	34871.4	16.1	67.2	0.709	1.302	138.77
MEAN	74.3	867	34985.8	16.6	69.2	0.709	1.302	133.70

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	849	129.30	72.5	81.9	151.6	267.0
4.5	855	130.36	73.1	83.7	134.9	238.0
7.5	862	131.64	73.8	85.7	120.3	212.0
11.0	871	133.17	74.6	87.9	108.4	191.0
16.5	884	135.63	75.9	91.0	95.5	168.0
21.0	895	137.71	77.0	93.3	88.4	156.0
22.5	898	138.41	77.4	94.1	86.2	152.0

TEST NO: S6.15 FLOW PATTERN:ANNULAR-MIST

ML= 310 MG= 71.24 QFLUX= 1387 NUTP= 38.6 HTP= 68 PDT= 0.827

PDF= 0.765 ALFA=0.938 WE= 23.43 TOUT(MEAS)= 74.8, 75.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.4	849	53565.0	17.6	71.0	0.710	1.304	192.22
OUTLET	74.8	872	53382.2	16.8	69.1	0.709	1.302	202.35
MEAN	73.6	861	53474.0	17.2	70.1	0.709	1.301	197.40

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	851	193.06	72.6	87.3	53.4	94.0
4.5	854	194.11	72.9	91.1	43.3	76.0
7.5	857	195.39	73.2	93.2	39.3	69.0
11.0	860	196.90	73.6	94.6	37.5	66.0
16.5	866	199.31	74.2	96.4	35.5	62.0
21.0	871	201.33	74.7	97.1	35.1	61.0
22.5	873	202.01	74.9	97.5	34.9	61.0

TEST NO: FLOW PATTERN:

ML= 310 MG=103.08 QFLUX= 1380 NUTP= 61.2 HTP= 108 PDT= 1.508

PDF= 1.453 ALFA=0.946 WE= 23.42 TOUT(MEAS)= 73.4, 75.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.9	843	77562.0	20.7	71.5	0.710	1.304	235.82
OUTLET	74.1	865	77310.9	19.2	69.6	0.709	1.302	254.87
MEAN	73.0	854	77436.5	20.0	70.5	0.710	1.301	245.48

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	845	237.35	72.1	81.7	80.9	142.0
4.5	848	239.30	72.4	84.4	65.1	114.0
7.5	851	241.67	72.7	85.6	60.6	106.0
11.0	855	244.49	73.0	86.4	58.7	103.0
16.5	860	249.05	73.6	87.1	58.2	102.0
21.0	865	252.90	74.1	87.3	59.2	104.0
22.5	867	254.21	74.2	87.4	59.3	104.0

TEST NO: S7.1 FLOW PATTERN:BUBBLE

ML= 538 MG= 0.16 QFLUX= 1211 NUTP= 49.4 HTP= 87 PDT= 0.800

PDF= 0.001 ALFA=0.195 WE= 70.97 TOUT(MEAS)= 77.3, 77.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.3	1541	120.3	15.9	68.1	0.709	2.264	0.48
OUTLET	77.6	1565	120.1	15.1	67.3	0.709	2.261	0.51
MEAN	77.0	1553	120.2	15.5	67.7	0.709	2.261	0.50

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1543	0.48	76.4	87.8	59.7	105.0
4.5	1545	0.49	76.5	89.7	51.7	91.0
7.5	1547	0.49	76.6	90.5	49.5	87.0
11.0	1550	0.49	76.8	90.9	48.5	85.0
16.5	1555	0.50	77.1	91.3	48.1	84.0
21.0	1559	0.51	77.3	91.9	47.0	83.0
22.5	1560	0.51	77.4	92.1	46.4	82.0

TEST NO: S7.2 FLOW PATTERN:BUBBLE

ML= 538 MG= 0.54 QFLUX= 1384 NUTP= 60.7 HTP= 107 PDT= 0.750

PDF= 0.154 ALFA=0.400 WE= 70.99 TOUT(MEAS)= 77.5, 77.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.5	1544	402.6	15.8	68.0	0.709	2.264	1.63
OUTLET	78.0	1571	401.7	15.0	67.1	0.709	2.261	1.72
MEAN	77.2	1558	402.2	15.4	67.6	0.709	2.261	1.68

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1546	1.64	76.6	87.2	73.3	129.0
4.5	1548	1.65	76.7	88.2	67.8	119.0
7.5	1551	1.66	76.8	89.7	60.7	107.0
11.0	1554	1.67	77.0	90.8	56.9	100.0
16.5	1559	1.69	77.3	90.6	58.9	104.0
21.0	1563	1.71	77.5	90.9	58.7	103.0
22.5	1564	1.71	77.6	91.3	57.2	101.0

TEST NO: S7.3 FLOW PATTERN:BUBBLE

ML= 538 MG= 0.89 QFLUX= 1590 NUTP= 66.1 HTP= 116 PDT= 0.668

PDF= 0.163 ALFA=0.492 WE= 71.07 TOUT(MEAS)= 78.7, 78.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.0	1553	665.1	15.6	67.6	0.709	2.264	2.73
OUTLET	78.8	1585	663.4	14.9	66.4	0.709	2.261	2.86
MEAN	77.9	1569	664.3	15.3	67.0	0.709	2.261	2.80

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1556	2.74	77.1	89.2	74.5	131.0
4.5	1559	2.76	77.3	90.1	70.4	124.0
7.5	1563	2.77	77.5	90.8	68.1	120.0
11.0	1567	2.79	77.8	91.6	65.1	115.0
16.5	1574	2.82	78.2	92.3	63.6	112.0
21.0	1580	2.85	78.5	92.7	63.5	112.0
22.5	1582	2.85	78.6	93.3	61.6	108.0

TEST NO: S7.4 FLOW PATTERN:SLUG-CHURN

ML= 538 MG= 1.28 QFLUX= 1588 NUTP= 74.4 HTP= 131 PDT= 0.627

PDF= 0.184 ALFA=0.554 WE= 70.96 TOUT(MEAS)= 77.6, 77.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.8	1533	958.4	15.5	68.4	0.709	2.264	3.95
OUTLET	77.6	1564	955.9	14.9	67.2	0.709	2.261	4.13
MEAN	76.7	1549	957.2	15.2	67.8	0.709	2.261	4.04

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1536	3.97	76.0	87.4	78.9	139.0
4.5	1539	3.99	76.2	88.0	75.8	133.0
7.5	1543	4.01	76.4	88.4	75.0	132.0
11.0	1547	4.03	76.6	88.8	73.7	130.0
16.5	1554	4.08	77.0	89.3	73.5	129.0
21.0	1560	4.11	77.4	89.6	73.4	129.0
22.5	1562	4.12	77.5	89.8	72.9	128.0

TEST NO: S7.5 FLOW PATTERN:SLUG-CHURN

ML= 538 MG= 1.93 QFLUX= 1806 NUTP= 84.9 HTP= 150 PDT= 0.621

PDF= 0.240 ALFA=0.617 WE= 70.96 TOUT(MEAS)= 77.6, 77.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.8	1533	1441.0	15.5	68.4	0.709	2.264	5.95
OUTLET	77.8	1568	1437.7	14.8	67.2	0.709	2.261	6.21
MEAN	76.8	1550	1439.8	15.1	67.8	0.709	2.261	6.08

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1535	5.97	75.9	87.3	89.7	158.0
4.5	1539	6.00	76.1	87.9	86.6	152.0
7.5	1543	6.03	76.4	88.3	85.6	151.0
11.0	1547	6.07	76.6	88.8	84.0	148.0
16.5	1555	6.13	77.1	89.3	83.3	147.0
21.0	1561	6.19	77.4	89.5	84.5	149.0
22.5	1563	6.20	77.5	89.5	85.1	150.0

TEST NO: S7.6 FLOW PATTERN:SLUG-CHURN

ML= 538 MG= 2.75 QFLUX= 2284 NUTP= 91.7 HTP= 162 PDT= 0.646

PDF= 0.314 ALFA=0.666 WE= 71.00 TOUT(MEAS)= 78.3, 78.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.9	1534	2060.0	15.5	68.4	0.709	2.264	8.48
OUTLET	78.4	1579	2052.8	14.9	66.7	0.709	2.261	8.88
MEAN	77.1	1556	2056.6	15.2	67.5	0.709	2.261	8.68

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1538	8.51	76.1	89.6	95.5	168.0
4.5	1542	8.56	76.3	90.1	94.1	166.0
7.5	1547	8.61	76.6	90.8	91.6	161.0
11.0	1554	8.66	77.0	91.1	91.5	161.0
16.5	1564	8.76	77.6	91.8	90.6	160.0
21.0	1572	8.84	78.0	92.3	90.5	159.0
22.5	1574	8.86	78.2	92.5	90.2	159.0

TEST NO: S7.7 FLOW PATTERN:CHURN

ML= 538 MG= 4.21 QFLUX= 2567 NUTP=101.0 HTP= 178 PDT= 0.695

PDF= 0.413 ALFA=0.717 WE= 70.95 TOUT(MEAS)= 78.0, 78.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.2	1522	3155.0	15.7	68.9	0.709	2.264	12.81
OUTLET	78.0	1572	3142.2	15.0	66.8	0.709	2.261	13.45
MEAN	76.6	1547	3148.7	15.3	67.9	0.709	2.261	13.14

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1526	12.86	75.4	89.4	104.1	183.0
4.5	1531	12.93	75.7	89.9	102.5	181.0
7.5	1538	13.01	76.1	90.5	100.7	177.0
11.0	1545	13.11	76.5	91.1	99.9	176.0
16.5	1557	13.26	77.2	91.8	100.0	176.0
21.0	1567	13.39	77.8	92.1	101.7	179.0
22.5	1571	13.43	77.9	92.3	101.4	179.0

TEST NO: S7.8 FLOW PATTERN:CHURN-ANNULAR

ML= 538 MG= 6.32 QFLUX= 2675 NUTP=107.7 HTP= 190 PDT= 0.823

PDF= 0.583 ALFA=0.758 WE= 71.05 TOUT(MEAS)= 79.0, 79.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.1	1538	4725.0	16.1	68.2	0.709	2.264	18.80
OUTLET	79.1	1591	4705.2	15.2	66.1	0.709	2.261	19.89
MEAN	77.6	1565	4715.2	15.6	67.1	0.709	2.261	19.36

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1543	18.89	76.4	90.0	111.3	196.0
4.5	1548	19.00	76.7	90.6	108.4	191.0
7.5	1555	19.14	77.1	91.2	107.3	189.0
11.0	1562	19.30	77.5	91.6	107.1	189.0
16.5	1574	19.56	78.2	92.3	107.2	189.0
21.0	1584	19.78	78.7	92.8	107.9	190.0
22.5	1588	19.85	78.9	93.1	107.0	189.0

TEST NO: S7.9 FLOW PATTERN:ANNULAR

ML= 538 MG= 8.96 QFLUX= 2811 NUTP=114.0 HTP= 201 PDT= 0.997

PDF= 0.789 ALFA=0.791 WE= 71.04 TOUT(MEAS)= 78.8, 79.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.1	1538	6698.0	16.3	68.2	0.709	2.264	26.33
OUTLET	79.2	1593	6668.8	15.3	66.2	0.709	2.261	28.15
MEAN	77.7	1566	6683.7	15.8	67.2	0.709	2.261	27.26

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1542	26.48	76.4	89.8	118.7	209.0
4.5	1548	26.67	76.7	90.3	116.5	205.0
7.5	1554	26.89	77.0	90.9	114.3	201.0
11.0	1561	27.16	77.4	91.4	113.7	200.0
16.5	1573	27.60	78.1	92.2	112.6	199.0
21.0	1583	27.96	78.6	92.8	112.3	198.0
22.5	1586	28.08	78.8	93.0	112.3	198.0

TEST NO: S7.10 FLOW PATTERN:ANNULAR

ML= 538 MG= 13.14 QFLUX= 2947 NUTP=115.5 HTP= 204 PDT= 0.991

PDF= 0.812 ALFA=0.820 WE= 70.84 TOUT(MEAS)= 77.1, 77.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	73.8	1498	9861.0	16.7	69.9	0.709	2.264	37.42
OUTLET	77.0	1554	9815.6	15.7	67.6	0.709	2.261	39.94
MEAN	75.4	1526	9838.6	16.2	68.7	0.709	2.260	38.70

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1503	37.62	74.1	87.8	121.6	214.0
4.5	1509	37.88	74.4	88.7	117.2	207.0
7.5	1516	38.20	74.9	89.3	115.4	203.0
11.0	1525	38.58	75.3	89.9	114.8	202.0
16.5	1538	39.18	76.1	90.7	114.2	201.0
21.0	1549	39.69	76.7	91.3	114.9	203.0
22.5	1553	39.86	76.9	91.7	113.6	200.0

TEST NO: S7.11 FLOW PATTERN:ANNULAR

ML= 538 MG= 18.24 QFLUX= 3267 NUTP=125.6 HTP= 221 PDT= 1.249

PDF= 1.093 ALFA=0.844 WE= 70.93 TOUT(MEAS)= 78.3, 77.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	74.8	1515	13668.0	17.0	69.1	0.709	2.264	51.22
OUTLET	78.4	1578	13598.2	15.7	66.9	0.709	2.261	55.48
MEAN	76.6	1547	13633.4	16.4	68.0	0.709	2.261	53.38

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1520	51.56	75.1	88.7	135.3	239.0
4.5	1526	51.99	75.4	89.7	129.8	229.0
7.5	1533	52.52	75.8	90.5	126.3	223.0
11.0	1542	53.15	76.3	91.2	124.5	219.0
16.5	1555	54.18	77.1	92.0	123.7	218.0
21.0	1566	55.04	77.7	92.8	122.9	217.0
22.5	1570	55.33	77.9	93.2	121.0	213.0

TEST NO: S7.12 FLOW PATTERN:ANNULAR

ML= 538 MG= 25.24 QFLUX= 3268 NUTP=129.4 HTP= 228 PDT= 1.438

PDF= 1.303 ALFA=0.864 WE= 71.04 TOUT(MEAS)= 79.8, 78.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.7	1530	18884.0	17.5	68.5	0.709	2.264	68.90
OUTLET	79.2	1593	18788.1	16.0	66.0	0.709	2.261	75.37
MEAN	77.4	1562	18836.2	16.8	67.2	0.709	2.261	72.17

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1536	69.42	76.0	88.8	144.6	255.0
4.5	1542	70.07	76.4	89.8	137.8	243.0
7.5	1550	70.87	76.8	90.8	132.7	234.0
11.0	1560	71.83	77.3	91.7	129.1	228.0
16.5	1575	73.38	78.2	93.0	124.7	220.0
21.0	1587	74.69	78.9	94.0	122.2	215.0
22.5	1591	75.14	79.1	94.2	122.5	216.0

TEST NO: S7.13 FLOW PATTERN:ANNULAR

ML= 538 MG= 37.92 QFLUX= 3389 NUTP=135.9 HTP= 240 PDT= 1.432

PDF= 1.318 ALFA=0.886 WE= 71.13 TOUT(MEAS)= 81.4, 79.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.4	1542	28350.0	18.2	67.9	0.709	2.264	99.62
OUTLET	80.0	1606	28203.4	16.8	65.1	0.709	2.262	108.68
MEAN	78.2	1574	28277.2	17.5	66.5	0.709	2.261	104.20

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1549	100.34	76.7	88.9	157.2	277.0
4.5	1556	101.26	77.1	90.0	149.1	263.0
7.5	1566	102.39	77.7	91.2	141.4	249.0
11.0	1577	103.73	78.3	92.4	135.9	240.0
16.5	1594	105.90	79.3	94.2	128.6	227.0
21.0	1608	107.73	80.1	95.5	124.4	219.0
22.5	1613	108.36	80.4	96.1	122.3	216.0

TEST NO: S7.14 FLOW PATTERN:ANNULAR

ML= 538 MG= 57.16 QFLUX= 3541 NUTP=137.5 HTP= 242 PDT= 1.917

PDF= 1.820 ALFA=0.903 WE= 71.09 TOUT(MEAS)= 81.8, 79.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.4	1526	42791.0	19.9	68.6	0.709	2.264	137.34
OUTLET	79.1	1591	42563.0	17.9	65.1	0.709	2.262	152.95
MEAN	77.3	1558	42677.2	18.9	66.9	0.709	2.261	145.20

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1533	138.56	75.8	87.3	174.4	308.0
4.5	1543	140.13	76.4	88.8	160.4	283.0
7.5	1554	142.04	77.0	90.6	147.9	261.0
11.0	1568	144.34	77.8	92.3	137.9	243.0
16.5	1589	148.09	79.0	95.1	124.8	220.0
21.0	1607	151.30	80.0	97.3	116.2	205.0
22.5	1612	152.39	80.3	98.0	113.5	200.0

TEST NO: S7.15 FLOW PATTERN:ANNULAR-MIST

ML= 538 MG= 82.29 QFLUX= 1820 NUTP= 41.0 HTP= 72 PDT= 0.972

PDF= 0.891 ALFA=0.919 WE= 70.99 TOUT(MEAS)= 78.0, 78.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.0	1536	61555.0	19.8	68.3	0.709	2.264	198.26
OUTLET	77.8	1568	61390.2	18.9	66.8	0.709	2.261	208.98
MEAN	76.9	1552	61472.6	19.3	67.6	0.709	2.261	203.74

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1539	199.14	76.1	94.5	56.0	99.0
4.5	1543	200.26	76.4	98.2	47.1	83.0
7.5	1548	201.61	76.7	100.7	42.8	75.0
11.0	1553	203.20	77.0	102.4	40.5	71.0
16.5	1562	205.76	77.5	105.2	37.2	65.0
21.0	1570	207.90	77.9	106.8	35.7	63.0
22.5	1572	208.62	78.0	107.4	35.2	62.0

TEST NO: S7.16 FLOW PATTERN:ANNULAR-MIST

ML= 538 MG=120.04 QFLUX= 2044 NUTP= 65.6 HTP= 115 PDT= 1.727

PDF= 1.657 ALFA=0.930 WE= 71.08 TOUT(MEAS)= 78.2, 80.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.4	1544	89728.0	22.6	67.9	0.709	2.264	254.19
OUTLET	78.4	1579	89468.3	20.9	66.0	0.709	2.261	276.00
MEAN	77.4	1562	89598.1	21.7	66.9	0.709	2.261	265.24

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1548	255.93	76.7	90.9	81.2	143.0
4.5	1553	258.15	77.0	93.4	70.5	124.0
7.5	1560	260.86	77.4	95.1	65.2	115.0
11.0	1567	264.09	77.8	96.0	63.5	112.0
16.5	1579	269.31	78.4	96.9	62.7	110.0
21.0	1589	273.73	79.0	97.3	63.5	112.0
22.5	1592	275.24	79.2	97.4	63.6	112.0

TEST NO: S7.17 FLOW PATTERN:ANNULAR-MIST

ML= 538 MG=143.72 QFLUX= 2039 NUTP= 89.0 HTP= 157 PDT= 2.515

PDF= 2.449 ALFA=0.935 WE= 71.05 TOUT(MEAS)= 78.2, 80.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.7	1531	107544.0	24.6	68.4	0.709	2.264	279.53
OUTLET	77.7	1565	107240.7	22.0	65.9	0.709	2.261	312.47
MEAN	76.7	1548	107392.6	23.3	67.2	0.709	2.261	296.08

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	1536	282.10	76.0	84.7	132.5	234.0
4.5	1543	285.38	76.4	87.9	100.1	176.0
7.5	1552	289.42	76.9	89.8	89.6	158.0
11.0	1561	294.26	77.4	91.1	84.7	149.0
16.5	1577	302.18	78.3	92.5	81.6	144.0
21.0	1589	308.97	79.0	93.3	80.7	142.0
22.5	1593	311.29	79.3	93.6	80.6	142.0

TEST NO: S8.1 FLOW PATTERN:BUBBLE

ML= 1439 MG= 0.17 QFLUX= 2299 NUTP= 79.0 HTP= 139 PDT= 1.183

PDF= 0.276 ALFA=0.088 WE= 500.10 TOUT(MEAS)= 68.0, 68.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	66.8	3683	129.0	16.8	75.8	0.710	6.048	0.47
OUTLET	67.8	3726	128.8	15.6	74.7	0.710	6.034	0.51
MEAN	67.3	3705	128.9	16.2	75.3	0.710	6.034	0.49

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3688	0.48	66.9	82.1	85.8	151.0
4.5	3694	0.48	67.0	83.2	80.4	142.0
7.5	3702	0.49	67.2	83.8	78.4	138.0
11.0	3711	0.49	67.4	84.2	77.8	137.0
16.5	3725	0.50	67.7	84.4	78.1	138.0
21.0	3736	0.51	68.0	84.5	78.6	138.0
22.5	3740	0.51	68.1	84.7	78.4	138.0

TEST NO: S8.2 FLOW PATTERN:BUBBLE

ML= 1439 MG= 0.58 QFLUX= 2336 NUTP= 82.2 HTP= 145 PDT= 1.061

PDF= 0.297 ALFA=0.232 WE= 499.90 TOUT(MEAS)= 67.7, 67.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	66.6	3673	441.8	16.7	76.0	0.710	6.048	1.64
OUTLET	67.5	3717	441.1	15.6	74.9	0.710	6.034	1.75
MEAN	67.1	3695	441.5	16.2	75.5	0.710	6.034	1.69

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3678	1.65	66.7	81.4	89.6	158.0
4.5	3684	1.66	66.8	82.6	83.6	147.0
7.5	3691	1.67	67.0	83.1	82.1	145.0
11.0	3700	1.69	67.2	83.4	81.4	143.0
16.5	3713	1.71	67.5	83.8	80.9	142.0
21.0	3724	1.74	67.7	83.9	81.6	144.0
22.5	3728	1.74	67.8	84.1	81.4	143.0

TEST NO: S8.3 FLOW PATTERN:BUBBLE-SLUG

ML= 1439 MG= 0.95 QFLUX= 2527 NUTP= 87.5 HTP= 154 PDT= 1.143

PDF= 0.459 ALFA=0.312 WE= 499.20 TOUT(MEAS)= 66.7, 67.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.2	3614	720.5	16.7	77.2	0.711	6.048	2.65
OUTLET	66.3	3661	719.4	15.6	75.8	0.710	6.034	2.85
MEAN	65.8	3637	719.9	16.2	76.5	0.710	6.033	2.75

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3620	2.67	65.4	80.7	93.4	165.0
4.5	3628	2.69	65.5	81.7	88.4	156.0
7.5	3637	2.71	65.8	82.3	86.5	152.0
11.0	3648	2.74	66.0	82.6	86.1	152.0
16.5	3665	2.79	66.4	82.8	87.0	153.0
21.0	3679	2.83	66.7	83.0	87.9	155.0
22.5	3684	2.84	66.8	83.1	88.1	155.0

TEST NO: S8.4 FLOW PATTERN:BUBBLE-SLUG

ML= 1439 MG= 1.36 QFLUX= 2523 NUTP=108.2 HTP= 191 PDT= 1.228

PDF= 0.606 ALFA=0.375 WE= 499.40 TOUT(MEAS)= 67.0, 67.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.7	3634	1033.0	17.0	76.8	0.711	6.048	3.76
OUTLET	66.7	3680	1032.0	15.7	75.6	0.710	6.034	4.06
MEAN	66.2	3657	1032.8	16.3	76.2	0.710	6.033	3.91

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3639	3.78	65.8	78.5	112.6	198.0
4.5	3646	3.81	65.9	79.1	108.8	192.0
7.5	3654	3.85	66.1	79.4	107.7	190.0
11.0	3663	3.89	66.3	79.8	106.5	188.0
16.5	3678	3.97	66.7	79.9	108.0	190.0
21.0	3690	4.02	66.9	80.1	109.0	192.0
22.5	3694	4.05	67.0	80.2	108.5	191.0

TEST NO: S8.5 FLOW PATTERN:BUBBLE-SLUG

ML= 1439 MG= 1.93 QFLUX= 2792 NUTP=119.0 HTP= 210 PDT= 1.275

PDF= 0.716 ALFA=0.438 WE= 499.80 TOUT(MEAS)= 67.6, 67.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	66.2	3657	1463.0	17.1	76.3	0.710	6.048	5.29
OUTLET	67.4	3709	1461.2	15.8	75.0	0.710	6.034	5.72
MEAN	66.8	3683	1462.4	16.5	75.6	0.710	6.034	5.51

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3663	5.32	66.4	79.2	122.8	216.0
4.5	3671	5.37	66.5	79.8	119.1	210.0
7.5	3680	5.42	66.7	80.1	117.9	208.0
11.0	3690	5.48	66.9	80.3	118.2	208.0
16.5	3707	5.59	67.3	80.6	118.7	209.0
21.0	3720	5.67	67.6	80.8	119.7	211.0
22.5	3725	5.70	67.7	81.0	119.4	211.0

TEST NO: S8.6 FLOW PATTERN:SLUG-CHURN

ML= 1439 MG= 2.84 QFLUX= 3131 NUTP=124.9 HTP= 220 PDT= 1.357

PDF= 0.862 ALFA=0.503 WE= 499.60 TOUT(MEAS)= 67.4, 67.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.8	3640	2154.0	17.4	76.6	0.711	6.048	7.64
OUTLET	67.1	3698	2149.9	16.0	75.1	0.710	6.034	8.29
MEAN	66.5	3669	2151.9	16.7	75.9	0.710	6.033	7.97

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3647	7.69	66.0	79.7	128.6	227.0
4.5	3655	7.76	66.2	80.3	125.0	220.0
7.5	3666	7.84	66.4	80.9	122.6	216.0
11.0	3678	7.94	66.7	81.0	123.5	218.0
16.5	3697	8.09	67.1	81.2	125.5	221.0
21.0	3713	8.23	67.5	81.5	126.6	223.0
22.5	3718	8.27	67.6	81.6	126.8	224.0

TEST NO: S8.7 FLOW PATTERN:CHURN-ANNULAR

ML= 1439 MG= 4.23 QFLUX= 3366 NUTP=131.8 HTP= 232 PDT= 1.468

PDF= 1.035 ALFA=0.566 WE= 499.60 TOUT(MEAS)= 67.5, 67.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.7	3634	3209.0	17.8	76.8	0.711	6.048	11.10
OUTLET	67.1	3696	3202.5	16.4	75.1	0.710	6.034	12.10
MEAN	66.4	3665	3205.9	17.1	75.9	0.710	6.033	11.61

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3641	11.18	65.9	80.0	134.6	237.0
4.5	3651	11.28	66.1	80.5	131.7	232.0
7.5	3662	11.40	66.3	81.0	130.0	229.0
11.0	3675	11.55	66.6	81.2	130.9	231.0
16.5	3695	11.79	67.1	81.5	131.9	233.0
21.0	3712	12.00	67.4	81.7	133.5	235.0
22.5	3717	12.07	67.6	81.9	133.3	235.0

TEST NO: S8.8 FLOW PATTERN:ANNULAR

ML= 1439 MG= 6.64 QFLUX= 3671 NUTP=141.8 HTP= 250 PDT= 1.736

PDF= 1.367 ALFA=0.630 WE= 499.70 TOUT(MEAS)= 67.7, 68.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.8	3640	5042.0	18.4	76.6	0.711	6.048	16.92
OUTLET	67.4	3708	5031.0	16.7	74.9	0.710	6.034	18.70
MEAN	66.6	3674	5036.7	17.5	75.8	0.710	6.034	17.82

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3648	17.06	66.0	80.5	142.8	252.0
4.5	3658	17.24	66.2	81.1	139.8	246.0
7.5	3670	17.46	66.5	81.4	139.1	245.0
11.0	3683	17.72	66.8	81.6	140.6	248.0
16.5	3705	18.15	67.3	81.8	142.9	252.0
21.0	3723	18.51	67.7	82.0	145.1	256.0
22.5	3729	18.64	67.8	82.1	145.3	256.0

TEST NO: S8.9 FLOW PATTERN:ANNULAR

ML= 1439 MG= 9.37 QFLUX= 3829 NUTP=149.2 HTP= 263 PDT= 1.997

PDF= 1.670 ALFA=0.671 WE= 500.30 TOUT(MEAS)= 68.5, 69.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	66.7	3678	7105.0	19.3	75.9	0.710	6.048	22.76
OUTLET	68.3	3750	7088.7	17.3	74.1	0.710	6.035	25.39
MEAN	67.5	3714	7097.0	18.3	75.0	0.710	6.034	24.08

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3686	22.96	66.9	81.1	152.2	268.0
4.5	3696	23.23	67.1	81.8	147.7	260.0
7.5	3708	23.55	67.4	82.1	147.3	260.0
11.0	3722	23.94	67.7	82.4	147.5	260.0
16.5	3744	24.57	68.1	82.6	149.6	264.0
21.0	3762	25.11	68.6	82.8	152.1	268.0
22.5	3768	25.30	68.7	83.0	152.0	268.0

TEST NO: S8.10 FLOW PATTERN:ANNULAR

ML= 1439 MG= 13.13 QFLUX= 3990 NUTP=152.5 HTP= 269 PDT= 2.141

PDF= 1.849 ALFA=0.708 WE= 500.50 TOUT(MEAS)= 68.6, 69.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	67.0	3691	9952.0	20.2	75.6	0.710	6.048	30.54
OUTLET	68.6	3765	9928.5	18.1	74.0	0.710	6.035	34.17
MEAN	67.8	3728	9940.7	19.1	74.8	0.710	6.034	32.36

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3698	30.82	67.1	81.3	159.0	280.0
4.5	3708	31.19	67.4	82.0	153.9	271.0
7.5	3720	31.63	67.6	82.6	150.8	266.0
11.0	3733	32.16	67.9	82.9	150.9	266.0
16.5	3755	33.03	68.4	83.4	150.9	266.0
21.0	3772	33.78	68.8	83.4	154.6	273.0
22.5	3778	34.04	68.9	83.4	155.7	275.0

TEST NO: S8.11 FLOW PATTERN:ANNULAR

ML= 1439 MG= 18.23 QFLUX= 4315 NUTP=159.6 HTP= 282 PDT= 2.277

PDF= 2.017 ALFA=0.739 WE= 499.60 TOUT(MEAS)= 67.3, 68.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.7	3634	13845.0	21.2	76.8	0.711	6.048	40.31
OUTLET	67.5	3714	13808.9	18.9	75.0	0.710	6.034	45.17
MEAN	66.6	3674	13827.2	20.1	75.9	0.710	6.033	42.75

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3642	40.69	65.9	80.5	167.2	295.0
4.5	3652	41.17	66.1	81.2	161.6	285.0
7.5	3663	41.76	66.4	81.7	158.9	280.0
11.0	3677	42.48	66.7	82.2	157.4	278.0
16.5	3699	43.65	67.1	82.6	158.0	279.0
21.0	3716	44.65	67.5	82.7	160.9	284.0
22.5	3722	45.00	67.7	82.8	161.1	284.0

TEST NO: S8.12 FLOW PATTERN:ANNULAR

ML= 1439 MG= 25.11 QFLUX= 4865 NUTP=173.8 HTP= 307 PDT= 2.628

PDF= 2.396 ALFA=0.768 WE= 499.80 TOUT(MEAS)= 67.6, 68.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	65.8	3640	19066.0	22.2	76.6	0.711	6.048	53.03
OUTLET	67.8	3729	19010.2	19.6	74.8	0.710	6.034	60.16
MEAN	66.8	3685	19038.4	20.9	75.7	0.710	6.034	56.60

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3648	53.58	66.0	81.1	182.0	321.0
4.5	3659	54.28	66.2	81.8	177.1	313.0
7.5	3672	55.15	66.5	82.4	173.6	306.0
11.0	3686	56.19	66.9	82.9	172.0	303.0
16.5	3710	57.91	67.4	83.5	171.4	302.0
21.0	3729	59.39	67.8	83.7	173.9	307.0
22.5	3736	59.90	68.0	83.8	174.1	307.0

TEST NO: S8.13 FLOW PATTERN:ANNULAR

ML= 1439 MG= 37.86 QFLUX= 5193 NUTP=182.5 HTP= 322 PDT= 3.295

PDF= 3.096 ALFA=0.800 WE= 501.10 TOUT(MEAS)= 69.7, 70.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	67.9	3731	28656.0	23.8	74.8	0.710	6.048	74.74
OUTLET	70.0	3828	28566.6	20.5	73.0	0.710	6.035	86.67
MEAN	68.9	3779	28611.5	22.2	73.9	0.710	6.035	80.67

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3740	75.64	68.1	83.3	192.4	339.0
4.5	3750	76.79	68.3	84.1	185.5	327.0
7.5	3763	78.22	68.6	84.7	182.5	322.0
11.0	3778	79.96	68.9	85.2	181.0	319.0
16.5	3802	82.84	69.4	85.8	180.1	318.0
21.0	3822	85.36	69.9	86.0	182.2	321.0
22.5	3828	86.23	70.0	86.3	180.7	319.0

TEST NO: S8.14 FLOW PATTERN:ANNULAR

ML= 1439 MG= 56.73 QFLUX= 5193 NUTP=187.3 HTP= 331 PDT= 3.700

PDF= 3.523 ALFA=0.823 WE= 501.30 TOUT(MEAS)= 70.4, 70.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	68.0	3736	42931.0	27.3	74.7	0.710	6.048	97.91
OUTLET	70.1	3832	42798.4	23.6	72.6	0.710	6.036	113.29
MEAN	69.0	3784	42865.1	25.4	73.7	0.710	6.035	105.56

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3746	99.07	68.2	83.0	198.7	351.0
4.5	3759	100.57	68.5	83.8	192.1	339.0
7.5	3774	102.41	68.8	84.5	186.9	330.0
11.0	3791	104.65	69.2	84.9	187.6	331.0
16.5	3819	108.37	69.8	85.8	184.0	325.0
21.0	3841	111.60	70.3	86.2	184.9	326.0
22.5	3849	112.72	70.5	86.5	183.4	324.0

TEST NO: S8.15 FLOW PATTERN:ANNULAR

ML= 1439 MG= 84.76 QFLUX= 5762 NUTP=189.6 HTP= 335 PDT= 3.979

PDF= 3.821 ALFA=0.843 WE= 503.10 TOUT(MEAS)= 73.9, 73.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.3	3841	63924.0	31.3	72.7	0.710	6.048	128.02
OUTLET	72.6	3947	63707.6	27.3	70.2	0.710	6.038	146.91
MEAN	71.4	3894	63815.9	29.3	71.5	0.710	6.037	137.44

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3853	129.46	70.6	85.7	214.9	379.0
4.5	3869	131.31	70.9	87.0	202.7	358.0
7.5	3888	133.59	71.3	88.1	194.1	343.0
11.0	3911	136.34	71.8	89.1	188.7	333.0
16.5	3946	140.90	72.6	90.5	181.8	321.0
21.0	3975	144.85	73.2	91.4	179.7	317.0
22.5	3985	146.22	73.4	91.8	177.8	314.0

TEST NO: S8.16 FLOW PATTERN:ANNULAR

ML= 1439 MG=117.74 QFLUX= 6256 NUTP=177.4 HTP= 313 PDT= 4.586

PDF= 4.443 ALFA=0.858 WE= 503.60 TOUT(MEAS)= 74.4, 73.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.9	3869	88720.0	35.4	72.2	0.710	6.048	157.48
OUTLET	73.4	3984	88398.8	30.8	69.7	0.709	6.038	181.21
MEAN	72.1	3926	88559.5	33.1	71.0	0.710	6.037	169.30

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3882	159.28	71.2	87.7	214.3	378.0
4.5	3898	161.59	71.5	89.2	199.6	352.0
7.5	3917	164.45	72.0	90.9	186.6	329.0
11.0	3940	167.92	72.4	92.5	176.5	311.0
16.5	3975	173.65	73.2	94.7	165.0	291.0
21.0	4005	178.62	73.9	96.2	158.9	280.0
22.5	4014	180.34	74.1	96.7	156.9	277.0

TEST NO: S8.17 FLOW PATTERN:ANNULAR

ML= 1439 MG=143.57 QFLUX= 6176 NUTP=136.0 HTP= 240 PDT= 4.044

PDF= 3.911 ALFA=0.869 WE= 503.40 TOUT(MEAS)= 74.4, 74.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	70.3	3842	108278.0	36.4	72.7	0.710	6.048	186.16
OUTLET	72.8	3954	107894.8	32.4	69.7	0.709	6.038	210.10
MEAN	71.5	3898	108086.8	34.4	71.2	0.710	6.037	198.16

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	3857	188.01	70.6	89.2	187.3	330.0
4.5	3876	190.38	71.1	93.1	158.3	279.0
7.5	3899	193.30	71.6	95.2	147.7	260.0
11.0	3926	196.81	72.1	99.2	129.4	228.0
16.5	3968	202.58	73.1	101.5	123.1	217.0
21.0	4003	207.54	73.8	103.5	118.1	208.0
22.5	4014	209.24	74.1	104.3	116.1	205.0

TEST NO: S9.1 FLOW PATTERN:BUBBLE

ML= 3058 MG= 0.19 QFLUX= 3080 NUTP=162.8 HTP= 287 PDT= 2.165

PDF= 1.217 ALFA=0.046 WE= 2277.00 TOUT(MEAS)= 74.1, 74.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	73.3	8453	140.4	18.7	70.4	0.710	12.850	0.48
OUTLET	73.9	8513	140.3	16.5	69.8	0.709	12.830	0.54
MEAN	73.6	8483	140.3	17.6	70.1	0.709	12.829	0.51

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	8460	0.48	73.4	84.0	164.3	290.0
4.5	8469	0.49	73.4	84.1	162.8	287.0
7.5	8479	0.49	73.5	84.3	161.5	285.0
11.0	8491	0.50	73.7	84.5	161.6	285.0
16.5	8511	0.52	73.9	84.6	162.6	287.0
21.0	8526	0.53	74.0	84.6	165.2	291.0
22.5	8531	0.53	74.1	84.7	164.7	290.0

TEST NO: S9.2 FLOW PATTERN:BUBBLE

ML= 3058 MG= 0.42 QFLUX= 3838 NUTP=161.9 HTP= 286 PDT= 2.230

PDF= 1.326 ALFA=0.090 WE= 2274.00 TOUT(MEAS)= 73.4, 73.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.4	8371	312.7	19.6	71.1	0.710	12.850	1.01
OUTLET	73.2	8445	312.4	17.4	70.3	0.710	12.829	1.13
MEAN	72.8	8408	312.5	18.5	70.7	0.710	12.828	1.07

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	8379	1.02	72.5	85.7	164.5	290.0
4.5	8390	1.03	72.6	86.0	162.3	286.0
7.5	8402	1.04	72.8	86.4	159.6	282.0
11.0	8417	1.06	72.9	86.4	160.8	284.0
16.5	8440	1.09	73.1	86.6	162.1	286.0
21.0	8459	1.12	73.3	86.6	163.9	289.0
22.5	8465	1.13	73.4	86.7	163.7	289.0

TEST NO: S9.3 FLOW PATTERN:BUBBLE

ML= 3058 MG= 0.59 QFLUX= 3997 NUTP=167.7 HTP= 296 PDT= 2.254

PDF= 1.378 ALFA=0.118 WE= 2273.00 TOUT(MEAS)= 72.9, 73.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.9	8315	440.6	20.0	71.5	0.710	12.850	1.39
OUTLET	72.6	8391	440.1	17.7	70.7	0.710	12.828	1.56
MEAN	72.3	8353	440.4	18.8	71.1	0.710	12.827	1.48

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	8323	1.40	71.9	85.4	168.6	297.0
4.5	8335	1.42	72.1	85.6	167.0	295.0
7.5	8348	1.44	72.2	85.9	165.8	292.0
11.0	8364	1.47	72.4	85.9	167.0	295.0
16.5	8388	1.51	72.6	86.1	168.2	297.0
21.0	8408	1.55	72.8	86.2	169.8	300.0
22.5	8415	1.56	72.9	86.3	168.7	298.0

TEST NO: S9.4 FLOW PATTERN:BUBBLE-FROTH

ML= 3058 MG= 0.88 QFLUX= 4030 NUTP=167.9 HTP= 296 PDT= 2.294

PDF= 1.463 ALFA=0.164 WE= 2273.00 TOUT(MEAS)= 72.9, 73.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	71.8	8310	661.2	19.9	71.6	0.710	12.850	2.09
OUTLET	72.6	8388	660.5	17.6	70.7	0.710	12.828	2.36
MEAN	72.2	8349	660.9	18.8	71.1	0.710	12.827	2.23

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	8320	2.11	71.9	85.4	169.4	299.0
4.5	8331	2.14	72.0	85.7	167.5	295.0
7.5	8346	2.17	72.2	85.9	166.4	294.0
11.0	8362	2.21	72.4	86.0	167.2	295.0
16.5	8389	2.28	72.6	86.2	168.4	297.0
21.0	8410	2.33	72.8	86.3	169.4	299.0
22.5	8417	2.35	72.9	86.4	169.4	299.0

TEST NO: S9.5 FLOW PATTERN:BUBBLE-FROTH

ML= 3058 MG= 1.28 QFLUX= 4328 NUTP=170.5 HTP= 301 PDT= 2.365

PDF= 1.583 ALFA=0.213 WE= 2273.00 TOUT(MEAS)= 73.1, 73.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.0	8328	962.7	20.2	71.4	0.710	12.850	3.00
OUTLET	72.9	8411	961.5	17.9	70.5	0.710	12.828	3.39
MEAN	72.4	8369	962.1	19.0	71.0	0.710	12.828	3.20

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	8337	3.03	72.1	86.2	173.3	306.0
4.5	8349	3.07	72.2	86.6	170.8	301.0
7.5	8364	3.12	72.4	86.8	169.9	300.0
11.0	8381	3.17	72.5	87.1	168.8	298.0
16.5	8407	3.27	72.8	87.2	170.9	301.0
21.0	8429	3.35	73.0	87.3	171.8	303.0
22.5	8437	3.38	73.1	87.4	171.1	302.0

TEST NO: S9.6 FLOW PATTERN:BUBBLE-FROTH

ML= 3058 MG= 1.92 QFLUX= 4330 NUTP=168.1 HTP= 297 PDT= 2.451

PDF= 1.731 ALFA=0.276 WE= 2275.00 TOUT(MEAS)= 73.6, 73.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.6	8384	1445.0	20.6	71.0	0.710	12.850	4.44
OUTLET	73.4	8467	1444.1	18.1	70.1	0.709	12.829	5.03
MEAN	73.0	8426	1445.0	19.3	70.5	0.710	12.828	4.74

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	8393	4.49	72.7	86.9	171.8	303.0
4.5	8405	4.55	72.8	87.3	169.1	298.0
7.5	8420	4.62	72.9	87.6	167.5	296.0
11.0	8436	4.70	73.1	87.8	166.7	294.0
16.5	8462	4.85	73.4	88.0	167.6	296.0
21.0	8484	4.97	73.6	88.1	168.9	298.0
22.5	8491	5.01	73.7	88.2	168.4	297.0

TEST NO: S9.7 FLOW PATTERN:FROTH

ML= 3058 MG= 2.74 QFLUX= 4330 NUTP=169.0 HTP= 298 PDT= 2.563

PDF= 1.902 ALFA=0.334 WE= 2276.00 TOUT(MEAS)= 73.9, 73.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.8	8401	2058.0	20.9	70.8	0.710	12.850	6.21
OUTLET	73.6	8485	2055.9	18.4	69.9	0.709	12.829	7.06
MEAN	73.2	8443	2057.1	19.7	70.4	0.710	12.829	6.63

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	8411	6.27	72.9	87.0	173.7	306.0
4.5	8423	6.36	73.0	87.4	170.2	300.0
7.5	8438	6.46	73.1	87.6	168.8	298.0
11.0	8455	6.58	73.3	87.9	168.0	296.0
16.5	8481	6.79	73.6	88.2	168.0	296.0
21.0	8503	6.97	73.8	88.2	169.6	299.0
22.5	8511	7.03	73.9	88.4	168.6	297.0

TEST NO: S9.8 FLOW PATTERN:FROTH

ML= 3058 MG= 4.17 QFLUX= 4671 NUTP=184.0 HTP= 325 PDT= 2.852

PDF= 2.257 ALFA=0.401 WE= 2276.00 TOUT(MEAS)= 74.2, 74.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.9	8419	3132.0	22.1	70.7	0.710	12.850	8.95
OUTLET	73.8	8509	3128.5	19.3	69.7	0.709	12.830	10.25
MEAN	73.4	8464	3130.6	20.7	70.2	0.710	12.829	9.60

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	8430	9.05	73.0	87.1	187.6	331.0
4.5	8443	9.18	73.2	87.5	184.5	326.0
7.5	8459	9.33	73.3	87.8	182.9	323.0
11.0	8478	9.52	73.5	88.0	182.8	323.0
16.5	8508	9.84	73.8	88.2	183.7	324.0
21.0	8533	10.11	74.1	88.4	184.9	326.0
22.5	8541	10.20	74.2	88.5	185.1	326.0

TEST NO: S9.9 FLOW PATTERN:FROTH-ANNULAR

ML= 3058 MG= 6.28 QFLUX= 4670 NUTP=188.3 HTP= 332 PDT= 3.064

PDF= 2.534 ALFA=0.467 WE= 2276.00 TOUT(MEAS)= 74.1, 74.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	72.9	8419	4721.0	23.2	70.7	0.710	12.850	12.86
OUTLET	73.9	8509	4715.4	20.1	69.7	0.709	12.830	14.79
MEAN	73.4	8464	4718.6	21.7	70.2	0.710	12.829	13.82

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	8430	13.01	73.0	86.8	192.8	340.0
4.5	8444	13.20	73.2	87.2	188.8	333.0
7.5	8460	13.43	73.4	87.5	187.3	331.0
11.0	8479	13.71	73.5	87.7	187.1	330.0
16.5	8510	14.17	73.9	88.0	187.5	331.0
21.0	8535	14.58	74.1	88.1	189.6	334.0
22.5	8543	14.72	74.2	88.1	189.9	335.0

TEST NO: S9.10 FLOW PATTERN:FROTH-ANNULAR

ML= 3058 MG= 8.90 QFLUX= 4881 NUTP=192.7 HTP= 340 PDT= 3.312

PDF= 2.832 ALFA=0.518 WE= 2277.00 TOUT(MEAS)= 74.3, 74.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	73.1	8432	6686.0	24.5	70.6	0.710	12.850	17.23
OUTLET	74.0	8526	6676.8	21.2	69.5	0.709	12.830	19.87
MEAN	73.5	8479	6681.4	22.9	70.1	0.709	12.829	18.54

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	8444	17.43	73.2	87.2	197.2	348.0
4.5	8458	17.68	73.3	87.6	193.1	341.0
7.5	8475	18.00	73.5	88.0	190.7	337.0
11.0	8496	18.39	73.7	88.2	191.1	337.0
16.5	8528	19.02	74.0	88.4	192.4	339.0
21.0	8554	19.58	74.3	88.5	195.1	344.0
22.5	8562	19.77	74.4	88.6	194.9	344.0

TEST NO: S9.11 FLOW PATTERN:FROTH-ANNULAR

ML= 3058 MG= 13.07 QFLUX= 5041 NUTP=209.7 HTP= 370 PDT= 3.861

PDF= 3.431 ALFA=0.568 WE= 2280.00 TOUT(MEAS)= 75.3, 75.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	74.1	8532	9801.0	26.8	69.8	0.709	12.850	23.23
OUTLET	75.1	8630	9787.1	22.9	68.8	0.709	12.832	27.07
MEAN	74.6	8581	9794.1	24.9	69.3	0.709	12.831	25.13

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	8543	23.51	74.2	87.5	214.0	378.0
4.5	8558	23.88	74.3	88.0	209.3	369.0
7.5	8575	24.34	74.5	88.3	207.4	366.0
11.0	8595	24.90	74.7	88.4	208.3	368.0
16.5	8626	25.83	75.0	88.6	210.3	371.0
21.0	8652	26.64	75.3	88.8	211.8	374.0
22.5	8661	26.92	75.4	88.9	210.9	372.0

TEST NO: S9.12 FLOW PATTERN:ANNULAR

ML= 3058 MG= 18.17 QFLUX= 5206 NUTP=215.8 HTP= 381 PDT= 4.370

PDF= 3.980 ALFA=0.608 WE= 2283.00 TOUT(MEAS)= 76.3, 76.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	74.9	8615	13611.0	28.9	69.1	0.709	12.850	29.98
OUTLET	75.9	8716	13591.5	24.5	68.0	0.709	12.833	35.23
MEAN	75.4	8666	13601.6	26.7	68.6	0.709	12.832	32.58

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	8628	30.37	75.1	88.4	220.3	389.0
4.5	8644	30.87	75.2	88.8	216.2	382.0
7.5	8664	31.50	75.4	89.2	213.6	377.0
11.0	8686	32.26	75.6	89.4	213.9	377.0
16.5	8722	33.53	76.0	89.7	215.2	380.0
21.0	8751	34.65	76.3	89.8	218.9	386.0
22.5	8761	35.03	76.4	89.8	219.3	387.0

TEST NO: S9.13 FLOW PATTERN:ANNULAR

ML= 3058 MG= 25.00 QFLUX= 5765 NUTP=229.1 HTP= 404 PDT= 5.030

PDF= 4.671 ALFA=0.639 WE= 2283.00 TOUT(MEAS)= 76.4, 76.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.0	8624	18724.0	32.1	69.0	0.709	12.850	37.11
OUTLET	76.1	8737	18693.7	27.1	67.9	0.709	12.833	43.88
MEAN	75.6	8680	18708.9	29.6	68.5	0.709	12.832	40.45

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	8638	37.61	75.1	89.1	234.4	414.0
4.5	8655	38.25	75.3	89.5	229.7	405.0
7.5	8676	39.06	75.5	89.9	226.7	400.0
11.0	8700	40.03	75.8	90.2	226.5	400.0
16.5	8737	41.68	76.1	90.4	229.3	405.0
21.0	8768	43.12	76.5	90.5	232.3	410.0
22.5	8779	43.62	76.6	90.7	231.4	408.0

TEST NO: S9.14 FLOW PATTERN:ANNULAR

ML= 3058 MG= 38.31 QFLUX= 6184 NUTP=244.3 HTP= 431 PDT= 6.034

PDF= 5.714 ALFA=0.680 WE= 2280.00 TOUT(MEAS)= 75.1, 75.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	73.7	8496	28751.0	36.6	70.0	0.709	12.850	49.82
OUTLET	74.9	8615	28701.5	30.5	68.8	0.709	12.832	59.50
MEAN	74.3	8555	28726.7	33.6	69.4	0.709	12.831	54.58

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	8511	50.53	73.9	87.9	249.8	441.0
4.5	8529	51.44	74.1	88.3	246.2	435.0
7.5	8552	52.59	74.3	88.7	242.6	428.0
11.0	8578	53.98	74.5	89.0	242.1	427.0
16.5	8619	56.33	75.0	89.3	243.9	430.0
21.0	8653	58.40	75.3	89.6	245.7	434.0
22.5	8664	59.13	75.4	89.7	245.8	434.0

TEST NO: S9.15 FLOW PATTERN:ANNULAR

ML= 3058 MG= 66.35 QFLUX= 6750 NUTP=259.4 HTP= 458 PDT= 7.488

PDF= 7.213 ALFA=0.725 WE= 2285.00 TOUT(MEAS)= 76.7, 77.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.3	8651	49678.0	43.8	68.8	0.709	12.850	72.29
OUTLET	76.6	8782	49585.0	36.3	67.5	0.709	12.834	86.95
MEAN	75.9	8717	49631.9	40.0	68.2	0.709	12.833	79.49

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	8667	73.36	75.4	89.7	268.4	474.0
4.5	8686	74.74	75.6	90.1	263.2	465.0
7.5	8710	76.46	75.9	90.6	258.7	457.0
11.0	8737	78.57	76.1	91.0	257.7	455.0
16.5	8779	82.13	76.6	91.4	257.9	455.0
21.0	8815	85.28	76.9	91.7	258.5	456.0
22.5	8826	86.38	77.0	91.8	258.3	456.0

TEST NO: S10.1 FLOW PATTERN:BUBBLE

ML= 3958 MG= 0.07 QFLUX= 5061 NUTP=204.5 HTP= 361 PDT= 2.989

PDF= 2.009 ALFA=0.013 WE= 3821.00 TOUT(MEAS)= 75.7, 75.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	74.7	11120	52.1	20.6	69.3	0.709	16.629	0.16
OUTLET	75.5	11219	52.0	17.6	68.6	0.709	16.606	0.19
MEAN	75.1	11170	52.1	19.1	68.9	0.709	16.605	0.17

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	11131	0.16	74.8	88.8	204.5	361.0
4.5	11145	0.17	74.9	88.9	204.4	361.0
7.5	11162	0.17	75.0	89.1	202.9	358.0
11.0	11182	0.17	75.2	89.3	203.4	359.0
16.5	11213	0.18	75.4	89.4	204.8	361.0
21.0	11238	0.18	75.6	89.5	207.1	365.0
22.5	11246	0.19	75.7	89.6	205.8	363.0

TEST NO: S10.2 FLOW PATTERN:BUBBLE

ML= 3958 MG= 0.20 QFLUX= 5250 NUTP=211.8 HTP= 374 PDT= 3.056

PDF= 2.099 ALFA=0.036 WE= 3834.00 TOUT(MEAS)= 78.2, 78.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.4	11467	150.3	20.8	67.3	0.709	16.629	0.46
OUTLET	78.2	11570	150.1	17.8	66.8	0.709	16.611	0.54
MEAN	77.8	11518	150.2	19.3	67.0	0.709	16.610	0.50

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	11475	0.47	77.4	91.3	214.0	378.0
4.5	11485	0.48	77.5	91.5	213.1	376.0
7.5	11498	0.49	77.6	91.7	211.4	373.0
11.0	11513	0.50	77.7	91.8	211.3	373.0
16.5	11536	0.52	77.9	92.0	211.5	373.0
21.0	11554	0.53	78.1	92.1	211.9	374.0
22.5	11561	0.54	78.1	92.2	210.8	372.0

TEST NO: S10.3 FLOW PATTERN:BUBBLE

ML= 3958 MG= 0.48 QFLUX= 5398 NUTP=210.7 HTP= 372 PDT= 3.068

PDF= 2.154 ALFA=0.078 WE= 3835.00 TOUT(MEAS)= 78.4, 78.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.4	11467	355.5	21.0	67.3	0.709	16.629	1.09
OUTLET	78.2	11573	355.1	17.9	66.6	0.709	16.611	1.27
MEAN	77.8	11520	355.3	19.4	67.0	0.709	16.610	1.18

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	11478	1.10	77.5	91.8	212.8	376.0
4.5	11491	1.12	77.6	92.1	210.9	372.0
7.5	11507	1.14	77.7	92.3	209.7	370.0
11.0	11526	1.17	77.8	92.5	209.2	369.0
16.5	11556	1.21	78.1	92.6	210.9	372.0
21.0	11580	1.25	78.3	92.7	212.4	375.0
22.5	11588	1.26	78.3	92.8	211.5	373.0

TEST NO: S10.4 FLOW PATTERN:BUBBLE

ML= 3958 MG= 0.71 QFLUX= 5397 NUTP=214.5 HTP= 379 PDT= 3.163

PDF= 2.278 ALFA=0.108 WE= 3834.00 TOUT(MEAS)= 78.1, 78.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.1	11427	530.2	21.4	67.5	0.709	16.629	1.59
OUTLET	77.9	11533	529.6	18.2	66.8	0.709	16.611	1.86
MEAN	77.5	11480	529.9	19.8	67.2	0.709	16.610	1.72

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	11438	1.61	77.2	91.5	213.5	377.0
4.5	11452	1.64	77.3	91.5	214.9	379.0
7.5	11468	1.67	77.4	91.8	212.9	376.0
11.0	11488	1.71	77.6	91.8	213.7	377.0
16.5	11518	1.77	77.8	92.0	215.4	380.0
21.0	11543	1.83	78.0	92.1	215.9	381.0
22.5	11551	1.85	78.0	92.2	215.2	380.0

TEST NO: S10.5 FLOW PATTERN:BUBBLE-FROTH

ML= 3958 MG= 1.05 QFLUX= 5622 NUTP=218.8 HTP= 386 PDT= 3.247

PDF= 2.389 ALFA=0.135 WE= 3835.00 TOUT(MEAS)= 78.4, 78.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.4	11467	783.1	24.0	67.3	0.709	16.629	2.10
OUTLET	78.2	11577	782.2	20.7	66.6	0.709	16.611	2.42
MEAN	77.8	11522	782.6	22.4	67.0	0.709	16.610	2.25

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	11477	2.12	77.5	91.9	220.0	388.0
4.5	11491	2.15	77.6	92.1	219.2	387.0
7.5	11507	2.19	77.7	92.4	217.1	383.0
11.0	11526	2.24	77.8	92.5	217.2	383.0
16.5	11556	2.31	78.1	92.6	219.1	387.0
21.0	11580	2.38	78.3	92.6	221.4	391.0
22.5	11588	2.40	78.3	92.8	220.0	388.0

TEST NO: S10.6 FLOW PATTERN:BUBBLE-FROTH

ML= 3958 MG= 1.47 QFLUX= 5659 NUTP=221.6 HTP= 391 PDT= 3.324

PDF= 2.514 ALFA=0.184 WE= 3834.00 TOUT(MEAS)= 78.3, 78.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.3	11450	1093.0	22.6	67.4	0.709	16.629	3.11
OUTLET	78.1	11561	1092.6	19.2	66.7	0.709	16.611	3.64
MEAN	77.7	11505	1093.3	20.9	67.0	0.709	16.610	3.37

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	11461	3.15	77.3	91.6	224.8	397.0
4.5	11475	3.20	77.4	91.7	224.0	395.0
7.5	11492	3.26	77.6	92.0	222.6	393.0
11.0	11512	3.34	77.7	92.4	218.8	386.0
16.5	11543	3.47	78.0	92.5	220.6	389.0
21.0	11568	3.58	78.2	92.6	222.6	393.0
22.5	11577	3.62	78.2	92.7	222.3	392.0

TEST NO: S10.7 FLOW PATTERN:BUBBLE-FROTH

ML= 3958 MG= 2.04 QFLUX= 5965 NUTP=221.0 HTP= 390 PDT= 3.485

PDF= 2.719 ALFA=0.227 WE= 3833.00 TOUT(MEAS)= 78.0, 78.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.9	11410	1524.0	23.3	67.6	0.709	16.629	4.20
OUTLET	77.9	11527	1522.9	19.8	66.9	0.709	16.610	4.92
MEAN	77.4	11468	1523.9	21.5	67.3	0.709	16.609	4.56

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	11421	4.25	77.0	92.3	221.7	391.0
4.5	11436	4.32	77.1	92.4	221.3	391.0
7.5	11453	4.41	77.3	92.6	220.0	388.0
11.0	11473	4.51	77.4	92.8	219.4	387.0
16.5	11505	4.69	77.7	92.9	221.5	391.0
21.0	11531	4.84	77.9	93.0	222.7	393.0
22.5	11539	4.90	77.9	93.2	222.1	392.0

TEST NO: S10.8 FLOW PATTERN:FROTH

ML= 3958 MG= 2.83 QFLUX= 6058 NUTP=220.9 HTP= 390 PDT= 3.652

PDF= 2.933 ALFA=0.275 WE= 3826.00 TOUT(MEAS)= 76.8, 76.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.6	11234	2120.0	24.0	68.6	0.709	16.629	5.64
OUTLET	76.5	11352	2118.0	20.3	67.8	0.709	16.608	6.63
MEAN	76.0	11293	2119.4	22.2	68.2	0.709	16.607	6.13

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	11247	5.71	75.7	91.1	223.0	393.0
4.5	11264	5.81	75.8	91.3	221.3	391.0
7.5	11284	5.92	76.0	91.6	219.5	387.0
11.0	11307	6.07	76.1	91.8	219.2	387.0
16.5	11344	6.31	76.4	92.0	220.8	390.0
21.0	11375	6.52	76.7	92.0	223.8	395.0
22.5	11385	6.59	76.8	92.2	222.0	392.0

TEST NO: S10.9 FLOW PATTERN:FROTH

ML= 3958 MG= 4.22 QFLUX= 5811 NUTP=223.3 HTP= 394 PDT= 3.866

PDF= 3.208 ALFA=0.337 WE= 3834.00 TOUT(MEAS)= 78.2, 78.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.1	11432	3154.0	25.2	67.5	0.709	16.629	8.02
OUTLET	78.0	11547	3150.2	21.4	66.7	0.709	16.611	9.44
MEAN	77.6	11490	3152.2	23.3	67.1	0.709	16.610	8.72

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	11444	8.12	77.2	91.7	226.8	400.0
4.5	11459	8.26	77.3	92.0	224.2	396.0
7.5	11478	8.43	77.5	92.2	222.6	393.0
11.0	11499	8.63	77.6	92.4	222.5	393.0
16.5	11532	8.98	77.9	92.7	222.6	393.0
21.0	11559	9.28	78.1	92.8	224.5	396.0
22.5	11568	9.38	78.2	92.9	223.2	394.0

TEST NO: S10.10 FLOW PATTERN:FROTH

ML= 3958 MG= 6.27 QFLUX= 5583 NUTP=225.5 HTP= 398 PDT= 4.166

PDF= 3.571 ALFA=0.401 WE= 3836.00 TOUT(MEAS)= 78.6, 78.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.5	11478	4677.0	26.3	67.2	0.709	16.629	11.40
OUTLET	78.3	11588	4671.7	22.2	66.5	0.709	16.612	13.49
MEAN	77.9	11533	4674.6	24.3	66.9	0.709	16.611	12.43

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	11490	11.55	77.6	91.3	230.9	407.0
4.5	11505	11.75	77.7	91.6	227.3	401.0
7.5	11523	12.00	77.8	91.9	225.3	398.0
11.0	11544	12.30	78.0	92.1	224.6	396.0
16.5	11577	12.81	78.2	92.3	224.3	396.0
21.0	11604	13.25	78.4	92.5	225.6	398.0
22.5	11613	13.41	78.5	92.6	224.5	396.0

TEST NO: S10.11 FLOW PATTERN:FROTH

ML= 3958 MG= 9.34 QFLUX= 5579 NUTP=238.9 HTP= 422 PDT= 4.633

PDF= 4.096 ALFA=0.459 WE= 3834.00 TOUT(MEAS)= 78.3, 78.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.1	11432	6973.0	28.6	67.5	0.709	16.629	15.65
OUTLET	78.0	11542	6965.4	23.9	66.7	0.709	16.611	18.61
MEAN	77.5	11487	6969.7	26.3	67.1	0.709	16.610	17.11

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	11445	15.87	77.2	90.3	242.2	427.0
4.5	11460	16.15	77.3	90.5	239.1	422.0
7.5	11479	16.50	77.5	90.8	237.1	418.0
11.0	11501	16.92	77.6	91.0	237.3	419.0
16.5	11536	17.64	77.9	91.1	238.9	422.0
21.0	11564	18.27	78.1	91.2	241.0	425.0
22.5	11573	18.50	78.2	91.3	240.7	425.0

TEST NO: S10.12 FLOW PATTERN:FROTH

ML= 3958 MG= 13.07 QFLUX= 5824 NUTP=240.0 HTP= 424 PDT= 5.048

PDF= 4.554 ALFA=0.504 WE= 3830.00 TOUT(MEAS)= 77.4, 77.7

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.4	11341	9773.0	31.0	68.0	0.709	16.629	20.17
OUTLET	77.3	11455	9760.7	25.9	67.2	0.709	16.610	24.00
MEAN	76.9	11398	9766.9	28.5	67.6	0.709	16.609	22.06

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	11354	20.45	76.5	90.0	244.6	432.0
4.5	11370	20.81	76.6	90.2	242.3	428.0
7.5	11389	21.27	76.8	90.7	237.8	420.0
11.0	11411	21.82	77.0	90.8	238.2	420.0
16.5	11446	22.75	77.2	91.0	238.9	422.0
21.0	11475	23.57	77.4	91.1	242.3	428.0
22.5	11485	23.86	77.5	91.2	242.1	427.0

TEST NO: S10.13 FLOW PATTERN:FROTH

ML= 3958 MG= 18.23 QFLUX= 5866 NUTP=250.1 HTP= 441 PDT= 5.644

PDF= 5.192 ALFA=0.545 WE= 3839.00 TOUT(MEAS)= 79.1, 79.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	78.0	11551	13593.0	33.9	66.8	0.709	16.629	25.76
OUTLET	78.9	11666	13575.7	28.3	66.0	0.709	16.613	30.78
MEAN	78.5	11609	13584.4	31.1	66.4	0.709	16.612	28.23

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	11564	26.13	78.1	91.3	252.2	445.0
4.5	11580	26.61	78.3	91.6	248.5	439.0
7.5	11599	27.20	78.4	91.8	247.3	437.0
11.0	11622	27.92	78.6	92.0	248.0	438.0
16.5	11657	29.14	78.9	92.1	250.8	443.0
21.0	11686	30.21	79.1	92.1	254.7	450.0
22.5	11696	30.59	79.1	92.2	254.3	449.0

TEST NO: S10.14 FLOW PATTERN:FROTH-ANNULAR

ML= 3958 MG= 25.29 QFLUX= 5766 NUTP=254.3 HTP= 449 PDT= 6.377

PDF= 5.960 ALFA=0.580 WE= 3834.00 TOUT(MEAS)= 78.1, 78.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.1	11431	18883.0	37.9	67.5	0.709	16.629	31.98
OUTLET	78.0	11544	18859.9	31.5	66.6	0.709	16.611	38.31
MEAN	77.6	11488	18871.7	34.7	67.1	0.709	16.610	35.09

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	11445	32.44	77.2	89.9	256.9	453.0
4.5	11461	33.04	77.3	90.2	253.1	447.0
7.5	11481	33.78	77.5	90.5	251.6	444.0
11.0	11505	34.70	77.7	90.7	251.6	444.0
16.5	11541	36.23	78.0	90.8	254.9	450.0
21.0	11572	37.59	78.2	90.8	259.0	457.0
22.5	11582	38.07	78.3	90.9	258.4	456.0

TEST NO: S10.15 FLOW PATTERN:FROTH-ANNULAR

ML= 3958 MG= 38.88 QFLUX= 5865 NUTP=267.3 HTP= 472 PDT= 7.416

PDF= 7.043 ALFA=0.625 WE= 3842.00 TOUT(MEAS)= 79.4, 80.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	78.5	11613	28977.0	43.3	66.5	0.709	16.629	43.11
OUTLET	79.4	11728	28940.8	35.9	65.7	0.709	16.614	51.81
MEAN	78.9	11670	28959.2	39.6	66.1	0.709	16.613	47.38

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	11626	43.74	78.6	90.9	269.9	476.0
4.5	11643	44.56	78.7	91.2	266.9	471.0
7.5	11663	45.58	78.9	91.5	264.1	466.0
11.0	11687	46.84	79.1	91.6	264.4	467.0
16.5	11724	48.95	79.4	91.8	267.9	473.0
21.0	11754	50.82	79.6	91.8	272.0	480.0
22.5	11765	51.48	79.7	91.9	272.1	480.0

TEST NO: S10.16 FLOW PATTERN:FROTH-ANNULAR

ML= 3958 MG= 55.94 QFLUX= 5866 NUTP=281.9 HTP= 498 PDT= 8.512

PDF= 8.171 ALFA=0.658 WE= 3848.00 TOUT(MEAS)= 80.4, 81.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	79.6	11761	41625.0	49.5	65.7	0.709	16.629	54.33
OUTLET	80.5	11876	41572.4	41.0	64.9	0.709	16.616	65.33
MEAN	80.1	11818	41598.7	45.3	65.3	0.709	16.615	59.73

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	11773	55.13	79.7	91.2	288.6	509.0
4.5	11789	56.17	79.9	91.6	283.4	500.0
7.5	11808	57.46	80.0	91.9	279.5	493.0
11.0	11830	59.04	80.2	92.1	279.3	493.0
16.5	11865	61.71	80.4	92.2	281.7	497.0
21.0	11893	64.08	80.7	92.4	284.1	502.0
22.5	11902	64.91	80.7	92.4	284.9	503.0

TEST NO: S11.1 FLOW PATTERN:BUBBLE

ML= 5757 MG= 0.13 QFLUX= 7374 NUTP=282.4 HTP= 499 PDT= 5.059

PDF= 4.081 ALFA=0.014 WE= 8108.00 TOUT(MEAS)= 77.9, 77.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.9	16588	97.6	25.8	67.6	0.709	24.187	0.24
OUTLET	77.7	16733	97.5	20.8	67.0	0.709	24.160	0.30
MEAN	77.3	16660	97.5	23.3	67.3	0.709	24.158	0.27

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	16603	0.25	77.0	91.8	281.4	497.0
4.5	16621	0.25	77.1	91.9	281.1	496.0
7.5	16644	0.26	77.2	92.1	280.4	495.0
11.0	16670	0.27	77.3	92.1	282.2	498.0
16.5	16711	0.28	77.6	92.3	283.1	500.0
21.0	16745	0.29	77.7	92.4	285.1	503.0
22.5	16756	0.30	77.8	92.5	284.2	502.0

TEST NO: S11.2 FLOW PATTERN:BUBBLE

ML= 5757 MG= 0.24 QFLUX= 7372 NUTP=288.3 HTP= 509 PDT= 5.123

PDF= 4.156 ALFA=0.024 WE= 8105.00 TOUT(MEAS)= 77.5, 77.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.6	16538	179.8	26.0	67.8	0.709	24.187	0.44
OUTLET	77.4	16683	179.6	20.9	67.3	0.709	24.159	0.55
MEAN	77.0	16610	179.7	23.5	67.6	0.709	24.157	0.49

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	16551	0.45	76.7	91.1	289.2	510.0
4.5	16568	0.46	76.8	91.2	289.1	510.0
7.5	16589	0.47	76.9	91.4	287.4	507.0
11.0	16612	0.49	77.0	91.6	287.4	507.0
16.5	16649	0.51	77.2	91.7	288.3	509.0
21.0	16680	0.53	77.4	91.8	289.4	511.0
22.5	16690	0.54	77.4	92.0	287.8	508.0

TEST NO: S11.3 FLOW PATTERN:BUBBLE

ML= 5757 MG= 0.41 QFLUX= 7652 NUTP=289.8 HTP= 512 PDT= 5.154

PDF= 4.203 ALFA=0.041 WE= 8109.00 TOUT(MEAS)= 78.0, 77.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.0	16604	308.8	26.1	67.6	0.709	24.187	0.76
OUTLET	77.8	16755	308.4	21.0	66.9	0.709	24.160	0.94
MEAN	77.4	16679	308.6	23.6	67.3	0.709	24.159	0.84

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	16619	0.77	77.1	92.1	288.9	510.0
4.5	16639	0.79	77.2	92.2	289.0	510.0
7.5	16662	0.81	77.3	92.4	287.7	508.0
11.0	16688	0.83	77.4	92.4	289.4	511.0
16.5	16731	0.88	77.7	92.6	290.8	513.0
21.0	16765	0.92	77.8	92.7	292.3	516.0
22.5	16777	0.93	77.9	92.8	290.4	513.0

TEST NO: S11.4 FLOW PATTERN:BUBBLE

ML= 5757 MG= 0.57 QFLUX= 7652 NUTP=289.6 HTP= 511 PDT= 5.171

PDF= 4.233 ALFA=0.055 WE= 8110.00 TOUT(MEAS)= 78.0, 78.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.0	16612	428.0	26.3	67.6	0.709	24.187	1.04
OUTLET	77.8	16763	427.5	21.1	66.9	0.709	24.160	1.29
MEAN	77.4	16688	427.8	23.7	67.2	0.709	24.159	1.16

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	16628	1.06	77.1	92.0	290.3	512.0
4.5	16647	1.08	77.2	92.1	290.7	513.0
7.5	16670	1.11	77.3	92.4	287.3	507.0
11.0	16697	1.15	77.5	92.5	288.4	509.0
16.5	16739	1.21	77.7	92.7	289.8	512.0
21.0	16773	1.26	77.9	92.7	292.0	515.0
22.5	16785	1.28	77.9	92.8	291.3	514.0

TEST NO: S11.5 FLOW PATTERN:BUBBLE

ML= 5757 MG= 0.82 QFLUX= 7649 NUTP=292.7 HTP= 517 PDT= 5.277

PDF= 4.359 ALFA=0.075 WE= 8105.00 TOUT(MEAS)= 77.6, 77.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.6	16530	615.1	26.7	67.9	0.709	24.187	1.47
OUTLET	77.4	16680	614.4	21.4	67.3	0.709	24.159	1.83
MEAN	77.0	16605	614.8	24.1	67.6	0.709	24.157	1.65

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	16544	1.50	76.7	91.4	293.6	518.0
4.5	16562	1.53	76.8	91.3	297.1	524.0
7.5	16583	1.57	76.9	91.7	292.5	516.0
11.0	16608	1.62	77.0	91.9	290.3	512.0
16.5	16647	1.71	77.2	92.1	291.6	515.0
21.0	16679	1.79	77.4	92.1	293.8	519.0
22.5	16690	1.81	77.4	92.3	292.0	515.0

TEST NO: S11.6 FLOW PATTERN:BUBBLE

ML= 5757 MG= 1.17 QFLUX= 7847 NUTP=290.9 HTP= 513 PDT= 5.338

PDF= 4.446 ALFA=0.100 WE= 8110.00 TOUT(MEAS)= 78.0, 78.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.1	16621	870.7	27.1	67.5	0.709	24.187	2.06
OUTLET	77.9	16775	869.7	21.8	66.9	0.709	24.160	2.55
MEAN	77.5	16698	870.2	24.4	67.2	0.709	24.159	2.30

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	16636	2.09	77.2	92.4	290.6	513.0
4.5	16655	2.14	77.3	92.5	290.7	513.0
7.5	16678	2.20	77.4	92.8	287.5	507.0
11.0	16705	2.27	77.5	92.9	289.5	511.0
16.5	16747	2.38	77.8	93.0	292.1	516.0
21.0	16782	2.49	77.9	93.0	294.3	519.0
22.5	16793	2.53	78.0	93.2	292.6	516.0

TEST NO: S11.7 FLOW PATTERN:BUBBLE-FROTH

ML= 5757 MG= 1.65 QFLUX= 7805 NUTP=295.7 HTP= 522 PDT= 5.471

PDF= 4.609 ALFA=0.131 WE= 8117.00 TOUT(MEAS)= 78.6, 78.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.7	16745	1233.0	27.9	67.0	0.709	24.187	2.84
OUTLET	78.6	16899	1232.4	22.5	66.5	0.709	24.162	3.51
MEAN	78.1	16822	1233.1	25.2	66.8	0.709	24.161	3.16

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	16758	2.88	77.8	92.7	295.7	522.0
4.5	16774	2.95	77.9	92.8	297.2	525.0
7.5	16793	3.02	78.0	93.0	294.4	520.0
11.0	16816	3.12	78.1	93.0	295.9	522.0
16.5	16851	3.28	78.3	93.3	295.0	521.0
21.0	16880	3.43	78.4	93.3	297.0	524.0
22.5	16890	3.48	78.5	93.5	295.3	521.0

TEST NO: S11.8 FLOW PATTERN:BUBBLE-FROTH

ML= 5757 MG= 2.28 QFLUX= 7804 NUTP=299.9 HTP= 529 PDT= 5.670

PDF= 4.839 ALFA=0.163 WE= 8115.00 TOUT(MEAS)= 78.5, 78.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.5	16695	1705.0	29.1	67.2	0.709	24.187	3.76
OUTLET	78.3	16849	1703.9	23.5	66.5	0.709	24.162	4.64
MEAN	77.9	16772	1704.9	26.3	66.9	0.709	24.160	4.19

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	16711	3.82	77.6	92.4	298.6	527.0
4.5	16731	3.90	77.7	92.4	299.5	529.0
7.5	16755	4.00	77.8	92.6	298.2	526.0
11.0	16784	4.13	77.9	92.7	298.6	527.0
16.5	16828	4.34	78.2	92.9	300.4	530.0
21.0	16864	4.53	78.4	93.0	303.0	535.0
22.5	16876	4.60	78.4	93.1	301.7	533.0

TEST NO: S11.9 FLOW PATTERN:FROTH

ML= 5757 MG= 2.91 QFLUX= 7805 NUTP=302.3 HTP= 534 PDT= 5.838

PDF= 5.033 ALFA=0.189 WE= 8120.00 TOUT(MEAS)= 79.0, 78.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	78.0	16786	2167.0	30.4	66.9	0.709	24.187	4.59
OUTLET	78.8	16940	2164.7	24.5	66.2	0.709	24.163	5.65
MEAN	78.4	16863	2166.0	27.4	66.6	0.709	24.162	5.10

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	16802	4.66	78.0	92.7	301.7	533.0
4.5	16822	4.76	78.1	92.7	302.8	534.0
7.5	16845	4.88	78.3	93.0	301.0	531.0
11.0	16873	5.03	78.4	93.1	300.5	530.0
16.5	16916	5.29	78.6	93.3	302.6	534.0
21.0	16952	5.52	78.8	93.3	305.4	539.0
22.5	16964	5.60	78.9	93.4	303.8	536.0

TEST NO: S11.10 FLOW PATTERN:FROTH

ML= 5757 MG= 4.28 QFLUX= 7843 NUTP=307.2 HTP= 542 PDT= 6.172

PDF= 5.412 ALFA=0.233 WE= 8110.00 TOUT(MEAS)= 78.1, 78.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.0	16604	3197.0	32.9	67.6	0.709	24.187	6.22
OUTLET	77.8	16758	3194.1	26.8	66.9	0.709	24.160	7.62
MEAN	77.4	16681	3196.0	29.8	67.2	0.709	24.159	6.90

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	16621	6.32	77.1	91.6	306.0	540.0
4.5	16642	6.45	77.2	91.6	307.4	543.0
7.5	16667	6.61	77.3	91.9	304.6	538.0
11.0	16696	6.81	77.5	92.0	306.8	542.0
16.5	16742	7.15	77.7	92.2	307.4	543.0
21.0	16780	7.46	77.9	92.2	310.2	548.0
22.5	16793	7.56	78.0	92.4	309.1	546.0

TEST NO: S11.11 FLOW PATTERN:FROTH

ML= 5757 MG= 5.95 QFLUX= 8068 NUTP=318.4 HTP= 562 PDT= 6.519

PDF= 5.804 ALFA=0.279 WE= 8128.00 TOUT(MEAS)= 79.7, 79.5

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	78.6	16911	4436.0	34.7	66.4	0.709	24.187	8.24
OUTLET	79.5	17070	4431.6	28.1	65.7	0.709	24.165	10.10
MEAN	79.0	16990	4434.3	31.4	66.1	0.709	24.164	9.15

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	16927	8.38	78.7	93.1	317.7	561.0
4.5	16947	8.55	78.8	93.2	317.9	561.0
7.5	16971	8.76	78.9	93.4	316.8	559.0
11.0	16999	9.03	79.1	93.5	317.5	561.0
16.5	17044	9.48	79.3	93.6	319.0	563.0
21.0	17080	9.88	79.5	93.8	320.6	566.0
22.5	17092	10.03	79.6	93.9	320.0	565.0

TEST NO: S11.12 FLOW PATTERN:FROTH

ML= 5757 MG= 8.47 QFLUX= 8071 NUTP=321.1 HTP= 567 PDT= 7.086

PDF= 6.421 ALFA=0.330 WE= 8136.00 TOUT(MEAS)= 80.4, 80.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	79.3	17035	6305.0	36.9	65.9	0.709	24.187	11.02
OUTLET	80.1	17195	6297.4	29.9	65.3	0.709	24.167	13.56
MEAN	79.7	17115	6301.2	33.4	65.6	0.709	24.166	12.26

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	17052	11.20	79.4	93.5	322.6	569.0
4.5	17073	11.44	79.5	93.7	321.7	568.0
7.5	17099	11.73	79.6	94.0	317.9	561.0
11.0	17128	12.09	79.8	94.1	319.4	564.0
16.5	17175	12.71	80.0	94.2	321.2	567.0
21.0	17213	13.27	80.2	94.3	325.0	574.0
22.5	17225	13.46	80.3	94.4	323.6	571.0

TEST NO: S11.13 FLOW PATTERN:FROTH

ML= 5757 MG= 11.87 QFLUX= 7851 NUTP=325.1 HTP= 574 PDT= 7.707

PDF= 7.089 ALFA=0.377 WE= 8138.00 TOUT(MEAS)= 80.6, 80.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	79.4	17068	8831.0	39.9	65.8	0.709	24.187	14.29
OUTLET	80.3	17224	8821.2	32.2	65.1	0.709	24.168	17.62
MEAN	79.9	17146	8826.4	36.1	65.5	0.709	24.166	15.91

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	17085	14.53	79.5	93.2	326.0	575.0
4.5	17107	14.83	79.6	93.3	325.7	575.0
7.5	17133	15.22	79.8	93.5	323.1	570.0
11.0	17163	15.69	79.9	93.7	323.6	571.0
16.5	17211	16.50	80.2	93.9	324.8	573.0
21.0	17250	17.23	80.4	93.9	328.7	580.0
22.5	17263	17.48	80.5	94.1	327.3	578.0

TEST NO: S11.14 FLOW PATTERN:FROTH

ML= 5757 MG= 17.31 QFLUX= 7854 NUTP=333.2 HTP= 588 PDT= 8.484

PDF= 7.916 ALFA=0.428 WE= 8147.00 TOUT(MEAS)= 81.4, 81.3

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	80.3	17226	12871.0	44.1	65.2	0.709	24.187	18.91
OUTLET	81.1	17382	12856.4	35.6	64.5	0.709	24.171	23.29
MEAN	80.7	17304	12863.9	39.9	64.9	0.709	24.169	21.04

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	17243	19.22	80.4	93.7	333.9	590.0
4.5	17266	19.62	80.5	93.9	332.4	587.0
7.5	17292	20.13	80.6	94.1	331.1	585.0
11.0	17323	20.76	80.8	94.2	330.7	584.0
16.5	17372	21.82	81.1	94.4	333.9	590.0
21.0	17412	22.78	81.3	94.4	337.4	596.0
22.5	17425	23.12	81.3	94.5	337.0	595.0

TEST NO: S11.15 FLOW PATTERN:FROTH

ML= 5757 MG= 24.39 QFLUX= 7854 NUTP=342.9 HTP= 605 PDT= 9.231

PDF= 8.704 ALFA=0.470 WE= 8151.00 TOUT(MEAS)= 81.8, 81.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	80.6	17292	18125.0	49.2	65.0	0.709	24.187	23.90
OUTLET	81.4	17448	18104.1	39.9	64.3	0.708	24.172	29.28
MEAN	81.0	17370	18114.6	44.6	64.6	0.709	24.170	26.53

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	17310	24.29	80.7	93.8	341.0	602.0
4.5	17332	24.79	80.8	93.9	341.2	602.0
7.5	17359	25.41	81.0	94.1	337.7	596.0
11.0	17390	26.18	81.1	94.2	340.9	602.0
16.5	17439	27.49	81.4	94.3	344.0	607.0
21.0	17479	28.66	81.6	94.3	350.3	618.0
22.5	17492	29.07	81.7	94.4	350.5	619.0

TEST NO: S12.1 FLOW PATTERN:BUBBLE

ML= 7196 MG= 0.15 QFLUX= 8251 NUTP=347.0 HTP= 613 PDT= 7.121

PDF= 6.140 ALFA=0.011 WE= 12660.00 TOUT(MEAS)= 77.3, 77.2

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.4	20610	113.7	31.1	68.0	0.709	30.234	0.23
OUTLET	77.1	20772	113.6	24.0	67.4	0.709	30.197	0.30
MEAN	76.7	20691	113.6	27.6	67.7	0.709	30.196	0.27

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	20628	0.24	76.4	90.0	344.4	608.0
4.5	20649	0.24	76.5	90.0	346.7	612.0
7.5	20675	0.25	76.6	90.2	345.2	609.0
11.0	20706	0.26	76.8	90.3	345.5	610.0
16.5	20753	0.28	77.0	90.4	347.3	613.0
21.0	20793	0.29	77.1	90.5	351.1	620.0
22.5	20806	0.30	77.2	90.6	349.5	617.0

TEST NO: S12.2 FLOW PATTERN:BUBBLE

ML= 7196 MG= 0.26 QFLUX= 8254 NUTP=347.3 HTP= 613 PDT= 7.152

PDF= 6.178 ALFA=0.018 WE= 12670.00 TOUT(MEAS)= 77.9, 77.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.9	20735	193.3	31.2	67.6	0.709	30.234	0.40
OUTLET	77.6	20897	193.1	24.1	66.9	0.709	30.200	0.51
MEAN	77.3	20816	193.2	27.7	67.3	0.709	30.198	0.45

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	20755	0.40	77.0	90.6	343.8	607.0
4.5	20780	0.41	77.1	90.6	345.9	611.0
7.5	20810	0.43	77.2	90.8	344.9	609.0
11.0	20845	0.44	77.4	90.9	346.5	612.0
16.5	20900	0.47	77.6	91.0	348.3	615.0
21.0	20945	0.50	77.8	91.1	351.9	621.0
22.5	20960	0.51	77.9	91.2	349.4	617.0

TEST NO: S12.3 FLOW PATTERN:BUBBLE

ML= 7196 MG= 0.39 QFLUX= 8253 NUTP=348.8 HTP= 616 PDT= 7.323

PDF= 6.358 ALFA=0.027 WE= 12669.00 TOUT(MEAS)= 77.8, 77.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.9	20724	290.7	31.3	67.7	0.709	30.234	0.60
OUTLET	77.6	20886	290.4	23.9	67.0	0.709	30.199	0.77
MEAN	77.2	20805	290.6	27.6	67.4	0.709	30.198	0.68

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	20743	0.61	76.9	90.4	346.6	612.0
4.5	20766	0.62	77.0	90.4	350.6	619.0
7.5	20794	0.64	77.2	90.6	347.0	613.0
11.0	20827	0.67	77.3	90.8	347.0	613.0
16.5	20879	0.71	77.5	90.9	349.5	617.0
21.0	20921	0.75	77.7	91.0	351.4	620.0
22.5	20935	0.76	77.8	91.1	349.9	618.0

TEST NO: S12.4 FLOW PATTERN:BUBBLE

ML= 7196 MG= 0.57 QFLUX= 8231 NUTP=349.5 HTP= 617 PDT= 7.210

PDF= 6.256 ALFA=0.038 WE= 12671.00 TOUT(MEAS)= 77.9, 77.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.9	20745	428.4	31.4	67.6	0.709	30.234	0.87
OUTLET	77.6	20907	428.0	24.2	66.9	0.709	30.200	1.12
MEAN	77.3	20826	428.2	27.8	67.3	0.709	30.198	0.99

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	20765	0.89	77.0	90.5	346.3	611.0
4.5	20789	0.91	77.1	90.5	348.8	616.0
7.5	20818	0.94	77.3	90.6	348.1	615.0
11.0	20853	0.98	77.4	90.8	347.5	613.0
16.5	20907	1.04	77.6	90.9	350.8	619.0
21.0	20951	1.09	77.8	91.0	353.0	623.0
22.5	20966	1.11	77.9	91.1	353.0	623.0

TEST NO: S12.5 FLOW PATTERN:BUBBLE

ML= 7196 MG= 0.80 QFLUX= 8252 NUTP=350.9 HTP= 619 PDT= 7.232

PDF= 6.291 ALFA=0.052 WE= 12667.00 TOUT(MEAS)= 77.7, 77.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.7	20693	594.4	31.6	67.8	0.709	30.234	1.20
OUTLET	77.4	20855	593.8	24.4	67.1	0.709	30.199	1.55
MEAN	77.1	20774	594.1	28.0	67.4	0.709	30.197	1.37

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	20712	1.23	76.8	90.0	353.2	624.0
4.5	20736	1.26	76.9	90.2	350.5	619.0
7.5	20765	1.30	77.0	90.4	348.4	615.0
11.0	20798	1.35	77.2	90.6	348.8	616.0
16.5	20851	1.43	77.4	90.7	351.2	620.0
21.0	20894	1.51	77.6	90.8	354.7	626.0
22.5	20909	1.54	77.6	90.9	353.5	624.0

TEST NO: S12.6 FLOW PATTERN:BUBBLE

ML= 7196 MG= 1.14 QFLUX= 8316 NUTP=349.0 HTP= 616 PDT= 7.333

PDF= 6.410 ALFA=0.071 WE= 12656.00 TOUT(MEAS)= 77.1, 77.1

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.1	20538	852.2	32.1	68.3	0.709	30.234	1.69
OUTLET	76.8	20701	851.4	24.8	67.5	0.709	30.197	2.18
MEAN	76.4	20620	851.8	28.5	67.9	0.709	30.195	1.93

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	20559	1.73	76.1	89.7	346.6	612.0
4.5	20586	1.77	76.3	89.8	347.1	613.0
7.5	20618	1.82	76.4	90.0	345.7	610.0
11.0	20655	1.89	76.6	90.1	347.1	613.0
16.5	20714	2.01	76.8	90.3	350.3	618.0
21.0	20762	2.12	77.0	90.3	355.1	627.0
22.5	20778	2.16	77.1	90.4	353.0	623.0

TEST NO: S12.7 FLOW PATTERN:BUBBLE

ML= 7196 MG= 1.59 QFLUX= 8226 NUTP=352.5 HTP= 622 PDT= 7.440

PDF= 6.540 ALFA=0.093 WE= 12654.00 TOUT(MEAS)= 76.9, 77.0

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.0	20517	1191.0	32.9	68.3	0.709	30.234	2.31
OUTLET	76.7	20678	1190.4	25.5	67.6	0.709	30.196	2.97
MEAN	76.3	20598	1191.0	29.2	68.0	0.709	30.194	2.63

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	20537	2.36	76.1	89.4	349.1	616.0
4.5	20562	2.42	76.2	89.4	351.1	620.0
7.5	20592	2.49	76.3	89.6	349.4	617.0
11.0	20627	2.58	76.4	89.7	351.6	621.0
16.5	20682	2.74	76.7	89.8	353.7	624.0
21.0	20727	2.89	76.9	89.9	357.2	631.0
22.5	20742	2.94	76.9	90.0	355.5	628.0

TEST NO: S12.8 FLOW PATTERN:BUBBLE-FROTH

ML= 7196 MG= 2.22 QFLUX= 8270 NUTP=356.1 HTP= 629 PDT= 7.612

PDF= 6.737 ALFA=0.118 WE= 12654.00 TOUT(MEAS)= 77.0, 76.9

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.9	20507	1658.0	34.3	68.4	0.709	30.234	3.09
OUTLET	76.6	20669	1657.2	26.6	67.6	0.709	30.196	3.95
MEAN	76.3	20588	1658.0	30.4	68.0	0.709	30.194	3.51

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	20528	3.15	76.0	89.3	351.8	621.0
4.5	20555	3.23	76.1	89.4	353.1	623.0
7.5	20587	3.33	76.3	89.5	353.3	624.0
11.0	20624	3.45	76.4	89.7	354.1	625.0
16.5	20683	3.66	76.7	89.7	358.7	633.0
21.0	20731	3.85	76.9	89.8	361.4	638.0
22.5	20747	3.91	76.9	90.0	359.8	635.0

TEST NO: S12.9 FLOW PATTERN:BUBBLE-FROTH

ML= 7196 MG= 2.83 QFLUX= 8268 NUTP=360.3 HTP= 636 PDT= 7.772

PDF= 6.919 ALFA=0.140 WE= 12647.00 TOUT(MEAS)= 76.6, 76.6

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	75.5	20414	2118.0	35.5	68.7	0.709	30.234	3.80
OUTLET	76.2	20576	2116.0	27.7	67.9	0.709	30.195	4.84
MEAN	75.9	20495	2117.0	31.6	68.3	0.709	30.193	4.30

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	20436	3.87	75.6	88.8	355.1	627.0
4.5	20462	3.97	75.7	88.9	356.4	629.0
7.5	20494	4.09	75.9	89.0	357.2	631.0
11.0	20531	4.23	76.0	89.1	359.0	634.0
16.5	20590	4.48	76.3	89.2	362.7	640.0
21.0	20638	4.71	76.5	89.3	366.4	647.0
22.5	20654	4.80	76.6	89.4	364.4	643.0

TEST NO: S12.10 FLOW PATTERN:FROTH

ML= 7196 MG= 4.63 QFLUX= 8273 NUTP=366.1 HTP= 646 PDT= 8.162

PDF= 7.356 ALFA=0.188 WE= 12669.00 TOUT(MEAS)= 77.9, 77.8

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	76.7	20693	3460.0	39.3	67.8	0.709	30.234	5.64
OUTLET	77.4	20856	3456.7	31.1	67.0	0.709	30.199	7.08
MEAN	77.1	20774	3458.5	35.2	67.4	0.709	30.197	6.34

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	20716	5.74	76.8	89.8	360.4	636.0
4.5	20744	5.88	76.9	89.9	362.0	639.0
7.5	20778	6.04	77.1	90.1	360.7	637.0
11.0	20818	6.24	77.3	90.1	363.9	643.0
16.5	20881	6.60	77.5	90.2	368.9	651.0
21.0	20932	6.91	77.7	90.2	374.7	662.0
22.5	20949	7.03	77.8	90.4	373.0	659.0

TEST NO: S12.11 FLOW PATTERN:FROTH

ML= 7196 MG= 6.41 QFLUX= 8296 NUTP=375.3 HTP= 663 PDT= 8.555

PDF= 7.787 ALFA=0.226 WE= 12680.00 TOUT(MEAS)= 78.5, 78.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.4	20849	4782.0	41.8	67.3	0.709	30.234	7.34
OUTLET	78.1	21012	4777.5	33.3	66.5	0.709	30.202	9.17
MEAN	77.7	20930	4779.9	37.5	66.9	0.709	30.200	8.23

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	20871	7.47	77.5	90.2	370.2	654.0
4.5	20899	7.63	77.6	90.2	372.1	657.0
7.5	20932	7.84	77.7	90.4	370.3	654.0
11.0	20971	8.10	77.9	90.5	373.3	659.0
16.5	21032	8.55	78.2	90.6	378.7	669.0
21.0	21083	8.95	78.4	90.7	382.0	674.0
22.5	21099	9.10	78.4	90.8	379.9	671.0

TEST NO: S12.12 FLOW PATTERN:FROTH

ML= 7196 MG= 11.75 QFLUX= 8294 NUTP=386.8 HTP= 683 PDT= 9.767

PDF= 9.074 ALFA=0.302 WE= 12678.00 TOUT(MEAS)= 78.4, 78.4

	TMIX	RESL	RESG	P	PRL	PRG	VSL	VSG
INLET	77.3	20817	8771.0	48.1	67.4	0.709	30.234	11.68
OUTLET	77.9	20980	8762.6	38.4	66.6	0.709	30.201	14.57
MEAN	77.6	20899	8767.0	43.3	67.0	0.709	30.199	13.09

Z	RESL	VSG	TBULK	TWALL	NUTP	HTP
2.0	20840	11.89	77.4	89.7	381.1	673.0
4.5	20869	12.15	77.5	89.7	384.2	678.0
7.5	20904	12.48	77.6	89.9	381.9	674.0
11.0	20945	12.90	77.8	90.0	383.6	677.0
16.5	21009	13.60	78.1	90.1	388.9	687.0
21.0	21061	14.23	78.3	90.2	395.8	699.0
22.5	21078	14.46	78.4	90.2	395.8	699.0