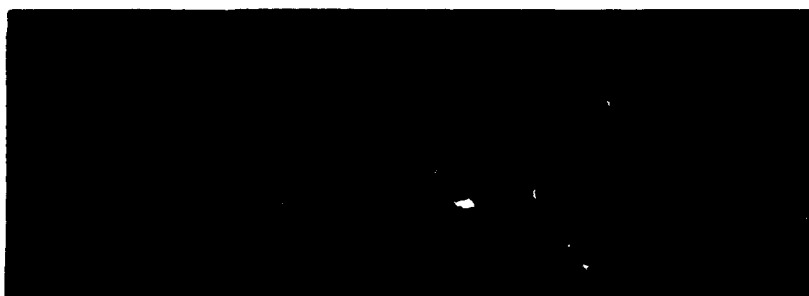


BR9023947



Info input  
MF prepare

**CENTRO DE DESENVOLVIMENTO DA TECNOLOGIA NUCLEAR**

CAIXA POSTAL, 1941 - 30161 - BELO HORIZONTE - BRASIL

ANALYSIS OF DISCHARGE DESIGNS AND REQUIRED DISTANCE  
FROM OUTFALL TO INTAKE FOR THE IGUAPE NUCLEAR POWER  
STATION, UNITS 1 AND 2

Rubens Martins Moreira

Divisão de Engenharia Ambiental  
- NUCLEBRÁS/CDTN -

CDTN - DERL.PD-001/83

- Janeiro/1983 -

*RM*

## LISTA DE DISTRIBUIÇÃO

Exemplar nº	1	-	NUCLEN
Exemplar nº	2	-	NUCLEN
Exemplar nº	3	-	GDAF
Exemplar nº	4	-	AESP.PR
Exemplar nº	5	-	SUPED
Exemplar nº	6	-	DERL.PD
Exemplar nº	7	-	DIEAM.PD
Exemplar nº	8	-	DIEAM.PD

*mmj*

## CONTENTS

	PAGE
1. DISCHARGE DESIGNS	1.
1.1 Design A	3.
1.2 Design B	3.
1.3 Design C	3.
2. AMBIENT CONDITIONS	5.
2.1 Ambient Current	5.
2.2 Ambient Water Temperature	6.
2.3 Surface Heat Exchange	6.
2.4 Ambient Dispersion	6.
2.5 Tide	7.
3. MATHEMATICAL ANALYSIS	8.
3.1 Near Field Analysis	8.
3.1.1 Design A	8.
3.1.2 Design B	9.
3.1.3 Design C	9.

*mu*

3.2	Far Field Analysis	9.
3.3	Intake Analysis	10.
3.4	Decision Variables	11.
4.	COMPUTER PRINT-OUT	14.
5.	RESULTS	16.
5.1	Results for $\Delta T = 7.5^{\circ}\text{C}$ Inside Condenser	17.
5.1.1	Design (A)	17.
5.1.2	Design (B)	18.
5.2	Results for $\Delta T = 8.0^{\circ}\text{C}$ Inside Condenser	19.
5.2.1	Design (A)	19.
5.2.2	Design (B)	19.
5.2.3	Design (C)	20.
5.2	Comments and Conclusions	24.
6.	ACKNOWLEDGEMENT	26.
7.	REFERENCES	27.
	APPENDIX A.1 - COMPUTER PRINT-OUTS FOR DESIGN (A)	29.

*mu*

**APPENDIX A.2 - COMPUTER PRINT-OUTS FOR DESIGN (B) 72.**

**APPENDIX A.3 - COMPUTER PRINT-OUTS FOR DESIGN (C) 115.**

*AMJ*

ANALYSIS OF DISCHARGE DESIGNS AND REQUIRED DISTANCE FROM OUTFALL  
TO INTAKE FOR THE IGUAPE NUCLEAR POWER STATION, UNITS 1 AND 2

1.           DISCHARGE DESIGNS

Three basic designs were considered: (A) an offshore single-port discharge through a surface canal; (B) an offshore single-port discharge through a submerged conduit; and (C) an offshore multiple-port discharge through one or more submerged conduits. These are illustrated in Fig. 1.

For each design it is assumed that:

a) Total discharge flow:

One unit operating (1U):  $Q_o = 80 \text{ m}^3/\text{s}$ ;

Two units operating (2U):  $Q_o = 160 \text{ m}^3/\text{s}$ .

b) Discharge temperature rise above ambiente:

$\Delta T_o = 8.5^\circ\text{C}$ ; or

$\Delta T_o = 9.0^\circ\text{C}$ .

Which accounts for the condenser temperature rise of either  $7.5^\circ\text{C}$  or  $8.0^\circ\text{C}$  plus  $1^\circ\text{C}$  recirculation.

Operation with only one unit could occur in the interim before the second unit has been completed or during outage of one of the two units. If the discharge flow is regulated so that the exit velocity is constant and independent of variations in the flow rate (e.g., by a system of gates), mixing with one unit will be somewhat better than with two units making the latter the more conservative condition. If an appropriate control structure is not contemplated and the discharge velocity is not maintained constant, the comparison above may not be valid and an a thorough analysis with one unit should be performed in the future.

*msj*

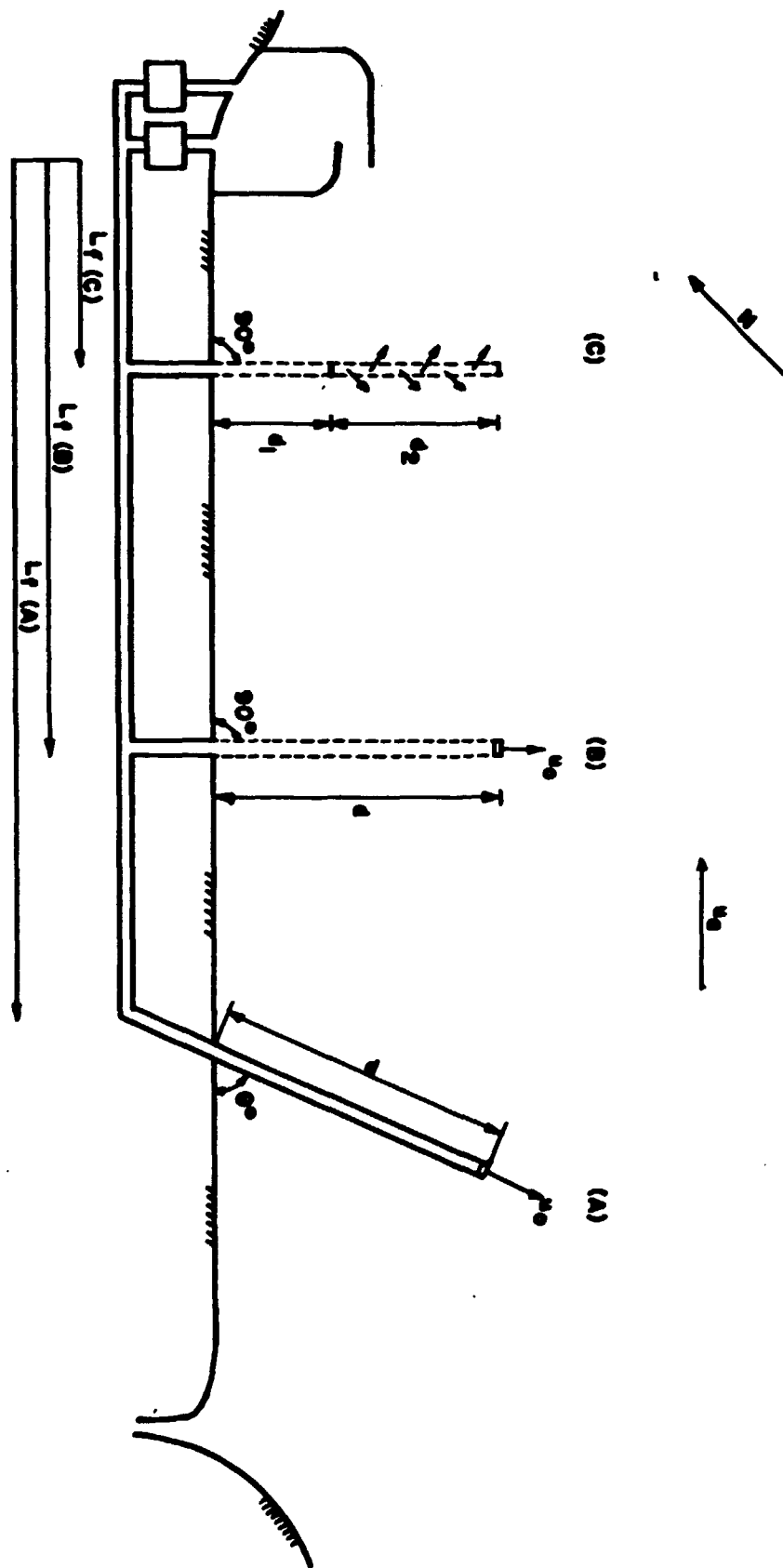


FIG. 1 - DISCHARGE DESIGNS

*mm*



### 1.1 Design A

Considered as a base-line because construction is easiest. However the small bottom slope, coupled with blockage of ambient currents by the jetties, will significantly reduce dilution in comparison with remaining designs. Another disadvantage concerns possible bathymetric changes created by sediment erosion and deposition.

### 1.2 Design B

This concept is similar to (A) except for the conveyance structure; the submerged conduit will allow both ambient current and sediment to pass over it thus minimizing local plume re-entrainment and sediment disruption. A submerged structure is expected to be more expensive than a surface canal. However, the better mixing should allow shorter separation lengths  $L$  (to achieve the same intake temperature) thus saving some costs and reducing potential impact on the Rio Verde region to the south. An additional advantage of a submerged conduit is the increased siting flexibility if a 3<sup>rd</sup> and a 4<sup>th</sup> unit are ever built.

### 1.3 Design C

This is a multi-port diffuser. In one option a submerge pipe, similar to design (B) would be used; however, by discharging flow through a number of ports or risers distributed over the offshore section of length  $d_2$ , better dilution can be obtained. A design with  $\theta_0 = 90^\circ$  and with nozzles pointing offshore has been shown to provide better dilution than other diffuser configurations under conditions of strong bi-directional currents

For the present calculations the distance from the shoreline to the first nozzle  $d_1$ , has been set at 400 m to

*mmj*

transport the flow outside the surf zone. The number of nozzles, and their exact elevation and angle relative to the diffuser axis and to the sea bottom, are variables which have a minor effect on the dilution and can be determined at a later date based on cost, desire to minimize scour, and other design objectives.

Primary variables and the range of variation which are considered are shown in Table 1.

Table 1 - Discharge variables

Variable	Design (A)	Design (B)	Design (C)
Discharge-intake distance (L)	0-4000m	0-2000m	0-2000m
Total outfall length (d)	400, 600, 800m	400, 600, 800m	600, 800, 1000m
Diffuser section length ( $d_2$ )	—	—	200, 400, 600m
Discharge angle ( $\theta_0$ )	$60^\circ$ *	$90^\circ$	$90^\circ$
Discharge exit velocity ( $v_0$ )	1, 2, 3, 4m/s	1, 2, 3, 4m/s	1, 2, 3, 4m/s

\* - Jetties inclined toward Juréia mountains.

One disadvantage of either design (B) or (C) is the large cross-sectional area required of the conduit, on account of the large flow rates and limited velocities. An alternative for design (C) would be to use a number of smaller pipes terminating at different distances ranging from  $d_1$  to  $d = d_1 + d_2$  from the shore. The ends of the pipes could be outfitted with nozzles to accelerate and direct the flow at small angles from the ground or from the diffuser line.

## 2. AMBIENT CONDITIONS

Conditions most likely to lead to intake recirculation during summer are considered.

### 2.1 Ambient Current

Steady, uniform currents, parallel to the shoreline and directed from Juréia to Grajaúna, are considered. Simulations have shown that high speed currents can be more critical when designs (A) and (B) are considered, whereas the best performance of staged diffusers (design C) is obtained with strong currents. Thus, the following ambient current speeds have been considered:

Design (A) and (B):  $\mu_a = 0.2$  and  $0.6$  m/s;

Design (C):  $\mu_a = 0.1, 0.2$  and  $0.6$  m/s.

It has been assumed that the  $0.2 - 0.6$  m/s range covers both the realistic and conservative values for designs (A) and (C) and  $\mu_a = 0.1$  m/s accounts for a conservative condition in case of design (C). These speeds are representative of measurements which have been taken offshore from the site and are conservative in the sense that prevailing currents in the summer are to the south. Furthermore, data collected so far indicate that highest ambient water temperatures, when intake recirculation could be most critical, are correlated with southerly currents. Such correlations will continue to be explored as future data are collected. It can be noted that by considering only steady currents, periods of calms and current reversals have not been accounted for. Time series analysis will be performed on past and future current measurements to see how frequently, and with what persistence, these conditions occur. If necessary, a transient analysis will be performed based on measurement records.

*mmj*

## 2.2 Ambient Water Temperature

The analysis solves for plume excess temperature (temperature rise above ambient) assuming that ambient temperature is spatially uniform. The analysis does not depend on the specific ambient temperature (except through the dependence of density on temperature), but an ambient temperature of ca 29°C is implied. With an allowance for 1°C due to recirculation, the intake temperature would become 30°C.

## 2.3 Surface Heat Exchange

A surface heat exchange coefficient of  $K = 1000 \text{ kcal/m}^2\text{-}^\circ\text{C} - \text{day}$  was computed based on summertime meteorological data. The corresponding kinematic coefficient,  $k = K/\rho c$ , is  $1.2 \times 10^{-5} \text{ m/s}$  where  $\rho = \text{density}$  and  $c = \text{specific heat of water}$ . This is the same value that has been used in previous analyses by CDTN (1, 2, 3) and it should be noted that surface heat exchange plays a relative minor role in reducing intake temperature.

## 2.4 Ambient Dispersion

Lateral diffusion (normal to the shoreline) is assumed to obey a "4/3" law of the form:

$$D = A \sigma^{4/3} \quad (1)$$

where  $\sigma = \text{the standard deviation of the lateral plume concentration distribution}$  and  $D = \text{a lateral diffusion coefficient}$ . The coefficient  $A$  was set to  $3 \times 10^{-3} \text{ m}^{2/3}/\text{s}$ , which is typical of a wide range of reported dispersion experiments (4), and is consistent with values found by CDTN (5) in field experiments near the Bay of Santos. Since most

*mmj*

experiments reported in the literature were performed farther offshore and this may have an influence on the exponent of the above equation, field measurements will be made at the site, close to the expected plume location to see if the relationship is appropriate.

## 2.5 Tide

In analysing intake performance, low tide is considered because the lower water level would provide less cold water (a conservative condition). In analysing discharge mixing, high water level is considered because at this stage the discharge velocity attains its lowest value for design (A) and has not an influence of the same magnitude on designs (B) and (C).

### 3. MATHEMATICAL ANALYSIS

#### 3.1 Near Field Analysis

A N.F. analysis was used to provide the following boundary conditions for the far field:

- distance from shoreline,  $Y_c$ ;
- uniform plume depth,  $h_L$ ;
- standard deviation of the lateral temperature distribution,  $\sigma_o$  (a Gaussian distribution was assumed).

Different analysis were used for designs (A), (B) and (C).

##### 3.1.1 Design (A)

Conditions were analysed using the MIT surface Jet Model, also used in the previous computations (1, 2, 3). Jet-bottom interaction and plume attachment effects have been accounted for. The bottom impact, which reduces the free-jet dilution capacity, has been estimated in the same way as in the previous computations (1, 2, 3). In addition to this effect, some lateral recirculation in the lee of the jet is expected to occur because the discharge jetties will obstruct the ambient current. In a strong cross-flow it is estimated that about 2/3 of the entrainment occurs on the outside (or windward) side and 1/3 occurs on the inside (or leeward) side. In the present calculations, it is assumed that the inside portion is completely re-entrained due to the plume attachment.

*RMJ*

### 3.1.2 Design (B)

The NF performance of design (B) is expected to be similar to that of design (A) except that with (B), no lateral re-entrainment should occur, thus, the correction for re-entrainment was deleted in the computations for this design.

### 3.1.3 Design (C)

The NF dilution achieved by the staged diffuser is evaluated using the model of Almquist and Stolzenbach (6), with the inclusion of the effect of ambient currents following Brocard (7, 8). Staged diffusers are strongly dependent on ambient current (much more than would be expected for designs (A) or (B)). Besides, current action favours dilution in staged diffusers (as opposite to the other designs considered).

## 3.2 Far Field Analysis

The FF is considered to be that region over which ambient processes—rather than discharge momentum and buoyancy—are responsible for plume transport and mixing. A simple steady-state model is assumed:

$$\mu_a \frac{\partial \Delta T}{\partial x} = D \frac{\partial^2 \Delta T}{\partial x^2} - \frac{k \Delta T}{h_L} \quad (2)$$

where  $\Delta T$  = temperature rise above ambient,  $\mu_a$  = ambient current velocity (assumed parallel to shore),  $D$  = lateral dispersion coefficient,  $k$  = kinematic surface heat exchange coefficient and  $x$  = longitudinal (alongshore) coordinate. The source condition at  $x = 0$  is a Gaussian plume with thickness  $h_L$ , lateral standard deviation  $\sigma_0$  and distance from shore  $y_p$ , whose values are obtained by the NF analysis.

To provide a condition of plume reflection (no-flux) at the shoreline, the method of images is used. The lateral dispersion coefficient  $D$  is assumed to vary with distance  $X$ , since it is controlled by the variation of the standard deviation of the lateral plume concentration distribution  $\sigma(x)$ .

Inasmuch as the FF model is steady state is does not account for periods of calm and reversing currents. If an analysis of current meter data suggests that these conditions are important, a transient model will be applied to the time series of current speeds.

### 3.3 Intake Analysis

The intake is located at a distance  $x = L_f$  downstream from the discharge (the distance  $L_f$  is a design variable to be determined). The depth of the ocean at the intake location (NUCON, drawing UE27491XU, Preliminary Cooling Water Lay-out - Part 1) is estimated to be  $h_i = 5.5$  m. Since the plume depths  $h_L$  predicted by the NF model are usually smaller than 5.5 m, the intake water temperature is expected to reflect a weighted average of warm water drawn over the upper depth  $h_L$  and ambient water drawn over the lower depth ( $h_i - h_L$ ). To consider worst case conditions where the current is oriented directly toward the intake, the maximum surface temperature obtained by the solution of Equation (2) is considered. Thus a conservative estimate for intake temperature  $\Delta T_i$  is:

$$\Delta T_i (L_f) = \frac{h_i \cdot \max [\Delta T(L_f, Y)]}{h_i} \quad (3)$$

*mmj*



### 3.4 Decision Variables

Once the temperature distribution in the FF and the location of the intake are known, the intake water temperature can be estimated. Since the intake position is fixed, the separation between discharge and intake positions ( $L_f$ ) can be established by moving the outfall to a distance such that the resulting FF temperature increment at the intake would be  $\Delta T_1(L_f) \leq 1^\circ\text{C}$ .

Nevertheless, considering that:

a) The flow field in the vicinity of the intake will be distorted by the intake structure (jetties to create a protection basin and harbour);

b) The upper water layers might be deflected shorewards by winds;

and these phenomena are not accounted for in the model, it is necessary to establish a criterion for the value of  $\Delta T_1$  to be taken. In the discussion to follow, one assumed a system of coordinates with origin at the point where the outfall structure crosses the shoreline, the OX axis being coincident with the shoreline (x increases in the direction of the intake), and the OY axis pointing offshore.

1<sup>st</sup> Criterion: the lines of flux closest to the shoreline will be deflected away from the shore, and simultaneously will be contracted, by the influence of both the intake structure and the Grajaúna headland. The ocean water flow-rate through the protection basin opening must equal the cooling water flow-rate through the condensers. It may be assumed that the ocean water to be captured is that one flowing in the closest vicinity of the shoreline. Now, the ocean has an approximately constant 1:100 slope close to the shoreline. Thus the ingoing water flux is that flowing through a triangular cross-section with width:

*mm*

$$Y_{div} = \sqrt{\frac{2Q_0}{\mu_a h_L}} \quad (4)$$

i.e.,  $Y_{div}$  is the  $Y$  coordinate of the line dividing the innermost flux from the water which is not going to be taken. With such a criterion, the intake temperature could be assumed as the average of the temperatures at  $Y = 0$  (shoreline) and  $Y = Y_{div}$ :

$$\Delta T_{med}(X) = \frac{1}{2} [\Delta T(X, 0) + \Delta T(X, Y_{div})] \frac{h_L}{h_i} \quad (5)$$

2<sup>nd</sup> Criterion: if the flux field remained undistorted and if there were no reflection at the beach, the water with the highest temperature would be that flowing through a cross-section around the center-line, i.e. the line through the position of axis of the jet at the end of the NF ( $Y_c$ ) and parallel to the shoreline. If that water were captured by the cooling system it would have the average temperature:

$$\Delta T_{CL} = \frac{1}{Q_0} \int_0^{Y_c} \Delta T(Q) dQ \times \frac{h_L}{h_i} = \frac{\int_{Y_c-1}^{Y_c+1} T(X, Y) \mu_a h_L dY}{\int_{Y_c-1}^{Y_c+1} \mu_a h_L dY} \times \frac{h_L}{h_i} \quad (6)$$

where  $1 = Q_0/2 \mu_a h_L$ .

However, since the water actually captured is that flowing at some distance  $0 < Y < Y_c$  from the shoreline, and shore reflection causes the temperature peak to drift towards the shore, this criterion assumes:

$$\Delta T_c(X) = \max \{ \Delta T_{CL}(X), \Delta T_{med}(X) \} \quad (7)$$

*run*

3<sup>rd</sup> Criterion: assumes that worse comes to worst and that, due to unfavorable wind effects at the upper ocean layers, the captured flow exactly corresponds to that one transporting the highest temperatures:

$$\Delta T_{\max}(X) = \max_{Q_0} \left\{ \frac{1}{Q_0} \int_0^{Q_0} \Delta T(Q) dQ \right\}$$

$$\max_Y \frac{\int_Y^{Y+21} T(X, \xi) \mu_a h_L d\xi}{\int_Y^{Y+21} \mu_a h_L d\xi} \frac{h_L}{h_i} \quad (8)$$

The water temperature at the intake has been calculated according with these three criteria, which have been numbered according with their increasing degree of conservativeness. The third and most conservative was the one actually used to define the separation  $L_f$  between the intake and the outfall.

*Run*

#### 4. COMPUTER PRINT-OUT

Computer codes were written, to implement both the NF and FF models, for the three designs considered.

The headline identifies the design as follows:

Design (A): DESCARGA NA SUPERFÍCIE

Design (B): DESCARGA SUBMERSA ... SEM DIFUSOR

Design (C): DESCARGA SUBMERSA ... COM DIFUSOR.

Next follows a line indicating the number of units (U) in operation, the discharge velocity (U0), the ambient current velocity (UA) and total outfall length (D).

Then the surface water temperature increment distribution in the far field is printed at the nodes of a rectangular grid system. This looks like a table (or a matrix) in the computer print-out, in which the first line contains the longitudinal coordinates (X) in meters and the first column contains the vertical coordinates (Y) in meters. This refers to the same coordinate system discussed in paragraph 3.4. The coordinate  $Y = 0$  refers to the shoreline.

Thus the second line of the matrix, corresponding to those grid points with coordinates (X, 0), gives the temperature increments along the shoreline. This system of tabulation can serve for an easy drawing of isotherms, as the first print-out in Appendix A1 shows - (of course there is a distortion in the shape of the field).

In the case of design (C) two other data are printed before the matrix of temperatures: the volumetric dilution in the NF (DILUIÇÃO INICIAL) and the resulting maximum temperature increment at the beginning of the FF (DELTA TEMP. (CP)).

Following that three data are printed:



a) YDIV: this is the width of the water flux closest to the shore with flow-rate  $Q_0$ , given by Equation (4).

b) YC: is the distance from the position of the jet axis at the end of the NF to the shoreline, i.e,  $Y_c$  used in the 2<sup>nd</sup> criterion of Paragraph 3.4.

c) FATOR: this is the ratio  $h_L/h_1$ , i.e. the proportion of warm water in the total flow-rate through the intake.

Finally, the values of the following variables are plotted as a function of the distance X from the outfall:

d) DTDIV =  $\Delta T(X, Y_{div})$ , i.e. the temperature increment at the dividing line of the flow closest to the shoreline.

e) DTC =  $\Delta T(X, Y_c)$ , the temperature increment at the continuation of the jet center line.

f) DTMED =  $\Delta T_{med}(X)$ , the average temperature increment in the water flux closest to the shoreline, according to Equation (5). This would fix  $L_f$  using criterion 1 of Section 3.4.

g) DTI =  $\Delta T_c(X)$ , the highest of the two values  $\Delta T_{CL}(X)$  and  $\Delta T_{med}(X)$ , according to Equation (7). This would fix  $L_f$  using criterion 2 or Section 3.4.

h) DTMAX =  $\Delta T_{max}(X)$ . Of the many possible components of the total water flux in the FF with flow rate  $Q_0$ , the one carrying water with the highest temperature, has the increment  $\Delta T_{max}(X)$  above the ambient, according to Equation (8). This fixes  $L_f$  using criterion 3 of Section 3.4.

mmj

## 5. RESULTS

The following tables present the results obtained with the calculations. The meaning of the symbols are:

$U$  = number of power plants in operation

$\mu_o$  = discharge velocity (m/s)

$\mu_a$  = ambient current velocity (m/s)

$d$  = total length of outfall (m)

(in case of design (C), the diffuser section always begins at a distance of 400 m from the shoreline).

$X_{NF}$  = distance from the discharge position to the end of the NF, along the X coordinate (m)

$X_{FF}$  = distance from the end of the NF to the point where  $\Delta T = 1^\circ\text{C}$  (m)

$L_f$  = required separation between discharge and intake (m).

It is important to have in mind that  $L_f$  is measured from the point where the outfall structure crosses the shoreline, as indicated in Figure 1. This is the reason why  $L_f \neq X_{NF} + X_{FF}$  in the case of design (A) in which the outfall axis is not at right angle with the shoreline.

Calculations have been performed for small ambient currents  $\mu_a = 0.10$  m/s in the case of design (C). This is a quite realistic velocity and it happens that feeble currents represent more conservative situations in the case of staged diffusers.

*mmj*

**5.1 Results for  $\Delta T = 7.5^\circ\text{C}$  Inside Condenser**
**5.1.1 Design (A)**

U	$\mu_o$	$\mu_a$	d	$X_{NF}$	$X_{FF}$	$L_f$		
1	1.0	0.20	400	500	650	600		
			600	500	500	350		
			800	500	400	150		
		0.60	400	50	1650	1450		
			600	50	1650	1350		
			800	50	1450	1050		
		2.0	0.20	400	750	1200	1300	
				600	750	900	900	
				800	750	450	350	
	0.60		400	100	1650	1450		
			600	100	1600	1300		
			800	100	1300	900		
	3.0		0.20	400	700	900	950	
				600	700	550	500	
				800	700	350	200	
		0.60	400	100	1150	950		
			600	100	1050	750		
			800	100	750	350		
		2	1.0	0.20	400	700	3200	3200
					600	700	1450	1350
					800	700	750	550
	0.60			400	100	>4000	>4000	
				600	100	>4000	>4000	
				800	100	>4000	>4000	
2.0	0.20			400	1050	2550	2700	
				600	1050	1800	1850	
				800	1050	1250	1200	
	0.60		400	100	4000	3750		
			600	100	3950	3600		
			800	100	3400	3000		
	3.0		0.20	400	1000	2400	2500	
				600	1000	1850	1850	
				800	1000	1400	1300	
0.60			400	250	3200	3050		
			600	250	2800	2550		
			800	250	2350	2000		

5.1.2 Design (B)

U	$\nu_o$	$\nu_a$	d	$X_{NF}$	$X_{FF}$	$L_f$	
1	1.0	0.20	400	500	500	1000	
			600	500	450	950	
			800	500	400	950	
		0.60	400	50	1350	1400	
			600	50	1350	1400	
			800	50	950	1000	
		2.0	0.20	400	750	900	1650
				600	750	500	1250
				800	750	850	1100
	0.60		400	100	1350	1450	
			600	100	1200	1300	
			800	100	800	900	
	3.0		0.20	400	700	600	1350
				600	700	300	1050
				800	700	250	950
		0.60	400	100	900	1000	
			600	100	650	750	
			800	100	450	550	
	2	1.0	0.20	400	700	1350	2050
				600	700	850	1550
				800	700	500	1200
			0.60	400	100	>4000	>4000
				600	100	>4000	>4000
				800	100	4000	>4000
2.0			0.20	400	1050	1750	2800
				600	1050	1200	2250
				800	1050	750	1800
		0.60	400	100	3550	3650	
			600	100	3100	3200	
			800	100	2400	2500	
3.0		0.20	400	1000	1700	2700	
			600	1000	1250	2250	
			800	1000	900	1900	
		0.60	400	250	2600	2850	
			600	250	2050	2300	
			800	250	1450	1700	



**5.2 Results for  $\Delta T = 8.0^\circ\text{C}$  Inside Condenser**

**5.2.1 Design (A)**

U	$\nu_o$	$\nu_a$	d	$X_{NF}$	$X_{FF}$	$L_f$
2	1.0	0.20	400	700	3800	3800
			600	700	1750	1650
			800	700	950	750
		0.60	400	50	5750	5500
			600	50	5550	5200
			800	50	5100	4650
	2.0	0.20	400	1050	3000	3150
			600	1050	2000	2050
			800	1050	1450	1400
		0.60	400	250	4800	4550
			600	250	4700	4350
			800	250	4100	3650
	3.0	0.20	400	1000	2550	2650
			600	1000	1950	1950
			800	1000	1550	1450
		0.60	400	250	3500	3300
			600	250	3050	2800
			800	250	2550	2200

**5.2.2 Design (B)**

U	$\nu_o$	$\nu_a$	d	$X_{NF}$	$X_{FF}$	$L_f$
2	1.0	0.20	400	700	1500	2200
			600	700	1000	1700
			800	700	500	1200
		0.60	400	50	5200	5250
			600	50	5000	5050
			800	50	4250	4300
	2.0	0.20	400	1050	1900	2950
			600	1050	1350	2400
			800	1050	900	1950
		0.60	400	100	4250	4350
			600	100	3800	3900
			800	100	3150	3250
	3.0	0.20	400	1000	1800	2900
			600	1000	1350	2350
			800	1000	1000	2000

*mm*

4.0	0.60	400	250	1850	2100
		600	250	1800	2050
		800	250	1400	1650
	0.20	400	200	1050	1250
		600	200	550	750
		800	200	200	400
	0.60	400	1000	150	1150
		600	1000	100	1100
		800	1000	100	1100

5.2.3 Design (C)

U	$\mu_o$	$\mu_a$	d	$X_{NF}$	$X_{FF}$	$L_f$
2	1.0	0.10	600	10	3250	3250
			800	10	2050	2050
			1000	10	550	550
		0.20	600	10	2040	2050
			800	20	900	900
			1000	40	400	450
		0.60	600	50	600	650
			800	100	100	200
			1000	0	0	0
	2.0	0.10	600	10	2900	2900
			800	10	1700	1700
			1000	10	450	450
		0.20	600	10	1650	1650
			800	20	500	500
			1000	40	300	350
		0.60	600	50	500	550
			800	100	50	150
			1000	0	0	0
	3.0	0.10	600	10	2700	2500
			800	10	1500	1500
			1000	10	400	400
		0.20	600	10	1350	1350
			800	20	450	450
			1000	40	250	300
0.60		600	50	450	500	
		800	100	50	150	
		1000	0	0	0	
4.0	0.10	600	10	2500	2500	
		800	10	1300	1300	
		1000	10	400	400	
	0.20	600	10	1100	1100	
		800	20	400	400	
		1000	40	200	250	
	0.60	600	50	450	500	
		800	100	50	150	
		1000	0	0	0	

*run*

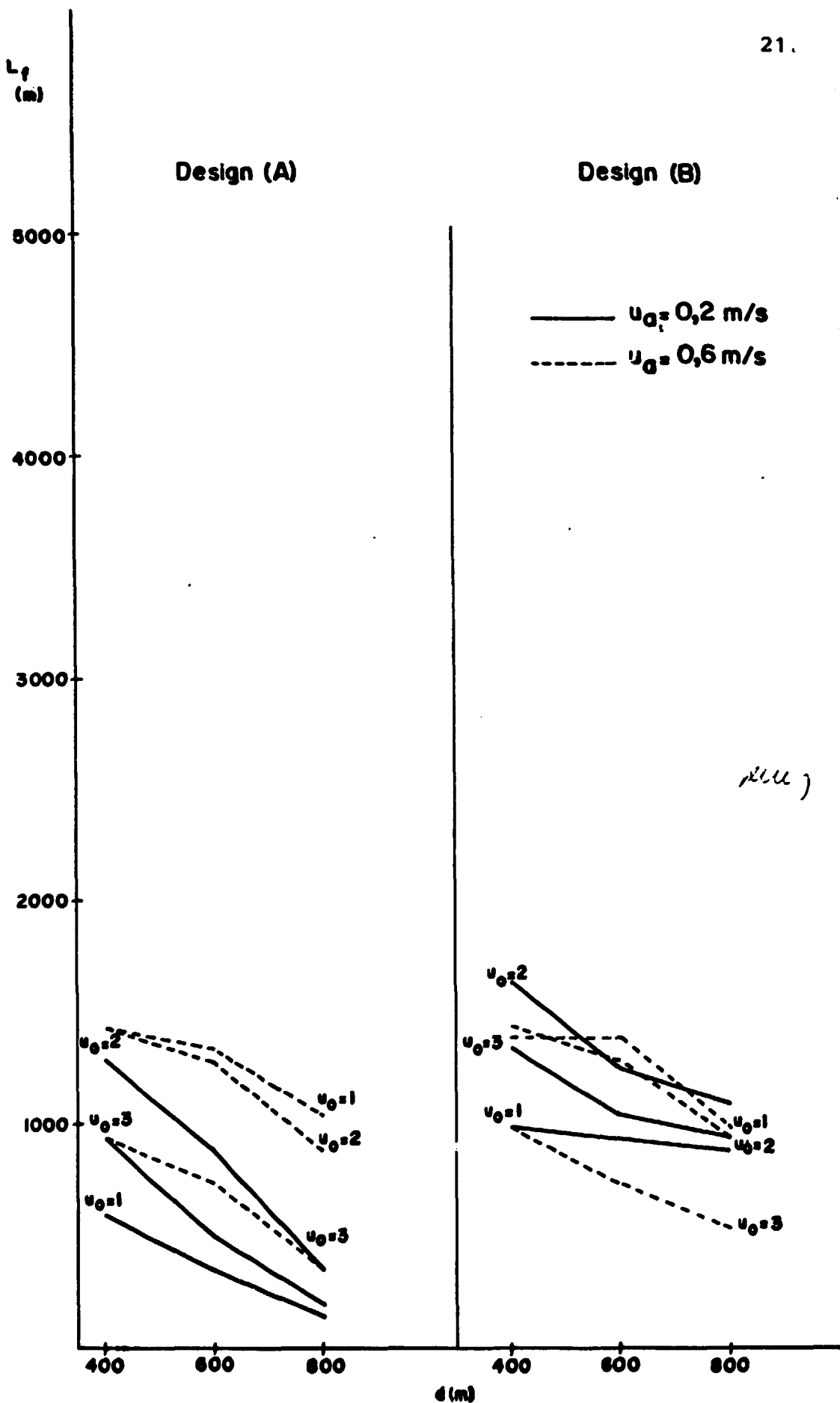


FIG. 2(a) - VARIATION OF DISCHARGE - INTAKE SEPARATION WITH AMBIENT AND OUTFALL PARAMETERS; 1 UNIT -  $\Delta T_0 = 8,5^\circ\text{C}$

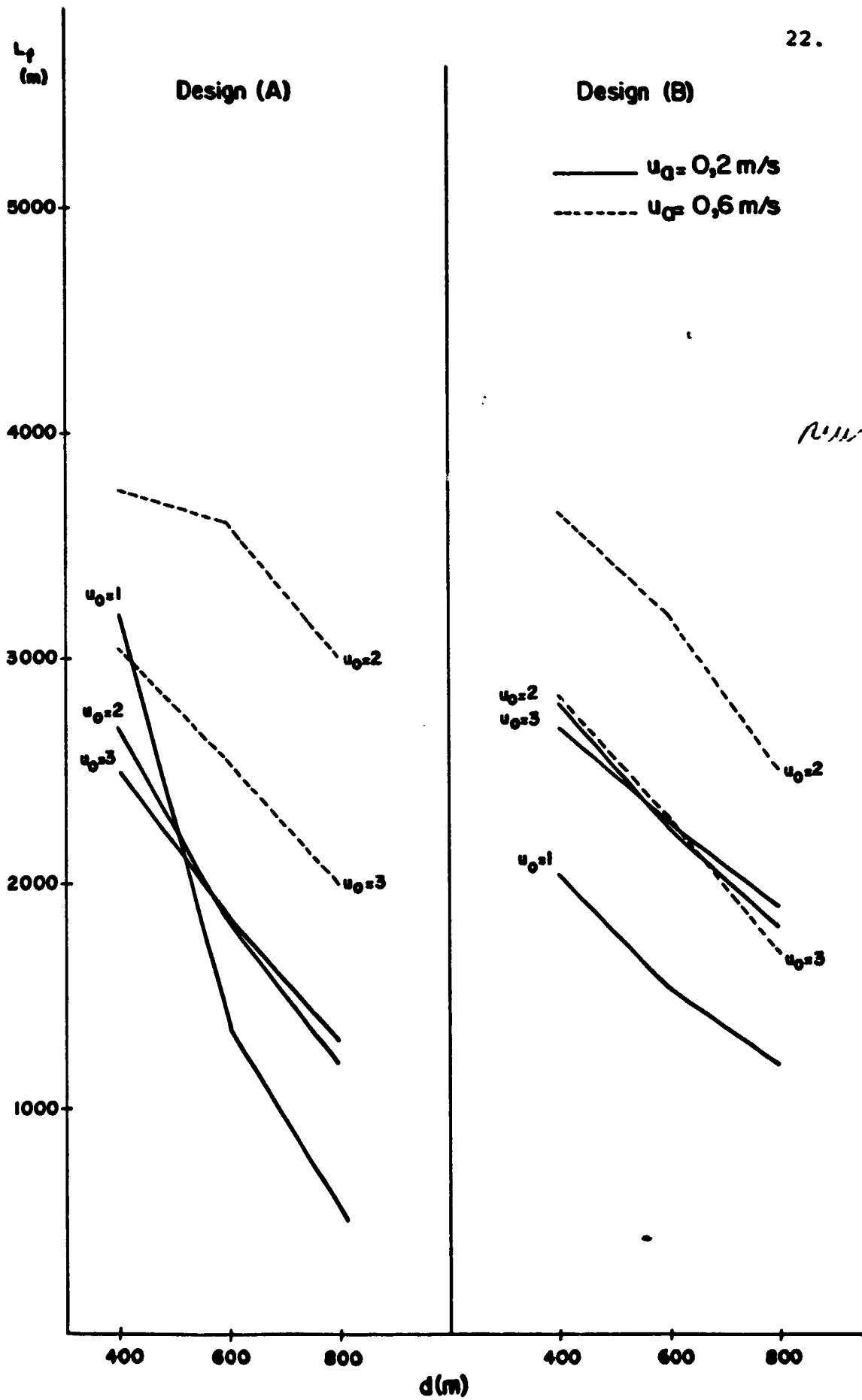


FIG. 2(b) - VARIATION OF DISCHARGE - INTAKE SEPARATION WITH AMBIENT AND OUTFALL PARAMETERS; 2 UNITS -  $\Delta T_0 = 8,5^\circ\text{C}$

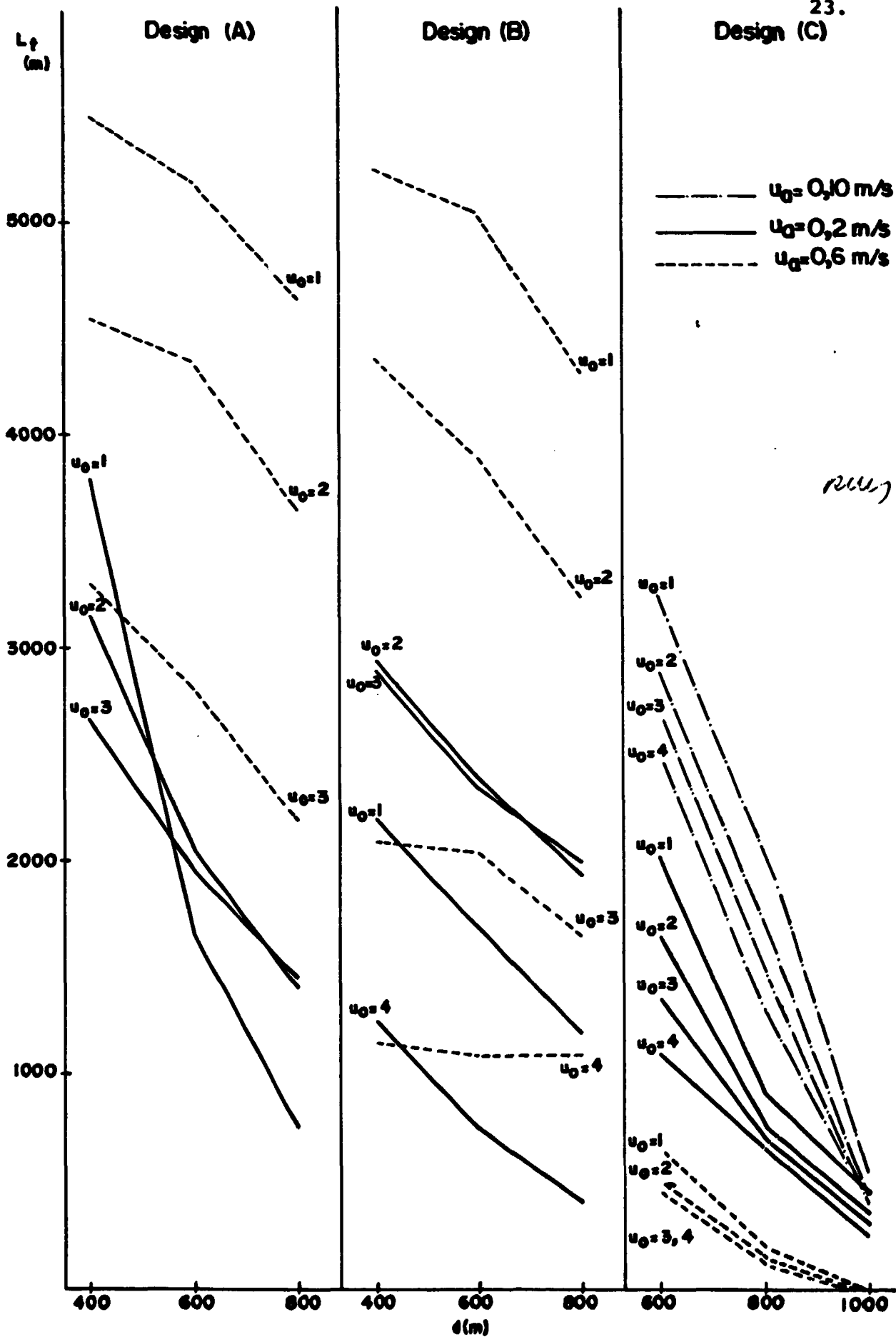


FIG. 3 - VARIATION OF DISCHARGE - INTAKE SEPARATION WITH AMBIENT AND OUTFALL PARAMETERS; 2 UNITS -  $\Delta T_0 = 9^\circ\text{C}$

These numerical values have been plotted in Figures 2 and 3.

## 5.2 Comments and Conclusions

- 5.2.1 The difference in the performance of Designs (A) and (B) is not very marked, although Design (B) is slightly superior as far as dilution is concerned.
- 5.2.2 Jetty lengths of magnitude  $d = 400$  m are shown to be insufficient, especially in the case of strong ambient currents; unless recourse is made to large discharge velocities ( $\mu_0 = 3$  m/s). Besides that, an outfall with length  $d = 400$  m may occasionally discharge inside the surf zone.
- 5.2.3 Under certain conditions, calculations for Designs (A) and (B) have shown a better performance with smaller discharge velocity values  $\mu_0$ . This is not physically to be expected. The cause of such anomalous behaviour may be related to assumptions used in the modelling, in particular the correction of jet-bottom interaction whose effect increases with increasing discharge velocities. Thus, this result must be considered with some reserve.
- 5.2.4 The dilution performance of Design (C) is markedly superior. The trend with ambient currents is reversed, dilution increasing when currents are stronger.
- 5.2.5 Independently of cost considerations, Design (C) seems to be the only one which allows enough remaining room for the eventual discharge of Units 3 and 4. This point needs some further confirmation by optimization studies.

5.2.6 Confirmation of present results with site specific data are recommended. Among these, two important influences should be checked:

- a) Dispersion characteristics at the site which must be evaluated with tracer and oceanographical studies at the site, both at the offshore at the surf regions. Such characteristics can have a great influence on the FF model results.
- b) Transients, their magnitudes and frequencies. This can also only be evaluated by the statistical analysis of oceanographic measurement records. The importance of such occurrence can be made clear by considering that only steady-state models have been used in the present calculations.

*nmj*

6.            ACKNOWLEDGEMENT

The general approach to the modelling strategy, as well as to calculation details have been suggested by Prof. E. Eric Adams from the Massachusetts Institute of Technology, who acted as consultant to Nuclebrás for the recirculation studies. Chapters 1 to 3 of the present report are indeed based on Prof. Adam's Report to Nuclebrás.

*mmj*



7.

REFERENCES

- [1] Moreira, R.M., "Modelagem Matemática da Dispersão dos Efluentes Térmicos de Centrais Nucleares no Oceano na Região da Ponta do Grajaúna", Divisão de Engenharia Ambiental, DERL.PD-002/82, CDTN, Belo Horizonte (Jan/1982).
- [2] Souza, R.C., Moreira, R.M., "Simulação da Descarga Térmica das Centrais Nucleares de Iguape - Efeito do Afastamento do Ponto de Descarga e da Alteração das Velocidades Iniciais", N.T. DERL.PD-006/82, CDTN, Belo Horizonte - (Abr/1982).
- [3] Moreira, R.M., "Simulação da Descarga Térmica das Centrais Nucleares de Iguape - Estudo Paramétrico da Influência das Correntes e do Afastamento da Descarga", N.T. DERL.PD-010/82, CDTN, Belo Horizonte (Set/1982).
- [4] Yudelson, J., "A Survey of Ocean Diffusion Studies and Data", Technical Report No. 67-2, W.M. Keck Laboratory for Hydraulics and Water Resources, Calif. Inst. of Tech. (1967).
- [5] Aun, P.E., et. al., "Relatório Final Sobre Viabilidade de Novas Áreas de Dragagem na Região de Santos", CDTN, Belo Horizonte (Ago/1974).
- [6] Almquist, C.W., Stolzenbach, K.D., "Staged Multiport Diffusers", J. of Hydr. Div., ASCE, 106, HY2: 285 (1980).



- [7] Brocard, D.N. "Discussion of Staged Multiport Diffusers", J. of Hydr. Div., ASCE, 106, HY10: 1723 (1980).
- [8] Adams, E.E., "Dilution Analysis for Unidirectional Diffusers", J. of Hydr. Div., ASCE, 108, HY3: 327 (1982).

*mm*

APPENDIX A.1

COMPUTER PRINT-OUTS FOR DESIGN(A)

(Temperature increase inside condenser = 8,5°C)

*run*

DESCARGA NA SUPERFICIE

U = 1.00      UA = .20      D = 400.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.72	1.06	1.29	1.42	1.46	1.45	1.41	1.34
100.0	.87	1.15	1.34	1.44	1.47	1.45	1.40	1.34
200.0	1.27	1.39	1.47	1.49	1.48	1.44	1.39	1.32
300.0	1.81	1.71	1.63	1.56	1.49	1.43	1.36	1.29
400.0	2.29	1.99	1.76	1.61	1.49	1.40	1.32	1.25
500.0	2.54	2.12	1.82	1.61	1.46	1.35	1.27	1.19
600.0	2.44	2.05	1.76	1.55	1.39	1.28	1.20	1.13
700.0	2.07	1.80	1.59	1.42	1.29	1.19	1.11	1.05
800.0	1.46	1.42	1.34	1.24	1.15	1.07	1.01	.96
900.0	.91	1.02	1.05	1.03	.99	.94	.90	.87
1000.0	.49	.66	.76	.80	.81	.80	.79	.77

YDIV = 282.8  
 YC = 521.7  
 FATOR = .384

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.66	.98	.47	.96	1.01	520.0
1000.0	.64	.81	.52	.80	.84	520.0
1500.0	.61	.70	.55	.69	.73	500.0
2000.0	.59	.61	.57	.61	.65	460.0
2500.0	.57	.56	.57	.57	.60	340.0
3000.0	.55	.51	.55	.55	.59	0.0
3500.0	.52	.48	.53	.53	.57	0.0
4000.0	.50	.45	.51	.51	.54	0.0

*nmj*

1 U

U0 = 1.00

UA = .20

D = 600.0

31.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.24	.47	.68	.86	.97	1.04	1.06	1.06
100.0	.32	.53	.73	.89	.99	1.05	1.07	1.06
200.0	.54	.72	.87	.97	1.04	1.07	1.07	1.06
300.0	.91	1.01	1.07	1.09	1.10	1.10	1.08	1.06
400.0	1.38	1.35	1.29	1.23	1.18	1.13	1.09	1.05
500.0	1.86	1.67	1.49	1.35	1.24	1.16	1.10	1.04
600.0	2.22	1.89	1.63	1.43	1.28	1.17	1.09	1.02
700.0	2.35	1.97	1.67	1.45	1.28	1.16	1.06	.99
800.0	2.19	1.87	1.61	1.41	1.24	1.12	1.02	.95
900.0	1.91	1.63	1.46	1.30	1.16	1.06	.97	.90
1000.0	1.33	1.30	1.23	1.14	1.05	.97	.90	.84

YDIV = 282.8  
 YC = 694.9  
 FATOR = .384

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.32	.90	.21	.89	.93	690.0
1000.0	.37	.75	.27	.75	.78	690.0
1500.0	.39	.64	.33	.64	.67	690.0
2000.0	.41	.56	.37	.55	.58	680.0
2500.0	.42	.49	.40	.49	.52	660.0
3000.0	.42	.44	.41	.45	.47	600.0
3500.0	.42	.41	.41	.41	.44	470.0
4000.0	.41	.38	.41	.41	.43	60.0

*nuj*

**DESCARGA NA SUPERFICIE**

**i U**

**U0 = 1.00**

**UA = .20**

**D = 800.0**

**32.**

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.08	.20	.35	.50	.63	.72	.78	.82
100.0	.11	.24	.38	.53	.65	.73	.79	.82
200.0	.21	.35	.48	.60	.70	.77	.81	.83
300.0	.40	.54	.64	.72	.78	.82	.84	.84
400.0	.69	.79	.85	.87	.88	.88	.87	.86
500.0	1.07	1.09	1.07	1.03	.98	.94	.91	.88
600.0	1.49	1.39	1.28	1.17	1.04	1.00	.94	.89
700.0	1.88	1.65	1.45	1.29	1.15	1.04	.96	.90
800.0	2.13	1.81	1.55	1.35	1.19	1.07	.97	.90
900.0	2.17	1.83	1.57	1.36	1.20	1.07	.96	.88
1000.0	1.99	1.72	1.50	1.31	1.16	1.04	.94	.86

**YDIV = 282.8**

**YC = 868.1**

**FATOR = .394**

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.14	.84	.08	.82	.79	870.0
1000.0	.19	.71	.13	.70	.67	870.0
1500.0	.24	.60	.18	.60	.58	870.0
2000.0	.27	.52	.23	.52	.50	870.0
2500.0	.29	.46	.27	.46	.44	860.0
3000.0	.31	.41	.29	.41	.39	840.0
3500.0	.32	.37	.31	.37	.36	800.0
4000.0	.32	.34	.32	.34	.33	720.0

*mm*

**i U**

**U0 = 1.00**

**UA = .60**

**D = 400.0**

	<b>500.0</b>	<b>1000.0</b>	<b>1500.0</b>	<b>2000.0</b>	<b>2500.0</b>	<b>3000.0</b>	<b>3500.0</b>	<b>4000.0</b>
<b>0.0</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>
<b>100.0</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>
<b>200.0</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.01</b>	<b>.02</b>	<b>.06</b>
<b>300.0</b>	<b>.00</b>	<b>.00</b>	<b>.01</b>	<b>.06</b>	<b>.16</b>	<b>.30</b>	<b>.43</b>	<b>.54</b>
<b>400.0</b>	<b>1.27</b>	<b>1.89</b>	<b>2.15</b>	<b>2.18</b>	<b>2.08</b>	<b>1.94</b>	<b>1.79</b>	<b>1.63</b>
<b>500.0</b>	<b>1.32</b>	<b>1.94</b>	<b>2.19</b>	<b>2.20</b>	<b>2.10</b>	<b>1.95</b>	<b>1.79</b>	<b>1.64</b>
<b>600.0</b>	<b>.00</b>	<b>.00</b>	<b>.01</b>	<b>.07</b>	<b>.17</b>	<b>.30</b>	<b>.43</b>	<b>.54</b>
<b>700.0</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.01</b>	<b>.03</b>	<b>.06</b>
<b>800.0</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>
<b>900.0</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>
<b>1000.0</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>	<b>.00</b>

**YDIV = 163.3**  
**YC = 450.3**  
**FATOR = .473**

<b>X</b>	<b>DTDIV</b>	<b>DTC</b>	<b>DTMED</b>	<b>DTI</b>	<b>DTMAX</b>	<b>YMAX</b>
<b>500.0</b>	<b>.00</b>	<b>3.13</b>	<b>.00</b>	<b>1.66</b>	<b>1.73</b>	<b>450.0</b>
<b>1000.0</b>	<b>.00</b>	<b>2.43</b>	<b>.00</b>	<b>1.42</b>	<b>1.46</b>	<b>450.0</b>
<b>1500.0</b>	<b>.00</b>	<b>1.95</b>	<b>.00</b>	<b>1.21</b>	<b>1.24</b>	<b>450.0</b>
<b>2000.0</b>	<b>.00</b>	<b>1.61</b>	<b>.00</b>	<b>1.04</b>	<b>1.05</b>	<b>450.0</b>
<b>2500.0</b>	<b>.00</b>	<b>1.36</b>	<b>.00</b>	<b>.89</b>	<b>.90</b>	<b>450.0</b>
<b>3000.0</b>	<b>.00</b>	<b>1.16</b>	<b>.00</b>	<b>.78</b>	<b>.79</b>	<b>450.0</b>
<b>3500.0</b>	<b>.00</b>	<b>1.01</b>	<b>.00</b>	<b>.68</b>	<b>.69</b>	<b>450.0</b>
<b>4000.0</b>	<b>.01</b>	<b>.89</b>	<b>.00</b>	<b>.61</b>	<b>.61</b>	<b>450.0</b>

*any*

1 U

U0 = 1.00

UA = .60

D = 600.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.01
400.0	.00	.00	.00	.00	.01	.02	.06	.12
500.0	.00	.01	.08	.23	.42	.59	.72	.81
600.0	4.62	4.13	3.58	3.09	2.68	2.34	2.06	1.82
700.0	.15	.51	.92	1.21	1.37	1.42	1.41	1.36
800.0	.00	.00	.00	.01	.06	.13	.23	.33
900.0	.00	.00	.00	.00	.00	.00	.01	.03
1000.0	.00	.00	.00	.00	.00	.00	.00	.00

YDIV = 163.3  
 YC = 623.5  
 FATOR = .473

X	OTDIV	OTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	3.13	.00	1.62	1.72	620.0
1000.0	.00	2.43	.00	1.39	1.46	620.0
1500.0	.00	1.95	.00	1.19	1.23	620.0
2000.0	.00	1.61	.00	1.02	1.05	620.0
2500.0	.00	1.36	.00	.89	.90	620.0
3000.0	.00	1.16	.00	.77	.78	620.0
3500.0	.00	1.01	.00	.68	.69	620.0
4000.0	.00	.89	.00	.60	.61	620.0

*mmj*



	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.00	.00	.02
600.0	.00	.00	.00	.00	.03	.07	.15	.23
700.0	.02	.15	.41	.69	.90	1.04	1.10	1.12
800.0	6.35	4.96	4.01	3.32	2.81	2.41	2.10	1.85
900.0	.01	.09	.30	.55	.77	.92	1.01	1.04
1000.0	.00	.00	.00	.00	.02	.06	.12	.20

$\bar{Y}DIV = 163.3$   
 $YC = 796.7$   
 $FATOR = .473$

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	3.02	.00	1.53	1.60	800.0
1000.0	.00	2.35	.00	1.33	1.36	800.0
1500.0	.00	1.90	.00	1.14	1.15	800.0
2000.0	.00	1.57	.00	.99	.98	800.0
2500.0	.00	1.33	.00	.86	.84	800.0
3000.0	.00	1.14	.00	.75	.73	800.0
3500.0	.00	.99	.00	.66	.64	800.0
4000.0	.00	.87	.00	.59	.57	800.0

*any*

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.00	.00	.02
600.0	.00	.00	.00	.00	.03	.07	.15	.23
700.0	.02	.15	.41	.69	.90	1.04	1.10	1.12
800.0	6.35	4.96	4.01	3.32	2.81	2.41	2.10	1.85
900.0	.01	.09	.30	.55	.77	.92	1.01	1.04
1000.0	.00	.00	.00	.00	.02	.06	.12	.20

YDIV = 163.3  
 YC = 796.7  
 FATOR = .473

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	3.02	.00	1.53	1.60	800.0
1000.0	.00	2.35	.00	1.33	1.36	800.0
1500.0	.00	1.90	.00	1.14	1.15	800.0
2000.0	.00	1.57	.00	.99	.98	800.0
2500.0	.00	1.33	.00	.86	.84	800.0
3000.0	.00	1.14	.00	.75	.73	800.0
3500.0	.00	.99	.00	.66	.64	800.0
4000.0	.00	.87	.00	.59	.57	800.0

*any*

I U

U0 = 2.00

UA = .20

D = 400.0

36.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.02	.09	.21	.36	.48	.57	.62	.65
100.0	.04	.13	.26	.39	.50	.58	.63	.65
200.0	.15	.29	.41	.50	.57	.62	.65	.65
300.0	.41	.55	.63	.66	.67	.67	.67	.66
400.0	.87	.91	.88	.83	.77	.73	.70	.67
500.0	1.44	1.27	1.10	.97	.86	.77	.72	.67
600.0	1.82	1.48	1.23	1.04	.90	.80	.72	.66
700.0	1.78	1.46	1.22	1.03	.89	.78	.70	.64
800.0	1.34	1.21	1.07	.94	.83	.74	.67	.61
900.0	.78	.85	.83	.79	.73	.66	.61	.56
1000.0	.35	.50	.58	.60	.59	.57	.54	.51

YDIV = 282.8  
 YC = 641.2  
 FATOR = .709

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.25	1.32	.13	1.40	1.52	640.0
1000.0	.35	1.07	.21	1.13	1.23	640.0
1500.0	.41	.88	.29	.94	1.02	640.0
2000.0	.45	.74	.35	.79	.87	640.0
2500.0	.46	.64	.40	.69	.75	630.0
3000.0	.47	.56	.44	.60	.66	620.0
3500.0	.47	.51	.46	.54	.60	570.0
4000.0	.47	.47	.46	.50	.56	460.0

*Handwritten signature*

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.02	.07	.15	.25	.33	.40	.45
100.0	.01	.03	.09	.18	.27	.35	.41	.46
200.0	.03	.08	.16	.25	.33	.39	.44	.48
300.0	.09	.19	.29	.36	.42	.46	.48	.50
400.0	.25	.39	.47	.51	.53	.53	.53	.53
500.0	.57	.67	.69	.68	.65	.61	.58	.56
600.0	1.03	1.00	.92	.83	.75	.68	.63	.58
700.0	1.49	1.27	1.09	.95	.83	.73	.65	.60
800.0	1.72	1.40	1.17	.99	.86	.75	.66	.60
900.0	1.59	1.33	1.13	.97	.84	.74	.65	.59
1000.0	1.18	1.09	.98	.87	.77	.69	.62	.56

YDIV = 282.8

YC = 814.4

FATOR = .709

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.05	1.23	.03	1.30	1.33	810.0
1000.0	.12	1.00	.07	1.06	1.09	810.0
1500.0	.19	.83	.12	.89	.91	810.0
2000.0	.24	.71	.17	.75	.77	810.0
2500.0	.29	.61	.23	.65	.67	810.0
3000.0	.31	.53	.28	.57	.58	810.0
3500.0	.34	.47	.31	.50	.52	800.0
4000.0	.35	.42	.34	.45	.47	770.0

*all*

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.02	.06	.12	.19	.25	.31
100.0	.00	.01	.03	.07	.13	.20	.26	.32
200.0	.00	.02	.06	.11	.17	.24	.29	.33
300.0	.02	.06	.12	.18	.24	.29	.33	.36
400.0	.06	.13	.21	.28	.33	.36	.38	.40
500.0	.16	.27	.36	.41	.44	.44	.44	.44
600.0	.37	.49	.54	.56	.55	.53	.50	.48
700.0	.72	.76	.75	.71	.66	.61	.56	.52
800.0	1.14	1.05	.94	.84	.75	.67	.60	.55
900.0	1.50	1.26	1.07	.92	.80	.71	.63	.56
1000.0	1.61	1.32	1.11	.95	.82	.72	.63	.57

YDIV = 282.8

YC = 987.6

FATOR = .709

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.01	1.14	.00	1.21	1.13	990.0
1000.0	.03	.94	.02	1.00	.93	990.0
1500.0	.07	.79	.04	.84	.78	990.0
2000.0	.12	.67	.08	.72	.67	990.0
2500.0	.16	.58	.12	.62	.58	990.0
3000.0	.20	.51	.17	.54	.51	990.0
3500.0	.23	.45	.20	.48	.45	980.0
4000.0	.25	.40	.24	.43	.40	980.0

*mu*

1 U

U0 = 2.00

UA = .60

D = 400.0

39.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.01	.02	.06	.12
400.0	.00	.04	.18	.39	.57	.69	.75	.77
500.0	4.22	3.47	2.84	2.35	1.97	1.69	1.46	1.28
600.0	.00	.00	.02	.09	.22	.34	.45	.52
700.0	.00	.00	.00	.00	.00	.01	.02	.05
800.0	.00	.00	.00	.00	.00	.00	.00	.00
900.0	.00	.00	.00	.00	.00	.00	.00	.00
1000.0	.00	.00	.00	.00	.00	.00	.00	.00

YDIV = 163.3

YC = 485.8

FATOR = .782

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	4.15	.00	1.41	1.66	490.0
1000.0	.00	3.08	.00	1.21	1.35	490.0
1500.0	.00	2.39	.00	1.02	1.10	490.0
2000.0	.00	1.93	.00	.87	.92	490.0
2500.0	.00	1.60	.00	.74	.77	490.0
3000.0	.00	1.35	.00	.64	.66	490.0
3500.0	.00	1.16	.00	.56	.57	490.0
4000.0	.00	1.01	.00	.49	.50	490.0

*run*

I U

U0 = 2.00

UA = .60

D = 600.0

40.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.01
500.0	.00	.00	.00	.01	.03	.09	.16	.24
600.0	.15	.52	.87	1.06	1.13	1.12	1.07	1.00
700.0	.93	1.45	1.63	1.61	1.51	1.38	1.25	1.13
800.0	.00	.00	.00	.02	.08	.17	.26	.34
900.0	.00	.00	.00	.00	.00	.00	.01	.03
1000.0	.00	.00	.00	.00	.00	.00	.00	.00

YDIV = 163.3  
 YC = 659.0  
 FATOR = .782

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	3.87	.00	1.27	1.61	660.0
1000.0	.00	2.90	.00	1.11	1.30	660.0
1500.0	.00	2.28	.00	.95	1.06	660.0
2000.0	.00	1.85	.00	.82	.88	660.0
2500.0	.00	1.54	.00	.71	.75	660.0
3000.0	.00	1.31	.00	.61	.64	660.0
3500.0	.00	1.13	.00	.54	.55	660.0
4000.0	.00	.98	.00	.47	.49	660.0

*my*

1 U

U0 = 2.00

UA = .60

D = 800.0

41.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.00	.00	.00
600.0	.00	.00	.00	.00	.00	.00	.02	.04
700.0	.00	.00	.01	.06	.14	.24	.34	.41
800.0	1.87	2.08	2.00	1.82	1.63	1.45	1.29	1.15
900.0	.08	.35	.65	.86	.96	.98	.96	.92
1000.0	.00	.00	.00	.01	.03	.08	.14	.21

YDIV = 163.3  
 YC = 832.3  
 FATOR = .782

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	3.64	.00	1.41	1.43	830.0
1000.0	.00	2.76	.00	1.18	1.16	830.0
1500.0	.00	2.18	.00	.98	.95	830.0
2000.0	.00	1.78	.00	.83	.79	830.0
2500.0	.00	1.49	.00	.71	.67	830.0
3000.0	.00	1.27	.00	.61	.58	830.0
3500.0	.00	1.09	.00	.53	.50	830.0
4000.0	.00	.96	.00	.47	.44	830.0

*all*



1 U

U0 = 3.00

UA = .20

D = 400.0

42.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.01	.04	.11	.19	.26	.32	.37
100.0	.00	.02	.06	.13	.21	.28	.33	.37
200.0	.01	.06	.13	.20	.27	.32	.36	.39
300.0	.07	.16	.25	.31	.35	.38	.40	.41
400.0	.23	.36	.43	.46	.46	.45	.44	.43
500.0	.58	.64	.64	.61	.56	.52	.48	.46
600.0	1.06	.95	.84	.73	.64	.57	.52	.47
700.0	1.43	1.15	.95	.81	.69	.60	.53	.48
800.0	1.41	1.15	.95	.80	.69	.60	.53	.47
900.0	1.02	.93	.82	.72	.64	.56	.50	.45
1000.0	.54	.62	.62	.59	.55	.51	.46	.42

YDIV = 283.1  
 YC = 746.2  
 FACTOR = .982

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.05	1.45	.03	1.29	1.27	750.0
1000.0	.14	1.16	.07	1.03	1.02	750.0
1500.0	.22	.95	.13	.85	.84	750.0
2000.0	.29	.80	.20	.72	.70	750.0
2500.0	.33	.68	.26	.61	.60	750.0
3000.0	.36	.59	.31	.53	.52	740.0
3500.0	.38	.52	.35	.47	.46	730.0
4000.0	.40	.47	.38	.42	.42	700.0

*msj*

1 U

U0 = 3.00

UA = .20

D = 600.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.01	.04	.08	.14	.19	.24
100.0	.00	.00	.02	.05	.10	.15	.20	.25
200.0	.00	.01	.04	.08	.13	.18	.23	.26
300.0	.01	.04	.09	.14	.19	.23	.27	.29
400.0	.04	.10	.18	.24	.28	.30	.32	.33
500.0	.13	.23	.31	.36	.37	.38	.37	.36
600.0	.35	.45	.49	.49	.48	.45	.42	.40
700.0	.72	.72	.68	.63	.57	.51	.46	.43
800.0	1.13	.98	.84	.73	.63	.56	.50	.44
900.0	1.36	1.10	.91	.77	.66	.58	.51	.45
1000.0	1.26	1.05	.88	.75	.65	.57	.50	.45

YDIV = 283.1  
 YC = 919.4  
 FATOR = .982

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.01	1.35	.00	1.20	1.06	920.0
1000.0	.03	1.09	.02	.97	.86	920.0
1500.0	.08	.90	.04	.80	.71	920.0
2000.0	.13	.76	.08	.68	.60	920.0
2500.0	.18	.65	.13	.58	.52	920.0
3000.0	.22	.57	.18	.51	.45	920.0
3500.0	.25	.50	.22	.45	.40	920.0
4000.0	.28	.44	.26	.40	.35	910.0

*duy*

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.01	.03	.07	.11	.15
100.0	.00	.00	.00	.02	.04	.08	.12	.16
200.0	.00	.00	.01	.03	.06	.10	.14	.17
300.0	.00	.01	.03	.06	.10	.14	.17	.20
400.0	.00	.02	.06	.11	.15	.19	.21	.23
500.0	.02	.07	.13	.18	.22	.25	.26	.27
600.0	.07	.16	.23	.28	.31	.32	.32	.31
700.0	.21	.31	.37	.40	.40	.39	.37	.35
800.0	.47	.53	.54	.52	.49	.46	.42	.39
900.0	.83	.78	.71	.64	.57	.51	.46	.41
1000.0	1.16	.98	.83	.71	.62	.54	.48	.43

YDIV = 283.1  
 YC = 1092.6  
 FATOR = .982

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	1.26	.00	1.12	.91	1090.0
1000.0	.01	1.03	.00	.92	.75	1090.0
1500.0	.02	.85	.01	.77	.62	1090.0
2000.0	.05	.73	.03	.65	.53	1090.0
2500.0	.09	.63	.06	.56	.46	1090.0
3000.0	.13	.55	.10	.49	.40	1090.0
3500.0	.16	.48	.13	.43	.35	1090.0
4000.0	.19	.43	.17	.39	.31	1090.0

*duy*

1 U

U0 = 3.00

UA = .60

D = 400.0

45.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.01	.02
400.0	.00	.00	.00	.03	.08	.17	.25	.31
500.0	1.38	1.70	1.69	1.56	1.40	1.24	1.10	.98
600.0	.02	.17	.42	.63	.75	.79	.79	.76
700.0	.00	.00	.00	.00	.01	.04	.09	.15
800.0	.00	.00	.00	.00	.00	.00	.00	.01
900.0	.00	.00	.00	.00	.00	.00	.00	.00
1000.0	.00	.00	.00	.00	.00	.00	.00	.00

YDIV = 163.5

YC = 531.7

FATOR = .964

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	4.13	.00	1.01	1.43	530.0
1000.0	.00	3.07	.00	.82	1.13	530.0
1500.0	.00	2.39	.00	.67	.91	530.0
2000.0	.00	1.93	.00	.55	.75	530.0
2500.0	.00	1.60	.00	.46	.63	530.0
3000.0	.00	1.35	.00	.40	.53	530.0
3500.0	.00	1.16	.00	.34	.46	530.0
4000.0	.00	1.01	.00	.30	.40	530.0

*duj*

1 U

U0 = 3.00

UA = .60

D = 600.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.01	.03	.06
600.0	.00	.01	.05	.15	.28	.38	.45	.50
700.0	3.91	2.97	2.35	1.91	1.59	1.35	1.17	1.02
800.0	.00	.02	.10	.24	.38	.48	.54	.56
900.0	.00	.00	.00	.00	.00	.02	.04	.08
1000.0	.00	.00	.00	.00	.00	.00	.00	.00

YDIV = 163.5

YC = 704.9

FATOR = .964

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	3.86	.00	.90	1.37	700.0
1000.0	.00	2.90	.00	.75	1.08	700.0
1500.0	.00	2.28	.00	.62	.87	700.0
2000.0	.00	1.85	.00	.52	.72	700.0
2500.0	.00	1.54	.00	.44	.60	700.0
3000.0	.00	1.31	.00	.38	.52	700.0
3500.0	.00	1.13	.00	.33	.45	700.0
4000.0	.00	.99	.00	.29	.39	700.0

*mmj*

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.00	.00	.00
600.0	.00	.00	.00	.00	.00	.00	.00	.01
700.0	.00	.00	.00	.00	.01	.04	.09	.14
800.0	.02	.13	.33	.51	.62	.68	.69	.68
900.0	2.49	2.25	1.95	1.67	1.44	1.25	1.10	.97
1000.0	.00	.00	.02	.08	.17	.26	.34	.39

YDIV = 163.5  
 YC = 878.1  
 FATOR = .964

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	3.63	.00	.80	1.18	880.0
1000.0	.00	2.76	.00	.68	.93	880.0
1500.0	.00	2.18	.00	.58	.76	880.0
2000.0	.00	1.78	.00	.49	.63	880.0
2500.0	.00	1.49	.00	.42	.53	880.0
3000.0	.00	1.27	.00	.37	.45	880.0
3500.0	.00	1.10	.00	.32	.39	880.0
4000.0	.00	.96	.00	.28	.35	880.0

*duy*

2 U

U0 = 1.00

UA = .20

D = 400.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	1.95	2.23	2.36	2.39	2.35	2.27	2.17	2.05
100.0	2.05	2.27	2.38	2.39	2.35	2.26	2.16	2.05
200.0	2.30	2.40	2.43	2.40	2.33	2.24	2.13	2.02
300.0	2.64	2.56	2.48	2.40	2.30	2.20	2.09	1.98
400.0	2.95	2.70	2.52	2.38	2.26	2.14	2.03	1.92
500.0	3.13	2.77	2.51	2.33	2.18	2.06	1.95	1.85
600.0	3.11	2.72	2.44	2.24	2.08	1.96	1.86	1.77
700.0	2.89	2.55	2.29	2.10	1.96	1.84	1.75	1.67
800.0	2.49	2.27	2.08	1.92	1.80	1.71	1.63	1.56
900.0	1.99	1.91	1.81	1.71	1.63	1.55	1.49	1.44
1000.0	1.48	1.53	1.51	1.48	1.43	1.39	1.35	1.32

YDIV = 400.0  
 YC = 554.9  
 FATOR = .455

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	1.34	1.43	1.11	1.43	1.47	540.0
1000.0	1.23	1.25	1.12	1.27	1.31	510.0
1500.0	1.14	1.13	1.11	1.15	1.21	440.0
2000.0	1.08	1.04	1.08	1.08	1.16	240.0
2500.0	1.03	.97	1.05	1.05	1.13	0.0
3000.0	.97	.91	1.00	1.00	1.08	0.0
3500.0	.92	.87	.95	.95	1.03	0.0
4000.0	.87	.82	.90	.90	.98	0.0

*any*

2 U

U0 = 1.00

UA = .20

D = 600.0

49.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	1.05	1.36	1.57	1.70	1.77	1.78	1.76	1.71
100.0	1.13	1.41	1.60	1.72	1.77	1.78	1.75	1.71
200.0	1.36	1.55	1.69	1.76	1.79	1.78	1.75	1.70
300.0	1.70	1.77	1.81	1.83	1.82	1.79	1.74	1.68
400.0	2.08	2.02	1.95	1.90	1.84	1.78	1.72	1.66
500.0	2.45	2.25	2.08	1.96	1.86	1.78	1.70	1.63
600.0	2.73	2.42	2.18	2.00	1.86	1.75	1.66	1.59
700.0	2.87	2.49	2.21	2.00	1.84	1.72	1.62	1.54
800.0	2.83	2.46	2.17	1.95	1.79	1.66	1.56	1.48
900.0	2.61	2.31	2.06	1.86	1.71	1.58	1.49	1.41
1000.0	2.27	2.07	1.89	1.73	1.60	1.49	1.40	1.33

YDIV = 400.0  
 YC = 728.1  
 FATOR = .455

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.95	1.31	.71	1.31	1.34	730.0
1000.0	.92	1.13	.77	1.15	1.17	720.0
1500.0	.89	1.00	.80	1.02	1.05	700.0
2000.0	.86	.90	.82	.93	.95	650.0
2500.0	.84	.83	.82	.85	.89	560.0
3000.0	.81	.77	.81	.81	.86	330.0
3500.0	.78	.73	.79	.79	.84	0.0
4000.0	.75	.69	.76	.76	.81	0.0

*mu*



	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.57	.82	1.03	1.20	1.31	1.37	1.40	1.40
100.0	.62	.86	1.06	1.21	1.32	1.38	1.41	1.40
200.0	.78	.98	1.15	1.27	1.35	1.40	1.41	1.41
300.0	1.03	1.18	1.28	1.36	1.40	1.42	1.42	1.41
400.0	1.36	1.42	1.45	1.46	1.47	1.46	1.44	1.41
500.0	1.72	1.68	1.63	1.58	1.53	1.49	1.45	1.40
600.0	2.08	1.93	1.79	1.68	1.59	1.52	1.45	1.40
700.0	2.39	2.14	1.93	1.77	1.64	1.53	1.45	1.38
800.0	2.59	2.27	2.02	1.82	1.66	1.54	1.44	1.36
900.0	2.67	2.32	2.05	1.83	1.66	1.52	1.42	1.33
1000.0	2.60	2.27	2.01	1.80	1.63	1.49	1.38	1.30

YDIV = 400.0  
 YC = 901.3  
 FATOR = .455

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.62	1.21	.44	1.22	1.12	900.0
1000.0	.64	1.06	.51	1.07	.98	900.0
1500.0	.66	.93	.56	.95	.87	890.0
2000.0	.67	.83	.60	.85	.78	880.0
2500.0	.67	.75	.63	.77	.71	840.0
3000.0	.66	.69	.64	.71	.66	770.0
3500.0	.65	.64	.65	.66	.63	640.0
4000.0	.64	.61	.64	.64	.61	350.0

*mu*

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.01
200.0	.00	.00	.00	.00	.01	.03	.06	.12
300.0	.00	.01	.04	.12	.25	.40	.55	.68
400.0	.72	1.23	1.62	1.87	1.98	2.01	1.98	1.91
500.0	7.19	5.94	5.01	4.30	3.74	3.29	2.93	2.62
600.0	.41	.83	1.23	1.52	1.69	1.78	1.79	1.76
700.0	.00	.00	.02	.08	.18	.32	.45	.58
800.0	.00	.00	.00	.00	.00	.02	.05	.09
900.0	.00	.00	.00	.00	.00	.00	.00	.01
1000.0	.00	.00	.00	.00	.00	.00	.00	.00

YDIV = 230.9  
 YC = 494.5  
 FATOR = .545

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	3.94	.00	2.91	3.24	490.0
1000.0	.00	3.26	.00	2.54	2.84	490.0
1500.0	.00	2.75	.00	2.23	2.48	490.0
2000.0	.00	2.35	.00	1.96	2.18	490.0
2500.0	.01	2.05	.01	1.73	1.93	490.0
3000.0	.04	1.80	.02	1.54	1.72	490.0
3500.0	.07	1.60	.04	1.38	1.54	490.0
4000.0	.12	1.43	.06	1.25	1.39	490.0

*mmj*

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.01	.02
400.0	.00	.00	.00	.01	.02	.06	.12	.20
500.0	.01	.04	.14	.31	.50	.69	.85	.96
600.0	2.21	2.65	2.81	2.81	2.70	2.56	2.39	2.23
700.0	5.52	4.96	4.41	3.91	3.48	3.11	2.80	2.53
800.0	.08	.27	.55	.83	1.07	1.25	1.35	1.41
900.0	.00	.00	.01	.03	.08	.16	.27	.38
1000.0	.00	.00	.00	.00	.00	.01	.02	.05

YDIV = 230.9  
 YC = 667.7  
 FATOR = .545

X	YDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	3.94	.00	2.85	3.24	670.0
1000.0	.00	3.26	.00	2.51	2.83	670.0
1500.0	.00	2.75	.00	2.20	2.48	670.0
2000.0	.00	2.35	.00	1.94	2.18	670.0
2500.0	.00	2.05	.00	1.72	1.93	670.0
3000.0	.00	1.80	.00	1.54	1.72	670.0
3500.0	.00	1.60	.00	1.38	1.54	670.0
4000.0	.00	1.43	.00	1.24	1.39	670.0

*msj*

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.01	.02	.04
600.0	.00	.00	.00	.02	.06	.13	.23	.33
700.0	.04	.18	.41	.67	.91	1.09	1.22	1.29
800.0	4.69	4.44	4.07	3.69	3.33	3.01	2.72	2.47
900.0	2.93	3.21	3.23	3.11	2.92	2.72	2.51	2.32
1000.0	.01	.07	.20	.40	.62	.81	.96	1.07

YDIV = 230.9

YC = 840.9

FATOR = .545

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	3.94	.00	2.96	2.99	840.0
1000.0	.00	3.26	.00	2.58	2.62	840.0
1500.0	.00	2.75	.00	2.25	2.29	840.0
2000.0	.00	2.35	.00	1.97	2.02	840.0
2500.0	.00	2.05	.00	1.74	1.79	840.0
3000.0	.00	1.80	.00	1.55	1.59	840.0
3500.0	.00	1.60	.00	1.39	1.43	840.0
4000.0	.00	1.43	.00	1.25	1.28	840.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.35	.59	.80	.95	1.06	1.11	1.13	1.12
100.0	.43	.65	.84	.98	1.07	1.12	1.13	1.12
200.0	.64	.82	.95	1.05	1.10	1.13	1.13	1.12
300.0	.98	1.06	1.11	1.14	1.15	1.15	1.14	1.11
400.0	1.39	1.35	1.30	1.25	1.21	1.17	1.14	1.10
500.0	1.79	1.61	1.46	1.34	1.25	1.19	1.13	1.09
600.0	2.08	1.79	1.57	1.40	1.28	1.19	1.12	1.06
700.0	2.18	1.86	1.61	1.42	1.27	1.17	1.09	1.03
800.0	2.07	1.78	1.56	1.38	1.24	1.13	1.05	.99
900.0	1.76	1.59	1.42	1.28	1.16	1.07	.99	.93
1000.0	1.36	1.31	1.23	1.14	1.06	.98	.92	.87

YDIV = 400.0

YC = 697.0

FATOR = .764

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	1.06	1.67	.67	1.80	1.80	700.0
1000.0	1.03	1.42	.74	1.54	1.54	700.0
1500.0	.99	1.23	.80	1.34	1.34	690.0
2000.0	.95	1.08	.84	1.19	1.19	680.0
2500.0	.92	.97	.86	1.07	1.07	640.0
3000.0	.90	.89	.87	.98	1.00	550.0
3500.0	.87	.83	.87	.92	.96	370.0
4000.0	.84	.79	.85	.87	.94	0.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.14	.29	.45	.60	.71	.80	.85	.88
100.0	.18	.32	.48	.62	.73	.81	.86	.89
200.0	.29	.43	.57	.68	.77	.84	.87	.89
300.0	.48	.61	.71	.79	.84	.88	.90	.90
400.0	.76	.84	.89	.91	.92	.92	.92	.91
500.0	1.10	1.11	1.08	1.04	1.00	.97	.95	.92
600.0	1.46	1.36	1.26	1.16	1.08	1.02	.97	.93
700.0	1.78	1.57	1.40	1.25	1.14	1.05	.98	.93
800.0	1.97	1.70	1.48	1.31	1.17	1.07	.98	.92
900.0	2.01	1.72	1.50	1.32	1.17	1.06	.97	.90
1000.0	1.87	1.64	1.44	1.28	1.14	1.03	.95	.88

YDIV = 400.0  
 YC = 870.2  
 FATOR = .764

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.58	1.54	.35	1.67	1.52	870.0
1000.0	.64	1.32	.43	1.44	1.31	870.0
1500.0	.68	1.15	.51	1.25	1.14	870.0
2000.0	.69	1.01	.57	1.10	1.00	870.0
2500.0	.70	.90	.62	.99	.90	850.0
3000.0	.71	.81	.66	.89	.81	830.0
3500.0	.70	.75	.68	.82	.75	770.0
4000.0	.70	.70	.69	.77	.71	660.0

*any*

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.06	.14	.25	.37	.48	.57	.64	.69
100.0	.07	.16	.27	.38	.49	.58	.64	.69
200.0	.13	.23	.33	.44	.53	.61	.66	.70
300.0	.23	.34	.44	.52	.59	.65	.69	.72
400.0	.39	.49	.57	.63	.68	.71	.73	.74
500.0	.61	.69	.74	.76	.77	.77	.77	.77
600.0	.88	.92	.92	.89	.86	.84	.81	.79
700.0	1.20	1.15	1.09	1.02	.95	.90	.85	.81
800.0	1.50	1.37	1.24	1.13	1.03	.95	.88	.83
900.0	1.74	1.53	1.35	1.20	1.08	.98	.90	.84
1000.0	1.87	1.61	1.41	1.24	1.11	1.00	.91	.84

YDIV = 400.0

YC = 1043.4

FATOR = .764

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.29	1.44	.17	1.56	1.30	1040.0
1000.0	.38	1.24	.24	1.35	1.12	1040.0
1500.0	.44	1.08	.31	1.18	.98	1040.0
2000.0	.48	.95	.38	1.04	.87	1040.0
2500.0	.52	.85	.44	.93	.77	1040.0
3000.0	.54	.76	.49	.84	.70	1030.0
3500.0	.56	.70	.52	.77	.64	1010.0
4000.0	.57	.64	.54	.71	.59	960.0

2 U

U0 = 2.00

UA = .60

D = 400.0

57.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.01	.03	.07
400.0	.00	.00	.02	.10	.22	.37	.51	.61
500.0	1.95	2.43	2.53	2.43	2.26	2.07	1.88	1.70
600.0	.90	1.52	1.86	1.97	1.94	1.85	1.72	1.59
700.0	.00	.00	.01	.05	.14	.26	.39	.50
800.0	.00	.00	.00	.00	.00	.01	.02	.05
900.0	.00	.00	.00	.00	.00	.00	.00	.00
1000.0	.00	.00	.00	.00	.00	.00	.00	.00

YDIV = 230.9

YC = 543.9

FATOR = .945

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	6.15	.00	3.19	3.41	540.0
1000.0	.00	4.79	.00	2.75	2.89	540.0
1500.0	.00	3.87	.00	2.36	2.45	540.0
2000.0	.00	3.20	.00	2.04	2.09	540.0
2500.0	.00	2.71	.00	1.77	1.80	540.0
3000.0	.00	2.33	.00	1.55	1.57	540.0
3500.0	.00	2.03	.00	1.36	1.38	540.0
4000.0	.01	1.79	.00	1.21	1.22	540.0

*mm*



2 U

U0 = 2.00

UA = .60

D = 600.0

58.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.01
500.0	.00	.00	.00	.00	.01	.04	.10	.17
600.0	.00	.05	.18	.38	.58	.74	.85	.91
700.0	5.17	4.32	3.63	3.09	2.66	2.31	2.03	1.80
800.0	.15	.47	.83	1.10	1.26	1.32	1.32	1.29
900.0	.00	.00	.00	.02	.06	.14	.23	.33
1000.0	.00	.00	.00	.00	.00	.00	.01	.03

YDIV = 230.9  
 YC = 717.1  
 FATOR = .945

X	D̄T̄DIV	DTC	D̄T̄MED	DTI	D̄T̄MAX	YMAX
500.0	.00	5.72	.00	2.97	3.27	720.0
1000.0	.00	4.51	.00	2.58	2.77	720.0
1500.0	.00	3.66	.00	2.23	2.35	720.0
2000.0	.00	3.06	.00	1.93	2.01	720.0
2500.0	.00	2.60	.00	1.69	1.74	720.0
3000.0	.00	2.24	.00	1.48	1.52	720.0
3500.0	.00	1.96	.00	1.31	1.34	720.0
4000.0	.00	1.73	.00	1.17	1.19	720.0

*RVU7*

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.00	.00	.00
600.0	.00	.00	.00	.00	.00	.00	.01	.03
700.0	.00	.00	.00	.02	.06	.13	.22	.31
800.0	.12	.39	.70	.96	1.12	1.20	1.22	1.20
900.0	5.42	4.38	3.62	3.05	2.61	2.27	1.99	1.77
1000.0	.02	.12	.32	.55	.75	.88	.96	1.00

YDIV = 230.9  
 YC = 890.3  
 FATOR = .945

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	5.36	.00	3.04	2.83	890.0
1000.0	.00	4.26	.00	2.59	2.39	890.0
1500.0	.00	3.49	.00	2.22	2.03	890.0
2000.0	.00	2.93	.00	1.91	1.74	890.0
2500.0	.00	2.50	.00	1.66	1.51	890.0
3000.0	.00	2.16	.00	1.46	1.32	890.0
3500.0	.00	1.90	.00	1.29	1.17	890.0
4000.0	.00	1.68	.00	1.15	1.04	890.0

*any*

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.01	.06	.15	.27	.38	.48	.55	.60
100.0	.03	.08	.18	.29	.40	.49	.56	.61
200.0	.07	.17	.27	.37	.46	.53	.59	.62
300.0	.19	.32	.42	.50	.55	.60	.62	.64
400.0	.42	.55	.62	.65	.66	.67	.67	.66
500.0	.78	.84	.85	.82	.78	.74	.71	.69
600.0	1.23	1.16	1.06	.97	.88	.81	.75	.71
700.0	1.64	1.42	1.23	1.08	.95	.85	.78	.72
800.0	1.85	1.54	1.31	1.13	.98	.87	.78	.72
900.0	1.77	1.49	1.28	1.11	.97	.86	.77	.70
1000.0	1.43	1.28	1.15	1.02	.91	.82	.74	.67

YDIV = 400.4

YC = 821.9

FATOR = 1.000

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.42	1.86	.22	1.88	1.89	820.0
1000.0	.55	1.55	.30	1.57	1.58	820.0
1500.0	.62	1.31	.39	1.33	1.34	820.0
2000.0	.65	1.13	.46	1.15	1.16	820.0
2500.0	.66	.98	.52	1.00	1.01	820.0
3000.0	.67	.87	.57	.89	.89	810.0
3500.0	.67	.78	.61	.80	.81	790.0
4000.0	.66	.71	.63	.73	.74	740.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.02	.06	.13	.21	.30	.37	.43
100.0	.01	.03	.07	.15	.23	.31	.38	.44
200.0	.02	.06	.12	.20	.27	.35	.41	.45
300.0	.05	.12	.20	.28	.35	.40	.45	.48
400.0	.13	.24	.33	.40	.44	.48	.50	.52
500.0	.29	.41	.49	.53	.55	.56	.56	.55
600.0	.56	.65	.69	.69	.67	.64	.61	.59
700.0	.92	.93	.89	.83	.77	.72	.67	.63
800.0	1.31	1.19	1.07	.96	.86	.78	.71	.65
900.0	1.62	1.38	1.19	1.04	.92	.82	.73	.67
1000.0	1.73	1.45	1.23	1.07	.93	.83	.74	.67

YDIV = 400.4  
 YC = 995.1  
 FATOR = 1.000

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.13	1.73	.07	1.74	1.60	1000.0
1000.0	.24	1.45	.13	1.47	1.34	1000.0
1500.0	.33	1.23	.19	1.25	1.15	1000.0
2000.0	.40	1.07	.26	1.09	.99	1000.0
2500.0	.44	.93	.33	.95	.87	990.0
3000.0	.48	.83	.39	.84	.77	990.0
3500.0	.50	.74	.44	.76	.69	990.0
4000.0	.52	.67	.47	.68	.63	970.0

*mmj*

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.01	.02	.06	.11	.18	.24	.30
100.0	.00	.01	.03	.07	.12	.19	.25	.31
200.0	.00	.02	.05	.10	.16	.22	.27	.32
300.0	.01	.04	.09	.15	.21	.26	.31	.35
400.0	.04	.09	.16	.22	.28	.32	.36	.39
500.0	.09	.18	.26	.32	.37	.40	.42	.43
600.0	.21	.31	.39	.44	.47	.48	.48	.48
700.0	.40	.50	.56	.58	.58	.56	.54	.52
800.0	.68	.74	.74	.72	.68	.64	.60	.57
900.0	1.03	.98	.92	.85	.77	.71	.65	.60
1000.0	1.35	1.20	1.07	.95	.85	.76	.69	.63

YDIV = 400.4  
 YC = 1168.3  
 FATOR = 1.000

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.04	1.62	.02	1.64	1.39	1170.0
1000.0	.09	1.37	.05	1.39	1.17	1170.0
1500.0	.16	1.17	.09	1.19	1.01	1170.0
2000.0	.22	1.02	.14	1.04	.88	1170.0
2500.0	.28	.90	.20	.91	.77	1170.0
3000.0	.32	.79	.25	.81	.68	1170.0
3500.0	.36	.71	.30	.73	.61	1170.0
4000.0	.39	.64	.35	.66	.55	1160.0

*any*

2 U

U0 = 3.00

UA = .60

D = 400.0

F7.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.01
400.0	.00	.00	.00	.00	.01	.02	.05	.09
500.0	.00	.01	.06	.16	.29	.42	.52	.59
600.0	2.50	2.52	2.35	2.13	1.91	1.71	1.54	1.39
700.0	.58	1.00	1.27	1.39	1.40	1.35	1.28	1.20
800.0	.00	.00	.01	.04	.11	.21	.30	.39
900.0	.00	.00	.00	.00	.00	.01	.02	.05
1000.0	.00	.00	.00	.00	.00	.00	.00	.00

YDIV = 231.2  
 YC = 635.7  
 FATOR = 1.000

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	4.79	.00	1.96	2.49	640.0
1000.0	.00	3.79	.00	1.66	2.07	640.0
1500.0	.00	3.09	.00	1.41	1.74	640.0
2000.0	.00	2.58	.00	1.21	1.48	640.0
2500.0	.00	2.20	.00	1.05	1.28	640.0
3000.0	.00	1.90	.00	.92	1.12	640.0
3500.0	.00	1.57	.00	.81	.98	640.0
4000.0	.00	1.48	.00	.72	.87	640.0

*run*

2 U

U0 = 3.00

UA = .60

D = 600.0

64.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.00	.01	.02
600.0	.00	.00	.00	.01	.03	.07	.12	.19
700.0	.02	.12	.30	.49	.64	.74	.80	.82
800.0	4.30	3.48	2.88	2.44	2.09	1.82	1.60	1.42
900.0	.11	.34	.59	.79	.92	.97	.99	.97
1000.0	.00	.00	.00	.02	.05	.11	.19	.26

YDIV = 231.2

YC = 808.9

FATOR = 1.000

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	4.46	.00	1.79	2.22	810.0
1000.0	.00	3.56	.00	1.54	1.85	810.0
1500.0	.00	2.93	.00	1.32	1.57	810.0
2000.0	.00	2.46	.00	1.14	1.34	810.0
2500.0	.00	2.11	.00	1.00	1.16	810.0
3000.0	.00	1.83	.00	.88	1.01	810.0
3500.0	.00	1.61	.00	.78	.89	810.0
4000.0	.00	1.43	.00	.70	.80	810.0

*mm*

2 U

U0 = 3.00

UA = .60

D = 800.0

65.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.00	.00	.00
600.0	.00	.00	.00	.00	.00	.00	.00	.00
700.0	.00	.00	.00	.00	.00	.01	.02	.04
800.0	.00	.00	.01	.04	.09	.17	.25	.32
900.0	.30	.60	.86	1.01	1.08	1.10	1.07	1.03
1000.0	3.70	3.11	2.64	2.27	1.97	1.73	1.53	1.37

YDIV = 231.2  
 YC = 982.1  
 FATOR = 1.000

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	4.20	.00	1.85	1.93	980.0
1000.0	.00	3.38	.00	1.55	1.61	980.0
1500.0	.00	2.80	.00	1.32	1.36	980.0
2000.0	.00	2.36	.00	1.13	1.17	980.0
2500.0	.00	2.03	.00	.98	1.01	980.0
3000.0	.00	1.77	.00	.86	.89	980.0
3500.0	.00	1.56	.00	.76	.79	980.0
4000.0	.00	1.39	.00	.68	.70	980.0

*run*



	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.27	.44	.60	.72	.80	.86	.88	.89
100.0	.32	.48	.62	.73	.81	.86	.88	.89
200.0	.45	.58	.70	.78	.84	.88	.89	.89
300.0	.65	.74	.81	.85	.88	.90	.90	.89
400.0	.92	.94	.94	.94	.93	.92	.91	.89
500.0	1.21	1.14	1.08	1.02	.98	.94	.91	.88
600.0	1.47	1.32	1.20	1.10	1.02	.96	.91	.87
700.0	1.66	1.44	1.27	1.14	1.04	.96	.91	.86
800.0	1.73	1.49	1.30	1.16	1.04	.96	.89	.84
900.0	1.67	1.45	1.27	1.13	1.02	.93	.86	.81
1000.0	1.49	1.33	1.19	1.07	.97	.89	.83	.78

YDIV = 400.4  
 YC = 803.7  
 FATOR = .782

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.72	1.35	.47	1.36	1.35	800.0
1000.0	.74	1.16	.54	1.18	1.17	800.0
1500.0	.74	1.02	.60	1.03	1.03	800.0
2000.0	.73	.90	.65	.92	.91	790.0
2500.0	.73	.81	.68	.83	.83	760.0
3000.0	.72	.75	.69	.76	.76	690.0
3500.0	.71	.70	.70	.71	.72	570.0
4000.0	.69	.66	.69	.69	.70	270.0

*mm*

2 U

U0 = 4.00

UA = .20

D = 600.0

67.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.13	.24	.36	.47	.56	.63	.68	.71
100.0	.15	.26	.38	.49	.57	.64	.68	.71
200.0	.22	.33	.44	.53	.60	.66	.69	.71
300.0	.35	.45	.53	.60	.65	.69	.71	.72
400.0	.52	.60	.65	.69	.71	.73	.73	.73
500.0	.74	.78	.79	.78	.78	.77	.76	.75
600.0	.99	.97	.93	.88	.84	.81	.78	.76
700.0	1.24	1.14	1.05	.97	.90	.84	.80	.76
800.0	1.44	1.28	1.15	1.03	.94	.87	.81	.77
900.0	1.57	1.37	1.21	1.07	.97	.88	.82	.76
1000.0	1.60	1.39	1.22	1.08	.97	.88	.81	.75

YDIV = 400.4

YC = 976.9

FATOR = .782

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.41	1.25	.25	1.26	1.14	980.0
1000.0	.47	1.09	.33	1.10	.99	980.0
1500.0	.51	.95	.39	.97	.87	980.0
2000.0	.54	.85	.45	.86	.78	970.0
2500.0	.56	.76	.50	.77	.70	960.0
3000.0	.57	.69	.53	.70	.63	940.0
3500.0	.57	.63	.55	.65	.59	890.0
4000.0	.57	.59	.56	.60	.55	800.0

my

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.05	.12	.21	.30	.38	.45	.51	.55
100.0	.07	.13	.22	.31	.39	.46	.52	.56
200.0	.10	.18	.26	.35	.42	.48	.53	.57
300.0	.17	.25	.33	.41	.47	.52	.55	.58
400.0	.28	.36	.43	.48	.53	.56	.58	.60
500.0	.42	.50	.54	.58	.60	.61	.62	.62
600.0	.61	.65	.67	.68	.67	.66	.65	.64
700.0	.82	.83	.81	.78	.74	.71	.69	.67
800.0	1.05	.99	.93	.87	.81	.76	.72	.68
900.0	1.26	1.14	1.04	.95	.87	.80	.74	.70
1000.0	1.42	1.26	1.12	1.00	.91	.83	.76	.71

$\bar{Y}DIV = 400.4$   
 $YC = 1150.1$   
 $FATOR = .782$

X	$\bar{D}T\bar{D}IV$	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.22	1.19	.13	1.20	1.00	1150.0
1000.0	.28	1.04	.19	1.05	.87	1150.0
1500.0	.34	.91	.25	.92	.77	1150.0
2000.0	.38	.81	.30	.82	.68	1150.0
2500.0	.41	.73	.36	.74	.61	1150.0
3000.0	.44	.66	.40	.67	.56	1140.0
3500.0	.46	.60	.43	.61	.51	1120.0
4000.0	.47	.55	.45	.56	.47	1080.0

*mu*

2 U

U0 = 4.00

UA = .60

D = 400.0

69.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.00	.01	.02
600.0	.00	.00	.00	.01	.02	.03	.05	.07
700.0	.01	.03	.05	.09	.13	.16	.19	.21
800.0	.26	.34	.39	.43	.45	.46	.45	.44
900.0	1.22	1.10	.99	.89	.81	.74	.68	.62
1000.0	.96	.91	.85	.80	.74	.69	.64	.59

YDIV = 231.2

YC = 936.3

FATOR = 1.000

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	1.38	.00	.40	.48	940.0
1000.0	.00	1.20	.00	.35	.42	940.0
1500.0	.00	1.06	.00	.31	.37	940.0
2000.0	.00	.95	.00	.28	.33	940.0
2500.0	.00	.85	.00	.25	.30	940.0
3000.0	.00	.77	.00	.23	.27	940.0
3500.0	.00	.70	.00	.21	.24	940.0
4000.0	.00	.64	.00	.19	.22	940.0



	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.00	.00	.00
600.0	.00	.00	.00	.00	.00	.00	.00	.01
700.0	.00	.00	.00	.00	.00	.01	.02	.03
800.0	.00	.00	.01	.02	.04	.06	.09	.11
900.0	.04	.08	.13	.17	.21	.24	.26	.28
1000.0	.51	.55	.57	.57	.56	.54	.52	.49

YDIV = 231.2  
 YC = 1109.5  
 FATOR = 1.000

X	DTDIV	DYC	DTMED	DTI	DTMAX	YMAX
500.0	.00	1.28	.00	.37	.41	1090.0
1000.0	.00	1.12	.00	.33	.36	1090.0
1500.0	.00	1.00	.00	.29	.32	1090.0
2000.0	.00	.89	.00	.26	.29	1090.0
2500.0	.00	.80	.00	.24	.26	1090.0
3000.0	.00	.73	.00	.22	.23	1090.0
3500.0	.00	.67	.00	.20	.21	1090.0
4000.0	.00	.61	.00	.18	.20	1090.0

*mu*

2 U

U0 = 4.00

UA = .60

D = 800.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.00	.00	.00
600.0	.00	.00	.00	.00	.00	.00	.00	.00
700.0	.00	.00	.00	.00	.00	.00	.00	.00
800.0	.00	.00	.00	.00	.00	.00	.01	.01
900.0	.00	.00	.00	.01	.01	.02	.04	.05
1000.0	.00	.01	.03	.05	.08	.11	.13	.16

YDIV = 231.2  
 YC = 1282.8  
 FATOR = 1.000

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	1.21	.00	.36	.36	1270.0
1000.0	.00	1.07	.00	.32	.32	1270.0
1500.0	.00	.95	.00	.28	.28	1270.0
2000.0	.00	.85	.00	.25	.25	1270.0
2500.0	.00	.77	.00	.23	.23	1270.0
3000.0	.00	.70	.00	.21	.21	1270.0
3500.0	.00	.64	.00	.19	.19	1270.0
4000.0	.00	.59	.00	.18	.18	1270.0

*Handwritten signature*

## APPENDIX A.2

COMPUTER PRINT-OUTS FOR DESIGN(B)

(Temperature increase inside condenser = 8,5°C)

*mu*

1 U

U0 = 1.00

UA = .20

D = 400.0

73.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.05	.18	.38	.57	.72	.82	.86	.89
100.0	.10	.26	.45	.62	.75	.83	.87	.89
200.0	.31	.51	.66	.76	.83	.87	.89	.88
300.0	.76	.90	.95	.95	.94	.93	.91	.89
400.0	1.44	1.38	1.27	1.15	1.05	.98	.93	.88
500.0	2.13	1.79	1.51	1.30	1.13	1.02	.93	.87
600.0	2.43	1.95	1.61	1.35	1.16	1.02	.92	.85
700.0	2.16	1.80	1.52	1.29	1.12	.98	.88	.81
800.0	1.48	1.40	1.28	1.14	1.02	.91	.82	.76
900.0	.79	.92	.95	.92	.87	.80	.74	.69
1000.0	.32	.51	.63	.69	.69	.68	.65	.61

YDIV = 282.8

YC = 602.4

FATOR = .384

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.25	.93	.14	.90	.94	600.0
1000.0	.32	.75	.19	.73	.77	600.0
1500.0	.34	.62	.24	.61	.64	600.0
2000.0	.35	.52	.29	.51	.54	600.0
2500.0	.35	.44	.32	.44	.47	590.0
3000.0	.35	.39	.33	.39	.41	560.0
3500.0	.35	.35	.34	.35	.38	490.0
4000.0	.34	.32	.34	.34	.36	310.0



I U

U0 = 1.00

UA = .20

D = 600.0

74.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.03	.10	.21	.34	.45	.53	.59
100.0	.01	.05	.13	.25	.36	.46	.54	.59
200.0	.04	.12	.23	.34	.44	.52	.58	.61
300.0	.14	.28	.40	.49	.56	.60	.63	.64
400.0	.38	.55	.64	.69	.70	.69	.68	.67
500.0	.82	.92	.93	.90	.84	.79	.74	.71
600.0	1.43	1.34	1.22	1.09	.97	.87	.79	.73
700.0	2.00	1.68	1.43	1.22	1.06	.93	.83	.75
800.0	2.25	1.82	1.51	1.27	1.09	.95	.84	.75
900.0	2.02	1.70	1.43	1.23	1.06	.93	.82	.73
1000.0	1.46	1.36	1.23	1.09	.97	.87	.77	.70

YDIV = 282.8  
 YC = 802.4  
 FATOR = .384

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.04	.86	.02	.84	.83	800.0
1000.0	.09	.70	.05	.68	.68	800.0
1500.0	.14	.58	.09	.57	.57	800.0
2000.0	.18	.49	.13	.48	.48	800.0
2500.0	.20	.42	.17	.42	.41	800.0
3000.0	.22	.36	.20	.36	.36	800.0
3500.0	.24	.32	.22	.32	.32	780.0
4000.0	.24	.29	.23	.29	.29	750.0

*mmj*

I U      U0 = 1.00      UA = .20      D = 800.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.02	.07	.14	.23	.30	.37
100.0	.00	.01	.03	.09	.16	.24	.32	.38
200.0	.00	.02	.07	.13	.21	.28	.35	.40
300.0	.02	.07	.14	.22	.29	.35	.40	.44
400.0	.06	.15	.26	.34	.40	.44	.47	.49
500.0	.18	.32	.43	.50	.53	.54	.54	.54
600.0	.44	.58	.66	.69	.68	.65	.62	.59
700.0	.87	.93	.92	.88	.81	.75	.69	.64
800.0	1.41	1.30	1.17	1.05	.93	.83	.74	.67
900.0	1.89	1.59	1.36	1.16	1.01	.88	.78	.70
1000.0	2.09	1.71	1.42	1.21	1.04	.90	.79	.71

$\bar{Y}DIV = 282.8$   
 $YC = 1002.4$   
 FATOR = .384

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.01	.80	.00	.78	.69	1000.0
1000.0	.02	.66	.01	.64	.57	1000.0
1500.0	.05	.55	.03	.54	.48	1000.0
2000.0	.08	.46	.05	.46	.41	1000.0
2500.0	.11	.40	.08	.40	.35	1000.0
3000.0	.13	.35	.11	.35	.31	1000.0
3500.0	.15	.30	.13	.30	.27	1000.0
4000.0	.17	.27	.15	.27	.24	990.0

*mu*

I U

U0 = 1.00

UA = .60

D = 400.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.01	.04	.08
400.0	.00	.00	.04	.15	.30	.46	.59	.67
500.0	4.51	3.96	3.37	2.86	2.45	2.12	1.85	1.63
600.0	.02	.19	.50	.80	1.00	1.10	1.13	1.12
700.0	.00	.00	.00	.00	.02	.07	.14	.22
800.0	.00	.00	.00	.00	.00	.00	.00	.01
900.0	.00	.00	.00	.00	.00	.00	.00	.00
1000.0	.00	.00	.00	.00	.00	.00	.00	.00

YDIV = 163.3

YC = 520.0

FATOR = .473

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	3.03	.00	1.50	1.56	520.0
1000.0	.00	2.29	.00	1.29	1.33	520.0
1500.0	.00	1.81	.00	1.09	1.12	520.0
2000.0	.00	1.47	.00	.93	.95	520.0
2500.0	.00	1.23	.00	.80	.81	520.0
3000.0	.00	1.05	.00	.69	.70	520.0
3500.0	.00	.90	.00	.61	.61	520.0
4000.0	.00	.79	.00	.54	.54	520.0

U	U0 = 1.00	UA = .60	D = 600.0					
	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.01	.03	.08
600.0	.00	.00	.04	.14	.29	.45	.57	.66
700.0	4.45	3.92	3.34	2.83	2.42	2.09	1.83	1.61
800.0	.02	.17	.48	.77	.98	1.08	1.11	1.10
900.0	.00	.00	.00	.00	.02	.06	.13	.21
1000.0	.00	.00	.00	.00	.00	.00	.00	.01

YDIV = 163.3  
 YC = 720.0  
 FATOR = .473

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	3.02	.00	1.48	1.54	720.0
1000.0	.00	2.28	.00	1.27	1.32	720.0
1500.0	.00	1.80	.00	1.08	1.11	720.0
2000.0	.00	1.46	.00	.92	.94	720.0
2500.0	.00	1.22	.00	.79	.80	720.0
3000.0	.00	1.03	.00	.69	.69	720.0
3500.0	.00	.89	.00	.60	.60	720.0
4000.0	.00	.78	.00	.53	.53	720.0

*mmj*

I U

U0 = 1.00

UA = .50

D = 900.0

78.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.00	.00	.00
600.0	.00	.00	.00	.00	.00	.00	.00	.00
700.0	.00	.00	.00	.00	.00	.01	.04	.08
800.0	.00	.00	.04	.15	.30	.45	.57	.66
900.0	4.35	3.81	3.25	2.76	2.36	2.04	1.78	1.57
1000.0	.03	.19	.49	.78	.97	1.07	1.10	1.08

YDIV = 163.3

YC = 920.0

FATOR = .473

X	OTDIV	OTC	OTMED	OTI	OTMAX	YMAX
500.0	.00	2.90	.00	1.44	1.33	920.0
1000.0	.00	2.20	.00	1.24	1.13	920.0
1500.0	.00	1.74	.00	1.05	.96	920.0
2000.0	.00	1.42	.00	.90	.81	920.0
2500.0	.00	1.18	.00	.77	.69	920.0
3000.0	.00	1.01	.00	.67	.60	920.0
3500.0	.00	.87	.00	.59	.52	920.0
4000.0	.00	.76	.00	.52	.46	920.0



I U      U0 = 2.00      UA = .20      D = 400.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.01	.05	.12	.20	.27	.32
100.0	.00	.00	.03	.08	.14	.22	.28	.33
200.0	.00	.02	.07	.14	.21	.27	.32	.35
300.0	.02	.09	.18	.26	.32	.35	.37	.39
400.0	.12	.26	.37	.43	.45	.44	.43	.42
500.0	.46	.60	.64	.62	.58	.53	.49	.46
600.0	1.11	1.03	.91	.79	.69	.61	.54	.48
700.0	1.69	1.33	1.08	.89	.75	.64	.56	.50
800.0	1.62	1.30	1.06	.88	.74	.64	.56	.49
900.0	.97	.95	.86	.76	.67	.59	.52	.47
1000.0	.36	.52	.58	.58	.56	.51	.47	.43

YDIV = 282.8  
 YC = 740.4  
 FATOR = .709

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.01	1.25	.00	1.30	1.40	740.0
1000.0	.05	.97	.02	1.02	1.10	740.0
1500.0	.11	.77	.06	.82	.88	740.0
2000.0	.17	.64	.10	.68	.73	740.0
2500.0	.21	.54	.15	.57	.62	740.0
3000.0	.24	.46	.19	.49	.53	740.0
3500.0	.26	.40	.22	.43	.46	740.0
4000.0	.27	.35	.25	.38	.41	720.0

*mm*

I U	U0 = 2.00	UA = .20	D = 600.0					
	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.01	.03	.08	.13	.18
100.0	.00	.00	.00	.02	.04	.09	.14	.18
200.0	.00	.00	.01	.04	.07	.12	.17	.21
300.0	.00	.01	.03	.08	.13	.17	.21	.24
400.0	.00	.03	.09	.16	.21	.25	.27	.29
500.0	.03	.11	.20	.28	.32	.34	.34	.34
600.0	.15	.30	.39	.43	.44	.43	.41	.39
700.0	.50	.62	.64	.61	.57	.52	.47	.43
800.0	1.09	1.00	.88	.76	.66	.58	.51	.46
900.0	1.58	1.25	1.02	.85	.72	.62	.54	.47
1000.0	1.52	1.22	1.00	.84	.71	.61	.53	.47

YDIV = 282.8

YC = 940.4

FATOR = .709

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	1.16	.00	1.22	1.16	940.0
1000.0	.00	.91	.00	.96	.91	940.0
1500.0	.02	.73	.01	.78	.74	940.0
2000.0	.05	.61	.03	.65	.62	940.0
2500.0	.08	.51	.05	.55	.52	940.0
3000.0	.12	.44	.08	.47	.45	940.0
3500.0	.14	.38	.12	.41	.39	940.0
4000.0	.17	.34	.15	.36	.34	940.0

*mmj*

I U      U0 = 2.00      UA = .20      D = 800.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.01	.03	.05	.09
100.0	.00	.00	.00	.00	.01	.03	.06	.09
200.0	.00	.00	.00	.01	.02	.05	.08	.11
300.0	.00	.00	.00	.02	.04	.08	.11	.14
400.0	.00	.00	.02	.04	.08	.12	.15	.18
500.0	.00	.01	.04	.09	.14	.18	.21	.22
600.0	.01	.04	.11	.17	.22	.25	.27	.27
700.0	.05	.13	.22	.29	.32	.34	.33	.32
800.0	.19	.32	.41	.44	.44	.42	.40	.37
900.0	.54	.63	.63	.60	.55	.50	.46	.41
1000.0	1.07	.96	.84	.74	.64	.56	.50	.44

YDIV = 282.8

YC = 1140.4

FATOR = .709

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	1.08	.00	1.14	.98	1140.0
1000.0	.00	.86	.00	.91	.78	1140.0
1500.0	.00	.70	.00	.74	.64	1140.0
2000.0	.01	.58	.01	.62	.53	1140.0
2500.0	.03	.49	.02	.53	.45	1140.0
3000.0	.05	.42	.03	.45	.39	1140.0
3500.0	.07	.37	.06	.39	.34	1140.0
4000.0	.10	.32	.08	.35	.30	1140.0

*mmj*



1 U

U0 = 2.00

UA = .60

D = 400.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.01	.03	.08	.14
500.0	.01	.16	.44	.69	.82	.86	.85	.81
600.0	.41	1.00	1.30	1.35	1.29	1.19	1.08	.97
700.0	.00	.00	.00	.01	.03	.09	.16	.23
800.0	.00	.00	.00	.00	.00	.00	.00	.01
900.0	.00	.00	.00	.00	.00	.00	.00	.00
1000.0	.00	.00	.00	.00	.00	.00	.00	.00

YDIV = 163.3  
 YC = 561.0  
 FATOR = .782

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	3.93	.00	1.33	1.47	560.0
1000.0	.00	2.81	.00	1.12	1.20	560.0
1500.0	.00	2.14	.00	.93	.97	560.0
2000.0	.00	1.70	.00	.77	.80	560.0
2500.0	.00	1.39	.00	.65	.67	560.0
3000.0	.00	1.16	.00	.55	.56	560.0
3500.0	.00	.99	.00	.48	.48	560.0
4000.0	.00	.86	.00	.42	.42	560.0

*mmj*

I U      U0 = 2.00      UA = .60      D = 600.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.00	.00	.01
600.0	.00	.00	.00	.00	.01	.04	.09	.14
700.0	.02	.19	.48	.70	.82	.85	.83	.79
800.0	.51	1.05	1.30	1.33	1.26	1.16	1.04	.94
900.0	.00	.00	.00	.01	.04	.10	.17	.24
1000.0	.00	.00	.00	.00	.00	.00	.00	.01

YDIV = 163.3  
 YC = 761.0  
 FATOR = .782

X	DTDIV	UTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	3.66	.00	1.28	1.37	760.0
1000.0	.00	2.65	.00	1.07	1.11	760.0
1500.0	.00	2.03	.00	.89	.90	760.0
2000.0	.00	1.62	.00	.74	.74	760.0
2500.0	.00	1.33	.00	.63	.62	760.0
3000.0	.00	1.12	.00	.53	.53	760.0
3500.0	.00	.95	.00	.46	.45	760.0
4000.0	.00	.83	.00	.40	.40	760.0

*Handwritten signature*

I U

U0 = 2.00

UA = .60

D = 800.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.00	.00	.00
600.0	.00	.00	.00	.00	.00	.00	.00	.00
700.0	.00	.00	.00	.00	.00	.00	.00	.01
800.0	.00	.00	.00	.00	.01	.04	.09	.15
900.0	.03	.23	.51	.72	.82	.84	.82	.75
1000.0	.59	1.10	1.30	1.31	1.23	1.13	1.02	.92

YDIV = 163.3  
 YC = 961.0  
 FATOR = .782

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	3.44	.00	1.23	1.17	960.0
1000.0	.00	2.51	.00	1.03	.95	960.0
1500.0	.00	1.94	.00	.86	.77	960.0
2000.0	.00	1.55	.00	.71	.64	960.0
2500.0	.00	1.28	.00	.60	.53	960.0
3000.0	.00	1.08	.00	.52	.45	960.0
3500.0	.00	.92	.00	.45	.39	960.0
4000.0	.00	.80	.00	.39	.34	960.0

*mm*

DESIGNER NUMBER = 354 017020K  
 I U U0 = 3.00 UA = .20 D = 400.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.01	.03	.06	.10	.15
100.0	.00	.00	.00	.01	.04	.07	.11	.15
200.0	.00	.00	.01	.03	.06	.10	.14	.17
300.0	.00	.01	.03	.07	.12	.15	.18	.21
400.0	.00	.03	.09	.15	.19	.22	.24	.24
500.0	.03	.12	.21	.27	.30	.30	.30	.29
600.0	.20	.34	.41	.42	.45	.38	.35	.32
700.0	.66	.69	.64	.57	.51	.45	.40	.35
800.0	1.25	1.00	.81	.67	.57	.49	.42	.37
900.0	1.33	1.03	.83	.68	.57	.49	.42	.37
1000.0	.81	.77	.69	.60	.52	.46	.40	.36

YDIV = 283.1  
 YC = 861.6  
 FATOR = .982

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	1.36	.00	1.20	1.10	860.0
1000.0	.00	1.04	.00	.92	.85	860.0
1500.0	.02	.83	.01	.74	.68	860.0
2000.0	.06	.68	.03	.61	.55	860.0
2500.0	.10	.57	.06	.51	.46	860.0
3000.0	.14	.48	.10	.43	.40	860.0
3500.0	.17	.42	.14	.38	.34	860.0
4000.0	.20	.37	.17	.33	.30	860.0

*mm*

I U

U0 = 3.00

UA = .20

D = 600.0

86.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.01	.02	.04	.07
100.0	.00	.00	.00	.00	.01	.02	.05	.08
200.0	.00	.00	.00	.00	.02	.04	.06	.09
300.0	.00	.00	.00	.01	.04	.06	.09	.12
400.0	.00	.00	.01	.04	.07	.10	.13	.15
500.0	.00	.01	.04	.08	.12	.16	.18	.19
600.0	.01	.04	.10	.16	.20	.22	.23	.23
700.0	.05	.14	.23	.28	.30	.30	.29	.28
800.0	.24	.36	.41	.42	.40	.37	.34	.31
900.0	.68	.68	.62	.55	.49	.43	.38	.34
1000.0	1.18	.94	.77	.64	.54	.47	.41	.36

$\bar{Y}DIV = 283.1$   
 $YC = 1061.6$   
 $FATOR = .982$

X	$\bar{D}T\bar{D}IV$	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	1.27	.00	1.12	.92	1060.0
1000.0	.00	.98	.00	.87	.72	1060.0
1500.0	.00	.79	.00	.70	.58	1060.0
2000.0	.01	.65	.01	.58	.48	1060.0
2500.0	.03	.54	.02	.49	.40	1060.0
3000.0	.06	.46	.04	.42	.34	1060.0
3500.0	.08	.40	.06	.36	.30	1060.0
4000.0	.11	.35	.09	.32	.26	1060.0

*any*

1 U

U0 = 3.00

UA = .20

D = 800.0

87.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.01	.03
100.0	.00	.00	.00	.00	.00	.01	.02	.03
200.0	.00	.00	.00	.00	.00	.01	.03	.04
300.0	.00	.00	.00	.00	.01	.02	.04	.06
400.0	.00	.00	.00	.01	.02	.04	.06	.08
500.0	.00	.00	.00	.02	.04	.07	.09	.11
600.0	.00	.00	.02	.04	.08	.11	.13	.15
700.0	.00	.01	.05	.09	.13	.16	.18	.19
800.0	.01	.05	.12	.17	.21	.23	.23	.23
900.0	.07	.16	.24	.28	.30	.30	.29	.27
1000.0	.27	.38	.42	.42	.39	.37	.33	.31

YDIV = 283.1  
 YC = 1261.6  
 FATOR = .982

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	1.19	.00	1.05	.79	1260.0
1000.0	.00	.93	.00	.83	.62	1260.0
1500.0	.00	.75	.00	.67	.51	1260.0
2000.0	.00	.62	.00	.55	.42	1260.0
2500.0	.01	.52	.00	.47	.35	1260.0
3000.0	.02	.45	.01	.40	.30	1260.0
3500.0	.04	.39	.03	.35	.26	1260.0
4000.0	.06	.34	.04	.31	.23	1260.0

*mm*

DESCARGA SUMERSA -- SEM DIFUSOR

1 U

U0 = 3.00

UA = .60

D = 400.0

88.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.01	.02
500.0	.00	.00	.00	.03	.09	.17	.24	.30
600.0	2.87	2.41	1.97	1.62	1.35	1.14	.98	.85
700.0	.00	.00	.05	.16	.29	.39	.45	.47
800.0	.00	.00	.00	.00	.00	.01	.02	.05
900.0	.00	.00	.00	.00	.00	.00	.00	.00
1000.0	.00	.00	.00	.00	.00	.00	.00	.00

YDIV = 163.5  
 YC = 614.0  
 FATOR = .964

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	3.88	.00	.80	1.27	610.0
1000.0	.00	2.76	.00	.67	.99	610.0
1500.0	.00	2.10	.00	.55	.79	610.0
2000.0	.00	1.66	.00	.46	.64	610.0
2500.0	.00	1.35	.00	.38	.53	610.0
3000.0	.00	1.13	.00	.33	.44	610.0
3500.0	.00	.96	.00	.28	.38	610.0
4000.0	.00	.83	.00	.24	.33	610.0

*mm*

1 U

U0 = 3.00

UA = .60

D = 600.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.00	.00	.00
600.0	.00	.00	.00	.00	.00	.00	.01	.02
700.0	.00	.00	.00	.03	.10	.18	.25	.30
800.0	2.78	2.32	1.89	1.55	1.30	1.10	.95	.83
900.0	.00	.01	.06	.18	.31	.40	.45	.47
1000.0	.00	.00	.00	.00	.00	.01	.03	.06

YDIV = 163.5

YC = 814.0

FATOR = .964

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	3.62	.00	.77	1.14	810.0
1000.0	.00	2.61	.00	.65	.89	810.0
1500.0	.00	2.00	.00	.53	.71	810.0
2000.0	.00	1.59	.00	.44	.58	810.0
2500.0	.00	1.30	.00	.37	.48	810.0
3000.0	.00	1.09	.00	.32	.40	810.0
3500.0	.00	.93	.00	.27	.35	810.0
4000.0	.00	.81	.00	.24	.30	810.0

*Handwritten signature*



DESCARGA SUMERSA -- SEM DIFUSOR

1 U	U0 = 3.00	UA = .60	D = 800.0						90.
	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0	
0.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.50	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
600.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
700.0	.00	.00	.00	.00	.00	.00	.00	.00	.00
800.0	.00	.00	.00	.00	.00	.00	.01	.03	.03
900.0	.00	.00	.01	.04	.11	.19	.26	.31	.31
1000.0	2.70	2.23	1.82	1.50	1.26	1.07	.92	.80	.80

YDIV = 163.5  
 YC = 1014.0  
 FATOR = .964

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	3.41	.00	.75	.69	1000.0
1000.0	.00	2.48	.00	.62	.61	1000.0
1500.0	.00	1.91	.00	.51	.53	1000.0
2000.0	.00	1.53	.00	.43	.45	1000.0
2500.0	.00	1.26	.00	.36	.39	1000.0
3000.0	.00	1.06	.00	.31	.33	1000.0
3500.0	.00	.90	.00	.26	.29	1000.0
4000.0	.00	.79	.00	.23	.26	1000.0

*Handwritten signature*

DESCARGA SUBMERSA -- SEM DIFUSOR

2 U      U0 = 1.00      UA = .20      D = 400.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.40	.72	1.02	1.24	1.37	1.44	1.46	1.44
100.0	.51	.82	1.08	1.27	1.39	1.45	1.46	1.43
200.0	.86	1.09	1.26	1.38	1.45	1.47	1.46	1.43
300.0	1.40	1.49	1.52	1.53	1.52	1.50	1.46	1.42
400.0	2.05	1.93	1.79	1.68	1.59	1.52	1.46	1.40
500.0	2.64	2.30	2.02	1.81	1.65	1.53	1.44	1.37
600.0	2.98	2.50	2.14	1.86	1.67	1.52	1.41	1.33
700.0	2.94	2.48	2.12	1.84	1.63	1.48	1.36	1.28
800.0	2.55	2.23	1.96	1.73	1.55	1.40	1.29	1.21
900.0	1.93	1.83	1.69	1.54	1.41	1.29	1.20	1.13
1000.0	1.28	1.37	1.36	1.31	1.23	1.16	1.09	1.03

YDIV = 400.0  
 YC = 640.7  
 FATOR = .455

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.93	1.37	.56	1.33	1.37	640.0
1000.0	.88	1.14	.60	1.13	1.16	640.0
1500.0	.82	.98	.64	.98	1.00	640.0
2000.0	.76	.85	.66	.86	.88	620.0
2500.0	.72	.75	.67	.77	.79	590.0
3000.0	.69	.69	.67	.70	.74	500.0
3500.0	.66	.63	.66	.66	.71	300.0
4000.0	.64	.60	.64	.64	.69	0.0

*mm*

DESCARGA SUBMERSA -- SEM DIFUSOR

2 U

U0 = 1.00

UA = .20

D = 600.0

92.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.10	.25	.44	.64	.81	.93	1.01	1.05
100.0	.14	.30	.49	.68	.83	.95	1.02	1.06
200.0	.27	.45	.63	.78	.90	.99	1.04	1.07
300.0	.52	.71	.84	.94	1.01	1.06	1.08	1.09
400.0	.92	1.05	1.11	1.13	1.14	1.13	1.12	1.11
500.0	1.43	1.45	1.40	1.34	1.27	1.22	1.17	1.13
600.0	1.99	1.84	1.67	1.52	1.39	1.29	1.21	1.14
700.0	2.48	2.15	1.88	1.66	1.48	1.34	1.23	1.15
800.0	2.75	2.32	1.99	1.73	1.52	1.36	1.23	1.14
900.0	2.72	2.30	1.98	1.72	1.51	1.35	1.22	1.12
1000.0	2.40	2.10	1.85	1.63	1.45	1.30	1.17	1.08

YDIV = 400.0  
 YC = 840.7  
 FATOR = .455

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.42	1.26	.23	1.24	1.18	840.0
1000.0	.48	1.06	.29	1.06	1.00	840.0
1500.0	.50	.91	.35	.91	.87	840.0
2000.0	.52	.79	.40	.80	.76	840.0
2500.0	.52	.69	.44	.70	.67	830.0
3000.0	.52	.62	.47	.63	.60	810.0
3500.0	.51	.56	.49	.57	.55	770.0
4000.0	.50	.51	.49	.53	.51	690.0

*any*

DESCARGA SUBMERSA -- SEM DIFUSOR

Z U

U0 = 1.00

UA = .20

D = 800.0

93.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.02	.08	.18	.32	.45	.58	.68	.75
100.0	.03	.10	.21	.34	.47	.59	.69	.76
200.0	.08	.17	.29	.41	.53	.64	.72	.78
300.0	.17	.29	.42	.53	.63	.71	.77	.81
400.0	.33	.48	.61	.69	.76	.80	.83	.85
500.0	.60	.75	.84	.88	.90	.90	.90	.89
600.0	.98	1.07	1.10	1.08	1.05	1.01	.97	.94
700.0	1.44	1.43	1.36	1.28	1.19	1.11	1.04	.98
800.0	1.93	1.77	1.60	1.45	1.31	1.19	1.09	1.01
900.0	2.34	2.03	1.78	1.57	1.39	1.25	1.13	1.03
1000.0	2.56	2.17	1.87	1.63	1.43	1.28	1.15	1.04

YDIV = 400.0  
 YC = 1040.7  
 FATOR = .455

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.15	1.17	.08	1.16	.99	1040.0
1000.0	.22	.99	.13	.99	.85	1040.0
1500.0	.28	.86	.18	.86	.74	1040.0
2000.0	.32	.74	.23	.75	.64	1040.0
2500.0	.34	.65	.27	.66	.57	1040.0
3000.0	.36	.58	.31	.59	.51	1040.0
3500.0	.38	.52	.34	.53	.46	1020.0
4000.0	.39	.47	.36	.48	.42	1000.0

*msj*

DESCARGA SUBMERSA -- SEM DIFUSOR

2 U

U0 = 1.00

UA = .60

D = 400.0

94.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.01
300.0	.00	.00	.00	.00	.01	.03	.07	.13
400.0	.00	.01	.05	.16	.30	.47	.62	.74
500.0	1.34	1.90	2.21	2.32	2.31	2.22	2.11	1.97
600.0	5.37	4.79	4.22	3.72	3.28	2.91	2.60	2.34
700.0	.03	.15	.37	.64	.87	1.06	1.17	1.24
800.0	.00	.00	.00	.01	.04	.11	.19	.29
900.0	.00	.00	.00	.00	.00	.00	.01	.03
1000.0	.00	.00	.00	.00	.00	.00	.00	.00

YDIV = 230.9  
 YC = 571.0  
 FATOR = .545

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	3.87	.00	2.77	3.02	570.0
1000.0	.00	3.15	.00	2.42	2.65	570.0
1500.0	.00	2.62	.00	2.11	2.32	570.0
2000.0	.00	2.23	.00	1.84	2.03	570.0
2500.0	.00	1.92	.00	1.62	1.79	570.0
3000.0	.00	1.68	.00	1.44	1.59	570.0
3500.0	.00	1.48	.00	1.28	1.42	570.0
4000.0	.01	1.32	.01	1.15	1.28	570.0

*mmj*

DESCARGA SUMERSA -- SEM DIFUSOR

2 U

U0 = 1.00

UA = .60

D = 600.0

95.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.01
500.0	.00	.00	.00	.00	.01	.02	.06	.12
600.0	.00	.01	.05	.14	.29	.45	.60	.72
700.0	1.26	1.83	2.15	2.27	2.27	2.19	2.07	1.94
800.0	5.30	4.74	4.18	3.68	3.25	2.88	2.57	2.31
900.0	.02	.13	.34	.60	.84	1.02	1.14	1.21
1000.0	.00	.00	.00	.01	.04	.10	.18	.28

YDIV = 230.9  
 YC = 771.0  
 FATOR = .545

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	3.86	.00	2.74	2.88	770.0
1000.0	.00	3.13	.00	2.39	2.53	770.0
1500.0	.00	2.60	.00	2.08	2.22	770.0
2000.0	.00	2.21	.00	1.82	1.95	770.0
2500.0	.00	1.90	.00	1.60	1.71	770.0
3000.0	.00	1.66	.00	1.42	1.52	770.0
3500.0	.00	1.46	.00	1.27	1.36	770.0
4000.0	.00	1.30	.00	1.14	1.22	770.0

*mmj*

DESCARGA SUMERSA -- SEM DIFUSOR

2 U      U0 = 1.00      UA = .60      D = 800.0

96.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.00	.00	.00
600.0	.00	.00	.00	.00	.00	.00	.00	.01
700.0	.00	.00	.00	.00	.01	.02	.06	.11
800.0	.00	.01	.04	.13	.27	.43	.58	.70
900.0	1.20	1.77	2.10	2.23	2.23	2.16	2.05	1.92
1000.0	5.24	4.70	4.14	3.64	3.22	2.85	2.55	2.29

YDIV = 230.9  
 YC = 971.0  
 FATOR = .545

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	3.85	.00	2.72	2.43	970.0
1000.0	.00	3.12	.00	2.37	2.16	970.0
1500.0	.00	2.59	.00	2.07	1.90	970.0
2000.0	.00	2.19	.00	1.81	1.68	970.0
2500.0	.00	1.89	.00	1.59	1.49	970.0
3000.0	.00	1.65	.00	1.41	1.32	970.0
3500.0	.00	1.45	.00	1.25	1.18	970.0
4000.0	.00	1.29	.00	1.13	1.06	970.0

*Handwritten signature*

DESCARGA SUMERSA -- SEM DIFUSOR

Z U

U0 = 2.00

UA = .20

D = 400.0

97.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.01	.05	.14	.26	.39	.50	.58	.63
100.0	.02	.08	.17	.30	.41	.52	.59	.64
200.0	.07	.16	.28	.39	.49	.56	.62	.66
300.0	.19	.33	.45	.53	.59	.63	.66	.68
400.0	.44	.59	.68	.71	.72	.72	.72	.71
500.0	.87	.94	.94	.90	.85	.81	.77	.74
600.0	1.41	1.31	1.19	1.07	.97	.88	.81	.76
700.0	1.89	1.60	1.38	1.19	1.04	.93	.84	.77
800.0	2.09	1.72	1.45	1.24	1.07	.94	.84	.77
900.0	1.92	1.62	1.39	1.20	1.05	.92	.83	.75
1000.0	1.46	1.34	1.21	1.08	.97	.87	.79	.72

YDIV = 400.0  
 YC = 804.8  
 FATOR = .764

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.34	1.60	.17	1.70	1.61	800.0
1000.0	.45	1.32	.25	1.41	1.34	800.0
1500.0	.52	1.11	.31	1.20	1.13	800.0
2000.0	.54	.94	.37	1.03	.97	800.0
2500.0	.55	.82	.42	.89	.85	800.0
3000.0	.55	.72	.47	.79	.75	800.0
3500.0	.55	.64	.49	.71	.67	780.0
4000.0	.54	.58	.51	.64	.61	740.0

*Handwritten signature*



DESCARGA SUBMERSA -- SEM DIFUSOR

Z U

U0 = 2.00

UA = .20

D = 600.0

98.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.01	.04	.10	.18	.27	.35	.42
100.0	.00	.02	.05	.12	.20	.28	.36	.42
200.0	.01	.04	.10	.17	.25	.32	.39	.44
300.0	.03	.09	.17	.25	.33	.39	.44	.48
400.0	.10	.20	.30	.38	.43	.47	.50	.52
500.0	.24	.37	.47	.53	.56	.57	.57	.57
600.0	.51	.63	.69	.70	.69	.66	.64	.61
700.0	.90	.94	.92	.88	.82	.76	.70	.65
800.0	1.37	1.26	1.14	1.03	.92	.83	.75	.69
900.0	1.77	1.51	1.30	1.13	.99	.88	.78	.71
1000.0	1.94	1.61	1.36	1.17	1.02	.89	.80	.72

YDIV = 400.0  
 YC = 1004.8  
 FATOR = .764

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.07	1.48	.04	1.58	1.34	1000.0
1000.0	.15	1.23	.08	1.32	1.12	1000.0
1500.0	.23	1.04	.13	1.13	.95	1000.0
2000.0	.29	.89	.18	.97	.82	1000.0
2500.0	.33	.78	.23	.85	.72	1000.0
3000.0	.36	.68	.28	.75	.63	1000.0
3500.0	.38	.61	.32	.67	.56	1000.0
4000.0	.40	.55	.36	.60	.51	990.0

*Handwritten signature*

Z U

U0 = 2.00

UA = .20

D = 800.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.01	.04	.08	.14	.20	.26
100.0	.00	.00	.02	.04	.09	.15	.21	.27
200.0	.00	.01	.03	.07	.12	.18	.24	.29
300.0	.00	.02	.06	.11	.17	.22	.28	.32
400.0	.02	.06	.11	.18	.24	.29	.33	.36
500.0	.05	.12	.20	.27	.33	.37	.40	.41
600.0	.13	.23	.33	.39	.44	.46	.47	.47
700.0	.29	.41	.50	.54	.56	.55	.54	.52
800.0	.56	.66	.70	.70	.68	.65	.61	.57
900.0	.93	.94	.91	.85	.79	.73	.67	.62
1000.0	1.34	1.22	1.10	.99	.88	.80	.72	.65

YDIV = 400.0  
 YC = 1204.8  
 FATOR = .764

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.01	1.38	.01	1.48	1.15	1200.0
1000.0	.04	1.15	.02	1.25	.96	1200.0
1500.0	.09	.98	.05	1.07	.83	1200.0
2000.0	.14	.85	.08	.92	.71	1200.0
2500.0	.18	.74	.12	.81	.63	1200.0
3000.0	.22	.65	.16	.72	.55	1200.0
3500.0	.25	.58	.20	.64	.49	1200.0
4000.0	.28	.52	.24	.57	.44	1200.0

*Handwritten signature*

DESCARGA SUPERFICIA -- SEM DIFUSOR

2 U

U0 = 2.00

UA = .60

D = 400.0

100.

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.01	.03	.06
500.0	.00	.00	.02	.09	.22	.36	.49	.59
600.0	3.13	3.18	2.92	2.59	2.27	2.00	1.77	1.57
700.0	.06	.34	.71	1.01	1.18	1.24	1.23	1.19
800.0	.00	.00	.00	.01	.03	.09	.17	.26
900.0	.00	.00	.00	.00	.00	.00	.00	.02
1000.0	.00	.00	.00	.00	.00	.00	.00	.00

YDIV = 230.9  
 YC = 628.0  
 FATOR = .945

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	5.91	.00	2.65	3.03	630.0
1000.0	.00	4.48	.00	2.33	2.59	630.0
1500.0	.00	3.54	.00	2.03	2.19	630.0
2000.0	.00	2.89	.00	1.76	1.86	630.0
2500.0	.00	2.42	.00	1.53	1.59	630.0
3000.0	.00	2.06	.00	1.34	1.38	630.0
3500.0	.00	1.78	.00	1.18	1.21	630.0
4000.0	.00	1.56	.00	1.04	1.06	630.0

*Handwritten signature*

2 U      U0 = 2.00      UA = .60      D = 600.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.00	.00	.00
600.0	.00	.00	.00	.00	.00	.01	.03	.07
700.0	.00	.00	.03	.11	.24	.39	.51	.59
800.0	3.14	3.10	2.81	2.49	2.18	1.92	1.70	1.51
900.0	.10	.41	.77	1.04	1.18	1.22	1.21	1.16
1000.0	.00	.00	.00	.01	.04	.10	.18	.27

YDIV = 230.9  
 YC = 828.0  
 FATOR = .945

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	5.49	.00	2.55	2.71	830.0
1000.0	.00	4.20	.00	2.24	2.31	830.0
1500.0	.00	3.35	.00	1.94	1.95	830.0
2000.0	.00	2.75	.00	1.68	1.66	830.0
2500.0	.00	2.30	.00	1.47	1.42	830.0
3000.0	.00	1.97	.00	1.28	1.23	830.0
3500.0	.00	1.71	.00	1.13	1.08	830.0
4000.0	.00	1.50	.00	1.01	.95	830.0

*mmj*

DESCARGA SUBMERSA -- SEM DIFUSOR

Z U      U0 = 2.00      UA = .60      D = 800.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.00	.00	.00
600.0	.00	.00	.00	.00	.00	.00	.00	.00
700.0	.00	.00	.00	.00	.00	.00	.00	.00
800.0	.00	.00	.00	.00	.00	.01	.04	.08
900.0	.00	.00	.04	.13	.27	.41	.52	.60
1000.0	3.13	3.01	2.72	2.40	2.11	1.85	1.64	1.46

YDIV = 230.9  
 YC = 1028.0  
 FATOR = .945

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	5.14	.00	2.46	2.06	1030.0
1000.0	.00	3.97	.00	2.15	1.80	1030.0
1500.0	.00	3.18	.00	1.87	1.56	1030.0
2000.0	.00	2.62	.00	1.62	1.36	1030.0
2500.0	.00	2.21	.00	1.41	1.18	1030.0
3000.0	.00	1.89	.00	1.24	1.04	1030.0
3500.0	.00	1.64	.00	1.09	.91	1030.0
4000.0	.00	1.45	.00	.97	.81	1030.0

*mu*

## DESCARGA SUBMERSA -- SEM DIFUSOR

103.

2 U      U0 = 3.00      UA = .20      D = 400.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.01	.03	.07	.13	.19	.25
100.0	.00	.00	.01	.03	.08	.14	.20	.26
200.0	.00	.01	.03	.07	.12	.18	.24	.28
300.0	.00	.02	.07	.13	.19	.24	.29	.32
400.0	.02	.07	.15	.23	.29	.33	.35	.37
500.0	.08	.19	.30	.37	.41	.42	.42	.42
600.0	.27	.42	.51	.54	.54	.52	.50	.47
700.0	.68	.77	.77	.73	.67	.61	.56	.52
800.0	1.26	1.14	1.00	.88	.77	.68	.61	.55
900.0	1.71	1.38	1.15	.97	.83	.72	.63	.56
1000.0	1.70	1.38	1.15	.97	.83	.72	.63	.56

YDIV = 400.4  
 YC = 949.0  
 FATOR = 1.000

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.02	1.77	.01	1.76	1.65	950.0
1000.0	.07	1.42	.04	1.42	1.33	950.0
1500.0	.15	1.17	.08	1.18	1.10	950.0
2000.0	.23	.98	.13	.99	.93	950.0
2500.0	.29	.84	.18	.85	.80	950.0
3000.0	.33	.73	.23	.74	.69	950.0
3500.0	.35	.64	.27	.65	.61	950.0
4000.0	.37	.57	.31	.58	.54	940.0

*mmj*

DESCARGA SUBMERSA -- SEM DIFUSOR

2 U      U0 = 3.00      UA = .20      D = 600.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.01	.02	.05	.09	.14
100.0	.00	.00	.00	.01	.03	.06	.10	.15
200.0	.00	.00	.00	.02	.04	.08	.12	.17
300.0	.00	.00	.01	.04	.08	.12	.16	.20
400.0	.00	.01	.04	.08	.13	.17	.21	.24
500.0	.01	.03	.08	.15	.20	.24	.27	.29
600.0	.03	.09	.18	.25	.30	.33	.34	.34
700.0	.11	.23	.32	.38	.41	.42	.41	.40
800.0	.32	.45	.52	.54	.54	.51	.48	.45
900.0	.72	.77	.75	.71	.65	.60	.54	.49
1000.0	1.22	1.09	.96	.84	.74	.66	.59	.53

YDIV = 400.4  
 YC = 1149.0  
 FATOR = 1.000

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	1.65	.00	1.64	1.39	1150.0
1000.0	.01	1.33	.00	1.34	1.14	1150.0
1500.0	.04	1.10	.02	1.11	.95	1150.0
2000.0	.08	.93	.04	.94	.80	1150.0
2500.0	.13	.80	.07	.81	.69	1150.0
3000.0	.17	.70	.11	.71	.60	1150.0
3500.0	.21	.61	.15	.62	.53	1150.0
4000.0	.24	.54	.19	.55	.47	1150.0

*mu*

2 U      U0 = 3.00      UA = .20      D = 800.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.01	.02	.04	.07
100.0	.00	.00	.00	.00	.01	.02	.05	.08
200.0	.00	.00	.00	.00	.02	.03	.06	.09
300.0	.00	.00	.00	.01	.03	.05	.08	.11
400.0	.00	.00	.01	.02	.05	.08	.11	.15
500.0	.00	.00	.02	.05	.09	.12	.16	.19
600.0	.00	.01	.05	.09	.14	.18	.21	.23
700.0	.01	.04	.10	.16	.21	.25	.27	.28
800.0	.04	.11	.20	.26	.31	.33	.34	.34
900.0	.14	.25	.34	.39	.42	.42	.41	.39
1000.0	.36	.46	.53	.54	.53	.50	.47	.44

YDIV = 400.4  
 YC = 1349.0  
 FATOR = 1.000

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	1.55	.00	1.55	1.21	1350.0
1000.0	.00	1.26	.00	1.27	.99	1350.0
1500.0	.01	1.05	.00	1.06	.83	1350.0
2000.0	.02	.89	.01	.90	.71	1350.0
2500.0	.05	.77	.03	.78	.61	1350.0
3000.0	.08	.67	.05	.68	.54	1350.0
3500.0	.12	.59	.08	.60	.47	1350.0
4000.0	.15	.53	.11	.54	.42	1350.0

*msj*



DESCARGA SUBMERSA -- SEM DIFUSOR

Z U      U0 = 3.00      UA = .60      D = 400.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.01	.02	.05
600.0	.00	.00	.01	.06	.15	.25	.35	.42
700.0	1.82	2.03	1.97	1.81	1.62	1.45	1.29	1.16
800.0	.14	.46	.76	.95	1.03	1.04	1.01	.96
900.0	.00	.00	.00	.01	.04	.09	.16	.24
1000.0	.00	.00	.00	.00	.00	.00	.01	.02

YDIV = 231.2  
 YC = 734.0  
 FATOR = 1.000

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	4.56	.00	1.75	2.19	730.0
1000.0	.00	3.49	.00	1.48	1.82	730.0
1500.0	.00	2.78	.00	1.24	1.52	730.0
2000.0	.00	2.28	.00	1.06	1.28	730.0
2500.0	.00	1.91	.00	.90	1.09	730.0
3000.0	.00	1.63	.00	.78	.94	730.0
3500.0	.00	1.42	.00	.69	.82	730.0
4000.0	.00	1.24	.00	.61	.73	730.0

*Muz*

DESCARGA SUBMERSA -- SEM DIFUSOR

2 U      U0 = 3.00      UA = .60      D = 600.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.00	.00	.00
600.0	.00	.00	.00	.00	.00	.00	.00	.00
700.0	.00	.00	.00	.00	.00	.01	.02	.05
800.0	.00	.00	.02	.08	.17	.27	.36	.43
900.0	1.88	2.01	1.92	1.75	1.57	1.40	1.25	1.12
1000.0	.20	.52	.81	.97	1.03	1.03	.99	.93

YDIV = 231.2  
 YC = 934.0  
 FATOR = 1.000

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	4.25	.00	1.67	1.85	930.0
1000.0	.00	3.28	.00	1.41	1.54	930.0
1500.0	.00	2.63	.00	1.19	1.28	930.0
2000.0	.00	2.17	.00	1.01	1.08	930.0
2500.0	.00	1.83	.00	.87	.93	930.0
3000.0	.00	1.57	.00	.75	.80	930.0
3500.0	.00	1.36	.00	.66	.70	930.0
4000.0	.00	1.20	.00	.59	.62	930.0

*mmj*

2 U      U0 = 3.00      UA = .60      D = 800.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.00	.00	.00
600.0	.00	.00	.00	.00	.00	.00	.00	.00
700.0	.00	.00	.00	.00	.00	.00	.00	.00
800.0	.00	.00	.00	.00	.00	.00	.00	.00
900.0	.00	.00	.00	.00	.00	.01	.03	.06
1000.0	.00	.00	.03	.09	.19	.29	.37	.43

YDIV = 231.2  
 YC = 1134.0  
 FATOR = 1.000

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	4.00	.00	1.61	1.38	1130.0
1000.0	.00	3.11	.00	1.35	1.20	1130.0
1500.0	.00	2.51	.00	1.14	1.03	1130.0
2000.0	.00	2.08	.00	.97	.89	1130.0
2500.0	.00	1.76	.00	.84	.78	1130.0
3000.0	.00	1.51	.00	.73	.68	1130.0
3500.0	.00	1.32	.00	.64	.60	1130.0
4000.0	.00	1.16	.00	.57	.54	1130.0

*Amg*

2 U      U0 = 4.00      UA = .20      D = 400.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.01	.04	.10	.19	.29	.37	.44	.49
100.0	.02	.05	.12	.21	.30	.38	.45	.49
200.0	.04	.10	.18	.27	.35	.42	.47	.51
300.0	.11	.20	.29	.36	.42	.47	.50	.53
400.0	.24	.35	.43	.48	.52	.54	.55	.56
500.0	.47	.56	.61	.62	.62	.61	.60	.58
600.0	.79	.82	.81	.77	.72	.68	.64	.61
700.0	1.16	1.08	.99	.89	.81	.74	.68	.63
800.0	1.49	1.29	1.12	.98	.87	.78	.71	.65
900.0	1.66	1.39	1.19	1.03	.90	.80	.72	.65
1000.0	1.61	1.36	1.17	1.02	.89	.79	.71	.64

YDIV = 400.4  
 YC = 928.0  
 FATOR = .782

X	DIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.19	1.30	.10	1.30	1.20	930.0
1000.0	.28	1.09	.15	1.10	1.01	930.0
1500.0	.34	.93	.21	.94	.87	930.0
2000.0	.38	.81	.26	.81	.75	930.0
2500.0	.40	.70	.31	.71	.66	930.0
3000.0	.42	.62	.35	.63	.59	920.0
3500.0	.43	.56	.39	.57	.53	910.0
4000.0	.43	.51	.41	.52	.48	880.0

*Muy*

DESCARGA SUBMERSA -- SEM DIFUSOR

Z U      U0 = 4.00      UA = .20      D = 600.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.01	.04	.08	.14	.21	.27	.33
100.0	.00	.01	.04	.09	.15	.22	.28	.33
200.0	.01	.03	.07	.13	.19	.25	.30	.35
300.0	.02	.06	.12	.18	.24	.29	.34	.37
400.0	.06	.13	.20	.26	.31	.35	.38	.41
500.0	.14	.23	.31	.36	.40	.42	.44	.44
600.0	.28	.39	.45	.49	.50	.50	.49	.48
700.0	.51	.59	.62	.62	.60	.57	.55	.52
800.0	.81	.82	.79	.74	.69	.64	.60	.56
900.0	1.13	1.04	.95	.85	.77	.70	.64	.59
1000.0	1.40	1.22	1.06	.93	.83	.74	.67	.60

YDIV = 400.4  
 YC = 1128.0  
 FATOR = .782

X	D <sub>T</sub> DIV	D <sub>T</sub> C	D <sub>T</sub> MED	D <sub>T</sub> I	D <sub>T</sub> MAX	Y <sub>MAX</sub>
500.0	.05	1.21	.02	1.21	1.02	1130.0
1000.0	.10	1.02	.05	1.03	.86	1130.0
1500.0	.16	.88	.09	.88	.74	1130.0
2000.0	.20	.76	.13	.77	.65	1130.0
2500.0	.24	.67	.18	.68	.57	1130.0
3000.0	.28	.59	.22	.60	.50	1130.0
3500.0	.30	.53	.26	.54	.45	1120.0
4000.0	.32	.48	.29	.49	.41	1120.0

*Handwritten signature*

Z U

U0 = 4.00

UA = .20

D = 800.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.01	.03	.07	.11	.16	.21
100.0	.00	.00	.01	.04	.07	.12	.17	.21
200.0	.00	.01	.02	.05	.09	.14	.19	.23
300.0	.00	.02	.04	.08	.13	.17	.21	.25
400.0	.01	.04	.08	.13	.17	.22	.25	.29
500.0	.03	.08	.14	.19	.24	.27	.30	.32
600.0	.08	.15	.22	.27	.31	.34	.36	.37
700.0	.17	.26	.33	.37	.40	.41	.41	.41
800.0	.32	.41	.46	.49	.49	.49	.47	.46
900.0	.54	.60	.62	.61	.59	.56	.53	.50
1000.0	.81	.81	.78	.73	.68	.63	.58	.53

$\bar{Y}_{DIV} = 400.4$   
 $YC = 1328.0$   
 $FATOR = .782$

X	$\bar{D}T_{DIV}$	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.01	1.15	.01	1.15	.89	1330.0
1000.0	.03	.97	.02	.98	.76	1330.0
1500.0	.06	.84	.04	.85	.65	1330.0
2000.0	.10	.73	.06	.74	.57	1330.0
2500.0	.14	.64	.09	.65	.50	1330.0
3000.0	.17	.57	.13	.58	.45	1330.0
3500.0	.20	.51	.16	.52	.40	1330.0
4000.0	.22	.46	.19	.47	.36	1330.0

*Handwritten signature*

2 U      U0 = 4.00      UA = .60      D = 400.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.70	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.00	.00	.00
600.0	.00	.00	.00	.00	.00	.00	.00	.00
700.0	.00	.00	.00	.00	.00	.00	.00	.01
800.0	.00	.00	.00	.00	.01	.02	.04	.06
900.0	.00	.02	.05	.09	.12	.16	.19	.21
1000.0	.43	.50	.53	.53	.52	.50	.47	.44

YDIV = 231.2  
 YC = 1081.2  
 FATOR = 1.000

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	1.32	.00	.38	.41	1070.0
1000.0	.00	1.12	.00	.33	.35	1070.0
1500.0	.00	.96	.00	.28	.30	1070.0
2000.0	.00	.84	.00	.25	.27	1070.0
2500.0	.00	.74	.00	.22	.24	1070.0
3000.0	.00	.66	.00	.20	.21	1070.0
3500.0	.00	.59	.00	.18	.19	1070.0
4000.0	.00	.54	.00	.16	.17	1070.0

*RM*

2 U      U0 = 4.00      UA = .60      D = 600.0

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.00	.00	.00
600.0	.00	.00	.00	.00	.00	.00	.00	.00
700.0	.00	.00	.00	.00	.00	.00	.00	.00
800.0	.00	.00	.00	.00	.00	.00	.00	.00
900.0	.00	.00	.00	.00	.00	.00	.01	.01
1000.0	.00	.00	.00	.01	.01	.03	.04	.06

YDIV = 231.2  
 YC = 1281.2  
 FATOR = 1.000

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	1.23	.00	.36	.35	1270.0
1000.0	.00	1.05	.00	.31	.30	1270.0
1500.0	.00	.91	.00	.27	.26	1270.0
2000.0	.00	.80	.00	.24	.23	1270.0
2500.0	.00	.70	.00	.21	.21	1270.0
3000.0	.00	.63	.00	.19	.19	1270.0
3500.0	.00	.57	.00	.17	.17	1270.0
4000.0	.00	.51	.00	.15	.15	1270.0

*ms*



2 U      U0 = 4.00      UA = .60      D = 800.C

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.00	.00	.00	.00	.00
100.0	.00	.00	.00	.00	.00	.00	.00	.00
200.0	.00	.00	.00	.00	.00	.00	.00	.00
300.0	.00	.00	.00	.00	.00	.00	.00	.00
400.0	.00	.00	.00	.00	.00	.00	.00	.00
500.0	.00	.00	.00	.00	.00	.00	.00	.00
600.0	.00	.00	.00	.00	.00	.00	.00	.00
700.0	.00	.00	.00	.00	.00	.00	.00	.00
800.0	.00	.00	.00	.00	.00	.00	.00	.00
900.0	.00	.00	.00	.00	.00	.00	.00	.00
1000.0	.00	.00	.00	.00	.00	.00	.00	.00

YDIV = 231.2  
 YC = 1481.2  
 FATOR = 1.000

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.00	1.17	.00	.34	.31	1470.0
1000.0	.00	1.00	.00	.29	.27	1470.0
1500.0	.00	.87	.00	.26	.24	1470.0
2000.0	.00	.76	.00	.23	.21	1470.0
2500.0	.00	.68	.00	.20	.19	1470.0
3000.0	.00	.61	.00	.18	.17	1470.0
3500.0	.00	.55	.00	.16	.15	1470.0
4000.0	.00	.50	.00	.15	.14	1470.0

*Amg*

APPENDIX A.3

COMPUTER PRINT-OUTS FOR DESIGN(C)

(Temperature increase inside condensers = 8,5°C)

*Amur*

## DESCARGA SURMERSA -- COM DIFUSOR

Z U

U0 = 1.00

UA = .10

D = 600.0

116.

DILUIÇÃO INICIAL = 1.4  
 DELTA TEMP. (CP) = 6.51

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	2.33	3.07	3.19	3.02	2.73	2.43	2.15	1.90
100.0	2.48	3.11	3.19	3.01	2.72	2.42	2.14	1.89
200.0	2.89	3.22	3.19	2.98	2.69	2.40	2.13	1.88
300.0	3.46	3.36	3.18	2.93	2.65	2.36	2.10	1.86
400.0	4.03	3.49	3.15	2.86	2.58	2.31	2.06	1.83
500.0	4.45	3.57	3.09	2.77	2.50	2.24	2.01	1.79
600.0	4.59	3.55	3.00	2.66	2.40	2.17	1.95	1.75
700.0	4.41	3.41	2.86	2.53	2.29	2.08	1.88	1.70
800.0	3.93	3.16	2.67	2.37	2.16	1.98	1.81	1.64
900.0	3.25	2.82	2.45	2.20	2.02	1.87	1.72	1.58
1000.0	2.49	2.40	2.19	2.01	1.88	1.76	1.64	1.51

YDIV = 565.7

YC = 600.0

FATOR = .444

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	2.03	2.04	1.54	1.84	1.84	590.0
1000.0	1.59	1.58	1.47	1.53	1.55	530.0
1500.0	1.35	1.33	1.38	1.38	1.43	110.0
2000.0	1.20	1.18	1.27	1.27	1.31	0.0
2500.0	1.08	1.07	1.15	1.15	1.18	0.0
3000.0	.98	.96	1.03	1.03	1.06	0.0
3500.0	.88	.87	.92	.92	.94	0.0
4000.0	.79	.78	.81	.81	.84	0.0

DESCARGA SUBMERSA -- COM DIFUSOR

2 U      U0 = 1.00      UA = .10      D = 800.0

DILUICAO INICIAL = 2.4  
 DELTA TEMP.(CP) = 3.81

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	1.53	1.93	2.04	1.99	1.86	1.70	1.54	1.40
100.0	1.58	1.94	2.04	1.99	1.86	1.70	1.54	1.39
200.0	1.72	1.99	2.05	1.98	1.85	1.69	1.53	1.39
300.0	1.94	2.07	2.06	1.97	1.83	1.67	1.52	1.38
400.0	2.20	2.15	2.07	1.95	1.80	1.65	1.50	1.36
500.0	2.47	2.23	2.07	1.92	1.77	1.62	1.48	1.34
600.0	2.69	2.30	2.06	1.89	1.73	1.59	1.45	1.32
700.0	2.84	2.33	2.04	1.84	1.69	1.55	1.41	1.29
800.0	2.88	2.32	1.99	1.79	1.63	1.50	1.38	1.26
900.0	2.82	2.27	1.93	1.72	1.57	1.45	1.34	1.23
1000.0	2.64	2.16	1.85	1.65	1.51	1.39	1.29	1.19

YDIV = 565.7  
 YC = 800.0  
 FATOR = .525

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	1.38	1.51	1.09	1.48	1.40	790.0
1000.0	1.20	1.22	1.10	1.22	1.17	730.0
1500.0	1.08	1.05	1.08	1.08	1.06	470.0
2000.0	1.00	.94	1.02	1.02	1.01	0.0
2500.0	.92	.86	.95	.95	.93	0.0
3000.0	.84	.79	.87	.87	.86	0.0
3500.0	.77	.72	.79	.79	.78	0.0
4000.0	.70	.66	.71	.71	.70	0.0

*mu*

2 U

U0 = 1.00

UA = .10

D = 1000.0

118.

DILUICAO INICIAL = 3.4  
 DELTA TEMP.(CP) = 2.64

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	1.17	1.42	1.51	1.49	1.42	1.33	1.23	1.12
100.0	1.20	1.43	1.51	1.49	1.42	1.33	1.22	1.12
200.0	1.26	1.46	1.52	1.49	1.42	1.32	1.22	1.12
300.0	1.36	1.50	1.53	1.49	1.41	1.31	1.21	1.11
400.0	1.49	1.55	1.54	1.48	1.40	1.30	1.20	1.10
500.0	1.64	1.60	1.55	1.47	1.38	1.29	1.19	1.09
600.0	1.78	1.65	1.55	1.46	1.37	1.27	1.17	1.08
700.0	1.91	1.70	1.56	1.44	1.34	1.25	1.15	1.06
800.0	2.01	1.73	1.55	1.42	1.32	1.22	1.13	1.05
900.0	2.08	1.74	1.54	1.40	1.29	1.20	1.11	1.03
1000.0	2.09	1.74	1.51	1.37	1.26	1.17	1.08	1.00

YDIV = 565.7  
 YC = 1000.0  
 FATOR = .567

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.98	1.19	.82	1.19	1.01	990.0
1000.0	.93	.99	.87	1.00	.86	920.0
1500.0	.88	.86	.87	.88	.77	690.0
2000.0	.83	.77	.84	.84	.74	0.0
2500.0	.78	.71	.79	.79	.70	0.0
3000.0	.72	.66	.74	.74	.65	0.0
3500.0	.67	.61	.68	.68	.60	0.0
4000.0	.61	.57	.63	.63	.55	0.0

*mm*

DESCARGA SUBMERSA -- COM DIFUSOR

2 U

U0 = 2.00

UA = .10

D = 600.0

119.

DILUICAO INICIAL = 1.8  
 DELTA TEMP.(CP) = 4.97

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	3.04	3.27	3.12	2.85	2.54	2.25	1.98	1.76
100.0	3.10	3.27	3.12	2.84	2.53	2.24	1.98	1.75
200.0	3.25	3.28	3.09	2.81	2.51	2.22	1.97	1.74
300.0	3.45	3.29	3.04	2.76	2.47	2.19	1.94	1.73
400.0	3.65	3.28	2.98	2.69	2.41	2.15	1.91	1.70
500.0	3.77	3.23	2.89	2.60	2.34	2.09	1.87	1.67
600.0	3.78	3.14	2.77	2.50	2.26	2.03	1.82	1.64
700.0	3.64	3.00	2.63	2.38	2.16	1.96	1.77	1.60
800.0	3.36	2.80	2.47	2.24	2.05	1.88	1.71	1.55
900.0	2.96	2.56	2.28	2.10	1.94	1.79	1.64	1.50
1000.0	2.49	2.27	2.08	1.94	1.82	1.69	1.57	1.44

YDIV = 565.7  
 YC = 600.0  
 FATOR = .444

X	D̄DIV	DTC	D̄MED	DTI	D̄MAX	YMAX
500.0	1.68	1.68	1.52	1.61	1.62	560.0
1000.0	1.41	1.40	1.43	1.43	1.48	300.0
1500.0	1.25	1.23	1.32	1.32	1.36	0.0
2000.0	1.13	1.11	1.20	1.20	1.23	0.0
2500.0	1.02	1.00	1.07	1.07	1.10	0.0
3000.0	.91	.90	.96	.96	.98	0.0
3500.0	.82	.81	.85	.85	.87	0.0
4000.0	.73	.73	.76	.76	.78	0.0

*Handwritten signature*

DESCARGA SUBMERSA -- COM DIFUSOR

2 U

U0 = 2.00

UA = .10

D = 800.0

120.

DILUICAO INICIAL = 3.0  
 DELTA TEMP.(CP) = 3.01

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	1.93	2.07	2.04	1.91	1.75	1.59	1.44	1.30
100.0	1.95	2.08	2.03	1.91	1.75	1.59	1.44	1.30
200.0	2.01	2.09	2.03	1.90	1.74	1.58	1.43	1.29
300.0	2.10	2.10	2.02	1.88	1.72	1.57	1.42	1.28
400.0	2.20	2.12	2.00	1.85	1.70	1.55	1.40	1.27
500.0	2.30	2.12	1.97	1.82	1.67	1.52	1.38	1.25
600.0	2.38	2.12	1.94	1.78	1.63	1.49	1.36	1.23
700.0	2.42	2.10	1.90	1.73	1.59	1.46	1.33	1.21
800.0	2.42	2.06	1.84	1.68	1.54	1.42	1.30	1.19
900.0	2.36	2.00	1.77	1.62	1.49	1.37	1.26	1.16
1000.0	2.25	1.91	1.70	1.55	1.43	1.33	1.23	1.13

YDIV = 565.7  
 YC = 800.0  
 FATOR = .525

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	1.24	1.27	1.13	1.27	1.21	740.0
1000.0	1.12	1.08	1.10	1.10	1.08	530.0
1500.0	1.03	.97	1.05	1.05	1.03	0.0
2000.0	.94	.88	.97	.97	.96	0.0
2500.0	.86	.81	.89	.89	.88	0.0
3000.0	.79	.74	.81	.81	.80	0.0
3500.0	.72	.68	.74	.74	.73	0.0
4000.0	.65	.62	.67	.67	.66	0.0

*Aug*

DESCARGA SUMERSA -- COM DIFUSOR

Z U U0 = 2.00 UA = .10 D = 1000.0

DILUICAO INICIAL = 4.2  
 DELTA TEMP. (CP) = 2.15

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	1.44	1.53	1.52	1.45	1.36	1.25	1.15	1.05
100.0	1.45	1.54	1.52	1.45	1.36	1.25	1.15	1.05
200.0	1.47	1.54	1.52	1.45	1.35	1.25	1.15	1.05
300.0	1.52	1.55	1.52	1.44	1.34	1.24	1.14	1.04
400.0	1.57	1.57	1.51	1.43	1.33	1.23	1.13	1.04
500.0	1.63	1.58	1.50	1.42	1.32	1.22	1.12	1.03
600.0	1.69	1.59	1.49	1.40	1.30	1.20	1.10	1.01
700.0	1.74	1.59	1.48	1.38	1.28	1.18	1.09	1.00
800.0	1.78	1.59	1.46	1.35	1.25	1.16	1.07	.99
900.0	1.79	1.58	1.43	1.32	1.22	1.13	1.05	.97
1000.0	1.79	1.55	1.40	1.29	1.19	1.11	1.03	.95

YDIV = 565.7  
 YC = 1000.0  
 FATOR = .567

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.95	1.01	.88	1.03	.88	930.0
1000.0	.90	.88	.88	.90	.79	720.0
1500.0	.85	.79	.86	.86	.75	0.0
2000.0	.80	.73	.81	.81	.72	0.0
2500.0	.74	.68	.76	.76	.67	0.0
3000.0	.68	.63	.70	.70	.62	0.0
3500.0	.63	.58	.64	.64	.57	0.0
4000.0	.58	.54	.59	.59	.52	0.0

*mu*



## DESCARGA SUMERSA -- COM DIFUSOR

P U

U0 = 3.00

UA = .10

D = 600.0

122.

DILUICAO INICIAL = 2.1  
 DELTA TEMP. (CP) = 4.20

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	3.28	3.26	3.01	2.71	2.40	2.12	1.87	1.66
100.0	3.30	3.25	3.00	2.70	2.39	2.12	1.87	1.66
200.0	3.35	3.23	2.97	2.67	2.37	2.10	1.86	1.65
300.0	3.41	3.20	2.92	2.62	2.34	2.07	1.84	1.63
400.0	3.46	3.15	2.85	2.56	2.29	2.04	1.81	1.61
500.0	3.47	3.06	2.76	2.48	2.23	1.99	1.78	1.59
600.0	3.41	2.95	2.65	2.39	2.15	1.94	1.74	1.56
700.0	3.27	2.81	2.51	2.28	2.07	1.87	1.69	1.52
800.0	3.05	2.63	2.36	2.16	1.98	1.80	1.64	1.48
900.0	2.75	2.42	2.20	2.03	1.88	1.73	1.58	1.44
1000.0	2.40	2.19	2.02	1.89	1.77	1.64	1.52	1.39

YDIV = 565.7  
 YC = 600.0  
 FATOR = .444

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	1.53	1.52	1.49	1.49	1.54	460.0
1000.0	1.33	1.31	1.39	1.39	1.43	0.0
1500.0	1.19	1.18	1.27	1.27	1.30	0.0
2000.0	1.08	1.06	1.14	1.14	1.17	0.0
2500.0	.97	.96	1.02	1.02	1.05	0.0
3000.0	.87	.86	.91	.91	.93	0.0
3500.0	.78	.77	.81	.81	.83	0.0
4000.0	.70	.69	.72	.72	.74	0.0

*miny*

DESCARGA SURMERSA -- COM DIFUSOR

Z U      U0 = 3.00      UA = .10      D = 800.0

DILUICAO INICIAL = 3.5  
 DELTA TEMP.(CP) = 2.59

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	2.08	2.09	1.99	1.84	1.67	1.51	1.36	1.23
100.0	2.09	2.09	1.98	1.83	1.67	1.51	1.36	1.23
200.0	2.11	2.09	1.97	1.82	1.66	1.50	1.36	1.22
300.0	2.14	2.08	1.96	1.80	1.64	1.49	1.35	1.22
400.0	2.18	2.07	1.93	1.78	1.62	1.47	1.33	1.21
500.0	2.21	2.05	1.90	1.75	1.59	1.45	1.31	1.19
600.0	2.23	2.03	1.86	1.71	1.56	1.42	1.29	1.18
700.0	2.23	1.99	1.81	1.66	1.52	1.39	1.27	1.16
800.0	2.19	1.93	1.76	1.61	1.48	1.36	1.24	1.14
900.0	2.13	1.87	1.69	1.55	1.43	1.32	1.21	1.11
1000.0	2.04	1.79	1.62	1.49	1.38	1.28	1.18	1.09

YDIV = 565.7  
 YC = 800.0  
 FATOR = .525

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	1.17	1.15	1.13	1.17	1.13	640.0
1000.0	1.07	1.02	1.08	1.08	1.07	0.0
1500.0	.99	.92	1.01	1.01	1.00	0.0
2000.0	.90	.85	.93	.93	.92	0.0
2500.0	.83	.78	.85	.85	.84	0.0
3000.0	.75	.71	.77	.77	.76	0.0
3500.0	.68	.65	.70	.70	.69	0.0
4000.0	.62	.60	.63	.63	.62	0.0

*mu*

DESCARGA SURMERSA -- COM DIFUSOR

2 U

U0 = 3.00

UA = .10

D = 1000.0

124.

DILUICAO INICIAL = 4.8

DELTA TEMP.(CP) = 1.87

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	1.54	1.56	1.50	1.41	1.30	1.20	1.10	1.00
100.0	1.54	1.56	1.50	1.41	1.30	1.20	1.09	1.00
200.0	1.56	1.56	1.49	1.40	1.30	1.19	1.09	1.00
300.0	1.57	1.56	1.49	1.39	1.29	1.18	1.09	.99
400.0	1.60	1.55	1.48	1.38	1.28	1.18	1.08	.99
500.0	1.62	1.55	1.46	1.37	1.26	1.16	1.07	.98
600.0	1.64	1.54	1.45	1.35	1.25	1.15	1.06	.97
700.0	1.65	1.53	1.42	1.32	1.23	1.13	1.04	.96
800.0	1.66	1.51	1.40	1.30	1.20	1.11	1.02	.94
900.0	1.65	1.49	1.37	1.27	1.18	1.09	1.01	.93
1000.0	1.64	1.46	1.34	1.24	1.15	1.06	.99	.91

YDIV = 565.7

YC = 1000.0

FATOR = .567

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.93	.93	.90	.95	.82	810.0
1000.0	.88	.83	.88	.88	.77	160.0
1500.0	.82	.76	.84	.84	.74	0.0
2000.0	.77	.70	.78	.78	.69	0.0
2500.0	.71	.65	.72	.72	.64	0.0
3000.0	.65	.60	.67	.67	.59	0.0
3500.0	.60	.56	.61	.61	.54	0.0
4000.0	.55	.52	.56	.56	.49	0.0

*Handwritten signature*

2 U

U0 = 4.00

UA = .10

D = 600.0

DILUICAO INICIAL = 2.4  
 DELTA TEMP.(CP) = 3.72

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	3.35	3.19	2.91	2.59	2.29	2.02	1.79	1.59
100.0	3.35	3.19	2.90	2.58	2.29	2.02	1.79	1.59
200.0	3.36	3.16	2.87	2.56	2.27	2.01	1.78	1.58
300.0	3.36	3.11	2.82	2.52	2.23	1.98	1.76	1.57
400.0	3.35	3.04	2.75	2.46	2.19	1.95	1.74	1.55
500.0	3.30	2.95	2.66	2.39	2.14	1.91	1.71	1.53
600.0	3.20	2.83	2.55	2.30	2.07	1.86	1.67	1.50
700.0	3.06	2.69	2.43	2.21	2.00	1.81	1.63	1.47
800.0	2.86	2.52	2.29	2.10	1.92	1.74	1.58	1.43
900.0	2.61	2.33	2.14	1.98	1.83	1.68	1.53	1.40
1000.0	2.32	2.13	1.98	1.86	1.73	1.60	1.48	1.35

YDIV = 565.7

YC = 600.0

FACTOR = .444

X	DIDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	1.44	1.42	1.46	1.46	1.51	270.0
1000.0	1.28	1.26	1.35	1.35	1.39	0.0
1500.0	1.15	1.13	1.22	1.22	1.26	0.0
2000.0	1.04	1.02	1.09	1.09	1.12	0.0
2500.0	.93	.92	.98	.98	1.00	0.0
3000.0	.84	.83	.87	.87	.89	0.0
3500.0	.75	.74	.77	.77	.79	0.0
4000.0	.67	.67	.69	.69	.71	0.0

ALL

DESCARGA SUBMERSA -- COM DIFUSOR

Z U      U0 = 4.00      UA = .10      D = 800.0

DILUICAO INICIAL = 3.9  
 DELTA TEMP.(CP) = 2.31

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	2.13	2.07	1.93	1.77	1.60	1.45	1.31	1.18
100.0	2.13	2.07	1.93	1.76	1.60	1.44	1.30	1.18
200.0	2.14	2.06	1.92	1.75	1.59	1.44	1.30	1.17
300.0	2.14	2.04	1.90	1.74	1.58	1.43	1.29	1.17
400.0	2.15	2.02	1.87	1.71	1.56	1.41	1.28	1.16
500.0	2.15	1.99	1.84	1.68	1.53	1.39	1.26	1.15
600.0	2.14	1.96	1.80	1.65	1.50	1.37	1.24	1.13
700.0	2.11	1.91	1.75	1.61	1.47	1.34	1.22	1.11
800.0	2.06	1.85	1.70	1.56	1.43	1.31	1.20	1.10
900.0	2.00	1.79	1.63	1.50	1.39	1.28	1.17	1.07
1000.0	1.91	1.71	1.56	1.45	1.34	1.24	1.14	1.05

YDIV = 565.7  
 YC = 800.0  
 FATOR = .525

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	1.13	1.08	1.12	1.12	1.10	440.0
1000.0	1.04	.97	1.06	1.06	1.05	0.0
1500.0	.95	.89	.98	.98	.97	0.0
2000.0	.87	.82	.90	.90	.89	0.0
2500.0	.80	.75	.82	.82	.81	0.0
3000.0	.72	.69	.74	.74	.73	0.0
3500.0	.66	.63	.67	.67	.66	0.0
4000.0	.60	.58	.61	.61	.60	0.0

*any*

DESCARGA SUBMERSA -- COM DIFUSOR

P U U0 = 4.00 UA = .10 D = 1000.0

127.

DILUICAO INICIAL = 5.3  
 DELTA TEMP.(CP) = 1.69

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	1.58	1.55	1.47	1.36	1.26	1.15	1.05	.96
100.0	1.58	1.55	1.46	1.36	1.25	1.15	1.05	.96
200.0	1.58	1.54	1.46	1.36	1.25	1.15	1.05	.96
300.0	1.59	1.54	1.45	1.35	1.24	1.14	1.04	.95
400.0	1.59	1.53	1.44	1.34	1.23	1.13	1.04	.95
500.0	1.60	1.52	1.42	1.32	1.22	1.12	1.03	.94
600.0	1.60	1.50	1.40	1.30	1.20	1.11	1.02	.93
700.0	1.60	1.49	1.38	1.28	1.18	1.09	1.00	.92
800.0	1.59	1.46	1.35	1.26	1.16	1.07	.99	.91
900.0	1.57	1.43	1.32	1.23	1.14	1.05	.97	.90
1000.0	1.54	1.40	1.29	1.20	1.11	1.03	.95	.88

YDIV = 565.7  
 YC = 1000.0  
 FATOR = .567

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.91	.87	.90	.90	.79	590.0
1000.0	.86	.79	.87	.87	.76	0.0
1500.0	.80	.73	.82	.82	.72	0.0
2000.0	.74	.68	.76	.76	.67	0.0
2500.0	.69	.63	.70	.70	.62	0.0
3000.0	.63	.58	.64	.64	.57	0.0
3500.0	.58	.54	.59	.59	.52	0.0
4000.0	.53	.50	.54	.54	.47	0.0

*Handwritten signature*

Z U

U0 = 1.00

UA = .20

D = 600.0

128.

DILUICAO INICIAL = .1.8  
 DELTA TEMP. (CP) = 5.06

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.14	.42	.79	1.11	1.35	1.49	1.55	1.56
100.0	.26	.57	.90	1.19	1.39	1.51	1.56	1.56
200.0	.66	.99	1.23	1.40	1.51	1.56	1.58	1.56
300.0	1.45	1.64	1.69	1.69	1.67	1.64	1.60	1.56
400.0	2.54	2.39	2.17	1.98	1.83	1.71	1.62	1.54
500.0	3.56	2.99	2.54	2.19	1.94	1.75	1.62	1.52
600.0	3.98	3.23	2.68	2.27	1.97	1.75	1.59	1.47
700.0	3.56	2.99	2.54	2.18	1.89	1.68	1.52	1.40
800.0	2.54	2.38	2.16	1.93	1.73	1.56	1.42	1.31
900.0	1.45	1.63	1.66	1.59	1.49	1.38	1.28	1.20
1000.0	.66	.96	1.14	1.21	1.21	1.18	1.12	1.07

YDIV = 400.0

YC = 600.0

FATOR = .444

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	1.13	1.77	.60	1.62	1.66	600.0
1000.0	1.06	1.43	.62	1.35	1.39	600.0
1500.0	.97	1.19	.66	1.14	1.18	600.0
2000.0	.88	1.01	.69	.98	1.01	600.0
2500.0	.81	.87	.71	.86	.89	580.0
3000.0	.76	.78	.71	.77	.80	540.0
3500.0	.72	.71	.70	.71	.74	440.0
4000.0	.69	.65	.69	.69	.72	170.0

mu

Z U

U0 = 1.00

UA = .20

D = 800.0

129.

DILUIÇÃO INICIAL = 3.3  
 DELTA TEMP.(CP) = 2.69

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.19	.37	.56	.72	.85	.93	.98	1.00
100.0	.24	.42	.60	.75	.87	.94	.98	1.00
200.0	.39	.56	.71	.83	.91	.97	1.00	1.00
300.0	.65	.79	.88	.94	.98	1.01	1.02	1.01
400.0	1.02	1.07	1.08	1.08	1.07	1.05	1.04	1.01
500.0	1.44	1.38	1.29	1.22	1.15	1.10	1.06	1.02
600.0	1.84	1.65	1.48	1.33	1.22	1.13	1.07	1.01
700.0	2.13	1.84	1.60	1.41	1.27	1.15	1.07	1.00
800.0	2.24	1.91	1.64	1.44	1.28	1.15	1.06	.98
900.0	2.13	1.84	1.60	1.40	1.25	1.12	1.03	.95
1000.0	1.84	1.65	1.47	1.31	1.18	1.07	.98	.91

YDIV = 400.0

YC = 800.0

FATOR = .525

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.53	1.18	.32	1.19	1.13	800.0
1000.0	.56	1.00	.38	1.02	.97	800.0
1500.0	.57	.86	.43	.89	.84	800.0
2000.0	.57	.75	.47	.78	.74	790.0
2500.0	.56	.67	.50	.69	.66	780.0
3000.0	.55	.60	.52	.63	.60	740.0
3500.0	.54	.56	.53	.58	.56	660.0
4000.0	.53	.52	.53	.54	.53	510.0



P U

U0 = 1.00

UA = .20

D = 1000.0

DILUICAO INICIAL = 5.2  
DELTA TEMP.(CP) = 1.75

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.22	.34	.46	.56	.64	.69	.72	.74
100.0	.25	.37	.48	.57	.65	.69	.72	.74
200.0	.32	.43	.53	.61	.67	.71	.73	.74
300.0	.44	.53	.60	.66	.70	.73	.74	.75
400.0	.60	.66	.70	.73	.75	.76	.76	.75
500.0	.79	.81	.81	.80	.79	.79	.77	.76
600.0	1.00	.96	.92	.88	.84	.81	.79	.76
700.0	1.19	1.10	1.02	.95	.89	.84	.80	.77
800.0	1.36	1.22	1.10	1.00	.92	.86	.81	.77
900.0	1.47	1.29	1.15	1.03	.94	.86	.81	.76
1000.0	1.51	1.32	1.17	1.04	.94	.86	.80	.75

YDIV = 400.0

YC = 1000.0

FATOR = .567

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.34	.86	.23	.89	.75	1000.0
1000.0	.37	.75	.28	.78	.66	1000.0
1500.0	.40	.66	.33	.69	.59	1000.0
2000.0	.41	.59	.37	.62	.52	990.0
2500.0	.42	.53	.39	.56	.47	970.0
3000.0	.43	.49	.41	.51	.44	930.0
3500.0	.43	.45	.42	.48	.41	850.0
4000.0	.43	.42	.42	.45	.39	720.0

*mm*

DILUIÇÃO INICIAL = 2.2  
 DELTA TEMP. (CP) = 4.13

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.39	.75	1.09	1.34	1.49	1.56	1.58	1.55
100.0	.53	.87	1.17	1.39	1.51	1.57	1.58	1.55
200.0	.96	1.22	1.40	1.51	1.58	1.60	1.58	1.54
300.0	1.64	1.71	1.71	1.69	1.66	1.63	1.58	1.52
400.0	2.44	2.22	2.02	1.86	1.74	1.65	1.57	1.50
500.0	3.09	2.62	2.25	1.98	1.79	1.65	1.54	1.48
600.0	3.34	2.76	2.34	2.02	1.79	1.62	1.50	1.40
700.0	3.09	2.61	2.24	1.95	1.72	1.55	1.43	1.33
800.0	2.43	2.21	1.98	1.77	1.59	1.45	1.34	1.25
900.0	1.64	1.68	1.62	1.52	1.41	1.31	1.22	1.15
1000.0	.94	1.14	1.22	1.23	1.19	1.14	1.09	1.04

YDIV = 400.0  
 YC = 600.0  
 FATOR = .444

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	1.08	1.48	.63	1.40	1.43	600.0
1000.0	.99	1.23	.66	1.18	1.21	600.0
1500.0	.90	1.04	.69	1.01	1.04	600.0
2000.0	.83	.90	.71	.88	.91	580.0
2500.0	.77	.79	.72	.79	.82	550.0
3000.0	.73	.72	.71	.72	.76	460.0
3500.0	.70	.67	.70	.70	.73	240.0
4000.0	.66	.62	.68	.68	.71	0.0

*mm*

DESCARGA SUBMERSA -- COM DIFUSOR

2 U      U0 = 2.00      UA = .20      D = 800.0

DELUICAO INICIAL = 3.9  
 DELTA TEMP.(CP) = 2.31

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.35	.54	.71	.84	.93	.98	1.00	1.00
100.0	.40	.58	.74	.86	.94	.99	1.01	1.00
200.0	.55	.70	.82	.91	.97	1.00	1.01	1.00
300.0	.78	.88	.94	.99	1.02	1.02	1.02	1.00
400.0	1.08	1.09	1.09	1.08	1.07	1.05	1.03	1.00
500.0	1.40	1.32	1.24	1.17	1.12	1.07	1.03	.99
600.0	1.69	1.51	1.36	1.24	1.15	1.09	1.03	.98
700.0	1.89	1.64	1.44	1.29	1.18	1.09	1.02	.97
800.0	1.96	1.69	1.47	1.30	1.18	1.08	1.00	.94
900.0	1.89	1.64	1.44	1.28	1.15	1.05	.97	.91
1000.0	1.68	1.50	1.34	1.21	1.09	1.00	.93	.87

YDIV = 400.0  
 YC = 800.0  
 FATOR = .525

X	D <sub>T</sub> DIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.57	1.03	.37	1.05	1.00	800.0
1000.0	.57	.89	.43	.91	.86	800.0
1500.0	.57	.77	.47	.80	.76	790.0
2000.0	.57	.69	.51	.71	.67	780.0
2500.0	.56	.62	.52	.64	.61	750.0
3000.0	.55	.57	.53	.59	.57	680.0
3500.0	.54	.53	.53	.55	.54	530.0
4000.0	.53	.49	.53	.53	.52	130.0

*Handwritten signature*

2 U      U0 = 2.00      UA = .20      D = 1000.0

DILUICAO INICIAL = 5.8  
DELTA TEMP. (CP) = 1.55

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.33	.45	.55	.63	.69	.72	.74	.75
100.0	.35	.47	.57	.64	.69	.73	.74	.75
200.0	.42	.52	.60	.67	.71	.74	.75	.75
300.0	.52	.60	.66	.70	.73	.75	.75	.75
400.0	.66	.70	.73	.75	.76	.76	.76	.75
500.0	.81	.81	.81	.80	.79	.78	.77	.75
600.0	.97	.93	.89	.85	.82	.80	.77	.75
700.0	1.12	1.04	.96	.90	.85	.81	.78	.75
800.0	1.25	1.12	1.02	.94	.87	.82	.78	.74
900.0	1.33	1.18	1.06	.96	.88	.82	.77	.73
1000.0	1.36	1.20	1.07	.96	.88	.81	.76	.72

YDIV = 400.0  
YC = 1000.0  
FATOR = .567

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.37	.77	.28	.80	.68	1000.0
1000.0	.40	.68	.33	.71	.60	1000.0
1500.0	.41	.61	.36	.63	.54	990.0
2000.0	.43	.55	.39	.57	.49	970.0
2500.0	.43	.50	.41	.52	.45	940.0
3000.0	.43	.46	.42	.48	.41	870.0
3500.0	.43	.43	.43	.45	.39	740.0
4000.0	.43	.41	.42	.43	.38	500.0

*Amg*

P U

U0 = 3.00

UA = .20

D = 600.0

DILUICAO INICIAL = 2.5  
 DELTA TEMP.(CP) = 3.61

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.63	.99	1.28	1.46	1.56	1.59	1.57	1.53
100.0	.77	1.09	1.33	1.49	1.57	1.59	1.57	1.53
200.0	1.15	1.35	1.49	1.57	1.61	1.60	1.57	1.51
300.0	1.71	1.73	1.71	1.68	1.65	1.61	1.55	1.49
400.0	2.32	2.10	1.93	1.79	1.69	1.61	1.53	1.46
500.0	2.79	2.39	2.08	1.86	1.71	1.59	1.50	1.42
600.0	2.96	2.49	2.13	1.87	1.68	1.55	1.45	1.36
700.0	2.78	2.38	2.05	1.80	1.62	1.48	1.38	1.29
800.0	2.31	2.08	1.85	1.66	1.50	1.38	1.29	1.21
900.0	1.69	1.66	1.57	1.46	1.35	1.26	1.18	1.12
1000.0	1.09	1.21	1.24	1.22	1.17	1.12	1.06	1.02

YDIV = 400.0  
 YC = 600.0  
 FATOR = .444

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	1.03	1.32	.65	1.26	1.29	600.0
1000.0	.94	1.11	.69	1.07	1.10	600.0
1500.0	.86	.95	.71	.93	.96	590.0
2000.0	.80	.83	.72	.82	.85	560.0
2500.0	.75	.75	.72	.75	.78	500.0
3000.0	.71	.69	.71	.71	.74	340.0
3500.0	.68	.64	.69	.69	.72	0.0
4000.0	.65	.61	.66	.66	.70	0.0

*Mun*

DI LUICAO INICIAL = 4.3  
 DELTA TEMP. (CP) = 2.07

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.49	.67	.81	.92	.98	1.01	1.01	1.00
100.0	.53	.70	.83	.93	.99	1.01	1.01	1.00
200.0	.66	.79	.89	.96	1.00	1.02	1.02	1.00
300.0	.86	.93	.98	1.02	1.03	1.03	1.02	.99
400.0	1.10	1.10	1.09	1.08	1.06	1.04	1.02	.99
500.0	1.35	1.27	1.20	1.14	1.09	1.05	1.01	.98
600.0	1.57	1.41	1.29	1.19	1.11	1.05	1.00	.96
700.0	1.72	1.51	1.35	1.22	1.12	1.05	.99	.94
800.0	1.78	1.54	1.36	1.22	1.11	1.03	.97	.91
900.0	1.72	1.51	1.33	1.19	1.08	1.00	.93	.88
1000.0	1.57	1.40	1.26	1.13	1.04	.96	.89	.84

YDIV = 400.0  
 YC = 800.0  
 FATOR = .525

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.58	.93	.42	.96	.91	800.0
1000.0	.58	.81	.46	.84	.79	800.0
1500.0	.57	.72	.50	.74	.70	790.0
2000.0	.57	.64	.52	.67	.63	760.0
2500.0	.56	.58	.54	.61	.58	700.0
3000.0	.55	.54	.54	.57	.55	590.0
3500.0	.53	.51	.53	.53	.53	330.0
4000.0	.52	.48	.52	.52	.52	0.0

*run*

$P U$        $U0 = 3.00$        $UA = .20$        $D = 1000.0$

DILUICAO INICIAL = 6.3  
DELTA TEMP. (CP) = 1.42

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.42	.53	.62	.68	.72	.74	.75	.75
100.0	.44	.54	.63	.69	.72	.75	.75	.75
200.0	.49	.58	.65	.70	.73	.75	.75	.75
300.0	.58	.65	.70	.73	.75	.76	.76	.75
400.0	.69	.73	.75	.76	.77	.77	.76	.75
500.0	.82	.82	.81	.80	.79	.78	.76	.74
600.0	.95	.91	.87	.84	.81	.79	.76	.74
700.0	1.07	.99	.92	.87	.83	.79	.76	.73
800.0	1.17	1.06	.97	.90	.84	.79	.76	.73
900.0	1.23	1.10	.99	.91	.84	.79	.75	.71
1000.0	1.25	1.11	1.00	.91	.84	.78	.74	.70

$YDIV = 400.0$   
 $YC = 1000.0$   
FATOR = .567

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.39	.71	.31	.74	.63	1000.0
1000.0	.41	.63	.36	.66	.56	990.0
1500.0	.43	.57	.39	.59	.50	980.0
2000.0	.43	.52	.41	.54	.46	950.0
2500.0	.44	.47	.42	.50	.43	890.0
3000.0	.44	.44	.43	.47	.40	790.0
3500.0	.43	.42	.43	.44	.39	600.0
4000.0	.42	.40	.42	.42	.38	0.0

*mmj*

Z U

U0 = 4.00

UA = .20

D = 600.0

$\bar{D}$ LUIÇAO INICIAL = 2.8  
 DELTA TEMP.(CP) = 3.25

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.84	1.17	1.40	1.54	1.59	1.60	1.56	1.51
100.0	.95	1.24	1.44	1.55	1.60	1.60	1.56	1.50
200.0	1.28	1.45	1.55	1.61	1.62	1.60	1.55	1.49
300.0	1.74	1.73	1.71	1.68	1.64	1.59	1.53	1.47
400.0	2.21	2.02	1.86	1.75	1.65	1.58	1.50	1.43
500.0	2.57	2.22	1.97	1.78	1.65	1.55	1.46	1.39
600.0	2.70	2.30	1.99	1.77	1.62	1.50	1.41	1.33
700.0	2.57	2.20	1.92	1.71	1.55	1.43	1.34	1.26
800.0	2.20	1.97	1.76	1.58	1.44	1.34	1.25	1.19
900.0	1.70	1.62	1.52	1.41	1.31	1.22	1.15	1.10
1000.0	1.18	1.25	1.24	1.20	1.15	1.09	1.05	1.01

YDIV = 400.0

YC = 600.0

FATOR = .444

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.98	1.20	.68	1.16	1.19	600.0
1000.0	.90	1.02	.71	1.00	1.02	590.0
1500.0	.83	.89	.72	.87	.90	580.0
2000.0	.78	.79	.73	.79	.81	530.0
2500.0	.74	.72	.72	.72	.76	430.0
3000.0	.70	.67	.71	.71	.74	110.0
3500.0	.67	.63	.68	.68	.72	0.0
4000.0	.64	.59	.65	.65	.69	0.0



Z U

U0 = 4.00

UA = .20

D = 800.0

DILUICAO INICIAL = 4.7  
DELTA TEMP.(CP) = 1.90

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.60	.76	.88	.96	1.01	1.02	1.01	.99
100.0	.64	.79	.90	.97	1.01	1.02	1.01	.99
200.0	.75	.86	.94	1.00	1.02	1.02	1.01	.99
300.0	.91	.97	1.01	1.03	1.04	1.03	1.01	.98
400.0	1.11	1.10	1.09	1.08	1.06	1.03	1.01	.97
500.0	1.31	1.23	1.17	1.12	1.07	1.03	1.00	.96
600.0	1.49	1.34	1.23	1.15	1.08	1.03	.98	.94
700.0	1.60	1.42	1.27	1.17	1.08	1.02	.97	.92
800.0	1.64	1.44	1.28	1.16	1.07	1.00	.94	.89
900.0	1.60	1.41	1.25	1.13	1.04	.97	.91	.86
1000.0	1.48	1.32	1.19	1.08	.99	.92	.87	.82

YDIV = 400.0

YC = 800.0

FATOR = .525

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.58	.86	.45	.89	.84	800.0
1000.0	.58	.76	.49	.78	.74	790.0
1500.0	.57	.67	.52	.70	.66	770.0
2000.0	.56	.61	.54	.63	.60	730.0
2500.0	.56	.56	.54	.59	.56	650.0
3000.0	.54	.52	.54	.55	.54	470.0
3500.0	.53	.49	.53	.53	.53	0.0
4000.0	.51	.47	.52	.52	.52	0.0

DILUICAO INICIAL = 6.8  
 DELTA TEMP. (CP) = 1.32

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.49	.59	.66	.71	.74	.75	.76	.75
100.0	.50	.60	.67	.72	.74	.76	.76	.75
200.0	.55	.63	.69	.73	.75	.76	.76	.75
300.0	.63	.68	.72	.75	.76	.76	.76	.74
400.0	.72	.75	.76	.77	.77	.77	.76	.74
500.0	.82	.82	.81	.80	.79	.77	.76	.74
600.0	.93	.89	.86	.83	.80	.78	.75	.73
700.0	1.03	.95	.90	.85	.81	.78	.75	.72
800.0	1.10	1.01	.93	.87	.82	.78	.74	.71
900.0	1.15	1.04	.95	.87	.81	.77	.73	.70
1000.0	1.17	1.05	.95	.87	.81	.76	.72	.68

YDIV = 400.0  
 YC = 1000.0  
 FATOR = .567

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.41	.66	.34	.69	.59	1000.0
1000.0	.42	.59	.38	.62	.53	990.0
1500.0	.43	.54	.40	.56	.48	960.0
2000.0	.44	.49	.42	.52	.44	920.0
2500.0	.44	.46	.43	.48	.41	840.0
3000.0	.44	.43	.43	.45	.39	690.0
3500.0	.43	.41	.43	.43	.38	370.0
4000.0	.42	.39	.42	.42	.38	0.0

*mmj*

2 U

U0 = 1.00

UA = .60

D = 600.0

140.

DILUICAO INICIAL = 3.7  
 DELTA TEMP.(CP) = 2.40

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.01	.01	.03	.05	.08
100.0	.00	.00	.01	.02	.04	.06	.09	.12
200.0	.02	.04	.07	.10	.14	.18	.22	.26
300.0	.15	.22	.28	.35	.40	.45	.48	.51
400.0	.67	.74	.79	.82	.84	.84	.83	.82
500.0	1.61	1.54	1.46	1.38	1.30	1.23	1.16	1.09
600.0	2.17	1.96	1.79	1.64	1.51	1.39	1.29	1.20
700.0	1.61	1.54	1.46	1.38	1.30	1.23	1.16	1.09
800.0	.67	.74	.79	.82	.84	.84	.83	.82
900.0	.15	.22	.28	.35	.40	.45	.48	.51
1000.0	.02	.04	.07	.10	.14	.18	.22	.26

YDIV = 230.9

YC = 600.0

FATOR = .444

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.02	.96	.01	.94	1.02	600.0
1000.0	.03	.87	.02	.86	.93	600.0
1500.0	.05	.79	.03	.78	.85	600.0
2000.0	.07	.73	.04	.72	.78	600.0
2500.0	.09	.67	.05	.66	.72	600.0
3000.0	.11	.62	.06	.62	.67	600.0
3500.0	.13	.57	.08	.57	.62	600.0
4000.0	.15	.53	.09	.53	.58	600.0

Z U

UD = 1.00

UA = .60

D = 800.0

141.

DELUICAO INICIAL = 8.1  
 DELTA TEMP.(CP) = 1.11

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.01	.01	.02	.03	.04	.06	.07	.09
100.0	.01	.02	.03	.04	.06	.07	.09	.11
200.0	.04	.05	.07	.08	.10	.12	.14	.16
300.0	.10	.12	.15	.17	.19	.21	.23	.24
400.0	.23	.26	.28	.30	.32	.33	.34	.35
500.0	.44	.46	.47	.48	.48	.47	.47	.46
600.0	.71	.70	.68	.66	.64	.61	.59	.57
700.0	.94	.89	.84	.80	.75	.72	.68	.65
800.0	1.04	.97	.91	.85	.80	.75	.71	.67
900.0	.94	.89	.84	.80	.75	.72	.68	.65
1000.0	.71	.70	.68	.66	.64	.61	.59	.57

YDIV = 230.9

YC = 800.0

FATOR = .525

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.03	.54	.01	.59	.56	800.0
1000.0	.04	.51	.02	.55	.53	800.0
1500.0	.05	.48	.03	.52	.49	800.0
2000.0	.06	.45	.03	.49	.46	800.0
2500.0	.07	.42	.04	.46	.44	800.0
3000.0	.08	.40	.05	.43	.41	800.0
3500.0	.09	.37	.06	.41	.39	800.0
4000.0	.10	.35	.07	.39	.37	800.0

DILUICAO INICIAL = 13.3  
 DELTA TEMP.(CP) = .68

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.02	.03	.04	.05	.06	.07	.09	.10
100.0	.03	.03	.04	.06	.07	.08	.09	.11
200.0	.05	.06	.07	.08	.09	.11	.12	.13
300.0	.08	.10	.11	.12	.13	.14	.16	.17
400.0	.14	.16	.17	.18	.19	.20	.20	.21
500.0	.23	.24	.24	.25	.26	.26	.26	.27
600.0	.33	.33	.33	.33	.33	.33	.33	.32
700.0	.44	.43	.42	.41	.40	.39	.38	.37
800.0	.54	.52	.50	.48	.47	.45	.43	.42
900.0	.61	.58	.56	.53	.51	.49	.46	.45
1000.0	.64	.61	.58	.55	.52	.50	.48	.45

YDIV = 230.9  
 YC = 1000.0  
 FATOR = .567

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.03	.36	.02	.33	.31	1000.0
1000.0	.04	.34	.03	.31	.29	1000.0
1500.0	.04	.33	.03	.29	.28	1000.0
2000.0	.05	.31	.04	.28	.26	1000.0
2500.0	.06	.30	.05	.27	.25	1000.0
3000.0	.07	.28	.05	.25	.24	1000.0
3500.0	.07	.27	.06	.24	.23	1000.0
4000.0	.08	.26	.07	.23	.22	1000.0

*Am*

2 U

U0 = 2.00

UA = .60

D = 600.0

143.

DILUIÇÃO INICIAL = 4.0  
 DELTA TEMP. (CP) = 2.25

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.00	.01	.02	.04	.07	.10
100.0	.00	.01	.02	.03	.05	.08	.11	.14
200.0	.03	.06	.09	.13	.17	.21	.25	.29
300.0	.20	.26	.33	.38	.43	.47	.50	.52
400.0	.72	.78	.82	.83	.84	.84	.83	.81
500.0	1.57	1.49	1.41	1.33	1.25	1.18	1.12	1.05
600.0	2.03	1.85	1.69	1.55	1.43	1.33	1.23	1.15
700.0	1.57	1.49	1.41	1.33	1.25	1.18	1.12	1.05
800.0	.72	.78	.82	.83	.84	.84	.83	.81
900.0	.20	.26	.33	.38	.43	.47	.50	.52
1000.0	.03	.06	.09	.13	.17	.21	.25	.28

YDIV = 230.9

YC = 600.0

FATOR = .444

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.03	.90	.01	.89	.96	600.0
1000.0	.04	.82	.02	.81	.88	600.0
1500.0	.06	.75	.03	.74	.81	600.0
2000.0	.08	.69	.04	.68	.75	600.0
2500.0	.10	.64	.06	.63	.69	600.0
3000.0	.12	.59	.07	.59	.64	600.0
3500.0	.14	.55	.09	.55	.60	600.0
4000.0	.16	.51	.10	.51	.56	600.0



Z U

U0 = 2.00

UA = .60

D = 800.0

DELTA INICIAL = 8.4  
 DELTA TEMP.(CP) = 1.07

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.01	.01	.02	.03	.05	.06	.08	.10
100.0	.01	.02	.03	.05	.06	.08	.10	.12
200.0	.04	.06	.08	.09	.11	.13	.15	.17
300.0	.11	.14	.16	.18	.20	.22	.23	.25
400.0	.25	.27	.29	.31	.33	.34	.34	.35
500.0	.45	.47	.47	.48	.48	.47	.47	.46
600.0	.70	.69	.67	.65	.63	.60	.58	.56
700.0	.92	.87	.82	.78	.74	.70	.66	.63
800.0	1.00	.94	.88	.83	.78	.73	.69	.66
900.0	.92	.87	.82	.78	.74	.70	.66	.63
1000.0	.70	.69	.67	.65	.63	.60	.58	.56

YDIV = 230.9

YC = 800.0

FATOR = .525

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.03	.53	.02	.57	.54	800.0
1000.0	.04	.49	.02	.54	.51	800.0
1500.0	.05	.46	.03	.50	.48	800.0
2000.0	.06	.43	.04	.47	.45	800.0
2500.0	.07	.41	.05	.45	.42	800.0
3000.0	.08	.39	.06	.42	.40	800.0
3500.0	.09	.36	.07	.40	.38	800.0
4000.0	.10	.35	.08	.38	.36	800.0

DILUICAO INICIAL = 13.6  
 DELTA TEMP. (CP) = .66

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.02	.03	.04	.05	.07	.08	.09	.11
100.0	.03	.04	.05	.06	.07	.09	.10	.11
200.0	.05	.06	.07	.09	.10	.11	.12	.14
300.0	.09	.10	.11	.13	.14	.15	.16	.17
400.0	.15	.16	.17	.18	.19	.20	.21	.21
500.0	.23	.24	.25	.25	.26	.26	.26	.27
600.0	.33	.33	.33	.33	.33	.33	.32	.32
700.0	.44	.43	.42	.41	.40	.39	.38	.37
800.0	.53	.51	.49	.48	.46	.44	.43	.41
900.0	.60	.57	.55	.52	.50	.48	.46	.44
1000.0	.63	.59	.56	.54	.51	.49	.47	.45

YDIV = 230.9  
 YC = 1000.0  
 FATOR = .567

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.03	.35	.02	.32	.30	1000.0
1000.0	.04	.34	.03	.30	.28	1000.0
1500.0	.05	.32	.04	.29	.27	1000.0
2000.0	.05	.30	.04	.27	.26	1000.0
2500.0	.06	.29	.05	.26	.25	1000.0
3000.0	.07	.28	.06	.25	.23	1000.0
3500.0	.08	.26	.06	.24	.22	1000.0
4000.0	.08	.25	.07	.23	.21	1000.0

*mm*



2 U

UD = 3.00

UA = .60

D = 600.0

DILUICAO INICIAL = 4.2  
 DELTA TEMP.(CP) = 2.12

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.00	.01	.02	.03	.06	.08	.12
100.0	.01	.01	.03	.04	.07	.10	.13	.16
200.0	.05	.08	.11	.15	.19	.23	.27	.31
300.0	.24	.30	.36	.41	.46	.49	.52	.53
400.0	.76	.80	.83	.84	.84	.83	.82	.80
500.0	1.53	1.45	1.37	1.29	1.22	1.15	1.08	1.02
600.0	1.93	1.76	1.61	1.49	1.37	1.27	1.19	1.11
700.0	1.53	1.45	1.37	1.29	1.22	1.15	1.08	1.02
800.0	.76	.80	.83	.84	.84	.83	.82	.80
900.0	.24	.30	.36	.41	.46	.49	.51	.53
1000.0	.05	.08	.11	.15	.19	.23	.27	.30

YDIV = 230.9

YC = 600.0

FATOR = .444

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.04	.86	.02	.84	.92	600.0
1000.0	.05	.78	.03	.77	.84	600.0
1500.0	.07	.72	.04	.71	.77	600.0
2000.0	.10	.66	.05	.66	.71	600.0
2500.0	.12	.61	.07	.61	.66	600.0
3000.0	.13	.57	.08	.56	.62	600.0
3500.0	.15	.53	.09	.53	.57	600.0
4000.0	.16	.49	.11	.49	.54	600.0

8.7

.04

100.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
.02	.03	.04	.06	.07	.09	.11
.03	.04	.06	.07	.09	.11	.13
.07	.08	.10	.12	.14	.16	.18
.15	.17	.19	.21	.23	.24	.26
.28	.30	.32	.33	.34	.35	.35
.47	.48	.48	.48	.47	.47	.46
.68	.66	.64	.62	.59	.57	.55
.85	.80	.76	.72	.68	.65	.62
.91	.85	.80	.76	.72	.68	.64
.85	.80	.76	.72	.68	.65	.62
.68	.66	.64	.62	.59	.57	.55

DTC	DTMED	DTI	DTMAX	YMAX
.51	.02	.56	.53	800.0
.48	.03	.52	.49	800.0
.45	.04	.49	.46	800.0
.42	.04	.46	.44	800.0
.40	.05	.43	.41	800.0
.38	.06	.41	.39	800.0
.36	.07	.39	.37	800.0
.34	.08	.37	.35	800.0

*Handwritten signature*

DILUICAO INICIAL = 4.5  
 DELTA TEMP.(CP) = 2.02

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.00	.01	.01	.03	.04	.07	.10	.14
100.0	.01	.02	.03	.06	.08	.11	.15	.18
200.0	.06	.10	.13	.18	.22	.26	.29	.32
300.0	.27	.33	.39	.44	.48	.51	.53	.54
400.0	.79	.82	.84	.85	.84	.83	.81	.79
500.0	1.49	1.41	1.33	1.25	1.18	1.11	1.05	.99
600.0	1.84	1.68	1.55	1.43	1.32	1.23	1.15	1.07
700.0	1.49	1.41	1.33	1.25	1.18	1.11	1.05	.99
800.0	.79	.82	.84	.85	.84	.83	.81	.79
900.0	.27	.33	.39	.44	.48	.51	.53	.54
1000.0	.06	.10	.13	.17	.22	.25	.29	.32

YDIV = 230.9  
 YC = 600.0  
 FATOR = .444

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.05	.82	.02	.81	.88	600.0
1000.0	.06	.75	.03	.74	.81	600.0
1500.0	.09	.69	.05	.68	.74	600.0
2000.0	.11	.63	.06	.63	.69	600.0
2500.0	.13	.59	.07	.59	.64	600.0
3000.0	.14	.55	.09	.55	.59	600.0
3500.0	.16	.51	.10	.51	.55	600.0
4000.0	.17	.48	.12	.48	.52	600.0

*mm*

Z U

U0 = 4.00

UA = .60

D = 800.0

DILUICAO INICIAL = 8.9  
DELTA TEMP.(CP) = 1.01

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.01	.02	.03	.05	.06	.08	.10	.12
100.0	.02	.03	.05	.06	.08	.10	.12	.14
200.0	.06	.07	.09	.11	.13	.15	.17	.19
300.0	.13	.16	.18	.20	.22	.23	.25	.26
400.0	.27	.29	.31	.33	.34	.35	.35	.36
500.0	.47	.48	.48	.48	.48	.47	.46	.45
600.0	.69	.67	.65	.63	.61	.59	.56	.54
700.0	.87	.83	.78	.74	.70	.67	.64	.61
800.0	.94	.88	.83	.78	.74	.70	.66	.63
900.0	.87	.83	.78	.74	.70	.67	.64	.61
1000.0	.69	.67	.65	.63	.61	.59	.56	.54

YDIV = 230.9  
YC = 800.0  
FATOR = .525

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.04	.50	.02	.54	.51	800.0
1000.0	.05	.46	.03	.51	.48	800.0
1500.0	.06	.44	.04	.48	.45	800.0
2000.0	.07	.41	.05	.45	.43	800.0
2500.0	.08	.39	.06	.42	.40	800.0
3000.0	.09	.37	.07	.40	.38	800.0
3500.0	.10	.35	.08	.38	.36	800.0
4000.0	.11	.33	.09	.36	.34	800.0

*Handwritten signature*

DILUICAO INICIAL = 14.2  
 DELTA TEMP. (CP) = .63

	500.0	1000.0	1500.0	2000.0	2500.0	3000.0	3500.0	4000.0
0.0	.03	.04	.05	.06	.08	.09	.10	.12
100.0	.04	.05	.06	.07	.08	.10	.11	.12
200.0	.06	.07	.08	.10	.11	.12	.13	.14
300.0	.10	.11	.12	.14	.15	.16	.17	.18
400.0	.16	.17	.18	.19	.20	.21	.21	.22
500.0	.24	.25	.25	.26	.26	.26	.27	.27
600.0	.33	.33	.33	.33	.33	.33	.32	.32
700.0	.43	.42	.41	.40	.39	.38	.37	.36
800.0	.52	.50	.48	.46	.45	.43	.41	.40
900.0	.58	.55	.53	.50	.48	.46	.44	.42
1000.0	.60	.57	.54	.52	.49	.47	.45	.43

YDIV = 230.9  
 YC = 1000.0  
 FATOR = .567

X	DTDIV	DTC	DTMED	DTI	DTMAX	YMAX
500.0	.04	.34	.03	.31	.29	1000.0
1000.0	.05	.32	.03	.29	.27	1000.0
1500.0	.05	.31	.04	.28	.26	1000.0
2000.0	.06	.29	.05	.26	.25	1000.0
2500.0	.07	.28	.06	.25	.24	1000.0
3000.0	.07	.27	.06	.24	.23	1000.0
3500.0	.08	.26	.07	.23	.22	1000.0
4000.0	.09	.25	.08	.22	.21	1000.0

*Handwritten signature*