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FREE-MOLECULE FLOW AND SURFACE DIFFUSION THROUGH SLOTS AND TUBES - A SUMMARY

by Thaine W. Reynolds and Edward A. Richley

Lewis Research Center
Cleveland, Ohio

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SUMMARY

Theoretical analyses have been conducted dealing with free-molecule gas flow through tubes and two-dimensional slots. Diffuse reemission from the walls has been assumed. Models investigated include converging and diverging slots and tubes as well as parallel-walled slots and cylindrical tubes. For the parallel-walled slots and cylindrical tubes, effects of both free-molecule flow and surface diffusion were studied. The results are summarized in this report. The pertinent integral equations, developed from classical kinetic theory are presented as are other important relations covering various transmission factors.

Numerical solutions were obtained by using an IBM 7094 computer and are given specifically for slot length-to-width ratios of from 1/4 to 8 and for tube length-to-radius ratios from 1/16 to 16, with wall half-angles ranging from 75° to -60°. In certain instances, it is shown that results are asymptotic to well-known long-tube or slot approximations. Results presented include wall flux distributions, exit-plane flux distributions, and direct and indirect transmission probabilities for gas-phase flow through all configurations.

The "combined" flow model that includes gas-phase flow and surface diffusion is described, and general solutions for flow through the slot or tube are discussed. Particular solutions for the slot or tube flows, matched to inlet and outlet lateral surface flows, are given for a wide range of values of a parameter that includes the effects of the surface diffusion coefficient, the adsorption time, and the slot or tube dimensions. Examples are given showing how single slot or tube results may be generalized to multiple-slot or multiple-tube models.

Gas-phase flow distributions, both radial and plane, downstream of the exit of the slots are presented for both the near and far fields. Finally, the far-field flux patterns that include the effects of surface diffusion are presented for both parallel-walled slots and cylindrical tubes.

INTRODUCTION

Free-molecule gas flow through bodies of various configurations has been studied since the early work of Knudsen (ref. 1), Smoluchowski (ref. 2) and Clausing (refs. 3 and 4). Interest in the field has gained impetus in recent times primarily because of the rapid expansion of vacuum and space technology. Also, increased availability of large computers has made possible solutions to problems heretofore considered nonsolvable.

Mathematical formulation of free-molecule internal flow problems was first accomplished by Clausing for right-circular tubes (ref. 3). Later investigators both rederived Clausing's equation by other techniques and formulated the problem for other models. In the treatment of the problem, the usual assumptions are that gas flow into the inlet is random, the flow is free molecule, the system is isothermal, and particle reflections from the wall are diffuse. From a physical viewpoint, the assumption that the particle reflections from the wall are diffuse is appropriate if particles are assumed to be first adsorbed and then evaporated. This, in turn, suggests the presence of an adsorbed layer on the wall, which implies the possibility of flow by surface diffusion. Inclusion of surface diffusion effects, however, not only contributes additional complications to the mathematical formulation of the problem but also requires knowledge of the diffusion coefficient and equilibrium adsorption data for the particular system considered. For this reason, the problem of combined free-molecule gas-phase flow and surface-diffusion flow has received much less attention than the gas-phase-flow problem alone.

The most commonly studied gas-phase-flow models have been convergent or divergent slots (two dimensional) and tubes. References that contain tabulated or graphical results for the various flux distributions or transmission probabilities are included in the following table. Also shown are references dealing with the combined flow problem. This table indicates that gas-phase flow systems have been studied much more than the combined flow systems, and, of the configurations studied, the cylindrical tube has received the most attention, particularly with respect to the total transmission factor.

In general, the determination of the transmission factor for a given system requires first, the solution of a wall flux distribution relation; second, the solution of an exit-plane flux distribution (which depends on the wall flux distribution); and finally, integration of the exit-plane distribution. The wall flux relation is an integrodifferential equation that is not amenable to explicit, analytical solution so that various iterative techniques have been used to obtain solutions. The exactness of the final transmission factor is thus a strong function of the convergence criteria employed in obtaining the intermediate solutions.

This report is a composite of the pertinent relations required to obtain solutions for all the systems shown in the table and presents typical results for each system. The objective is to provide a useful working reference and, in addition, to present some ma-

System	Configuration (a)	Flux distributions			Total transmission factor
		Wall	Exit plane	Downstream plane	
		References for tabulated or graphical theoretical results			
Gas-phase flow ($\mathscr{D}$ = 0)					
Convergent or divergent slots		5	5	6	5, 20
Parallel-walled slots		5	5	6	5, 8 to 13, 19 and 20
Convergent or divergent tubes		5, 16	5, 24	22	5, 16, 22, 24, 25
Cylindrical tubes		5, 15, 16, 21	5, 18, 19, 21, 24, 26	4, 17, 22, 23	4, 5, 8 to 13, 15 to 19, and 21 to 26
Combined gas-phase and surface-diffusion flow ($\mathscr{D} \neq 0$)					
Parallel-walled slots		Present report	----------	Present report	Present report
Cylindrical tubes		7	----------	Present report	7, 14

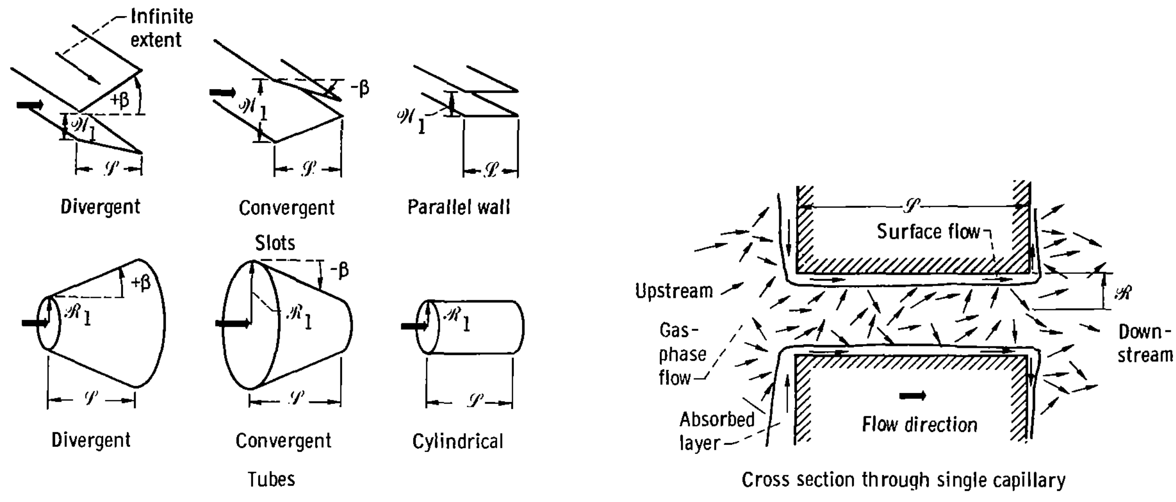
[a]Configuration designations used here are used throughout the report to identify the specific configuration. Shaded configuration indicates that surface diffusion is involved.

terial not previously published. The order of presentation follows the areas of study presented in the table; that is, the wall flux relations are given first, followed by the exit-plane relations, and so forth. When it is appropriate, a general relation is given first, followed by the specific relations for each system and model. Many of the details of the derivations of the various relations have been omitted for compactness. (These details are available conveniently summarized in refs. 5, 6, 7, and 18.) Finally, representative tabulated or graphical results for each system are given and discussed.

ANALYTIC RELATIONS

Basic Models and Assumptions

The basic configurations considered and their flow directions are given in sketch (a).



(a)
(b)

A view of the model for the combined gas-phase and surface-diffusion flow through a cylindrical tube is shown in sketch (b). In all cases, the configuration is assumed to be connected to two large reservoirs, one at either end. At any location within this configuration, the equilibrium of particles arriving at, adsorbing on, and finally desorbing from the surface leaves that point of the surface with a net surface coverage. In the upstream chamber, the gas is assumed to be isotropic; that is, it has a random directional distribution that results in a uniform arrival rate over the inlet area of the configuration. Explicit knowledge of the speed distribution function in the inlet reservoir is not required. Only the arrival rate needs to be known, and in this sense, the solution for the gas-phase flow will be independent of temperature. If the gas in the inlet chamber is assumed to be Maxwellian, the arrival rate is directly related to the gas density and temperature as

$$\mu = (\text{gas density}) \left(\frac{kT_g}{2\pi m_p}\right)^{1/2}$$

(All symbols are defined in appendix A.)

The reservoir at the downstream end is assumed to be at vacuum conditions, so that there is no return flow from this region. The driving potential for the flow is thus the gas density (or pressure) gradient from the upstream to the downstream reservoir. The density under all conditions must be low enough so that the mean free path for collisions between particles is much larger than any linear dimension of the configuration.

If a surface-diffusion component of flow is allowed, the surface coverage decreases along the upstream lateral surface (upstream reservoir) in the direction toward the tube entrance, through the tube, and along the downstream lateral surface away from the tube exit, as depicted in sketch (b). The driving potential for the surface flow is thus the surface-concentration gradient that exists from the upstream to the downstream reservoirs. For cases involving surface flows, all surfaces are assumed to be isothermal.

In a sense, the combined-flow model presents three separate problems: one deals with surface flow alone on the upstream lateral surface; the second deals with both gas-phase and surface flow within the slot or tube; and the third deals with surface flow along the downstream lateral surface. A "matched" solution is obtained by an appropriate matching of prescribed boundary conditions between the regions. The method by which this is accomplished is discussed in the section Matched Solutions. For gas-phase flow alone, it is merely necessary to describe the gas flow within a slot or tube. The basic relation from which the gas-phase-flow behavior may be described and derived (ref. 18) is

$$d\mu_b = \frac{\nu_a \cos \gamma_{a,b} \cos \gamma_{b,a}}{\pi \ell_{a,b}^2} dA_a = \nu_a F_{a,b} \tag{1}$$

where

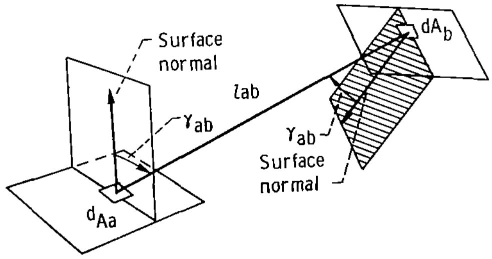
$d\mu_b$ flux (particles per unit area per unit time) arriving at differential area dA_b from dA_a

γ_a flux leaving differential area dA_a

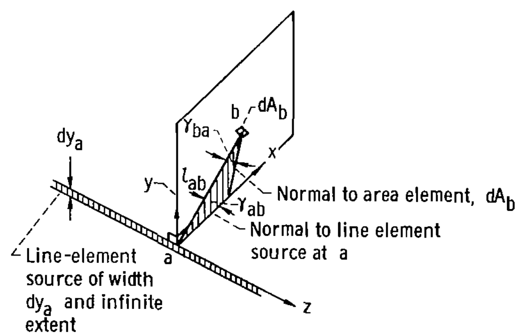
$F_{a,b}$ geometric configuration factor (fraction of particles leaving area A_a that arrive at specified location on area A_b)

Note that the configuration factors used herein are the same ones that are used in radiant heat-transfer situations, many of which are given in reference 27.

The geometric relations expressed in equation (1) are shown in sketch (c). The total arrival rate μ_b at dA_b is obtained by integrating equation (1) over all the source



(c)



(d)

area A_a that contributes to the flux at dA_b. If the configuration being examined is two dimensional, that is, of infinite extent in the third dimension, such as shown in sketch (d), the particle flux relations can be developed from the line-source relation as follows:

$$d\mu_b = \frac{\nu_a \cos \gamma_{a,b} \cos \gamma_{b,a}}{2\ell_{a,b}} \, dy_a = \nu_a F_{a,b} \tag{2}$$

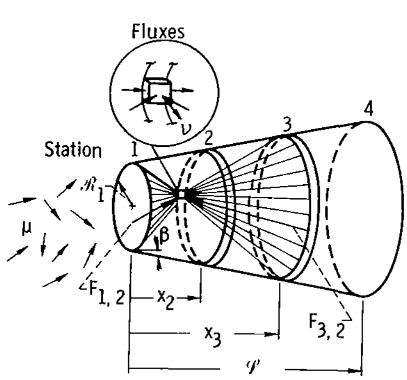
Equation (2) is, of course, obtained from equation (1) by the partial integration of dA_a over the line element from z equal to negative infinity to positive infinity. The total arrival rate μ_b at dA_b is obtained by integrating equation (2) over all line elements that contribute to the flux at dA_b.

Wall Flux

Generally, flow through a slot or tube consists of both gas-phase and surface flows. The equation describing the total flow (refs. 7, 9, 18, and 28) is

$$\nu(X_2) = \mu_1 F_{1,2} + \int_0^L \nu(X_3) F_{3,2} \, dX_3 + \mathscr{D}\nabla^2\sigma \tag{3}$$

where dimensional variables have been nondimensionalized by dividing by the entrance width $\mathscr{W}_1$ or radius $\mathscr{R}_1$ for the slot or tube, respectively. Sketch (e) aids in visualizing the physical significance of the terms in equation (3). A diverging tube configuration is shown; however, the form of equation (3) is applicable to all configurations considered. It is only necessary to use the appropriate definitions of the configuration parameters, or form factors, $F_{1,2}$ and $F_{3,2}$, the nondimensional distance variables, and the Laplacian operator ∇^2. These parameters are further defined as the different geometries are discussed.



(e)

Gas-phase flow ($\mathscr{D} = 0$). - For these systems the diffusion coefficient is zero, and equation (3) can be written as

$$N(X_2) = F_{1,2} + \int_0^L N(X_3) F_{3,2} \, dX_3 \tag{4}$$

where the leaving rate $\nu(X)$ has been normalized

Model	Wall flux relation
	$F_{1,2} = \frac{1}{2}\left[1 - \cos\beta\left(\frac{X_2\sec^2\beta + \tan\beta}{\sqrt{X_2^2\sec^2\beta + 2X_2\tan\beta + 1}}\right)\right]$
	$F_{3,2} = \frac{\cos\beta}{2}\left\{\frac{1 + 2(X_2 + X_3)\tan\beta + 4X_2X_3\tan^2\beta}{\left[(X_2 - X_3)^2 + (1 + X_2\tan\beta + X_3\tan\beta)^2\right]^{3/2}}\right\}$
 ($\beta = 0$)	$F_{1,2} = \frac{1}{2}\left(1 - \frac{X_2}{\sqrt{X_2^2 + 1}}\right)$
	$F_{3,2} = \frac{1}{2}\frac{1}{\left[(X_2 - X_3)^2 + 1\right]^{3/2}}$
	$F_{1,2} = \frac{1}{2R_2}\left[\frac{X_2^2\sec^2\beta + 3X_2\tan\beta + 2}{\left(X_2^2\sec^2\beta + 4R_2\right)^{1/2}} - X_2\cos\beta - R_2\sin\beta\right]$
	$F_{3,2} = \frac{\cos\beta}{2R_3}\left\{1 - \lvert X_3 - X_2\rvert\sec\beta\,\frac{(X_3 - X_2)^2\sec^2\beta + 6R_2R_3}{\left[(X_3 - X_2)^2\sec^2\beta + 4R_2R_3\right]^{3/2}}\right\}$
 ($\beta = 0$)	$F_{1,2} = \frac{1}{2}\left(\frac{X_2^2 + 2}{\sqrt{X_2^2 + 4}} - X_2\right)$
	$F_{3,2} = \left\{1 - \lvert X_3 - X_2\rvert\,\frac{(X_3 - X_2)^2 + 6}{\left[(X_3 - X_2)^2 + 4\right]^{3/2}}\right\}\frac{1}{2}$

to the uniform arrival rate μ_1. The preceding table gives the relations for $F_{1,2}$ and $F_{3,2}$ for the slot or the tube for any value of the wall angle β. The simplified forms for $\beta = 0$ are given separately for convenience. (Tables of functional relations are included at appropriate points throughout the report. Tables of results (I to X) are given in a body at the end of the report.)

Combined flow ($\mathscr{D} \neq 0$). - For the cases where the surface diffusion coefficient is not zero, a relation between the leaving rate $\nu(X)$ and the surface concentration $\sigma(X)$ is required. The relation employed herein is the equivalent of Henry's law applied to adsorption, as discussed in appendix B; that is

$$\nu(X) = C_1 \frac{\sigma(X)}{\sigma_m} = C_1 \theta(X) \tag{5}$$

Substituting equation (5) into equation (3) and rearranging yield

$$\Theta(X_2) = F_{1,2} + \int_0^L \Theta(X_3) F_{3,2}\, dX_3 + C_2 \Theta''(X_2) \tag{6}$$

where the factors $F_{1,2}$ and $F_{3,2}$ are the same as those listed in the table on page 7.

$$\Theta(X) = \frac{\theta(X)}{\theta_\infty} \tag{7}$$

and C_2 is defined for the tube as

$$C_2 = \frac{\mathscr{D}\sigma_m}{\mu_1 \mathscr{R}_1^2} \theta_\infty \tag{8a}$$

and for the slot as

$$C_2 = \frac{\mathscr{D}\sigma_m}{\mu_1 \mathscr{W}_1^2} \theta_\infty \tag{8b}$$

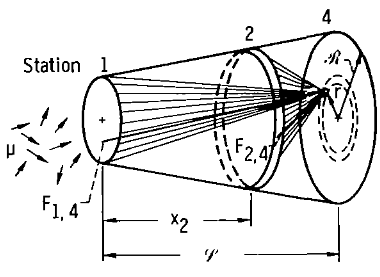
Note that, on the upstream lateral surface, far from the slot or the tube entrance, the leaving rate from the surface equals the arrival rate and the surface-coverage fraction approaches a maximum value, so that from equation (5),

$$C_1 = \frac{\mu_1}{\theta_\infty} \tag{9}$$

Exit-Plane Flux

As shown in sketch (f), the flux at a point in the exit plane consists of particles arriving directly from the inlet plus particles arriving from the walls. The equation describing the arrival rate at the exit plane, expressed in nondimensional and normalized form, is

$$M(R_4) = \frac{\mu(R_4)}{\mu_1} = F_{1,4} + \int_0^L N(X_2)F_{2,4}\,dX_2 \tag{10}$$



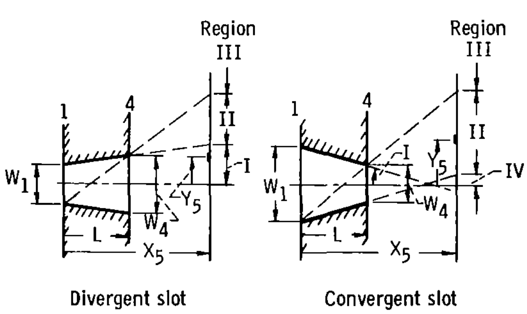
(f)

For gas-phase flow only, $N(X_2)$ is obtained from equation (4), while for combined flow, $N(X_2)$ is obtained from equations (5), (7), and (9):

$$N(X_2) = \frac{\nu(X_2)}{\mu_1} = \frac{C_1\theta(X_2)}{\mu_1} = \frac{C_1\theta_\infty}{\mu_1}\Theta(X_2) = \Theta(X_2)$$

The factors $F_{1,4}$ and $F_{2,4}$ are given in the table on page 10 for the slots or tubes of any wall angle β. For the slot, of course, the nondimensional variable in the exit plane becomes Y_4 rather than R_4.

Downstream Flux

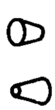


(g)

Mathematical description of the flux arriving at a plane downstream of the exit of a slot or tube depends on the location and orientation of the plane with respect to the configuration.

Slots (normal planes). - A general expression for the flux at a point Y_5 in a plane normal to the slot centerline (see sketch (g)) is

$$M(Y_5) = F_{1,5} + \int_{X_2}^{L} N(X_3)F_{3,5}\,dX_3 + \int_{(W_4)/2}^{\infty} N(Y_4)F_{4,5}\,dY_4 \tag{11}$$

Model	Exit plane relation
	$F_{1,4} = \frac{1}{2}\left\{\frac{1 - 2Y_4}{\left[4L^2 + (1 - 2Y_4)^2\right]^{1/2}} + \frac{1 + 2Y_4}{\left[4L^2 + (1 + 2Y_4)^2\right]^{1/2}}\right\}$
	$F_{2,4} = 2(L - X_2)\left\{\frac{W_4 + 2Y_4}{\left[4(L - X_2)^2 + (1 + 2Y_4 + 2X_2 \tan \beta)^2\right]^{3/2}} + \frac{W_4 - 2Y_4}{\left[4(L - X_2)^2 + (1 - 2Y_4 + 2X_2 \tan \beta)^2\right]^{3/2}}\right\}$
 ($\beta = 0$)	$F_{1,4} = \frac{1}{2}\left\{\frac{1 - 2Y_4}{\left[4L^2 + (1 - 2Y_4)^2\right]^{1/2}} + \frac{1 + 2Y_4}{\left[4L^2 + (1 + 2Y_4)^2\right]^{1/2}}\right\}$
	$F_{2,4} = 2(L - X_2)\left\{\frac{1 + 2Y_4}{\left[4(L - X_2)^2 + (1 + 2Y_4)^2\right]^{3/2}} + \frac{1 - 2Y_4}{\left[4(L - X_2)^2 + (1 - 2Y_4)^2\right]^{3/2}}\right\}$
	$F_{1,4} = \frac{1}{2}\left\{1 - \frac{L^2 + R_4^2 - 1}{\left[\left(1 + L^2 + R_4^2\right)^2 - 4R_4^2\right]^{1/2}}\right\}$
	$F_{2,4} = 2\left(\frac{R_2^2(L - X_2)\left[(L - X_2)^2 + R_2^2 - R_4^2 + R_2(L - X_2)^2\left[(L - X_2)^2 + R_2^2 - R_4^2\right] \tan \beta}{\left[\left\{(L - X_2)^2 + R_4^2 + R_2^2\right\}^2 - 4R_2^2R_4^2\right]^{3/2}}\right)$
 ($\beta = 0$)	$F_{1,4} = \frac{1}{2}\left\{1 - \frac{L^2 + R_4^2 - 1}{\left[\left(1 + L^2 + R_4^2\right)^2 - 4R_4^2\right]^{1/2}}\right\}$
	$F_{2,4} = 2(L - X_2)\frac{(L - X_2)^2 + 1 - R_4^2}{\left\{\left[(L - X_2)^2 + 1 + R_4^2\right]^2 - 4R_4^2\right\}^{3/2}}$

The first term on the right side is the contribution arriving directly from the inlet; the second term is the wall flux contribution; and the third term is the contribution from the downstream lateral surface. The third term takes on nonzero values only for the combined flow system. Sketch (g) shows that Regions I to IV have geometric bounds, and, as a result, the expressions for the factors $F_{1,5}$ and $F_{3,5}$ exhibit regionwise dependency. The factor $F_{4,5}$ is independent of region and is

$$F_{4,5} = \frac{(X_5 - L)^2}{2}\left\{\frac{1}{\left[(X_5 - L)^2 + (Y_4 - Y_5)^2\right]^{3/2}} + \frac{1}{\left[(X_5 - L)^2 + (Y_4 + Y_5)^2\right]^{3/2}}\right\}$$

The extent of the regions and the values of the lower limit of integration X_2 of the second term in equation (11) are given in the following table. Note from sketch (g) that Region IV occurs only for the convergent slot and then only when $X_5 > 1/\left(2\left|\tan\beta\right|\right)$.

Region	Extent of region	Value of X_2 in eq. (11)
I	$0 \le Y_5 \le \frac{W_4}{2} + (X_5 - L)\tan\beta$	0
II	$\frac{W_4}{2} + (X_5 - L)\tan\beta \le Y_5 \le \frac{W_4}{2} + \frac{X_5 - L}{2}\left(\frac{W_4 + 1}{L}\right)$	0
III	$\frac{W_4}{2} + \frac{X_5 - L}{2}\left(\frac{W_4 + 1}{L}\right) \le Y_5 < \infty$	$\dfrac{1}{1 + \left(\dfrac{X_5 - L}{Y_5 - \frac{W_4}{2}}\right)\tan\beta}\left[L - \dfrac{X_5 - L}{Y_5 - \frac{W_4}{2}}\left(\dfrac{W_4 + 1}{2}\right)\right]$
IV	$0 \le Y_5 \le X_5\left|\tan\beta\right| - \frac{1}{2}$	Not applicable

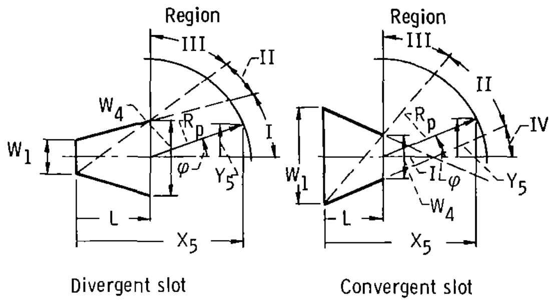
In equation (11), the $N(X_3)$ function is obtained as discussed previously in the section Exit-Plane Flux. The $N(Y_4)$ term depends on an evaporation-rate relation discussed in the section Upstream and Downstream Lateral Surface. The functional relations $F_{1,5}$ and $F_{3,5}$ for each region are given in the table on page 12. The parallel-walled relations are obtained by setting $\beta = 0$.

Region	Downstream plane relation
I	$F_{1,5} = \frac{1}{2}\left\{\frac{1 - 2Y_5}{\left[4X_5^2 + (1 - 2Y_5)^2\right]^{1/2}} + \frac{1 + 2Y_5}{\left[4X_5^2 + (1 + 2Y_5)^2\right]^{1/2}}\right\}$
	$F_{3,5} = 2(X_5 - X_3)\left\{\frac{1 + 2Y_5 + 2X_5 \tan\beta}{\left[4(X_5 - X_3)^2 + (1 + 2Y_5 + 2X_3 \tan\beta)^2\right]^{3/2}} + \frac{1 - 2Y_5 + 2X_5 \tan\beta}{\left[4(X_5 - X_3)^2 + (1 - 2Y_5 + 2X_3 \tan\beta)^2\right]^{3/2}}\right\}$
II	$F_{1,5} = \frac{1}{2}\left\{\frac{\psi_1 - Y_5}{\left[X_5^2 + (\psi_1 - Y_5)^2\right]^{1/2}} + \frac{1 + 2Y_5}{\left[4X_5^2 + (1 + 2Y_5)^2\right]^{1/2}}\right\}$ where $\psi_1 = \frac{W_4}{2} - L\left(\frac{Y_5 - \frac{W_4}{2}}{X_5 - L}\right)$
	$F_{3,5} = 2(X_5 - X_3)\left\{\frac{1 + 2Y_5 + 2X_5 \tan\beta}{\left[4(X_5 - X_3)^2 + (1 + 2Y_5 + 2X_3 \tan\beta)^2\right]^{3/2}}\right\}$
III	$F_{1,5} = 0$
	$F_{3,5} = 2(X_5 - X_3)\left\{\frac{1 + 2Y_5 + 2X_5 \tan\beta}{\left[4(X_5 - X_3)^2 + (1 + 2Y_5 + 2X_3 \tan\beta)^2\right]^{3/2}}\right\}$
IV	$F_{1,5} = \frac{1}{2}\left\{\frac{W_4 - 2Y_5}{\left[4(X_5 - L)^2 + (W_4 - 2Y_5)^2\right]^{1/2}} + \frac{W_4 + 2Y_5}{\left[4(X_5 - L)^2 + (W_4 + 2Y_5)^2\right]^{1/2}}\right\}$
	$F_{3,5} = 0$

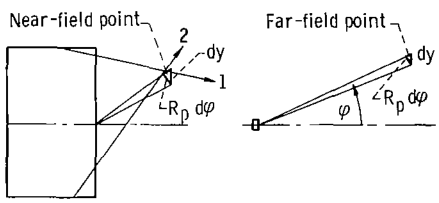
Slots (curved surfaces). - Another useful approach, applicable to the gas-phase flow system, is to consider the variable point Y_5 as if it were located on a curved, semicylindrical, surface at some radial distance R_p from a centerline in the slot exit plane. The flux relation can then be expressed in terms of the angular dependency φ and radial distance R_p as

$$M(\varphi, R_p) = F_{1,5} + \int_{X_2}^{L} N(X_3)F_{3,5}\, dX_3 \tag{12}$$

where $F_{1,5}$ and $F_{3,5}$ exhibit regionwise dependency, and the regions are as shown in sketch (h). The extent of the regions (and values of the lower limit of integration) is the same as that for the normal plane setup except that in Region III the maximum value of Y_5 is R_p rather than infinity. The functional relations for $F_{1,5}$ and $F_{3,5}$, given in terms of the pertinent variables shown in sketch (h) are listed for each region in the table on page 14.



(h)



(i)

Tubes. - Because of the complexity of the mathematics, solutions for downstream flux distributions available in the literature have been restricted to cylindrical tube models (see, e.g., ref. 17 and the table on p. 3). A further restriction has been to consider only gas-phase-flow systems in the far field. Sketch (i) depicts the conceptual difference between the near and far fields. Essentially, particle trajectory 1 through the near-field point in sketch (i) passes through the differential area dy but not through the differential area $R_p\, d\varphi$. On the other hand, particle trajectory 2 passes through $R_p\, d\varphi$ but not through dy. Thus, a simple relation between the fluxes through these two planes in the near field cannot be written. Far from the exit (i.e., far field), particle trajectories that pass through $R_p\, d\varphi$ also pass through dy. The fluxes through these two planes in the far field are, thus, related by the expression

$$M(Y_5) = M(\varphi, R_p)\cos\varphi \tag{13}$$

Relations are presented in reference 17 for the far-field angular flux patterns for gas-phase flow from cylindrical tubes. These relations are given in terms of a function T, so that

Region	Downstream radial relation[a]
I	$F_{1,5} = \frac{1}{2R_p}\left\{\frac{(X_5 - L)(1 - 2Y_5) + 2X_5Y_5}{\left[4X_5^2 + (1 - 2Y_5)^2\right]^{1/2}} + \frac{(X_5 - L)(1 + 2Y_5) - 2X_5Y_5}{\left[4X_5^2 + (1 + 2Y_5)^2\right]^{1/2}}\right\}$
	$F_{3,5} = \frac{(1 + 2Y_5 + 2X_5 \tan \beta)\left[(1 + 2Y_5 + 2X_3 \tan \beta)\sin \varphi + 2(X_5 - X_3)\cos \varphi\right]}{\left[4(X_5 - X_3)^2 + (1 + 2Y_5 + 2X_3 \tan \beta)^2\right]^{3/2}} + \frac{(1 - 2Y_5 + 2X_5 \tan \beta)\left[(1 - 2Y_5 + 2X_3 \tan \beta)\sin \varphi + 2(X_5 - X_3)\cos \varphi\right]}{\left[4(X_5 - X_3)^2 + (1 - 2Y_5 + 2X_3 \tan \beta)^2\right]^{3/2}}$
II	$F_{1,5} = \frac{1}{2R_p}\left\{\frac{(X_5 - L)(\psi_1 - Y_5) + X_5Y_5}{\left[X_5^2 + (\psi_1 - Y_5)^2\right]^{1/2}} + \frac{(X_5 - L)(1 + 2Y_5) - 2X_5Y_5}{\left[4X_5^2 + (1 + 2Y_5)^2\right]^{1/2}}\right\}$ where $\psi_1 = \frac{W_4}{2} - L\left(\frac{Y_5 - \frac{W_4}{2}}{X_5 - L}\right)$
	$F_{3,5} = \frac{(1 + 2Y_5 + 2X_5 \tan \beta)\left[(1 + 2Y_5 + 2X_3 \tan \beta)\sin \varphi + 2(X_5 - X_3)\cos \varphi\right]}{\left[4(X_5 - X_3)^2 + (1 + 2Y_5 + 2X_3 \tan \beta)^2\right]^{3/2}}$
III	$F_{1,5} = 0$
	$F_{3,5} = \frac{(1 + 2Y_5 + 2X_5 \tan \beta)\left[(1 + 2Y_5 + 2X_3 \tan \beta)\sin \varphi + 2(X_5 - X_3)\cos \varphi\right]}{\left[4(X_5 - X_3)^2 + (1 + 2Y_5 + 2X_3 \tan \beta)^2\right]^{3/2}}$
IV	$F_{1,5} = \frac{W_4}{4R_p}\left\{\frac{1}{\left[1 + \left(\frac{W_4}{2R_p}\sec \varphi - \tan \varphi\right)^2\right]^{1/2}} + \frac{1}{\left[1 + \left(\frac{W_4}{2R_p}\sec \varphi + \tan \varphi\right)^2\right]^{1/2}}\right\}$
	$F_{3,5} = 0$

[a]Useful identities in these relations are $X_5 = R_p \cos \varphi + L$ and $Y_5 = R_p \sin \varphi$.

$$M(\varphi, R_p) = T \cos \varphi \tag{14}$$

where

$$T = 1 - N_0 + \frac{4(2N_0 - 1)}{3\pi p} \qquad \text{for } p \geqq 1$$

$$T = 1 - \frac{2N_0}{\pi}\left[\sin^{-1} p + p(1 - p^2)^{1/2}\right] + \frac{4(2N_0 - 1)}{3\pi p}\left[1 - (1 - p^2)^{3/2}\right] \qquad \text{for } p \leqq 1$$

$$p = \frac{L}{2} \tan \varphi$$

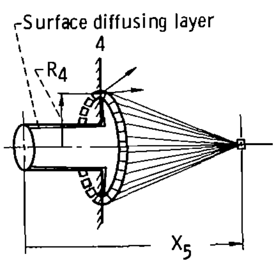
and

$$N_0 = N(X_2)_{X_2=0}$$

that is, the value of the wall flux at the inlet to the tube.

By using the simplifying assumption of a linear wall flux in the tube (of the form $N(X_2) = 1 - N(L - X_2)$, which will be seen to be true in the section RESULTS AND DISCUSSION), equation (11), written for gas-phase flow and in terms of tube variables, can be integrated to obtain a relation for the flux along the axis that is applicable over both the near and far fields. The relation is

$$M(X_5)_{Y_5=0} = \frac{1 - N_0}{X_5^2 + 1} + \frac{1 - N_0}{(X_5 - L)^2 + 1} + \frac{2N_0 - 1}{L}\left[\tan^{-1}(X_5) - \tan^{-1}(X_5 - L)\right] \tag{15}$$



(j)

If, because of surface diffusion, there is an additional contribution from the downstream lateral surface (see sketch (j)), this contribution is of the form

$$\int_1^{\infty} N(R_4) F_{4,5}\, dR_4 \tag{16}$$

where

$$F_{4,5} = \frac{2R_4(X_5 - L)^2}{\left[(X_5 - L)^2 + R_4^2\right]^2}$$

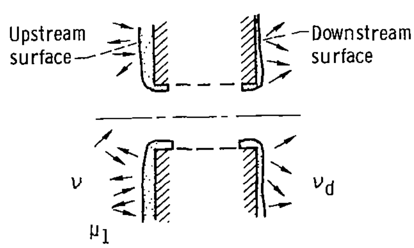
and $N(R_4)$ is an appropriate evaporation rate relation to be derived in the section Tubes, Downstream Surface. Solutions in this case are restricted to combined flow systems in which the wall flux is of the form

$$N(X_2) = 1 - N(L - X_2)$$

As will be seen, this relation will be true for the matched-flow solutions.

Lateral Surfaces

The surfaces for which a description of this portion of the flow is sought are depicted in sketch (k), applicable to either the parallel-walled slot or the cylindrical tube models with the appropriate choice of variables. The general differential equation describing the steady-state surface concentration σ on the upstream surface under simultaneous adsorption, desorption, and surface diffusion is



(k)

$$\mathscr{D}\nabla^2\sigma = \nu - \mu_1 \tag{17a}$$

and on the downstream surface is

$$\mathscr{D}\nabla^2\sigma = \nu_d \tag{17b}$$

To avoid cumbersome notation in this section, the subscript notation used in previous sections to identify the plane of reference will generally be dropped. The plane of reference will be clear from the section title.

Slot, upstream surface. - For this case, equation (17a) describing the steady-state surface concentration is

$$\mathscr{D}\frac{d^2\sigma}{dY^2} = \mathscr{W}_1^2(\nu - \mu_1) \tag{18}$$

Using Henry's law approximation $\nu(Y) = C_1\theta(Y)$ and the normalization definition of Θ (eq. (7)) equation (18) transforms to

$$\Theta''(Y) - C_3\Theta(Y) + C_3 = 0 \tag{19}$$

where

$$C_3 = \frac{\mathscr{W}_1^2}{\mathscr{D}\tau} = \frac{C_1\mathscr{W}_1^2}{\sigma_m\mathscr{D}} = \frac{1}{C_2} \tag{20}$$

The general solution to equation (19) is

$$\Theta(Y) = Ae^{-Y\sqrt{C_3}} + Be^{Y\sqrt{C_3}} + 1 \tag{21}$$

In general, for closely spaced slots, B is not zero. Boundary conditions applicable to equations (19) and (21) for the general case are assumed to be

$$\Theta(Y) = \Theta_{Y_1} \quad \text{or} \quad \Theta'(Y) = \Theta'_{Y_1} \qquad \text{at } Y = \frac{W_1}{2} = \frac{1}{2} \tag{22a}$$

and

$$\Theta'(\psi) = 0 \qquad \text{at } Y = \psi \tag{22b}$$

In equation (22b), ψ is some specified value of Y. If ψ is taken as the nondimensional distance to the midpoint between slots, small values of ψ imply closely spaced slots. With this definition of ψ, the fraction of open area is $1/(2\psi)$. Applying these boundary conditions gives equation (21) for the general case:

$$\frac{1 - \Theta(Y)}{1 - \Theta_{Y_1}} = \frac{e^{-Y\sqrt{C_3}} + e^{-2\psi\sqrt{C_3}}\, e^{Y\sqrt{C_3}}}{e^{-(1/2)\sqrt{C_3}} + e^{-2\psi\sqrt{C_3}}\, e^{(1/2)\sqrt{C_3}}} \tag{23}$$

For widely spaced slots (i.e., as ψ becomes infinite), this relation reduces to the single slot solution:

$$\frac{1 - \Theta(Y)}{1 - \Theta_{Y_1}} = e^{-[Y-(1/2)]\sqrt{C_3}} \tag{24}$$

Differentiation of equation (23) yields for the slope

$$\Theta'(Y) = \left(1 - \Theta_{Y_1}\right)\sqrt{C_3}\;\frac{e^{-Y\sqrt{C_3}} - e^{-2\psi\sqrt{C_3}}\,e^{Y\sqrt{C_3}}}{e^{-(1/2)\sqrt{C_3}} + e^{-2\psi\sqrt{C_3}}\,e^{(1/2)\sqrt{C_3}}} \tag{25}$$

which for the single slot, at $Y = W_1/2 = 1/2$, becomes

$$\Theta'_{Y_1} = \left(1 - \Theta_{Y_1}\right)\sqrt{C_3} \tag{26}$$

Slot, downstream surface. - A development parallel to that for the upstream surface leads to the following solutions of equation (17b) subject to the boundary conditions that

$$\Theta(Y) = \Theta_{Y_4} \quad \text{or} \quad \Theta'(Y) = \Theta'_{Y_4} \qquad \text{at } Y = \frac{W_4}{2} = \frac{1}{2} \tag{27a}$$

and

$$\Theta'(\psi) = 0 \qquad \text{at } Y = \psi \tag{27b}$$

For the general case of closely spaced slots,

$$\frac{\Theta(Y)}{\Theta_{Y_4}} = \frac{e^{-Y\sqrt{C_3}} + e^{-2\psi\sqrt{C_3}}\,e^{Y\sqrt{C_3}}}{e^{-(1/2)\sqrt{C_3}} + e^{-2\psi\sqrt{C_3}}\,e^{(1/2)\sqrt{C_3}}} \tag{28}$$

and for the single slot,

$$\frac{\Theta(Y)}{\Theta_{Y_4}} = e^{-[Y-(1/2)]\sqrt{C_3}} \tag{29}$$

For the slope in the general case, differentiation of equation (28) yields,

$$\Theta'(Y) = -\Theta_{Y_4}\sqrt{C_3}\,\frac{e^{-Y\sqrt{C_3}} - e^{-2\psi\sqrt{C_3}}\,e^{Y\sqrt{C_3}}}{e^{-(1/2)\sqrt{C_3}} + e^{-2\psi\sqrt{C_3}}\,e^{(1/2)\sqrt{C_3}}} \tag{30}$$

which, for the single slot at $Y = W_4/2 = 1/2$ becomes

$$\Theta'_{Y_4} = -\Theta_{Y_4}\sqrt{C_3} \tag{31}$$

It can readily be shown that the $N(Y_4)$ term needed for the downstream flux relation (eq. (11)) is simply $\Theta(Y)$ of equation (28) or (29).

The similarity between the upstream relations (eqs. (25) and (26)) and the downstream relations (eqs. (30) and (31)) is apparent. Further inspection of equations (25) and (30) shows that portions of the right sides are identical. The identical combination of functions, evaluated at $Y = 1/2$, corresponding to the slot edge, is herein defined as

$$\mathscr{F}_s(C_3) = \sqrt{C_3}\,\frac{1 - e^{(1-2\psi)\sqrt{C_3}}}{1 + e^{(1-2\psi)\sqrt{C_3}}} \tag{32}$$

and is plotted in figure 1.

It is apparent from figure 1 that, for values of C_2 less than about 1, the Θ'_{Y_1} or Θ'_{Y_4} solutions of equations (25) and (30) for the single slot case ($\psi = \infty$) are applicable to fairly closely spaced slots as well. Subsequent solutions will be presented only for $\psi = \infty$ cases. The matched solutions for cases of $\psi < \infty$ may be obtained by following the same procedures to be given for the single slot case but by using the appropriate curve from figure 1.

Tube, upstream surface. - For this case, equation (17a) becomes

$$\mathscr{D}\left(\frac{d^2\sigma}{dR^2} + \frac{1}{R}\,\frac{d\sigma}{dR}\right) = \mathscr{K}_1^2(\nu - \mu_1) \tag{33}$$

Equation (33) can be rewritten in terms of Θ and C_3 as

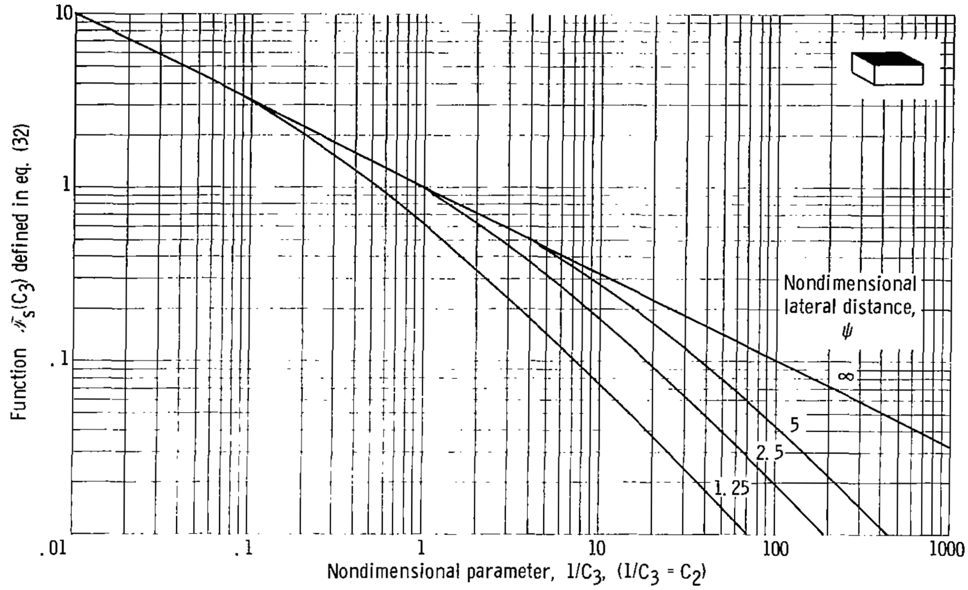


Figure 1. - Parameters useful for solution of upstream and downstream wall expressions for slots (eqs. (25) and (30)).

$$R^2\Theta''(R) + R\Theta'(R) - R^2C_3\Theta(R) = -R^2C_3 \tag{34}$$

where, for the tube,

$$C_3 = \frac{\mathscr{R}_1^2}{\mathscr{D}\tau} = \frac{C_1\mathscr{R}_1^2}{\sigma_m\mathscr{D}} = \frac{1}{C_2} \tag{35}$$

Equation (34) is in the form of a modified Bessel equation for which the general solution is

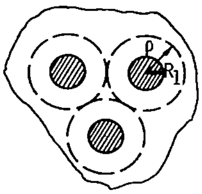
$$\Theta(R) = bI_0\left(R\sqrt{C_3}\right) + cK_0\left(R\sqrt{C_3}\right) + 1 \tag{36}$$

In general, for closely spaced tubes (pores), the constant b is not zero. In this case, boundary conditions applicable to equations (34) and (36) are

$$\Theta(R) = \Theta_{R_1} \quad \text{or} \quad \Theta'(R) = \Theta'_{R_1} \qquad \text{at } R = R_1 = 1 \tag{37a}$$

and

$$\Theta'(\rho) = 0 \qquad \text{at } R = \rho \tag{37b}$$



(ℓ)

In equation (37b), ρ is some specified value of R. If ρ is defined as shown in sketch (ℓ), the fraction of open area is approximately $1/\rho^2$. Applying equation (37b) to equation (36) yields

$$\frac{b}{c} = \frac{K_1\left(\rho\sqrt{C_3}\right)}{I_1\left(\rho\sqrt{C_3}\right)} \tag{38}$$

By using this relation, then equation (36) becomes, for the general case,

$$\frac{1 - \Theta(R)}{1 - \Theta_{R_1}} = \frac{\dfrac{K_1\left(\rho\sqrt{C_3}\right)}{I_1\left(\rho\sqrt{C_3}\right)} I_0\left(R\sqrt{C_3}\right) + K_0\left(R\sqrt{C_3}\right)}{\dfrac{K_1\left(\rho\sqrt{C_3}\right)}{I_1\left(\rho\sqrt{C_3}\right)} I_0\left(\sqrt{C_3}\right) + K_0\left(\sqrt{C_3}\right)} \tag{39}$$

For widely spaced pores, this expression reduces to the single tube relation (i.e., for $\rho \rightarrow \infty$)

$$\frac{1 - \Theta(R)}{1 - \Theta_{R_1}} = \frac{K_0\left(R\sqrt{C_3}\right)}{K_0\left(\sqrt{C_3}\right)} \tag{40}$$

Differentiation of equation (39) yields, for the slope,

$$\Theta'(R) = -\left(1 - \Theta_{R_1}\right)\sqrt{C_3}\,\frac{\dfrac{K_1\left(\rho\sqrt{C_3}\right)}{I_1\left(\rho\sqrt{C_3}\right)} I_1\left(R\sqrt{C_3}\right) - K_1\left(R\sqrt{C_3}\right)}{\dfrac{K_1\left(\rho\sqrt{C_3}\right)}{I_1\left(\rho\sqrt{C_3}\right)} I_0\left(\sqrt{C_3}\right) + K_0\left(\sqrt{C_3}\right)} \tag{41}$$

which, for the single tube at $R = R_1 = 1$, becomes

$$\Theta'_{R_1} = \left(1 - \Theta_{R_1}\right)\sqrt{C_3}\,\frac{K_1\left(\sqrt{C_3}\right)}{K_0\left(\sqrt{C_3}\right)} \tag{42}$$

With C_3 specified, equation (42) may be solved for various values of Θ_{R_1}.

Tube, downstream surface. - There is no gas-phase arrival rate on the downstream surface (see sketch (k)), so that equation (17b) describing the steady-state surface concentration on this surface is

$$\mathscr{D}\left(\frac{d^2\sigma}{dR^2} + \frac{1}{R}\frac{d\sigma}{dR}\right) = \nu_d \mathscr{R}^2 \tag{43}$$

A development similar to that used for the upstream surface leads to the following solutions where the applicable boundary conditions are

$$\Theta(R) = \Theta_{R_4} \quad \text{or} \quad \Theta'(R) = \Theta'_{R_4} \qquad \text{at } R = R_4 = 1 \tag{44a}$$

and

$$\Theta'(\rho) = 0 \qquad \text{at } R = \rho \tag{44b}$$

For the general case of closely spaced pores,

$$\frac{\Theta(R)}{\Theta_{R_4}} = \frac{\dfrac{K_1\left(\rho\sqrt{C_3}\right)}{I_1\left(\rho\sqrt{C_3}\right)} I_0\left(R\sqrt{C_3}\right) + K_0\left(R\sqrt{C_3}\right)}{\dfrac{K_1\left(\rho\sqrt{C_3}\right)}{I_1\left(\rho\sqrt{C_3}\right)} I_0\left(\sqrt{C_3}\right) + K_0\left(\sqrt{C_3}\right)} \tag{45}$$

and for the single tube or pore,

$$\frac{\Theta(R)}{\Theta_{R_4}} = \frac{K_0\left(R\sqrt{C_3}\right)}{K_0\left(\sqrt{C_3}\right)} \tag{46}$$

The slope for the general case is

$$\Theta'(R) = \Theta_{R_4}\sqrt{C_3}\,\frac{\dfrac{K_1\left(\rho\sqrt{C_3}\right)}{I_1\ \rho\sqrt{C_3}}\, I_1\left(R\sqrt{C_3}\right) - K_1\left(R\sqrt{C_3}\right)}{\dfrac{K_1\left(\rho\sqrt{C_3}\right)}{I_1\left(\rho\sqrt{C_3}\right)}\, I_0\left(\sqrt{C_3}\right) + K_0\left(\sqrt{C_3}\right)} \tag{47}$$

and for the single tube at $R = 1$,

$$\Theta'_{R_4} = -\Theta_{R_4}\sqrt{C_3}\,\frac{K_1\left(\sqrt{C_3}\right)}{K_0\left(\sqrt{C_3}\right)} \tag{48}$$

With C_3 specified, equation (48) may be solved for various values of Θ_{R_4}. The function $\Theta(R)$ in equations (45) and (46) is equivalent to $N(R_4)$ in equation (16).

As in the case of the slot, the similarity between the upstream relations (eqs. (41) and (42)) and the downstream relations (eqs. (47) and (48)) is apparent. The combination of functions that appears in both equations (41) and (47), evaluated at $R = 1$ and corresponding to the tube edge, is herein defined as

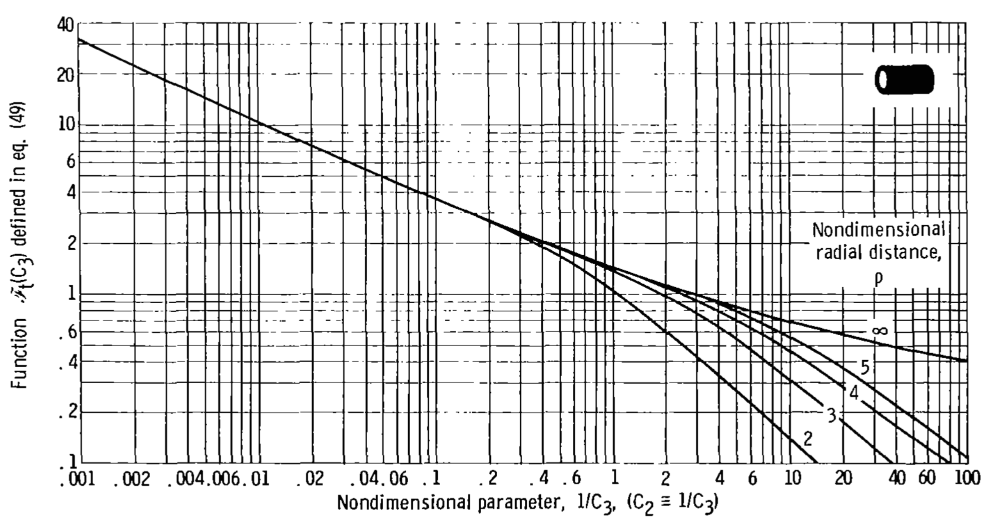


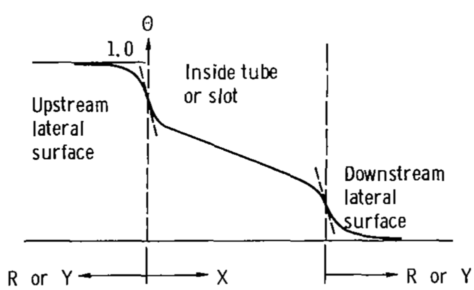
Figure 2. - Parameters useful for solution of upstream and downstream expressions for tubes (eqs. (41) and (47)).

$$\mathscr{F}_t(C_3) = \sqrt{C_3}\,\frac{\dfrac{K_1\left(\rho\sqrt{C_3}\right)}{I_1\left(\rho\sqrt{C_3}\right)} I_1\left(\sqrt{C_3}\right) - K_1\left(\sqrt{C_3}\right)}{\dfrac{K_1\left(\rho\sqrt{C_3}\right)}{I_1\left(\rho\sqrt{C_3}\right)} I_0\left(\sqrt{C_3}\right) + K_0\left(\sqrt{C_3}\right)} \tag{49}$$

and is plotted against the variable C_2 ($C_2 = 1/C_3$) in figure 2.

It is apparent from figure 2 that, for values of C_2 less than about 1, the Θ' solutions for the single-tube case ($\rho = \infty$) are applicable to closely spaced pores ($\rho \approx 2$) as well. Subsequent solutions are presented for the single tube only ($\rho = \infty$).

Matching conditions. - The boundary conditions employed to obtain matched solutions of flow through the slots or tubes with the upstream and downstream lateral surface flows are specified essentially by assuming a continuity of flow in the surface layer (i.e., both the values of coverage and slope are matched at the end points). Sketch (m) illustrates such a condition. The matching conditions are given in the accompanying table.



(m)

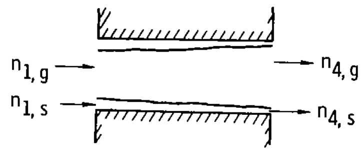
Configuration	Upstream end	Downstream end
Tube	$\Theta_0 = \Theta_{R_1}$ $\Theta_0' = -\Theta_{R_1}'$	$\Theta_L = \Theta_{R_4}$ $\Theta_L' = \Theta_{R_4}'$
Slot	$\Theta_0 = \Theta_{Y_1}$ $\Theta_0' = -\Theta'_{Y_1}$	$\Theta_L = \Theta_{Y_4}$ $\Theta_L' = \Theta_{Y_4}'$

Transmission Factors

Transmission factors that are defined in the case of gas-phase transport alone are all ratios of the net flow out the exit to the gas-phase flow into the inlet. For those cases, there is no other flow mechanism introducing material into the tube. When surface transport is also possible, however, mass flow may be introduced into the tube by this means as well. The amount may, in fact, exceed that introduced by gas-phase transport. Nevertheless, it is still convenient to define transmission factors based on the inlet gas-phase arrival rate alone, even though the transmission factor may then exceed 1. The inlet gas arrival rate is a readily evaluated number, independent of the configuration or flow conditions, whereas the surface-transport portion of the inlet flow is not. Thus, the total transmission factor of a configuration may be defined as

$$P_t = \frac{n_{4,g} + n_{4,s}}{n_{1,g}} \tag{50}$$

where $n_{4,g}$ is the gas-phase flow out the exit, $n_{4,s}$ is the exiting surface-transport flow, and $n_{1,g}$ is the inlet gas-phase flow. The various n's have the units of particles per second and are depicted in sketch (n).



(n)

It is often convenient to define partial transmission factors as

$$P_g = \frac{n_{4,g}}{n_{1,g}} \tag{51}$$

where P_g is the gas-phase transmission factor, and

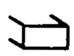
$$P_s = \frac{n_{4,s}}{n_{1,g}} \tag{52}$$

where P_s is the surface-diffusion-phase transmission factor.

The gas-phase transmission factor P_g is the integral of equation (10) over the exit area of the configuration and thus can be expressed as the sum of a "direct" transmission factor P_d, and an "indirect" transmission factor P_i:

$$P_g = P_d + P_i \tag{53}$$

The direct transmission factors, the integrals of $F_{1,4}$ over the exit plane, are functions only of the geometry of the configuration and do not depend on the solutions for wall flux as do the P_i factors. Values of P_d for the various models are given in the following table:

Model	Direct transmission factor, P_d
	$\frac{1}{2}\left\{\left[4L^2 + (1 + W_4)^2\right]^{1/2} - \left[4L^2 + (1 - W_4)^2\right]^{1/2}\right\}$
	$\left(L^2 + 1\right)^{1/2} - L$
 	$\frac{1}{2}\left\{1 + L^2 + R_4^2 - \left[\left(1 + L^2 + R_4^2\right)^2 - 4R_4^2\right]^{1/2}\right\}$
	$1 + \frac{L^2}{2} - \frac{L}{2}\left(L^2 + 4\right)^{1/2}$

The surface flow out the exit of either the slot or the tube is given by the following relations:

Slot:

$$n_{4,s} = -2\frac{\mathscr{D}z}{\mathscr{W}}\frac{d\sigma}{dX} = -2\frac{\mathscr{D}z}{\mathscr{W}}\sigma_m\theta_\infty\Theta_L'$$

(54)

Tube:

$$n_{4,s} = -2\pi\mathscr{D}\frac{d\sigma}{dX} = -2\pi\mathscr{D}\sigma_m\theta_\infty\Theta_L'$$

so that, the surface transmission factor P_s can be written as

$$P_s = \frac{n_{4,s}}{n_{1,g}} = -2C_2\Theta_L' \tag{55}$$

where C_2 is given by equation (8a) for the tube or by equation (8b) for the slot. The normalized slope of the surface-coverage fraction Θ_L' must also be specified from specific problem considerations.

RESULTS AND DISCUSSION

Wall Flux Distributions

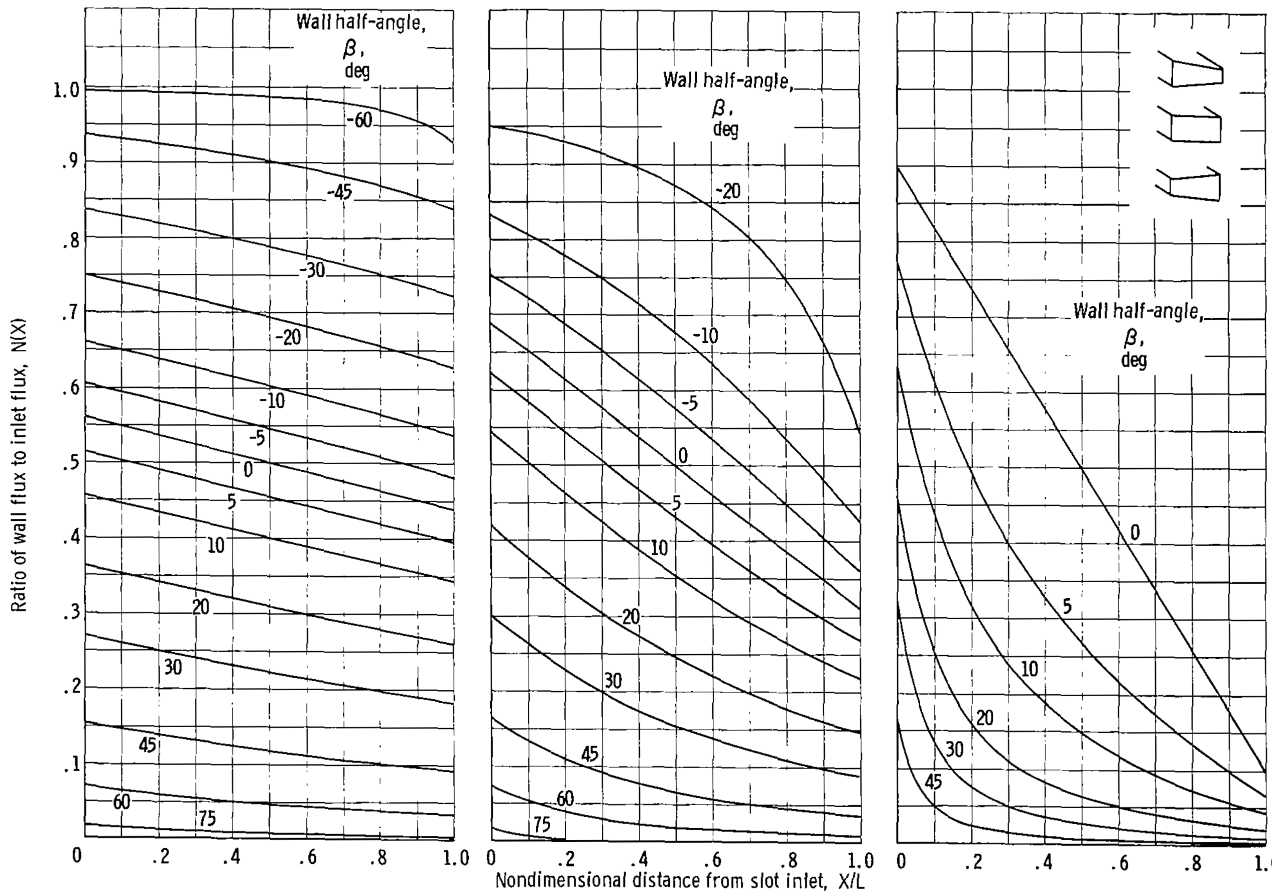
The various equations involving wall fluxes are integrodifferential equations not amenable to closed-form solutions. Numerical solutions were obtained on an IBM 7094 computer. For the cases of gas flow alone, solution of the wall flux equation was accomplished by the application of an iterative procedure described in detail in reference 5. The procedure consists essentially of supplying an initial guess of the unknown function $N(X_3)$ in the integral of equation (4). The equation is numerically integrated by using a combination of Simpson's rule and trapezoidal integration. New values of the function are thus produced that are used, in turn, in the next iteration. The iteration proceeds in this manner until convergence is reached; that is, until the maximum change in any one of the final pointwise values, compared with its previous value, is less than some preassigned limit. For the solutions presented herein, the largest value used for this limit was 0.02 percent. Trial solutions in which widely different initial guesses were supplied always resulted in convergence to practically the same final answers; however, the rate of convergence differed. The simple initial guess of $N(X_3) = 0$ generally yielded the most rapid rate of convergence.

For cases involving combined gas-phase and surface flows, the simple iterative procedure just described did not converge rapidly enough to be useful. The procedure and the FORTRAN program for the combined flow solutions are presented in detail in reference 7.

Gas-phase flow ($\mathscr{D} = 0$). - Wall flux values for the convergent or divergent two-dimensional slots are presented in table I, and for the convergent or divergent tubes in table II. Several illustrative plots of the data from these tables are shown in figures 3 and 4. (The symbols that were used in the Introduction have been employed on all the subsequent figures and tables as an aid in relating the results presented to the configurations and conditions involved.) Wall flux varies nearly linearly along the slot or the tube length for $\beta = 0$, is concave downward for the converging configurations and is concave upward for the diverging configurations. This behavior of the slot and the tube-wall flux distributions with the wall half-angle is a result of the varying magnitude of contributions received directly from the inlet and particles reflected from the walls. Comparison of these results with those of reference 16 indicates excellent agreement between the two sets of calculations.

For the parallel-walled-slot and cylindrical-tube cases, the solution for the wall flux is nearly linear. The true solution has the property

$$N(X) + N(L - X) = 1 \tag{56}$$

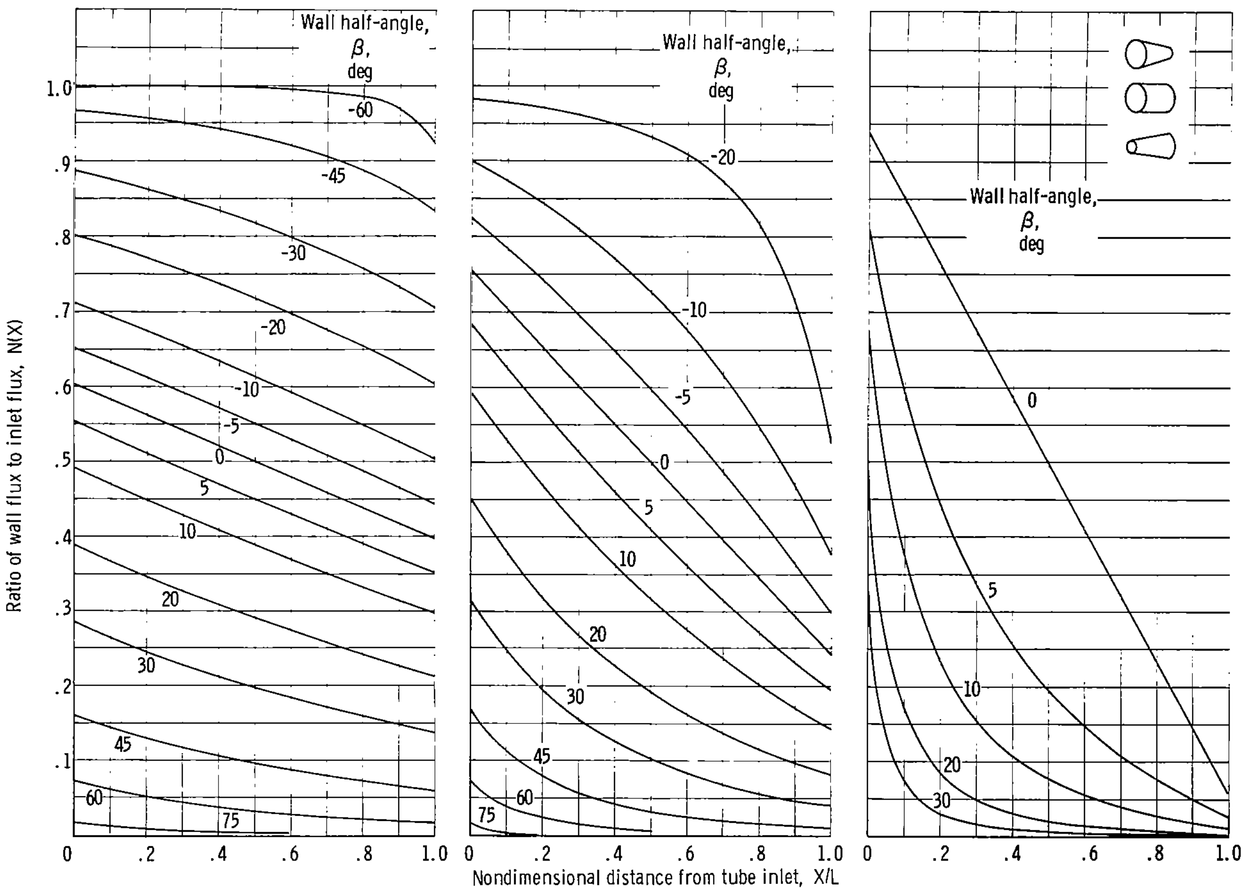


(a) Length to inlet-width ratio, 0.25

(b) Length to inlet-width ratio, 1.

(c) Length to inlet-width ratio, 8.

Figure 3. - Variation of flux along wall of convergent and divergent slots. (Diverging walls, positive β; converging walls, negative β.)



(a) Length to inlet-radius ratio, 0.5. (b) Length to inlet-radius ratio, 2. (c) Length to inlet-radius ratio, 16.

Figure 4. - Variation of flux along wall of convergent and divergent tubes. (Diverging walls; positive β; converging walls, negative β.)

and thus, the linear approximation to the solution may be written as

$$N(X) = N_0 + \left(\frac{1 - 2N_0}{L}\right)X \tag{57}$$

The parameter N_0, the wall flux at the inlet, can be determined approximately by assuming equation (57) to be a solution of equation (4), substituting, performing the integration, and evaluating the resulting expression at $X = 0$, or $X = L$. The parameter for the parallel-walled slot is

$$N_0 = \frac{(L + 1)(L^2 + 1)^{1/2} - 1}{2(L + 1)(L^2 + 1)^{1/2} - (L^2 + 2)} \tag{58}$$

and for the cylindrical tube is

$$N_0 = \frac{1 + \frac{L}{2} - \frac{L^2}{2(L^2 + 4)^{1/2}}}{1 + \frac{2}{(L^2 + 4)^{1/2}}} \tag{59}$$

This parameter for the tube has been noted before in references 3 and 29 and may be used for the value of N_0 in equations (14) and (15).

The difference between the values of N_0, obtained from equations (58) and (59) with the end point values obtained from the numerical solutions, is less than 1 percent, as shown in the following table:

Slot			Tube		
Nondimensional length, L	Normalized wall flux at tube inlet, N_0		Nondimensional length, L	Normalized wall flux at tube inlet, N_0	
	Table I	Eq. (58)		Table II	Eq. (59)
0.25	0.561	0.561	0.5	0.604	0.607
.5	.613	.613	1	.674	.674
1	.688	.688	2	.758	.757
2	.770	.770	4	.837	.837
4	.843	.844	8	.899	.901
8	.899	.904	16	.942	.945

Values of N_0 from equations (58) and (59) are plotted in figure 5.

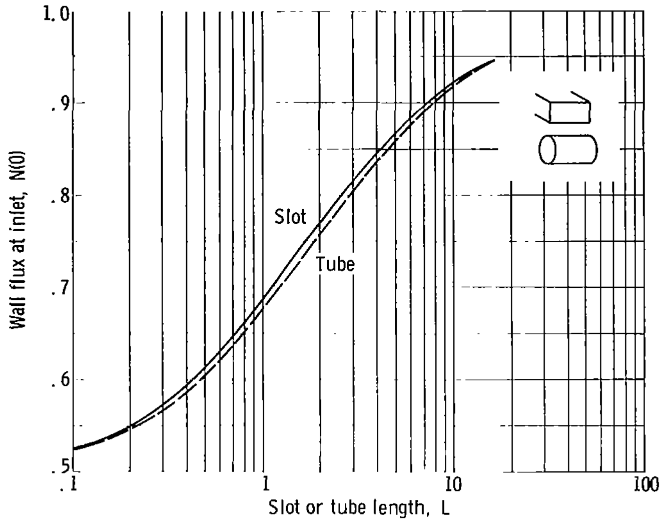
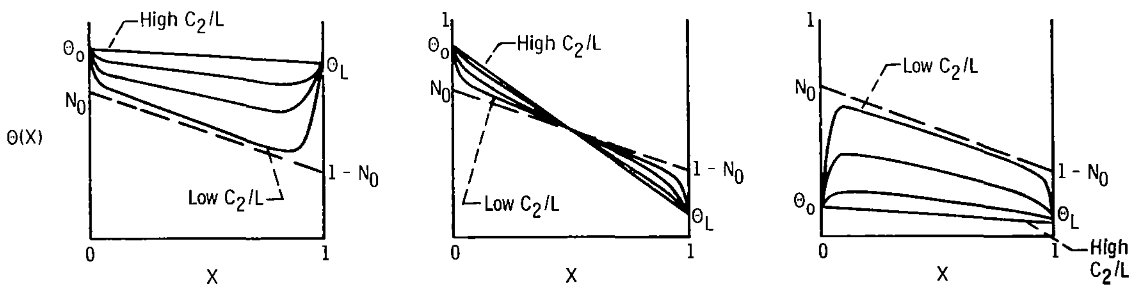


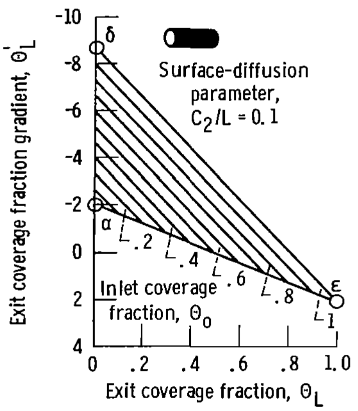
Figure 5. - Variation of inlet wall flux with slot or tube length for wall half-angle of 0.

Combined flow ($\mathscr{D} \neq 0$). - Solutions to the wall flux relation (eq. (6)) for parallel-walled slots and cylindrical tubes were obtained initially for various pairs of Θ_0, Θ_L values for various values of the surface-diffusion parameter C_2/L. It is not practical to present all the wall-coverage data that were obtained. Sketches (o) to (q) present typical examples of various levels of coverage at the end points. The trend of the solutions which was obtained in all cases can be noted from these sketches.



(o) (p) (q)

When Θ_0 and Θ_L are fixed, the solution varies from a straight line through Θ_0 and Θ_L at high C_2/L values and tends toward the straight line through



(r)

N_0 and $1 - N_0$ as C_2/L approaches zero, except for holding to the imposed end-point values. The trend from a straight-line solution at high C_2/L values toward the zero-coverage solutions may also be indicative of the nature of the solutions to be expected from convergent or divergent configurations.

All values of the slopes at the inlet and oulet, Θ'_0 and Θ'_L, respectively, can be represented by maps as shown in sketch (r). These maps can be constructed from three sets of Θ_0, Θ_L conditions, which are summarized in table III for slots and in table IV for tubes. The three sets of values for each C_2/L are designated in these tables as

$$\delta \text{ for } \Theta_0 = 1.0,\ \Theta_L = 0$$

$$\alpha \text{ for } \Theta_0 = 0,\ \Theta_L = 0$$

$$\epsilon \text{ for } \Theta_0 = 1.0,\ \Theta_L = 1.0$$

The location of these designated points in the sketch, along with the slopes of the lines, also given in the tables, illustrates the construction of a map involving the slope at the exit Θ'_L. Similarly, a map involving the inlet slope Θ'_0 may be constructed. The use of these maps for obtaining matched solutions is discussed in the section Matched Solutions.

The variable C_2/L, which has been employed to obtain solutions in the surface diffusion cases and is called the surface-diffusion parameter, may be interpreted in the following way. As noted in equation (35),

$$C_2 = \frac{\mathscr{D}\tau}{\mathscr{R}_1^2} \tag{60}$$

The root-mean-square distance λ, traversed by an adsorbed molecule during its adsorption lifetime τ, is given by reference 30 as

$$\lambda = (2\mathscr{D}\tau)^{1/2} \tag{61}$$

This term has been called a "diffusion length" by some authors. The diffusion coefficient $\mathscr{D}$ increases with increasing temperature, while the lifetime τ decreases. The product of the two, however, usually decreases with increasing temperature since the mean adsorption time generally exhibits a greater temperature variation.

Using equations (60) and (61) gives the parameter C_2/L as

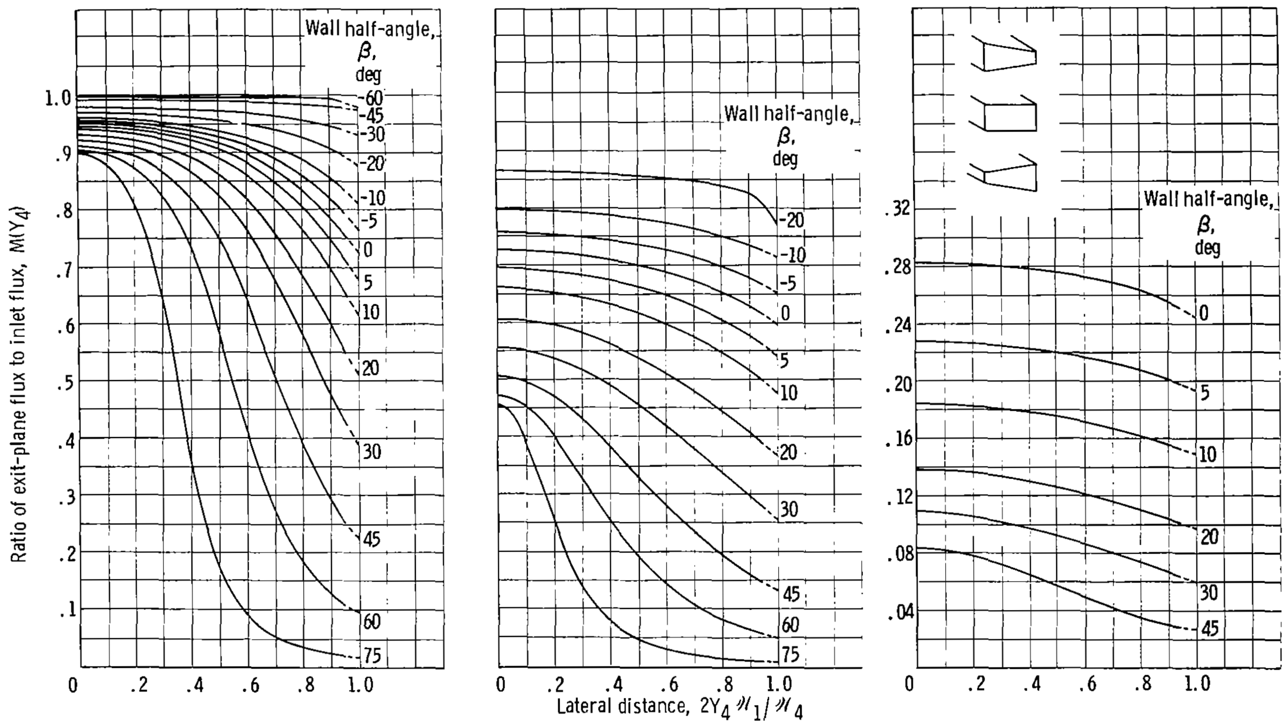
$$\frac{C_2}{L} \equiv \mathscr{D}\frac{\tau}{\mathscr{R}_1^2}\left(\frac{\mathscr{R}_1}{\mathscr{L}}\right) \equiv \frac{1}{2}\left(\frac{\lambda}{\mathscr{R}_1}\right)\left(\frac{\lambda}{\mathscr{L}}\right) \tag{62}$$

which may be regarded as the product of two dimensionless ratios (diffusion length/inlet radius and diffusion length/tube length). The same interpretation is of course applicable to the slot if $\mathscr{R}_1$ is replaced by $\mathscr{W}_1$.

Exit-Plane Flux

The integrals in the exit-plane flux-distribution equations for both the tubes and the slots contain functions that become somewhat difficult to evaluate accurately by numerical methods at the exit plane near the wall. The problem may be overcome to a great extent by using very small increments; however, practical considerations of computer time arise. Numerical values of flux over about 95 percent of the exit opening were unaffected by variations in the choice of increment size. The rapid decrease in flux very close to the wall that has sometimes been noted in this type of calculation is not a "boundary-layer" effect but merely a result of the finite increment size. The finer the increment used in the calculation procedure, the smaller the apparent boundary-layer effect.

Flux values across the exit plane at different lateral distances from the centerline of the slot are given in table V for the convergent and divergent slots. Several illustrative plots of the variations of exit-plane flux distribution with wall half-angle are shown in figure 6. Values across the exit plane of the convergent

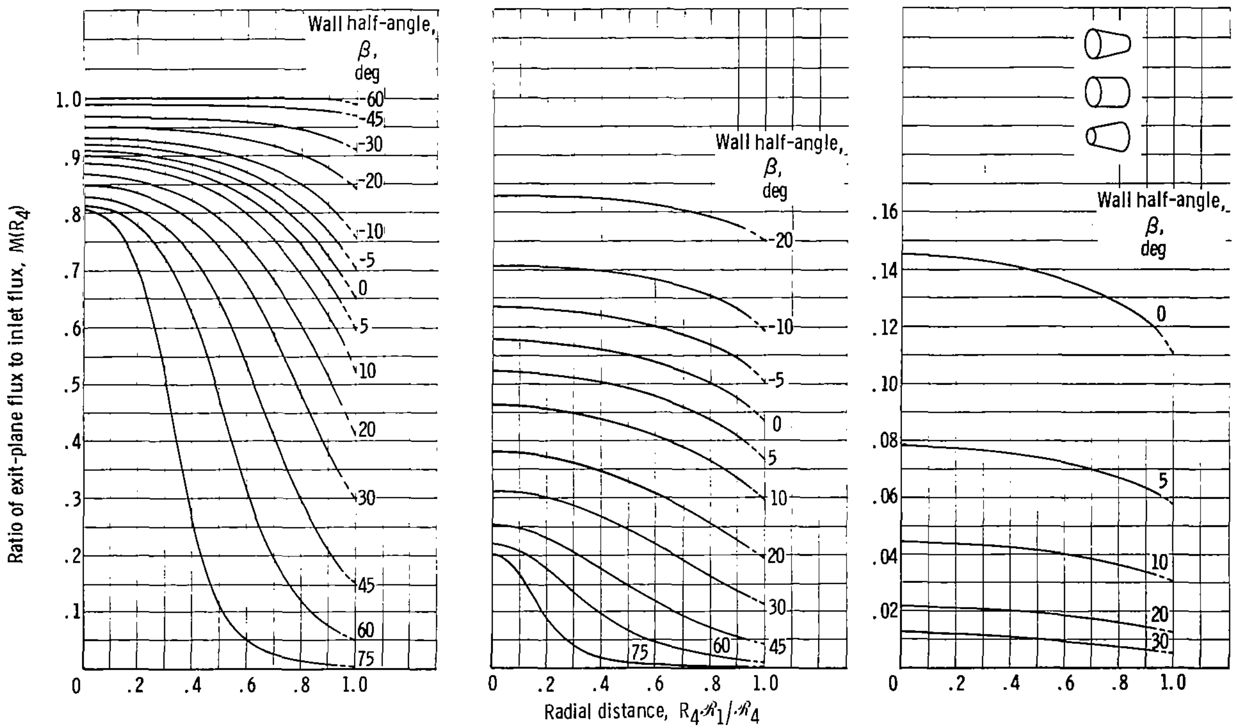


(a) Length to inlet-width ratio, 0.25.

(b) Length to inlet-width ratio, 1.

(c) Length to inlet-width ratio, 8.

Figure 6. - Variation of flux across exit plane of convergent and divergent slots. (Diverging walls, positive β; converging walls, negative β.)



(a) Length to inlet-radius ratio, 0.5.

(b) Length to inlet-radius ratio, 2.

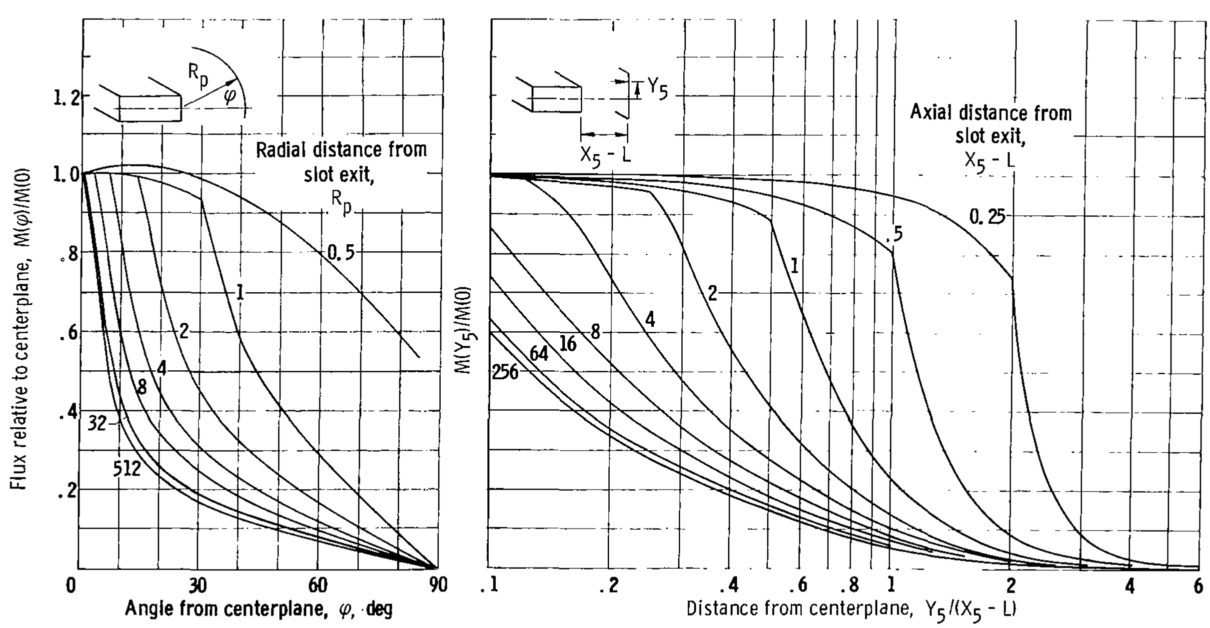
(c) Length to inlet-radius ratio, 16.

Figure 7. - Variation of flux across exit plane of convergent and divergent tubes. (Diverging walls, positive β; converging walls, negative β.)

and divergent tubes are given in table VI, and plots of these results are shown in figure 7. These results are for gas-phase flow only, but the curves for $\beta = 0$ are nearly correct for the matched-solution combined-flow cases as well.

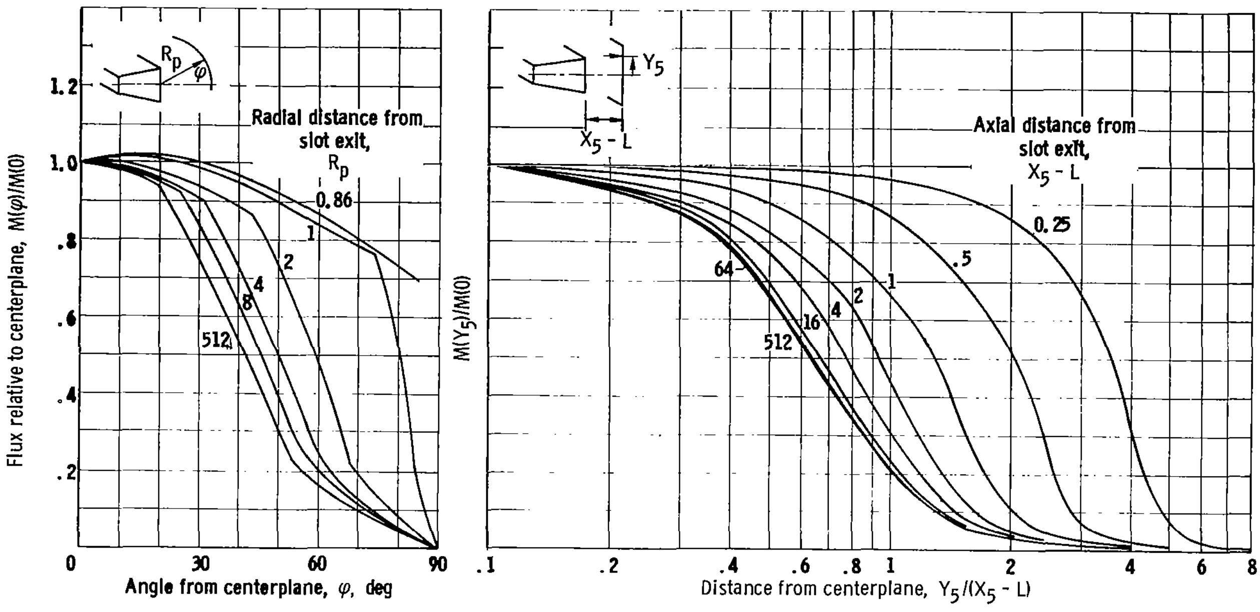
Downstream Flux

Slots. - The most extensive calculations of downstream flux patterns have been made for slots with gas-phase flow only. Complete tabulation of these results is presented in tables VII and VIII. Some illustrative plots are shown in figures 8 to 10. It may be noted that two different types of patterns are presented: one for the variation of flux with the angle at a constant radial distance R_p from the slot exit centerplane, and the other for the variation of flux with the distance from the slot centerplane in planes normal to the centerplane. These patterns correspond to the two general types of surveys that are apt to be of interest experimentally. Of course, in the far field, these two flux patterns are simply related by $M(Y_5) = M(\varphi)\cos\varphi$. In the near field, there is, in general, no simple relation between them, as was pointed out in the section Downstream Flux (in Analytic Relations). Discontinuities in the slopes, as the location at which the flux is determined



(a) Radial patterns. (b) Plane patterns.

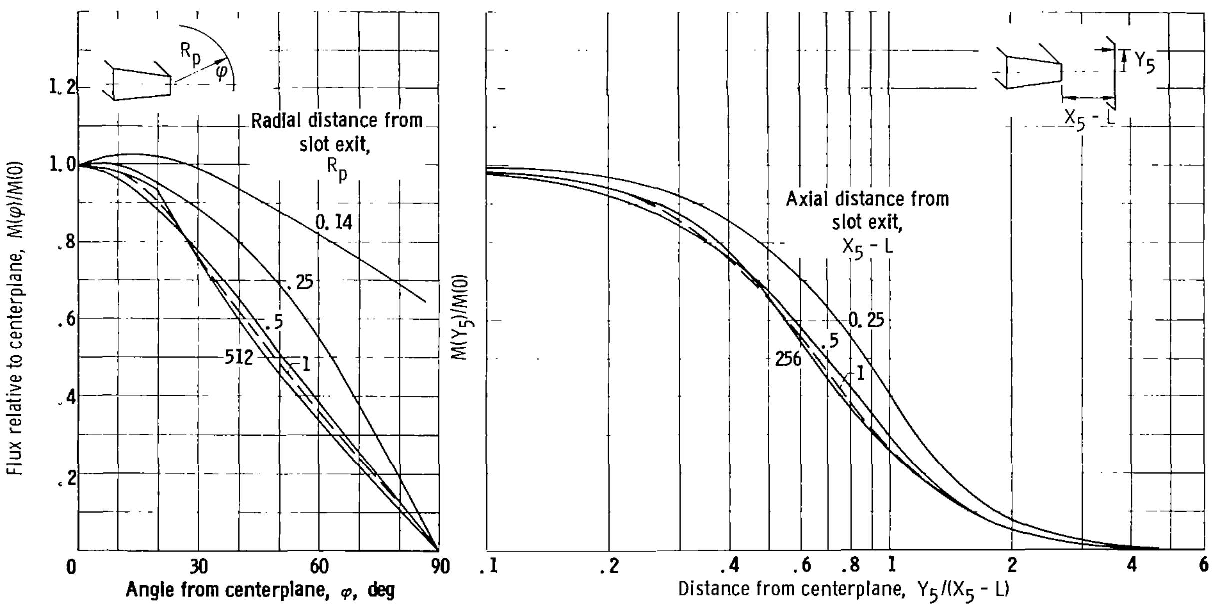
Figure 8. - Variation of flux patterns with distance from slot exit. Length to inlet-width ratio, 8; wall half-angle, 0°.



(a) Radial patterns.

(b) Plane patterns.

Figure 9. - Variation of flux patterns with distance from slot exit. Length to inlet-width ratio, 1; wall half-angle, 20°.



(a) Radial patterns.

(b) Plane patterns.

Figure 10. - Variation of flux patterns with distance from slot exit. Length to inlet-width ratio, 1; wall half-angle, -20°.

changes from one region to another, may be noted particularly in figures 8 and 9(a).

Values of flux along the centerplane downstream of the exit are shown for parallel-walled slots of various length to width ratios in figure 11. Near the exit, the flux is greatest for the smaller values of L. As the distance from the slot exit increases, the flux becomes less dependent on L and approaches the theoretical value obtained for a slit source at large distances from the source (i. e., $M(0) = 1/2R_p$).

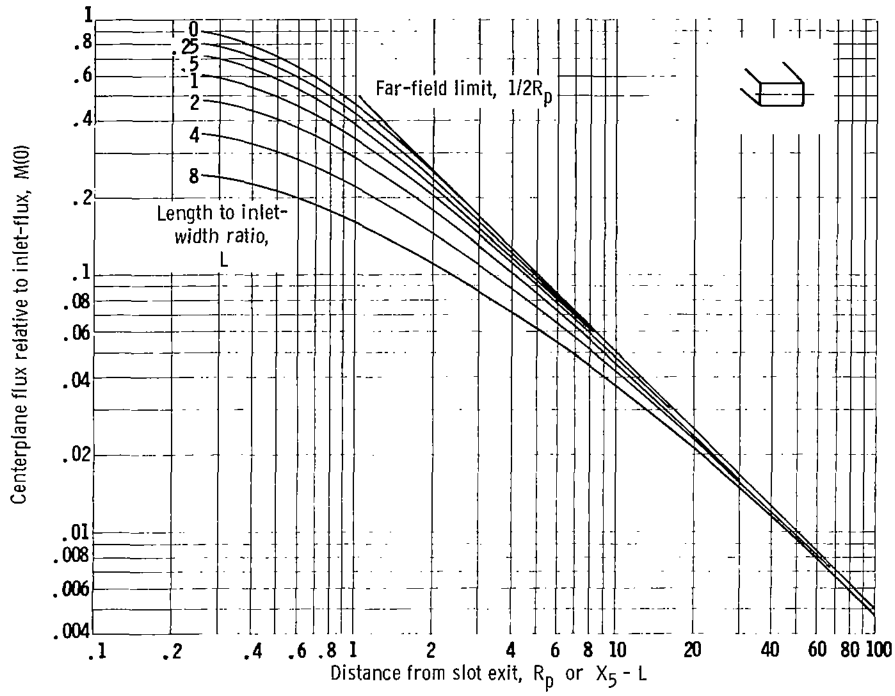
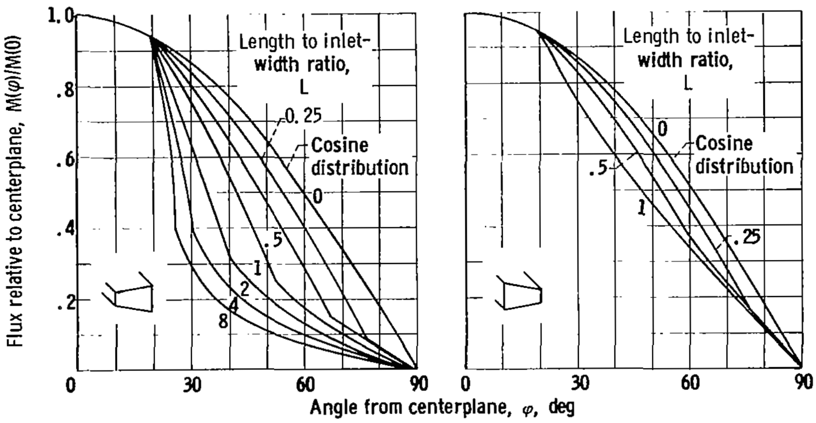


Figure 11. - Variation of centerplane flux with distance from exit aperture for parallel-walled slot.

Some typical variations in the far-field flux patterns of different slot configurations are shown in figures 12 to 14. The patterns for the 20° divergent and 20° convergent slots of various length to width ratios (fig. 12) show the discontinuities in slope that occur at the boundaries between the flux regions. The normalized flux follows the cosine law out to the angle $\varphi = |\beta|$. Beyond this angle, the flux drops below the cosine pattern. The greater collimating effect of the larger length-to-width-ratio slots is apparent in figures 12 and 13. Figure 14 shows that the collimating effect of wall half-angle for a given length to width ratio is a maximum at about 20°.

The contribution of surface-diffused material to the downstream flux patterns from parallel-walled slots has not been carried out for near-field variations. The relations by which this may be done for a particular case have been presented in equations (11) and (29). Far-field flux patterns that include the surface-diffused component are obtained by merely adding the flux pattern from the surface-diffused material out the exit to the



(a) Divergent slots; wall half-angle, 20°.

(b) Convergent slots; wall half-angle, -20°.

Figure 12. - Far-field flux patterns for slots with 20° wall-half angle and various length to inlet-width ratios.

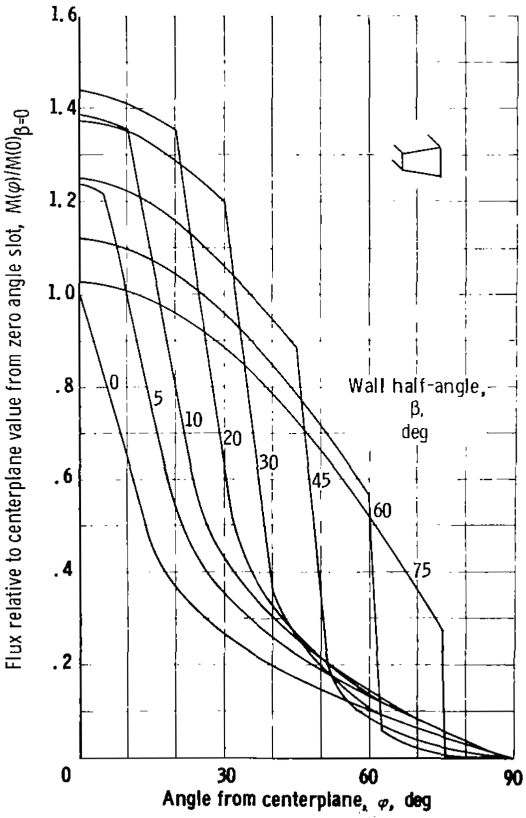


Figure 14. - **Comparison of relative flux from slots of different wall half-angles. Length to** inlet-**width ratio, 4.**

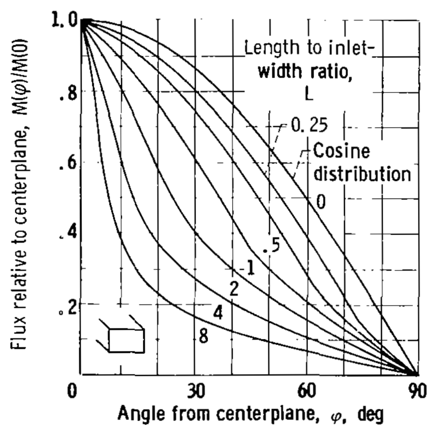


Figure 13. - Far-field flux patterns for parallel-walled slots (wall half-angle = 0°) and various length to inlet-width ratios.

pattern obtained for the case of gas-phase flow alone. Note that equation (29) for the coverage on the downstream lateral surface exhibits an exponential decay as the distance from the slot centerplane increases. The leaving flux, which is proportional to the coverage, thus decreases exponentially as well. The total value of the integrated flux from the surface is equal to the total material leaving the slot exit by surface diffusion. Thus, it is readily seen that the downstream far-field flux pattern for the surface-diffused material is given by the simple slit relation, for the assumption that the total flux comes from a slit source. At some radial distance R_p then,

$$\frac{M_s(\varphi)}{M(0)} = P_s \cos \varphi \qquad (63)$$

where P_s is the surface-transmission factor. Specific patterns are presented in the discussion of Matched Solutions.

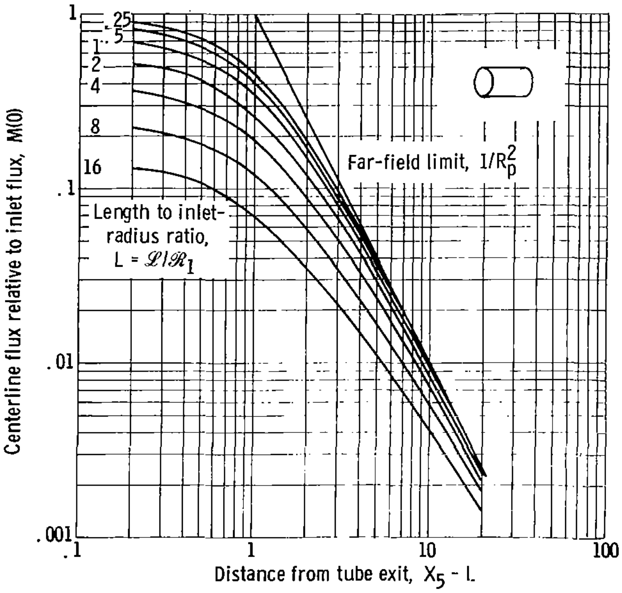


Figure 15. - Variation of centerline flux with distance from exit aperture for cylindrical tube.

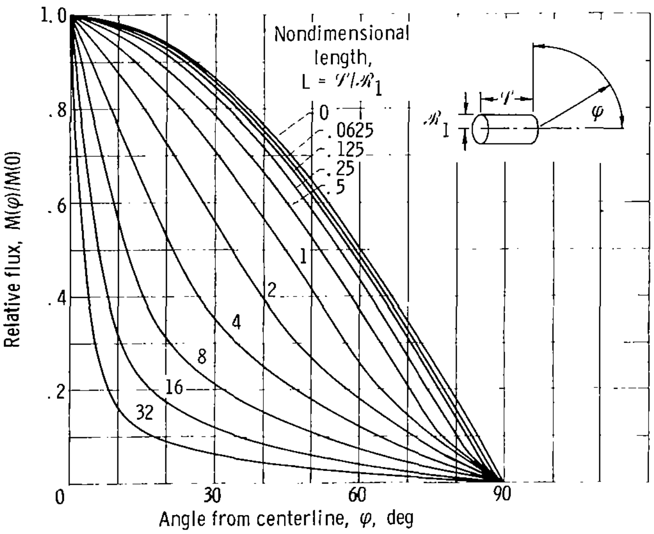


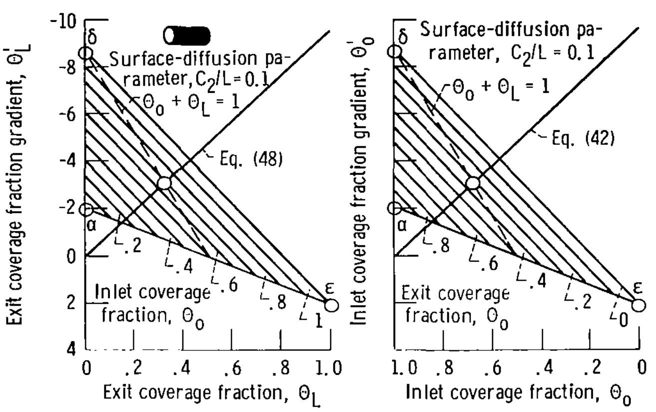
Figure 16. - Far-field radial flux patterns from cylindrical tubes.

<u>Tubes</u>. - Flux patterns from tubes have not been treated as extensively as those from slots. No calculated near-field flux patterns have been presented in the literature to the authors' knowledge. However, the gas-phase flux along the centerline at various distances from the exit of the cylindrical tubes may be readily calculated from equation (15). Results obtained by using this relation are shown in figure 15. The behavior is qualitatively the same as for the parallel-walled slot. At large distances from the exit, all centerline flux values approach the far-field limiting value of $M(0) = 1/2R_p^2$. Gas-phase far-field flux patterns have been calculated from the relations presented in reference 17 (eq. (14), herein). These calculations are shown in figure 16 for various ratios of tube length to radius. As with slots, the far-field flux patterns at a given radial distance R_p for surface-diffused

material are given by an expression identical in form to that of equation (63). Specific patterns for cylindrical tubes are discussed in the following section.

Matched Solutions

The method of obtaining matched solutions that include lateral surface flows is the same for either the slot or the tube; therefore, the procedure is illustrated for one case only. Sketch (s) shows the general-solution map presented previously for a cylindrical tube with a nondimensional length of 0.125 and for a case with the surface-diffusion parameter C_2/L of 0.1. Sketch (t) shows the corresponding map involving the slope at the upstream end Θ_0'. (Note that the two maps appear to be identical because of the abscissa coordinate orientation.) On these maps, which give conditions that are general solutions for the tube-wall flux, the relations representing the solutions for the corresponding upstream and downstream surfaces are superimposed; in this case, equation (42) for the upstream surface and equation (48) for the downstream surface. Before these equations were plotted, they were converted to the variables shown by using the following boundary-matching conditions:



(s) (t)

For equation (42)

$$\Theta_{R_1} = \Theta_0 \text{ and } \Theta'_{R_1} = \Theta'_0$$

and for equation (48)

$$\Theta_{R_4} = \Theta_L \text{ and } \Theta'_{R_4} = \Theta'_L$$

A trial selection of points on these two maps will quickly yield the single point that lies on both end surface curves and has the same Θ_0, Θ_L values. This point gives the matched-solution values for this condition. However, another relation involving the solutions may be shown that makes this trial selection of points unnecessary.

In sketch (s), the ordinate is the slope at the downstream end of the tube, while in sketch (t), it is the upstream value. From the symmetry of the two plots, it may be readily shown that the matched solution must be on the line $\Theta_0 + \Theta_L = 1.0$, so that actually only one map is required. For example, equations (42) and (48) and the matching conditions may be combined to give the relation

$$\frac{\Theta_0'}{\Theta_L'} = \frac{1 - \Theta_0}{\Theta_L}$$

The general tube solutions, illustrated by sketches (s) and (t), may also be expressed mathematically as

$$\Theta_L' = f_1(\Theta_0) + m_1\Theta_L$$

and

$$\Theta_0' = f_1(1 - \Theta_L) + m_1(1 - \Theta_0)$$

where $f_1(\Theta_0)$ and $f_1(1 - \Theta_L)$ are the intercepts in sketches (s) and (t), respectively, and m_1 is the slope of the lines. Combining these two expressions gives

$$\frac{\Theta_0'}{\Theta_L'} = \frac{f_1(1 - \Theta_L) + m_1(1 - \Theta_0)}{f_1(\Theta_0) + m_1\Theta_L}$$

This expression combines with the first relation to give

$$\frac{1 - \Theta_0}{\Theta_L} = \frac{f_1(1 - \Theta_L) + m_1(1 - \Theta_0)}{f_1(\Theta_0) + m_1\Theta_L}$$

Cross multiplication and simplification of this last expression yield the relation

$$(1 - \Theta_0)f_1(\Theta_0) = \Theta_L f_1(1 - \Theta_L)$$

which further reduces to

$$1 - \Theta_0 = \Theta_L$$

since $f_1(\Theta_0)$ equals $f_1(1 - \Theta_L)$ when $\Theta_L = 1 - \Theta_0$. The matched-boundary solutions thus have the properties

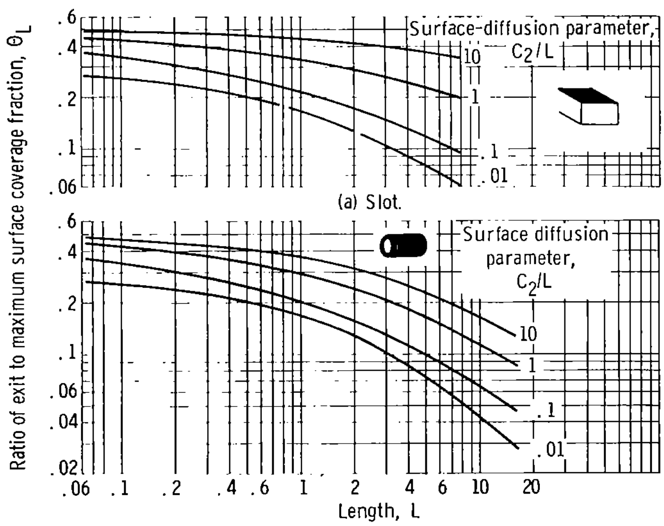
$$\Theta_0 + \Theta_L = 1.0 \tag{64}$$

and

$$\Theta_0' = \Theta_L'$$

Equation (64) is superimposed on the general-solution maps, sketches (s) and (t) (dashed curve). The point of intersection of the two superimposed relations gives the solution for the condition where the tube flow and exit-plane lateral-surface flow satisfy the boundary-matching conditions specified. Solutions of this type, that is, the matched solutions, would appear to be the most meaningful from a physical viewpoint.

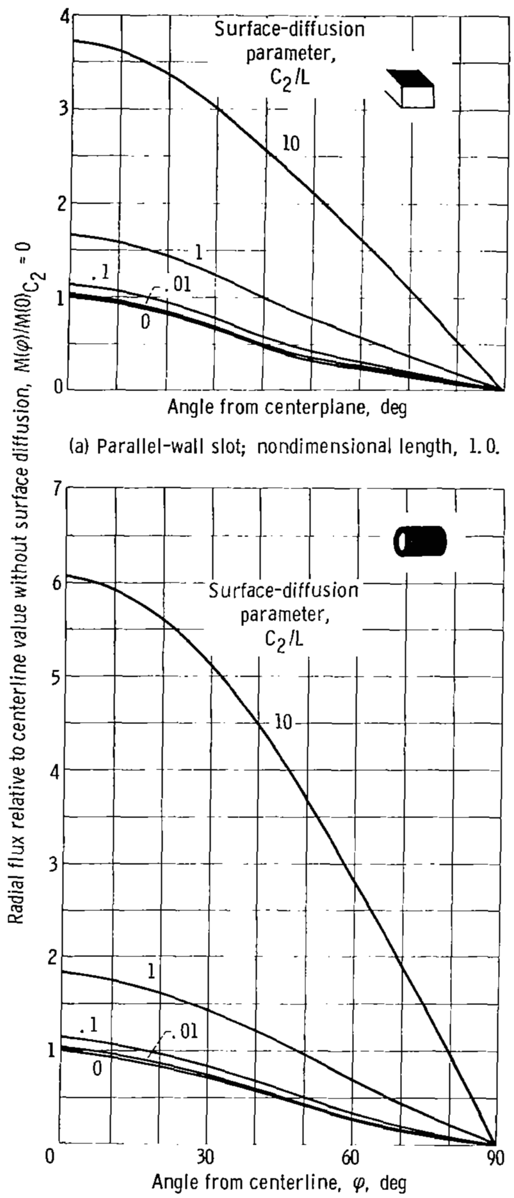
Matched solutions obtained in the manner just illustrated are presented in table IX for slots and in table X for tubes. The variations of the coverage fraction at the exit with slot or tube length for various ratios of the surface-diffusion parameter are shown in figure 17(a) for the slot and in figure 17(b) for the tube.



(b) Tube.

Figure 17. - Matched solutions of variation of surface coverage at downstream end with length.

The effect of surface flow on the downstream flux patterns may now be shown using equation (63) and the results of the matched solutions just presented. Typical radial flux patterns for a parallel-walled slot with L = 1 and for a cylindrical tube with L = 1 are shown in figure 18, with C_2/L as a parameter. With a value of C_2/L of 0.01, the surface flow is small, and the effect on the flux pattern is slight. For a value of C_2/L of 10, the surface flow dominates the flux patterns.



(a) Parallel-wall slot; nondimensional length, 1.0.

(b) Cylindrical tube; nondimensional length, 1.0.

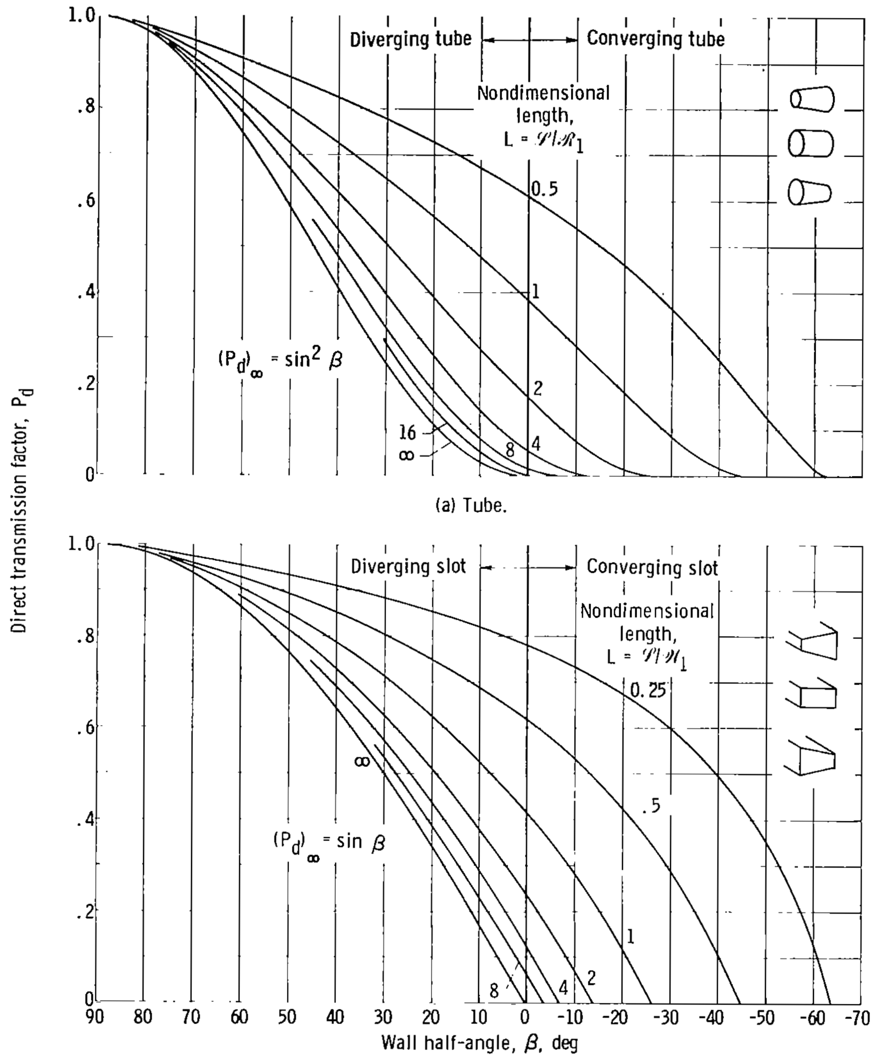
Figure 18. - Effect of surface diffusion on far-field radial flux.

Transmission Factors

Gas-phase flow ($\mathscr{D} = 0$). - The direct transmission factors calculated by equations in the table on page 26 are plotted in figure 19(a) for the converging or diverging slot and in figure 19(b) for the converging or diverging tube. The value of P_d gives the fraction of the inlet flux that passes through the slot or tube without experiencing a wall collision. As L increases, this fraction approaches the limiting value of $\sin\beta$ for the slot or $\sin^2\beta$ for the tube.

The total transmission factors for gas-phase flow are shown in figure 20. These values were obtained by integrating the exit-plane flux over the entire exit area. For the diverging configurations, the total transmission factor P_t appears to approach a limiting value asymptotically, especially for wall half-angles greater than about 10°.

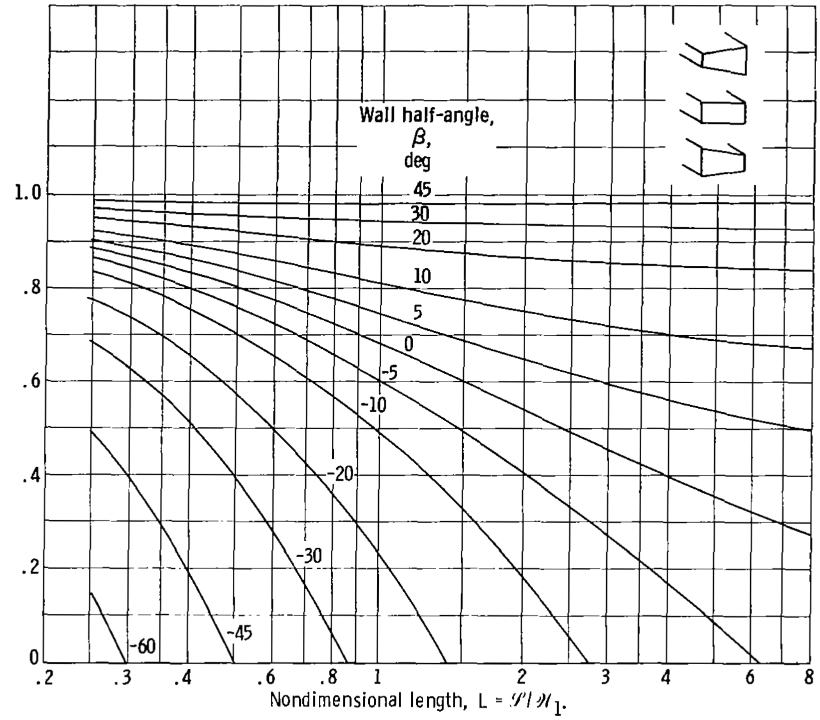
Combined flow ($\mathscr{D} \neq 0$). - The various transmission factors calculated for the combined-flow matched solutions, are presented in tables IX and X, and some of these factors are plotted in figures 21 and 22. The surface-transmission factor alone P_s is shown in figure 21, while figure 22 shows the total transmission factor P_t. The total transmission factor increases as C_2/L increases for a given length slot or tube. As the length L increases for a given value of C_2/L, the total transmission factor decreases for low values of C_2/L but increases for values of C_2/L equal to or greater than 1. For values of C_2/L greater



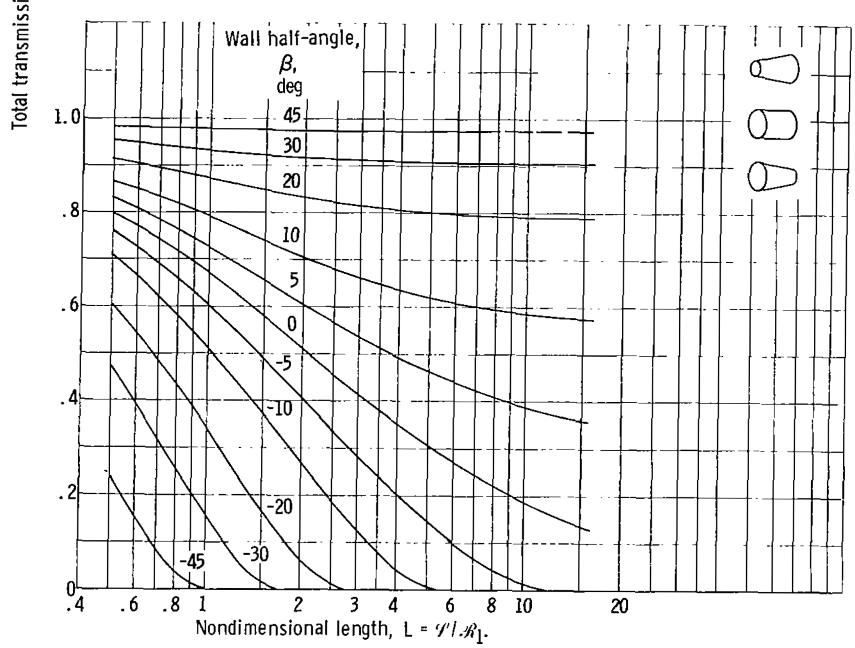
(a) Tube.

(b) Slot.

Figure 19. - Variation of direct transmission factor with wall half-angle.



(a) Slot.



(b) Tube.

Figure 20. - Variation of total transmission factor of convergent and divergent tubes and slots with tube and slot length. (Diverging walls, positive β; converging walls, negative β.)

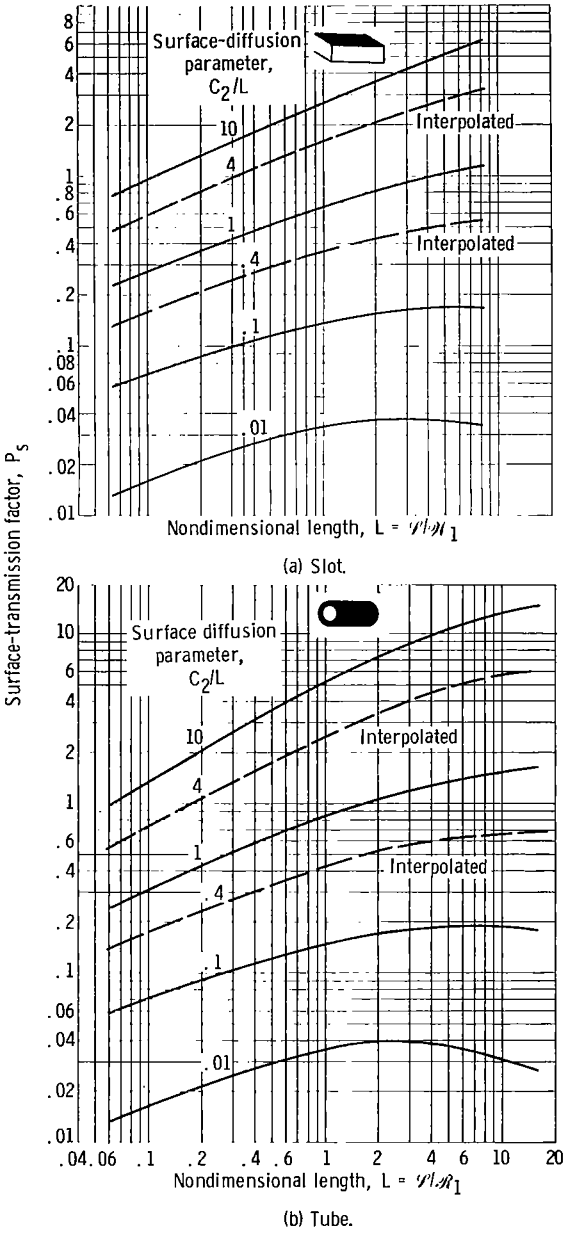
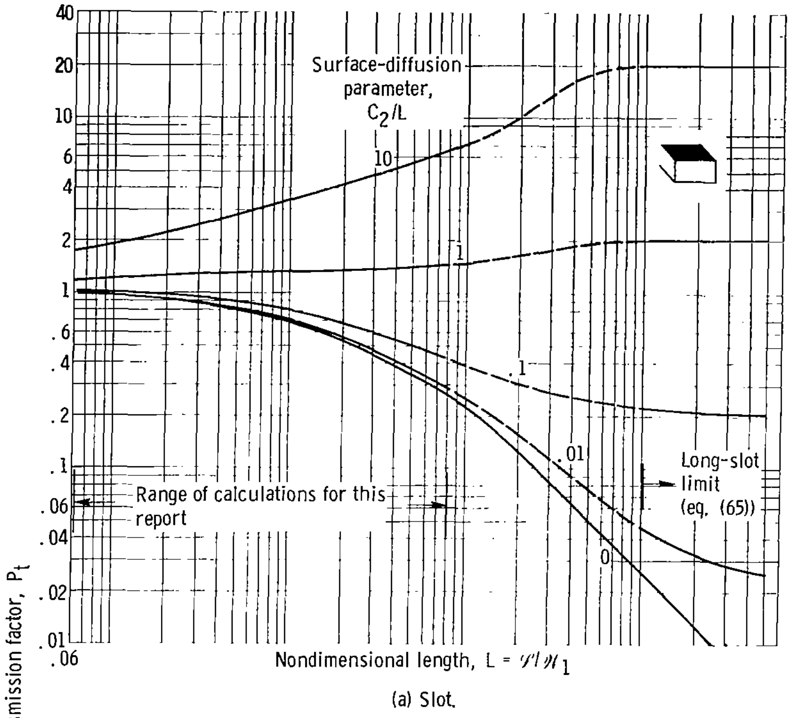
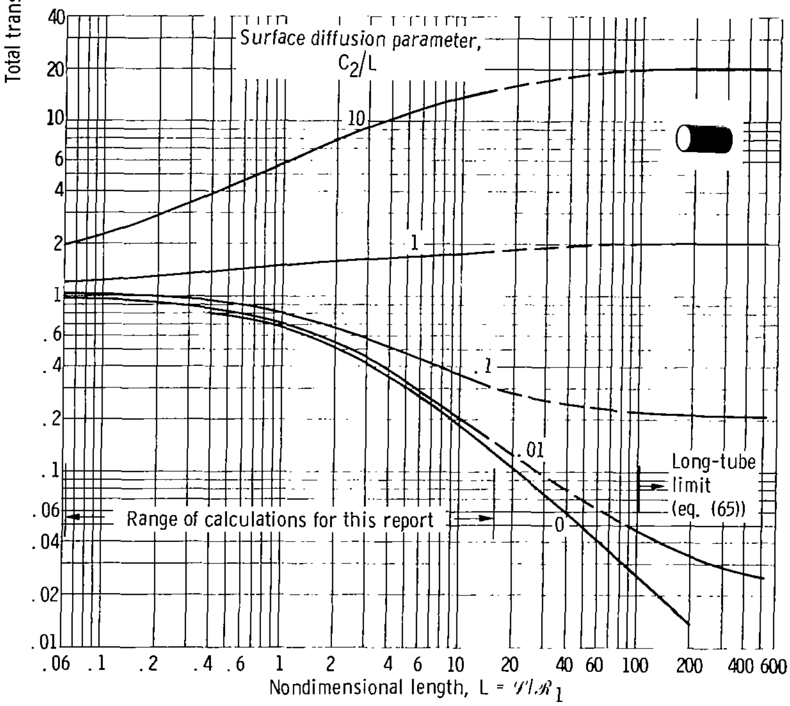


Figure 21. - Matched solutions of variation of downstream surface-transmission factor with length.



(a) Slot.



(b) Tube.

Figure 22. - Matched solutions of variation of total transmission factor with length.

than about 0.1, the surface flow contributes significantly to the total flow. The long-tube or long-slot limiting values for the total transmission factor may be derived from the relations in reference 30 as

$$(P_t)_{lim} = 2\frac{C_2}{L} + \frac{8}{3L} \tag{65}$$

These limiting values are also shown in figure 22; note that the results of the calculations herein for the matched solutions may be faired into the long-tube or slot relations by the time L reaches a value of about 100.

CONCLUDING REMARKS

A compilation of the mathematical relations required to obtain solutions to the problem of free-molecule gas-phase flow through converging or diverging slots and tubes is presented. Also the pertinent relations dealing with combined gas and surface flows through parallel-walled slots and cylindrical tubes are presented. Results, obtained numerically, are given in either tabular or graphical form and include wall-flux distributions, exit-plane flux distributions, flux distributions downstream of the exit, and various transmission factors.

Wall flux distributions for the tubes and slots were qualitatively similar and varied nearly linearly with distance for the cylindrical tube and for the parallel-walled slot. For the divergent configurations, the wall flux varied more sharply with distance near the inlet; however, for the convergent configurations, the wall flux varied more sharply near the exit.

Exit-plane flux distributions were also qualitatively similar for the slots and tubes. In all cases, as would be expected, the flux decreased in magnitude as the distance from the slot centerplane or the distance from the tube axis increased, the decrease becoming more pronounced for shorter, divergent configurations.

Flux distributions downstream of the exit exhibited several noteworthy features determined from examination of typical plots. For example, (1) the beam is more collimated the larger the length to inlet-width ratio; (2) a divergent slot yields a more collimated beam than a convergent slot of the same length to inlet width ratio and the same magnitude of wall half-angle; (3) far-field distribution patterns in all cases follow the cosine law out to angles equal to the wall half-angle and then drop below the cosine law pattern.

In general, for the combined flow solutions, with the inlet and exit surface-coverage fractions held fixed, the curves describing the surface-coverage fraction within the configurations varied as follows: with a large value of the surface-diffusion flow parameter, solutions were nearly straight lines between end points; as the parameter decreased, the curves approached the nearly linear solutions of zero surface-diffusion flow except for the fixed end points.

Matched-boundary-condition solutions were obtained from general-solution maps. The matched solutions presented were only for the single tube or slot, but relations were derived that permit application of these results to closely spaced arrays.

Transmission-factor relations were developed that allow quantitative comparisons to be made of the differences between flow with and without surface-diffusion effects in terms of a surface-diffusion flow parameter C_2/L. One possible physical interpretation of the parameter was given, and that was, to consider it as a product of two dimensionless ratios. These ratios were expressed in terms of a diffusion length to a configuration length and a diffusion length to a configuration width (or radius). If the product of these ratios is greater than about 0.1, surface flow contributed significantly to the total flow.

Lewis Research Center,
National Aeronautics and Space Administration,
Cleveland, Ohio, October 10, 1966,
120-26-02-10-22.

APPENDIX A

SYMBOLS

A	parameter defined in eq. (21)
dA	differential area
B	parameter defined in eq. (21)
b	parameter defined in eq. (36)
C_1	parameter defined in eq. (5) or (9)
C_2	parameter defined in eqs. (8a) and (8b)
C_3	parameter defined in eqs. (20) and (35)
c	parameter defined in eq. (36)
$\mathscr{D}$	surface-diffusion coefficient
e	base of natural logarithm
F	form factor
$\mathscr{F}$	parameter defined in eqs. (32) and (49)
f_1	intercepts in sketches (s) and (t)
g	parameter defined in eq. (B3)
I_0	modified Bessel function of first kind of order zero
I_1	modified Bessel function of first kind of first order
j	parameter defined in eq. (B5)
K_0	modified Bessel function of second kind of order zero
K_1	modified Bessel function of second kind of first order
k	Boltzmann constant
L	nondimensional length, $\mathscr{L}/\mathscr{W}_1$ for slot; $\mathscr{L}/\mathscr{R}_1$ for tube
$\mathscr{L}$	slot or tube length
ℓ	distance, variable
M	arrival rate normalized to upstream equilibrium arrival rate
M(Y)	arrival rate at plane parallel to exit plane, normalized to upstream equilibrium arrival rate, μ_1
$M(\varphi)$	arrival rate at plane perpendicular to R_p, normalized to upstream equilibrium arrival rate, μ_1
M(O)	arrival rate at plane parallel to exit plane for $Y = \varphi = 0$, normalized to upstream equilibrium arrival rate, μ_1
m	slope of line, $\Theta_0 + \Theta_L = 1$ on general-solution map
m_p	mass of particle
m_1	slope of lines on general-solution maps
N	leaving rate normalized to upstream equilibrium arrival rate
N_0	normalized wall flux at tube inlet
n	flow rate (particles per unit time)

P	transmission factor
p	parameter of eq. (14)
R	nondimensional radial distance; in general, $R/\mathscr{R}_1$. Within tube, R_2 or R_3 is nondimensional distance to tube wall at various axial locations; also, $R_1 = 1$
R_p	nondimensional downstream radial distance = $\mathscr{R}_p/\mathscr{R}_1$
$\mathscr{R}$	tube radius at various axial locations
r	radial distance variable
T	function defined by eq. (14)
T_g	gas temperature
W	slot width nondimensionalized to inlet width; in general, $\mathscr{W}/\mathscr{W}_1$; also, $W_1 = 1$
$\mathscr{W}$	slot width at various centerplane locations
X	nondimensional distance variable, $x/\mathscr{W}_1$ for slot or $x/\mathscr{R}_1$ for tube
$x, y, z,$	distance variables
dy	differential distance
Y	nondimensional lateral distance, $y/\mathscr{W}_1$
α	end-point slope value on general solution map
β	wall half-angle, positive or negative
$\gamma_{a,b}$	angle (sketch (c)) between surface normal at a and line $\ell_{a,b}$
$\gamma_{b,a}$	angle between surface at b and $\ell_{a,b}$
δ	end-point slope value on general-solution map
ϵ	end-point slope value on general-solution map
Θ	fraction of monolayer surface coverage normalized to maximum value attainable in system, θ/θ_∞
θ	fraction of monolayer surface coverage
θ_∞	maximum surface-coverage fraction attainable in system
λ	root-mean-square distance traversed by adsorbed particle during its adsorption lifetime, defined in eq. (61)
μ	arrival flux (particles per unit area per unit time)
$d\mu$	differential arrival flux
ν	leaving flux (particles per unit area per unit time)
ρ	specified value of nondimensional downstream radial distance
σ	surface concentration
σ_m	surface concentration for filled monolayer
τ	adsorption time
φ	angle from centerplane defined in sketch (h) for slot; angle from centerline for tube
$d\varphi$	differential angle defined in sketch (i)
ψ	specified value of nondimensional lateral distance

ψ_1 specified function given in tables on pp. 12 and 14

∇^2 Laplacian operator

Subscripts:

a arbitrary location

b arbitrary location

d downstream or direct

g gas phase

i indirect

L downstream end of slot or tube wall at exit

R_1 upstream lateral surface edge of tube at inlet

R_4 downstream lateral surface edge of tube at exit

s slot or surface transport

t tube or total

Y_1 upstream lateral surface edge of slot at inlet

Y_4 downstream lateral surface edge of slot at exit

Y_5 lateral surface downstream of exit

0 upstream end of slot or tube wall at inlet

1 inlet plane or upstream of inlet

2, 3 wall surfaces

4 exit plane

5 downstream of exit

Superscripts:

' first derivative

'' second derivative

APPENDIX B

ADSORPTION ISOTHERMS

The discussion of adsorption isotherm relations included herein is intended merely to give an insight into the subject. Detailed discussions are given in references 31 and 32. The type of relation utilized for a given system is usually governed by the assumptions made with respect to the following factors:

(a) Adsorbed film mobility: The classification of an adsorbed film as mobile or immobile depends on the relative values of the energy barriers to diffusion and to evaporation. If the energy barrier to surface diffusion is low compared with the evaporation energy, the particles will migrate for some time before they are apt to leave the surface; hence, the film is classed as mobile.

(b) Variation of adsorption energy (binding energy) with surface concentration: Adsorption energy may vary because of surface inhomogeneities. It may also vary because of dipole interactions among the adsorbed species.

(c) Relative surface concentration: Certain forms of the adsorption isotherm relation have a filled monolayer as the limiting concentration; others do not restrict adsorption to a monolayer but permit multilayer adsorption. This distinction also generally depends on the relative adsorption energies of the gas for the substrate and of the gas for itself.

A summary of some of the various forms for the adsorption isotherm relation from reference 32 is as follows:

Mobile film (no interaction); unlimited adsorption:

$$\mu = C_1 \theta \tag{B1}$$

Mobile film; adsorption amount limited to monolayer:

$$\mu = C_1 \frac{\theta}{1 - \theta} \exp\left(\frac{\theta}{1 - \theta}\right) \tag{B2}$$

Mobile film (interaction):

$$\mu = C_1 \frac{\theta}{1 - \theta} \exp\left(\frac{\theta}{1 - \theta} - g\theta\right) \tag{B3}$$

Immobile film (no interaction):

$$\mu = C_1 \frac{\theta}{1 - \theta} \tag{B4}$$

Immobile film (interaction):

$$\mu = C_1 \frac{\theta}{1 - \theta} \exp(-j\theta) \tag{B5}$$

where μ is the arrival rate, C_1 is a proportionality constant, and θ is the surface concentration expressed as a fraction of a monolayer.

Equations (B1) and (B4) are the simplest of the preceding relations. Equation (B1) is not bounded and permits coverages in excess of a monolayer. Equation (B4), usually referred to as the Langmuir adsorption relation (ref. 32), represents the behavior characteristic of many systems of interest where the adsorption energy of the gas for the substrate is considerably greater than the adsorption energy of the gas for itself (i.e., the sublimation energy). In this case, adsorption is usually restricted to less than a monolayer until gas-phase arrival rates (or corresponding gas pressures) approach the saturation value corresponding to the temperature of the adsorbing surface.

In equilibrium, the adsorption rate equals the vaporization rate so that for low values of θ, equations (B2) to (B5) reduce to the form of equation (B1):

$$\nu = \mu \cong C_1\theta \tag{B6}$$

This equation is identical to equation (5). The solutions of the flow relations obtained in this report are based on a relation of the form of equation (B6). They can be considered characteristic of systems that have constant adsorption energy over the range of surface concentration considered and for which the isotherm behavior described by equation (B1) applies without limit to θ. For the other isotherm relations, the solutions are restricted to systems with low values of θ.

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TABLE I. - WALL FLUX DISTRIBUTIONS FOR SLOTS (EQ. (4))

Nondimensional length, $L = \mathscr{L}_1/\mathscr{W}_1$	Nondimensional distance from inlet, X/L	Wall half-angle, β, deg													
		Diverging walls							Parallel walls	Converging walls					
		75	60	45	30	20	10	5	0	-5	-10	-20	-30	-45	-60
		Flux ratio, $N(X_2)$													
0.25	0	0.0175	0.0716	0.156	0.271	0.365	0.458	0.515	0.561	0.607	0.662	0.752	0.838	0.938	0.995
	.1	.0147	.0656	.147	.261	.353	.446	.503	.549	.595	.650	.741	.830	.933	.994
	.2	.0124	.0602	.139	.250	.342	.434	.491	.537	.583	.639	.731	.820	.927	.993
	.3	.0107	.0555	.132	.240	.331	.422	.478	.524	.571	.627	.719	.811	.920	.992
	.4	.00927	.0513	.125	.231	.320	.411	.466	.512	.558	.615	.708	.800	.913	.990
	.5	.00812	.0475	.118	.222	.309	.399	.454	.500	.546	.602	.696	.789	.904	.988
	.6	.00717	.0441	.112	.213	.299	.388	.442	.488	.533	.590	.683	.777	.894	.985
	.7	.00638	.0411	.106	.205	.289	.377	.431	.476	.521	.577	.670	.765	.883	.979
	.8	.00571	.0383	.101	.197	.279	.366	.419	.463	.508	.564	.657	.751	.871	.971
	.9	.00514	.0358	.0961	.189	.270	.355	.407	.451	.496	.551	.643	.737	.856	.956
	1.0	.00465	.0336	.0915	.182	.261	.344	.396	.439	.483	.538	.629	.722	.840	.927
0.5	0	0.0176	0.0724	0.160	0.285	0.389	0.495	0.560	0.613	0.666	0.730	0.831	0.924	-----	-----
	.1	.0125	.0611	.144	.264	.367	.473	.538	.591	.645	.710	.816	.915	-----	-----
	.2	.00931	.0522	.129	.245	.345	.450	.515	.569	.623	.690	.799	.904	-----	-----
	.3	.00721	.0450	.117	.227	.325	.428	.492	.546	.601	.668	.780	.891	-----	-----
	.4	.00574	.0392	.106	.211	.305	.406	.470	.523	.578	.645	.760	.876	-----	-----
	.5	.00469	.0344	.0960	.196	.287	.385	.447	.500	.554	.622	.737	.858	-----	-----
	.6	.00390	.0304	.0875	.182	.269	.364	.425	.477	.530	.597	.713	.837	-----	-----
	.7	.00329	.0271	.0800	.170	.253	.345	.404	.454	.506	.571	.686	.811	-----	-----
	.8	.00281	.0243	.0734	.158	.238	.326	.382	.431	.481	.545	.657	.780	-----	-----
	.9	.00246	.0218	.0675	.147	.223	.307	.362	.409	.457	.518	.625	.743	-----	-----
	1.0	.00213	.0198	.0622	.138	.210	.290	.342	.387	.433	.491	.592	.697	-----	-----
1	0	0.0176	0.0730	0.164	0.300	0.418	0.544	0.623	0.688	0.754	0.832	0.949	-----	-----	-----
	.1	.00932	.0528	.133	.261	.377	.503	.584	.653	.723	.808	.940	-----	-----	-----
	.2	.00576	.0398	.110	.227	.338	.464	.546	.616	.689	.780	.928	-----	-----	-----
	.3	.00391	.0310	.0917	.199	.304	.425	.507	.578	.653	.750	.914	-----	-----	-----
	.4	.00283	.0249	.0776	.175	.273	.389	.468	.539	.615	.715	.896	-----	-----	-----
	.5	.00214	.0204	.0664	.154	.245	.355	.431	.500	.575	.677	.874	-----	-----	-----
	.6	.00168	.0170	.0573	.137	.220	.323	.395	.461	.534	.635	.844	-----	-----	-----
	.7	.00135	.0144	.0500	.122	.198	.293	.360	.422	.491	.589	.804	-----	-----	-----
	.8	.00111	.0123	.0440	.109	.178	.265	.327	.384	.448	.538	.748	-----	-----	-----
	.9	.000934	.0107	.0389	.0975	.161	.240	.296	.347	.404	.483	.665	-----	-----	-----
	1.0	.000794	.00937	.0347	.0878	.146	.217	.267	.312	.360	.425	.545	-----	-----	-----
2	0	0.0176	0.0732	0.166	0.310	0.442	0.590	0.688	0.770	0.854	0.951	-----	-----	-----	-----
	.1	.00577	.0401	.112	.239	.367	.520	.625	.719	.817	.937	-----	-----	-----	-----
	.2	.00284	.0252	.0803	.188	.305	.455	.564	.665	.775	.919	-----	-----	-----	-----
	.3	.00169	.0173	.0602	.151	.255	.397	.505	.610	.730	.897	-----	-----	-----	-----
	.4	.00112	.0127	.0468	.123	.215	.345	.450	.555	.682	.871	-----	-----	-----	-----
	.5	.000800	.00968	.0374	.102	.183	.300	.398	.500	.629	.839	-----	-----	-----	-----
	.6	.000600	.00765	.0306	.0858	.156	.261	.349	.445	.572	.798	-----	-----	-----	-----
	.7	.000467	.00621	.0255	.0729	.134	.225	.304	.390	.509	.743	-----	-----	-----	-----
	.8	.000374	.00514	.0216	.0625	.115	.194	.261	.335	.439	.666	-----	-----	-----	-----
	.9	.000306	.00433	.0185	.0541	.0996	.166	.222	.281	.362	.547	-----	-----	-----	-----
	1.0	.000256	.00370	.0161	.0471	.0865	.142	.186	.230	.281	.358	-----	-----	-----	-----
4	0	0.0176	0.0733	0.167	0.315	0.457	0.624	0.740	0.843	0.949	-----	-----	-----	-----	-----
	.1	.00284	.0253	.0815	.195	.325	.502	.640	.773	.923	-----	-----	-----	-----	-----
	.2	.00112	.0128	.0482	.132	.240	.405	.549	.701	.892	-----	-----	-----	-----	-----
	.3	.000602	.00779	.0321	.0950	.183	.331	.471	.632	.857	-----	-----	-----	-----	-----
	.4	.000376	.00528	.0231	.0720	.144	.273	.403	.565	.817	-----	-----	-----	-----	-----
	.5	.000258	.00383	.0175	.0565	.116	.226	.343	.500	.770	-----	-----	-----	-----	-----
	.6	.000188	.00292	.0137	.0454	.0946	.187	.289	.433	.713	-----	-----	-----	-----	-----
	.7	.000143	.00230	.0111	.0372	.0778	.154	.240	.366	.641	-----	-----	-----	-----	-----
	.8	.000113	.00187	.00914	.0309	.0645	.127	.195	.298	.547	-----	-----	-----	-----	-----
	.9	.0000914	.00154	.00767	.0260	.0538	.103	.154	.226	.413	-----	-----	-----	-----	-----
	1.0	.0000755	.00130	.00653	.0221	.0451	.0829	.117	.156	.212	-----	-----	-----	-----	-----
8	0	---------	-------	0.167	0.317	0.464	0.644	0.776	0.899	-----	-----	-----	-----	-----	-----
	.1	---------	-------	.0486	.135	.251	.439	.613	.810	-----	-----	-----	-----	-----	-----
	.2	---------	-------	.0236	.0762	.159	.317	.492	.725	-----	-----	-----	-----	-----	-----
	.3	---------	-------	.0143	.0501	.111	.240	.400	.647	-----	-----	-----	-----	-----	-----
	.4	---------	-------	.00976	.0358	.0824	.187	.327	.571	-----	-----	-----	-----	-----	-----
	.5	---------	-------	.00714	.0270	.0634	.148	.267	.496	-----	-----	-----	-----	-----	-----
	.6	---------	-------	.00547	.0211	.0498	.117	.216	.422	-----	-----	-----	-----	-----	-----
	.7	---------	-------	.00433	.0168	.0397	.0932	.172	.347	-----	-----	-----	-----	-----	-----
	.8	---------	-------	.00352	.0137	.0320	.0733	.133	.269	-----	-----	-----	-----	-----	-----
	.9	---------	-------	.00292	.0113	.0261	.0569	.0977	.187	-----	-----	-----	-----	-----	-----
	1.0	---------	-------	.00246	.00949	.0213	.0436	.0673	.0990	-----	-----	-----	-----	-----	-----

TABLE II. - WALL FLUX DISTRIBUTIONS FOR TUBES (EQ. (4))

Nondimensional length, $L = \mathscr{L}/\mathscr{R}_1$	Nondimensional distance from inlet, X/L	Wall half angle, β, deg; Diverging walls							Parallel walls	Converging walls					
		75	60	45	30	20	10	5	0	-5	-10	-20	-30	-45	-60
		Flux ratio, $N(X_2)$													
0.5	0	0.0176	0.0727	0.161	0.286	0.388	0.491	0.553	0.604	0.653	0.712	0.804	0.887	0.969	0.999
	.1	.0124	.0614	.145	.265	.367	.470	.532	.583	.633	.694	.789	.876	.964	.999
	.2	.00911	.0523	.130	.247	.346	.449	.511	.562	.613	.675	.773	.864	.958	.999
	.3	.00690	.0449	.118	.230	.327	.428	.490	.542	.593	.655	.756	.854	.952	.998
	.4	.00535	.0388	.106	.214	.308	.408	.470	.521	.572	.635	.738	.836	.944	.998
	.5	.00424	.0338	.0964	.197	.290	.388	.449	.500	.551	.614	.718	.819	.934	.997
	.6	.00341	.0296	.0876	.185	.273	.369	.429	.479	.530	.593	.698	.801	.922	.995
	.7	.00279	.0260	.0798	.172	.257	.350	.409	.458	.509	.571	.676	.781	.907	.992
	.8	.00231	.0230	.0727	.160	.242	.332	.389	.438	.487	.549	.653	.759	.889	.986
	.9	.00194	.0204	.0664	.149	.227	.314	.370	.417	.465	.526	.629	.734	.865	.972
	1.0	.00164	.0182	.0606	.139	.213	.297	.350	.396	.443	.503	.603	.706	.834	.926
1	0	0.0176	0.0734	0.166	0.302	0.420	0.541	0.614	0.674	0.732	0.798	0.896	0.967	-----	-----
	.1	.00913	.0530	.135	.264	.380	.502	.578	.640	.700	.772	.879	.960	-----	-----
	.2	.00537	.0396	.111	.232	.344	.465	.542	.605	.668	.744	.860	.952	-----	-----
	.3	.00343	.0303	.0927	.204	.311	.430	.506	.570	.635	.714	.838	.941	-----	-----
	.4	.00233	.0237	.0779	.179	.280	.396	.471	.535	.601	.682	.812	.928	-----	-----
	.5	.00166	.0189	.0659	.158	.253	.363	.437	.500	.566	.648	.784	.910	-----	-----
	.6	.00122	.0153	.0562	.140	.228	.332	.403	.465	.529	.611	.751	.888	-----	-----
	.7	.000924	.0126	.0482	.124	.205	.303	.371	.430	.492	.572	.713	.856	-----	-----
	.8	.000717	.0104	.0415	.109	.184	.275	.339	.395	.454	.532	.669	.818	-----	-----
	.9	.000565	.0088	.0360	.0969	.165	.249	.306	.360	.416	.489	.618	.761	-----	-----
	1.0	.000457	.00741	.0313	.0859	.148	.225	.278	.326	.377	.443	.560	.682	-----	-----
2	0	0.0176	0.0737	0.168	0.315	0.450	0.595	0.685	0.756	0.827	0.901	0.984	-----	-----	-----
	.1	.00537	.0399	.114	.247	.378	.529	.626	.707	.786	.875	.979	-----	-----	-----
	.2	.00233	.0241	.0811	.196	.318	.468	.569	.656	.744	.845	.972	-----	-----	-----
	.3	.00122	.0157	.0595	.157	.269	.412	.514	.604	.698	.811	.963	-----	-----	-----
	.4	.000722	.0108	.0449	.127	.227	.362	.461	.552	.650	.773	.951	-----	-----	-----
	.5	.000462	.00775	.0347	.104	.192	.316	.411	.500	.598	.728	.935	-----	-----	-----
	.6	.000314	.00576	.0273	.0854	.163	.275	.363	.448	.544	.677	.911	-----	-----	-----
	.7	.000223	.00440	.0218	.0708	.138	.237	.317	.396	.487	.618	.875	-----	-----	-----
	.8	.000164	.00343	.0177	.0590	.116	.203	.274	.344	.427	.549	.817	-----	-----	-----
	.9	.000124	.00273	.0145	.0492	.0982	.172	.233	.293	.364	.468	.715	-----	-----	-----
	1.0	.0000965	.00220	.012	.0412	.0824	.144	.194	.242	.298	.375	.522	-----	-----	-----
4	0	0.0176	0.0737	0.169	0.322	0.469	0.638	0.748	0.836	0.917	0.985	-----	-----	-----	-----
	.1	.00234	.0242	.0824	.204	.344	.526	.656	.769	.879	.977	-----	-----	-----	-----
	.2	.000723	.0109	.0463	.137	.257	.433	.572	.701	.834	.967	-----	-----	-----	-----
	.3	.000315	.00587	.0288	.0959	.195	.357	.495	.633	.786	.953	-----	-----	-----	-----
	.4	.000165	.00354	.0192	.0698	.151	.295	.426	.566	.733	.936	-----	-----	-----	-----
	.5	.0000976	.00231	.0134	.0522	.118	.242	.363	.500	.674	.912	-----	-----	-----	-----
	.6	.0000625	.00160	.00980	.0399	.0935	.198	.306	.433	.607	.878	-----	-----	-----	-----
	.7	.0000425	.00115	.00734	.0309	.0740	.161	.253	.366	.531	.828	-----	-----	-----	-----
	.8	.0000302	.000856	.00564	.0242	.0587	.129	.204	.298	.443	.747	-----	-----	-----	-----
	.9	.0000222	.000654	.00441	.0192	.0464	.101	.159	.230	.341	.605	-----	-----	-----	-----
	1.0	.0000168	.000511	.00349	.0152	.0364	.0770	.117	.163	.224	.323	-----	-----	-----	-----
8	0	---------	--------	0.170	0.325	0.478	0.665	0.793	0.899	0.983	-----	-----	-----	-----	-----
	.1	---------	--------	.047	.140	.270	.476	.650	.816	.966	-----	-----	-----	-----	-----
	.2	---------	--------	.020	.074	.168	.349	.533	.734	.945	-----	-----	-----	-----	-----
	.3	---------	--------	.010	.044	.112	.262	.437	.655	.920	-----	-----	-----	-----	-----
	.4	---------	--------	.0061	.029	.078	.200	.357	.577	.889	-----	-----	-----	-----	-----
	.5	---------	--------	.004	.020	.056	.153	.290	.500	.849	-----	-----	-----	-----	-----
	.6	---------	--------	.0027	.014	.042	.118	.231	.422	.795	-----	-----	-----	-----	-----
	.7	---------	--------	.0019	.010	.031	.090	.181	.344	.721	-----	-----	-----	-----	-----
	.8	---------	--------	.0014	.0079	.023	.067	.136	.265	.615	-----	-----	-----	-----	-----
	.9	---------	--------	.0011	.0060	.017	.049	.0959	.184	.452	-----	-----	-----	-----	-----
	1.0	---------	--------	.00085	.0045	.0129	.034	.0608	.101	.173	-----	-----	-----	-----	-----
16	0	---------	--------	-------	0.326	0.482	0.678	0.820	0.942	-----	-----	-----	-----	-----	-----
	.1	---------	--------	-------	.0750	.173	.375	.594	.847	-----	-----	-----	-----	-----	-----
	.2	---------	--------	-------	.0302	.0849	.232	.442	.757	-----	-----	-----	-----	-----	-----
	.3	---------	--------	-------	.0157	.0491	.155	.335	.670	-----	-----	-----	-----	-----	-----
	.4	---------	--------	-------	.00936	.0312	.106	.256	.584	-----	-----	-----	-----	-----	-----
	.5	---------	--------	-------	.00606	.0210	.0769	.195	.499	-----	-----	-----	-----	-----	-----
	.6	---------	--------	-------	.00415	.0147	.0554	.147	.413	-----	-----	-----	-----	-----	-----
	.7	---------	--------	-------	.00294	.0105	.0399	.108	.327	-----	-----	-----	-----	-----	-----
	.8	---------	--------	-------	.00213	.00753	.0282	.0764	.241	-----	-----	-----	-----	-----	-----
	.9	---------	--------	-------	.00157	.00540	.0192	.0494	.152	-----	-----	-----	-----	-----	-----
	1.0	---------	--------	-------	.00117	.00384	.0122	.0267	.0579	-----	-----	-----	-----	-----	-----

TABLE III. - WALL FLUX GRADIENT AT END POINTS FOR SLOTS (EQ. (6))

Nondimensional length, $L = \mathscr{L}/\mathscr{W}_1$	Surface-diffusion parameter, C_2/L	General-solution points			Slope of line on general solution maps for which $\Theta_0 + \Theta_L = 1$, -m
		α	δ	ϵ	
		Θ_0' for $\begin{cases}\Theta_0 = 1.0 \\ \Theta_L = 1.0\end{cases}$ Θ_L' for $\begin{cases}\Theta_0 = 0 \\ \Theta_L = 0\end{cases}$	Θ_0' for $\begin{cases}\Theta_0 = 1.0 \\ \Theta_L = 0\end{cases}$ Θ_L' for $\begin{cases}\Theta_0 = 1.0 \\ \Theta_L = 0\end{cases}$	Θ_0' for $\begin{cases}\Theta_0 = 0 \\ \Theta_L = 0\end{cases}$ Θ_L' for $\begin{cases}\Theta_0 = 1.0 \\ \Theta_L = 1.0\end{cases}$	
0.0625	0.01	-15.897	-22.864	16.339	46.170
	.1	-2.234	-16.751	2.282	33.550
	1	-.2337	-16.076	.2386	32.157
	10	-.02348	-16.008	.02397	32.016
0.25	0.01	-8.401	-9.1646	9.834	19.762
	.1	-1.748	-4.680	1.937	9.549
	1	-.2033	-4.0706	.2229	8.161
	10	-.02068	-4.007	.02265	8.016
1	0.01	-2.848	-3.250	5.621	9.27
	.1	-.7726	-1.403	1.273	3.306
	1	-.1100	-1.046	.1667	2.149
	10	-.01154	-1.0046	.01729	2.015
2	0.01	-1.451	-1.7195	4.367	6.355
	.1	-.380	-.7341	.943	2.031
	1	-.0567	-.5278	.1235	1.122
	10	-.00602	-.5028	.01284	1.012
4	0.01	-0.6754	-0.836	3.239	4.235
	.1	-.1634	-.362	.6453	1.206
	1	-.0235	-.263	.0810	.583
	10	-.00249	-.251	.00836	.508
8	0.01	-0.289	-0.3801	2.261	2.732
	.1	-.0636	-.1713	.4066	.686
	1	-.00849	-.1304	.0481	.300
	10	-.000885	-.1255	.00492	.247

TABLE IV. - WALL FLUX GRADIENT AT END POINTS FOR TUBES (EQ. (6))

Nondimensional length, $L = \mathscr{L}/\mathscr{R}_1$	Surface-diffusion parameter, C_2/L	General solution points			Slope of line on general solution maps for which $\Theta_0 + \Theta_L = 1$, -m
		α	δ	ϵ	
		Θ_0' for $\Theta_0 = 1.0$, $\Theta_L = 1.0$ Θ_L' for $\Theta_0 = 0$, $\Theta_L = 0$	Θ_0' for $\Theta_0 = 1.0$, $\Theta_L = 0$ Θ_L' for $\Theta_0 = 1.0$, $\Theta_L = 0$	Θ_0' for $\Theta_0 = 0$, $\Theta_L = 0$ Θ_L' for $\Theta_0 = 1.0$, $\Theta_L = 1.0$	
0.0625	0.01	-16.1411	-23.10	16.588	46.64
	.1	-2.2591	-16.773	2.308	33.595
	1	-.2362	-16.0767	.2411	32.158
	10	-.02373	-16.0062	.02422	32.013
0.125	0.01	-12.258	-14.335	13.061	29.473
	.1	-2.072	-8.743	2.167	17.581
	1	-.2254	-8.0747	.2350	16.159
	10	-.02275	-8.007	.02371	16.015
1	0.01	-3.0089	-3.374	5.551	9.290
	.1	-.8301	-1.427	1.2887	3.313
	1	-.1196	-1.048	.1715	2.148
	10	-.01257	-1.0048	.0178	2.0148
4	0.01	-.6609	-.8195	3.0113	3.989
	.1	-.1690	-.3670	.6509	1.216
	1	-.02522	-.2644	.08456	.588
	10	-.00269	-.2515	.008786	.509
16	0.01	-0.0708	-0.1228	1.223	1.398
	.1	-.0131	-.07293	.2190	.3517
	1	-.00152	-.06365	.02488	.1507
	10	-.000155	-.06261	.002526	.1276

TABLE V. - EXIT PLANE FLUX DISTRIBUTIONS FOR SLOTS (EQ. (10))

Nondimensional length, $L = \mathscr{L}/\mathscr{W}_1$	Nondimensional lateral distance, $2Y_4\mathscr{W}_1/\mathscr{W}_4$	Wall half-angle, β, deg													
		Diverging walls							Parallel walls	Converging walls					
		75	60	45	30	20	10	5	0	-5	-10	-20	-30	-45	-60
		Flux ratio, $M(Y_4)$													
0.25	0	0.896	0.901	0.909	0.920	0.929	0.939	0.944	0.949	0.954	0.960	0.969	0.978	0.990	0.997
	.1	.877	.893	.904	.917	.927	.937	.943	.948	.953	.959	.969	.978	.990	.997
	.2	.805	.870	.890	.908	.921	.932	.939	.945	.950	.957	.967	.978	.989	.997
	.3	.627	.820	.864	.892	.909	.924	.932	.939	.945	.953	.965	.976	.989	.997
	.4	.361	.728	.818	.865	.890	.910	.921	.930	.938	.947	.961	.974	.988	.997
	.5	.175	.584	.744	.823	.861	.890	.905	.916	.927	.938	.956	.972	.988	.997
	.6	.0918	.414	.636	.761	.818	.860	.881	.897	.911	.926	.949	.968	.987	.997
	.7	.0541	.274	.507	.676	.759	.819	.848	.870	.889	.910	.939	.963	.985	.996
	.8	.0351	.183	.384	.575	.682	.763	.803	.832	.858	.886	.925	.956	.983	.996
	.9	.0244	.128	.288	.473	.594	.693	.745	.783	.817	.854	.906	.946	.980	.993
	.95	.0206	.109	.250	.425	.547	.653	.710	.752	.791	.833	.892	.939	.978	.985
	1.0	.0132	.0619	.138	.240	.322	.403	.453	.493	.533	.582	.664	.747	.851	.930
0.5	0	0.710	0.722	0.743	0.774	0.800	0.828	0.845	0.860	0.875	0.892	0.922	0.951	-----	-----
	.1	.652	.704	.733	.768	.797	.826	.844	.858	.873	.892	.922	.951	-----	-----
	.2	.480	.647	.705	.752	.786	.819	.838	.854	.870	.889	.920	.950	-----	-----
	.3	.279	.555	.656	.725	.768	.807	.829	.847	.864	.885	.918	.949	-----	-----
	.4	.149	.439	.589	.687	.743	.790	.816	.836	.856	.879	.915	.948	-----	-----
	.5	.0835	.326	.509	.638	.709	.767	.798	.822	.845	.871	.910	.945	-----	-----
	.6	.0505	.235	.425	.581	.668	.739	.776	.804	.830	.860	.904	.943	-----	-----
	.7	.0327	.170	.347	.518	.621	.705	.749	.782	.812	.847	.897	.939	-----	-----
	.8	.0225	.125	.279	.453	.568	.664	.716	.754	.790	.829	.887	.934	-----	-----
	.9	.0161	.9833	.223	.390	.510	.617	.675	.719	.761	.807	.873	.926	-----	-----
	.95	.0138	.0813	.199	.359	.479	.590	.651	.698	.742	.791	.863	.914	-----	-----
	1.0	.00987	.0526	.124	.223	.304	.385	.435	.475	.516	.567	.651	.737	-----	-----
1	0	0.452	0.470	0.502	0.554	0.603	0.657	0.692	0.723	0.755	0.795	0.864	-----	-----	-----
	.1	.384	.450	.493	.550	.600	.655	.691	.722	.754	.794	.864	-----	-----	-----
	.2	.245	.397	.467	.536	.592	.650	.687	.719	.751	.793	.863	-----	-----	-----
	.3	.137	.325	.428	.515	.578	.641	.680	.714	.747	.790	.861	-----	-----	-----
	.4	.0770	.252	.380	.487	.559	.629	.671	.706	.742	.785	.859	-----	-----	-----
	.5	.0457	.190	.329	.453	.536	.613	.659	.696	.734	.780	.856	-----	-----	-----
	.6	.0289	.142	.279	.416	.509	.594	.644	.684	.724	.772	.851	-----	-----	-----
	.7	.0192	.106	.233	.377	.478	.571	.625	.669	.711	.763	.845	-----	-----	-----
	.8	.0134	.0806	.193	.336	.443	.544	.603	.650	.695	.750	.837	-----	-----	-----
	.9	.00969	.0618	.158	.296	.405	.512	.575	.625	.674	.733	.825	-----	-----	-----
	.95	.00834	.0544	.143	.275	.384	.493	.557	.610	.661	.722	.803	-----	-----	-----
	1.0	.00645	.0391	.0991	.188	.263	.341	.391	.432	.475	.529	.624	-----	-----	-----
2	0	0.247	0.264	0.295	0.349	0.405	0.473	0.522	0.568	0.620	0.694	-----	-----	-----	-----
	.1	.204	.252	.290	.347	.403	.472	.521	.567	.619	.693	-----	-----	-----	-----
	.2	.127	.220	.275	.339	.398	.469	.519	.565	.617	.692	-----	-----	-----	-----
	.3	.0715	.180	.252	.327	.390	.463	.514	.562	.615	.690	-----	-----	-----	-----
	.4	.0411	.141	.226	.311	.379	.456	.509	.557	.611	.686	-----	-----	-----	-----
	.5	.0248	.108	.197	.291	.365	.446	.501	.550	.605	.682	-----	-----	-----	-----
	.6	.0159	.0819	.169	.270	.349	.434	.491	.542	.598	.676	-----	-----	-----	-----
	.7	.0107	.0623	.143	.247	.330	.420	.479	.532	.589	.669	-----	-----	-----	-----
	.8	.00746	.0478	.120	.223	.309	.403	.464	.519	.578	.659	-----	-----	-----	-----
	.9	.00541	.0370	.100	.199	.286	.382	.446	.502	.563	.646	-----	-----	-----	-----
	.95	.00466	.0327	.0913	.186	.273	.370	.435	.492	.553	.627	-----	-----	-----	-----
	1.0	.00379	.0255	.0691	.138	.201	.271	.318	.361	.409	.475	-----	-----	-----	-----
4	0	0.127	0.139	0.161	0.201	0.246	0.309	0.360	0.416	0.491	-----	-----	-----	-----	-----
	.1	.104	.133	.158	.200	.245	.308	.360	.415	.490	-----	-----	-----	-----	-----
	.2	.0650	.116	.150	.196	.243	.306	.358	.414	.489	-----	-----	-----	-----	-----
	.3	.0371	.0958	.139	.189	.238	.303	.356	.412	.487	-----	-----	-----	-----	-----
	.4	.0215	.0756	.125	.181	.232	.299	.352	.408	.484	-----	-----	-----	-----	-----
	.5	.0131	.0583	.110	.170	.225	.293	.348	.404	.480	-----	-----	-----	-----	-----
	.6	.00840	.0447	.0950	.159	.216	.286	.342	.399	.475	-----	-----	-----	-----	-----
	.7	.00565	.0342	.0812	.146	.205	.278	.334	.392	.469	-----	-----	-----	-----	-----
	.8	.00396	.0264	.0688	.133	.194	.268	.325	.384	.461	-----	-----	-----	-----	-----
	.9	.00287	.0206	.0579	.120	.181	.256	.314	.373	.440	-----	-----	-----	-----	-----
	.95	.00248	.0183	.0530	.113	.174	.249	.308	.364	.405	-----	-----	-----	-----	-----
	1.0	.00207	.0150	.0428	.0898	.135	.192	.234	.278	.334	-----	-----	-----	-----	-----
8	0	-------	------	0.0841	0.109	0.138	0.184	0.228	0.283	-----	-----	-----	-----	-----	-----
	.1	-------	------	.0827	.108	.138	.184	.228	.283	-----	-----	-----	-----	-----	-----
	.2	-------	------	.0788	.106	.137	.183	.227	.282	-----	-----	-----	-----	-----	-----
	.3	-------	------	.0730	.103	.134	.181	.225	.281	-----	-----	-----	-----	-----	-----
	.4	-------	------	.0659	.0984	.131	.179	.223	.279	-----	-----	-----	-----	-----	-----
	.5	-------	------	.0582	.0931	.127	.176	.221	.276	-----	-----	-----	-----	-----	-----
	.6	-------	------	.0507	.0872	.123	.172	.217	.273	-----	-----	-----	-----	-----	-----
	.7	-------	------	.0436	.0808	.117	.168	.213	.269	-----	-----	-----	-----	-----	-----
	.8	-------	------	.0372	.0741	.111	.163	.208	.264	-----	-----	-----	-----	-----	-----
	.9	-------	------	.0315	.0674	.105	.156	.202	.256	-----	-----	-----	-----	-----	-----
	.95	-------	------	.0290	.0639	.101	.153	.198	.241	-----	-----	-----	-----	-----	-----
	1.0	-------	------	.0245	.0532	.0827	.122	.156	.197	-----	-----	-----	-----	-----	-----

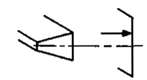
TABLE VI. - EXIT-PLANE FLUX DISTRIBUTIONS FOR TUBES (EQ. (10))

Nondimensional length, $L = \mathscr{L}/\mathscr{R}_1$	Nondimensional radial distance, $R_4\mathscr{R}_1/\mathscr{R}_4$	Wall half-angle, β, deg													
		Diverging walls							Parallel walls	Converging walls					
		75	60	45	30	20	10	5	0	-5	-10	-20	-30	-45	-60
		Flux ratio, $M(R_4)$													
0.5	0	0.802	0.810	0.824	0.846	0.865	0.884	0.896	0.906	0.916	0.927	0.947	0.965	0.986	0.997
	.1	.780	.802	.819	.843	.862	.882	.894	.904	.914	.927	.946	.965	.985	.997
	.2	.699	.773	.803	.832	.854	.876	.890	.901	.911	.924	.945	.964	.985	.997
	.3	.515	.717	.772	.813	.840	.866	.881	.894	.906	.920	.942	.963	.985	.996
	.4	.267	.619	.720	.782	.819	.851	.869	.883	.897	.913	.938	.961	.984	.996
	.5	.113	.474	.641	.735	.786	.828	.850	.868	.884	.903	.932	.958	.983	.996
	.6	.0513	.315	.531	.669	.740	.795	.824	.846	.867	.890	.924	.954	.982	.996
	.7	.0265	.193	.406	.582	.676	.750	.788	.816	.842	.871	.913	.948	.980	.996
	.8	.0152	.119	.293	.481	.597	.691	.740	.776	.809	.846	.898	.940	.978	.995
	.9	.00946	.0758	.206	.380	.506	.617	.676	.721	.763	.809	.875	.928	.974	.994
	.95	.00763	.0615	.172	.333	.458	.473	.637	.686	.732	.784	.859	.918	.971	.991
	1.0	.00461	.0331	.0903	.180	.259	.343	.395	.439	.483	.539	.631	.725	.842	.928
1	0	0.504	0.520	0.550	0.600	0.648	0.700	0.734	0.762	0.791	0.826	0.883	0.934	-----	-----
	.1	.450	.502	.541	.595	.644	.698	.732	.761	.790	.825	.883	.934	-----	-----
	.2	.303	.450	.513	.579	.634	.691	.726	.756	.786	.823	.881	.933	-----	-----
	.3	.153	.368	.468	.553	.616	.678	.717	.749	.780	.818	.878	.932	-----	-----
	.4	.0691	.274	.408	.517	.590	.661	.703	.737	.771	.812	.875	.930	-----	-----
	.5	.0329	.188	.340	.471	.558	.638	.685	.723	.759	.803	.870	.928	-----	-----
	.6	.0171	.125	.271	.419	.519	.610	.662	.704	.744	.791	.863	.924	-----	-----
	.7	.00971	.0823	.210	.363	.473	.575	.634	.680	.724	.776	.854	.919	-----	-----
	.8	.00590	.0552	.159	.307	.423	.534	.599	.650	.699	.756	.841	.912	-----	-----
	.9	.00378	.0377	.119	.253	.369	.486	.555	.611	.665	.728	.823	.902	-----	-----
	.95	.00308	.0313	.102	.226	.339	.456	.528	.586	.642	.709	.809	.894	-----	-----
	1.0	.00209	.0191	.0599	.133	.205	.286	.340	.386	.434	.495	.600	.708	-----	-----
2	0	0.204	0.220	0.252	0.313	0.380	0.463	0.522	0.576	0.633	0.706	0.827	-----	-----	-----
	.1	.164	.208	.246	.310	.378	.462	.521	.575	.632	.705	.827	-----	-----	-----
	.2	.0912	.176	.230	.301	.371	.457	.518	.572	.629	.703	.826	-----	-----	-----
	.3	.0426	.135	.205	.286	.360	.449	.511	.566	.625	.700	.823	-----	-----	-----
	.4	.0200	.0973	.176	.266	.346	.439	.502	.559	.619	.695	.820	-----	-----	-----
	.5	.0100	.0673	.146	.243	.326	.425	.491	.549	.610	.688	.816	-----	-----	-----
	.6	.00546	.0459	.118	.217	.306	.408	.476	.536	.599	.679	.810	-----	-----	-----
	.7	.00318	.0314	.0930	.191	.282	.387	.458	.520	.585	.667	.802	-----	-----	-----
	.8	.00196	.0217	.0724	.164	.255	.362	.435	.499	.567	.652	.791	-----	-----	-----
	.9	.00127	.0152	.0556	.138	.226	.333	.407	.472	.542	.630	.774	-----	-----	-----
	.95	.00104	.0128	.0484	.125	.209	.315	.389	.455	.525	.614	.756	-----	-----	-----
	1.0	.000762	.00867	.0314	.0797	.134	.206	.258	.307	.361	.434	.566	-----	-----	-----
4	0	0.0609	0.0694	0.0879	0.128	0.179	0.257	0.325	0.396	0.484	0.613	-----	-----	-----	-----
	.1	.0471	.0653	.0859	.126	.178	.256	.325	.396	.483	.613	-----	-----	-----	-----
	.2	.0251	.0548	.0802	.123	.175	.254	.322	.394	.481	.611	-----	-----	-----	-----
	.3	.0118	.0420	.0717	.117	.170	.250	.319	.390	.478	.608	-----	-----	-----	-----
	.4	.00564	.0304	.0619	.109	.164	.245	.314	.385	.474	.604	-----	-----	-----	-----
	.5	.00289	.0213	.0518	.101	.156	.236	.307	.379	.467	.598	-----	-----	-----	-----
	.6	.00159	.0148	.0423	.0908	.147	.229	.298	.371	.459	.591	-----	-----	-----	-----
	.7	.000933	.0103	.0339	.0805	.136	.218	.288	.360	.449	.581	-----	-----	-----	-----
	.8	.000579	.00710	.0268	.0700	.124	.205	.275	.347	.436	.568	-----	-----	-----	-----
	.9	.000377	.00510	.0203	.0596	.111	.190	.258	.329	.418	.546	-----	-----	-----	-----
	.95	.000308	.00431	.0163	.0544	.103	.180	.247	.318	.405	.503	-----	-----	-----	-----
	1.0	.000238	.00318	.0130	.0373	.0701	.122	.169	.219	.282	.379	-----	-----	-----	-----
8	0	--------	-------	0.0264	0.0431	0.0684	0.118	0.174	0.249	0.375	-----	-----	-----	-----	-----
	.1	--------	-------	.0258	.0427	.0681	.118	.173	.249	.375	-----	-----	-----	-----	-----
	.2	--------	-------	.0241	.0416	.0671	.117	.172	.248	.373	-----	-----	-----	-----	-----
	.3	--------	-------	.0217	.0397	.0654	.115	.170	.246	.371	-----	-----	-----	-----	-----
	.4	--------	-------	.0188	.0373	.0631	.112	.168	.243	.367	-----	-----	-----	-----	-----
	.5	--------	-------	.0159	.0344	.0602	.109	.164	.239	.363	-----	-----	-----	-----	-----
	.6	--------	-------	.0131	.0313	.0568	.106	.160	.234	.357	-----	-----	-----	-----	-----
	.7	--------	-------	.0106	.0279	.0529	.101	.154	.227	.349	-----	-----	-----	-----	-----
	.8	--------	-------	.00845	.0245	.0486	.0953	.148	.219	.339	-----	-----	-----	-----	-----
	.9	--------	-------	.00667	.0211	.0437	.0885	.139	.209	.316	-----	-----	-----	-----	-----
	.95	--------	-------	.00590	.0194	.0411	.0845	.134	.200	.283	-----	-----	-----	-----	-----
	1.0	--------	-------	.00446	.0141	.0292	.0590	.0931	.140	.219	-----	-----	-----	-----	-----
16	0	--------	-------	-------	0.0127	0.0221	0.0446	0.0782	0.145	-----	-----	-----	-----	-----	-----
	.1	--------	-------	-------	.0126	.0220	.0445	.0781	.145	-----	-----	-----	-----	-----	-----
	.2	--------	-------	-------	.0123	.0217	.0441	.0776	.144	-----	-----	-----	-----	-----	-----
	.3	--------	-------	-------	.0118	.0212	.0435	.0768	.143	-----	-----	-----	-----	-----	-----
	.4	--------	-------	-------	.0111	.0205	.0426	.0757	.141	-----	-----	-----	-----	-----	-----
	.5	--------	-------	-------	.0103	.0196	.0415	.0742	.139	-----	-----	-----	-----	-----	-----
	.6	--------	-------	-------	.00936	.0185	.0401	.0723	.136	-----	-----	-----	-----	-----	-----
	.7	--------	-------	-------	.00840	.0173	.0384	.0699	.132	-----	-----	-----	-----	-----	-----
	.8	--------	-------	-------	.00743	.0160	.0364	.0670	.128	-----	-----	-----	-----	-----	-----
	.9	--------	-------	-------	.00645	.0145	.0339	.0632	.122	-----	-----	-----	-----	-----	-----
	.95	--------	-------	-------	.00596	.0137	.0325	.0609	.117	-----	-----	-----	-----	-----	-----
	1.0	--------	-------	-------	.00457	.0101	.0233	.0430	.0824	-----	-----	-----	-----	-----	-----

TABLE VII. - CALCULATED DISTRIBUTIONS OF PARTICLE FLUX ALONG PLANES AT VARIOUS DISTANCES FROM SLOT EXIT (EQ. (11))

(a) Length to inlet-width ratio, 0.25

(a-1) Wall half-angle, 0°



Nondimensional distance from slot exit, $X_5 - L$	Nondimensional centerplane flux relative to inlet flux, M(O)	Distance from centerplane, $\frac{Y_5}{X_5 - L}$																
		.1	.2	.3	.4	.5	.6	.8	1.	1.25	1.5	1.75	2.	2.5	3.	4.	6.	8.
		Flux relative to centerplane, $M(Y_5)/M(O)$																
0.25	0.80071	0.999	0.997	0.993	0.988	0.981	0.972	0.948	0.915	0.860	0.785	0.691	0.582	0.311	0.155	0.046	0.007	0.003
0.50	0.63040	0.996	0.986	0.968	0.944	0.912	0.874	0.781	0.672	0.500	0.354	0.245	0.170	0.086	0.047	0.016	0.004	0.001
1.00	0.40904	0.992	0.967	0.927	0.875	0.814	0.734	0.574	0.431	0.295	0.201	0.138	0.097	0.051	0.028	0.010	0.003	0.001
2.00	0.22968	0.988	0.953	0.894	0.815	0.729	0.642	0.482	0.353	0.237	0.161	0.111	0.078	0.041	0.023	0.008	0.002	0.001
4.00	0.12043	0.986	0.938	0.867	0.784	0.695	0.607	0.450	0.327	0.218	0.148	0.102	0.072	0.038	0.021	0.008	0.002	0.001
8.00	0.06144	0.981	0.928	0.856	0.771	0.681	0.594	0.438	0.317	0.211	0.143	0.098	0.069	0.036	0.020	0.007	0.002	0.001
16.00	0.03099	0.977	0.924	0.850	0.765	0.676	0.588	0.433	0.313	0.208	0.141	0.097	0.068	0.036	0.020	0.007	0.002	0.001
32.00	0.01556	0.975	0.921	0.848	0.763	0.673	0.586	0.431	0.311	0.207	0.140	0.096	0.068	0.035	0.020	0.007	0.002	0.001
64.00	0.00780	0.974	0.920	0.847	0.762	0.672	0.584	0.430	0.310	0.206	0.139	0.096	0.067	0.035	0.020	0.007	0.002	0.001
128.00	0.00390	0.973	0.920	0.846	0.761	0.671	0.584	0.429	0.310	0.206	0.139	0.096	0.067	0.035	0.020	0.007	0.002	0.001
256.00	0.00195	0.973	0.920	0.846	0.761	0.671	0.584	0.429	0.310	0.206	0.139	0.095	0.067	0.035	0.020	0.007	0.002	0.001
512.00	0.00098	0.973	0.919	0.846	0.761	0.671	0.583	0.429	0.309	0.206	0.139	0.095	0.067	0.035	0.020	0.007	0.002	0.001

(a-2) Wall half-angle, 5°

0.25	0.79551	0.999	0.997	0.993	0.988	0.981	0.973	0.950	0.919	0.867	0.798	0.710	0.606	0.349	0.173	0.050	0.007	0.003
0.50	0.62980	0.997	0.987	0.970	0.946	0.917	0.880	0.791	0.685	0.528	0.375	0.260	0.180	0.090	0.049	0.017	0.003	0.001
1.00	0.41202	0.992	0.968	0.929	0.878	0.818	0.752	0.590	0.444	0.303	0.206	0.142	0.099	0.051	0.029	0.010	0.003	0.001
2.00	0.23264	0.988	0.954	0.901	0.827	0.740	0.652	0.489	0.358	0.240	0.163	0.112	0.079	0.041	0.023	0.008	0.002	0.001
4.00	0.12232	0.986	0.948	0.877	0.792	0.702	0.613	0.454	0.329	0.220	0.148	0.102	0.072	0.037	0.021	0.007	0.002	0.001
8.00	0.06248	0.986	0.938	0.864	0.778	0.687	0.598	0.441	0.319	0.212	0.143	0.098	0.069	0.036	0.020	0.007	0.002	0.001
16.00	0.03154	0.985	0.933	0.858	0.772	0.681	0.592	0.435	0.314	0.209	0.140	0.096	0.068	0.035	0.020	0.007	0.002	0.001
32.00	0.01584	0.985	0.930	0.855	0.769	0.678	0.589	0.433	0.312	0.207	0.139	0.096	0.067	0.035	0.019	0.007	0.002	0.001
64.00	0.00794	0.984	0.929	0.854	0.767	0.677	0.588	0.431	0.311	0.206	0.139	0.095	0.067	0.035	0.019	0.007	0.002	0.001
128.00	0.00397	0.983	0.928	0.853	0.767	0.676	0.587	0.431	0.310	0.206	0.138	0.095	0.067	0.035	0.019	0.007	0.002	0.001
256.00	0.00199	0.983	0.928	0.853	0.766	0.676	0.587	0.431	0.310	0.206	0.138	0.095	0.067	0.035	0.019	0.007	0.002	0.001
512.00	0.00099	0.983	0.928	0.853	0.766	0.675	0.587	0.430	0.310	0.206	0.138	0.095	0.066	0.035	0.019	0.007	0.002	0.001

(a-3) Wall half-angle, 10°

0.25	0.78814	0.999	0.997	0.993	0.988	0.982	0.973	0.951	0.922	0.873	0.809	0.728	0.631	0.403	0.201	0.056	0.008	0.002
0.50	0.62721	0.997	0.987	0.971	0.949	0.921	0.886	0.801	0.698	0.562	0.405	0.282	0.195	0.097	0.051	0.017	0.003	0.001
1.00	0.41395	0.992	0.969	0.931	0.882	0.823	0.758	0.612	0.462	0.316	0.214	0.147	0.103	0.053	0.029	0.010	0.002	0.001
2.00	0.23523	0.988	0.955	0.902	0.836	0.756	0.666	0.500	0.366	0.245	0.165	0.113	0.079	0.041	0.023	0.008	0.002	0.001
4.00	0.12408	0.987	0.948	0.889	0.805	0.714	0.623	0.461	0.334	0.222	0.149	0.102	0.072	0.037	0.020	0.007	0.002	0.001
8.00	0.06348	0.986	0.945	0.876	0.789	0.696	0.606	0.445	0.321	0.213	0.143	0.098	0.068	0.035	0.019	0.007	0.002	0.001
16.00	0.03207	0.985	0.944	0.870	0.781	0.689	0.599	0.439	0.316	0.209	0.140	0.096	0.067	0.035	0.019	0.007	0.002	0.001
32.00	0.01611	0.985	0.943	0.867	0.778	0.686	0.595	0.436	0.314	0.208	0.139	0.095	0.066	0.034	0.019	0.006	0.002	0.001
64.00	0.00808	0.985	0.942	0.865	0.776	0.684	0.594	0.435	0.313	0.207	0.139	0.095	0.066	0.034	0.019	0.006	0.002	0.001
128.00	0.00404	0.985	0.941	0.864	0.776	0.683	0.593	0.434	0.312	0.206	0.138	0.095	0.066	0.034	0.019	0.006	0.002	0.001
256.00	0.00202	0.985	0.940	0.864	0.775	0.683	0.593	0.434	0.312	0.206	0.138	0.094	0.066	0.034	0.019	0.006	0.002	0.001
512.00	0.00101	0.985	0.940	0.864	0.775	0.683	0.592	0.434	0.312	0.206	0.138	0.094	0.066	0.034	0.019	0.006	0.002	0.001

(a-4) Wall half-angle, 20°

0.25	0.77413	0.999	0.997	0.993	0.988	0.982	0.973	0.952	0.924	0.877	0.818	0.746	0.660	0.467	0.263	0.069	0.008	0.002
0.50	0.61924	0.997	0.988	0.973	0.952	0.926	0.893	0.813	0.717	0.586	0.460	0.326	0.225	0.110	0.058	0.018	0.003	0.001
1.00	0.41360	0.992	0.970	0.935	0.887	0.831	0.768	0.634	0.500	0.342	0.232	0.158	0.110	0.056	0.030	0.010	0.002	0.001
2.00	0.23733	0.989	0.956	0.904	0.840	0.766	0.690	0.525	0.384	0.256	0.172	0.118	0.082	0.042	0.023	0.007	0.002	0.001
4.00	0.12584	0.987	0.949	0.890	0.817	0.738	0.645	0.476	0.344	0.228	0.153	0.104	0.072	0.037	0.020	0.006	0.002	0.001
8.00	0.06454	0.986	0.945	0.884	0.808	0.717	0.623	0.457	0.329	0.217	0.145	0.099	0.069	0.035	0.019	0.006	0.002	0.001
16.00	0.03265	0.986	0.944	0.881	0.804	0.708	0.614	0.449	0.322	0.213	0.142	0.097	0.067	0.034	0.018	0.006	0.001	0.001
32.00	0.01641	0.985	0.943	0.880	0.799	0.703	0.610	0.445	0.319	0.210	0.140	0.095	0.066	0.034	0.018	0.006	0.001	0.001
64.00	0.00823	0.985	0.943	0.879	0.797	0.701	0.608	0.444	0.318	0.209	0.140	0.095	0.066	0.034	0.018	0.006	0.001	0.001
128.00	0.00412	0.985	0.943	0.879	0.796	0.700	0.607	0.443	0.317	0.209	0.139	0.095	0.066	0.033	0.018	0.006	0.001	0.001
256.00	0.00206	0.985	0.943	0.879	0.796	0.700	0.606	0.442	0.317	0.209	0.139	0.095	0.066	0.033	0.018	0.006	0.001	0.001
512.00	0.00103	0.985	0.943	0.879	0.795	0.699	0.606	0.442	0.317	0.208	0.139	0.094	0.066	0.033	0.018	0.006	0.001	0.001

(a-5) Wall half-angle, 30°

0.25	0.75842	0.999	0.997	0.993	0.988	0.981	0.972	0.951	0.922	0.876	0.819	0.752	0.674	0.498	0.334	0.092	0.010	0.002
0.50	0.60752	0.997	0.988	0.974	0.954	0.928	0.898	0.822	0.730	0.604	0.481	0.373	0.271	0.131	0.067	0.021	0.002	0.001
1.00	0.40933	0.993	0.971	0.937	0.892	0.837	0.776	0.645	0.518	0.381	0.258	0.175	0.121	0.061	0.032	0.010	0.002	0.001
2.00	0.23693	0.989	0.957	0.906	0.843	0.770	0.695	0.547	0.411	0.274	0.183	0.125	0.086	0.044	0.023	0.007	0.001	0.001
4.00	0.12627	0.987	0.949	0.891	0.819	0.740	0.659	0.501	0.361	0.239	0.159	0.108	0.075	0.038	0.020	0.006	0.001	0.001
8.00	0.06493	0.986	0.946	0.884	0.809	0.727	0.643	0.477	0.342	0.225	0.150	0.102	0.070	0.035	0.019	0.006	0.001	0.000
16.00	0.03288	0.986	0.944	0.881	0.804	0.721	0.637	0.466	0.334	0.219	0.146	0.099	0.068	0.034	0.018	0.006	0.001	0.000
32.00	0.01654	0.985	0.944	0.880	0.802	0.718	0.633	0.462	0.330	0.217	0.144	0.097	0.067	0.034	0.018	0.005	0.001	0.000
64.00	0.00829	0.985	0.943	0.879	0.801	0.717	0.631	0.459	0.328	0.215	0.143	0.097	0.067	0.034	0.018	0.005	0.001	0.000
128.00	0.00415	0.985	0.943	0.879	0.801	0.716	0.630	0.458	0.327	0.215	0.142	0.096	0.067	0.033	0.018	0.005	0.001	0.000
256.00	0.00208	0.985	0.943	0.879	0.801	0.716	0.629	0.458	0.327	0.214	0.142	0.096	0.066	0.033	0.018	0.005	0.001	0.000
512.00	0.00104	0.985	0.943	0.879	0.801	0.716	0.629	0.457	0.327	0.214	0.142	0.096	0.066	0.033	0.018	0.005	0.001	0.000

(a-6) Wall half-angle, 45°

0.25	0.73732	0.999	0.997	0.993	0.987	0.979	0.970	0.947	0.917	0.869	0.811	0.744	0.670	0.514	0.365	0.167	0.017	0.001
0.50	0.58853	0.997	0.988	0.974	0.954	0.929	0.899	0.825	0.738	0.619	0.500	0.394	0.306	0.185	0.093	0.028	0.003	0.001
1.00	0.39880	0.993	0.973	0.940	0.896	0.843	0.784	0.656	0.532	0.397	0.294	0.218	0.149	0.074	0.039	0.012	0.001	0.000
2.00	0.23294	0.989	0.958	0.909	0.846	0.775	0.701	0.555	0.428	0.306	0.212	0.144	0.099	0.049	0.026	0.008	0.001	0.000
4.00	0.12490	0.987	0.950	0.892	0.821	0.742	0.662	0.511	0.386	0.267	0.178	0.120	0.083	0.041	0.022	0.007	0.001	0.000
8.00	0.06442	0.986	0.946	0.885	0.810	0.728	0.645	0.492	0.369	0.247	0.164	0.111	0.076	0.038	0.020	0.006	0.001	0.000
16.00	0.03268	0.986	0.944	0.882	0.805	0.721	0.637	0.484	0.361	0.239	0.158	0.107	0.073	0.037	0.019	0.006	0.001	0.000
32.00	0.01645	0.985	0.944	0.880	0.803	0.718	0.634	0.480	0.357	0.235	0.156	0.105	0.072	0.036	0.019	0.006	0.001	0.000
64.00	0.00825	0.985	0.943	0.879	0.802	0.717	0.632	0.478	0.355	0.233	0.154	0.104	0.072	0.036	0.019	0.005	0.001	0.000
128.00	0.00413	0.985	0.943	0.879	0.801	0.716	0.631	0.477	0.354	0.232	0.154	0.104	0.071	0.035	0.019	0.005	0.001	0.000
256.00	0.00207	0.985	0.943	0.879	0.801	0.716	0.631	0.477	0.354	0.232	0.153	0.103	0.071	0.035	0.019	0.005	0.001	0.000
512.00	0.00103	0.985	0.943	0.879	0.801	0.716	0.631	0.476	0.354	0.231	0.153	0.103	0.071	0.035	0.019	0.005	0.001	0.000

(a-7) Wall half-angle, 60°

0.25	0.72103	0.999	0.996	0.992	0.986	0.978	0.968	0.943	0.911	0.860	0.799	0.729	0.654	0.502	0.368	0.182	0.038	0.005
0.50	0.57153	0.997	0.988	0.973	0.953	0.927	0.896	0.821	0.734	0.618	0.505	0.403	0.317	0.194	0.123	0.046	0.006	0.000
1.00	0.38675	0.993	0.973	0.940	0.897	0.845	0.787	0.662	0.539	0.406	0.301	0.224	0.169	0.100	0.055	0.017	0.002	0.000
2.00	0.22689	0.989	0.958	0.910	0.849	0.779	0.705	0.560	0.433	0.311	0.224	0.163	0.121	0.064	0.034	0.011	0.001	0.000
4.00	0.12215	0.987	0.950	0.893	0.823	0.744	0.664	0.514	0.389	0.273	0.194	0.140	0.102	0.051	0.027	0.008	0.000	0.000
8.00	0.06316	0.986	0.946	0.886	0.811	0.729	0.646	0.494	0.370	0.258	0.182	0.131	0.092	0.046	0.025	0.008	0.000	0.000
16.00	0.03208	0.986	0.945	0.882	0.805	0.722	0.638	0.484	0.361	0.250	0.176	0.126	0.087	0.044	0.023	0.007	0.000	0.000
32.00	0.01616	0.985	0.944	0.880	0.803	0.719	0.634	0.480	0.357	0.247	0.173	0.124	0.085	0.043	0.023	0.007	0.000	0.000
64.00	0.00811	0.985	0.943	0.880	0.802	0.717	0.632	0.478	0.355	0.245	0.172	0.122	0.084	0.042	0.023	0.007	0.000	0.000
128.00	0.00406	0.985	0.943	0.879	0.801	0.716	0.631	0.477	0.355	0.245	0.171	0.121	0.084	0.042	0.022	0.007	0.000	0.000
256.00	0.00203	0.985	0.943	0.879	0.801	0.716	0.631	0.477	0.354	0.244	0.171	0.121	0.084	0.042	0.022	0.007	0.000	0.000
512.00	0.00102	0.985	0.943	0.879	0.801	0.716	0.631	0.476	0.354	0.244	0.171	0.121	0.083	0.042	0.022	0.007	0.000	0.000

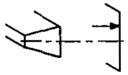
(a-8) Wall half-angle, 75°

0.25	0.71038	0.999	0.996	0.992	0.985	0.977	0.967	0.940	0.906	0.853	0.789	0.716	0.638	0.482	0.349	0.179	0.056	0.023
0.50	0.55896	0.997	0.987	0.972	0.951	0.924	0.892	0.815	0.725	0.608	0.495	0.396	0.314	0.197	0.127	0.058	0.018	0.004
1.00	0.37586	0.993	0.972	0.939	0.895	0.843	0.785	0.660	0.539	0.407	0.304	0.227	0.172	0.102	0.064	0.029	0.007	0.001
2.00	0.22032	0.989	0.959	0.911	0.849	0.780	0.706	0.562	0.436	0.313	0.226	0.165	0.123	0.072	0.045	0.020	0.004	0.000
4.00	0.11883	0.987	0.950	0.894	0.824	0.746	0.666	0.515	0.391	0.275	0.195	0.141	0.104	0.060	0.037	0.017	0.003	0.000
8.00	0.06153	0.986	0.946	0.886	0.811	0.730	0.647	0.495	0.371	0.258	0.182	0.131	0.096	0.056	0.034	0.015	0.002	0.000
16.00	0.03128	0.986	0.945	0.882	0.806	0.722	0.638	0.485	0.362	0.251	0.176	0.126	0.093	0.053	0.033	0.014	0.002	0.000
32.00	0.01576	0.985	0.944	0.880	0.803	0.719	0.634	0.480	0.358	0.247	0.173	0.124	0.091	0.052	0.032	0.014	0.002	0.000
64.00	0.00791	0.985	0.943	0.880	0.802	0.717	0.632	0.478	0.356	0.246	0.172	0.123	0.090	0.052	0.032	0.013	0.002	0.000
128.00	0.00396	0.985	0.943	0.879	0.801	0.716	0.631	0.477	0.355	0.245	0.171	0.123	0.090	0.051	0.032	0.013	0.002	0.000
256.00	0.00198	0.985	0.943	0.879	0.801	0.716	0.631	0.477	0.354	0.244	0.171	0.122	0.090	0.051	0.032	0.013	0.002	0.000
512.00	0.00099	0.985	0.943	0.879	0.801	0.716	0.631	0.476	0.354	0.244	0.171	0.122	0.090	0.051	0.032	0.013	0.002	0.000

TABLE VII. - Continued. CALCULATED DISTRIBUTIONS OF PARTICLE FLUX ALONG PLANES AT VARIOUS DISTANCES FROM SLOT EXIT (EQ. (11))

(b) Length to inlet-width ratio, 0.50

(b-1) Wall half-angle, 0°



Nondimensional distance from slot exit, $X_5 - L$	Nondimensional centerplane flux relative to inlet flux, M(O)	Distance from centerplane, $\frac{Y_5}{X_5 - L}$																
		.1	.2	.3	.4	.5	.6	.8	1.	1.25	1.5	1.75	2.	2.5	3.	4.	6.	8.
		Flux relative to centerplane, $M(Y_5)/M(O)$																
0.25	0.72204	0.999	0.997	0.994	0.988	0.982	0.973	0.951	0.921	0.870	0.801	0.714	0.614	0.317	0.148	0.033	0.007	0.003
0.50	0.57375	0.997	0.987	0.971	0.948	0.920	0.885	0.799	0.698	0.513	0.355	0.239	0.160	0.073	0.034	0.013	0.004	0.001
1.00	0.38014	0.992	0.970	0.933	0.885	0.829	0.744	0.573	0.424	0.281	0.184	0.121	0.080	0.036	0.021	0.009	0.003	0.001
2.00	0.21896	0.989	0.957	0.895	0.809	0.718	0.626	0.460	0.329	0.212	0.137	0.090	0.059	0.029	0.017	0.007	0.002	0.001
4.00	0.11717	0.987	0.932	0.852	0.762	0.668	0.577	0.416	0.293	0.187	0.120	0.078	0.051	0.026	0.016	0.007	0.002	0.001
8.00	0.06054	0.977	0.914	0.832	0.740	0.646	0.555	0.397	0.278	0.177	0.113	0.073	0.048	0.025	0.015	0.007	0.002	0.001
16.00	0.03076	0.969	0.905	0.822	0.730	0.636	0.545	0.389	0.272	0.172	0.110	0.071	0.046	0.025	0.015	0.006	0.002	0.001
32.00	0.01550	0.965	0.900	0.817	0.725	0.631	0.541	0.385	0.268	0.170	0.108	0.070	0.045	0.025	0.015	0.006	0.002	0.001
64.00	0.00778	0.963	0.898	0.815	0.723	0.628	0.538	0.383	0.267	0.169	0.107	0.069	0.045	0.025	0.015	0.006	0.002	0.001
128.00	0.00390	0.962	0.897	0.814	0.722	0.627	0.537	0.382	0.266	0.168	0.107	0.069	0.045	0.025	0.015	0.006	0.002	0.001
256.00	0.00195	0.961	0.896	0.813	0.721	0.627	0.536	0.381	0.266	0.168	0.107	0.069	0.045	0.024	0.015	0.006	0.002	0.001
512.00	0.00098	0.961	0.896	0.813	0.721	0.626	0.536	0.381	0.265	0.168	0.107	0.069	0.045	0.024	0.015	0.006	0.002	0.001

(b-2) Wall half-angle, 5°

0.25	0.71156	0.999	0.997	0.994	0.989	0.983	0.976	0.957	0.930	0.887	0.828	0.754	0.663	0.406	0.191	0.041	0.007	0.003
0.50	0.57276	0.997	0.988	0.974	0.954	0.928	0.896	0.818	0.723	0.574	0.404	0.273	0.183	0.082	0.037	0.013	0.003	0.001
1.00	0.38582	0.993	0.971	0.937	0.891	0.837	0.776	0.607	0.451	0.300	0.196	0.129	0.085	0.037	0.020	0.008	0.002	0.001
2.00	0.22460	0.989	0.958	0.909	0.834	0.741	0.647	0.476	0.340	0.219	0.141	0.092	0.060	0.028	0.016	0.007	0.002	0.001
4.00	0.12081	0.987	0.950	0.873	0.780	0.684	0.590	0.425	0.299	0.190	0.122	0.078	0.051	0.025	0.015	0.006	0.002	0.001
8.00	0.06257	0.986	0.933	0.849	0.755	0.658	0.565	0.404	0.282	0.178	0.113	0.073	0.047	0.024	0.014	0.006	0.002	0.001
16.00	0.03183	0.986	0.923	0.838	0.743	0.647	0.554	0.394	0.274	0.173	0.110	0.070	0.045	0.023	0.014	0.006	0.002	0.001
32.00	0.01605	0.985	0.918	0.833	0.738	0.641	0.549	0.389	0.271	0.170	0.108	0.069	0.045	0.023	0.014	0.006	0.002	0.001
64.00	0.00806	0.982	0.915	0.830	0.735	0.638	0.546	0.387	0.269	0.169	0.107	0.068	0.044	0.023	0.014	0.006	0.002	0.001
128.00	0.00404	0.981	0.914	0.829	0.734	0.637	0.545	0.386	0.268	0.168	0.107	0.068	0.044	0.023	0.014	0.006	0.002	0.001
256.00	0.00202	0.981	0.913	0.828	0.733	0.636	0.544	0.385	0.267	0.168	0.106	0.068	0.044	0.023	0.014	0.006	0.002	0.001
512.00	0.00101	0.980	0.913	0.828	0.733	0.636	0.544	0.385	0.267	0.168	0.106	0.068	0.044	0.023	0.014	0.006	0.002	0.001

(b-3) Wall half-angle, 10°

0.25	0.69649	0.999	0.998	0.995	0.990	0.985	0.978	0.960	0.937	0.899	0.850	0.787	0.710	0.528	0.265	0.056	0.007	0.003
0.50	0.56722	0.997	0.990	0.977	0.959	0.936	0.908	0.837	0.750	0.628	0.474	0.324	0.217	0.097	0.043	0.013	0.003	0.001
1.00	0.38888	0.993	0.973	0.941	0.898	0.846	0.788	0.656	0.491	0.328	0.214	0.140	0.092	0.040	0.020	0.008	0.002	0.001
2.00	0.22920	0.989	0.959	0.911	0.850	0.775	0.678	0.500	0.357	0.230	0.147	0.095	0.061	0.026	0.015	0.006	0.002	0.001
4.00	0.12405	0.987	0.951	0.895	0.807	0.707	0.610	0.439	0.308	0.195	0.124	0.079	0.051	0.023	0.014	0.006	0.002	0.001
8.00	0.06444	0.986	0.947	0.875	0.777	0.677	0.581	0.414	0.288	0.181	0.115	0.073	0.047	0.022	0.013	0.006	0.002	0.001
16.00	0.03282	0.986	0.945	0.861	0.763	0.663	0.567	0.402	0.279	0.175	0.110	0.070	0.045	0.022	0.013	0.005	0.002	0.001
32.00	0.01656	0.985	0.943	0.855	0.757	0.656	0.561	0.397	0.275	0.172	0.108	0.069	0.044	0.021	0.013	0.005	0.002	0.001
64.00	0.00832	0.985	0.940	0.852	0.753	0.653	0.558	0.394	0.273	0.171	0.107	0.068	0.043	0.021	0.013	0.005	0.002	0.001
128.00	0.00417	0.985	0.939	0.850	0.752	0.652	0.556	0.393	0.272	0.170	0.107	0.068	0.043	0.021	0.013	0.005	0.002	0.001
256.00	0.00209	0.985	0.938	0.849	0.751	0.651	0.555	0.392	0.271	0.169	0.106	0.067	0.043	0.021	0.013	0.005	0.002	0.001
512.00	0.00104	0.985	0.938	0.849	0.750	0.650	0.555	0.392	0.271	0.169	0.106	0.067	0.043	0.021	0.013	0.005	0.002	0.001

(b-4) Wall half-angle, 20°

0.25	0.66834	0.999	0.998	0.995	0.991	0.985	0.979	0.962	0.941	0.907	0.866	0.816	0.756	0.608	0.443	0.101	0.008	0.002
0.50	0.55060	0.998	0.991	0.980	0.964	0.945	0.920	0.860	0.784	0.674	0.559	0.443	0.300	0.133	0.059	0.013	0.003	0.001
1.00	0.38639	0.994	0.976	0.947	0.908	0.860	0.806	0.687	0.568	0.391	0.256	0.167	0.109	0.046	0.019	0.007	0.002	0.001
2.00	0.23210	0.990	0.961	0.915	0.857	0.789	0.718	0.553	0.396	0.254	0.162	0.104	0.067	0.027	0.013	0.006	0.002	0.001
4.00	0.12689	0.988	0.952	0.897	0.828	0.752	0.656	0.472	0.331	0.209	0.131	0.083	0.053	0.021	0.012	0.005	0.001	0.001
8.00	0.06624	0.986	0.947	0.888	0.814	0.720	0.617	0.438	0.304	0.190	0.119	0.075	0.047	0.019	0.011	0.005	0.001	0.001
16.00	0.03382	0.986	0.945	0.883	0.807	0.701	0.599	0.423	0.292	0.182	0.113	0.071	0.045	0.019	0.011	0.005	0.001	0.001
32.00	0.01709	0.985	0.944	0.881	0.799	0.692	0.590	0.416	0.286	0.178	0.111	0.069	0.044	0.018	0.011	0.005	0.001	0.001
64.00	0.00859	0.985	0.943	0.880	0.794	0.688	0.586	0.412	0.284	0.176	0.110	0.069	0.043	0.018	0.011	0.005	0.001	0.001
128.00	0.00430	0.985	0.943	0.879	0.792	0.686	0.584	0.411	0.282	0.175	0.109	0.068	0.043	0.018	0.011	0.005	0.001	0.001
256.00	0.00216	0.985	0.943	0.879	0.791	0.684	0.583	0.410	0.282	0.175	0.109	0.068	0.043	0.018	0.011	0.005	0.001	0.001
512.00	0.00108	0.985	0.943	0.879	0.791	0.684	0.582	0.409	0.281	0.174	0.108	0.068	0.042	0.018	0.011	0.005	0.001	0.001

(b-5) Wall half-angle, 30°

0.25	0.63830	0.999	0.998	0.994	0.990	0.985	0.978	0.961	0.940	0.906	0.867	0.821	0.769	0.650	0.511	0.213	0.008	0.002
0.50	0.52778	0.998	0.992	0.981	0.967	0.949	0.927	0.872	0.804	0.706	0.600	0.495	0.401	0.202	0.089	0.015	0.003	0.001
1.00	0.37641	0.994	0.978	0.951	0.916	0.872	0.821	0.709	0.592	0.460	0.326	0.212	0.138	0.059	0.024	0.006	0.002	0.001
2.00	0.22998	0.990	0.963	0.919	0.863	0.798	0.728	0.589	0.459	0.295	0.188	0.120	0.077	0.031	0.011	0.005	0.001	0.001
4.00	0.12700	0.988	0.953	0.899	0.831	0.756	0.678	0.525	0.368	0.232	0.146	0.092	0.058	0.022	0.010	0.004	0.001	0.000
8.00	0.06663	0.987	0.948	0.889	0.816	0.736	0.654	0.479	0.331	0.207	0.129	0.081	0.050	0.019	0.009	0.004	0.001	0.000
16.00	0.03410	0.986	0.945	0.884	0.808	0.725	0.642	0.458	0.315	0.196	0.121	0.076	0.047	0.017	0.009	0.004	0.001	0.000
32.00	0.01725	0.986	0.944	0.881	0.804	0.720	0.636	0.448	0.308	0.190	0.118	0.073	0.046	0.017	0.009	0.004	0.001	0.000
64.00	0.00867	0.985	0.943	0.880	0.802	0.718	0.632	0.443	0.304	0.188	0.116	0.072	0.045	0.016	0.009	0.004	0.001	0.000
128.00	0.00435	0.985	0.943	0.879	0.801	0.717	0.629	0.441	0.302	0.187	0.115	0.072	0.044	0.016	0.009	0.004	0.001	0.000
256.00	0.00218	0.985	0.943	0.879	0.801	0.716	0.627	0.440	0.301	0.186	0.115	0.071	0.044	0.016	0.009	0.004	0.001	0.000
512.00	0.00109	0.985	0.943	0.879	0.801	0.716	0.627	0.439	0.301	0.186	0.115	0.071	0.044	0.016	0.009	0.004	0.001	0.000

(b-6) Wall half-angle, 45°

0.25	0.60090	0.999	0.997	0.994	0.989	0.983	0.976	0.957	0.934	0.898	0.856	0.809	0.758	0.649	0.539	0.330	0.040	0.002
0.50	0.49453	0.998	0.992	0.981	0.967	0.949	0.927	0.874	0.811	0.723	0.628	0.534	0.444	0.297	0.199	0.041	0.002	0.001
1.00	0.35582	0.995	0.980	0.955	0.922	0.881	0.834	0.729	0.619	0.488	0.378	0.291	0.225	0.098	0.042	0.005	0.001	0.000
2.00	0.22112	0.991	0.965	0.923	0.870	0.807	0.740	0.604	0.479	0.353	0.260	0.167	0.108	0.045	0.018	0.003	0.001	0.000
4.00	0.12360	0.988	0.954	0.902	0.836	0.762	0.685	0.538	0.413	0.294	0.186	0.118	0.075	0.030	0.011	0.003	0.001	0.000
8.00	0.06526	0.987	0.949	0.890	0.818	0.738	0.657	0.506	0.382	0.253	0.159	0.100	0.063	0.025	0.008	0.003	0.001	0.000
16.00	0.03351	0.986	0.946	0.884	0.809	0.727	0.644	0.491	0.368	0.235	0.147	0.092	0.058	0.022	0.007	0.002	0.001	0.000
32.00	0.01698	0.986	0.944	0.882	0.805	0.721	0.637	0.483	0.361	0.227	0.141	0.088	0.055	0.021	0.006	0.002	0.001	0.000
64.00	0.00855	0.985	0.944	0.880	0.803	0.718	0.634	0.480	0.357	0.223	0.138	0.086	0.054	0.020	0.006	0.002	0.001	0.000
128.00	0.00429	0.985	0.943	0.879	0.801	0.717	0.632	0.478	0.355	0.221	0.137	0.086	0.054	0.020	0.006	0.002	0.001	0.000
256.00	0.00215	0.985	0.943	0.879	0.801	0.716	0.631	0.477	0.354	0.220	0.136	0.085	0.053	0.020	0.006	0.002	0.001	0.000
512.00	0.00107	0.985	0.943	0.879	0.801	0.716	0.631	0.477	0.354	0.219	0.136	0.085	0.053	0.020	0.006	0.002	0.001	0.000

(b-7) Wall half-angle, 60°

0.25	0.57469	0.999	0.997	0.993	0.988	0.982	0.974	0.953	0.928	0.889	0.844	0.794	0.739	0.627	0.517	0.338	0.128	0.023
0.50	0.46856	0.998	0.991	0.980	0.965	0.946	0.923	0.868	0.803	0.714	0.623	0.535	0.454	0.318	0.218	0.107	0.006	0.000
1.00	0.33584	0.995	0.980	0.955	0.922	0.882	0.837	0.735	0.629	0.503	0.394	0.306	0.238	0.147	0.095	0.022	0.001	0.000
2.00	0.21001	0.991	0.966	0.926	0.874	0.813	0.747	0.614	0.490	0.364	0.269	0.200	0.151	0.084	0.038	0.006	0.000	0.000
4.00	0.11832	0.988	0.955	0.904	0.839	0.766	0.690	0.543	0.419	0.300	0.216	0.157	0.117	0.053	0.023	0.002	0.000	0.000
8.00	0.06278	0.987	0.949	0.891	0.820	0.740	0.660	0.509	0.385	0.271	0.192	0.139	0.096	0.042	0.017	0.001	0.000	0.000
16.00	0.03233	0.986	0.946	0.885	0.810	0.728	0.645	0.492	0.369	0.257	0.181	0.130	0.086	0.037	0.015	0.001	0.000	0.000
32.00	0.01640	0.986	0.944	0.882	0.805	0.722	0.638	0.484	0.361	0.250	0.176	0.126	0.082	0.035	0.014	0.001	0.000	0.000
64.00	0.00826	0.985	0.944	0.880	0.803	0.719	0.634	0.480	0.357	0.247	0.173	0.122	0.079	0.034	0.014	0.001	0.000	0.000
128.00	0.00414	0.985	0.943	0.880	0.802	0.717	0.632	0.478	0.355	0.245	0.172	0.121	0.078	0.033	0.013	0.001	0.000	0.000
256.00	0.00208	0.985	0.943	0.879	0.801	0.716	0.631	0.477	0.355	0.245	0.171	0.120	0.078	0.033	0.013	0.001	0.000	0.000
512.00	0.00104	0.985	0.943	0.879	0.801	0.716	0.631	0.477	0.354	0.244	0.171	0.120	0.078	0.033	0.013	0.001	0.000	0.000

(b-8) Wall half-angle, 75°

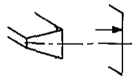
0.25	0.55916	0.999	0.997	0.993	0.987	0.981	0.972	0.951	0.924	0.883	0.835	0.782	0.726	0.608	0.495	0.315	0.130	0.062
0.50	0.45210	0.998	0.991	0.979	0.963	0.943	0.919	0.862	0.794	0.702	0.608	0.518	0.438	0.308	0.217	0.113	0.037	0.016
1.00	0.32105	0.995	0.979	0.954	0.920	0.879	0.832	0.729	0.623	0.499	0.394	0.309	0.243	0.152	0.099	0.047	0.015	0.000
2.00	0.20001	0.991	0.966	0.926	0.874	0.814	0.749	0.616	0.494	0.368	0.274	0.204	0.155	0.092	0.059	0.027	0.004	0.000
4.00	0.11292	0.989	0.956	0.905	0.840	0.768	0.692	0.547	0.422	0.303	0.218	0.160	0.119	0.070	0.044	0.020	0.001	0.000
8.00	0.06008	0.987	0.949	0.892	0.821	0.742	0.661	0.511	0.387	0.272	0.193	0.140	0.103	0.060	0.037	0.017	0.000	0.000
16.00	0.03099	0.986	0.946	0.885	0.811	0.729	0.646	0.493	0.370	0.258	0.182	0.131	0.096	0.055	0.034	0.014	0.000	0.000
32.00	0.01574	0.986	0.945	0.882	0.805	0.722	0.638	0.485	0.362	0.251	0.176	0.126	0.093	0.053	0.033	0.013	0.000	0.000
64.00	0.00793	0.985	0.944	0.880	0.803	0.719	0.634	0.480	0.358	0.247	0.173	0.124	0.091	0.052	0.032	0.013	0.000	0.000
128.00	0.00398	0.985	0.943	0.880	0.802	0.717	0.632	0.478	0.356	0.245	0.172	0.123	0.090	0.052	0.032	0.012	0.000	0.000
256.00	0.00199	0.985	0.943	0.879	0.801	0.716	0.631	0.477	0.355	0.245	0.171	0.123	0.090	0.051	0.032	0.012	0.000	0.000
512.00	0.00100	0.985	0.943	0.879	0.801	0.716	0.631	0.477	0.354	0.244	0.171	0.122	0.090	0.051	0.032	0.012	0.000	0.000

TABLE VII. - Continued. CALCULATED DISTRIBUTIONS OF PARTICLE FLUX ALONG PLANES AT VARIOUS DISTANCES

FROM SLOT EXIT (EQ. (11))

(c) Length to inlet-width ratio, 1.00

(c-1) Wall half-angle, 0°



Nondimensional distance from slot exit, $X_5 - L$	Nondimensional centerplane flux relative to inlet flux, M(O)	Distance from centerplane, $\frac{Y_5}{X_5 - L}$: .1	.2	.3	.4	.5	.6	.8	1.	1.25	1.5	1.75	2.	2.5	3.	4.	6.	8.
		Flux relative to centerplane, $M(Y_5)/M(O)$																
0.25	0.61376	0.999	0.997	0.994	0.990	0.984	0.976	0.957	0.930	0.884	0.822	0.743	0.650	0.308	0.114	0.031	0.007	0.002
0.50	0.49514	0.997	0.988	0.974	0.954	0.928	0.896	0.819	0.727	0.517	0.340	0.210	0.123	0.058	0.031	0.012	0.003	0.001
1.00	0.33747	0.993	0.973	0.940	0.898	0.847	0.750	0.560	0.395	0.241	0.139	0.091	0.063	0.033	0.019	0.008	0.002	0.001
2.00	0.20158	0.990	0.961	0.894	0.795	0.691	0.590	0.410	0.272	0.154	0.100	0.068	0.047	0.025	0.015	0.006	0.002	0.001
4.00	0.11143	0.988	0.919	0.823	0.718	0.614	0.514	0.346	0.222	0.131	0.086	0.059	0.041	0.022	0.013	0.006	0.002	0.001
8.00	0.05887	0.969	0.885	0.785	0.679	0.575	0.478	0.315	0.199	0.122	0.080	0.055	0.039	0.021	0.013	0.005	0.002	0.001
16.00	0.03031	0.953	0.867	0.766	0.660	0.556	0.459	0.300	0.188	0.117	0.077	0.053	0.037	0.020	0.012	0.005	0.002	0.001
32.00	0.01539	0.944	0.858	0.757	0.650	0.546	0.450	0.293	0.182	0.115	0.076	0.052	0.037	0.020	0.012	0.005	0.002	0.001
64.00	0.00775	0.940	0.853	0.752	0.645	0.541	0.446	0.289	0.179	0.114	0.075	0.051	0.036	0.020	0.012	0.005	0.002	0.001
128.00	0.00389	0.938	0.851	0.749	0.643	0.539	0.444	0.287	0.178	0.113	0.075	0.051	0.036	0.020	0.012	0.005	0.002	0.001
256.00	0.00195	0.937	0.850	0.748	0.642	0.538	0.442	0.287	0.177	0.113	0.075	0.051	0.036	0.020	0.012	0.005	0.002	0.001
512.00	0.00098	0.936	0.849	0.748	0.641	0.537	0.442	0.286	0.177	0.113	0.075	0.051	0.036	0.020	0.012	0.005	0.002	0.001

(c-2) Wall half-angle, 5°

0.25	0.59609	1.000	0.998	0.996	0.992	0.988	0.982	0.968	0.949	0.916	0.873	0.816	0.744	0.529	0.226	0.042	0.007	0.003
0.50	0.49385	0.998	0.991	0.980	0.964	0.943	0.918	0.854	0.775	0.659	0.453	0.290	0.175	0.068	0.035	0.013	0.003	0.001
1.00	0.34743	0.994	0.976	0.947	0.908	0.862	0.809	0.637	0.458	0.283	0.166	0.098	0.066	0.034	0.019	0.008	0.002	0.001
2.00	0.21164	0.990	0.963	0.920	0.850	0.744	0.638	0.447	0.298	0.170	0.101	0.068	0.047	0.025	0.015	0.006	0.002	0.001
4.00	0.11811	0.988	0.954	0.867	0.758	0.649	0.545	0.367	0.235	0.130	0.085	0.057	0.040	0.022	0.013	0.005	0.002	0.001
8.00	0.06269	0.987	0.926	0.822	0.712	0.602	0.500	0.330	0.208	0.119	0.078	0.053	0.037	0.020	0.012	0.005	0.002	0.001
16.00	0.03235	0.986	0.905	0.800	0.688	0.580	0.479	0.312	0.195	0.114	0.075	0.051	0.036	0.019	0.012	0.005	0.001	0.001
32.00	0.01644	0.985	0.894	0.788	0.677	0.568	0.468	0.304	0.188	0.111	0.073	0.050	0.035	0.019	0.011	0.005	0.001	0.001
64.00	0.00829	0.980	0.889	0.782	0.671	0.563	0.463	0.300	0.185	0.110	0.072	0.049	0.035	0.019	0.011	0.005	0.001	0.001
128.00	0.00416	0.977	0.886	0.780	0.668	0.560	0.460	0.297	0.184	0.109	0.072	0.049	0.035	0.019	0.011	0.005	0.001	0.001
256.00	0.00208	0.976	0.885	0.778	0.667	0.558	0.459	0.296	0.183	0.109	0.072	0.049	0.035	0.019	0.011	0.005	0.001	0.001
512.00	0.00104	0.975	0.884	0.777	0.666	0.558	0.458	0.296	0.182	0.109	0.072	0.049	0.034	0.019	0.011	0.005	0.001	0.001

(c-3) Wall half-angle, 10°

0.25	0.57008	1.000	0.998	0.996	0.994	0.990	0.986	0.974	0.960	0.936	0.905	0.866	0.817	0.683	0.477	0.066	0.009	0.003
0.50	0.48284	0.998	0.993	0.984	0.972	0.956	0.936	0.886	0.821	0.723	0.617	0.430	0.272	0.090	0.042	0.014	0.003	0.001
1.00	0.35084	0.995	0.979	0.954	0.920	0.878	0.830	0.724	0.554	0.352	0.210	0.118	0.071	0.035	0.019	0.008	0.002	0.001
2.00	0.21870	0.991	0.965	0.924	0.871	0.810	0.708	0.502	0.338	0.194	0.104	0.067	0.046	0.024	0.014	0.006	0.002	0.001
4.00	0.12347	0.989	0.956	0.905	0.816	0.700	0.589	0.398	0.256	0.139	0.082	0.055	0.038	0.020	0.012	0.005	0.001	0.001
8.00	0.06591	0.987	0.950	0.875	0.758	0.642	0.534	0.352	0.222	0.117	0.075	0.050	0.035	0.019	0.011	0.005	0.001	0.001
16.00	0.03410	0.986	0.947	0.847	0.730	0.614	0.507	0.331	0.206	0.109	0.071	0.048	0.034	0.018	0.011	0.005	0.001	0.001
32.00	0.01735	0.986	0.945	0.833	0.715	0.600	0.494	0.320	0.198	0.107	0.069	0.047	0.033	0.018	0.010	0.004	0.001	0.001
64.00	0.00876	0.985	0.939	0.826	0.708	0.594	0.488	0.315	0.194	0.105	0.069	0.046	0.033	0.018	0.010	0.004	0.001	0.001
128.00	0.00440	0.985	0.936	0.823	0.705	0.590	0.485	0.313	0.192	0.105	0.068	0.046	0.032	0.017	0.010	0.004	0.001	0.001
256.00	0.00220	0.985	0.934	0.821	0.703	0.588	0.483	0.311	0.191	0.104	0.068	0.046	0.032	0.017	0.010	0.004	0.001	0.001
512.00	0.00110	0.985	0.933	0.820	0.702	0.588	0.482	0.311	0.191	0.104	0.068	0.046	0.032	0.017	0.010	0.004	0.001	0.001

(c-4) Wall half-angle, 20°

0.25	0.52368	1.000	0.999	0.997	0.995	0.991	0.988	0.978	0.966	0.947	0.924	0.896	0.864	0.784	0.676	0.327	0.013	0.003
0.50	0.45235	0.999	0.995	0.988	0.979	0.967	0.953	0.916	0.869	0.796	0.709	0.614	0.521	0.224	0.068	0.017	0.004	0.001
1.00	0.34186	0.996	0.984	0.963	0.936	0.901	0.861	0.767	0.664	0.526	0.329	0.194	0.107	0.038	0.020	0.008	0.002	0.001
2.00	0.22071	0.992	0.969	0.931	0.883	0.826	0.764	0.631	0.434	0.255	0.141	0.072	0.045	0.023	0.013	0.005	0.001	0.001
4.00	0.12703	0.989	0.958	0.908	0.846	0.776	0.691	0.472	0.307	0.170	0.086	0.052	0.035	0.018	0.011	0.004	0.001	0.001
8.00	0.06845	0.987	0.951	0.895	0.825	0.732	0.610	0.405	0.256	0.136	0.069	0.046	0.032	0.017	0.010	0.004	0.001	0.000
16.00	0.03558	0.986	0.947	0.887	0.813	0.692	0.572	0.374	0.233	0.121	0.065	0.043	0.030	0.016	0.009	0.004	0.001	0.000
32.00	0.01815	0.986	0.945	0.883	0.800	0.672	0.554	0.359	0.222	0.114	0.063	0.042	0.029	0.015	0.009	0.004	0.001	0.000
64.00	0.00917	0.985	0.944	0.881	0.790	0.662	0.545	0.352	0.217	0.111	0.062	0.041	0.029	0.015	0.009	0.004	0.001	0.000
128.00	0.00461	0.985	0.943	0.880	0.785	0.658	0.540	0.348	0.214	0.109	0.061	0.041	0.028	0.015	0.009	0.004	0.001	0.000
256.00	0.00231	0.985	0.943	0.879	0.783	0.655	0.538	0.347	0.213	0.109	0.061	0.041	0.028	0.015	0.009	0.004	0.001	0.000
512.00	0.00116	0.985	0.943	0.879	0.782	0.654	0.537	0.346	0.212	0.108	0.061	0.041	0.028	0.015	0.009	0.004	0.001	0.000

(c-5) Wall half-angle, 30^{o}

0.25	0.47817	1.000	0.999	0.997	0.994	0.991	0.988	0.978	0.966	0.948	0.926	0.900	0.872	0.807	0.732	0.545	0.026	0.004
0.50	0.41564	0.999	0.995	0.990	0.982	0.971	0.959	0.928	0.889	0.831	0.763	0.687	0.604	0.444	0.229	0.022	0.004	0.001
1.00	0.32156	0.997	0.986	0.970	0.947	0.918	0.883	0.802	0.709	0.590	0.479	0.351	0.209	0.059	0.021	0.007	0.002	0.001
2.00	0.21386	0.993	0.972	0.938	0.893	0.841	0.782	0.659	0.541	0.366	0.212	0.116	0.057	0.021	0.012	0.005	0.001	0.000
4.00	0.12548	0.990	0.959	0.912	0.853	0.785	0.713	0.572	0.395	0.224	0.120	0.057	0.032	0.016	0.009	0.004	0.001	0.000
8.00	0.06828	0.988	0.952	0.897	0.828	0.752	0.674	0.492	0.316	0.172	0.087	0.041	0.027	0.014	0.008	0.003	0.001	0.000
16.00	0.03567	0.986	0.948	0.888	0.815	0.734	0.653	0.446	0.281	0.150	0.073	0.038	0.026	0.013	0.008	0.003	0.001	0.000
32.00	0.01824	0.986	0.945	0.884	0.808	0.725	0.642	0.424	0.265	0.140	0.067	0.036	0.025	0.013	0.007	0.003	0.001	0.000
64.00	0.00922	0.986	0.944	0.881	0.804	0.720	0.635	0.413	0.258	0.135	0.064	0.036	0.024	0.013	0.007	0.003	0.001	0.000
128.00	0.00464	0.985	0.943	0.880	0.802	0.718	0.628	0.408	0.254	0.132	0.063	0.035	0.024	0.012	0.007	0.003	0.001	0.000
256.00	0.00233	0.985	0.943	0.879	0.801	0.717	0.625	0.406	0.252	0.131	0.062	0.035	0.024	0.012	0.007	0.003	0.001	0.000
512.00	0.00116	0.985	0.943	0.879	0.801	0.716	0.623	0.404	0.251	0.130	0.061	0.035	0.024	0.012	0.007	0.003	0.001	0.000

(c-6) Wall half-angle, 45^{o}

0.25	0.42695	1.000	0.998	0.997	0.994	0.991	0.986	0.976	0.963	0.943	0.919	0.893	0.863	0.797	0.726	0.582	0.313	0.012
0.50	0.36966	0.999	0.995	0.990	0.981	0.971	0.959	0.929	0.892	0.838	0.778	0.714	0.649	0.519	0.396	0.220	0.004	0.001
1.00	0.28864	0.997	0.988	0.973	0.952	0.927	0.897	0.826	0.746	0.639	0.534	0.438	0.357	0.237	0.079	0.007	0.001	0.000
2.00	0.19683	0.994	0.975	0.945	0.905	0.857	0.803	0.687	0.572	0.444	0.342	0.263	0.153	0.041	0.010	0.003	0.001	0.000
4.00	0.11811	0.990	0.962	0.917	0.860	0.795	0.726	0.587	0.464	0.341	0.222	0.123	0.064	0.013	0.007	0.003	0.001	0.000
8.00	0.06510	0.988	0.953	0.900	0.832	0.758	0.680	0.533	0.409	0.276	0.153	0.080	0.037	0.010	0.006	0.002	0.001	0.000
16.00	0.03423	0.987	0.948	0.890	0.817	0.737	0.656	0.505	0.381	0.232	0.126	0.063	0.026	0.010	0.005	0.002	0.001	0.000
32.00	0.01756	0.986	0.946	0.884	0.809	0.727	0.643	0.491	0.367	0.213	0.114	0.056	0.022	0.009	0.005	0.002	0.001	0.000
64.00	0.00889	0.986	0.944	0.882	0.805	0.721	0.637	0.483	0.360	0.204	0.108	0.052	0.020	0.009	0.005	0.002	0.001	0.000
128.00	0.00448	0.985	0.944	0.880	0.803	0.718	0.634	0.480	0.357	0.199	0.105	0.050	0.019	0.009	0.005	0.002	0.001	0.000
256.00	0.00224	0.985	0.943	0.879	0.801	0.717	0.632	0.478	0.355	0.197	0.104	0.050	0.018	0.009	0.005	0.002	0.001	0.000
512.00	0.00112	0.985	0.943	0.879	0.801	0.716	0.631	0.477	0.354	0.196	0.103	0.049	0.018	0.009	0.005	0.002	0.001	0.000

(c-7) Wall half-angle, 60^{o}

0.25	0.39443	1.000	0.998	0.996	0.993	0.990	0.985	0.974	0.960	0.938	0.913	0.884	0.852	0.782	0.707	0.560	0.328	0.189
0.50	0.33873	0.999	0.995	0.989	0.980	0.969	0.956	0.924	0.885	0.829	0.767	0.703	0.639	0.517	0.412	0.254	0.095	0.001
1.00	0.26289	0.997	0.988	0.972	0.952	0.926	0.896	0.827	0.749	0.648	0.551	0.462	0.384	0.261	0.179	0.080	0.001	0.000
2.00	0.18011	0.994	0.976	0.947	0.909	0.863	0.812	0.702	0.590	0.465	0.361	0.280	0.218	0.136	0.069	0.003	0.000	0.000
4.00	0.10938	0.991	0.963	0.921	0.866	0.802	0.735	0.599	0.476	0.352	0.260	0.194	0.147	0.066	0.016	0.002	0.000	0.000
8.00	0.06085	0.988	0.954	0.902	0.836	0.762	0.685	0.539	0.415	0.297	0.214	0.156	0.113	0.035	0.004	0.001	0.000	0.000
16.00	0.03216	0.987	0.949	0.891	0.819	0.739	0.659	0.508	0.384	0.270	0.192	0.139	0.087	0.024	0.003	0.001	0.000	0.000
32.00	0.01654	0.986	0.946	0.885	0.810	0.728	0.645	0.492	0.369	0.257	0.181	0.130	0.076	0.019	0.003	0.001	0.000	0.000
64.00	0.00839	0.986	0.944	0.882	0.805	0.722	0.638	0.484	0.361	0.250	0.176	0.124	0.070	0.017	0.003	0.001	0.000	0.000
128.00	0.00422	0.985	0.944	0.880	0.803	0.719	0.634	0.480	0.357	0.247	0.173	0.120	0.068	0.016	0.003	0.001	0.000	0.000
256.00	0.00212	0.985	0.943	0.880	0.802	0.717	0.632	0.478	0.355	0.245	0.172	0.119	0.067	0.015	0.003	0.001	0.000	0.000
512.00	0.00106	0.985	0.943	0.879	0.801	0.716	0.631	0.477	0.355	0.245	0.171	0.118	0.066	0.015	0.003	0.001	0.000	0.000

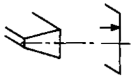
(c-8) Wall half-angle, 75^{o}

0.25	0.37642	1.000	0.998	0.996	0.993	0.989	0.984	0.972	0.957	0.935	0.908	0.877	0.844	0.770	0.693	0.541	0.308	0.176
0.50	0.32118	0.999	0.995	0.988	0.979	0.968	0.954	0.920	0.879	0.820	0.756	0.690	0.623	0.500	0.395	0.244	0.102	0.049
1.00	0.24712	0.997	0.987	0.971	0.950	0.923	0.892	0.820	0.741	0.638	0.541	0.454	0.379	0.263	0.185	0.096	0.033	0.013
2.00	0.16817	0.994	0.976	0.946	0.908	0.862	0.811	0.700	0.591	0.468	0.366	0.286	0.224	0.141	0.092	0.044	0.011	0.000
4.00	0.10213	0.991	0.964	0.921	0.867	0.805	0.738	0.603	0.482	0.358	0.265	0.198	0.150	0.090	0.057	0.027	0.000	0.000
8.00	0.05702	0.988	0.955	0.903	0.837	0.764	0.688	0.543	0.419	0.300	0.216	0.158	0.116	0.069	0.043	0.020	0.000	0.000
16.00	0.03023	0.987	0.949	0.891	0.820	0.741	0.660	0.510	0.386	0.272	0.193	0.140	0.103	0.060	0.037	0.016	0.000	0.000
32.00	0.01557	0.986	0.946	0.885	0.810	0.728	0.646	0.493	0.370	0.258	0.182	0.131	0.096	0.055	0.034	0.013	0.000	0.000
64.00	0.00791	0.986	0.945	0.882	0.805	0.722	0.638	0.485	0.362	0.251	0.176	0.126	0.093	0.053	0.033	0.011	0.000	0.000
128.00	0.00398	0.985	0.944	0.880	0.803	0.719	0.634	0.480	0.358	0.247	0.173	0.124	0.091	0.052	0.032	0.011	0.000	0.000
256.00	0.00200	0.985	0.943	0.880	0.802	0.717	0.632	0.478	0.356	0.245	0.172	0.123	0.090	0.052	0.032	0.010	0.000	0.000
512.00	0.00100	0.985	0.943	0.879	0.801	0.716	0.631	0.477	0.355	0.245	0.171	0.123	0.090	0.051	0.032	0.010	0.000	0.000

TABLE VII. - Continued. CALCULATED DISTRIBUTIONS OF PARTICLE FLUX ALONG PLANES AT VARIOUS DISTANCES FROM SLOT EXIT (EQ. (11))

(d) Length to inlet-width ratio, 2.00

(d-1) Wall half-angle, 0^{o}



Nondimensional distance from slot exit, $X_5 - L$	Nondimensional centerplane flux relative to inlet flux, M(O)	Distance from centerplane, $\frac{Y_5}{X_5 - L}$: .1	.2	.3	.4	.5	.6	.8	1.	1.25	1.5	1.75	2.	2.5	3.	4.	6.	8.
		Flux relative to centerplane, $M(Y_5)/M(O)$																
0.25	0.48806	0.999	0.998	0.995	0.991	0.986	0.979	0.962	0.938	0.896	0.840	0.768	0.684	0.258	0.104	0.029	0.006	0.002
0.50	0.40032	0.997	0.990	0.977	0.959	0.936	0.908	0.838	0.756	0.497	0.280	0.172	0.111	0.052	0.028	0.011	0.003	0.001
1.00	0.28188	0.994	0.976	0.948	0.910	0.866	0.746	0.514	0.316	0.190	0.120	0.080	0.055	0.029	0.017	0.007	0.002	0.001
2.00	0.17626	0.991	0.966	0.887	0.760	0.632	0.509	0.310	0.205	0.128	0.083	0.056	0.040	0.021	0.013	0.005	0.002	0.001
4.00	0.10206	0.989	0.894	0.763	0.630	0.502	0.385	0.246	0.165	0.104	0.069	0.047	0.033	0.018	0.011	0.005	0.001	0.001
8.00	0.05591	0.953	0.828	0.693	0.559	0.433	0.332	0.217	0.147	0.093	0.061	0.042	0.030	0.016	0.010	0.004	0.001	0.001
16.00	0.02946	0.921	0.792	0.655	0.520	0.396	0.309	0.203	0.138	0.088	0.058	0.040	0.028	0.015	0.009	0.004	0.001	0.000
32.00	0.01516	0.904	0.774	0.635	0.501	0.377	0.298	0.196	0.133	0.085	0.056	0.038	0.027	0.015	0.009	0.004	0.001	0.000
64.00	0.00769	0.895	0.764	0.625	0.490	0.367	0.292	0.193	0.131	0.083	0.055	0.038	0.027	0.015	0.009	0.004	0.001	0.000
128.00	0.00388	0.891	0.759	0.620	0.485	0.363	0.289	0.191	0.130	0.083	0.055	0.038	0.027	0.015	0.009	0.004	0.001	0.000
256.00	0.00195	0.889	0.757	0.618	0.483	0.360	0.288	0.190	0.129	0.082	0.054	0.037	0.026	0.014	0.009	0.004	0.001	0.000
512.00	0.00097	0.888	0.755	0.616	0.481	0.359	0.287	0.190	0.129	0.082	0.054	0.037	0.026	0.014	0.009	0.004	0.001	0.000

(d-2) Wall half-angle, 5^{o}

0.25	0.46329	1.000	0.999	0.997	0.995	0.992	0.989	0.979	0.967	0.947	0.920	0.885	0.839	0.709	0.379	0.057	0.009	0.003
0.50	0.39845	0.998	0.994	0.986	0.975	0.961	0.943	0.897	0.838	0.748	0.582	0.343	0.186	0.077	0.038	0.013	0.003	0.001
1.00	0.29682	0.995	0.982	0.959	0.929	0.891	0.848	0.708	0.477	0.249	0.150	0.095	0.064	0.032	0.018	0.007	0.002	0.001
2.00	0.19224	0.992	0.969	0.933	0.887	0.760	0.627	0.390	0.232	0.140	0.089	0.060	0.041	0.022	0.013	0.005	0.002	0.001
4.00	0.11328	0.990	0.961	0.866	0.725	0.587	0.459	0.265	0.174	0.108	0.070	0.047	0.033	0.018	0.011	0.005	0.001	0.001
8.00	0.06263	0.988	0.918	0.776	0.632	0.497	0.375	0.227	0.150	0.094	0.061	0.042	0.029	0.016	0.009	0.004	0.001	0.001
16.00	0.03317	0.987	0.873	0.728	0.584	0.450	0.332	0.209	0.139	0.087	0.057	0.039	0.028	0.015	0.009	0.004	0.001	0.000
32.00	0.01711	0.986	0.849	0.703	0.559	0.427	0.311	0.200	0.134	0.084	0.055	0.038	0.027	0.014	0.009	0.004	0.001	0.000
64.00	0.00869	0.976	0.837	0.690	0.547	0.415	0.304	0.196	0.131	0.083	0.054	0.037	0.026	0.014	0.008	0.004	0.001	0.000
128.00	0.00438	0.970	0.831	0.684	0.540	0.409	0.300	0.194	0.130	0.082	0.054	0.037	0.026	0.014	0.008	0.004	0.001	0.000
256.00	0.00220	0.967	0.828	0.681	0.537	0.406	0.298	0.193	0.129	0.081	0.053	0.037	0.026	0.014	0.008	0.004	0.001	0.000
512.00	0.00110	0.966	0.827	0.679	0.536	0.404	0.297	0.192	0.129	0.081	0.053	0.036	0.026	0.014	0.008	0.004	0.001	0.000

(d-3) Wall half-angle, 10^{o}

0.25	0.42686	1.000	0.999	0.998	0.997	0.995	0.993	0.987	0.979	0.967	0.952	0.934	0.911	0.849	0.756	0.251	0.014	0.004
0.50	0.37894	0.999	0.996	0.992	0.985	0.976	0.965	0.937	0.900	0.839	0.763	0.678	0.517	0.145	0.060	0.018	0.004	0.002
1.00	0.29705	0.997	0.987	0.970	0.947	0.918	0.883	0.802	0.712	0.449	0.224	0.126	0.080	0.038	0.020	0.008	0.002	0.001
2.00	0.20037	0.993	0.973	0.941	0.899	0.849	0.795	0.533	0.313	0.161	0.099	0.064	0.044	0.022	0.013	0.005	0.002	0.001
4.00	0.12063	0.990	0.963	0.919	0.859	0.709	0.566	0.326	0.187	0.112	0.071	0.047	0.033	0.017	0.010	0.004	0.001	0.001
8.00	0.06741	0.988	0.955	0.891	0.736	0.587	0.452	0.239	0.154	0.094	0.061	0.041	0.029	0.015	0.009	0.004	0.001	0.000
16.00	0.03590	0.987	0.950	0.828	0.672	0.525	0.395	0.215	0.140	0.086	0.056	0.038	0.026	0.014	0.008	0.004	0.001	0.000
32.00	0.01857	0.986	0.947	0.796	0.640	0.495	0.367	0.204	0.133	0.083	0.054	0.036	0.025	0.014	0.008	0.003	0.001	0.000
64.00	0.00945	0.986	0.938	0.779	0.623	0.479	0.353	0.199	0.130	0.081	0.052	0.035	0.025	0.013	0.008	0.003	0.001	0.000
128.00	0.00477	0.985	0.930	0.771	0.615	0.471	0.346	0.196	0.129	0.080	0.052	0.035	0.025	0.013	0.008	0.003	0.001	0.000
256.00	0.00240	0.985	0.926	0.767	0.611	0.468	0.343	0.195	0.128	0.079	0.052	0.035	0.025	0.013	0.008	0.003	0.001	0.000
512.00	0.00120	0.985	0.924	0.765	0.609	0.466	0.341	0.194	0.127	0.079	0.051	0.035	0.024	0.013	0.008	0.003	0.001	0.000

(d-4) Wall half-angle, 20^{o}

0.25	0.36843	1.000	0.999	0.999	0.998	0.996	0.995	0.990	0.985	0.976	0.966	0.954	0.940	0.906	0.865	0.750	0.067	0.007
0.50	0.33453	0.999	0.998	0.995	0.991	0.985	0.979	0.962	0.941	0.907	0.865	0.815	0.754	0.612	0.327	0.034	0.005	0.002
1.00	0.27580	0.998	0.991	0.981	0.966	0.947	0.924	0.866	0.796	0.696	0.596	0.377	0.173	0.055	0.026	0.009	0.002	0.001
2.00	0.19689	0.995	0.979	0.953	0.918	0.876	0.828	0.724	0.592	0.306	0.127	0.076	0.049	0.024	0.013	0.005	0.001	0.001
4.00	0.12279	0.991	0.966	0.926	0.875	0.815	0.751	0.512	0.284	0.124	0.074	0.048	0.032	0.016	0.009	0.004	0.001	0.000
8.00	0.06987	0.989	0.957	0.907	0.844	0.774	0.623	0.355	0.169	0.095	0.059	0.039	0.026	0.014	0.008	0.003	0.001	0.000
16.00	0.03755	0.987	0.951	0.895	0.825	0.689	0.533	0.285	0.142	0.084	0.053	0.035	0.024	0.013	0.007	0.003	0.001	0.000
32.00	0.01952	0.986	0.947	0.887	0.812	0.641	0.489	0.253	0.133	0.079	0.050	0.033	0.023	0.012	0.007	0.003	0.001	0.000
64.00	0.00996	0.986	0.945	0.883	0.786	0.617	0.468	0.237	0.128	0.076	0.048	0.032	0.022	0.012	0.007	0.003	0.001	0.000
128.00	0.00503	0.985	0.944	0.881	0.774	0.605	0.457	0.229	0.126	0.075	0.048	0.032	0.022	0.012	0.007	0.003	0.001	0.000
256.00	0.00253	0.985	0.943	0.880	0.768	0.600	0.452	0.225	0.125	0.075	0.047	0.032	0.022	0.012	0.007	0.003	0.001	0.000
512.00	0.00127	0.985	0.943	0.879	0.765	0.597	0.449	0.223	0.124	0.074	0.047	0.031	0.022	0.012	0.007	0.003	0.001	0.000

(d-5) Wall half-angle, 30^{o}

0.25	0.31790	1.000	0.999	0.999	0.998	0.996	0.995	0.991	0.986	0.978	0.968	0.957	0.945	0.915	0.881	0.799	0.588	0.038
0.50	0.29046	0.999	0.998	0.996	0.992	0.988	0.982	0.969	0.951	0.925	0.894	0.858	0.818	0.726	0.617	0.323	0.008	0.002
1.00	0.24495	0.998	0.994	0.985	0.974	0.960	0.943	0.900	0.848	0.770	0.683	0.594	0.510	0.208	0.042	0.011	0.002	0.001
2.00	0.18195	0.996	0.983	0.962	0.933	0.898	0.858	0.765	0.665	0.546	0.376	0.167	0.063	0.026	0.013	0.005	0.001	0.000
4.00	0.11732	0.992	0.969	0.933	0.885	0.830	0.770	0.645	0.523	0.249	0.084	0.050	0.032	0.015	0.008	0.003	0.001	0.000
8.00	0.06800	0.989	0.959	0.911	0.850	0.782	0.710	0.559	0.309	0.113	0.058	0.036	0.024	0.012	0.007	0.003	0.001	0.000
16.00	0.03685	0.988	0.952	0.897	0.828	0.752	0.673	0.439	0.224	0.082	0.049	0.031	0.021	0.011	0.006	0.003	0.001	0.000
32.00	0.01926	0.986	0.948	0.888	0.815	0.735	0.653	0.385	0.187	0.075	0.045	0.029	0.020	0.010	0.006	0.002	0.001	0.000
64.00	0.00985	0.986	0.945	0.884	0.808	0.725	0.642	0.359	0.169	0.072	0.044	0.028	0.019	0.010	0.006	0.002	0.001	0.000
128.00	0.00498	0.986	0.944	0.881	0.804	0.720	0.630	0.347	0.160	0.070	0.043	0.028	0.019	0.010	0.006	0.002	0.001	0.000
256.00	0.00251	0.985	0.943	0.880	0.802	0.718	0.622	0.340	0.156	0.070	0.042	0.027	0.019	0.010	0.006	0.002	0.001	0.000
512.00	0.00126	0.985	0.943	0.879	0.801	0.717	0.618	0.337	0.154	0.069	0.042	0.027	0.019	0.010	0.006	0.002	0.001	0.000

(d-6) Wall half-angle, 45^{o}

0.25	0.26696	1.000	0.999	0.999	0.998	0.996	0.995	0.991	0.985	0.977	0.967	0.956	0.943	0.913	0.879	0.800	0.626	0.463
0.50	0.24350	1.000	0.998	0.996	0.992	0.988	0.982	0.969	0.952	0.927	0.897	0.864	0.826	0.750	0.669	0.511	0.246	0.003
1.00	0.20654	0.999	0.994	0.987	0.977	0.964	0.949	0.913	0.868	0.805	0.736	0.665	0.592	0.455	0.339	0.025	0.002	0.001
2.00	0.15710	0.996	0.986	0.968	0.945	0.915	0.881	0.802	0.714	0.602	0.497	0.406	0.331	0.120	0.017	0.004	0.001	0.000
4.00	0.10466	0.993	0.973	0.941	0.898	0.847	0.792	0.673	0.558	0.432	0.332	0.199	0.072	0.015	0.007	0.002	0.001	0.000
8.00	0.06207	0.990	0.961	0.916	0.858	0.792	0.722	0.584	0.461	0.339	0.171	0.053	0.022	0.010	0.005	0.002	0.000	0.000
16.00	0.03409	0.988	0.953	0.899	0.832	0.757	0.680	0.532	0.409	0.246	0.093	0.028	0.017	0.008	0.004	0.002	0.000	0.000
32.00	0.01791	0.987	0.948	0.890	0.817	0.737	0.656	0.505	0.381	0.194	0.062	0.025	0.016	0.007	0.004	0.002	0.000	0.000
64.00	0.00919	0.986	0.946	0.884	0.809	0.727	0.644	0.491	0.368	0.170	0.049	0.023	0.015	0.007	0.004	0.001	0.000	0.000
128.00	0.00466	0.986	0.944	0.882	0.805	0.721	0.637	0.483	0.361	0.159	0.043	0.022	0.014	0.007	0.004	0.001	0.000	0.000
256.00	0.00234	0.985	0.944	0.880	0.803	0.718	0.634	0.480	0.357	0.153	0.040	0.022	0.014	0.007	0.004	0.001	0.000	0.000
512.00	0.00118	0.985	0.943	0.879	0.802	0.717	0.632	0.478	0.355	0.151	0.038	0.022	0.014	0.007	0.004	0.001	0.000	0.000

(d-7) Wall half-angle, 60^{o}

0.25	0.23718	1.000	0.999	0.999	0.997	0.996	0.994	0.990	0.984	0.976	0.965	0.953	0.940	0.908	0.872	0.790	0.613	0.455
0.50	0.21539	0.999	0.998	0.995	0.992	0.987	0.981	0.967	0.950	0.923	0.893	0.858	0.821	0.742	0.661	0.509	0.287	0.156
1.00	0.18182	0.999	0.994	0.987	0.976	0.964	0.948	0.911	0.866	0.804	0.736	0.668	0.601	0.478	0.375	0.224	0.020	0.001
2.00	0.13834	0.997	0.986	0.969	0.946	0.918	0.886	0.810	0.728	0.623	0.525	0.436	0.360	0.244	0.169	0.028	0.001	0.000
4.00	0.09316	0.994	0.975	0.944	0.904	0.856	0.803	0.690	0.577	0.453	0.351	0.272	0.212	0.133	0.034	0.002	0.000	0.000
8.00	0.05601	0.990	0.963	0.919	0.863	0.799	0.731	0.594	0.472	0.349	0.258	0.193	0.146	0.037	0.004	0.001	0.000	0.000
16.00	0.03104	0.988	0.954	0.901	0.835	0.761	0.684	0.538	0.414	0.296	0.213	0.156	0.104	0.007	0.003	0.001	0.000	0.000
32.00	0.01639	0.987	0.949	0.891	0.819	0.739	0.659	0.508	0.384	0.270	0.192	0.139	0.069	0.006	0.003	0.001	0.000	0.000
64.00	0.00843	0.986	0.946	0.885	0.810	0.728	0.645	0.492	0.369	0.257	0.181	0.130	0.055	0.005	0.002	0.001	0.000	0.000
128.00	0.00428	0.986	0.944	0.882	0.805	0.722	0.638	0.484	0.361	0.250	0.176	0.122	0.048	0.005	0.002	0.001	0.000	0.000
256.00	0.00215	0.985	0.944	0.880	0.803	0.719	0.634	0.480	0.357	0.247	0.173	0.116	0.045	0.005	0.002	0.001	0.000	0.000
512.00	0.00108	0.985	0.943	0.880	0.802	0.717	0.632	0.478	0.355	0.245	0.172	0.114	0.043	0.005	0.002	0.001	0.000	0.000

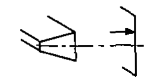
(d-8) Wall half-angle, 75^{o}

0.25	0.22133	1.000	0.999	0.999	0.997	0.996	0.994	0.989	0.984	0.975	0.964	0.951	0.937	0.904	0.867	0.782	0.600	0.440
0.50	0.20031	0.999	0.998	0.995	0.991	0.986	0.981	0.966	0.948	0.920	0.888	0.853	0.814	0.733	0.650	0.496	0.277	0.158
1.00	0.16822	0.998	0.994	0.986	0.976	0.962	0.946	0.908	0.862	0.797	0.728	0.659	0.591	0.468	0.367	0.226	0.094	0.045
2.00	0.12724	0.996	0.986	0.969	0.945	0.916	0.883	0.807	0.724	0.619	0.522	0.436	0.362	0.251	0.176	0.092	0.032	0.004
4.00	0.08543	0.994	0.974	0.944	0.904	0.857	0.804	0.692	0.581	0.458	0.358	0.279	0.219	0.137	0.090	0.043	0.005	0.000
8.00	0.05147	0.991	0.963	0.920	0.865	0.802	0.734	0.599	0.478	0.355	0.263	0.197	0.149	0.089	0.057	0.026	0.000	0.000
16.00	0.02864	0.988	0.954	0.902	0.837	0.763	0.687	0.541	0.418	0.299	0.216	0.158	0.118	0.069	0.043	0.020	0.000	0.000
32.00	0.01517	0.987	0.949	0.891	0.820	0.741	0.660	0.510	0.386	0.271	0.193	0.140	0.103	0.060	0.037	0.015	0.000	0.000
64.00	0.00781	0.986	0.946	0.885	0.810	0.728	0.646	0.493	0.370	0.258	0.182	0.131	0.096	0.055	0.034	0.010	0.000	0.000
128.00	0.00397	0.986	0.945	0.882	0.805	0.722	0.638	0.485	0.362	0.251	0.176	0.126	0.093	0.053	0.033	0.008	0.000	0.000
256.00	0.00200	0.985	0.944	0.880	0.803	0.719	0.634	0.480	0.358	0.247	0.173	0.124	0.091	0.052	0.032	0.007	0.000	0.000
512.00	0.00100	0.985	0.943	0.880	0.802	0.717	0.632	0.478	0.356	0.246	0.172	0.123	0.090	0.052	0.032	0.006	0.000	0.000

TABLE VII. - Continued. CALCULATED DISTRIBUTIONS OF PARTICLE FLUX ALONG PLANES AT VARIOUS DISTANCES FROM SLOT EXIT (EQ. (11))

(e) Length to inlet-width ratio, 4.00

(e-1) Wall half-angle, 0°



Nondimensional distance from slot exit, $X_5 - L$	Nondimensional centerplane flux relative to inlet flux, M(O)	Distance from centerplane, $\frac{Y_5}{X_5 - L}$																
		.1	.2	.3	.4	.5	.6	.8	1.	1.25	1.5	1.75	2.	2.5	3.	4.	6.	8.
		Flux relative to centerplane, $M(Y_5)/M(O)$																
0.25	0.36128	0.999	0.998	0.995	0.992	0.987	0.981	0.965	0.944	0.906	0.855	0.790	0.714	0.231	0.095	0.026	0.006	0.002
0.50	0.30124	0.998	0.991	0.979	0.963	0.943	0.917	0.855	0.782	0.432	0.247	0.153	0.099	0.047	0.025	0.010	0.003	0.001
1.00	0.21932	0.995	0.979	0.955	0.922	0.883	0.719	0.422	0.270	0.164	0.104	0.069	0.048	0.025	0.014	0.006	0.002	0.001
2.00	0.14422	0.993	0.972	0.867	0.685	0.506	0.392	0.252	0.168	0.105	0.069	0.047	0.033	0.018	0.010	0.004	0.001	0.001
4.00	0.08846	0.991	0.844	0.648	0.469	0.363	0.289	0.189	0.128	0.081	0.053	0.036	0.026	0.014	0.008	0.004	0.001	0.000
8.00	0.05105	0.923	0.719	0.514	0.382	0.300	0.241	0.159	0.108	0.069	0.045	0.031	0.022	0.012	0.007	0.003	0.001	0.000
16.00	0.02795	0.859	0.647	0.448	0.341	0.269	0.216	0.143	0.097	0.062	0.041	0.028	0.020	0.011	0.007	0.003	0.001	0.000
32.00	0.01473	0.825	0.607	0.418	0.319	0.253	0.203	0.135	0.092	0.059	0.039	0.027	0.019	0.010	0.006	0.003	0.001	0.000
64.00	0.00758	0.807	0.587	0.404	0.309	0.245	0.197	0.131	0.089	0.057	0.038	0.026	0.018	0.010	0.006	0.003	0.001	0.000
128.00	0.00385	0.797	0.576	0.396	0.303	0.241	0.194	0.129	0.088	0.056	0.037	0.026	0.018	0.010	0.006	0.003	0.001	0.000
256.00	0.00194	0.793	0.571	0.393	0.301	0.238	0.192	0.128	0.087	0.056	0.037	0.025	0.018	0.010	0.006	0.003	0.001	0.000
512.00	0.00097	0.790	0.568	0.391	0.299	0.237	0.191	0.127	0.087	0.055	0.037	0.025	0.018	0.010	0.006	0.003	0.001	0.000

(e-2) Wall half-angle, 5°

0.25	0.33070	1.000	0.999	0.999	0.997	0.996	0.994	0.989	0.983	0.973	0.960	0.943	0.922	0.862	0.763	0.142	0.012	0.004
0.50	0.29685	0.999	0.997	0.992	0.986	0.978	0.968	0.942	0.907	0.849	0.776	0.661	0.324	0.114	0.052	0.016	0.004	0.001
1.00	0.23709	0.997	0.988	0.972	0.951	0.925	0.893	0.820	0.614	0.295	0.171	0.106	0.070	0.034	0.019	0.008	0.002	0.001
2.00	0.16569	0.994	0.977	0.949	0.912	0.855	0.667	0.356	0.222	0.133	0.084	0.056	0.039	0.020	0.012	0.005	0.001	0.001
4.00	0.10489	0.992	0.968	0.907	0.701	0.504	0.365	0.226	0.148	0.092	0.060	0.040	0.028	0.015	0.009	0.004	0.001	0.000
8.00	0.06164	0.990	0.930	0.713	0.503	0.361	0.280	0.178	0.119	0.074	0.049	0.033	0.023	0.013	0.008	0.003	0.001	0.000
16.00	0.03413	0.988	0.827	0.605	0.408	0.309	0.243	0.156	0.105	0.066	0.043	0.030	0.021	0.011	0.007	0.003	0.001	0.000
32.00	0.01810	0.987	0.771	0.546	0.373	0.285	0.225	0.146	0.098	0.062	0.041	0.028	0.020	0.011	0.006	0.003	0.001	0.000
64.00	0.00934	0.972	0.742	0.516	0.356	0.273	0.216	0.140	0.094	0.060	0.039	0.027	0.019	0.010	0.006	0.003	0.001	0.000
128.00	0.00475	0.959	0.728	0.501	0.348	0.267	0.211	0.137	0.092	0.058	0.038	0.026	0.019	0.010	0.006	0.003	0.001	0.000
256.00	0.00240	0.952	0.720	0.493	0.344	0.264	0.209	0.136	0.091	0.058	0.038	0.026	0.018	0.010	0.006	0.003	0.001	0.000
512.00	0.00120	0.948	0.716	0.489	0.342	0.263	0.208	0.135	0.091	0.058	0.038	0.026	0.018	0.010	0.006	0.003	0.001	0.000

(e-3) Wall half-angle, 10°

0.25	0.28909	1.000	1.000	0.999	0.999	0.998	0.997	0.995	0.991	0.987	0.980	0.973	0.965	0.944	0.917	0.828	0.066	0.008
0.50	0.26834	1.000	0.998	0.997	0.994	0.990	0.986	0.975	0.960	0.936	0.904	0.863	0.812	0.683	0.198	0.035	0.006	0.002
1.00	0.22860	0.998	0.993	0.985	0.973	0.958	0.940	0.892	0.833	0.747	0.525	0.226	0.129	0.053	0.027	0.010	0.002	0.001
2.00	0.17048	0.996	0.982	0.961	0.932	0.897	0.856	0.753	0.390	0.188	0.111	0.070	0.047	0.023	0.013	0.005	0.002	0.001
4.00	0.11211	0.993	0.972	0.938	0.895	0.819	0.608	0.291	0.177	0.104	0.066	0.044	0.030	0.016	0.009	0.004	0.001	0.000
8.00	0.06722	0.990	0.963	0.919	0.746	0.527	0.345	0.202	0.129	0.079	0.051	0.034	0.024	0.013	0.007	0.003	0.001	0.000
16.00	0.03763	0.989	0.955	0.823	0.590	0.379	0.277	0.169	0.110	0.068	0.044	0.030	0.021	0.011	0.007	0.003	0.001	0.000
32.00	0.02008	0.987	0.950	0.740	0.509	0.331	0.249	0.154	0.101	0.063	0.041	0.028	0.019	0.010	0.006	0.003	0.001	0.000
64.00	0.01040	0.986	0.945	0.698	0.468	0.311	0.236	0.147	0.096	0.060	0.039	0.026	0.019	0.010	0.006	0.003	0.001	0.000
128.00	0.00530	0.986	0.924	0.676	0.447	0.302	0.230	0.143	0.094	0.059	0.038	0.026	0.018	0.010	0.006	0.003	0.001	0.000
256.00	0.00267	0.985	0.913	0.665	0.436	0.297	0.226	0.142	0.093	0.058	0.038	0.026	0.018	0.010	0.006	0.002	0.001	0.000
512.00	0.00134	0.985	0.908	0.660	0.431	0.295	0.225	0.141	0.093	0.058	0.038	0.026	0.018	0.010	0.006	0.002	0.001	0.000

(e-4) Wall half-angle, 20°

0.25	0.23268	1.000	1.000	0.999	0.999	0.999	0.998	0.996	0.994	0.991	0.987	0.983	0.978	0.965	0.950	0.913	0.805	0.575
0.50	0.21978	1.000	0.999	0.998	0.997	0.995	0.992	0.986	0.979	0.967	0.952	0.935	0.915	0.866	0.802	0.614	0.015	0.003
1.00	0.19578	0.999	0.997	0.993	0.987	0.979	0.970	0.947	0.917	0.870	0.811	0.743	0.670	0.261	0.065	0.015	0.003	0.001
2.00	0.15675	0.997	0.989	0.976	0.957	0.933	0.905	0.837	0.760	0.659	0.325	0.128	0.073	0.031	0.016	0.006	0.002	0.001
4.00	0.10930	0.994	0.977	0.949	0.912	0.869	0.820	0.715	0.382	0.144	0.081	0.050	0.033	0.016	0.009	0.004	0.001	0.000
8.00	0.06770	0.991	0.966	0.926	0.874	0.815	0.752	0.331	0.156	0.087	0.053	0.034	0.023	0.012	0.007	0.003	0.001	0.000
16.00	0.03856	0.989	0.957	0.908	0.845	0.741	0.506	0.202	0.119	0.069	0.043	0.028	0.020	0.010	0.006	0.003	0.001	0.000
32.00	0.02076	0.987	0.951	0.895	0.826	0.609	0.388	0.172	0.104	0.061	0.039	0.026	0.018	0.009	0.005	0.002	0.001	0.000
64.00	0.01080	0.986	0.947	0.888	0.795	0.544	0.331	0.159	0.098	0.058	0.037	0.024	0.017	0.009	0.005	0.002	0.001	0.000
128.00	0.00552	0.986	0.945	0.883	0.760	0.512	0.303	0.153	0.095	0.056	0.036	0.024	0.017	0.009	0.005	0.002	0.001	0.000
256.00	0.00279	0.985	0.944	0.881	0.743	0.496	0.289	0.150	0.093	0.056	0.035	0.024	0.016	0.009	0.005	0.002	0.001	0.000
512.00	0.00140	0.985	0.943	0.880	0.734	0.488	0.282	0.149	0.092	0.055	0.035	0.023	0.016	0.009	0.005	0.002	0.001	0.000

(e-5) Wall half-angle, 30°

0.25	0.19049	1.000	1.000	1.000	0.999	0.999	0.998	0.997	0.995	0.992	0.989	0.985	0.981	0.970	0.957	0.926	0.843	0.741
0.50	0.18067	1.000	0.999	0.998	0.997	0.996	0.994	0.989	0.982	0.973	0.961	0.947	0.932	0.896	0.854	0.756	0.485	0.008
1.00	0.16321	0.999	0.998	0.994	0.990	0.985	0.978	0.962	0.941	0.909	0.871	0.828	0.780	0.670	0.551	0.045	0.004	0.001
2.00	0.13521	0.998	0.992	0.983	0.970	0.953	0.933	0.884	0.824	0.739	0.649	0.562	0.469	0.058	0.023	0.007	0.001	0.001
4.00	0.09860	0.995	0.981	0.959	0.928	0.891	0.849	0.754	0.655	0.538	0.172	0.069	0.040	0.017	0.009	0.003	0.001	0.000
8.00	0.06305	0.992	0.969	0.932	0.884	0.829	0.769	0.644	0.428	0.112	0.058	0.035	0.023	0.011	0.006	0.002	0.001	0.000
16.00	0.03653	0.989	0.959	0.911	0.851	0.783	0.711	0.503	0.155	0.073	0.042	0.026	0.017	0.009	0.005	0.002	0.001	0.000
32.00	0.01985	0.988	0.952	0.897	0.829	0.753	0.674	0.341	0.116	0.061	0.036	0.023	0.015	0.008	0.005	0.002	0.001	0.000
64.00	0.01038	0.986	0.948	0.889	0.815	0.735	0.654	0.268	0.104	0.056	0.033	0.021	0.015	0.007	0.004	0.002	0.001	0.000
128.00	0.00531	0.986	0.945	0.884	0.808	0.726	0.642	0.234	0.098	0.053	0.032	0.021	0.014	0.007	0.004	0.002	0.000	0.000
256.00	0.00269	0.986	0.944	0.881	0.804	0.721	0.621	0.217	0.096	0.052	0.032	0.020	0.014	0.007	0.004	0.002	0.000	0.000
512.00	0.00135	0.985	0.944	0.880	0.802	0.718	0.609	0.209	0.095	0.052	0.031	0.020	0.014	0.007	0.004	0.002	0.000	0.000

(e-6) Wall half-angle, 45°

0.25	0.15207	1.000	1.000	1.000	0.999	0.999	0.998	0.997	0.995	0.993	0.989	0.986	0.981	0.971	0.959	0.929	0.850	0.757
0.50	0.14420	1.000	0.999	0.998	0.997	0.996	0.994	0.989	0.983	0.974	0.963	0.950	0.935	0.902	0.863	0.777	0.591	0.424
1.00	0.13059	0.999	0.998	0.995	0.991	0.986	0.980	0.965	0.946	0.918	0.885	0.849	0.809	0.726	0.640	0.475	0.020	0.002
2.00	0.10960	0.998	0.994	0.986	0.975	0.961	0.944	0.904	0.856	0.789	0.716	0.641	0.567	0.432	0.325	0.012	0.001	0.000
4.00	0.08234	0.996	0.985	0.966	0.941	0.910	0.875	0.792	0.703	0.590	0.487	0.399	0.326	0.030	0.010	0.003	0.001	0.000
8.00	0.05440	0.993	0.972	0.939	0.896	0.845	0.789	0.670	0.556	0.431	0.332	0.100	0.028	0.010	0.005	0.002	0.000	0.000
16.00	0.03219	0.990	0.961	0.916	0.858	0.792	0.722	0.584	0.462	0.340	0.077	0.027	0.016	0.007	0.004	0.001	0.000	0.000
32.00	0.01769	0.988	0.953	0.899	0.832	0.758	0.680	0.533	0.410	0.191	0.038	0.020	0.012	0.006	0.003	0.001	0.000	0.000
64.00	0.00930	0.987	0.948	0.890	0.817	0.738	0.657	0.506	0.382	0.118	0.032	0.018	0.011	0.005	0.003	0.001	0.000	0.000
128.00	0.00477	0.986	0.946	0.884	0.809	0.727	0.644	0.491	0.368	0.086	0.030	0.017	0.011	0.005	0.003	0.001	0.000	0.000
256.00	0.00242	0.986	0.944	0.882	0.805	0.721	0.637	0.484	0.361	0.070	0.029	0.016	0.010	0.005	0.003	0.001	0.000	0.000
512.00	0.00122	0.985	0.944	0.880	0.803	0.718	0.634	0.480	0.357	0.063	0.028	0.016	0.010	0.005	0.003	0.001	0.000	0.000

(e-7) Wall half-angle, 60°

0.25	0.13095	1.000	1.000	1.000	0.999	0.999	0.998	0.997	0.995	0.992	0.989	0.985	0.981	0.970	0.958	0.927	0.847	0.754
0.50	0.12398	1.000	0.999	0.998	0.997	0.996	0.994	0.989	0.983	0.973	0.962	0.949	0.934	0.900	0.861	0.774	0.591	0.432
1.00	0.11204	0.999	0.998	0.995	0.991	0.986	0.980	0.965	0.946	0.917	0.884	0.848	0.809	0.726	0.643	0.489	0.271	0.147
2.00	0.09391	0.998	0.994	0.986	0.975	0.961	0.945	0.906	0.859	0.793	0.724	0.653	0.585	0.462	0.360	0.215	0.003	0.000
4.00	0.07086	0.996	0.986	0.968	0.944	0.915	0.881	0.804	0.719	0.613	0.514	0.427	0.352	0.240	0.166	0.005	0.000	0.000
8.00	0.04739	0.993	0.974	0.943	0.902	0.854	0.800	0.686	0.573	0.449	0.349	0.271	0.211	0.132	0.007	0.001	0.000	0.000
16.00	0.02840	0.990	0.962	0.919	0.863	0.798	0.730	0.594	0.472	0.349	0.258	0.193	0.146	0.008	0.003	0.001	0.000	0.000
32.00	0.01573	0.988	0.954	0.901	0.835	0.761	0.685	0.538	0.415	0.297	0.214	0.156	0.086	0.005	0.002	0.001	0.000	0.000
64.00	0.00831	0.987	0.949	0.891	0.819	0.740	0.659	0.508	0.385	0.270	0.192	0.139	0.035	0.004	0.002	0.001	0.000	0.000
128.00	0.00427	0.986	0.946	0.885	0.810	0.728	0.645	0.492	0.369	0.257	0.181	0.130	0.014	0.004	0.002	0.001	0.000	0.000
256.00	0.00217	0.986	0.944	0.882	0.805	0.722	0.638	0.484	0.361	0.250	0.176	0.117	0.011	0.003	0.002	0.001	0.000	0.000
512.00	0.00109	0.985	0.944	0.880	0.803	0.719	0.634	0.480	0.357	0.247	0.173	0.109	0.010	0.003	0.002	0.001	0.000	0.000

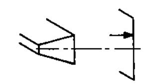
(e-8) Wall half-angle, 75°

0.25	0.11992	1.000	1.000	1.000	0.999	0.999	0.998	0.997	0.995	0.992	0.989	0.985	0.980	0.970	0.957	0.925	0.844	0.748
0.50	0.11340	1.000	0.999	0.998	0.997	0.996	0.994	0.989	0.982	0.973	0.961	0.948	0.933	0.898	0.858	0.769	0.584	0.425
1.00	0.10225	0.999	0.998	0.995	0.991	0.986	0.979	0.964	0.944	0.915	0.882	0.845	0.805	0.721	0.637	0.483	0.268	0.152
2.00	0.08544	0.998	0.994	0.986	0.974	0.961	0.944	0.904	0.857	0.790	0.720	0.650	0.581	0.459	0.358	0.220	0.091	0.044
4.00	0.06428	0.996	0.985	0.968	0.944	0.914	0.880	0.803	0.719	0.613	0.516	0.430	0.357	0.246	0.173	0.090	0.032	0.000
8.00	0.04297	0.993	0.974	0.943	0.903	0.855	0.802	0.689	0.578	0.455	0.355	0.277	0.217	0.136	0.089	0.043	0.000	0.000
16.00	0.02582	0.991	0.963	0.920	0.864	0.801	0.733	0.598	0.477	0.354	0.262	0.196	0.149	0.089	0.057	0.026	0.000	0.000
32.00	0.01435	0.988	0.954	0.902	0.836	0.763	0.687	0.541	0.417	0.299	0.216	0.158	0.118	0.069	0.043	0.020	0.000	0.000
64.00	0.00760	0.987	0.949	0.891	0.820	0.741	0.660	0.510	0.386	0.271	0.193	0.140	0.103	0.060	0.037	0.013	0.000	0.000
128.00	0.00391	0.986	0.946	0.885	0.810	0.728	0.646	0.493	0.370	0.258	0.182	0.131	0.096	0.055	0.034	0.005	0.000	0.000
256.00	0.00199	0.986	0.945	0.882	0.805	0.722	0.638	0.485	0.362	0.251	0.176	0.126	0.093	0.053	0.033	0.001	0.000	0.000
512.00	0.00100	0.985	0.944	0.880	0.803	0.719	0.634	0.480	0.358	0.247	0.173	0.124	0.091	0.052	0.032	0.000	0.000	0.000

TABLE VII. - Continued. CALCULATED DISTRIBUTIONS OF PARTICLE FLUX ALONG PLANES AT VARIOUS DISTANCES FROM SLOT EXIT (EQ. (11))

(f) Length to inlet-width ratio, 8.00

(f-1) Wall half-angle, 0°



Nondimensional distance from slot exit, $X_5 - L$	Nondimensional centerplane flux relative to inlet flux, M(O)	Distance from centerplane, $\frac{Y_5}{X_5 - L}$																
		.1	.2	.3	.4	.5	.6	.8	1.	1.25	1.5	1.75	2.	2.5	3.	4.	6.	8.
		Flux relative to centerplane, $M(Y_5)/M(O)$																
0.25	0.24888	1.000	0.998	0.996	0.993	0.988	0.983	0.969	0.949	0.915	0.868	0.808	0.739	0.209	0.086	0.024	0.005	0.002
0.50	0.21073	0.998	0.992	0.981	0.967	0.948	0.926	0.870	0.804	0.381	0.221	0.137	0.089	0.042	0.023	0.009	0.002	0.001
1.00	0.15834	0.995	0.982	0.961	0.932	0.898	0.652	0.362	0.233	0.142	0.091	0.060	0.042	0.022	0.013	0.005	0.002	0.001
2.00	0.10939	0.994	0.976	0.822	0.554	0.411	0.321	0.208	0.139	0.087	0.057	0.039	0.027	0.015	0.009	0.004	0.001	0.000
4.00	0.07141	0.993	0.749	0.482	0.358	0.280	0.223	0.147	0.100	0.063	0.042	0.029	0.020	0.011	0.007	0.003	0.001	0.000
8.00	0.04398	0.865	0.522	0.361	0.275	0.217	0.175	0.116	0.079	0.050	0.033	0.023	0.016	0.009	0.005	0.002	0.001	0.000
16.00	0.02546	0.741	0.426	0.302	0.232	0.184	0.148	0.099	0.067	0.043	0.029	0.020	0.014	0.008	0.005	0.002	0.001	0.000
32.00	0.01396	0.670	0.379	0.271	0.209	0.166	0.134	0.090	0.061	0.039	0.026	0.018	0.013	0.007	0.004	0.002	0.001	0.000
64.00	0.00736	0.631	0.356	0.256	0.198	0.157	0.127	0.085	0.058	0.037	0.025	0.017	0.012	0.007	0.004	0.002	0.001	0.000
128.00	0.00379	0.610	0.344	0.248	0.191	0.152	0.123	0.082	0.056	0.036	0.024	0.016	0.012	0.006	0.004	0.002	0.000	0.000
256.00	0.00192	0.600	0.338	0.243	0.188	0.150	0.121	0.081	0.055	0.035	0.023	0.016	0.011	0.006	0.004	0.002	0.000	0.000
512.00	0.00097	0.594	0.335	0.241	0.187	0.149	0.120	0.080	0.055	0.035	0.023	0.016	0.011	0.006	0.004	0.002	0.000	0.000

(f-2) Wall half-angle, 5°

0.25	0.21572	1.000	1.000	0.999	0.999	0.998	0.998	0.996	0.993	0.989	0.984	0.978	0.971	0.952	0.926	0.824	0.041	0.007
0.50	0.20174	1.000	0.999	0.997	0.994	0.991	0.987	0.977	0.962	0.939	0.906	0.864	0.810	0.414	0.128	0.029	0.005	0.002
1.00	0.17381	0.998	0.994	0.986	0.974	0.960	0.942	0.896	0.839	0.695	0.291	0.166	0.103	0.046	0.024	0.009	0.002	0.001
2.00	0.13277	0.996	0.984	0.965	0.939	0.907	0.872	0.459	0.261	0.151	0.094	0.061	0.041	0.021	0.012	0.005	0.001	0.001
4.00	0.09144	0.994	0.976	0.948	0.813	0.507	0.361	0.218	0.142	0.087	0.056	0.038	0.026	0.014	0.008	0.004	0.001	0.000
8.00	0.05820	0.992	0.969	0.689	0.424	0.310	0.240	0.153	0.101	0.063	0.041	0.028	0.020	0.011	0.006	0.003	0.001	0.000
16.00	0.03447	0.990	0.794	0.456	0.320	0.243	0.191	0.123	0.083	0.052	0.034	0.023	0.016	0.009	0.005	0.002	0.001	0.000
32.00	0.01919	0.988	0.654	0.381	0.275	0.212	0.167	0.109	0.073	0.046	0.030	0.021	0.015	0.008	0.005	0.002	0.001	0.000
64.00	0.01021	0.979	0.578	0.347	0.254	0.196	0.155	0.101	0.068	0.043	0.028	0.019	0.014	0.007	0.004	0.002	0.001	0.000
128.00	0.00528	0.944	0.539	0.331	0.243	0.188	0.149	0.098	0.066	0.042	0.027	0.019	0.013	0.007	0.004	0.002	0.001	0.000
256.00	0.00269	0.926	0.519	0.323	0.238	0.184	0.146	0.096	0.064	0.041	0.027	0.018	0.013	0.007	0.004	0.002	0.001	0.000
512.00	0.00136	0.917	0.509	0.319	0.235	0.182	0.145	0.095	0.064	0.040	0.027	0.018	0.013	0.007	0.004	0.002	0.001	0.000

(f-3) Wall half-angle, 10°

0.25	0.17743	1.000	1.000	1.000	1.000	0.999	0.999	0.998	0.997	0.995	0.993	0.991	0.988	0.981	0.973	0.952	0.881	0.515
0.50	0.17025	1.000	1.000	0.999	0.998	0.997	0.996	0.992	0.987	0.980	0.971	0.960	0.947	0.913	0.864	0.690	0.016	0.004
1.00	0.15561	0.999	0.998	0.995	0.991	0.986	0.979	0.962	0.940	0.903	0.855	0.797	0.732	0.171	0.064	0.017	0.004	0.001
2.00	0.12934	0.998	0.991	0.981	0.966	0.947	0.924	0.868	0.803	0.463	0.195	0.111	0.069	0.032	0.017	0.006	0.002	0.001
4.00	0.09489	0.995	0.981	0.959	0.929	0.893	0.853	0.407	0.215	0.120	0.073	0.048	0.032	0.017	0.010	0.004	0.001	0.000
8.00	0.06251	0.993	0.972	0.940	0.898	0.607	0.356	0.196	0.123	0.074	0.047	0.032	0.022	0.012	0.007	0.003	0.001	0.000
16.00	0.03777	0.991	0.964	0.922	0.541	0.327	0.238	0.144	0.093	0.057	0.037	0.025	0.017	0.009	0.006	0.002	0.001	0.000
32.00	0.02127	0.989	0.956	0.695	0.375	0.262	0.197	0.122	0.080	0.049	0.032	0.022	0.015	0.008	0.005	0.002	0.001	0.000
64.00	0.01139	0.987	0.950	0.574	0.327	0.234	0.178	0.111	0.073	0.046	0.030	0.020	0.014	0.008	0.005	0.002	0.001	0.000
128.00	0.00591	0.986	0.929	0.513	0.305	0.221	0.169	0.106	0.070	0.044	0.029	0.019	0.014	0.007	0.004	0.002	0.001	0.000
256.00	0.00301	0.986	0.898	0.482	0.295	0.215	0.165	0.104	0.069	0.043	0.028	0.019	0.013	0.007	0.004	0.002	0.001	0.000
512.00	0.00152	0.985	0.882	0.466	0.290	0.212	0.163	0.103	0.068	0.042	0.028	0.019	0.013	0.007	0.004	0.002	0.001	0.000

(f-4) Wall half-angle, 20°

0.25	0.13412	1.000	1.000	1.000	1.000	1.000	0.999	0.999	0.998	0.997	0.996	0.995	0.993	0.989	0.984	0.973	0.939	0.894
0.50	0.13000	1.000	1.000	0.999	0.999	0.998	0.998	0.996	0.993	0.990	0.985	0.980	0.973	0.959	0.941	0.896	0.755	0.038
1.00	0.12207	1.000	0.999	0.998	0.996	0.994	0.991	0.984	0.975	0.960	0.943	0.922	0.898	0.838	0.757	0.149	0.007	0.002
2.00	0.10765	0.999	0.996	0.991	0.985	0.976	0.965	0.938	0.904	0.850	0.786	0.716	0.647	0.092	0.035	0.010	0.002	0.001
4.00	0.08522	0.997	0.988	0.974	0.954	0.929	0.900	0.831	0.754	0.524	0.147	0.078	0.047	0.021	0.011	0.004	0.001	0.000
8.00	0.05927	0.994	0.977	0.950	0.914	0.871	0.823	0.664	0.201	0.098	0.057	0.036	0.024	0.012	0.007	0.003	0.001	0.000
16.00	0.03690	0.991	0.967	0.927	0.877	0.819	0.660	0.201	0.111	0.063	0.039	0.025	0.017	0.009	0.005	0.002	0.001	0.000
32.00	0.02113	0.989	0.958	0.909	0.848	0.659	0.302	0.145	0.087	0.051	0.032	0.021	0.014	0.008	0.004	0.002	0.001	0.000
64.00	0.01142	0.987	0.951	0.896	0.827	0.458	0.239	0.125	0.077	0.045	0.029	0.019	0.013	0.007	0.004	0.002	0.001	0.000
128.00	0.00595	0.986	0.947	0.888	0.765	0.360	0.215	0.116	0.072	0.043	0.027	0.018	0.013	0.007	0.004	0.002	0.000	0.000
256.00	0.00304	0.986	0.945	0.884	0.710	0.316	0.205	0.112	0.070	0.042	0.026	0.018	0.012	0.007	0.004	0.002	0.000	0.000
512.00	0.00154	0.986	0.944	0.881	0.683	0.305	0.200	0.110	0.069	0.041	0.026	0.017	0.012	0.006	0.004	0.002	0.000	0.000

(f-5) Wall half-angle, 30°

0.25	0.10560	1.000	1.000	1.000	1.000	1.000	0.999	0.999	0.999	0.998	0.997	0.996	0.994	0.991	0.987	0.977	0.950	0.913
0.50	0.10258	1.000	1.000	1.000	0.999	0.999	0.998	0.997	0.995	0.992	0.988	0.983	0.978	0.967	0.952	0.918	0.827	0.717
1.00	0.09694	1.000	0.999	0.998	0.997	0.995	0.993	0.987	0.980	0.970	0.957	0.942	0.925	0.885	0.840	0.733	0.079	0.004
2.00	0.08705	0.999	0.997	0.994	0.989	0.983	0.976	0.958	0.935	0.901	0.860	0.814	0.762	0.649	0.537	0.022	0.003	0.001
4.00	0.07158	0.998	0.992	0.982	0.968	0.950	0.929	0.878	0.817	0.731	0.643	0.560	0.154	0.035	0.015	0.005	0.001	0.000
8.00	0.05197	0.995	0.981	0.959	0.928	0.891	0.849	0.755	0.658	0.463	0.092	0.046	0.027	0.012	0.006	0.002	0.001	0.000
16.00	0.03329	0.992	0.969	0.933	0.886	0.831	0.772	0.649	0.260	0.078	0.041	0.025	0.016	0.008	0.004	0.002	0.000	0.000
32.00	0.01937	0.990	0.959	0.912	0.853	0.785	0.714	0.398	0.107	0.052	0.030	0.019	0.013	0.006	0.004	0.001	0.000	0.000
64.00	0.01055	0.988	0.952	0.898	0.830	0.754	0.676	0.180	0.084	0.044	0.026	0.017	0.011	0.006	0.003	0.001	0.000	0.000
128.00	0.00553	0.987	0.948	0.889	0.816	0.736	0.655	0.151	0.076	0.041	0.024	0.016	0.011	0.005	0.003	0.001	0.000	0.000
256.00	0.00283	0.986	0.946	0.884	0.809	0.726	0.643	0.139	0.072	0.039	0.023	0.015	0.010	0.005	0.003	0.001	0.000	0.000
512.00	0.00143	0.986	0.944	0.881	0.805	0.721	0.604	0.134	0.070	0.038	0.023	0.015	0.010	0.005	0.003	0.001	0.000	0.000

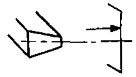
(f-6) Wall half-angle, 45°

0.25	0.08157	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.999	0.998	0.997	0.996	0.995	0.992	0.988	0.979	0.953	0.920
0.50	0.07925	1.000	1.000	1.000	0.999	0.999	0.998	0.997	0.995	0.992	0.989	0.985	0.980	0.969	0.956	0.924	0.841	0.744
1.00	0.07498	1.000	0.999	0.998	0.997	0.995	0.993	0.988	0.982	0.972	0.960	0.947	0.931	0.896	0.856	0.765	0.576	0.406
2.00	0.06765	0.999	0.998	0.995	0.991	0.985	0.979	0.963	0.943	0.914	0.879	0.841	0.801	0.715	0.627	0.461	0.009	0.001
4.00	0.05648	0.998	0.993	0.985	0.974	0.959	0.942	0.901	0.851	0.782	0.708	0.632	0.559	0.428	0.325	0.007	0.001	0.000
8.00	0.04223	0.996	0.985	0.966	0.940	0.909	0.873	0.790	0.700	0.589	0.488	0.401	0.329	0.019	0.007	0.002	0.000	0.000
16.00	0.02785	0.993	0.972	0.940	0.896	0.846	0.790	0.672	0.558	0.434	0.336	0.041	0.019	0.007	0.003	0.001	0.000	0.000
32.00	0.01650	0.990	0.961	0.916	0.859	0.793	0.724	0.586	0.464	0.342	0.040	0.019	0.011	0.005	0.002	0.001	0.000	0.000
64.00	0.00908	0.988	0.953	0.900	0.833	0.759	0.682	0.535	0.411	0.083	0.027	0.014	0.009	0.004	0.002	0.001	0.000	0.000
128.00	0.00478	0.987	0.949	0.890	0.818	0.738	0.657	0.506	0.383	0.052	0.023	0.013	0.008	0.004	0.002	0.001	0.000	0.000
256.00	0.00246	0.986	0.946	0.885	0.809	0.727	0.644	0.492	0.368	0.046	0.021	0.012	0.007	0.003	0.002	0.001	0.000	0.000
512.00	0.00125	0.986	0.944	0.882	0.805	0.721	0.637	0.484	0.361	0.043	0.020	0.011	0.007	0.003	0.002	0.001	0.000	0.000

TABLE VII. - Continued. CALCULATED DISTRIBUTIONS OF PARTICLE FLUX ALONG PLANES AT VARIOUS DISTANCES FROM SLOT EXIT (EQ. (11))

(g) Length to inlet-width ratio, 0.25

(g-1) Wall half-angle, -5°



Nondimensional distance from slot exit, $X_5 - L$	Nondimensional centerplane flux relative to inlet flux, M(O)	Distance from centerplane, $\frac{Y_5}{X_5 - L}$																
		.1	.2	.3	.4	.5	.6	.8	1.	1.25	1.5	1.75	2.	2.5	3.	4.	6.	8.
		Flux relative to centerplane, $M(Y_5)/M(O)$																
0.25	0.80497	0.999	0.997	0.993	0.987	0.980	0.970	0.945	0.910	0.850	0.769	0.668	0.531	0.277	0.139	0.042	0.007	0.003
0.50	0.62935	0.996	0.985	0.967	0.941	0.907	0.868	0.770	0.643	0.474	0.334	0.231	0.161	0.082	0.045	0.016	0.004	0.002
1.00	0.40463	0.991	0.966	0.925	0.872	0.798	0.718	0.559	0.420	0.287	0.196	0.135	0.095	0.050	0.028	0.010	0.003	0.001
2.00	0.22586	0.988	0.948	0.883	0.804	0.719	0.633	0.475	0.348	0.234	0.159	0.110	0.078	0.041	0.023	0.009	0.002	0.001
4.00	0.11810	0.980	0.929	0.859	0.776	0.689	0.602	0.446	0.325	0.218	0.148	0.102	0.072	0.038	0.022	0.008	0.002	0.001
8.00	0.05989	0.976	0.924	0.853	0.768	0.680	0.593	0.438	0.317	0.212	0.144	0.099	0.070	0.037	0.021	0.008	0.002	0.001
16.00	0.02999	0.980	0.927	0.854	0.769	0.680	0.592	0.436	0.316	0.211	0.143	0.099	0.070	0.037	0.021	0.008	0.002	0.001
32.00	0.01500	0.981	0.928	0.855	0.769	0.680	0.592	0.436	0.315	0.210	0.142	0.098	0.069	0.037	0.021	0.008	0.002	0.001
64.00	0.00750	0.982	0.929	0.855	0.770	0.680	0.592	0.436	0.315	0.210	0.142	0.098	0.069	0.037	0.021	0.008	0.002	0.001
128.00	0.00375	0.982	0.929	0.856	0.770	0.680	0.592	0.436	0.315	0.210	0.142	0.098	0.069	0.037	0.021	0.008	0.002	0.001
256.00	0.00187	0.983	0.929	0.856	0.770	0.680	0.592	0.436	0.315	0.210	0.142	0.098	0.069	0.037	0.021	0.008	0.002	0.001
512.00	0.00094	0.983	0.929	0.856	0.770	0.680	0.592	0.436	0.315	0.210	0.142	0.098	0.069	0.037	0.021	0.008	0.002	0.001

(g-2) Wall half-angle, -10°

0.25	0.80849	0.999	0.997	0.992	0.986	0.978	0.967	0.940	0.901	0.833	0.743	0.619	0.471	0.240	0.121	0.038	0.007	0.003
0.50	0.62530	0.996	0.984	0.964	0.936	0.900	0.858	0.747	0.609	0.444	0.311	0.216	0.151	0.078	0.043	0.016	0.004	0.002
1.00	0.39693	0.991	0.964	0.920	0.855	0.780	0.701	0.543	0.407	0.278	0.190	0.132	0.093	0.049	0.028	0.011	0.003	0.001
2.00	0.21987	0.982	0.937	0.872	0.794	0.709	0.624	0.469	0.344	0.232	0.158	0.110	0.078	0.042	0.024	0.009	0.003	0.001
4.00	0.11302	0.982	0.932	0.862	0.779	0.692	0.605	0.449	0.327	0.220	0.150	0.104	0.074	0.039	0.023	0.009	0.003	0.001
8.00	0.05678	0.985	0.936	0.864	0.779	0.690	0.602	0.445	0.324	0.217	0.147	0.102	0.072	0.039	0.022	0.009	0.003	0.001
16.00	0.02843	0.985	0.938	0.865	0.780	0.690	0.601	0.444	0.322	0.216	0.147	0.102	0.072	0.038	0.022	0.009	0.003	0.001
32.00	0.01422	0.985	0.939	0.866	0.780	0.690	0.601	0.444	0.322	0.216	0.146	0.101	0.072	0.038	0.022	0.009	0.003	0.001
64.00	0.00711	0.985	0.940	0.867	0.781	0.690	0.601	0.444	0.322	0.215	0.146	0.101	0.072	0.038	0.022	0.009	0.003	0.001
128.00	0.00355	0.985	0.940	0.867	0.781	0.690	0.601	0.444	0.322	0.215	0.146	0.101	0.072	0.038	0.022	0.009	0.003	0.001
256.00	0.00178	0.985	0.941	0.867	0.781	0.690	0.601	0.444	0.322	0.215	0.146	0.101	0.072	0.038	0.022	0.009	0.003	0.001
512.00	0.00089	0.985	0.941	0.867	0.781	0.690	0.601	0.444	0.322	0.215	0.146	0.101	0.072	0.038	0.022	0.009	0.003	0.001

(g-3) Wall half-angle, -20°

0.25	0.80817	0.999	0.996	0.990	0.982	0.972	0.959	0.924	0.874	0.789	0.659	0.511	0.374	0.187	0.097	0.033	0.007	0.003
0.50	0.60929	0.995	0.981	0.958	0.925	0.881	0.825	0.694	0.555	0.398	0.277	0.192	0.135	0.071	0.040	0.015	0.004	0.002
1.00	0.37688	0.987	0.950	0.897	0.830	0.754	0.675	0.520	0.389	0.266	0.182	0.127	0.090	0.049	0.028	0.011	0.003	0.001
2.00	0.20082	0.986	0.944	0.878	0.799	0.714	0.628	0.471	0.346	0.235	0.161	0.112	0.080	0.043	0.025	0.010	0.003	0.001
4.00	0.10197	0.985	0.944	0.878	0.794	0.706	0.618	0.460	0.336	0.227	0.155	0.108	0.077	0.042	0.024	0.010	0.003	0.001
8.00	0.05118	0.985	0.943	0.879	0.795	0.705	0.616	0.457	0.334	0.225	0.153	0.107	0.076	0.041	0.024	0.010	0.003	0.001
16.00	0.02562	0.985	0.943	0.879	0.796	0.705	0.616	0.457	0.333	0.224	0.153	0.107	0.076	0.041	0.024	0.010	0.003	0.001
32.00	0.01281	0.985	0.943	0.879	0.797	0.706	0.616	0.457	0.333	0.224	0.153	0.106	0.076	0.041	0.024	0.010	0.003	0.001
64.00	0.00641	0.985	0.943	0.879	0.797	0.706	0.616	0.457	0.332	0.224	0.153	0.106	0.076	0.041	0.024	0.010	0.003	0.001
128.00	0.00320	0.985	0.943	0.879	0.797	0.706	0.616	0.457	0.332	0.224	0.153	0.106	0.076	0.041	0.024	0.010	0.003	0.001
256.00	0.00160	0.985	0.943	0.879	0.797	0.706	0.616	0.457	0.332	0.224	0.153	0.106	0.076	0.041	0.024	0.010	0.003	0.001
512.00	0.00080	0.985	0.943	0.879	0.797	0.706	0.616	0.457	0.332	0.224	0.153	0.106	0.076	0.041	0.024	0.010	0.003	0.001

(g-4) Wall half-angle, -30°

0.25	0.79314	0.998	0.994	0.986	0.975	0.960	0.942	0.892	0.814	0.684	0.536	0.394	0.280	0.141	0.076	0.028	0.007	0.003
0.50	0.57356	0.994	0.973	0.940	0.894	0.839	0.776	0.636	0.498	0.351	0.244	0.170	0.121	0.065	0.037	0.015	0.004	0.002
1.00	0.33454	0.988	0.954	0.898	0.827	0.749	0.667	0.511	0.381	0.260	0.180	0.126	0.090	0.049	0.029	0.012	0.004	0.002
2.00	0.17477	0.986	0.946	0.885	0.809	0.723	0.636	0.478	0.352	0.239	0.165	0.116	0.083	0.046	0.027	0.011	0.003	0.001
4.00	0.08840	0.985	0.944	0.880	0.803	0.718	0.629	0.470	0.344	0.234	0.161	0.113	0.081	0.044	0.026	0.011	0.003	0.001
8.00	0.04433	0.985	0.943	0.879	0.801	0.716	0.628	0.468	0.343	0.232	0.159	0.112	0.080	0.044	0.026	0.011	0.003	0.001
16.00	0.02218	0.985	0.943	0.879	0.801	0.716	0.629	0.468	0.342	0.232	0.159	0.112	0.080	0.044	0.026	0.011	0.003	0.001
32.00	0.01109	0.985	0.943	0.879	0.800	0.716	0.629	0.468	0.342	0.232	0.159	0.111	0.080	0.044	0.026	0.011	0.003	0.001
64.00	0.00555	0.985	0.943	0.879	0.800	0.716	0.629	0.468	0.342	0.232	0.159	0.111	0.080	0.044	0.026	0.011	0.003	0.001
128.00	0.00277	0.985	0.943	0.879	0.800	0.716	0.629	0.468	0.342	0.231	0.159	0.111	0.080	0.044	0.026	0.011	0.003	0.001
256.00	0.00139	0.985	0.943	0.879	0.800	0.716	0.629	0.468	0.342	0.231	0.159	0.111	0.080	0.044	0.026	0.011	0.003	0.001
512.00	0.00069	0.985	0.943	0.879	0.800	0.716	0.630	0.468	0.342	0.231	0.159	0.111	0.080	0.044	0.026	0.011	0.003	0.001

(g-5) Wall half-angle, -45°

0.25	0.70711	0.995	0.983	0.963	0.936	0.901	0.858	0.752	0.628	0.470	0.336	0.236	0.167	0.088	0.051	0.020	0.006	0.002
0.50	0.44721	0.990	0.962	0.918	0.859	0.791	0.715	0.562	0.426	0.296	0.205	0.144	0.104	0.057	0.034	0.015	0.004	0.002
1.00	0.24254	0.987	0.949	0.891	0.818	0.737	0.654	0.499	0.370	0.254	0.176	0.124	0.090	0.050	0.030	0.013	0.004	0.002
2.00	0.12403	0.986	0.944	0.882	0.805	0.721	0.637	0.482	0.357	0.244	0.169	0.119	0.086	0.048	0.029	0.013	0.004	0.002
4.00	0.06238	0.985	0.943	0.880	0.802	0.717	0.632	0.478	0.354	0.241	0.167	0.118	0.085	0.048	0.029	0.013	0.004	0.002
8.00	0.03123	0.985	0.943	0.879	0.801	0.716	0.631	0.477	0.353	0.241	0.167	0.118	0.085	0.047	0.028	0.013	0.004	0.002
16.00	0.01562	0.985	0.943	0.879	0.800	0.716	0.631	0.476	0.353	0.241	0.166	0.118	0.085	0.047	0.028	0.013	0.004	0.002
32.00	0.00781	0.985	0.943	0.879	0.800	0.716	0.631	0.476	0.353	0.241	0.166	0.118	0.085	0.047	0.028	0.013	0.004	0.002
64.00	0.00391	0.985	0.943	0.879	0.800	0.716	0.631	0.476	0.353	0.241	0.166	0.118	0.085	0.047	0.028	0.013	0.004	0.002
128.00	0.00195	0.985	0.943	0.879	0.800	0.716	0.631	0.476	0.354	0.241	0.166	0.118	0.085	0.047	0.028	0.013	0.004	0.002
256.00	0.00098	0.985	0.943	0.879	0.800	0.716	0.631	0.476	0.354	0.241	0.166	0.118	0.085	0.047	0.028	0.013	0.004	0.002
512.00	0.00049	0.985	0.943	0.879	0.800	0.716	0.631	0.476	0.354	0.241	0.166	0.118	0.085	0.047	0.028	0.013	0.004	0.002

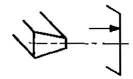
(g-6) Wall half-angle, -60°

0.25	0.28735	0.987	0.951	0.895	0.825	0.746	0.664	0.509	0.381	0.264	0.184	0.131	0.095	0.054	0.033	0.014	0.004	0.002
0.50	0.14834	0.986	0.945	0.883	0.807	0.723	0.639	0.485	0.361	0.249	0.174	0.124	0.090	0.051	0.031	0.014	0.004	0.002
1.00	0.07479	0.985	0.943	0.880	0.802	0.718	0.633	0.478	0.355	0.245	0.172	0.122	0.089	0.050	0.031	0.014	0.004	0.002
2.00	0.03747	0.985	0.943	0.879	0.801	0.716	0.631	0.477	0.354	0.244	0.171	0.122	0.089	0.050	0.031	0.014	0.004	0.002
4.00	0.01875	0.985	0.943	0.879	0.801	0.716	0.631	0.476	0.354	0.244	0.171	0.122	0.089	0.050	0.031	0.014	0.004	0.002
8.00	0.00937	0.985	0.943	0.879	0.800	0.716	0.631	0.476	0.354	0.244	0.171	0.122	0.089	0.050	0.031	0.014	0.004	0.002
16.00	0.00469	0.985	0.943	0.879	0.800	0.716	0.631	0.476	0.354	0.244	0.171	0.122	0.089	0.050	0.031	0.014	0.004	0.002
32.00	0.00234	0.985	0.943	0.879	0.800	0.716	0.631	0.476	0.354	0.244	0.171	0.122	0.089	0.050	0.031	0.014	0.004	0.002
64.00	0.00117	0.985	0.943	0.879	0.800	0.716	0.631	0.476	0.354	0.244	0.171	0.122	0.089	0.050	0.031	0.014	0.004	0.002
128.00	0.00059	0.985	0.943	0.879	0.800	0.716	0.631	0.476	0.354	0.244	0.171	0.122	0.089	0.050	0.031	0.014	0.004	0.002
256.00	0.00029	0.985	0.943	0.879	0.800	0.716	0.631	0.476	0.354	0.244	0.171	0.122	0.089	0.050	0.031	0.014	0.004	0.002
512.00	0.00015	0.985	0.943	0.879	0.800	0.716	0.631	0.476	0.354	0.244	0.171	0.122	0.089	0.050	0.031	0.014	0.004	0.002

TABLE VII. - Continued. CALCULATED DISTRIBUTIONS OF PARTICLE FLUX ALONG PLANES AT VARIOUS DISTANCES FROM SLOT EXIT (EQ. (11))

(h) Length to inlet-width ratio, 0.50

(h-1) Wall half-angle, -5°



Nondimensional distance from slot exit, $X_5 - L$	Nondimensional centerplane flux relative to inlet flux, M(O)	Distance from centerplane, $\frac{Y_5}{X_5 - L}$: .1	.2	.3	.4	.5	.6	.8	1.	1.25	1.5	1.75	2.	2.5	3.	4.	6.	8.
		Flux relative to centerplane, $M(Y_5)/M(O)$																
0.25	0.73002	0.999	0.997	0.993	0.987	0.979	0.969	0.943	0.907	0.846	0.764	0.664	0.504	0.247	0.116	0.029	0.007	0.003
0.50	0.57057	0.996	0.985	0.967	0.942	0.909	0.870	0.776	0.636	0.458	0.314	0.211	0.142	0.065	0.033	0.013	0.004	0.001
1.00	0.37105	0.992	0.968	0.929	0.875	0.795	0.710	0.544	0.400	0.265	0.174	0.115	0.077	0.037	0.021	0.009	0.003	0.001
2.00	0.21137	0.989	0.945	0.872	0.788	0.698	0.608	0.447	0.319	0.207	0.134	0.088	0.056	0.030	0.018	0.008	0.002	0.001
4.00	0.11252	0.972	0.913	0.835	0.746	0.655	0.566	0.409	0.289	0.185	0.120	0.078	0.052	0.028	0.017	0.007	0.002	0.001
8.00	0.05741	0.968	0.906	0.826	0.735	0.642	0.552	0.397	0.279	0.178	0.114	0.074	0.049	0.027	0.016	0.007	0.002	0.001
16.00	0.02874	0.974	0.910	0.828	0.736	0.642	0.551	0.394	0.276	0.176	0.113	0.073	0.049	0.027	0.016	0.007	0.002	0.001
32.00	0.01437	0.977	0.913	0.830	0.737	0.642	0.551	0.393	0.275	0.175	0.112	0.073	0.049	0.027	0.016	0.007	0.002	0.001
64.00	0.00719	0.979	0.914	0.831	0.738	0.642	0.551	0.393	0.275	0.175	0.112	0.073	0.049	0.027	0.016	0.007	0.002	0.001
128.00	0.00359	0.980	0.915	0.831	0.738	0.642	0.551	0.393	0.275	0.175	0.112	0.073	0.049	0.027	0.016	0.007	0.002	0.001
256.00	0.00180	0.980	0.915	0.831	0.738	0.642	0.551	0.393	0.275	0.175	0.112	0.073	0.049	0.027	0.016	0.007	0.002	0.001
512.00	0.00090	0.980	0.915	0.832	0.738	0.642	0.551	0.393	0.274	0.174	0.112	0.073	0.049	0.027	0.016	0.007	0.002	0.001

(h-2) Wall half-angle, -10°

0.25	0.73459	0.999	0.996	0.991	0.983	0.973	0.960	0.927	0.880	0.801	0.693	0.532	0.384	0.182	0.086	0.026	0.006	0.002
0.50	0.55911	0.996	0.983	0.961	0.931	0.893	0.849	0.716	0.567	0.399	0.271	0.182	0.123	0.058	0.031	0.013	0.004	0.001
1.00	0.35430	0.991	0.965	0.911	0.839	0.758	0.674	0.512	0.375	0.248	0.164	0.109	0.073	0.037	0.022	0.009	0.003	0.001
2.00	0.19898	0.974	0.920	0.848	0.765	0.677	0.589	0.433	0.310	0.201	0.132	0.087	0.058	0.032	0.019	0.008	0.002	0.001
4.00	0.10197	0.981	0.921	0.843	0.754	0.662	0.572	0.414	0.294	0.190	0.123	0.081	0.055	0.030	0.018	0.008	0.002	0.001
8.00	0.05118	0.985	0.929	0.847	0.755	0.661	0.569	0.410	0.289	0.186	0.120	0.079	0.055	0.030	0.018	0.008	0.002	0.001
16.00	0.02562	0.985	0.933	0.850	0.757	0.661	0.569	0.408	0.287	0.184	0.119	0.078	0.054	0.030	0.018	0.008	0.002	0.001
32.00	0.01281	0.985	0.936	0.852	0.758	0.662	0.569	0.408	0.287	0.184	0.119	0.078	0.054	0.030	0.018	0.008	0.002	0.001
64.00	0.00641	0.985	0.937	0.853	0.759	0.662	0.569	0.408	0.286	0.183	0.118	0.078	0.054	0.030	0.018	0.008	0.002	0.001
128.00	0.00320	0.985	0.938	0.854	0.759	0.662	0.569	0.407	0.286	0.183	0.118	0.078	0.054	0.030	0.018	0.008	0.002	0.001
256.00	0.00160	0.985	0.938	0.854	0.759	0.662	0.569	0.407	0.286	0.183	0.118	0.077	0.054	0.030	0.018	0.008	0.002	0.001
512.00	0.00080	0.985	0.938	0.854	0.759	0.662	0.569	0.407	0.286	0.183	0.118	0.077	0.054	0.030	0.018	0.008	0.002	0.001

(h-3) Wall half-angle, -20°

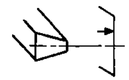
0.25	0.71861	0.998	0.993	0.983	0.970	0.952	0.930	0.871	0.784	0.630	0.470	0.333	0.229	0.109	0.055	0.021	0.006	0.002
0.50	0.51191	0.994	0.976	0.944	0.890	0.827	0.756	0.606	0.463	0.318	0.214	0.145	0.099	0.050	0.029	0.012	0.004	0.002
1.00	0.30478	0.980	0.934	0.871	0.795	0.713	0.629	0.472	0.344	0.228	0.152	0.102	0.070	0.038	0.023	0.010	0.003	0.001
2.00	0.15799	0.986	0.945	0.870	0.784	0.692	0.603	0.443	0.318	0.208	0.138	0.092	0.065	0.036	0.022	0.009	0.003	0.001
4.00	0.07975	0.985	0.944	0.877	0.785	0.690	0.597	0.435	0.310	0.202	0.133	0.089	0.064	0.035	0.021	0.009	0.003	0.001
8.00	0.03997	0.985	0.943	0.879	0.788	0.691	0.597	0.433	0.307	0.200	0.131	0.088	0.063	0.035	0.021	0.009	0.003	0.001
16.00	0.02000	0.985	0.943	0.879	0.791	0.693	0.598	0.432	0.306	0.199	0.130	0.088	0.063	0.035	0.021	0.009	0.003	0.001
32.00	0.01000	0.985	0.943	0.879	0.792	0.693	0.598	0.432	0.306	0.198	0.130	0.088	0.063	0.035	0.021	0.009	0.003	0.001
64.00	0.00500	0.985	0.943	0.879	0.793	0.694	0.598	0.432	0.306	0.198	0.130	0.088	0.063	0.035	0.021	0.009	0.003	0.001
128.00	0.00250	0.985	0.943	0.879	0.793	0.694	0.598	0.432	0.306	0.198	0.130	0.088	0.063	0.035	0.021	0.009	0.003	0.001
256.00	0.00125	0.985	0.943	0.879	0.793	0.694	0.598	0.432	0.306	0.198	0.129	0.088	0.063	0.035	0.021	0.009	0.003	0.001
512.00	0.00062	0.985	0.943	0.879	0.794	0.694	0.598	0.432	0.306	0.198	0.129	0.088	0.063	0.035	0.021	0.009	0.003	0.001

(h-4) Wall half-angle, -30°

0.25	0.62606	0.996	0.983	0.958	0.921	0.873	0.818	0.689	0.551	0.394	0.273	0.187	0.130	0.066	0.038	0.016	0.005	0.002
0.50	0.38723	0.989	0.955	0.899	0.831	0.754	0.673	0.517	0.383	0.259	0.175	0.120	0.084	0.046	0.028	0.012	0.004	0.002
1.00	0.20552	0.986	0.947	0.887	0.810	0.721	0.632	0.470	0.341	0.227	0.152	0.105	0.075	0.042	0.025	0.011	0.003	0.001
2.00	0.10443	0.986	0.944	0.881	0.804	0.717	0.624	0.459	0.330	0.218	0.146	0.101	0.073	0.041	0.025	0.011	0.003	0.001
4.00	0.05243	0.985	0.943	0.879	0.801	0.717	0.624	0.456	0.327	0.215	0.144	0.100	0.072	0.040	0.024	0.011	0.003	0.001
8.00	0.02624	0.985	0.943	0.879	0.801	0.716	0.626	0.456	0.326	0.214	0.143	0.100	0.072	0.040	0.024	0.011	0.003	0.001
16.00	0.01312	0.985	0.943	0.879	0.800	0.716	0.627	0.456	0.326	0.214	0.143	0.100	0.072	0.040	0.024	0.011	0.003	0.001
32.00	0.00656	0.985	0.943	0.879	0.800	0.716	0.627	0.456	0.326	0.213	0.143	0.100	0.072	0.040	0.024	0.011	0.003	0.001
64.00	0.00328	0.985	0.943	0.879	0.800	0.716	0.628	0.456	0.326	0.213	0.143	0.100	0.072	0.040	0.024	0.011	0.003	0.001
128.00	0.00164	0.985	0.943	0.879	0.800	0.716	0.628	0.457	0.326	0.213	0.143	0.100	0.072	0.040	0.024	0.011	0.003	0.001
256.00	0.00082	0.985	0.943	0.879	0.800	0.716	0.628	0.457	0.326	0.213	0.143	0.100	0.072	0.040	0.024	0.011	0.003	0.001
512.00	0.00041	0.985	0.943	0.879	0.800	0.716	0.628	0.457	0.326	0.213	0.143	0.100	0.072	0.040	0.024	0.011	0.003	0.001

(i) Length to inlet-width ratio, 1.00

(i-1) Wall half-angle, -5°



Nondimensional distance from slot exit, $X_5 - L$	Nondimensional centerplane flux relative to inlet flux, M(O)	Distance from centerplane, $\frac{Y_5}{X_5 - L}$																
		.1	.2	.3	.4	.5	.6	.8	1.	1.25	1.5	1.75	2.	2.5	3.	4.	6.	8.
		Flux relative to centerplane, $M(Y_5)/M(O)$																
0.25	0.62451	0.999	0.996	0.992	0.985	0.976	0.965	0.936	0.895	0.826	0.738	0.586	0.410	0.167	0.075	0.024	0.006	0.002
0.50	0.48533	0.996	0.985	0.966	0.940	0.907	0.868	0.762	0.592	0.400	0.254	0.153	0.101	0.050	0.028	0.011	0.003	0.001
1.00	0.31894	0.992	0.969	0.933	0.864	0.771	0.676	0.495	0.344	0.206	0.129	0.086	0.060	0.032	0.019	0.008	0.002	0.001
2.00	0.18672	0.990	0.931	0.843	0.746	0.646	0.549	0.380	0.250	0.151	0.099	0.068	0.048	0.026	0.015	0.007	0.002	0.001
4.00	0.10223	0.955	0.877	0.784	0.683	0.583	0.488	0.328	0.210	0.133	0.088	0.060	0.043	0.023	0.014	0.006	0.002	0.001
8.00	0.05243	0.953	0.870	0.772	0.668	0.565	0.469	0.310	0.199	0.127	0.084	0.058	0.041	0.022	0.013	0.006	0.002	0.001
16.00	0.02624	0.963	0.877	0.775	0.668	0.563	0.466	0.305	0.197	0.126	0.084	0.058	0.041	0.022	0.013	0.006	0.002	0.001
32.00	0.01312	0.969	0.881	0.777	0.668	0.562	0.464	0.303	0.196	0.126	0.084	0.057	0.041	0.022	0.013	0.006	0.002	0.001
64.00	0.00656	0.972	0.883	0.778	0.669	0.562	0.463	0.301	0.196	0.126	0.083	0.057	0.041	0.022	0.013	0.006	0.002	0.001
128.00	0.00328	0.974	0.884	0.779	0.669	0.562	0.463	0.301	0.196	0.125	0.083	0.057	0.041	0.022	0.013	0.006	0.002	0.001
256.00	0.00164	0.974	0.884	0.779	0.669	0.561	0.463	0.301	0.195	0.125	0.083	0.057	0.041	0.022	0.013	0.006	0.002	0.001
512.00	0.00082	0.975	0.885	0.779	0.669	0.561	0.462	0.300	0.195	0.125	0.083	0.057	0.041	0.022	0.013	0.006	0.002	0.001

(i-2) Wall half-angle, -10°

0.25	0.61772	0.998	0.993	0.984	0.972	0.956	0.935	0.882	0.811	0.662	0.480	0.323	0.207	0.092	0.048	0.018	0.005	0.002
0.50	0.44936	0.995	0.978	0.952	0.916	0.861	0.780	0.611	0.451	0.290	0.180	0.120	0.082	0.043	0.025	0.010	0.003	0.001
1.00	0.28081	0.991	0.945	0.869	0.782	0.690	0.597	0.428	0.292	0.181	0.119	0.081	0.057	0.031	0.018	0.008	0.002	0.001
2.00	0.15799	0.958	0.886	0.799	0.704	0.607	0.513	0.352	0.233	0.150	0.100	0.068	0.049	0.027	0.016	0.007	0.002	0.001
4.00	0.07975	0.985	0.904	0.806	0.702	0.598	0.500	0.335	0.225	0.145	0.097	0.067	0.047	0.026	0.016	0.007	0.002	0.001
8.00	0.03997	0.985	0.916	0.813	0.703	0.595	0.495	0.327	0.222	0.143	0.096	0.066	0.047	0.026	0.016	0.007	0.002	0.001
16.00	0.02000	0.985	0.924	0.818	0.705	0.595	0.492	0.323	0.220	0.142	0.095	0.066	0.047	0.026	0.016	0.007	0.002	0.001
32.00	0.01000	0.985	0.928	0.820	0.706	0.594	0.491	0.322	0.220	0.142	0.095	0.066	0.047	0.026	0.016	0.007	0.002	0.001
64.00	0.00500	0.985	0.931	0.821	0.706	0.594	0.491	0.321	0.220	0.142	0.095	0.066	0.047	0.026	0.015	0.007	0.002	0.001
128.00	0.00250	0.985	0.932	0.822	0.707	0.594	0.490	0.320	0.219	0.142	0.095	0.066	0.047	0.026	0.015	0.007	0.002	0.001
256.00	0.00125	0.985	0.932	0.822	0.707	0.594	0.490	0.320	0.219	0.142	0.095	0.066	0.047	0.026	0.015	0.007	0.002	0.001
512.00	0.00062	0.985	0.933	0.823	0.707	0.594	0.490	0.320	0.219	0.142	0.095	0.066	0.047	0.026	0.015	0.007	0.002	0.001

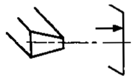
(i-3) Wall half-angle, -20°

0.25	0.45795	0.994	0.974	0.923	0.859	0.786	0.707	0.546	0.401	0.261	0.172	0.117	0.082	0.044	0.026	0.011	0.003	0.001
0.50	0.26963	0.983	0.924	0.850	0.764	0.674	0.584	0.420	0.294	0.192	0.128	0.088	0.063	0.034	0.021	0.009	0.003	0.001
1.00	0.13865	0.986	0.945	0.860	0.759	0.656	0.558	0.388	0.272	0.178	0.120	0.083	0.059	0.033	0.020	0.009	0.003	0.001
2.00	0.06983	0.985	0.943	0.876	0.765	0.654	0.549	0.379	0.266	0.174	0.117	0.081	0.058	0.032	0.019	0.009	0.003	0.001
4.00	0.03498	0.985	0.943	0.879	0.772	0.655	0.546	0.376	0.263	0.172	0.116	0.081	0.058	0.032	0.019	0.009	0.003	0.001
8.00	0.01750	0.985	0.943	0.879	0.776	0.656	0.544	0.375	0.262	0.172	0.116	0.081	0.058	0.032	0.019	0.008	0.003	0.001
16.00	0.00875	0.985	0.943	0.879	0.779	0.656	0.543	0.374	0.262	0.172	0.116	0.081	0.058	0.032	0.019	0.008	0.003	0.001
32.00	0.00437	0.985	0.943	0.879	0.780	0.657	0.543	0.374	0.262	0.172	0.116	0.081	0.058	0.032	0.019	0.008	0.003	0.001
64.00	0.00219	0.985	0.943	0.879	0.781	0.657	0.543	0.374	0.262	0.172	0.116	0.081	0.058	0.032	0.019	0.008	0.003	0.001
128.00	0.00109	0.985	0.943	0.879	0.781	0.657	0.543	0.374	0.262	0.172	0.116	0.081	0.058	0.032	0.019	0.008	0.003	0.001
256.00	0.00055	0.985	0.943	0.879	0.782	0.657	0.543	0.374	0.262	0.172	0.116	0.081	0.058	0.032	0.019	0.008	0.003	0.001
512.00	0.00027	0.985	0.943	0.879	0.782	0.657	0.543	0.374	0.262	0.172	0.116	0.081	0.058	0.032	0.019	0.008	0.003	0.001

TABLE VII. - Concluded. CALCULATED DISTRIBUTIONS OF PARTICLE FLUX ALONG PLANES AT VARIOUS DISTANCES FROM SLOT EXIT (EQ. (11))

(j) Length to inlet-width ratio, 2.00

(j-1) Wall half-angle, -5^{o}

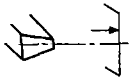


Nondimensional distance from slot exit, $X_5 - L$	Nondimensional centerplane flux relative to inlet flux, M(O)	Distance from centerplane, $\frac{Y_5}{X_5 - L}$																
		.1	.2	.3	.4	.5	.6	.8	1.	1.25	1.5	1.75	2.	2.5	3.	4.	6.	8.
		Flux relative to centerplane, $M(Y_5)/M(O)$																
0.25	0.49254	0.999	0.994	0.987	0.977	0.964	0.948	0.905	0.847	0.758	0.544	0.336	0.207	0.090	0.046	0.016	0.004	0.002
0.50	0.37201	0.995	0.982	0.960	0.930	0.894	0.851	0.642	0.442	0.262	0.165	0.108	0.074	0.038	0.022	0.009	0.003	0.001
1.00	0.24471	0.992	0.970	0.909	0.797	0.680	0.565	0.364	0.244	0.153	0.100	0.068	0.047	0.025	0.015	0.006	0.002	0.001
2.00	0.14770	0.983	0.878	0.760	0.637	0.517	0.407	0.270	0.184	0.117	0.077	0.053	0.037	0.020	0.012	0.005	0.002	0.001
4.00	0.08399	0.908	0.793	0.668	0.542	0.423	0.341	0.228	0.156	0.100	0.066	0.045	0.032	0.018	0.011	0.005	0.001	0.001
8.00	0.04246	0.926	0.797	0.659	0.523	0.408	0.331	0.222	0.152	0.098	0.065	0.045	0.032	0.017	0.010	0.005	0.001	0.001
16.00	0.02125	0.943	0.804	0.658	0.515	0.404	0.328	0.220	0.151	0.097	0.065	0.044	0.032	0.017	0.010	0.005	0.001	0.001
32.00	0.01062	0.952	0.808	0.657	0.511	0.402	0.326	0.219	0.150	0.097	0.064	0.044	0.032	0.017	0.010	0.005	0.001	0.001
64.00	0.00531	0.957	0.810	0.657	0.508	0.401	0.326	0.219	0.150	0.097	0.064	0.044	0.032	0.017	0.010	0.005	0.001	0.001
128.00	0.00266	0.960	0.812	0.656	0.507	0.401	0.325	0.219	0.150	0.097	0.064	0.044	0.032	0.017	0.010	0.005	0.001	0.001
256.00	0.00133	0.961	0.812	0.656	0.506	0.401	0.325	0.219	0.150	0.097	0.064	0.044	0.032	0.017	0.010	0.005	0.001	0.001
512.00	0.00066	0.962	0.812	0.656	0.506	0.400	0.325	0.219	0.150	0.096	0.064	0.044	0.032	0.017	0.010	0.005	0.001	0.001

(j-2) Wall half angle, -10^{o}

0.25	0.37897	0.994	0.978	0.951	0.905	0.814	0.716	0.519	0.356	0.225	0.146	0.098	0.068	0.036	0.021	0.009	0.003	0.001
0.50	0.24323	0.992	0.910	0.813	0.707	0.598	0.493	0.336	0.232	0.149	0.098	0.067	0.048	0.026	0.015	0.007	0.002	0.001
1.00	0.13865	0.944	0.840	0.724	0.604	0.492	0.405	0.277	0.191	0.123	0.082	0.057	0.040	0.022	0.013	0.006	0.002	0.001
2.00	0.06983	0.985	0.864	0.723	0.583	0.477	0.392	0.268	0.186	0.120	0.080	0.056	0.040	0.022	0.013	0.006	0.002	0.001
4.00	0.03498	0.985	0.883	0.722	0.576	0.471	0.387	0.265	0.184	0.119	0.080	0.055	0.039	0.022	0.013	0.006	0.002	0.001
8.00	0.01750	0.985	0.897	0.721	0.574	0.468	0.385	0.264	0.183	0.119	0.079	0.055	0.039	0.022	0.013	0.006	0.002	0.001
16.00	0.00875	0.985	0.905	0.721	0.572	0.467	0.384	0.263	0.182	0.118	0.079	0.055	0.039	0.022	0.013	0.006	0.002	0.001
32.00	0.00437	0.985	0.910	0.720	0.572	0.467	0.384	0.263	0.182	0.118	0.079	0.055	0.039	0.022	0.013	0.006	0.002	0.001
64.00	0.00219	0.985	0.912	0.720	0.572	0.467	0.384	0.263	0.182	0.118	0.079	0.055	0.039	0.022	0.013	0.006	0.002	0.001
128.00	0.00109	0.985	0.913	0.720	0.572	0.466	0.384	0.262	0.182	0.118	0.079	0.055	0.039	0.022	0.013	0.006	0.002	0.001
256.00	0.00055	0.985	0.914	0.720	0.572	0.466	0.384	0.262	0.182	0.118	0.079	0.055	0.039	0.022	0.013	0.006	0.002	0.001
512.00	0.00027	0.985	0.914	0.720	0.571	0.466	0.384	0.262	0.182	0.118	0.079	0.055	0.039	0.022	0.013	0.006	0.002	0.001

(k) Length to inlet width ratio, 4.00; wall half-angle, -5°

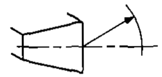


Nondimensional distance from slot exit, $X_5 - L$	Nondimensional centerplane flux relative to inlet flux, M(O)	Distance from centerplane, $\frac{Y_5}{X_5 - L}$																
		.1	.2	.3	.4	.5	.6	.8	1.	1.25	1.5	1.75	2.	2.5	3.	4.	6.	8.
		Flux relative to centerplane, $M(Y_5)/M(O)$																
0.25	0.31449	0.996	0.985	0.966	0.941	0.909	0.872	0.645	0.415	0.252	0.159	0.104	0.071	0.036	0.021	0.008	0.002	0.001
0.50	0.21760	0.994	0.975	0.924	0.776	0.624	0.492	0.323	0.218	0.138	0.090	0.061	0.043	0.023	0.013	0.006	0.002	0.001
1.00	0.14070	0.992	0.836	0.670	0.517	0.412	0.334	0.223	0.152	0.097	0.064	0.044	0.031	0.017	0.010	0.004	0.001	0.001
2.00	0.08694	0.850	0.670	0.501	0.394	0.317	0.258	0.173	0.119	0.076	0.051	0.035	0.025	0.014	0.008	0.004	0.001	0.000
4.00	0.04495	0.858	0.634	0.471	0.372	0.300	0.244	0.165	0.113	0.073	0.049	0.033	0.024	0.013	0.008	0.003	0.001	0.000
8.00	0.02249	0.884	0.621	0.465	0.368	0.297	0.242	0.164	0.112	0.072	0.048	0.033	0.024	0.013	0.008	0.003	0.001	0.000
16.00	0.01125	0.901	0.617	0.462	0.366	0.296	0.241	0.163	0.112	0.072	0.048	0.033	0.024	0.013	0.008	0.003	0.001	0.000
32.00	0.00562	0.912	0.616	0.461	0.365	0.295	0.241	0.163	0.112	0.072	0.048	0.033	0.024	0.013	0.008	0.003	0.001	0.000
64.00	0.00281	0.917	0.615	0.461	0.365	0.295	0.240	0.162	0.112	0.072	0.048	0.033	0.024	0.013	0.008	0.003	0.001	0.000
128.00	0.00141	0.920	0.615	0.460	0.364	0.294	0.240	0.162	0.112	0.072	0.048	0.033	0.024	0.013	0.008	0.003	0.001	0.000
256.00	0.00070	0.922	0.614	0.460	0.364	0.294	0.240	0.162	0.112	0.072	0.048	0.033	0.024	0.013	0.008	0.003	0.001	0.000
512.00	0.00035	0.922	0.614	0.460	0.364	0.294	0.240	0.162	0.112	0.072	0.048	0.033	0.024	0.013	0.008	0.003	0.001	0.000

TABLE VIII. - CALCULATED ANGULAR DISTRIBUTIONS OF PARTICLE FLUX AT VARIOUS RADIAL DISTANCES FROM SLOT EXIT (EQ. (12))

(a) Length to inlet-width ratio, 0.25

(a-1) Wall half-angle, 0°



Nondimensional downstream radial distance, R_P	Nondimensional centerplane flux relative to inlet flux, M(O)	Angle from centerplane, φ, deg																
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
		Flux relative to centerplane, $M(\varphi)/M(O)$																
0.50	0.63040	1.007	1.011	1.011	1.009	1.003	0.994	0.982	0.967	0.949	0.929	0.906	0.881	0.854	0.825	0.795	0.764	0.731
1.00	0.40904	1.001	0.997	0.988	0.975	0.957	0.937	0.901	0.860	0.811	0.754	0.688	0.611	0.522	0.421	0.306	0.178	0.068
2.00	0.22968	0.998	0.989	0.974	0.943	0.907	0.863	0.813	0.757	0.694	0.625	0.550	0.468	0.381	0.290	0.194	0.100	0.047
4.00	0.12043	0.997	0.981	0.953	0.918	0.877	0.829	0.775	0.715	0.650	0.578	0.503	0.422	0.338	0.251	0.161	0.089	0.043
8.00	0.06144	0.993	0.972	0.943	0.907	0.864	0.815	0.760	0.699	0.632	0.561	0.485	0.405	0.322	0.236	0.149	0.086	0.041
16.00	0.03099	0.989	0.967	0.938	0.902	0.859	0.809	0.753	0.692	C.625	0.553	0.478	0.398	0.315	0.230	0.143	0.085	0.041
32.00	0.01556	0.987	0.965	0.936	0.899	0.856	0.806	0.750	0.689	0.622	0.550	0.474	0.395	0.312	0.227	0.141	0.084	0.040
64.00	0.00780	0.986	0.964	0.935	0.898	0.855	0.805	0.749	0.687	0.620	0.549	0.473	0.393	0.311	0.226	0.139	0.084	0.040
128.00	0.00390	0.986	0.964	0.934	0.898	0.854	0.804	0.748	0.686	0.619	0.548	0.472	0.392	0.310	0.225	0.139	0.084	0.040
256.00	0.00195	0.986	0.963	0.934	0.897	0.854	0.804	0.748	0.686	0.619	0.547	0.472	0.392	0.310	0.225	0.138	0.084	0.040
512.00	0.00098	0.985	0.963	0.934	0.897	0.854	0.804	0.748	0.686	0.619	0.547	0.471	0.392	0.310	0.225	0.138	0.084	0.040

(a-2) Wall half-angle, 5°

0.52	0.61805	1.007	1.011	1.011	1.009	1.003	0.994	0.983	0.968	0.951	0.931	0.908	0.883	0.856	0.827	0.797	0.766	0.733
1.00	0.41202	1.001	0.998	0.990	0.977	0.960	0.939	0.916	0.877	0.829	0.773	0.707	0.630	0.541	0.437	0.318	0.185	0.066
2.00	0.23264	0.998	0.990	0.975	0.955	0.918	0.875	0.824	0.767	0.704	0.634	0.557	0.474	0.385	0.291	0.193	0.094	0.044
4.00	0.12232	0.997	0.987	0.963	0.928	0.886	0.837	0.782	0.721	0.654	0.582	0.505	0.423	0.338	0.249	0.158	0.083	0.040
8.00	0.06248	0.996	0.982	0.952	0.915	0.872	0.822	0.765	0.703	0.635	0.563	0.485	0.404	0.320	0.233	0.144	0.080	0.038
16.00	0.03154	0.996	0.977	0.947	0.909	0.865	0.815	0.758	0.695	0.627	0.554	0.477	0.396	0.312	0.226	0.138	0.079	0.038
32.00	0.01584	0.996	0.974	0.944	0.907	0.862	0.811	0.754	0.691	0.623	0.551	0.473	0.393	0.309	0.223	0.135	0.078	0.037
64.00	0.00794	0.996	0.973	0.943	0.905	0.861	0.810	0.753	0.690	0.622	0.549	0.472	0.391	0.307	0.221	0.134	0.078	0.037
128.00	0.00397	0.996	0.973	0.942	0.905	0.860	0.809	0.752	0.689	0.621	0.548	0.471	0.390	0.307	0.221	0.133	0.078	0.037
256.00	0.00199	0.995	0.972	0.942	0.904	0.860	0.809	0.752	0.689	0.620	0.548	0.470	0.390	0.306	0.220	0.133	0.078	0.037
512.00	0.00099	0.995	0.972	0.942	0.904	C.860	0.809	0.751	0.688	0.620	0.547	0.470	0.390	0.306	0.220	0.132	0.078	0.037

(a-3) Wall half-angle, 10°

0.54	0.60189	1.007	1.010	1.011	1.008	1.003	0.994	0.983	0.968	0.951	0.931	0.909	0.884	0.856	0.827	0.796	0.764	0.731
1.00	0.41395	1.002	0.999	0.991	0.979	0.963	0.942	0.919	0.892	0.854	0.799	0.734	0.657	0.567	0.460	0.337	0.197	0.063
2.00	0.23523	0.998	0.990	0.976	0.957	0.933	0.891	0.840	0.782	0.718	0.646	0.568	0.483	0.392	0.295	0.194	0.089	0.041
4.00	0.12408	0.997	0.987	0.970	0.942	0.899	0.849	0.793	0.731	0.662	0.589	0.510	0.426	0.338	0.248	0.154	0.076	0.036
8.00	0.06348	0.996	0.985	0.966	0.928	0.883	0.831	0.774	0.710	0.641	0.566	0.487	0.405	0.318	0.230	0.139	0.073	0.034
16.00	0.03207	0.996	0.985	0.959	0.921	0.876	0.823	0.765	0.701	0.631	0.557	0.478	0.396	0.310	0.222	0.132	0.071	0.034
32.00	0.01611	0.996	0.985	0.957	0.918	0.872	0.820	0.761	0.697	0.627	0.553	0.474	0.391	0.306	0.218	0.129	0.071	0.034
64.00	0.00808	0.996	0.985	0.955	0.916	0.870	0.818	0.759	0.695	0.625	0.551	0.472	0.390	0.304	0.217	0.127	0.071	0.034
128.00	0.00404	0.996	0.985	0.954	0.915	0.870	0.817	0.758	0.694	0.624	0.550	0.471	0.389	0.303	0.216	0.126	0.070	0.033
256.00	0.00202	0.996	0.985	0.954	0.915	0.869	0.817	0.758	0.693	0.624	0.549	0.470	0.388	0.303	0.215	0.126	0.070	0.033
512.00	0.00101	0.996	0.985	0.954	0.915	0.869	0.816	0.758	0.693	0.623	0.549	0.470	0.388	0.303	0.215	0.126	0.070	0.033

(a-4) Wall half-angle, 20°

0.59	0.57202	1.006	1.009	1.009	1.006	1.001	0.992	0.980	0.966	0.949	0.928	0.905	0.880	0.852	0.821	0.788	0.752	0.714
1.00	0.41360	1.002	1.000	0.993	0.982	0.967	0.947	0.924	0.897	0.866	0.834	0.790	0.714	0.623	0.513	0.381	0.225	0.058
2.00	0.23733	0.999	0.991	0.977	0.958	0.933	0.904	0.871	0.816	0.749	0.675	0.594	0.505	0.409	0.306	0.199	0.087	0.034
4.00	0.12584	0.997	0.987	0.970	0.947	0.918	0.877	0.818	0.754	0.682	0.605	0.523	0.435	0.344	0.248	0.150	0.064	0.030
8.00	0.06454	0.996	0.985	0.967	0.943	0.909	0.855	0.794	0.728	0.655	0.578	0.495	0.409	0.319	0.227	0.132	0.060	0.028
16.00	0.03265	0.996	0.985	0.966	0.941	0.899	0.845	0.783	0.716	0.644	0.566	0.484	0.398	0.309	0.217	0.124	0.059	0.028
32.00	0.01641	0.996	0.984	0.965	0.940	0.895	0.840	0.778	0.711	0.638	0.561	0.479	0.393	0.304	0.213	0.120	0.058	0.027
64.00	0.00823	0.996	0.984	0.965	0.940	0.893	0.838	0.776	0.709	0.636	0.558	0.476	0.390	0.302	0.211	0.118	0.058	0.027
128.00	0.00412	0.996	0.984	0.965	0.940	0.892	0.836	0.775	0.707	0.634	0.557	0.475	0.389	0.301	0.210	0.117	0.058	0.027
256.00	0.00206	0.996	0.984	0.965	0.940	0.891	0.836	0.774	0.707	0.634	0.556	0.474	0.389	0.300	0.209	0.117	0.058	0.027
512.00	0.00103	0.996	0.984	0.965	0.939	0.891	0.836	0.774	0.706	0.634	0.556	0.474	0.388	0.300	0.209	0.117	0.058	0.027

(a-5) Wall half-angle, 30^{o}

0.64	0.53668	1.005	1.007	1.006	1.003	0.996	0.987	0.975	0.960	0.942	0.921	0.897	0.870	0.840	0.806	0.768	0.727	0.680
1.00	0.40933	1.002	1.000	0.995	0.985	0.970	0.952	0.929	0.903	0.872	0.837	0.800	0.759	0.707	0.595	0.454	0.279	0.072
2.00	0.23693	0.999	0.992	0.978	0.959	0.934	0.905	0.870	0.832	0.790	0.721	0.635	0.541	0.439	0.329	0.212	0.090	0.027
4.00	0.12627	0.997	0.987	0.970	0.946	0.917	0.882	0.843	0.790	0.715	0.634	0.547	0.454	0.357	0.256	0.152	0.051	0.023
8.00	0.06493	0.996	0.985	0.966	0.941	0.910	0.873	0.828	0.758	0.681	0.600	0.513	0.422	0.327	0.229	0.129	0.047	0.022
16.00	0.03288	0.996	0.984	0.965	0.939	0.907	0.869	0.814	0.743	0.666	0.585	0.498	0.408	0.314	0.217	0.119	0.046	0.021
32.00	0.01654	0.996	0.984	0.964	0.938	0.906	0.868	0.807	0.736	0.659	0.578	0.491	0.401	0.308	0.212	0.115	0.046	0.021
64.00	0.00829	0.996	0.984	0.964	0.938	0.905	0.867	0.804	0.733	0.656	0.574	0.488	0.398	0.305	0.209	0.112	0.046	0.021
128.00	0.00415	0.996	0.984	0.964	0.937	0.905	0.866	0.803	0.731	0.655	0.573	0.486	0.396	0.303	0.208	0.111	0.045	0.021
256.00	0.00208	0.996	0.984	0.964	0.937	0.905	0.866	0.802	0.731	0.654	0.572	0.486	0.396	0.303	0.207	0.111	0.045	0.021
512.00	0.00104	0.996	0.984	0.964	0.937	0.904	0.866	0.802	0.730	0.653	0.571	0.485	0.395	0.302	0.207	0.110	0.045	0.021

(a-6) Wall half-angle, 45^{o}

0.75	0.47854	1.003	1.003	1.001	0.995	0.988	0.977	0.963	0.946	0.926	0.902	0.875	0.844	0.808	0.768	0.721	0.667	0.604
1.00	0.39880	1.002	1.000	0.995	0.986	0.973	0.956	0.935	0.910	0.881	0.846	0.807	0.764	0.715	0.663	0.609	0.457	0.172
2.00	0.23294	0.999	0.992	0.979	0.961	0.937	0.908	0.873	0.833	0.789	0.740	0.688	0.631	0.520	0.394	0.258	0.114	0.018
4.00	0.12490	0.997	0.987	0.971	0.947	0.917	0.882	0.841	0.795	0.744	0.690	0.613	0.510	0.401	0.288	0.170	0.049	0.014
8.00	0.06442	0.996	0.985	0.967	0.941	0.909	0.870	0.827	0.778	0.724	0.659	0.563	0.463	0.358	0.249	0.138	0.030	0.013
16.00	0.03268	0.996	0.984	0.965	0.938	0.905	0.865	0.820	0.770	0.715	0.637	0.542	0.442	0.339	0.233	0.125	0.029	0.013
32.00	0.01645	0.996	0.984	0.964	0.937	0.903	0.863	0.817	0.767	0.711	0.627	0.532	0.433	0.330	0.225	0.118	0.029	0.013
64.00	0.00825	0.996	0.984	0.964	0.936	0.902	0.862	0.816	0.765	0.709	0.622	0.527	0.428	0.326	0.222	0.115	0.029	0.013
128.00	0.00413	0.996	0.984	0.963	0.936	0.902	0.861	0.815	0.764	0.708	0.620	0.525	0.426	0.324	0.220	0.114	0.029	0.013
256.00	0.00207	0.996	0.983	0.963	0.936	0.902	0.861	0.815	0.764	0.708	0.618	0.524	0.425	0.323	0.219	0.113	0.029	0.013
512.00	0.00103	0.996	0.983	0.963	0.936	0.902	0.861	0.815	0.763	0.707	0.618	0.523	0.425	0.323	0.218	0.112	0.029	0.013

(a-7) Wall half-angle, 60^{o}

0.92	0.40736	1.001	0.999	0.994	0.986	0.976	0.962	0.944	0.923	0.899	0.870	0.836	0.797	0.753	0.702	0.642	0.573	0.493
1.00	0.38675	1.001	0.998	0.993	0.984	0.972	0.957	0.938	0.914	0.887	0.855	0.818	0.776	0.727	0.671	0.607	0.535	0.459
2.00	0.22689	0.999	0.992	0.980	0.963	0.940	0.912	0.878	0.839	0.794	0.744	0.689	0.629	0.564	0.495	0.383	0.196	0.011
4.00	0.12215	0.997	0.988	0.972	0.949	0.920	0.884	0.843	0.796	0.744	0.687	0.626	0.560	0.490	0.370	0.229	0.083	0.008
8.00	0.06316	0.997	0.986	0.967	0.942	0.910	0.871	0.827	0.777	0.721	0.661	0.597	0.529	0.435	0.309	0.178	0.046	0.007
16.00	0.03208	0.996	0.985	0.965	0.939	0.906	0.866	0.820	0.768	0.711	0.649	0.584	0.514	0.406	0.283	0.158	0.030	0.007
32.00	0.01616	0.996	0.984	0.965	0.938	0.904	0.863	0.816	0.764	0.706	0.644	0.577	0.507	0.392	0.271	0.148	0.023	0.006
64.00	0.00811	0.996	0.984	0.964	0.937	0.903	0.862	0.814	0.762	0.704	0.641	0.574	0.503	0.386	0.266	0.143	0.020	0.006
128.00	0.00406	0.996	0.984	0.964	0.937	0.902	0.861	0.814	0.761	0.702	0.640	0.573	0.500	0.383	0.263	0.141	0.018	0.006
256.00	0.00203	0.996	0.984	0.964	0.936	0.902	0.861	0.813	0.760	0.702	0.639	0.572	0.498	0.381	0.262	0.140	0.017	0.006
512.00	0.00102	0.996	0.984	0.964	0.936	0.902	0.860	0.813	0.760	0.702	0.639	0.571	0.497	0.381	0.261	0.139	0.017	0.006

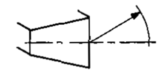
(a-8) Wall half-angle, 75^{o}

1.42	0.29008	0.999	0.994	0.985	0.972	0.955	0.933	0.908	0.877	0.841	0.800	0.753	0.700	0.640	0.573	0.498	0.415	0.323
2.00	0.22032	0.998	0.991	0.980	0.963	0.942	0.915	0.883	0.845	0.802	0.753	0.698	0.637	0.570	0.497	0.418	0.335	0.246
4.00	0.11883	0.997	0.988	0.972	0.951	0.923	0.888	0.848	0.802	0.750	0.692	0.630	0.562	0.490	0.413	0.332	0.248	0.014
8.00	0.06153	0.997	0.986	0.969	0.944	0.913	0.875	0.831	0.781	0.725	0.664	0.598	0.528	0.453	0.375	0.294	0.156	0.002
16.00	0.03128	0.996	0.985	0.967	0.941	0.908	0.869	0.823	0.771	0.714	0.651	0.584	0.512	0.436	0.358	0.276	0.120	0.002
32.00	0.01576	0.996	0.985	0.966	0.939	0.906	0.866	0.819	0.767	0.708	0.645	0.577	0.504	0.428	0.349	0.267	0.105	0.002
64.00	0.00791	0.996	0.985	0.965	0.939	0.905	0.864	0.817	0.764	0.706	0.642	0.573	0.500	0.424	0.345	0.263	0.097	0.002
128.00	0.00396	0.996	0.984	0.965	0.938	0.904	0.864	0.816	0.763	0.704	0.640	0.571	0.499	0.422	0.343	0.261	0.094	0.002
256.00	0.00198	0.996	0.984	0.965	0.938	0.904	0.863	0.816	0.763	0.704	0.639	0.571	0.498	0.421	0.342	0.259	0.092	0.002
512.00	0.00099	0.996	0.984	0.965	0.938	0.904	0.863	0.816	0.762	0.703	0.639	0.570	0.497	0.421	0.341	0.258	0.091	0.002

TABLE VIII. - Continued. CALCULATED ANGULAR DISTRIBUTIONS OF PARTICLE FLUX AT VARIOUS RADIAL DISTANCES FROM SLOT EXIT (EQ. (12))

(b) Length to inlet-width ratio, 0.50

(b-1) Wall half-angle, 0°



Nondimensional downstream radial distance, R_p	Nondimensional centerplane flux relative to inlet flux, M(O)	Angle from centerplane, φ, deg: 5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
		Flux relative to centerplane, $M(\varphi)/M(O)$																
0.50	0.57375	1.011	1.018	1.021	1.020	1.014	1.005	0.991	0.975	0.955	0.932	0.906	0.878	0.848	0.816	0.783	0.748	0.712
1.00	0.38014	1.003	1.000	0.991	0.978	0.961	0.942	0.900	0.851	0.795	0.731	0.656	0.571	0.472	0.360	0.234	0.139	0.065
2.00	0.21896	0.998	0.990	0.975	0.937	0.892	0.840	0.783	0.718	0.647	0.570	0.487	0.397	0.303	0.204	0.146	0.093	0.044
4.00	0.11717	0.997	0.976	0.939	0.895	0.845	0.788	0.726	0.657	0.584	0.505	0.422	0.334	0.244	0.178	0.128	0.081	0.039
8.00	0.06054	0.990	0.959	0.920	0.874	0.822	0.764	0.700	0.630	0.556	0.477	0.394	0.308	0.219	0.168	0.121	0.077	0.037
16.00	0.03076	0.983	0.950	0.910	0.864	0.811	0.752	0.687	0.617	0.543	0.464	0.381	0.295	0.213	0.164	0.118	0.075	0.036
32.00	0.01550	0.978	0.946	0.906	0.859	0.806	0.746	0.681	0.611	0.536	0.457	0.375	0.289	0.210	0.162	0.117	0.075	0.036
64.00	0.00778	0.976	0.944	0.904	0.857	0.803	0.744	0.679	0.608	0.533	0.454	0.372	0.286	0.209	0.161	0.116	0.074	0.036
128.00	0.00390	0.975	0.942	0.902	0.855	0.802	0.742	0.677	0.607	0.532	0.453	0.370	0.285	0.209	0.161	0.116	0.074	0.035
256.00	0.00195	0.975	0.942	0.902	0.855	0.801	0.742	0.676	0.606	0.531	0.452	0.370	0.284	0.208	0.161	0.116	0.074	0.035
512.00	0.00098	0.975	0.942	0.902	0.854	0.801	0.741	0.676	0.606	0.531	0.452	0.369	0.284	0.208	0.160	0.116	0.074	0.035

(b-2) Wall half-angle, 5°

0.54	0.55316	1.011	1.018	1.021	1.019	1.014	1.005	0.992	0.976	0.956	0.933	0.908	0.881	0.851	0.820	0.787	0.753	0.718
1.00	0.38582	1.004	1.002	0.994	0.982	0.966	0.947	0.925	0.888	0.834	0.771	0.698	0.612	0.513	0.396	0.262	0.142	0.066
2.00	0.22460	0.999	0.991	0.978	0.961	0.916	0.864	0.806	0.740	0.668	0.589	0.503	0.410	0.312	0.208	0.141	0.089	0.042
4.00	0.12081	0.997	0.988	0.960	0.915	0.863	0.805	0.741	0.671	0.595	0.514	0.428	0.338	0.244	0.169	0.121	0.076	0.036
8.00	0.06257	0.997	0.979	0.939	0.891	0.838	0.777	0.711	0.639	0.563	0.481	0.396	0.307	0.216	0.159	0.114	0.072	0.034
16.00	0.03183	0.996	0.969	0.928	0.880	0.825	0.764	0.697	0.625	0.548	0.467	0.381	0.293	0.203	0.154	0.111	0.070	0.033
32.00	0.01605	0.996	0.964	0.923	0.874	0.819	0.758	0.690	0.618	0.541	0.459	0.375	0.287	0.199	0.152	0.109	0.070	0.033
64.00	0.00806	0.996	0.962	0.920	0.871	0.816	0.754	0.687	0.615	0.537	0.456	0.371	0.283	0.197	0.151	0.109	0.069	0.033
128.00	0.00404	0.995	0.961	0.919	0.870	0.815	0.753	0.686	0.613	0.536	0.454	0.369	0.282	0.197	0.151	0.108	0.069	0.033
256.00	0.00202	0.995	0.960	0.918	0.869	0.814	0.752	0.685	0.612	0.535	0.453	0.369	0.281	0.197	0.151	0.108	0.069	0.033
512.00	0.00101	0.994	0.960	0.918	0.869	0.813	0.752	0.684	0.612	0.534	0.453	0.368	0.281	0.196	0.151	0.108	0.069	0.033

(b-3) Wall half-angle, 10°

0.59	0.52697	1.010	1.017	1.019	1.018	1.013	1.004	0.991	0.975	0.956	0.934	0.909	0.881	0.852	0.821	0.788	0.755	0.720
1.00	0.38888	1.005	1.004	0.998	0.987	0.972	0.953	0.931	0.907	0.883	0.828	0.757	0.673	0.573	0.453	0.309	0.148	0.067
2.00	0.22920	0.999	0.992	0.979	0.962	0.941	0.900	0.840	0.773	0.699	0.617	0.527	0.431	0.327	0.217	0.134	0.083	0.039
4.00	0.12405	0.997	0.988	0.972	0.944	0.891	0.831	0.764	0.691	0.612	0.528	0.439	0.345	0.247	0.158	0.112	0.070	0.033
8.00	0.06444	0.997	0.986	0.966	0.917	0.861	0.798	0.729	0.655	0.575	0.490	0.401	0.309	0.214	0.147	0.104	0.066	0.031
16.00	0.03282	0.996	0.985	0.954	0.903	0.846	0.782	0.713	0.638	0.557	0.473	0.385	0.293	0.199	0.142	0.101	0.064	0.030
32.00	0.01656	0.996	0.985	0.948	0.897	0.839	0.775	0.705	0.629	0.549	0.465	0.376	0.285	0.192	0.140	0.100	0.063	0.030
64.00	0.00832	0.996	0.985	0.945	0.893	0.835	0.771	0.701	0.625	0.545	0.461	0.373	0.282	0.188	0.139	0.099	0.063	0.030
128.00	0.00417	0.996	0.985	0.943	0.892	0.834	0.769	0.699	0.623	0.543	0.459	0.371	0.280	0.187	0.139	0.099	0.063	0.030
256.00	0.00209	0.996	0.985	0.942	0.891	0.833	0.768	0.698	0.622	0.542	0.458	0.370	0.279	0.186	0.139	0.099	0.063	0.030
512.00	0.00104	0.996	0.985	0.942	0.891	0.832	0.768	0.698	0.622	0.542	0.457	0.369	0.278	0.185	0.139	0.099	0.063	0.030

(b-4) Wall half-angle, 20°

0.68	0.48089	1.009	1.014	1.016	1.014	1.009	0.999	0.987	0.971	0.951	0.929	0.904	0.876	0.846	0.814	0.781	0.746	0.711
1.00	0.3[illegible]639	1.005	1.006	1.002	0.993	0.981	0.963	0.943	0.919	0.892	0.864	0.835	0.804	0.709	0.589	0.434	0.234	0.073
2.00	0.23210	1.000	0.994	0.982	0.964	0.942	0.916	0.888	0.846	0.769	0.682	0.587	0.482	0.368	0.246	0.122	0.074	0.034
4.00	0.12689	0.998	0.988	0.972	0.950	0.925	0.889	0.818	0.740	0.655	0.565	0.468	0.366	0.260	0.150	0.097	0.060	0.028
8.00	0.06624	0.997	0.985	0.968	0.945	0.913	0.846	0.772	0.692	0.606	0.515	0.419	0.320	0.217	0.126	0.089	0.055	0.026
16.00	0.03382	0.996	0.984	0.966	0.942	0.894	0.825	0.750	0.669	0.583	0.492	0.397	0.299	0.198	0.122	0.086	0.053	0.025
32.00	0.01709	0.996	0.984	0.965	0.941	0.885	0.815	0.740	0.659	0.572	0.482	0.387	0.289	0.189	0.120	0.084	0.053	0.025
64.00	0.00859	0.996	0.984	0.965	0.940	0.880	0.810	0.735	0.653	0.567	0.476	0.382	0.285	0.185	0.118	0.083	0.052	0.024
128.00	0.00430	0.996	0.983	0.965	0.940	0.878	0.808	0.732	0.651	0.565	0.474	0.380	0.282	0.183	0.118	0.083	0.052	0.024
256.00	0.00216	0.996	0.983	0.964	0.940	0.877	0.807	0.731	0.650	0.563	0.473	0.378	0.281	0.182	0.118	0.083	0.052	0.024
512.00	0.00108	0.996	0.983	0.964	0.939	0.876	0.806	0.730	0.649	0.563	0.472	0.378	0.281	0.181	0.118	0.083	0.052	0.024

(b-5) Wall half-angle, 30°

0.79	0.43026	1.007	1.011	1.011	1.008	1.002	0.992	0.979	0.962	0.942	0.919	0.893	0.864	0.833	0.799	0.763	0.725	0.686
1.00	0.37641	1.005	1.007	1.004	0.997	0.987	0.972	0.954	0.931	0.905	0.876	0.845	0.811	0.777	0.746	0.672	0.456	0.120
2.00	0.22998	1.001	0.995	0.984	0.967	0.945	0.919	0.889	0.857	0.822	0.787	0.685	0.571	0.444	0.305	0.154	0.065	0.028
4.00	0.12700	0.998	0.988	0.972	0.950	0.923	0.891	0.856	0.819	0.727	0.628	0.522	0.410	0.291	0.169	0.080	0.048	0.022
8.00	0.06663	0.997	0.985	0.967	0.942	0.913	0.878	0.841	0.754	0.660	0.561	0.456	0.347	0.234	0.119	0.072	0.044	0.020
16.00	0.03410	0.996	0.984	0.965	0.939	0.908	0.872	0.812	0.723	0.629	0.530	0.427	0.319	0.209	0.100	0.069	0.042	0.019
32.00	0.01725	0.996	0.983	0.963	0.937	0.905	0.869	0.798	0.709	0.615	0.516	0.413	0.306	0.197	0.097	0.067	0.041	0.019
64.00	0.00867	0.996	0.983	0.963	0.936	0.904	0.867	0.791	0.702	0.608	0.509	0.406	0.300	0.192	0.096	0.067	0.041	0.019
128.00	0.00435	0.996	0.983	0.963	0.936	0.904	0.867	0.787	0.699	0.604	0.506	0.403	0.297	0.189	0.096	0.066	0.041	0.019
256.00	0.00218	0.996	0.983	0.962	0.936	0.903	0.866	0.786	0.697	0.603	0.504	0.401	0.296	0.188	0.096	0.066	0.041	0.019
512.00	0.00109	0.996	0.983	0.962	0.936	0.903	0.866	0.785	0.696	0.602	0.503	0.400	0.295	0.187	0.095	0.066	0.041	0.019

(b-6) Wall half-angle, 45°

1.00	0.35582	1.004	1.005	1.003	0.998	0.989	0.978	0.962	0.944	0.922	0.896	0.867	0.835	0.799	0.759	0.716	0.669	0.620
2.00	0.22112	1.001	0.996	0.986	0.971	0.951	0.927	0.897	0.863	0.826	0.785	0.741	0.696	0.649	0.493	0.297	0.080	0.021
4.00	0.12360	0.998	0.989	0.974	0.952	0.925	0.892	0.855	0.813	0.768	0.720	0.669	0.537	0.395	0.244	0.088	0.033	0.014
8.00	0.06526	0.997	0.986	0.968	0.943	0.911	0.875	0.833	0.787	0.738	0.685	0.563	0.434	0.300	0.163	0.049	0.029	0.012
16.00	0.03351	0.996	0.984	0.965	0.938	0.905	0.866	0.822	0.774	0.723	0.637	0.516	0.390	0.261	0.128	0.046	0.027	0.012
32.00	0.01698	0.996	0.983	0.963	0.936	0.902	0.862	0.817	0.768	0.715	0.614	0.494	0.370	0.242	0.113	0.045	0.026	0.011
64.00	0.00855	0.996	0.983	0.962	0.934	0.900	0.860	0.814	0.765	0.711	0.603	0.484	0.360	0.234	0.105	0.044	0.026	0.011
128.00	0.00429	0.996	0.983	0.962	0.934	0.899	0.859	0.813	0.763	0.709	0.598	0.478	0.355	0.229	0.102	0.044	0.026	0.011
256.00	0.00215	0.996	0.983	0.962	0.934	0.899	0.858	0.812	0.762	0.708	0.595	0.476	0.353	0.227	0.100	0.044	0.026	0.011
512.00	0.00107	0.996	0.983	0.962	0.933	0.899	0.858	0.812	0.762	0.708	0.594	0.475	0.352	0.226	0.099	0.044	0.026	0.011

(b-7) Wall half-angle, 60°

1.35	0.27838	1.001	0.999	0.994	0.986	0.974	0.959	0.940	0.917	0.890	0.859	0.825	0.785	0.741	0.692	0.638	0.578	0.513
2.00	0.21001	1.000	0.996	0.987	0.974	0.956	0.934	0.907	0.875	0.838	0.797	0.751	0.701	0.647	0.589	0.528	0.437	0.022
4.00	0.11832	0.998	0.990	0.976	0.956	0.929	0.898	0.860	0.818	0.771	0.719	0.664	0.604	0.541	0.458	0.244	0.022	0.008
8.00	0.06278	0.997	0.987	0.969	0.945	0.914	0.878	0.835	0.787	0.735	0.678	0.617	0.553	0.473	0.296	0.113	0.016	0.006
16.00	0.03233	0.996	0.985	0.966	0.940	0.907	0.867	0.822	0.772	0.717	0.657	0.594	0.527	0.401	0.233	0.063	0.015	0.006
32.00	0.01640	0.996	0.984	0.964	0.937	0.903	0.862	0.816	0.764	0.708	0.647	0.582	0.514	0.368	0.206	0.041	0.014	0.006
64.00	0.00826	0.996	0.984	0.963	0.936	0.901	0.860	0.813	0.760	0.703	0.641	0.576	0.507	0.353	0.193	0.031	0.014	0.006
128.00	0.00414	0.996	0.983	0.963	0.935	0.900	0.859	0.811	0.758	0.701	0.639	0.573	0.501	0.345	0.186	0.026	0.014	0.005
256.00	0.00208	0.996	0.983	0.963	0.935	0.900	0.858	0.810	0.757	0.699	0.637	0.571	0.497	0.341	0.183	0.025	0.014	0.005
512.00	0.00104	0.996	0.983	0.963	0.935	0.899	0.858	0.810	0.757	0.699	0.637	0.571	0.495	0.340	0.182	0.025	0.014	0.005

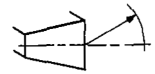
(b-8) Wall half-angle, 75°

2.35	0.17638	0.999	0.993	0.983	0.969	0.951	0.928	0.901	0.869	0.832	0.790	0.742	0.689	0.631	0.567	0.496	0.420	0.337
4.00	0.11292	0.998	0.990	0.977	0.958	0.934	0.905	0.869	0.829	0.782	0.731	0.674	0.612	0.545	0.474	0.397	0.317	0.106
8.00	0.06008	0.997	0.987	0.971	0.948	0.919	0.884	0.843	0.796	0.743	0.685	0.622	0.554	0.483	0.407	0.327	0.207	0.002
16.00	0.03099	0.997	0.986	0.968	0.943	0.911	0.873	0.829	0.778	0.722	0.661	0.595	0.525	0.451	0.373	0.293	0.091	0.002
32.00	0.01574	0.996	0.985	0.966	0.940	0.907	0.868	0.822	0.769	0.712	0.649	0.582	0.510	0.435	0.357	0.276	0.046	0.002
64.00	0.00793	0.996	0.985	0.965	0.939	0.905	0.865	0.818	0.765	0.707	0.643	0.575	0.503	0.427	0.349	0.267	0.026	0.001
128.00	0.00398	0.996	0.984	0.965	0.938	0.904	0.863	0.816	0.763	0.704	0.640	0.572	0.499	0.423	0.344	0.263	0.016	0.001
256.00	0.00199	0.996	0.984	0.965	0.938	0.904	0.863	0.815	0.762	0.703	0.639	0.570	0.497	0.421	0.342	0.261	0.012	0.001
512.00	0.00100	0.996	0.984	0.965	0.938	0.903	0.862	0.815	0.761	0.702	0.638	0.569	0.497	0.420	0.341	0.258	0.010	0.001

TABLE VIII. - Continued. CALCULATED ANGULAR DISTRIBUTIONS OF PARTICLE FLUX AT VARIOUS RADIAL DISTANCES FROM SLOT EXIT (EQ. (12))

(c) Length to inlet-width ratio, 1.00

(c-1) Wall half-angle, 0^{o}



Nondimensional downstream radial distance, R_p	Nondimensional centerplane flux relative to inlet flux, M(O)	Angle from centerplane, φ, deg																
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
		Flux relative to centerplane, $M(\varphi)/M(O)$																
0.50	0.49514	1.015	1.025	1.029	1.027	1.021	1.010	0.994	0.974	0.951	0.924	0.895	0.863	0.829	0.793	0.755	0.715	0.674
1.00	0.33747	1.005	1.003	0.994	0.981	0.964	0.945	0.890	0.827	0.757	0.678	0.587	0.484	0.368	0.279	0.200	0.126	0.059
2.00	0.20158	0.999	0.992	0.976	0.922	0.861	0.794	0.720	0.639	0.552	0.458	0.358	0.293	0.234	0.179	0.128	0.081	0.038
4.00	0.11143	0.997	0.966	0.911	0.849	0.781	0.707	0.627	0.542	0.452	0.357	0.299	0.246	0.197	0.151	0.108	0.069	0.033
8.00	0.05887	0.985	0.933	0.875	0.810	0.739	0.662	0.580	0.494	0.403	0.328	0.275	0.227	0.181	0.139	0.100	0.064	0.030
16.00	0.03031	0.969	0.916	0.856	0.789	0.717	0.639	0.556	0.469	0.378	0.314	0.264	0.218	0.174	0.134	0.097	0.062	0.029
32.00	0.01539	0.961	0.907	0.846	0.779	0.706	0.628	0.544	0.457	0.366	0.308	0.259	0.214	0.171	0.132	0.095	0.061	0.029
64.00	0.00775	0.957	0.902	0.841	0.774	0.701	0.622	0.538	0.451	0.360	0.305	0.256	0.211	0.170	0.130	0.094	0.060	0.029
128.00	0.00389	0.955	0.900	0.839	0.771	0.698	0.619	0.535	0.448	0.357	0.303	0.255	0.210	0.169	0.130	0.094	0.060	0.029
256.00	0.00195	0.954	0.899	0.838	0.770	0.696	0.617	0.534	0.446	0.355	0.302	0.254	0.210	0.168	0.130	0.093	0.060	0.029
512.00	0.00098	0.953	0.899	0.837	0.769	0.696	0.617	0.533	0.445	0.354	0.302	0.254	0.210	0.168	0.129	0.093	0.060	0.029

(c-2) Wall half-angle, 5^{o}

0.58	0.46472	1.014	1.024	1.027	1.026	1.020	1.009	0.994	0.975	0.952	0.926	0.897	0.866	0.833	0.798	0.762	0.724	0.684
1.00	0.34743	1.007	1.006	1.000	0.989	0.973	0.954	0.933	0.911	0.846	0.771	0.685	0.584	0.465	0.326	0.229	0.143	0.066
2.00	0.21164	1.000	0.993	0.981	0.966	0.917	0.849	0.773	0.691	0.601	0.503	0.398	0.299	0.237	0.180	0.127	0.080	0.037
4.00	0.11811	0.998	0.989	0.957	0.893	0.823	0.746	0.663	0.574	0.479	0.380	0.296	0.242	0.192	0.146	0.104	0.066	0.031
8.00	0.06269	0.997	0.976	0.915	0.847	0.773	0.693	0.607	0.516	0.421	0.322	0.268	0.219	0.175	0.133	0.095	0.060	0.029
16.00	0.03235	0.996	0.956	0.893	0.823	0.747	0.666	0.579	0.488	0.392	0.307	0.256	0.210	0.167	0.128	0.091	0.058	0.028
32.00	0.01644	0.996	0.945	0.881	0.811	0.735	0.652	0.565	0.474	0.378	0.299	0.250	0.205	0.163	0.125	0.089	0.057	0.027
64.00	0.00829	0.996	0.940	0.876	0.805	0.728	0.646	0.558	0.466	0.371	0.296	0.247	0.203	0.162	0.124	0.089	0.056	0.027
128.00	0.00416	0.995	0.937	0.873	0.802	0.725	0.642	0.555	0.463	0.368	0.294	0.246	0.202	0.161	0.123	0.088	0.056	0.027
256.00	0.00208	0.993	0.936	0.872	0.800	0.723	0.641	0.553	0.461	0.366	0.293	0.245	0.201	0.160	0.123	0.088	0.056	0.027
512.00	0.00104	0.993	0.935	0.871	0.800	0.722	0.640	0.552	0.460	0.365	0.293	0.245	0.201	0.160	0.123	0.088	0.056	0.027

(c-3) Wall half-angle, 10^{o}

0.68	0.42800	1.013	1.022	1.025	1.023	1.017	1.006	0.992	0.973	0.951	0.926	0.898	0.867	0.835	0.801	0.766	0.730	0.692
1.00	0.35084	1.008	1.010	1.007	0.998	0.984	0.967	0.946	0.923	0.899	0.876	0.822	0.732	0.621	0.481	0.304	0.179	0.080
2.00	0.21870	1.001	0.996	0.984	0.968	0.950	0.928	0.851	0.767	0.674	0.571	0.460	0.338	0.243	0.182	0.127	0.079	0.036
4.00	0.12347	0.998	0.989	0.975	0.957	0.883	0.802	0.715	0.621	0.521	0.415	0.304	0.236	0.185	0.140	0.098	0.062	0.029
8.00	0.06591	0.997	0.987	0.972	0.901	0.822	0.737	0.647	0.551	0.449	0.344	0.259	0.210	0.165	0.125	0.089	0.056	0.026
16.00	0.03410	0.996	0.986	0.945	0.872	0.791	0.705	0.613	0.516	0.415	0.310	0.245	0.199	0.157	0.119	0.084	0.053	0.025
32.00	0.01735	0.996	0.985	0.932	0.857	0.776	0.689	0.596	0.499	0.398	0.293	0.238	0.194	0.153	0.116	0.083	0.052	0.025
64.00	0.00876	0.996	0.985	0.925	0.850	0.768	0.680	0.588	0.490	0.389	0.285	0.235	0.191	0.151	0.115	0.082	0.052	0.024
128.00	0.00440	0.996	0.985	0.922	0.846	0.764	0.676	0.583	0.486	0.385	0.282	0.233	0.190	0.150	0.114	0.081	0.051	0.024
256.00	0.00220	0.996	0.985	0.920	0.844	0.762	0.674	0.581	0.484	0.383	0.281	0.233	0.189	0.150	0.114	0.081	0.051	0.024
512.00	0.00110	0.996	0.985	0.919	0.843	0.761	0.673	0.580	0.483	0.382	0.280	0.232	0.189	0.150	0.114	0.081	0.051	0.024

(c-4) Wall half-angle, 20^{o}

0.86	0.36840	1.011	1.018	1.020	1.017	1.011	1.000	0.985	0.967	0.945	0.921	0.893	0.864	0.832	0.799	0.765	0.731	0.697
1.00	0.34186	1.009	1.014	1.014	1.009	0.999	0.986	0.968	0.947	0.923	0.896	0.868	0.838	0.810	0.784	0.736	0.533	0.176
2.00	0.22071	1.003	0.999	0.989	0.974	0.954	0.932	0.909	0.885	0.842	0.733	0.612	0.476	0.324	0.191	0.129	0.077	0.034
4.00	0.12703	0.999	0.990	0.975	0.956	0.933	0.910	0.835	0.732	0.620	0.502	0.376	0.243	0.174	0.128	0.088	0.054	0.025
8.00	0.06845	0.997	0.986	0.969	0.948	0.924	0.839	0.738	0.631	0.518	0.400	0.277	0.193	0.149	0.110	0.077	0.047	0.022
16.00	0.03558	0.996	0.984	0.966	0.944	0.889	0.793	0.691	0.583	0.470	0.353	0.232	0.179	0.139	0.103	0.072	0.045	0.021
32.00	0.01815	0.996	0.983	0.965	0.942	0.867	0.771	0.668	0.559	0.447	0.330	0.217	0.173	0.134	0.100	0.070	0.044	0.020
64.00	0.00917	0.995	0.983	0.964	0.941	0.857	0.759	0.656	0.548	0.435	0.319	0.213	0.170	0.132	0.099	0.069	0.043	0.020
128.00	0.00461	0.995	0.983	0.964	0.940	0.851	0.754	0.650	0.542	0.429	0.313	0.211	0.169	0.131	0.098	0.069	0.043	0.020
256.00	0.00231	0.995	0.983	0.964	0.940	0.849	0.751	0.647	0.539	0.426	0.311	0.210	0.168	0.131	0.098	0.069	0.043	0.020
512.00	0.00116	0.995	0.982	0.963	0.939	0.847	0.749	0.646	0.538	0.425	0.309	0.210	0.168	0.131	0.098	0.068	0.043	0.020

(c-5) Wall half-angle, 30°

1.08	0.30965	1.CC8	1.013	1.013	1.010	1.002	0.991	0.976	0.957	0.935	0.911	0.883	0.854	0.822	0.789	0.755	0.721	0.688
2.00	0.21386	1.003	1.C01	0.993	0.980	0.963	0.941	0.916	0.889	0.860	0.831	0.805	0.728	0.556	0.356	0.143	0.080	0.033
4.00	0.12548	0.999	0.991	0.977	0.957	0.933	0.905	0.876	0.845	0.788	0.653	0.508	0.353	0.188	0.117	0.078	0.046	0.020
8.00	0.06828	0.997	0.986	0.969	0.946	0.918	0.887	0.854	0.764	0.636	0.501	0.359	0.212	0.131	0.094	0.064	0.038	0.017
16.00	0.03567	0.996	0.984	0.965	0.939	0.910	0.877	0.817	0.694	0.566	0.432	0.294	0.158	0.119	0.086	0.059	0.036	0.016
32.00	0.01824	0.996	0.983	0.962	0.936	0.906	0.872	0.783	0.661	0.532	0.400	0.263	0.150	0.114	0.083	0.057	0.034	0.016
64.00	0.00922	0.995	0.982	0.961	0.935	0.903	0.869	0.767	0.644	0.516	0.384	0.249	0.147	0.111	0.081	0.056	0.034	0.015
128.00	0.00464	0.995	0.982	0.961	0.934	0.902	0.867	0.759	0.636	0.508	0.376	0.241	0.145	0.110	0.081	0.055	0.034	0.015
256.00	0.00233	0.995	0.982	0.961	0.933	0.902	0.867	0.755	0.632	0.504	0.372	0.238	0.144	0.110	0.080	0.055	0.034	0.015
512.00	0.00116	0.995	0.982	0.960	0.933	0.901	0.866	0.752	0.630	0.502	0.370	0.236	0.144	0.109	0.080	0.055	0.033	0.015

(c-6) Wall half-angle, 45°

1.50	0.23473	1.005	1.006	1.003	0.998	0.988	0.975	0.958	0.939	0.915	0.889	0.860	0.828	0.794	0.758	0.721	0.682	0.644
2.00	0.19683	1.C03	1.002	0.996	0.987	0.973	0.955	0.933	0.907	0.878	0.846	0.811	0.775	0.738	0.702	0.670	0.402	0.046
4.00	0.11811	1.CC0	0.993	0.981	0.962	0.939	0.911	0.879	0.843	0.805	0.765	0.724	0.683	0.477	0.239	0.067	0.035	0.014
8.00	0.06510	0.997	0.988	0.971	0.947	0.918	0.884	0.847	0.805	0.761	0.715	0.604	0.415	0.217	0.073	0.046	0.026	0.011
16.00	0.03423	0.996	0.985	0.965	0.939	0.907	0.870	0.828	0.784	0.736	0.657	0.483	0.303	0.118	0.063	0.040	0.023	0.010
32.00	0.01756	0.996	0.983	0.962	0.935	0.901	0.862	0.819	0.772	0.722	0.599	0.428	0.253	0.086	0.059	0.038	0.022	0.009
64.00	0.00889	0.996	0.982	0.961	0.933	0.898	0.858	0.814	0.766	0.715	0.571	0.402	0.230	0.083	0.057	0.037	0.021	0.009
128.00	0.00448	0.995	0.982	0.960	0.932	0.896	0.856	0.811	0.762	0.711	0.558	0.389	0.218	0.081	0.056	0.036	0.021	0.009
256.00	0.00224	0.995	0.982	0.960	0.931	0.896	0.855	0.810	0.761	0.709	0.551	0.383	0.212	0.081	0.056	0.036	0.021	0.009
512.00	0.00112	0.995	0.982	0.960	0.931	0.895	0.854	0.809	0.760	0.708	0.547	0.380	0.210	0.080	0.055	0.036	0.021	0.009

(c-7) Wall half-angle, 60°

2.20	0.16930	1.CC1	0.999	0.994	0.985	0.972	0.956	0.936	0.913	0.886	0.855	0.821	0.784	0.743	0.698	0.650	0.599	0.544
4.00	0.10938	0.999	0.994	0.983	0.967	0.947	0.921	0.891	0.857	0.818	0.775	0.728	0.679	0.626	0.571	0.513	0.101	0.010
8.00	0.06085	0.998	0.989	0.973	0.952	0.924	0.891	0.853	0.810	0.762	0.711	0.656	0.598	0.537	0.356	0.044	0.016	0.006
16.00	0.03216	0.997	0.986	0.968	0.943	0.911	0.874	0.831	0.783	0.730	0.674	0.614	0.551	0.429	0.165	0.025	0.013	0.005
32.00	0.01654	0.996	0.984	0.965	0.938	0.904	0.864	0.819	0.768	0.713	0.654	0.592	0.526	0.336	0.088	0.023	0.011	0.004
64.00	0.00839	0.996	0.983	0.963	0.935	0.900	0.859	0.813	0.761	0.704	0.644	0.580	0.514	0.294	0.054	0.021	0.011	0.004
128.00	0.00422	0.996	0.983	0.962	0.934	0.899	0.857	0.809	0.757	0.700	0.639	0.574	0.507	0.274	0.038	0.021	0.011	0.004
256.00	0.00212	0.996	0.983	0.962	0.933	0.898	0.856	0.808	0.755	0.697	0.636	0.572	0.497	0.264	0.036	0.021	0.011	0.004
512.00	0.001C6	0.996	0.983	0.962	0.933	0.897	0.855	0.807	0.754	0.696	0.635	0.570	0.491	0.259	0.036	0.021	0.011	0.004

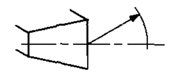
(c-8) Wall half-angle, 75°

4.20	0.09826	0.999	0.993	0.983	0.969	0.950	0.927	0.899	0.867	0.830	0.788	0.742	0.690	0.634	0.572	0.505	0.432	0.354
8.00	0.057C2	0.998	0.989	0.976	0.956	0.931	0.901	0.864	0.823	0.776	0.724	0.667	0.605	0.539	0.468	0.392	0.313	0.004
16.00	0.03023	0.997	0.987	0.970	0.947	0.918	0.882	0.841	0.793	0.740	0.682	0.619	0.552	0.481	0.405	0.326	0.131	0.001
32.00	0.01557	0.996	0.986	0.967	0.942	0.910	0.872	0.827	0.777	0.721	0.660	0.594	0.524	0.450	0.373	0.293	0.005	0.001
64.00	0.00791	0.996	0.985	0.966	0.940	0.907	0.867	0.820	0.768	0.711	0.648	0.581	0.509	0.434	0.356	0.276	0.004	0.001
128.00	0.00398	0.996	0.984	0.965	0.938	0.905	0.864	0.817	0.764	0.705	0.642	0.574	0.502	0.427	0.348	0.267	0.004	0.001
256.00	0.00200	0.996	0.984	0.965	0.938	0.904	0.863	0.815	0.762	0.703	0.639	0.571	0.498	0.423	0.344	0.263	0.004	0.001
512.00	0.00100	0.996	0.984	0.965	0.937	0.903	0.862	0.814	0.761	0.702	0.637	0.569	0.497	0.421	0.342	0.261	0.004	0.001

TABLE VIII. - Continued. CALCULATED ANGULAR DISTRIBUTIONS OF PARTICLE FLUX AT VARIOUS RADIAL DISTANCES FROM SLOT EXIT (EQ. (12))

(d) Length to inlet-width ratio, 2.00

(d-1) Wall half-angle, 0°



Nondimensional downstream radial distance, R_p	Nondimensional centerplane flux relative to inlet flux, M(O)	Angle from centerplane, φ, deg; Flux relative to centerplane, $M(\varphi)/M(O)$: 5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
0.50	0.40032	1.017	1.027	1.031	1.029	1.020	1.007	0.988	0.965	0.938	0.908	0.875	0.839	0.800	0.759	0.717	0.672	0.624
1.00	0.28188	1.006	1.004	0.995	0.981	0.964	0.945	0.865	0.778	0.682	0.575	0.470	0.390	0.315	0.243	0.175	0.111	0.052
2.00	0.17626	1.000	0.993	0.975	0.891	0.800	0.702	0.597	0.489	0.417	0.354	0.297	0.244	0.195	0.150	0.107	0.068	0.032
4.00	0.10206	0.998	0.947	0.857	0.760	0.658	0.549	0.453	0.388	0.333	0.283	0.238	0.196	0.157	0.120	0.086	0.055	0.026
8.00	0.05591	0.974	0.884	0.787	0.684	0.576	0.465	0.398	0.343	0.294	0.251	0.211	0.174	0.140	0.107	0.077	0.049	0.024
16.00	0.02946	0.943	0.849	0.748	0.642	0.531	0.433	0.372	0.321	0.276	0.235	0.198	0.163	0.131	0.101	0.073	0.047	0.022
32.00	0.01516	0.926	0.830	0.728	0.620	0.508	0.417	0.359	0.309	0.266	0.227	0.191	0.158	0.127	0.098	0.071	0.045	0.022
64.00	0.00769	0.918	0.821	0.718	0.609	0.496	0.409	0.352	0.304	0.262	0.223	0.188	0.155	0.125	0.096	0.069	0.044	0.021
128.00	0.00388	0.913	0.816	0.712	0.603	0.490	0.405	0.349	0.301	0.259	0.221	0.186	0.154	0.124	0.095	0.069	0.044	0.021
256.00	0.00195	0.911	0.814	0.710	0.601	0.487	0.403	0.347	0.300	0.258	0.220	0.186	0.153	0.123	0.095	0.069	0.044	0.021
512.00	0.00097	0.910	0.812	0.708	0.599	0.485	0.402	0.346	0.299	0.257	0.220	0.185	0.153	0.123	0.095	0.068	0.044	0.021

(d-2) Wall half-angle, 5°

R_p	M(O)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
0.66	0.36091	1.016	1.025	1.028	1.026	1.018	1.004	0.986	0.964	0.938	0.909	0.877	0.842	0.805	0.766	0.725	0.682	0.636
1.00	0.29682	1.009	1.012	1.007	0.996	0.981	0.962	0.940	0.916	0.894	0.812	0.709	0.589	0.447	0.346	0.251	0.159	0.073
2.00	0.19224	1.002	0.996	0.985	0.971	0.937	0.840	0.734	0.620	0.496	0.400	0.331	0.269	0.213	0.162	0.115	0.072	0.034
4.00	0.11328	0.998	0.991	0.964	0.865	0.758	0.645	0.526	0.418	0.352	0.296	0.246	0.201	0.159	0.121	0.086	0.055	0.026
8.00	0.06263	0.997	0.977	0.876	0.769	0.656	0.537	0.421	0.356	0.302	0.255	0.212	0.174	0.138	0.106	0.076	0.048	0.023
16.00	0.03317	0.997	0.933	0.828	0.717	0.600	0.479	0.386	0.328	0.279	0.236	0.197	0.161	0.129	0.098	0.071	0.045	0.021
32.00	0.01711	0.996	0.910	0.803	0.690	0.572	0.449	0.370	0.315	0.268	0.226	0.189	0.155	0.124	0.095	0.068	0.043	0.021
64.00	0.00869	0.996	0.898	0.790	0.676	0.557	0.433	0.361	0.308	0.262	0.222	0.185	0.152	0.122	0.093	0.067	0.043	0.020
128.00	0.00438	0.994	0.892	0.784	0.669	0.550	0.426	0.357	0.305	0.259	0.220	0.184	0.151	0.120	0.092	0.066	0.042	0.020
256.00	0.00220	0.991	0.889	0.780	0.666	0.546	0.422	0.355	0.303	0.258	0.218	0.183	0.150	0.120	0.092	0.066	0.042	0.020
512.00	0.00110	0.990	0.888	0.779	0.664	0.544	0.420	0.354	0.302	0.257	0.218	0.182	0.150	0.119	0.092	0.066	0.042	0.020

(d-3) Wall half-angle, 10°

R_p	M(O)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
0.86	0.31735	1.014	1.022	1.025	1.022	1.014	1.001	0.983	0.962	0.937	0.908	0.877	0.844	0.809	0.772	0.733	0.692	0.650
1.00	0.29705	1.012	1.018	1.018	1.012	1.001	0.985	0.965	0.942	0.916	0.888	0.858	0.828	0.799	0.737	0.590	0.364	0.177
2.00	0.20037	1.004	1.000	0.991	0.976	0.959	0.941	0.924	0.814	0.688	0.550	0.397	0.315	0.245	0.183	0.128	0.079	0.036
4.00	0.12063	0.999	0.991	0.979	0.964	0.900	0.781	0.654	0.519	0.384	0.315	0.257	0.206	0.161	0.121	0.086	0.053	0.025
8.00	0.06741	0.997	0.988	0.975	0.887	0.766	0.639	0.505	0.375	0.311	0.258	0.212	0.171	0.135	0.102	0.072	0.045	0.021
16.00	0.03590	0.996	0.986	0.938	0.820	0.695	0.564	0.429	0.337	0.281	0.234	0.193	0.156	0.123	0.094	0.067	0.042	0.020
32.00	0.01857	0.996	0.986	0.906	0.785	0.658	0.526	0.390	0.320	0.267	0.223	0.184	0.149	0.118	0.090	0.064	0.040	0.019
64.00	0.00945	0.996	0.985	0.889	0.768	0.640	0.507	0.372	0.311	0.261	0.218	0.180	0.146	0.116	0.088	0.063	0.040	0.019
128.00	0.00477	0.996	0.985	0.881	0.759	0.630	0.497	0.367	0.307	0.257	0.215	0.178	0.144	0.114	0.087	0.062	0.039	0.019
256.00	0.00240	0.996	0.985	0.877	0.754	0.626	0.493	0.364	0.305	0.256	0.214	0.177	0.144	0.114	0.086	0.062	0.039	0.018
512.00	0.00120	0.995	0.985	0.875	0.752	0.623	0.490	0.363	0.304	0.255	0.213	0.176	0.143	0.113	0.086	0.061	0.039	0.018

(d-4) Wall half-angle, 20°

R_p	M(O)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
1.22	0.25434	1.011	1.018	1.019	1.015	1.006	0.993	0.976	0.955	0.931	0.904	0.875	0.844	0.811	0.777	0.742	0.706	0.670
2.00	0.19689	1.006	1.006	1.000	0.988	0.972	0.953	0.931	0.908	0.885	0.864	0.842	0.667	0.460	0.267	0.176	0.103	0.044
4.00	0.12279	1.001	0.994	0.981	0.964	0.945	0.924	0.905	0.794	0.632	0.457	0.291	0.223	0.168	0.122	0.084	0.051	0.023
8.00	0.06987	0.998	0.988	0.972	0.953	0.933	0.864	0.712	0.552	0.384	0.268	0.212	0.166	0.127	0.094	0.065	0.040	0.018
16.00	0.03755	0.996	0.985	0.968	0.947	0.900	0.751	0.596	0.434	0.288	0.231	0.184	0.146	0.112	0.083	0.058	0.036	0.017
32.00	0.01952	0.996	0.983	0.965	0.944	0.845	0.694	0.538	0.377	0.267	0.215	0.173	0.137	0.106	0.079	0.055	0.034	0.016
64.00	0.00996	0.995	0.982	0.964	0.942	0.817	0.666	0.509	0.348	0.257	0.208	0.167	0.133	0.103	0.077	0.054	0.033	0.016
128.00	0.00503	0.995	0.982	0.963	0.941	0.803	0.651	0.495	0.334	0.252	0.204	0.164	0.131	0.101	0.076	0.053	0.033	0.015
256.00	0.00253	0.995	0.982	0.962	0.941	0.796	0.644	0.487	0.327	0.250	0.202	0.163	0.130	0.101	0.075	0.053	0.033	0.015
512.00	0.00127	0.995	0.981	0.962	0.939	0.793	0.641	0.484	0.323	0.249	0.202	0.163	0.129	0.100	0.075	0.053	0.033	0.015

(d-5) Wall half-angle, 30°

1.66	0.19996	1.008	1.012	1.011	1.006	0.997	0.983	0.966	0.946	0.923	0.897	0.869	0.839	0.808	0.776	0.744	0.712	0.683
2.00	0.18195	1.007	1.009	1.006	0.998	0.986	0.970	0.950	0.927	0.902	0.875	0.847	0.819	0.792	0.769	0.753	0.398	0.098
4.00	0.11732	1.001	0.996	0.986	0.969	0.949	0.926	0.901	0.876	0.851	0.829	0.653	0.409	0.197	0.132	0.085	0.048	0.021
8.00	0.06800	0.998	0.989	0.973	0.952	0.928	0.901	0.874	0.847	0.664	0.454	0.234	0.165	0.120	0.084	0.056	0.033	0.015
16.00	0.03689	0.997	0.985	0.966	0.942	0.915	0.886	0.856	0.675	0.476	0.272	0.178	0.134	0.099	0.071	0.048	0.029	0.013
32.00	0.01926	0.996	0.983	0.962	0.937	0.908	0.877	0.774	0.584	0.388	0.210	0.161	0.122	0.091	0.066	0.045	0.027	0.012
64.00	0.00985	0.995	0.981	0.960	0.934	0.904	0.872	0.730	0.540	0.346	0.199	0.153	0.117	0.088	0.064	0.043	0.026	0.012
128.00	0.00498	0.995	0.981	0.959	0.932	0.901	0.869	0.708	0.518	0.325	0.194	0.149	0.114	0.086	0.062	0.043	0.026	0.012
256.00	0.00251	0.995	0.980	0.959	0.931	0.900	0.867	0.697	0.508	0.315	0.192	0.148	0.113	0.085	0.062	0.042	0.026	0.012
512.00	0.00126	0.995	0.980	0.958	0.931	0.900	0.867	0.691	0.502	0.310	0.190	0.147	0.113	0.085	0.062	0.042	0.026	0.012

(d-6) Wall half-angle, 45°

2.50	0.13987	1.004	1.005	1.001	0.994	0.983	0.969	0.951	0.931	0.907	0.881	0.853	0.823	0.791	0.759	0.727	0.695	0.664
4.00	0.10466	1.002	0.999	0.991	0.978	0.961	0.940	0.915	0.888	0.858	0.826	0.793	0.761	0.730	0.702	0.301	0.062	0.020
8.00	0.06207	0.999	0.991	0.977	0.957	0.932	0.903	0.871	0.836	0.800	0.762	0.724	0.556	0.210	0.079	0.046	0.024	0.010
16.00	0.03409	0.997	0.986	0.968	0.944	0.914	0.880	0.842	0.802	0.760	0.717	0.494	0.196	0.085	0.055	0.034	0.019	0.008
32.00	0.01791	0.996	0.984	0.963	0.936	0.904	0.866	0.825	0.781	0.736	0.607	0.331	0.107	0.072	0.047	0.030	0.017	0.007
64.00	0.00919	0.996	0.982	0.961	0.932	0.898	0.859	0.816	0.770	0.722	0.526	0.257	0.098	0.067	0.045	0.028	0.016	0.007
128.00	0.00466	0.995	0.981	0.959	0.930	0.895	0.855	0.811	0.764	0.715	0.487	0.222	0.094	0.064	0.043	0.028	0.016	0.007
256.00	0.00234	0.995	0.981	0.959	0.929	0.893	0.852	0.808	0.761	0.711	0.468	0.205	0.092	0.063	0.043	0.027	0.016	0.007
512.00	0.00118	0.995	0.981	0.958	0.928	0.892	0.851	0.807	0.759	0.709	0.459	0.196	0.091	0.063	0.042	0.027	0.016	0.007

(d-7) Wall half-angle, 60°

3.90	0.09472	1.001	0.998	0.992	0.983	0.969	0.953	0.933	0.909	0.883	0.853	0.821	0.786	0.748	0.707	0.665	0.620	0.573
4.00	0.09316	1.001	0.998	0.992	0.982	0.968	0.951	0.931	0.907	0.880	0.850	0.817	0.781	0.743	0.702	0.658	0.613	0.566
8.00	0.05601	0.999	0.992	0.981	0.964	0.942	0.915	0.884	0.849	0.810	0.767	0.722	0.673	0.622	0.569	0.363	0.023	0.006
16.00	0.03104	0.997	0.988	0.972	0.950	0.921	0.888	0.849	0.806	0.759	0.708	0.654	0.597	0.537	0.182	0.025	0.011	0.004
32.00	0.01639	0.996	0.985	0.967	0.941	0.909	0.871	0.828	0.780	0.728	0.672	0.613	0.551	0.346	0.037	0.019	0.009	0.003
64.00	0.00843	0.996	0.984	0.964	0.936	0.902	0.862	0.816	0.766	0.711	0.653	0.591	0.527	0.210	0.031	0.016	0.008	0.003
128.00	0.00428	0.996	0.983	0.962	0.934	0.898	0.857	0.810	0.758	0.702	0.642	0.579	0.514	0.148	0.029	0.016	0.008	0.003
256.00	0.00215	0.996	0.983	0.961	0.932	0.897	0.854	0.807	0.754	0.697	0.637	0.573	0.506	0.118	0.028	0.015	0.008	0.003
512.00	0.00108	0.996	0.982	0.961	0.932	0.896	0.853	0.805	0.752	0.695	0.634	0.570	0.489	0.104	0.028	0.015	0.008	0.003

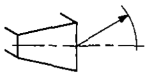
(d-8) Wall half-angle, 75°

7.90	0.05199	0.998	0.993	0.982	0.968	0.949	0.926	0.899	0.867	0.830	0.790	0.744	0.694	0.639	0.579	0.514	0.444	0.368
8.00	0.05147	0.998	0.992	0.982	0.968	0.949	0.926	0.898	0.866	0.829	0.788	0.742	0.692	0.637	0.576	0.511	0.440	0.364
16.00	0.02864	0.997	0.989	0.975	0.955	0.930	0.899	0.863	0.821	0.774	0.722	0.665	0.603	0.537	0.467	0.392	0.312	0.002
32.00	0.01517	0.997	0.987	0.970	0.947	0.917	0.881	0.840	0.792	0.739	0.681	0.619	0.551	0.480	0.405	0.326	0.007	0.001
64.00	0.00781	0.996	0.985	0.967	0.942	0.910	0.871	0.827	0.776	0.720	0.659	0.593	0.523	0.450	0.373	0.293	0.004	0.001
128.00	0.00397	0.996	0.985	0.966	0.939	0.906	0.866	0.820	0.768	0.710	0.647	0.580	0.509	0.434	0.356	0.276	0.003	0.001
256.00	0.00200	0.996	0.984	0.965	0.938	0.904	0.863	0.816	0.763	0.705	0.641	0.573	0.501	0.426	0.348	0.267	0.003	0.001
512.00	0.00100	0.996	0.984	0.965	0.937	0.903	0.862	0.814	0.761	0.702	0.638	0.570	0.498	0.422	0.344	0.263	0.003	0.001

TABLE VIII. - Continued. CALCULATED ANGULAR DISTRIBUTIONS OF PARTICLE FLUX AT VARIOUS RADIAL DISTANCES FROM SLOT EXIT (EQ. (12))

(e) Length to inlet-width ratio, 4.00

(e-1) Wall half-angle, 0°



Nondimensional downstream radial distance, R_p	Nondimensional centerplane flux relative to inlet flux, M(O)	Angle from centerplane, φ, deg: 5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
		Flux relative to centerplane, $M(\varphi)/M(O)$																
0.50	0.30124	1.017	1.026	1.029	1.025	1.014	0.998	0.977	0.951	0.921	0.888	0.851	0.811	0.769	0.724	0.676	0.627	0.575
1.00	0.21932	1.006	1.004	0.995	0.980	0.961	0.941	0.821	0.691	0.566	0.477	0.403	0.336	0.272	0.211	0.152	0.096	0.045
2.00	0.14422	1.000	0.994	0.970	0.832	0.687	0.551	0.464	0.397	0.340	0.290	0.244	0.201	0.161	0.124	0.089	0.056	0.027
4.00	0.08846	0.998	0.911	0.756	0.595	0.478	0.404	0.347	0.299	0.257	0.220	0.185	0.153	0.122	0.094	0.068	0.043	0.021
8.00	0.05105	0.953	0.789	0.619	0.476	0.395	0.337	0.290	0.251	0.216	0.185	0.156	0.129	0.103	0.080	0.057	0.037	0.018
16.00	0.02795	0.892	0.718	0.539	0.423	0.353	0.302	0.261	0.226	0.195	0.167	0.141	0.116	0.094	0.072	0.052	0.033	0.016
32.00	0.01473	0.858	0.679	0.496	0.396	0.332	0.285	0.246	0.213	0.184	0.158	0.133	0.110	0.088	0.068	0.049	0.032	0.015
64.00	0.00758	0.840	0.659	0.478	0.383	0.321	0.276	0.238	0.207	0.178	0.153	0.129	0.107	0.086	0.066	0.048	0.031	0.015
128.00	0.00385	0.831	0.648	0.469	0.376	0.316	0.271	0.235	0.203	0.176	0.150	0.127	0.105	0.084	0.065	0.047	0.030	0.014
256.00	0.00194	0.826	0.643	0.465	0.373	0.313	0.269	0.233	0.202	0.174	0.149	0.126	0.104	0.084	0.065	0.047	0.030	0.014
512.00	0.00097	0.824	0.640	0.462	0.371	0.312	0.268	0.232	0.201	0.173	0.148	0.125	0.104	0.083	0.064	0.047	0.030	0.014

(e-2) Wall half-angle, 5°

0.82	0.25652	1.015	1.024	1.025	1.021	1.010	0.994	0.974	0.949	0.920	0.888	0.852	0.814	0.774	0.730	0.685	0.637	0.586
1.00	0.23709	1.012	1.017	1.015	1.007	0.993	0.974	0.951	0.924	0.895	0.864	0.832	0.790	0.657	0.501	0.383	0.264	0.129
2.00	0.16569	1.004	1.000	0.989	0.975	0.959	0.909	0.755	0.590	0.469	0.388	0.321	0.262	0.209	0.159	0.113	0.071	0.033
4.00	0.10489	0.999	0.992	0.983	0.862	0.692	0.520	0.425	0.356	0.301	0.253	0.211	0.172	0.137	0.104	0.075	0.047	0.022
8.00	0.06164	0.998	0.991	0.832	0.652	0.483	0.394	0.331	0.281	0.239	0.202	0.169	0.138	0.110	0.084	0.060	0.038	0.018
16.00	0.03413	0.997	0.905	0.721	0.532	0.411	0.341	0.289	0.246	0.210	0.178	0.149	0.122	0.098	0.075	0.054	0.034	0.016
32.00	0.01810	0.997	0.850	0.661	0.472	0.378	0.315	0.268	0.229	0.196	0.166	0.139	0.114	0.091	0.070	0.050	0.032	0.015
64.00	0.00934	0.996	0.821	0.629	0.449	0.362	0.303	0.258	0.220	0.188	0.160	0.134	0.110	0.088	0.068	0.049	0.031	0.015
128.00	0.00475	0.994	0.807	0.613	0.438	0.354	0.297	0.252	0.216	0.185	0.157	0.131	0.108	0.086	0.066	0.048	0.030	0.015
256.00	0.00240	0.988	0.799	0.605	0.433	0.350	0.293	0.250	0.214	0.183	0.155	0.130	0.107	0.086	0.066	0.047	0.030	0.014
512.00	0.00120	0.984	0.796	0.601	0.430	0.348	0.292	0.249	0.213	0.182	0.155	0.130	0.107	0.085	0.065	0.047	0.030	0.014

(e-3) Wall half-angle, 10°

1.22	0.21322	1.013	1.020	1.021	1.016	1.005	0.990	0.970	0.946	0.918	0.888	0.854	0.818	0.780	0.739	0.696	0.652	0.604
2.00	0.17048	1.007	1.007	1.000	0.988	0.972	0.952	0.931	0.909	0.889	0.778	0.581	0.415	0.319	0.240	0.169	0.104	0.047
4.00	0.11211	1.001	0.995	0.984	0.970	0.956	0.863	0.668	0.469	0.372	0.302	0.245	0.197	0.154	0.116	0.081	0.051	0.024
8.00	0.06722	0.998	0.990	0.978	0.926	0.728	0.521	0.391	0.318	0.263	0.218	0.179	0.144	0.114	0.086	0.061	0.038	0.018
16.00	0.03763	0.997	0.987	0.958	0.757	0.549	0.395	0.320	0.265	0.221	0.184	0.152	0.124	0.098	0.074	0.053	0.033	0.016
32.00	0.02008	0.996	0.986	0.874	0.667	0.454	0.353	0.289	0.241	0.202	0.169	0.140	0.114	0.090	0.069	0.049	0.031	0.015
64.00	0.01040	0.996	0.985	0.830	0.620	0.420	0.334	0.275	0.230	0.193	0.162	0.134	0.109	0.086	0.066	0.047	0.030	0.014
128.00	0.00530	0.995	0.985	0.808	0.596	0.407	0.325	0.268	0.224	0.189	0.158	0.131	0.107	0.085	0.064	0.046	0.029	0.014
256.00	0.00267	0.995	0.985	0.797	0.584	0.400	0.320	0.264	0.222	0.186	0.156	0.129	0.105	0.084	0.064	0.045	0.029	0.014
512.00	0.00134	0.995	0.985	0.791	0.578	0.397	0.318	0.263	0.220	0.185	0.155	0.129	0.105	0.083	0.063	0.045	0.029	0.014

(e-4) Wall half-angle, 20°

1.94	0.15874	1.010	1.015	1.014	1.008	0.997	0.982	0.963	0.940	0.914	0.886	0.855	0.823	0.788	0.753	0.716	0.678	0.639
2.00	0.15675	1.010	1.014	1.013	1.006	0.995	0.980	0.960	0.937	0.912	0.883	0.853	0.820	0.787	0.753	0.718	0.683	0.653
4.00	0.10930	1.003	1.000	0.991	0.977	0.959	0.940	0.920	0.902	0.886	0.720	0.431	0.285	0.207	0.148	0.099	0.059	0.026
8.00	0.06770	0.999	0.991	0.978	0.961	0.943	0.927	0.818	0.557	0.338	0.256	0.198	0.153	0.117	0.086	0.059	0.036	0.016
16.00	0.03856	0.997	0.986	0.971	0.953	0.935	0.749	0.490	0.314	0.243	0.193	0.153	0.120	0.093	0.069	0.048	0.029	0.014
32.00	0.02076	0.996	0.984	0.966	0.947	0.841	0.587	0.347	0.266	0.211	0.169	0.135	0.107	0.083	0.062	0.043	0.027	0.012
64.00	0.01080	0.995	0.982	0.964	0.944	0.761	0.506	0.316	0.246	0.196	0.158	0.127	0.101	0.078	0.059	0.041	0.026	0.012
128.00	0.00552	0.995	0.981	0.962	0.942	0.721	0.465	0.302	0.236	0.190	0.153	0.124	0.098	0.076	0.057	0.040	0.025	0.012
256.00	0.00279	0.995	0.981	0.962	0.941	0.700	0.445	0.296	0.232	0.186	0.151	0.122	0.097	0.075	0.056	0.040	0.025	0.011
512.00	0.00140	0.995	0.980	0.961	0.941	0.690	0.435	0.292	0.230	0.185	0.150	0.121	0.096	0.075	0.056	0.039	0.024	0.011

(e-5) Wall half-angle, 30°

2.82	0.11766	1.007	1.009	1.007	1.000	0.989	0.973	0.955	0.933	0.909	0.882	0.854	0.824	0.794	0.763	0.732	0.702	0.673
4.00	0.09860	1.004	1.003	0.997	0.986	0.971	0.953	0.931	0.908	0.884	0.859	0.836	0.815	0.800	0.562	0.194	0.097	0.037
8.00	0.06305	1.000	0.994	0.981	0.964	0.943	0.921	0.898	0.876	0.856	0.692	0.308	0.188	0.129	0.088	0.057	0.033	0.014
16.00	0.03653	0.998	0.987	0.971	0.950	0.925	0.900	0.876	0.784	0.445	0.224	0.160	0.117	0.085	0.061	0.041	0.024	0.011
32.00	0.01985	0.996	0.984	0.964	0.940	0.914	0.886	0.829	0.505	0.242	0.174	0.130	0.098	0.072	0.052	0.035	0.021	0.010
64.00	0.01038	0.995	0.981	0.961	0.935	0.906	0.877	0.693	0.372	0.211	0.156	0.118	0.090	0.067	0.048	0.033	0.020	0.009
128.00	0.00531	0.995	0.980	0.958	0.932	0.902	0.872	0.626	0.307	0.198	0.148	0.113	0.086	0.065	0.047	0.032	0.019	0.009
256.00	0.00269	0.995	0.980	0.957	0.930	0.900	0.869	0.593	0.275	0.192	0.145	0.110	0.084	0.063	0.046	0.031	0.019	0.009
512.00	0.00135	0.994	0.979	0.957	0.929	0.899	0.867	0.577	0.263	0.190	0.143	0.109	0.084	0.063	0.046	0.031	0.019	0.009

(e-6) Wall half-angle, 45°

4.50	0.07744	1.003	1.002	0.998	0.989	0.977	0.962	0.944	0.922	0.899	0.874	0.847	0.818	0.790	0.761	0.732	0.705	0.680
8.00	0.05440	1.001	0.996	0.986	0.972	0.954	0.932	0.907	0.880	0.851	0.821	0.791	0.763	0.736	0.469	0.082	0.035	0.012
16.00	0.03219	0.998	0.989	0.975	0.954	0.929	0.900	0.868	0.834	0.799	0.764	0.728	0.316	0.093	0.054	0.031	0.017	0.007
32.00	0.01769	0.997	0.985	0.967	0.942	0.912	0.878	0.840	0.801	0.761	0.719	0.284	0.097	0.060	0.038	0.024	0.013	0.006
64.00	0.00930	0.996	0.983	0.962	0.934	0.901	0.864	0.823	0.780	0.736	0.509	0.127	0.079	0.051	0.034	0.021	0.012	0.005
128.00	0.00477	0.995	0.981	0.959	0.930	0.895	0.856	0.813	0.769	0.722	0.382	0.112	0.072	0.048	0.032	0.020	0.011	0.005
256.00	0.00242	0.995	0.981	0.958	0.928	0.892	0.852	0.808	0.762	0.715	0.322	0.106	0.069	0.046	0.031	0.020	0.011	0.005
512.00	0.00122	0.995	0.980	0.957	0.927	0.890	0.850	0.805	0.759	0.711	0.292	0.103	0.067	0.045	0.030	0.019	0.011	0.005

(e-7) Wall half-angle, 60°

7.30	0.05032	1.000	0.997	0.990	0.980	0.966	0.949	0.929	0.906	0.881	0.852	0.821	0.788	0.753	0.716	0.677	0.636	0.594
8.00	0.04739	1.000	0.996	0.989	0.978	0.963	0.945	0.924	0.900	0.872	0.842	0.809	0.774	0.737	0.698	0.657	0.615	0.573
16.00	0.02840	0.998	0.991	0.979	0.961	0.939	0.912	0.881	0.846	0.807	0.765	0.720	0.673	0.623	0.571	0.052	0.014	0.004
32.00	0.01573	0.997	0.987	0.971	0.948	0.920	0.886	0.847	0.804	0.757	0.707	0.654	0.597	0.538	0.042	0.017	0.007	0.002
64.00	0.00831	0.996	0.985	0.966	0.940	0.907	0.869	0.826	0.778	0.727	0.671	0.613	0.552	0.184	0.026	0.012	0.006	0.002
128.00	0.00427	0.996	0.983	0.963	0.935	0.901	0.860	0.814	0.764	0.709	0.651	0.590	0.527	0.048	0.022	0.011	0.005	0.002
256.00	0.00217	0.996	0.983	0.961	0.933	0.897	0.855	0.808	0.756	0.700	0.641	0.579	0.514	0.042	0.020	0.010	0.005	0.002
512.00	0.00109	0.996	0.982	0.961	0.931	0.895	0.853	0.805	0.752	0.696	0.636	0.573	0.501	0.040	0.019	0.010	0.005	0.002

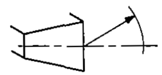
(e-8) Wall half-angle, 75°

15.30	0.02676	0.998	0.992	0.982	0.968	0.949	0.926	0.899	0.867	0.831	0.791	0.746	0.697	0.643	0.584	0.520	0.451	0.377
16.00	0.02582	0.998	0.992	0.982	0.967	0.948	0.924	0.896	0.864	0.827	0.786	0.740	0.690	0.635	0.575	0.510	0.440	0.365
32.00	0.01435	0.997	0.989	0.975	0.955	0.929	0.898	0.862	0.820	0.773	0.721	0.665	0.603	0.537	0.467	0.392	0.313	0.001
64.00	0.00760	0.997	0.987	0.970	0.947	0.917	0.881	0.839	0.792	0.739	0.681	0.618	0.551	0.480	0.405	0.326	0.004	0.001
128.00	0.00391	0.996	0.985	0.967	0.942	0.910	0.871	0.826	0.776	0.720	0.659	0.593	0.523	0.449	0.373	0.293	0.002	0.000
256.00	0.00199	0.996	0.985	0.966	0.939	0.906	0.866	0.819	0.767	0.709	0.647	0.580	0.509	0.434	0.356	0.276	0.002	0.000
512.00	0.00100	0.996	0.984	0.965	0.938	0.904	0.863	0.816	0.763	0.704	0.641	0.573	0.501	0.426	0.348	0.267	0.002	0.000

TABLE VIII. - Continued. CALCULATED ANGULAR DISTRIBUTIONS OF PARTICLE FLUX AT VARIOUS RADIAL DISTANCES FROM SLOT EXIT (EQ. (12))

(f) Length to inlet-width ratio, 8.00

(f-1) Wall half-angle, 0°



Nondimensional downstream radial distance, R_P	Nondimensional centerplane flux relative to inlet flux, M(O)	Angle from centerplane, φ, deg																
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
		Flux relative to centerplane, $M(\varphi)/M(O)$																
0.50	0.21073	1.016	1.024	1.025	1.019	1.006	0.988	0.964	0.936	0.903	0.867	0.827	0.784	0.738	0.689	0.638	0.585	0.529
1.00	0.15834	1.006	1.003	0.993	0.977	0.957	0.936	0.745	0.583	0.487	0.413	0.350	0.292	0.237	0.184	0.133	0.084	0.039
2.00	0.10939	1.000	0.994	0.960	0.727	0.546	0.450	0.382	0.327	0.281	0.240	0.202	0.167	0.134	0.103	0.074	0.047	0.022
4.00	0.07141	0.998	0.846	0.582	0.446	0.367	0.312	0.269	0.232	0.200	0.171	0.144	0.119	0.096	0.074	0.053	0.034	0.016
8.00	0.04398	0.915	0.614	0.427	0.341	0.285	0.244	0.211	0.183	0.158	0.135	0.114	0.094	0.076	0.058	0.042	0.027	0.013
16.00	0.02546	0.794	0.489	0.356	0.287	0.242	0.208	0.180	0.156	0.135	0.115	0.097	0.081	0.065	0.050	0.036	0.023	0.011
32.00	0.01396	0.724	0.433	0.320	0.259	0.218	0.188	0.163	0.141	0.122	0.105	0.088	0.073	0.059	0.045	0.033	0.021	0.010
64.00	0.00736	0.686	0.406	0.301	0.244	0.206	0.177	0.154	0.134	0.116	0.099	0.084	0.069	0.056	0.043	0.031	0.020	0.010
128.00	0.00379	0.666	0.392	0.291	0.237	0.200	0.172	0.149	0.130	0.112	0.096	0.081	0.067	0.054	0.042	0.030	0.019	0.009
256.00	0.00192	0.656	0.385	0.287	0.233	0.197	0.169	0.147	0.128	0.110	0.095	0.080	0.066	0.053	0.041	0.030	0.019	0.009
512.00	0.00097	0.651	0.382	0.284	0.231	0.195	0.168	0.146	0.127	0.109	0.094	0.079	0.066	0.053	0.041	0.030	0.019	0.009

(f-2) Wall half-angle, 5°

1.14	0.16675	1.014	1.020	1.020	1.013	1.001	0.983	0.960	0.933	0.901	0.866	0.828	0.786	0.742	0.695	0.646	0.594	0.538
2.00	0.13277	1.007	1.005	0.997	0.983	0.965	0.944	0.922	0.867	0.629	0.480	0.390	0.320	0.257	0.198	0.143	0.090	0.041
4.00	0.09144	1.001	0.995	0.984	0.973	0.757	0.525	0.417	0.345	0.290	0.244	0.203	0.166	0.132	0.101	0.072	0.045	0.021
8.00	0.05820	0.998	0.992	0.853	0.555	0.416	0.338	0.284	0.241	0.205	0.173	0.144	0.118	0.094	0.072	0.052	0.033	0.016
16.00	0.03447	0.997	0.907	0.582	0.405	0.323	0.268	0.227	0.194	0.166	0.141	0.118	0.097	0.077	0.059	0.042	0.027	0.013
32.00	0.01919	0.997	0.768	0.466	0.346	0.280	0.235	0.200	0.171	0.146	0.124	0.104	0.086	0.068	0.053	0.038	0.024	0.011
64.00	0.01021	0.997	0.692	0.422	0.319	0.259	0.218	0.186	0.159	0.136	0.116	0.097	0.080	0.064	0.049	0.035	0.023	0.011
128.00	0.00528	0.997	0.653	0.401	0.305	0.249	0.210	0.179	0.154	0.131	0.112	0.094	0.077	0.062	0.047	0.034	0.022	0.010
256.00	0.00269	0.985	0.633	0.391	0.298	0.244	0.205	0.175	0.151	0.129	0.110	0.092	0.076	0.061	0.047	0.034	0.021	0.010
512.00	0.00136	0.976	0.623	0.386	0.295	0.241	0.203	0.174	0.149	0.128	0.109	0.091	0.075	0.060	0.046	0.033	0.021	0.010

(f-3) Wall half-angle, 10°

1.94	0.13074	1.012	1.017	1.015	1.008	0.996	0.978	0.956	0.930	0.900	0.867	0.831	0.793	0.751	0.708	0.661	0.612	0.560
2.00	0.12934	1.011	1.016	1.014	1.006	0.994	0.976	0.953	0.927	0.897	0.864	0.829	0.791	0.750	0.708	0.663	0.617	0.434
4.00	0.09489	1.004	1.001	0.991	0.977	0.961	0.943	0.926	0.836	0.522	0.387	0.305	0.242	0.189	0.142	0.100	0.062	0.028
8.00	0.06251	1.000	0.993	0.982	0.970	0.897	0.555	0.394	0.312	0.254	0.209	0.171	0.138	0.108	0.082	0.058	0.036	0.017
16.00	0.03777	0.998	0.989	0.980	0.769	0.457	0.342	0.274	0.226	0.188	0.157	0.129	0.105	0.083	0.063	0.045	0.028	0.013
32.00	0.02127	0.996	0.987	0.881	0.514	0.356	0.280	0.229	0.191	0.160	0.134	0.111	0.090	0.071	0.054	0.039	0.024	0.012
64.00	0.01139	0.996	0.986	0.754	0.430	0.316	0.252	0.208	0.175	0.147	0.123	0.102	0.083	0.066	0.050	0.036	0.023	0.011
128.00	0.00591	0.995	0.985	0.688	0.399	0.298	0.239	0.198	0.167	0.140	0.118	0.098	0.080	0.063	0.048	0.034	0.022	0.010
256.00	0.00301	0.995	0.985	0.655	0.384	0.289	0.233	0.193	0.163	0.137	0.115	0.096	0.078	0.062	0.047	0.034	0.021	0.010
512.00	0.00152	0.995	0.985	0.638	0.377	0.285	0.230	0.191	0.161	0.135	0.114	0.094	0.077	0.061	0.047	0.033	0.021	0.010

(f-4) Wall half-angle, 20°

3.38	0.09128	1.008	1.011	1.008	1.000	0.988	0.971	0.950	0.926	0.899	0.869	0.837	0.804	0.768	0.731	0.693	0.653	0.611
4.00	0.08522	1.007	1.008	1.003	0.994	0.979	0.961	0.940	0.916	0.890	0.862	0.834	0.806	0.779	0.755	0.444	0.212	0.090
8.00	0.05927	1.002	0.997	0.986	0.971	0.955	0.937	0.920	0.907	0.737	0.361	0.252	0.186	0.138	0.100	0.068	0.041	0.018
16.00	0.03690	0.998	0.990	0.976	0.960	0.945	0.932	0.590	0.322	0.236	0.182	0.143	0.111	0.085	0.063	0.043	0.027	0.012
32.00	0.02113	0.997	0.985	0.970	0.953	0.938	0.532	0.304	0.226	0.177	0.141	0.112	0.089	0.068	0.051	0.035	0.022	0.010
64.00	0.01142	0.995	0.983	0.966	0.948	0.729	0.355	0.251	0.194	0.154	0.124	0.100	0.079	0.061	0.046	0.032	0.020	0.009
128.00	0.00595	0.995	0.981	0.963	0.944	0.601	0.315	0.230	0.180	0.144	0.117	0.094	0.075	0.058	0.044	0.031	0.019	0.009
256.00	0.00304	0.994	0.980	0.961	0.942	0.537	0.298	0.221	0.173	0.139	0.113	0.091	0.073	0.057	0.042	0.030	0.019	0.009
512.00	0.00154	0.994	0.980	0.961	0.941	0.505	0.290	0.216	0.170	0.137	0.111	0.090	0.072	0.056	0.042	0.029	0.018	0.009

(f-5) Wall half-angle, 30°

5.14	0.06474	1.005	1.006	1.002	0.993	0.980	0.964	0.944	0.922	0.897	0.870	0.842	0.813	0.783	0.753	0.723	0.693	0.663
8.00	0.05197	1.003	1.000	0.992	0.979	0.963	0.944	0.923	0.901	0.879	0.858	0.839	0.825	0.634	0.194	0.107	0.057	0.022
16.00	0.03329	0.999	0.992	0.979	0.961	0.941	0.920	0.899	0.880	0.864	0.367	0.191	0.128	0.089	0.062	0.040	0.023	0.010
32.00	0.01937	0.997	0.986	0.969	0.948	0.925	0.901	0.879	0.639	0.239	0.159	0.115	0.084	0.062	0.044	0.029	0.018	0.008
64.00	0.01055	0.996	0.983	0.963	0.939	0.913	0.887	0.763	0.269	0.174	0.126	0.094	0.071	0.053	0.038	0.026	0.016	0.007
128.00	0.00553	0.995	0.980	0.959	0.933	0.905	0.877	0.536	0.223	0.153	0.113	0.086	0.065	0.049	0.035	0.024	0.015	0.007
256.00	0.00283	0.995	0.979	0.957	0.930	0.901	0.872	0.426	0.205	0.144	0.108	0.082	0.063	0.047	0.034	0.023	0.014	0.006
512.00	0.00143	0.994	0.979	0.956	0.928	0.898	0.869	0.371	0.197	0.140	0.105	0.080	0.062	0.046	0.034	0.023	0.014	0.006

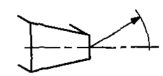
(f-6) Wall half-angle, 45°

8.50	0.04092	1.002	1.000	0.994	0.985	0.972	0.956	0.937	0.916	0.893	0.868	0.842	0.816	0.789	0.763	0.737	0.713	0.692
16.00	0.02785	1.000	0.994	0.984	0.969	0.950	0.928	0.904	0.877	0.850	0.822	0.794	0.768	0.744	0.128	0.050	0.022	0.008
32.00	0.01650	0.998	0.988	0.973	0.952	0.927	0.898	0.867	0.834	0.801	0.767	0.733	0.124	0.062	0.036	0.021	0.011	0.005
64.00	0.00908	0.996	0.984	0.965	0.940	0.910	0.876	0.840	0.801	0.762	0.722	0.124	0.067	0.042	0.026	0.016	0.009	0.004
128.00	0.00478	0.996	0.982	0.961	0.933	0.900	0.862	0.822	0.780	0.737	0.316	0.090	0.055	0.036	0.023	0.015	0.008	0.004
256.00	0.00246	0.995	0.981	0.958	0.929	0.893	0.854	0.812	0.768	0.723	0.151	0.079	0.050	0.033	0.022	0.014	0.008	0.003
512.00	0.00125	0.995	0.980	0.957	0.926	0.890	0.850	0.806	0.761	0.715	0.136	0.075	0.048	0.032	0.021	0.014	0.008	0.003

TABLE VIII. - Continued. CALCULATED ANGULAR DISTRIBUTIONS OF PARTICLE FLUX AT VARIOUS RADIAL DISTANCES FROM SLOT EXIT (EQ. (12))

(g) Length to inlet-width ratio, 0.25

(g-1) Wall half-angle, -5^{o}

Nondimensional downstream radial distance, R_p	Nondimensional centerplane flux relative to inlet flux, M(O)	Angle from centerplane, φ, deg 																
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
		Flux relative to centerplane, $M(\varphi)/M(O)$																
0.48	0.64201	1.007	1.011	1.011	1.008	1.002	0.993	0.980	0.965	0.947	0.926	0.903	0.877	0.850	0.821	0.790	0.758	0.725
0.50	0.62935	1.007	1.010	1.010	1.006	0.999	0.989	0.976	0.960	0.941	0.919	0.896	0.870	0.842	0.813	0.779	0.737	0.651
1.00	0.40463	1.000	0.996	0.986	0.972	0.953	0.922	0.886	0.844	0.794	0.737	0.671	0.594	0.506	0.407	0.295	0.173	0.070
2.00	0.22586	0.997	0.987	0.963	0.933	0.897	0.854	0.804	0.749	0.687	0.618	0.544	0.464	0.379	0.289	0.195	0.105	0.050
4.00	0.11810	0.991	0.971	0.944	0.910	0.870	0.823	0.770	0.711	0.646	0.576	0.501	0.422	0.340	0.254	0.165	0.095	0.046
8.00	0.05989	0.989	0.968	0.939	0.904	0.862	0.814	0.759	0.699	0.633	0.563	0.488	0.409	0.326	0.242	0.155	0.092	0.044
16.00	0.02999	0.992	0.970	0.942	0.906	0.863	0.814	0.759	0.698	0.631	0.560	0.484	0.405	0.323	0.238	0.151	0.092	0.044
32.00	0.01500	0.994	0.972	0.943	0.907	0.864	0.814	0.759	0.697	0.631	0.559	0.483	0.404	0.321	0.236	0.149	0.092	0.044
64.00	0.00750	0.994	0.973	0.944	0.908	0.864	0.815	0.759	0.697	0.630	0.559	0.483	0.403	0.320	0.235	0.148	0.091	0.044
128.00	0.00375	0.995	0.973	0.944	0.908	0.865	0.815	0.759	0.697	0.630	0.558	0.482	0.403	0.320	0.234	0.147	0.091	0.044
256.00	0.00187	0.995	0.973	0.944	0.908	0.865	0.815	0.759	0.697	0.630	0.558	0.482	0.402	0.320	0.234	0.147	0.091	0.044
512.00	0.00094	0.995	0.973	0.944	0.908	0.865	0.815	0.759	0.697	0.630	0.558	0.482	0.402	0.319	0.234	0.147	0.091	0.044

(g-2) Wall half-angle, -10^{o}

0.45	0.65524	1.007	1.010	1.010	1.007	1.000	0.990	0.977	0.960	0.941	0.920	0.896	0.870	0.841	0.812	0.782	0.751	0.719
0.50	0.62530	1.006	1.008	1.007	1.002	0.993	0.982	0.967	0.949	0.928	0.906	0.881	0.853	0.822	0.785	0.737	0.659	0.474
1.00	0.39693	1.000	0.994	0.983	0.964	0.938	0.907	0.870	0.827	0.776	0.718	0.651	0.575	0.489	0.392	0.284	0.168	0.072
2.00	0.21987	0.993	0.976	0.952	0.922	0.886	0.844	0.795	0.740	0.679	0.612	0.538	0.460	0.376	0.289	0.197	0.112	0.054
4.00	0.11302	0.994	0.975	0.948	0.914	0.874	0.828	0.775	0.716	0.652	0.582	0.508	0.429	0.347	0.261	0.173	0.104	0.050
8.00	0.05678	0.996	0.979	0.952	0.917	0.875	0.827	0.772	0.712	0.646	0.575	0.500	0.420	0.338	0.252	0.165	0.102	0.049
16.00	0.02843	0.996	0.982	0.954	0.919	0.876	0.827	0.772	0.711	0.644	0.573	0.497	0.417	0.334	0.249	0.161	0.101	0.049
32.00	0.01422	0.996	0.984	0.955	0.920	0.877	0.828	0.772	0.711	0.644	0.572	0.496	0.416	0.333	0.247	0.160	0.101	0.049
64.00	0.00711	0.996	0.984	0.956	0.920	0.877	0.828	0.772	0.711	0.644	0.572	0.496	0.416	0.332	0.247	0.159	0.101	0.049
128.00	0.00355	0.996	0.985	0.956	0.920	0.878	0.828	0.772	0.711	0.644	0.572	0.495	0.415	0.332	0.246	0.159	0.101	0.049
256.00	0.00178	0.996	0.985	0.956	0.921	0.878	0.828	0.772	0.711	0.644	0.572	0.495	0.415	0.332	0.246	0.158	0.101	0.049
512.00	0.00089	0.996	0.985	0.957	0.921	0.878	0.828	0.772	0.711	0.644	0.572	0.495	0.415	0.332	0.246	0.158	0.101	0.049

(g-3) Wall half-angle, -20^{o}

0.41	0.67487	1.006	1.008	1.007	1.002	0.993	0.981	0.966	0.948	0.926	0.902	0.880	0.856	0.830	0.803	0.775	0.745	0.713
0.50	0.60929	1.004	1.003	0.999	0.990	0.978	0.963	0.946	0.925	0.903	0.876	0.846	0.810	0.766	0.708	0.626	0.494	0.271
1.00	0.37688	0.995	0.983	0.966	0.944	0.917	0.884	0.846	0.801	0.750	0.690	0.623	0.548	0.464	0.371	0.270	0.162	0.075
2.00	0.20082	0.997	0.985	0.961	0.931	0.895	0.852	0.803	0.747	0.686	0.619	0.546	0.467	0.384	0.297	0.207	0.126	0.061
4.00	0.10197	0.996	0.985	0.966	0.933	0.893	0.846	0.793	0.734	0.670	0.600	0.525	0.446	0.363	0.278	0.189	0.119	0.058
8.00	0.05118	0.996	0.985	0.966	0.935	0.894	0.846	0.792	0.732	0.666	0.595	0.519	0.440	0.357	0.271	0.183	0.117	0.057
16.00	0.02562	0.996	0.985	0.966	0.937	0.895	0.847	0.792	0.731	0.665	0.594	0.517	0.438	0.354	0.268	0.180	0.117	0.057
32.00	0.01281	0.996	0.985	0.966	0.938	0.896	0.848	0.793	0.731	0.665	0.593	0.517	0.437	0.353	0.267	0.179	0.117	0.057
64.00	0.00641	0.996	0.985	0.966	0.939	0.897	0.848	0.793	0.732	0.665	0.593	0.517	0.436	0.353	0.266	0.179	0.117	0.057
128.00	0.00320	0.996	0.985	0.966	0.939	0.897	0.848	0.793	0.732	0.665	0.593	0.516	0.436	0.352	0.266	0.179	0.116	0.057
256.00	0.00160	0.996	0.985	0.966	0.939	0.897	0.848	0.793	0.732	0.665	0.593	0.516	0.436	0.352	0.266	0.179	0.116	0.057
512.00	0.00080	0.996	0.985	0.966	0.939	0.897	0.848	0.793	0.732	0.665	0.593	0.516	0.436	0.352	0.266	0.179	0.116	0.057

(g-4) Wall half-angle, -30^{o}

0.35	0.69157	1.004	1.004	1.000	0.992	0.980	0.964	0.949	0.933	0.915	0.895	0.874	0.850	0.825	0.799	0.771	0.742	0.711
0.50	0.57356	0.999	0.994	0.985	0.973	0.958	0.941	0.920	0.896	0.867	0.833	0.793	0.743	0.681	0.601	0.494	0.351	0.167
1.00	0.33454	0.997	0.989	0.973	0.950	0.921	0.886	0.844	0.797	0.742	0.681	0.612	0.535	0.452	0.361	0.263	0.163	0.079
2.00	0.17477	0.997	0.986	0.969	0.945	0.909	0.866	0.816	0.760	0.698	0.630	0.557	0.479	0.396	0.309	0.219	0.140	0.068
4.00	0.08840	0.996	0.985	0.967	0.941	0.908	0.863	0.810	0.752	0.687	0.617	0.542	0.463	0.380	0.295	0.206	0.134	0.066
8.00	0.04433	0.996	0.985	0.966	0.940	0.907	0.864	0.810	0.750	0.685	0.614	0.539	0.459	0.376	0.290	0.203	0.133	0.065
16.00	0.02218	0.996	0.985	0.966	0.940	0.906	0.865	0.811	0.750	0.684	0.613	0.537	0.457	0.374	0.288	0.203	0.132	0.065
32.00	0.01109	0.996	0.985	0.966	0.940	0.906	0.865	0.811	0.751	0.685	0.613	0.537	0.457	0.373	0.287	0.202	0.132	0.065
64.00	0.00555	0.996	0.985	0.966	0.940	0.906	0.866	0.811	0.751	0.685	0.613	0.537	0.457	0.373	0.287	0.202	0.132	0.065
128.00	0.00277	0.996	0.985	0.966	0.940	0.906	0.866	0.812	0.751	0.685	0.613	0.537	0.457	0.373	0.286	0.202	0.132	0.065
256.00	0.00139	0.996	0.985	0.966	0.940	0.906	0.866	0.812	0.751	0.685	0.613	0.537	0.457	0.373	0.286	0.202	0.132	0.065
512.00	0.00069	0.996	0.985	0.966	0.940	0.906	0.866	0.812	0.751	0.685	0.613	0.537	0.457	0.373	0.286	0.202	0.132	0.065

(g-5) Wall half-angle, -45^{o}

0.25	0.70711	0.998	0.994	0.988	0.979	0.970	0.958	0.944	0.929	0.911	0.892	0.872	0.849	0.825	0.800	0.773	0.744	0.714
0.50	0.44721	0.998	0.992	0.982	0.968	0.948	0.922	0.891	0.853	0.809	0.757	0.697	0.626	0.545	0.451	0.346	0.228	0.112
1.00	0.24254	0.997	0.987	0.971	0.949	0.920	0.885	0.843	0.790	0.732	0.667	0.595	0.518	0.435	0.348	0.256	0.168	0.082
2.00	0.12403	0.996	0.985	0.967	0.942	0.910	0.871	0.825	0.773	0.711	0.642	0.569	0.491	0.409	0.323	0.236	0.155	0.076
4.00	0.06238	0.996	0.985	0.966	0.940	0.907	0.867	0.821	0.768	0.706	0.637	0.563	0.484	0.401	0.316	0.232	0.152	0.075
8.00	0.03123	0.996	0.985	0.966	0.940	0.907	0.866	0.820	0.767	0.706	0.636	0.561	0.482	0.399	0.313	0.230	0.152	0.075
16.00	0.01562	0.996	0.985	0.966	0.940	0.906	0.866	0.819	0.766	0.706	0.636	0.561	0.482	0.399	0.313	0.230	0.151	0.075
32.00	0.00781	0.996	0.985	0.966	0.940	0.906	0.866	0.819	0.766	0.707	0.636	0.561	0.482	0.398	0.312	0.230	0.151	0.075
64.00	0.00391	0.996	0.985	0.966	0.940	0.906	0.866	0.819	0.766	0.707	0.636	0.561	0.482	0.398	0.312	0.230	0.151	0.075
128.00	0.00195	0.996	0.985	0.966	0.940	0.906	0.866	0.819	0.766	0.707	0.637	0.561	0.482	0.398	0.312	0.230	0.151	0.075
256.00	0.00098	0.996	0.985	0.966	0.940	0.906	0.866	0.819	0.766	0.707	0.637	0.561	0.482	0.398	0.312	0.230	0.151	0.075
512.00	0.00049	0.996	0.985	0.966	0.940	0.906	0.866	0.819	0.766	0.707	0.637	0.561	0.482	0.398	0.312	0.230	0.151	0.075

(g-6) Wall half-angle, -60^{o}

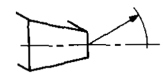
0.08	0.70711	0.999	0.996	0.991	0.985	0.976	0.966	0.953	0.938	0.921	0.903	0.883	0.861	0.838	0.813	0.786	0.758	0.729
0.25	0.28735	0.997	0.988	0.973	0.953	0.925	0.892	0.852	0.806	0.752	0.692	0.623	0.548	0.465	0.377	0.285	0.190	0.094
0.50	0.14834	0.996	0.986	0.968	0.943	0.912	0.873	0.828	0.777	0.719	0.655	0.587	0.510	0.429	0.344	0.258	0.171	0.085
1.00	0.07479	0.996	0.985	0.966	0.941	0.908	0.868	0.821	0.769	0.710	0.646	0.577	0.501	0.420	0.336	0.251	0.166	0.083
2.00	0.03747	0.996	0.985	0.966	0.940	0.907	0.866	0.820	0.767	0.708	0.644	0.574	0.499	0.418	0.334	0.249	0.165	0.082
4.00	0.01875	0.996	0.985	0.966	0.940	0.906	0.866	0.819	0.766	0.707	0.643	0.574	0.499	0.417	0.333	0.249	0.165	0.082
8.00	0.00937	0.996	0.985	0.966	0.940	0.906	0.866	0.819	0.766	0.707	0.643	0.574	0.499	0.417	0.333	0.249	0.165	0.082
16.00	0.00469	0.996	0.985	0.966	0.940	0.906	0.866	0.819	0.766	0.707	0.643	0.574	0.499	0.417	0.333	0.249	0.165	0.082
32.00	0.00234	0.996	0.985	0.966	0.940	0.906	0.866	0.819	0.766	0.707	0.643	0.574	0.499	0.417	0.333	0.249	0.165	0.082
64.00	0.00117	0.996	0.985	0.966	0.940	0.906	0.866	0.819	0.766	0.707	0.643	0.574	0.499	0.417	0.333	0.249	0.165	0.082
128.00	0.00059	0.996	0.985	0.966	0.940	0.906	0.866	0.819	0.766	0.707	0.643	0.574	0.499	0.417	0.333	0.249	0.165	0.082
256.00	0.00029	0.996	0.985	0.966	0.940	0.906	0.866	0.819	0.766	0.707	0.643	0.574	0.500	0.417	0.333	0.249	0.165	0.082
512.00	0.00015	0.996	0.985	0.966	0.940	0.906	0.866	0.819	0.766	0.707	0.643	0.574	0.500	0.417	0.333	0.249	0.165	0.082

TABLE VIII. - Continued. CALCULATED ANGULAR DISTRIBUTIONS OF PARTICLE FLUX AT VARIOUS RADIAL DISTANCES FROM SLOT EXIT (EQ. (12))

(h) Length to inlet-width ratio, 0.50

(h-1) Wall half-angle, -5°

Angle from centerplane, φ, deg



Nondimensional downstream radial distance, R_P	Nondimensional centerplane flux relative to inlet flux, M(O)	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
		Flux relative to centerplane, $M(\varphi)/M(O)$																
0.46	0.59356	1.012	1.019	1.021	1.020	1.014	1.004	0.990	0.972	0.952	0.928	0.902	0.873	0.842	0.810	0.775	0.739	0.703
0.50	0.57057	1.010	1.016	1.017	1.014	1.006	0.994	0.978	0.959	0.937	0.912	0.885	0.856	0.823	0.783	0.732	0.655	0.467
1.00	0.37105	1.002	0.997	0.987	0.973	0.949	0.911	0.868	0.817	0.760	0.694	0.619	0.534	0.438	0.331	0.214	0.136	0.064
2.00	0.21137	0.998	0.985	0.953	0.915	0.870	0.820	0.763	0.700	0.630	0.555	0.474	0.387	0.296	0.210	0.151	0.096	0.046
4.00	0.11252	0.985	0.956	0.920	0.878	0.829	0.774	0.713	0.647	0.575	0.498	0.417	0.333	0.245	0.186	0.134	0.086	0.041
8.00	0.05741	0.981	0.951	0.913	0.868	0.817	0.760	0.697	0.629	0.556	0.479	0.397	0.312	0.232	0.179	0.129	0.083	0.040
16.00	0.02874	0.988	0.956	0.917	0.871	0.819	0.760	0.696	0.627	0.552	0.473	0.391	0.306	0.230	0.178	0.128	0.082	0.040
32.00	0.01437	0.991	0.959	0.919	0.873	0.820	0.761	0.696	0.625	0.550	0.471	0.388	0.302	0.229	0.177	0.128	0.082	0.039
64.00	0.00719	0.993	0.960	0.921	0.874	0.821	0.761	0.696	0.625	0.550	0.470	0.387	0.301	0.229	0.177	0.128	0.082	0.039
128.00	0.00359	0.994	0.961	0.921	0.874	0.821	0.761	0.696	0.625	0.549	0.470	0.386	0.300	0.228	0.177	0.128	0.082	0.039
256.00	0.00180	0.994	0.961	0.921	0.875	0.821	0.761	0.696	0.625	0.549	0.469	0.386	0.299	0.228	0.177	0.128	0.082	0.039
512.00	0.00090	0.994	0.962	0.922	0.875	0.821	0.761	0.696	0.625	0.549	0.469	0.386	0.299	0.228	0.177	0.128	0.082	0.039

(h-2) Wall half-angle, -10°

0.41	0.61659	1.012	1.019	1.021	1.018	1.011	1.000	0.985	0.967	0.945	0.920	0.892	0.862	0.830	0.796	0.763	0.729	0.694
0.50	0.55911	1.008	1.012	1.010	1.003	0.992	0.977	0.958	0.936	0.910	0.879	0.844	0.803	0.753	0.688	0.596	0.451	0.215
1.00	0.35430	1.000	0.994	0.979	0.950	0.917	0.877	0.832	0.780	0.722	0.655	0.580	0.497	0.404	0.302	0.209	0.134	0.063
2.00	0.19898	0.986	0.960	0.929	0.891	0.848	0.798	0.742	0.681	0.613	0.540	0.461	0.378	0.290	0.217	0.157	0.101	0.048
4.00	0.10197	0.994	0.965	0.930	0.888	0.839	0.784	0.723	0.657	0.585	0.509	0.428	0.343	0.261	0.203	0.147	0.095	0.045
8.00	0.05118	0.996	0.975	0.937	0.892	0.841	0.784	0.720	0.651	0.577	0.499	0.416	0.331	0.256	0.199	0.144	0.093	0.045
16.00	0.02562	0.996	0.980	0.941	0.896	0.843	0.784	0.720	0.650	0.574	0.495	0.411	0.325	0.254	0.198	0.144	0.093	0.045
32.00	0.01281	0.996	0.983	0.944	0.897	0.844	0.785	0.720	0.649	0.573	0.493	0.409	0.322	0.254	0.197	0.143	0.092	0.045
64.00	0.00641	0.996	0.984	0.945	0.898	0.845	0.785	0.720	0.649	0.573	0.492	0.408	0.321	0.253	0.197	0.143	0.092	0.045
128.00	0.00320	0.996	0.985	0.945	0.899	0.845	0.786	0.720	0.649	0.572	0.492	0.407	0.320	0.253	0.197	0.143	0.092	0.045
256.00	0.00160	0.996	0.985	0.946	0.899	0.846	0.786	0.720	0.648	0.572	0.491	0.407	0.320	0.253	0.197	0.143	0.092	0.045
512.00	0.00080	0.996	0.985	0.946	0.899	0.846	0.786	0.720	0.648	0.572	0.491	0.407	0.319	0.253	0.197	0.143	0.092	0.045

(h-3) Wall half-angle, -20°

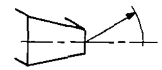
0.32	0.65156	1.011	1.016	1.017	1.012	1.002	0.988	0.970	0.948	0.923	0.894	0.869	0.842	0.814	0.784	0.753	0.720	0.686
0.50	0.51191	1.003	0.999	0.990	0.974	0.953	0.929	0.900	0.867	0.829	0.784	0.731	0.667	0.589	0.493	0.375	0.242	0.117
1.00	0.30478	0.991	0.971	0.946	0.915	0.879	0.837	0.789	0.735	0.674	0.606	0.532	0.451	0.363	0.277	0.203	0.131	0.063
2.00	0.15799	0.996	0.986	0.957	0.918	0.873	0.822	0.764	0.701	0.631	0.557	0.477	0.393	0.311	0.243	0.178	0.115	0.056
4.00	0.07975	0.996	0.985	0.967	0.926	0.876	0.821	0.759	0.691	0.618	0.540	0.458	0.372	0.300	0.235	0.172	0.111	0.054
8.00	0.03997	0.996	0.985	0.966	0.931	0.880	0.822	0.759	0.689	0.614	0.534	0.450	0.364	0.297	0.232	0.170	0.110	0.053
16.00	0.02000	0.996	0.985	0.966	0.935	0.883	0.824	0.759	0.688	0.612	0.532	0.447	0.362	0.296	0.231	0.169	0.110	0.053
32.00	0.01000	0.996	0.985	0.966	0.937	0.884	0.825	0.760	0.688	0.612	0.531	0.445	0.361	0.295	0.231	0.169	0.110	0.053
64.00	0.00500	0.996	0.985	0.966	0.938	0.885	0.826	0.760	0.688	0.611	0.530	0.444	0.361	0.295	0.231	0.169	0.110	0.053
128.00	0.00250	0.996	0.985	0.966	0.938	0.885	0.826	0.760	0.688	0.611	0.530	0.444	0.361	0.295	0.231	0.169	0.110	0.053
256.00	0.00125	0.996	0.985	0.966	0.939	0.886	0.826	0.760	0.688	0.611	0.530	0.444	0.361	0.295	0.231	0.169	0.110	0.053
512.00	0.00062	0.996	0.985	0.966	0.939	0.886	0.826	0.760	0.688	0.611	0.530	0.444	0.361	0.295	0.231	0.169	0.110	0.053

(h-4) Wall half-angle, -30°

0.21	0.68154	1.008	1.010	1.006	0.996	0.980	0.961	0.944	0.926	0.906	0.884	0.861	0.835	0.809	0.781	0.751	0.720	0.688
0.25	0.62606	1.004	1.001	0.992	0.979	0.965	0.949	0.931	0.910	0.886	0.860	0.830	0.795	0.754	0.700	0.625	0.502	0.286
0.50	0.38723	0.998	0.989	0.969	0.945	0.915	0.880	0.840	0.793	0.739	0.678	0.609	0.531	0.445	0.352	0.262	0.171	0.083
1.00	0.20552	0.997	0.987	0.970	0.946	0.904	0.857	0.803	0.743	0.677	0.604	0.527	0.444	0.363	0.287	0.211	0.138	0.067
2.00	0.10443	0.996	0.985	0.967	0.941	0.909	0.855	0.796	0.730	0.658	0.582	0.500	0.419	0.344	0.271	0.200	0.130	0.064
4.00	0.05243	0.996	0.985	0.966	0.940	0.907	0.859	0.796	0.728	0.653	0.574	0.491	0.412	0.339	0.267	0.197	0.128	0.063
8.00	0.02624	0.996	0.985	0.966	0.940	0.906	0.862	0.798	0.728	0.652	0.571	0.486	0.410	0.337	0.266	0.196	0.128	0.062
16.00	0.01312	0.996	0.985	0.966	0.940	0.906	0.864	0.799	0.728	0.652	0.570	0.484	0.410	0.337	0.265	0.195	0.128	0.062
32.00	0.00656	0.996	0.985	0.966	0.940	0.906	0.865	0.800	0.729	0.652	0.570	0.484	0.409	0.336	0.265	0.195	0.128	0.062
64.00	0.00328	0.996	0.985	0.966	0.940	0.906	0.866	0.800	0.729	0.652	0.570	0.483	0.409	0.336	0.265	0.195	0.128	0.062
128.00	0.00164	0.996	0.985	0.966	0.940	0.906	0.866	0.801	0.729	0.652	0.569	0.483	0.409	0.336	0.265	0.195	0.128	0.062
256.00	0.00082	0.996	0.985	0.966	0.940	0.906	0.866	0.801	0.729	0.652	0.569	0.483	0.409	0.336	0.265	0.195	0.128	0.062
512.00	0.00041	0.996	0.985	0.966	0.940	0.906	0.866	0.801	0.729	0.652	0.569	0.483	0.409	0.336	0.265	0.195	0.128	0.062

(i) Length to inlet-width ratio, 1.00

(i-1) Wall half-angle, -5°



Nondimensional downstream radial distance, R_P	Nondimensional centerplane flux relative to inlet flux, M(O)	Angle from centerplane, φ, deg																
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
		Flux relative to centerplane, $M(\varphi)/M(O)$																
0.42	0.52572	1.016	1.026	1.030	1.028	1.021	1.009	0.993	0.972	0.948	0.921	0.890	0.857	0.822	0.784	0.745	0.704	0.661
0.50	0.48533	1.013	1.019	1.019	1.013	1.002	0.986	0.966	0.943	0.916	0.888	0.850	0.802	0.744	0.672	0.573	0.412	0.212
1.00	0.31894	1.003	0.998	0.987	0.972	0.927	0.875	0.816	0.750	0.677	0.595	0.504	0.403	0.323	0.250	0.180	0.114	0.054
2.00	0.18672	0.998	0.973	0.925	0.871	0.811	0.745	0.673	0.595	0.511	0.421	0.349	0.289	0.232	0.178	0.128	0.082	0.039
4.00	0.10223	0.970	0.923	0.870	0.810	0.744	0.673	0.596	0.515	0.429	0.357	0.302	0.250	0.201	0.155	0.112	0.072	0.034
8.00	0.05243	0.969	0.918	0.860	0.796	0.727	0.651	0.571	0.486	0.398	0.342	0.289	0.239	0.192	0.149	0.107	0.069	0.033
16.00	0.02624	0.980	0.926	0.866	0.799	0.726	0.648	0.565	0.477	0.394	0.338	0.286	0.237	0.191	0.147	0.107	0.068	0.033
32.00	0.01312	0.986	0.931	0.869	0.801	0.726	0.647	0.562	0.472	0.392	0.337	0.285	0.236	0.190	0.147	0.106	0.068	0.033
64.00	0.00656	0.989	0.934	0.871	0.802	0.727	0.646	0.560	0.470	0.392	0.336	0.284	0.236	0.190	0.147	0.106	0.068	0.033
128.00	0.00328	0.991	0.935	0.872	0.802	0.727	0.645	0.559	0.469	0.391	0.336	0.284	0.236	0.190	0.147	0.106	0.068	0.033
256.00	0.00164	0.992	0.935	0.872	0.803	0.727	0.645	0.559	0.468	0.391	0.336	0.284	0.235	0.190	0.147	0.106	0.068	0.033
512.00	0.00082	0.992	0.936	0.873	0.803	0.727	0.645	0.559	0.468	0.391	0.336	0.284	0.235	0.190	0.147	0.106	0.068	0.033

(i-2) Wall half-angle, -10°

0.32	0.56301	1.017	1.026	1.030	1.028	1.020	1.007	0.989	0.967	0.941	0.912	0.879	0.844	0.807	0.768	0.731	0.692	0.652
0.50	0.44936	1.008	1.008	1.001	0.988	0.971	0.946	0.908	0.864	0.815	0.759	0.693	0.616	0.523	0.415	0.312	0.205	0.098
1.00	0.28081	0.999	0.982	0.943	0.899	0.850	0.794	0.732	0.664	0.589	0.507	0.424	0.355	0.289	0.224	0.162	0.104	0.050
2.00	0.15799	0.972	0.930	0.882	0.828	0.768	0.703	0.632	0.555	0.474	0.405	0.344	0.287	0.232	0.180	0.131	0.084	0.040
4.00	0.07975	0.996	0.952	0.897	0.834	0.766	0.692	0.612	0.528	0.450	0.389	0.331	0.276	0.223	0.173	0.126	0.081	0.039
8.00	0.03997	0.996	0.968	0.907	0.840	0.767	0.687	0.603	0.514	0.444	0.383	0.326	0.272	0.220	0.171	0.124	0.080	0.039
16.00	0.02000	0.996	0.977	0.914	0.844	0.767	0.685	0.598	0.506	0.441	0.381	0.324	0.270	0.219	0.170	0.124	0.080	0.039
32.00	0.01000	0.996	0.982	0.917	0.846	0.768	0.685	0.596	0.504	0.440	0.380	0.323	0.270	0.219	0.170	0.124	0.080	0.039
64.00	0.00500	0.996	0.984	0.919	0.847	0.768	0.684	0.595	0.503	0.439	0.379	0.323	0.269	0.218	0.170	0.123	0.080	0.038
128.00	0.00250	0.996	0.985	0.920	0.847	0.769	0.684	0.594	0.503	0.439	0.379	0.323	0.269	0.218	0.170	0.123	0.080	0.038
256.00	0.00125	0.996	0.985	0.920	0.848	0.769	0.684	0.594	0.502	0.439	0.379	0.323	0.269	0.218	0.170	0.123	0.080	0.038
512.00	0.00062	0.996	0.985	0.921	0.848	0.769	0.684	0.593	0.502	0.439	0.379	0.323	0.269	0.218	0.170	0.123	0.080	0.038

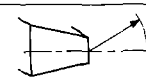
(i-3) Wall half-angle, -20°

0.14	0.62303	1.017	1.025	1.027	1.022	1.011	0.994	0.972	0.945	0.915	0.881	0.852	0.822	0.790	0.758	0.724	0.689	0.653
0.25	0.45795	1.003	0.996	0.977	0.951	0.921	0.887	0.848	0.803	0.752	0.694	0.627	0.549	0.466	0.378	0.284	0.186	0.090
0.50	0.26963	0.995	0.964	0.928	0.886	0.838	0.784	0.725	0.659	0.587	0.516	0.447	0.379	0.311	0.244	0.179	0.116	0.056
1.00	0.13865	0.996	0.986	0.951	0.895	0.834	0.766	0.693	0.615	0.544	0.476	0.410	0.345	0.282	0.221	0.161	0.105	0.051
2.00	0.06983	0.996	0.985	0.966	0.910	0.838	0.761	0.677	0.601	0.531	0.464	0.399	0.336	0.274	0.215	0.157	0.102	0.049
4.00	0.03498	0.996	0.985	0.966	0.921	0.843	0.758	0.670	0.597	0.527	0.460	0.395	0.333	0.272	0.213	0.156	0.101	0.049
8.00	0.01750	0.996	0.985	0.966	0.928	0.846	0.758	0.669	0.595	0.525	0.458	0.394	0.331	0.271	0.212	0.155	0.101	0.049
16.00	0.00875	0.996	0.985	0.966	0.933	0.848	0.757	0.668	0.594	0.524	0.458	0.393	0.331	0.270	0.212	0.155	0.101	0.049
32.00	0.00437	0.996	0.985	0.966	0.935	0.849	0.757	0.668	0.594	0.524	0.457	0.393	0.331	0.270	0.212	0.155	0.101	0.049
64.00	0.00219	0.996	0.985	0.966	0.936	0.850	0.757	0.668	0.593	0.524	0.457	0.393	0.330	0.270	0.212	0.155	0.101	0.049
128.00	0.00109	0.996	0.985	0.966	0.937	0.850	0.757	0.668	0.593	0.524	0.457	0.393	0.330	0.270	0.211	0.155	0.101	0.049
256.00	0.00055	0.996	0.985	0.966	0.937	0.850	0.757	0.668	0.593	0.524	0.457	0.393	0.330	0.270	0.211	0.155	0.101	0.049
512.00	0.00027	0.996	0.985	0.966	0.937	0.850	0.757	0.668	0.593	0.524	0.457	0.393	0.330	0.270	0.211	0.155	0.101	0.049

TABLE VIII. - Concluded. CALCULATED ANGULAR DISTRIBUTIONS OF PARTICLE FLUX AT VARIOUS RADIAL DISTANCES FROM SLOT EXIT (EQ. (12))

(j) Length to inlet-width ratio, 2.00

(j-1) Wall half-angle, -5°



Nondimensional downstream radial distance, R_P	Nondimensional centerplane flux relative to inlet flux, M(O)	Angle from centerplane, φ, deg																
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
		Flux relative to centerplane, $M(\varphi)/M(O)$																
0.34	0.44358	1.018	1.029	1.033	1.031	1.022	1.008	0.989	0.965	0.937	0.905	0.871	0.833	0.793	0.751	0.707	0.660	0.613
0.50	0.37201	1.011	1.014	1.009	0.998	0.981	0.959	0.935	0.895	0.830	0.758	0.676	0.581	0.485	0.394	0.297	0.195	0.093
1.00	0.24471	1.002	0.995	0.983	0.917	0.842	0.760	0.672	0.576	0.495	0.425	0.361	0.301	0.243	0.188	0.135	0.086	0.041
2.00	0.14770	0.998	0.927	0.848	0.762	0.671	0.574	0.491	0.426	0.369	0.317	0.268	0.223	0.179	0.138	0.100	0.064	0.031
4.00	0.08399	0.927	0.845	0.756	0.662	0.562	0.476	0.414	0.361	0.313	0.268	0.227	0.189	0.152	0.117	0.085	0.054	0.026
8.00	0.04246	0.948	0.853	0.753	0.646	0.535	0.462	0.402	0.351	0.304	0.261	0.222	0.184	0.148	0.115	0.083	0.053	0.026
16.00	0.02125	0.966	0.864	0.755	0.640	0.529	0.458	0.399	0.348	0.302	0.260	0.220	0.183	0.148	0.114	0.083	0.053	0.026
32.00	0.01062	0.976	0.869	0.756	0.637	0.527	0.456	0.397	0.347	0.301	0.259	0.219	0.182	0.147	0.114	0.083	0.053	0.026
64.00	0.00531	0.982	0.872	0.756	0.635	0.525	0.455	0.397	0.346	0.300	0.258	0.219	0.182	0.147	0.114	0.083	0.053	0.026
128.00	0.00266	0.985	0.874	0.757	0.634	0.525	0.454	0.396	0.346	0.300	0.258	0.219	0.182	0.147	0.114	0.083	0.053	0.026
256.00	0.00133	0.986	0.875	0.757	0.633	0.524	0.454	0.396	0.346	0.300	0.258	0.219	0.182	0.147	0.114	0.082	0.053	0.026
512.00	0.00066	0.987	0.875	0.757	0.633	0.524	0.454	0.396	0.346	0.300	0.258	0.219	0.182	0.147	0.114	0.082	0.053	0.026

(j-2) Wall half-angle, -10°

0.14	0.50271	1.020	1.032	1.036	1.033	1.024	1.008	0.988	0.962	0.932	0.899	0.862	0.823	0.781	0.738	0.696	0.654	0.611
0.25	0.37897	1.008	1.006	0.996	0.979	0.948	0.895	0.838	0.774	0.704	0.626	0.549	0.474	0.397	0.317	0.235	0.152	0.072
0.50	0.24323	0.998	0.951	0.891	0.825	0.754	0.677	0.598	0.529	0.465	0.405	0.347	0.291	0.236	0.184	0.133	0.086	0.041
1.00	0.13865	0.962	0.890	0.811	0.727	0.638	0.561	0.496	0.437	0.383	0.332	0.283	0.237	0.192	0.149	0.108	0.070	0.034
2.00	0.06983	0.996	0.922	0.821	0.714	0.619	0.545	0.482	0.425	0.372	0.322	0.274	0.229	0.186	0.144	0.105	0.068	0.033
4.00	0.03498	0.596	0.949	0.828	0.704	0.612	0.539	0.476	0.420	0.367	0.318	0.271	0.227	0.184	0.143	0.104	0.067	0.032
8.00	0.01750	0.996	0.967	0.833	0.701	0.610	0.537	0.474	0.418	0.366	0.317	0.270	0.226	0.183	0.143	0.104	0.067	0.032
16.00	0.00875	0.596	0.978	0.835	0.700	0.608	0.535	0.473	0.417	0.365	0.316	0.270	0.225	0.183	0.142	0.104	0.067	0.032
32.00	0.00437	0.996	0.984	0.837	0.699	0.608	0.535	0.472	0.416	0.364	0.316	0.269	0.225	0.183	0.142	0.104	0.067	0.032
64.00	0.00219	0.796	0.985	0.837	0.699	0.608	0.535	0.472	0.416	0.364	0.315	0.269	0.225	0.183	0.142	0.104	0.067	0.032
128.00	0.00109	0.996	0.985	0.838	0.699	0.607	0.534	0.472	0.416	0.364	0.315	0.269	0.225	0.183	0.142	0.104	0.067	0.032
256.00	0.00055	0.996	0.985	0.838	0.699	0.607	0.534	0.472	0.416	0.364	0.315	0.269	0.225	0.183	0.142	0.104	0.067	0.032
512.00	0.00027	0.996	0.985	0.838	0.699	0.607	0.534	0.472	0.416	0.364	0.315	0.269	0.225	0.183	0.142	0.104	0.067	0.032

(k) Length to inlet width ratio, 4.00; wall half-angle, -5°

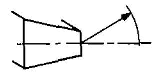
Nondimensional downstream radial distance, R_P	Nondimensional centerplane flux relative to inlet flux, M(O)	Angle from centerplane, φ, deg 																
		5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85
		Flux relative to centerplane, $M(\varphi)/M(O)$																
0.18	0.35983	1.019	1.030	1.033	1.029	1.019	1.003	0.981	0.954	0.923	0.888	0.850	0.809	0.765	0.719	0.671	0.621	0.570
0.25	0.31449	1.013	1.017	1.012	1.001	0.983	0.959	0.932	0.902	0.833	0.744	0.648	0.560	0.478	0.395	0.305	0.204	0.098
0.50	0.21760	1.003	0.997	0.984	0.906	0.797	0.682	0.584	0.507	0.441	0.382	0.325	0.272	0.220	0.171	0.123	0.079	0.037
1.00	0.14070	0.998	0.895	0.768	0.635	0.536	0.463	0.404	0.353	0.307	0.264	0.224	0.186	0.150	0.116	0.084	0.054	0.026
2.00	0.08694	0.877	0.733	0.585	0.483	0.413	0.359	0.314	0.274	0.238	0.205	0.174	0.145	0.117	0.090	0.065	0.042	0.020
4.00	0.04495	0.892	0.708	0.549	0.456	0.392	0.341	0.298	0.261	0.227	0.195	0.166	0.138	0.111	0.086	0.062	0.040	0.019
8.00	0.02249	0.924	0.702	0.542	0.451	0.388	0.338	0.296	0.259	0.225	0.194	0.165	0.137	0.111	0.086	0.062	0.040	0.019
16.00	0.01125	0.945	0.696	0.539	0.449	0.386	0.336	0.295	0.258	0.224	0.193	0.164	0.136	0.110	0.085	0.062	0.040	0.019
32.00	0.00562	0.958	0.692	0.537	0.448	0.385	0.336	0.294	0.257	0.224	0.193	0.164	0.136	0.110	0.085	0.062	0.040	0.019
64.00	0.00281	0.965	0.691	0.537	0.448	0.385	0.335	0.294	0.257	0.224	0.193	0.164	0.136	0.110	0.085	0.062	0.040	0.019
128.00	0.00141	0.969	0.691	0.537	0.447	0.385	0.335	0.294	0.257	0.224	0.193	0.164	0.136	0.110	0.085	0.062	0.040	0.019
256.00	0.00070	0.971	0.691	0.536	0.447	0.384	0.335	0.294	0.257	0.224	0.193	0.164	0.136	0.110	0.085	0.062	0.040	0.019
512.00	0.00035	0.972	0.691	0.536	0.447	0.384	0.335	0.294	0.257	0.224	0.193	0.164	0.136	0.110	0.085	0.062	0.040	0.019

TABLE IX. - MATCHED BOUNDARY-CONDITION SOLUTIONS FOR SINGLE SLOT (EQS. (6), (26), (31), AND (64))

Nondimensional length, $L = \mathscr{L}/\mathscr{W}_1$	Surface-diffusion parameter, C_2/L	Ratio of inlet to maximum surface-coverage fraction, Θ_0	Ratio of exit to maximum surface-coverage fraction, Θ_L	Exit-coverage-fraction gradient, $-\Theta_L'$	Transmission factors			
					Indirect, P_i	Surface (eq. (55)), P_s	Direct (table (p. 26)), P_d	Total (eq. (50)) P_t
0.0625	0.01	0.735	0.265	10.6	0.0237	0.0132	0.939	0.976
	.1	.638	.362	4.59	.0230	.0574		1.019
	1	.556	.444	1.776	.0259	.222		1.187
	10	.519	.481	.609	.022	.76		1.721
0.25	0.01	0.770	0.230	4.60	0.1027	0.023	0.781	0.907
	.1	.705	.295	1.86	.1022	.093		.976
	1	.599	.401	.802	.1020	.401		1.284
	10	.537	.463	.292	.1014	1.46		2.34
1	0.01	0.831	0.169	1.69	0.259	0.0338	0.414	0.707
	.1	.783	.217	.686	.257	.1372		.808
	1	.668	.332	.332	.267	.664		1.345
	10	.569	.431	.136	.280	2.72		3.414
2	0.01	0.872	0.128	0.905	0.292	0.0362	0.236	0.564
	.1	.828	.172	.384	.291	.1536		.681
	1	.711	.289	.204	.318	.816		1.370
	10	.593	.407	.091	.349	3.64		4.225
4	0.01	0.9095	0.0905	0.454	0.261	0.0364	0.123	0.4204
	.1	.870	.130	.206	.263	.1648		.551
	1	.758	.242	.121	.309	.968		1.390
	10	.623	.377	.0596	.374	4.77		5.267
8	0.01	0.9393	0.0607	0.214	0.198	0.0342	0.0623	0.295
	.1	.905	.095	.106	.205	.170		.437
	1	.80	.20	.0706	.269	1.13		1.461
	10	.658	.342	.0382	.360	6.11		6.532

TABLE X. - MATCHED BOUNDARY-CONDITION SOLUTIONS FOR SINGLE TUBE (EQS. (6), (42), (48), AND (64))

Nondimensional length, $L = \mathscr{L}/\mathscr{R}_1$	Surface-diffusion parameter, C_2/L	Ratio of inlet to maximum surface-coverage fraction, Θ_0	Ratio of exit to maximum surface-coverage fraction, Θ_L	Exit-coverage-fraction gradient, $-\Theta_L'$	Transmission factors			
					Indirect, P_i	Surface (eq. (55)), P_s	Direct (table (p. 26)), P_d	Total (eq. (50)), P_t
0.0625	0.01	0.733	0.267	10.68	0.0236	0.01335	0.939	0.976
	.1	.640	.360	4.71	.0230	.0589		1.021
	1	.562	.438	1.95	.0224	.244		1.205
	10	.525	.475	.807	.0220	1.01		1.971
0.125	0.01	0.752	0.248	7.07	0.0528	0.0177	0.883	0.954
	.1	.677	.323	3.07	.0522	.0768		1.012
	1	.585	.415	1.38	.0513	.345		1.279
	10	.539	.461	.608	.0507	1.52		2.454
1	0.01	0.830	0.170	1.79	0.278	0.0358	0.382	0.696
	.1	.798	.202	.737	.275	.147		.804
	1	.707	.293	.419	.282	.838		1.502
	10	.627	.373	.254	.289	5.08		5.751
4	0.01	0.915	0.0853	0.478	0.283	0.0383	0.056	0.377
	.1	.889	.111	.231	.278	.185		.519
	1	.820	.180	.158	.306	1.264		1.626
	10	.748	.252	.1236	.342	9.888		10.286
16	0.01	0.972	0.028	0.0836	0.118	0.0267	0.004	0.149
	.1	.953	.047	.0562	.117	.18		.301
	1	.915	.085	.0508	.143	1.62		1.767
	10	.874	.126	.0465	.175	14.88		15.059

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