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INVESTIGATION OF A LARGE-SCALE MIXED-COMPRESSION AXISYMMETRIC INLET SYSTEM CAPABLE OF HIGH PERFORMANCE AT MACH NUMBERS 0.6 TO 3.0

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Ames Research Center
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SUMMARY

A model of a mixed-compression inlet with a 20-inch-diameter capture area was designed and tested in combination with three subsonic diffuser designs. The shortest inlet system was about 1.50 capture diameters long measured from the cowl lip to the engine face and employed vortex generators just downstream of the throat to reduce the total pressure distortion at the engine face. The other two systems were 1.75 capture diameters long and did not employ vortex generators. The supersonic portion of the inlet was designed for Mach number 3.0 and was capable of performing at off-design Mach numbers by translation of the cowl. The major objective was to investigate relatively short axisymmetric inlet systems capable of high performance over the complete Mach number range. The model was tested in a wind tunnel at Mach numbers from 0.6 to 3.2 and angles of attack from 0° to 8°. The Reynolds number was about $2{\times}10^6$ per foot at Mach number 3.0.

The supersonic diffuser of the inlet was designed with the aid of a computer program employing the method of characteristics. Preliminary tests showed that the supersonic portion of the inlet performed as predicted, but the flow separated in the subsonic diffuser limiting the performance at the engine face. The subsonic diffuser was then modified and the total-pressure recovery was raised to 90 percent with about 11 percent boundary-layer bleed mass flow from 86-percent recovery with 13-percent bleed. Off-design total-pressure recoveries were also improved about 4 percent over the Mach number range 1.55 to 3.0. The 1.50 capture diameter inlet, with vortex generators, showed an additional 1-percent improvement in recovery, but of more significance was the reduction in total pressure distortion at the engine face. The distortion was reduced to 6 to 7 percent from about 10 percent and the maximum recovery was improved to about 91 percent with about 11-percent boundary-layer bleed mass flow. Without the generators the distortion of the 1.50-diameter inlet was about doubled (14 percent).

The test results in the Mach number range 0.6 to 1.2 included details of experimentally measured additive drag. It was found that there was an optimum trade of additive drag for pressure recovery.

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*Title, Unclassified.

INTRODUCTION

One of the important elements of a supersonic propulsion system is the inlet. Satisfactory performance of the system usually depends upon a high level of inlet performance not only at the conditions for which the system has been optimized, but as in the case of a supersonic transport vehicle, over the entire mission. When the performance of a vehicle is considered, the weight of the inlet is important. A short inlet, of course, tends to weigh less than a long inlet, but also tends to make high performance difficult to attain. This has presented a challenging problem, the solution of which was approached through a theoretical and experimental research program with a large-scale axisymmetric inlet model. The major objective of the program was to investigate relatively short axisymmetric inlet systems theoretically capable of high performance over a wide range of Mach numbers.

The axisymmetric inlet model chosen for study was a mixed compression type. The supersonic portion of the inlet was designed for Mach number 3.0. Performance at off-design Mach numbers was accomplished by translation of the cowl. Three variations in subsonic diffuser design were tested in combination with virtually the same supersonic diffuser. The initial subsonic diffuser proved to be deficient, as indicated by preliminary test results, and led to a modification which produced more satisfactory results. A shorter subsonic diffuser was then designed and tested with vortex generators. The generators were mounted just downstream of the throat region to reduce the total pressure distortion at the engine face. Boundary-layer bleed configurations were developed for Mach number 3.0 and were tested at off-design Mach numbers without change. By controlling the bleed plenum chamber pressures, a range of bleed mass-flow ratios was investigated for a given bleed configuration. Tests were conducted over the Mach number range 0.6 to 3.2 at a tunnel total pressure of 30 inches of Hg. This corresponded to a Reynolds number of about 2×10^6 per foot at Mach number 3.0. The tests were conducted primarily to determine the performance parameters of engine-face total-pressure recovery and distortion as a function of boundary-layer bleed mass-flow ratio at angles of attack from 0° to 8°. The transonic tests included experimental determination of the additive drag. Theoretical predictions based upon the method of characteristics were compared with the experimental results. A small portion of the results presented herein is also presented in references 1 and 2.

SYMBOLS

A_c capture area, 314.16 sq in.

A_x local duct area normal to the inlet centerline, sq in.

b	span of the vortex generators, in.
C_{D_a}	additive drag coefficient based on A_c
C_{FN}	net-thrust coefficient based on A_c
D	capture diameter, 20 in.
h	local rake height, in.
M_∞	free-stream Mach number
ΔM_∞	free-stream Mach number decrement from the design Mach number
M_l	local Mach number
m	mass flow
P_t	total pressure
p	static pressure
Δp_{t_2}	total pressure distortion parameter, $\dfrac{p_{t_{2_{max}}} - p_{t_{2_{min}}}}{\bar{p}_{t_2}}$
$\dfrac{r}{R}$	$\dfrac{\text{local radius}}{\text{capture area radius}}$
$\dfrac{x}{R}$	$\dfrac{\text{axial distance from the tip of the centerbody}}{\text{capture area radius}}$
$\left(\dfrac{x}{R}\right)_c$	$\dfrac{\text{axial distance from the cowl lip}}{\text{capture area radius}}$
$\left(\dfrac{x}{R}\right)_{lip}$	$\dfrac{\text{axial distance from the cone tip to the cowl lip}}{\text{capture area radius}}$
$\dfrac{\Delta x}{R}$	incremental $\dfrac{x}{R}$
α	angle of attack, deg
α_u	incipient unstart angle of attack, deg
$(\bar{\ })$	average values

Subscripts

o inlet lip station

1 throat station

2 engine-face station

bl bleed

l local flow

∞ free-stream conditions

Note: The letters A, B, C, and D, referring to the boundary-layer bleed exit settings, denote a progressively more restricted bleed flow from A, the fully open exit setting, to D, the most restricted setting. The letter A' refers to a bleed exit setting associated only with the 1.75 D modified inlet.

DESIGN

Satisfactory performance of a propulsion system usually demands a relatively short inlet capable of high performance at off-design Mach numbers as well as at the design Mach number. The requirement for adequate transonic acceleration led to a design which employed a low-angle conical centerbody to keep the transonic additive drag reasonably small. The requirement for high performance at off-design Mach numbers was compatible with the transonic requirements and led to a supersonic diffuser design with high performance. For the shortest subsonic diffuser the use of vortex generators was vital in achieving low flow distortion at the engine face. The design of the inlet system divided naturally into two parts, the supersonic diffuser and the subsonic diffuser.

Supersonic Diffuser

This portion of the inlet was designed with the aid of a computer program that employed the method of characteristics. The program proved to be adequate and is fully described in reference 3. Figure 1 shows the diffuser contours with the theoretical network of characteristics and flow properties from the computer program. An initial internal cowl angle of 0° and a 12.5° half-angle conical centerbody were selected to satisfy the important external requirements for low transonic additive drag and low cowl drag. The rest of the contours to the throat were adjusted by trial until the computer program gave the desired theoretical conditions at the throat and sufficiently low pressure rises across the internal shock-wave impingements to prevent boundary-layer separation. The goal was to attain uniform flow in the throat at a Mach number of 1.3 and a pressure recovery above 95 percent. Figure 1 shows that this goal was closely achieved. In addition, the pressure ratios across the first and second shock-wave impingements on the centerbody were 2.80 and 1.68, respectively, and 2.13 on the cowl. These pressure ratios were judged (on the basis of ref. 4) to be below those for incipient separation of the expected boundary layers. The off-design air flow requirements of a selected turbofan engine were satisfied throughout the Mach number range. The inlet provided 40.5 percent of the capture mass flow at Mach number 1.0. This may not be sufficient for some engines, but a contracting centerbody version of the inlet could provide higher mass flow at all speeds. An additional restraint imposed upon the theoretical design was the requirement that the axial distance through which the cowl had to be translated for off-design operation be kept to a minimum. For this inlet, the translation distance required was about 10 inches or half an inlet diameter. This was believed to be short enough to avoid excessive weight penalties.

Subsonic Diffuser

Since most of the performance deficiencies found in the initial tests were associated with losses in the throat and subsonic diffuser, three different subsonic diffusers were tested in combination with virtually the same supersonic diffuser. These three designs are shown in figure 2. The initial diffuser and its modification are shown in figure 2(a). The initial diffuser was designed with a linear variation of area from the beginning of the throat at $x/R = 3.75$ to the engine-face station at $x/R = 6.04$. The modified diffuser was designed to have a linear static-pressure variation between these stations. The modified design provided a lower rate of expansion downstream of the throat to $x/R = 5.20$ than did the initial design. After this point the flow expanded rapidly. Because the changes in area distribution between the initial and modified diffusers were accomplished for reasons of expediency by changes in the centerbody dimensions only, the minimum area did not remain fixed relative to the cowl when the cowl was translated for off-design operation. It was recognized that shifting of the minimum area with translation was undesirable, especially from an inlet control standpoint. However, the design was tested mainly to determine the difference in performance with the two diffusers at the design Mach number. The inlet for these two diffusers was about 1.75 diameters long measured from the cowl lip to the engine-face station. The success attained with this modified diffuser led to the design of a shorter subsonic diffuser providing an inlet about 1.50 diameters long, as shown in figure 2(b). The diffuser had a linear variation of Mach number from the beginning of the throat at $x/R = 3.75$ to the final diffusion Mach number of about 0.3 at the engine-face station, $x/R = 5.50$. This design provided a slightly lower rate of expansion in the throat region than did the diffuser modified to yield a linear static pressure variation. In addition, the throat ($x/R = 3.75$) did not shift with translation.

The coordinates of the inlets are presented in table I. The contours for the 1.75 D inlets include compensation for boundary-layer growth from the points of the first shock wave impingements on the cowl and centerbody to the throat. The contours for the 1.50 diameter inlet were based on inviscid calculations only.

MODEL AND INSTRUMENTATION

The model with a 20-inch capture diameter was as large as practical for installation in the Unitary Plan wind tunnels at Ames Research Center. Sketches of the model and instrumentation are shown in figure 3, and a photograph of the model mounted in the 11-foot transonic wind tunnel is shown in figure 4. For structural reasons, the inlet area was varied by translating the cowl rather than the centerbody. The cowl had a sharp 15° lip and could be translated about 18 inches as shown in figure 3(a). The outer shell was attached to four hollow struts mounted on the centerbody sting support. The main duct exit area was controlled by a translating sleeve and a fixed plug. Figure 3(b) shows details of the bleed system. Four separate bleed zones are indicated, each of which had separate and controllable exits allowing the bleed flow to be controlled from maximum flow to no flow. Also, separation of the zones prevented recirculation of the flow from the higher pressure zones in the throat (zones III and IV) through the lower pressure zones upstream (zones I and II). To insure low back pressure at the bleed exits, exit fairings shown in figure 3(a) were provided. The forward bleed areas were designed to be just ahead of the shock-wave impingements shown in figure 1. On the basis of the results in reference 5, this appeared to be an effective means of controlling the boundary-layer growth. Distributed bleed in the throat region provided a variation of bleed flow as the terminal shock wave progressed into the throat region. The porosity of all of the bleed areas was 41.5 percent. The diameter of the holes in bleed zone I was 0.025 inch. The diameter of the holes in the remaining zones was 0.125 inch.

The instrumentation was conventional but rather detailed. The main duct instrumentation consisted of six total-pressure rakes for measuring the total-pressure recovery at the simulated engine face. Each rake had six tubes spaced so as to provide an area weighted average total pressure as shown by the sketch in table II. Static pressure rakes (see fig. 3(a)) were stationed near the main duct plug which, in conjunction with the known area at this station and the choked main duct exit area, allowed computation of the main duct mass flow. Static pressure orifices were located in a row along the top inner surfaces of the cowl and centerbody to the end of the subsonic diffuser. Two boundary-layer rakes were located on the centerbody and one on the cowl as shown in figure 3(b). Two pitot pressure rakes at the beginning of the throat measured the performance of the supersonic diffuser. Bleed flow rate in the centerbody boundary-layer removal ducts was measured by three total- and static-pressure rakes in the outer duct and four in the inner duct. Bleed flow rate measurements through the two zones on the cowl surface were made by the use of measured plenum chamber pressures and the known choked exit areas. Pressures were also measured in the centerbody plenum chambers. For the transonic tests, four rakes were installed at the point of maximum centerbody diameter. Pressure measurements from these rakes were used to calculate both the inlet mass flow and the total momentum change from the free stream to the inlet lip.

Vortex generators were installed about two throat heights downstream from the beginning of the throat of the 1.50 diameter inlet. Forty generators were mounted on the centerbody and 54 on the cowl. Other details of the generators are shown in figure 3(b). The vortex generators were selected in accordance with reference 6. Vortex generators were not used with the 1.75 diameter inlet systems.

MEASUREMENT TECHNIQUES AND ACCURACY

As with most inlet tests of this type, a problem was encountered in accurately determining the mass-flow rates through both the main duct and the various bleed systems. The calibration factor for the main duct flow metering system was found to vary with main duct plug position, Mach number, and boundary layer bleed mass flow. No calibration factor was found that would yield better than approximately ±2 percent accuracy in the main duct mass flow. Special care was taken in calibrating the bleed mass-flow measuring systems. Each system was calibrated in the wind tunnel at Mach 3.0 and $\alpha = 0$. The technique consisted of varying each bleed exit from open to fully closed and then plotting the computed bleed mass-flow ratio against the incremental change in main duct mass flow. This method yielded bleed calibration factors which gave consistent results when all the bleed mass-flow rates were summed and compared to the difference between the known capture flow ($m_0/m_\infty = 1.000$ at $M_\infty = 3.0$) and the measured engine-face mass flow. The bleed flow calibration factors thus determined were used for data reduction at all Mach numbers. No attempt was made to calibrate the bleed flow measuring systems at angle of attack, but the calibration factors were believed to be as accurate at 2° as at 0°. In the transonic Mach number range from 0.6 to 1.3 bleed flow was not measured. For the transonic tests the inlet mass flow was measured by the four rakes mounted just ahead of the throat (see fig. 3(b)). Additive drag was computed by the methods described in reference 7, from the total momentum change of the inlet mass flow (determined from the rake measurements), pressure forces on the compression surfaces, and estimated friction forces acting on the surfaces. All other measurement techniques were conventional and the estimated accuracy of the measured quantities is as follows:

	p_t/p_{t_∞}	m_{bl}/m_∞	α	p/p_∞	M_∞
Accuracy at $\alpha = 0^\circ$	±0.005	±0.005	±0.1°	±0.2	±0.05

Tunnel total pressure was 15 psia for all tests.

RESULTS AND DISCUSSION

Much of the data obtained was of limited interest and has been plotted in appendix A or tabulated in table II. The method for determining optimum performance based upon a combination of transonic additive drag and total-pressure recovery is discussed in appendix B. The discussion to follow has drawn certain results from these appendixes for comparison and illustration of the more significant factors.

Most of the inlet development effort was directed toward attaining high performance at the design Mach number of 3.0. The bleed configurations and the bleed exit settings that controlled the bleed-flow rates were established at Mach number 3.0, and the inlets were tested without change of the bleed exit settings at off-design Mach numbers. No attempt was made to improve the off-design performance with other boundary-layer bleed configurations. The modified version of the initial diffuser (1.75 D) was not considered suitable for off-design operation since its throat did not remain fixed relative to the centerbody at off-design conditions. Most of the results presented for this design are therefore limited to Mach number 3.0. The results for the 1.50 diameter inlet are presented in more detail since the throat remained fixed relative to the centerbody throughout its operating range. The presentation of the transonic results is treated differently from the results at higher Mach numbers because a determination of the trade-off of experimental additive drag versus pressure recovery at the engine face was required in order to optimize net propulsive thrust. This involved the use of typical engine data and an assumed flight profile to obtain realistic values of thrust. The optimization procedure is presented in appendix B.

Performance at $M_\infty = 3.0$

Because of control margin requirements an actual propulsion system may not operate at the maximum inlet pressure recovery. However, the maximum recovery serves as an indicator of the capability of the inlet. All inlets were designed with a throat Mach number of 1.3, but a lower Mach number (1.2 or less) was required to achieve maximum pressure recovery. For tests of the initial and modified inlets (1.75 D) this occurred with the bow shock wave impinging 0.075 x/R inside the cowl lip. This represented more geometric contraction than was expected even allowing for the lower throat Mach number of 1.2 or less. The additional contraction was thought to be caused by overcompensation of the boundary layer due to the geometric compensation introduced into the contours. For this reason compensation was not included for the shorter inlet (1.50 D). For this inlet maximum pressure recovery was attained with the bow shock wave impinging only 0.045 x/R inside the cowl lip. This again represented an additional contraction required to obtain maximum pressure recovery. With the inlet system operating under these conditions and with the terminal shock wave systems in the more forward position in the throat, an envelope of the maximum pressure recovery and corresponding total pressure distortion measured for several combinations of bleed exit settings and bleed configurations is presented in figure 5. For the initial tests a maximum recovery of 86 percent with 13-percent bleed mass flow and about 10-percent distortion at the engine face was attained. Since recoveries as high as 97 percent were measured for the supersonic diffuser, the main loss in performance was attributable to flow separation in the throat and subsonic diffuser. This led to the modification of the subsonic diffuser from one based on a linear area variation to one which gave a linear static pressure variation. This greatly reduced the initial rate of diffusion in the throat region as shown in figure 2(a). With the modified diffuser a range of maximum recoveries was attained up to a little over 90 percent with about 11-percent bleed (fig. 5). For this condition the distortion was about 10 percent, the lowest attained with this diffuser. With the shorter diffuser employing vortex generators, the distortion was lowered to between 6 and 7 percent for the same bleed flow while the recovery was increased about 1 percent to 91 percent. This latter result was attributable to the better distribution of the flow energy induced by the vortex generators through turbulent mixing of the high energy core flow with the boundary layer in the throat. Results of supercritical operation for the modified and 1.50 diameter inlet systems are compared in figure 6. They show a continuation of the better performance with the 1.50 D inlet. Not only did the recovery remain about 1 percent better as the terminal shock wave system moved downstream, but the distortion also remained at or below 10 percent over the useful supercritical range. This was a typical result with vortex generators as can be seen in figure 7 where the results for four bleed exit settings are plotted. These curves show that the performance is still largely a function of boundary-layer bleed. The effect of the vortex generators is shown by comparison of the performance with and without generators shown in figure 8. The use of vortex generators in this short diffuser improved the pressure recovery by about 1 percent, but more significantly, the distortion was markedly reduced from about 16 to about 7 percent for conditions near maximum recovery. An examination of the detailed pressure recovery plots from the engine-face rakes shown in figure 9 reveals the nature of the distortion for the maximum pressure recovery points of the previous figure. Radial distribution of pressure recovery for each of the six engine-face rakes is plotted and shows radial distortion values as low as 2 percent. The greatest radial distortion with the vortex generators installed was 6.3 percent (rake no. 6) which was about equal to the total distortion (fig. 8). This suggests that local tailoring of the generators or inlet contours or both might reduce the total distortion to 5 percent or less. Because distortions this low appear possible and since most engines are designed to operate without any performance penalty with up to 10 percent distortion, even shorter subsonic diffusers may be practical.

Figure 10 shows typical variations with engine face total-pressure recovery of the bleed flow through the individual bleed zones. Bleed in the region of the throat (zones III and IV) changed with engine-face pressure recovery as a result of the change in position of the terminal shock wave in the throat. As the terminal shock wave moved upstream into the throat area and passed over the bleed holes, the higher pressures behind the terminal shock wave forced more air out of the bleed holes. The change in engine-face mass flow with pressure recovery was thus due almost entirely to the change in bleed flow through zones III and IV. (The bleed flow through zone II can increase slightly with the terminal shock wave in its most forward position.) As illustrated by the data of figure 10, the boundary-layer removal required from the centerbody surface was greater than that required on the cowl. This was because of the relatively longer boundary-layer run on the centerbody and the two shock impingements on the centerbody boundary layer whereas only one occurred on the cowl. Boundary-layer measurements at several stations on the cowl and centerbody are shown in figure 11. Comparison of the pitot pressure profiles at the two stations on the cowl surface indicated that the boundary layer was thin and well controlled by the bleed through zone I. On the centerbody a similar comparison showed considerably thicker boundary layers at the throat survey station. The relatively thick boundary layer in the throat was believed to be caused in part by the lack of boundary-layer removal near the first shock-wave impingement on the centerbody. Comparison of the boundary-layer pitot pressure profiles shown in figure 11 on the centerbody ahead of and behind this impingement (approximately $x/R = 3.200$) indicates a sudden thickening of the boundary layer but does not indicate separation. Consequently, about two-thirds of the total bleed was required on the centerbody.

When the performance penalties associated with boundary-layer removal are estimated, it is necessary to consider the amount of bleed and also the total-pressure recovery of the bleed flow because the ducting required for the bleed flow is smaller with higher recoveries, and the bleed exit momentum recovery potential is greater. Both factors help to minimize the propulsion system weight and drag. Figure 12 shows typical boundary-layer bleed plenum chamber pressure ratios for each zone for the "B" exit setting. Fortunately, the zone IV centerbody bleed, which had the highest flow rate, also had the highest recovery. In addition, the increase in recovery for zone IV with increasing bleed was favorable because, as shown in figure 10, the increase in total bleed was mostly through zone IV.

Some of the effects of the terminal shock wave system on bleed flow variation have been discussed, but little knowledge of the shock-wave position can be gained without examination of static pressure distributions. For this purpose three typical distributions for the 1.50 diameter inlet are presented in figure 13 to show the positions of the shock waves at three levels of performance. These distributions correspond to performance data shown in figure 6. The measured supersonic static pressure distributions agree reasonably well with the theoretical distributions shown in figure 1, although direct comparison cannot be made because of differences in cowl position. For the experimental results the cowl was translated 0.045 x/R forward of the theoretical design position of figure 1. The theoretically sharp pressure rises at the shock wave reflection points were masked somewhat by the boundary layer, especially in the throat region where the terminal shock wave was in the position for maximum pressure recovery (fig. 13(a)). When the shock wave was farther downstream (figs. 13(b) and (c)) the terminal shock wave pressure rise started close to the predicted pressure level ($p/p_\infty = 13.0$) and extended over some length as is characteristic of a shock wave train. As the terminal shock train moved downstream (figs. 13(b) and (c)) the pressure recovery and bleed mass flow progressively decreased as shown in figure 6. As the shock train moved out of the throat region in which the bleed removal holes are located, there was no longer any change in bleed flow and the pressure recovery decreased rapidly. By altering the bleed hole distribution in the throat it should be possible to change the variation of bleed flow with pressure recovery to some extent.

The previous discussion considered only the steady-state performance at 0° angle of attack. Of equal importance is the resistance of the inlet to unstarting which might be caused by sudden changes in approaching flow conditions similar to those associated with gusts. A gust can change the local angle of attack suddenly by 2° or more. If an inlet can be pitched to this angle or greater without unstarting, it should be relatively insensitive to sudden changes in angle of attack of this order. When operated supercritically with some recovery penalty, the present inlets have remained started up to an angle of attack of 3.5°. To illustrate this, figure 14 has been prepared in which the pressure recovery for exit settings A, B, and C from figure 7 has been replotted. To facilitate understanding of these curves a detailed explanation of the curve for bleed exit setting A is described. The data points were obtained at 0° angle of attack. Starting at 0° the angle of attack was increased until the inlet unstarted. At maximum pressure recovery (which represents the most forward position of the terminal shock wave system) an angle of attack of 0.5° unstarted the inlet as shown on the curve. If the pressure recovery were degraded a small amount (representing downstream withdrawal of the terminal shock wave system), the angle of attack could be increased to $\alpha_u = 1.5^{\circ}$ before the inlet unstarted. Further reducing the pressure recovery allowed the angle of attack to be increased to a limiting value of $\alpha_u = 3.8^{\circ}$. At this point further reducing the pressure recovery had no effect on α_u; it remained constant at 3.8°.

Another characteristic of a gust besides suddenly changing the local angle of attack is the possibility of a reduction of the local Mach number. With the inlet operating at peak performance, the throat Mach number was 1.2 or lower; hence, a slight reduction in local external Mach number could cause the throat to choke ($M_{th} \rightarrow 1.0$) which would result in unstarting the inlet. Figure 15 shows the maximum recovery of the 1.50 D inlet for several lip positions, the highest recovery corresponding to the $(x/R)_{lip} = 2.330$ position. Plotted in the lower part of the figure is the Mach number decrement from Mach number 3.0 that the inlet can experience before unstarting. (This curve was derived from the lower curve in figure 16.) For instance, with the lip at position $(x/R)_{lip} = 2.400$ the inlet remains started as the Mach number is decreased from 3.0 to 2.8. It can be seen that if a gust causing a 0.1 decrement in local Mach number is to be tolerated, the inlet contraction ratio must be reduced so that the maximum inlet recovery is degraded about 1.5 percent.

The cowl lip translation required to restart the inlet is plotted in figure 16 for Mach numbers 1.55 to 3.2. Also shown for comparison is the theoretical lip position for restart which shows that the inlet started with less cowl translation than predicted. This favorable result was ascribed to the bleed flow removed from zones I and II upstream of the throat which decreased the amount of flow that the throat had to pass allowing the inlet to restart with less translation. Because of this, the inlet was self starting (no translation required) at $M_\infty = 1.55$.

The maximum pressure recovery and flow distortion of the 1.50 D and the modified 1.75 D inlets are compared up to 8° angle of attack in figure 17. When the inlet was operated at angle of attack, the maximum pressure recovery attainable was less than at $\alpha = 0^{\circ}$ as indicated. The performance of both systems deteriorated rapidly above 2°, but the recovery of the shorter inlet was about 1 percent better up to 5°. Above 5° the distortion in the shorter inlet became more serious and the pressure recovery reduced accordingly.

To match an inlet to an engine it is important to know the engine-face mass-flow capability at angle of attack. This capability is presented in figure 18 for the B bleed exit setting. It can be seen that up to 5° the mass-flow capability remained fairly high, but at 8° the flow was seriously reduced and accompanied by high flow distortion. As mentioned in the section for Accuracy, no attempt was made to calibrate the main duct and bleed flow at angle of attack, and the error involved in the main duct mass flow at angles of attack above 2^{o} may be as much as 5 percent. The mass-flow values shown at angle of attack should therefore be treated as qualitative.

Off-Design Performance

Maximum performance of the three inlets is shown in figure 19 for Mach numbers from 0.6 to 3.2. The recovery for the initial inlet remained about 4 percent lower than that for the other two inlets from Mach numbers 1.55 to 3.0. This was attributed to flow separation caused by the rapid initial expansion in the subsonic diffuser as previously mentioned. Use of a linear static pressure variation in the design of the subsonic diffuser provided a low initial rate of expansion in the throat region and produced good performance at design and off-design Mach numbers even though the throat shifted with translation as shown in figure 2(a). The 1.50 D inlet with vortex generators was designed so that the throat did not shift with translation (see fig. 2(b)) and incorporated the low initial rate of expansion in the subsonic diffuser. Its recovery was generally equal to or about 1 percent higher than the modified inlet and the distortion was considerably lower throughout most of the Mach number range. It should be pointed out that the data for $M_\infty = 3.2$ were obtained with the contraction ratio corresponding to that for maximum recovery at $M_\infty = 3.0$. Model design features prevented translating the centerbody to increase contraction ratio which would have increased the pressure recovery. The transonic results from Mach numbers 0.6 to 1.2 were obtained from an optimization procedure with a selected engine as described in appendix B. The transonic data show that the distortion for the shorter inlet with the generators was reduced by about 2.5 percent from that of the modified inlet.

One of the prime concerns in the transonic range was the need for low additive drag as pointed out in the discussion of the design. The consideration of drag alone was not enough, however, to define the best operating condition. As a minimum consideration the effects of pressure recovery and additive drag were optimized for a selected engine to obtain the best operating conditions for a given vehicle flight profile. The additive drag and total-pressure recovery were functions of the inlet mass flow and the cowl position. Positions for minimum additive drag were also those with low recovery as indicated in figure 20. The only realistic way of considering the best combination of recovery and additive drag was to select an engine with a known airflow schedule and optimize the thrust minus additive drag for a given flight profile. In this way the optimized set of curves in figure 20 was obtained. Because of the strong influence of pressure recovery on engine thrust, optimum performance occurs with other than minimum additive drag. Each engine-inlet combination requires a new optimization; hence, more complete data and a sample computation for the results shown in figure 20 are presented in appendix B. The theoretical additive drag shown in figure 20 was computed with the method of characteristics and compares reasonably well with the experimental results. As mentioned in appendix B optimum performance at all transonic Mach numbers occurred with the cowl lip at or near

$(x/R)_{lip} = 3.50$ while minimum additive drag occurred with $(x/R)_{lip} = 3.65$. This reduction in translation of 0.15 x/R could result in a reduction of the inlet weight.

CONCLUDING REMARKS

A 20-inch capture diameter model of a mixed compression axisymmetric inlet system designed for high performance from $M_\infty = 0$ to 3.0 has been tested. Three relatively short subsonic diffusers have been tested in combination with virtually the same supersonic diffuser. The main conclusions to be drawn from these tests are that the supersonic portion of the inlet performed as predicted, and that the main difficulty in achieving high performance lay in the elimination of flow separation in the throat and subsonic diffuser. Vortex generators located just downstream of the throat were effective over the complete Mach number range in reducing the total pressure distortion at the engine face of the shortest subsonic diffuser tested. Without vortex generators the distortions were high (about double that with generators) and were considered unsatisfactory for most engines. The distortion with the generators was less than may be needed and suggests that even shorter subsonic diffusers are practical.

The inlet with the shortest subsonic diffuser was about 1.50 capture diameters long measured from the cowl lip to the engine face. The supersonic portion was successfully designed with the aid of a computer program employing the method of characteristics. The subsonic diffuser problems were overcome with a design employing a linear Mach number variation from the beginning of the throat to the engine face. This variation allowed a low rate of initial expansion in the throat and avoided flow separation.

The inlet showed good resistance to unstarting which might result from atmospheric disturbances such as gusts. Operation at slightly supercritical conditions with only a relatively small reduction in maximum pressure recovery was needed to maintain started conditions for local angles of attack ranging to 3.5°.

Control of the boundary layer has been accomplished with four porous bleed areas. The boundary layer in the supersonic portion of the diffuser was effectively controlled by bleeding just ahead of two internal shock wave impingements. A distributed pattern of bleed in the throat region allowed an increase in bleed flow and engine-face recovery as the terminal shock-wave system moved into the throat. By altering the distribution of the bleed holes in the throat it should be possible to either lengthen or shorten to some extent the distance the terminal shock wave system can travel for a given level of performance.

Ames Research Center
National Aeronautics and Space Administration
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APPENDIX A

PLOTTED DATA

Figure 21.- Theoretical inlet mass-flow ratio, $\alpha = 0^{\circ}$.

Figures 22(a) - 22(h)[1].- Supercritical performance, 1.50 D inlet with vortex generators, $\alpha = 0^{\circ}$, bleed exit settings A, B, and C, $M_{\infty} = 3.2$ to 1.55.

Figures 23(a) - 23(g)[1].- Supercritical performance, 1.50 D inlet without vortex generators, $\alpha = 0^{\circ}$, bleed exit settings A and C, $M_{\infty} = 3.0$ to 1.55.

Figure 24.- Supercritical performance, 1.50 D inlet with vortex generators, bleed exit setting B, $M_{\infty} = 3.0$, $\alpha = 0^{\circ}$, $(x/R)_{lip} = 2.320$, 2.330, 2.350, 2.370, 2.400.

Figures 25(a) - 25(h).- Bleed zone mass flow, 1.50 D inlet with vortex generators, $\alpha = 0^{\circ}$, bleed exit settings A, B, and C, $M_{\infty} = 3.20$ to 1.55.

Figures 26(a) - 26(f).- Pitot pressure profiles, 1.50 D inlet, bleed exit setting B, $\alpha = 0^{\circ}$, $M_{\infty} = 2.75$ to 1.55.[2]

Figures 27(a) - 27(d).- Bleed zone plenum chamber pressures, 1.50 D inlet with vortex generators, $(x/R)_{lip} = 2.330$, $M_{\infty} = 3.00$, $\alpha = 0^{\circ}$, bleed exit settings A, B, C, and D.

Figures 28(a) - 28(d).- Maximum bleed zone plenum chamber pressures, 1.50 D inlet with vortex generators, $\alpha = 0^{\circ}$, bleed zones I, II, III, and IV.

Figures 29(a-c) - 35(a-c).- Static pressure distribution, 1.50 D inlet with vortex generators, bleed exit setting B, $\alpha = 0^{\circ}$, $M_{\infty} = 3.20$, 2.75 to 1.55.[2]

Figures 36(a) - 36(g).- Maximum performance at angle of attack, 1.50 D inlet with vortex generators, $M_{\infty} = 3.00$ to 1.55.

Figures 37(a) - 37(g).- Maximum performance at angle of attack, 1.50 D inlet without vortex generators, $M_{\infty} = 3.00$ to 1.55.

Figures 38(a) - 38(e).- Supercritical performance at angle of attack, 1.50 D inlet with vortex generators, bleed exit setting B, $M_{\infty} = 2.75$ to 1.75.[2]

Figures 39(a) - 39(i).- Transonic total-pressure recovery and additive drag, $\alpha = 0^{\circ}$, $M_{\infty} = 0.60$ to 1.20.

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[1]Half-filled symbols on these figures indicate points for which tabulated data are presented.

[2]$M_{\infty} = 3.00$ data shown in section on Discussion only.

APPENDIX B

METHOD OF DETERMINING THE OPTIMUM COMBINATION OF TRANSONIC ADDITIVE DRAG AND TOTAL-PRESSURE RECOVERY

The transonic additive drag and total-pressure recovery were a function of the inlet mass flow and the cowl position. Conditions that yielded low additive drag generally yielded low recovery. The reverse was also true; therefore, the tradeoff between drag and recovery was calculated for an appropriate engine with an assumed flight profile to show an example of the optimum combination of additive drag and pressure recovery. Data needed for optimization at Mach numbers 0.6 to 1.2 are presented in figure 39(a), and an example of the computation procedure is outlined below for Mach number 0.6.

From engine performance data, values of thrust for 100-percent throttle setting were found at Mach number 0.6 at the altitude defined by the assumed flight profile shown in figure 40(a). These values of thrust were corrected for the pressure recoveries for the range of inlet mass flow m_0/m_∞ shown in figure 39(a). Thrust was converted to thrust coefficient C_{FN}, and from C_{FN} the corresponding additive drag coefficient C_{D_a} was subtracted. At this point the engine mass flow demand was checked to see if enough flow was available from the inlet. Since there was ample inlet flow, as shown in figure 20, part was bypassed, producing an additional drag penalty that was not included in the computations. Curves of $C_{FN} - C_{D_a}$ versus m_0/m_∞ were determined for each cowl position $(x/R)_{lip}$ as shown in figure 40(b). For the Mach number of this example the peak or optimum $C_{FN} - C_{D_a}$ occurred near $m_0/m_\infty = 0.355$ with $(x/R)_{lip} = 3.50$. Then C_{D_a} and $\bar{p}_{t_2}/p_{t_\infty}$ for this point were plotted in figure 20 as were the points for other transonic Mach numbers. For this particular engine-inlet combination the optimum transonic operating points shown all occurred with the cowl lip near the $x/R = 3.50$ position.

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TABLE I.- INLET COORDINATES

CENTERBODY

INITIAL 1.75 D INLET

$\frac{x}{R}$	$\frac{r}{R}$
0	0
Straight line	
3.300	.730
3.325	.735
3.350	.740
3.375	.745
3.400	.749
3.425	.753
3.450	.757
3.475	.760
3.500	.763
3.525	.766
3.550	.7675
3.575	.769
3.600	.7705
3.625	.772
3.650	.772
3.675	.7705
3.700	.769
3.725	.767
3.750	.764
Straight line	
4.050	.716

Engine face

MODIFIED 1.75 D INLET

$\frac{x}{R}$	$\frac{r}{R}$
0	0
Straight line	
3.300	.730
3.325	.735
3.350	.740
3.375	.745
3.400	.749
3.425	.753
3.450	.757
3.475	.760
3.500	.763
3.525	.766
3.550	.7675
3.575	.769
3.600	.7705
3.625	.772
3.650	.772
3.675	.7705
3.700	.769
3.725	.767
3.705	.769
3.725	.767
Straight line	
5.000	.6230
5.100	.611
5.200	.598
5.300	.584
5.400	.570
5.500	.553
5.600	.534
5.700	.513
5.800	.488
5.900	.457
6.000	.419
6.045	.400

Engine face

1.50 D INLET

$\frac{x}{R}$	$\frac{r}{R}$
0	0
Straight line	
3.300	.730
3.325	.7355
3.350	.7405
3.375	.745
3.400	.750
3.425	.754
3.450	.7575
3.475	.7615
3.500	.765
3.525	.7675
3.550	.770
3.575	.772
3.600	.773
3.625	.774
3.650	.775
3.675	.774
3.700	.772
3.725	.768
3.750	.765
Straight line	
3.950	.730
4.050	.710
4.150	.690
4.250	.668
4.350	.646
4.450	.623
4.550	.599
4.650	.574
4.750	.548
4.850	.523
4.950	.498
5.050	.4725
5.150	.447
5.250	.4235
5.350	.404
5.375	.400

Engine face

COWL

INITIAL AND MODIFIED 1.75 D INLET

$\left(\frac{x}{R}\right)_c$	$\frac{r}{R}$
0	1.000
Straight line	
.450	1.000
.500	.999
.550	.998
.600	.9975
.650	.997
.700	.995
.750	.9925
.800	.990
.850	.987
.900	.984
.950	.979
1.000	.973
1.050	.966
Straight line	
1.400	.920
1.425	.917
1.450	.915
1.475	.9125
1.500	.911
1.550	.908
1.600	.905
1.650	.902
1.700	.899
1.800	.893
1.900	.888
2.000	.882
2.100	.876
2.200	.871
2.300	.866
2.400	.861
2.500	.856
2.600	.8525
2.700	.848
2.800	.845
2.900	.841
3.000	.838
3.100	.835
3.200	.833
3.300	.830
3.400	.828
3.500	.827
3.600	.826
3.670	.825

Engine face

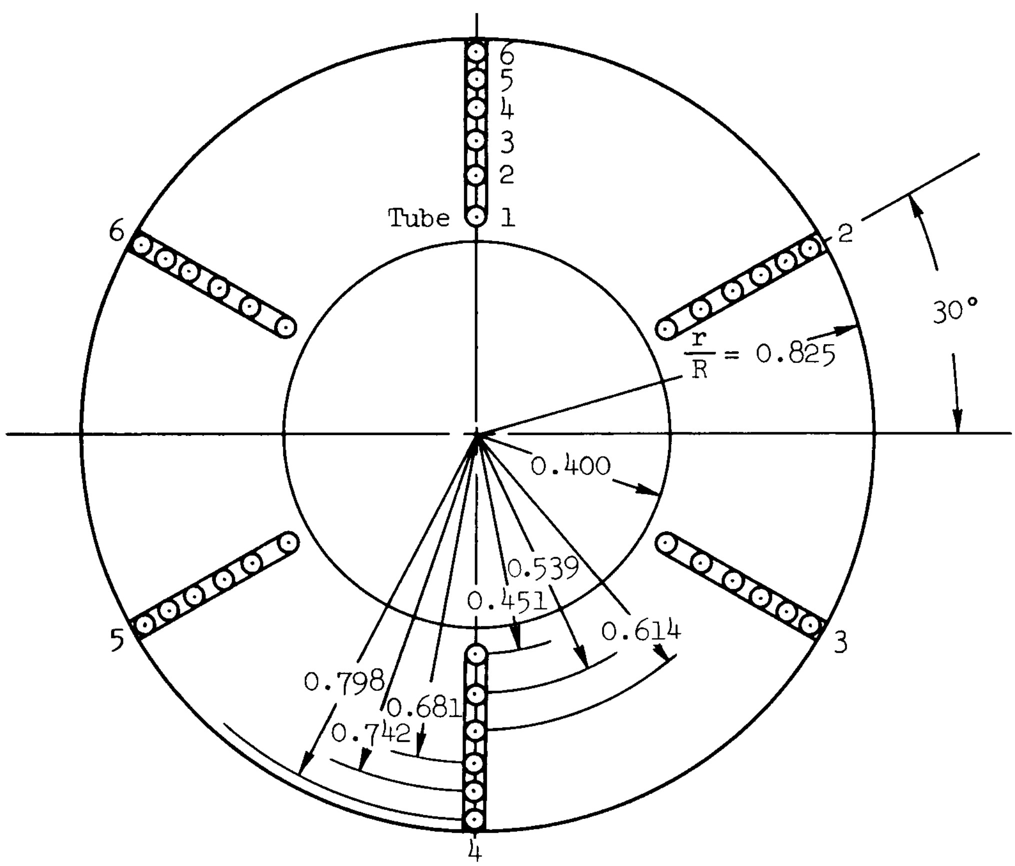
1.50 D INLET

$\left(\frac{x}{R}\right)_c$	$\frac{r}{R}$
0	1.000
Straight line	
.450	1.000
.500	.999
.550	.998
.600	.9975
.650	.997
.700	.995
.750	.9925
.800	.990
.850	.987
.900	.984
.950	.979
1.000	.973
1.050	.966
Straight line	
1.700	.875
1.800	.862
1.900	.849
2.000	.836
2.100	.824
2.200	.812
2.300	.802
2.400	.792
2.500	.784
2.600	.778
2.700	.775
2.800	.776
2.850	.778
2.900	.782
2.950	.790
3.000	.802
3.050	.815
3.100	.823
3.125	.825

Engine face

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$

The following include total pressure recoveries from the individual tubes which were mounted at the engine-face. Other quantities of interest are also included. A sketch showing the location of each tube is shown below.



Engine-face pressure tube location looking downstream

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 3.20 α = 0.0° m_0/m_∞ = 1.000 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.776 m_{bl}/m_∞ = 0.077 Δp_{t_2} = 0.147 p_2/p_∞ = 35.61

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.803	0.806	0.807	0.783	0.751	0.729	2	0.809	0.809	0.805	0.799	0.764	0.732
3	0.802	0.819	0.787	0.754	0.733	0.721	4	0.771	0.795	0.811	0.790	0.769	0.739
5	0.814	0.789	0.773	0.747	0.728	0.717	6	0.831	0.819	0.798	0.772	0.748	0.727

M_∞ = 3.20 α = 0.0° m_0/m_∞ = 1.000 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.723 m_{bl}/m_∞ = 0.067 Δp_{t_2} = 0.210 p_2/p_∞ = 32.38

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.805	0.770	0.727	0.677	0.656	0.653	2	0.780	0.755	0.731	0.701	0.676	0.665
3	0.744	0.764	0.776	0.756	0.730	0.703	4	0.778	0.760	0.756	0.710	0.674	0.659
5	0.773	0.754	0.748	0.696	0.662	0.657	6	0.779	0.776	0.754	0.701	0.668	0.659

M_∞ = 3.20 α = 0.0° m_0/m_∞ = 1.000 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.648 m_{bl}/m_∞ = 0.065 Δp_{t_2} = 0.298 p_2/p_∞ = 28.22

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.557	0.558	0.559	0.565	0.553	0.541	2	0.626	0.671	0.682	0.669	0.705	0.693
3	0.595	0.648	0.682	0.692	0.706	0.657	4	0.590	0.632	0.634	0.635	0.690	0.676
5	0.606	0.627	0.658	0.675	0.684	0.704	6	0.595	0.673	0.734	0.715	0.720	0.675

M_∞ = 3.20 α = 0.0° m_0/m_∞ = 1.000 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.777 m_{bl}/m_∞ = 0.069 Δp_{t_2} = 0.148 p_2/p_∞ = 35.54

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.802	0.808	0.813	0.783	0.747	0.728	2	0.800	0.811	0.802	0.799	0.765	0.735
3	0.805	0.822	0.785	0.752	0.735	0.721	4	0.770	0.796	0.814	0.793	0.775	0.744
5	0.813	0.792	0.775	0.749	0.730	0.718	6	0.833	0.822	0.796	0.771	0.750	0.730

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 3.20 α = 0.0° m_0/m_∞ = 1.000 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.730 m_{bl}/m_∞ = 0.061 Δp_{t_2} = 0.223 p_2/p_∞ = 32.14

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.809	0.757	0.689	0.655	0.646	0.647	2	0.791	0.797	0.777	0.742	0.719	0.690
3	0.777	0.782	0.753	0.725	0.707	0.689	4	0.750	0.760	0.747	0.740	0.727	0.703
5	0.767	0.787	0.783	0.741	0.711	0.690	6	0.783	0.743	0.712	0.674	0.656	0.652

M_∞ = 3.20 α = 0.0° m_0/m_∞ = 1.000 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.634 m_{bl}/m_∞ = 0.060 Δp_{t_2} = 0.302 p_2/p_∞ = 26.30

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.645	0.605	0.570	0.565	0.558	0.558	2	0.582	0.549	0.531	0.524	0.521	0.521
3	0.642	0.665	0.693	0.690	0.694	0.678	4	0.614	0.650	0.654	0.656	0.696	0.712
5	0.614	0.641	0.648	0.657	0.680	0.678	6	0.690	0.694	0.702	0.688	0.691	0.680

M_∞ = 3.20 α = 0.0° m_0/m_∞ = 1.000 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.770 m_{bl}/m_∞ = 0.061 Δp_{t_2} = 0.151 p_2/p_∞ = 35.18

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.800	0.808	0.787	0.748	0.717	0.709	2	0.802	0.804	0.796	0.794	0.763	0.731
3	0.811	0.821	0.781	0.744	0.718	0.712	4	0.767	0.795	0.815	0.794	0.772	0.739
5	0.798	0.785	0.774	0.756	0.731	0.717	6	0.821	0.826	0.780	0.748	0.724	0.716

M_∞ = 3.20 α = 0.0° m_0/m_∞ = 1.000 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.730 m_{bl}/m_∞ = 0.056 Δp_{t_2} = 0.186 p_2/p_∞ = 33.58

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.761	0.765	0.780	0.760	0.733	0.705	2	0.786	0.767	0.747	0.694	0.666	0.658
3	0.778	0.751	0.726	0.689	0.661	0.653	4	0.777	0.789	0.783	0.762	0.718	0.677
5	0.786	0.755	0.716	0.675	0.655	0.653	6	0.788	0.780	0.783	0.729	0.694	0.671

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 3.20 α = 0.0° m_o/m_∞ = 1.000 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.642 m_{bl}/m_∞ = 0.055 Δp_{t_2} = 0.302 p_2/p_∞ = 26.70

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.657	0.609	0.577	0.564	0.549	0.547	2	0.589	0.544	0.532	0.528	0.528	0.528
3	0.716	0.715	0.691	0.709	0.722	0.684	4	0.609	0.621	0.649	0.675	0.715	0.709
5	0.638	0.656	0.678	0.680	0.674	0.665	6	0.704	0.704	0.700	0.691	0.690	0.678

M_∞ = 3.00 α = 0.0° m_o/m_∞ = 0.999 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.915 m_{bl}/m_∞ = 0.129 Δp_{t_2} = 0.060 p_2/p_∞ = 32.18

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.898	0.910	0.910	0.911	0.902	0.911	2	0.896	0.916	0.898	0.916	0.944	0.940
3	0.927	0.930	0.932	0.914	0.927	0.909	4	0.888	0.898	0.896	0.919	0.930	0.936
5	0.915	0.909	0.917	0.916	0.917	0.901	6	0.934	0.927	0.927	0.909	0.930	0.894

M_∞ = 3.00 α = 0.0° m_o/m_∞ = 0.999 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.878 m_{bl}/m_∞ = 0.092 Δp_{t_2} = 0.069 p_2/p_∞ = 31.59

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.853	0.863	0.854	0.868	0.872	0.866	2	0.859	0.879	0.858	0.877	0.894	0.905
3	0.897	0.894	0.897	0.873	0.896	0.873	4	0.847	0.866	0.858	0.881	0.899	0.908
5	0.873	0.867	0.866	0.868	0.873	0.858	6	0.902	0.896	0.904	0.888	0.908	0.874

M_∞ = 3.00 α = 0.0° m_o/m_∞ = 0.999 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.806 m_{bl}/m_∞ = 0.077 Δp_{t_2} = 0.110 p_2/p_∞ = 27.70

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.822	0.781	0.765	0.781	0.812	0.804	2	0.806	0.797	0.764	0.788	0.852	0.823
3	0.850	0.812	0.803	0.798	0.821	0.803	4	0.799	0.812	0.773	0.778	0.819	0.844
5	0.827	0.800	0.785	0.788	0.781	0.780	6	0.836	0.814	0.825	0.812	0.824	0.839

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 3.00 α = 0.0° m_o/m_∞ = 0.999 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.910 m_{bl}/m_∞ = 0.109 Δp_{t_2} = 0.062 p_2/p_∞ = 31.76

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.903	0.910	0.915	0.905	0.896	0.901	2	0.892	0.909	0.892	0.922	0.936	0.932
3	0.928	0.921	0.927	0.909	0.926	0.902	4	0.884	0.892	0.888	0.910	0.916	0.915
5	0.916	0.911	0.918	0.906	0.905	0.885	6	0.931	0.921	0.920	0.902	0.918	0.880

M_∞ = 3.00 α = 0.0° m_o/m_∞ = 0.999 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.885 m_{bl}/m_∞ = 0.086 Δp_{t_2} = 0.087 p_2/p_∞ = 30.71

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.874	0.874	0.867	0.873	0.868	0.864	2	0.868	0.884	0.865	0.890	0.900	0.909
3	0.910	0.903	0.902	0.874	0.898	0.880	4	0.860	0.878	0.865	0.894	0.901	0.899
5	0.894	0.879	0.884	0.870	0.870	0.844	6	0.921	0.909	0.906	0.888	0.908	0.881

M_∞ = 3.00 α = 0.0° m_o/m_∞ = 0.999 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.814 m_{bl}/m_∞ = 0.071 Δp_{t_2} = 0.108 p_2/p_∞ = 27.87

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.842	0.796	0.780	0.793	0.806	0.799	2	0.818	0.809	0.777	0.809	0.863	0.819
3	0.865	0.820	0.811	0.806	0.826	0.805	4	0.811	0.826	0.784	0.799	0.827	0.842
5	0.848	0.808	0.793	0.793	0.785	0.779	6	0.856	0.824	0.832	0.810	0.827	0.833

M_∞ = 3.00 α = 0.0° m_o/m_∞ = 0.999 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.902 m_{bl}/m_∞ = 0.098 Δp_{t_2} = 0.068 p_2/p_∞ = 31.43

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.896	0.902	0.904	0.895	0.885	0.892	2	0.888	0.902	0.889	0.920	0.934	0.921
3	0.924	0.918	0.921	0.897	0.913	0.890	4	0.876	0.888	0.881	0.903	0.911	0.909
5	0.909	0.905	0.909	0.899	0.896	0.873	6	0.930	0.917	0.911	0.893	0.908	0.873

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 3.00 α = 0.0° m_0/m_∞ = 0.999 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.890 m_{b1}/m_∞ = 0.082 Δp_{t_2} = 0.094 p_2/p_∞ = 30.87

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.887	0.884	0.877	0.874	0.865	0.858	2	0.879	0.894	0.873	0.900	0.908	0.903
3	0.923	0.906	0.904	0.879	0.900	0.876	4	0.870	0.885	0.879	0.899	0.902	0.887
5	0.904	0.887	0.893	0.874	0.868	0.849	6	0.933	0.920	0.910	0.887	0.906	0.875

M_∞ = 3.00 α = 0.0° m_0/m_∞ = 0.999 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.820 m_{b1}/m_∞ = 0.065 Δp_{t_2} = 0.108 p_2/p_∞ = 28.11

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.857	0.804	0.789	0.797	0.807	0.802	2	0.827	0.817	0.785	0.813	0.857	0.834
3	0.874	0.824	0.812	0.809	0.832	0.811	4	0.821	0.835	0.791	0.803	0.826	0.848
5	0.858	0.814	0.794	0.795	0.793	0.790	6	0.867	0.829	0.832	0.816	0.828	0.843

M_∞ = 2.75 α = 0.0° m_0/m_∞ = 0.938 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.914 m_{b1}/m_∞ = 0.133 Δp_{t_2} = 0.110 p_2/p_∞ = 21.59

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.936	0.901	0.922	0.907	0.926	0.875	2	0.912	0.932	0.915	0.937	0.924	0.881
3	0.957	0.938	0.918	0.898	0.923	0.857	4	0.901	0.915	0.909	0.906	0.916	0.927
5	0.942	0.910	0.933	0.891	0.900	0.879	6	0.954	0.935	0.920	0.912	0.925	0.857

M_∞ = 2.75 α = 0.0° m_0/m_∞ = 0.938 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.904 m_{b1}/m_∞ = 0.119 Δp_{t_2} = 0.081 p_2/p_∞ = 21.42

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.921	0.887	0.905	0.899	0.927	0.882	2	0.885	0.916	0.887	0.914	0.921	0.891
3	0.935	0.919	0.919	0.892	0.920	0.863	4	0.879	0.903	0.886	0.902	0.909	0.930
5	0.923	0.892	0.907	0.890	0.901	0.865	6	0.930	0.915	0.920	0.914	0.920	0.862

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 2.75 α = 0.0° m_o/m_∞ = 0.938 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.855 m_{bl}/m_∞ = 0.097 Δp_{t_2} = 0.105 p_2/p_∞ = 19.97

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.889	0.838	0.827	0.836	0.869	0.844	2	0.842	0.857	0.818	0.841	0.894	0.838
3	0.902	0.874	0.848	0.838	0.875	0.826	4	0.837	0.862	0.820	0.834	0.853	0.908
5	0.889	0.837	0.834	0.836	0.834	0.845	6	0.906	0.875	0.889	0.854	0.874	0.849

M_∞ = 2.75 α = 0.0° m_o/m_∞ = 0.938 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.913 m_{bl}/m_∞ = 0.120 Δp_{t_2} = 0.123 p_2/p_∞ = 21.38

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.951	0.907	0.926	0.898	0.914	0.861	2	0.921	0.932	0.921	0.943	0.918	0.878
3	0.962	0.949	0.915	0.889	0.910	0.854	4	0.903	0.916	0.915	0.904	0.914	0.925
5	0.950	0.914	0.936	0.884	0.895	0.859	6	0.963	0.947	0.916	0.907	0.915	0.851

M_∞ = 2.75 α = 0.0° m_o/m_∞ = 0.938 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.902 m_{bl}/m_∞ = 0.104 Δp_{t_2} = 0.109 p_2/p_∞ = 21.13

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.930	0.891	0.910	0.887	0.918	0.866	2	0.894	0.915	0.890	0.922	0.914	0.884
3	0.947	0.917	0.911	0.881	0.909	0.849	4	0.883	0.901	0.885	0.897	0.902	0.935
5	0.931	0.895	0.911	0.884	0.898	0.859	6	0.946	0.918	0.907	0.902	0.905	0.877

M_∞ = 2.75 α = 0.0° m_o/m_∞ = 0.938 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.873 m_{bl}/m_∞ = 0.091 Δp_{t_2} = 0.098 p_2/p_∞ = 20.31

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.907	0.857	0.852	0.854	0.887	0.850	2	0.859	0.873	0.843	0.879	0.896	0.878
3	0.913	0.888	0.882	0.848	0.873	0.853	4	0.853	0.868	0.838	0.864	0.880	0.921
5	0.900	0.855	0.856	0.854	0.859	0.847	6	0.924	0.892	0.895	0.871	0.887	0.875

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 2.75 α = 0.0° m_o/m_∞ = 0.938 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.909 m_{bl}/m_∞ = 0.104 Δp_{t_2} = 0.121 p_2/p_∞ = 21.08

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.947	0.902	0.925	0.887	0.906	0.853	2	0.889	0.909	0.886	0.946	0.957	0.856
3	0.941	0.936	0.943	0.892	0.928	0.865	4	0.895	0.908	0.907	0.903	0.908	0.921
5	0.946	0.908	0.934	0.878	0.885	0.856	6	0.953	0.937	0.937	0.904	0.930	0.847

M_∞ = 2.75 α = 0.0° m_o/m_∞ = 0.938 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.879 m_{bl}/m_∞ = 0.087 Δp_{t_2} = 0.112 p_2/p_∞ = 20.25

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.918	0.867	0.866	0.853	0.882	0.838	2	0.857	0.882	0.851	0.900	0.930	0.832
3	0.912	0.906	0.905	0.854	0.882	0.849	4	0.865	0.876	0.852	0.884	0.895	0.907
5	0.907	0.868	0.873	0.851	0.851	0.837	6	0.929	0.905	0.924	0.877	0.893	0.857

M_∞ = 2.50 α = 0.0° m_o/m_∞ = 0.851 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.930 m_{bl}/m_∞ = 0.130 Δp_{t_2} = 0.076 p_2/p_∞ = 14.76

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.937	0.906	0.932	0.909	0.943	0.917	2	0.904	0.932	0.911	0.949	0.950	0.926
3	0.949	0.943	0.952	0.920	0.930	0.889	4	0.915	0.911	0.910	0.947	0.944	0.960
5	0.937	0.908	0.939	0.923	0.925	0.906	6	0.949	0.944	0.946	0.943	0.948	0.907

M_∞ = 2.50 α = 0.0° m_o/m_∞ = 0.851 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.901 m_{bl}/m_∞ = 0.104 Δp_{t_2} = 0.108 p_2/p_∞ = 14.15

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.878	0.863	0.879	0.907	0.916	0.898	2	0.865	0.877	0.872	0.920	0.922	0.939
3	0.894	0.900	0.919	0.909	0.905	0.908	4	0.866	0.869	0.875	0.923	0.928	0.961
5	0.890	0.872	0.887	0.916	0.894	0.886	6	0.903	0.904	0.923	0.930	0.937	0.917

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 2.50 α = 0.0° m_o/m_∞ = 0.851 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.849 m_{bl}/m_∞ = 0.093 Δp_{t_2} = 0.145 p_2/p_∞ = 13.07

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.853	0.813	0.831	0.840	0.851	0.832	2	0.834	0.840	0.830	0.871	0.856	0.822
3	0.877	0.888	0.916	0.840	0.816	0.809	4	0.829	0.845	0.823	0.874	0.857	0.875
5	0.871	0.833	0.851	0.853	0.807	0.795	6	0.863	0.868	0.919	0.883	0.848	0.863

M_∞ = 2.50 α = 0.0° m_o/m_∞ = 0.851 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.929 m_{bl}/m_∞ = 0.108 Δp_{t_2} = 0.085 p_2/p_∞ = 14.67

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.917	0.894	0.918	0.926	0.941	0.925	2	0.888	0.914	0.889	0.952	0.961	0.961
3	0.937	0.936	0.962	0.933	0.927	0.920	4	0.895	0.897	0.897	0.958	0.951	0.967
5	0.931	0.900	0.928	0.933	0.921	0.907	6	0.941	0.940	0.964	0.948	0.963	0.914

M_∞ = 2.50 α = 0.0° m_o/m_∞ = 0.851 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.895 m_{bl}/m_∞ = 0.091 Δp_{t_2} = 0.118 p_2/p_∞ = 13.93

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.858	0.853	0.877	0.899	0.927	0.902	2	0.850	0.850	0.856	0.910	0.943	0.938
3	0.866	0.883	0.931	0.912	0.897	0.906	4	0.852	0.849	0.856	0.915	0.938	0.955
5	0.875	0.863	0.880	0.912	0.896	0.886	6	0.879	0.889	0.925	0.933	0.937	0.931

M_∞ = 2.50 α = 0.0° m_o/m_∞ = 0.851 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.829 m_{bl}/m_∞ = 0.084 Δp_{t_2} = 0.118 p_2/p_∞ = 12.50

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.836	0.791	0.819	0.807	0.815	0.806	2	0.790	0.811	0.802	0.863	0.847	0.835
3	0.849	0.848	0.883	0.806	0.806	0.822	4	0.791	0.828	0.804	0.883	0.840	0.868
5	0.854	0.809	0.845	0.798	0.798	0.803	6	0.868	0.862	0.888	0.838	0.811	0.838

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 2.50 α = 0.0° m_o/m_∞ = 0.851   Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.926 m_{bl}/m_∞ = 0.095 Δp_{t_2} = 0.083 p_2/p_∞ = 14.56

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.913	0.895	0.923	0.915	0.933	0.915	2	0.888	0.910	0.888	0.950	0.959	0.960
3	0.932	0.935	0.962	0.932	0.920	0.921	4	0.891	0.896	0.900	0.958	0.951	0.961
5	0.927	0.900	0.930	0.930	0.913	0.897	6	0.939	0.940	0.964	0.943	0.961	0.891

M_∞ = 2.50 α = 0.0° m_o/m_∞ = 0.851   Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.892 m_{bl}/m_∞ = 0.078 Δp_{t_2} = 0.118 p_2/p_∞ = 13.85

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.850	0.851	0.880	0.894	0.917	0.897	2	0.842	0.851	0.869	0.923	0.939	0.932
3	0.850	0.879	0.923	0.907	0.888	0.909	4	0.849	0.850	0.868	0.918	0.931	0.947
5	0.864	0.856	0.882	0.912	0.892	0.883	6	0.869	0.882	0.919	0.933	0.934	0.930

M_∞ = 2.50 α = 0.0° m_o/m_∞ = 0.851   Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.843 m_{bl}/m_∞ = 0.072 Δp_{t_2} = 0.148 p_2/p_∞ = 12.84

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.826	0.800	0.815	0.831	0.858	0.840	2	0.802	0.821	0.812	0.874	0.866	0.874
3	0.847	0.846	0.899	0.832	0.822	0.851	4	0.792	0.823	0.805	0.873	0.875	0.918
5	0.843	0.814	0.840	0.822	0.829	0.840	6	0.848	0.849	0.901	0.856	0.841	0.877

M_∞ = 2.25 α = 0.0° m_o/m_∞ = 0.738   Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.952 m_{bl}/m_∞ = 0.133 Δp_{t_2} = 0.048 p_2/p_∞ = 10.26

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.933	0.935	0.953	0.964	0.965	0.951	2	0.931	0.937	0.941	0.968	0.965	0.963
3	0.939	0.949	0.962	0.965	0.960	0.941	4	0.928	0.928	0.943	0.959	0.966	0.974
5	0.940	0.932	0.953	0.945	0.952	0.945	6	0.949	0.953	0.963	0.967	0.969	0.968

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 2.25 α = 0.0° m_o/m_∞ = 0.738 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.930 m_{bl}/m_∞ = 0.108 Δp_{t_2} = 0.093 p_2/p_∞ = 9.90

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.891	0.913	0.938	0.954	0.957	0.939	2	0.887	0.891	0.905	0.945	0.958	0.966
3	0.884	0.898	0.922	0.949	0.942	0.951	4	0.886	0.896	0.920	0.944	0.962	0.971
5	0.910	0.905	0.922	0.943	0.941	0.937	6	0.909	0.924	0.947	0.962	0.965	0.964

M_∞ = 2.25 α = 0.0° m_o/m_∞ = 0.738 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.889 m_{bl}/m_∞ = 0.078 Δp_{t_2} = 0.093 p_2/p_∞ = 9.14

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.854	0.893	0.920	0.899	0.896	0.871	2	0.845	0.859	0.878	0.896	0.881	0.888
3	0.853	0.879	0.897	0.896	0.877	0.887	4	0.861	0.893	0.921	0.922	0.921	0.915
5	0.864	0.867	0.884	0.892	0.884	0.863	6	0.874	0.892	0.916	0.927	0.921	0.912

M_∞ = 2.25 α = 0.0° m_o/m_∞ = 0.738 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.947 m_{bl}/m_∞ = 0.109 Δp_{t_2} = 0.060 p_2/p_∞ = 10.09

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.923	0.926	0.948	0.960	0.957	0.946	2	0.921	0.924	0.936	0.967	0.963	0.962
3	0.930	0.943	0.960	0.963	0.954	0.939	4	0.918	0.917	0.938	0.956	0.964	0.974
5	0.932	0.923	0.951	0.942	0.940	0.937	6	0.945	0.952	0.963	0.967	0.968	0.967

M_∞ = 2.25 α = 0.0° m_o/m_∞ = 0.738 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.933 m_{bl}/m_∞ = 0.092 Δp_{t_2} = 0.098 p_2/p_∞ = 9.83

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.893	0.910	0.936	0.957	0.951	0.937	2	0.886	0.895	0.920	0.958	0.959	0.969
3	0.880	0.901	0.933	0.955	0.935	0.956	4	0.886	0.897	0.923	0.952	0.967	0.971
5	0.912	0.905	0.933	0.943	0.933	0.926	6	0.921	0.930	0.957	0.966	0.966	0.959

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 2.25 α = 0.0° m_o/m_∞ = 0.738 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.902 m_{bl}/m_∞ = 0.071 Δp_{t_2} = 0.098 p_2/p_∞ = 9.30

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.857	0.893	0.927	0.918	0.913	0.893	2	0.855	0.867	0.890	0.914	0.900	0.915
3	0.855	0.884	0.907	0.915	0.887	0.912	4	0.863	0.899	0.928	0.940	0.940	0.935
5	0.876	0.877	0.894	0.911	0.901	0.887	6	0.883	0.903	0.922	0.943	0.937	0.937

M_∞ = 2.25 α = 0.0° m_o/m_∞ = 0.738 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.945 m_{bl}/m_∞ = 0.095 Δp_{t_2} = 0.067 p_2/p_∞ = 10.01

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.917	0.923	0.947	0.960	0.952	0.942	2	0.912	0.916	0.937	0.962	0.966	0.972
3	0.921	0.934	0.953	0.969	0.945	0.952	4	0.915	0.913	0.936	0.964	0.972	0.975
5	0.934	0.922	0.951	0.940	0.930	0.925	6	0.946	0.952	0.963	0.967	0.967	0.965

M_∞ = 2.25 α = 0.0° m_o/m_∞ = 0.738 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.933 m_{bl}/m_∞ = 0.083 Δp_{t_2} = 0.096 p_2/p_∞ = 9.80

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.894	0.911	0.935	0.956	0.946	0.935	2	0.885	0.897	0.927	0.961	0.962	0.970
3	0.882	0.908	0.935	0.963	0.926	0.959	4	0.887	0.901	0.923	0.951	0.969	0.972
5	0.910	0.906	0.935	0.941	0.929	0.918	6	0.923	0.934	0.958	0.965	0.963	0.955

M_∞ = 2.25 α = 0.0° m_o/m_∞ = 0.738 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.892 m_{bl}/m_∞ = 0.060 Δp_{t_2} = 0.090 p_2/p_∞ = 9.06

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.847	0.893	0.919	0.903	0.886	0.859	2	0.847	0.855	0.871	0.910	0.891	0.906
3	0.870	0.889	0.907	0.910	0.875	0.899	4	0.865	0.895	0.927	0.916	0.915	0.915
5	0.871	0.865	0.896	0.895	0.873	0.857	6	0.886	0.908	0.920	0.926	0.920	0.908

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 2.00 α = 0.0° m_0/m_∞ = 0.625 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.958 m_{b1}/m_∞ = 0.123 Δp_{t_2} = 0.043 p_2/p_∞ = 7.01

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.937	0.942	0.958	0.975	0.970	0.961	2	0.936	0.938	0.946	0.964	0.973	0.974
3	0.945	0.951	0.961	0.975	0.937	0.957	4	0.938	0.938	0.957	0.971	0.977	0.977
5	0.952	0.944	0.965	0.956	0.955	0.960	6	0.953	0.958	0.972	0.974	0.978	0.977

M_∞ = 2.00 α = 0.0° m_0/m_∞ = 0.625 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.935 m_{b1}/m_∞ = 0.104 Δp_{t_2} = 0.086 p_2/p_∞ = 6.71

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.898	0.914	0.938	0.952	0.942	0.932	2	0.889	0.896	0.912	0.938	0.954	0.961
3	0.892	0.907	0.933	0.960	0.938	0.952	4	0.889	0.908	0.933	0.961	0.969	0.957
5	0.917	0.922	0.949	0.944	0.942	0.944	6	0.917	0.935	0.960	0.967	0.960	0.959

M_∞ = 2.00 α = 0.0° m_0/m_∞ = 0.625 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.886 m_{b1}/m_∞ = 0.085 Δp_{t_2} = 0.112 p_2/p_∞ = 6.21

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.845	0.866	0.891	0.914	0.915	0.896	2	0.835	0.852	0.875	0.896	0.911	0.905
3	0.834	0.852	0.872	0.899	0.902	0.905	4	0.840	0.853	0.869	0.903	0.918	0.928
5	0.850	0.865	0.883	0.903	0.923	0.923	6	0.850	0.867	0.885	0.918	0.933	0.933

M_∞ = 2.00 α = 0.0° m_0/m_∞ = 0.625 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.956 m_{b1}/m_∞ = 0.104 Δp_{t_2} = 0.051 p_2/p_∞ = 6.80

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.934	0.938	0.959	0.975	0.957	0.954	2	0.929	0.929	0.945	0.966	0.975	0.977
3	0.937	0.947	0.961	0.977	0.931	0.964	4	0.935	0.933	0.958	0.973	0.976	0.976
5	0.950	0.943	0.967	0.955	0.943	0.942	6	0.955	0.961	0.972	0.975	0.975	0.978

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 2.00 α = 0.0° m_0/m_∞ = 0.625 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.943 m_{bl}/m_∞ = 0.095 Δp_{t_2} = 0.055 p_2/p_∞ = 6.72

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.919	0.932	0.946	0.955	0.946	0.930	2	0.912	0.914	0.925	0.960	0.955	0.956
3	0.919	0.932	0.955	0.958	0.936	0.951	4	0.924	0.924	0.945	0.954	0.963	0.960
5	0.930	0.928	0.952	0.941	0.944	0.948	6	0.943	0.950	0.956	0.957	0.963	0.964

M_∞ = 2.00 α = 0.0° m_0/m_∞ = 0.625 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.907 m_{bl}/m_∞ = 0.079 Δp_{t_2} = 0.120 p_2/p_∞ = 6.38

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.863	0.882	0.902	0.933	0.939	0.928	2	0.855	0.869	0.889	0.912	0.935	0.943
3	0.856	0.869	0.884	0.918	0.928	0.935	4	0.863	0.872	0.896	0.911	0.933	0.964
5	0.876	0.885	0.905	0.925	0.932	0.936	6	0.875	0.889	0.911	0.930	0.947	0.964

M_∞ = 2.00 α = 0.0° m_0/m_∞ = 0.625 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.955 m_{bl}/m_∞ = 0.090 Δp_{t_2} = 0.057 p_2/p_∞ = 6.83

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.931	0.934	0.959	0.974	0.949	0.947	2	0.923	0.926	0.944	0.973	0.977	0.978
3	0.930	0.944	0.963	0.977	0.944	0.974	4	0.931	0.930	0.957	0.974	0.975	0.971
5	0.948	0.937	0.966	0.954	0.936	0.932	6	0.954	0.961	0.972	0.974	0.972	0.975

M_∞ = 2.00 α = 0.0° m_0/m_∞ = 0.625 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.936 m_{bl}/m_∞ = 0.079 Δp_{t_2} = 0.071 p_2/p_∞ = 6.61

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.902	0.928	0.944	0.950	0.936	0.922	2	0.894	0.901	0.927	0.957	0.952	0.953
3	0.893	0.911	0.937	0.950	0.930	0.941	4	0.907	0.920	0.951	0.956	0.957	0.957
5	0.924	0.925	0.949	0.938	0.932	0.925	6	0.933	0.949	0.958	0.958	0.958	0.960

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 2.00 α = 0.0° m_o/m_∞ = 0.625 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.902 m_{bl}/m_∞ = 0.068 Δp_{t_2} = 0.125 p_2/p_∞ = 6.27

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.854	0.876	0.895	0.925	0.932	0.922	2	0.847	0.869	0.889	0.915	0.931	0.940
3	0.845	0.860	0.881	0.912	0.919	0.928	4	0.852	0.866	0.890	0.913	0.937	0.953
5	0.866	0.888	0.907	0.916	0.928	0.931	6	0.865	0.881	0.902	0.925	0.948	0.958

M_∞ = 1.75 α = 0.0° m_o/m_∞ = 0.521 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.951 m_{bl}/m_∞ = 0.099 Δp_{t_2} = 0.036 p_2/p_∞ = 4.56

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.931	0.944	0.958	0.965	0.951	0.937	2	0.935	0.941	0.950	0.965	0.964	0.961
3	0.946	0.951	0.961	0.964	0.949	0.950	4	0.945	0.944	0.951	0.953	0.949	0.945
5	0.948	0.949	0.956	0.944	0.949	0.939	6	0.950	0.954	0.961	0.963	0.960	0.959

M_∞ = 1.75 α = 0.0° m_o/m_∞ = 0.521 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.925 m_{bl}/m_∞ = 0.087 Δp_{t_2} = 0.070 p_2/p_∞ = 4.32

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.887	0.899	0.915	0.931	0.934	0.929	2	0.889	0.900	0.925	0.943	0.947	0.940
3	0.901	0.908	0.927	0.936	0.933	0.929	4	0.920	0.926	0.933	0.927	0.918	0.904
5	0.926	0.934	0.952	0.927	0.927	0.911	6	0.903	0.924	0.944	0.951	0.949	0.937

M_∞ = 1.75 α = 0.0° m_o/m_∞ = 0.521 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.856 m_{bl}/m_∞ = 0.078 Δp_{t_2} = 0.084 p_2/p_∞ = 4.02

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.857	0.870	0.889	0.904	0.910	0.891	2	0.859	0.870	0.889	0.904	0.915	0.909
3	0.857	0.865	0.874	0.881	0.885	0.878	4	0.859	0.873	0.884	0.893	0.902	0.895
5	0.855	0.873	0.901	0.914	0.930	0.927	6	0.856	0.871	0.885	0.891	0.888	0.876

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 1.75 α = 0.0° m_o/m_∞ = 0.521 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.960 m_{b1}/m_∞ = 0.092 Δp_{t_2} = 0.050 p_2/p_∞ = 4.58

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.936	0.944	0.961	0.981	0.957	0.941	2	0.943	0.943	0.952	0.968	0.980	0.984
3	0.946	0.951	0.963	0.976	0.963	0.979	4	0.939	0.939	0.956	0.972	0.982	0.979
5	0.940	0.945	0.967	0.965	0.951	0.958	6	0.942	0.953	0.973	0.977	0.981	0.982

M_∞ = 1.75 α = 0.0° m_o/m_∞ = 0.521 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.932 m_{b1}/m_∞ = 0.080 Δp_{t_2} = 0.068 p_2/p_∞ = 4.32

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.895	0.911	0.931	0.946	0.932	0.924	2	0.898	0.912	0.933	0.948	0.957	0.956
3	0.906	0.916	0.939	0.952	0.943	0.947	4	0.914	0.925	0.939	0.941	0.925	0.919
5	0.923	0.940	0.956	0.929	0.926	0.913	6	0.917	0.943	0.958	0.954	0.945	0.934

M_∞ = 1.75 α = 0.0° m_o/m_∞ = 0.521 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.888 m_{b1}/m_∞ = 0.068 Δp_{t_2} = 0.081 p_2/p_∞ = 3.94

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.860	0.875	0.893	0.906	0.905	0.893	2	0.872	0.879	0.890	0.908	0.917	0.915
3	0.852	0.862	0.870	0.881	0.893	0.886	4	0.865	0.873	0.883	0.899	0.908	0.908
5	0.862	0.879	0.895	0.897	0.925	0.924	6	0.858	0.866	0.877	0.887	0.898	0.901

M_∞ = 1.75 α = 0.0° m_o/m_∞ = 0.521 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.960 m_{b1}/m_∞ = 0.079 Δp_{t_2} = 0.066 p_2/p_∞ = 4.54

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.921	0.942	0.967	0.984	0.957	0.942	2	0.930	0.936	0.960	0.975	0.984	0.985
3	0.935	0.950	0.969	0.982	0.963	0.979	4	0.922	0.929	0.958	0.978	0.984	0.983
5	0.929	0.945	0.970	0.966	0.953	0.963	6	0.935	0.955	0.978	0.978	0.983	0.982

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 1.75 α = 0.0° m_o/m_∞ = 0.521 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.937 m_{bl}/m_∞ = 0.070 Δp_{t_2} = 0.059 p_2/p_∞ = 4.32

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.904	0.924	0.945	0.955	0.936	0.923	2	0.908	0.922	0.942	0.957	0.959	0.954
3	0.910	0.926	0.941	0.956	0.938	0.944	4	0.920	0.929	0.941	0.941	0.934	0.925
5	0.926	0.943	0.957	0.934	0.934	0.923	6	0.925	0.943	0.958	0.956	0.954	0.942

M_∞ = 1.75 α = 0.0° m_o/m_∞ = 0.521 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.898 m_{bl}/m_∞ = 0.060 Δp_{t_2} = 0.080 p_2/p_∞ = 3.98

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.863	0.881	0.902	0.922	0.919	0.905	2	0.874	0.882	0.901	0.920	0.930	0.934
3	0.862	0.880	0.888	0.892	0.899	0.895	4	0.863	0.880	0.893	0.908	0.920	0.926
5	0.869	0.888	0.909	0.901	0.918	0.914	6	0.866	0.884	0.898	0.911	0.922	0.907

M_∞ = 1.55 α = 0.0° m_o/m_∞ = 0.466 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.969 m_{bl}/m_∞ = 0.107 Δp_{t_2} = 0.050 p_2/p_∞ = 3.59

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.983	0.978	0.965	0.963	0.959	0.949	2	0.991	0.980	0.975	0.961	0.963	0.964
3	0.986	0.977	0.963	0.963	0.961	0.965	4	0.985	0.978	0.971	0.962	0.965	0.966
5	0.984	0.978	0.966	0.942	0.955	0.959	6	0.982	0.970	0.963	0.962	0.965	0.965

M_∞ = 1.55 α = 0.0° m_o/m_∞ = 0.466 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.966 m_{bl}/m_∞ = 0.093 Δp_{t_2} = 0.048 p_2/p_∞ = 3.52

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.941	0.945	0.967	0.981	0.967	0.953	2	0.939	0.945	0.956	0.976	0.979	0.978
3	0.951	0.960	0.979	0.985	0.974	0.983	4	0.940	0.946	0.973	0.985	0.985	0.983
5	0.941	0.959	0.977	0.962	0.963	0.974	6	0.949	0.962	0.983	0.983	0.983	0.983

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 1.55 α = 0.0° m_o/m_∞ = 0.466 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.872 m_{b1}/m_∞ = 0.059 Δp_{t_2} = 0.076 p_2/p_∞ = 2.99

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.837	0.847	0.856	0.869	0.880	0.868	2	0.850	0.857	0.873	0.888	0.894	0.884
3	0.841	0.852	0.874	0.883	0.891	0.893	4	0.837	0.848	0.861	0.869	0.877	0.881
5	0.854	0.872	0.885	0.874	0.893	0.895	6	0.849	0.865	0.882	0.895	0.903	0.903

M_∞ = 1.55 α = 0.0° m_o/m_∞ = 0.466 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.979 m_{b1}/m_∞ = 0.096 Δp_{t_2} = 0.048 p_2/p_∞ = 3.62

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.987	0.988	0.984	0.974	0.963	0.951	2	0.986	0.985	0.996	0.982	0.973	0.971
3	0.991	0.993	0.990	0.979	0.967	0.969	4	0.985	0.984	0.994	0.978	0.974	0.971
5	0.990	0.990	0.988	0.952	0.961	0.963	6	0.998	0.993	0.980	0.973	0.970	0.970

M_∞ = 1.55 α = 0.0° m_o/m_∞ = 0.466 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.961 m_{b1}/m_∞ = 0.087 Δp_{t_2} = 0.038 p_2/p_∞ = 3.50

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.966	0.968	0.959	0.961	0.956	0.937	2	0.974	0.971	0.966	0.959	0.959	0.961
3	0.968	0.962	0.959	0.960	0.957	0.961	4	0.972	0.968	0.962	0.960	0.961	0.963
5	0.968	0.967	0.959	0.938	0.950	0.953	6	0.961	0.957	0.959	0.959	0.962	0.963

M_∞ = 1.55 α = 0.0° m_o/m_∞ = 0.466 Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.889 m_{b1}/m_∞ = 0.055 Δp_{t_2} = 0.073 p_2/p_∞ = 3.05

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.861	0.872	0.883	0.900	0.899	0.888	2	0.872	0.880	0.889	0.902	0.912	0.909
3	0.859	0.868	0.883	0.903	0.903	0.907	4	0.851	0.861	0.877	0.892	0.903	0.905
5	0.874	0.887	0.897	0.890	0.911	0.914	6	0.863	0.876	0.890	0.904	0.916	0.911

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 1.55 α = 0.0° m_o/m_∞ = 0.466 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.976 m_{b1}/m_∞ = 0.083 Δp_{t_2} = 0.055 p_2/p_∞ = 3.52

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.984	0.988	0.986	0.974	0.962	0.948	2	0.982	0.982	0.995	0.943	0.963	0.971
3	0.989	0.992	0.988	0.979	0.967	0.968	4	0.981	0.980	0.994	0.978	0.973	0.970
5	0.988	0.988	0.988	0.943	0.954	0.958	6	0.997	0.993	0.982	0.971	0.970	0.969

M_∞ = 1.55 α = 0.0° m_o/m_∞ = 0.466 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.963 m_{b1}/m_∞ = 0.063 Δp_{t_2} = 0.060 p_2/p_∞ = 3.43

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.927	0.944	0.964	0.984	0.959	0.948	2	0.938	0.943	0.962	0.978	0.981	0.980
3	0.947	0.958	0.965	0.981	0.965	0.971	4	0.934	0.944	0.966	0.980	0.984	0.983
5	0.938	0.948	0.969	0.963	0.957	0.968	6	0.945	0.958	0.983	0.984	0.984	0.983

M_∞ = 1.55 α = 0.0° m_o/m_∞ = 0.466 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.901 m_{b1}/m_∞ = 0.050 Δp_{t_2} = 0.075 p_2/p_∞ = 3.10

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.872	0.884	0.898	0.909	0.915	0.903	2	0.882	0.891	0.906	0.920	0.926	0.928
3	0.867	0.879	0.891	0.901	0.912	0.918	4	0.861	0.879	0.897	0.903	0.915	0.920
5	0.877	0.898	0.915	0.903	0.923	0.923	6	0.874	0.885	0.896	0.910	0.927	0.921

M_∞ = 3.00 α = 2.0° m_o/m_∞ = ——— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.898 m_{b1}/m_∞ = 0.123 Δp_{t_2} = 0.098 p_2/p_∞ = 31.52

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.860	0.879	0.885	0.892	0.906	0.898	2	0.881	0.897	0.891	0.907	0.916	0.948
3	0.899	0.890	0.900	0.919	0.939	0.896	4	0.860	0.873	0.879	0.896	0.904	0.892
5	0.874	0.875	0.873	0.892	0.895	0.897	6	0.898	0.904	0.933	0.927	0.946	0.916

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 3.00 α = 2.0° m_o/m_∞ = ——— Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.893 m_{bl}/m_∞ = 0.109 Δp_{t_2} = 0.104 p_2/p_∞ = 31.31

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.862	0.879	0.882	0.889	0.899	0.889	2	0.875	0.893	0.889	0.904	0.906	0.943
3	0.901	0.884	0.898	0.917	0.928	0.893	4	0.851	0.863	0.866	0.887	0.896	0.883
5	0.875	0.870	0.873	0.888	0.885	0.880	6	0.897	0.904	0.931	0.926	0.937	0.913

M_∞ = 3.00 α = 2.0° m_o/m_∞ = ——— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.887 m_{bl}/m_∞ = 0.099 Δp_{t_2} = 0.098 p_2/p_∞ = 31.08

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.862	0.877	0.881	0.887	0.890	0.883	2	0.874	0.897	0.892	0.900	0.900	0.934
3	0.897	0.875	0.891	0.908	0.917	0.883	4	0.847	0.858	0.860	0.880	0.884	0.869
5	0.869	0.864	0.866	0.879	0.872	0.866	6	0.892	0.898	0.930	0.924	0.931	0.908

M_∞ = 2.75 α = 2.0° m_o/m_∞ = ——— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.911 m_{bl}/m_∞ = 0.121 Δp_{t_2} = 0.092 p_2/p_∞ = 21.47

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.909	0.891	0.912	0.899	0.926	0.876	2	0.893	0.905	0.888	0.921	0.936	0.933
3	0.921	0.917	0.938	0.939	0.945	0.921	4	0.871	0.881	0.871	0.895	0.926	0.955
5	0.910	0.887	0.891	0.918	0.924	0.911	6	0.911	0.913	0.922	0.923	0.924	0.881

M_∞ = 2.75 α = 2.0° m_o/m_∞ = ——— Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.910 m_{bl}/m_∞ = 0.112 Δp_{t_2} = 0.097 p_2/p_∞ = 21.38

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.907	0.887	0.908	0.895	0.923	0.886	2	0.890	0.903	0.890	0.919	0.923	0.911
3	0.925	0.903	0.939	0.926	0.944	0.914	4	0.870	0.882	0.876	0.902	0.926	0.958
5	0.922	0.890	0.899	0.913	0.926	0.911	6	0.921	0.914	0.934	0.927	0.930	0.874

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 2.75 α = 2.0° m_o/m_∞ = ——— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.903 m_{bl}/m_∞ = 0.097 Δp_{t_2} = 0.112 p_2/p_∞ = 21.07

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.899	0.880	0.900	0.889	0.920	0.881	2	0.875	0.899	0.891	0.910	0.906	0.888
3	0.918	0.894	0.927	0.913	0.930	0.913	4	0.858	0.873	0.864	0.891	0.911	0.960
5	0.910	0.874	0.883	0.902	0.915	0.901	6	0.921	0.915	0.940	0.936	4.935	0.879

M_∞ = 2.50 α = 2.0° m_o/m_∞ = ——— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.930 m_{bl}/m_∞ = 0.134 Δp_{t_2} = 0.065 p_2/p_∞ = 14.88

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.917	0.903	0.928	0.917	0.941	0.922	2	0.905	0.919	0.910	0.942	0.950	0.953
3	0.939	0.939	0.940	0.936	0.944	0.912	4	0.897	0.910	0.926	0.942	0.944	0.958
5	0.941	0.916	0.931	0.931	0.933	0.916	6	0.926	0.927	0.946	0.953	0.954	0.929

M_∞ = 2.50 α = 2.0° m_o/m_∞ = ——— Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.924 m_{bl}/m_∞ = 0.112 Δp_{t_2} = 0.100 p_2/p_∞ = 14.63

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.915	0.898	0.924	0.912	0.933	0.914	2	0.902	0.916	0.909	0.947	0.940	0.948
3	0.930	0.936	0.956	0.935	0.940	0.900	4	0.866	0.883	0.911	0.938	0.949	0.958
5	0.927	0.902	0.927	0.919	0.920	0.903	6	0.929	0.930	0.947	0.946	0.948	0.922

M_∞ = 2.50 α = 2.0° m_o/m_∞ = ——— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.920 m_{bl}/m_∞ = 0.094 Δp_{t_2} = 0.120 p_2/p_∞ = 14.48

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.910	0.892	0.922	0.909	0.927	0.908	2	0.901	0.918	0.918	0.945	0.928	0.942
3	0.917	0.924	0.951	0.948	0.949	0.895	4	0.846	0.862	0.898	0.935	0.955	0.957
5	0.916	0.890	0.914	0.919	0.912	0.894	6	0.930	0.932	0.946	0.947	0.948	0.916

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 2.25 α = 2.0° m_0/m_∞ = —— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.941 m_{bl}/m_∞ = 0.147 Δp_{t_2} = 0.078 p_2/p_∞ = 10.14

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.930	0.930	0.944	0.952	0.946	0.939	2	0.930	0.933	0.951	0.955	0.955	0.962
3	0.902	0.918	0.929	0.937	0.943	0.940	4	0.895	0.910	0.933	0.948	0.961	0.968
5	0.927	0.928	0.942	0.944	0.952	0.950	6	0.938	0.942	0.954	0.958	0.961	0.961

M_∞ = 2.25 α = 2.0° m_0/m_∞ = —— Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.936 m_{bl}/m_∞ = 0.108 Δp_{t_2} = 0.097 p_2/p_∞ = 9.95

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.927	0.921	0.943	0.950	0.934	0.925	2	0.920	0.926	0.949	0.954	0.947	0.963
3	0.885	0.904	0.928	0.945	0.952	0.953	4	0.877	0.896	0.922	0.940	0.957	0.967
5	0.915	0.917	0.936	0.942	0.947	0.945	6	0.937	0.942	0.954	0.958	0.960	0.960

M_∞ = 2.25 α = 2.0° m_0/m_∞ = —— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.919 m_{bl}/m_∞ = 0.094 Δp_{t_2} = 0.128 p_2/p_∞ = 9.77

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.906	0.909	0.933	0.954	0.930	0.922	2	0.888	0.904	0.936	0.953	0.922	0.944
3	0.851	0.868	0.895	0.924	0.946	0.956	4	0.843	0.861	0.888	0.909	0.932	0.953
5	0.870	0.882	0.911	0.936	0.936	0.955	6	0.918	0.925	0.953	0.958	0.961	0.957

M_∞ = 2.00 α = 2.0° m_0/m_∞ = —— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.921 m_{bl}/m_∞ = 0.117 Δp_{t_2} = 0.089 p_2/p_∞ = 6.63

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.904	0.921	0.947	0.945	0.938	0.924	2	0.888	0.893	0.918	0.957	0.927	0.950
3	0.887	0.896	0.899	0.897	0.893	0.881	4	0.880	0.889	0.912	0.928	0.935	0.926
5	0.899	0.918	0.933	0.921	0.935	0.925	6	0.921	0.933	0.961	0.962	0.953	0.950

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 2.00 α = 2.0° m_o/m_∞ = —— Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.920 m_{bl}/m_∞ = 0.083 Δp_{t_2} = 0.088 p_2/p_∞ = 6.10

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.912	0.926	0.947	0.945	0.929	0.910	2	0.895	0.903	0.927	0.956	0.935	0.946
3	0.880	0.891	0.896	0.900	0.902	0.896	4	0.875	0.883	0.907	0.906	0.922	0.918
5	0.907	0.915	0.937	0.929	0.934	0.925	6	0.935	0.947	0.955	0.949	0.948	0.950

M_∞ = 2.00 α = 2.0° m_o/m_∞ = —— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.928 m_{bl}/m_∞ = 0.079 Δp_{t_2} = 0.100 p_2/p_∞ = 6.59

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.919	0.917	0.945	0.954	0.935	0.925	2	0.920	0.924	0.950	0.949	0.942	0.954
3	0.873	0.888	0.904	0.922	0.931	0.936	4	0.871	0.884	0.899	0.915	0.929	0.940
5	0.907	0.924	0.942	0.934	0.942	0.932	6	0.933	0.944	0.955	0.958	0.962	0.963

M_∞ = 1.75 α = 2.0° m_o/m_∞ = —— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.945 m_{bl}/m_∞ = 0.112 Δp_{t_2} = 0.066 p_2/p_∞ = 4.64

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.942	0.946	0.952	0.967	0.957	0.945	2	0.942	0.950	0.966	0.967	0.956	0.951
3	0.931	0.944	0.949	0.948	0.938	0.924	4	0.929	0.932	0.932	0.927	0.917	0.905
5	0.948	0.947	0.955	0.934	0.941	0.922	6	0.947	0.952	0.963	0.968	0.962	0.958

M_∞ = 1.75 α = 2.0° m_o/m_∞ = —— Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.944 m_{bl}/m_∞ = 0.084 Δp_{t_2} = 0.070 p_2/p_∞ = 4.57

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.932	0.942	0.958	0.977	0.949	0.926	2	0.938	0.939	0.965	0.967	0.957	0.956
3	0.914	0.925	0.935	0.941	0.940	0.941	4	0.910	0.919	0.936	0.941	0.938	0.935
5	0.948	0.943	0.956	0.936	0.939	0.925	6	0.941	0.949	0.970	0.974	0.970	0.963

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 1.75 α = 2.0° m_o/m_∞ = —— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.930 m_{b1}/m_∞ = 0.083 Δp_{t_2} = 0.106 p_2/p_∞ = 4.50

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.958	0.970	0.970	0.935	0.905	0.875	2	0.966	0.964	0.946	0.918	0.912	0.912
3	0.945	0.933	0.920	0.920	0.900	0.913	4	0.938	0.933	0.929	0.924	0.924	0.924
5	0.951	0.948	0.925	0.902	0.905	0.908	6	0.973	0.958	0.925	0.912	0.911	0.913

M_∞ = 1.55 α = 2.0° m_o/m_∞ = —— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.966 m_{b1}/m_∞ = 0.120 Δp_{t_2} = 0.054 p_2/p_∞ = 3.57

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.991	0.988	0.978	0.964	0.952	0.942	2	0.994	0.975	0.965	0.959	0.961	0.962
3	0.964	0.965	0.961	0.964	0.963	0.965	4	0.959	0.960	0.962	0.965	0.968	0.968
5	0.966	0.970	0.965	0.942	0.959	0.951	6	0.983	0.978	0.962	0.960	0.962	0.963

M_∞ = 1.55 α = 2.0° m_o/m_∞ = —— Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.965 m_{b1}/m_∞ = 0.088 Δp_{t_2} = 0.061 p_2/p_∞ = 3.53

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.989	0.988	0.981	0.966	0.950	0.932	2	0.991	0.976	0.964	0.960	0.962	0.963
3	0.966	0.964	0.961	0.964	0.963	0.965	4	0.960	0.960	0.963	0.965	0.967	0.967
5	0.967	0.972	0.964	0.943	0.956	0.951	6	0.988	0.979	0.962	0.961	0.962	0.963

M_∞ = 1.55 α = 2.0° m_o/m_∞ = —— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.965 m_{b1}/m_∞ = 0.077 Δp_{t_2} = 0.065 p_2/p_∞ = 3.51

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.987	0.988	0.984	0.967	0.949	0.930	2	0.993	0.979	0.964	0.961	0.963	0.936
3	0.967	0.964	0.962	0.965	0.964	0.966	4	0.958	0.960	0.964	0.967	0.968	0.968
5	0.969	0.973	0.963	0.943	0.955	0.951	6	0.989	0.982	0.963	0.963	0.963	0.964

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 3.00 α = 5.0° m_o/m_∞ = —— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.799 m_{bl}/m_∞ = 0.098 Δp_{t_2} = 0.208 p_2/p_∞ = 28.30

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.781	0.806	0.829	0.842	0.857	0.846	2	0.780	0.808	0.847	0.863	0.887	0.836
3	0.803	0.805	0.793	0.771	0.748	0.735	4	0.778	0.766	0.743	0.735	0.724	0.721
5	0.804	0.791	0.775	0.763	0.745	0.733	6	0.800	0.835	0.868	0.862	0.861	0.822

M_∞ = 3.00 α = 5.0° m_o/m_∞ = —— Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.800 m_{bl}/m_∞ = 0.087 Δp_{t_2} = 0.207 p_2/p_∞ = 28.04

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.780	0.804	0.830	0.842	0.855	0.843	2	0.753	0.780	0.816	0.853	0.887	0.844
3	0.721	0.729	0.754	0.777	0.800	0.804	4	0.724	0.741	0.765	0.791	0.806	0.797
5	0.738	0.762	0.778	0.802	0.812	0.786	6	0.770	0.814	0.866	0.870	0.857	0.846

M_∞ = 3.00 α = 5.0° m_o/m_∞ = —— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.793 m_{bl}/m_∞ = 0.091 Δp_{t_2} = 0.256 p_2/p_∞ = 27.87

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.799	0.817	0.836	0.844	0.852	0.841	2	0.740	0.768	0.813	0.852	0.875	0.907
3	0.708	0.712	0.737	0.770	0.813	0.836	4	0.704	0.712	0.726	0.755	0.787	0.809
5	0.704	0.712	0.734	0.761	0.800	0.828	6	0.743	0.780	0.832	0.882	0.899	0.851

M_∞ = 2.75 α = 5.0° m_o/m_∞ = —— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.813 m_{bl}/m_∞ = 0.111 Δp_{t_2} = 0.157 p_2/p_∞ = 19.23

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.826	0.842	0.854	0.836	0.832	0.812	2	0.788	0.810	0.836	0.855	0.876	0.875
3	0.754	0.767	0.781	0.802	0.824	0.821	4	0.748	0.759	0.768	0.788	0.810	0.801
5	0.756	0.768	0.786	0.803	0.824	0.819	6	0.798	0.815	0.837	0.854	0.864	0.863

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 2.75 α = 5.0° m_o/m_∞ = —— Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.809 m_{b1}/m_∞ = 0.101 Δp_{t_2} = 0.199 p_2/p_∞ = 19.00

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.823	0.844	0.862	0.838	0.826	0.806	2	0.777	0.800	0.829	0.850	0.881	0.887
3	0.736	0.753	0.778	0.803	0.830	0.836	4	0.727	0.737	0.756	0.781	0.811	0.811
5	0.736	0.747	0.771	0.794	0.820	0.831	6	0.786	0.809	0.836	0.861	0.878	0.870

M_∞ = 2.75 α = 5.0° m_o/m_∞ = —— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.802 m_{b1}/m_∞ = 0.089 Δp_{t_2} = 0.232 p_2/p_∞ = 18.78

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.816	0.841	0.865	0.842	0.820	0.796	2	0.771	0.792	0.823	0.853	0.885	0.896
3	0.721	0.734	0.759	0.790	0.826	0.841	4	0.709	0.721	0.741	0.765	0.802	0.809
5	0.720	0.732	0.754	0.782	0.814	0.835	6	0.775	0.800	0.832	0.862	0.883	0.869

M_∞ = 2.50 α = 5.0° m_o/m_∞ = —— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.825 m_{b1}/m_∞ = 0.121 Δp_{t_2} = 0.172 p_2/p_∞ = 13.37

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.833	0.852	0.867	0.885	0.890	0.887	2	0.813	0.824	0.840	0.856	0.878	0.876
3	0.766	0.773	0.784	0.797	0.811	0.813	4	0.760	0.768	0.779	0.792	0.807	0.800
5	0.767	0.775	0.789	0.802	0.823	0.824	6	0.812	0.825	0.852	0.883	0.897	0.902

M_∞ = 2.50 α = 5.0° m_o/m_∞ = —— Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.828 m_{b1}/m_∞ = 0.107 Δp_{t_2} = 0.190 p_2/p_∞ = 13.28

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.839	0.857	0.868	0.889	0.879	0.875	2	0.816	0.827	0.845	0.868	0.894	0.898
3	0.760	0.767	0.784	0.804	0.826	0.838	4	0.748	0.756	0.771	0.786	0.808	0.808
5	0.759	0.768	0.784	0.805	0.830	0.845	6	0.810	0.824	0.861	0.896	0.903	0.905

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 2.50 α = 5.0° m_o/m_∞ = —— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.823 m_{bl}/m_∞ = 0.093 Δp_{t_2} = 0.210 p_2/p_∞ = 13.12

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.836	0.853	0.868	0.889	0.874	0.867	2	0.804	0.815	0.841	0.866	0.892	0.905
3	0.742	0.750	0.774	0.804	0.832	0.848	4	0.732	0.745	0.761	0.783	0.801	0.804
5	0.743	0.753	0.774	0.799	0.824	0.845	6	0.804	0.821	0.863	0.901	0.901	0.895

M_∞ = 2.25 α = 5.0° m_o/m_∞ = —— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.867 m_{bl}/m_∞ = 0.134 Δp_{t_2} = 0.159 p_2/p_∞ = 9.38

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.896	0.899	0.903	0.916	0.896	0.886	2	0.885	0.881	0.890	0.898	0.907	0.905
3	0.821	0.823	0.823	0.827	0.836	0.830	4	0.815	0.822	0.821	0.833	0.843	0.832
5	0.835	0.833	0.836	0.825	0.857	0.854	6	0.883	0.881	0.908	0.943	0.928	0.953

M_∞ = 2.25 α = 5.0° m_o/m_∞ = —— Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.863 m_{bl}/m_∞ = 0.100 Δp_{t_2} = 0.185 p_2/p_∞ = 9.23

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.893	0.893	0.908	0.916	0.882	0.863	2	0.876	0.878	0.890	0.904	0.919	0.912
3	0.805	0.806	0.814	0.827	0.843	0.848	4	0.789	0.802	0.808	0.821	0.833	0.829
5	0.821	0.824	0.832	0.823	0.858	0.865	6	0.878	0.878	0.916	0.948	0.922	0.932

M_∞ = 2.25 α = 5.0° m_o/m_∞ = —— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.856 m_{bl}/m_∞ = 0.083 Δp_{t_2} = 0.207 p_2/p_∞ = 9.08

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.889	0.890	0.902	0.912	0.877	0.852	2	0.869	0.874	0.886	0.901	0.918	0.909
3	0.788	0.797	0.809	0.828	0.848	0.859	4	0.768	0.786	0.788	0.802	0.820	0.825
5	0.810	0.805	0.812	0.811	0.858	0.870	6	0.872	0.878	0.913	0.945	0.914	0.931

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 2.00 α = 5.0° m_0/m_∞ = —— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.859 m_{bl}/m_∞ = 0.102 Δp_{t_2} = 0.189 p_2/p_∞ = 6.12

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.882	0.912	0.939	0.932	0.901	0.859	2	0.852	0.863	0.879	0.911	0.915	0.904
3	0.812	0.818	0.811	0.804	0.796	0.785	4	0.814	0.825	0.830	0.833	0.822	0.797
5	0.842	0.840	0.828	0.790	0.797	0.780	6	0.886	0.916	0.938	0.933	0.932	0.942

M_∞ = 2.00 α = 5.0° m_0/m_∞ = —— Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.868 m_{bl}/m_∞ = 0.080 Δp_{t_2} = 0.162 p_2/p_∞ = 6.13

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.901	0.926	0.940	0.928	0.899	0.857	2	0.881	0.901	0.907	0.907	0.906	0.893
3	0.823	0.823	0.820	0.820	0.822	0.809	4	0.803	0.800	0.799	0.800	0.820	0.802
5	0.847	0.848	0.857	0.838	0.860	0.848	6	0.904	0.923	0.937	0.940	0.939	0.926

M_∞ = 2.00 α = 5.0° m_0/m_∞ = —— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.871 m_{bl}/m_∞ = 0.071 Δp_{t_2} = 0.169 p_2/p_∞ = 6.14

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.901	0.920	0.934	0.936	0.905	0.866	2	0.887	0.911	0.918	0.916	0.909	0.900
3	0.829	0.825	0.824	0.827	0.836	0.829	4	0.795	0.800	0.804	0.810	0.808	0.805
5	0.851	0.848	0.848	0.832	0.862	0.858	6	0.907	0.928	0.942	0.939	0.929	0.927

M_∞ = 1.75 α = 5.0° m_0/m_∞ = —— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.926 m_{bl}/m_∞ = 0.119 Δp_{t_2} = 0.082 p_2/p_∞ = 4.54

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.966	0.968	0.970	0.943	0.914	0.894	2	0.922	0.906	0.906	0.914	0.915	0.906
3	0.920	0.939	0.952	0.952	0.943	0.926	4	0.896	0.897	0.900	0.904	0.910	0.910
5	0.920	0.937	0.950	0.933	0.944	0.940	6	0.904	0.902	0.912	0.934	0.944	0.926

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 1.75 α = 5.0° m_o/m_∞ = —— Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.921 m_{bl}/m_∞ = 0.086 Δp_{t_2} = 0.112 p_2/p_∞ = 4.43

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.964	0.969	0.964	0.927	0.896	0.866	2	0.924	0.904	0.908	0.925	0.917	0.902
3	0.917	0.933	0.939	0.940	0.942	0.933	4	0.879	0.883	0.886	0.889	0.895	0.895
5	0.917	0.935	0.943	0.924	0.943	0.939	6	0.904	0.902	0.914	0.931	0.947	0.949

M_∞ = 1.75 α = 5.0° m_o/m_∞ = —— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.918 m_{bl}/m_∞ = 0.074 Δp_{t_2} = 0.125 p_2/p_∞ = 4.38

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.963	0.969	0.961	0.920	0.887	0.854	2	0.924	0.904	0.907	0.929	0.920	0.899
3	0.914	0.930	0.932	0.934	0.935	0.928	4	0.872	0.876	0.879	0.884	0.894	0.887
5	0.914	0.930	0.936	0.919	0.940	0.936	6	0.905	0.902	0.914	0.929	0.954	0.964

M_∞ = 1.55 α = 5.0° m_o/m_∞ = —— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.950 m_{bl}/m_∞ = 0.109 Δp_{t_2} = 0.081 p_2/p_∞ = 3.46

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.989	0.988	0.981	0.957	0.939	0.916	2	0.946	0.946	0.954	0.957	0.942	0.951
3	0.936	0.951	0.958	0.961	0.962	0.961	4	0.912	0.918	0.922	0.926	0.932	0.932
5	0.936	0.957	0.969	0.954	0.968	0.967	6	0.945	0.944	0.955	0.957	0.959	0.959

M_∞ = 1.55 α = 5.0° m_o/m_∞ = —— Exit setting = B

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.949 m_{bl}/m_∞ = 0.079 Δp_{t_2} = 0.086 p_2/p_∞ = 3.42

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.984	0.990	0.984	0.962	0.934	0.909	2	0.951	0.946	0.951	0.954	0.949	0.950
3	0.934	0.950	0.960	0.963	0.965	0.963	4	0.908	0.909	0.914	0.917	0.924	0.924
5	0.931	0.952	0.969	0.957	0.968	0.970	6	0.948	0.945	0.953	0.955	0.958	0.959

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(a) 1.50 D inlet with vortex generators

M_∞ = 1.55 α = 5.0° m_0/m_∞ = —— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.947 m_{bl}/m_∞ = 0.069 Δp_{t_2} = 0.096 p_2/p_∞ = 3.38

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.983	0.987	0.982	0.957	0.935	0.905	2	0.950	0.945	0.951	0.954	0.949	0.950
3	0.933	0.952	0.959	0.963	0.966	0.960	4	0.896	0.905	0.909	0.912	0.918	0.914
5	0.930	0.949	0.965	0.955	0.965	0.969	6	0.947	0.945	0.954	0.956	0.957	0.958

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(b) 1.50 D inlet without vortex generators

M_∞ = 3.00 α = 0.0° m_o/m_∞ = 0.999 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.907 m_{bl}/m_∞ = 0.137 Δp_{t_2} = 0.134 p_2/p_∞ = 31.29

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.862	0.894	0.946	0.952	0.896	0.857	2	0.868	0.921	0.952	0.971	0.906	0.855
3	0.864	0.905	0.955	0.972	0.899	0.854	4	0.867	0.908	0.951	0.963	0.912	0.864
5	0.866	0.899	0.939	0.969	0.909	0.859	6	0.863	0.915	0.962	0.954	0.883	0.850

M_∞ = 3.00 α = 0.0° m_o/m_∞ = 0.999 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.882 m_{bl}/m_∞ = 0.111 Δp_{t_2} = 0.164 p_2/p_∞ = 29.94

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.820	0.872	0.944	0.942	0.876	0.825	2	0.830	0.895	0.940	0.928	0.900	0.821
3	0.821	0.873	0.936	0.936	0.901	0.827	4	0.831	0.896	0.959	0.937	0.868	0.820
5	0.827	0.879	0.939	0.943	0.859	0.814	6	0.824	0.887	0.959	0.952	0.867	0.819

M_∞ = 3.00 α = 0.0° m_o/m_∞ = 0.999 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.777 m_{bl}/m_∞ = 0.087 Δp_{t_2} = 0.332 p_2/p_∞ = 25.79

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.663	0.666	0.715	0.835	0.893	0.777	2	0.668	0.705	0.808	0.921	0.897	0.755
3	0.666	0.691	0.781	0.903	0.899	0.773	4	0.666	0.687	0.764	0.891	0.868	0.771
5	0.665	0.683	0.762	0.909	0.906	0.777	6	0.663	0.674	0.735	0.855	0.897	0.782

M_∞ = 3.00 α = 0.0° m_o/m_∞ = 0.99 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.890 m_{bl}/m_∞ = 0.100 Δp_{t_2} = 0.166 p_2/p_∞ = 30.19

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.846	0.908	0.956	0.918	0.855	0.825	2	0.842	0.906	0.949	0.960	0.894	0.832
3	0.840	0.898	0.954	0.957	0.879	0.830	4	0.834	0.880	0.938	0.959	0.895	0.838
5	0.840	0.887	0.943	0.962	0.886	0.837	6	0.869	0.950	0.958	0.884	0.827	0.814

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(b) 1.50 D inlet without vortex generators

M_∞ = 3.00 α = 0.0° m_o/m_∞ = 0.999 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.865 m_{bl}/m_∞ = 0.080 Δp_{t_2} = 0.194 p_2/p_∞ = 28.82

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.827	0.914	0.950	0.878	0.799	0.783	2	0.821	0.901	0.944	0.941	0.842	0.795
3	0.834	0.914	0.945	0.853	0.789	0.783	4	0.817	0.888	0.947	0.930	0.840	0.794
5	0.808	0.881	0.931	0.945	0.849	0.797	6	0.809	0.894	0.942	0.933	0.834	0.791

M_∞ = 3.00 α = 0.0° m_o/m_∞ = 0.999 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.797 m_{bl}/m_∞ = 0.069 Δp_{t_2} = 0.315 p_2/p_∞ = 25.53

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.761	0.890	0.903	0.785	0.704	0.691	2	0.733	0.869	0.938	0.855	0.737	0.702
3	0.805	0.926	0.882	0.761	0.697	0.691	4	0.749	0.866	0.917	0.801	0.709	0.692
5	0.722	0.824	0.941	0.884	0.739	0.703	6	0.779	0.926	0.920	0.797	0.704	0.693

M_∞ = 2.75 α = 0.0° m_o/m_∞ = 0.938 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.918 m_{bl}/m_∞ = 0.139 Δp_{t_2} = 0.104 p_2/p_∞ = 21.77

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.886	0.940	0.928	0.935	0.953	0.897	2	0.902	0.946	0.922	0.912	0.944	0.864
3	0.893	0.951	0.929	0.918	0.943	0.873	4	0.888	0.935	0.951	0.938	0.951	0.889
5	0.891	0.941	0.937	0.915	0.934	0.867	6	0.882	0.939	0.950	0.917	0.926	0.857

M_∞ = 2.75 α = 0.0° m_o/m_∞ = 0.938 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.887 m_{bl}/m_∞ = 0.102 Δp_{t_2} = 0.204 p_2/p_∞ = 20.50

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.791	0.824	0.908	0.958	0.966	0.895	2	0.789	0.831	0.910	0.956	0.961	0.884
3	0.791	0.814	0.898	0.954	0.962	0.907	4	0.790	0.803	0.885	0.958	0.970	0.883
5	0.792	0.827	0.916	0.957	0.963	0.900	6	0.789	0.817	0.891	0.954	0.960	0.886

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(b) 1.50 D inlet without vortex generators

M_∞ = 2.75 α = 0.0° m_o/m_∞ = 0.938 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.816 m_{bl}/m_∞ = 0.084 Δp_{t_2} = 0.335 p_2/p_∞ = 18.39

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.688	0.706	0.792	0.903	0.955	0.824	2	0.688	0.711	0.790	0.916	0.940	0.821
3	0.690	0.718	0.820	0.935	0.945	0.830	4	0.688	0.708	0.787	0.891	0.961	0.819
5	0.690	0.713	0.823	0.937	0.943	0.829	6	0.690	0.715	0.825	0.932	0.942	0.811

M_∞ = 2.75 α = 0.0° m_o/m_∞ = 0.938 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.902 m_{bl}/m_∞ = 0.102 Δp_{t_2} = 0.162 p_2/p_∞ = 20.75

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.866	0.954	0.962	0.934	0.922	0.852	2	0.816	0.865	0.950	0.958	0.910	0.847
3	0.823	0.877	0.945	0.961	0.927	0.853	4	0.843	0.910	0.957	0.961	0.947	0.862
5	0.836	0.903	0.957	0.959	0.917	0.830	6	0.830	0.888	0.949	0.953	0.935	0.825

M_∞ = 2.75 α = 0.0° m_o/m_∞ = 0.938 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.853 m_{bl}/m_∞ = 0.085 Δp_{t_2} = 0.248 p_2/p_∞ = 19.07

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.779	0.918	0.937	0.885	0.886	0.784	2	0.742	0.769	0.899	0.948	0.896	0.797
3	0.753	0.808	0.915	0.935	0.888	0.784	4	0.766	0.854	0.937	0.926	0.904	0.791
5	0.765	0.859	0.953	0.922	0.868	0.763	6	0.753	0.814	0.934	0.936	0.880	0.763

M_∞ = 2.50 α = 0.0° m_o/m_∞ = 0.851 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.931 m_{bl}/m_∞ = 0.143 Δp_{t_2} = 0.103 p_2/p_∞ = 14.86

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.891	0.928	0.953	0.960	0.965	0.922	2	0.886	0.932	0.950	0.953	0.959	0.893
3	0.871	0.924	0.947	0.953	0.959	0.913	4	0.891	0.929	0.951	0.960	0.967	0.915
5	0.885	0.927	0.948	0.953	0.957	0.906	6	0.878	0.930	0.943	0.952	0.955	0.897

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(b) 1.50 D inlet without vortex generators

M_∞ = 2.50 α = 0.0° m_o/m_∞ = 0.851 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.914 m_{bl}/m_∞ = 0.112 Δp_{t_2} = 0.128 p_2/p_∞ = 14.19

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.859	0.928	0.962	0.953	0.957	0.861	2	0.848	0.923	0.954	0.941	0.937	0.859
3	0.846	0.923	0.955	0.939	0.937	0.878	4	0.856	0.922	0.959	0.954	0.957	0.867
5	0.850	0.918	0.944	0.939	0.947	0.870	6	0.847	0.917	0.945	0.939	0.946	0.857

M_∞ = 2.50 α = 0.0° m_o/m_∞ = 0.851 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.832 m_{bl}/m_∞ = 0.094 Δp_{t_2} = 0.308 p_2/p_∞ = 12.35

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.704	0.787	0.903	0.923	0.951	0.796	2	0.695	0.736	0.827	0.893	0.930	0.793
3	0.701	0.752	0.865	0.913	0.940	0.804	4	0.702	0.783	0.896	0.937	0.938	0.804
5	0.702	0.753	0.870	0.918	0.929	0.804	6	0.703	0.764	0.884	0.931	0.937	0.778

M_∞ = 2.50 α = 0.0° m_o/m_∞ = 0.851 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.922 m_{bl}/m_∞ = 0.103 Δp_{t_2} = 0.109 p_2/p_∞ = 14.42

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.865	0.926	0.959	0.955	0.957	0.894	2	0.865	0.931	0.957	0.956	0.953	0.859
3	0.862	0.933	0.957	0.957	0.956	0.878	4	0.870	0.927	0.957	0.956	0.960	0.881
5	0.865	0.927	0.954	0.950	0.954	0.872	6	0.860	0.927	0.951	0.946	0.954	0.862

M_∞ = 2.50 α = 0.0° m_o/m_∞ = 0.851 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.902 m_{bl}/m_∞ = 0.086 Δp_{t_2} = 0.184 p_2/p_∞ = 13.79

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.811	0.889	0.950	0.961	0.970	0.844	2	0.804	0.878	0.938	0.944	0.967	0.849
3	0.805	0.876	0.937	0.943	0.967	0.873	4	0.816	0.896	0.953	0.960	0.967	0.858
5	0.815	0.896	0.940	0.953	0.962	0.852	6	0.809	0.885	0.941	0.945	0.965	0.840

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(b) 1.50 D inlet without vortex generators

M_∞ = 2.50 α = 0.0° m_o/m_∞ = 0.851 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.859 m_{b1}/m_∞ = 0.075 Δp_{t_2} = 0.255 p_2/p_∞ = 12.81

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.739	0.835	0.938	0.951	0.940	0.805	2	0.732	0.803	0.893	0.936	0.924	0.799
3	0.744	0.836	0.912	0.942	0.933	0.800	4	0.744	0.847	0.930	0.951	0.934	0.796
5	0.740	0.833	0.912	0.940	0.926	0.793	6	0.737	0.824	0.917	0.944	0.937	0.772

M_∞ = 2.25 α = 0.0° m_o/m_∞ = .738 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.949 m_{b1}/m_∞ = 0.132 Δp_{t_2} = 0.062 p_2/p_∞ = 9.98

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.918	0.943	0.959	0.965	0.969	0.948	2	0.912	0.938	0.955	0.966	0.967	0.947
3	0.910	0.940	0.955	0.965	0.965	0.965	4	0.926	0.946	0.951	0.964	0.965	0.950
5	0.925	0.943	0.952	0.944	0.966	0.946	6	0.927	0.947	0.957	0.962	0.968	0.937

M_∞ = 2.25 α = 0.0° m_o/m_∞ = 0.738 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.937 m_{b1}/m_∞ = 0.117 Δp_{t_2} = 0.087 p_2/p_∞ = 9.72

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.895	0.924	0.944	0.960	0.968	0.940	2	0.887	0.907	0.935	0.960	0.967	0.941
3	0.891	0.902	0.927	0.956	0.967	0.961	4	0.894	0.916	0.941	0.956	0.969	0.940
5	0.905	0.933	0.947	0.944	0.965	0.941	6	0.902	0.935	0.951	0.960	0.962	0.930

M_∞ = 2.25 α = 0.0° m_o/m_∞ = 0.738 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.886 m_{b1}/m_∞ = 0.081 Δp_{t_2} = 0.093 p_2/p_∞ = 8.77

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.863	0.903	0.915	0.904	0.915	0.885	2	0.845	0.871	0.905	0.895	0.899	0.837
3	0.841	0.861	0.899	0.892	0.904	0.858	4	0.866	0.906	0.916	0.908	0.914	0.874
5	0.858	0.887	0.905	0.897	0.913	0.844	6	0.846	0.895	0.910	0.920	0.917	0.846

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(b) 1.50 D inlet without vortex generators

M_∞ = 2.25 α = 0.0° m_o/m_∞ = 0.738 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.940 m_{b1}/m_∞ = 0.092 Δp_{t_2} = 0.090 p_2/p_∞ = 9.63

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.894	0.935	0.957	0.966	0.966	0.929	2	0.892	0.934	0.955	0.967	0.965	0.924
3	0.884	0.927	0.955	0.965	0.964	0.943	4	0.902	0.941	0.951	0.962	0.965	0.927
5	0.906	0.940	0.950	0.945	0.966	0.914	6	0.909	0.944	0.957	0.962	0.968	0.913

M_∞ = 2.25 α = 0.0° m_o/m_∞ = 0.738 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.922 m_{b1}/m_∞ = 0.074 Δp_{t_2} = 0.109 p_2/p_∞ = 9.25

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.868	0.915	0.943	0.954	0.963	0.909	2	0.865	0.904	0.933	0.948	0.956	0.890
3	0.865	0.896	0.927	0.949	0.957	0.914	4	0.872	0.912	0.945	0.955	0.961	0.905
5	0.873	0.917	0.944	0.938	0.962	0.901	6	0.870	0.921	0.946	0.955	0.965	0.898

M_∞ = 2.25 α = 0.0° m_o/m_∞ = 0.738 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.887 m_{b1}/m_∞ = 0.061 Δp_{t_2} = 0.141 p_2/p_∞ = 8.59

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.821	0.900	0.916	0.922	0.919	0.879	2	0.808	0.868	0.916	0.926	0.909	0.845
3	0.805	0.854	0.908	0.919	0.920	0.852	4	0.833	0.903	0.920	0.926	0.915	0.870
5	0.854	0.898	0.917	0.894	0.923	0.829	6	0.840	0.909	0.927	0.913	0.930	0.834

M_∞ = 2.00 α = 0.0° m_o/m_∞ = 0.625 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.958 m_{b1}/m_∞ = 0.123 Δp_{t_2} = 0.065 p_2/p_∞ = 6.81

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.926	0.953	0.960	0.968	0.979	0.961	2	0.927	0.953	0.961	0.963	0.972	0.964
3	0.917	0.947	0.959	0.965	0.975	0.975	4	0.935	0.952	0.965	0.971	0.974	0.951
5	0.935	0.958	0.967	0.955	0.976	0.960	6	0.932	0.956	0.968	0.972	0.974	0.962

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(b) 1.50 D inlet without vortex generators

M_∞ = 2.00 α = 0.0° m_o/m_∞ = 0.625 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.934 m_{b1}/m_∞ = 0.105 Δp_{t_2} = 0.091 p_2/p_∞ = 6.49

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.892	0.914	0.934	0.959	0.957	0.944	2	0.883	0.896	0.919	0.948	0.968	0.948
3	0.887	0.895	0.913	0.939	0.965	0.959	4	0.896	0.912	0.935	0.960	0.964	0.942
5	0.894	0.924	0.957	0.951	0.957	0.952	6	0.900	0.920	0.950	0.965	0.961	0.948

M_∞ = 2.00 α = 0.0° m_o/m_∞ = 0.625 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.886 m_{b1}/m_∞ = 0.085 Δp_{t_2} = 0.121 p_2/p_∞ = 5.88

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.843	0.863	0.885	0.906	0.919	0.901	2	0.840	0.854	0.874	0.895	0.910	0.905
3	0.835	0.846	0.866	0.884	0.903	0.911	4	0.842	0.853	0.879	0.902	0.920	0.907
5	0.850	0.866	0.888	0.898	0.928	0.942	6	0.848	0.864	0.890	0.914	0.929	0.930

M_∞ = 2.00 α = 0.0° m_o/m_∞ = 0.625 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.952 m_{b1}/m_∞ = 0.090 Δp_{t_2} = 0.082 p_2/p_∞ = 6.59

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.912	0.951	0.962	0.971	0.975	0.942	2	0.905	0.945	0.963	0.968	0.976	0.945
3	0.899	0.937	0.960	0.972	0.976	0.961	4	0.925	0.952	0.964	0.972	0.972	0.931
5	0.928	0.960	0.966	0.955	0.969	0.929	6	0.932	0.958	0.968	0.972	0.975	0.933

M_∞ = 2.00 α = 0.0° m_o/m_∞ = 0.625 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.934 m_{b1}/m_∞ = 0.079 Δp_{t_2} = 0.082 p_2/p_∞ = 6.34

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.886	0.920	0.950	0.957	0.954	0.925	2	0.886	0.911	0.935	0.956	0.955	0.934
3	0.887	0.900	0.925	0.949	0.952	0.941	4	0.902	0.931	0.952	0.958	0.951	0.921
5	0.900	0.947	0.963	0.939	0.956	0.929	6	0.896	0.939	0.963	0.960	0.958	0.933

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(b) 1.50 D inlet without vortex generators

M_∞ = 2.00 α = 0.0° m_o/m_∞ = 0.625 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.900 m_{bl}/m_∞ = 0.067 Δp_{t_2} = 0.123 p_2/p_∞ = 5.91

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.853	0.874	0.895	0.924	0.942	0.917	2	0.848	0.865	0.890	0.913	0.930	0.923
3	0.844	0.859	0.879	0.905	0.925	0.941	4	0.854	0.865	0.888	0.919	0.942	0.916
5	0.863	0.885	0.903	0.910	0.955	0.922	6	0.862	0.881	0.898	0.932	0.948	0.918

M_∞ = 1.75 α = 0.0° m_o/m_∞ = 0.521 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.953 m_{bl}/m_∞ = 0.100 Δp_{t_2} = 0.053 p_2/p_∞ = 4.58

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.932	0.955	0.960	0.965	0.962	0.954	2	0.918	0.946	0.963	0.969	0.962	0.948
3	0.926	0.948	0.960	0.967	0.957	0.954	4	0.939	0.957	0.955	0.954	0.953	0.934
5	0.947	0.963	0.957	0.946	0.963	0.944	6	0.944	0.963	0.963	0.967	0.966	0.941

M_∞ = 1.75 α = 0.0° m_o/m_∞ = 0.521 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.937 m_{bl}/m_∞ = 0.092 Δp_{t_2} = 0.062 p_2/p_∞ = 4.44

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.902	0.915	0.928	0.946	0.954	0.938	2	0.903	0.923	0.941	0.950	0.950	0.934
3	0.906	0.922	0.943	0.956	0.949	0.932	4	0.929	0.950	0.949	0.945	0.935	0.917
5	0.932	0.958	0.958	0.933	0.948	0.925	6	0.921	0.940	0.959	0.960	0.953	0.928

M_∞ = 1.75 α = 0.0° m_o/m_∞ = 0.521 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.886 m_{bl}/m_∞ = 0.078 Δp_{t_2} = 0.098 p_2/p_∞ = 4.01

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.856	0.866	0.884	0.899	0.905	0.885	2	0.856	0.871	0.891	0.906	0.924	0.899
3	0.853	0.862	0.874	0.880	0.901	0.882	4	0.859	0.871	0.885	0.900	0.912	0.884
5	0.857	0.872	0.894	0.899	0.940	0.923	6	0.857	0.870	0.881	0.891	0.897	0.897

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(b) 1.50 D inlet without vortex generators

M_∞ = 1.75 α = 0.0° m_o/m_∞ = 0.521 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.957 m_{b1}/m_∞ = 0.077 Δp_{t_2} = 0.067 p_2/p_∞ = 4.51

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.929	0.957	0.958	0.976	0.975	0.948	2	0.922	0.960	0.956	0.969	0.980	0.959
3	0.916	0.950	0.958	0.969	0.976	0.967	4	0.934	0.960	0.961	0.974	0.974	0.944
5	0.931	0.957	0.966	0.963	0.973	0.955	6	0.919	0.952	0.967	0.980	0.977	0.945

M_∞ = 1.75 α = 0.0° m_o/m_∞ = 0.521 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.932 m_{b1}/m_∞ = 0.069 Δp_{t_2} = 0.067 p_2/p_∞ = 4.30

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.898	0.918	0.940	0.952	0.953	0.926	2	0.900	0.917	0.938	0.953	0.959	0.919
3	0.899	0.910	0.924	0.939	0.950	0.936	4	0.913	0.931	0.944	0.935	0.926	0.908
5	0.921	0.955	0.961	0.935	0.940	0.914	6	0.919	0.942	0.960	0.960	0.948	0.916

M_∞ = 1.75 α = 0.0° m_o/m_∞ = 0.521 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.895 m_{b1}/m_∞ = 0.061 Δp_{t_2} = 0.099 p_2/p_∞ = 3.98

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.865	0.880	0.891	0.911	0.926	0.897	2	0.875	0.882	0.892	0.912	0.932	0.901
3	0.860	0.868	0.879	0.894	0.903	0.893	4	0.866	0.878	0.896	0.912	0.930	0.896
5	0.869	0.884	0.902	0.903	0.949	0.926	6	0.864	0.873	0.890	0.909	0.921	0.892

M_∞ = 1.55 α = 0.0° m_o/m_∞ = 0.466 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.966 m_{b1}/m_∞ = 0.106 Δp_{t_2} = 0.052 p_2/p_∞ = 3.54

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.980	0.973	0.957	0.958	0.961	0.961	2	0.987	0.982	0.958	0.956	0.959	0.958
3	0.982	0.983	0.960	0.958	0.961	0.962	4	0.984	0.979	0.960	0.958	0.962	0.962
5	0.982	0.976	0.959	0.941	0.961	0.962	6	0.991	0.972	0.958	0.958	0.961	0.958

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(b) 1.50 D inlet without vortex generators

M_∞ = 1.55 α = 0.0° m_o/m_∞ = 0.466 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.969 m_{bl}/m_∞ = 0.092 Δp_{t_2} = 0.061 p_2/p_∞ = 3.45

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.926	0.960	0.978	0.984	0.983	0.974	2	0.932	0.962	0.982	0.983	0.984	0.974
3	0.930	0.962	0.976	0.983	0.983	0.981	4	0.932	0.964	0.983	0.984	0.984	0.973
5	0.931	0.967	0.980	0.965	0.981	0.979	6	0.935	0.970	0.985	0.983	0.979	0.972

M_∞ = 1.55 α = 0.0° m_o/m_∞ = 0.466 Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.869 m_{bl}/m_∞ = 0.059 Δp_{t_2} = 0.088 p_2/p_∞ = 2.81

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.832	0.840	0.853	0.870	0.889	0.869	2	0.845	0.854	0.870	0.885	0.902	0.868
3	0.839	0.852	0.866	0.878	0.896	0.890	4	0.836	0.841	0.857	0.871	0.888	0.870
5	0.848	0.863	0.874	0.874	0.907	0.896	6	0.848	0.862	0.875	0.890	0.908	0.876

M_∞ = 1.55 α = 0.0° m_o/m_∞ = 0.466 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.974 m_{bl}/m_∞ = 0.081 Δp_{t_2} = 0.049 p_2/p_∞ = 3.53

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.974	0.994	0.971	0.967	0.967	0.963	2	0.979	0.997	0.981	0.967	0.966	0.962
3	0.973	0.996	0.982	0.969	0.967	0.966	4	0.978	0.996	0.981	0.968	0.968	0.964
5	0.980	0.995	0.973	0.949	0.966	0.966	6	0.988	0.993	0.972	0.966	0.967	0.961

M_∞ = 1.55 α = 0.0° m_o/m_∞ = 0.466 Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.898 m_{bl}/m_∞ = 0.049 Δp_{t_2} = 0.075 p_2/p_∞ = 2.93

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.871	0.887	0.900	0.914	0.920	0.890	2	0.883	0.896	0.901	0.915	0.930	0.897
3	0.867	0.875	0.885	0.899	0.914	0.900	4	0.869	0.885	0.893	0.902	0.919	0.896
5	0.872	0.890	0.908	0.903	0.934	0.918	6	0.874	0.885	0.896	0.912	0.926	0.892

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(b) 1.50 D inlet without vortex generators

M_∞ = 3.00 α = 2.0° m_o/m_∞ = ——— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.882 m_{bl}/m_∞ = 0.128 Δp_{t_2} = 0.178 p_2/p_∞ = 30.61

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.809	0.806	0.829	0.874	0.934	0.898	2	0.838	0.882	0.923	0.949	0.963	0.862
3	0.844	0.888	0.938	0.950	0.876	0.834	4	0.872	0.933	0.889	0.831	0.814	0.814
5	0.843	0.884	0.932	0.953	0.903	0.841	6	0.822	0.851	0.899	0.945	0.954	0.859

M_∞ = 3.00 α = 2.0° m_o/m_∞ = ——— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.873 m_{bl}/m_∞ = 0.101 Δp_{t_2} = 0.187 p_2/p_∞ = 30.18

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.798	0.808	0.859	0.925	0.947	0.874	2	0.824	0.868	0.917	0.951	0.944	0.847
3	0.825	0.882	0.946	0.911	0.828	0.805	4	0.832	0.922	0.921	0.873	0.806	0.795
5	0.812	0.857	0.938	0.937	0.860	0.811	6	0.814	0.843	0.907	0.958	0.931	0.841

M_∞ = 2.75 α = 2.0° m_o/m_∞ = ——— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.907 m_{bl}/m_∞ = 0.127 Δp_{t_2} = 0.142 p_2/p_∞ = 21.30

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.869	0.903	0.932	0.945	0.946	0.878	2	0.874	0.928	0.920	0.931	0.950	0.854
3	0.852	0.908	0.916	0.930	0.957	0.889	4	0.833	0.869	0.907	0.933	0.962	0.879
5	0.851	0.916	0.913	0.920	0.956	0.883	6	0.869	0.918	0.930	0.935	0.943	0.855

M_∞ = 2.75 α = 2.0° m_o/m_∞ = ——— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.890 m_{bl}/m_∞ = 0.098 Δp_{t_2} = 0.197 p_2/p_∞ = 20.57

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.845	0.896	0.933	0.942	0.942	0.861	2	0.799	0.844	0.919	0.954	0.934	0.874
3	0.797	0.820	0.900	0.915	0.958	0.914	4	0.793	0.830	0.907	0.942	0.969	0.875
5	0.797	0.826	0.923	0.910	0.960	0.896	6	0.807	0.866	0.930	0.942	0.943	0.859

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(b) 1.50 D inlet without vortex generators

M_∞ = 2.50 α = 2.0° m_o/m_∞ = —— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.927 m_{b1}/m_∞ = 0.138 Δp_{t_2} = 0.078 p_2/p_∞ = 14.83

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.903	0.920	0.925	0.940	0.948	0.909	2	0.895	0.929	0.935	0.948	0.952	0.901
3	0.888	0.942	0.952	0.938	0.947	0.899	4	0.903	0.932	0.949	0.955	0.961	0.909
5	0.898	0.938	0.946	0.940	0.950	0.901	6	0.889	0.918	0.929	0.947	0.948	0.895

M_∞ = 2.50 α = 2.0° m_o/m_∞ = —— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.918 m_{b1}/m_∞ = 0.099 Δp_{t_2} = 0.135 p_2/p_∞ = 14.42

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.887	0.924	0.929	0.942	0.949	0.889	2	0.881	0.932	0.947	0.947	0.953	0.863
3	0.853	0.910	0.958	0.967	0.948	0.886	4	0.843	0.886	0.933	0.964	0.960	0.900
5	0.858	0.917	0.960	0.948	0.949	0.881	6	0.870	0.921	0.937	0.945	0.952	0.865

M_∞ = 2.25 α = 2.0° m_o/m_∞ = —— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.940 m_{b1}/m_∞ = 0.129 Δp_{t_2} = 0.147 p_2/p_∞ = 9.87

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.923	0.946	0.941	0.953	0.958	0.930	2	0.918	0.944	0.956	0.951	0.962	0.945
3	0.903	0.920	0.933	0.938	0.944	0.934	4	0.895	0.913	0.934	0.952	0.963	0.946
5	0.913	0.940	0.956	0.942	0.966	0.958	6	0.916	0.945	0.950	0.955	0.961	0.930

M_∞ = 2.25 α = 2.0° m_o/m_∞ = —— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.920 m_{b1}/m_∞ = 0.093 Δp_{t_2} = 0.093 p_2/p_∞ = 9.42

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.895	0.928	0.939	0.958	0.956	0.915	2	0.882	0.920	0.946	0.952	0.955	0.930
3	0.853	0.871	0.897	0.925	0.949	0.953	4	0.847	0.867	0.894	0.919	0.944	0.926
5	0.865	0.888	0.922	0.943	0.972	0.932	6	0.902	0.928	0.943	0.955	0.958	0.897

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(b) 1.50 D inlet without vortex generators

M_∞ = 2.00 α = 2.0° m_o/m_∞ = —— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.917 m_{bl}/m_∞ = 0.100 Δp_{t_2} = 0.096 p_2/p_∞ = 6.35

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.894	0.925	0.950	0.956	0.944	0.928	2	0.876	0.899	0.920	0.946	0.964	0.927
3	0.881	0.891	0.896	0.898	0.895	0.879	4	0.877	0.884	0.902	0.927	0.932	0.896
5	0.884	0.909	0.933	0.928	0.947	0.918	6	0.887	0.925	0.955	0.963	0.950	0.918

M_∞ = 2.00 α = 2.0° m_o/m_∞ = —— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.930 m_{bl}/m_∞ = 0.083 Δp_{t_2} = 0.096 p_2/p_∞ = 6.38

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.903	0.941	0.947	0.955	0.963	0.927	2	0.903	0.947	0.950	0.951	0.957	0.928
3	0.879	0.892	0.906	0.925	0.940	0.935	4	0.877	0.889	0.910	0.929	0.942	0.923
5	0.893	0.923	0.949	0.938	0.966	0.940	6	0.907	0.947	0.953	0.961	0.966	0.922

M_∞ = 1.75 α = 2.0° m_o/m_∞ = —— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.943 m_{bl}/m_∞ = 0.096 Δp_{t_2} = 0.070 p_2/p_∞ = 4.50

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.940	0.961	0.953	0.956	0.970	0.959	2	0.930	0.963	0.965	0.963	0.957	0.936
3	0.919	0.929	0.945	0.946	0.943	0.925	4	0.926	0.928	0.923	0.920	0.917	0.904
5	0.940	0.960	0.961	0.938	0.947	0.922	6	0.940	0.958	0.959	0.964	0.963	0.933

M_∞ = 1.75 α = 2.0° m_o/m_∞ = —— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.944 m_{bl}/m_∞ = 0.074 Δp_{t_2} = 0.078 p_2/p_∞ = 4.41

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.926	0.949	0.964	0.976	0.974	0.944	2	0.924	0.958	0.960	0.961	0.961	0.953
3	0.913	0.924	0.935	0.946	0.949	0.944	4	0.903	0.914	0.925	0.934	0.943	0.934
5	0.924	0.952	0.960	0.939	0.947	0.922	6	0.927	0.953	0.968	0.975	0.966	0.932

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(b) 1.50 D inlet without vortex generators

M_∞ = 1.55 α = 2.0° m_o/m_∞ = —— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.968 m_{b1}/m_∞ = 0.106 Δp_{t_2} = 0.056 p_2/p_∞ = 3.55

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.981	0.996	0.985	0.972	0.964	0.958	2	0.985	0.993	0.969	0.959	0.961	0.958
3	0.970	0.965	0.960	0.962	0.963	0.965	4	0.974	0.960	0.962	0.964	0.965	0.965
5	0.987	0.960	0.958	0.942	0.962	0.965	6	0.990	0.983	0.961	0.960	0.961	0.958

M_∞ = 1.55 α = 2.0° m_o/m_∞ = —— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.966 m_{b1}/m_∞ = 0.077 Δp_{t_2} = 0.054 p_2/p_∞ = 3.45

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.975	0.995	0.978	0.963	0.962	0.956	2	0.982	0.990	0.962	0.957	0.960	0.957
3	0.964	0.961	0.958	0.962	0.963	0.965	4	0.965	0.959	0.962	0.964	0.965	0.963
5	0.984	0.958	0.958	0.943	0.963	0.965	6	0.989	0.980	0.958	0.959	0.960	0.955

M_∞ = 3.00 α = 5.0° m_o/m_∞ = —— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.806 m_{b1}/m_∞ = 0.099 Δp_{t_2} = 0.222 p_2/p_∞ = 28.02

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.777	0.812	0.850	0.881	0.888	0.809	2	0.759	0.794	0.834	0.886	0.893	0.818
3	0.776	0.808	0.823	0.795	0.765	0.739	4	0.768	0.785	0.789	0.761	0.736	0.724
5	0.782	0.825	0.811	0.785	0.757	0.735	6	0.762	0.806	0.859	0.903	0.896	0.809

M_∞ = 3.00 α = 5.0° m_o/m_∞ = —— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.792 m_{b1}/m_∞ = 0.078 Δp_{t_2} = 0.241 p_2/p_∞ = 27.26

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.763	0.810	0.858	0.884	0.884	0.789	2	0.736	0.781	0.837	0.896	0.889	0.794
3	0.713	0.721	0.748	0.771	0.786	0.765	4	0.713	0.736	0.768	0.801	0.804	0.757
5	0.714	0.731	0.758	0.789	0.798	0.772	6	0.734	0.781	0.844	0.904	0.895	0.792

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(b) 1.50 D inlet without vortex generators

M_∞ = 2.75 α = 5.0° m_o/m_∞ = —— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.810 m_{b1}/m_∞ = 0.094 Δp_{t_2} = 0.201 p_2/p_∞ = 18.81

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.801	0.835	0.860	0.873	0.848	0.790	2	0.775	0.814	0.852	0.868	0.892	0.842
3	0.805	0.824	0.802	0.776	0.756	0.738	4	0.804	0.817	0.787	0.763	0.745	0.730
5	0.810	0.825	0.803	0.775	0.755	0.738	6	0.775	0.821	0.855	0.868	0.889	0.833

M_∞ = 2.75 α = 5.0° m_o/m_∞ = —— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.808 m_{b1}/m_∞ = 0.087 Δp_{t_2} = 0.267 p_2/p_∞ = 18.64

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.824	0.859	0.874	0.848	0.839	0.789	2	0.778	0.809	0.842	0.889	0.917	0.813
3	0.715	0.731	0.766	0.808	0.850	0.822	4	0.701	0.723	0.752	0.790	0.824	0.791
5	0.713	0.727	0.765	0.808	0.842	0.817	6	0.769	0.806	0.851	0.898	0.908	0.812

M_∞ = 2.50 α = 5.0° m_o/m_∞ = —— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.815 m_{b1}/m_∞ = 0.094 Δp_{t_2} = 0.221 p_2/p_∞ = 12.99

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.829	0.854	0.880	0.895	0.898	0.847	2	0.805	0.836	0.855	0.874	0.886	0.834
3	0.757	0.757	0.774	0.791	0.793	0.781	4	0.738	0.748	0.763	0.776	0.787	0.773
5	0.753	0.759	0.775	0.788	0.800	0.788	6	0.800	0.824	0.852	0.890	0.919	0.850

M_∞ = 2.50 α = 5.0° m_o/m_∞ = —— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.820 m_{b1}/m_∞ = 0.083 Δp_{t_2} = 0.268 p_2/p_∞ = 12.80

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.832	0.866	0.888	0.888	0.896	0.836	2	0.799	0.817	0.844	0.882	0.915	0.858
3	0.727	0.740	0.769	0.799	0.832	0.828	4	0.716	0.732	0.760	0.793	0.806	0.785
5	0.735	0.752	0.775	0.803	0.839	0.830	6	0.792	0.817	0.859	0.905	0.935	0.853

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Continued

(b) 1.50 D inlet without vortex generators

M_∞ = 2.25 α = 5.0° m_o/m_∞ = —— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.874 m_{b1}/m_∞ = 0.126 Δp_{t_2} = 0.155 p_2/p_∞ = 9.10

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.895	0.912	0.924	0.920	0.919	0.888	2	0.886	0.896	0.898	0.906	0.923	0.905
3	0.827	0.828	0.834	0.837	0.843	0.838	4	0.817	0.819	0.830	0.841	0.845	0.839
5	0.837	0.841	0.844	0.832	0.857	0.850	6	0.871	0.901	0.924	0.953	0.950	0.922

M_∞ = 2.25 α = 5.0° m_o/m_∞ = —— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.864 m_{b1}/m_∞ = 0.084 Δp_{t_2} = 0.211 p_2/p_∞ = 8.73

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.890	0.904	0.904	0.923	0.909	0.845	2	0.876	0.886	0.895	0.917	0.942	0.896
3	0.793	0.803	0.819	0.837	0.863	0.858	4	0.776	0.787	0.799	0.817	0.830	0.827
5	0.814	0.814	0.826	0.825	0.871	0.873	6	0.873	0.896	0.923	0.959	0.941	0.901

M_∞ = 2.00 α = 5.0° m_o/m_∞ = —— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.869 m_{b1}/m_∞ = 0.090 Δp_{t_2} = 0.177 p_2/p_∞ = 5.88

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.888	0.933	0.948	0.945	0.922	0.907	2	0.861	0.877	0.889	0.921	0.938	0.877
3	0.824	0.825	0.817	0.812	0.807	0.795	4	0.825	0.826	0.838	0.844	0.836	0.811
5	0.852	0.848	0.836	0.807	0.808	0.794	6	0.897	0.926	0.939	0.945	0.946	0.912

M_∞ = 2.00 α = 5.0° m_o/m_∞ = —— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.850 m_{b1}/m_∞ = 0.075 Δp_{t_2} = 0.204 p_2/p_∞ = 5.75

RAKE NO.	TUBE NO. 1	2	3	4	5	6	RAKE NO.	TUBE NO. 1	2	3	4	5	6
1	0.834	0.859	0.884	0.898	0.888	0.860	2	0.850	0.860	0.824	0.804	0.797	0.783
3	0.838	0.856	0.870	0.882	0.902	0.912	4	0.822	0.824	0.820	0.816	0.820	0.809
5	0.855	0.877	0.897	0.890	0.935	0.903	6	0.849	0.873	0.833	0.806	0.799	0.761

TABLE II.- ENGINE-FACE PRESSURE RECOVERY DATA, $\bar{p}_{t_2}/p_{t_\infty}$ - Concluded

(b) 1.50 D inlet without vortex generators

M_∞ = 1.75 α = 5.0° m_o/m_∞ = ——— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.931 m_{bl}/m_∞ = 0.103 Δp_{t_2} = 0.092 p_2/p_∞ = 4.47

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.957	0.977	0.975	0.971	0.949	0.918	2	0.943	0.910	0.899	0.900	0.900	0.892
3	0.919	0.933	0.956	0.969	0.968	0.959	4	0.911	0.917	0.917	0.918	0.915	0.904
5	0.914	0.941	0.963	0.954	0.972	0.956	6	0.925	0.902	0.905	0.906	0.907	0.898

M_∞ = 1.75 α = 5.0° m_o/m_∞ = ——— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.927 m_{bl}/m_∞ = 0.076 Δp_{t_2} = 0.101 p_2/p_∞ = 4.34

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.951	0.973	0.975	0.971	0.951	0.906	2	0.942	0.910	0.900	0.900	0.900	0.890
3	0.911	0.941	0.960	0.966	0.968	0.954	4	0.881	0.889	0.893	0.897	0.904	0.895
5	0.914	0.945	0.958	0.948	0.971	0.957	6	0.933	0.902	0.904	0.906	0.907	0.887

M_∞ = 1.55 α = 5.0° m_o/m_∞ = ——— Exit setting = A

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.951 m_{bl}/m_∞ = 0.096 Δp_{t_2} = 0.085 p_2/p_∞ = 3.41

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.982	0.994	0.982	0.965	0.951	0.948	2	0.950	0.942	0.947	0.950	0.951	0.947
3	0.936	0.953	0.961	0.963	0.963	0.954	4	0.913	0.918	0.923	0.925	0.930	0.925
5	0.934	0.949	0.969	0.957	0.976	0.970	6	0.943	0.945	0.950	0.952	0.955	0.951

M_∞ = 1.55 α = 5.0° m_o/m_∞ = ——— Exit setting = C

$\bar{p}_{t_2}/p_{t_\infty}$ = 0.948 m_{bl}/m_∞ = 0.071 Δp_{t_2} = 0.098 p_2/p_∞ = 3.31

RAKE NO.	TUBE NO.						RAKE NO.	TUBE NO.					
	1	2	3	4	5	6		1	2	3	4	5	6
1	0.977	0.994	0.979	0.957	0.951	0.946	2	0.958	0.943	0.948	0.951	0.950	0.947
3	0.933	0.953	0.960	0.962	0.960	0.948	4	0.901	0.907	0.908	0.912	0.917	0.911
5	0.930	0.952	0.967	0.956	0.977	0.964	6	0.949	0.945	0.951	0.953	0.955	0.948

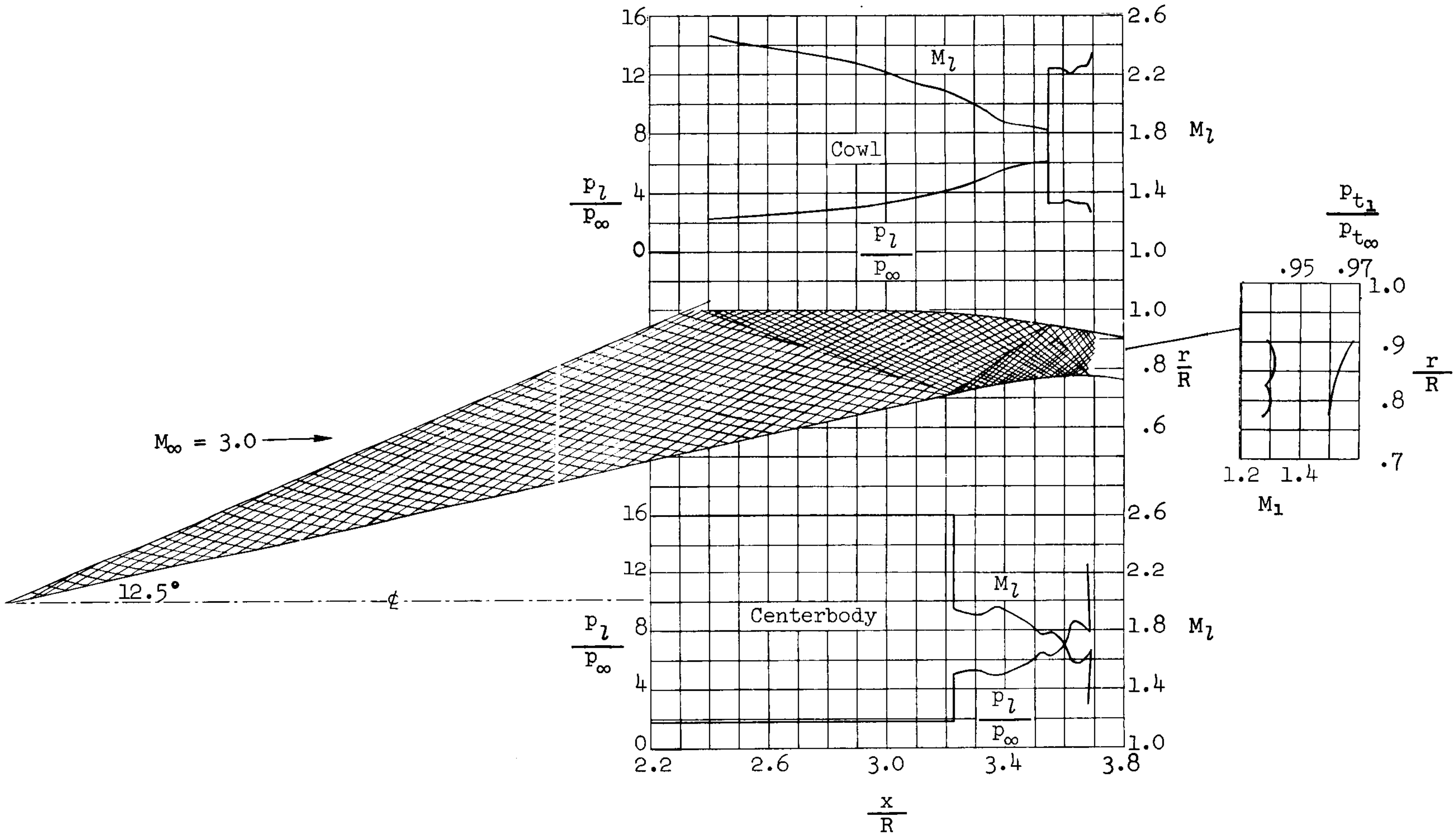
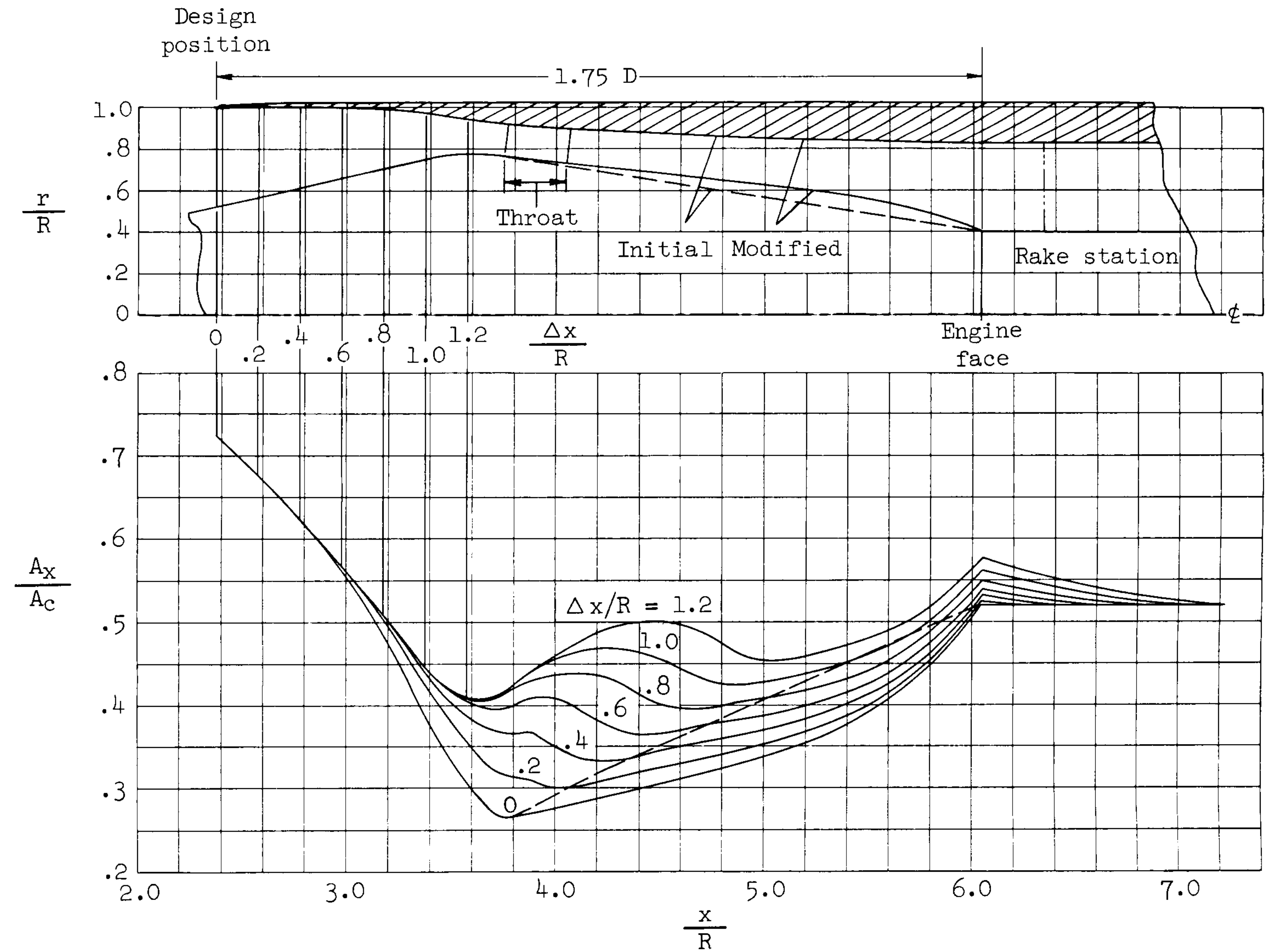
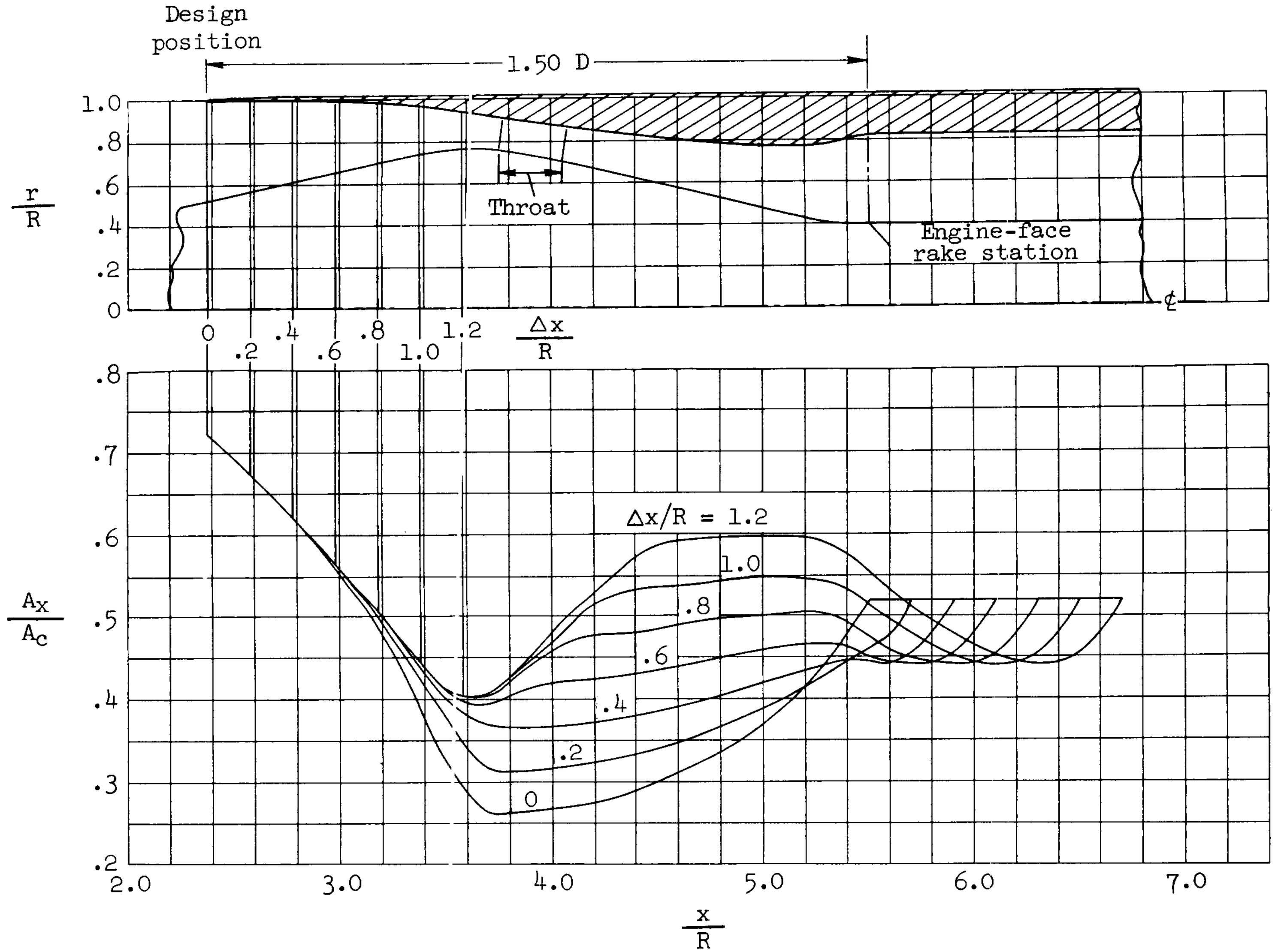


Figure 1.- Design theoretical supersonic flow field.



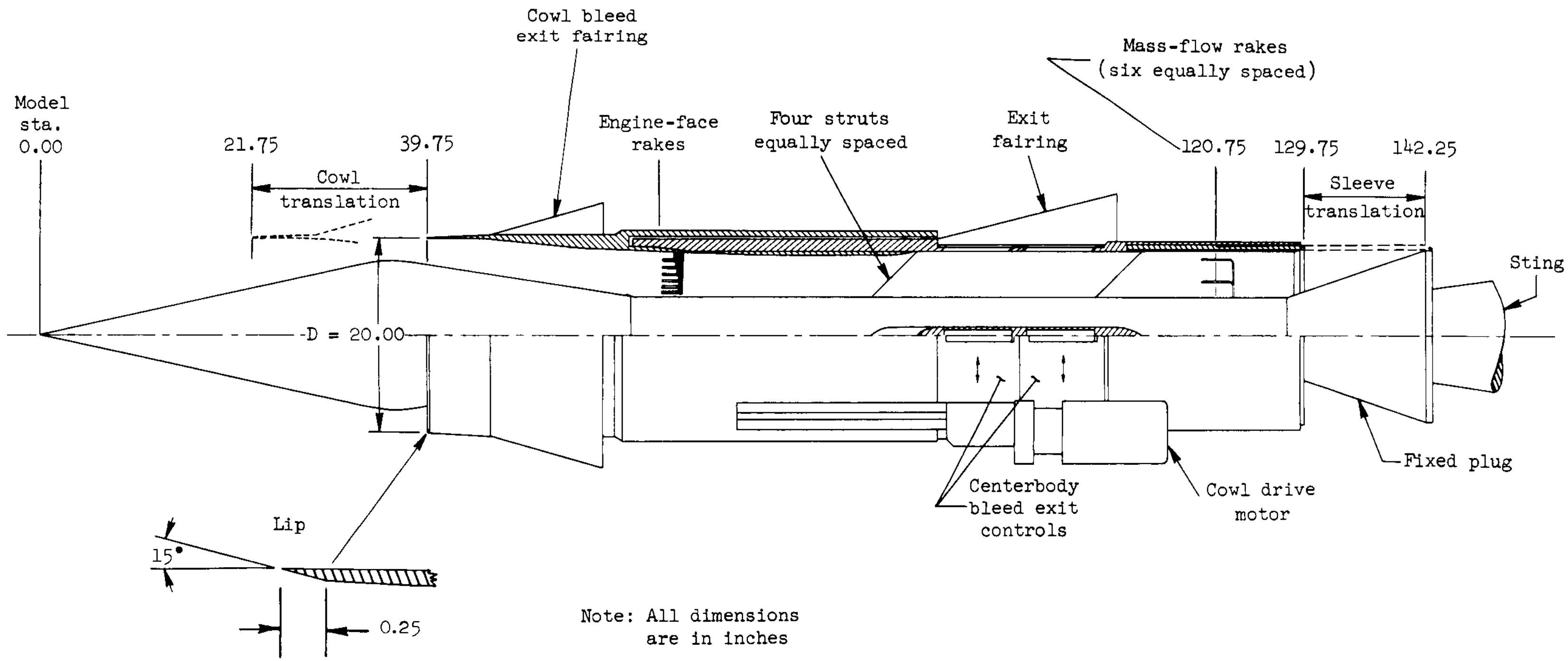
(a) Initial and modified 1.75 diameter inlets.

Figure 2.- Area distributions.



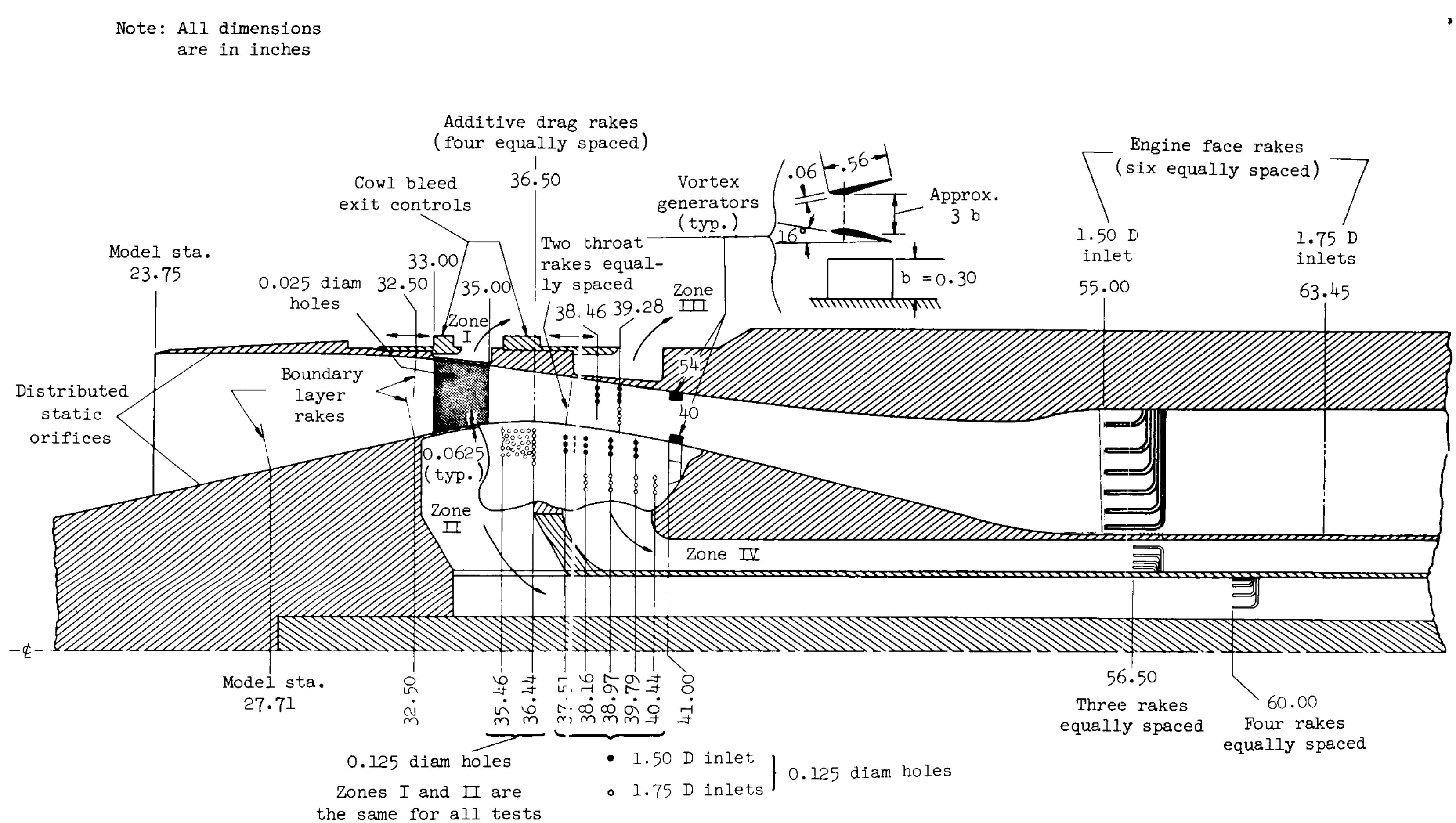
(b) 1.50 diameter inlet.

Figure 2.- Concluded.



(a) Overall model.

Figure 3.- Model.



(b) Bleed configurations and instrumentation.

Figure 3.- Concluded.

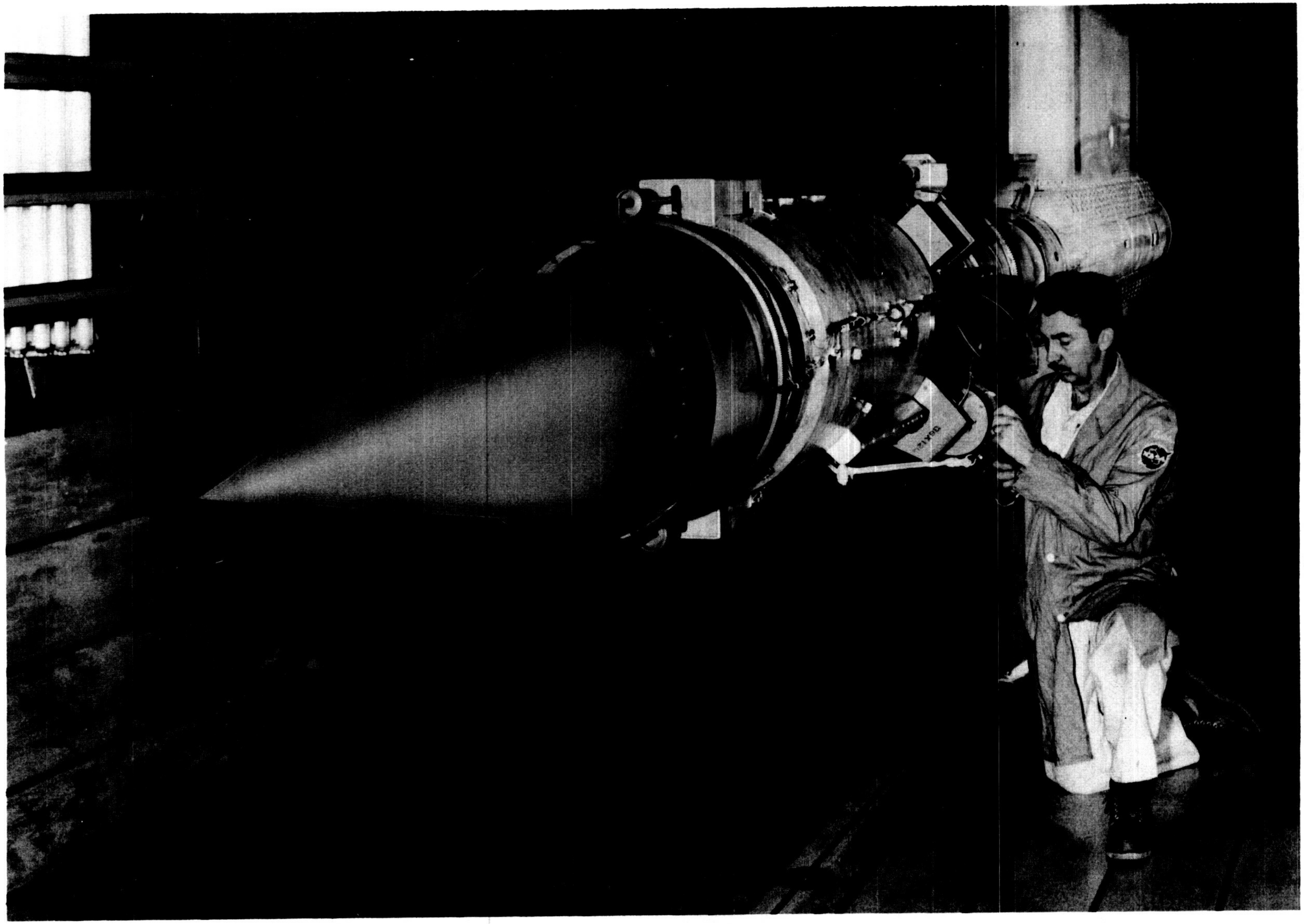


Figure 4.- Model mounted in the transonic wind tunnel. A-34092.1

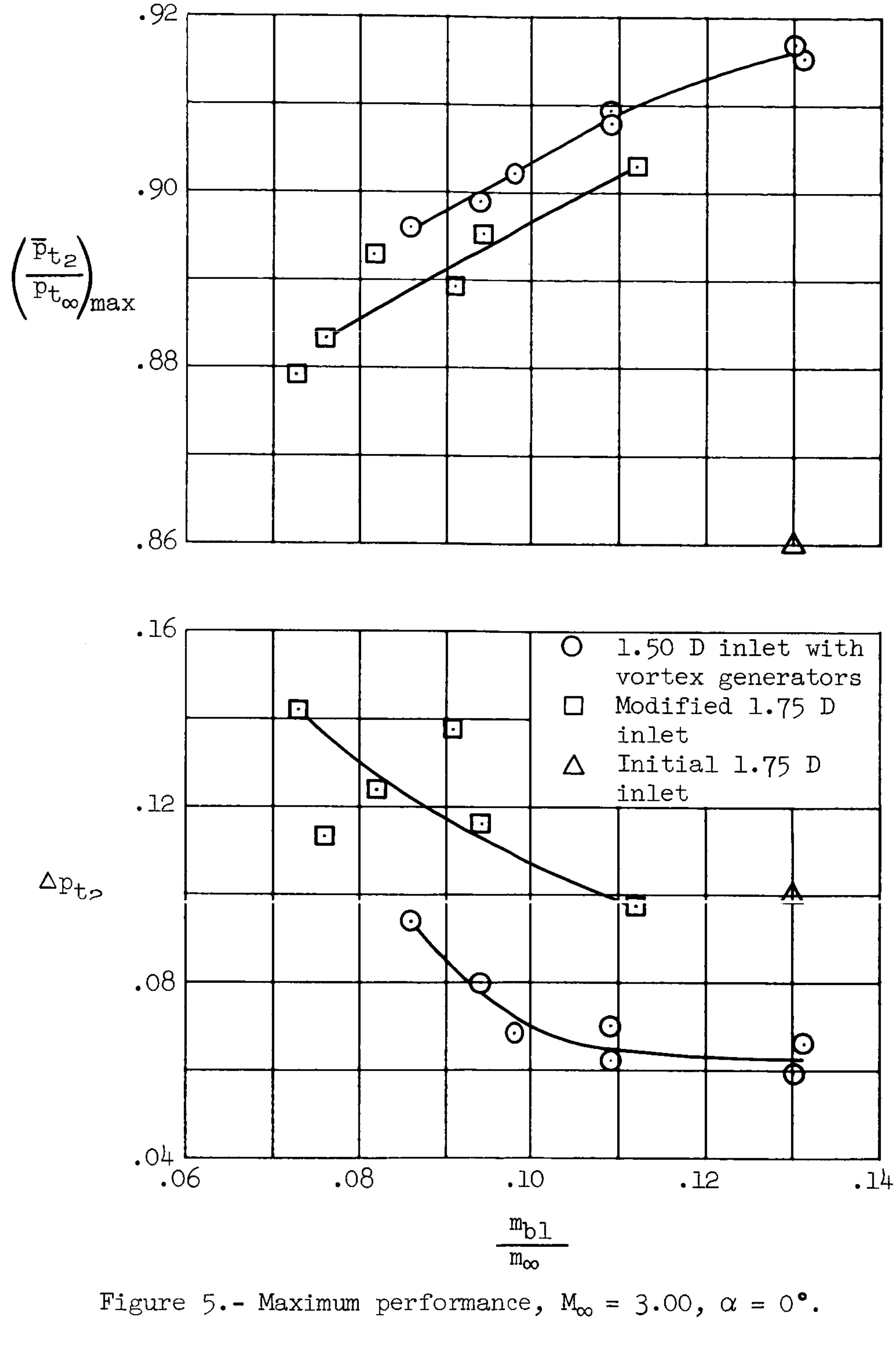


Figure 5.- Maximum performance, $M_\infty = 3.00$, $\alpha = 0°$.

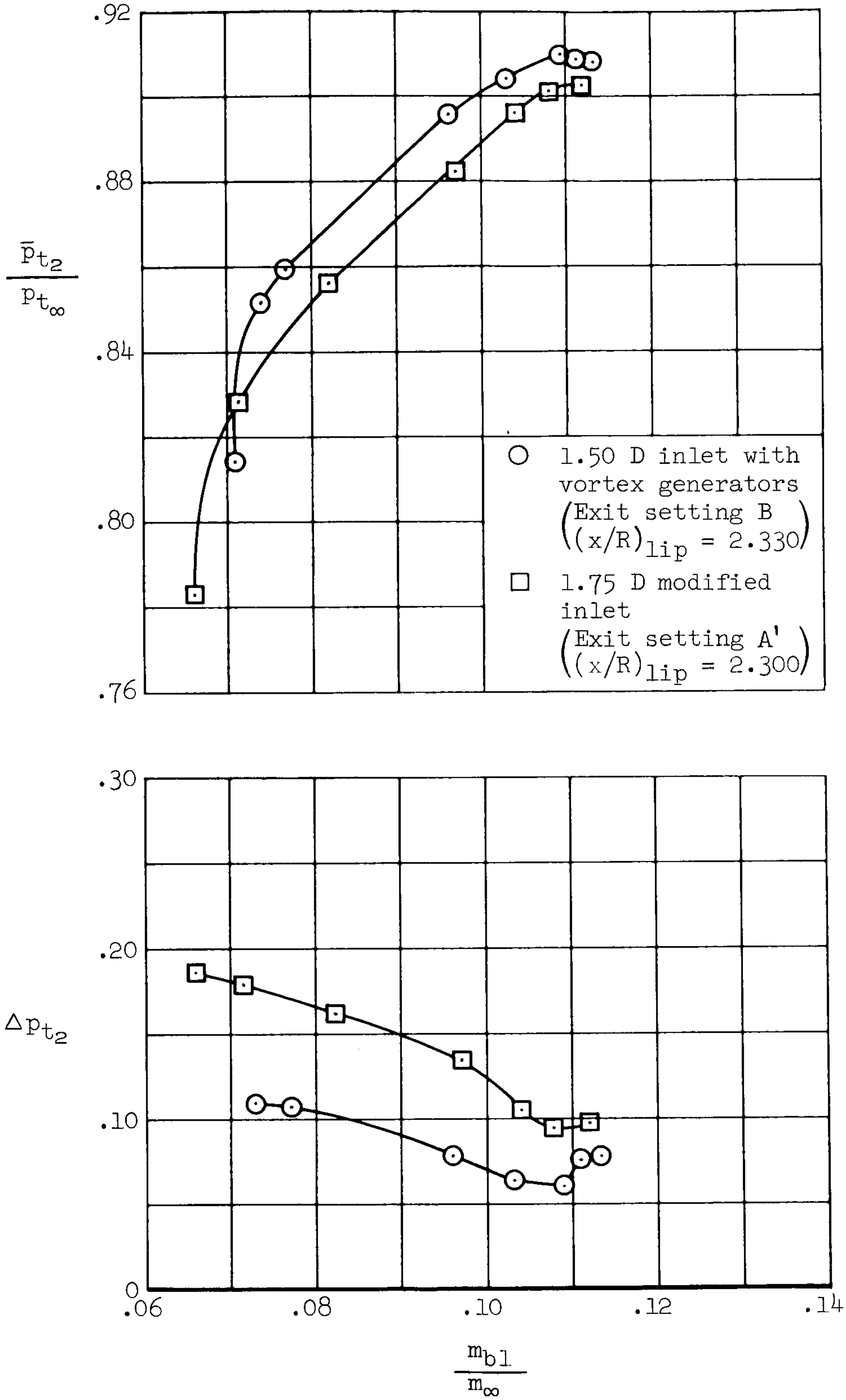


Figure 6.- Supercritical performance; M_∞ = 3.00, α = 0°.

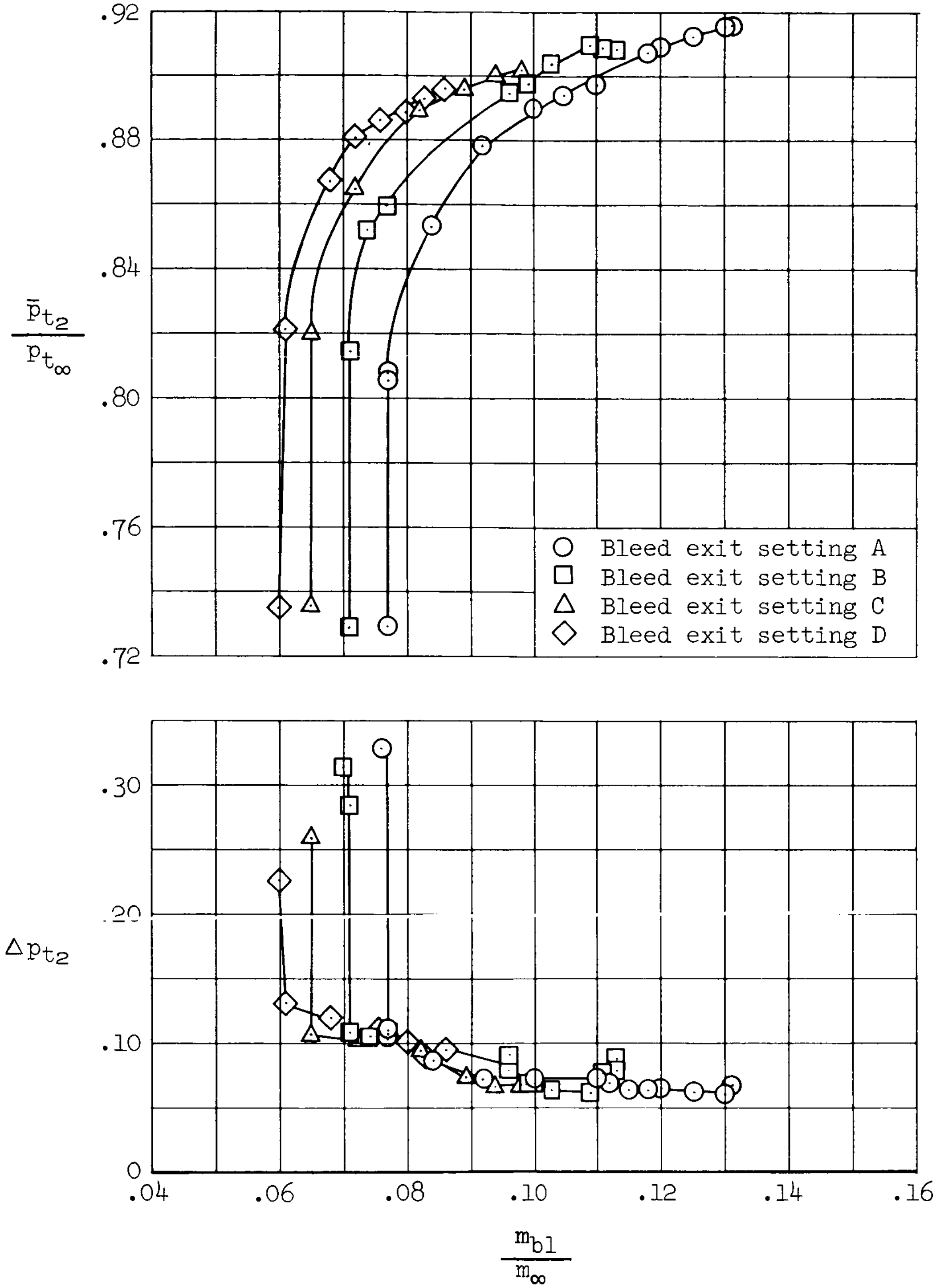


Figure 7.- Supercritical performance, 1.50 D inlet with vortex generators; $(x/R)_{lip} = 2.330$; $M_\infty = 3.00$, $\alpha = 0°$.

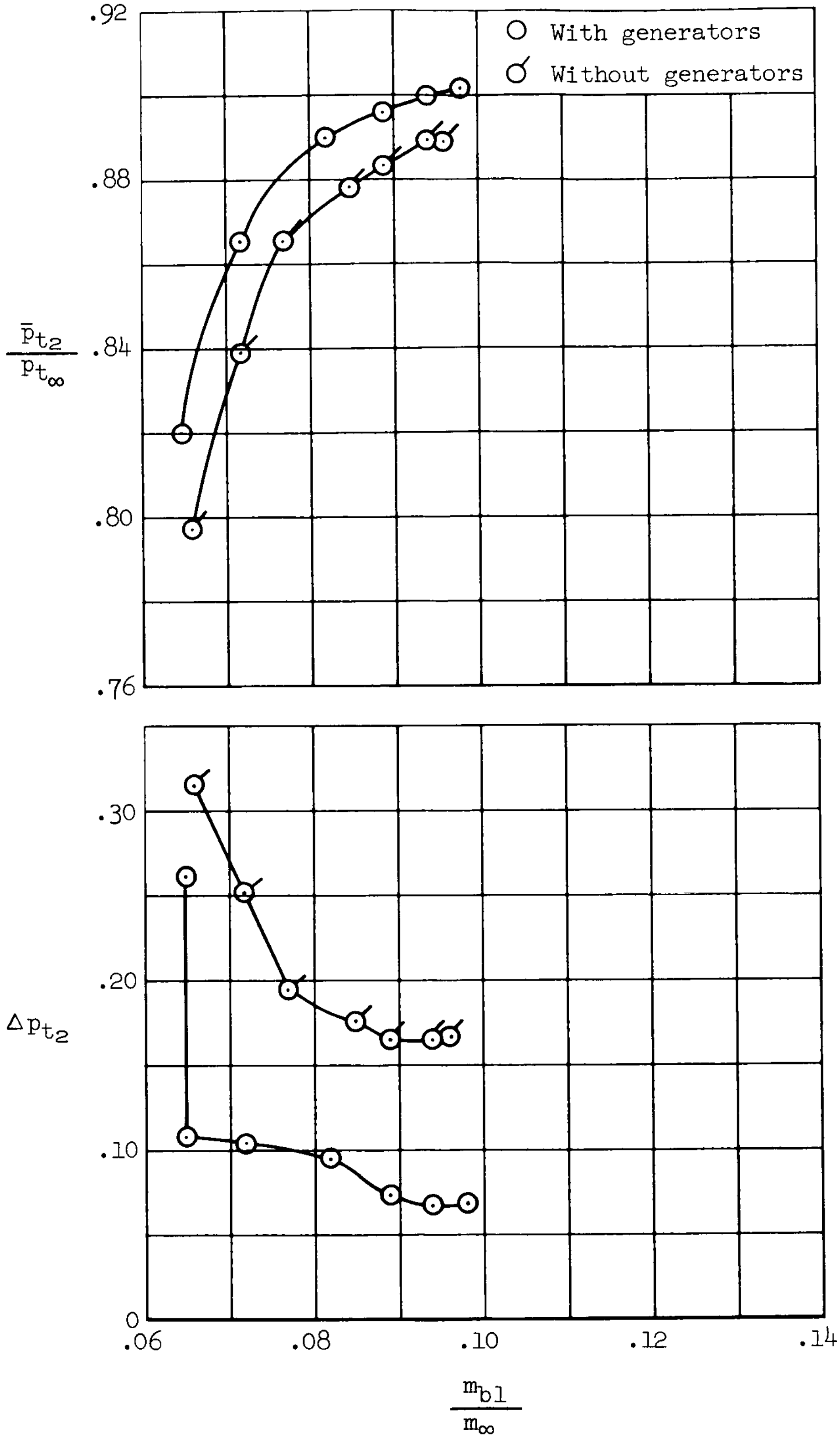


Figure 8.- Effect of vortex generators, 1.50 D inlet; bleed exit setting C, $(x/R)_{lip} = 2.330$; $M_\infty = 3.00$, $\alpha = 0°$.

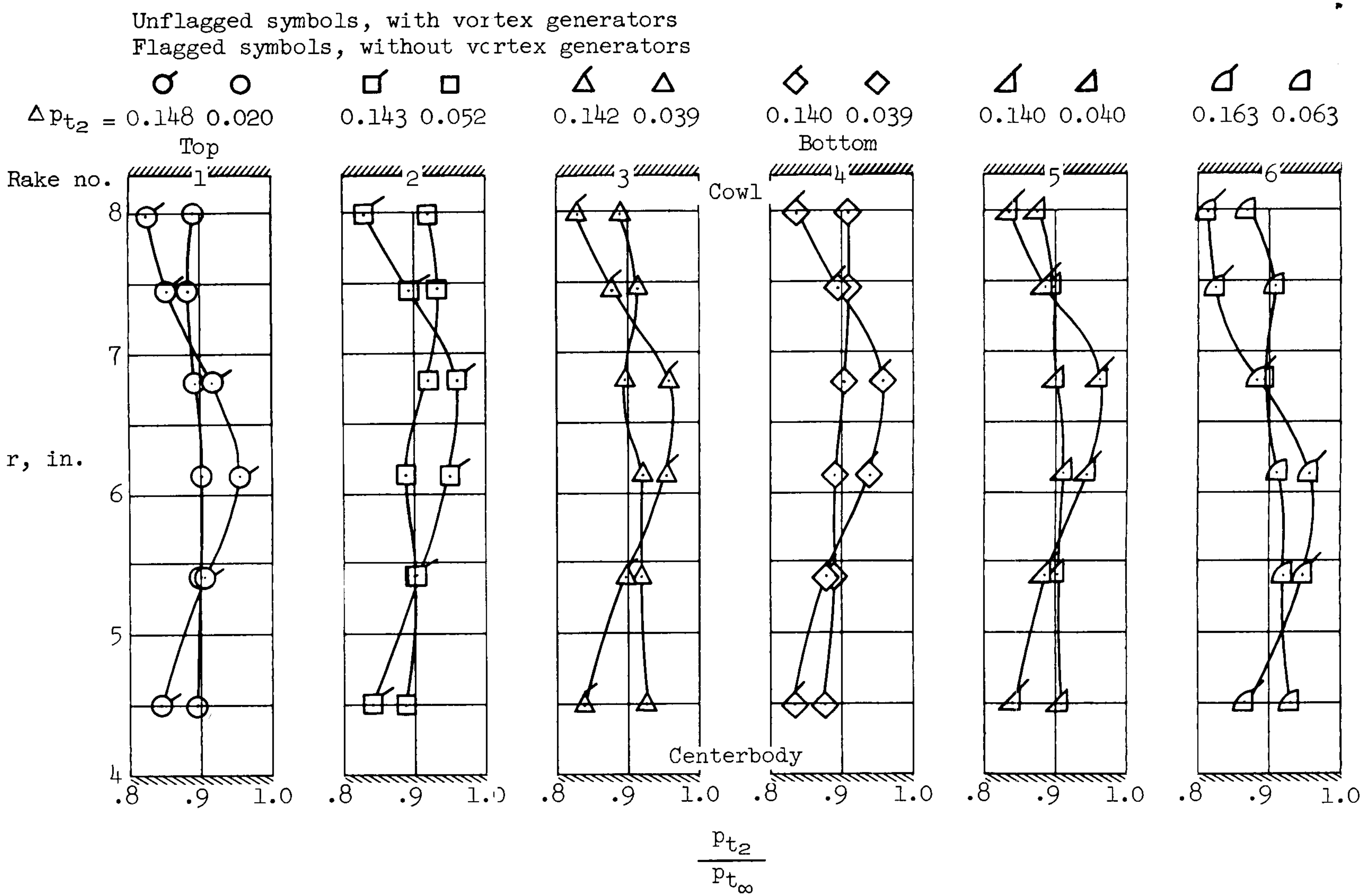


Figure 9.- Total pressure recovery profiles at the engine-face, 1.50 D inlet; bleed exit setting C, $(x/R)_{lip} = 2.330$; $M_\infty = 3.00$, $\alpha = 0°$.

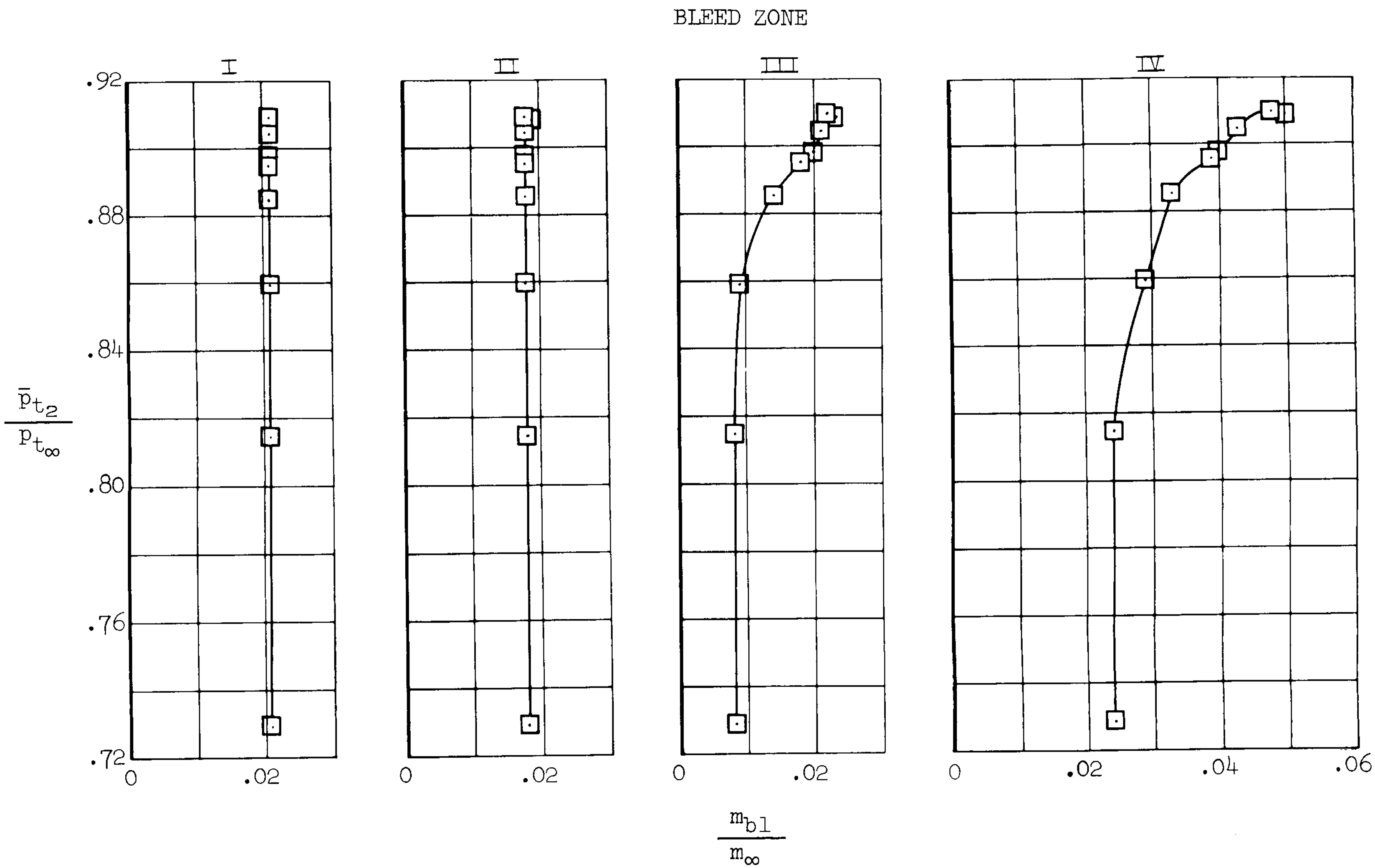


Figure 10.- Bleed zone mass flow, 1.50 D inlet with vortex generators; bleed exit setting B, $(x/R)_{lip} = 2.330$; $M_\infty = 3.00$, $\alpha = 0°$.

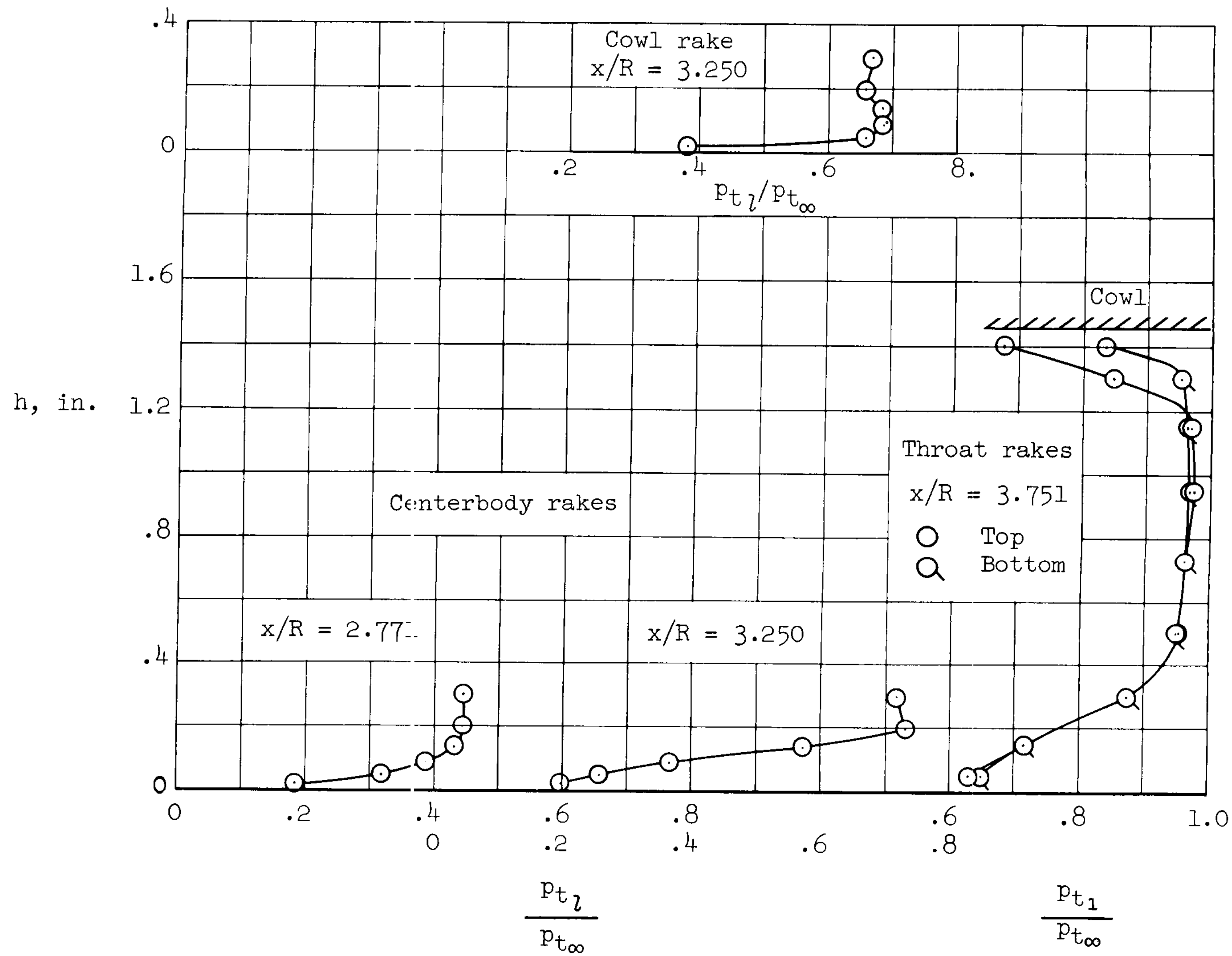


Figure 11.- Pitot pressure profiles, 1.50 D inlet; bleed exit setting B, $(x/R)_{lip} = 2.330$; $M_\infty = 3.00$, $\alpha = 0°$.

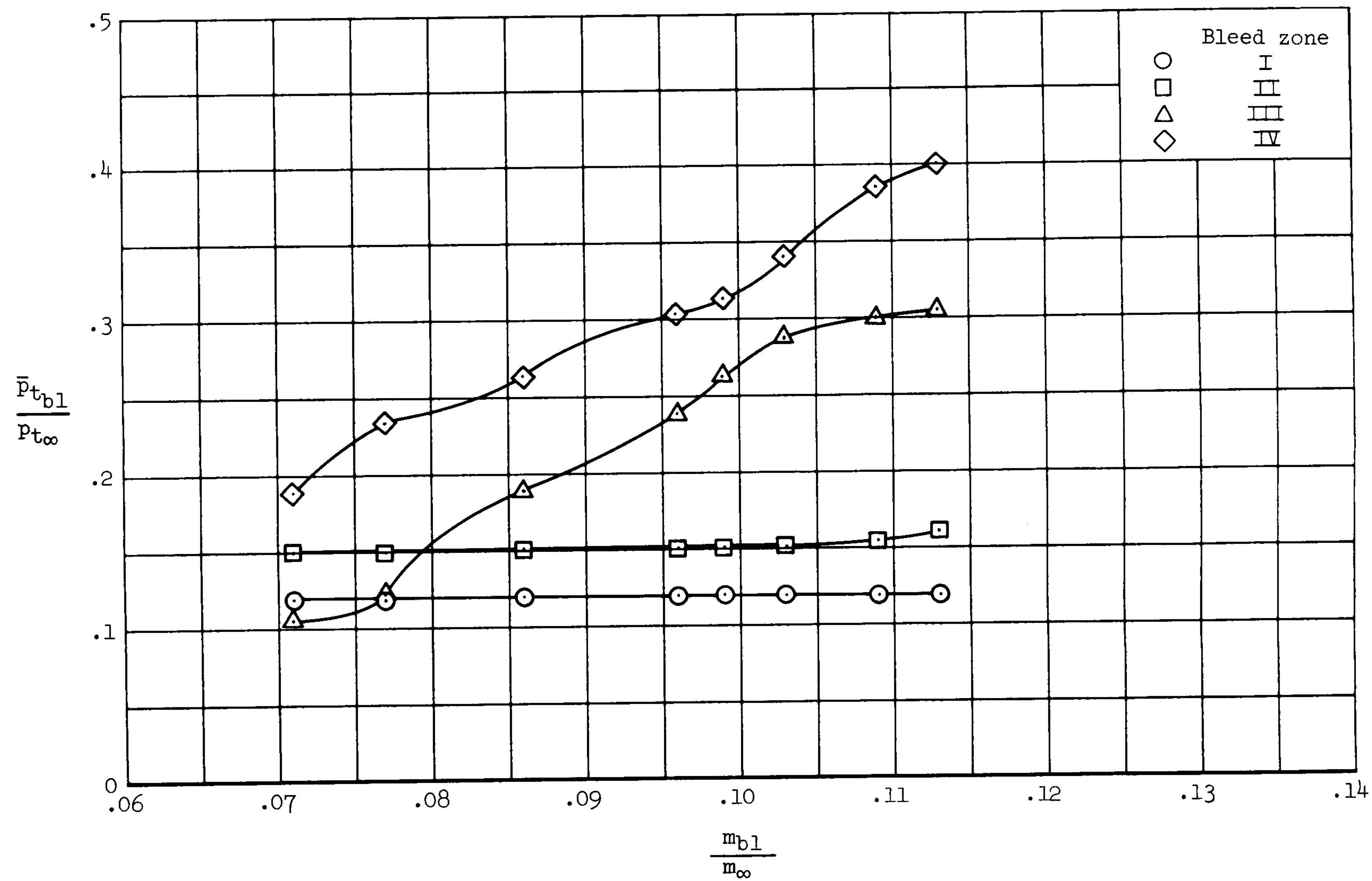
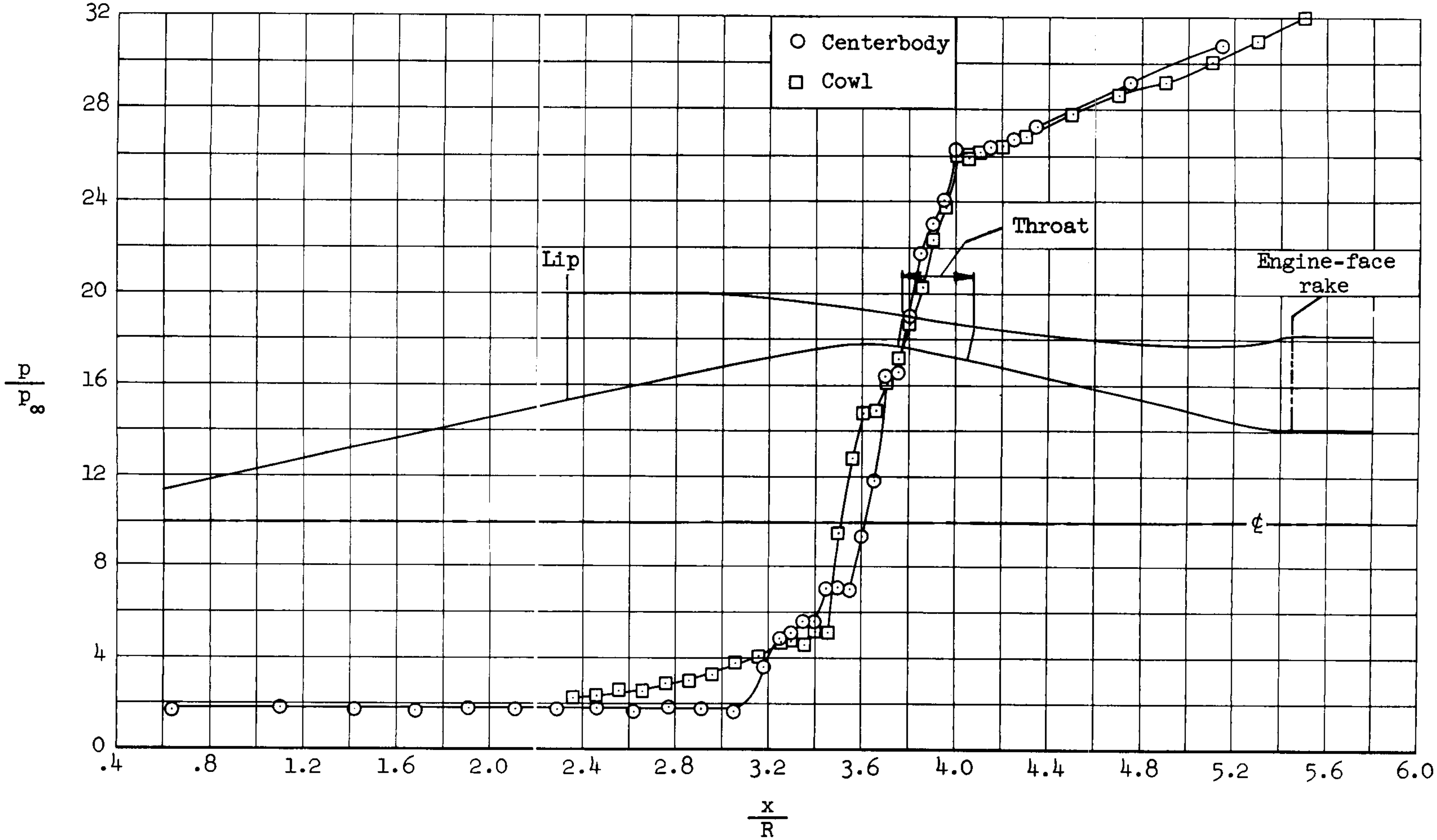
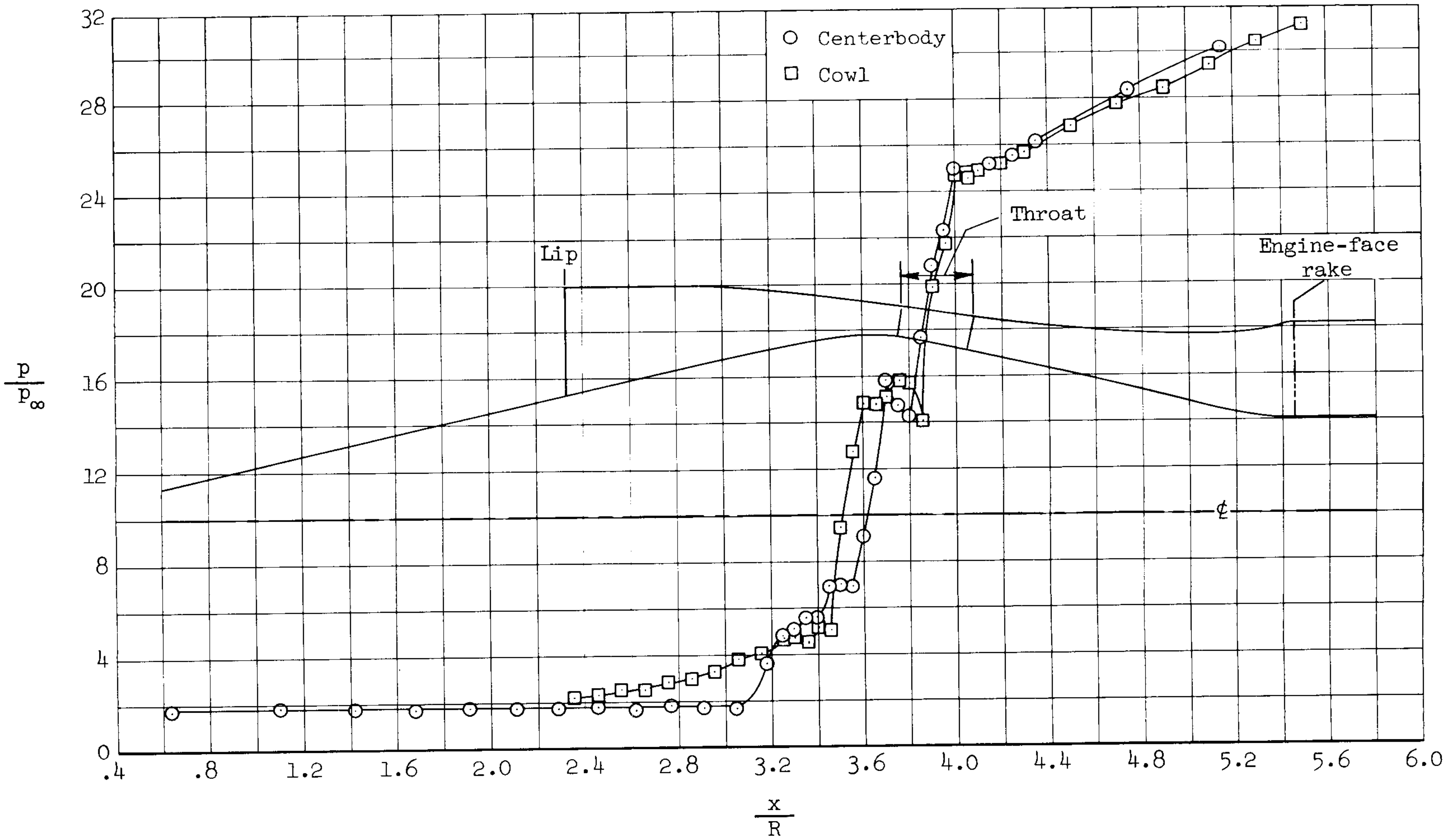


Figure 12.- Bleed zone plenum chamber pressures, 1.50 D inlet with vortex generators; bleed exit setting B, $(x/R)_{lip} = 2.330$; $M_\infty = 3.00$, $\alpha = 0°$.



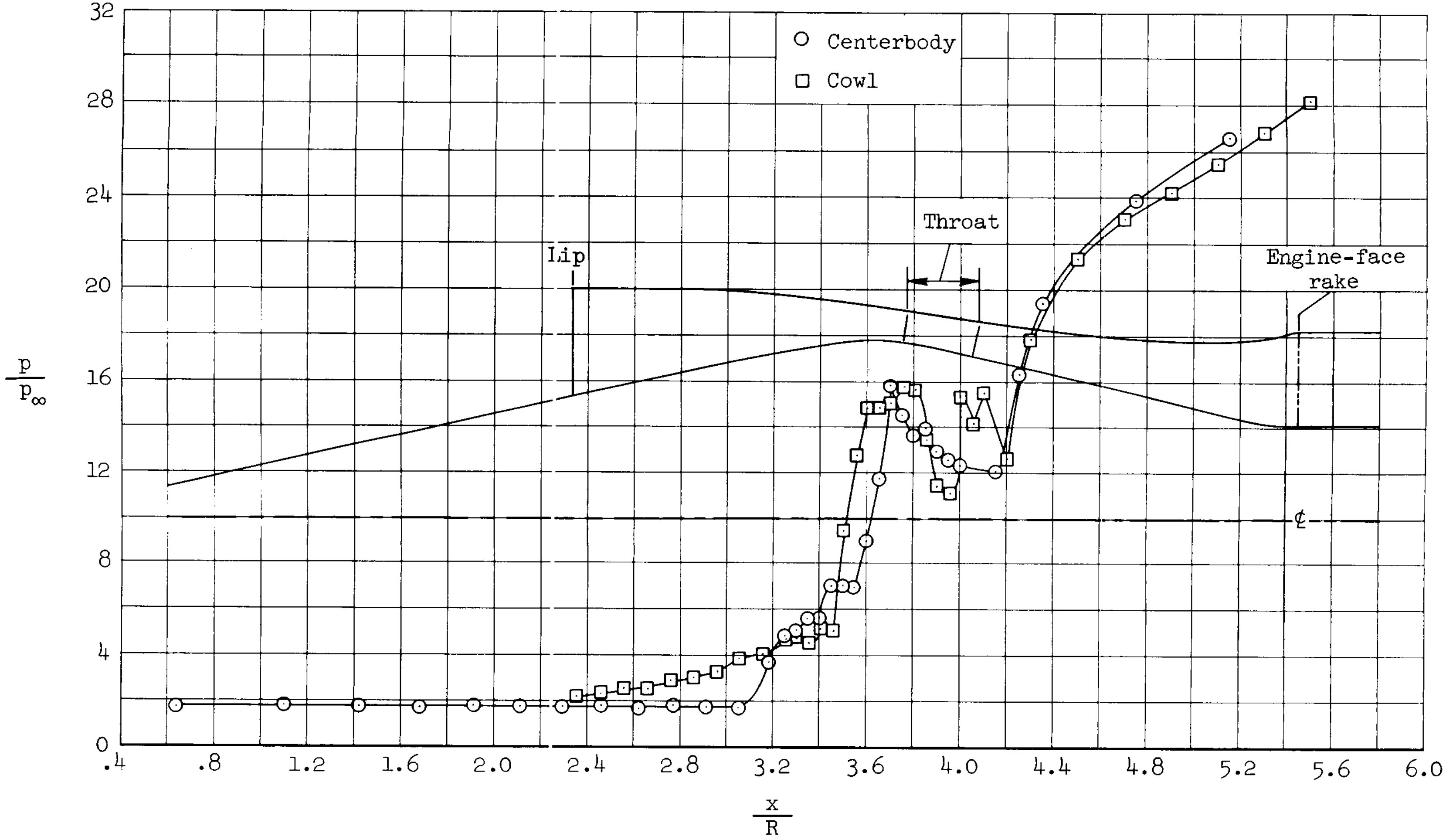
(a) $\bar{p}_{t_2}/p_{t_\infty} = 0.901$, $m_{bl}/m_\infty = 0.109$.

Figure 13.- Static pressure distribution, 1.50 D inlet with vortex generators; bleed exit setting B, $(x/R)_{lip} = 2.330$; $M_\infty = 3.00$, $\alpha = 0°$.



(b) $\bar{p}_{t_2}/p_{t_\infty} = 0.895$, $m_{bl}/m_\infty = 0.096$.

Figure 13.- Continued.



(c) $\bar{p}_{t_2}/p_{t_\infty} = 0.815$, $m_{bl}/m_\infty = 0.071$.

Figure 13.- Concluded.

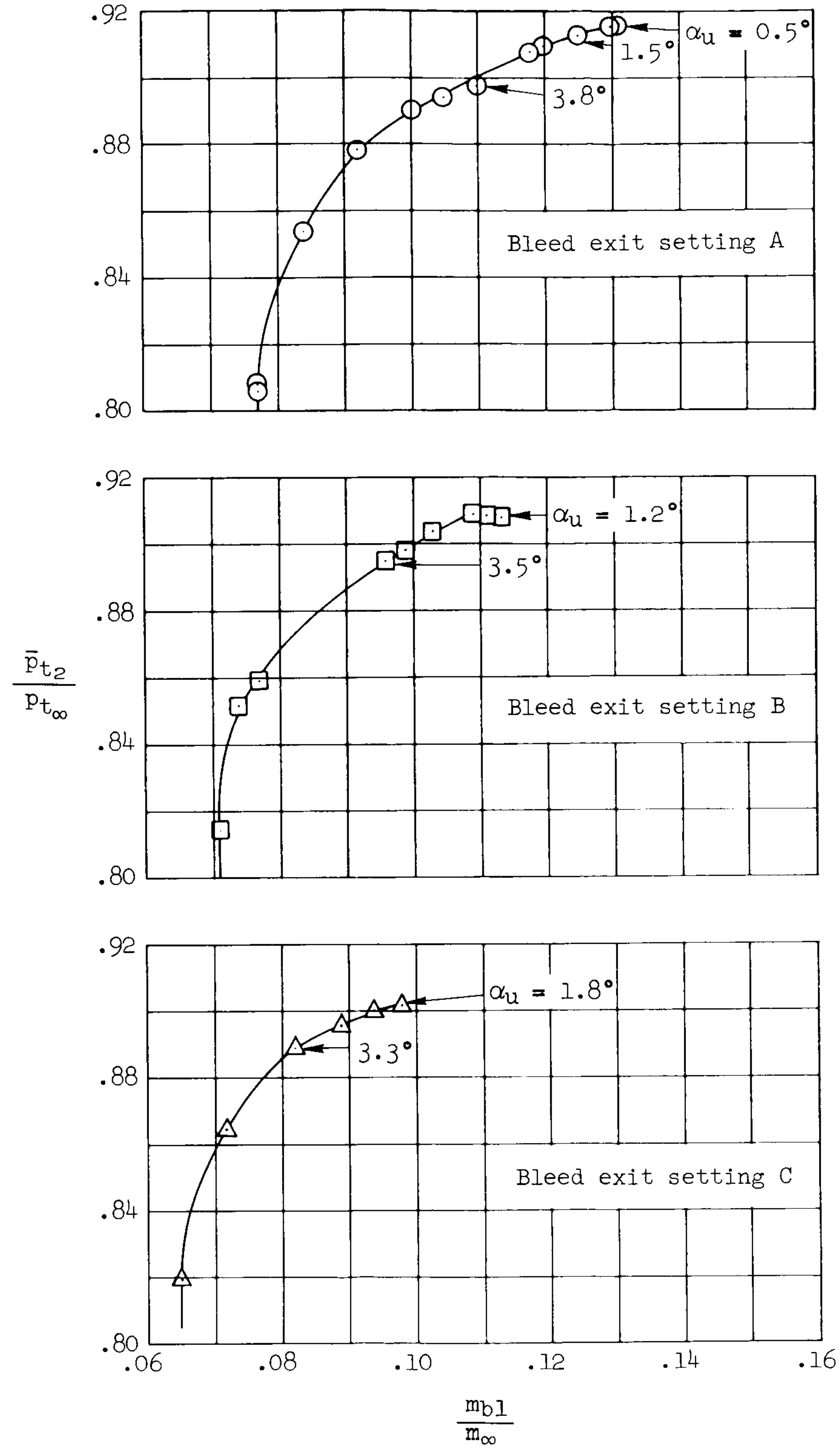


Figure 14.- Inlet unstart angles of attack for various degrees of supercritical operation, 1.50 D inlet with vortex generators; $(x/R)_{lip}$ = 2.330, M_∞ = 3.00; α = 0°.

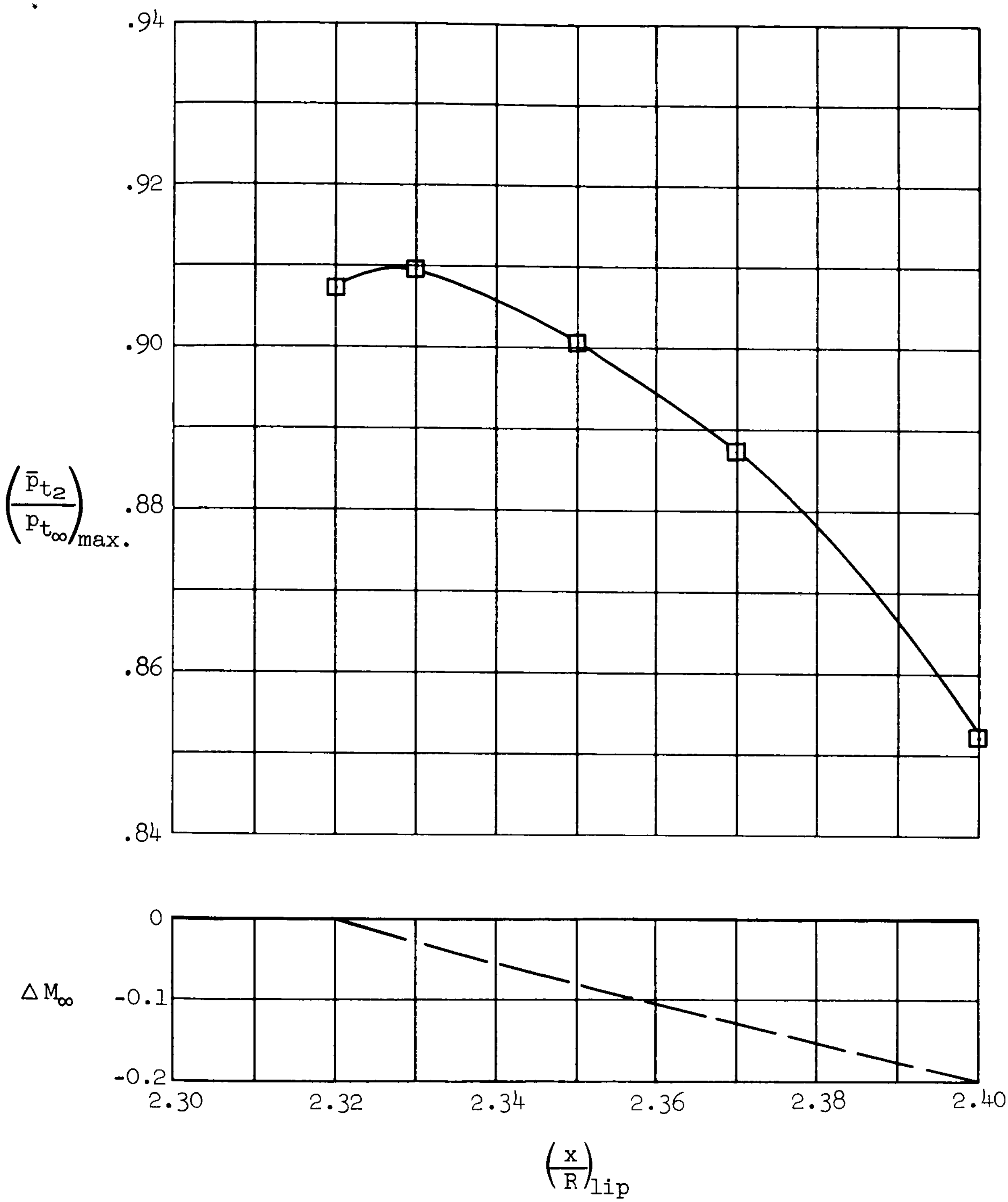


Figure 15.- Sensitivity to Mach number decrement, 1.50 D inlet with vortex generators; bleed exit setting B, $M_\infty = 3.00$, $\alpha = 0°$.

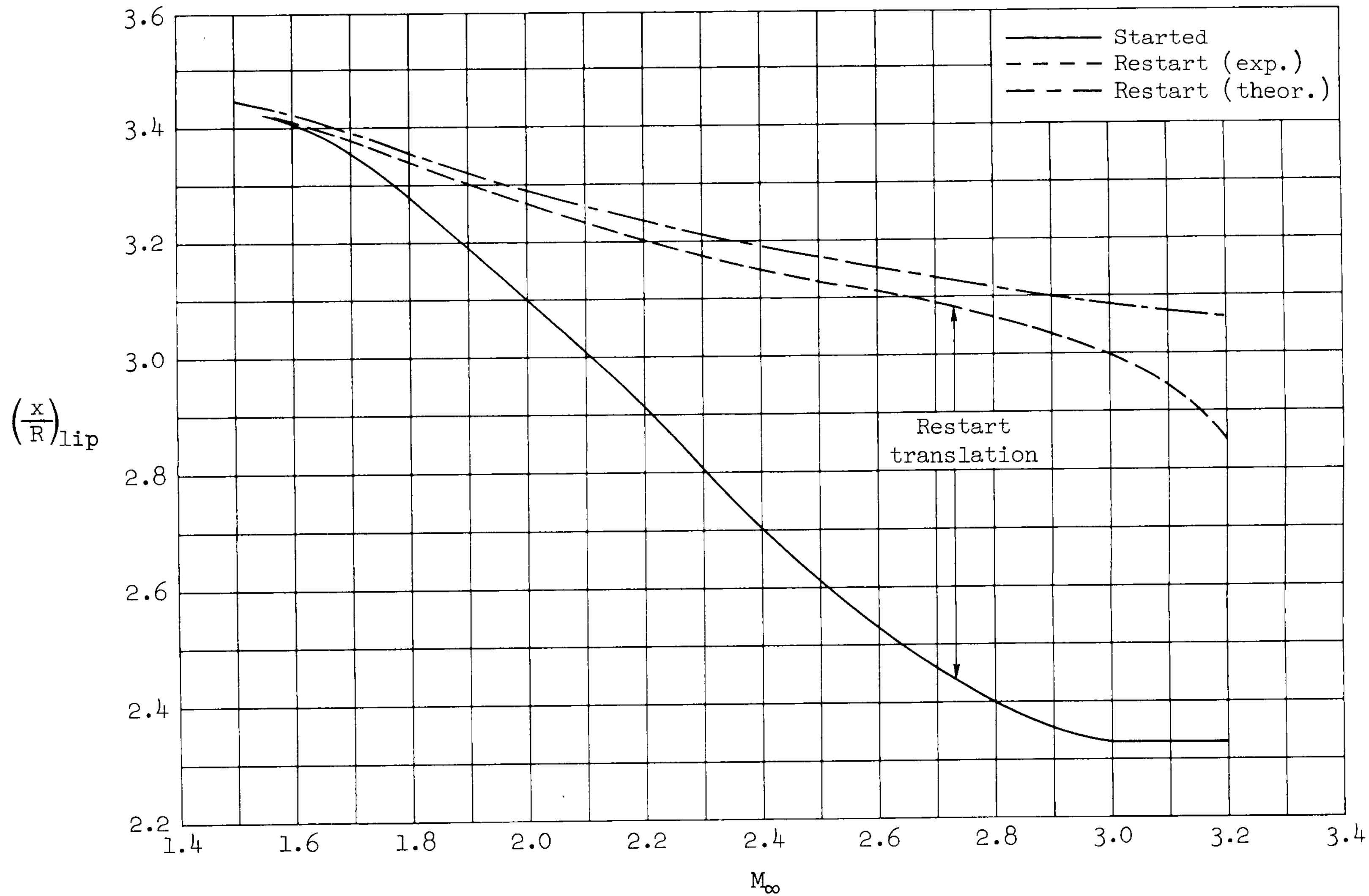


Figure 16.- Restart capability, 1.50 D inlet with vortex generators; bleed exit setting B; $\alpha = 0°$.

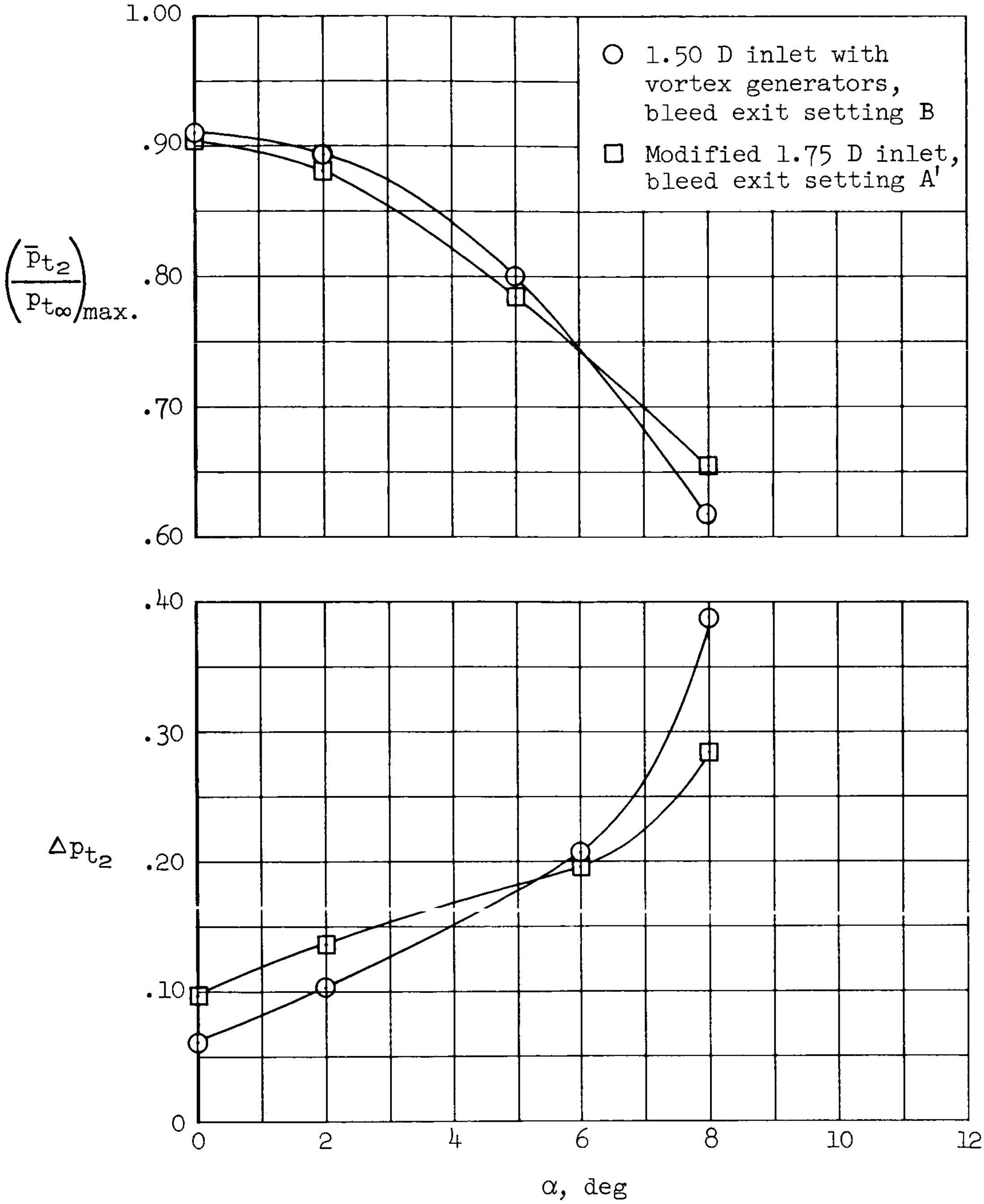


Figure 17.- Maximum performance at angle of attack, $M_\infty = 3.00$.

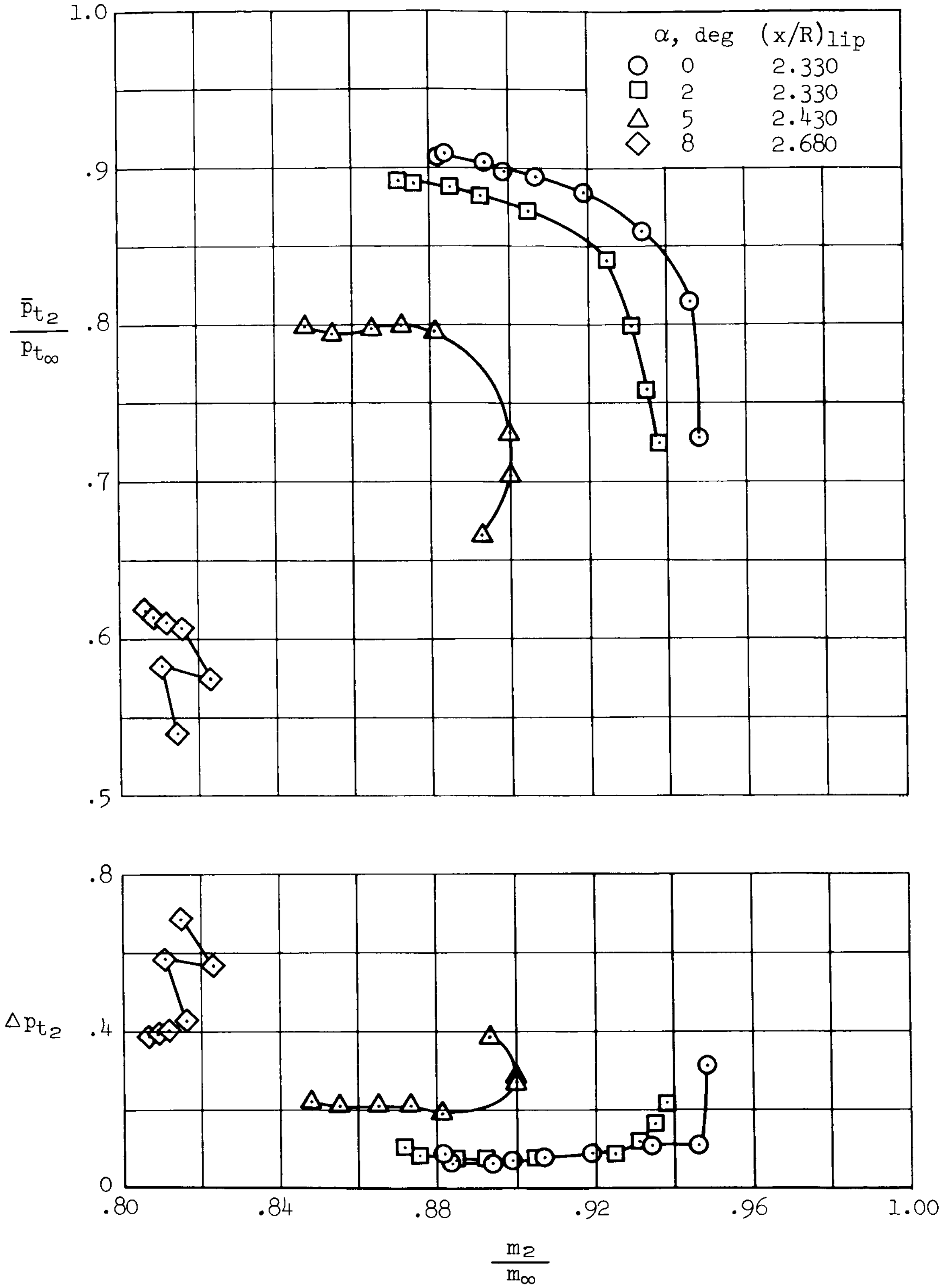


Figure 18.- Supercritical performance at angle of attack, 1.50 D inlet with vortex generators; exit setting B, $M_\infty = 3.00$.

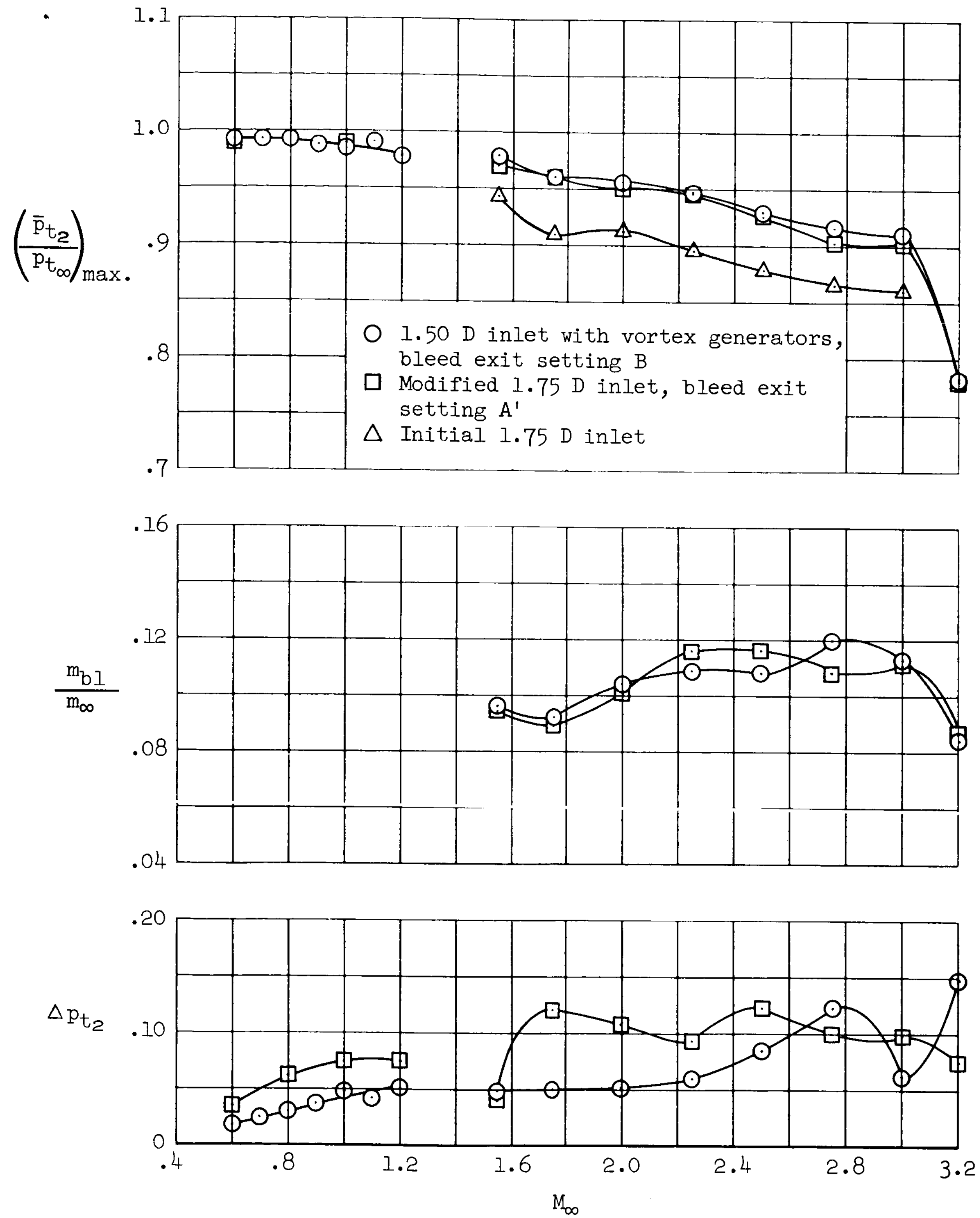


Figure 19.- Off-design maximum performance, α = 0°.

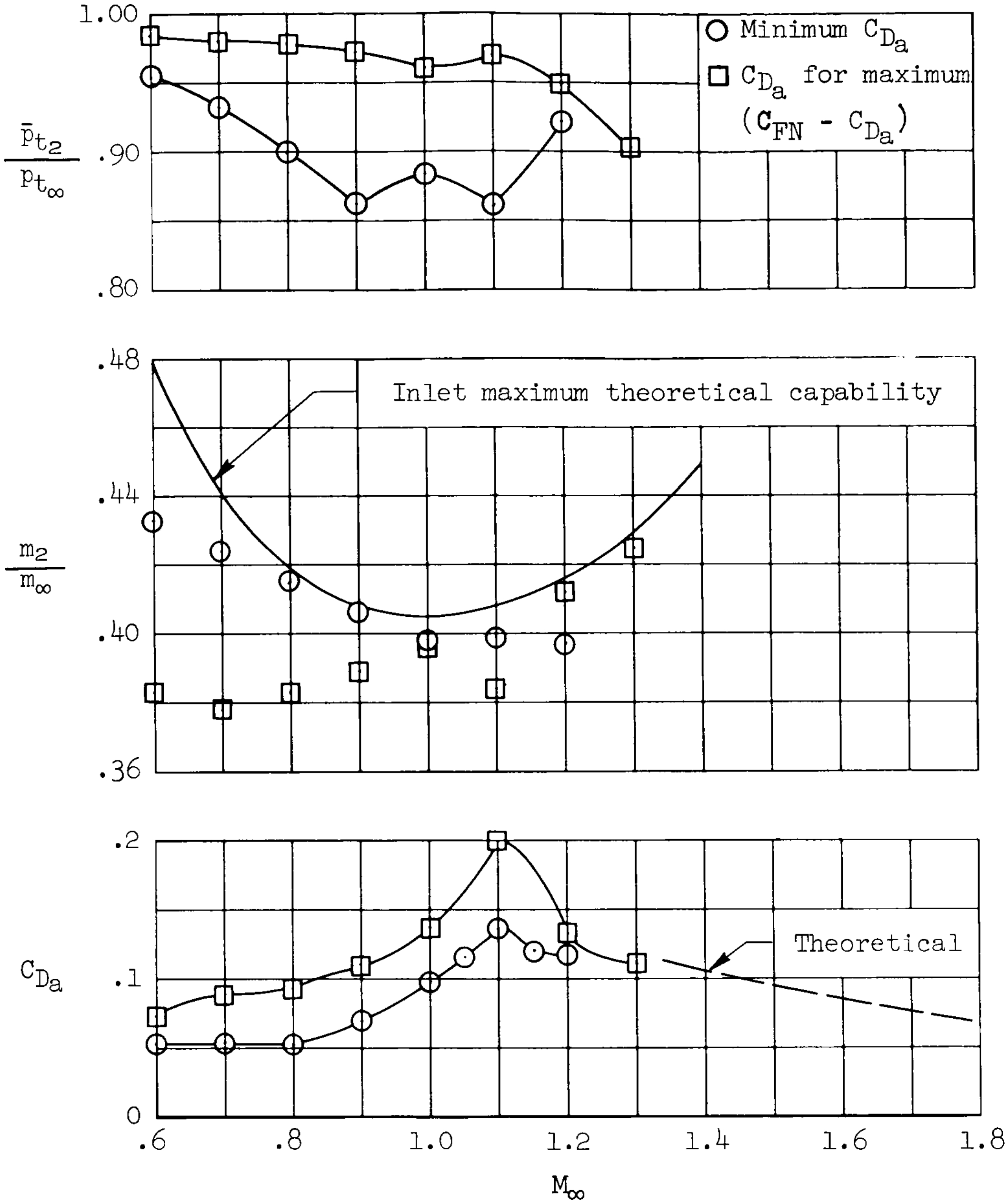


Figure 20.- Transonic performance; bleed exit setting B; α = 0°.

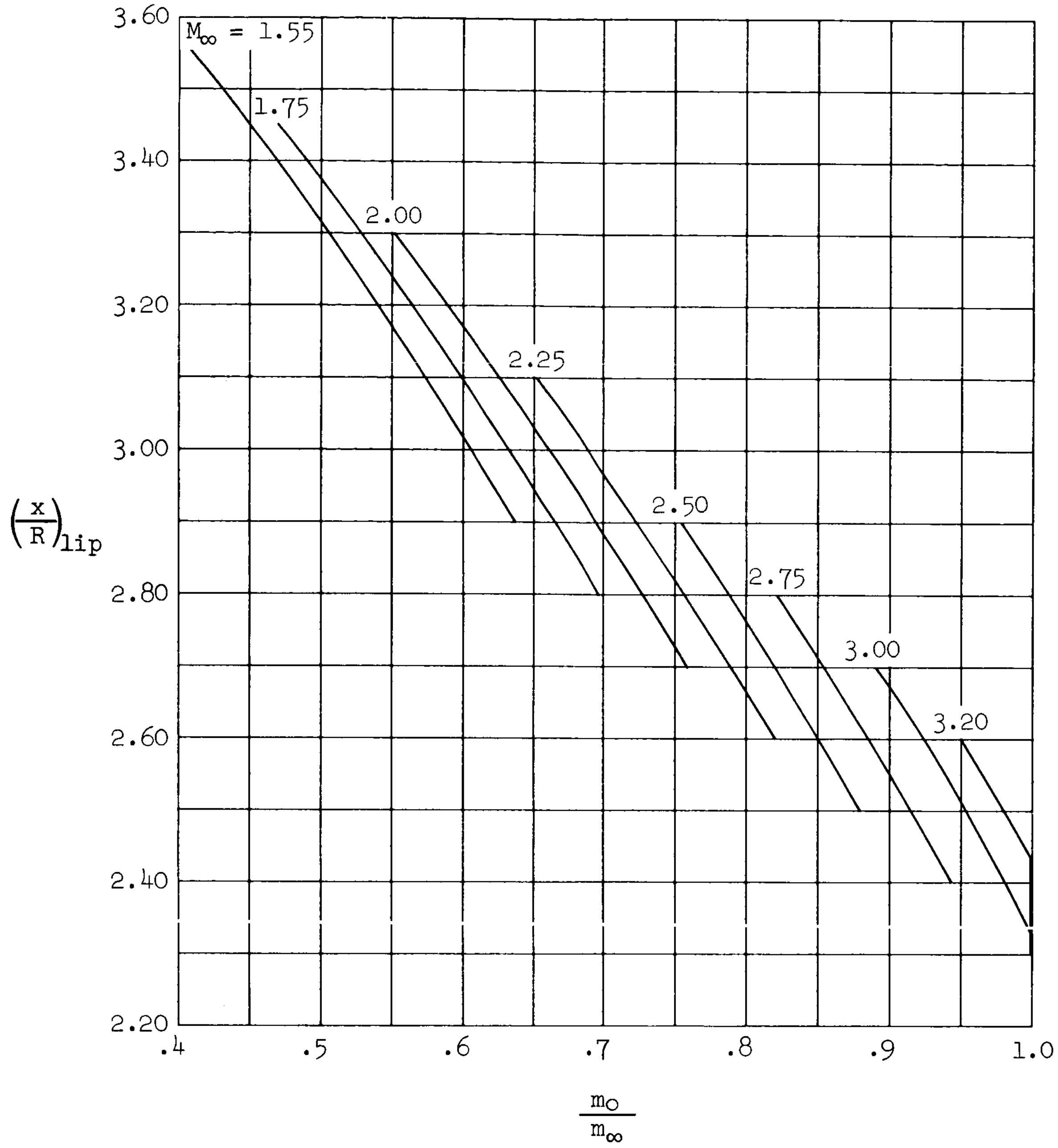
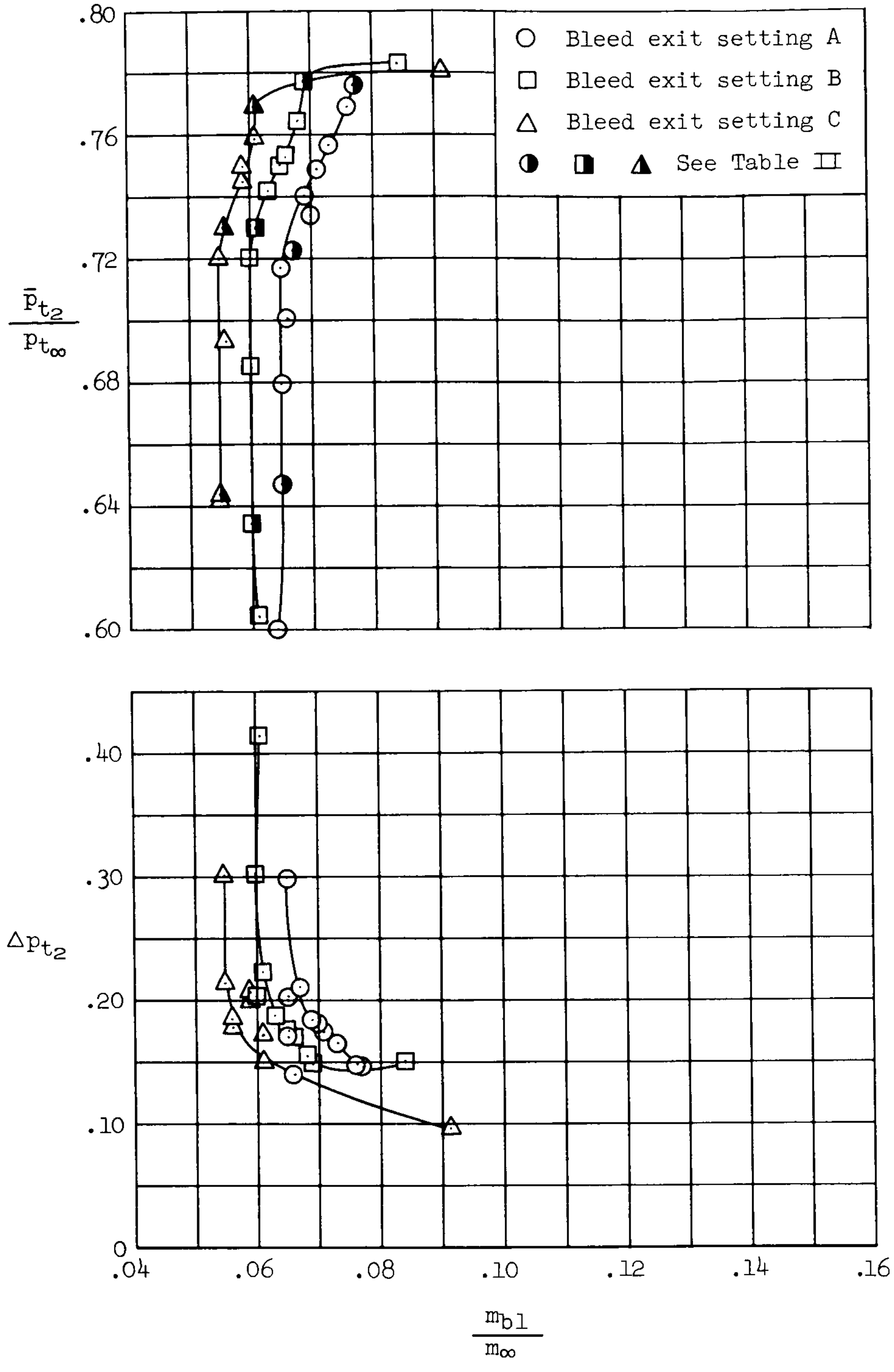
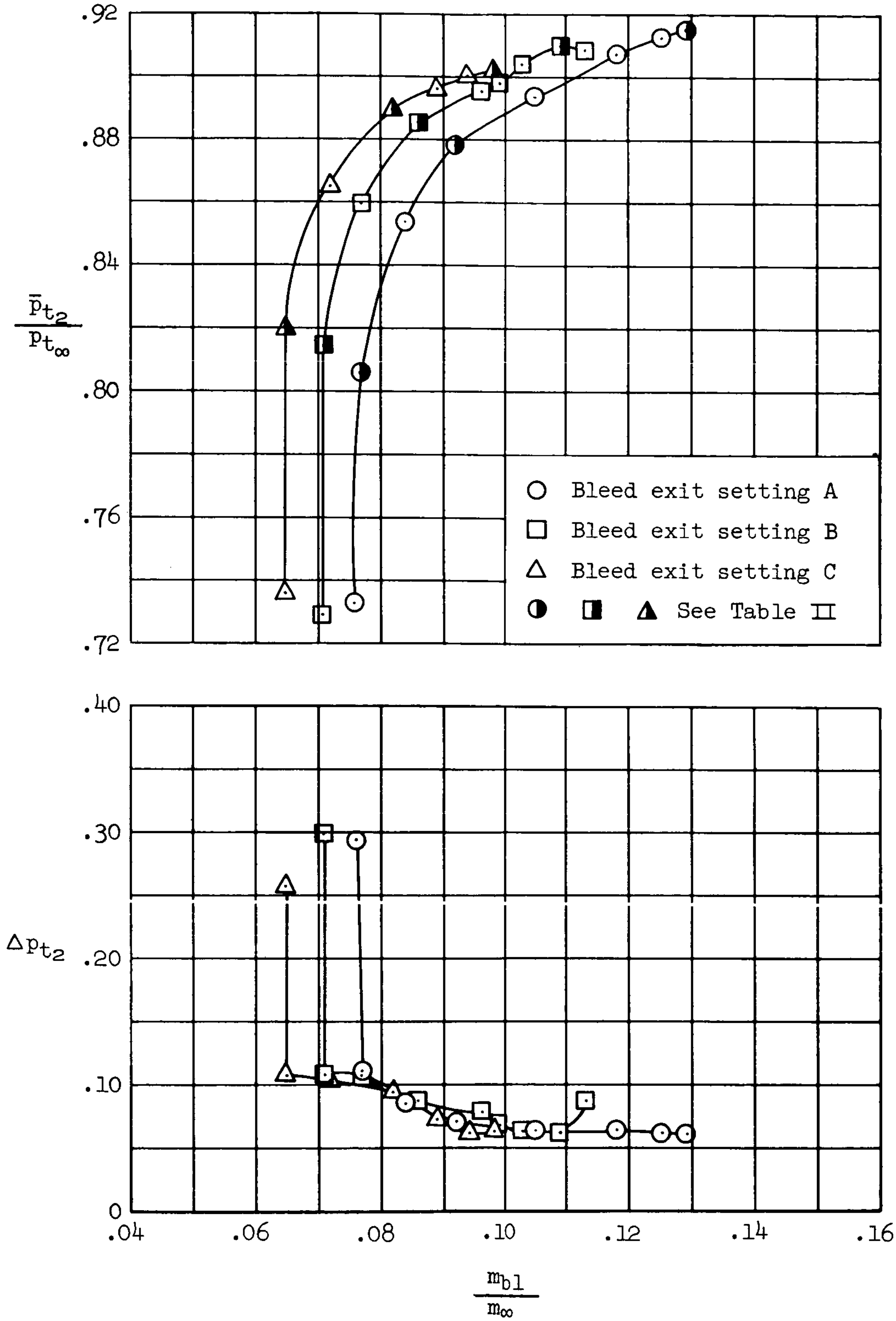


Figure 21.- Inlet theoretical mass-flow ratio, α = 0°.



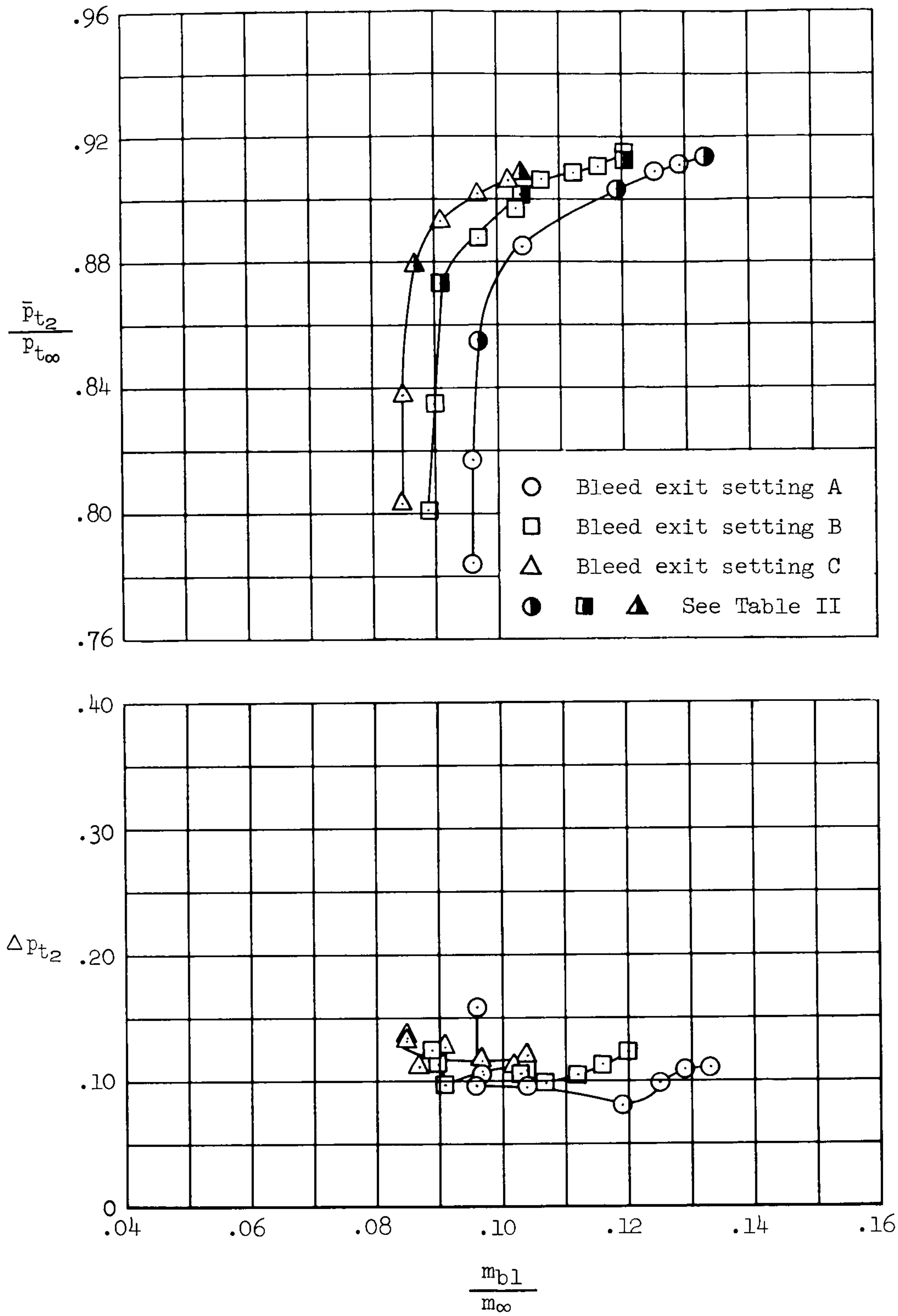
(a) $(x/R)_{lip} = 2.330$, $M_\infty = 3.20$.

Figure 22.- Supercritical performance, 1.50 D inlet with vortex generators; $\alpha = 0°$.



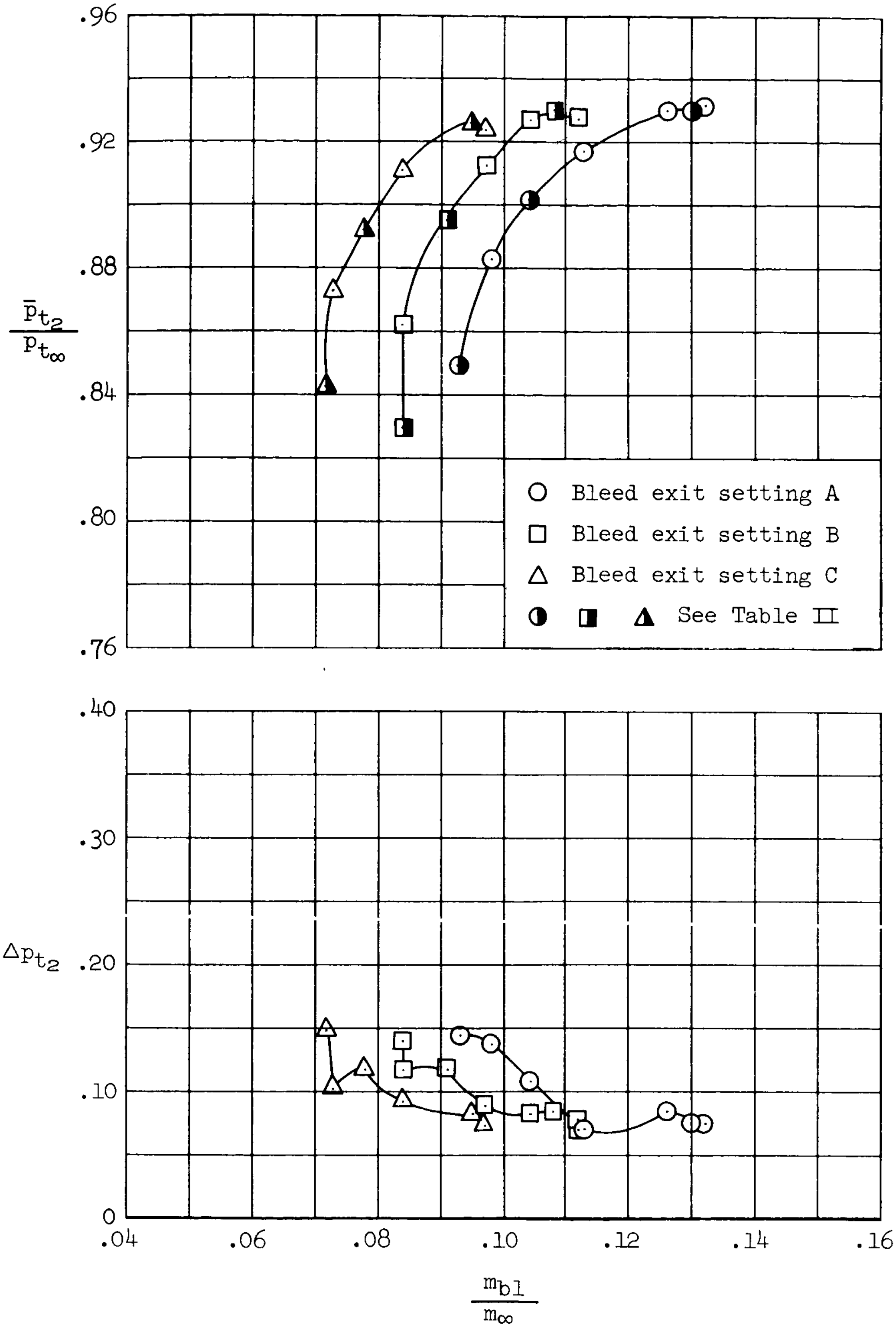
(b) $(x/R)_{lip} = 2.330$, $M_\infty = 3.00$.

Figure 22.- Continued.



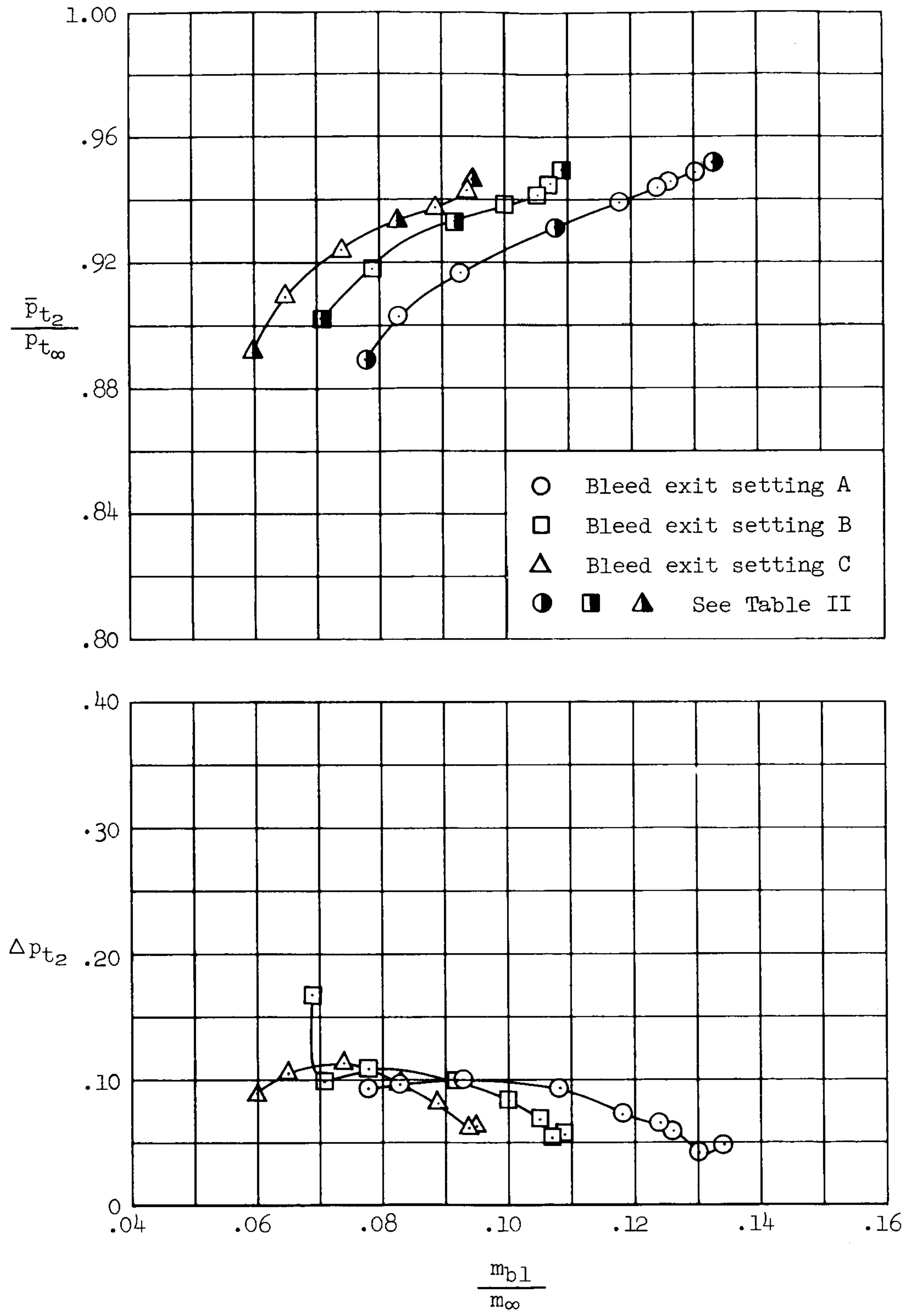
(c) $(x/R)_{lip} = 2.420$, $M_\infty = 2.75$.

Figure 22.- Continued.



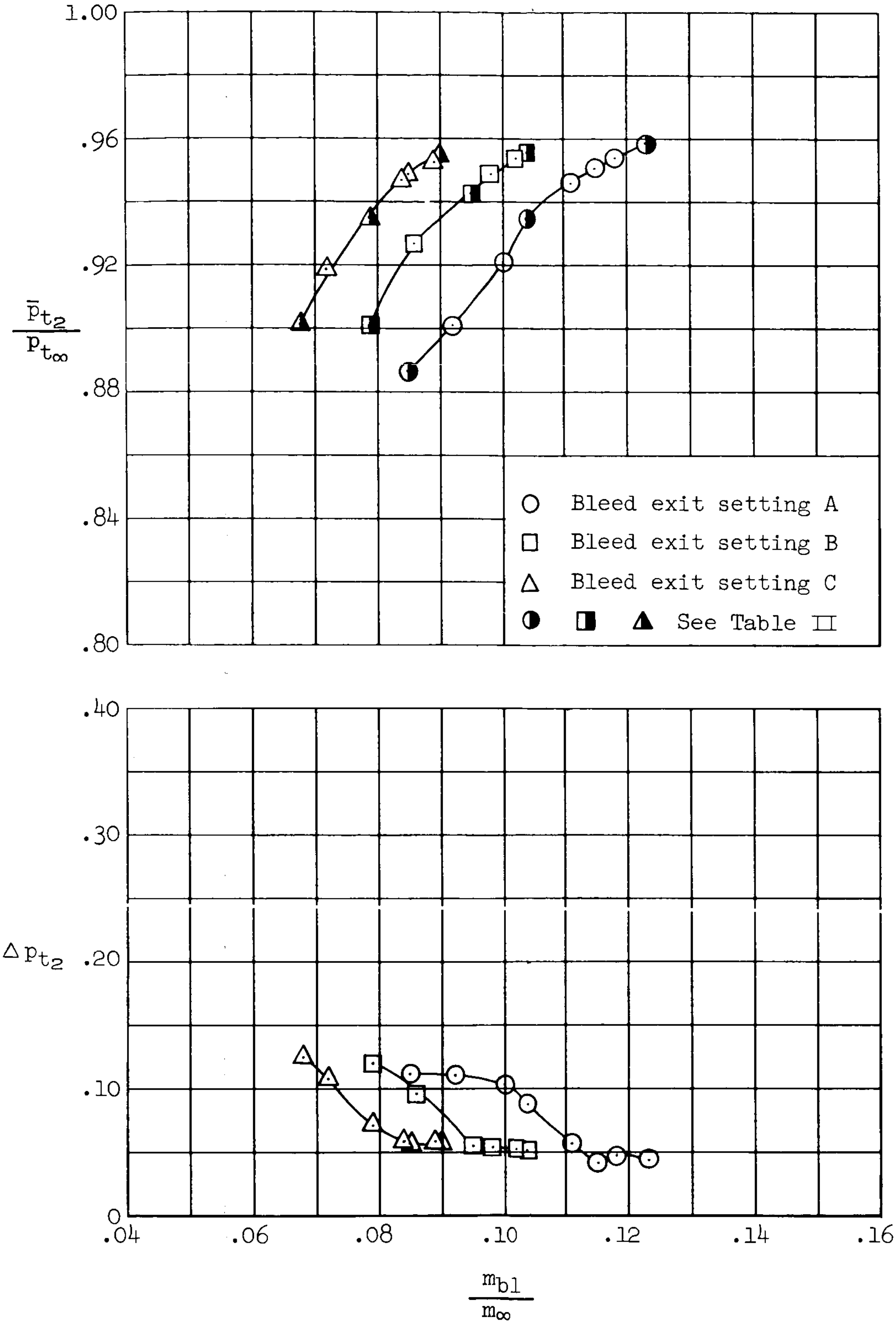
(d) $(x/R)_{lip} = 2.600$, $M_\infty = 2.50$.

Figure 22.- Continued.



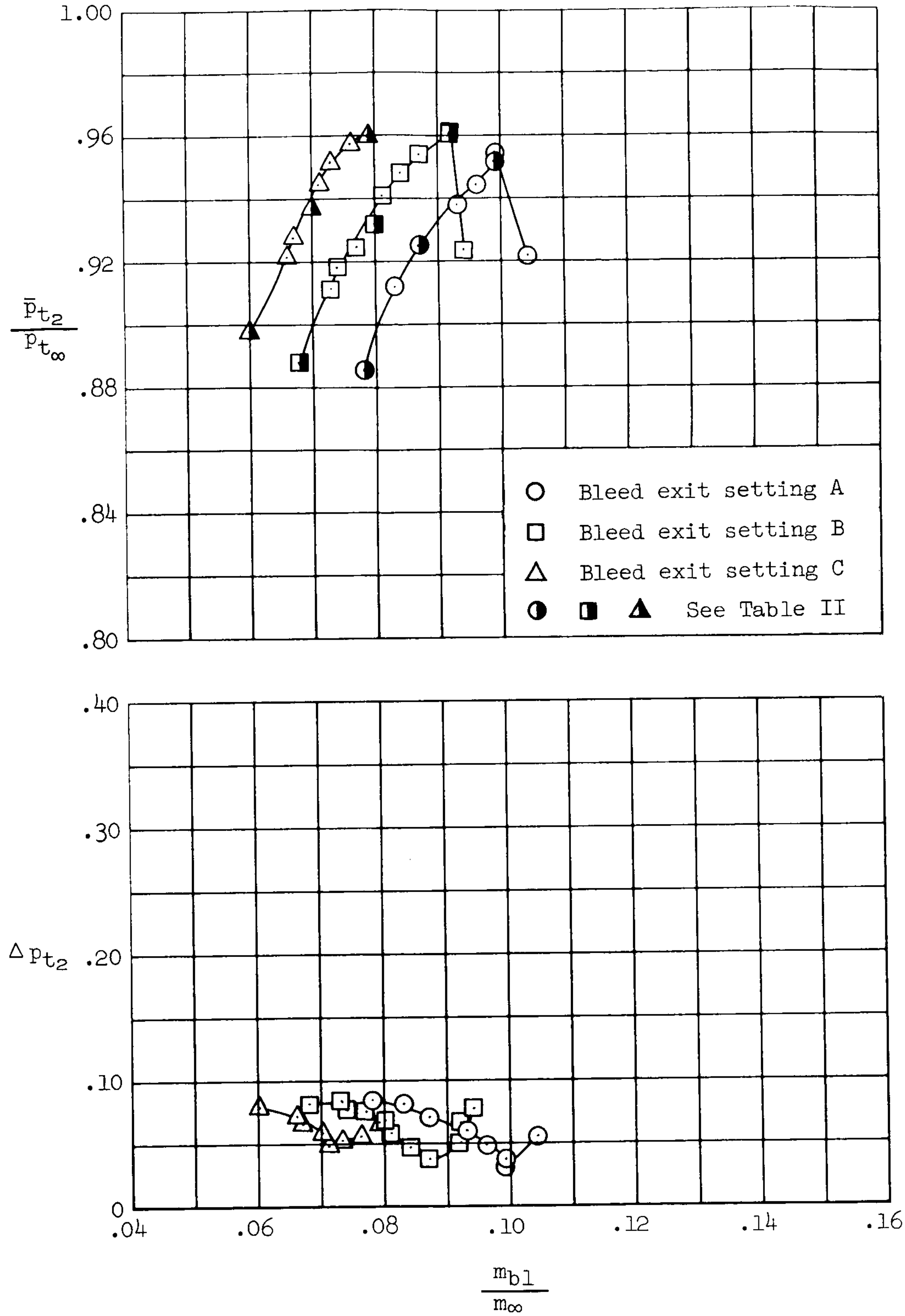
(e) $(x/R)_{lip} = 2.860$, $M_\infty = 2.25$.

Figure 22.- Continued.



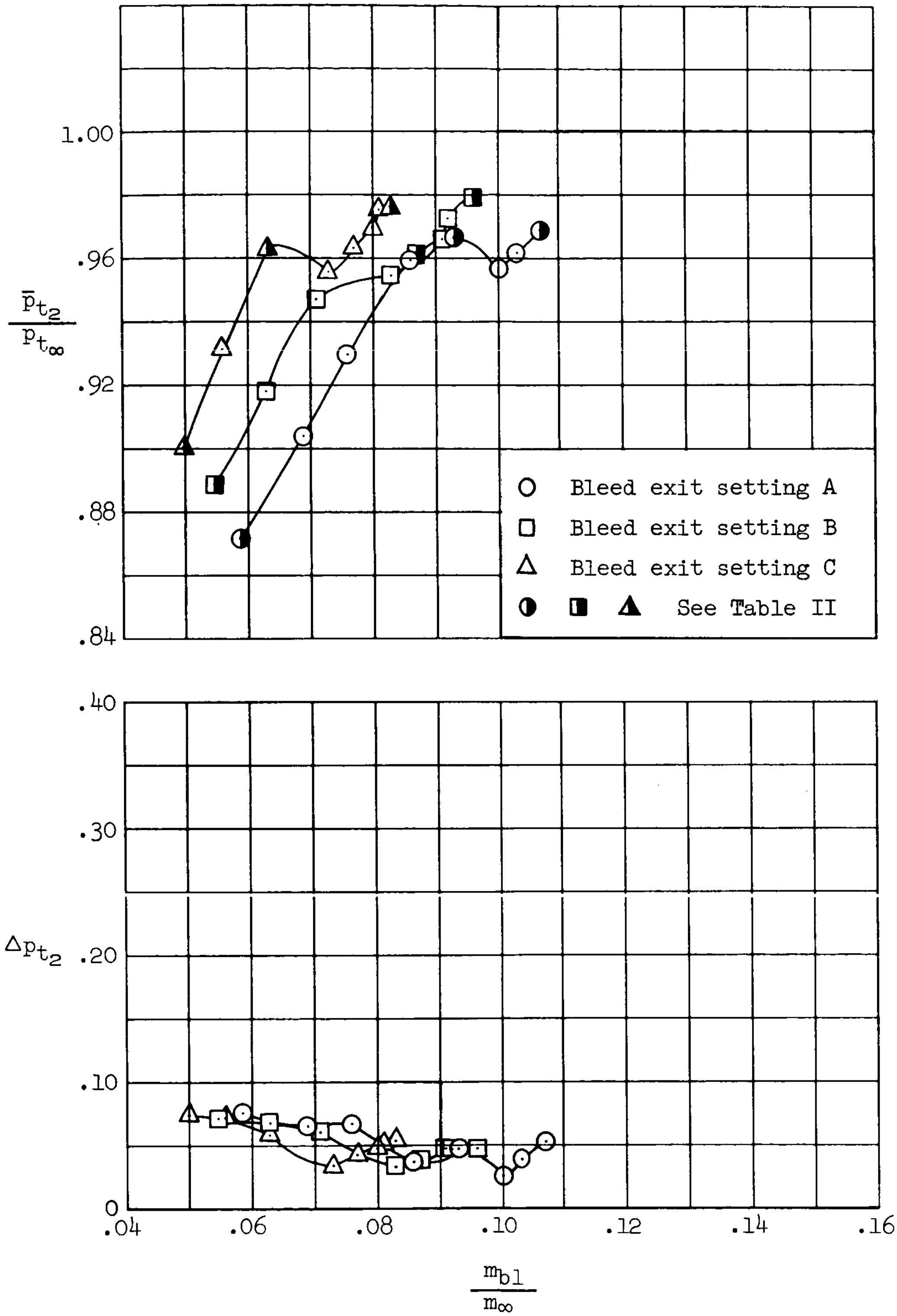
(f) $(x/R)_{lip} = 3.100$, $M_\infty = 2.00$.

Figure 22.- Continued.



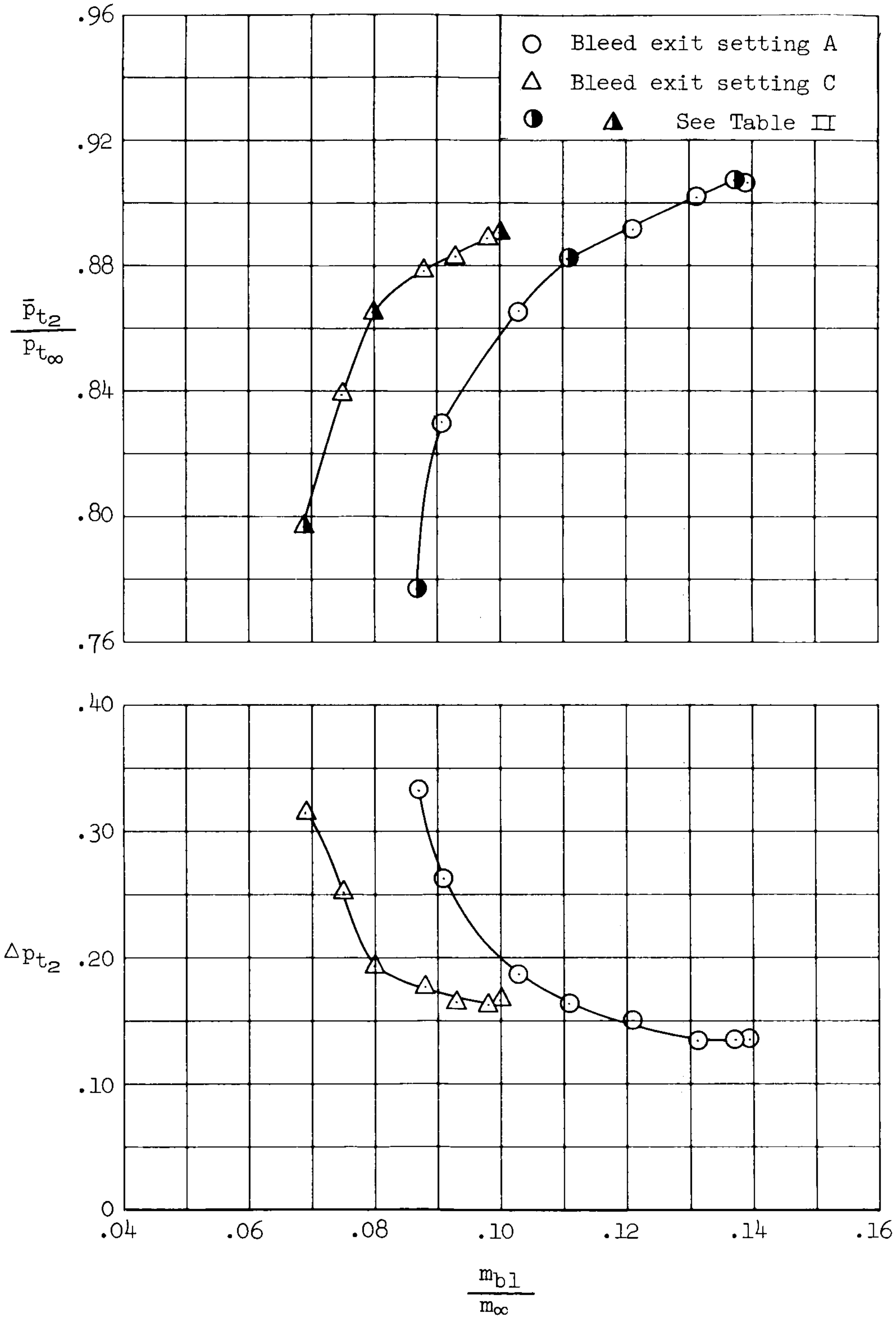
(g) $(x/R)_{lip} = 3.320$, $M_\infty = 1.75$.

Figure 22.- Continued.



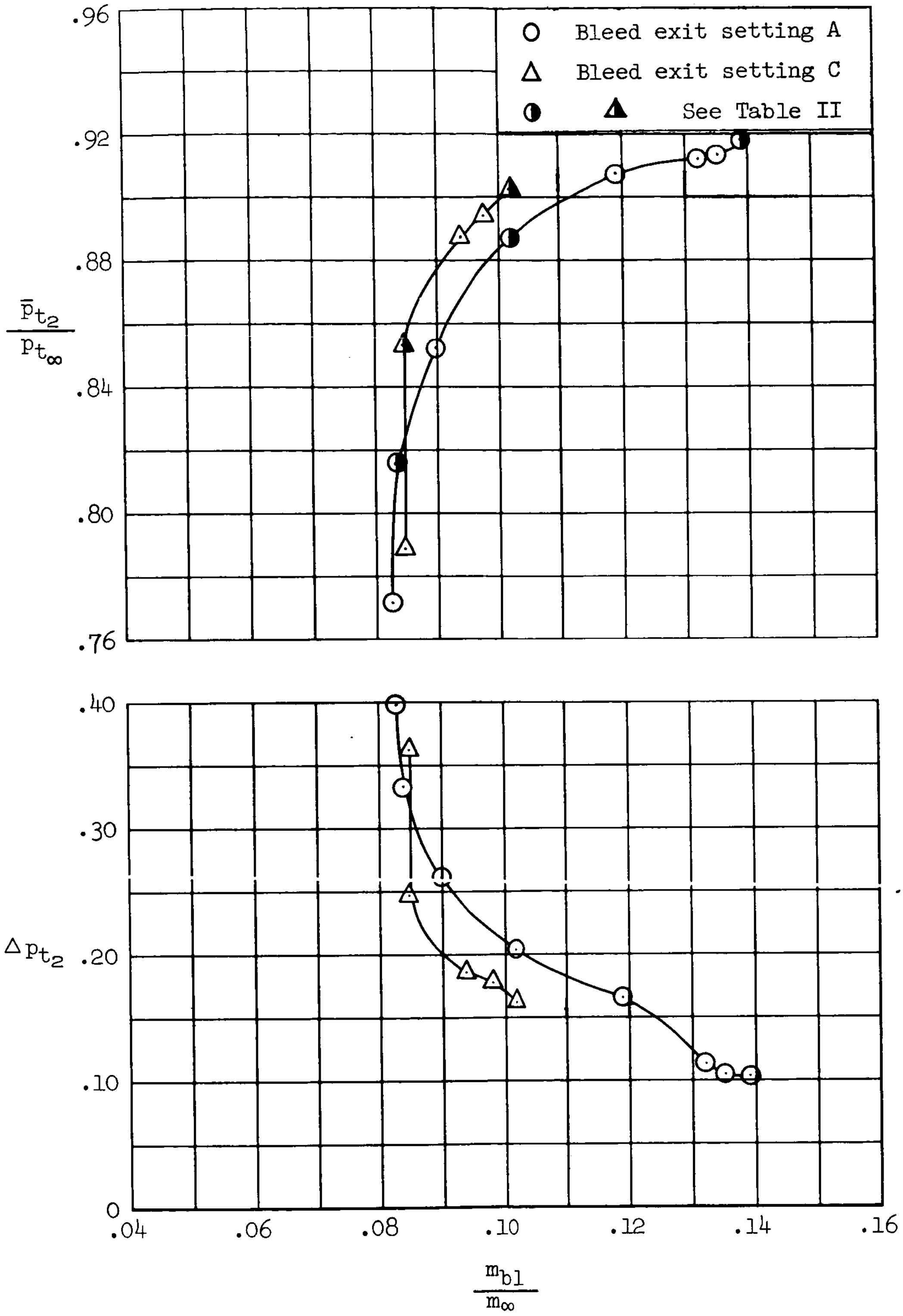
(h) $(x/R)_{lip} = 3.420$, $M_\infty = 1.55$.

Figure 22.- Concluded.



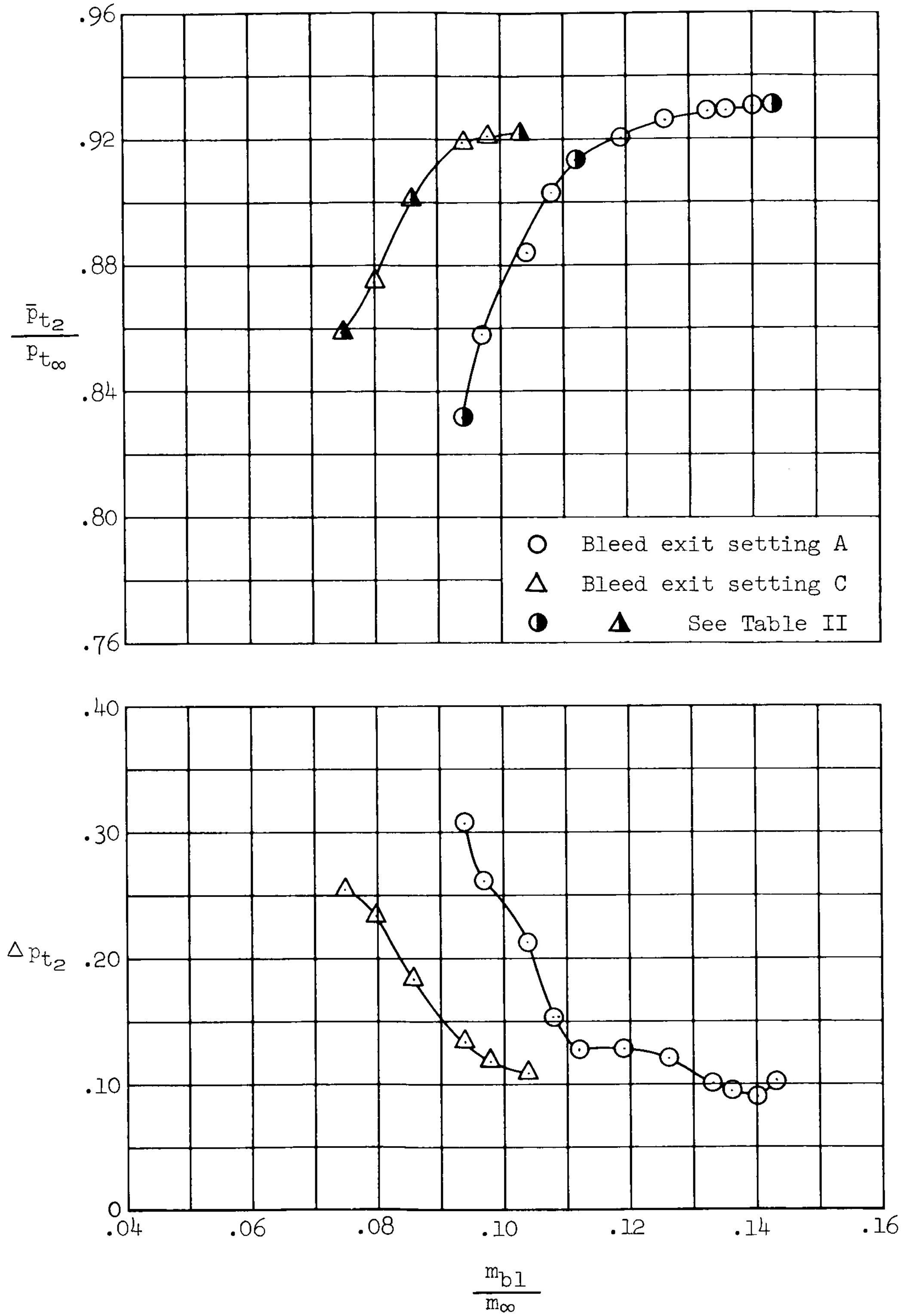
(a) $(x/R)_{lip} = 2.330$, $M_\infty = 3.00$.

Figure 23.- Supercritical performance, 1.50 D inlet without vortex generators; $\alpha = 0°$.



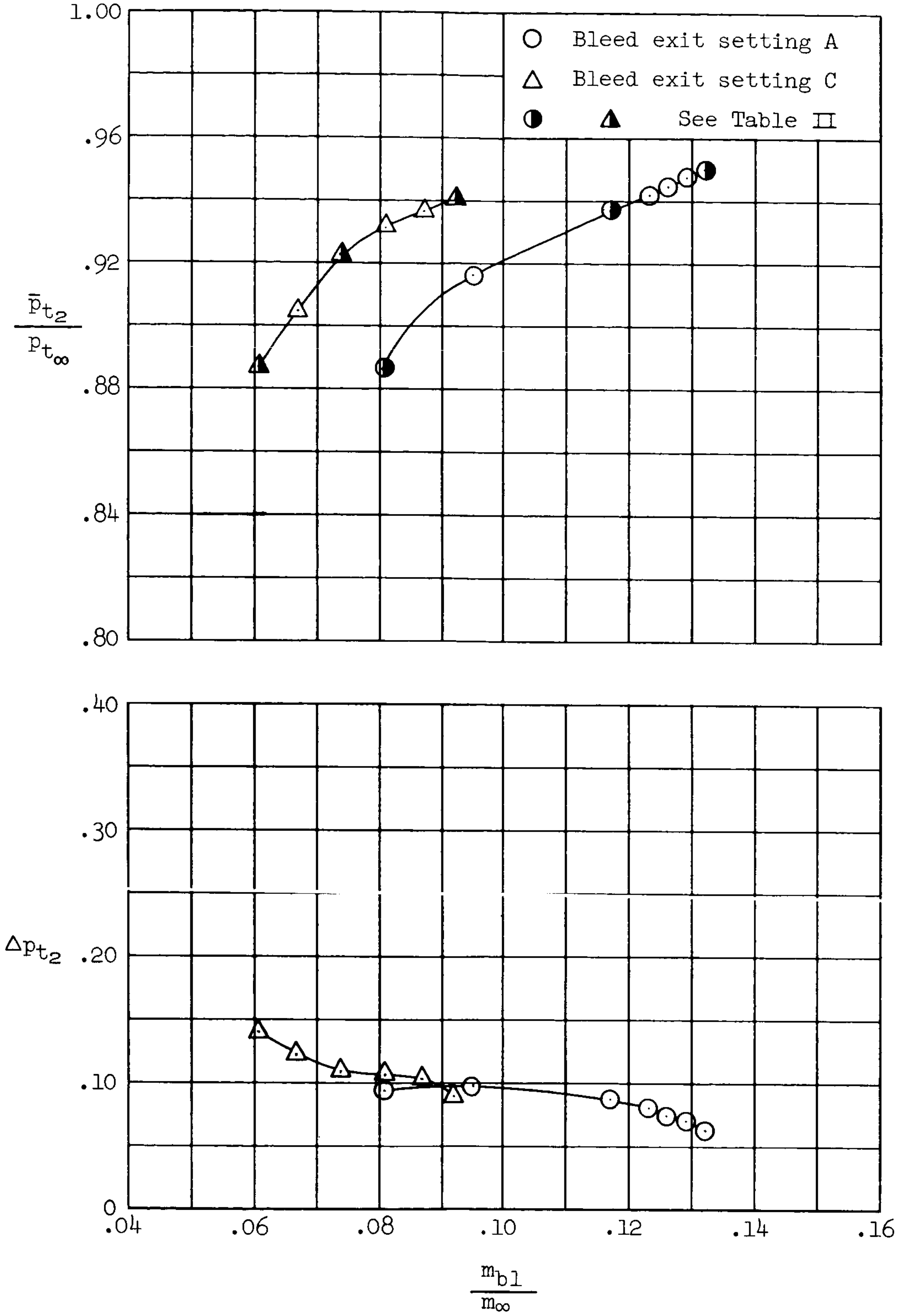
(b) $(x/R)_{lip} = 2.420$, $M_\infty = 2.75$.

Figure 23.- Continued.



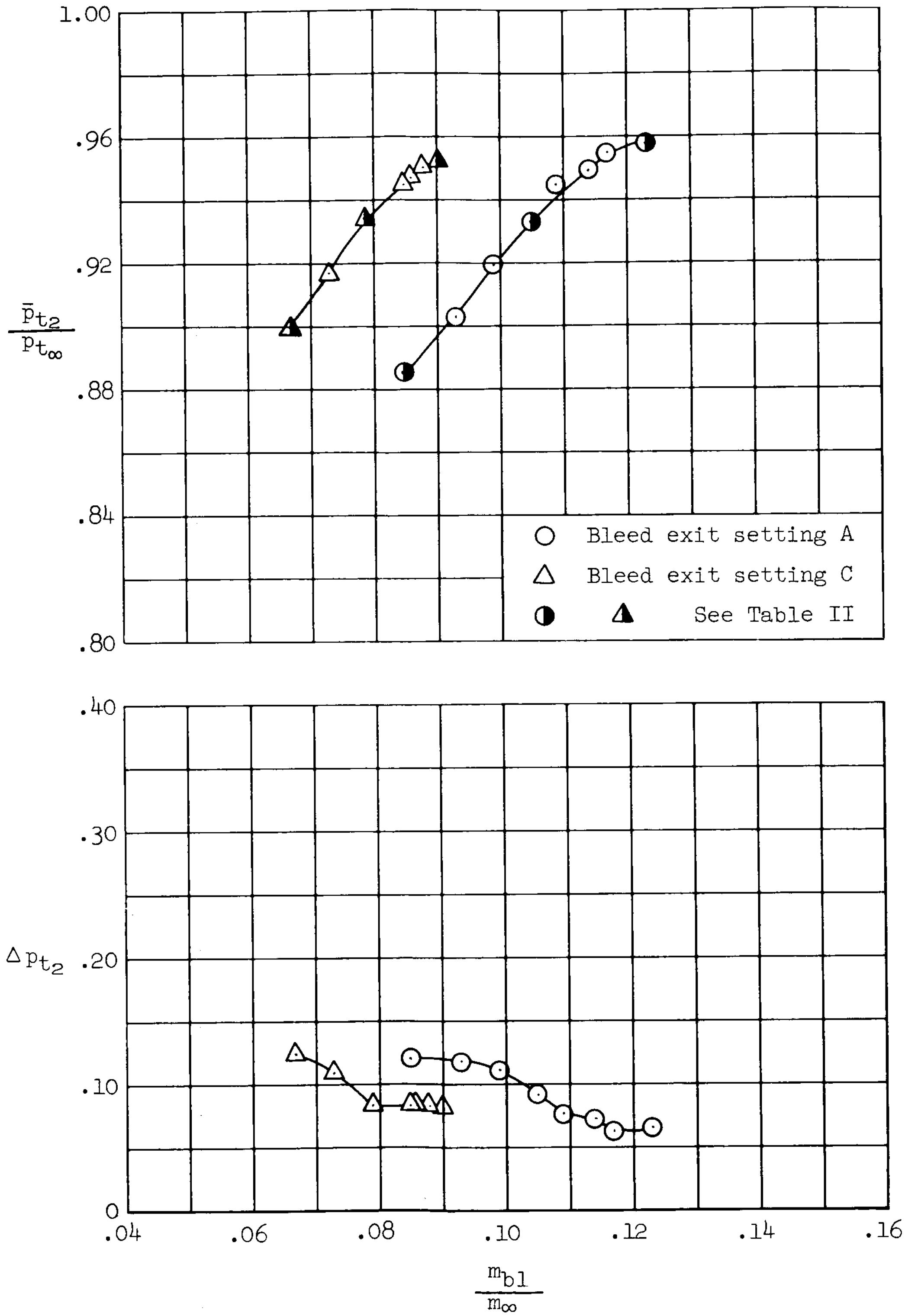
(c) $(x/R)_{lip} = 2.600$, $M_\infty = 2.50$.

Figure 23.- Continued.



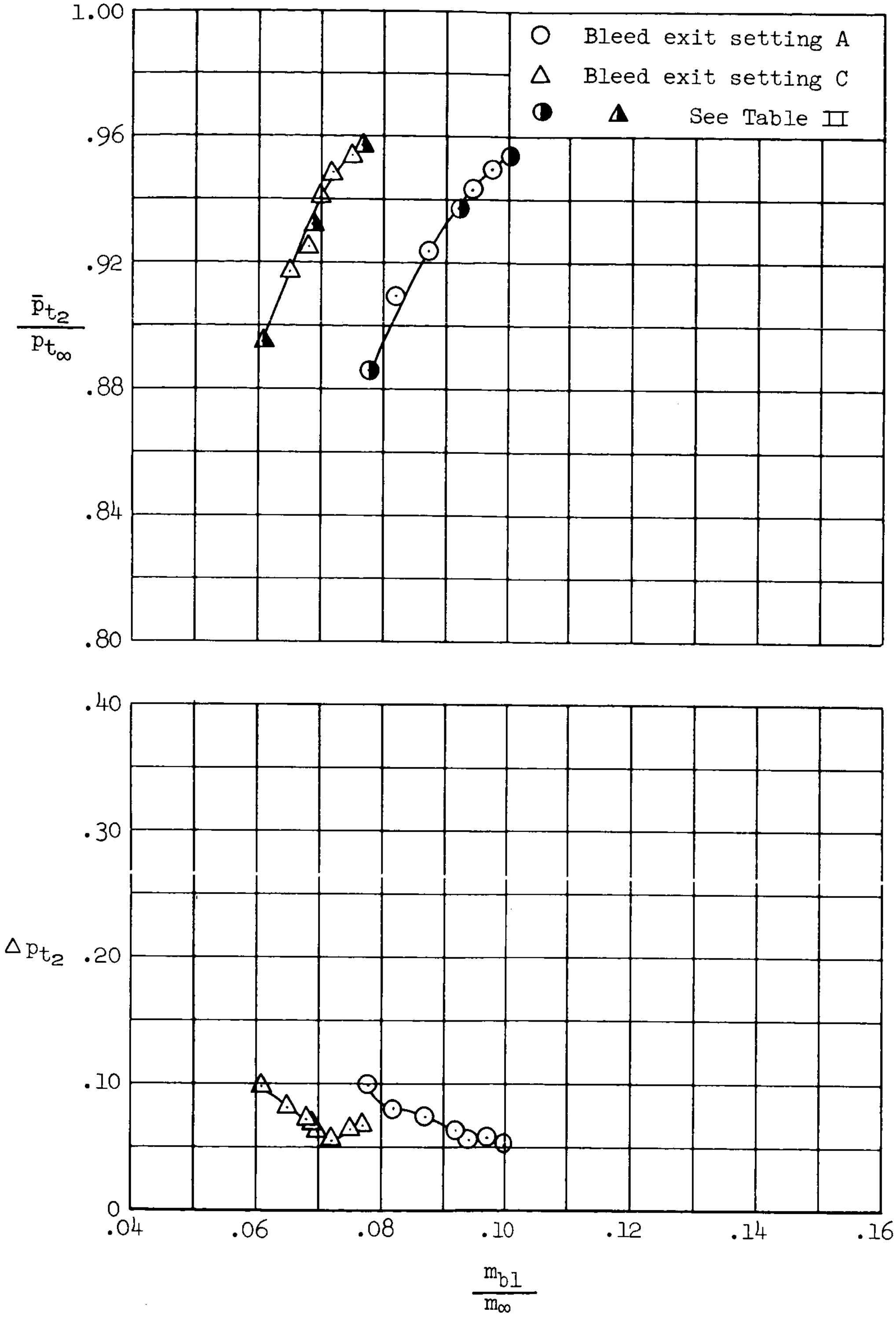
(d) $(x/R)_{lip} = 2.860$, $M_\infty = 2.25$.

Figure 23.- Continued.



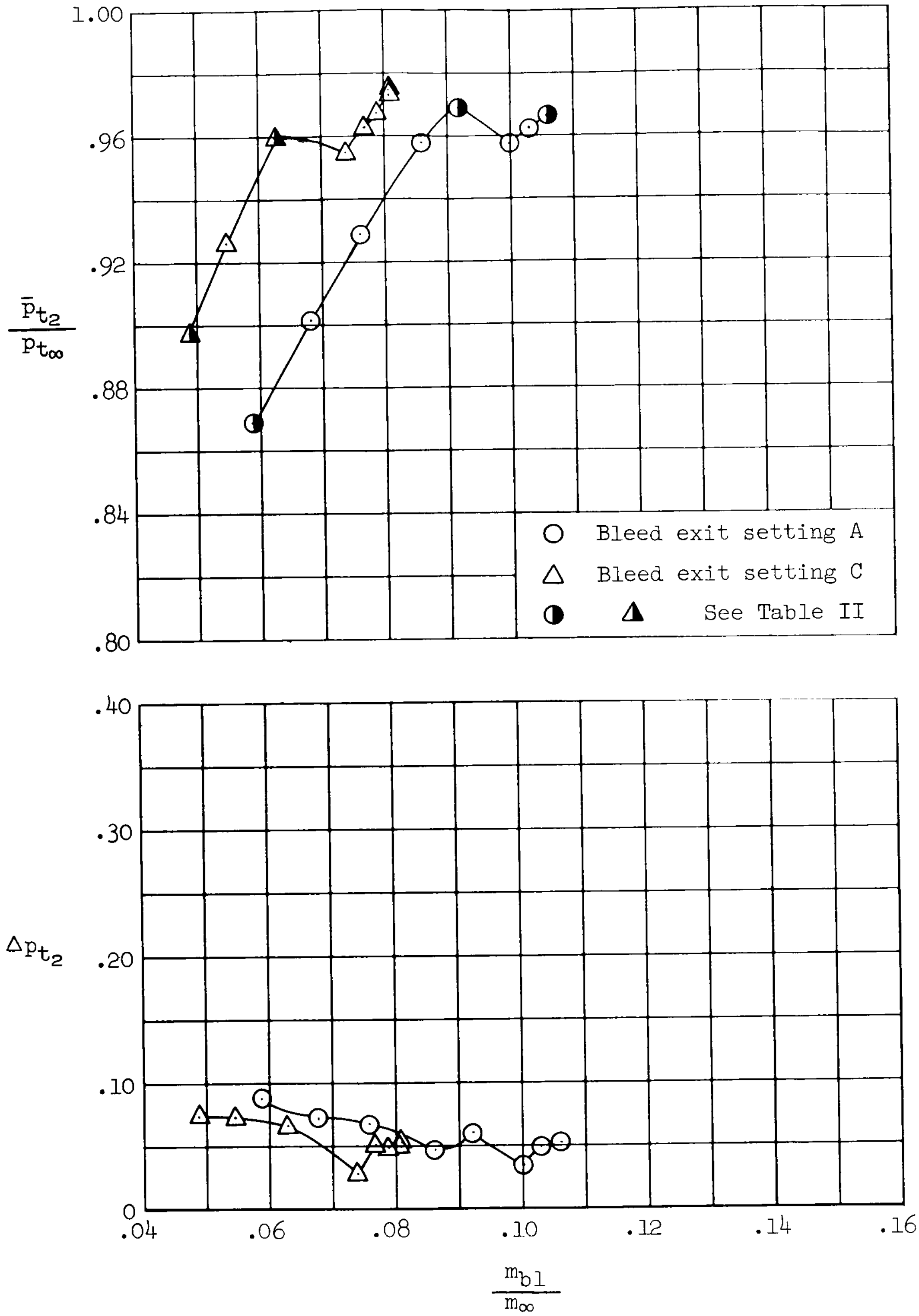
(e) $(x/R)_{lip} = 3.100$, $M_\infty = 2.00$.

Figure 23.- Continued.



(f) $(x/R)_{lip} = 3.320$, $M_\infty = 1.75$.

Figure 23.- Continued.



(g) $(x/R)_{lip} = 3.420$, $M_\infty = 1.55$.

Figure 23.- Concluded.

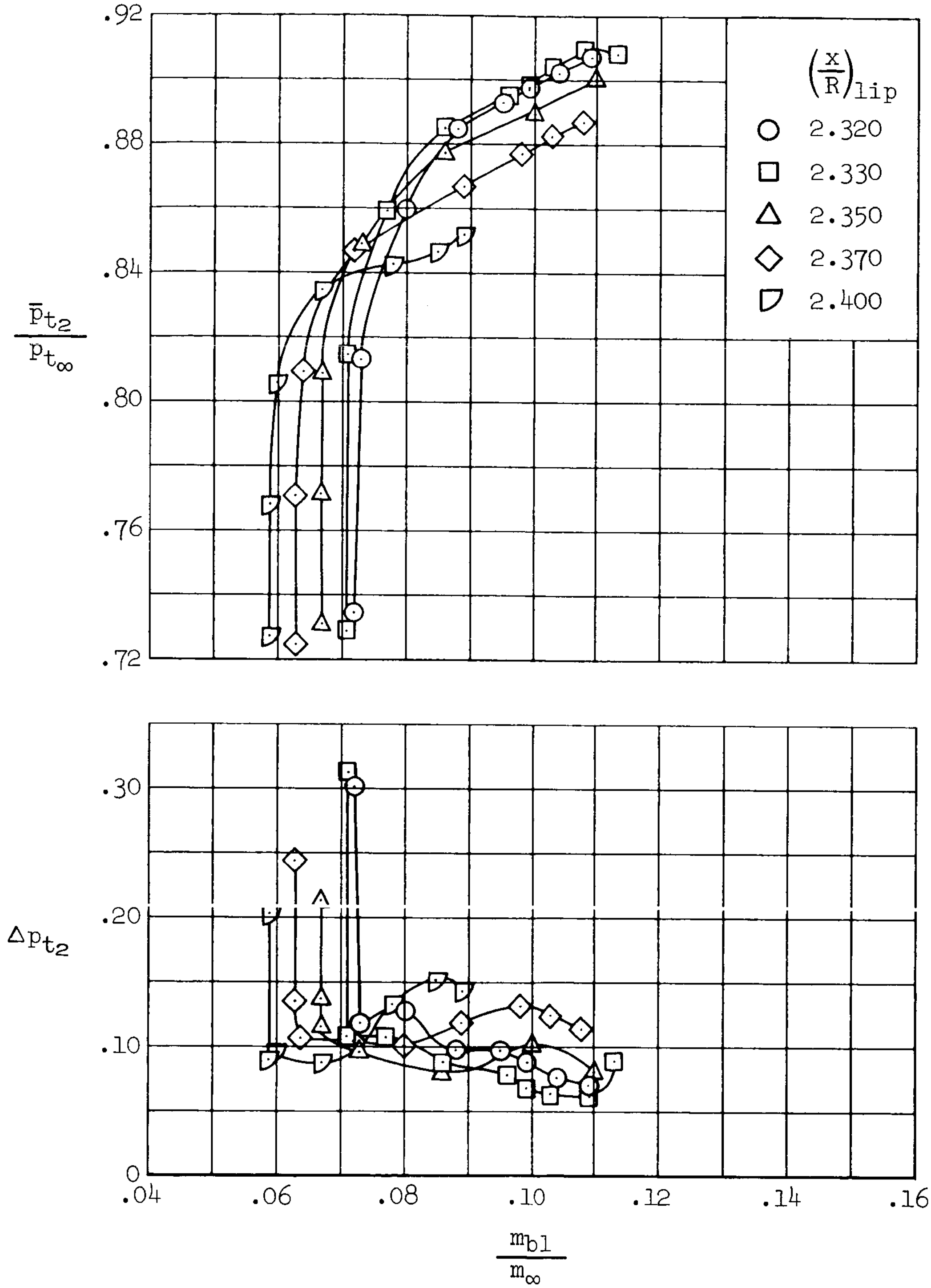
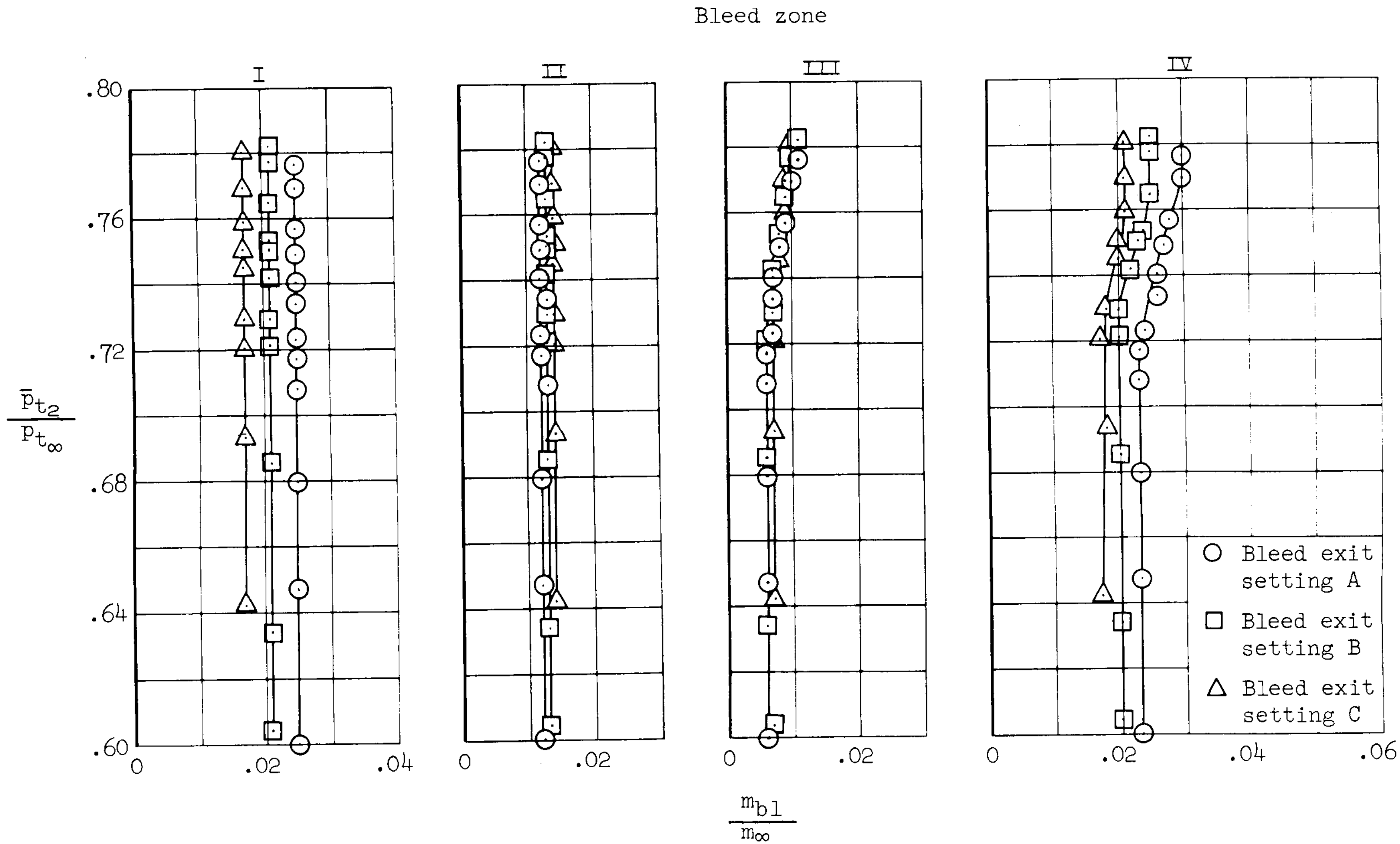
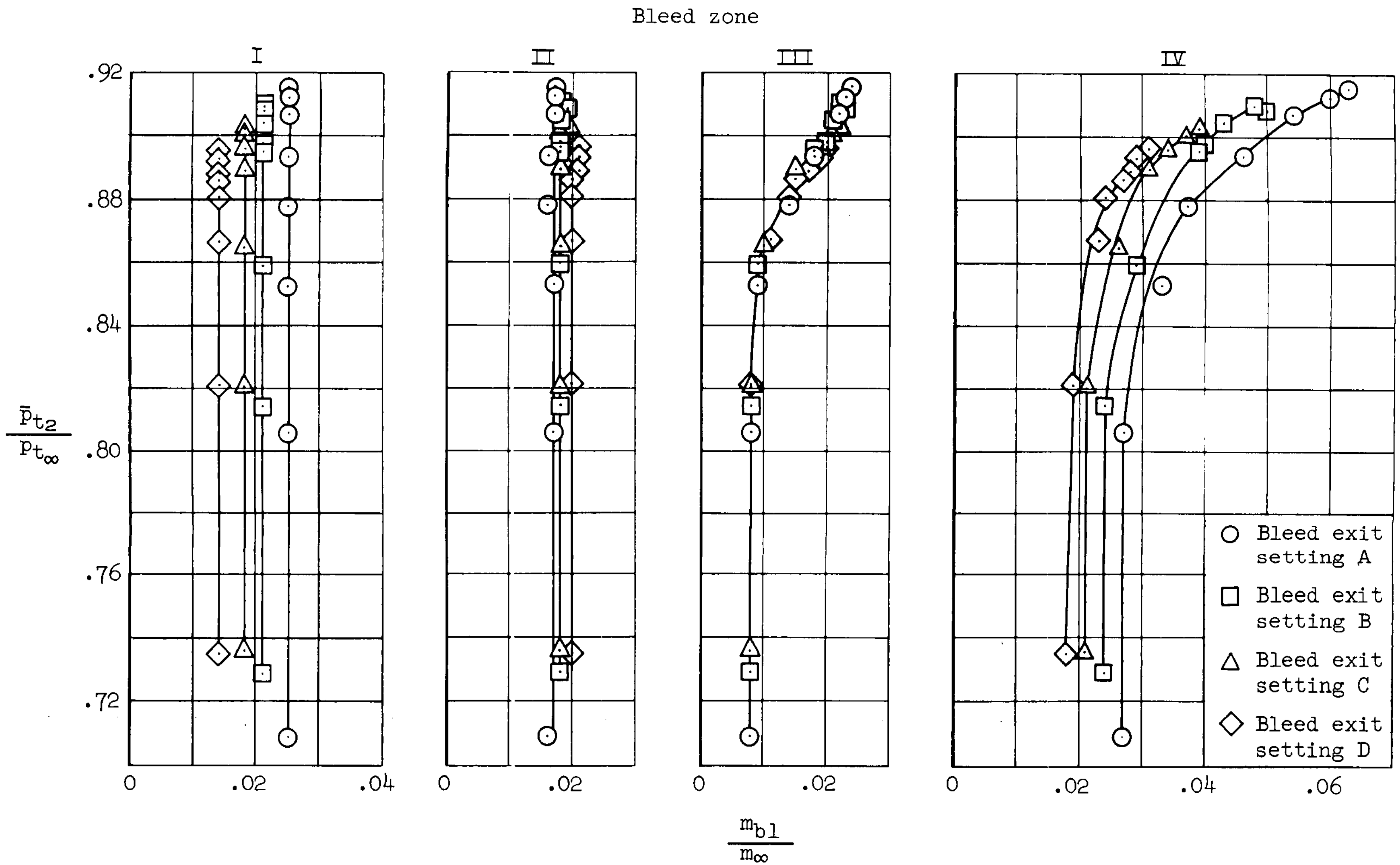


Figure 24.- Supercritical performance, 1.50 D inlet with vortex generators; bleed exit setting B; $M_\infty = 3.00$, $\alpha = 0°$.



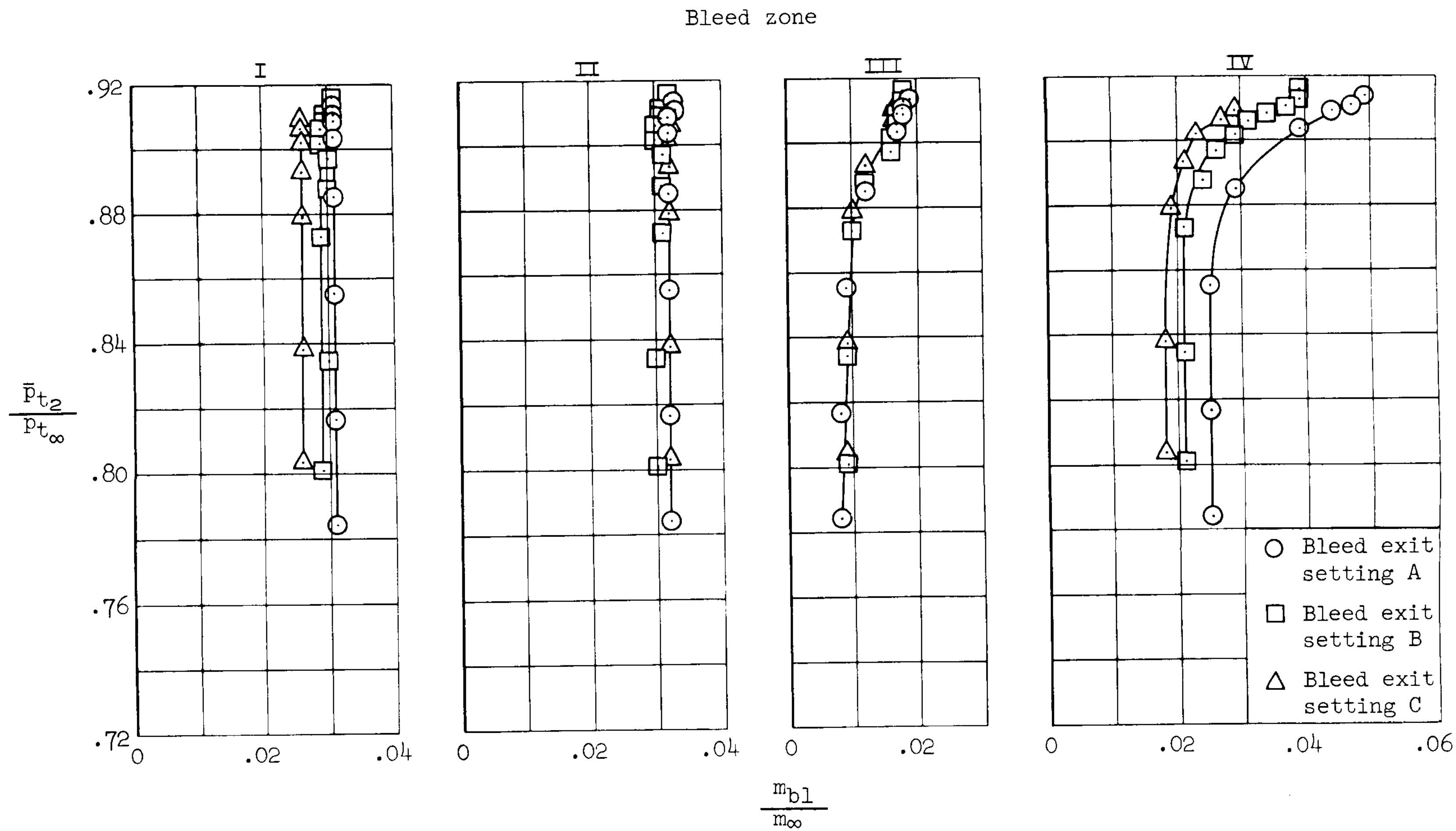
(a) $(x/R)_{lip} = 2.330$, $M_\infty = 3.20$.

Figure 25.- Bleed zone mass flow, 1.50 D inlet with vortex generators; $\alpha = 0°$.



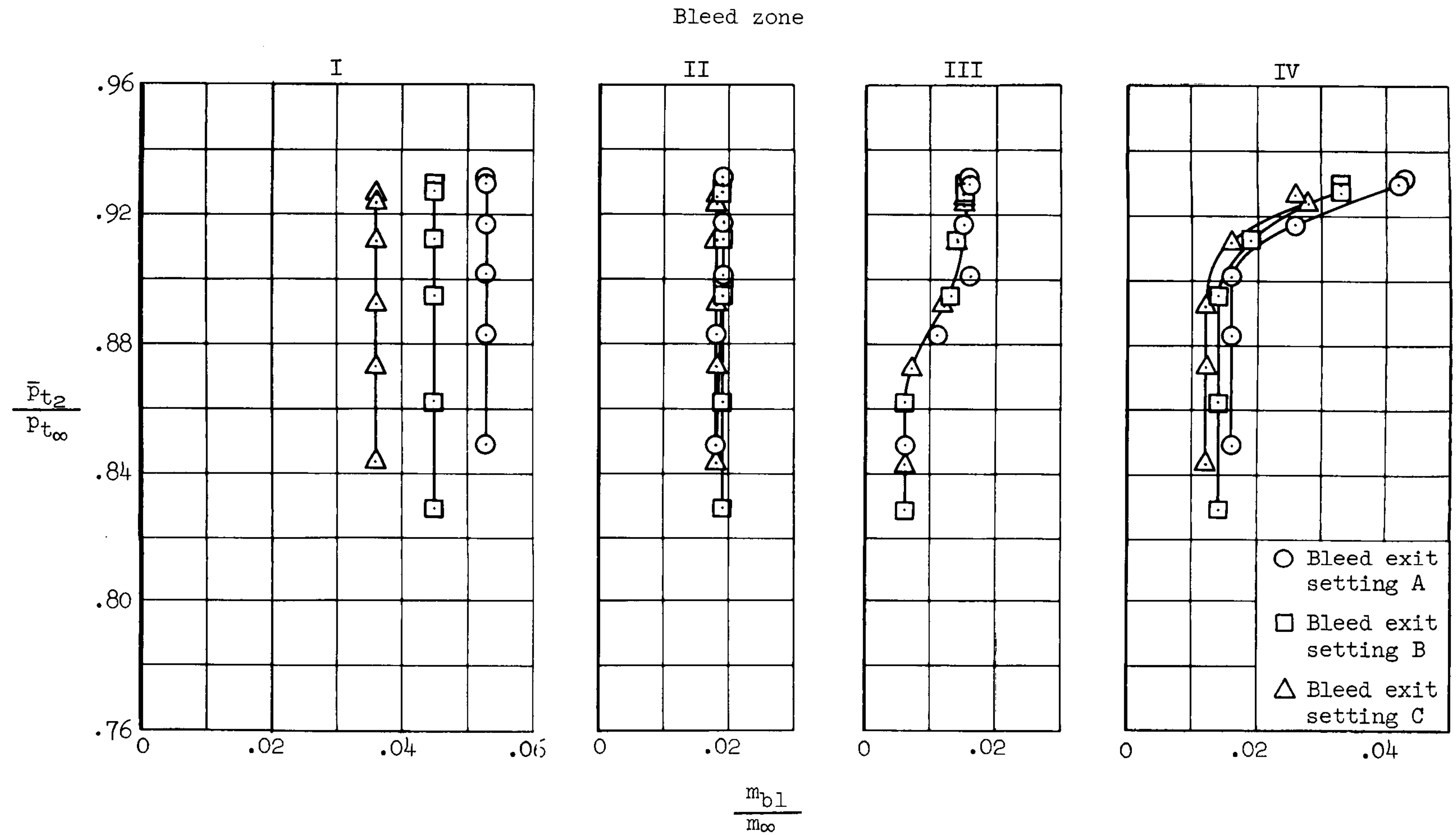
(t) $(x/R)_{lip} = 2.330$, $M_\infty = 3.00$.

Figure 25.- Continued.



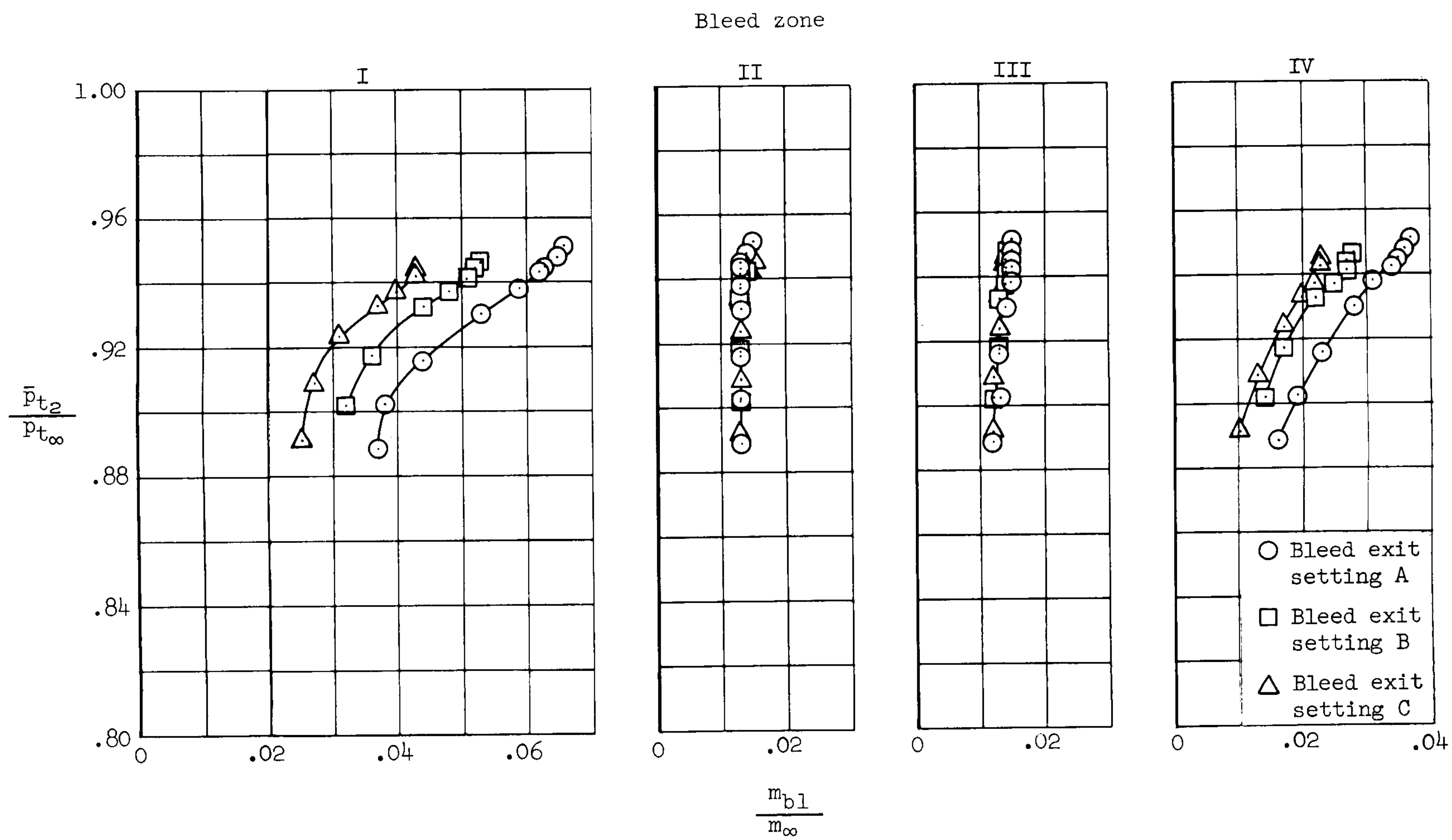
(c) $(x/R)_{lip} = 2.420$, $M_\infty = 2.75$.

Figure 25.- Continued.



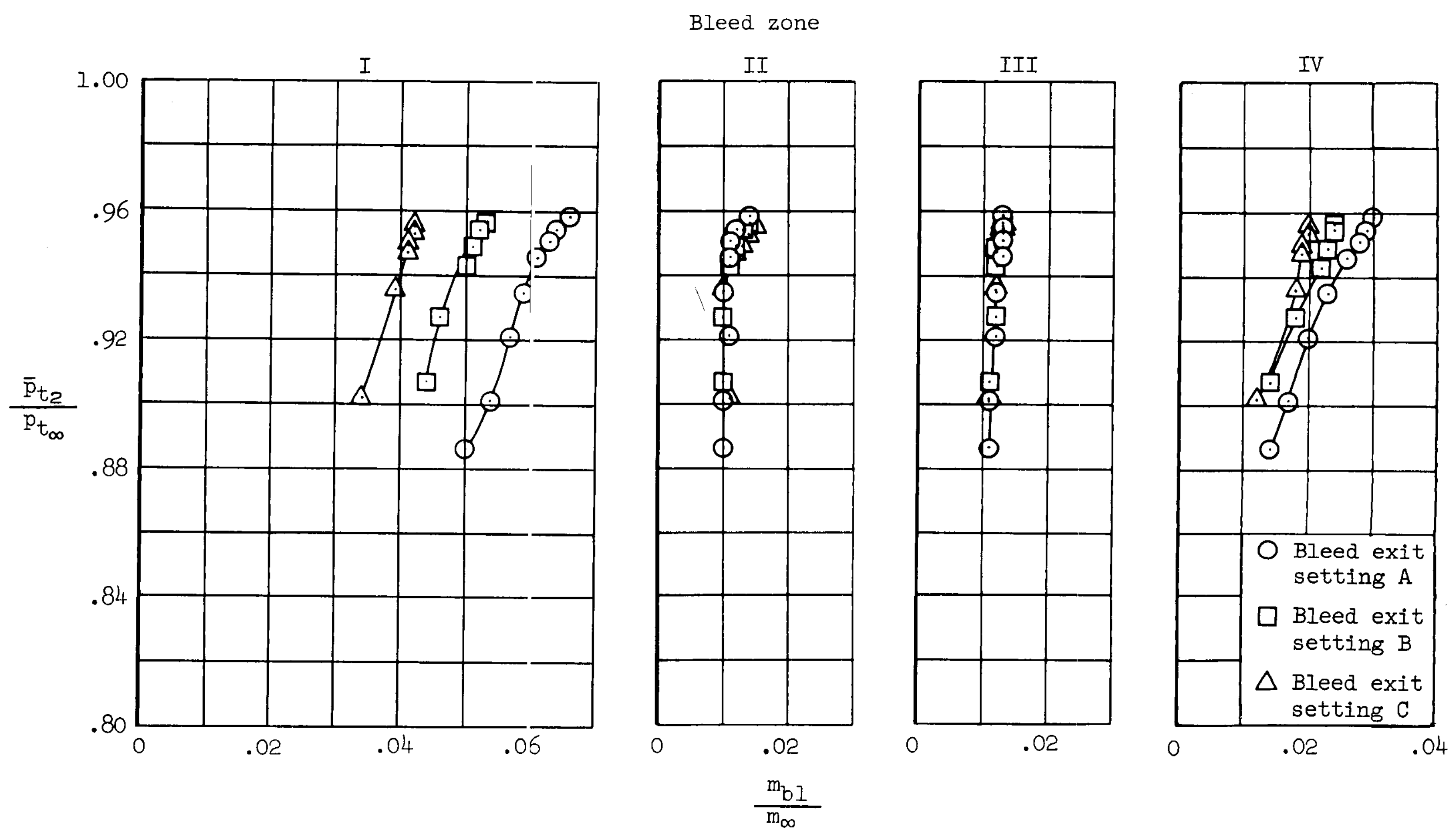
(d) $(x/R)_{lip} = 2.600$, $M_\infty = 2.50$.

Figure 25.- Continued.



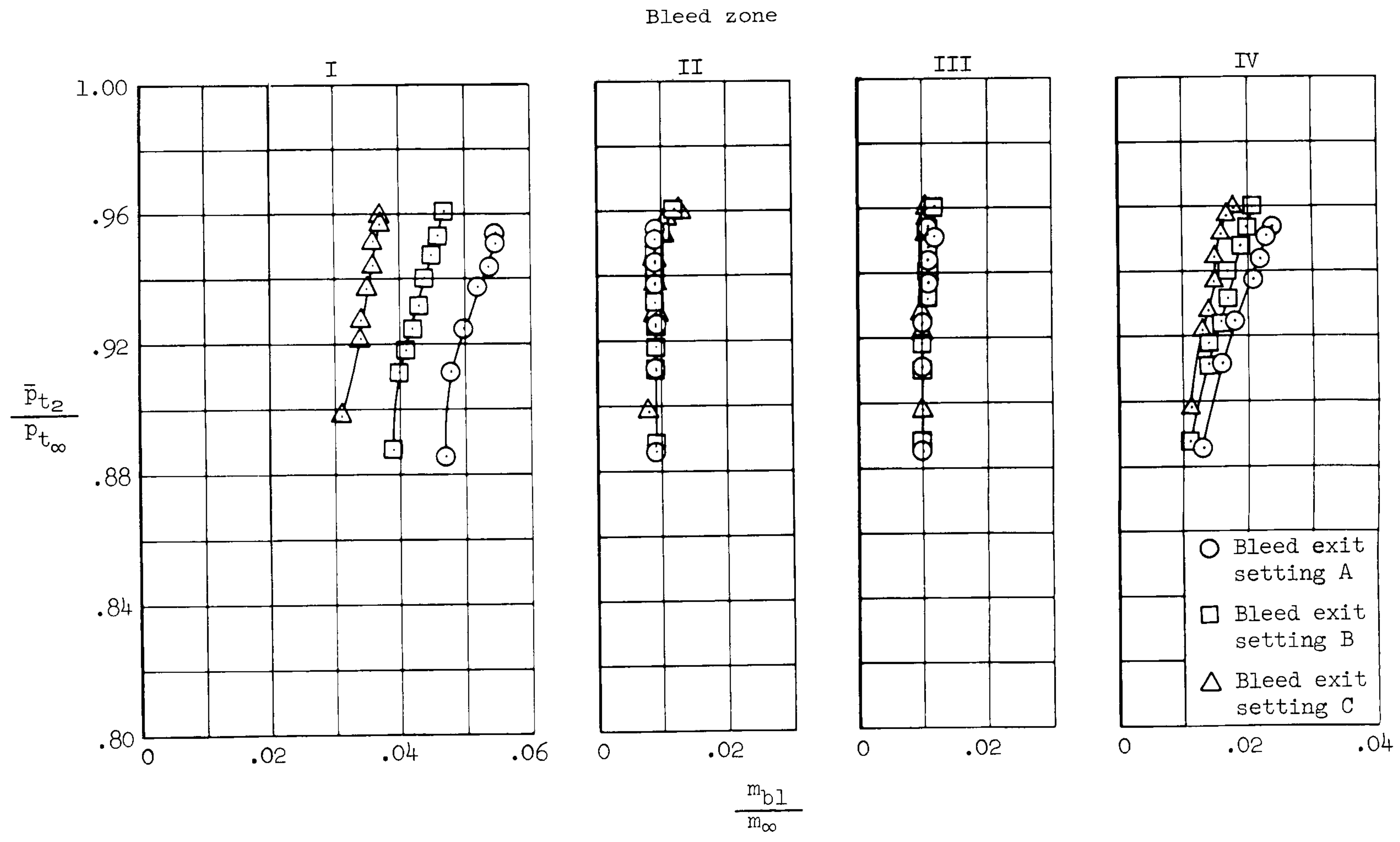
(e) $(x/R)_{lip} = 2.860$, $M_\infty = 2.25$.

Figure 25.- Continued.



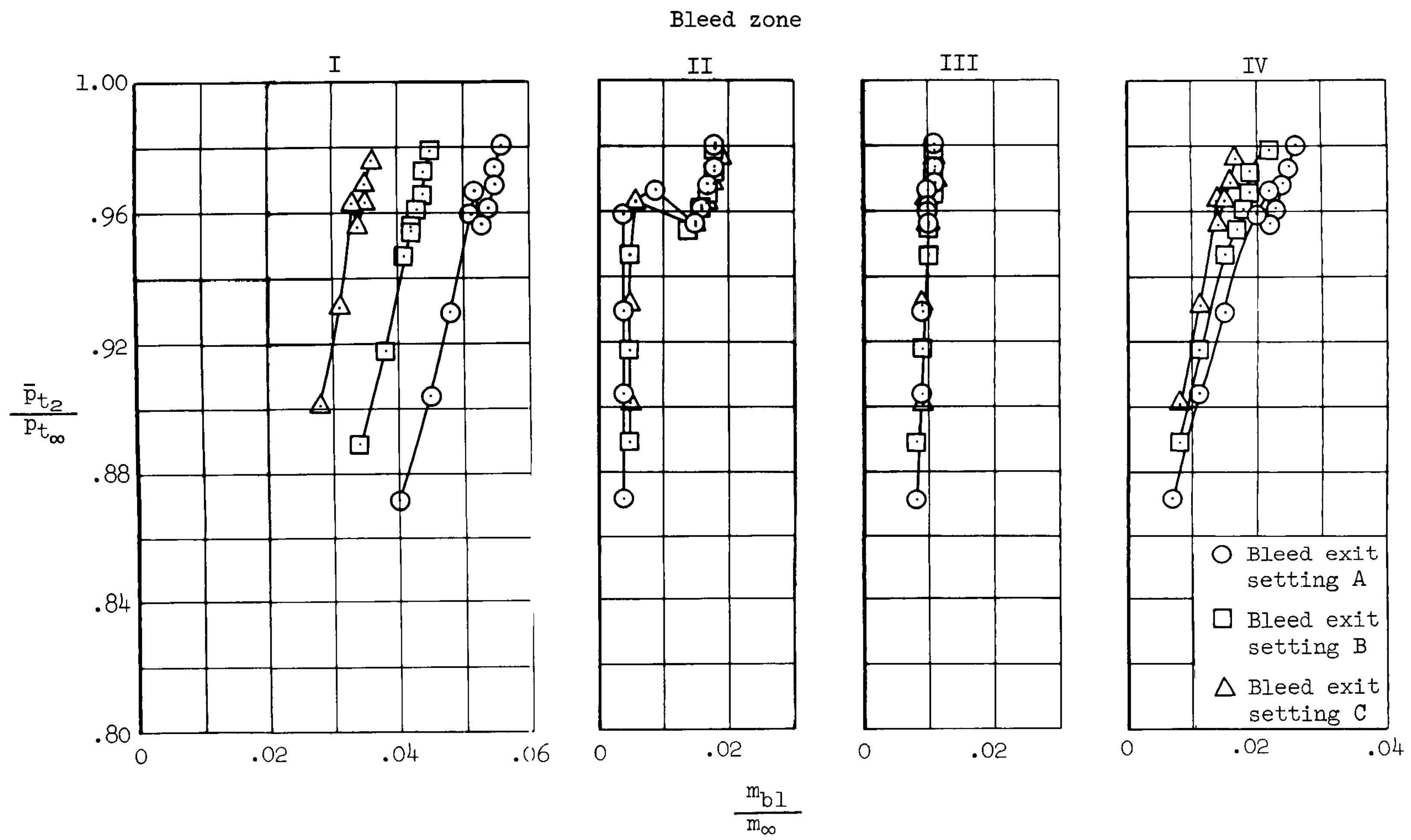
(f) $(x/R)_{lip} = 3.100$, $M_\infty = 2.00$.

Figure 25.- Continued.



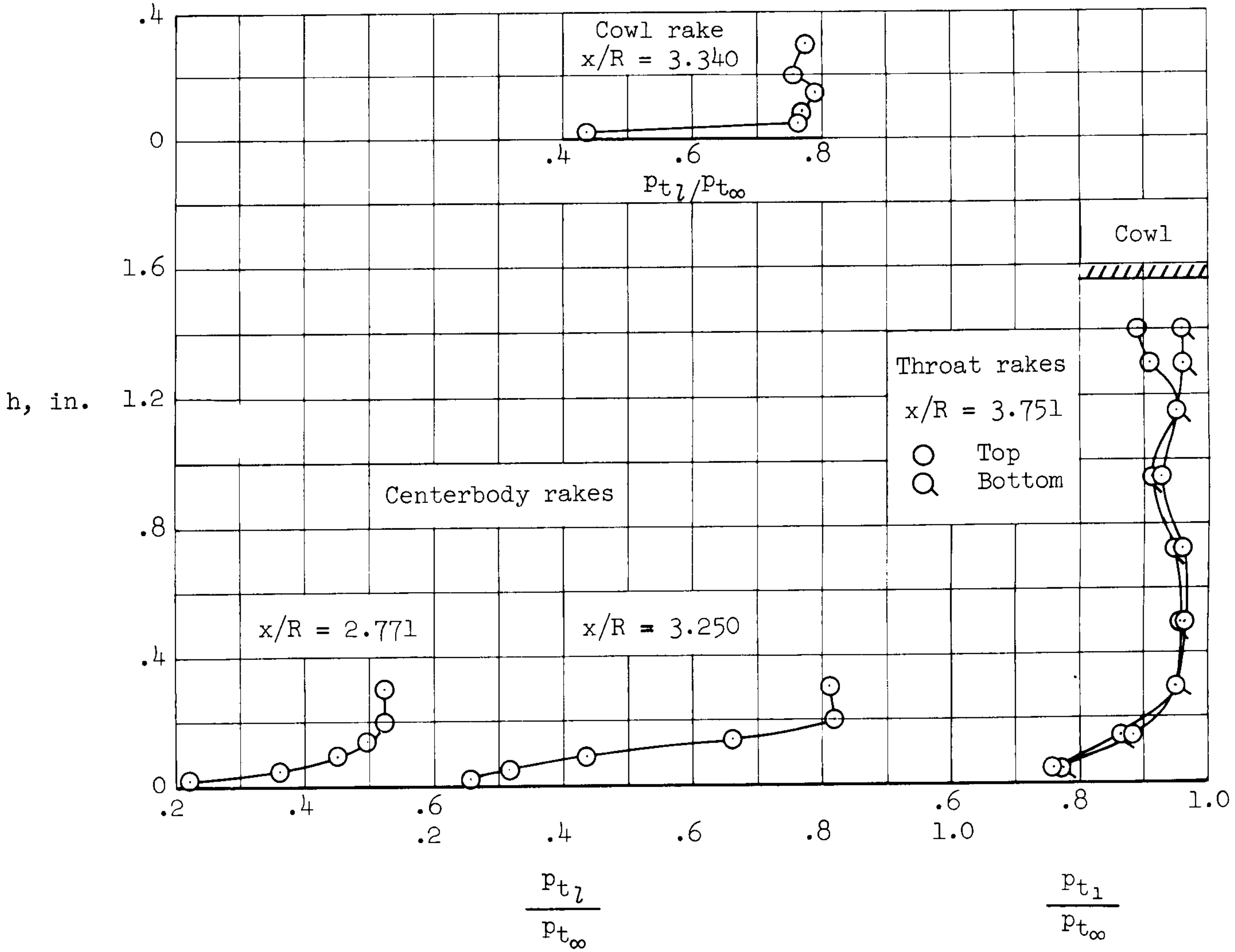
(g) $(x/R)_{lip} = 3.320$, $M_\infty = 1.75$.

Figure 25.- Continued.



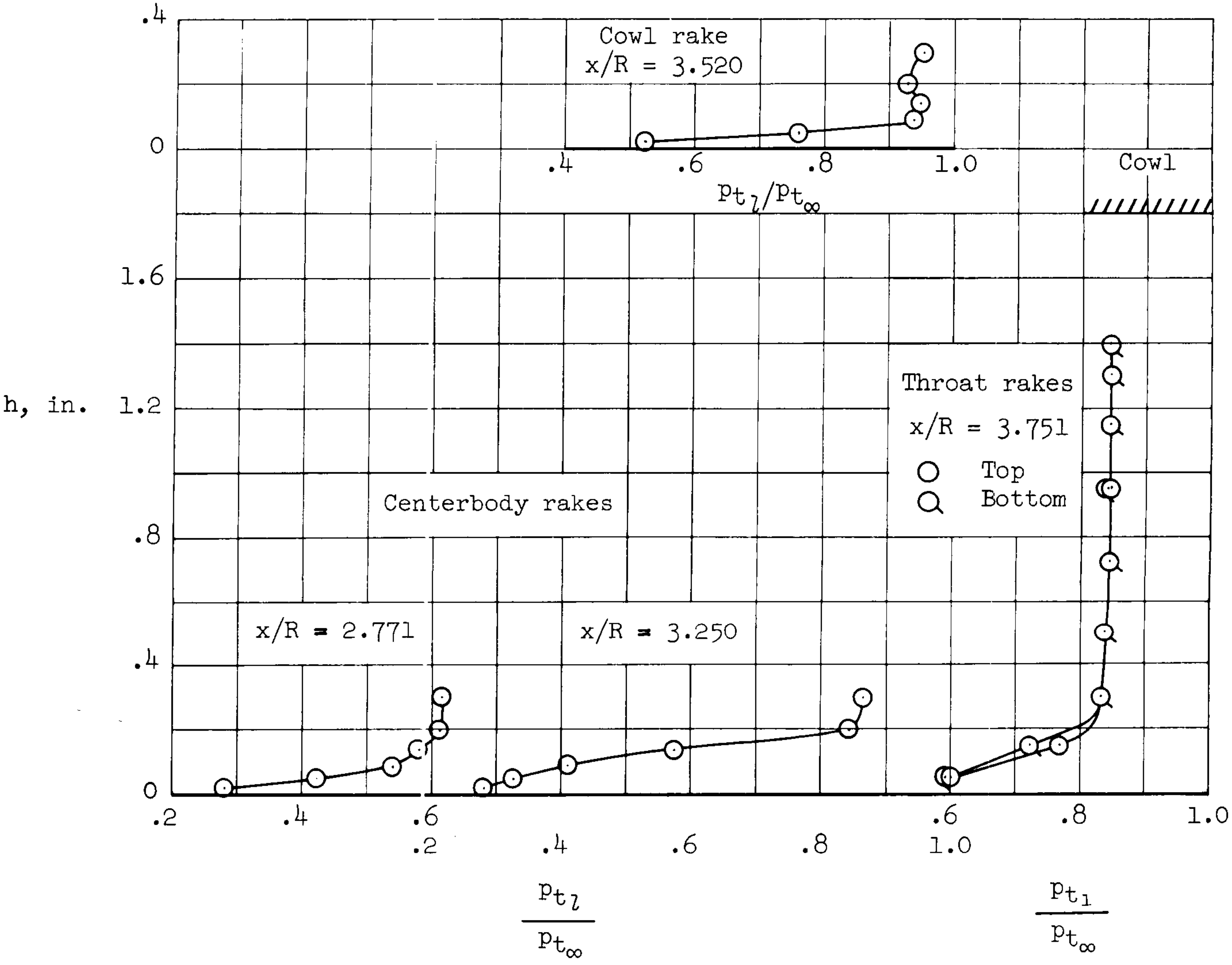
(h) $(x/R)_{lip} = 3.420$, $M_\infty = 1.55$.

Figure 25.- Concluded.



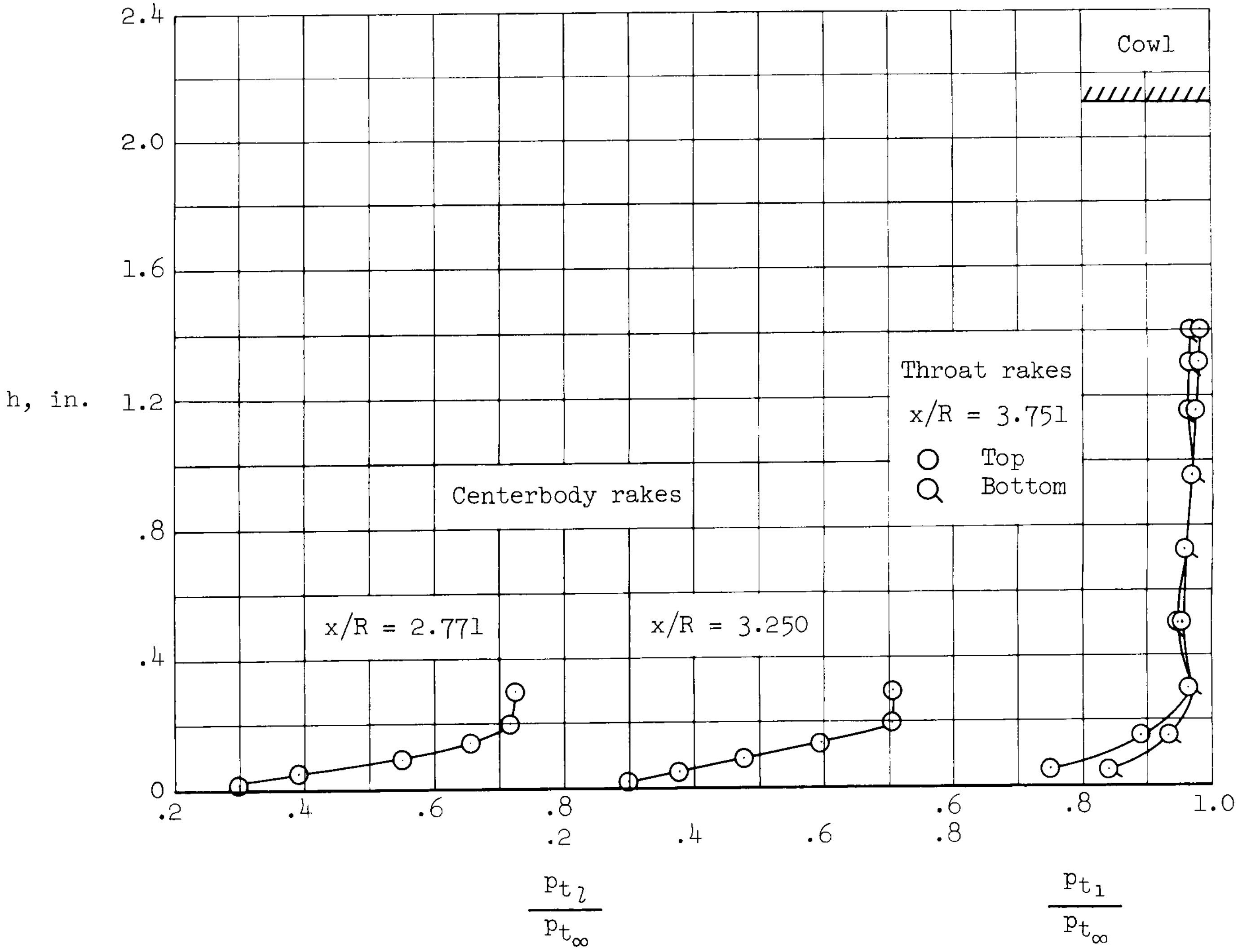
(a) $(x/R)_{lip} = 2.420$, $M_\infty = 2.75$

Figure 26.- Pitot pressure profiles, 1.50 D inlet; bleed exit setting B; $\alpha = 0°$.



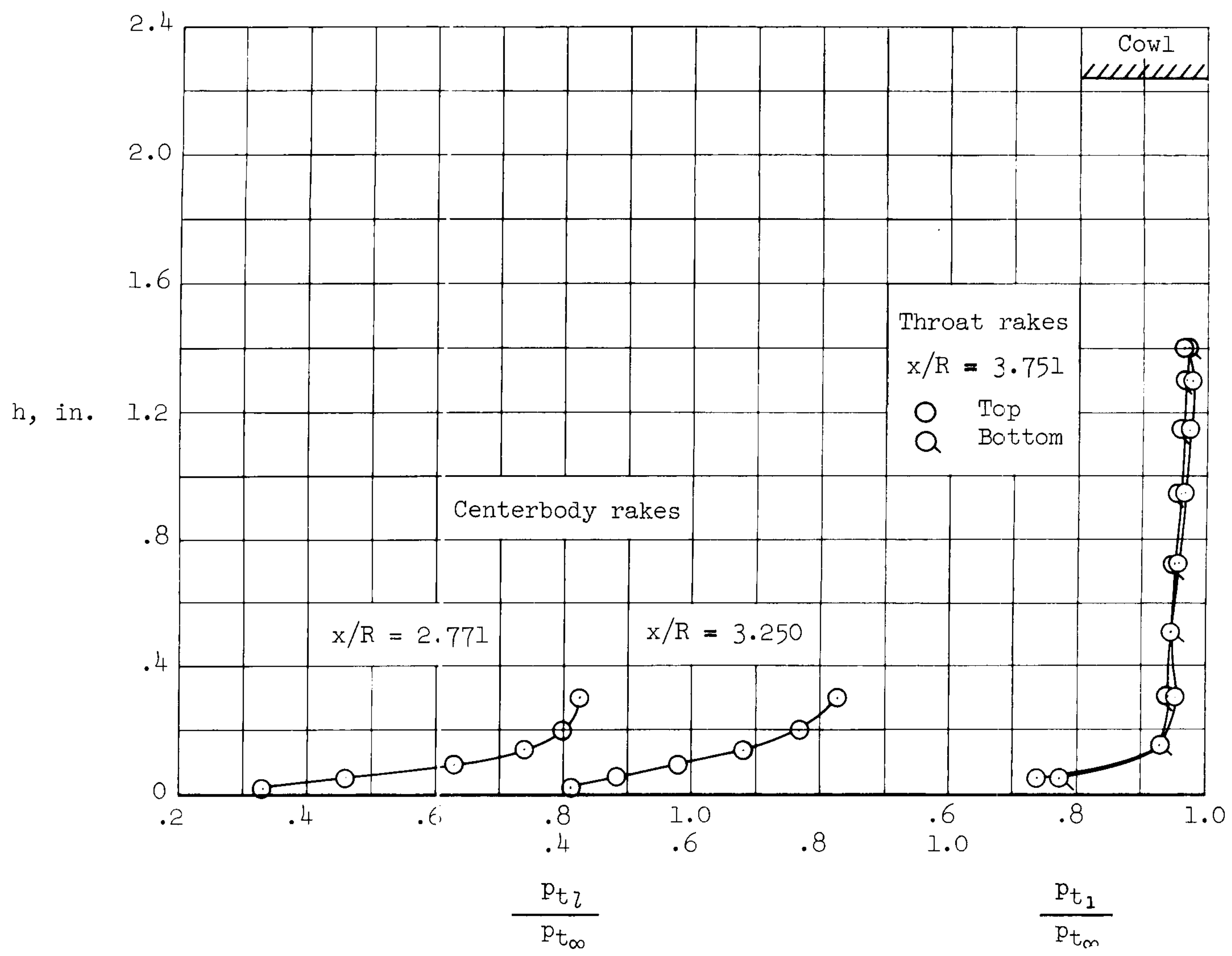
(b) $(x/R)_{lip} = 2.600$, $M_\infty = 2.50$

Figure 26.- Continued.



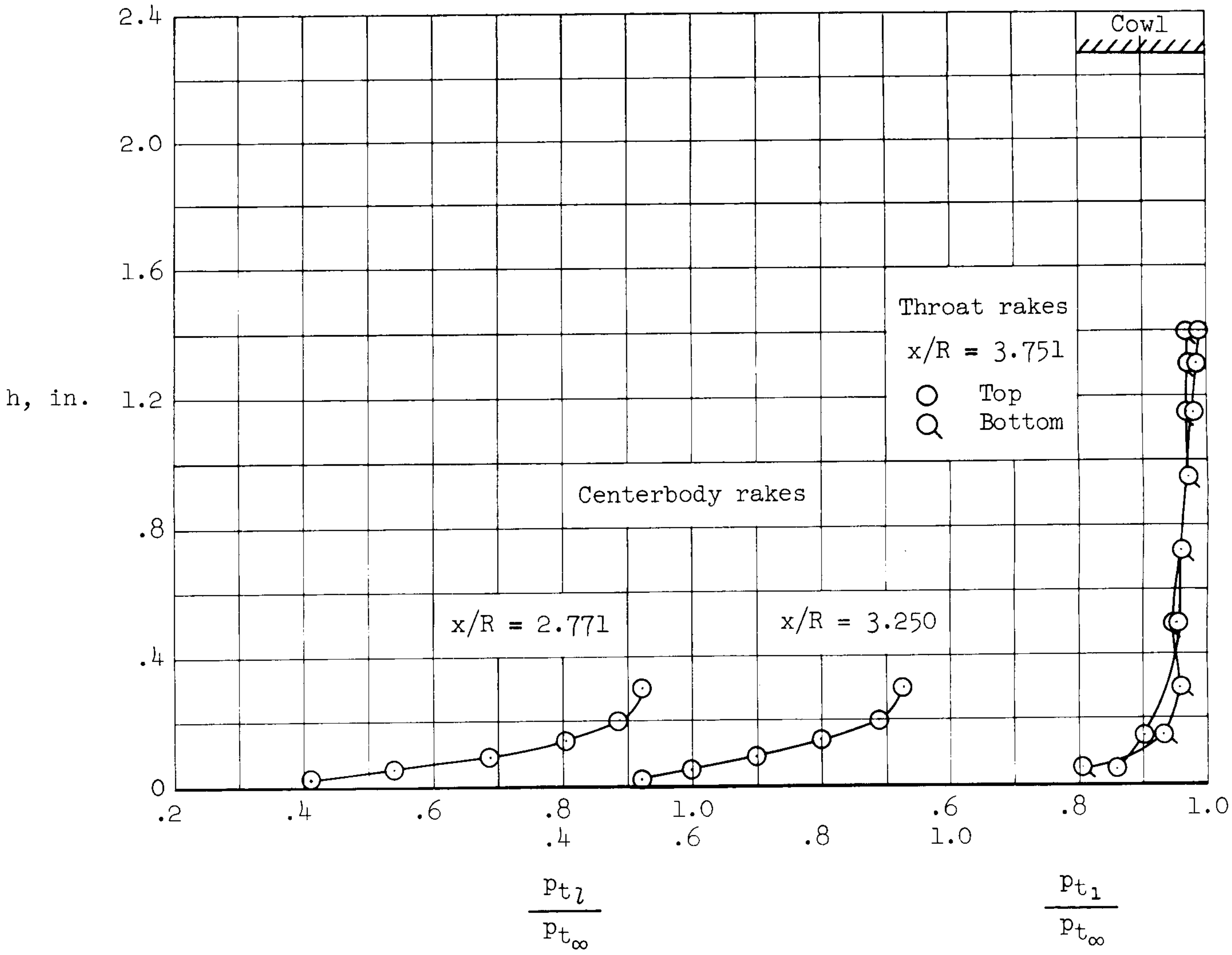
(c) $(x/R)_{lip} = 2.860$, $M_\infty = 2.25$

Figure 26.- Continued.



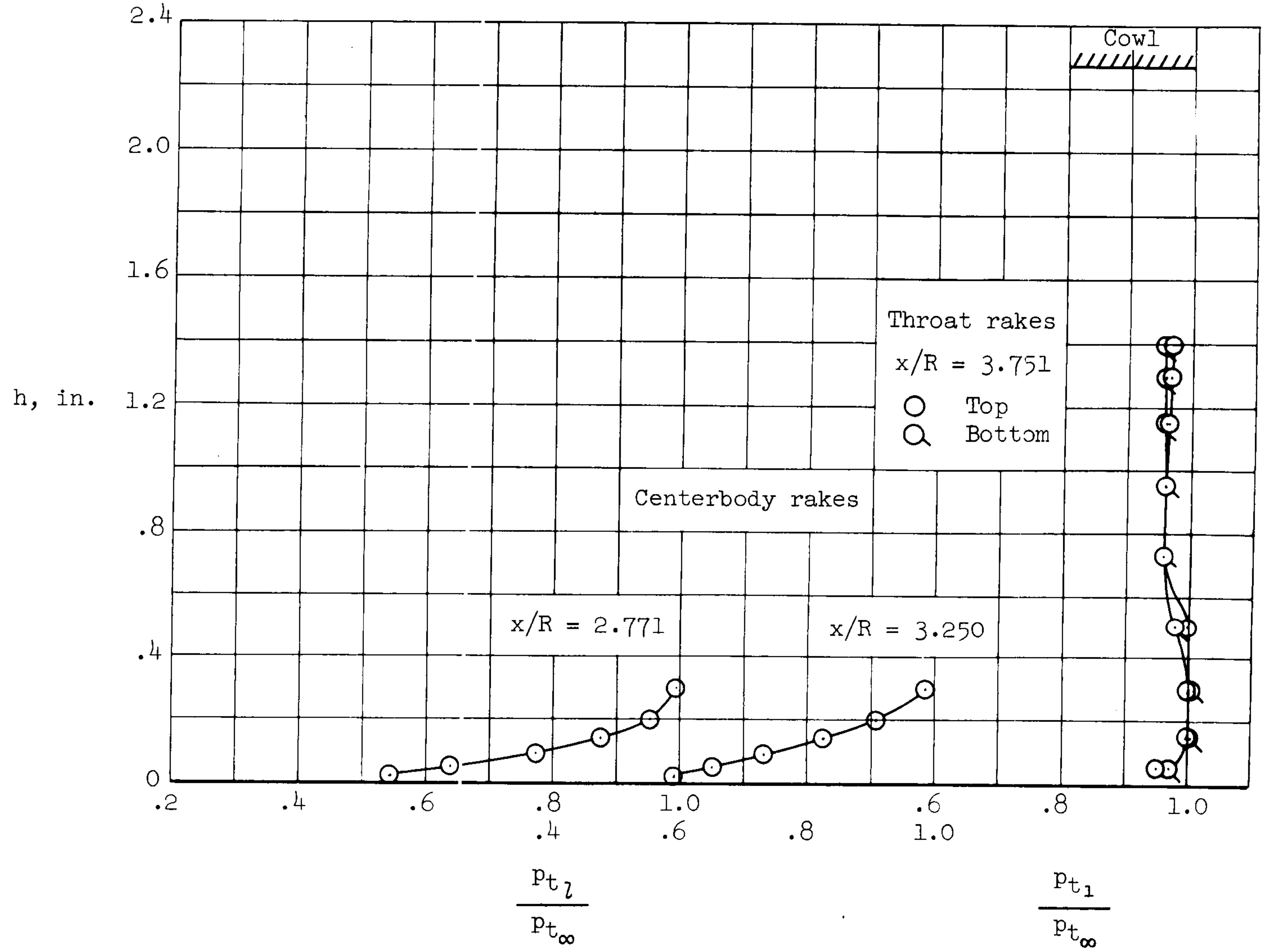
(d) $(x/R)_{lip} = 3.100$, $M_\infty = 2.00$

Figure 26.- Continued.



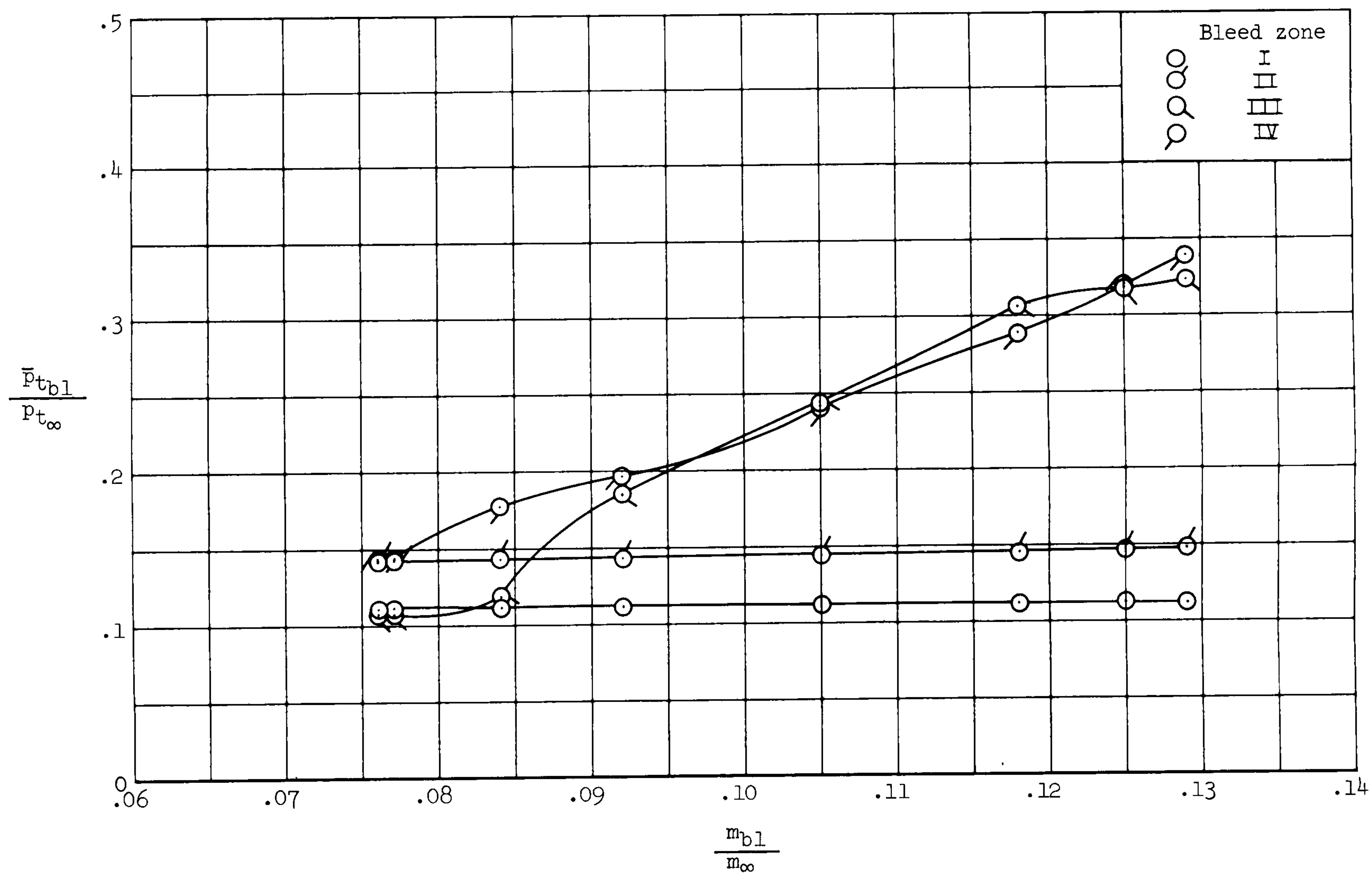
(e) $(x/R)_{lip} = 3.320$, $M_\infty = 1.75$

Figure 26.- Continued.



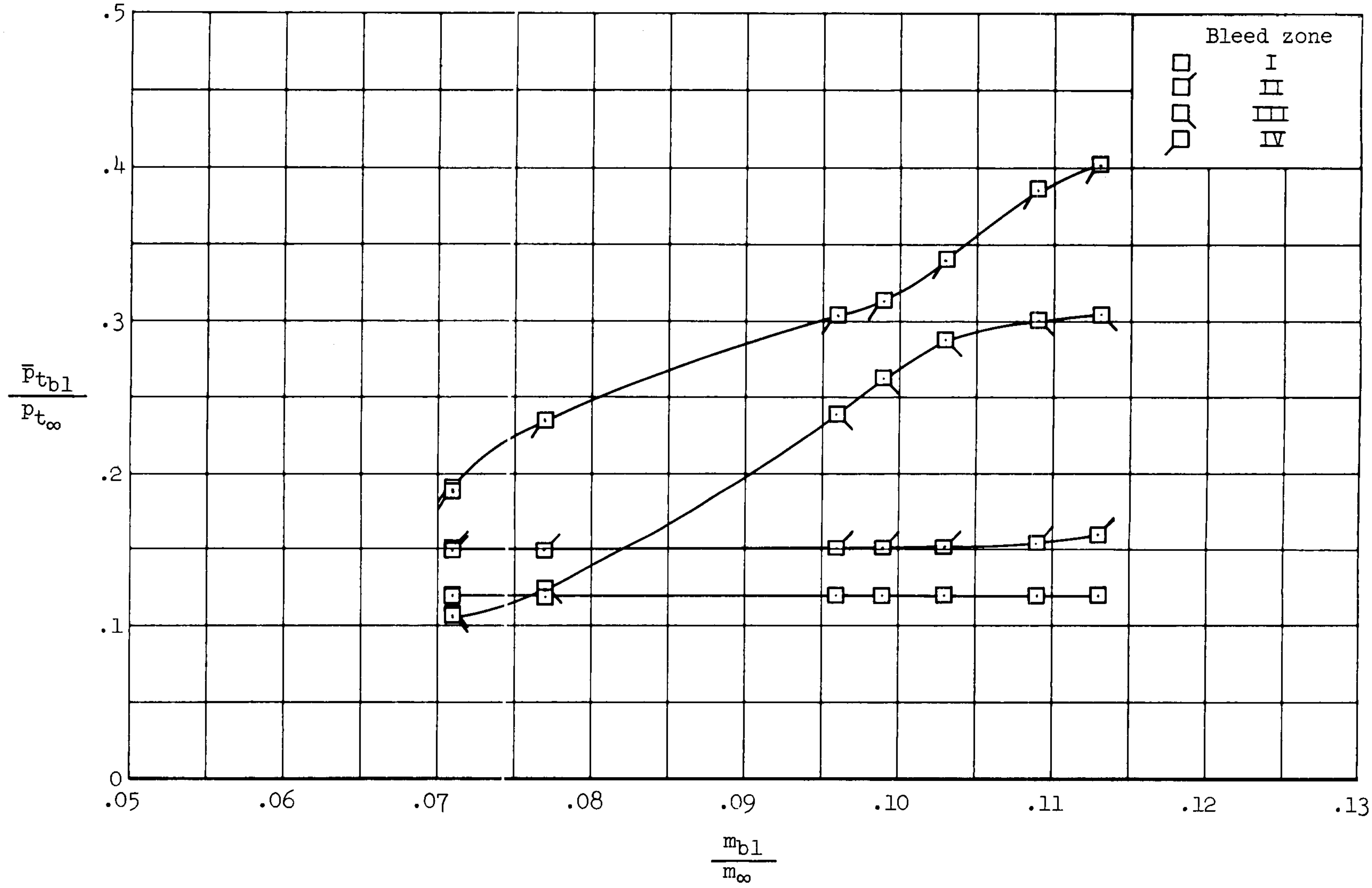
(f) $(x/R)_{lip} = 3.420$, $M_\infty = 1.55$

Figure 26.- Concluded.



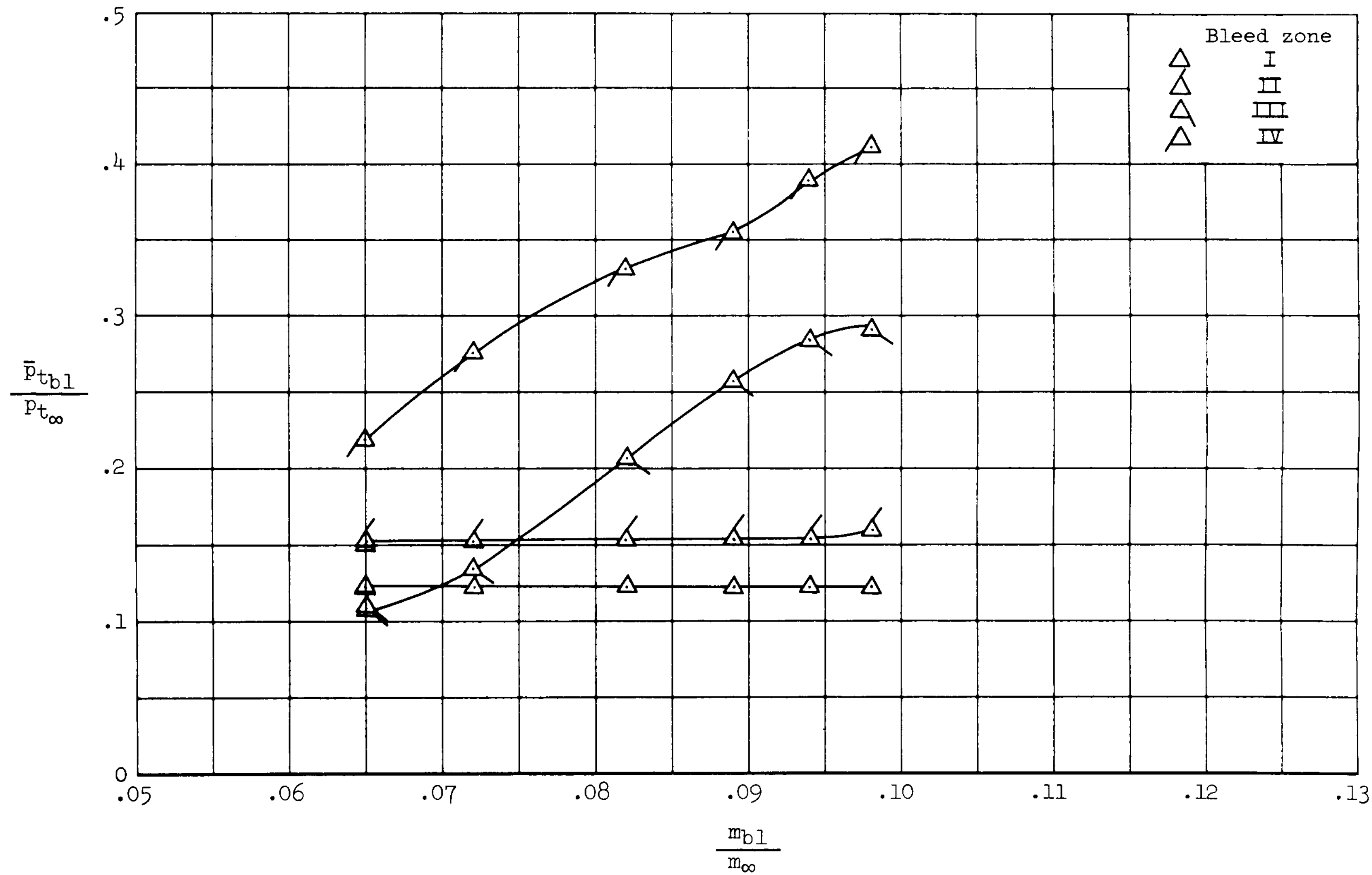
(a) Bleed exit setting A.

Figure 27.- Bleed plenum chamber pressure recoveries, 1.50 D inlet with vortex generators; $(x/R)_{lip} = 2.330$, $M_\infty = 3.00$; $\alpha = 0^\circ$.



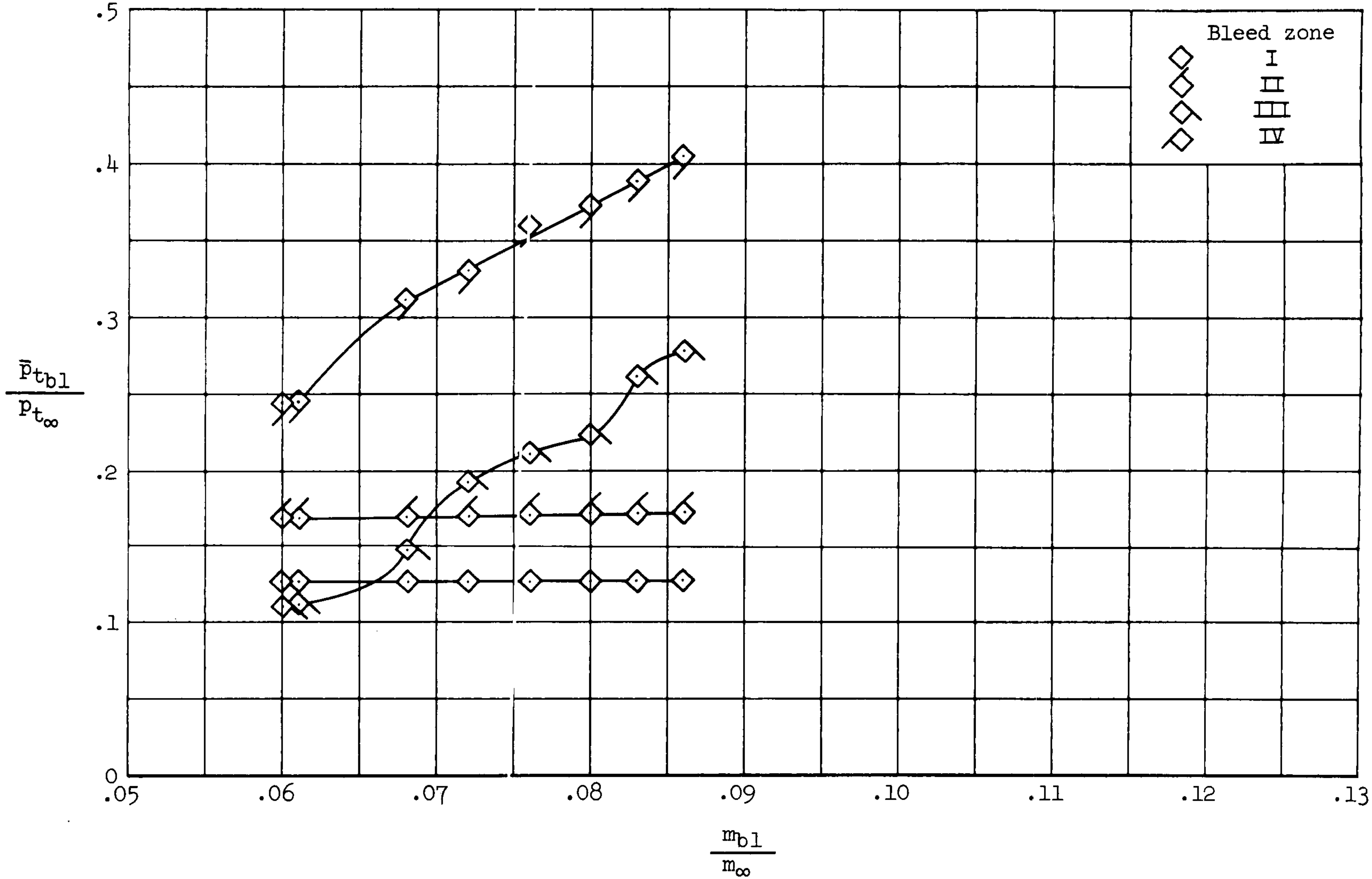
(b) Bleed exit setting B.

Figure 27.- Continued.



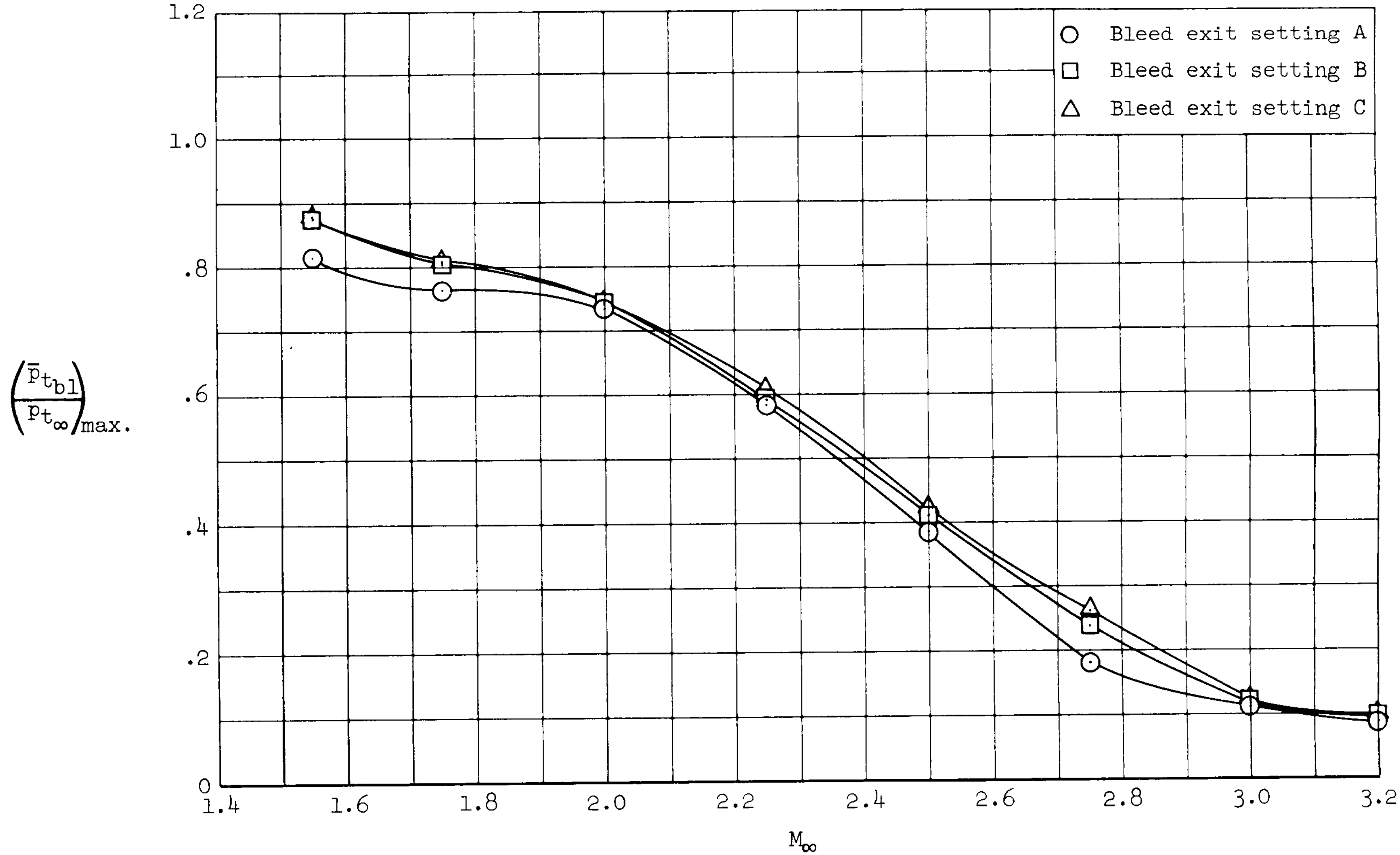
(c) Bleed exit setting C.

Figure 27.- Continued.



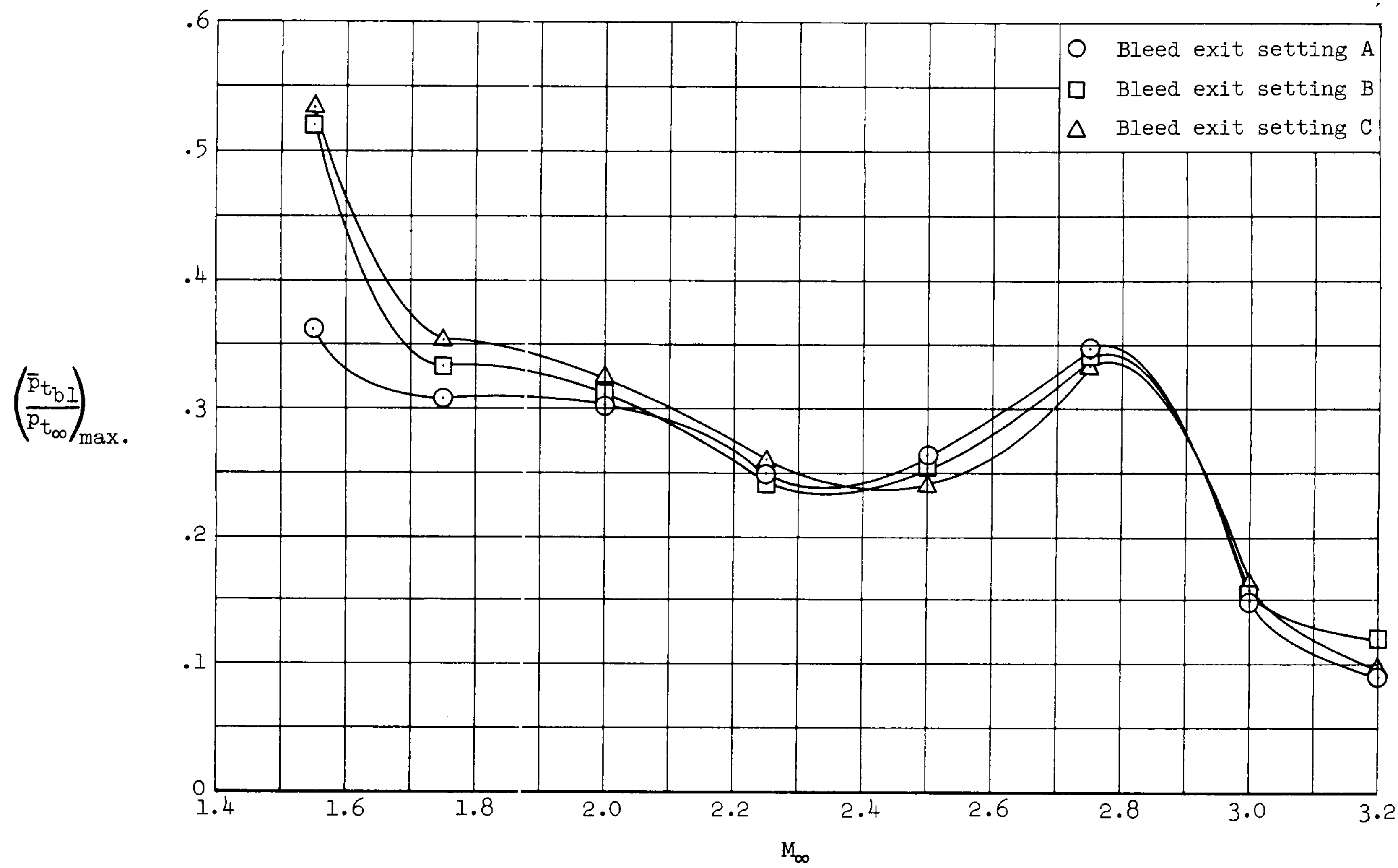
(d) Bleed exit setting D.

Figure 27.- Concluded.



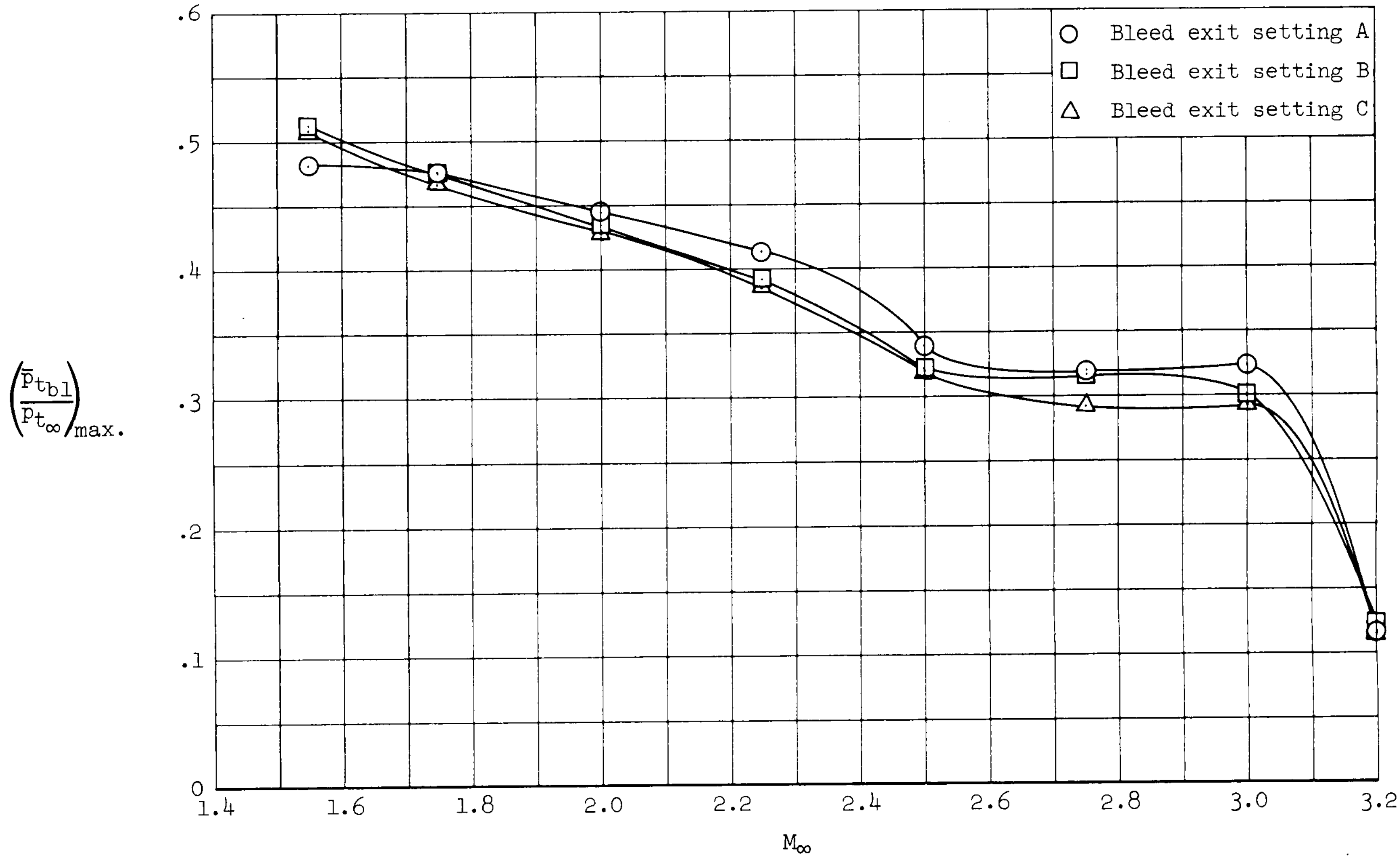
(a) Bleed zone I.

Figure 28.- Maximum bleed plenum chamber pressure recoveries, 1.50 D inlet with vortex generators; $\alpha = 0^\circ$.



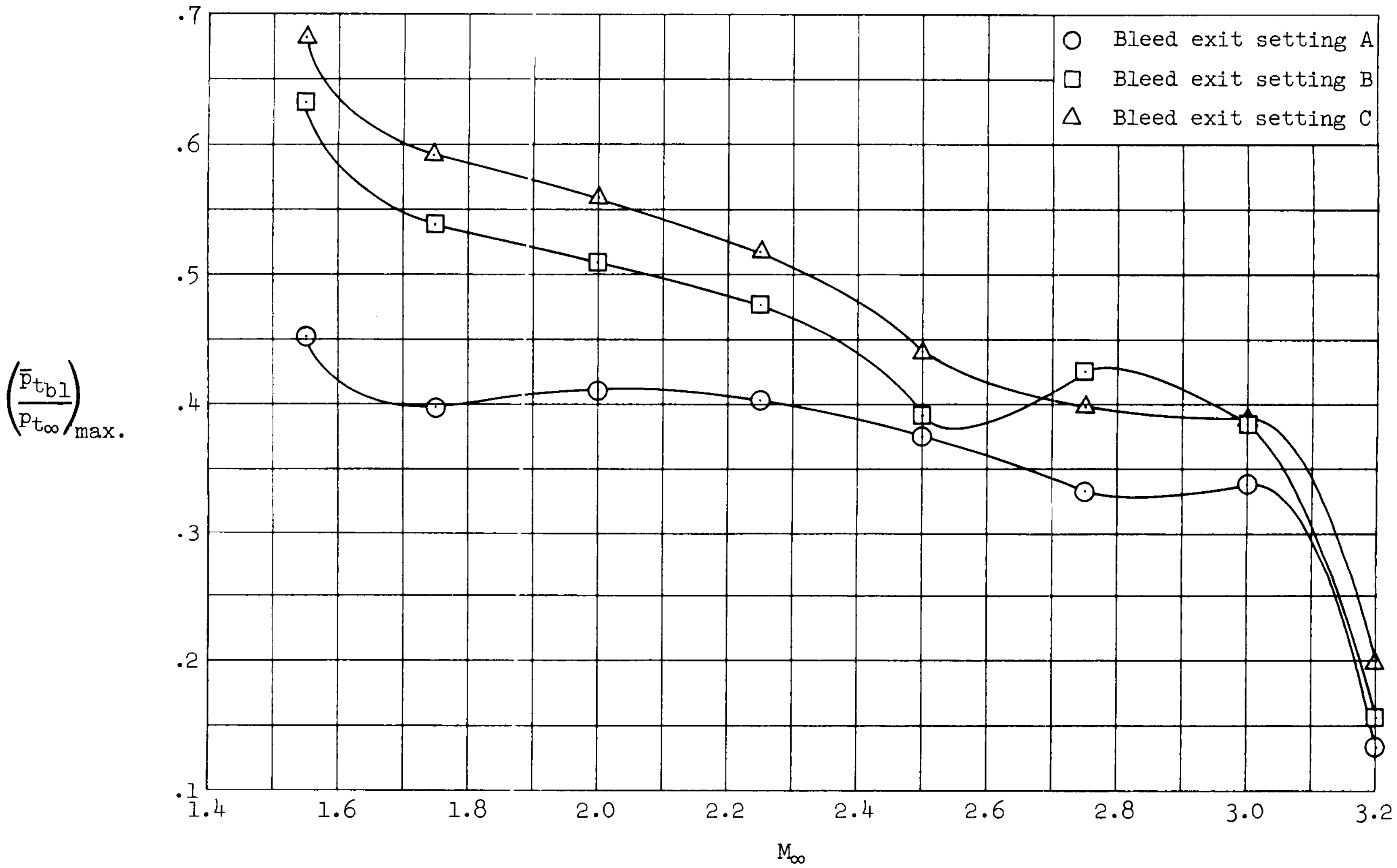
(b) Bleed zone II.

Figure 28.- Continued.



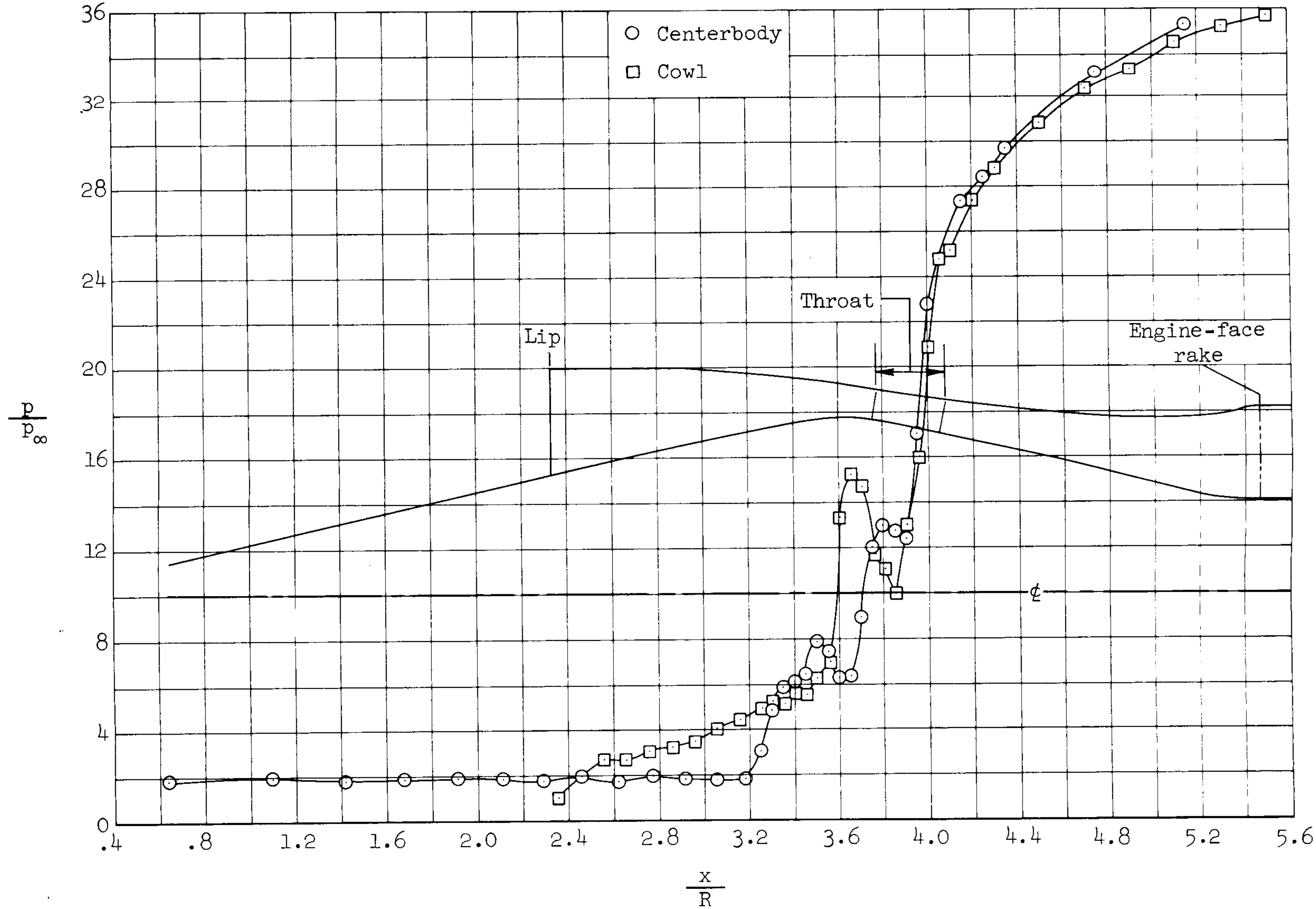
(c) Bleed zone III.

Figure 28.- Continued.



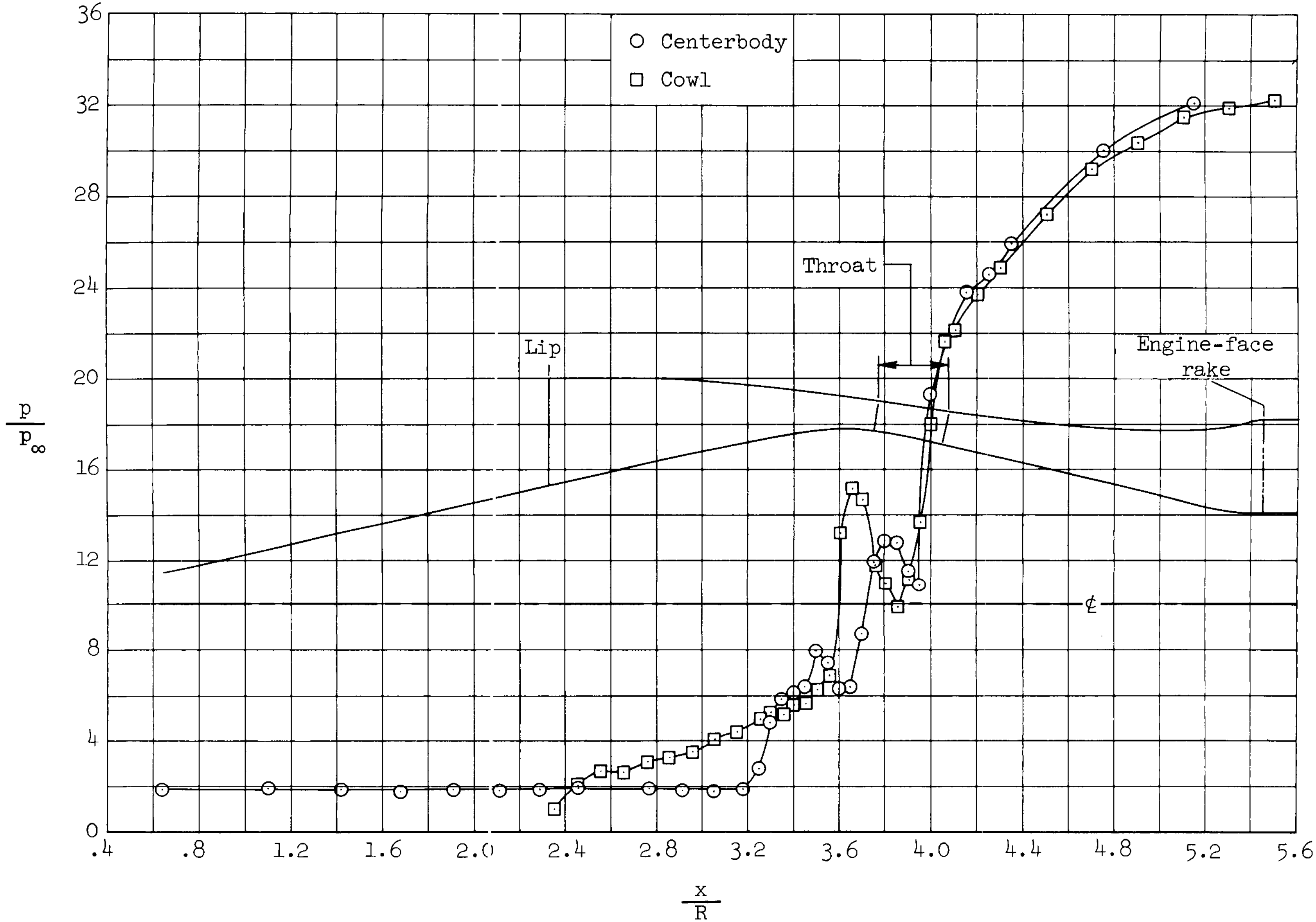
(d) Bleed zone IV.

Figure 28.- Concluded.



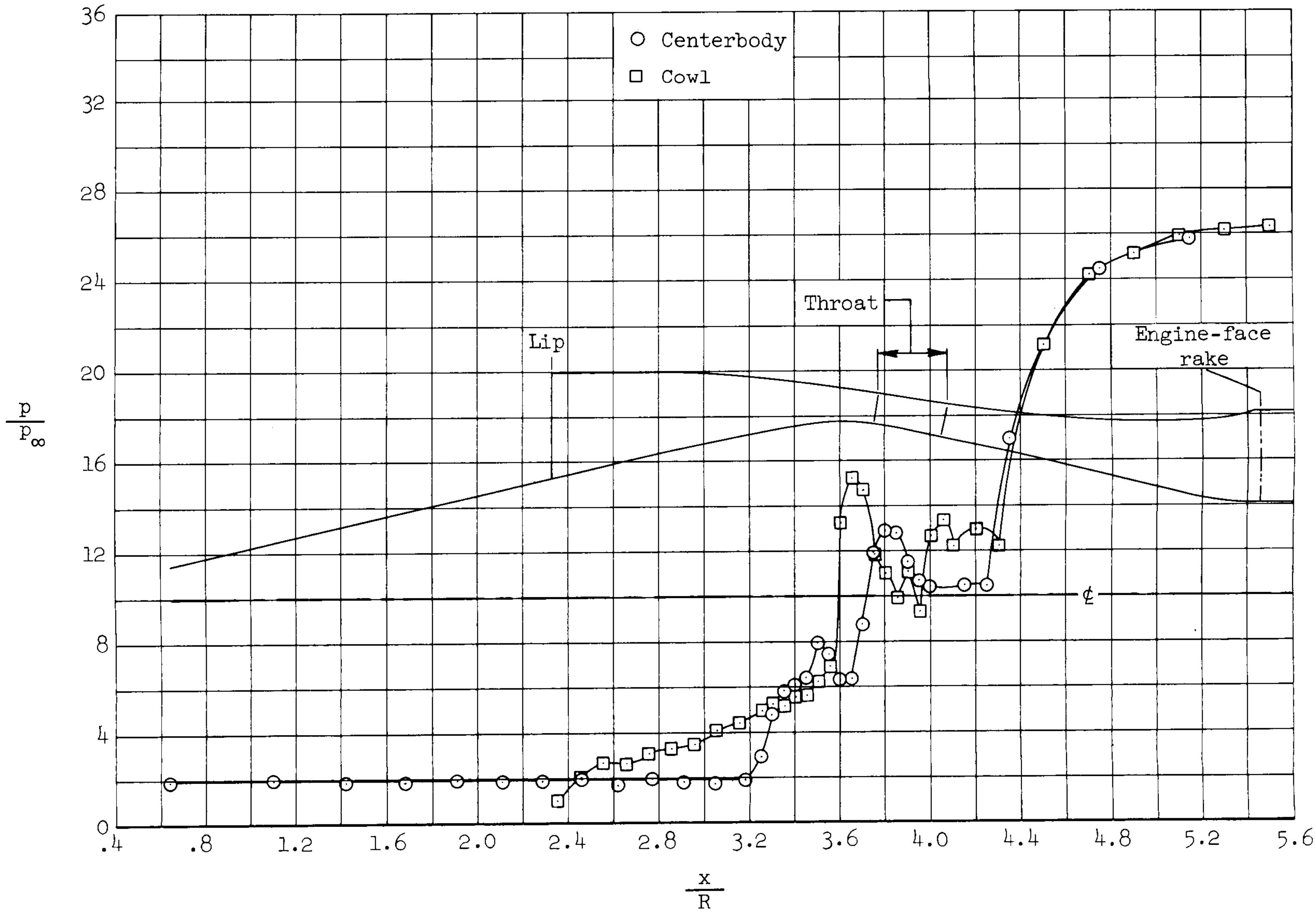
(a) $\bar{p}_{t_2}/p_{t_\infty} = 0.776$, $m_{bl}/m_\infty = 0.077$.

Figure 29.- Static pressure distribution, 1.50 D inlet with vortex generators; bleed exit setting B, $(x/R)_{lip} = 2.330$; $M_\infty = 3.20$, $\alpha = 0°$.



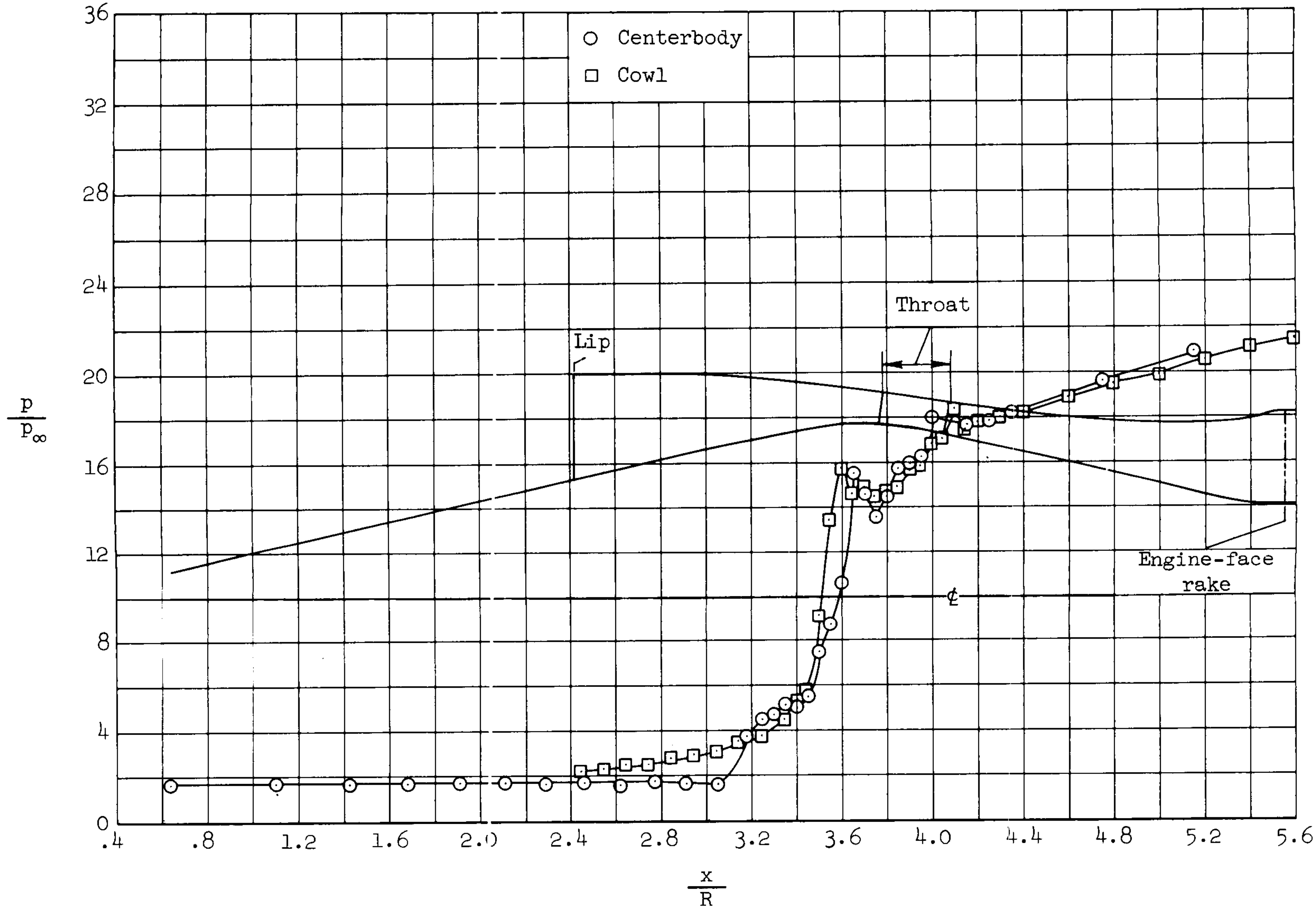
(b) $\bar{p}_{t_2}/p_{t_\infty} = 0.730$, $m_{bl}/m_\infty = 0.061$.

Figure 29.- Continued.



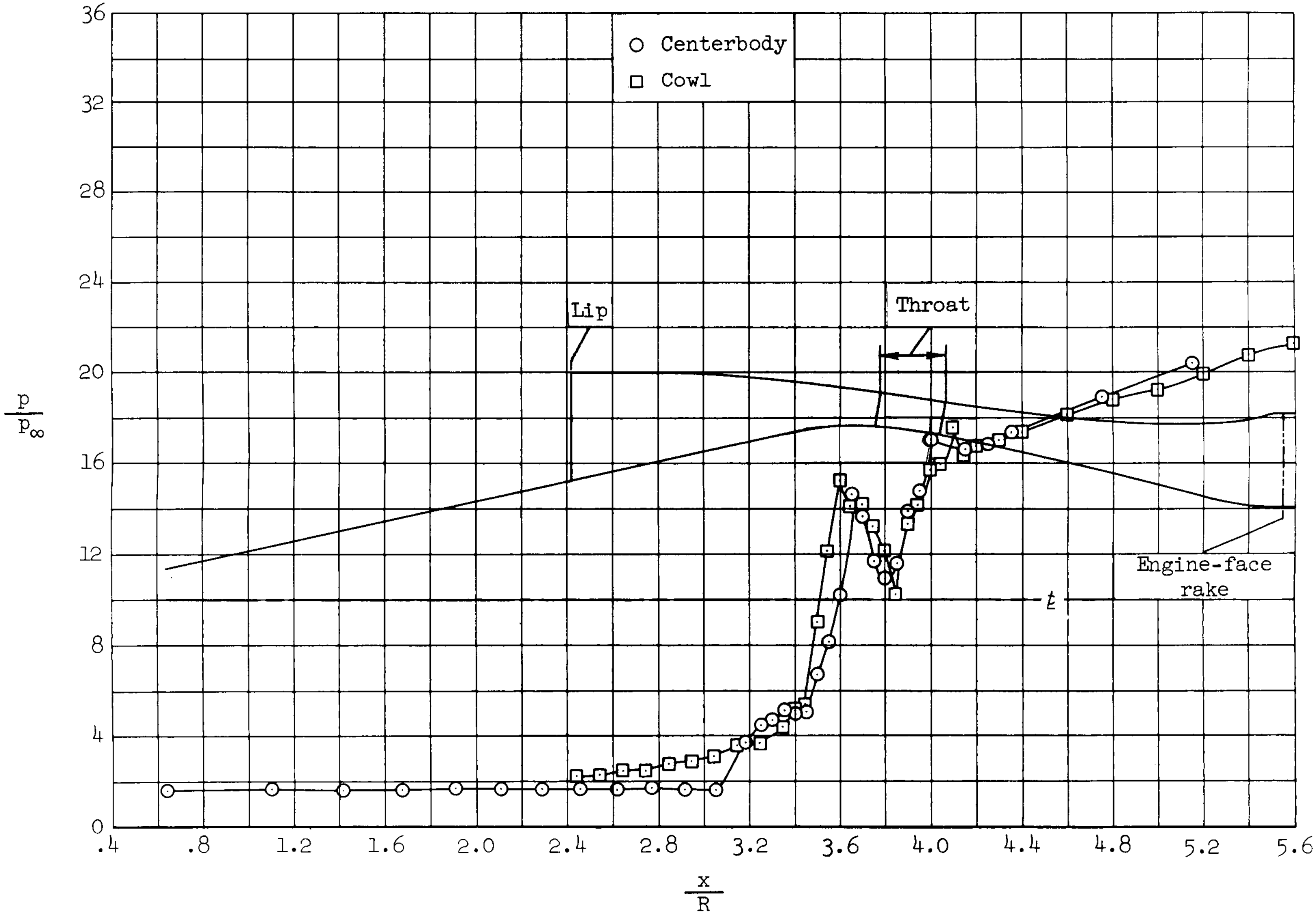
(c) $\bar{p}_{t_2}/p_{t_\infty} = 0.634$, $m_{bl}/m_\infty = 0.060$.

Figure 29.- Concluded.



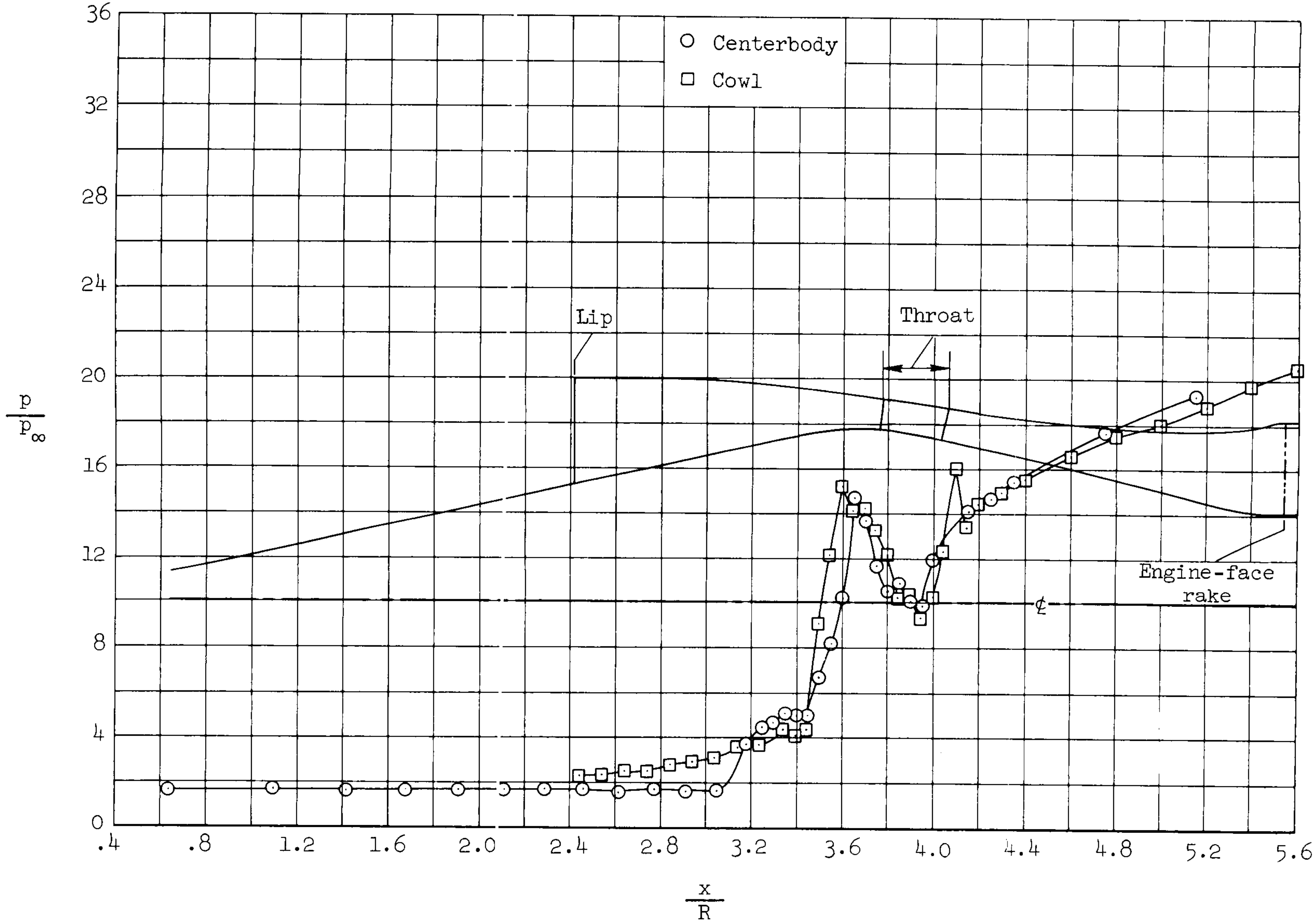
(a) $\bar{P}_{t_2}/p_{t_\infty} = 0.913$, $m_{bl}/m_\infty = 0.120$.

Figure 30.- Static pressure distribution, 1.50 D inlet with vortex generators; bleed exit setting B, $(x/R)_{lip} = 2.420$; $M_\infty = 2.75$, $\alpha = 0°$.



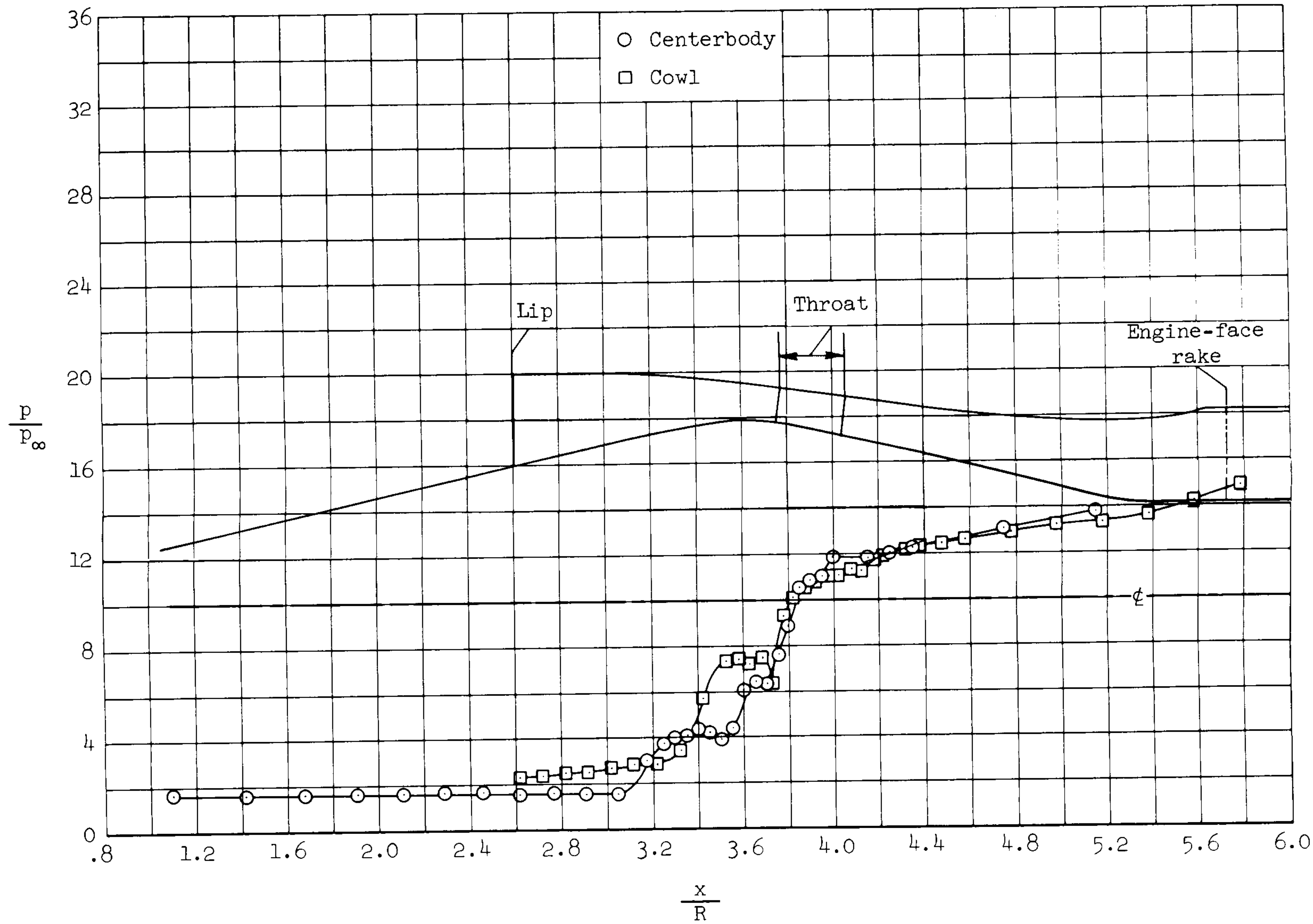
(b) $\bar{p}_{t_2}/p_{t_\infty} = 0.902$, $m_{bl}/m_\infty = 0.104$.

Figure 30.- Continued.



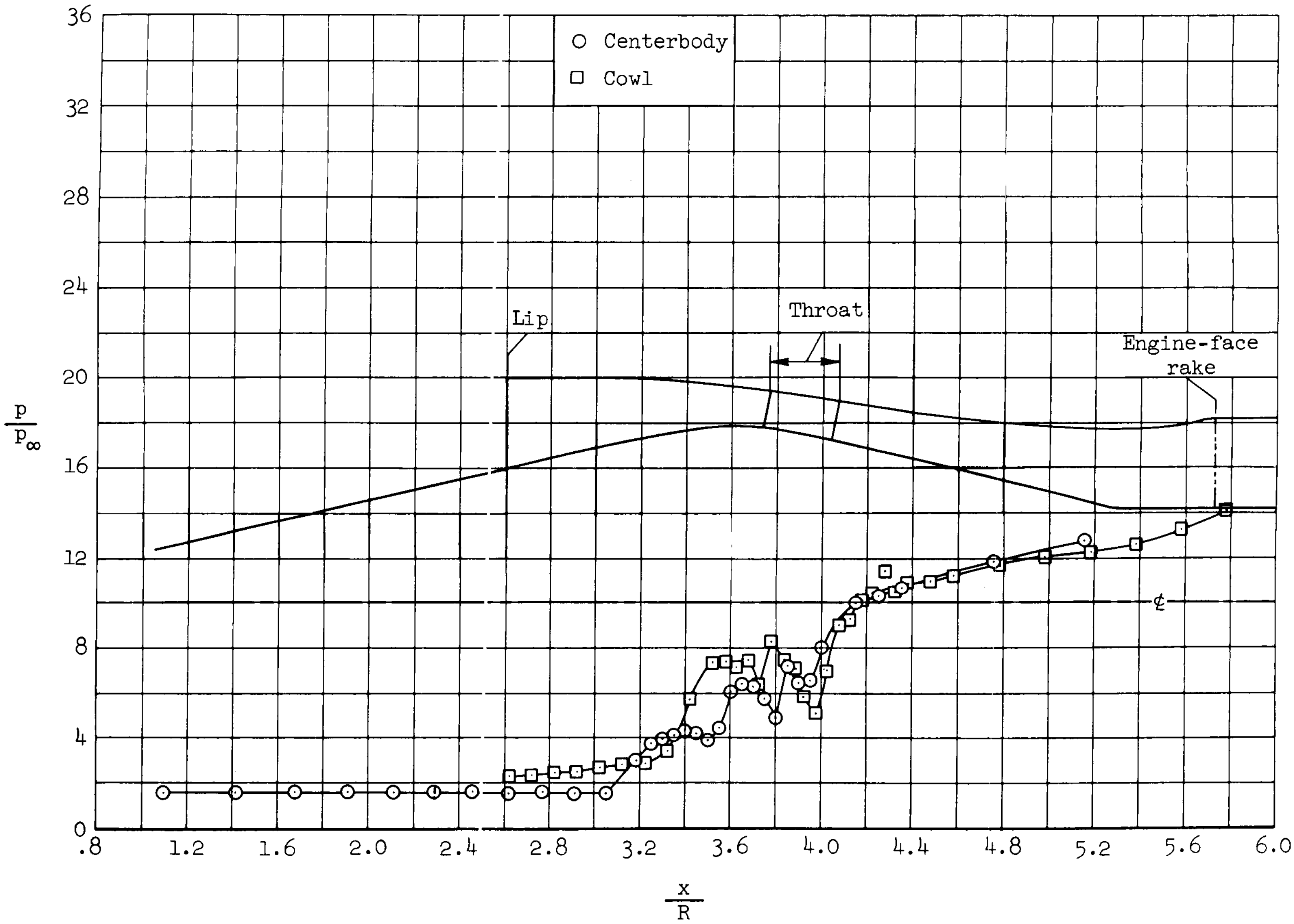
(c) $\bar{p}_{t,2}/p_{t_\infty} = 0.873$, $m_{bl}/m_\infty = 0.091$.

Figure 30.- Concluded.



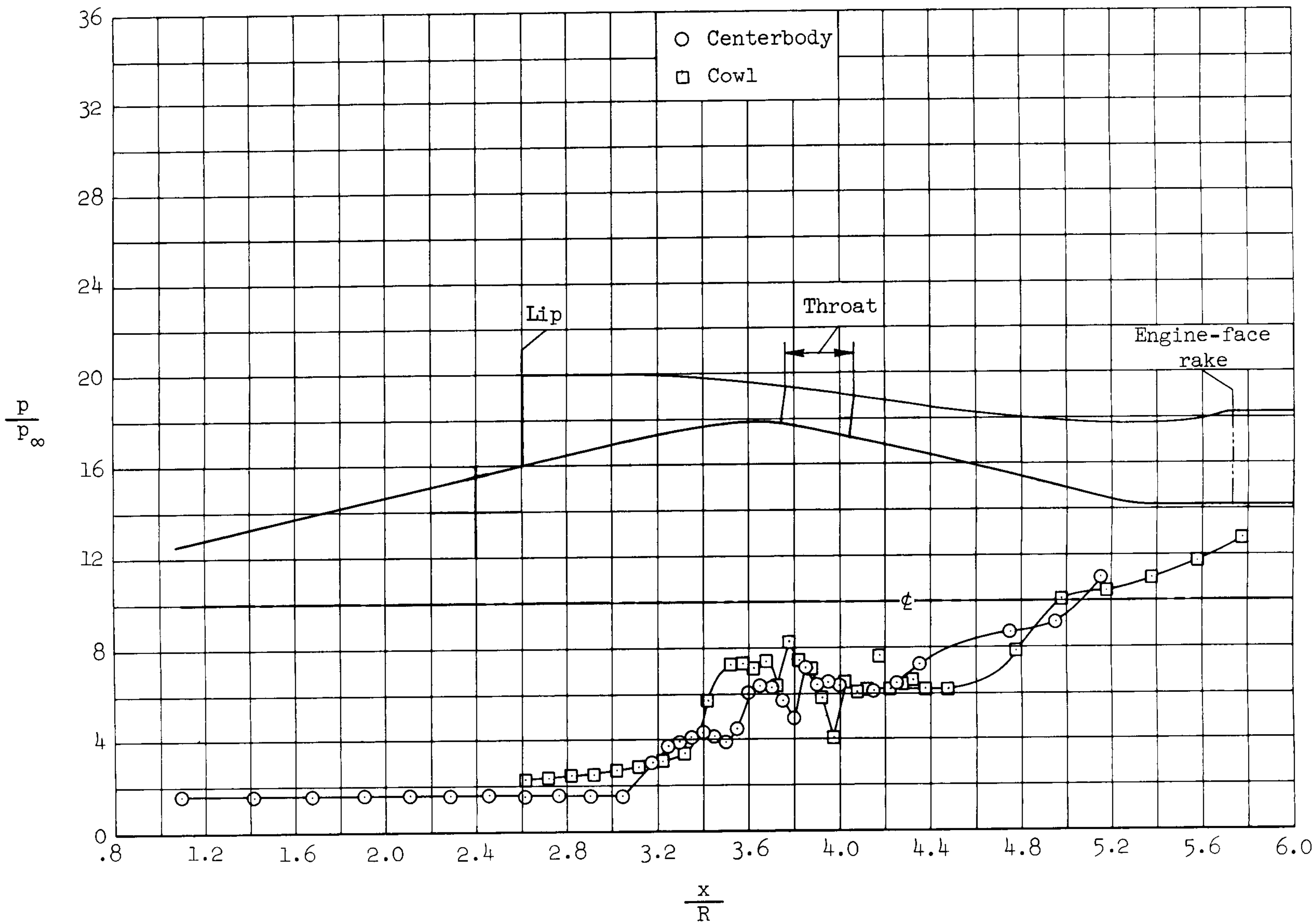
(a) $\bar{p}_{t_2}/p_{t_\infty} = 0.929$, $m_{bl}/m_\infty = 0.108$.

Figure 31.- Static pressure distribution, 1.50 D inlet with vortex generators; bleed exit setting B, $(x/R)_{lip} = 2.600$; $M_\infty = 2.50$, $\alpha = 0°$.



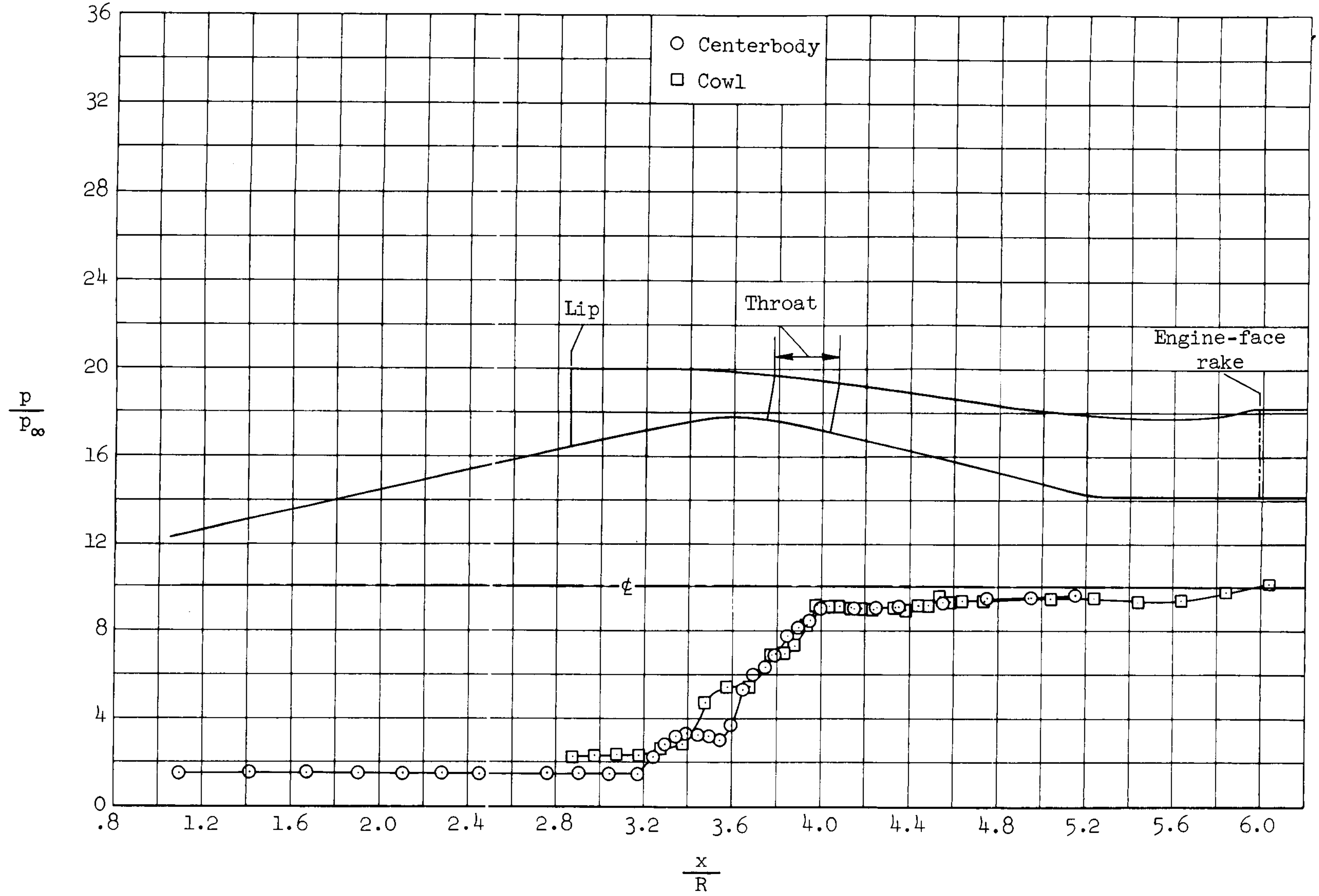
(b) $\bar{p}_{t_2}/p_{t_\infty} = 0.895$, $m_{bl}/m_\infty = 0.091$.

Figure 31.- Continued.



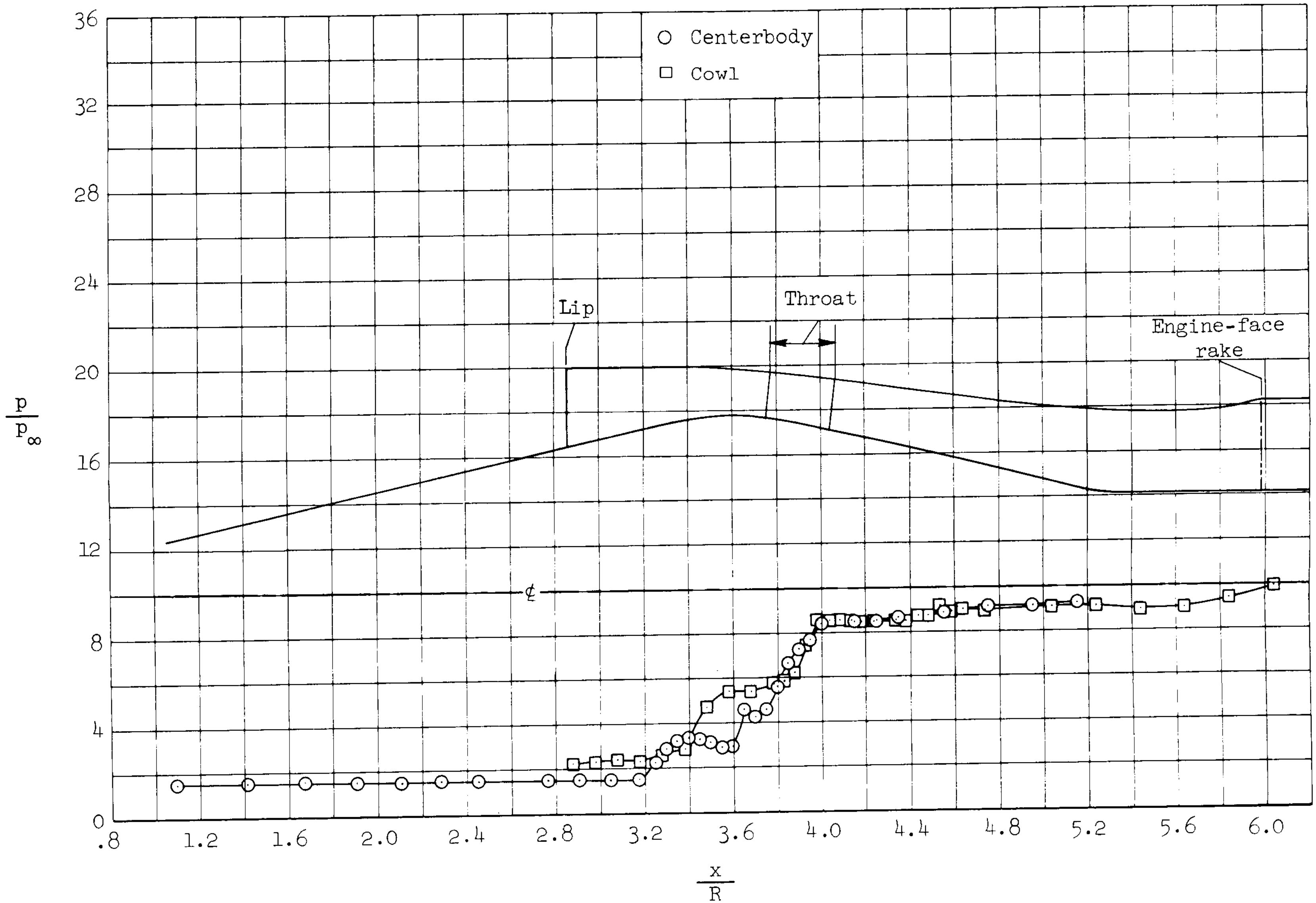
(c) $\bar{p}_{t_2}/p_{t_\infty} = 0.829$, $m_{bl}/m_\infty = 0.084$.

Figure 31.- Concluded.



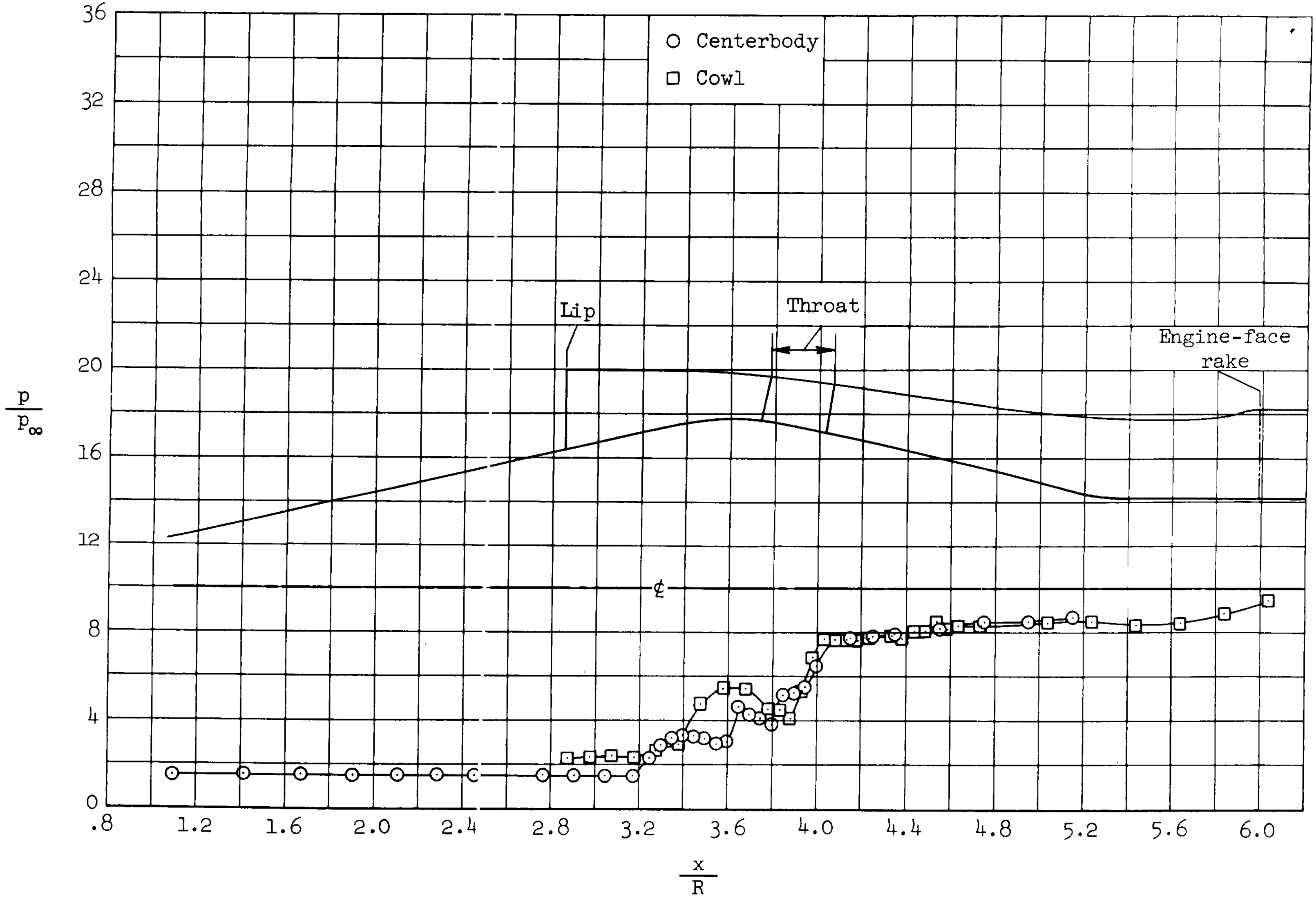
(a) $\bar{p}_{t_2}/p_{t_\infty} = 0.947$, $m_{bl}/m_\infty = 0.109$.

Figure 32.- Static pressure distribution, 1.50 D inlet with vortex generators; bleed exit setting B, $(x/R)_{lip} = 2.860$; $M_\infty = 2.25$, $\alpha = 0°$.



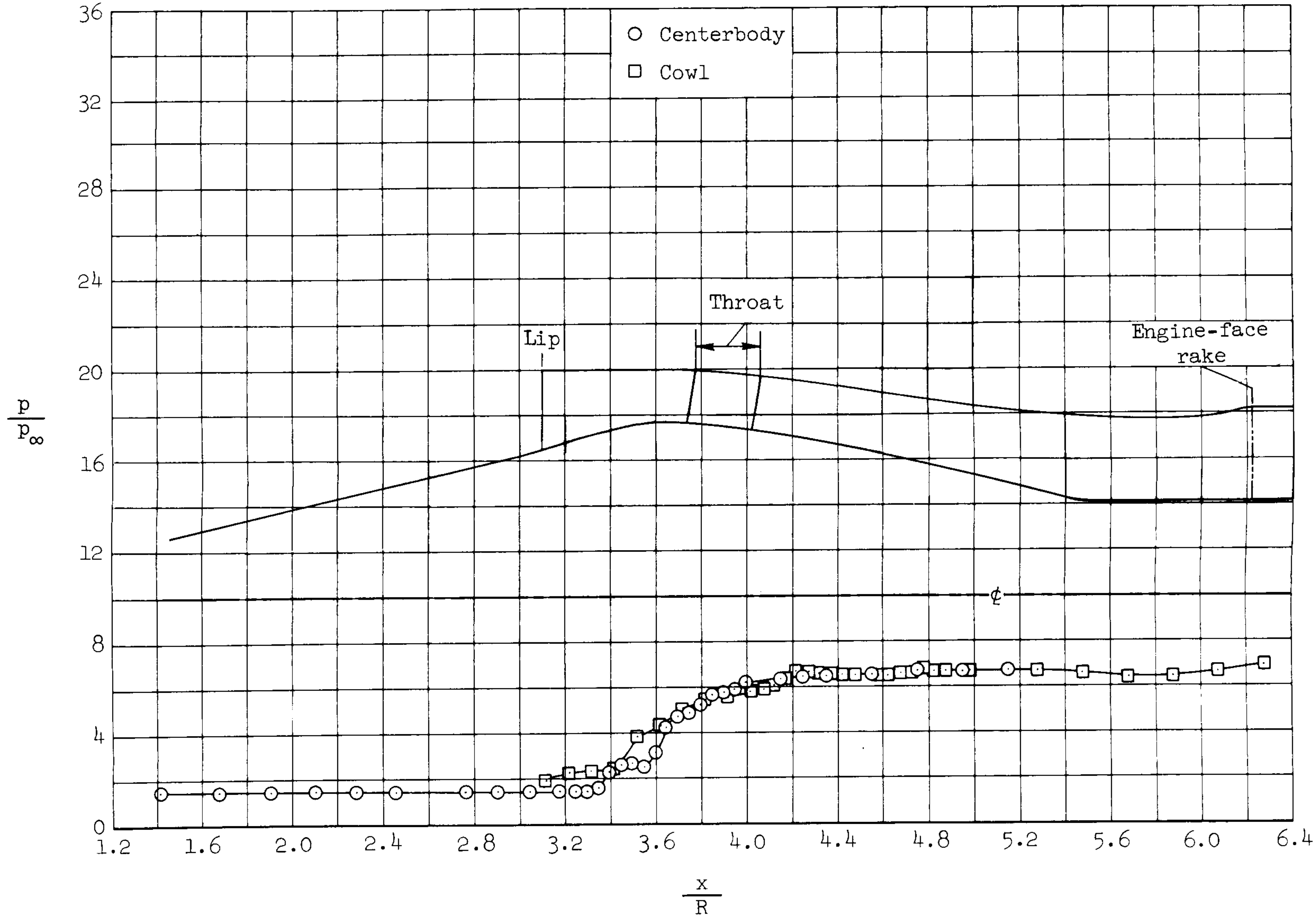
(b) $\bar{p}_{t_2}/p_{t_\infty} = 0.933$, $m_{bl}/m_\infty = 0.092$.

Figure 32.- Continued.



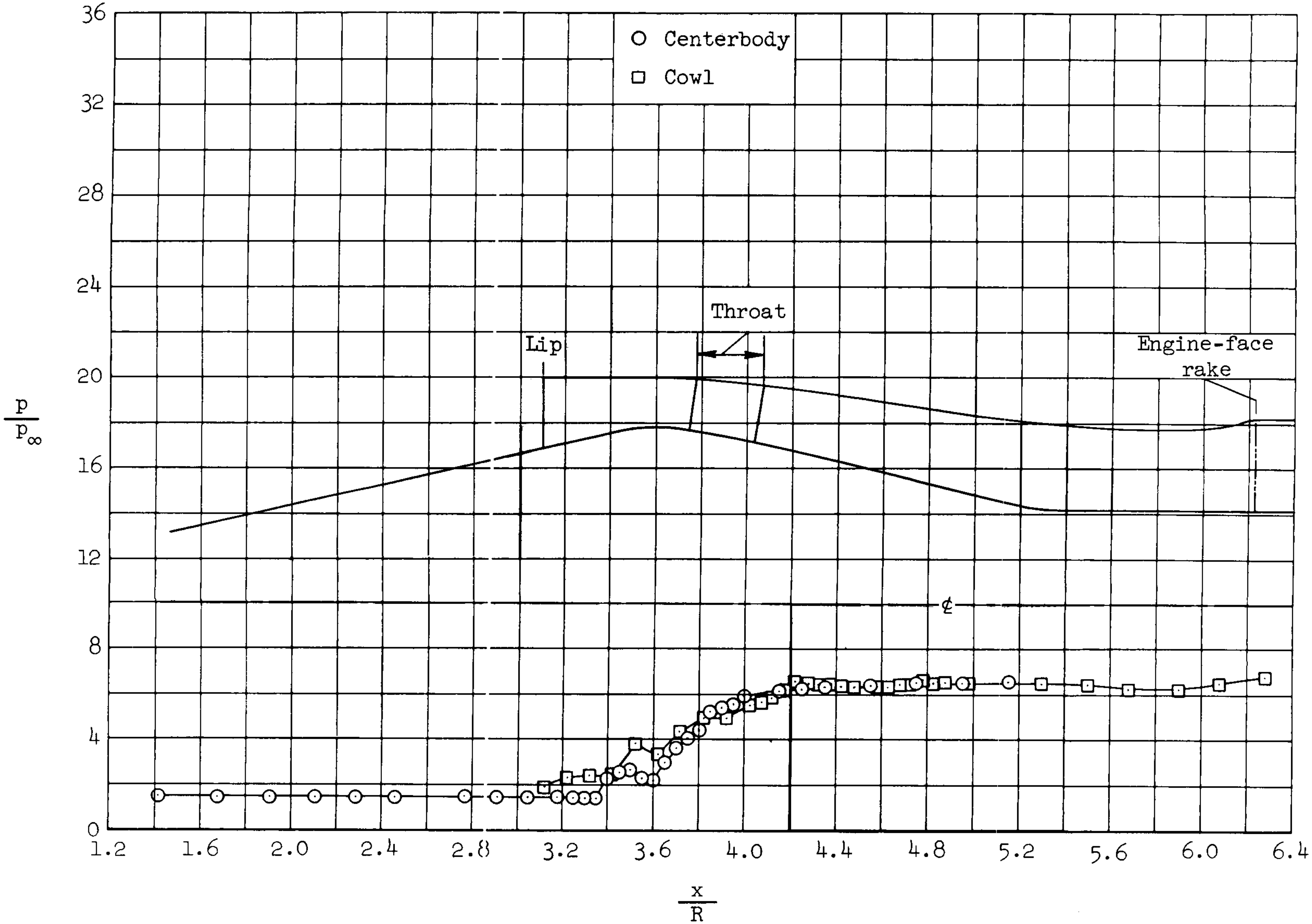
(c) $\bar{p}_{t_2}/p_{t_\infty} = 0.902$, $m_{bl}/m_\infty = 0.071$.

Figure 32.- Concluded.



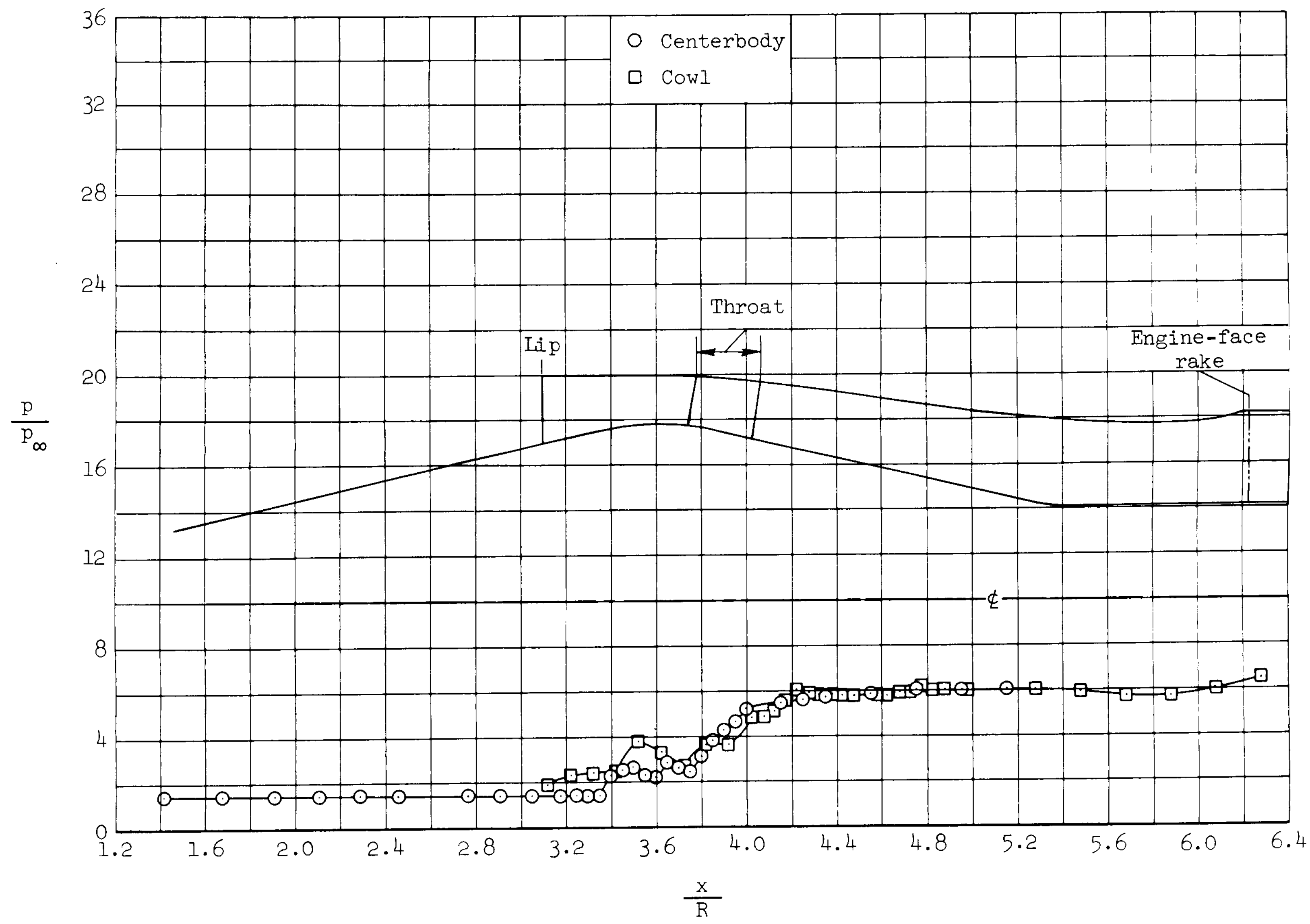
(a) $\bar{p}_{t_2}/p_{t_\infty} = 0.956$, $m_{bl}/m_\infty = 0.104$.

Figure 33.- Static pressure distribution, 1.50 D inlet with vortex generators; bleed exit setting B, $(x/R)_{lip} = 3.100$; $M_\infty = 2.00$, $\alpha = 0°$.



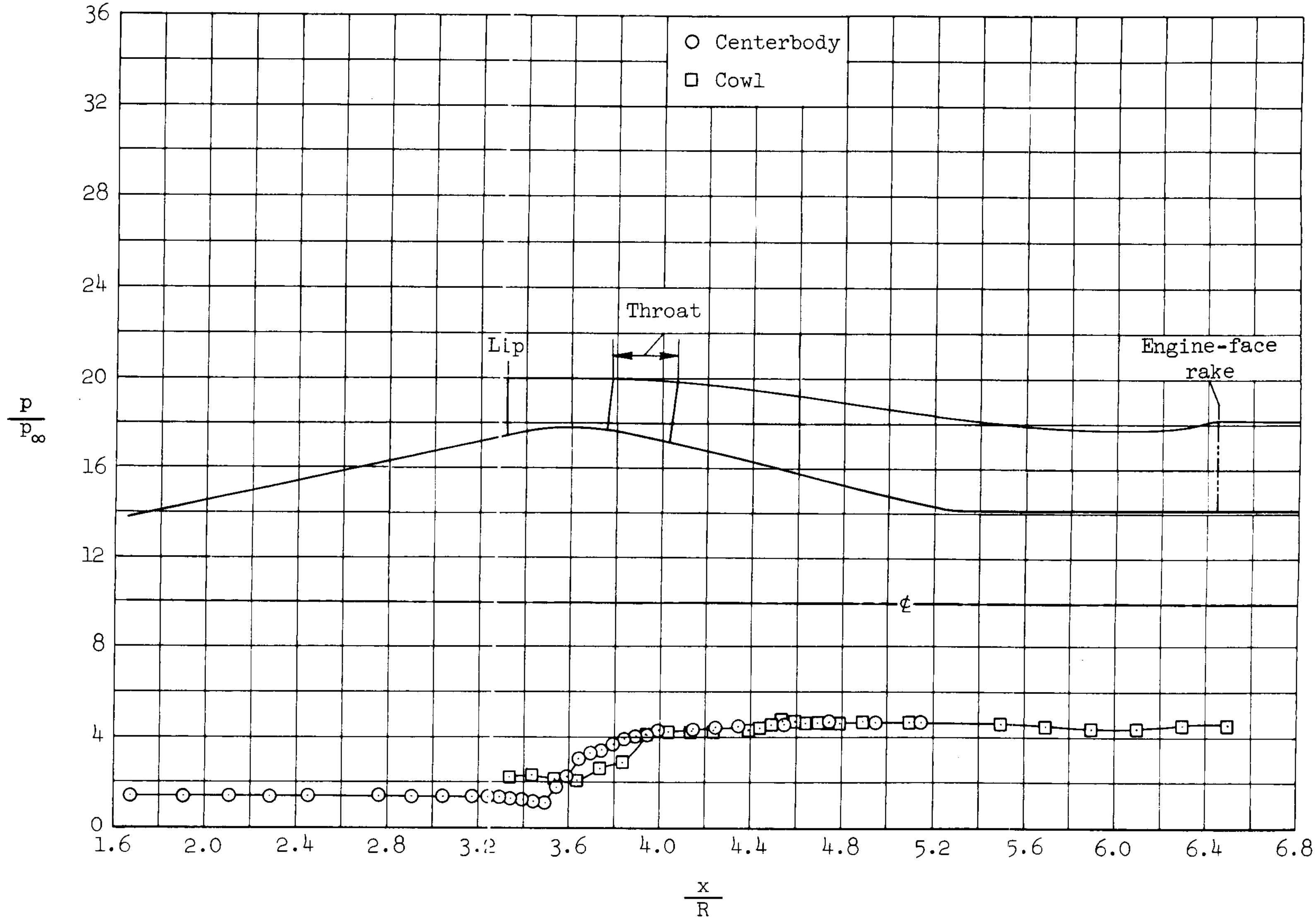
(b) $\bar{p}_{t_2}/p_{t_\infty} = 0.943$, $m_{bl}/m_\infty = 0.095$.

Figure 33.- Continued.



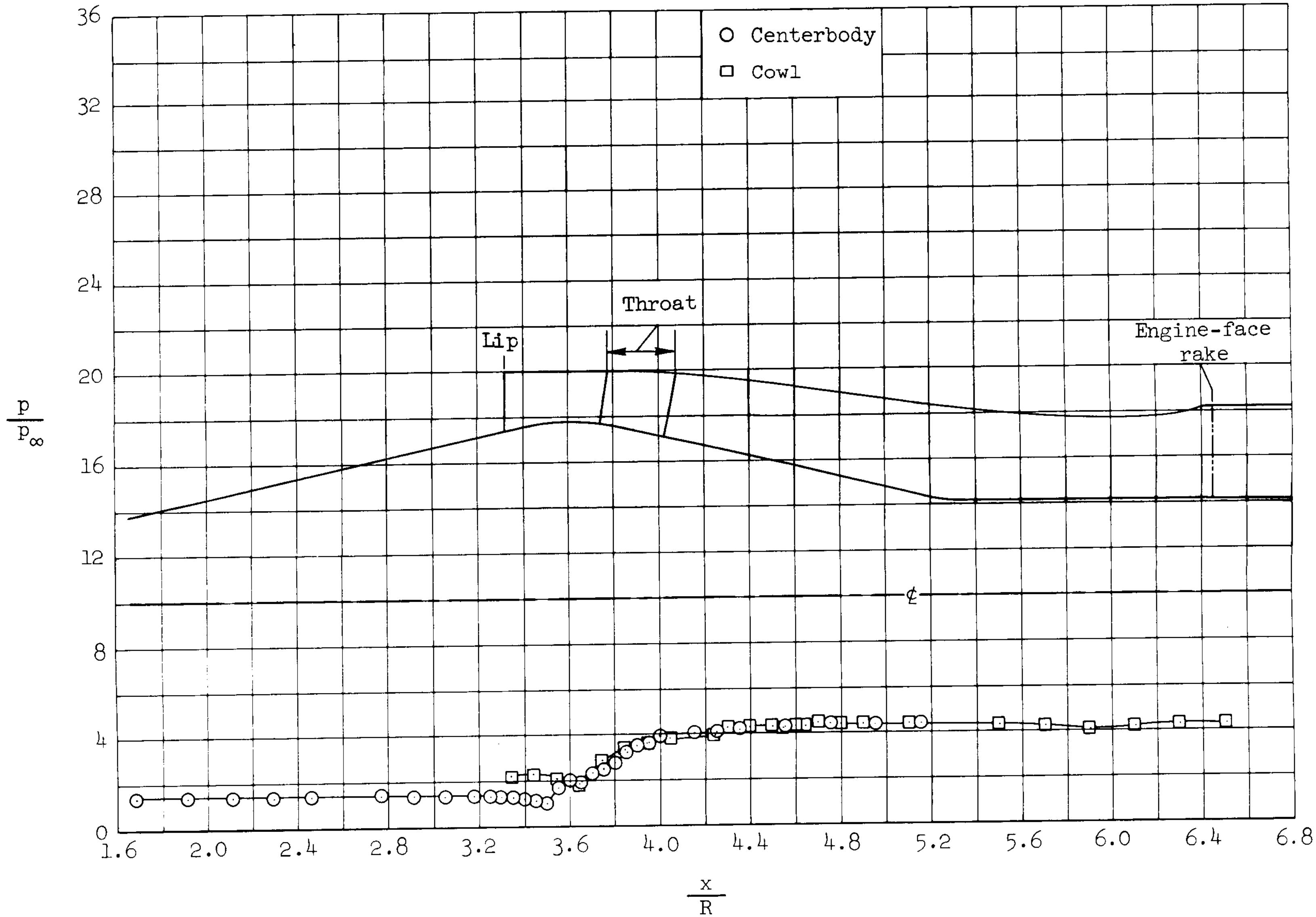
(c) $\bar{p}_{t_2}/p_{t_\infty} = 0.907$, $m_{bl}/m_\infty = 0.079$.

Figure 33.- Concluded.



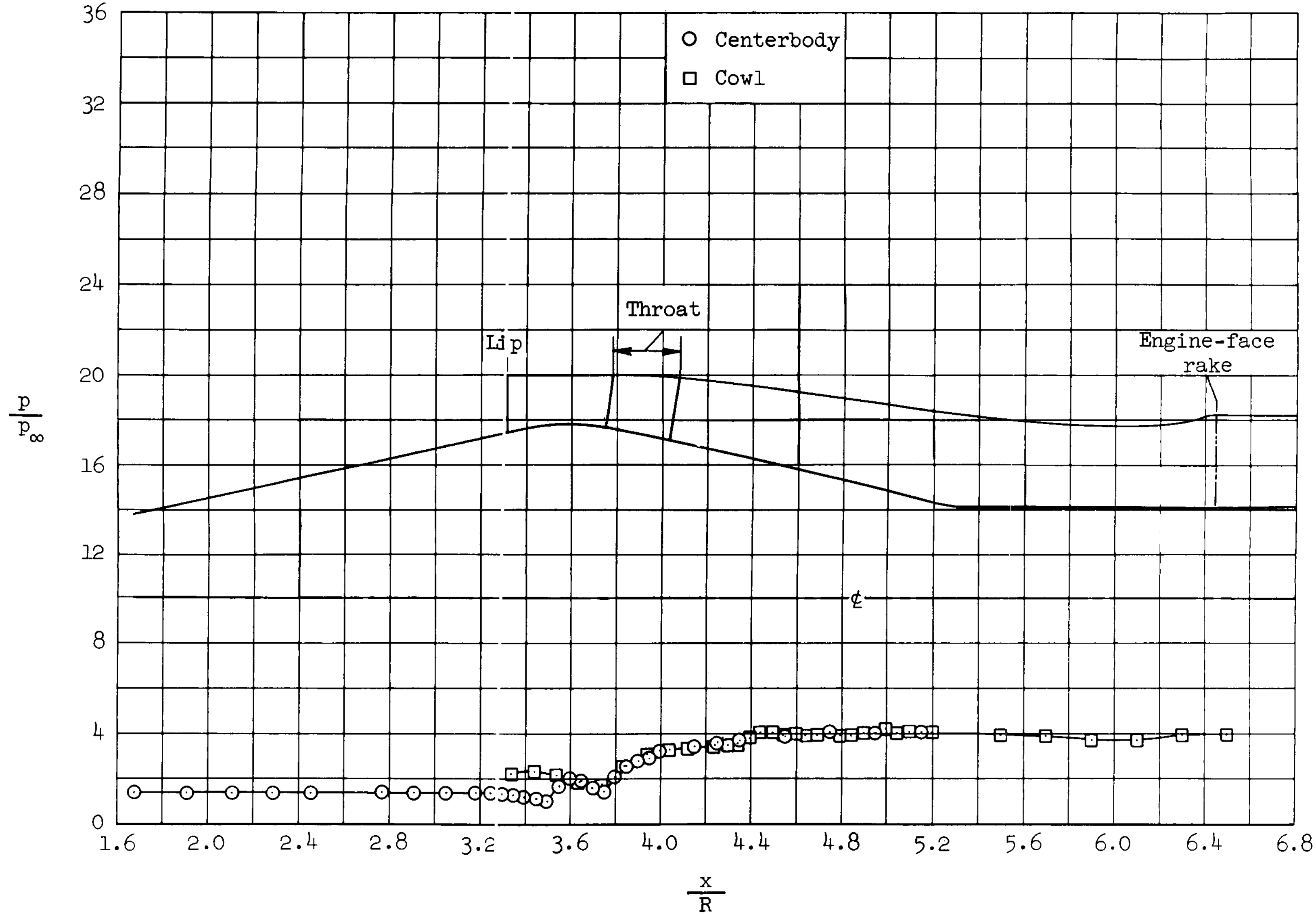
(a) $\bar{p}_{t_2}/p_{t_\infty} = 0.960$, $m_{bl}/m_\infty = 0.092$.

Figure 34.- Static pressure distribution, 1.50 D inlet with vortex generators; bleed exit setting B, $(x/R)_{lip} = 3.320$; $M_\infty = 1.75$, $\alpha = 0°$.



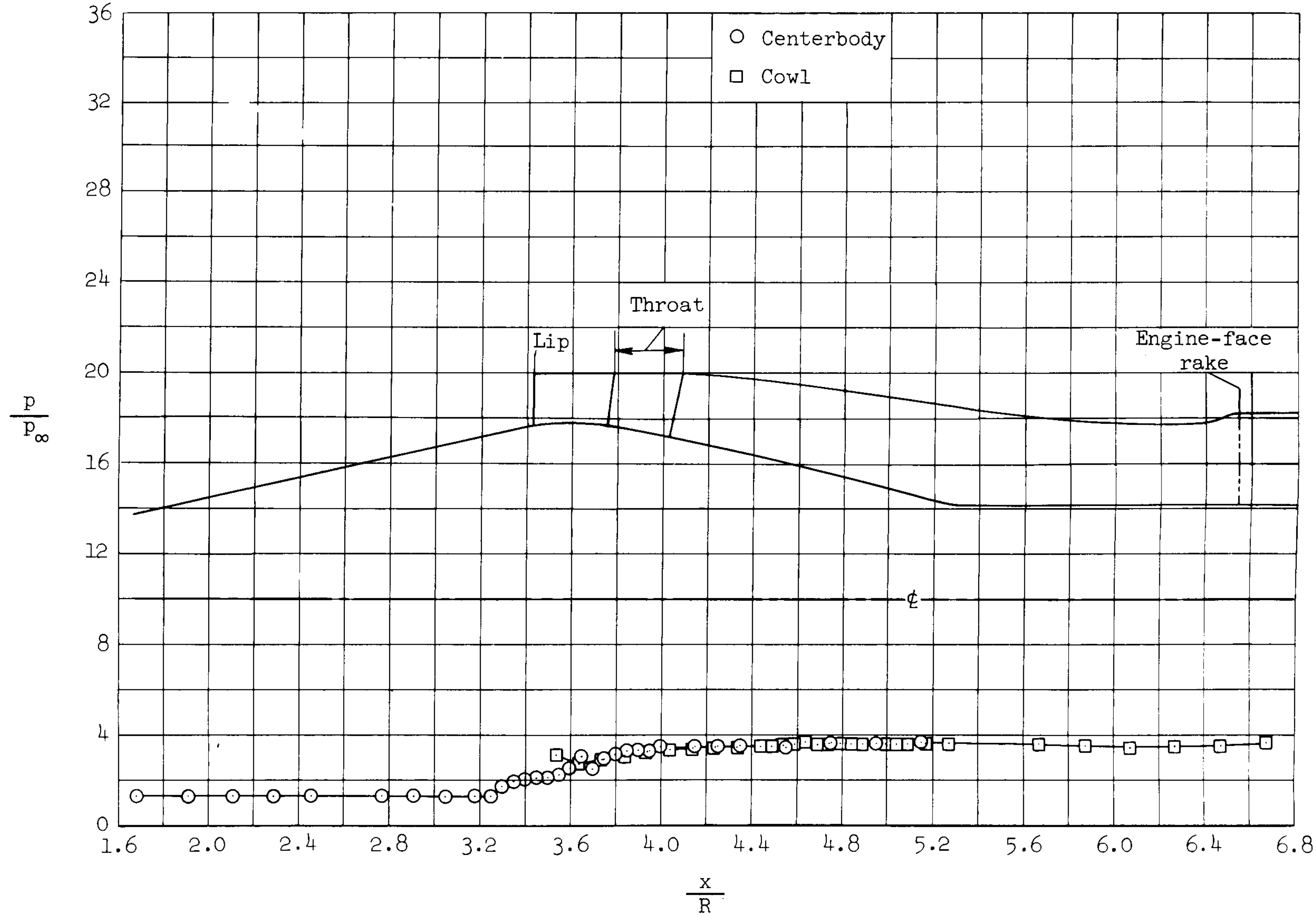
(b) $\bar{p}_{t_2}/p_{t_\infty} = 0.932$, $m_{bl}/m_\infty = 0.080$.

Figure 34.- Continued.



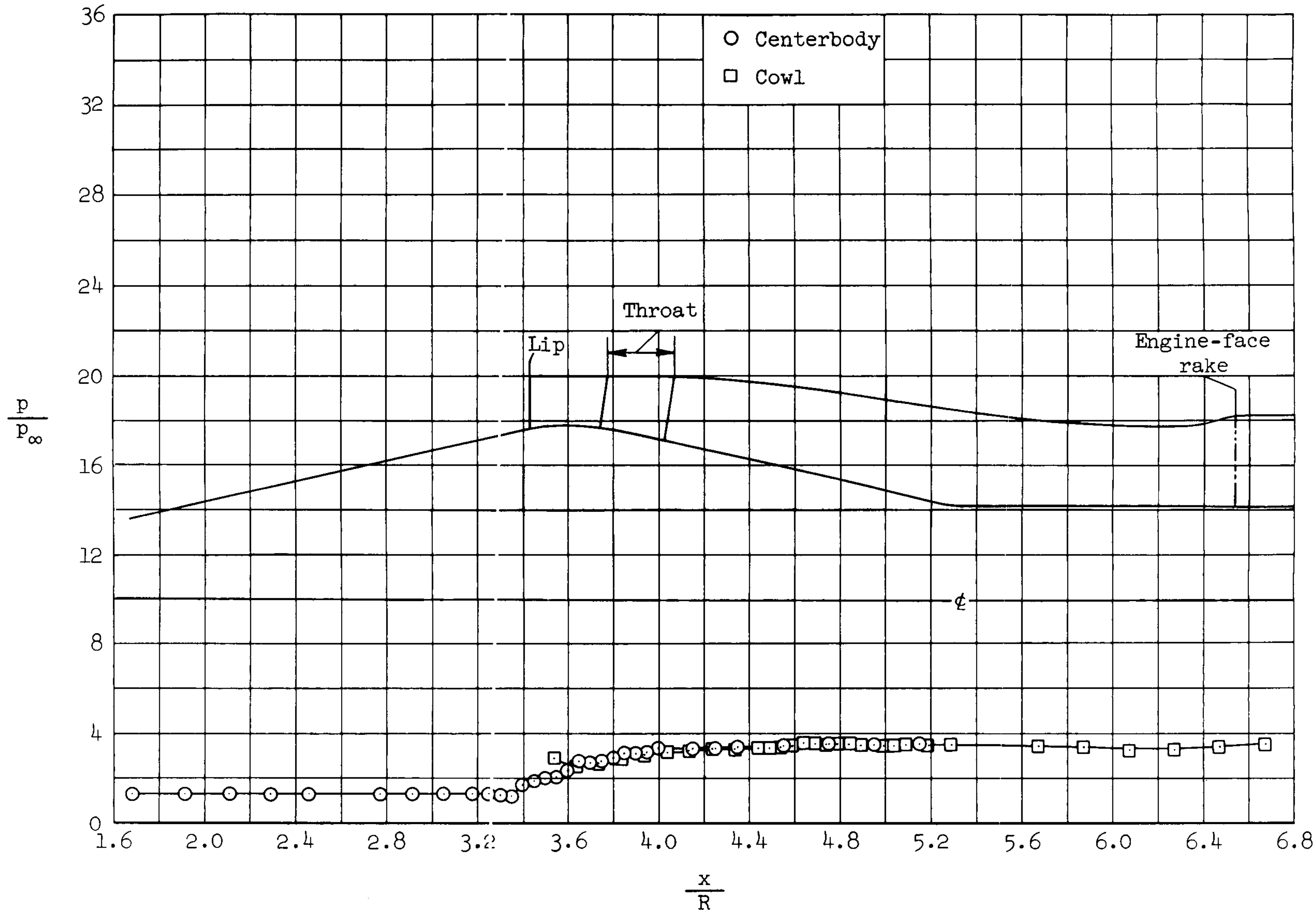
(c) $\bar{p}_{t_2}/p_{t_\infty} = 0.888$, $m_{bl}/m_\infty = 0.068$.

Figure 34.- Concluded.



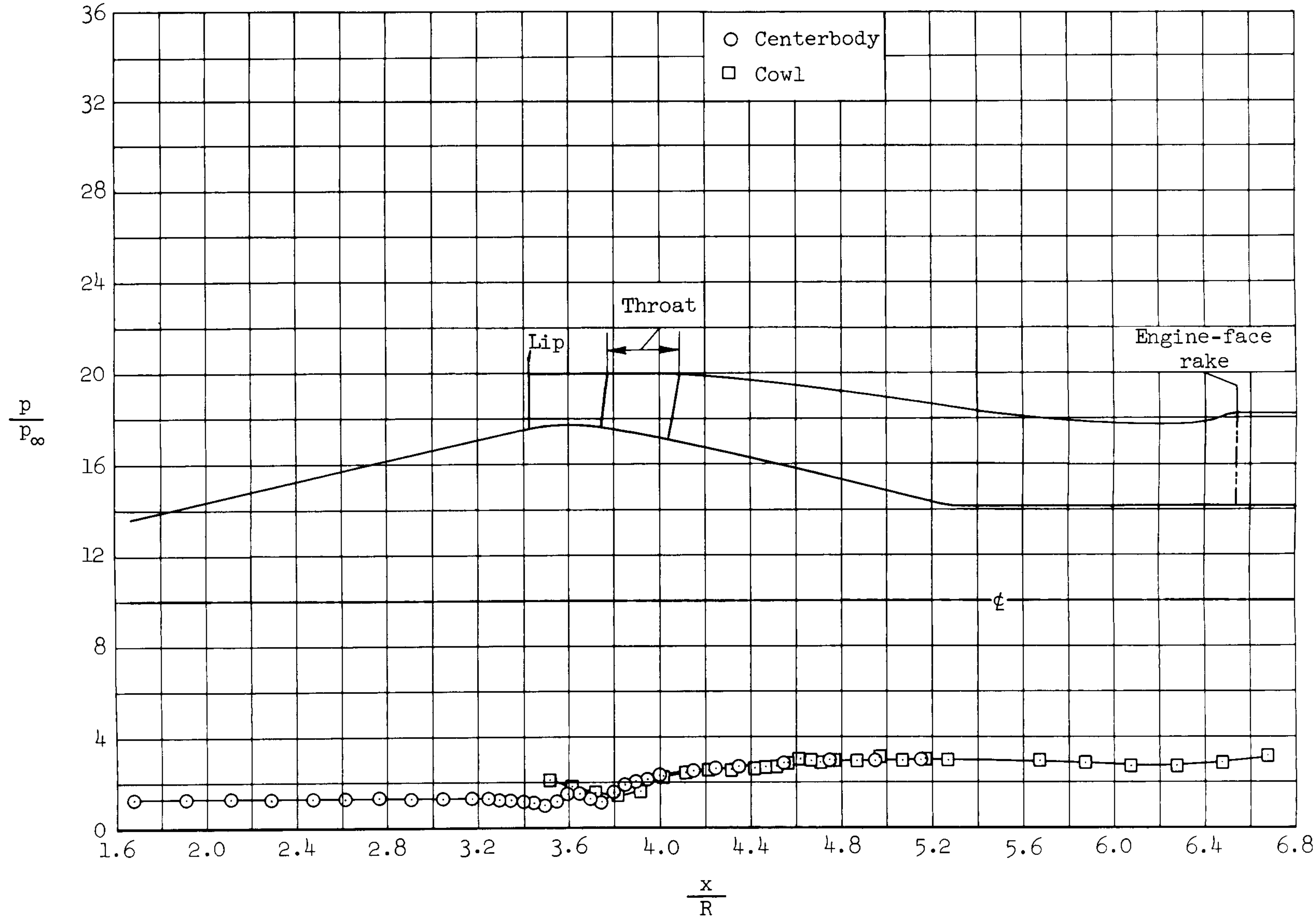
(a) $\bar{p}_{t_2}/p_{t_\infty} = 0.979$, $m_{bl}/m_\infty = 0.096$.

Figure 35.- Static pressure distribution, 1.50 D inlet with vortex generators; bleed exit setting B, $(x/R)_{lip} = 3.420$; $M_\infty = 1.55$, $\alpha = 0°$.



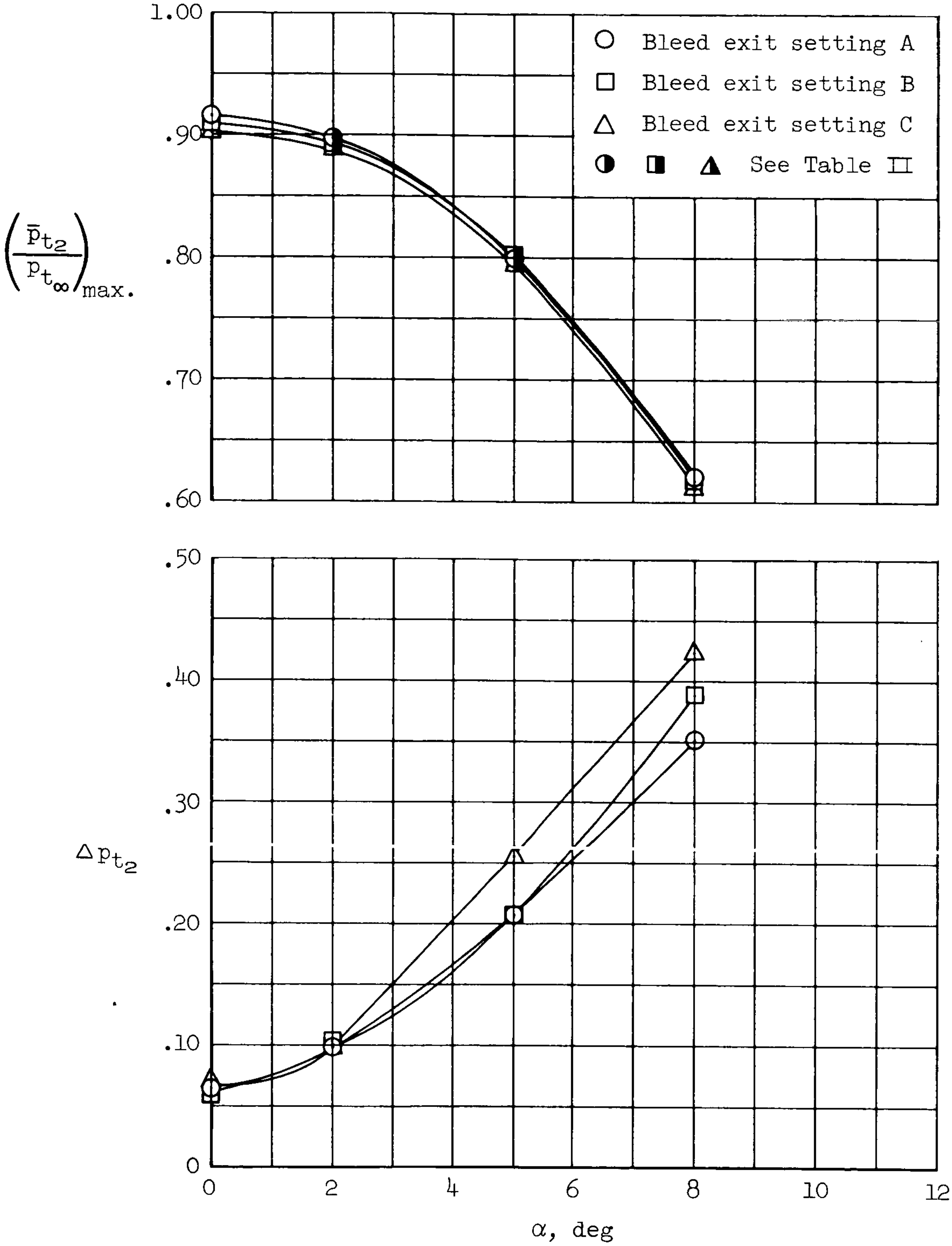
(b) $\bar{p}_{t_2}/p_{t_\infty} = 0.961$, $m_{bl}/m_\infty = 0.087$.

Figure 35.- Continued.



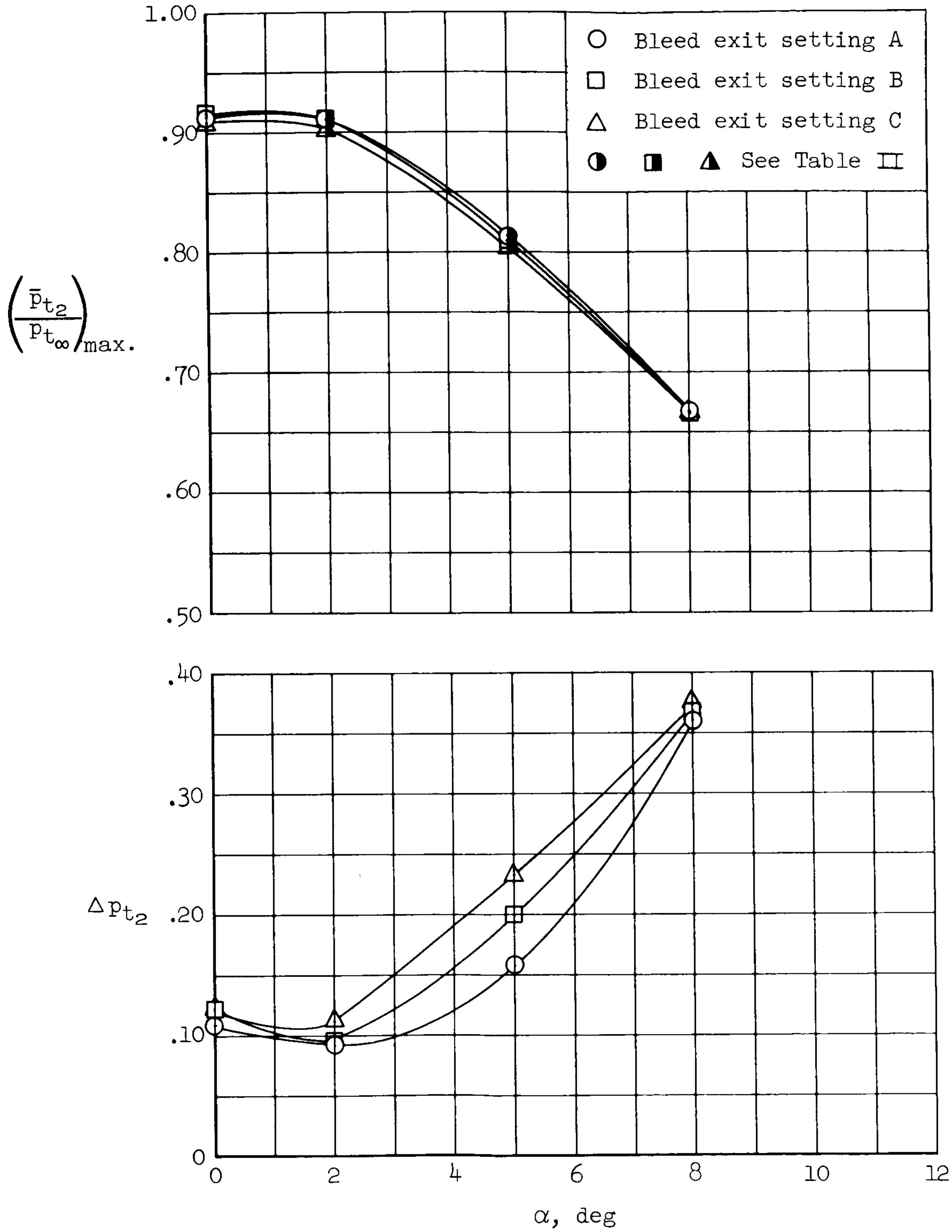
(c) $\bar{p}_{t_2}/p_{t_\infty} = 0.889$, $m_{bl}/m_\infty = 0.055$.

Figure 35.- Concluded.



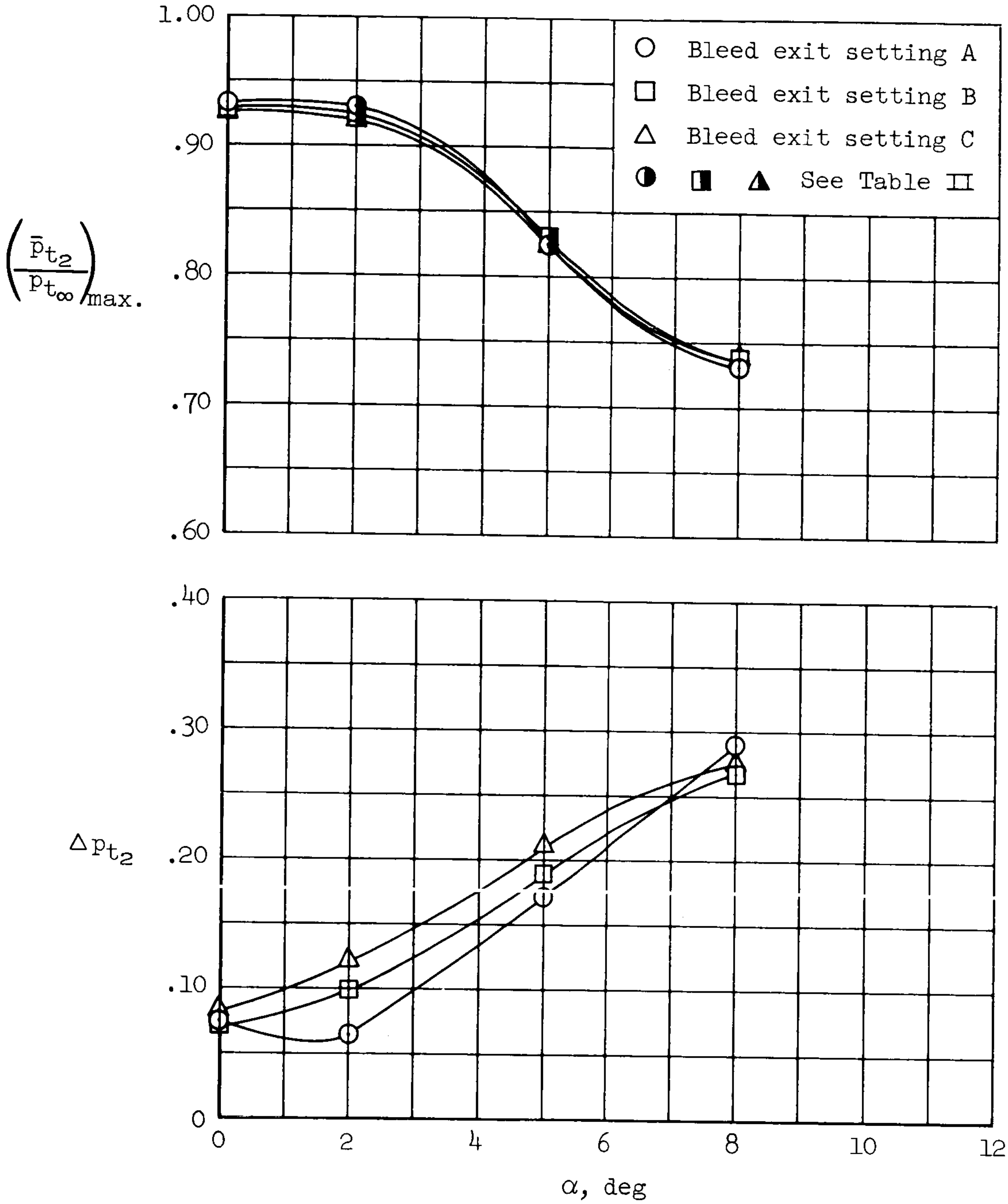
(a) M_∞ = 3.00.

Figure 36.- Maximum performance at angle of attack, 1.50 D inlet with vortex generators.



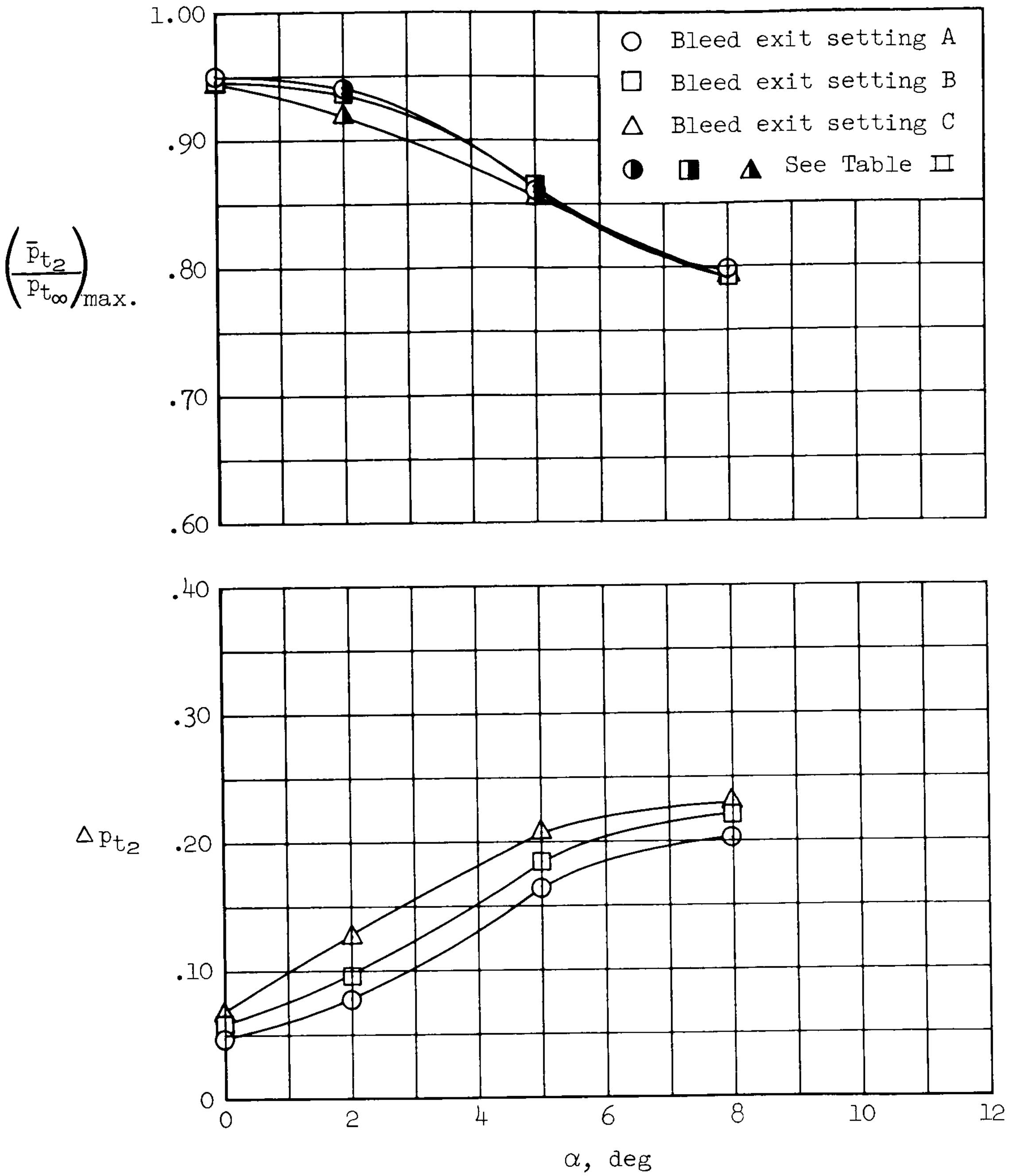
(b) $M_\infty = 2.75$.

Figure 36.- Continued.



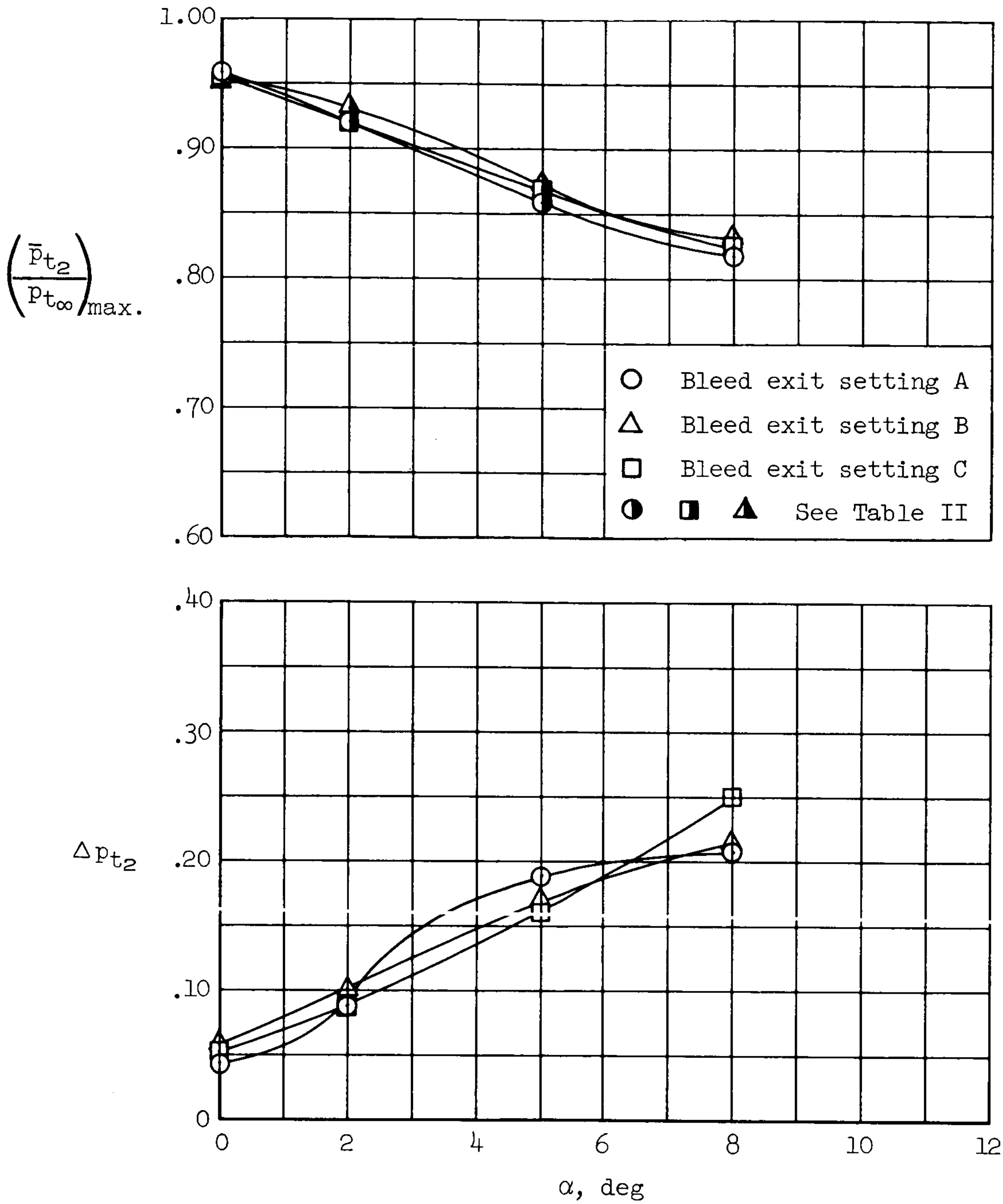
(c) $M_\infty = 2.50$.

Figure 36.- Continued.



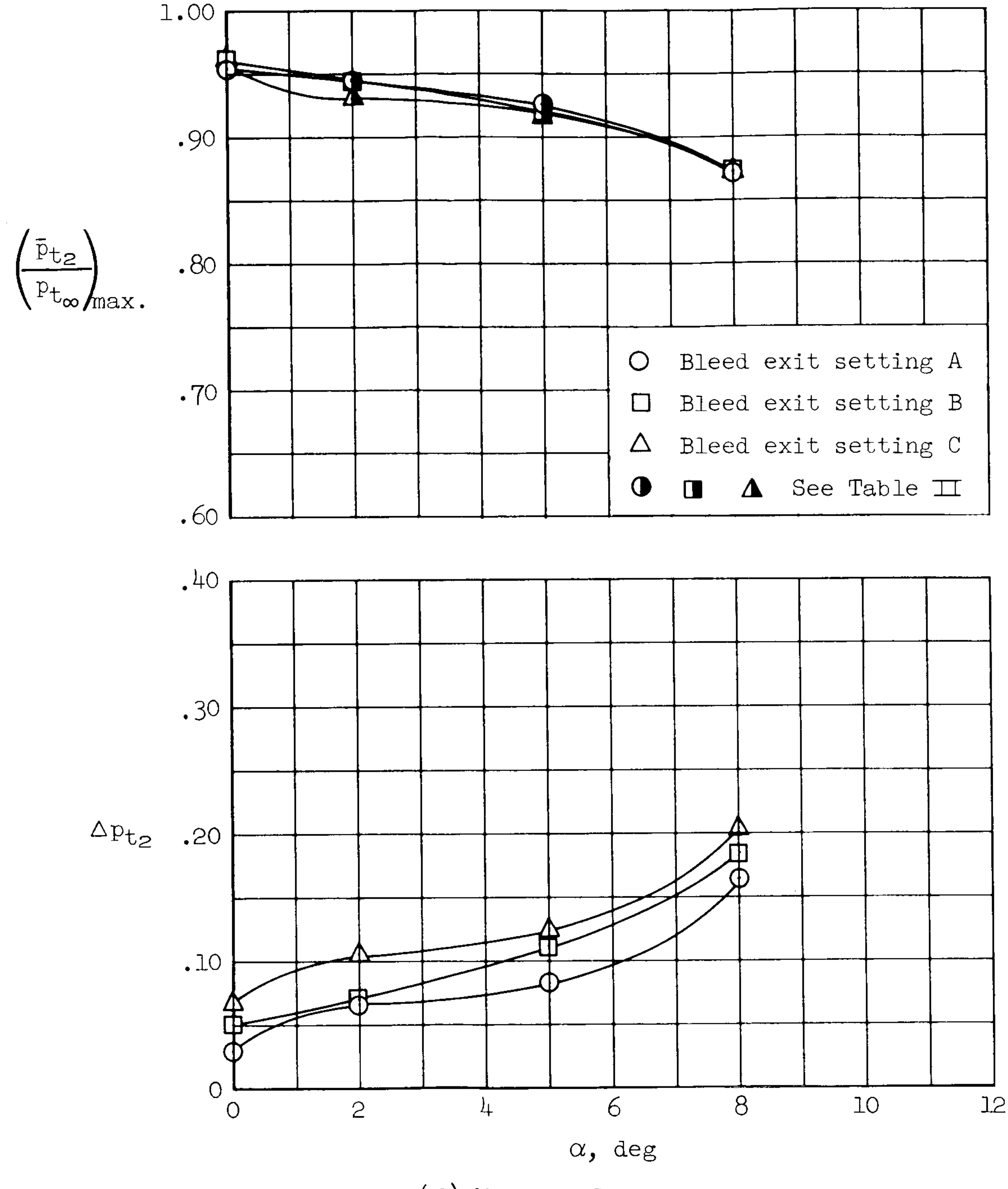
(d) $M_\infty = 2.25$.

Figure 36.- Continued.



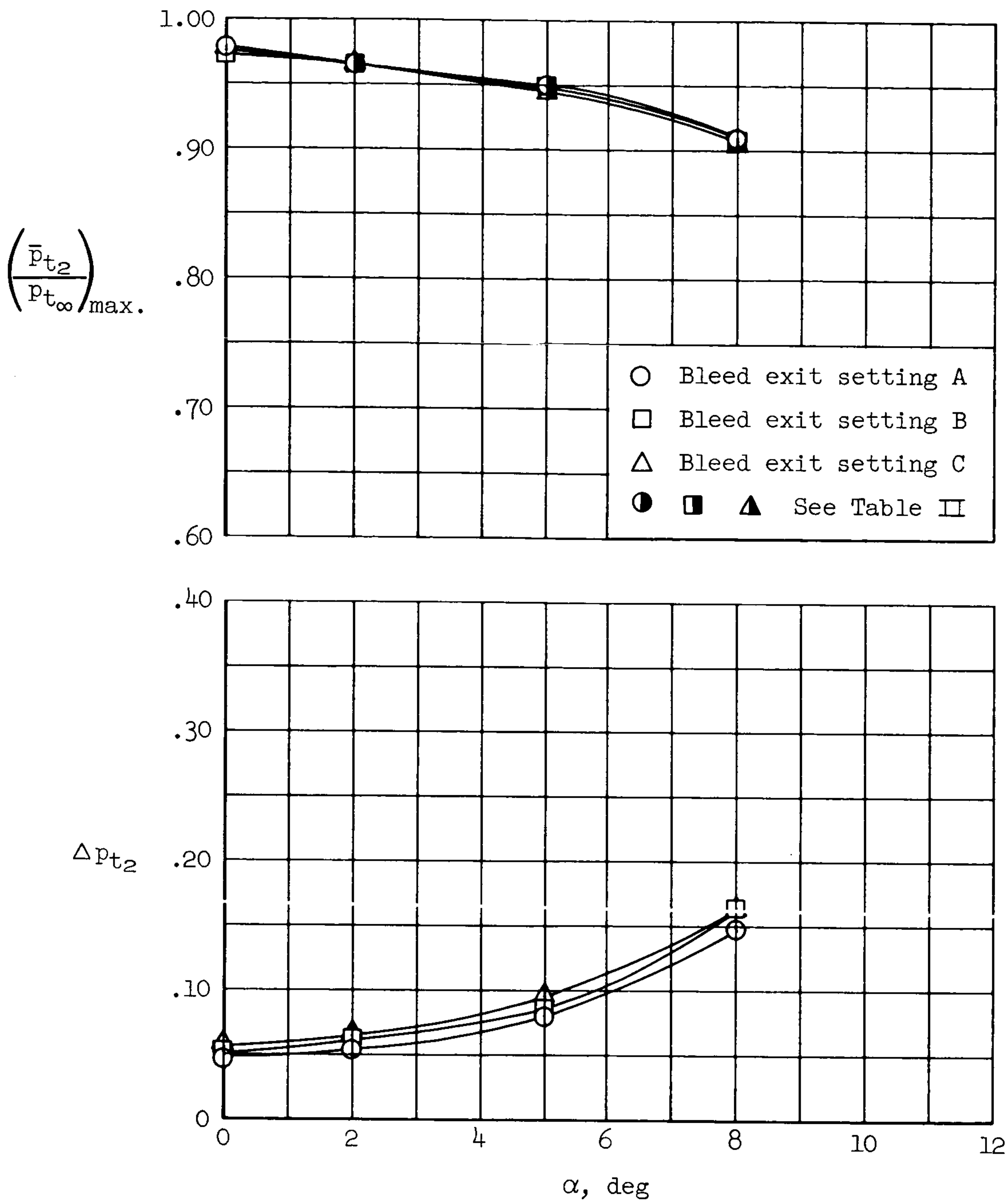
(e) $M_\infty = 2.00$.

Figure 36.- Continued.



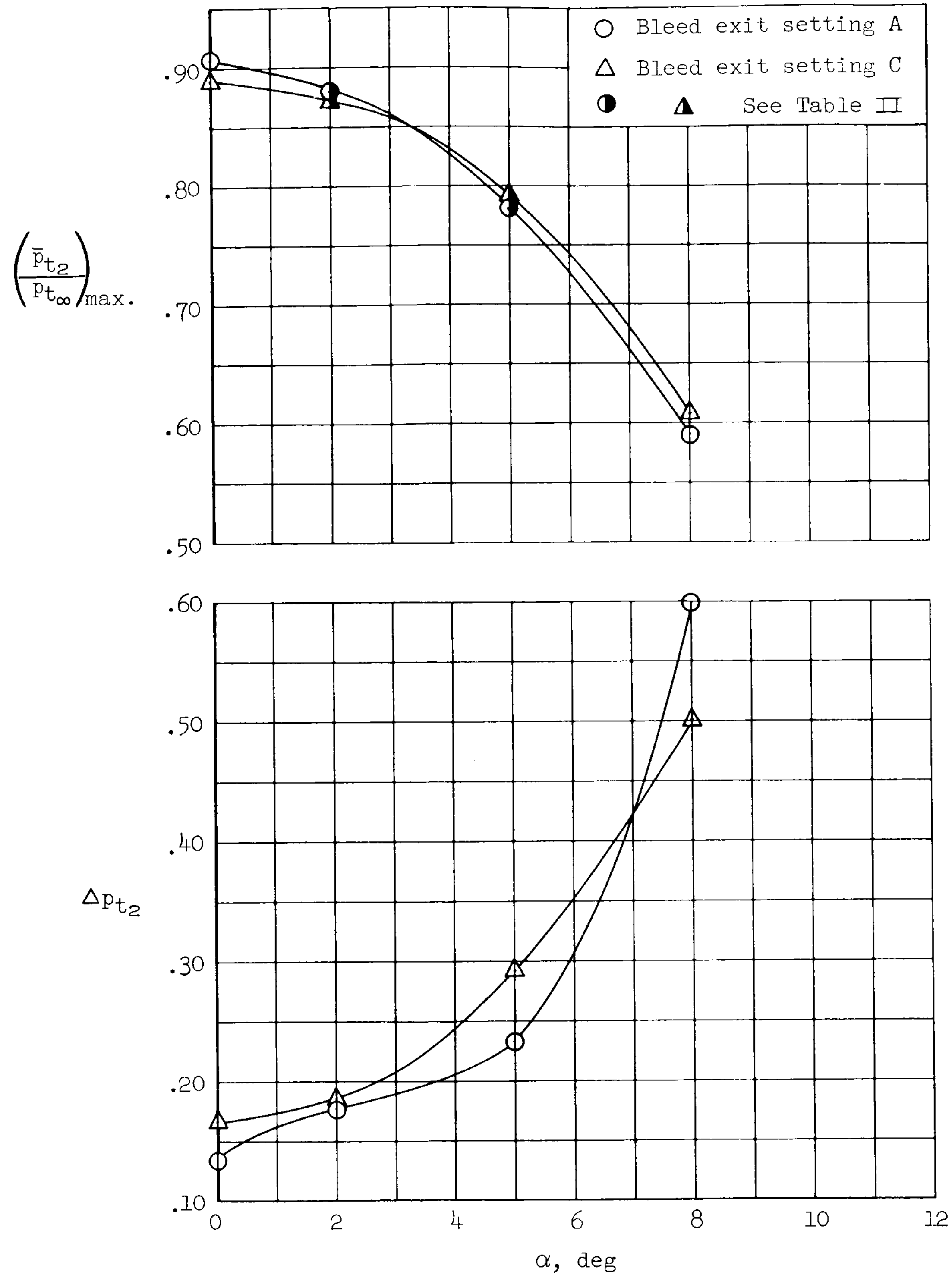
(f) $M_\infty = 1.75$.

Figure 36.- Continued.



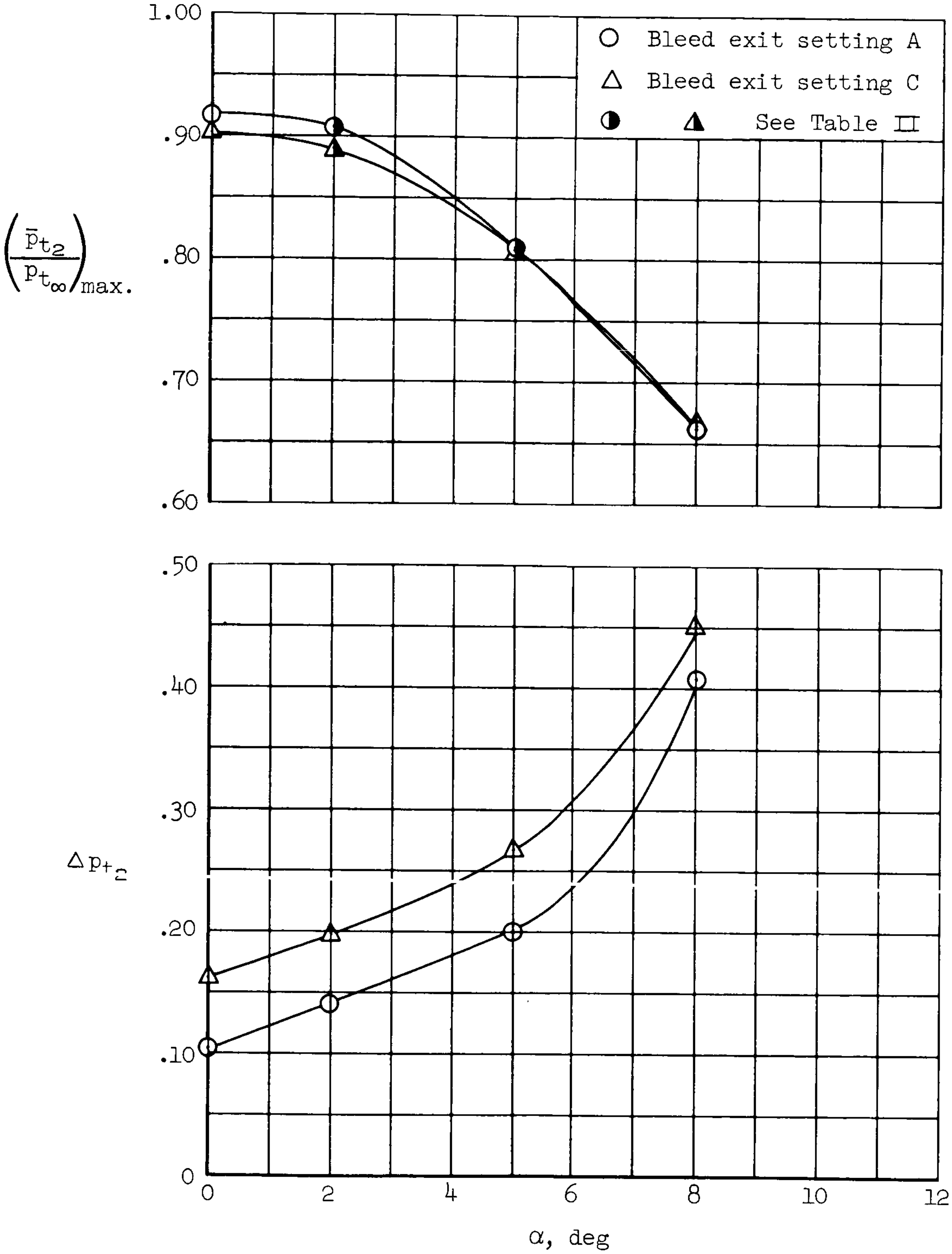
(g) $M_\infty = 1.55$.

Figure 36.- Concluded.



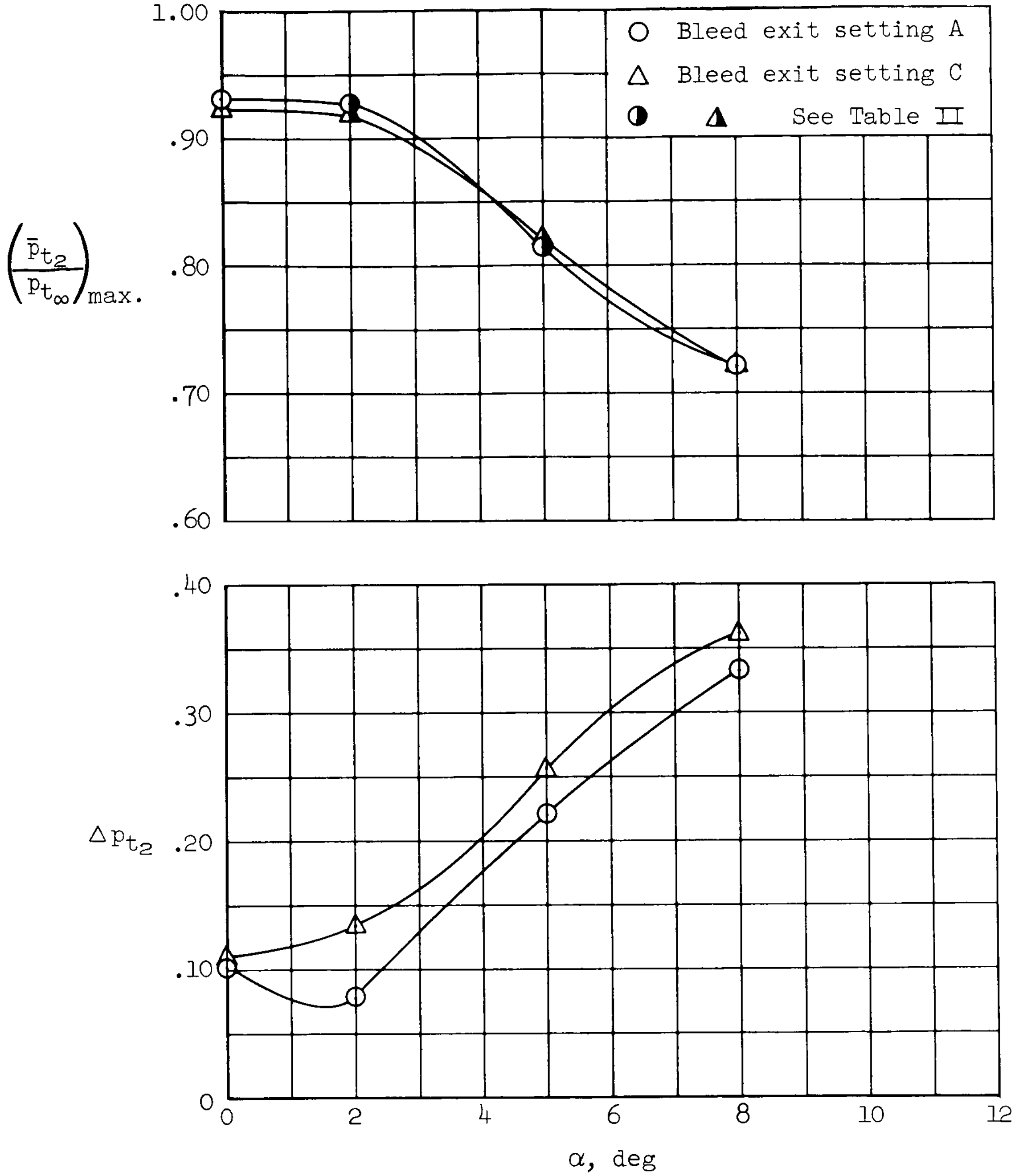
(a) $M_\infty = 3.00$.

Figure 37.- Maxumum performance at angle of attack, 1.50 D inlet without vortex generators.



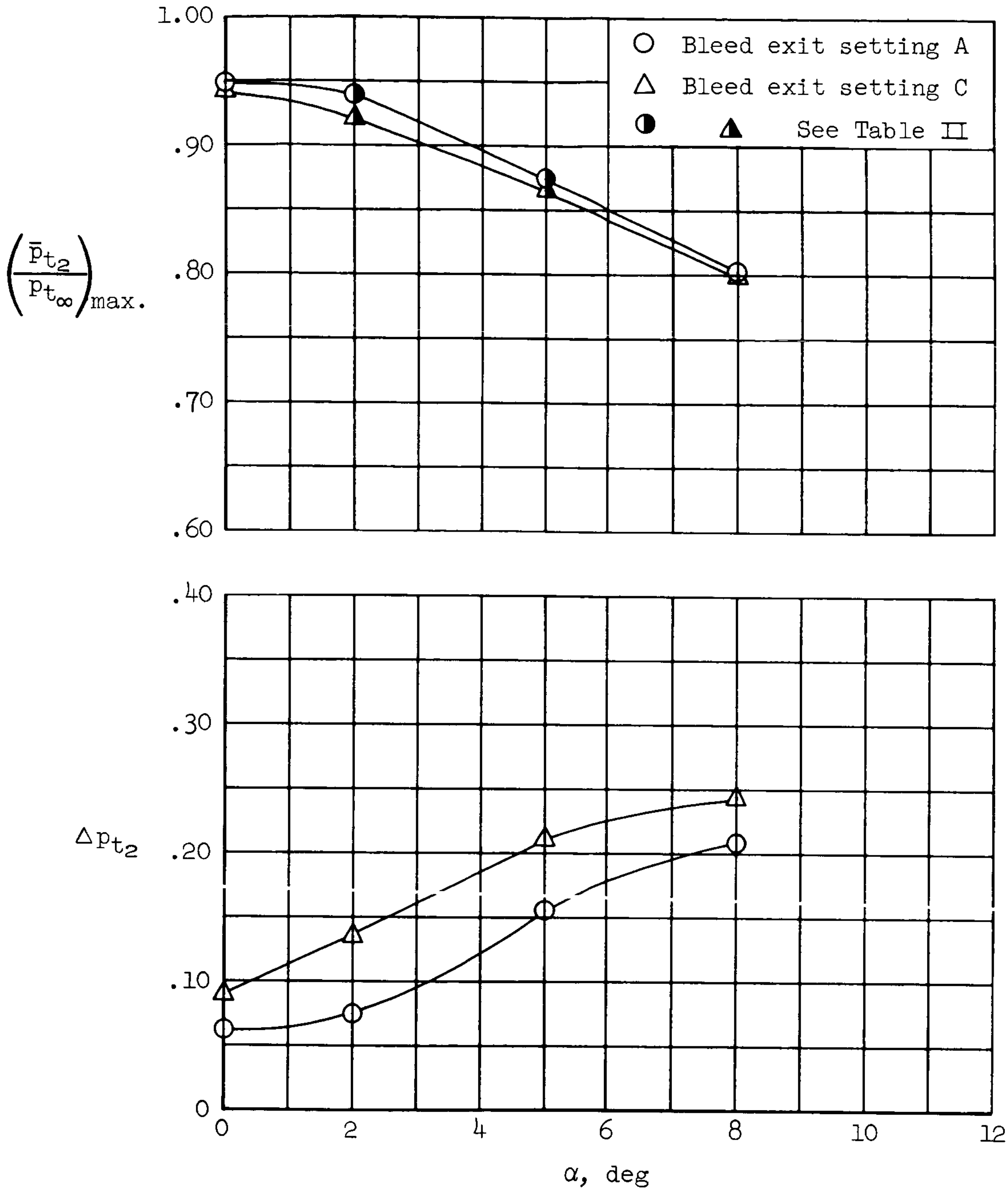
(b) $M_\infty = 2.75$.

(b) Figure 37.- Continued.



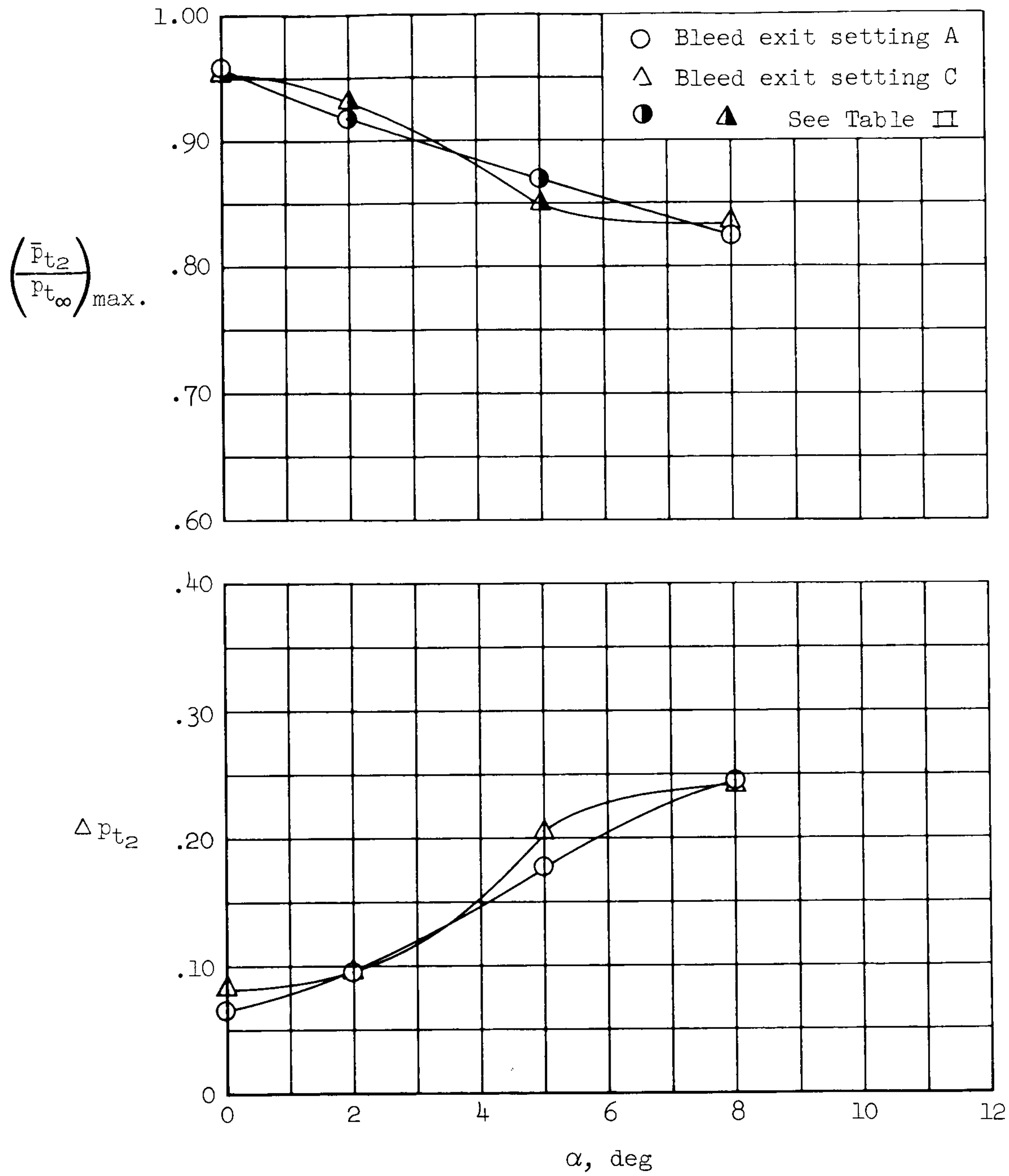
(c) $M_\infty = 2.50$.

Figure 37.- Continued.



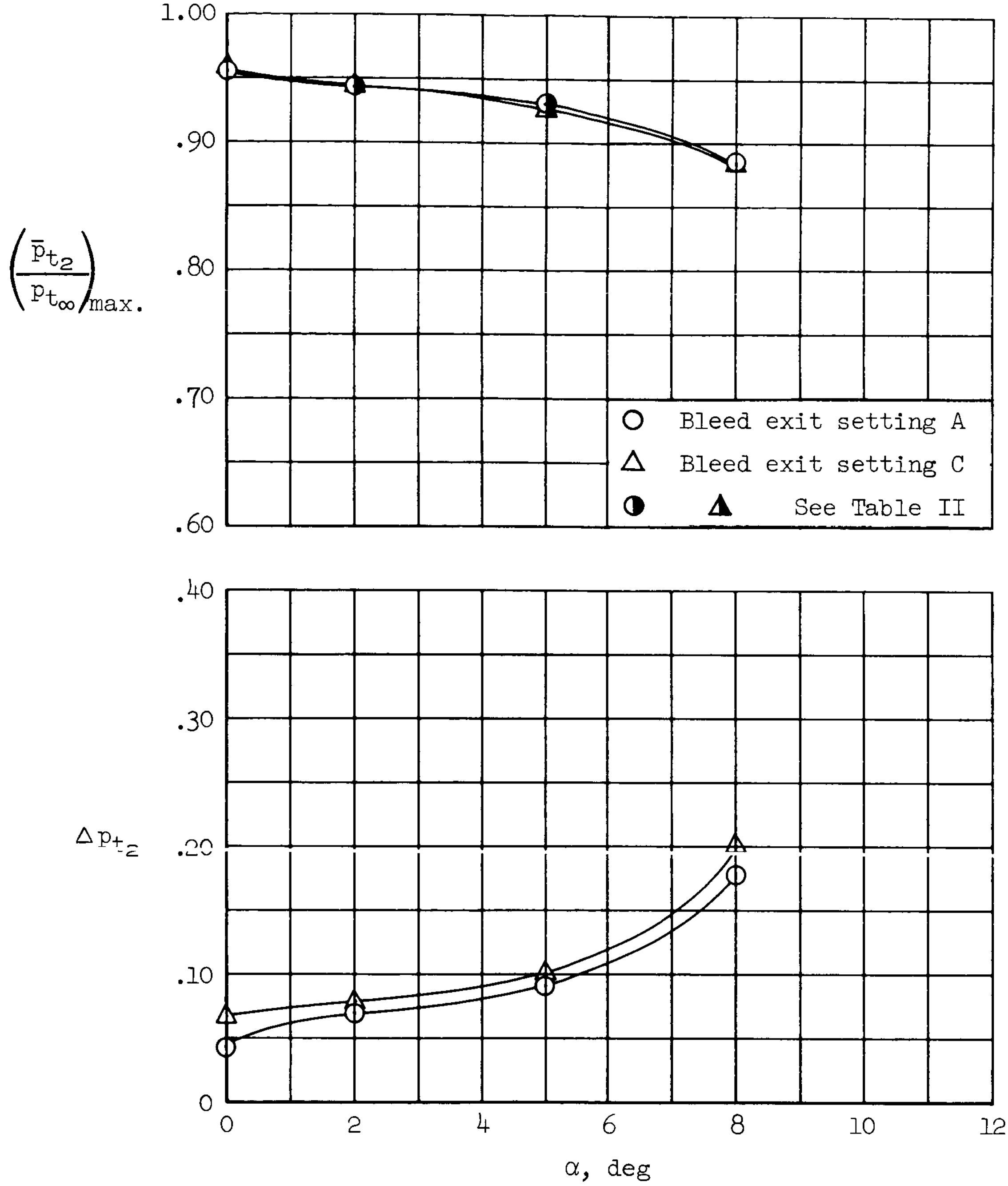
(d) $M_\infty = 2.25$.

Figure 37.- Continued.



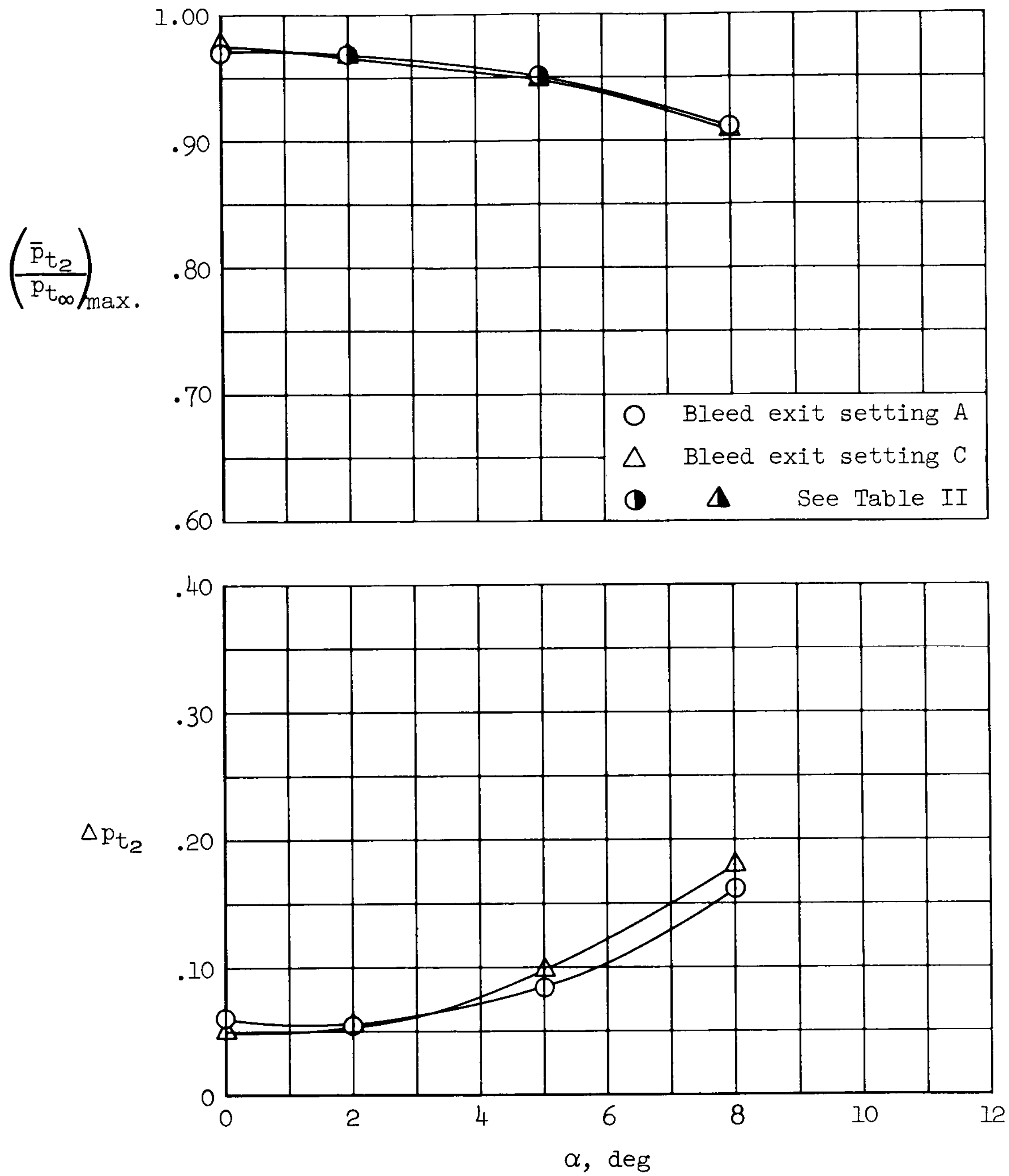
(e) $M_\infty = 2.00$.

Figure 37.- Continued.



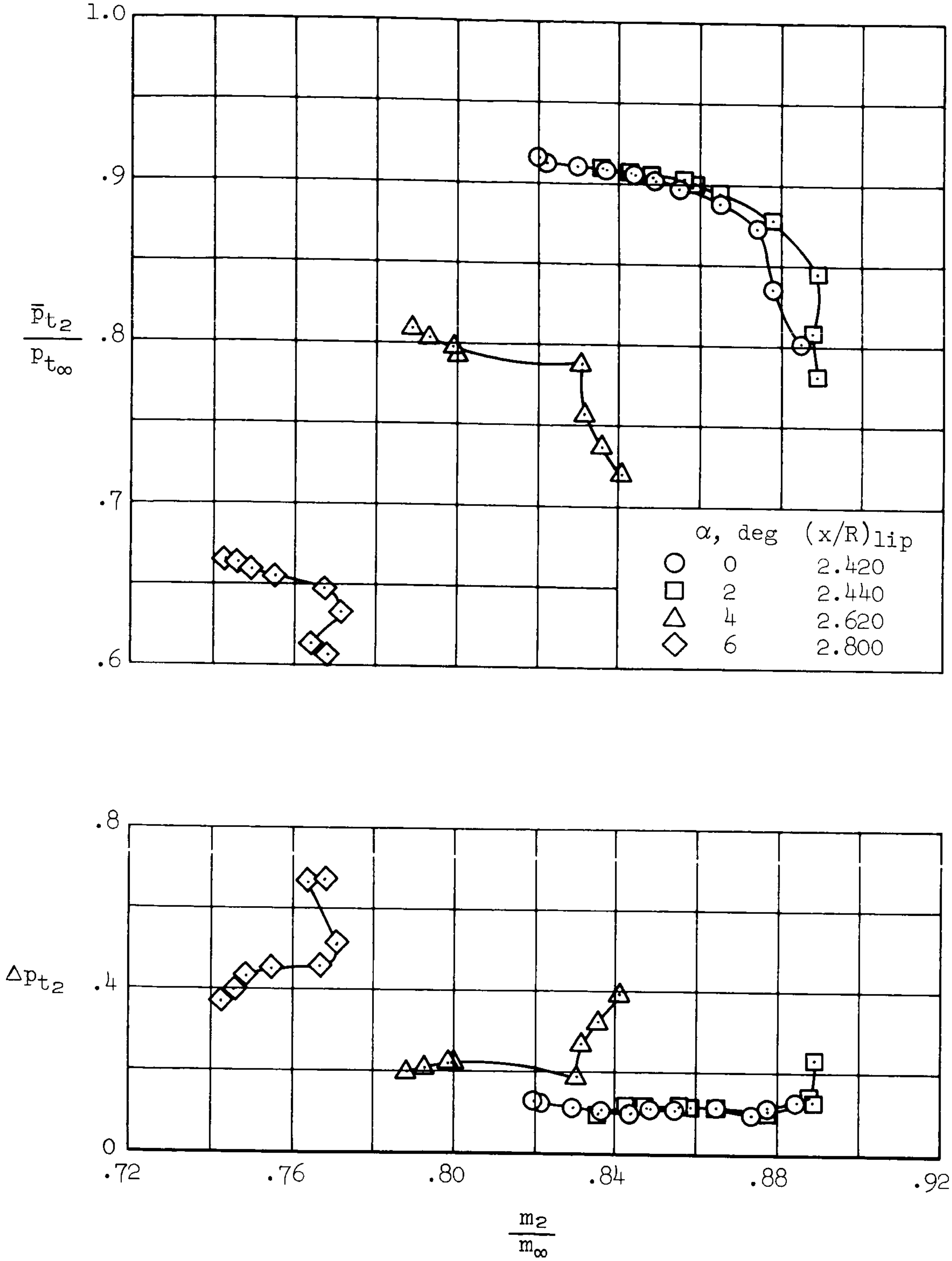
(f) $M_\infty = 1.75$.

Figure 37.- Continued.



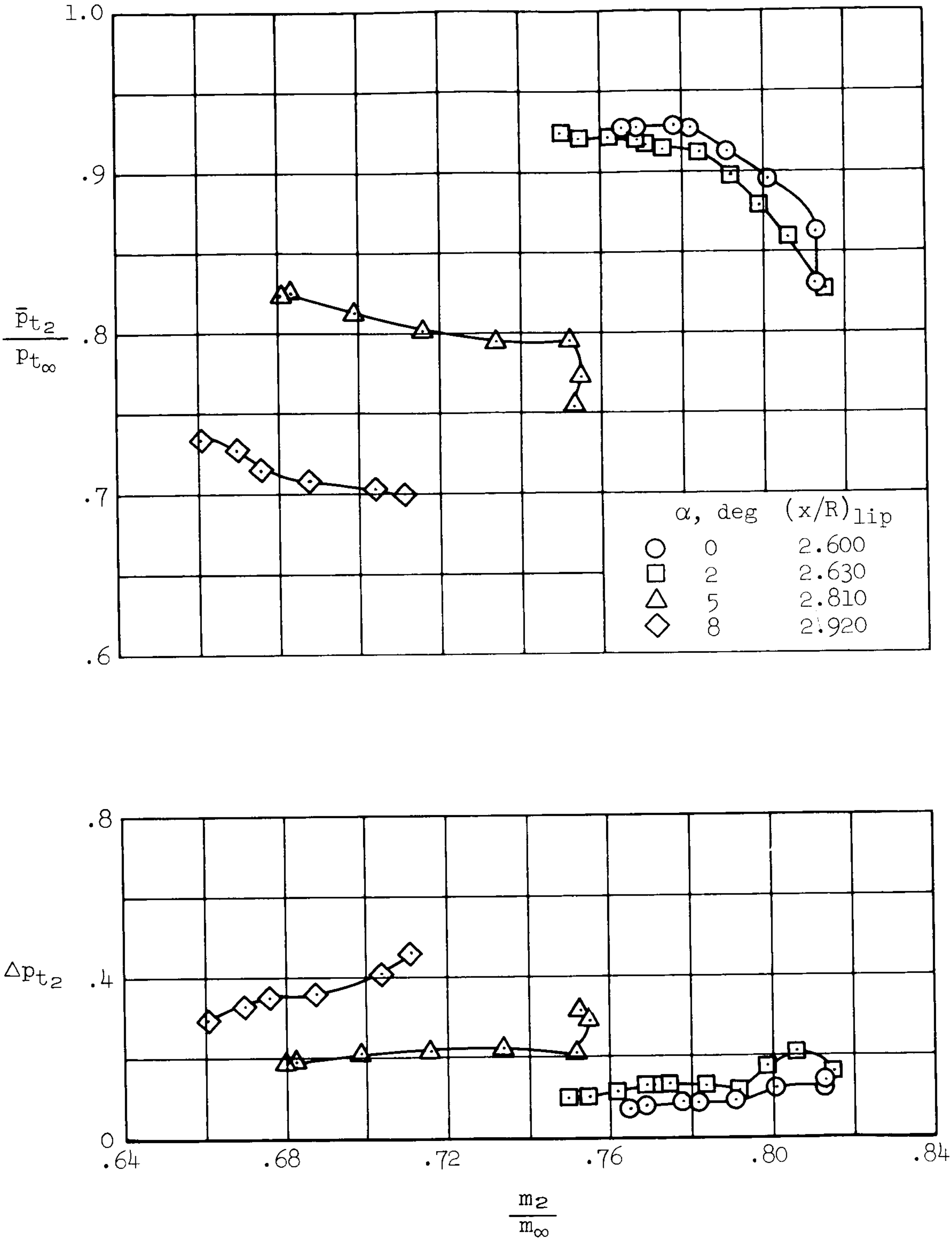
(g) $M_\infty = 1.55$.

Figure 37.- Concluded.



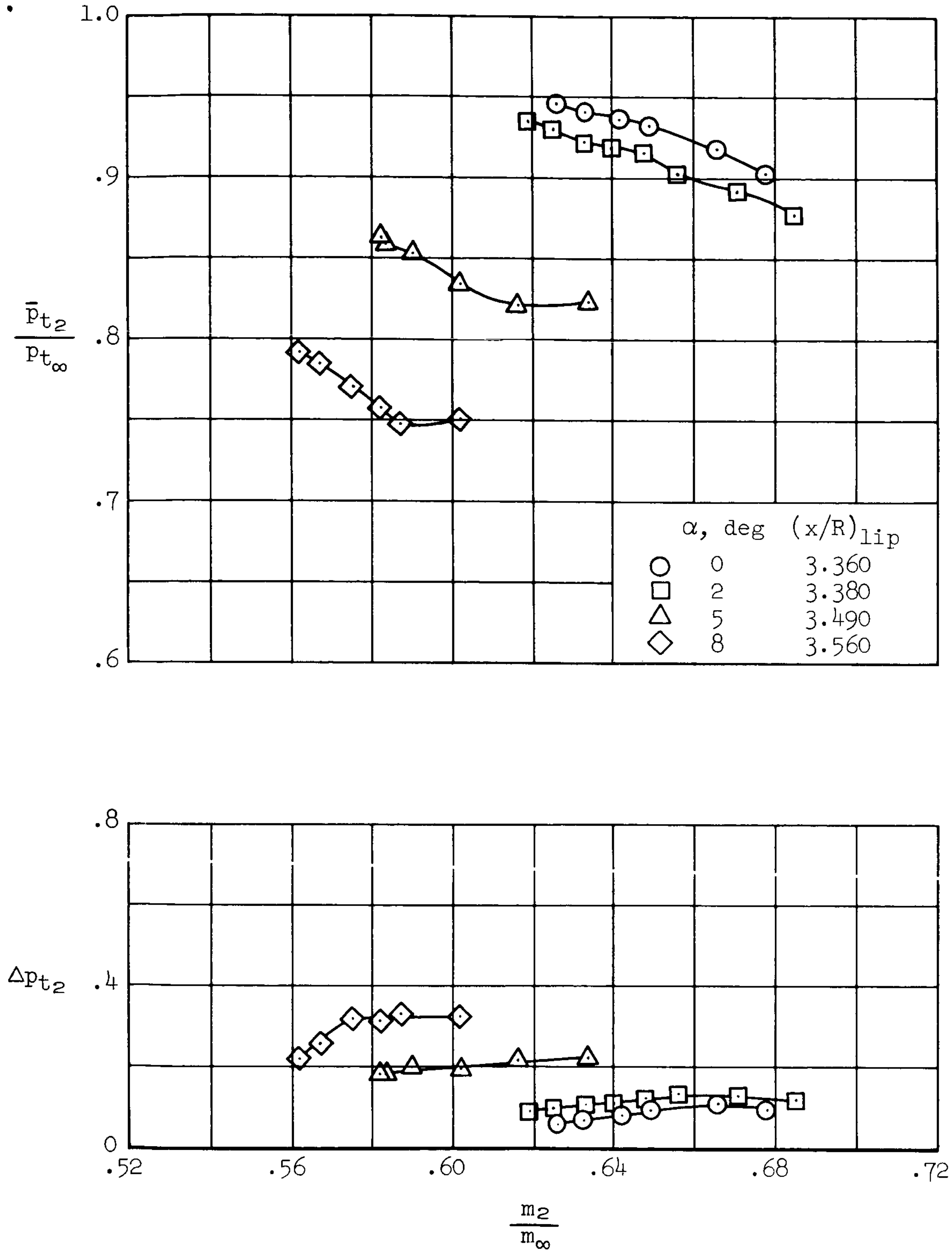
(a) $M_\infty = 2.75$

Figure 38.- Supercritical performance at angle of attack, 1.50 D inlet with vortex generators; exit setting B.



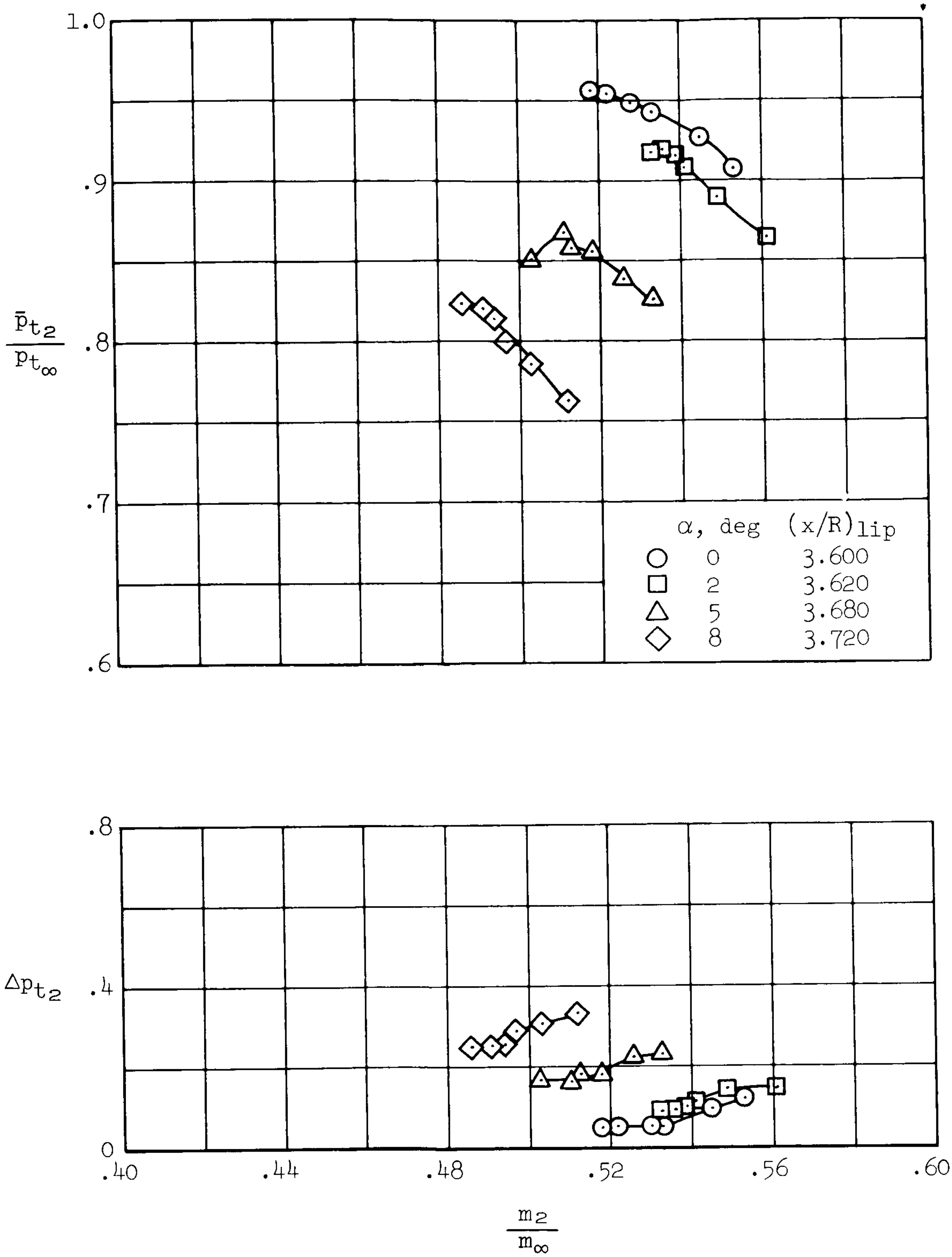
(b) $M_\infty = 2.50$

Figure 38.- Continued.



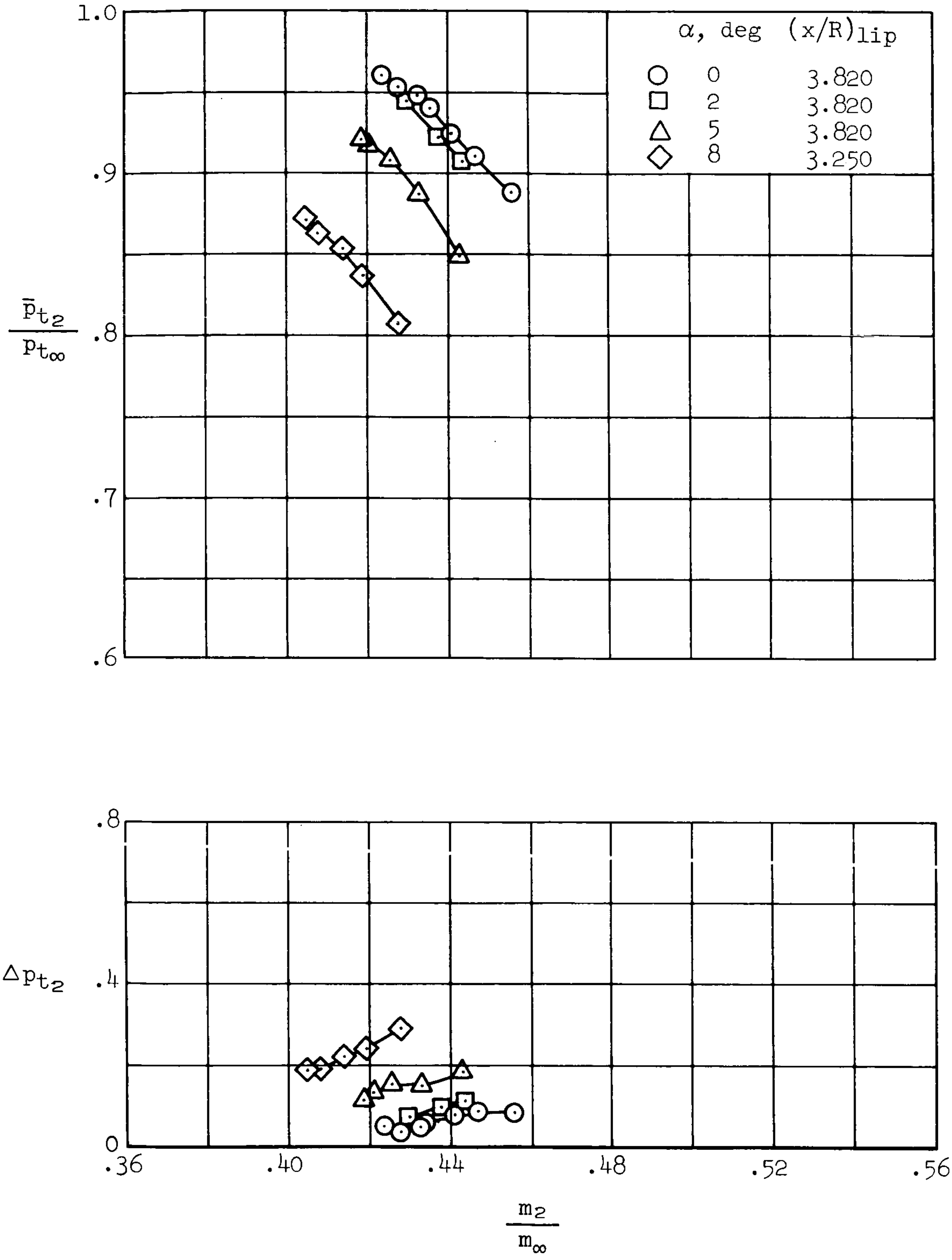
(c) $M_\infty = 2.25$

Figure 38.- Continued.



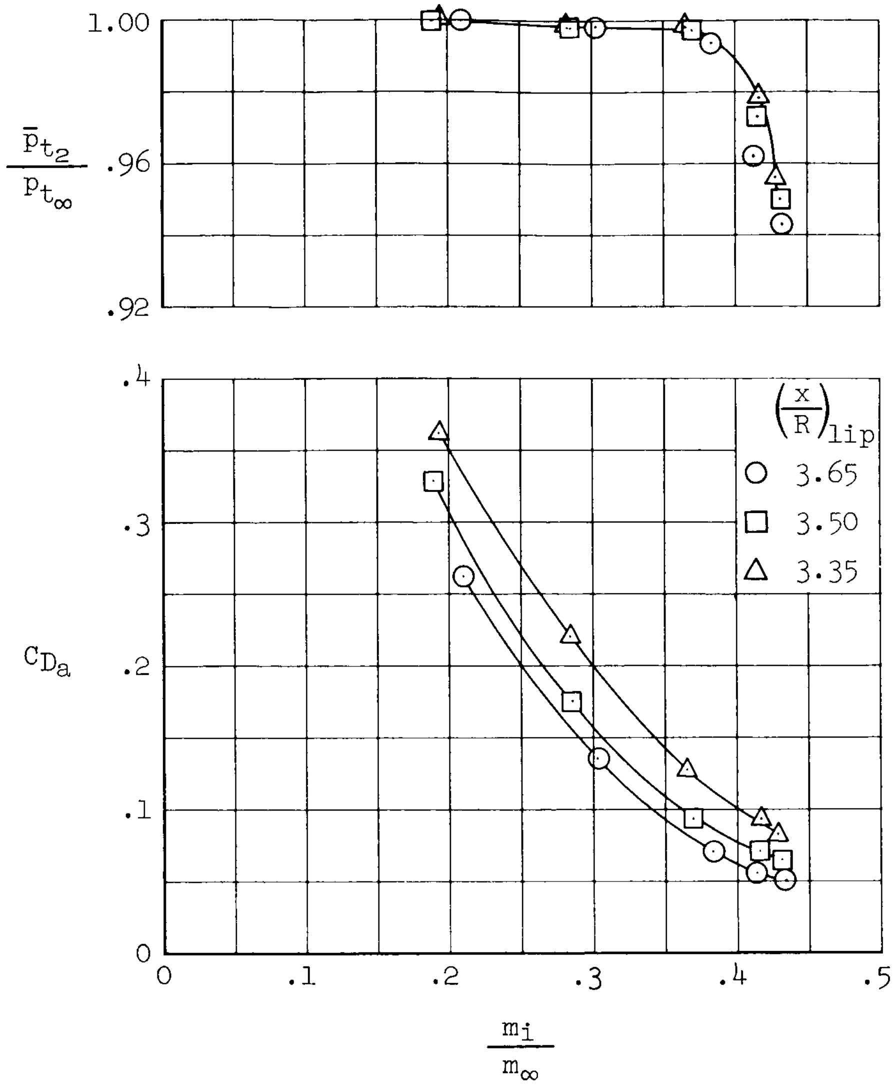
(d) $M_\infty = 2.00$

Figure 38.- Continued.



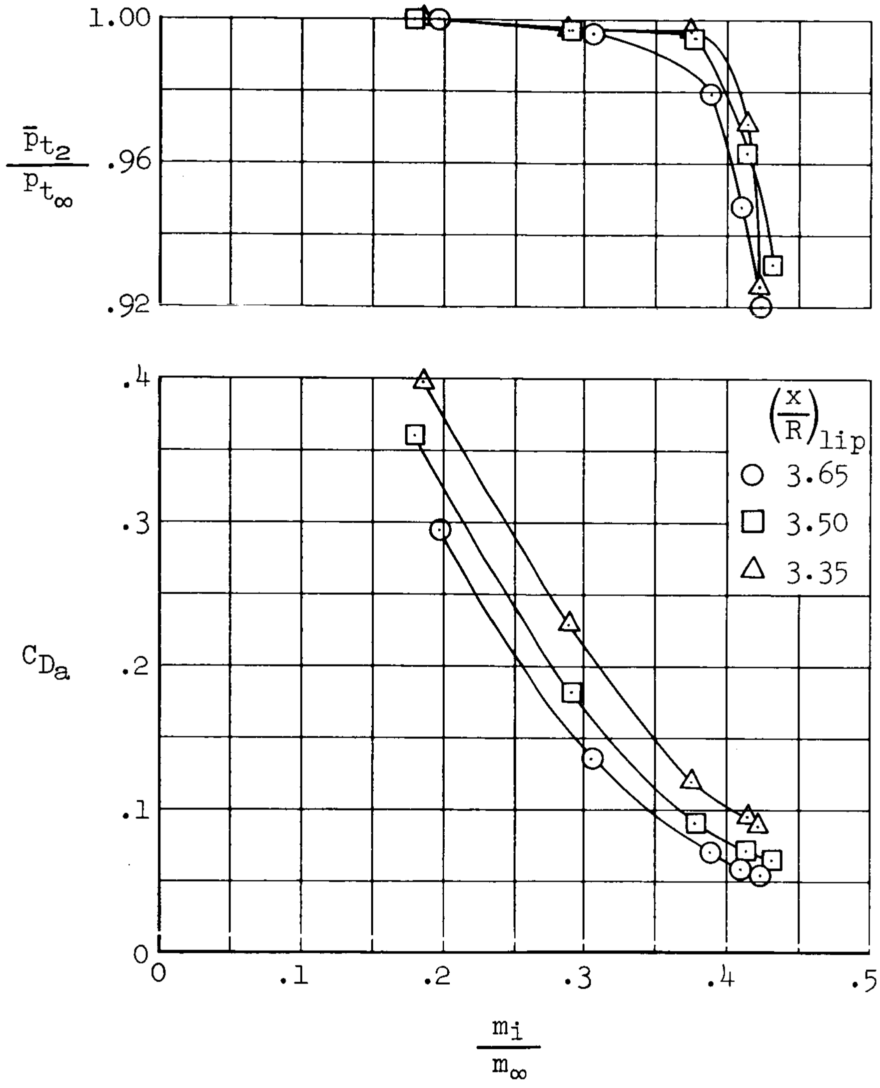
(e) $M_\infty = 1.75$

Figure 38.- Concluded.



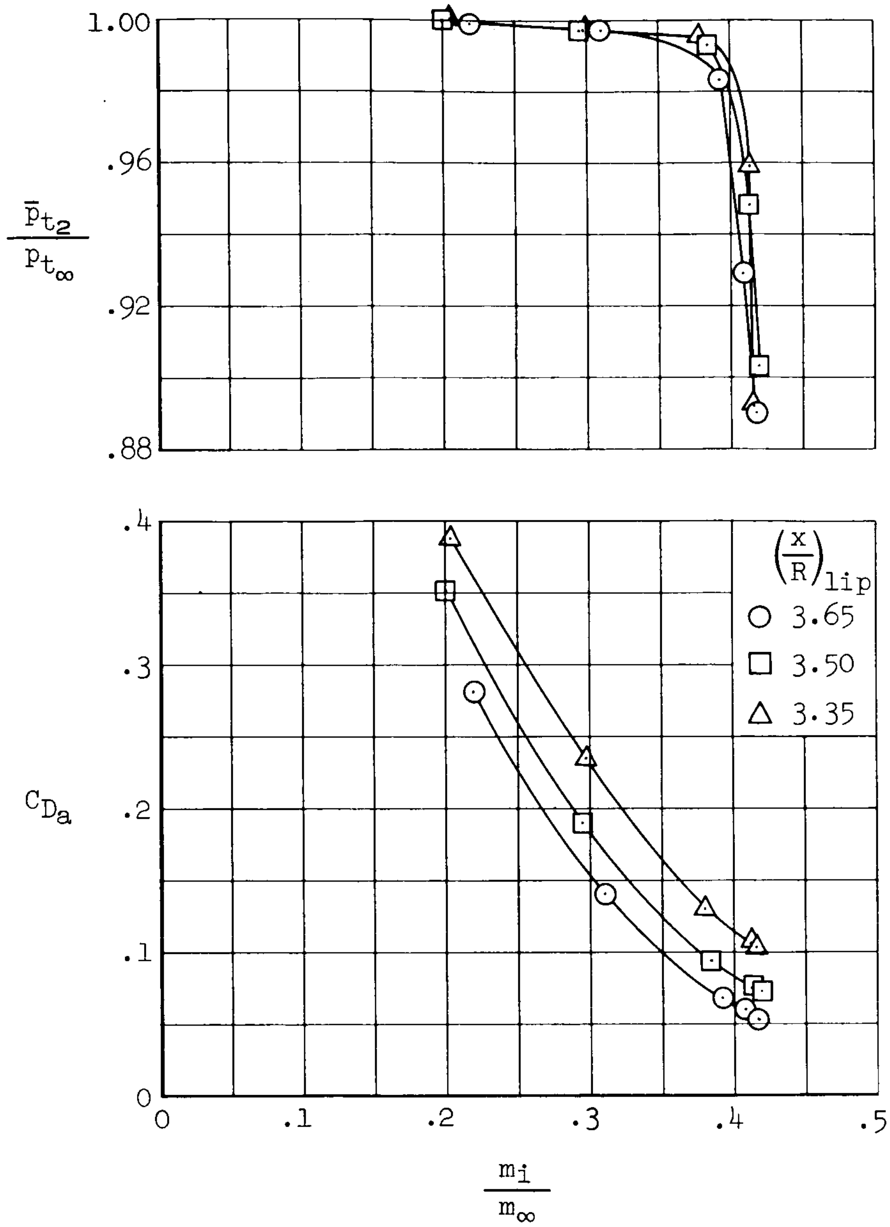
(a) $M_\infty = 0.60$.

Figure 39.- Transonic total-pressure recovery and additive drag, $\alpha = 0°$.



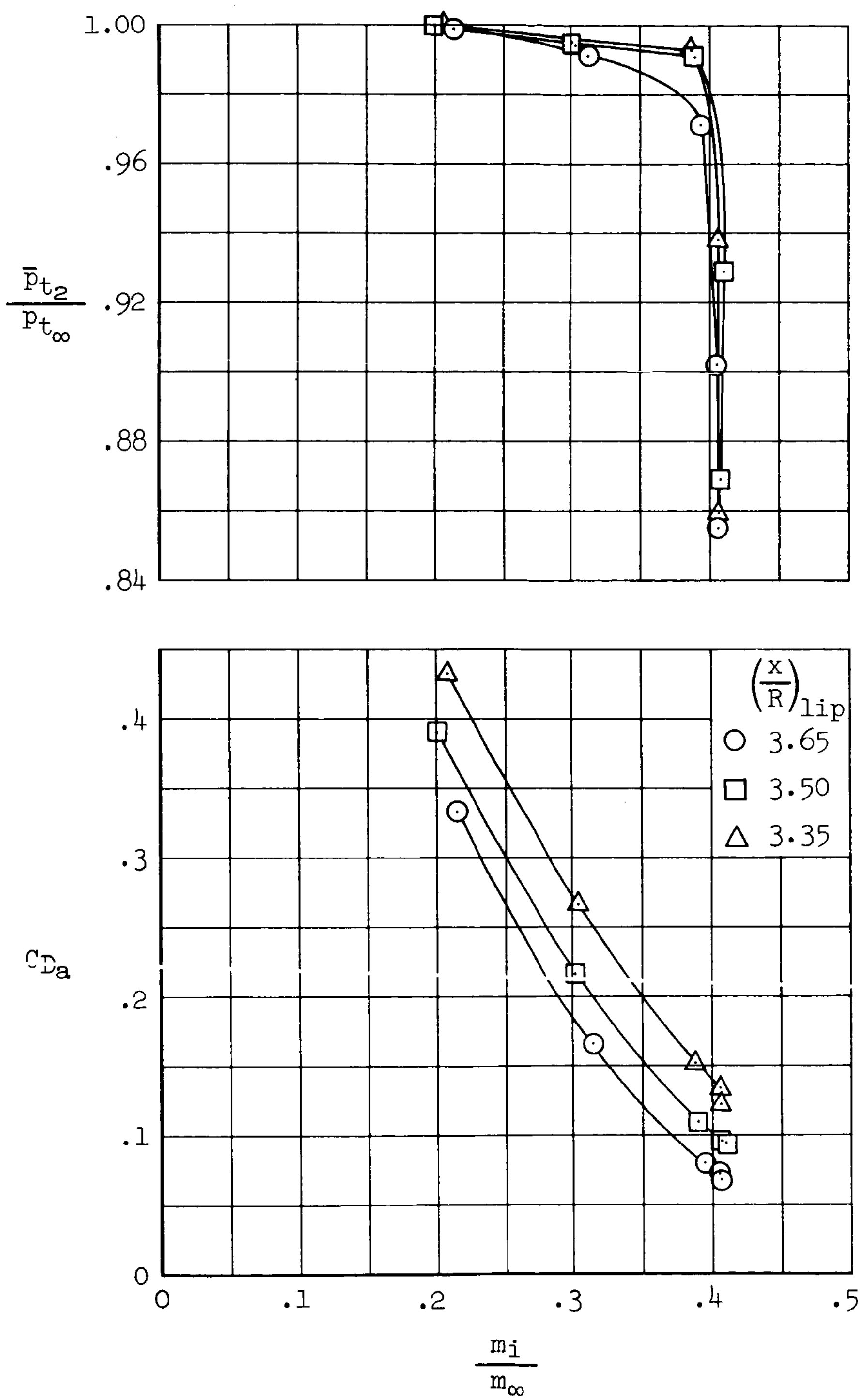
(b) $M_\infty = 0.70$.

Figure 39.- Continued.



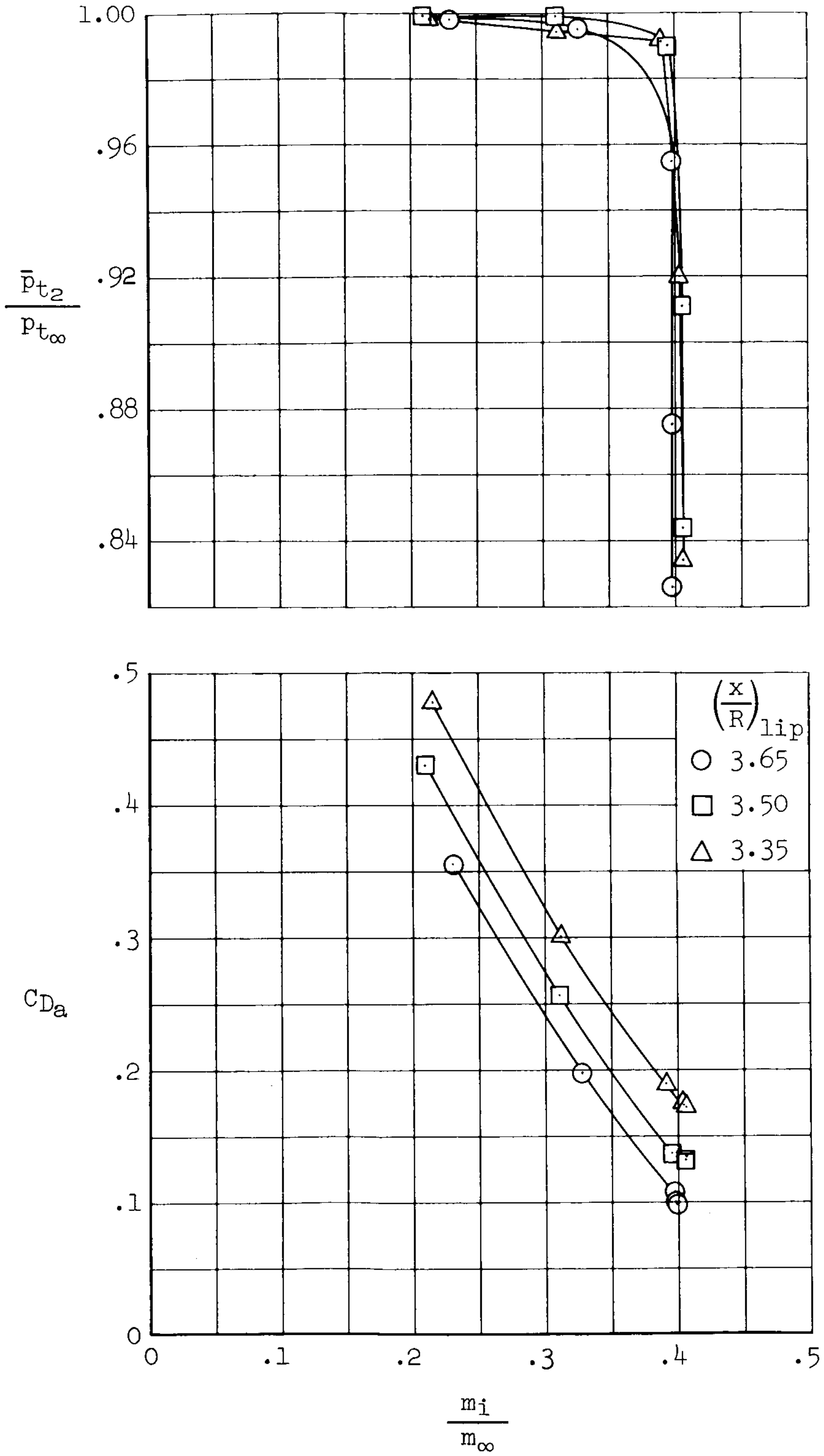
(c) $M_\infty = 0.80$.

Figure 39.- Continued.



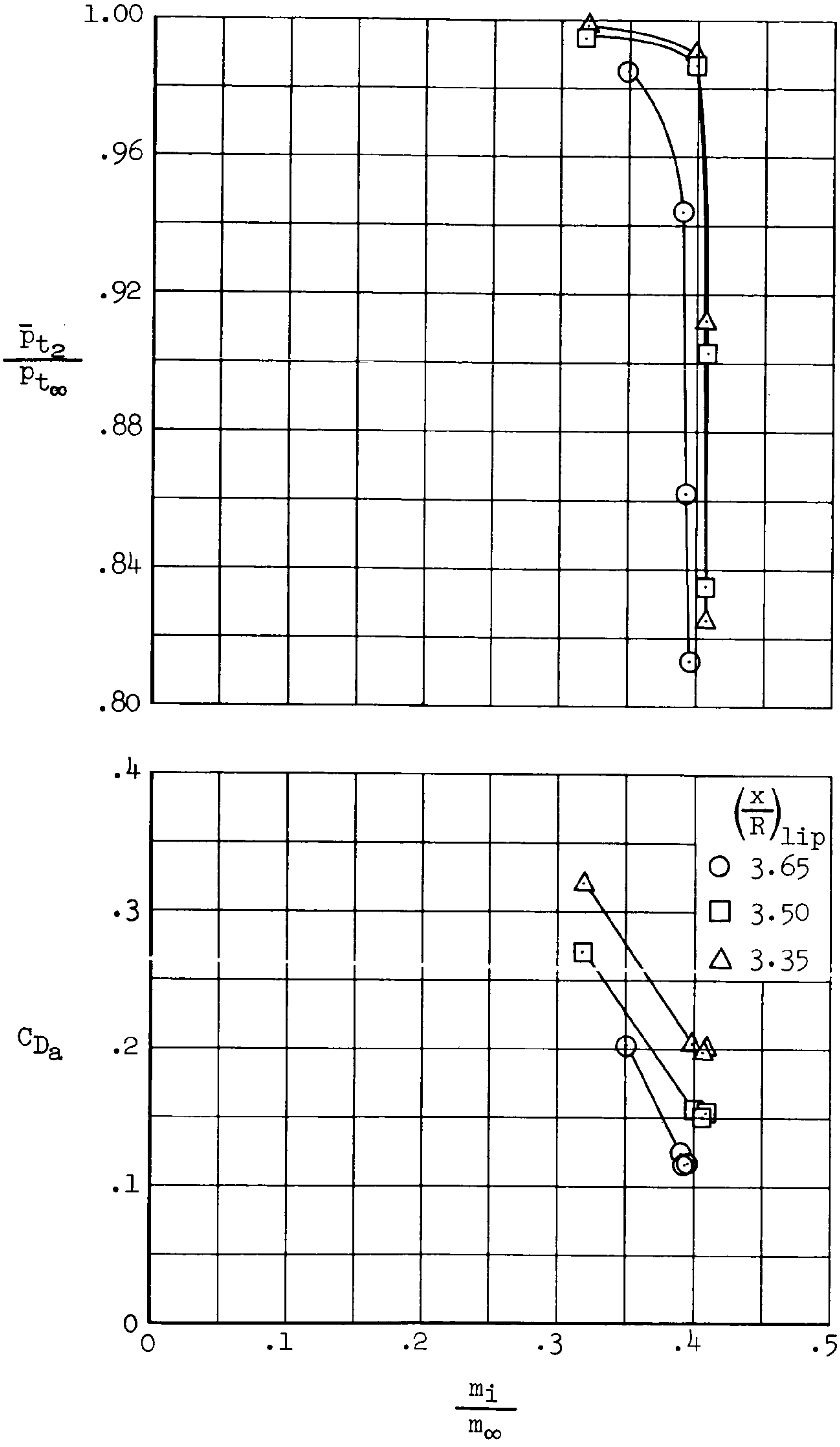
(d) $M_\infty = 0.90$.

Figure 39.- Continued.



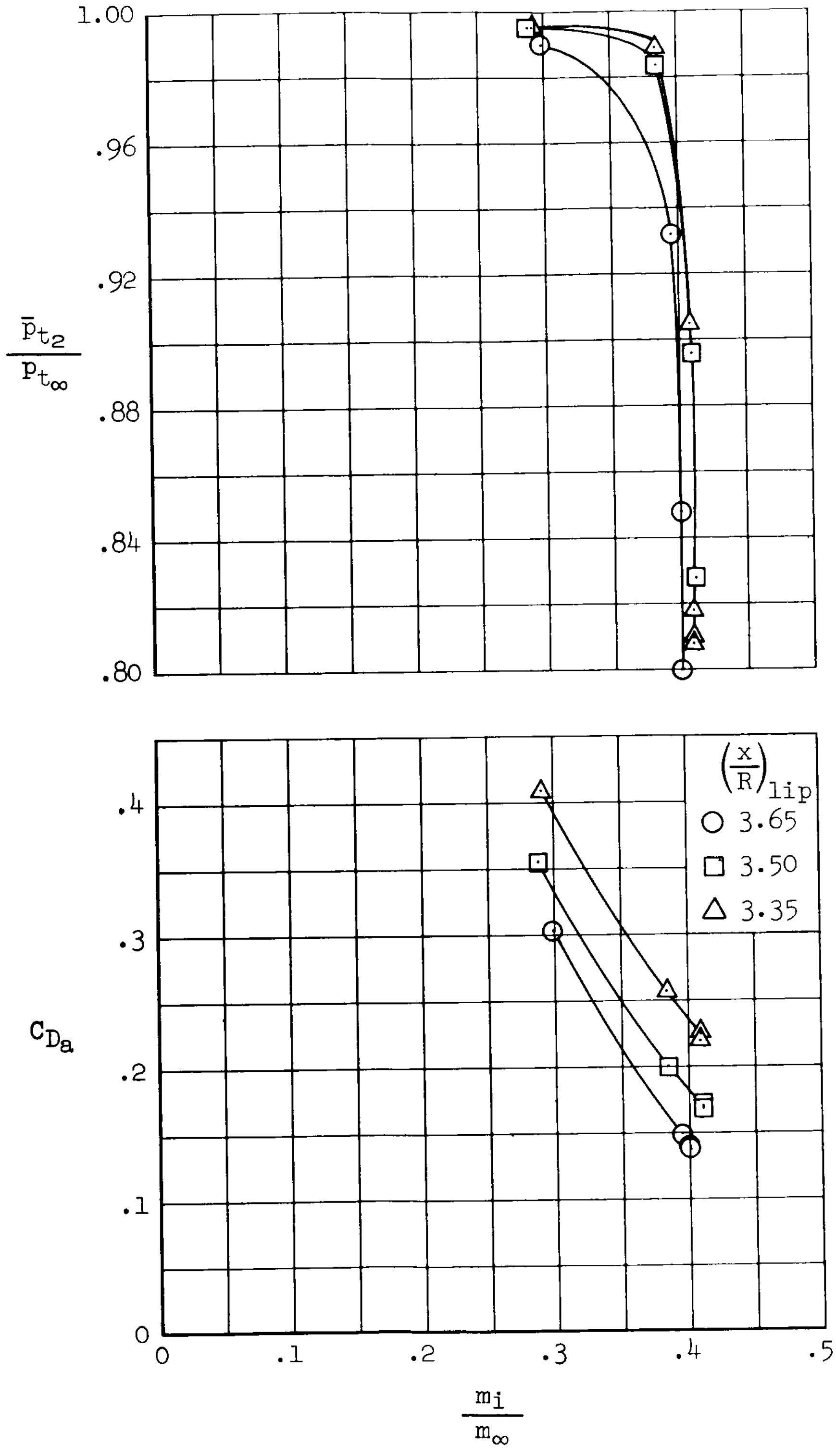
(e) $M_\infty = 1.00$.

Figure 39.- Continued.



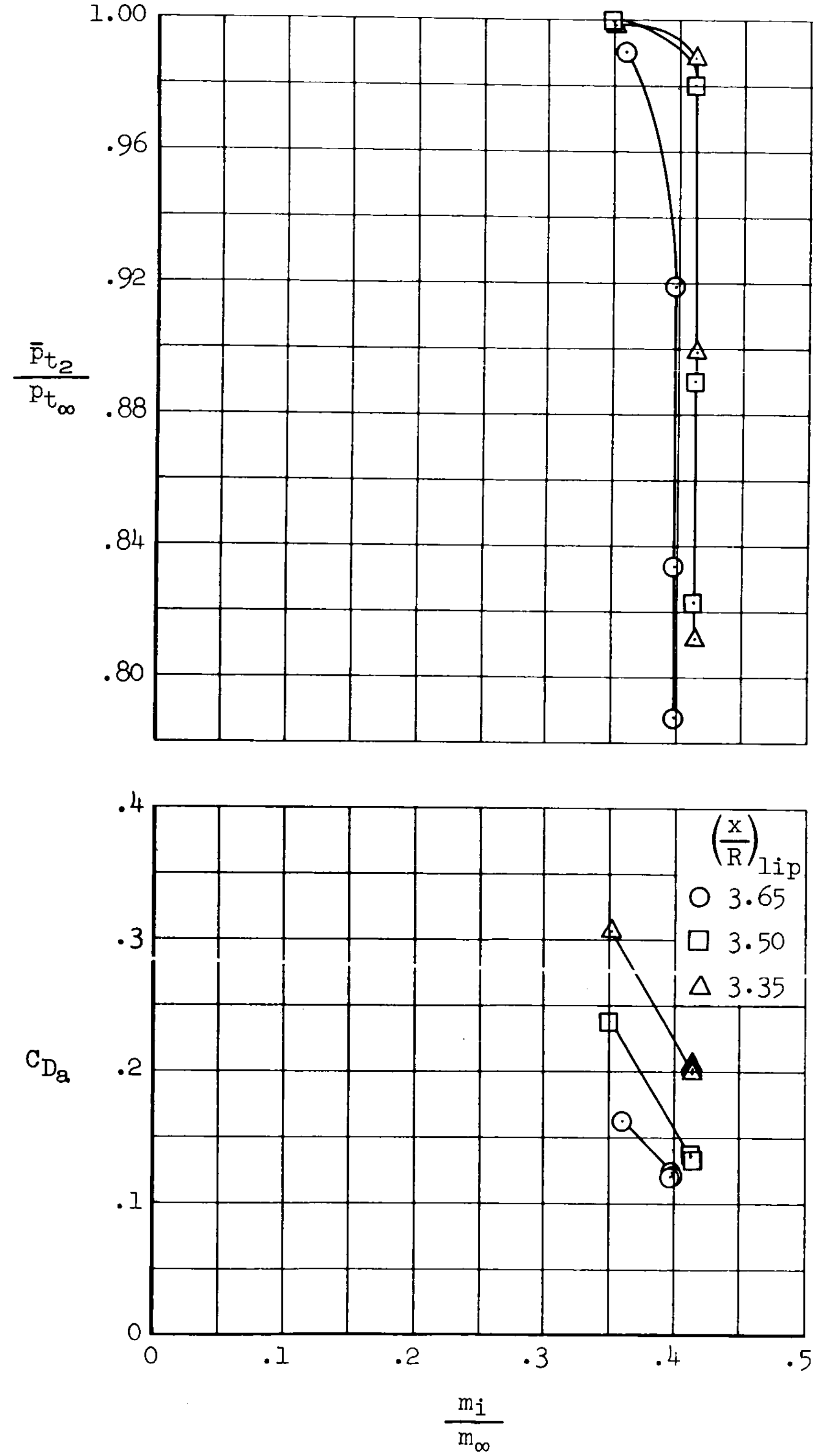
(f) $M_\infty = 1.05$.

Figure 39.- Continued.



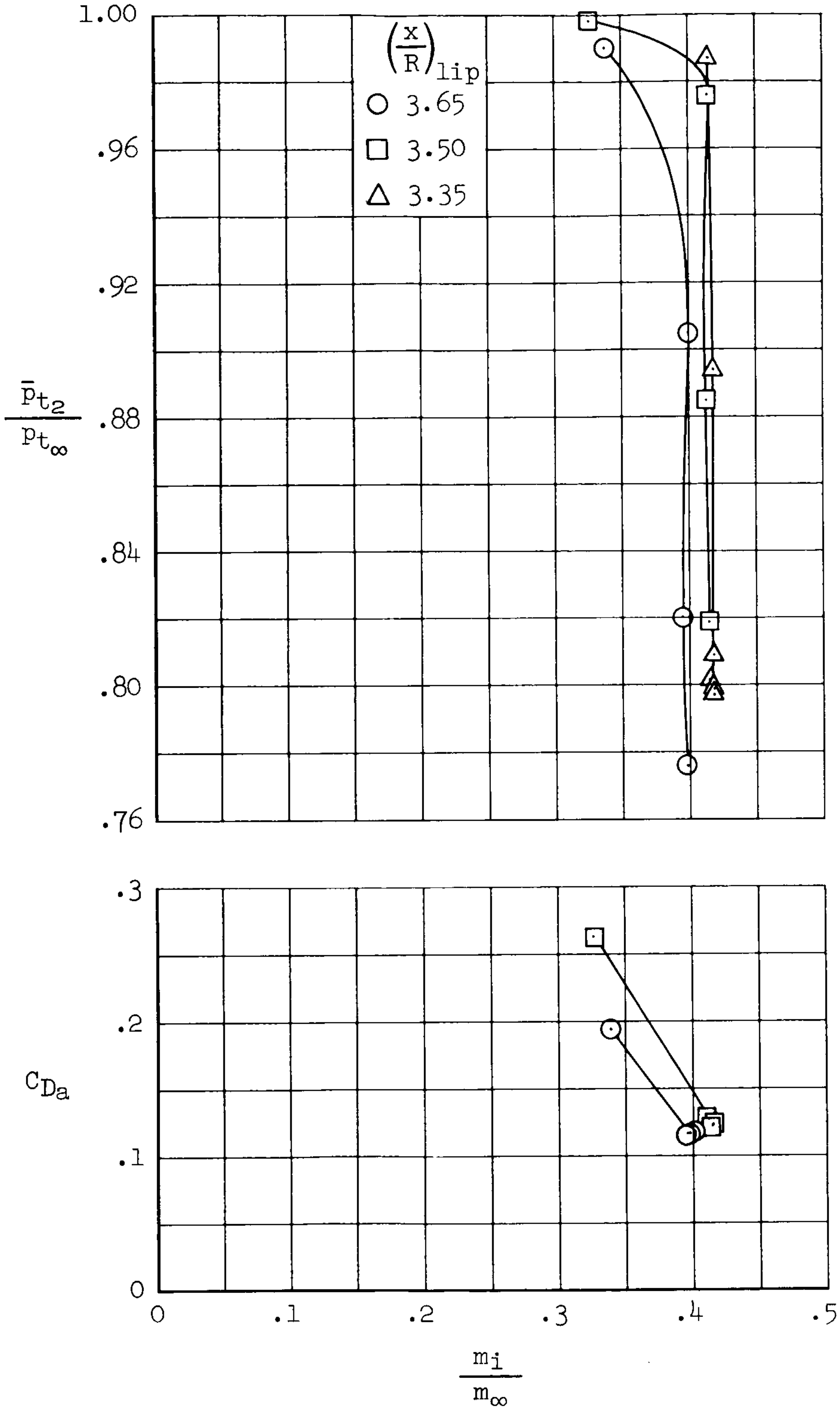
(g) M = 1.10.

Figure 39.- Continued.



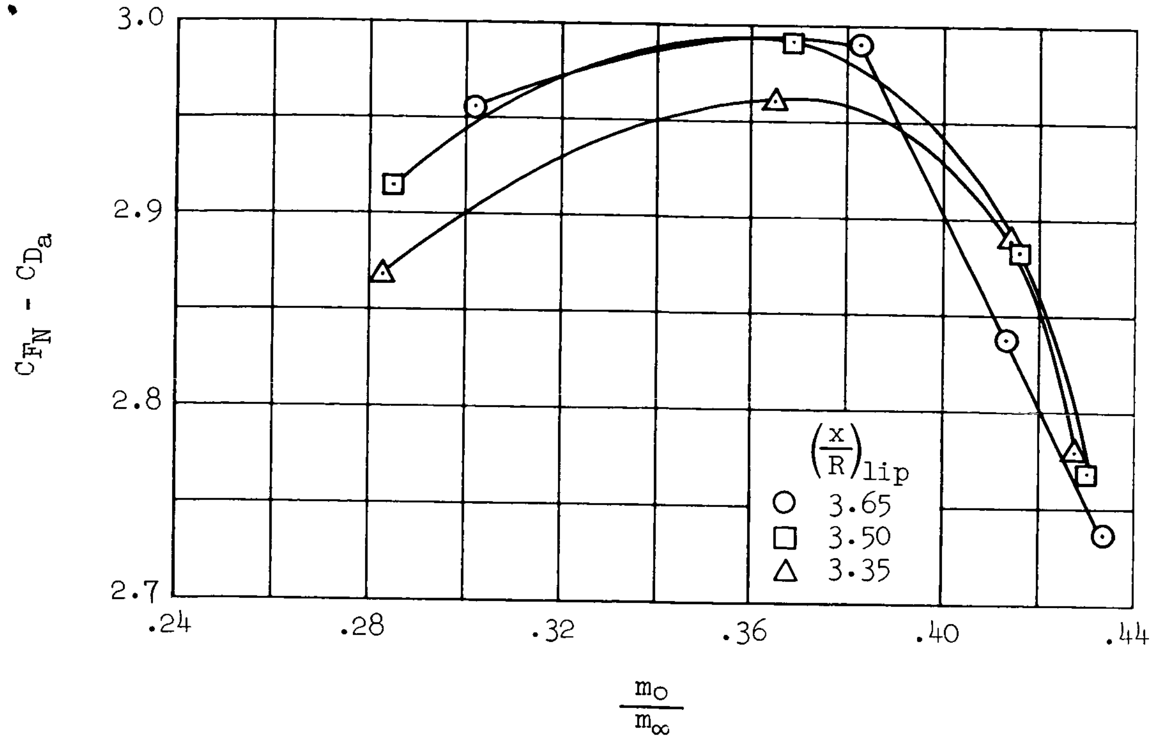
(h) $M_\infty = 1.15$.

Figure 39.- Continued.

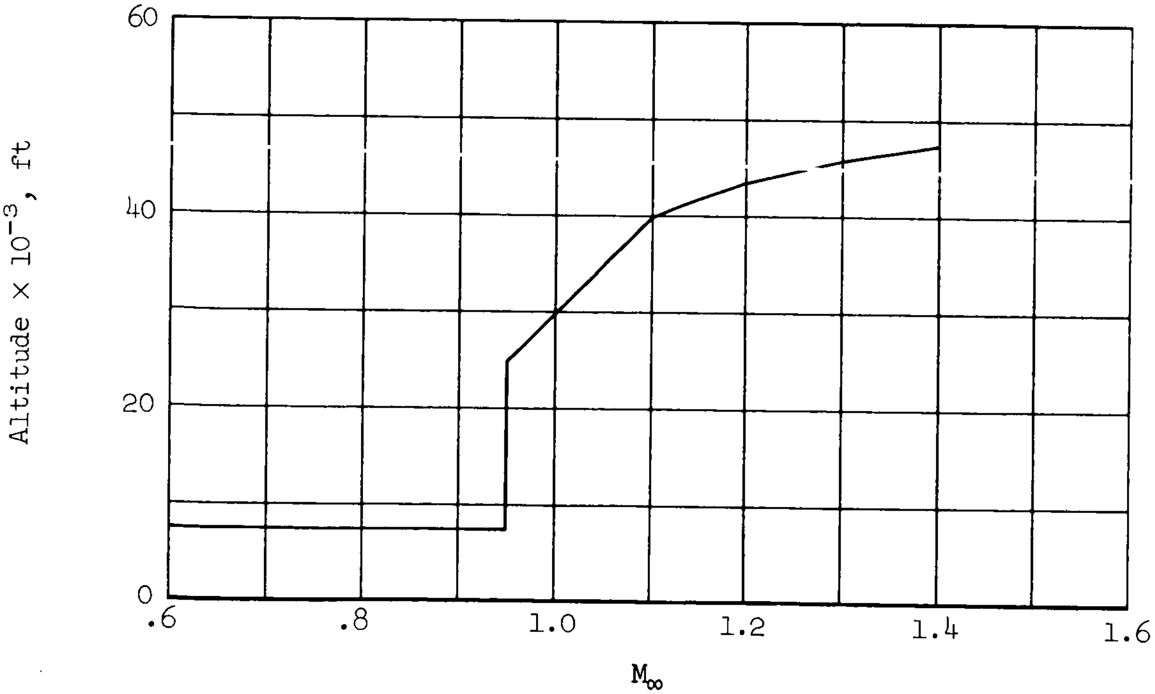


(i) $M_\infty = 1.20$.

Figure 39.- Concluded.



(a) Net propulsive thrust, $M_\infty = 0.60$.



(b) Flight profile.

Figure 40.- Transonic optimization.

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