NASA Technical Memorandum 78488

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(NASA-TM-78488) AN EXPERIMENTAL DOCUMENTATION OF PRESSURE GRADIENT AND REYNOLDS NUMBER EFFECTS ON COMPRESSIBLE TURBULENT BOUNDARY LAYERS (NASA) 114 p HC A06/MF A01 CSCL 20D G3/34 N78-27364 Unclas 25155

JUNE 1978

National Aeronautics and Space Administration

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SYMBOLS

C_f	skin-friction coefficient
CF*E03	$C_f x10^3$
I	sensor current
K	turbulent kinetic energy, $(\overline{u'^2} + \overline{v'^2} + \overline{w'^2})/2$
M	Mach number
P	static pressure
P INF	local free-stream static pressure ahead of interaction
PW	wall pressure
PW INF	wall pressure ahead of interaction
p	pressure
p^+	nondimensional pressure gradient parameter, $\rho_w \mu_w (dp_w/dx)/(\rho_w \tau_w)^{3/2}$
R	sensor resistance
Re	Reynolds number
RHO	density
RHO INF	local free-stream density ahead of interaction
RHO'	rms density fluctuations
RHOU	mass flux (ρu)
RHOU INF	local free-stream mass flux ahead of interaction
RHOU'	rms mass flux fluctations
RHOUU INF	local free-stream value of ρu^2 ahead of interaction
$R_{(\rho u)v}$	correlation coefficient of (ρu); and v' fluctuations, $\overline{(\rho u)v'}/ < (\rho u)' > <v'>$
SQRTK	square root of the turbulent kinetic energy
S_{T_o}	sensor sensitivity to total temperature

$S_{\rho u}$	sensor sensitivity to mass flux
T	temperature
TAU*E03	turbulent shear stress, $x10^3$
TAUW	wall shear stress
TAUW INF	wall shear stress ahead of interaction
T INF	local free-stream static temperature ahead of interaction
TT	total temperature
TT INF	local free-stream total temperature ahead of interaction
U INF	local free-stream velocity
U'	rms streamwise velocity fluctuations
u,U	streamwise velocity component
u^+	nondimensional streamwise velocity component transformed using Van Driest transformation
V'	rms vertical velocity fluctuations
v	vertical velocity component
W'	rms transverse velocity fluctuations
w	transverse velocity component
x	streamwise coordinate measured from the tip of the centerbody
x'	streamwise coordinate measured from nozzle throat
y	transverse coordinate (normal to wall)
y^+	nondimensional transverse coordinate transformed using Van Driest transformation
δ	boundary-layer thickness
δ^*	boundary-layer displacement thickness
θ	boundary-layer momentum thickness
μ	molecular viscosity
ρ	density

τ	shear stress

Subscripts:

e	boundary layer edge
i	incompressible
max	maximum
o	initial boundary-layer conditions, upstream of pressure gradient
T	total
x'	based on distance from nozzle throat
w	wall
∞	free-stream conditions upstream of pressure gradient
δ	based on boundary-layer thickness
θ	based on boundary-layer momentum thickness

Superscripts:

$(\ )'$	fluctuating value
$\overline{(\ )}$	time average value
$\langle(\ )\rangle$	root mean square

AN EXPERIMENTAL DOCUMENTATION OF PRESSURE GRADIENT AND REYNOLDS NUMBER EFFECTS ON COMPRESSIBLE TURBULENT BOUNDARY LAYERS

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SUMMARY

An experiment is described in which attached supersonic turbulent boundary layers, with a wide range of adverse pressure gradient strengths, were investigated for Reynolds numbers from 11.7×10^6 to 314×10^6. Surface pressure and surface shear measurements were obtained for six flow fields over the entire Reynolds number range. In addition, two flow fields — one with a moderate pressure gradient and the other with a severe pressure gradient — are thoroughly documented at a single Reynolds number. This experimental documentation includes both mean and fluctuating profiles throughout the flow field, and is sufficient to define the complete flow field, including the upstream undisturbed flow region. These data are provided in graphical and tabular form in sufficient detail to validate present or future computer codes and/or turbulence models.

INTRODUCTION

The ability to obtain solutions of complicated fluid flow fields of practical interest is rapidly becoming a reality, spurred on by phenomenal advances in both computers and also by a parallel development of sophisticated numerical codes describing the flow. These codes consist of the Navier-Stokes equations combined with a turbulence model. The development of an adequate model will remove a major limitation to current efforts to predict generalized turbulent flow fields. Reference 1 presents a summary of recent advances in compressible turbulent boundary layer modeling. Usable codes are available for flows with zero or very mild pressure gradients. However, at present there are no adequate models available that can consistently be used to predict flows with adverse pressure gradients leading up to, and including separation. To fill this void, there has been a continuing effort at Ames to structure several experimental flows with various adverse pressure gradients, with and without separation, and to document these flows. This documentation consists of experimental measurements of both mean and fluctuating quantities obtained on the surface and in the flow field. This documentation extends to the upstream undisturbed flow region, where measurements are taken in order to define conditions necessary for starting

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computations. Against such documented flow fields, various computer codes and their associated turbulence models can be tested. An example of such a documented flow was the intersection of a shock wave with a hypersonic compressible turbulent boundary layer discussed in reference 2. In the present experimental test program, several individual flows covering a range of adverse pressure gradient strengths were investigated over a wide range of Reynolds numbers. Selected data have previously been published in the literature (refs. 3 and 4). The present paper provides the complete set of data as well as detailed discussions covering the instrumentation and data reduction techniques.

DESCRIPTION OF EXPERIMENT

Facility

This experimental investigation was performed in the Ames Research Center High Reynolds Number Channel at a nominal Mach number of 2.3. This is an air charged blowdown facility consisting of a large settling tank with flow conditioning screens and interchangeable test sections and nozzles, each designed to produce a particular flow. The nominal free-stream test conditions for the present investigation are given in table 1. By varying reservoir pressure, the Reynolds number could be changed by a factor of 30. The useful test times varied from 5 to 60 min, depending on the total pressure. Run-to-run variations in pressure and Mach number were less than 0.5%. However the wind-tunnel total temperatures and wall temperatures varied up to 15 K from run-to-run; and during a single run it varied about 15 K over the 60-min test time. Provided the data were normalized by actual conditions of wall temperature and total temperature corresponding to the time at which the data were recorded, no noticeable effects were observed.

For the present study, the facility consisted of an axisymmetric contoured nozzle and an attached constant diameter test section (diameter 24.77 cm, length 270 cm). The average surface roughness on the inside of the test section was approximately 0.4 μm, an order of magnitude less than the minimum viscous sublayer thickness encountered during the present tests. The downstream end of this test section connected to a diverging two-dimensional diffuser which was attached to large spheres maintained at low pressure (<0.03 atm).

Model and Test Setup

The test setup is shown schematically in figure 1. It consisted of a centerbody suspended on the end of a sting within the constant area test section. The compressible turbulent boundary layer investigated developed along the inside of this test section. The axisymmetric centerbody shapes were designed using inviscid characteristics theory to produce pressure gradient flow fields free of shock waves. Six centerbodies (designated I through VI) were used to impose adverse pressure gradients of various strengths on the wall boundary layer. When the geometry permitted, the bodies were designed to impose a region of constant pressure (a pressure plateau) following the adverse gradient, and then a region of favorable pressure gradient following that. The nondimensional pressure gradient parameter p^+ ranged from 0.003 to 0.131 over the Reynolds number range investigated for the bodies tested in this investigation. As indicated in figure 1, flow-field profiles as well as surface measurements were obtained using a single instrumentation port in the test section. Plugs for this port, 3.81 cm in diameter, were machined in place to fit flush (a maximum step of 3 μm) with the inner cylindrical surface. One plug was instrumented with surface skin-friction gages as described below. Another plug was fitted with a survey mechanism into which various probes for probing the flow field were inserted.

Instrumentation: Surface Measurements

Surface pressure.- Wall static pressure taps, 0.050 cm in diameter at the wall, were spaced every 5.08 cm along the tube in the region of interest. Surface pressures were obtained with strain gage absolute-pressure transducers connected with short lengths of stainless steel tubing which in turn were connected to the static taps along the wall.

Surface shear.- Surface shear was measured using three techniques: the Preston tube (ref. 5), the heated-wire technique (refs. 6-8), and law-of-the-wall plots using flow-field measurements. A sketch of the Preston tube used is presented in figure 2. For all the present test conditions the probe height was within the boundary layer region governed by the law-of-the-wall. The total pressure measured by this probe while touching the wall could therefore be analytically related to the surface shear (ref. 5). The heated-wire probe was fabricated as indicated in figure 3. The platinum - 10% rhodium wire, 0.00254 cm in diameter and 0.635 cm long is heated to a predetermined temperature; the surface shear is then related to the power required to keep the wire at the predetermined temperature. The wire in the present case was kept at the required temperature by means of a constant temperature anemometer. An accurate wall temperature measurement is required as an input in the data reduction technique (to be discussed below) to obtain the surface shear. In the present work, the surface temperature was obtained by using chromel-constantan thermocoulples located up- and downstream of the wire probe. These thermocouples had the same diameter and length as the exposed gage wire and were connected to posts of the same length and diameter as the gage posts. One thermocouple was placed upstream of the heated gage a distance of 0.500 cm. Another thermocouple was placed downstream of the heated gage wire. Both thermocouples registered equal surface temperatures (within 0.5 K).

Instrumentation: Flow Field Measurements

Flow-field surveys were obtained using a mechanism similar to that shown in figure 2 of reference 2. A stepping motor, with controlled rotation of 1.8° increments, was used to directly drive a power screw, which moved a mounting table upon which various probes were fastened. The drive shaft movement was measured with a precision potentiometer. Precision bearings and anti-backlash worm gears were used throughout.

Instrumentation: Mean Flow

Pitot pressure.- The probe used to obtain pitot pressure in the flow field is sketched in figure 4. This probe, constructed with stainless steel tubing, was connected at the end to a strain gage absolute pressure transducer.

Static pressure.- Static pressures in the flow field were measured using two types of probes. The first, shown in figure 5(a) was a common-cone cylinder probe, with the static holes about 10 diameters back from the core apex. This probe is discussed in reference 9. Method-of-characteristics computations predict that the static pressure on the cylindrical part of the probe, 10 diameters back from the probe tip, is equal to the stream static pressure. Viscous interaction corrections to the measured static pressures are negligible for the present test conditions (ref. 9). Flow-field static pressures were also measured with the probe pictured in figure 5(b). This probe, a 10° half-angle cone, followed by a transition into a 2° half-angle cone followed by a cylindrical section is discussed in references 10 and 11. Characteristics solutions for this geometry at Mach numbers from 1. to 2.5 indicate that the pressure measured at a point about 5 diameters back from the cone apex is equal to the stream static pressure. The advantage with this probe is that the sensing holes can be placed closer to the probe tip, thus reducing the errors due to flow-field static pressure gradients in the streamwise direction.

Total temperature.- Flow-field total temperature surveys were obtained using a probe first proposed by Vas in reference 12; this probe is shown in figure 6. It can be seen that the design is that of an unshielded thermocouple with a large length/diameter ratio, with the supporting posts and a third thermocouple junction used to obtain the support tip temperature. With both the temperature of the butt-welded thermocouple joint and the support end temperature known, the true total temperature at any point in the flow field can be obtained by following the procedure outlined in reference 12 to correct for radiation, conduction, and recovery factor.

Instrumentation: Fluctuation Quantities

Both single hot-wire and dual wedge hot-film probes, sketched in figure 7, were used to obtain the three fluctuating velocity components and turbulent shear stress. (The method used to obtain these quantities will be discussed below.)

The single hot wire (diameter 10 μm, length 0.15 cm) was used for calibration purposes. Attempts to use this probe for the detailed flow-field surveys failed due to excessive wire breakage and signal distortion caused by vibration and strain gauging effects. Therefore a second single hot wire (diameter 10 μm, length 0.15 cm), supported with an epoxy film (see ref. 13) was used to measure mass flow and total temperature fluctuations (fig. 7(a)). For the present test series a single epoxy-backed wire survived over 35 boundary-layer traverses. A commercially available dual wedge film probe (diameter 0.11 cm) was used to obtain the instantaneous ratios of the vertical and transverse velocities to the mass-flow fluctuations (fig. 7(b)). All probes were operated with constant temperature anemometers.

Test Procedure

The data were obtained during a series of tests with the tunnel operating at the nominal conditions noted in table 1. The measured boundary-layer parameters immediately ahead of the interaction are also tabulated in table 1. For each test condition a slight Mach number gradient (-0.05/m) existed in the test section ahead of the interaction because of boundary-layer growth on the wall of the tube. The measurements were obtained at the port approximately 290 cm downstream from the nozzle throat. This was sufficiently downstream from boundary layer transition to establish a fully developed equilibrium turbulent boundary layer along the tube wall. The pressure transducers used to measure surface static pressure and flow-field total static pressures were calibrated before each run by varying the no-flow wind-tunnel test section pressure.

During the tests, each centerbody was moved axially over the measurement location, to obtain the surface pressure and skin friction as functions of x, and was prepositioned at specific axial locations for the various profile measurements. The total axial traverse was about 22 cm. The boundary-layer thickness increased about 6% in a distance corresponding to the axial length over which the centerbody was moved. However, this increase had little effect on the experimental results provided they were compared at equivalent axial distances relative to the centerbody. This is illustrated by the pressure measurements shown in figure 8 where data for an individual test run from three pressure orifices, spaced 10 cm apart long the tube, are plotted in this manner.

For the remainder of this report, only average values of wall pressure will be presented. For all the data presented here, the indicated axial distance x has been measured from the tip of each centerbody.

Flow-field surveys were obtained using the pitot pressure, static pressure, total-temperature, and the hot-wire and hot-film probes described above in conjunction with the survey mechanism. Each survey was taken during a single test run by prepositioning the centerbody. Surveys were made at axial locations every 2 cm in the interaction region for two centerbodies at $Re_{x'_0} = 35.3 \times 10^6$. Additional surveys were made ahead of the interaction region for the remaining Reynolds numbers. In traversing the boundary layer, each probe was stopped at each location for a few seconds to ensure that there was no time lag in the measurement. The static pressure at the model surface was monitored continuously during all traverses to ensure interference-free data.

The constant area test section in which this investigation was done was instrumented with static pressure taps at points along the circumference (0°, 45°, and 180°) at selected axial stations. Variations in these data around the tube were within the experimental accuracy of the measurements. Thus it was concluded that the flow was axisymmetric.

DATA REDUCTION

Mean Flow Measurements

Surface quantities.- A direct measurement of surface shear was not possible for these tests and thus indirect methods were used to obtain these data. The skin friction was measured using the heated-wire technique (refs. 6-8) described above, from Preston tube measurements (ref. 5), and from law-of-the-wall plots using the mean flow-field measurements. For each test run the heated-wire gages were calibrated in the upstream boundary layer ahead of the interaction at five values of wall shear (obtained by varying wind-tunnel total pressure). For this calibration the wall shear was determined from the Preston tube measurements and law-of-the-wall plots. Wall shear for the upstream turbulent boundary layer was also computed using a finite-difference boundary-layer program discussed in reference 14 that was modified for turbulent flows by Marvin and Sheaffer. The turbulence model employed was a two-layer eddy-viscosity model described in reference 15. The computed turbulent boundary layer on a flat plate was allowed to grow until its displacement thickness was equal to that measured (upstream of the interaction), and the wall shear was taken at that point. For the upstream boundary layer, the surface shear obtained from the three methods discussed above (Preston tube, law-of-the-wall, and boundary-layer computations) agreed within 3%.

A typical calibration plot for the gage is shown in figure 9. The calibration curve would have passed through the origin if the rexolite substrate were a perfect insulator. A plot of a typical wall shear distribution is shown in figure 10. Results from all three measurement techniques are shown. (The law-of-the-wall results are only shown for those x locations where a distinct law-of-the-wall portion of the velocity profile could be identified.) In the large adverse pressure gradient region ($26 < x < 38$) the Preston tube data are also invalid. Since both the Preston tube and law-of-the-wall techniques are uncertain in regions of adverse pressure gradients as well as requiring additional flow-field measurements, only the results from the heated-wire gage will be presented in the remaining portions of this paper.

For each test run, data from two heated-wire gages, located 2 cm apart in the axial direction, were obtained. It is seen that there is significant scatter in the data, especially for large values of x. This scatter is due in part to the turbulent fluctuations detected by the gauges as well as to the basic uncertainties in the measured quantities. For the remainder of this report only average values of skin friction for each test configuration will be presented, with appropriate scatter bars.

Flow field quantities.- Velocity, density and pressure profiles were obtained from pitot and static pressure and total temperature surveys. These data will be discussed in the section on experimental results. Corrections to the data obtained from the total temperature probe for radiation, conduction, and recovery factor were made following the method of Vas in reference 12. A typical survey of corrected flow-field total temperature normalized by reservoir total temperature vs y is shown in figure 11. For the present tests the measured values of this normalized total temperature ratio were essentially constant everywhere in the flow field (the maximum variation was 0.5%). Therefore, a constant total temperature equal to the free-stream total temperature was used in the data reduction procedure for the velocity and density profiles.

Fluctuating Measurements

The three fluctuating velocity components and turbulent shear stress were obtained from the single hot-wire and dual hot-film probe using the data reduction technique described below. Spectrum analysis established that the usable frequency range for all probes used was over 100 kHz and subsequent data analysis indicated that less than 1% of the flow energy was contained in frequencies above 80 kHz.)

The principal difficulty in using hot wires and films in compressible flow is that the sensor responds to velocity, density, and total temperature fluctuations and, in general, exhibits a different sensitivity to each one. However, it has been shown by Morkovin (ref. 16) for supersonic speeds, and by Horstman and Rose (ref. 17) for transonic speeds, that the density and velocity sensitivities are equal for specific test conditions. It has been shown in reference 17 that the sensors respond to mass flow rather than density and velocity separately, independent of the Mach number, provided the Reynolds number, based on sensor diameter, is greater than 20 and that the temperature overheat is greater than 0.4. The minimum sensor Reynolds number for the present investigation was 30. The wire-overheats were usually greater than 1.0. The epoxy-backed normal wire was used to measure the mass flow and total temperature fluctuations using Kovasznay's mode diagram approach (ref. 18). Since the epoxy-backed wire could be affected by thermal feedback problems which can cause the probe sensitivities to be functions of frequency (ref. 17), a dynamic calibration technique was employed to determine the mass-flow sensitivity. Both the bare wire and epoxy-backed probes were calibrated and used to measure the mass-flow fluctuations in the undisturbed boundary layer. (The calibrations were performed both in the free stream, varying the tunnel total pressure, and by traverses through the previously measured boundary layer.) By comparing the measurements obtained by the two probes, corrections to the epoxy-backed probe sensitivity coefficients were determined. These corrections were found to be a function of probe Reynolds number, varying from 30% at the lowest to 5% at the highest Reynolds numbers tested. Using the corrected mass-flow sensitivity coefficients, the mass-flow and total temperature fluctuations were measured using the mode diagram approach at several locations in the flow field. Three typical mode diagrams are shown in figure 12 for the upstream boundary layer. The temperature sensitivity S_{T_0} decreases with increasing overheat while the mass-flow sensitivity $S_{\rho u}$ remains relatively constant. Thus, the intercept on the ordinate, where $(S_{\rho u}/S_{T_0}) \to 0$, gives the intensity of the total temperature fluctuations while the slope of the curve at high values of $S_{\rho u}/S_{T_0}$ yields the intensity of the mass-flow fluctuations. It should be noted that at very low overheats, a constant temperature system has poor frequency response; and since the density and velocity sensitivities may no longer be equal, errors could be introduced in a measurement of the total temperature fluctuation. Even so, it can easily be seen from figure 12 that the level of temperature fluctuations in the boundary layer was very small (much less than 1%), and that the sensor responded solely to the mass-flow fluctuations, especially at the higher overheats. With the exception of the data obtained for modal analysis plots, all probes were operated at high overheats ($S_{\rho u}/S_{T_0} > 1.5$) where the total temperature fluctuations could be neglected.

To obtain the velocity fluctuations from the mass-flow fluctuations the equations outlined in reference 17 were used, assuming negligible total temperature and pressure fluctuations. A 1% total temperature fluctuation (the maximum value for the present tests) would result in a maximum error of 10% in the inferred velocity fluctuation. The later assumption of negligible pressure fluctuations has been shown to be valid at the present Mach numbers (refs. 17,19) even in the presence of oblique shock waves.

To measure the vertical and transverse velocity fluctuations and the turbulent shear stress the dual wedge film probe was used. By operating the probe at a single high overheat and only measuring ratios of fluctuating voltages, the only calibration measurements required were relative measurements of the mean voltages to insure the two films had equal sensitivities. The data reduction techniques and equations used are described in references 17 and 20. A turbulent Prandtl number equal to 0.9 was assumed in the data reduction procedure.

During the course of this investigation it was found that the fluctuating velocities could be determined at local transonic Mach numbers but that the turbulent shear stress could not. This is best illustrated by examining the output of the dual wedge sensor as a function of height above the wall, as shown in figure 13. Three quantities are plotted: the rms sum of the outputs of the two films (proportional to mass flow), the rms difference of the outputs of the two films (proportional to vertical velocity), and the correlation coefficient R (proportional to the turbulent shear stress). Both the mass flow and vertical velocity fluctuations appear normal and show no strange behavior near the wall. However the correlation coefficient decreases to almost zero near the wall (where the local Mach number is equal to 1.2). At first it was assumed this was a wall interference effect, but by examining additional boundary-layer traverses through the interaction regions it was found that this drop-off in R always occurred at a local Mach number equal to 1.2, independent of y. This suggests that the drop-off is due to probe interference, caused by the rapid formation of detached and attached shock waves arising from the local flow fluctuations on the tip of the probe. This same phenomenon was observed in reference 13. In the results section of this paper no shear stress data are presented for local Mach numbers less than 1.3.

Experimental Uncertainties

The experimental uncertainties in the surface pressure and skin friction were estimated to be ±5% and ±15%, respectively. The uncertainty in y is ±0.01 cm. The experimental uncertainties in the mean flow-field data are ±0.5% for the total temperature, ±10% for the static pressure, ±6% for the static temperature, ±12% for density, and ±3% for the velocity. The uncertainties in the flow-field variables are due principally to zero offsets in the pressure measurements. Since each survey was obtained with a single probe, the uncertainty of the vertical variation in these flow-field quantities is significantly less than the numbers quoted above.

The experimental uncertainties in the fluctuating flow-field quantities due to the various assumptions employed and calibration errors are ±15% for the fluctuating velocity components and ±20% for the turbulent stress.

EXPERIMENTAL RESULTS

Six centerbodies (designated I through VI) were used to impose adverse pressure gradients of various strengths on the wall boundary layer. Mean surface measurements were obtained for each centerbody at four Reynolds numbers: $Re_{x_0'} = 11.7 \times 10^6$; 35.3×10^6; 105×10^6; and 314×10^6. Mean flow-field data were obtained upstream of the interaction region at all four Reynolds numbers and for two centerbodies (II and IV) at a Reynolds number of 35.3×10^6 throughout the flow field. Fluctuating flow-field data were measured in the upstream boundary layer for the three lower Reynolds numbers and throughout the flow field for two centerbodies (II and IV) at a Reynolds number of 35.3×10^6. These data, presented in both tabular and graphical form, will be discussed in this section.

Local Free-Stream Conditions

The nominal free-stream conditions and the boundary-layer parameters ahead of the interaction region are given in table 1 for the four test pressures (and Reynolds numbers) of this investigation. The slight differences in Mach number were caused by small differences in the boundary-layer growth in the nozzle throat.

Surface Measurements

Detailed surface pressure and skin-friction coefficient distributions are shown for centerbodies I to VI in figure 14. Since the nondimensional pressure distribution on the tunnel wall for a given body was essentially independent of Reynolds number, only one average curve is shown for each body. The skin friction data represent average values with appropriate scatter bars for run-to-run variation as well as the basic uncertainties in the data. For each centerbody, data were taken at four different Reynolds numbers as shown in the figure. The maximum value of the parameter p^+, a measure of the strength of the adverse pressure gradient, is noted for each centerbody at each Reynolds number tested. (The centerbodies designated A and B in ref. 3 correspond to centerbodies II and IV, respectively, in this paper.) These data are also tabulated in table 2. The ratio of wall shear to its initial value is also given in this table. Where space and tunnel blockage considerations allowed, the centerbodies were designed to impress an adverse pressure gradient followed by a plateau region of constant pressure to permit the study of effects of history on the flow. Centerbodies I, II, and III have these long pressure plateau regions. Centerbodies IV and V resulted in shorter plateau regions followed by favorable pressure gradients. Centerbody VI has the same overall pressure rise as centerbodies IV and V but the pressure gradient is spread over a much longer axial distance.

We can note several things about the skin-friction data. As expected, the initial value of Cf_{∞} decreases as Reynolds number increases. At the lowest Reynolds numbers the data show the most streamwise variation in skin friction and at the highest Reynolds numbers there is very little streamwise variation. At large x (~40 cm) the skin friction is higher than the initial value for the lower Reynolds numbers, and the reverse (with minor exceptions) is true for the higher Reynolds numbers. These results are independent of whether the pressure distribution has a long plateau (I, II, III), short plateau (IV, VI), or no plateau (V).

Flow-Field Measurements: Upstream Boundary Layer

Mean flow measurements.- Upstream mean boundary-layer profiles were obtained for all four test conditions; the results are tabulated in table 3. The integrated values of incompressible and compressible displacement and momentum thicknesses are given in table 1. Also included is the boundary-layer thickness used for the upper limit of integration. In figure 15 the mean velocity profiles transformed into incompressible coordinates via the Van Driest II transformation (ref. 21) are shown in law-of-the-wall coordinates. Also shown is Coles' (ref. 22) universal law-of-the-wall. The good agreement verifies the presence of a fully developed turbulent boundary layer.

Fluctuating measurements.- Root-mean-square fluctuating velocity and turbulent shear stress profiles are shown in figures 16 and 17, and are tabulated in table 4. Data were not obtained at the highest Reynolds number (105×10^6) for the vertical component ($\langle v' \rangle$) and the shear stress τ in the outer half of the boundary layer since higher probe power requirements at this Reynolds number could not be met with the available equipment. Examination of the fluctuating velocity profiles shows that the data are essentially independent of Reynolds number.

Pressure Gradient Region

Mean flow measurements.- The mean flow-field results obtained for centerbodies II and IV at a Reynolds number of 35.3×10^6 are tabulated in tables 5 and 6. The integrated values of incompressible and compressible displacement and momentum thicknesses are given in tables 7 and 8. Also included is the boundary-layer thickness used for the upper limit of integration for each profile. The velocity measurements are shown in figure 18. Centerbody II (see fig. 14(b)) had a strong adverse pressure gradient ($p^+ = 0.018$) followed by a long plateau. The velocity profiles (fig. 18) show a retardation in the adverse pressure gradient region but recover to an equilibrium profile at the downstream station. Centerbody IV resulted in a rather severe adverse pressure gradient ($p^+ = 0.042$) followed by a short plateau and then a favorable pressure gradient (fig. 14(d)). The velocity profiles (fig. 18) show a strong retardation in the adverse pressure gradient region and a rapid recovery downstream.

Fluctuating measurements.- The fluctuating flow-field data obtained for centerbodies II and IV at a Reynolds number of 35.3×10^6 are tabulated in tables 9 and 10. The root-mean-square turbulent kinetic energy and turbulent shear stress profiles are also shown in figures 19 and 20. The solid symbols in figure 20 represent the wall shear measurments shown in figure 14. For centerbody II, the turbulent kinetic energy and turbulent shear stress profiles both show increases in the adverse pressure gradient region. However, in the downstream plateau region, the turbulent kinetic energy distributions begin to relax to an equilibrium profile while the shear stress distributions do not. For centerbody IV, the turbulent kinetic energy and shear-stress profiles clearly show the effects of both adverse and favorable pressure gradients. The adverse gradient increases both the kinetic energy and shear stress in the flow field while the wall shear decreases. The effect of the favorable gradient is opposite.

CONCLUDING REMARKS

A detailed experimental investigation of attached turbulent boundary layers over an extensive range of Reynolds numbers (11.7×10^6 to 314×10^6) is presented. Experimental measurements were obtained for adverse pressure gradients ranging from mild ($p^+ = 0.003$) to severe ($p^+ = 0.131$) in shock-free flow. Mean measurements (surface pressure, surface shear, and pressure and temperature profiles) and fluctuating measurements (three velocity fluctuation components and turbulent shear stress profiles) were obtained. The tabulated results presented in this report provide, in sufficient detail, experimental data for validating present or future computer codes and/or turbulence models.

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TABLE 1.- NOMINAL FREE-STREAM TEST CONDITIONS

Test conditions	P_T, atm			
	0.33	1.0	3.0	9.0
T_T, K	278	278	278	278
M_∞	2.21	2.24	2.33	2.36
P_∞, N/m^2	2909	8528	23111	65638
T_∞, K	252.8	249.1	239.9	236.7
T_W, K	278	278	278	278
ρ_∞, kg/m^2	0.0723	0.2149	0.6045	1.7399
U_∞, m/s	525.3	529.2	538.8	542.1
δ_o, cm	4.0	4.0	4.0	4.0
δ_o^*, cm	0.97	0.85	0.85	0.80
$\delta_{i_o}^*$, cm	0.51	0.42	0.40	0.36
θ_o, cm	0.26	0.23	0.23	0.21
θ_{i_o}, cm	0.36	0.31	0.30	0.20
$Re_{x',o}$	11.7×10^6	35.3×10^6	105×10^6	314×10^6
Re_{δ_o}	0.16×10^6	0.49×10^6	1.44×10^6	4.32×10^6
Re_{θ_o}	1.04×10^6	2.82×10^6	8.28×10^6	22.7×10^6

TABLE 2.- SURFACE PRESSURE, SHEAR, AND SKIN-FRICTION-COEFFICIENT DISTRIBUTIONS

CENTERBODY I, RE=11.7X10E05

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.61
25	1.00	1.00	1.61
26	1.01	1.00	1.61
27	1.02	1.00	1.61
28	1.04	1.00	1.61
29	1.06	1.00	1.61
30	1.08	1.00	1.61
31	1.11	1.00	1.61
32	1.14	1.01	1.63
33	1.16	1.05	1.69
34	1.19	1.11	1.79
35	1.22	1.19	1.92
36	1.24	1.24	2.00
37	1.25	1.28	2.06
38	1.26	1.30	2.09
39	1.26	1.31	2.11
40	1.26	1.31	2.11

CENTERBODY I, RE=105.X10E06

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.25
25	1.00	1.00	1.25
26	1.00	1.00	1.25
27	1.01	1.00	1.25
28	1.04	1.00	1.25
29	1.05	1.00	1.25
30	1.08	.99	1.24
31	1.10	.97	1.21
32	1.13	.95	1.19
33	1.17	.94	1.18
34	1.20	.93	1.16
35	1.24	.93	1.16
36	1.27	.92	1.15
37	1.28	.92	1.15
38	1.29	.93	1.16
39	1.29	.94	1.18
40	1.29	.95	1.19

CENTERBODY I, RE=35.3X10E06

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.48
25	1.00	1.00	1.48
26	1.01	1.00	1.48
27	1.02	1.00	1.48
28	1.03	1.00	1.48
29	1.05	1.00	1.48
30	1.07	1.00	1.48
31	1.10	1.00	1.48
32	1.12	1.00	1.48
33	1.15	1.00	1.48
34	1.18	1.00	1.48
35	1.22	1.00	1.48
36	1.24	1.02	1.51
37	1.25	1.07	1.58
38	1.25	1.11	1.64
39	1.25	1.13	1.67
40	1.25	1.15	1.70

CENTERBODY I, RE=314.X10E06

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.07
25	1.00	1.00	1.07
26	1.00	1.00	1.07
27	1.01	.99	1.06
28	1.02	.98	1.05
29	1.04	.98	1.05
30	1.06	.94	1.01
31	1.08	.93	1.01
32	1.11	.92	.98
33	1.13	.91	.97
34	1.16	.90	.96
35	1.19	.89	.95
36	1.24	.89	.95
37	1.26	.88	.94
38	1.28	.87	.93
39	1.28	.87	.93
40	1.28	.86	.92

TABLE 2.- Continued.

CENTERBODY II, RE=11.7X10E06

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.61
25	1.00	.96	1.55
26	1.01	.91	1.47
27	1.03	.83	1.34
28	1.07	.79	1.27
29	1.14	.79	1.27
30	1.22	.88	1.42
31	1.29	.94	1.51
32	1.34	.99	1.59
33	1.35	1.03	1.66
34	1.36	1.05	1.69
35	1.36	1.07	1.72
36	1.36	1.08	1.74
37	1.36	1.08	1.74
38	1.35	1.08	1.74
39	1.35	1.08	1.74
40	1.35	1.08	1.74
41	1.34	1.07	1.72
42	1.33	1.06	1.71

CENTERBODY II, RE=105.X10E06

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.25
25	1.00	1.00	1.25
26	1.00	1.00	1.25
27	1.01	1.00	1.25
28	1.03	.91	1.14
29	1.08	.88	1.10
30	1.16	.82	1.03
31	1.24	.76	.95
32	1.32	.78	.98
33	1.38	.80	1.00
34	1.39	.82	1.03
35	1.39	.84	1.05
36	1.39	.84	1.05
37	1.39	.84	1.05
38	1.39	.84	1.05
39	1.39	.84	1.05
40	1.38	.84	1.05
41	1.38	.84	1.05

CENTERBODY II, RE=35.3X10E06

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.48
25	1.00	1.00	1.48
26	1.01	1.00	1.48
27	1.03	.99	1.47
28	1.08	.96	1.42
29	1.16	.89	1.32
30	1.25	.84	1.24
31	1.32	.82	1.21
32	1.35	.82	1.21
33	1.36	.83	1.23
34	1.36	.84	1.24
35	1.36	.85	1.26
36	1.36	.86	1.27
37	1.36	.88	1.30
38	1.36	.89	1.32
39	1.36	.90	1.33
40	1.36	.90	1.33
41	1.36	.90	1.33

CENTERBODY II, RE=314.X10E06

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.07
25	1.00	1.00	1.07
26	1.00	.98	1.05
27	1.00	.94	1.01
28	1.01	.90	.96
29	1.04	.86	.92
30	1.10	.83	.89
31	1.16	.82	.88
32	1.23	.81	.87
33	1.31	.82	.88
34	1.37	.82	.88
35	1.39	.82	.88
36	1.39	.83	.89
37	1.39	.83	.89
38	1.39	.83	.89
39	1.39	.83	.89
40	1.39	.83	.89
41	1.39	.83	.89

TABLE 2.- Continued.

CENTERBODY III, RE=11.7X10E06

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.61
25	1.00	.98	1.58
26	1.01	.91	1.47
27	1.03	.76	1.22
28	1.08	.70	1.13
29	1.32	.80	1.29
30	1.42	.93	1.50
31	1.46	1.03	1.66
32	1.46	1.11	1.78
33	1.46	1.18	1.90
34	1.45	1.22	1.96
35	1.45	1.25	2.01
36	1.44	1.27	2.04
37	1.42	1.27	2.04
38	1.41	1.28	2.06
39	1.39	1.28	2.06
40	1.36	1.28	2.06

CENTERBODY III, RE=105.X10E06

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.25
25	1.00	1.00	1.25
26	1.01	.99	1.24
27	1.03	.98	1.23
28	1.07	.95	1.19
29	1.18	.79	.99
30	1.38	.70	.88
31	1.50	.77	.96
32	1.51	.87	1.09
33	1.51	.94	1.18
34	1.51	.96	1.20
35	1.50	.99	1.24
36	1.50	1.01	1.26
37	1.49	1.01	1.26
38	1.48	1.00	1.25
39	1.46	1.00	1.25
40	1.44	1.00	1.25

CENTERBODY III, RE=35.3X10E06

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.48
25	1.00	1.00	1.48
26	1.01	1.00	1.48
27	1.02	.98	1.45
28	1.08	.90	1.33
29	1.24	.79	1.17
30	1.41	.79	1.17
31	1.47	.85	1.26
32	1.48	.98	1.45
33	1.48	1.08	1.60
34	1.47	1.12	1.66
35	1.47	1.15	1.70
36	1.46	1.16	1.72
37	1.46	1.17	1.73
38	1.45	1.17	1.73
39	1.44	1.17	1.73
40	1.41	1.17	1.73

CENTERBODY III, RE=314.X10E06

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.07
25	1.00	1.00	1.07
26	1.00	1.00	1.07
27	1.01	.98	1.05
28	1.04	.94	1.01
29	1.11	.86	.92
30	1.32	.75	.80
31	1.47	.75	.80
32	1.51	.78	.83
33	1.52	.82	.88
34	1.51	.88	.94
35	1.51	.91	.97
36	1.50	.94	1.01
37	1.48	.95	1.02
38	1.47	.96	1.03
39	1.46	.96	1.03
40	1.44	.96	1.03

TABLE 2.- Continued.

CENTERBODY IV, RE=11.7X10E06

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.61
25	1.01	.98	1.58
26	1.03	.92	1.48
27	1.08	.81	1.30
28	1.17	.69	1.11
29	1.29	.59	.95
30	1.42	.54	.87
31	1.52	.56	.90
32	1.58	.60	.97
33	1.60	.66	1.06
34	1.60	.74	1.19
35	1.60	.84	1.35
36	1.59	.95	1.53
37	1.55	1.07	1.72
38	1.48	1.16	1.87
39	1.39	1.22	1.96
40	1.30	1.24	2.00
41	1.22	1.24	2.00

CENTERBODY IV, RE=105.X10E06

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.25
25	1.00	1.00	1.25
26	1.01	.99	1.24
27	1.02	.98	1.23
28	1.05	.96	1.20
29	1.11	.93	1.16
30	1.21	.89	1.11
31	1.34	.82	1.03
32	1.48	.76	.95
33	1.62	.73	.91
34	1.68	.77	.96
35	1.69	.83	1.04
36	1.69	.89	1.11
37	1.68	.94	1.18
38	1.66	.99	1.24
39	1.56	1.03	1.29
40	1.44	1.06	1.33
41	1.33	1.08	1.35

CENTERBODY IV, RE=35.3X10E06

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.48
25	1.00	.98	1.45
26	1.01	.95	1.41
27	1.03	.91	1.35
28	1.08	.85	1.26
29	1.16	.77	1.14
30	1.26	.70	1.04
31	1.41	.66	.98
32	1.55	.67	.99
33	1.61	.72	1.07
34	1.61	.80	1.18
35	1.61	.90	1.33
36	1.61	.98	1.45
37	1.61	1.06	1.57
38	1.55	1.13	1.67
39	1.45	1.17	1.73
40	1.34	1.20	1.78
41	1.23	1.23	1.82

CENTERBODY IV, RE=314.X10E06

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.07
25	1.00	1.00	1.07
26	1.00	1.00	1.07
27	1.01	.98	1.05
28	1.04	.96	1.03
29	1.08	.94	1.01
30	1.15	.90	.96
31	1.25	.85	.91
32	1.39	.80	.86
33	1.58	.76	.81
34	1.66	.75	.80
35	1.69	.79	.85
36	1.69	.84	.90
37	1.69	.89	.95
38	1.66	.94	1.01
39	1.61	1.00	1.07
40	1.51	1.05	1.12
41	1.37	1.10	1.18

TABLE 2.- Continued.

CENTERBODY V, RE=11.7X10E06

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.61
25	1.00	.96	1.55
26	1.02	.91	1.47
27	1.07	.82	1.32
28	1.17	.70	1.13
29	1.35	.64	1.03
30	1.48	.62	1.00
31	1.59	.62	1.00
32	1.65	.69	1.11
33	1.67	.82	1.32
34	1.66	1.01	1.63
35	1.61	1.14	1.84
36	1.53	1.25	2.01
37	1.45	1.35	2.17
38	1.36	1.38	2.22
39	1.28	1.41	2.27

CENTERBODY V, RE=105.X10E06

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.25
25	1.00	1.00	1.25
26	1.01	.98	1.23
27	1.04	.94	1.18
28	1.11	.90	1.13
29	1.21	.83	1.04
30	1.36	.72	.90
31	1.53	.59	.74
32	1.68	.52	.65
33	1.80	.58	.73
34	1.83	.72	.90
35	1.80	.88	1.10
36	1.67	1.01	1.26
37	1.56	1.09	1.36
38	1.45	1.15	1.44
39	1.34	1.19	1.49

CENTERBODY V, RE=35.3X10E06

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.48
25	1.00	1.00	1.48
26	1.01	1.00	1.48
27	1.04	.99	1.47
28	1.12	.90	1.33
29	1.25	.71	1.05
30	1.41	.60	.89
31	1.56	.56	.83
32	1.67	.58	.86
33	1.71	.73	1.08
34	1.71	.90	1.33
35	1.67	1.06	1.57
36	1.57	1.15	1.70
37	1.47	1.21	1.79
38	1.38	1.24	1.84
39	1.29	1.26	1.86

CENTERBODY V, RE=314.X10E06

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.07
25	1.00	1.00	1.07
26	1.00	1.00	1.07
27	1.01	.98	1.05
28	1.04	.95	1.02
29	1.11	.90	.96
30	1.22	.83	.89
31	1.37	.77	.82
32	1.56	.69	.74
33	1.73	.63	.67
34	1.85	.61	.65
35	1.85	.68	.73
36	1.77	.78	.83
37	1.66	.88	.94
38	1.54	.94	1.01
39	1.42	.98	1.05

TABLE 2.- Concluded.

CENTERBODY VI, RE=11.7X10E06

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.61
25	1.00	1.00	1.61
26	1.01	.99	1.59
27	1.02	.98	1.58
28	1.05	.95	1.53
29	1.10	.93	1.50
30	1.17	.88	1.42
31	1.25	.85	1.37
32	1.33	.81	1.30
33	1.39	.77	1.24
34	1.44	.77	1.24
35	1.48	.81	1.30
36	1.50	.86	1.38
37	1.50	.93	1.50
38	1.50	.99	1.59
39	1.50	1.05	1.69
40	1.50	1.12	1.80
41	1.49	1.17	1.88

CENTERBODY VI, RE=105.X10E06

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.25
25	1.00	1.00	1.25
26	1.00	1.00	1.25
27	1.01	1.00	1.25
28	1.03	1.00	1.25
29	1.07	1.00	1.25
30	1.13	.99	1.24
31	1.20	.98	1.23
32	1.29	.93	1.16
33	1.40	.90	1.13
34	1.54	.85	1.06
35	1.71	.80	1.00
36	1.83	.78	.98
37	1.88	.82	1.03
38	1.91	.90	1.13
39	1.93	.97	1.21
40	1.95	1.04	1.30
41	1.95	1.09	1.36

CENTERBODY VI, RE=35.3X10E06

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.48
25	1.00	1.00	1.48
26	1.01	.99	1.47
27	1.03	.98	1.45
28	1.06	.96	1.42
29	1.11	.92	1.36
30	1.18	.86	1.27
31	1.29	.79	1.17
32	1.44	.73	1.08
33	1.56	.66	.98
34	1.66	.64	.95
35	1.72	.74	1.10
36	1.75	.84	1.24
37	1.76	.94	1.39
38	1.76	1.01	1.49
39	1.76	1.08	1.60
40	1.76	1.16	1.72
41	1.76	1.22	1.81

CENTERBODY VI, RE=314.X10E06

X(CM)	PW / PW INF	TAUW / TAUW INF	CF*E03
24	1.00	1.00	1.07
25	1.00	1.00	1.07
26	1.00	1.00	1.07
27	1.01	1.00	1.07
28	1.01	1.00	1.07
29	1.04	1.00	1.07
30	1.09	.98	1.05
31	1.16	.97	1.04
32	1.24	.97	1.04
33	1.32	.95	1.02
34	1.45	.93	1.00
35	1.61	.91	.97
36	1.77	.89	.95
37	1.86	.87	.93
38	1.90		
39	1.92		
40	1.92		
41	1.92		

TABLE 3.- UPSTREAM BOUNDARY-LAYER PROFILES -- MEAN MEASUREMENTS

INITIAL BOUNDARY-LAYER PROFILES, RE = 11.7X10E06

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.000	0.505	1.982	0.000	0.000	1.000
0.050	0.786	1.000	0.567	1.764	0.471	0.267	1.000
0.075	0.860	1.000	0.579	1.726	0.510	0.296	1.000
0.100	0.920	1.000	0.590	1.695	0.540	0.319	1.000
0.150	1.006	1.000	0.607	1.648	0.583	0.354	1.000
0.200	1.071	1.000	0.620	1.612	0.614	0.381	1.000
0.250	1.122	1.000	0.632	1.583	0.637	0.402	1.000
0.300	1.165	1.000	0.642	1.559	0.657	0.421	1.000
0.350	1.203	1.000	0.651	1.537	0.673	0.438	1.000
0.400	1.234	1.000	0.658	1.519	0.687	0.452	1.000
0.450	1.265	1.000	0.666	1.501	0.700	0.466	1.000
0.500	1.291	1.000	0.673	1.486	0.711	0.478	1.000
0.600	1.339	1.000	0.686	1.459	0.73[illegible]	0.500	1.000
0.700	1.377	1.000	0.696	1.437	0.745	0.519	1.000
0.800	1.411	1.000	0.706	1.417	0.758	0.535	1.000
0.900	1.444	1.000	0.715	1.398	0.771	0.551	1.000
1.000	1.480	1.000	0.726	1.378	0.784	0.569	1.000
1.100	1.511	1.000	0.735	1.360	0.796	0.585	1.000
1.200	1.545	1.000	0.746	1.341	0.808	0.602	1.000
1.300	1.581	1.000	0.757	1.321	0.820	0.621	1.000
1.400	1.616	1.000	0.768	1.302	0.832	0.639	1.000
1.500	1.650	1.000	0.780	1.283	0.844	0.658	1.000
1.600	1.684	1.000	0.791	1.265	0.855	0.676	1.000
1.700	1.717	1.000	0.802	1.247	0.865	0.694	1.000
1.800	1.752	1.000	0.814	1.228	0.876	0.714	1.000
1.900	1.781	1.000	0.825	1.213	0.885	0.730	1.000
2.000	1.814	1.000	0.837	1.195	0.895	0.749	1.000
2.100	1.847	1.000	0.849	1.178	0.905	0.768	1.000
2.200	1.879	1.000	0.861	1.161	0.914	0.787	1.000
2.300	1.909	1.000	0.872	1.146	0.922	0.805	1.000
2.400	1.940	1.000	0.885	1.131	0.931	0.824	1.000
2.500	1.970	1.000	0.897	1.116	0.939	0.842	1.000
2.600	2.001	1.000	0.909	1.101	0.947	0.861	1.000
2.700	2.031	1.000	0.921	1.086	0.955	0.880	1.000
2.800	2.058	1.000	0.932	1.073	0.962	0.897	1.000
2.900	2.085	1.000	0.943	1.060	0.969	0.914	1.000
3.000	2.106	1.000	0.953	1.050	0.974	0.928	1.000
3.100	2.126	1.000	0.961	1.041	0.979	0.941	1.000
3.200	2.146	1.000	0.969	1.032	0.984	0.954	1.000
3.300	2.161	1.000	0.976	1.025	0.987	0.964	1.000
3.400	2.176	1.000	0.982	1.018	0.991	0.973	1.000
3.500	2.186	1.000	0.987	1.013	0.993	0.981	1.000
3.600	2.195	1.000	0.991	1.009	0.995	0.986	1.000
3.700	2.199	1.000	0.993	1.008	0.996	0.989	1.000
3.800	2.205	1.000	0.995	1.005	0.998	0.993	1.000
3.900	2.207	1.000	0.996	1.004	0.998	0.994	1.000
4.000	2.211	1.000	0.998	1.002	0.999	0.997	1.000
4.250	2.215	1.000	1.000	1.000	1.000	1.000	1.000
4.500	2.215	1.000	1.000	1.000	1.000	1.000	1.000
4.750	2.215	1.000	1.000	1.000	1.000	1.000	1.000
5.000	2.215	1.000	1.000	1.000	1.000	1.000	1.000
5.250	2.215	1.000	1.000	1.000	1.000	1.000	1.000
5.500	2.215	1.000	1.000	1.000	1.000	1.000	1.000
5.750	2.215	1.000	1.000	1.000	1.000	1.000	1.000
6.000	2.215	1.000	1.000	1.000	1.000	1.000	1.000

TABLE 3.- Continued.

INITIAL BOUNDARY-LAYER PROFILES, RE = 35.3X10E06

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.000	0.496	2.017	0.000	0.000	1.000
0.050	0.929	1.000	0.581	1.720	0.540	0.314	1.000
0.075	1.010	1.000	0.597	1.675	0.580	0.346	1.000
0.100	1.071	1.000	0.610	1.640	0.609	0.371	1.000
0.150	1.163	1.000	0.630	1.587	0.650	0.409	1.000
0.200	1.230	1.000	0.646	1.548	0.679	0.439	1.000
0.250	1.278	1.000	0.658	1.521	0.699	0.459	1.000
0.300	1.315	1.000	0.667	1.498	0.714	0.477	1.000
0.350	1.345	1.000	0.675	1.481	0.726	0.490	1.000
0.400	1.370	1.000	0.682	1.467	0.736	0.502	1.000
0.450	1.391	1.000	0.688	1.454	0.744	0.512	1.000
0.500	1.412	1.000	0.694	1.442	0.752	0.521	1.000
0.600	1.452	1.000	0.705	1.419	0.767	0.541	1.000
0.700	1.492	1.000	0.716	1.396	0.781	0.560	1.000
0.800	1.533	1.000	0.729	1.372	0.796	0.580	1.000
0.900	1.573	1.000	0.741	1.349	0.810	0.601	1.000
1.000	1.615	1.000	0.755	1.325	0.825	0.622	1.000
1.100	1.653	1.000	0.767	1.304	0.837	0.642	1.000
1.200	1.684	1.000	0.777	1.287	0.847	0.659	1.000
1.300	1.715	1.000	0.788	1.270	0.857	0.675	1.000
1.400	1.746	1.000	0.798	1.253	0.867	0.692	1.000
1.500	1.776	1.000	0.808	1.237	0.876	0.708	1.000
1.600	1.807	1.000	0.820	1.220	0.885	0.726	1.000
1.700	1.841	1.000	0.832	1.202	0.895	0.745	1.000
1.800	1.872	1.000	0.843	1.186	0.904	0.762	1.000
1.900	1.905	1.000	0.856	1.169	0.913	0.781	1.000
2.000	1.934	1.000	0.867	1.154	0.921	0.799	1.000
2.100	1.961	1.000	0.877	1.140	0.928	0.814	1.000
2.200	1.987	1.000	0.887	1.127	0.936	0.830	1.000
2.300	2.011	1.000	0.897	1.115	0.942	0.845	1.000
2.400	2.037	1.000	0.907	1.102	0.948	0.860	1.000
2.500	2.057	1.000	0.916	1.092	0.954	0.873	1.000
2.600	2.080	1.000	0.925	1.081	0.959	0.887	1.000
2.700	2.101	1.000	0.934	1.071	0.964	0.900	1.000
2.800	2.121	1.000	0.942	1.062	0.969	0.913	1.000
2.900	2.139	1.000	0.949	1.053	0.973	0.924	1.000
3.000	2.156	1.000	0.957	1.045	0.978	0.936	1.000
3.100	2.169	1.000	0.962	1.039	0.981	0.944	1.000
3.200	2.182	1.000	0.968	1.033	0.984	0.952	1.000
3.300	2.195	1.000	0.974	1.027	0.987	0.961	1.000
3.400	2.206	1.000	0.978	1.022	0.989	0.968	1.000
3.500	2.215	1.000	0.982	1.018	0.991	0.973	1.000
3.600	2.223	1.000	0.986	1.014	0.993	0.979	1.000
3.700	2.230	1.000	0.989	1.011	0.994	0.983	1.000
3.800	2.236	1.000	0.992	1.009	0.996	0.987	1.000
3.900	2.240	1.000	0.994	1.007	0.997	0.990	1.000
4.000	2.244	1.000	0.995	1.005	0.998	0.993	1.000
4.250	2.251	1.000	0.998	1.002	0.999	0.997	1.000
4.500	2.255	1.000	1.000	1.000	1.000	1.000	1.000
4.750	2.255	1.000	1.000	1.000	1.000	1.000	1.000
5.000	2.255	1.000	1.000	1.000	1.000	1.000	1.000
5.250	2.255	1.000	1.000	1.000	1.000	1.000	1.000
5.500	2.255	1.000	1.000	1.000	1.000	1.000	1.000
5.750	2.255	1.000	1.000	1.000	1.000	1.000	1.000
6.000	2.255	1.000	1.000	1.000	1.000	1.000	1.000

TABLE 3.- Continued.

INITIAL BOUNDARY-LAYER PROFILES, RE = 105.X10E06

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.000	0.478	2.093	0.000	0.000	1.000
0.050	0.994	1.000	0.572	1.748	0.562	0.322	1.000
0.075	1.074	1.000	0.588	1.701	0.599	0.352	1.000
0.100	1.141	1.000	0.602	1.660	0.629	0.379	1.000
0.150	1.239	1.000	0.625	1.601	0.671	0.419	1.000
0.200	1.320	1.000	0.644	1.552	0.703	0.453	1.000
0.250	1.372	1.000	0.658	1.520	0.724	0.476	1.000
0.300	1.422	1.000	0.671	1.490	0.743	0.499	1.000
0.350	1.463	1.000	0.682	1.466	0.758	0.517	1.000
0.400	1.492	1.000	0.691	1.448	0.768	0.530	1.000
0.450	1.517	1.000	0.698	1.434	0.777	0.542	1.000
0.500	1.541	1.000	0.705	1.419	0.785	0.554	1.000
0.600	1.582	1.000	0.717	1.395	0.799	0.573	1.000
0.700	1.622	1.000	0.729	1.372	0.812	0.592	1.000
0.800	1.654	1.000	0.739	1.353	0.823	0.608	1.000
0.900	1.685	1.000	0.749	1.335	0.833	0.624	1.000
1.000	1.716	1.000	0.759	1.317	0.843	0.640	1.000
1.100	1.744	1.000	0.768	1.301	0.851	0.654	1.000
1.200	1.771	1.000	0.778	1.286	0.859	0.668	1.000
1.300	1.794	1.000	0.786	1.273	0.866	0.680	1.000
1.400	1.821	1.000	0.795	1.258	0.874	0.694	1.000
1.500	1.841	1.000	0.802	1.247	0.880	0.705	1.000
1.600	1.861	1.000	0.809	1.237	0.885	0.716	1.000
1.700	1.883	1.000	0.817	1.224	0.891	0.728	1.000
1.800	1.905	1.000	0.825	1.213	0.898	0.740	1.000
1.900	1.927	1.000	0.833	1.201	0.903	0.752	1.000
2.000	1.949	1.000	0.841	1.189	0.909	0.765	1.000
2.100	1.973	1.000	0.850	1.177	0.916	0.778	1.000
2.200	1.997	1.000	0.859	1.164	0.922	0.792	1.000
2.300	2.021	1.000	0.869	1.152	0.928	0.805	1.000
2.400	2.046	1.000	0.878	1.139	0.934	0.820	1.000
2.500	2.074	1.000	0.889	1.125	0.941	0.837	1.000
2.600	2.104	1.000	0.901	1.110	0.948	0.854	1.000
2.700	2.134	1.000	0.913	1.095	0.955	0.872	1.000
2.800	2.165	1.000	0.926	1.080	0.963	0.891	1.000
2.900	2.202	1.000	0.941	1.063	0.971	0.914	1.000
3.000	2.230	1.000	0.953	1.049	0.977	0.931	1.000
3.100	2.256	1.000	0.964	1.037	0.983	0.947	1.000
3.200	2.274	1.000	0.972	1.029	0.987	0.959	1.000
3.300	2.287	1.000	0.978	1.023	0.990	0.968	1.000
3.400	2.297	1.000	0.982	1.018	0.992	0.974	1.000
3.500	2.308	1.000	0.987	1.013	0.994	0.981	1.000
3.600	2.313	1.000	0.989	1.011	0.995	0.984	1.000
3.700	2.317	1.000	0.991	1.009	0.996	0.987	1.000
3.800	2.322	1.000	0.993	1.007	0.997	0.990	1.000
3.900	2.326	1.000	0.995	1.005	0.998	0.993	1.000
4.000	2.329	1.000	0.996	1.004	0.998	0.994	1.000
4.250	2.333	1.000	0.998	1.002	0.999	0.997	1.000
4.500	2.338	1.000	1.000	1.000	1.000	1.000	1.000
4.750	2.338	1.000	1.000	1.000	1.000	1.000	1.000
5.000	2.338	1.000	1.000	1.000	1.000	1.000	1.000
5.250	2.338	1.000	1.000	1.000	1.000	1.000	1.000
5.500	2.338	1.000	1.000	1.000	[illegible]	1.000	1.000
5.750	2.338	1.000	1.000	1.000	[illegible]	1.000	1.000
6.000	2.338	1.000	1.000	[illegible]	[illegible]	1.000	1.000

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Table 3.-Concluded.

INITIAL BOUNDARY-LAYER PROFILES, RE = 314.X10E06

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.000	0.472	2.120	0.000	0.000	1.000
0.050	1.151	1.000	0.597	1.675	0.630	0.376	1.000
0.075	1.226	1.000	0.613	1.630	0.661	0.406	1.000
0.100	1.294	1.000	0.630	1.588	0.689	0.434	1.000
0.150	1.359	1.000	0.646	1.548	0.715	0.462	1.000
0.200	1.420	1.000	0.662	1.510	0.738	0.489	1.000
0.250	1.462	1.000	0.673	1.486	0.752	0.506	1.000
0.300	1.497	1.000	0.683	1.463	0.766	0.523	1.000
0.350	1.535	1.000	0.694	1.441	0.779	0.540	1.000
0.400	1.564	1.000	0.702	1.423	0.789	0.554	1.000
0.450	1.589	1.000	0.710	1.409	0.797	0.566	1.000
0.500	1.613	1.000	0.717	1.394	0.805	0.578	1.000
0.600	1.657	1.000	0.731	1.368	0.819	0.599	1.000
0.700	1.694	1.000	0.743	1.347	0.831	0.617	1.000
0.800	1.727	1.000	0.753	1.328	0.841	0.633	1.000
0.900	1.756	1.000	0.763	1.311	0.850	0.648	1.000
1.000	1.775	1.000	0.769	1.300	0.855	0.658	1.000
1.100	1.803	1.000	0.778	1.285	0.864	0.672	1.000
1.200	1.833	1.000	0.789	1.268	0.872	0.688	1.000
1.300	1.857	1.000	0.797	1.254	0.879	0.701	1.000
1.400	1.881	1.000	0.805	1.241	0.886	0.713	1.000
1.500	1.901	1.000	0.813	1.230	0.891	0.725	1.000
1.600	1.922	1.000	0.820	1.219	0.897	0.736	1.000
1.700	1.947	1.000	0.830	1.205	0.904	0.750	1.000
1.800	1.973	1.000	0.839	1.192	0.910	0.764	1.000
1.900	1.993	1.000	0.846	1.181	0.915	0.775	1.000
2.000	2.006	1.000	0.852	1.174	0.919	0.783	1.000
2.100	2.023	1.000	0.860	1.163	0.925	0.795	1.000
2.200	2.050	1.000	0.868	1.152	0.930	0.807	1.000
2.300	2.069	1.000	0.876	1.142	0.935	0.818	1.000
2.400	2.088	1.000	0.883	1.132	0.939	0.829	1.000
2.500	2.114	1.000	0.894	1.119	0.945	0.845	1.000
2.600	2.140	1.000	0.904	1.106	0.951	0.860	1.000
2.700	2.163	1.000	0.913	1.095	0.957	0.874	1.000
2.800	2.191	1.000	0.925	1.081	0.963	0.891	1.000
2.900	2.216	1.000	0.935	1.069	0.969	0.906	1.000
3.000	2.253	1.000	0.951	1.052	0.977	0.929	1.000
3.100	2.285	1.000	0.964	1.037	0.983	0.948	1.000
3.200	2.314	1.000	0.977	1.023	0.990	0.967	1.000
3.300	2.323	1.000	0.981	1.019	0.991	0.973	1.000
3.400	2.331	1.000	0.984	1.016	0.993	0.977	1.000
3.500	2.338	1.000	0.987	1.013	0.994	0.982	1.000
3.600	2.345	1.000	0.991	1.009	0.996	0.986	1.000
3.700	2.347	1.000	0.991	1.009	0.996	0.988	1.000
3.800	2.349	1.000	0.993	1.007	0.997	0.989	1.000
3.900	2.354	1.000	0.995	1.005	0.998	0.992	1.000
4.000	2.359	1.000	0.997	1.003	0.999	0.995	1.000
4.250	2.361	1.000	0.998	1.002	0.999	0.997	1.000
4.500	2.366	1.000	1.000	1.000	1.000	1.000	1.000
4.750	2.366	1.000	1.000	1.000	1.000	1.000	1.000
5.000	2.366	1.000	1.000	1.000	1.000	1.000	1.000
5.250	2.366	1.000	1.000	1.000	1.000	1.000	1.000
5.500	2.366	1.000	1.000	1.000	1.000	1.000	1.000
5.750	2.366	1.000	1.000	1.000	1.000	1.000	1.000
6.000	2.366	1.000	1.000	1.000	1.000	1.000	1.000

TABLE 4.- UPSTREAM BOUNDARY-LAYER PROFILES — FLUCTUATING MEASUREMENTS

INITIAL BOUNDARY-LAYER PROFILES, RE = 11.7X10E06

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.14	0.078	0.039	0.091	0.032			
0.21	0.082	0.041	0.090	0.033	0.057	0.077	
0.25	0.074	0.038	0.080	0.030	0.050	0.069	
0.30	0.070	0.034	0.072	0.030	0.041	0.062	
0.35	0.060	0.030	0.062	0.026	0.035	0.053	0.411
0.40	0.062	0.031	0.063	0.027	0.033	0.053	0.511
0.51	0.064	0.031	0.062	0.031	0.031	0.053	0.642
0.62	0.060	0.031	0.059	0.031	0.029	0.051	0.669
0.73	0.062	0.030	0.056	0.030	0.028	0.049	0.676
0.83	0.058	0.028	0.051	0.028	0.028	0.046	0.601
1.05	0.060	0.029	0.053	0.028	0.027	0.045	0.584
1.26	0.059	0.028	0.048	0.027	0.026	0.043	0.536
1.47	0.059	0.028	0.046	0.026	0.026	0.042	0.488
1.68	0.060	0.028	0.045	0.025	0.025	0.040	0.446
1.90	0.062	0.029	0.044	0.024	0.024	0.038	0.418
2.11	0.062	0.029	0.042	0.023	0.022	0.037	0.374
2.32	0.062	0.029	0.041	0.022	0.021	0.036	0.330
2.53	0.064	0.030	0.040	0.020	0.019	0.034	0.298
2.75	0.066	0.031	0.040	0.019	0.018	0.033	0.256
2.96	0.066	0.031	0.038	0.018	0.017	0.032	0.217
3.17	0.064	0.030	0.036	0.017	0.015	0.029	0.176
3.38	0.060	0.028	0.033	0.016	0.014	0.027	0.132
3.60	0.054	0.025	0.029	0.017	0.014	0.026	0.103
3.81	0.048	0.023	0.025	0.018	0.014	0.024	0.076
4.02	0.038	0.018	0.020	0.016	0.014	0.021	0.048
4.19	0.027	0.013	0.014	0.015	0.013	0.017	0.031
4.34	0.022	0.010	0.012	0.014			0.015
4.45	0.020	0.009	0.011				

TABLE 4.- Continued.

INITIAL BOUNDARY-LAYER PROFILES, RE = 35.3X10E06

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.14	0.062	0.032	0.067				
0.17	0.061	0.030	0.063	0.024			
0.20	0.059	0.029	0.060	0.023	0.038	0.053	
0.24	0.058	0.028	0.058	0.022	0.036	0.052	
0.30	0.059	0.029	0.058	0.023	0.035	0.051	
0.35	0.059	0.029	0.057	0.024	0.033	0.049	0.392
0.40	0.059	0.028	0.054	0.025	0.031	0.048	0.471
0.51	0.057	0.028	0.052	0.026	0.028	0.046	0.522
0.62	0.057	0.027	0.051	0.025	0.027	0.044	0.518
0.72	0.056	0.027	0.048	0.024	0.025	0.043	0.480
0.83	0.055	0.027	0.047	0.024	0.025	0.041	0.464
0.94	0.055	0.026	0.046	0.024	0.025	0.039	0.459
1.15	0.056	0.026	0.043	0.023	0.024	0.039	0.417
1.36	0.058	0.028	0.044	0.024	0.024	0.039	0.417
1.57	0.061	0.029	0.044	0.024	0.024	0.039	0.440
1.79	0.064	0.030	0.043	0.024	0.024	0.039	0.422
2.00	0.066	0.031	0.043	0.024	0.023	0.038	0.419
2.22	0.068	0.032	0.043	0.023	0.022	0.038	0.401
2.43	0.072	0.034	0.043	0.022	0.021	0.037	0.371
2.64	0.072	0.034	0.042	0.021	0.021	0.036	0.349
2.85	0.072	0.034	0.041	0.020	0.020	0.034	0.314
3.06	0.066	0.031	0.037	0.020	0.017	0.032	0.209
3.28	0.057	0.027	0.031	0.019	0.015	0.028	0.140
3.49	0.055	0.026	0.030	0.020	0.015	0.027	0.145
3.70	0.037	0.018	0.020	0.017	0.012	0.021	0.063
3.94	0.034	0.016	0.018	0.019	0.011	0.020	0.058
4.12	0.023	0.011	0.012				
4.34	0.016	0.008	0.009				
4.55	0.012	0.006	0.006				

TABLE 4.- Concluded.

INITIAL BOUNDARY-LAYER PROFILES, RE = 105.X10E06

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.14	0.078	0.040	0.084				
0.18	0.073	0.037	0.075	0.032	0.054	0.069	
0.20	0.070	0.035	0.071	0.031	0.052	0.066	
0.25	0.068	0.034	0.066	0.029	0.047	0.060	
0.31	0.066	0.032	0.063	0.029	0.041	0.056	
0.36	0.063	0.030	0.058	0.029	0.035	0.051	0.541
0.41	0.061	0.030	0.055	0.029	0.033	0.050	0.538
0.52	0.060	0.029	0.053	0.028	0.030	0.047	0.530
0.63	0.060	0.029	0.051	0.028	0.029	0.046	0.511
0.73	0.058	0.028	0.048	0.027	0.028	0.044	0.474
0.84	0.057	0.028	0.046	0.027	0.028	0.042	0.463
0.95	0.058	0.028	0.046	0.027	0.028	0.041	0.464
1.16	0.057	0.028	0.043	0.027	0.028	0.041	0.452
1.37	0.058	0.028	0.043	0.026	0.027	0.041	0.425
1.58	0.061	0.030	0.044	0.027	0.028	0.042	0.433
1.80	0.065	0.031	0.045	0.027	0.027	0.042	0.423
1.83	0.065	0.031	0.045	0.027	0.027	0.042	0.421
2.01	0.066	0.032	0.044		0.028		
2.22	0.068	0.033	0.044		0.026		
2.44	0.071	0.034	0.044		0.026		
2.65	0.071	0.034	0.042		0.025		
2.86	0.071	0.034	0.040		0.023		
3.07	0.070	0.034	0.038		0.020		
3.29	0.071	0.034	0.038		0.018		
3.50	0.065	0.031	0.034		0.016		
3.71	0.053	0.025	0.028		0.015		
3.92	0.044	0.021	0.023		0.014		
4.14	0.033	0.016	0.017		0.012		
4.35	0.022	0.011	0.011		0.009		
4.40	0.021	0.010	0.011		0.008		

TABLE 5.- BOUNDARY-LAYER PROFILES — CENTER BODY II MEAN MEASUREMENTS

CENTERBODY II, X = 17.75 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.000	0.493	2.030	0.000	0.000	1.000
0.050	0.935	1.000	0.579	1.728	0.542	0.313	1.000
0.075	1.010	1.000	0.593	1.686	0.578	0.343	1.000
0.100	1.086	1.000	0.609	1.643	0.613	0.373	1.000
0.150	1.163	1.000	0.626	1.598	0.648	0.406	1.000
0.200	1.234	1.000	0.643	1.556	0.678	0.436	1.000
0.250	1.285	1.000	0.655	1.526	0.700	0.459	1.000
0.300	1.323	1.000	0.665	1.504	0.715	0.475	1.000
0.350	1.356	1.000	0.674	1.484	0.728	0.490	1.000
0.400	1.381	1.000	0.680	1.470	0.738	0.502	1.000
0.450	1.405	1.000	0.687	1.455	0.747	0.513	1.000
0.500	1.432	1.000	0.695	1.440	0.757	0.526	1.000
0.600	1.479	1.000	0.708	1.412	0.774	0.548	1.000
0.700	1.517	1.000	0.719	1.390	0.788	0.567	1.000
0.800	1.558	1.000	0.732	1.367	0.802	0.587	1.000
0.900	1.591	1.000	0.742	1.348	0.814	0.604	1.000
1.000	1.624	1.000	0.752	1.329	0.825	0.621	1.000
1.100	1.656	1.000	0.763	1.311	0.835	0.637	1.000
1.200	1.690	1.000	0.774	1.292	0.847	0.655	1.000
1.300	1.718	1.000	0.784	1.276	0.855	0.670	1.000
1.400	1.746	1.000	0.793	1.261	0.864	0.685	1.000
1.500	1.776	1.000	0.803	1.245	0.873	0.701	1.000
1.600	1.805	1.000	0.813	1.229	0.882	0.717	1.000
1.700	1.834	1.000	0.824	1.214	0.890	0.733	1.000
1.800	1.862	1.000	0.834	1.199	0.898	0.749	1.000
1.900	1.890	1.000	0.844	1.184	0.906	0.765	1.000
2.000	1.919	1.000	0.856	1.169	0.914	0.782	1.000
2.100	1.946	1.000	0.866	1.155	0.922	0.798	1.000
2.200	1.975	1.000	0.877	1.140	0.929	0.815	1.000
2.300	2.004	1.000	0.888	1.126	0.937	0.832	1.000
2.400	2.034	1.000	0.900	1.111	0.945	0.851	1.000
2.500	2.062	1.000	0.912	1.097	0.952	0.868	1.000
2.600	2.092	1.000	0.924	1.083	0.959	0.886	1.000
2.700	2.119	1.000	0.935	1.070	0.966	0.903	1.000
2.800	2.143	1.000	0.945	1.058	0.971	0.918	1.000
2.900	2.165	1.000	0.955	1.048	0.977	0.932	1.000
3.000	2.187	1.000	0.964	1.038	0.982	0.946	1.000
3.100	2.204	1.000	0.971	1.030	0.985	0.957	1.000
3.200	2.219	1.000	0.978	1.023	0.989	0.967	1.000
3.300	2.232	1.000	0.983	1.017	0.992	0.975	1.000
3.400	2.240	1.000	0.987	1.013	0.994	0.981	1.000
3.500	2.247	1.000	0.990	1.010	0.995	0.985	1.000
3.600	2.251	1.000	0.992	1.008	0.996	0.988	1.000
3.700	2.255	1.000	0.994	1.006	0.997	0.991	1.000
3.800	2.261	1.000	0.996	1.004	0.998	0.994	1.000
3.900	2.265	1.000	0.998	1.002	0.999	0.997	1.000
4.000	2.269	1.000	1.000	1.000	1.000	1.000	1.000
4.250	2.282	1.000	1.006	0.994	1.003	1.009	1.000
4.500	2.288	1.000	1.008	0.992	1.004	1.012	1.000
4.750	2.291	1.002	1.012	0.990	1.005	1.017	1.000
5.000	2.289	1.006	1.015	0.991	1.004	1.019	1.000
5.250	2.281	1.010	1.015	0.995	1.002	1.017	1.000
5.500	2.266	1.015	1.013	1.001	0.999	1.013	1.000
5.750	2.252	1.019	1.012	1.008	0.996	1.008	1.000
6.000	2.244	1.024	1.013	1.011	0.995	1.007	1.000

TABLE 5.- Continued.

CENTERBODY II, X = 19.75 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.000	0.493	2.030	0.000	0.000	1.000
0.050	0.929	1.000	0.578	1.731	0.538	0.311	1.000
0.075	1.010	1.000	0.593	1.686	0.578	0.343	1.000
0.100	1.071	1.000	0.606	1.651	0.607	0.367	1.000
0.150	1.163	1.000	0.626	1.598	0.648	0.406	1.000
0.200	1.238	1.000	0.644	1.554	0.680	0.438	1.000
0.250	1.293	1.000	0.657	1.521	0.703	0.462	1.000
0.300	1.334	1.000	0.668	1.497	0.719	0.480	1.000
0.350	1.370	1.000	0.678	1.476	0.733	0.497	1.000
0.400	1.402	1.000	0.686	1.457	0.746	0.512	1.000
0.450	1.425	1.000	0.693	1.444	0.755	0.523	1.000
0.500	1.446	1.000	0.699	1.431	0.762	0.533	1.000
0.600	1.485	1.000	0.710	1.409	0.777	0.551	1.000
0.700	1.527	1.000	0.722	1.384	0.792	0.572	1.000
0.800	1.561	1.000	0.733	1.365	0.804	0.589	1.000
0.900	1.594	1.000	0.743	1.346	0.815	0.605	1.000
1.000	1.621	1.000	0.752	1.331	0.824	0.619	1.000
1.100	1.652	1.001	0.762	1.313	0.834	0.636	1.000
1.200	1.680	1.001	0.772	1.297	0.843	0.651	1.000
1.300	1.711	1.001	0.782	1.280	0.853	0.667	1.000
1.400	1.742	1.001	0.793	1.263	0.863	0.684	1.000
1.500	1.770	1.002	0.803	1.248	0.871	0.700	1.000
1.600	1.800	1.002	0.814	1.232	0.880	0.716	1.000
1.700	1.830	1.004	0.825	1.216	0.889	0.734	1.000
1.800	1.855	1.004	0.835	1.202	0.896	0.748	1.000
1.900	1.885	1.005	0.847	1.187	0.905	0.766	1.000
2.000	1.912	1.005	0.857	1.173	0.912	0.782	1.000
2.100	1.940	1.006	0.869	1.158	0.920	0.799	1.000
2.200	1.969	1.006	0.880	1.143	0.928	0.816	1.000
2.300	1.998	1.007	0.893	1.129	0.936	0.835	1.000
2.400	2.029	1.007	0.905	1.113	0.943	0.853	1.000
2.500	2.057	1.008	0.917	1.099	0.951	0.872	1.000
2.600	2.087	1.010	0.931	1.085	0.958	0.892	1.000
2.700	2.117	1.011	0.944	1.070	0.965	0.912	1.000
2.800	2.146	1.011	0.957	1.057	0.972	0.930	1.000
2.900	2.164	1.012	0.966	1.048	0.976	0.943	1.000
3.000	2.181	1.012	0.973	1.040	0.980	0.954	1.000
3.100	2.196	1.012	0.980	1.033	0.984	0.964	1.000
3.200	2.208	1.013	0.986	1.028	0.986	0.972	1.000
3.300	2.216	1.015	0.991	1.024	0.988	0.979	1.000
3.400	2.226	1.016	0.996	1.020	0.990	0.987	1.000
3.500	2.232	1.016	0.999	1.017	0.992	0.991	1.000
3.600	2.239	1.017	1.003	1.014	0.993	0.997	1.000
3.700	2.243	1.018	1.006	1.012	0.994	1.001	1.000
3.800	2.248	1.018	1.008	1.010	0.995	1.004	1.000
3.900	2.252	1.019	1.012	1.008	0.996	1.008	1.000
4.000	2.255	1.021	1.014	1.006	0.997	1.011	1.000
4.250	2.263	1.024	1.021	1.003	0.999	1.020	1.000
4.500	2.274	1.027	1.029	0.998	1.001	1.030	1.000
4.750	2.274	1.030	1.033	0.998	1.001	1.034	1.000
5.000	2.261	1.034	1.030	1.004	0.998	1.029	1.000
5.250	2.248	1.039	1.029	1.010	0.995	1.024	1.000
5.500	2.239	1.042	1.029	1.014	0.993	1.022	1.000
5.750	2.234	1.047	1.031	1.016	0.992	1.023	1.000
6.000	2.234	1.052	1.036	1.016	0.992	1.028	1.000

TABLE 5.- Continued.

CENTERBODY II, X = 21.75 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.000	0.493	2.030	0.000	0.000	1.000
0.050	0.947	1.000	0.581	1.721	0.548	0.318	1.000
0.075	1.031	1.000	0.597	1.674	0.588	0.351	1.000
0.100	1.096	1.000	0.611	1.637	0.618	0.377	1.000
0.150	1.168	1.000	0.627	1.595	0.656	0.407	1.000
0.200	1.246	1.000	0.646	1.549	0.683	0.441	1.000
0.250	1.289	1.000	0.656	1.524	0.701	0.460	1.000
0.300	1.327	1.000	0.666	1.502	0.716	0.477	1.000
0.350	1.356	1.000	0.674	1.484	0.728	0.490	1.000
0.400	1.381	1.000	0.680	1.470	0.738	0.502	1.000
0.450	1.405	1.000	0.687	1.455	0.747	0.513	1.000
0.500	1.429	1.000	0.694	1.442	0.756	0.524	1.000
0.600	1.469	1.000	0.705	1.418	0.771	0.544	1.000
0.700	1.508	1.000	0.717	1.396	0.785	0.562	1.000
0.800	1.546	1.000	0.728	1.374	0.798	0.581	1.000
0.900	1.579	1.000	0.738	1.354	0.810	0.598	1.000
1.000	1.612	1.000	0.749	1.336	0.821	0.615	1.000
1.100	1.670	1.000	0.767	1.303	0.840	0.645	1.000
1.200	1.678	1.000	0.770	1.299	0.843	0.649	1.000
1.300	1.721	1.000	0.785	1.275	0.856	0.672	1.000
1.400	1.737	1.000	0.790	1.266	0.861	0.680	1.000
1.500	1.770	1.000	0.801	1.248	0.871	0.698	1.000
1.600	1.802	1.000	0.813	1.231	0.881	0.716	1.000
1.700	1.831	1.000	0.823	1.215	0.889	0.732	1.000
1.800	1.861	1.001	0.835	1.200	0.898	0.750	1.000
1.900	1.888	1.001	0.845	1.185	0.906	0.765	1.000
2.000	1.919	1.002	0.858	1.169	0.914	0.784	1.000
2.100	1.947	1.004	0.869	1.154	0.922	0.802	1.000
2.200	1.977	1.005	0.882	1.139	0.930	0.820	1.000
2.300	2.004	1.006	0.894	1.126	0.937	0.838	1.000
2.400	2.036	1.007	0.908	1.110	0.945	0.858	1.000
2.500	2.066	1.008	0.921	1.095	0.953	0.877	1.000
2.600	2.092	1.010	0.933	1.082	0.959	0.895	1.000
2.700	2.116	1.012	0.945	1.071	0.965	0.912	1.000
2.800	2.139	1.013	0.956	1.060	0.970	0.928	1.000
2.900	2.159	1.015	0.966	1.051	0.975	0.942	1.000
3.000	2.176	1.017	0.975	1.043	0.979	0.955	1.000
3.100	2.191	1.018	0.983	1.036	0.983	0.966	1.000
3.200	2.205	1.019	0.990	1.029	0.986	0.976	1.000
3.300	2.216	1.021	0.997	1.024	0.988	0.985	1.000
3.400	2.223	1.023	1.002	1.021	0.990	0.992	1.000
3.500	2.226	1.024	1.005	1.020	0.990	0.995	1.000
3.600	2.229	1.027	1.008	1.018	0.991	0.999	1.000
3.700	2.234	1.028	1.012	1.016	0.992	1.004	1.000
3.800	2.246	1.030	1.020	1.011	0.995	1.014	1.000
3.900	2.259	1.032	1.027	1.005	0.998	1.024	1.000
4.000	2.270	1.034	1.034	1.000	1.000	1.034	1.000
4.250	2.280	1.039	1.044	0.995	1.002	1.046	1.000
4.500	2.273	1.045	1.046	0.998	1.001	1.047	1.000
4.750	2.262	1.051	1.047	1.003	0.998	1.046	1.000
5.000	2.247	1.057	1.046	1.010	0.995	1.041	1.000
5.250	2.234	1.063	1.046	1.016	0.992	1.038	1.000
5.500	2.226	1.070	1.050	1.020	0.990	1.040	1.000
5.750	2.223	1.076	1.054	1.021	0.990	1.044	1.000
6.000	2.219	1.085	1.061	1.023	0.989	1.049	1.000

TABLE 5.- Continued.

CENTERBODY II, X = 23.75 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.006	0.496	2.030	0.000	0.000	1.000
0.050	0.942	1.006	0.584	1.724	0.545	0.318	1.000
0.075	1.010	1.006	0.597	1.686	0.578	0.345	1.000
0.100	1.067	1.006	0.608	1.654	0.604	0.368	1.000
0.150	1.158	1.006	0.629	1.601	0.646	0.406	1.000
0.200	1.230	1.006	0.645	1.559	0.676	0.437	1.000
0.250	1.280	1.006	0.658	1.529	0.697	0.459	1.000
0.300	1.321	1.006	0.669	1.505	0.714	0.478	1.000
0.350	1.354	1.006	0.677	1.485	0.727	0.493	1.000
0.400	1.379	1.006	0.684	1.471	0.737	0.504	1.000
0.450	1.403	1.006	0.691	1.456	0.746	0.515	1.000
0.500	1.427	1.006	0.697	1.443	0.755	0.527	1.000
0.600	1.470	1.006	0.710	1.417	0.771	0.547	1.000
0.700	1.512	1.006	0.722	1.393	0.786	0.568	1.000
0.800	1.552	1.006	0.734	1.370	0.801	0.588	1.000
0.900	1.589	1.006	0.746	1.349	0.813	0.606	1.000
1.000	1.621	1.006	0.756	1.331	0.824	0.623	1.000
1.100	1.656	1.006	0.767	1.311	0.835	0.641	1.000
1.200	1.684	1.006	0.777	1.295	0.845	0.656	1.000
1.300	1.718	1.006	0.788	1.277	0.855	0.674	1.000
1.400	1.748	1.006	0.798	1.260	0.865	0.690	1.000
1.500	1.780	1.006	0.810	1.243	0.874	0.708	1.000
1.600	1.809	1.006	0.820	1.227	0.883	0.724	1.000
1.700	1.840	1.006	0.831	1.210	0.892	0.741	1.000
1.800	1.870	1.006	0.842	1.194	0.901	0.759	1.000
1.900	1.901	1.006	0.854	1.178	0.909	0.776	1.000
2.000	1.926	1.007	0.864	1.165	0.916	0.792	1.000
2.100	1.953	1.010	0.877	1.152	0.923	0.810	1.000
2.200	1.979	1.012	0.889	1.138	0.930	0.827	1.000
2.300	2.007	1.015	0.902	1.124	0.938	0.846	1.000
2.400	2.029	1.019	0.916	1.113	0.943	0.864	1.000
2.500	2.051	1.024	0.929	1.103	0.949	0.882	1.000
2.600	2.073	1.029	0.942	1.092	0.954	0.899	1.000
2.700	2.089	1.036	0.956	1.084	0.958	0.916	1.000
2.800	2.106	1.042	0.969	1.076	0.962	0.933	1.000
2.900	2.122	1.050	0.983	1.068	0.966	0.950	1.000
3.000	2.134	1.059	0.997	1.062	0.969	0.966	1.000
3.100	2.145	1.070	1.013	1.057	0.972	0.984	1.000
3.200	2.150	1.085	1.028	1.055	0.973	1.000	1.000
3.300	2.161	1.093	1.042	1.050	0.976	1.016	1.000
3.400	2.171	1.101	1.053	1.045	0.978	1.030	1.000
3.500	2.180	1.105	1.062	1.041	0.980	1.041	1.000
3.600	2.187	1.109	1.069	1.037	0.982	1.050	1.000
3.700	2.194	1.110	1.073	1.034	0.983	1.055	1.000
3.800	2.200	1.112	1.078	1.031	0.985	1.061	1.000
3.900	2.204	1.112	1.080	1.030	0.985	1.064	1.000
4.000	2.205	1.113	1.081	1.029	0.986	1.065	1.000
4.250	2.204	1.115	1.083	1.030	0.985	1.067	1.000
4.500	2.203	1.116	1.084	1.030	0.985	1.067	1.000
4.750	2.198	1.119	1.084	1.032	0.984	1.067	1.000
5.000	2.194	1.121	1.084	1.034	0.983	1.066	1.000
5.250	2.196	1.122	1.086	1.033	0.984	1.069	1.000
5.500	2.201	1.124	1.090	1.031	0.985	1.073	1.000
5.750	2.203	1.125	1.092	1.030	0.985	1.076	1.000
6.000	2.206	1.126	1.094	1.029	0.986	1.079	1.000

TABLE 5.- Continued.

CENTERBODY II, X = 25.75 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.024	0.505	2.030	0.000	0.000	1.000
0.050	0.881	1.024	0.583	1.757	0.515	0.300	1.000
0.075	0.956	1.024	0.597	1.717	0.552	0.329	1.000
0.100	1.026	1.024	0.611	1.677	0.586	0.358	1.000
0.150	1.117	1.024	0.631	1.625	0.627	0.396	1.000
0.200	1.190	1.024	0.648	1.582	0.660	0.427	1.000
0.250	1.250	1.024	0.662	1.547	0.685	0.453	1.000
0.300	1.299	1.024	0.675	1.518	0.705	0.476	1.000
0.350	1.339	1.024	0.685	1.494	0.721	0.494	1.000
0.400	1.374	1.024	0.695	1.474	0.735	0.511	1.000
0.450	1.408	1.024	0.705	1.454	0.748	0.527	1.000
0.500	1.435	1.024	0.712	1.438	0.758	0.540	1.000
0.600	1.483	1.024	0.726	1.410	0.776	0.564	1.000
0.700	1.521	1.024	0.738	1.388	0.789	0.582	1.000
0.800	1.554	1.024	0.748	1.369	0.801	0.599	1.000
0.900	1.584	1.024	0.758	1.352	0.811	0.615	1.000
1.000	1.613	1.024	0.767	1.335	0.821	0.630	1.000
1.100	1.64[illegible]	1.024	0.778	1.317	0.832	0.647	1.000
1.200	1.676	1.024	0.789	1.299	0.843	0.665	1.000
1.300	1.711	1.024	0.800	1.280	0.853	0.682	1.000
1.400	1.741	1.024	0.810	1.264	0.862	0.699	1.000
1.500	1.770	1.024	0.821	1.248	0.871	0.715	1.000
1.600	1.801	1.024	0.832	1.231	0.881	0.733	1.000
1.700	1.829	1.024	0.842	1.216	0.889	0.749	1.000
1.800	1.857	1.024	0.852	1.202	0.897	0.764	1.000
1.900	1.889	1.024	0.865	1.185	0.906	0.783	1.000
2.000	1.913	1.027	0.876	1.172	0.913	0.799	1.000
2.100	1.936	1.033	0.890	1.160	0.919	0.818	1.000
2.200	1.958	1.039	0.904	1.149	0.925	0.836	1.000
2.300	1.975	1.051	0.922	1.140	0.929	0.856	1.000
2.400	1.988	1.064	0.939	1.134	0.933	0.876	1.000
2.500	2.004	1.079	0.958	1.126	0.937	0.898	1.000
2.600	2.014	1.099	0.981	1.121	0.939	0.921	1.000
2.700	2.027	1.115	1.001	1.114	0.943	0.944	1.000
2.800	2.052	1.124	1.020	1.102	0.949	0.968	1.000
2.900	2.093	1.127	1.042	1.082	0.959	1.000	1.000
3.000	2.127	1.127	1.058	1.066	0.968	1.024	1.000
3.100	2.155	1.127	1.071	1.053	0.974	1.043	1.000
3.200	2.170	1.127	1.078	1.045	0.978	1.054	1.000
3.300	2.183	1.127	1.085	1.039	0.981	1.064	1.000
3.400	2.191	1.127	1.089	1.036	0.983	1.070	1.000
3.500	2.199	1.127	1.092	1.032	0.984	1.075	1.000
3.600	2.203	1.127	1.094	1.030	0.985	1.078	1.000
3.700	2.203	1.127	1.094	1.030	0.985	1.078	1.000
3.800	2.205	1.127	1.095	1.029	0.986	1.079	1.000
3.900	2.207	1.127	1.096	1.029	0.986	1.081	1.000
4.000	2.208	1.127	1.097	1.028	0.986	1.082	1.000
4.250	2.211	1.126	1.097	1.026	0.987	1.083	1.000
4.500	2.215	1.125	1.098	1.025	0.988	1.085	1.000
4.750	2.216	1.125	1.099	1.024	0.988	1.086	1.000
5.000	2.220	1.124	1.099	1.022	0.989	1.087	1.000
5.250	2.218	1.124	1.098	1.023	0.989	1.086	1.000
5.500	2.214	1.124	1.096	1.025	0.988	1.083	1.000
5.750	2.209	1.122	1.093	1.027	0.987	1.078	1.000
6.000	2.206	1.122	1.091	1.029	0.986	1.076	1.000

TABLE 5.- Continued.

CENTERBODY II, X = 27.75 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.079	0.531	2.030	0.000	0.000	1.000
0.050	0.780	1.079	0.596	1.810	0.462	0.276	1.000
0.075	0.865	1.079	0.611	1.766	0.506	0.309	1.000
0.100	0.955	1.079	0.628	1.717	0.551	0.347	1.000
0.150	1.050	1.079	0.650	1.660	0.595	0.390	1.000
0.200	1.135	1.079	0.668	1.614	0.635	0.425	1.000
0.250	1.191	1.079	0.682	1.58[illegible]	0.666	0.450	1.000
0.300	1.241	1.079	0.695	1.552	0.681	0.473	1.000
0.350	1.281	1.079	0.706	1.529	0.698	0.492	1.000
0.400	1.315	1.079	0.715	1.508	0.712	0.509	1.000
0.450	1.339	1.079	0.722	1.494	0.721	0.521	1.000
0.500	1.363	1.079	0.729	1.480	0.731	0.533	1.000
0.600	1.402	1.079	0.740	1.457	0.746	0.552	1.000
0.700	1.443	1.079	0.753	1.433	0.761	0.573	1.000
0.800	1.480	1.079	0.764	1.412	0.775	0.592	1.000
0.900	1.516	1.079	0.776	1.391	0.788	0.611	1.000
1.000	1.553	1.079	0.788	1.370	0.801	0.631	1.000
1.100	1.593	1.079	0.801	1.347	0.814	0.652	1.000
1.200	1.628	1.079	0.813	1.327	0.826	0.672	1.000
1.300	1.663	1.079	0.825	1.307	0.838	0.692	1.000
1.400	1.698	1.079	0.838	1.288	0.849	0.711	1.000
1.500	1.733	1.079	0.851	1.268	0.860	0.732	1.000
1.600	1.766	1.079	0.863	1.250	0.870	0.751	1.000
1.700	1.801	1.079	0.876	1.231	0.881	0.772	1.000
1.800	1.822	1.092	0.895	1.220	0.887	0.794	1.000
1.900	1.853	1.099	0.914	1.203	0.896	0.818	1.000
2.000	1.877	1.113	0.935	1.191	0.903	0.844	1.000
2.100	1.901	1.131	0.960	1.178	0.909	0.873	1.000
2.200	1.928	1.145	0.984	1.164	0.917	0.902	1.000
2.300	1.959	1.152	1.003	1.149	0.925	0.927	1.000
2.400	1.992	1.152	1.017	1.132	0.934	0.950	1.000
2.500	2.023	1.152	1.032	1.116	0.942	0.972	1.000
2.600	2.051	1.152	1.045	1.103	0.949	0.991	1.000
2.700	2.075	1.152	1.056	1.091	0.955	1.008	1.000
2.800	2.099	1.152	1.067	1.079	0.961	1.025	1.000
2.900	2.120	1.152	1.077	1.069	0.966	1.041	1.000
3.000	2.137	1.152	1.086	1.061	0.970	1.053	1.000
3.100	2.1[illegible]	1.152	1.093	1.054	0.974	1.064	1.000
3.200	2.164	1.152	1.099	1.048	0.976	1.073	1.000
3.300	2.172	1.152	1.102	1.045	0.978	1.076	1.000
3.400	2.179	1.152	1.106	1.041	0.980	1.084	1.000
3.500	2.181	1.152	1.107	1.040	0.980	1.085	1.000
3.600	2.185	1.152	1.109	1.038	0.981	1.088	1.000
3.700	2.185	1.152	1.109	1.038	0.981	1.088	1.000
3.800	2.185	1.152	1.109	1.038	0.981	1.088	1.000
3.900	2.185	1.152	1.109	1.038	0.981	1.088	1.000
4.000	2.185	1.152	1.109	1.038	0.981	1.088	1.000
4.250	2.185	1.152	1.109	1.038	0.981	1.088	1.000
4.500	2.185	1.152	1.109	1.038	0.981	1.088	1.000
4.750	2.185	1.152	1.109	1.038	0.981	1.088	1.000
5.000	2.185	1.152	1.109	1.038	0.981	1.088	1.000
5.250	2.185	1.149	1.107	1.038	0.981	1.086	1.000
5.500	2.187	1.145	1.104	1.037	0.982	1.084	1.000
5.750	2.187	1.142	1.101	1.037	0.982	1.081	1.000
6.000	2.190	1.137	1.098	1.036	0.982	1.078	1.000

TABLE 5.- Continued.

CENTERBODY 11, X = 29.75 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.261	0.621	2.030	0.000	0.000	1.000
0.050	0.743	1.261	0.690	1.828	0.442	0.305	1.000
0.075	0.789	1.262	0.699	1.805	0.467	0.327	1.000
0.100	0.844	1.263	0.711	1.777	0.496	0.352	1.000
0.150	0.933	1.265	0.732	1.729	0.540	0.395	1.000
0.200	1.008	1.269	0.752	1.687	0.577	0.434	1.000
0.250	1.070	1.273	0.771	1.652	0.606	0.467	1.000
0.300	1.118	1.285	0.791	1.624	0.628	0.497	1.000
0.350	1.162	1.297	0.811	1.599	0.647	0.525	1.000
0.400	1.196	1.315	0.833	1.578	0.662	0.552	1.000
0.450	1.222	1.333	0.853	1.563	0.673	0.574	1.000
0.500	1.254	1.345	0.871	1.545	0.686	0.598	1.000
0.600	1.300	1.376	0.907	1.517	0.706	0.640	1.000
0.700	1.341	1.400	0.938	1.493	0.722	0.677	1.000
0.800	1.372	1.424	0.966	1.475	0.734	0.709	1.000
0.900	1.400	1.442	0.989	1.458	0.745	0.737	1.000
1.000	1.433	1.455	1.011	1.439	0.758	0.766	1.000
1.100	1.468	1.461	1.030	1.419	0.770	0.793	1.000
1.200	1.507	1.455	1.042	1.396	0.785	0.818	1.000
1.300	1.550	1.442	1.052	1.371	0.800	0.841	1.000
1.400	1.594	1.424	1.058	1.346	0.815	0.862	1.000
1.500	1.641	1.400	1.061	1.319	0.831	0.882	1.000
1.600	1.687	1.376	1.063	1.294	0.845	0.899	1.000
1.700	1.737	1.345	1.063	1.266	0.861	0.916	1.000
1.800	1.784	1.321	1.065	1.240	0.876	0.933	1.000
1.900	1.841	1.285	1.062	1.210	0.892	0.948	1.000
2.000	1.885	1.261	1.062	1.187	0.905	0.961	1.000
2.100	1.929	1.236	1.062	1.164	0.917	0.974	1.000
2.200	1.972	1.212	1.062	1.142	0.929	0.986	1.000
2.300	2.008	1.196	1.065	1.124	0.938	0.999	1.000
2.400	2.034	1.188	1.070	1.111	0.945	1.010	1.000
2.500	2.059	1.182	1.076	1.098	0.951	1.023	1.000
2.600	2.081	1.176	1.081	1.088	0.956	1.034	1.000
2.700	2.100	1.172	1.086	1.079	0.961	1.044	1.000
2.800	2.116	1.167	1.090	1.071	0.965	1.052	1.000
2.900	2.128	1.165	1.094	1.065	0.968	1.058	1.000
3.000	2.139	1.164	1.098	1.060	0.970	1.065	1.000
3.100	2.147	1.161	1.099	1.056	0.972	1.069	1.000
3.200	2.150	1.160	1.100	1.055	0.973	1.070	1.000
3.300	2.152	1.160	1.101	1.054	0.973	1.071	1.000
3.400	2.154	1.160	1.101	1.053	0.974	1.073	1.000
3.500	2.155	1.161	1.103	1.053	0.974	1.075	1.000
3.600	2.152	1.164	1.104	1.054	0.973	1.075	1.000
3.700	2.153	1.165	.106	1.054	0.974	1.076	1.000
3.800	2.151	1.166	1.106	1.054	0.973	1.076	1.000
3.900	2.148	1.167	1.106	1.056	0.973	1.075	1.000
4.000	2.145	1.168	1.105	1.057	0.972	1.074	1.000
4.250	2.140	1.170	1.104	1.059	0.971	1.072	1.000
4.500	2.136	1.170	1.102	1.061	0.970	1.069	1.000
4.750	2.136	1.166	1.099	1.061	0.970	1.066	1.000
5.000	2.135	1.164	1.096	1.062	0.969	1.062	1.000
5.250	2.137	1.158	1.091	1.061	0.970	1.058	1.000
5.500	2.141	1.152	1.087	1.059	0.971	1.056	1.000
5.750	2.146	1.145	1.084	1.057	0.972	1.054	1.000
6.000	2.150	1.139	1.080	1.055	0.973	1.051	1.000

TABLE 5.- Continued.

CENTERBODY II, X = 31.75 CM

Y,CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.370	0.675	2.030	0.000	0.000	1.000
0.050	0.736	1.370	0.746	1.832	0.439	0.328	1.000
0.075	0.787	1.370	0.758	1.806	0.466	0.353	1.000
0.100	0.831	1.372	0.769	1.784	0.489	0.376	1.000
0.150	0.910	1.376	0.790	1.742	0.529	0.418	1.000
0.200	0.976	1.382	0.811	1.705	0.562	0.455	1.000
0.250	1.030	1.392	0.831	1.675	0.587	0.488	1.000
0.300	1.076	1.401	0.851	1.647	0.610	0.519	1.000
0.350	1.114	1.415	0.870	1.627	0.626	0.544	1.000
0.400	1.152	1.424	0.886	1.604	0.643	0.571	1.000
0.450	1.182	1.435	0.905	1.586	0.656	0.594	1.000
0.500	1.211	1.446	0.921	1.570	0.668	0.616	1.000
0.600	1.263	1.470	0.955	1.539	0.690	0.660	1.000
0.700	1.298	1.501	0.988	1.519	0.705	0.696	1.000
0.800	1.332	1.527	1.019	1.498	0.718	0.732	1.000
0.900	1.354	1.552	1.044	1.486	0.727	0.759	1.000
1.000	1.381	1.568	1.067	1.469	0.738	0.787	1.000
1.100	1.413	1.575	1.085	1.451	0.750	0.814	1.000
1.200	1.449	1.576	1.102	1.430	0.763	0.841	1.000
1.300	1.486	1.570	1.115	1.408	0.777	0.866	1.000
1.400	1.524	1.564	1.128	1.386	0.791	0.892	1.000
1.500	1.567	1.552	1.139	1.362	0.806	0.918	1.000
1.600	1.615	1.537	1.152	1.334	0.822	0.947	1.000
1.700	1.666	1.515	1.161	1.305	0.839	0.974	1.000
1.800	1.725	1.488	1.170	1.273	0.858	1.003	1.000
1.900	1.781	1.461	1.176	1.242	0.875	1.028	1.000
2.000	1.829	1.430	1.176	1.216	0.889	1.045	1.000
2.100	1.876	1.394	1.170	1.192	0.902	1.056	1.000
2.200	1.918	1.358	1.161	1.169	0.914	1.061	1.000
2.300	1.964	1.315	1.148	1.146	0.926	1.063	1.000
2.400	2.009	1.273	1.133	1.123	0.938	1.063	1.000
2.500	2.041	1.242	1.122	1.107	0.946	1.062	1.000
2.600	2.070	1.217	1.113	1.093	0.954	1.062	1.000
2.700	2.096	1.194	1.105	1.081	0.960	1.061	1.000
2.800	2.117	1.176	1.098	1.070	0.965	1.060	1.000
2.900	2.135	1.164	1.096	1.062	0.969	1.062	1.000
3.000	2.148	1.154	1.093	1.056	0.973	1.063	1.000
3.100	2.160	1.148	1.093	1.050	0.975	1.066	1.000
3.200	2.167	1.143	1.092	1.047	0.977	1.067	1.000
3.300	2.173	1.137	1.089	1.044	0.978	1.066	1.000
3.400	2.179	1.132	1.087	1.041	0.980	1.065	1.000
3.500	2.183	1.127	1.085	1.039	0.981	1.064	1.000
3.600	2.185	1.126	1.084	1.038	0.981	1.064	1.000
3.700	2.186	1.125	1.084	1.038	0.981	1.063	1.000
3.800	2.185	1.124	1.082	1.038	0.981	1.062	1.000
3.900	2.188	1.121	1.081	1.037	0.982	1.061	1.000
4.000	2.189	1.120	1.081	1.036	0.982	1.061	1.000
4.250	2.188	1.115	1.076	1.037	0.982	1.056	1.000
4.500	2.190	1.110	1.072	1.036	0.982	1.053	1.000
4.750	2.188	1.107	1.067	1.037	0.982	1.048	1.000
5.000	2.189	1.102	1.063	1.036	0.982	1.044	1.000
5.250	2.192	1.097	1.060	1.035	0.983	1.042	1.000
5.500	2.194	1.093	1.057	1.034	0.983	1.040	1.000
5.750	2.198	1.088	1.054	1.033	0.984	1.037	1.000
6.000	2.203	1.084	1.052	1.030	0.985	1.037	1.000

TABLE 5.- Continued.

CENTERBODY II, X = 33.75 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.376	0.678	2.030	0.000	0.000	1.000
0.050	0.725	1.376	0.749	1.837	0.433	0.324	1.000
0.075	0.776	1.376	0.759	1.812	0.460	0.350	1.000
0.100	0.817	1.376	0.768	1.791	0.482	0.370	1.000
0.150	0.886	1.376	0.784	1.755	0.517	0.405	1.000
0.200	0.951	1.376	0.800	1.719	0.549	0.439	1.000
0.250	0.997	1.382	0.816	1.693	0.572	0.466	1.000
0.300	1.050	1.388	0.835	1.663	0.597	0.498	1.000
0.350	1.089	1.394	0.649	1.641	0.615	0.522	1.000
0.400	1.128	1.400	0.865	1.618	0.632	0.547	1.000
0.450	1.161	1.410	0.882	1.599	0.647	0.570	1.000
0.500	1.193	1.412	0.894	1.580	0.661	0.590	1.000
0.600	1.255	1.424	0.922	1.544	0.687	0.634	1.000
0.700	1.305	1.434	0.947	1.514	0.708	0.670	1.000
0.800	1.354	1.442	0.971	1.486	0.727	0.706	1.000
0.900	1.395	1.451	0.993	1.461	0.743	0.738	1.000
1.000	1.434	1.461	1.016	1.438	0.758	0.770	1.000
1.100	1.470	1.468	1.036	1.417	0.771	0.799	1.000
1.200	1.501	1.475	1.054	1.399	0.783	0.825	1.000
1.300	1.526	1.484	1.071	1.385	0.791	0.848	1.000
1.400	1.568	1.490	1.095	1.361	0.806	0.882	1.000
1.500	1.606	1.495	1.116	1.339	0.819	0.914	1.000
1.600	1.647	1.498	1.138	1.316	0.832	0.948	1.000
1.700	1.686	1.499	1.159	1.294	0.845	0.979	1.000
1.800	1.728	1.501	1.181	1.271	0.858	1.014	1.000
1.900	1.767	1.502	1.202	1.250	0.870	1.046	1.000
2.000	1.802	1.503	1.221	1.231	0.881	1.076	1.000
2.100	1.838	1.501	1.239	1.211	0.891	1.104	1.000
2.200	1.872	1.496	1.253	1.193	0.901	1.130	1.000
2.300	1.912	1.482	1.264	1.173	0.912	1.153	1.000
2.400	1.958	1.458	1.269	1.149	0.925	1.174	1.000
2.500	2.004	1.430	1.270	1.126	0.937	1.190	1.000
2.600	2.045	1.400	1.266	1.106	0.947	1.200	1.000
2.700	2.079	1.367	1.256	1.089	0.956	1.201	1.000
2.800	2.112	1.327	1.237	1.073	0.964	1.192	1.000
2.900	2.135	1.293	1.218	1.062	0.969	1.181	1.000
3.000	2.158	1.248	1.188	1.051	0.975	1.158	1.000
3.100	2.167	1.206	1.152	1.047	0.977	1.126	1.000
3.200	2.173	1.176	1.126	1.044	0.978	1.102	1.000
3.300	2.178	1.152	1.105	1.042	0.979	1.083	1.000
3.400	2.182	1.136	1.093	1.040	0.981	1.071	1.000
3.500	2.183	1.127	1.085	1.039	0.981	1.064	1.000
3.600	2.186	1.121	1.080	1.038	0.981	1.060	1.000
3.700	2.190	1.115	1.076	1.036	0.982	1.057	1.000
3.800	2.192	1.112	1.074	1.035	0.983	1.055	1.000
3.900	2.196	1.107	1.071	1.033	0.984	1.053	1.000
4.000	2.198	1.103	1.068	1.033	0.984	1.051	1.000
4.250	2.200	1.097	1.064	1.031	0.985	1.047	1.000
4.500	2.203	1.091	1.059	1.030	0.985	1.043	1.000
4.750	2.208	1.085	1.055	1.028	0.986	1.041	1.000
5.000	2.210	1.079	1.051	1.027	0.987	1.037	1.000
5.250	2.213	1.073	1.046	1.025	0.988	1.033	1.000
5.500	2.216	1.067	1.041	1.024	0.988	1.029	1.000
5.750	2.221	1.061	1.038	1.022	0.989	1.027	1.000
6.000	2.224	1.055	1.033	1.021	0.990	1.023	1.000

TABLE 5.- Continued.

CENTERBODY 11, X = 35.75 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.376	0.678	2.030	0.000	0.000	1.000
0.050	0.782	1.376	0.761	1.809	0.464	0.353	1.000
0.075	0.835	1.376	0.773	1.779	0.493	0.381	1.000
0.100	0.890	1.376	0.785	1.752	0.519	0.408	1.000
0.150	0.958	1.378	0.803	1.715	0.553	0.444	1.000
0.200	1.017	1.381	0.821	1.682	0.581	0.477	1.000
0.250	1.060	1.383	0.834	1.657	0.601	0.502	1.000
0.300	1.101	1.385	0.848	1.634	0.620	0.526	1.000
0.350	1.136	1.388	0.860	1.614	0.636	0.547	1.000
0.400	1.166	1.390	0.871	1.596	0.649	0.566	1.000
0.450	1.195	1.393	0.882	1.579	0.662	0.584	1.000
0.500	1.220	1.396	0.893	1.565	0.672	0.600	1.000
0.600	1.262	1.401	0.910	1.539	0.690	0.628	1.000
0.700	1.306	1.406	0.929	1.514	0.708	0.658	1.000
0.800	1.348	1.410	0.947	1.489	0.725	0.686	1.000
0.900	1.387	1.413	0.964	1.466	0.740	0.713	1.000
1.000	1.421	1.419	0.982	1.446	0.753	0.739	1.000
1.100	1.458	1.425	1.001	1.424	0.767	0.767	1.000
1.200	1.494	1.430	1.019	1.404	0.780	0.795	1.000
1.300	1.529	1.434	1.037	1.383	0.793	0.822	1.000
1.400	1.567	1.436	1.055	1.362	0.806	0.850	1.000
1.500	1.604	1.436	1.072	1.340	0.818	0.877	1.000
1.600	1.648	1.436	1.092	1.316	0.833	0.909	1.000
1.700	1.685	1.436	1.110	1.295	0.845	0.938	1.000
1.800	1.724	1.436	1.128	1.273	0.857	0.967	1.000
1.900	1.766	1.436	1.149	1.250	0.870	1.000	1.000
2.000	1.807	1.436	1.169	1.228	0.882	1.032	1.000
2.100	1.846	1.436	1.191	1.206	0.894	1.065	1.000
2.200	1.881	1.440	1.211	1.189	0.904	1.095	1.000
2.300	1.907	1.445	1.230	1.175	0.911	1.120	1.000
2.400	1.932	1.448	1.246	1.162	0.918	1.144	1.000
2.500	1.952	1.452	1.261	1.152	0.923	1.164	1.000
2.600	1.970	1.455	1.273	1.143	0.928	1.182	1.000
2.700	1.984	1.458	1.284	1.136	0.932	1.196	1.000
2.800	1.997	1.455	1.288	1.129	0.935	1.204	1.000
2.900	2.013	1.442	1.286	1.121	0.939	1.208	1.000
3.000	2.026	1.424	1.279	1.114	0.943	1.206	1.000
3.100	2.040	1.406	1.269	1.108	0.946	1.201	1.000
3.200	2.052	1.382	1.254	1.102	0.949	1.191	1.000
3.300	2.055	1.360	1.242	1.100	0.950	1.180	1.000
3.400	2.074	1.327	1.216	1.091	0.955	1.161	1.000
3.500	2.088	1.297	1.196	1.084	0.958	1.146	1.000
3.600	2.105	1.267	1.177	1.076	0.962	1.133	1.000
3.700	2.130	1.228	1.154	1.064	0.968	1.117	1.000
3.800	2.148	1.200	1.136	1.056	0.972	1.105	1.000
3.900	2.167	1.171	1.119	1.047	0.977	1.093	1.000
4.000	2.179	1.152	1.106	1.041	0.980	1.084	1.000
4.250	2.204	1.115	1.083	1.030	0.985	1.067	1.000
4.500	2.217	1.091	1.066	1.024	0.988	1.053	1.000
4.750	2.227	1.073	1.053	1.019	0.991	1.043	1.000
5.000	2.231	1.064	1.046	1.018	0.991	1.037	1.000
5.250	2.235	1.055	1.039	1.015	0.993	1.031	1.000
5.500	2.241	1.046	1.033	1.013	0.994	1.027	1.000
5.750	2.249	1.036	1.027	1.009	0.995	1.022	1.000
6.000	2.254	1.027	1.020	1.007	0.997	1.016	1.000

TABLE 5.- Continued.

CENTERBODY II, X = 37.75 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.372	0.676	2.030	0.000	0.000	1.000
0.050	0.868	1.372	0.778	1.764	0.508	0.395	1.000
0.075	0.917	1.372	0.790	1.738	0.533	0.421	1.000
0.100	0.944	1.372	0.796	1.723	0.546	0.435	1.000
0.150	0.990	1.373	0.809	1.697	0.568	0.460	1.000
0.200	1.029	1.375	0.820	1.675	0.587	0.481	1.000
0.250	1.064	1.377	0.832	1.655	0.603	0.502	1.000
0.300	1.097	1.379	0.843	1.636	0.619	0.522	1.000
0.350	1.133	1.382	0.855	1.615	0.634	0.543	1.000
0.400	1.163	1.384	0.866	1.598	0.648	0.561	1.000
0.450	1.193	1.387	0.877	1.580	0.661	0.580	1.000
0.500	1.220	1.390	0.889	1.564	0.672	0.598	1.000
0.600	1.275	1.394	0.910	1.532	0.695	0.633	1.000
0.700	1.330	1.398	0.932	1.500	0.717	0.669	1.000
0.800	1.376	1.402	0.952	1.473	0.736	0.701	1.000
0.900	1.420	1.406	0.972	1.446	0.753	0.732	1.000
1.000	1.461	1.410	0.991	1.423	0.769	0.761	1.000
1.100	1.498	1.412	1.008	1.401	0.781	0.788	1.000
1.200	1.536	1.413	1.026	1.378	0.796	0.816	1.000
1.300	1.574	1.415	1.042	1.357	0.808	0.842	1.000
1.400	1.608	1.415	1.057	1.338	0.820	0.867	1.000
1.500	1.643	1.416	1.074	1.318	0.831	0.893	1.000
1.600	1.679	1.416	1.091	1.298	0.843	0.920	1.000
1.700	1.716	1.417	1.109	1.277	0.855	0.948	1.000
1.800	1.750	1.418	1.127	1.259	0.865	0.975	1.000
1.900	1.788	1.418	1.145	1.238	0.877	1.004	1.000
2.000	1.826	1.419	1.166	1.218	0.888	1.035	1.000
2.100	1.863	1.422	1.186	1.199	0.898	1.066	1.000
2.200	1.896	1.424	1.206	1.181	0.908	1.095	1.000
2.300	1.926	1.427	1.224	1.166	0.916	1.121	1.000
2.400	1.951	1.429	1.240	1.152	0.923	1.145	1.000
2.500	1.973	1.432	1.254	1.141	0.929	1.165	1.000
2.600	1.990	1.434	1.266	1.133	0.933	1.181	1.000
2.700	2.004	1.436	1.276	1.126	0.937	1.196	1.000
2.800	2.018	1.438	1.285	1.119	0.941	1.209	1.000
2.900	2.025	1.439	1.290	1.115	0.942	1.216	1.000
3.000	2.030	1.439	1.293	1.113	0.944	1.220	1.000
3.100	2.032	1.440	1.295	1.112	0.944	1.223	1.000
3.200	2.032	1.439	1.294	1.112	0.944	1.222	1.000
3.300	2.036	1.432	1.290	1.110	0.945	1.219	1.000
3.400	2.043	1.421	1.284	1.107	0.947	1.216	1.000
3.500	2.051	1.406	1.275	1.103	0.949	1.210	1.000
3.600	2.057	1.394	1.268	1.099	0.951	1.205	1.000
3.700	2.067	1.376	1.257	1.095	0.953	1.198	1.000
3.800	2.076	1.360	1.247	1.091	0.955	1.191	1.000
3.900	2.087	1.341	1.236	1.085	0.958	1.184	1.000
4.000	2.097	1.321	1.223	1.080	0.960	1.174	1.000
4.250	2.124	1.267	1.187	1.067	0.967	1.148	1.000
4.500	2.146	1.218	1.153	1.057	0.972	1.121	1.000
4.750	2.163	1.173	1.119	1.049	0.976	1.092	1.000
5.000	2.176	1.131	1.085	1.043	0.979	1.062	1.000
5.250	2.185	1.091	1.051	1.038	0.981	1.031	1.000
5.500	2.198	1.048	1.016	1.032	0.984	1.000	1.000
5.750	2.208	1.006	0.979	1.028	0.986	0.965	1.000
6.000	2.229	0.964	0.946	1.018	0.991	0.938	1.000

TABLE 5.- Concluded.

CENTERBODY II, X = 39.75 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.370	0.675	2.030	0.000	0.000	1.000
0.050	0.816	1.370	0.765	1.792	0.481	0.368	1.000
0.075	0.880	1.370	0.779	1.758	0.514	0.400	1.000
0.100	0.928	1.370	0.791	1.732	0.538	0.425	1.000
0.150	0.963	1.370	0.800	1.712	0.555	0.444	1.000
0.200	1.050	1.370	0.824	1.663	0.597	0.492	1.000
0.250	1.097	1.370	0.837	1.637	0.618	0.517	1.000
0.300	1.129	1.371	0.848	1.617	0.633	0.536	1.000
0.350	1.161	1.372	0.858	1.599	0.647	0.555	1.000
0.400	1.192	1.373	0.869	1.581	0.660	0.574	1.000
0.450	1.216	1.375	0.878	1.565	0.672	0.590	1.000
0.500	1.241	1.376	0.886	1.552	0.681	0.604	1.000
0.600	1.285	1.378	0.903	1.526	0.699	0.632	1.000
0.700	1.329	1.382	0.921	1.500	0.717	0.660	1.000
0.800	1.367	1.388	0.939	1.478	0.732	0.688	1.000
0.900	1.406	1.394	0.958	1.455	0.747	0.716	1.000
1.000	1.443	1.400	0.977	1.433	0.761	0.744	1.000
1.100	1.486	1.404	0.997	1.408	0.777	0.774	1.000
1.200	1.525	1.406	1.015	1.386	0.791	0.803	1.000
1.300	1.569	1.406	1.034	1.360	0.806	0.834	1.000
1.400	1.612	1.406	1.053	1.336	0.821	0.864	1.000
1.500	1.650	1.406	1.070	1.315	0.833	0.891	1.000
1.600	1.680	1.406	1.084	1.298	0.843	0.914	1.000
1.700	1.716	1.406	1.101	1.278	0.855	0.941	1.000
1.800	1.747	1.406	1.116	1.260	0.864	0.964	1.000
1.900	1.778	1.406	1.131	1.244	0.874	0.988	1.000
2.000	1.815	1.406	1.149	1.224	0.885	1.017	1.000
2.100	1.847	1.406	1.165	1.207	0.894	1.042	1.000
2.200	1.876	1.406	1.180	1.192	0.902	1.065	1.000
2.300	1.903	1.406	1.194	1.177	0.910	1.087	1.000
2.400	1.927	1.406	1.207	1.165	0.917	1.106	1.000
2.500	1.948	1.408	1.220	1.154	0.922	1.125	1.000
2.600	1.966	1.412	1.233	1.145	0.927	1.143	1.000
2.700	1.982	1.416	1.245	1.137	0.931	1.160	1.000
2.800	1.995	1.418	1.255	1.130	0.935	1.173	1.000
2.900	2.007	1.421	1.264	1.124	0.938	1.185	1.000
3.000	2.016	1.423	1.271	1.120	0.940	1.195	1.000
3.100	2.023	1.424	1.276	1.116	0.942	1.202	1.000
3.200	2.028	1.424	1.279	1.114	0.943	1.206	1.000
3.300	2.028	1.424	1.279	1.114	0.943	1.206	1.000
3.400	2.028	1.424	1.279	1.114	0.943	1.206	1.000
3.500	2.031	1.421	1.277	1.112	0.944	1.206	1.000
3.600	2.032	1.417	1.275	1.112	0.944	1.204	1.000
3.700	2.032	1.413	1.271	1.112	0.944	1.200	1.000
3.800	2.031	1.411	1.268	1.112	0.944	1.197	1.000
3.900	2.031	1.406	1.264	1.112	0.944	1.193	1.000
4.000	2.034	1.396	1.257	1.111	0.945	1.187	1.000
4.250	2.037	1.376	1.240	1.109	0.945	1.173	1.000
4.500	2.045	1.345	1.217	1.105	0.947	1.153	1.000
4.750	2.087	1.273	1.173	1.085	0.958	1.124	1.000
5.000	2.163	1.164	1.110	1.049	0.976	1.083	1.000
5.250	2.230	1.067	1.048	1.018	0.991	1.039	1.000
5.500	2.265	1.000	0.998	1.002	0.995	0.997	1.000
5.750	2.297	0.939	0.951	0.988	1.006	0.957	1.000
6.000	2.303	0.897	0.910	0.985	1.007	0.917	1.000

TABLE 6.- BOUNDARY-LAYER PROFILES — CENTER BODY IV MEAN MEASUREMENTS

CENTERBODY IV, X = 14.4 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.000	0.501	1.995	0.000	0.000	1.000
0.050	0.988	1.000	0.599	1.669	0.572	0.343	1.000
0.075	1.057	1.000	0.613	1.631	0.605	0.371	1.000
0.100	1.114	1.000	0.626	1.598	0.631	0.395	1.000
0.150	1.193	1.000	0.644	1.553	0.667	0.429	1.000
0.200	1.250	1.000	0.658	1.520	0.691	0.455	1.000
0.250	1.293	1.000	0.669	1.495	0.709	0.474	1.000
0.300	1.327	1.000	0.678	1.476	0.722	0.490	1.000
0.350	1.359	1.000	0.686	1.457	0.735	0.505	1.000
0.400	1.388	1.000	0.694	1.441	0.747	0.518	1.000
0.450	1.412	1.000	0.701	1.426	0.756	0.530	1.000
0.500	1.436	1.000	0.708	1.413	0.765	0.541	1.000
0.600	1.479	1.000	0.720	1.388	0.781	0.563	1.000
0.700	1.514	1.000	0.731	1.368	0.794	0.580	1.000
0.800	1.546	1.000	0.741	1.350	0.805	0.596	1.000
0.900	1.579	1.000	0.751	1.331	0.817	0.614	1.000
1.000	1.612	1.000	0.762	1.313	0.828	0.631	1.000
1.100	1.648	1.000	0.773	1.293	0.840	0.650	1.000
1.200	1.679	1.000	0.784	1.276	0.850	0.666	1.000
1.300	1.713	1.000	0.795	1.257	0.861	0.685	1.000
1.400	1.743	1.000	0.806	1.241	0.870	0.701	1.000
1.500	1.776	1.000	0.817	1.224	0.881	0.720	1.000
1.600	1.807	1.000	0.829	1.207	0.890	0.737	1.000
1.700	1.838	1.000	0.840	1.190	0.899	0.755	1.000
1.800	1.867	1.000	0.851	1.176	0.907	0.772	1.000
1.900	1.899	1.000	0.863	1.159	0.917	0.791	1.000
2.000	1.929	1.000	0.874	1.144	0.925	0.809	1.000
2.100	1.959	1.000	0.886	1.129	0.933	0.826	1.000
2.200	1.987	1.000	0.897	1.115	0.941	0.844	1.000
2.300	2.016	1.000	0.908	1.101	0.948	0.861	1.000
2.400	2.046	1.000	0.921	1.086	0.956	0.880	1.000
2.500	2.071	1.000	0.931	1.074	0.962	0.896	1.000
2.600	2.094	1.000	0.941	1.063	0.968	0.911	1.000
2.700	2.119	1.000	0.951	1.051	0.974	0.926	1.000
2.800	2.136	1.000	0.959	1.043	0.978	0.938	1.000
2.900	2.156	1.000	0.967	1.034	0.983	0.951	1.000
3.000	2.172	1.000	0.974	1.027	0.986	0.961	1.000
3.100	2.187	1.000	0.981	1.020	0.990	0.971	1.000
3.200	2.200	1.000	0.986	1.014	0.993	0.979	1.000
3.300	2.208	1.000	0.990	1.010	0.995	0.985	1.000
3.400	2.217	1.000	0.994	1.006	0.997	0.991	1.000
3.500	2.221	1.000	0.996	1.004	0.998	0.994	1.000
3.600	2.223	1.000	0.997	1.003	0.998	0.995	1.000
3.700	2.228	1.000	0.999	1.001	0.999	0.998	1.000
3.800	2.230	1.000	0.999	1.000	1.000	0.999	1.000
3.900	2.231	1.000	1.000	1.000	1.000	1.000	1.000
4.000	2.231	1.000	1.000	1.000	1.000	1.000	1.000
4.250	2.231	1.000	1.000	1.000	1.000	1.000	1.000
4.500	2.231	1.000	1.000	1.000	1.000	1.000	1.000
4.750	2.231	1.000	1.000	1.000	1.000	1.000	1.000
5.000	2.231	1.000	1.000	1.000	1.000	1.000	1.000
5.250	2.231	1.000	1.000	1.000	1.000	1.000	1.000
5.500	2.231	1.000	1.000	1.000	1.000	1.000	1.000
5.750	2.231	1.000	1.000	1.000	1.000	1.000	1.000
6.000	2.231	1.000	1.000	1.000	1.000	1.000	1.000

TABLE 6.- Continued.

CENTERBODY IV, X = 18.4 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.000	0.501	1.995	0.000	0.000	1.000
0.050	0.988	1.000	0.599	1.669	0.572	0.343	1.000
0.075	1.057	1.000	0.613	1.631	0.605	0.371	1.000
0.100	1.114	1.000	0.626	1.598	0.631	0.395	1.000
0.150	1.193	1.000	0.644	1.553	0.667	0.429	1.000
0.200	1.250	1.000	0.658	1.520	0.691	0.455	1.000
0.250	1.293	1.000	0.669	1.495	0.709	0.474	1.000
0.300	1.327	1.000	0.678	1.476	0.722	0.490	1.000
0.350	1.359	1.000	0.686	1.457	0.735	0.505	1.000
0.400	1.388	1.000	0.694	1.441	0.747	0.518	1.000
0.450	1.412	1.000	0.701	1.426	0.756	0.530	1.000
0.500	1.436	1.000	0.708	1.413	0.765	0.541	1.000
0.600	1.479	1.000	0.720	1.388	0.781	0.563	1.000
0.700	1.514	1.000	0.731	1.368	0.794	0.580	1.000
0.800	1.546	1.000	0.741	1.350	0.805	0.596	1.000
0.900	1.579	1.000	0.751	1.331	0.817	0.614	1.000
1.000	1.612	1.000	0.762	1.313	0.828	0.631	1.000
1.100	1.648	1.000	0.773	1.293	0.840	0.650	1.000
1.200	1.679	1.000	0.784	1.276	0.850	0.666	1.000
1.300	1.713	1.000	0.795	1.257	0.861	0.685	1.000
1.400	1.743	1.000	0.806	1.241	0.870	0.701	1.000
1.500	1.776	1.000	0.817	1.224	0.881	0.720	1.000
1.600	1.807	1.000	0.829	1.207	0.890	0.737	1.000
1.700	1.838	1.000	0.840	1.190	0.899	0.755	1.000
1.800	1.867	1.000	0.851	1.176	0.907	0.772	1.000
1.900	1.899	1.000	0.863	1.159	0.917	0.791	1.000
2.000	1.929	1.000	0.874	1.144	0.925	0.809	1.000
2.100	1.959	1.000	0.886	1.129	0.933	0.826	1.000
2.200	1.987	1.000	0.897	1.115	0.941	0.844	1.000
2.300	2.016	1.000	0.908	1.101	0.948	0.861	1.000
2.400	2.046	1.000	0.921	1.086	0.956	0.880	1.000
2.500	2.070	1.001	0.932	1.074	0.962	0.896	1.000
2.600	2.091	1.002	0.942	1.064	0.967	0.911	1.000
2.700	2.115	1.004	0.953	1.053	0.973	0.927	1.000
2.800	2.131	1.005	0.961	1.046	0.977	0.939	1.000
2.900	2.149	1.006	0.970	1.037	0.981	0.952	1.000
3.000	2.163	1.007	0.977	1.031	0.985	0.962	1.000
3.100	2.177	1.008	0.985	1.024	0.988	0.973	1.000
3.200	2.188	1.010	0.991	1.019	0.990	0.981	1.000
3.300	2.195	1.011	0.995	1.016	0.992	0.987	1.000
3.400	2.203	1.012	0.999	1.013	0.994	0.993	1.000
3.500	2.205	1.013	1.002	1.012	0.994	0.996	1.000
3.600	2.205	1.016	1.004	1.012	0.994	0.998	1.000
3.700	2.206	1.019	1.007	1.011	0.994	1.001	1.000
3.800	2.205	1.021	1.009	1.012	0.994	1.003	1.000
3.900	2.203	1.024	1.012	1.012	0.994	1.005	1.000
4.000	2.201	1.028	1.014	1.013	0.993	1.008	1.000
4.250	2.196	1.038	1.022	1.016	0.992	1.014	1.000
4.500	2.186	1.050	1.029	1.020	0.990	1.019	1.000
4.750	2.179	1.062	1.038	1.023	0.988	1.025	1.000
5.000	2.168	1.075	1.046	1.028	0.986	1.031	1.000
5.250	2.157	1.087	1.052	1.034	0.983	1.034	1.000
5.500	2.150	1.099	1.060	1.037	0.981	1.041	1.000
5.750	2.142	1.115	1.072	1.041	0.979	1.050	1.000
6.000	2.142	1.128	1.084	1.041	0.979	1.062	1.000

TABLE 6.- Continued.

CENTERBODY IV, X = 20.4 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.000	0.501	1.995	0.000	0.000	1.000
0.050	0.875	1.000	0.578	1.730	0.517	0.299	1.000
0.075	0.977	1.000	0.597	1.676	0.567	0.338	1.000
0.100	1.051	1.000	0.612	1.634	0.602	0.369	1.000
0.150	1.154	1.000	0.635	1.575	0.650	0.412	1.000
0.200	1.226	1.000	0.652	1.534	0.681	0.444	1.000
0.250	1.292	1.000	0.666	1.502	0.704	0.469	1.000
0.300	1.323	1.000	0.677	1.478	0.721	0.488	1.000
0.350	1.356	1.000	0.685	1.459	0.734	0.503	1.000
0.400	1.384	1.000	0.693	1.443	0.745	0.517	1.000
0.450	1.409	1.000	0.700	1.428	0.755	0.528	1.000
0.500	1.432	1.000	0.707	1.415	0.764	0.540	1.000
0.600	1.475	1.000	0.719	1.390	0.780	0.561	1.000
0.700	1.517	1.000	0.732	1.366	0.795	0.582	1.000
0.800	1.555	1.000	0.744	1.345	0.808	0.601	1.000
0.900	1.591	1.000	0.755	1.325	0.821	0.620	1.000
1.000	1.627	1.000	0.767	1.305	0.833	0.639	1.000
1.100	1.659	1.000	0.777	1.287	0.844	0.656	1.000
1.200	1.690	1.000	0.788	1.270	0.854	0.672	1.000
1.300	1.718	1.000	0.797	1.254	0.863	0.688	1.000
1.400	1.746	1.000	0.807	1.240	0.871	0.703	1.000
1.500	1.774	1.001	0.818	1.224	0.880	0.720	1.000
1.600	1.804	1.001	0.828	1.209	0.889	0.736	1.000
1.700	1.831	1.002	0.839	1.194	0.897	0.753	1.000
1.800	1.861	1.004	0.851	1.179	0.906	0.771	1.000
1.900	1.887	1.005	0.862	1.165	0.913	0.787	1.000
2.000	1.913	1.006	0.873	1.152	0.920	0.804	1.000
2.100	1.939	1.007	0.884	1.139	0.928	0.820	1.000
2.200	1.966	1.008	0.896	1.125	0.935	0.838	1.000
2.300	1.991	1.010	0.907	1.113	0.942	0.854	1.000
2.400	2.018	1.011	0.919	1.100	0.949	0.872	1.000
2.500	2.043	1.013	0.932	1.088	0.955	0.890	1.000
2.600	2.065	1.016	0.943	1.077	0.961	0.906	1.000
2.700	2.085	1.018	0.954	1.067	0.966	0.921	1.000
2.800	2.101	1.022	0.964	1.060	0.969	0.935	1.000
2.900	2.116	1.025	0.974	1.052	0.973	0.948	1.000
3.000	2.129	1.029	0.984	1.046	0.976	0.960	1.000
3.100	2.143	1.033	0.993	1.040	0.980	0.973	1.000
3.200	2.150	1.038	1.001	1.037	0.981	0.982	1.000
3.300	2.155	1.042	1.008	1.034	0.983	0.990	1.000
3.400	2.160	1.047	1.015	1.032	0.984	0.998	1.000
3.500	2.162	1.051	1.019	1.031	0.984	1.003	1.000
3.600	2.161	1.056	1.023	1.032	0.984	1.007	1.000
3.700	2.160	1.061	1.028	1.032	0.984	1.011	1.000
3.800	2.158	1.065	1.032	1.033	0.983	1.014	1.000
3.900	2.157	1.070	1.036	1.033	0.983	1.018	1.000
4.000	2.156	1.075	1.040	1.034	0.983	1.022	1.000
4.250	2.152	1.088	1.051	1.036	0.982	1.032	1.000
4.500	2.148	1.102	1.062	1.038	0.981	1.041	1.000
4.750	2.142	1.115	1.072	1.041	0.979	1.050	1.000
5.000	2.135	1.131	1.083	1.044	0.978	1.059	1.000
5.250	2.130	1.145	1.095	1.046	0.977	1.069	1.000
5.500	2.124	1.161	1.107	1.049	0.975	1.079	1.000
5.750	2.120	1.177	1.120	1.051	0.974	1.091	1.000
6.000	2.111	1.198	1.135	1.055	0.972	1.103	1.000

TABLE 6.- Continued.

CENTERBODY IV, X = 22.4 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.000	0.501	1.995	0.000	0.000	1.000
0.050	0.965	1.000	0.595	1.682	0.561	0.334	1.000
0.075	1.042	1.000	0.610	1.639	0.598	0.365	1.000
0.100	1.100	1.000	0.622	1.606	0.625	0.389	1.000
0.150	1.193	1.000	0.644	1.553	0.667	0.429	1.000
0.200	1.254	1.000	0.659	1.518	0.693	0.456	1.000
0.250	1.297	1.000	0.670	1.493	0.710	0.476	1.000
0.300	1.334	1.000	0.680	1.471	0.725	0.493	1.000
0.350	1.366	1.000	0.688	1.453	0.738	0.508	1.000
0.400	1.394	1.000	0.696	1.437	0.749	0.522	1.000
0.450	1.415	1.000	0.702	1.424	0.757	0.532	1.000
0.500	1.439	1.000	0.709	1.411	0.766	0.543	1.000
0.600	1.485	1.000	0.722	1.384	0.783	0.566	1.000
0.700	1.523	1.000	0.734	1.363	0.797	0.585	1.000
0.800	1.561	1.000	0.745	1.342	0.810	0.604	1.000
0.900	1.597	1.000	0.757	1.321	0.823	0.623	1.000
1.000	1.630	1.000	0.767	1.303	0.834	0.640	1.000
1.100	1.662	1.000	0.778	1.285	0.845	0.657	1.000
1.200	1.689	1.001	0.788	1.270	0.854	0.673	1.000
1.300	1.715	1.004	0.799	1.256	0.862	0.688	1.000
1.400	1.740	1.006	0.809	1.243	0.870	0.704	1.000
1.500	1.767	1.008	0.821	1.228	0.878	0.721	1.000
1.600	1.790	1.012	0.832	1.216	0.885	0.736	1.000
1.700	1.815	1.016	0.844	1.203	0.892	0.754	1.000
1.800	1.840	1.018	0.856	1.189	0.900	0.770	1.000
1.900	1.864	1.022	0.868	1.177	0.907	0.787	1.000
2.000	1.888	1.025	0.880	1.165	0.913	0.804	1.000
2.100	1.907	1.030	0.892	1.155	0.919	0.820	1.000
2.200	1.928	1.035	0.905	1.144	0.925	0.837	1.000
2.300	1.953	1.039	0.918	1.132	0.931	0.855	1.000
2.400	1.976	1.044	0.931	1.120	0.938	0.873	1.000
2.500	1.998	1.048	0.945	1.109	0.943	0.892	1.000
2.600	2.022	1.053	0.960	1.098	0.950	0.911	1.000
2.700	2.044	1.059	0.975	1.087	0.955	0.931	1.000
2.800	2.063	1.064	0.988	1.078	0.960	0.948	1.000
2.900	2.081	1.069	1.000	1.069	0.965	0.965	1.000
3.000	2.095	1.074	1.011	1.062	0.968	0.979	1.000
3.100	2.109	1.079	1.022	1.056	0.971	0.992	1.000
3.200	2.117	1.085	1.031	1.052	0.973	1.004	1.000
3.300	2.121	1.091	1.039	1.050	0.974	1.012	1.000
3.400	2.124	1.096	1.045	1.049	0.975	1.018	1.000
3.500	2.125	1.101	1.050	1.049	0.975	1.024	1.000
3.600	2.127	1.107	1.056	1.048	0.976	1.031	1.000
3.700	2.124	1.113	1.061	1.049	0.975	1.035	1.000
3.800	2.125	1.120	1.068	1.049	0.975	1.042	1.000
3.900	2.123	1.127	1.074	1.049	0.975	1.047	1.000
4.000	2.123	1.133	1.080	1.050	0.975	1.053	1.000
4.250	2.121	1.149	1.094	1.050	0.974	1.066	1.000
4.500	2.116	1.167	1.109	1.053	0.973	1.079	1.000
4.750	2.109	1.185	1.123	1.056	0.972	1.091	1.000
5.000	2.101	1.205	1.137	1.060	0.969	1.102	1.000
5.250	2.093	1.224	1.151	1.063	0.968	1.114	1.000
5.500	2.085	1.242	1.164	1.067	0.966	1.124	1.000
5.750	2.074	1.265	1.180	1.073	0.963	1.136	1.000
6.000	2.062	1.287	1.194	1.078	0.960	1.146	1.000

TABLE 6.- Continued.

CENTERBODY IV, X = 24.4 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.000	0.501	1.995	0.000	0.000	1.000
0.050	0.833	1.000	0.571	1.752	0.494	0.282	1.000
0.075	0.922	1.000	0.586	1.705	0.540	0.317	1.000
0.100	0.999	1.000	0.601	1.663	0.578	0.347	1.000
0.150	1.110	1.000	0.625	1.601	0.629	0.393	1.000
0.200	1.193	1.000	0.644	1.553	0.667	0.429	1.000
0.250	1.258	1.000	0.660	1.516	0.694	0.458	1.000
0.300	1.304	1.000	0.672	1.489	0.713	0.479	1.000
0.350	1.345	1.000	0.682	1.465	0.730	0.498	1.000
0.400	1.381	1.000	0.692	1.445	0.744	0.515	1.000
0.450	1.409	1.000	0.700	1.428	0.755	0.528	1.000
0.500	1.432	1.000	0.707	1.415	0.764	0.540	1.000
0.600	1.479	1.000	0.720	1.388	0.781	0.563	1.000
0.700	1.517	1.000	0.732	1.366	0.795	0.582	1.000
0.800	1.551	1.000	0.742	1.347	0.807	0.599	1.000
0.900	1.582	1.000	0.752	1.329	0.818	0.615	1.000
1.000	1.610	1.002	0.763	1.314	0.827	0.631	1.000
1.100	1.643	1.005	0.775	1.296	0.838	0.650	1.000
1.200	1.672	1.007	0.787	1.280	0.848	0.667	1.000
1.300	1.701	1.010	0.799	1.264	0.857	0.685	1.000
1.400	1.730	1.013	0.812	1.248	0.866	0.703	1.000
1.500	1.755	1.018	0.824	1.235	0.874	0.721	1.000
1.600	1.783	1.024	0.840	1.220	0.883	0.741	1.000
1.700	1.807	1.032	0.854	1.207	0.890	0.760	1.000
1.800	1.834	1.038	0.870	1.193	0.898	0.781	1.000
1.900	1.858	1.042	0.883	1.180	0.905	0.799	1.000
2.000	1.881	1.048	0.897	1.168	0.912	0.818	1.000
2.100	1.906	1.055	0.913	1.155	0.919	0.838	1.000
2.200	1.927	1.062	0.927	1.145	0.924	0.857	1.000
2.300	1.949	1.069	0.943	1.134	0.930	0.877	1.000
2.400	1.969	1.076	0.958	1.124	0.936	0.896	1.000
2.500	1.991	1.084	0.974	1.113	0.941	0.917	1.000
2.600	2.009	1.091	0.988	1.104	0.946	0.935	1.000
2.700	2.025	1.098	1.002	1.096	0.951	0.952	1.000
2.800	2.039	1.105	1.015	1.089	0.954	0.968	1.000
2.900	2.053	1.113	1.028	1.083	0.958	0.984	1.000
3.000	2.065	1.121	1.041	1.077	0.961	1.000	1.000
3.100	2.076	1.128	1.053	1.072	0.963	1.015	1.000
3.200	2.085	1.136	1.064	1.067	0.966	1.027	1.000
3.300	2.090	1.144	1.075	1.065	0.967	1.039	1.000
3.400	2.097	1.152	1.085	1.062	0.968	1.050	1.000
3.500	2.101	1.159	1.094	1.060	0.970	1.060	1.000
3.600	2.104	1.167	1.103	1.058	0.970	1.071	1.000
3.700	2.104	1.176	1.111	1.058	0.970	1.078	1.000
3.800	2.103	1.184	1.119	1.059	0.970	1.085	1.000
3.900	2.102	1.193	1.126	1.059	0.970	1.092	1.000
4.000	2.100	1.201	1.133	1.060	0.969	1.098	1.000
4.250	2.091	1.224	1.150	1.064	0.967	1.112	1.000
4.500	2.084	1.246	1.167	1.068	0.965	1.126	1.000
4.750	2.073	1.267	1.180	1.073	0.963	1.136	1.000
5.000	2.058	1.291	1.195	1.080	0.959	1.146	1.000
5.250	2.049	1.312	1.210	1.094	0.957	1.157	1.000
5.500	2.024	1.360	1.240	1.096	0.950	1.179	1.000
5.750	1.992	1.422	1.278	1.112	0.942	1.204	1.000
6.000	1.955	1.505	1.331	1.131	0.932	1.241	1.000

TABLE 6.- Continued.

CENTERBODY IV, X = 26.4 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.012	0.507	1.995	0.000	0.000	1.000
0.050	0.821	1.012	0.576	1.758	0.488	0.281	1.000
0.075	0.843	1.012	0.579	1.747	0.500	0.290	1.000
0.100	0.936	1.012	0.596	1.697	0.547	0.326	1.000
0.150	1.011	1.012	0.611	1.657	0.583	0.356	1.000
0.200	1.123	1.012	0.635	1.594	0.635	0.403	1.000
0.250	1.196	1.012	0.652	1.552	0.668	0.436	1.000
0.300	1.256	1.012	0.667	1.517	0.693	0.463	1.000
0.350	1.305	1.012	0.680	1.488	0.714	0.485	1.000
0.400	1.349	1.012	0.692	1.463	0.731	0.506	1.000
0.450	1.381	1.012	0.701	1.445	0.744	0.521	1.000
0.500	1.412	1.012	0.709	1.427	0.756	0.536	1.000
0.600	1.465	1.012	0.725	1.396	0.776	0.562	1.000
0.700	1.509	1.012	0.738	1.371	0.792	0.585	1.000
0.800	1.547	1.012	0.750	1.350	0.805	0.604	1.000
0.900	1.574	1.018	0.763	1.334	0.815	0.622	1.000
1.000	1.601	1.024	0.777	1.319	0.824	0.640	1.000
1.100	1.627	1.030	0.790	1.304	0.833	0.658	1.000
1.200	1.656	1.036	0.804	1.289	0.843	0.678	1.000
1.300	1.680	1.042	0.818	1.275	0.851	0.695	1.000
1.400	1.710	1.048	0.833	1.259	0.860	0.716	1.000
1.500	1.737	1.056	0.848	1.244	0.869	0.737	1.000
1.600	1.760	1.064	0.864	1.232	0.876	0.756	1.000
1.700	1.785	1.073	0.880	1.219	0.883	0.777	1.000
1.800	1.805	1.085	0.898	1.208	0.889	0.799	1.000
1.900	1.828	1.096	0.916	1.196	0.896	0.821	1.000
2.000	1.847	1.108	0.934	1.186	0.902	0.843	1.000
2.100	1.867	1.119	0.952	1.176	0.907	0.864	1.000
2.200	1.890	1.131	0.972	1.164	0.914	0.888	1.000
2.300	1.905	1.145	0.991	1.156	0.918	0.910	1.000
2.400	1.921	1.158	1.009	1.148	0.923	0.931	1.000
2.500	1.939	1.169	1.026	1.139	0.928	0.951	1.000
2.600	1.955	1.181	1.044	1.131	0.932	0.973	1.000
2.700	1.969	1.192	1.060	1.124	0.936	0.992	1.000
2.800	1.983	1.202	1.077	1.117	0.940	1.012	1.000
2.900	1.995	1.213	1.092	1.111	0.943	1.030	1.000
3.000	2.008	1.224	1.109	1.104	0.946	1.049	1.000
3.100	2.015	1.236	1.123	1.101	0.948	1.064	1.000
3.200	2.022	1.245	1.134	1.098	0.950	1.077	1.000
3.300	2.028	1.255	1.146	1.095	0.951	1.090	1.000
3.400	2.031	1.264	1.156	1.093	0.952	1.101	1.000
3.500	2.033	1.274	1.166	1.092	0.953	1.111	1.000
3.600	2.036	1.281	1.175	1.091	0.953	1.120	1.000
3.700	2.039	1.291	1.185	1.090	0.954	1.130	1.000
3.800	2.043	1.297	1.192	1.088	0.955	1.139	1.000
3.900	2.043	1.304	1.199	1.087	0.955	1.146	1.000
4.000	2.045	1.310	1.206	1.086	0.956	1.152	1.000
4.250	2.048	1.324	1.220	1.085	0.956	1.167	1.000
4.500	2.026	1.364	1.245	1.095	0.951	1.184	1.000
4.750	2.012	1.394	1.264	1.102	0.947	1.198	1.000
5.000	1.989	1.439	1.292	1.114	0.941	1.216	1.000
5.250	1.970	1.485	1.322	1.124	0.936	1.237	1.000
5.500	1.970	1.485	1.322	1.124	0.936	1.237	1.000
5.750	1.966	1.485	1.320	1.125	0.935	1.234	1.000
6.000	1.963	1.485	1.318	1.127	0.934	1.231	1.000

TABLE 6.- Continued.

CENTERBODY IV, X = 28.4 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.109	0.556	1.995	0.000	0.000	1.000
0.050	0.767	1.109	0.621	1.785	0.459	0.285	1.000
0.075	0.797	1.109	0.626	1.771	0.475	0.298	1.000
0.100	0.818	1.109	0.630	1.760	0.486	0.307	1.000
0.150	0.866	1.115	0.643	1.735	0.511	0.329	1.000
0.200	0.918	1.125	0.659	1.708	0.538	0.354	1.000
0.250	0.974	1.135	0.677	1.677	0.566	0.383	1.000
0.300	1.036	1.148	0.699	1.643	0.595	0.416	1.000
0.350	1.113	1.158	0.724	1.599	0.631	0.457	1.000
0.400	1.170	1.170	0.747	1.567	0.656	0.490	1.000
0.450	1.216	1.185	0.770	1.540	0.676	0.521	1.000
0.500	1.256	1.200	0.791	1.517	0.693	0.549	1.000
0.600	1.314	1.230	0.830	1.483	0.717	0.595	1.000
0.700	1.348	1.270	0.868	1.463	0.731	0.635	1.000
0.800	1.372	1.309	0.903	1.449	0.741	0.669	1.000
0.900	1.386	1.345	0.923	1.441	0.746	0.696	1.000
1.000	1.398	1.382	0.963	1.434	0.751	0.723	1.000
1.100	1.415	1.400	0.982	1.425	0.757	0.744	1.000
1.200	1.442	1.394	0.989	1.409	0.768	0.759	1.000
1.300	1.474	1.382	0.993	1.391	0.779	0.774	1.000
1.400	1.514	1.364	0.997	1.368	0.794	0.791	1.000
1.500	1.560	1.333	0.994	1.342	0.810	0.805	1.000
1.600	1.600	1.315	0.997	1.319	0.824	0.822	1.000
1.700	1.652	1.285	0.995	1.291	0.841	0.838	1.000
1.800	1.692	1.267	0.998	1.269	0.854	0.853	1.000
1.900	1.737	1.248	1.003	1.244	0.869	0.872	1.000
2.000	1.778	1.236	1.011	1.223	0.881	0.891	1.000
2.100	1.813	1.230	1.022	1.204	0.892	0.911	1.000
2.200	1.848	1.224	1.033	1.186	0.902	0.931	1.000
2.300	1.879	1.224	1.047	1.170	0.911	0.953	1.000
2.400	1.902	1.230	1.063	1.157	0.917	0.975	1.000
2.500	1.922	1.242	1.083	1.147	0.923	0.999	1.000
2.600	1.941	1.255	1.103	1.138	0.928	1.023	1.000
2.700	1.960	1.267	1.122	1.128	0.933	1.048	1.000
2.800	1.969	1.285	1.143	1.124	0.936	1.069	1.000
2.900	1.984	1.297	1.162	1.116	0.940	1.092	1.000
3.000	1.994	1.309	1.178	1.111	0.942	1.110	1.000
3.100	2.002	1.321	1.193	1.108	0.944	1.127	1.000
3.200	2.008	1.333	1.207	1.104	0.946	1.142	1.000
3.300	2.015	1.342	1.219	1.101	0.948	1.155	1.000
3.400	2.029	1.339	1.224	1.094	0.952	1.165	1.000
3.500	2.041	1.336	1.227	1.088	0.955	1.172	1.000
3.600	2.049	1.333	1.229	1.085	0.956	1.176	1.000
3.700	2.042	1.345	1.236	1.088	0.955	1.181	1.000
3.800	2.035	1.358	1.244	1.091	0.953	1.186	1.000
3.900	2.030	1.370	1.252	1.094	0.952	1.192	1.000
4.000	2.021	1.388	1.264	1.098	0.949	1.200	1.000
4.250	2.000	1.427	1.287	1.108	0.944	1.215	1.000
4.500	1.981	1.461	1.306	1.118	0.939	1.227	1.000
4.750	1.987	1.455	1.305	1.115	0.941	1.227	1.000
5.000	1.993	1.442	1.297	1.112	0.942	1.222	1.000
5.250	1.997	1.430	1.289	1.110	0.943	1.216	1.000
5.500	2.002	1.418	1.280	1.108	0.944	1.209	1.000
5.750	2.006	1.406	1.272	1.105	0.946	1.203	1.000
6.000	2.011	1.394	1.264	1.103	0.947	1.196	1.000

TABLE 6.- Continued.

CENTERBODY IV, X = 30.4 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.285	0.644	1.995	0.000	0.000	1.000
0.050	0.668	1.285	0.701	1.832	0.405	0.284	1.000
0.075	0.687	1.291	0.708	1.823	0.416	0.294	1.000
0.100	0.714	1.295	0.715	1.811	0.431	0.308	1.000
0.150	0.747	1.305	0.727	1.795	0.449	0.326	1.000
0.200	0.791	1.316	0.742	1.774	0.472	0.350	1.000
0.250	0.841	1.327	0.759	1.748	0.498	0.379	1.000
0.300	0.896	1.339	0.779	1.719	0.526	0.410	1.000
0.350	0.953	1.352	0.800	1.688	0.555	0.444	1.000
0.400	0.998	1.367	0.822	1.664	0.577	0.474	1.000
0.450	1.039	1.382	0.842	1.641	0.597	0.502	1.000
0.500	1.075	1.400	0.864	1.621	0.613	0.530	1.000
0.600	1.133	1.435	0.904	1.587	0.640	0.579	1.000
0.700	1.186	1.469	0.944	1.557	0.664	0.626	1.000
0.800	1.231	1.503	0.982	1.531	0.683	0.671	1.000
0.900	1.269	1.535	1.017	1.509	0.699	0.710	1.000
1.000	1.305	1.564	1.050	1.489	0.714	0.750	1.000
1.100	1.335	1.594	1.084	1.471	0.726	0.787	1.000
1.200	1.364	1.624	1.117	1.454	0.737	0.824	1.000
1.300	1.390	1.648	1.145	1.439	0.748	0.856	1.000
1.400	1.408	1.679	1.175	1.429	0.754	0.886	1.000
1.500	1.427	1.703	1.201	1.418	0.762	0.915	1.000
1.600	1.444	1.727	1.227	1.408	0.768	0.943	1.000
1.700	1.461	1.752	1.252	1.398	0.774	0.970	1.000
1.800	1.479	1.770	1.275	1.388	0.781	0.996	1.000
1.900	1.497	1.783	1.298	1.377	0.788	1.023	1.000
2.000	1.524	1.788	1.312	1.362	0.797	1.046	1.000
2.100	1.552	1.788	1.328	1.347	0.807	1.072	1.000
2.200	1.578	1.788	1.342	1.332	0.816	1.096	1.000
2.300	1.614	1.764	1.345	1.312	0.829	1.114	1.000
2.400	1.657	1.727	1.341	1.288	0.843	1.131	1.000
2.500	1.716	1.661	1.322	1.256	0.862	1.140	1.000
2.600	1.796	1.564	1.289	1.213	0.887	1.143	1.000
2.700	1.888	1.455	1.249	1.165	0.913	1.141	1.000
2.800	1.912	1.442	1.252	1.152	0.920	1.152	1.000
2.900	1.935	1.430	1.254	1.141	0.927	1.162	1.000
3.000	1.956	1.418	1.255	1.130	0.932	1.170	1.000
3.100	1.974	1.406	1.254	1.121	0.937	1.175	1.000
3.200	1.991	1.394	1.252	1.113	0.941	1.179	1.000
3.300	2.002	1.388	1.253	1.108	0.944	1.184	1.000
3.400	2.012	1.382	1.253	1.103	0.947	1.187	1.000
3.500	2.022	1.376	1.253	1.098	0.950	1.190	1.000
3.600	2.030	1.370	1.252	1.094	0.952	1.192	1.000
3.700	2.024	1.382	1.260	1.097	0.950	1.197	1.000
3.800	2.016	1.394	1.266	1.101	0.948	1.201	1.000
3.900	2.018	1.394	1.267	1.100	0.949	1.202	1.000
4.000	2.019	1.394	1.268	1.099	0.949	1.203	1.000
4.250	2.021	1.394	1.269	1.098	0.949	1.205	1.000
4.500	2.019	1.394	1.268	1.099	0.949	1.203	1.000
4.750	2.018	1.394	1.267	1.100	0.949	1.202	1.000
5.000	2.014	1.394	1.265	1.101	0.948	1.199	1.000
5.250	2.011	1.394	1.264	1.103	0.947	1.196	1.000
5.500	1.987	1.418	1.272	1.115	0.940	1.196	1.000
5.750	2.015	1.364	1.238	1.101	0.948	1.174	1.000
6.000	2.008	1.333	1.207	1.104	0.946	1.142	1.000

TABLE 6.- Continued.

CENTERBODY IV, X = 32.4 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.564	0.784	1.995	0.000	0.000	1.000
0.050	0.519	1.564	0.826	1.893	0.320	0.264	1.000
0.075	0.537	1.564	0.829	1.886	0.331	0.274	1.000
0.100	0.563	1.564	0.833	1.876	0.346	0.288	1.000
0.150	0.619	1.564	0.844	1.853	0.378	0.319	1.000
0.200	0.681	1.564	0.856	1.826	0.413	0.353	1.000
0.250	0.742	1.564	0.870	1.797	0.446	0.388	1.000
0.300	0.807	1.564	0.886	1.765	0.481	0.426	1.000
0.350	0.869	1.564	0.902	1.734	0.513	0.463	1.000
0.400	0.932	1.564	0.920	1.700	0.545	0.501	1.000
0.450	0.977	1.565	0.934	1.675	0.567	0.530	1.000
0.500	1.018	1.566	0.948	1.652	0.587	0.556	1.000
0.600	1.094	1.570	0.975	1.610	0.622	0.606	1.000
0.700	1.140	1.582	0.999	1.584	0.643	0.642	1.000
0.800	1.205	1.596	1.032	1.546	0.672	0.693	1.000
0.900	1.248	1.616	1.062	1.521	0.690	0.733	1.000
1.000	1.284	1.634	1.089	1.500	0.705	0.768	1.000
1.100	1.318	1.653	1.116	1.481	0.719	0.803	1.000
1.200	1.355	1.670	1.145	1.459	0.734	0.840	1.000
1.300	1.391	1.687	1.173	1.439	0.748	0.877	1.000
1.400	1.420	1.709	1.202	1.422	0.759	0.913	1.000
1.500	1.444	1.745	1.240	1.408	0.768	0.953	1.000
1.600	1.472	1.776	1.276	1.392	0.779	0.994	1.000
1.700	1.494	1.806	1.309	1.380	0.786	1.029	1.000
1.800	1.519	1.836	1.345	1.365	0.796	1.070	1.000
1.900	1.552	1.848	1.373	1.347	0.807	1.108	1.000
2.000	1.584	1.861	1.400	1.329	0.818	1.146	1.000
2.100	1.610	1.867	1.420	1.314	0.827	1.175	1.000
2.200	1.633	1.867	1.435	1.301	0.835	1.198	1.000
2.300	1.653	1.867	1.447	1.290	0.842	1.218	1.000
2.400	1.675	1.855	1.451	1.278	0.849	1.232	1.000
2.500	1.692	1.842	1.452	1.269	0.854	1.241	1.000
2.600	1.731	[illegible]	1.433	1.248	0.867	1.242	1.000
2.700	1.758	1.745	1.416	1.233	0.875	1.239	1.000
2.800	1.795	1.685	1.389	1.213	0.886	1.231	1.000
2.900	1.827	1.636	1.367	1.197	0.896	1.225	1.000
3.000	1.859	1.588	1.346	1.180	0.905	1.218	1.000
3.100	1.885	1.552	1.330	1.166	0.913	1.214	1.000
3.200	1.912	1.515	1.315	1.152	0.920	1.210	1.000
3.300	1.935	1.485	1.302	1.141	0.927	1.206	1.000
3.400	1.955	1.461	1.291	1.131	0.932	1.204	1.000
3.500	1.974	1.436	1.281	1.121	0.937	1.201	1.000
3.600	1.999	1.406	1.268	1.109	0.944	1.197	1.000
3.700	2.001	1.406	1.269	1.108	0.944	1.199	1.000
3.800	2.001	1.406	1.269	1.108	0.944	1.199	1.000
3.900	2.001	1.406	1.269	1.108	0.944	1.199	1.000
4.000	1.999	1.406	1.268	1.109	0.944	1.197	1.000
4.250	1.993	1.406	1.264	1.112	0.942	1.191	1.000
4.500	1.994	1.388	1.248	1.112	0.942	1.176	1.000
4.750	2.010	1.345	1.219	1.103	0.947	1.154	1.000
5.000	2.014	1.309	1.188	1.101	0.948	1.126	1.000
5.250	2.025	1.261	1.150	1.096	0.950	1.093	1.000
5.500	2.044	1.200	1.104	1.087	0.955	1.055	1.000
5.750	2.098	1.103	1.040	1.061	0.969	1.007	1.000
6.000	2.125	1.042	0.994	1.048	0.975	0.970	1.000

TABLE 6.- Continued.

CENTERBODY IV, X = 34.4 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.606	0.805	1.995	0.000	0.000	1.000
0.050	0.607	1.606	0.864	1.858	0.371	0.321	1.000
0.075	0.643	1.606	0.872	1.843	0.391	0.341	1.000
0.100	0.676	1.606	0.879	1.828	0.410	0.360	1.000
0.150	0.736	1.606	0.892	1.800	0.443	0.395	1.000
0.200	0.795	1.606	0.907	1.771	0.474	0.430	1.000
0.250	0.848	1.606	0.921	1.744	0.502	0.462	1.000
0.300	0.895	1.607	0.935	1.720	0.526	0.492	1.000
0.350	0.938	1.608	0.948	1.697	0.548	0.519	1.000
0.400	0.974	1.610	0.960	1.677	0.566	0.543	1.000
0.450	1.012	1.611	0.973	1.656	0.584	0.568	1.000
0.500	1.043	1.613	0.984	1.639	0.598	0.589	1.000
0.600	1.101	1.618	1.008	1.606	0.625	0.630	1.000
0.700	1.155	1.622	1.030	1.575	0.650	0.669	1.000
0.800	1.204	1.628	1.053	1.546	0.671	0.707	1.000
0.900	1.251	1.634	1.075	1.520	0.691	0.743	1.000
1.000	1.295	1.640	1.096	1.494	0.710	0.779	1.000
1.100	1.336	1.648	1.121	1.470	0.726	0.814	1.000
1.200	1.374	1.658	1.145	1.448	0.741	0.849	1.000
1.300	1.41[illegible]	1.669	1.169	1.427	0.755	0.883	1.000
1.400	1.443	1.685	1.196	1.409	0.768	0.918	1.000
1.500	1.475	1.702	1.224	1.390	0.780	0.954	1.000
1.600	1.506	1.721	1.254	1.372	0.791	0.992	1.000
1.700	1.537	1.739	1.283	1.355	0.802	1.029	1.000
1.800	1.566	1.758	1.313	1.339	0.812	1.067	1.000
1.900	1.596	1.772	1.341	1.322	0.823	1.103	1.000
2.000	1.626	1.788	1.370	1.305	0.833	1.141	1.000
2.100	1.654	1.806	1.400	1.290	0.842	1.179	1.000
2.200	1.677	1.830	1.433	1.277	0.850	1.218	1.000
2.300	1.699	1.842	1.456	1.265	0.857	1.247	1.000
2.400	1.73[illegible]	1.855	1.489	1.245	0.868	1.293	1.000
2.500	1.766	1.855	1.509	1.229	0.878	1.325	1.000
2.600	1.793	1.842	1.517	1.214	0.886	1.344	1.000
2.700	1.811	1.830	1.519	1.205	0.891	1.354	1.000
2.800	1.831	1.806	1.512	1.195	0.897	1.356	1.000
2.900	1.848	1.782	1.503	1.186	0.902	1.356	1.000
3.000	1.852	1.758	1.485	1.184	0.903	1.341	1.000
3.100	1.848	1.733	1.462	1.185	0.902	1.319	1.000
3.200	1.854	1.697	1.435	1.182	0.904	1.297	1.000
3.300	1.867	1.648	1.402	1.175	0.908	1.273	1.000
3.400	1.883	1.600	1.371	1.167	0.912	1.250	1.000
3.500	1.902	1.545	1.335	1.157	0.917	1.225	1.000
3.600	1.935	1.479	1.296	1.141	0.926	1.201	1.000
3.700	1.970	1.412	1.257	1.124	0.936	1.176	1.000
3.800	2.004	1.352	1.221	1.107	0.945	1.154	1.000
3.900	2.041	1.291	1.186	1.089	0.954	1.132	1.000
4.000	2.080	1.230	1.150	1.070	0.964	1.109	1.000
4.250	2.112	1.152	1.092	1.054	0.972	1.062	1.000
4.500	2.151	1.091	1.053	1.036	0.982	1.033	1.000
4.750	2.188	1.030	1.011	1.019	0.990	1.001	1.000
5.000	2.217	0.982	0.976	1.006	0.997	0.973	1.000
5.250	2.226	0.958	0.955	1.002	0.999	0.954	1.000
5.500	2.257	0.921	0.932	0.988	1.006	0.937	1.000
5.750	2.280	0.897	0.917	0.978	1.011	0.927	1.000
6.000	2.297	0.885	0.911	0.971	1.015	0.925	1.000

TABLE 6.- Continued.

CENTERBODY IV, X = 36.4 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.606	0.805	1.995	0.000	0.000	1.000
0.050	0.650	1.606	0.873	1.840	0.395	0.345	1.000
0.075	0.701	1.606	0.884	1.817	0.424	0.375	1.000
0.100	0.753	1.606	0.896	1.792	0.452	0.405	1.000
0.150	0.815	1.606	0.912	1.761	0.485	0.442	1.000
0.200	0.870	1.606	0.927	1.733	0.513	0.476	1.000
0.250	0.905	1.604	0.935	1.714	0.531	0.497	1.000
0.300	0.946	1.601	0.946	1.692	0.552	0.522	1.000
0.350	0.984	1.599	0.956	1.672	0.570	0.545	1.000
0.400	1.019	1.596	0.966	1.652	0.587	0.568	1.000
0.450	1.050	1.594	0.975	1.635	0.602	0.587	1.000
0.500	1.079	1.592	0.983	1.618	0.615	0.605	1.000
0.600	1.139	1.588	1.002	1.584	0.643	0.644	1.000
0.700	1.194	1.588	1.023	1.553	0.667	0.682	1.000
0.800	1.241	1.590	1.043	1.525	0.687	0.717	1.000
0.900	1.288	1.594	1.064	1.498	0.707	0.752	1.000
1.000	1.332	1.601	1.087	1.473	0.724	0.788	1.000
1.100	1.371	1.611	1.111	1.450	0.740	0.822	1.000
1.200	1.411	1.622	1.136	1.427	0.755	0.858	1.000
1.300	1.444	1.636	1.162	1.408	0.768	0.893	1.000
1.400	1.478	1.652	1.190	1.389	0.781	0.929	1.000
1.500	1.511	1.667	1.217	1.370	0.793	0.964	1.000
1.600	1.541	1.685	1.245	1.353	0.803	1.000	1.000
1.700	1.574	1.697	1.272	1.334	0.815	1.037	1.000
1.800	1.603	1.712	1.299	1.318	0.825	1.071	1.000
1.900	1.632	1.724	1.324	1.302	0.835	1.106	1.000
2.000	1.668	1.730	1.349	1.282	0.847	1.142	1.000
2.100	1.704	1.730	1.370	1.262	0.858	1.176	1.000
2.200	1.738	1.722	1.385	1.244	0.869	1.204	1.000
2.300	1.771	1.709	1.394	1.226	0.879	1.226	1.000
2.400	1.799	1.697	1.401	1.211	0.888	1.243	1.000
2.500	1.823	1.695	1.406	1.196	0.895	1.258	1.000
2.600	1.843	1.675	1.410	1.188	0.901	1.270	1 000
2.700	1.857	1.665	1.410	1.181	0.905	1.276	1.000
2.800	1.870	1.651	1.406	1.174	0.908	1.278	1.000
2.900	1.880	1.636	1.400	1.169	0.911	1.275	1.000
3.000	1.884	1.630	1.397	1.167	0.912	1.274	1.000
3.100	1.889	1.619	1.391	1.164	0.914	1.271	1.000
3.200	1.895	1.610	1.386	1.161	0.916	1.269	1.000
3.300	1.900	1.598	1.379	1.158	0.917	1.264	1.000
3.400	1.906	1.582	1.369	1.155	0.919	1.257	1.000
3.500	1.914	1.564	1.358	1.151	0.921	1.250	1.000
3.600	1.937	1.521	1.335	1.140	0.927	1.237	1.000
3.700	1.958	1.479	1.309	1.129	0.933	1.221	1.000
3.800	1.995	1.412	1.271	1.111	0.943	1.198	1.000
3.900	2.033	1.345	1.232	1.092	0.952	1.173	1.000
4.000	2.075	1.273	1.187	1.072	0.963	1.143	1.000
4.250	2.139	1.121	1.076	1.042	0.979	1.054	1.000
4.500	2.195	1.018	1.002	1.016	0.992	0.994	1.000
4.750	2.259	0.945	0.957	0.988	1.006	0.963	1.000
5.000	2.262	0.939	0.953	0.986	1.007	0.959	1.000
5.250	2.296	0.897	0.923	0.971	1.014	0.937	1.000
5.500	2.297	0.891	0.918	0.971	1.015	0.931	1.000
5.750	2.303	0.887	0.916	0.968	1.016	0.931	1.000
6.000	2.306	0.885	0.915	0.967	1.017	0.930	1.000

TABLE 6.- Continued.

CENTERBODY IV, X = 38.4 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.515	0.759	1.995	0.000	0.000	1.000
0.050	0.797	1.515	0.856	1.770	0.475	0.407	1.000
0.075	0.840	1.512	0.865	1.748	0.498	0.431	1.000
0.100	0.980	1.508	0.873	1.727	0.519	0.453	1.000
0.150	0.933	1.501	0.883	1.700	0.545	0.481	1.000
0.200	0.981	1.492	0.892	1.673	0.569	0.507	1.000
0.250	1.023	1.482	0.899	1.650	0.589	0.530	1.000
0.300	1.064	1.472	0.905	1.627	0.608	0.550	1.000
0.350	1.100	1.461	0.909	1.606	0.625	0.568	1.000
0.400	1.138	1.450	0.915	1.585	0.642	0.587	1.000
0.450	1.171	1.439	0.919	1.566	0.657	0.604	1.000
0.500	1.204	1.428	0.923	1.547	0.671	0.620	1.000
0.600	1.265	1.411	0.933	1.512	0.697	0.651	1.000
0.700	1.319	1.399	0.944	1.480	0.720	0.679	1.000
0.800	1.367	1.392	0.958	1.452	0.739	0.708	1.000
0.900	1.410	1.392	0.975	1.428	0.755	0.736	1.000
1.000	1.446	1.395	0.992	1.407	0.769	0.763	1.000
1.100	1.479	1.402	1.010	1.388	0.781	0.789	1.000
1.200	1.511	1.413	1.032	1.370	0.793	0.818	1.000
1.300	1.540	1.428	1.055	1.354	0.803	0.847	1.000
1.400	1.563	1.445	1.078	1.340	0.811	0.875	1.000
1.500	1.588	1.464	1.104	1.326	0.820	0.905	1.000
1.600	1.611	1.482	1.129	1.313	0.828	0.934	1.000
1.700	1.636	1.497	1.152	1.300	0.836	0.963	1.000
1.800	1.658	1.513	1.175	1.287	0.843	0.991	1.000
1.900	1.686	1.522	1.197	1.272	0.852	1.020	1.000
2.000	1.712	1.531	1.217	1.258	0.861	1.047	1.000
2.100	1.746	1.531	1.235	1.239	0.872	1.076	1.000
2.200	1.777	1.532	1.253	1.223	0.881	1.104	1.000
2.300	1.806	1.533	1.270	1.208	0.890	1.129	1.000
2.400	1.830	1.533	1.283	1.195	0.897	1.150	1.000
2.500	1.854	1.530	1.294	1.183	0.904	1.169	1.000
2.600	1.876	1.521	1.299	1.171	0.910	1.182	1.000
2.700	1.912	1.492	1.294	1.153	0.920	1.191	1.000
2.800	1.947	1.457	1.284	1.135	0.930	1.194	1.000
2.900	1.979	1.424	1.273	1.119	0.938	1.194	1.000
3.000	2.011	1.388	1.258	1.103	0.947	1.191	1.000
3.100	2.025	1.370	1.249	1.096	0.950	1.188	1.000
3.200	2.032	1.358	1.242	1.093	0.952	1.183	1.000
3.300	2.038	1.345	1.235	1.090	0.954	1.178	1.000
3.400	2.043	1.333	1.226	1.087	0.955	1.171	1.000
3.500	2.045	1.321	1.216	1.087	0.955	1.162	1.000
3.600	2.046	1.309	1.205	1.086	0.956	1.152	1.000
3.700	2.048	1.297	1.195	1.085	0.956	1.143	1.000
3.800	2.051	1.285	1.186	1.084	0.957	1.135	1.000
3.900	2.058	1.273	1.178	1.080	0.959	1.130	1.000
4.000	2.067	1.261	1.172	1.076	0.961	1.126	1.000
4.250	2.071	1.261	1.174	1.074	0.962	1.129	1.000
4.500	2.082	1.261	1.179	1.069	0.965	1.138	1.000
4.750	2.098	1.261	1.188	1.061	0.969	1.151	1.000
5.000	2.098	1.261	1.188	1.061	0.969	1.151	1.000
5.250	2.073	1.248	1.163	1.073	0.963	1.120	1.000
.500	2.208	1.030	1.020	1.010	0.995	1.015	1.000
.750	2.235	0.964	0.966	0.998	1.001	0.967	1.000
6.000	2.276	0.937	0.956	0.980	1.010	0.966	1.000

TABLE 6.- Concluded.

CENTERBODY IV, X = 40.4 CM

Y(CM)	M	P / P INF	RHO / RHO INF	T / T INF	U / U INF	RHOU / RHOU INF	TT / TT INF
0.000	0.000	1.303	0.653	1.995	0.000	0.000	1.000
0.050	0.967	1.297	0.772	1.681	0.562	0.434	1.000
0.075	1.013	1.293	0.781	1.656	0.584	0.456	1.000
0.100	1.060	1.288	0.791	1.629	0.606	0.480	1.000
0.150	1.1[illegible]	1.278	0.802	1.594	0.635	0.509	1.000
0.200	1.169	1.265	0.807	1.567	0.656	0.530	1.000
0.250	1.204	1.252	0.810	1.546	0.671	0.544	1.000
0.300	1.234	1.236	0.808	1.529	0.684	0.553	1.000
0.350	1.262	1.224	0.809	1.513	0.696	0.563	1.000
0.400	1.292	1.208	0.808	1.496	0.708	0.572	1.000
0.450	1.323	1.195	0.809	1.478	0.721	0.583	1.000
0.500	1.350	1.188	0.812	1.462	0.732	0.594	1.000
0.600	1.393	1.182	0.822	1.437	0.749	0.616	1.000
0.700	1.437	1.182	0.837	1.412	0.765	0.640	1.000
0.800	1.469	1.194	0.857	1.393	0.778	0.666	1.000
0.900	1.501	1.210	0.879	1.376	0.789	0.694	1.000
1.000	1.531	1.229	0.905	1.359	0.800	0.724	1.000
1.100	1.560	1.247	0.929	1.342	0.810	0.753	1.000
1.200	1.593	1.262	0.953	1.324	0.821	0.783	1.000
1.300	1.618	1.275	0.974	1.309	0.830	0.808	1.000
1.400	1.646	1.290	0.997	1.294	0.839	0.837	1.000
1.500	1.666	1.304	1.017	1.283	0.846	0.860	1.000
1.600	1.688	1.319	1.038	1.271	0.853	0.885	1.000
1.700	1.710	1.330	1.056	1.259	0.860	0.908	1.000
1.800	1.732	1.339	1.074	1.247	0.867	0.931	1.000
1.900	1.754	1.345	1.089	1.235	0.874	0.952	1.000
2.000	1.775	1.352	1.104	1.224	0.880	0.972	1.000
2.100	1.803	1.352	1.118	1.209	0.889	0.993	1.000
2.200	1.828	1.352	1.130	1.196	0.896	1.012	1.000
2.300	1.861	1.345	1.141	1.179	0.906	1.034	1.000
2.400	1.894	1.339	1.153	1.162	0.915	1.055	1.000
2.500	1.929	1.333	1.165	1.144	0.925	1.078	1.000
2.600	1.965	1.327	1.179	1.126	0.935	1.102	1.000
2.700	1.999	1.314	1.185	1.109	0.944	1.118	1.000
2.800	2.020	1.304	1.187	1.099	0.949	1.127	1.000
2.900	2.030	1.297	1.186	1.094	0.952	1.128	1.000
3.000	2.039	1.291	1.185	1.090	0.954	1.130	1.000
3.100	2.047	1.286	1.184	1.086	0.956	1.132	1.000
3.200	2.051	1.282	1.184	1.083	0.957	1.133	1.000
3.300	2.058	1.279	1.194	1.080	0.959	1.135	1.000
3.400	2.063	1.275	1.183	1.078	0.960	1.136	1.000
3.500	2.069	1.273	1.184	1.075	0.962	1.139	1.000
3.600	2.073	1.273	1.186	1.073	0.963	1.141	1.000
3.700	2.075	1.273	1.187	1.072	0.963	1.143	1.000
3.800	2.075	1.274	1.188	1.072	0.963	1.145	1.000
3.900	2.075	1.276	1.190	1.072	0.963	1.146	1.000
4.000	2.075	1.279	1.193	1.072	0.963	1.148	1.000
4.250	2.075	1.285	1.198	1.072	0.963	1.154	1.000
4.500	2.062	1.309	1.214	1.078	0.960	1.166	1.000
4.750	2.057	1.321	1.222	1.081	0.959	1.172	1.000
5.000	2.047	1.332	1.228	1.086	0.956	1.174	1.000
5.250	2.026	1.359	1.239	1.095	0.951	1.178	1.000
5.500	1.953	1.503	1.328	1.132	0.932	1.237	1.000
5.750	1.952	1.515	1.338	1.132	0.931	1.246	1.000
6.000	1.952	1.515	1.338	1.132	0.931	1.246	1.000

TABLE 7.- INTEGRAL BOUNDARY-LAYER PARAMETERS — CENTERBODY II, $Re_{x'_o} = 35.3\times10^6$

X, cm	δ	δ^*	θ	δ_i^*	θ_i
17.75	4.000	0.859	0.234	0.424	0.313
19.75	4.000	0.874	0.228	0.418	0.309
21.75	3.900	0.899	0.226	0.419	0.310
23.75	3.750	0.952	0.202	0.393	0.291
25.75	3.500	0.940	0.209	0.408	0.300
27.75	3.350	0.892	0.218	0.431	0.308
29.75	3.200	0.655	0.276	0.478	0.326
31.75	3.000	0.556	0.319	0.517	0.349
33.75	2.700	0.741	0.252	0.481	0.325
35.75	2.950	0.785	0.229	0.444	0.308
37.75	3.150	0.789	0.220	0.427	0.298
39.75	3.300	0.796	0.224	0.430	0.302

TABLE 8.- INTEGRAL BOUNDARY-LAYER PARAMETERS — CENTERBODY IV, $Re_{x'_o} = 35.3\times10^6$

X, cm	δ	δ^*	θ	δ_i^*	θ_i
14.40	4.000	0.809	0.225	0.402	0.298
18.40	3.900	0.815	0.214	0.388	0.288
20.40	3.800	0.842	0.199	0.374	0.275
22.40	3.700	0.869	0.190	0.358	0.268
24.40	3.620	0.928	0.183	0.367	0.269
26.40	3.550	0.961	0.166	0.355	0.257
28.40	3.480	0.938	0.237	0.483	0.333
30.40	3.400	0.799	0.340	0.623	0.411
32.40	3.250	0.725	0.323	0.607	0.384
34.40	2.950	0.852	0.241	0.510	0.333
36.40	2.800	0.763	0.239	0.474	0.316
38.40	2.900	0.726	0.247	0.448	0.314
40.40	3.000	0.725	0.218	0.386	0.285

TABLE 9.- BOUNDARY-LAYER PROFILES — CENTER BODY II FLUCTUATING MEASUREMENTS

CENTERBODY II, X = 17.75 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.20	0.067	0.033	0.068	0.034	0.032	0.063	
0.25	0.056	0.028	0.056	0.025	0.036	0.050	
0.31	0.057	0.028	0.055	0.023	0.033	0.048	
0.36	0.058	0.028	0.055	0.023	0.030	0.047	0.353
0.42	0.055	0.027	0.051	0.023	0.027	0.044	0.395
0.47	0.055	0.027	0.050	0.023	0.026	0.044	0.477
0.57	0.055	0.026	0.048	0.025	0.025	0.042	0.559
0.68	0.055	0.026	0.047	0.025	0.025	0.042	0.548
0.78	0.055	0.026	0.046	0.025	0.025	0.041	0.529
0.89	0.055	0.026	0.045	0.024	0.024	0.040	0.532
1.00	0.053	0.026	0.043	0.025	0.025	0.039	0.489
1.21	0.055	0.026	0.042	0.024	0.024	0.038	0.465
1.43	0.056	0.027	0.041	0.024	0.023	0.037	0.446
1.64	0.058	0.028	0.041	0.024	0.023	0.038	0.461
1.85	0.061	0.029	0.042	0.025	0.024	0.038	0.461
2.06	0.062	0.029	0.041	0.023	0.022	0.037	0.407
2.28	0.066	0.031	0.041	0.022	0.021	0.036	0.408
2.49	0.067	0.032	0.040	0.022	0.020	0.035	0.377
2.70	0.069	0.032	0.040	0.021	0.019	0.035	0.369
2.91	0.068	0.032	0.038	0.020	0.017	0.033	0.310
3.12	0.059	0.028	0.032	0.018	0.014	0.028	0.222
3.34	0.050	0.023	0.026	0.016	0.013	0.024	0.147
3.55	0.036	0.017	0.019	0.012	0.010	0.017	0.076
3.76	0.036	0.017	0.019	0.013	0.010	0.018	0.068
3.98	0.023	0.011	0.012	0.013	0.008	0.014	0.044
4.19	0.017	0.008	0.009	0.010	0.005	0.010	0.020
4.40	0.013	0.006	0.006	0.009	0.003	0.008	0.019
4.61	0.013	0.006	0.007	0.012	0.003	0.010	0.034
4.82	0.010	0.005	0.005	0.009	0.002	0.008	0.014
5.04	0.009	0.004	0.005	0.008	0.002	0.007	0.007
5.25	0.009	0.004	0.005	0.008	0.002	0.007	0.006
5.46	0.008	0.004	0.004	0.006	0.002	0.006	0.005

TABLE 9.- Continued.

CENTERBODY II, X = 19.75 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.19	0.075	0.037	0.078		0.046		
0.24	0.063	0.032	0.062	0.028	0.041	0.057	
0.29	0.061	0.030	0.059	0.026	0.035	0.051	
0.34	0.060	0.029	0.057	0.024	0.031	0.049	0.318
0.40	0.058	0.028	0.054	0.023	0.029	0.047	0.353
0.45	0.056	0.027	0.052	0.023	0.027	0.045	0.443
0.50	0.056	0.027	0.051	0.025	0.027	0.044	0.507
0.61	0.056	0.027	0.050	0.027	0.025	0.043	0.615
0.71	0.056	0.027	0.048	0.026	0.025	0.042	0.567
0.82	0.055	0.026	0.047	0.026	0.025	0.041	0.571
0.93	0.055	0.076	0.045	0.024	0.023	0.039	0.494
1.03	0.055	0.026	0.044	0.026	0.023	0.039	0.517
1.25	0.057	0.027	0.043	0.025	0.024	0.039	0.506
1.46	0.058	0.028	0.043	0.026	0.024	0.039	0.528
1.67	0.060	0.029	0.043	0.025	0.024	0.039	0.493
1.88	0.062	0.031	0.042	0.025	0.024	0.038	0.482
2.10	0.065	0.032	0.042	0.024	0.022	0.037	0.468
2.31	0.067	0.032	0.041	0.023	0.020	0.037	0.416
2.52	0.069	0.033	0.040	0.022	0.021	0.035	0.385
2.74	0.070	0.033	0.039	0.021	0.019	0.034	0.354
2.95	0.069	0.032	0.038	0.019	0.018	0.032	0.300
3.16	0.062	0.029	0.033	0.017	0.016	0.028	0.215
3.37	0.054	0.025	0.029	0.015	0.015	0.024	0.145
3.59	0.042	0.020	0.022	0.013	0.015	0.020	0.076
3.80	0.029	0.014	0.015	0.012	0.012	0.014	0.045
4.02	0.023	0.011	0.012	0.012	0.010	0.014	0.057
4.23	0.018	0.009	0.010	0.015			.050
4.44	0.014	0.007	0.008	0.012			.020
4.65	0.012	0.005	0.006	0.010			.01[illegible]
4.87	0.010	0.005	0.005	0.010			.009
5.08	0.009	0.004	0.005	0.009			.008
5.29	0.009	0.004	0.005	0.009			.008

TABLE 9.- Continued.

CENTERBODY II, X = 21.75 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.19	0.080	0.039	0.082		0.046		
0.24	0.068	0.034	0.067	0.032	0.042	0.061	
0.30	0.062	0.031	0.060	0.024	0.037	0.053	
0.35	0.061	0.030	0.058	0.025	0.032	0.050	0.353
0.40	0.058	0.028	0.054	0.022	0.029	0.046	0.354
0.45	0.057	0.027	0.052	0.024	0.027	0.045	0.474
0.51	0.059	0.027	0.052	0.025	0.026	0.044	0.538
0.61	0.057	0.027	0.050	0.027	0.025	0.043	0.623
0.72	0.056	0.027	0.048	0.026	0.024	0.042	0.550
0.82	0.055	0.026	0.047	0.025	0.025	0.041	0.546
0.93	0.055	0.026	0.045	0.025	0.024	0.040	0.518
1.04	0.055	0.026	0.044	0.025	0.024	0.040	0.501
1.25	0.058	0.027	0.043	0.026	0.025	0.039	0.529
1.47	0.059	0.028	0.043	0.026	0.024	0.039	0.511
1.68	0.061	0.030	0.043	0.025	0.024	0.039	0.485
1.89	0.063	0.031	0.042	0.024	0.023	0.038	0.459
2.10	0.065	0.032	0.042	0.024	0.023	0.038	0.458
2.31	0.067	0.032	0.041	0.022	0.021	0.036	0.406
2.53	0.068	0.033	0.040	0.022	0.020	0.035	0.398
2.74	0.070	0.033	0.039	0.021	0.019	0.034	0.368
2.95	0.069	0.032	0.038	0.022	0.017	0.032	0.336
3.16	0.062	0.029	0.033	0.019	0.016	0.029	0.230
3.37	0.054	0.025	0.029	0.016	0.015	0.024	0.163
3.59	0.042	0.020	0.022	0.014	0.014	0.020	0.101
3.80	0.029	0.014	0.015	0.013	0.012	0.015	0.047
4.02	0.025	0.012	0.013	0.017	0.010	0.016	0.057
4.23	0.019	0.009	0.010	0.009			0.017
4.44	0.014	0.007	0.008	0.009			0.011
4.62	0.012	0.006	0.006	0.011			0.010
4.87	0.012	0.006	0.006	0.011			0.010
5.08	0.011	0.005	0.006	0.011			0.009
5.29	0.011	0.005	0.006	0.011			0.008

TABLE 9.- Continued.

CENTERBODY II, X = 23.75 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQR TK/ U INF	TAU*E03/ RHOUU INF
0.19	0.078	0.038	0.080		0.046		
0.25	0.073	0.036	0.073	0.033	0.042	0.065	
0.30	0.070	0.034	0.067	0.030	0.039	0.059	
0.35	0.062	0.030	0.059	0.025	0.033	0.052	0.329
0.41	0.060	0.029	0.056	0.023	0.030	0.048	0.381
0.46	0.058	0.028	0.053	0.024	0.028	0.046	0.464
0.51	0.057	0.028	0.052	0.026	0.027	0.045	0.550
0.62	0.056	0.027	0.049	0.027	0.025	0.043	0.631
0.73	0.057	0.027	0.048	0.029	0.026	0.044	0.625
0.83	0.057	0.027	0.047	0.029	0.025	0.043	0.621
0.94	0.055	0.027	0.045	0.026	0.024	0.040	0.553
1.04	0.055	0.027	0.044	0.026	0.024	0.040	0.538
1.26	0.057	0.027	0.043	0.028	0.024	0.040	0.516
1.47	0.058	0.027	0.042	0.026	0.024	0.039	0.506
1.68	0.061	0.028	0.043	0.026	0.025	0.040	0.502
1.80	0.065	0.030	0.044	0.026	0.024	0.040	0.499
2.11	0.067	0.031	0.043	0.025	0.023	0.038	0.463
2.32	0.068	0.032	0.042	0.023	0.022	0.037	0.425
2.53	0.070	0.033	0.041	0.023	0.020	0.036	0.419
2.75	0.071	0.033	0.040	0.022	0.018	0.035	0.360
2.96	0.070	0.032	0.038	0.021	0.017	0.033	0.330
3.17	0.064	0.030	0.034	0.021	0.016	0.030	0.268
3.38	0.056	0.026	0.028	0.020	0.014	0.026	0.226
3.60	0.045	0.021	0.022	0.017	0.013	0.022	0.140
3.81	0.040	0.019	0.020	0.016	0.011	0.020	0.094
4.02	0.024	0.011	0.012	0.011	0.009	0.013	0.031
4.18	0.017	0.008	0.008	0.010			0.021

TABLE 9.- Continued.

CENTERBODY II, X = 25.75 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.19	0.082	0.041	0.085		0.048		
0.24	0.079	0.039	0.078	0.034	0.043	0.067	
0.29	0.075	0.036	0.072	0.036	0.040	0.063	
0.35	0.070	0.034	0.066	0.027	0.036	0.057	
0.40	0.069	0.034	0.064	0.025	0.034	0.054	0.389
0.45	0.065	0.032	0.058	0.024	0.032	0.049	0.419
0.51	0.062	0.030	0.055	0.027	0.030	0.048	0.523
0.61	0.059	0.029	0.051	0.030	0.027	0.045	0.649
0.72	0.058	0.028	0.048	0.033	0.024	0.045	0.697
0.82	0.057	0.027	0.046	0.031	0.023	0.042	0.670
0.93	0.056	0.027	0.045	0.030	0.022	0.041	0.611
1.04	0.056	0.027	0.044	0.028	0.022	0.039	0.554
1.14	0.057	0.027	0.043	0.026	0.022	0.039	0.524
1.25	0.057	0.027	0.043	0.026	0.022	0.039	0.517
1.46	0.060	0.028	0.042	0.026	0.023	0.039	0.535
1.68	0.062	0.029	0.042	0.026	0.023	0.038	0.520
1.89	0.065	0.030	0.042	0.025	0.022	0.038	0.482
2.10	0.069	0.031	0.042	0.024	0.021	0.037	0.456
2.31	0.070	0.033	0.042	0.024	0.021	0.037	0.448
2.53	0.072	0.034	0.041	0.022	0.019	0.036	0.433
2.74	0.073	0.035	0.040	0.022	0.017	0.034	0.388
2.95	0.075	0.036	0.039	0.024	0.016	0.034	0.379
3.16	0.072	0.034	0.036	0.022	0.015	0.032	0.307
3.38	0.055	0.026	0.027	0.018	0.012	0.025	0.199
3.54	0.038	0.018	0.018	0.010	0.010	0.016	0.061
3.80	0.033	0.016	0.016	0.016	0.011	0.017	0.073
4.00	0.029	0.014	0.014	0.019	0.012	0.018	0.055
4.18	0.016	0.008	0.008	0.014			0.024

TABLE 9.- Continued.

CENTERBODY II, X = 27.75 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.19	0.080	0.040	0.080		0.047		
0.24	0.084	0.042	0.082	0.036	0.047	0.072	
0.30	0.093	0.041	0.088	0.038	0.049	0.076	
0.35	0.087	0.043	0.080	0.032	0.047	0.069	
0.40	0.084	0.047	0.076	0.030	0.044	0.066	0.456
0.46	0.078	0.043	0.069	0.027	0.041	0.060	0.339
0.51	0.077	0.040	0.068	0.028	0.039	0.057	0.454
0.62	0.071	0.034	0.061	0.030	0.033	0.050	0.615
0.73	0.065	0.031	0.053	0.027	0.029	0.046	0.657
0.83	0.062	0.030	0.050	0.036	0.027	0.046	0.772
0.94	0.060	0.029	0.047	0.036	0.025	0.045	0.707
1.16	0.060	0.029	0.045	0.036	0.023	0.044	0.669
1.37	0.061	0.029	0.043	0.032	0.023	0.041	0.630
1.58	0.063	0.030	0.043	0.029	0.023	0.040	0.594
1.80	0.067	0.032	0.043	0.027	0.022	0.039	0.566
2.01	0.071	0.034	0.043	0.025	0.022	0.038	0.541
2.22	0.076	0.036	0.043	0.026	0.020	0.038	0.513
2.44	0.080	0.038	0.043	0.025	0.020	0.038	0.417
2.66	0.083	0.039	0.043	0.024	0.018	0.037	0.458
2.87	0.075	0.036	0.038	0.019	0.016	0.032	0.338
3.08	0.069	0.033	0.034	0.019	0.015	0.029	0.256
3.29	0.057	0.026	0.027	0.016	0.012	0.023	0.146
3.51	0.038	0.017	0.018	0.010	0.009	0.015	0.058
3.72	0.034	0.016	0.016	0.015	0.011	0.017	0.058
3.94	0.022	0.010	0.011	0.013	0.009	0.013	0.021
4.15	0.017	0.008	0.008	0.011	0.008	0.011	0.012
4.36	0.012	0.002	0.005	0.009	0.008	0.009	0.005

TABLE 9.- Continued.

CENTERBODY II, X = 29.75 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.19	0.094	0.049	0.087		0.051		
0.24	0.102	0.052	0.090	0.044	0.053	0.080	
0.30	0.108	0.055	0.092	0.043	0.052	0.088	
0.35	0.108	0.054	0.089	0.039	0.051	0.078	
0.40	0.106	0.053	0.085	0.034	0.048	0.073	
0.46	0.114	0.056	0.088	0.037	0.047	0.075	
0.56	0.107	0.053	0.078	0.031	0.045	0.068	0.634
0.67	0.100	0.049	0.069	0.029	0.041	0.061	0.633
0.78	0.099	0.048	0.066	0.030	0.038	0.058	0.845
0.88	0.093	0.045	0.060	0.030	0.035	0.054	0.853
0.99	0.090	0.044	0.056	0.035	0.033	0.053	1.048
1.20	0.080	0.038	0.048	0.037	0.029	0.048	0.997
1.42	0.078	0.037	0.045	0.035	0.028	0.045	0.829
1.63	0.078	0.037	0.044	0.038	0.027	0.045	0.811
1.84	0.083	0.039	0.045	0.034	0.025	0.044	0.842
2.05	0.085	0.040	0.045	0.032	0.024	0.043	0.724
2.26	0.087	0.041	0.045	0.027	0.022	0.040	0.591
2.48	0.087	0.041	0.044	0.024	0.021	0.038	0.554
2.69	0.082	0.039	0.041	0.022	0.018	0.036	0.430
2.90	0.069	0.033	0.034	0.018	0.015	0.029	0.260
3.12	0.056	0.026	0.027	0.017	0.013	0.024	0.183
3.33	0.049	0.023	0.024	0.016	0.012	0.022	0.115
3.54	0.031	0.015	0.015	0.013	0.009	0.015	0.061
3.76	0.021	0.010	0.010	0.010	0.008	0.011	0.020
3.97	0.017	0.008	0.008	0.011	0.009	0.012	0.008
4.18	0.013	0.006	0.006	0.010	0.008	0.010	0.006
4.34	0.012	0.006	0.006	0.009	0.008	0.010	0.006

TABLE 9.- Continued.

CENTERBODY II, X = 31.75 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.19	0.091	0.048	0.078		0.048		
0.24	0.095	0.050	0.080	0.039	0.049	0.072	
0.30	0.100	0.052	0.080	0.040	0.048	0.072	
0.35	0.102	0.052	0.079	0.039	0.047	0.071	
0.40	0.100	0.050	0.077	0.035	0.045	0.068	
0.50	0.104	0.051	0.075	0.033	0.043	0.066	
0.61	0.108	0.052	0.073	0.033	0.042	0.064	1.016
0.72	0.109	0.053	0.070	0.032	0.040	0.061	1.005
0.83	0.109	0.053	0.069	0.032	0.036	0.059	1.011
0.93	0.108	0.052	0.066	0.030	0.033	0.056	1.013
1.04	0.104	0.051	0.062	0.031	0.031	0.053	1.126
1.25	0.099	0.048	0.056	0.031	0.029	0.050	1.133
1.47	0.095	0.045	0.051	0.034	0.027	0.047	0.968
1.68	0.093	0.044	0.047	0.036	0.027	0.046	1.014
1.89	0.091	0.043	0.045	0.037	0.026	0.045	0.878
2.10	0.089	0.042	0.043	0.030	0.024	0.041	0.684
2.31	0.087	0.040	0.042	0.027	0.022	0.039	0.594
2.53	0.083	0.037	0.040	0.023	0.020	0.036	0.439
2.74	0.077	0.036	0.037	0.023	0.018	0.033	0.332
2.96	0.070	0.033	0.034	0.025	0.015	0.033	0.279
3.17	0.044	0.021	0.022	0.019	0.011	0.022	0.119
3.38	0.033	0.015	0.016	0.021	0.009	0.020	0.043
3.59	0.024	0.012	0.012	0.015	0.008	0.015	0.017
3.80	0.020	0.009	0.009	0.017	0.009	0.015	0.016
4.02	0.014	0.007	0.007	0.012	0.009	0.012	0.008
4.15	0.012	0.006	0.006		0.008		

TABLE 9.- Continued.

CENTERBODY II, X = 33.75 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.19	0.082	0.043	0.072		0.045		
0.24	0.084	0.044	0.072	0.035	0.044	0.065	
0.30	0.085	0.044	0.070	0.035	0.042	0.063	
0.35	0.086	0.044	0.069	0.035	0.041	0.062	
0.40	0.088	0.045	0.069	0.034	0.039	0.061	
0.45	0.087	0.044	0.067	0.033	0.037	0.057	
0.51	0.090	0.045	0.068	0.033	0.036	0.059	
0.56	0.093	0.046	0.067	0.033	0.036	0.059	
0.61	0.095	0.047	0.067	0.032	0.036	0.058	1.007
0.67	0.095	0.047	0.066	0.032	0.036	0.058	1.009
0.72	0.097	0.048	0.066	0.032	0.036	0.058	1.010
0.82	0.096	0.047	0.063	0.032	0.035	0.055	1.041
0.93	0.094	0.045	0.060	0.031	0.032	0.053	1.011
1.04	0.094	0.045	0.057	0.032	0.030	0.051	1.079
1.25	0.095	0.045	0.055	0.033	0.028	0.049	1.144
1.46	0.096	0.046	0.052	0.031	0.026	0.047	1.067
1.67	0.097	0.046	0.050	0.028	0.025	0.044	0.920
[illegible]	0.101	0.048	0.050	0.027	0.025	0.044	0.817
2.1[illegible]	0.100	0.048	0.047	0.026	0.023	0.041	0.752
2.32	0.096	0.046	0.043	0.025	0.021	0.038	0.698
2.52	0.089	0.042	0.039	0.025	0.020	0.036	0.538
2.74	0.073	0.034	0.032	0.025	0.016	0.030	0.370
2.95	0.058	0.027	0.026	0.019	0.014	0.025	0.173
3.16	0.054	0.025	0.025	0.024	0.016	0.027	0.090
3.38	0.050	0.024	0.024	0.032	0.019	0.032	0.077
3.59	0.039	0.019	0.019	0.034	0.019	0.031	0.060
3.80	0.028	0.013	0.014	0.026	0.017	0.024	0.027
3.92	0.024	0.011	0.012	0.022	0.017	0.022	0.019

TABLE 9.- Continued.

CENTERBODY II, X = 35.75 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.19	0.073	0.038	0.064		0.043		
0.24	0.074	0.039	0.065	0.032	0.042	0.059	
0.29	0.076	0.039	0.063	0.033	0.041	0.058	
0.34	0.079	0.040	0.063	0.034	0.040	0.058	
0.40	0.080	0.040	0.063	0.034	0.037	0.057	
0.45	0.080	0.040	0.062	0.031	0.035	0.055	
0.50	0.084	0.041	0.063	0.031	0.035	0.055	
0.61	0.090	0.044	0.064	0.031	0.035	0.056	1.060
0.72	0.091	0.045	0.063	0.031	0.033	0.055	1.091
0.82	0.090	0.044	0.061	0.032	0.032	0.053	1.105
0.93	0.086	0.042	0.055	0.030	0.030	0.048	1.040
1.03	0.086	0.042	0.053	0.030	0.028	0.047	1.040
1.25	0.087	0.042	0.051	0.029	0.027	0.046	0.945
1.46	0.089	0.043	0.049	0.028	0.025	0.043	0.918
1.67	0.092	0.044	0.048	0.026	0.024	0.042	0.761
1.89	0.095	0.045	0.047	0.025	0.023	0.041	0.703
2.10	0.097	0.046	0.045	0.023	0.021	0.039	0.618
2.31	0.098	0.047	0.044	0.022	0.019	0.037	0.513
2.53	0.093	0.042	0.041	0.021	0.018	0.034	0.416
2.74	0.078	0.034	0.034	0.021	0.016	0.030	0.239
2.95	0.058	0.027	0.026	0.023	0.015	0.026	0.086
3.16	0.044	0.021	0.020	0.03[illegible]	0.015	0.028	-0.115
3.37	0.034	0.016	0.016	0.031	0.016	0.027	-0.171
3.59	0.025	0.012	0.012	0.024	0.013	0.021	-0.123
3.80	0.020	0.009	0.010	0.020	0.011	0.017	-0.054
4.02	0.016	0.008	0.008	0.016	0.010	0.014	-0.022

TABLE 9.- Continued.

CENTERBODY II, X = 37.75 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.19	0.072	0.037	0.061		0.041		
0.24	0.071	0.036	0.059	0.030	0.041	0.055	
0.30	0.075	0.038	0.060	0.033	0.040	0.056	
0.35	0.073	0.037	0.058	0.032	0.038	0.054	
0.40	0.076	0.039	0.060	0.032	0.036	0.054	
0.45	0.079	0.040	0.060	0.031	0.035	0.053	
0.51	0.081	0.040	0.060	0.031	0.033	0.053	
0.61	0.084	0.041	0.060	0.031	0.032	0.053	
0.72	0.087	0.043	0.060	0.030	0.033	0.053	0.954
0.82	0.088	0.043	0.059	0.031	0.032	0.052	0.990
0.93	0.089	0.043	0.058	0.031	0.030	0.051	1.085
1.04	0.089	0.043	0.056	0.031	0.029	0.049	1.064
1.14	0.089	0.043	0.054	0.030	0.028	0.048	0.99[illegible]
1.36	0.090	0.042	0.052	0.030	0.027	0.047	1.02[illegible]
1.57	0.092	0.044	0.051	0.030	0.026	0.046	0.98[illegible]
1.78	0.094	0.044	0.049	0.027	0.025	0.043	0.[illegible]3
1.99	0.097	0.045	0.048	0.026	0.023	0.042	0.[illegible]
2.20	0.100	0.047	0.048	0.025	0.022	0.041	0.70[illegible]
2.42	0.100	0.048	0.045	0.023	0.018	0.038	0.575
2.63	0.088	0.042	0.038	0.019	0.016	0.032	0.397
2.85	0.068	0.032	0.029	0.017	0.014	0.026	0.221
3.06	0.057	0.027	0.024	0.017	0.014	0.023	0.125
3.27	0.039	0.019	0.017	0.016	0.010	0.018	0.057
3.48	0.025	0.012	0.011	0.017	0.011	0.016	0.024
3.70	0.01[illegible]	0.008	0.008	0.011	0.012	0.013	0.000
3.91	0.018	0.008	0.008	0.011	0.011	0.012	-0.014
4.12	0.018	0.008	0.008	0.012	0.012	0.013	-0.024

TABLE 9.- Concluded.

CENTERBODY II, X = 39.75 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.19	0.058	0.030	0.049		0.037		
0.24	0.061	0.031	0.049	0.026	0.038	0.048	
0.29	0.064	0.032	0.051	0.027	0.035	0.048	
0.35	0.065	0.033	0.050	0.028	0.034	0.047	
0.40	0.069	0.035	0.053	0.028	0.034	0.049	
0.45	0.072	0.035	0.054	0.029	0.033	0.049	
0.56	0.076	0.036	0.055	0.030	0.033	0.050	0.767
0.66	0.083	0.041	0.059	0.031	0.034	0.053	0.959
0.77	0.087	0.043	0.060	0.031	0.033	0.053	0.969
0.88	0.090	0.044	0.060	0.032	0.033	0.053	1.123
0.98	0.091	0.044	0.058	0.032	0.033	0.052	1.135
1.09	0.092	0.044	0.057	0.032	0.031	0.051	1.079
1.30	0.094	0.044	0.056	0.033	0.028	0.050	1.117
1.52	0.096	0.046	0.054	0.032	0.027	0.048	1.092
1.73	0.098	0.047	0.052	0.031	0.026	0.046	0.977
1.94	0.097	0.046	0.049	0.028	0.024	0.044	0.857
2.15	0.099	0.046	0.048	0.027	0.022	0.042	0.790
2.37	0.101	0.048	0.048	0.026	0.021	0.041	0.768
2.58	0.100	0.048	0.045	0.023	0.019	0.038	0.580
2.79	0.090	0.043	0.040	0.020	0.016	0.034	0.403
3.00	0.075	0.036	0.033	0.018	0.016	0.029	0.279
3.22	0.054	0.026	0.024	0.015	0.013	0.022	0.149
3.43	0.036	0.017	0.016	0.016	0.011	0.017	0.034
3.64	0.027	0.013	0.012	0.017	0.012	0.017	0.027
3.86	0.020	0.010	0.009	0.015	0.012	0.015	0.016
4.07	0.016	0.008	0.008	0.012	0.011	0.013	-0.006
4.28	0.015	0.007	0.007	0.009	0.010	0.011	-0.002

TABLE 10.- BOUNDARY-LAYER PROFILES — CENTERBODY IV FLUCTUATING MEASUREMENTS

CENTERBODY IV, X = 18.4 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.14	0.065	0.031	0.066	0.026	0.038	0.058	
0.20	0.059	0.029	0.059	0.023	0.035	0.052	
0.25	0.055	0.027	0.054	0.022	0.030	0.047	
0.30	0.054	0.027	0.052	0.023	0.027	0.045	0.430
0.35	0.055	0.027	0.052	0.025	0.026	0.045	0.486
0.41	0.056	0.027	0.052	0.025	0.026	0.045	0.502
0.52	0.056	0.027	0.050	0.024	0.025	0.043	0.488
0.62	0.055	0.026	0.048	0.024	0.024	0.041	0.451
0.73	0.056	0.027	0.048	0.024	0.024	0.042	0.482
0.83	0.055	0.027	0.046	0.024	0.023	0.040	0.452
0.94	0.056	0.027	0.045	0.023	0.023	0.039	0.438
1.15	0.056	0.027	0.043	0.023	0.023	0.038	0.424
1.37	0.057	0.027	0.042	0.022	0.023	0.037	0.384
1.58	0.058	0.028	0.040	0.022	0.022	0.036	0.394
1.79	0.058	0.028	0.039	0.020	0.021	0.034	0.338
2.00	0.059	0.028	0.038	0.019	0.019	0.033	0.306
2.22	0.060	0.028	0.037	0.019	0.018	0.032	0.294
2.43	0.060	0.029	0.036	0.018	0.017	0.031	0.252
2.64	0.061	0.029	0.035	0.016	0.017	0.030	0.220
2.86	0.059	0.028	0.033	0.017	0.016	0.028	0.181
3.07	0.056	0.026	0.030	0.016	0.014	0.025	0.130
3.28	0.051	0.024	0.027	0.014	0.013	0.023	0.122
3.49	0.045	0.021	0.024	0.015	0.016	0.022	0.112
3.71	0.038	0.018	0.020	0.014	0.013	0.019	0.056
3.92	0.030	0.014	0.016	0.013	0.014	0.016	0.031
4.12	0.022	0.010	0.012	0.013	0.015	0.015	0.015
4.13	0.022	0.010	0.011	0.013		0.015	0.014
4.34	0.016	0.007	0.008	0.011			0.011

TABLE 10.- Continued.

CENTERBODY IV, X = 20.4 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.15	0.076	0.038	0.082	0.030	0.044	0.070	
0.20	0.070	0.035	0.072	0.028	0.040	0.063	
0.26	0.060	0.029	0.059	0.023	0.033	0.051	
0.31	0.056	0.027	0.055	0.025	0.029	0.047	0.443
0.36	0.057	0.028	0.054	0.026	0.028	0.047	0.525
0.41	0.058	0.028	0.054	0.027	0.028	0.047	0.557
0.52	0.056	0.027	0.050	0.025	0.026	0.044	0.508
0.63	0.057	0.027	0.050	0.025	0.025	0.043	0.501
0.73	0.057	0.027	0.049	0.024	0.025	0.042	0.477
0.84	0.057	0.027	0.047	0.024	0.024	0.041	0.471
0.94	0.056	0.027	0.045	0.024	0.024	0.040	0.447
1.16	0.057	0.027	0.043	0.023	0.023	0.038	0.426
1.37	0.058	0.027	0.042	0.023	0.023	0.038	0.408
1.59	0.059	0.028	0.041	0.023	0.021	0.037	0.397
1.80	0.059	0.028	0.040	0.022	0.021	0.036	0.374
2.01	0.060	0.028	0.038	0.020	0.020	0.034	0.340
2.22	0.061	0.029	0.038	0.020	0.018	0.033	0.292
2.44	0.061	0.029	0.037	0.018	0.017	0.031	0.269
2.65	0.061	0.029	0.035	0.017	0.017	0.030	0.220
2.86	0.059	0.028	0.033	0.017	0.014	0.028	0.191
3.07	0.057	0.027	0.031	0.017	0.014	0.027	0.150
3.28	0.053	0.024	0.028	0.015	0.015	0.025	0.135
3.50	0.045	0.021	0.024	0.014	0.012	0.022	0.094
3.71	0.038	0.017	0.020	0.013	0.013	0.019	0.058
3.90	0.032	0.015	0.017	0.014	0.012	0.017	0.046
3.92	0.031	0.014	0.016	0.014		0.017	0.045
4.14	0.022	0.011	0.012	0.014			0.023

TABLE 10.- Continued.

CENTERBODY IV, X = 22.4 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.15	0.098	0.048	0.103	0.037	0.055	0.087	
0.20	0.093	0.045	0.093	0.032	0.051	0.075	
0.26	0.081	0.039	0.078	0.030	0.043	0.069	
0.31	0.069	0.034	0.066	0.028	0.036	0.057	0.423
0.36	0.065	0.031	0.061	0.031	0.032	0.054	0.568
0.41	0.062	0.030	0.057	0.030	0.030	0.050	0.590
0.53	0.055	0.026	0.049	0.026	0.025	0.042	0.486
0.63	0.056	0.026	0.048	0.025	0.024	0.042	0.477
0.73	0.057	0.027	0.048	0.024	0.024	0.042	0.458
0.84	0.057	0.027	0.047	0.025	0.024	0.041	0.464
0.95	0.057	0.027	0.046	0.024	0.024	0.040	0.449
1.16	0.057	0.027	0.044	0.024	0.024	0.039	0.424
1.38	0.057	0.027	0.042	0.023	0.022	0.037	0.397
1.59	0.058	0.028	0.041	0.022	0.021	0.036	0.391
1.80	0.059	0.028	0.040	0.022	0.021	0.036	0.352
2.01	0.061	0.029	0.039	0.021	0.019	0.034	0.347
2.22	0.061	0.029	0.038	0.019	0.019	0.033	0.291
2.44	0.062	0.029	0.037	0.018	0.017	0.031	0.276
2.65	0.062	0.029	0.035	0.017	0.015	0.029	0.227
2.86	0.061	0.028	0.033	0.017	0.015	0.028	0.208
3.08	0.059	0.028	0.032	0.017	0.014	0.027	0.171
3.29	0.054	0.025	0.029	0.016	0.013	0.025	0.130
3.50	0.046	0.022	0.024	0.015	0.012	0.021	0.089
3.71	0.036	0.017	0.018	0.013	0.013	0.018	0.043
3.91	0.032	0.015	0.016	0.014	0.013	0.018	0.017
3.93	0.031	0.016	0.015	0.014		0.018	0.014
4.14	0.024	0.012	0.013	0.015			0.030

TABLE 10.- Continued.

CENTERBODY IV, X = 24.4 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.13	0.096	0.047	0.106		0.058		
0.16	0.097	0.048	0.104	0.044	0.059	0.090	
0.21	0.106	0.053	0.110	0.040	0.059	0.091	
0.26	0.107	0.053	0.107	0.038	0.056	0.089	
0.31	0.098	0.048	0.095	0.034	0.050	0.081	
0.37	0.084	0.041	0.080	0.031	0.043	0.068	0.283
0.42	0.077	0.038	0.072	0.033	0.039	0.062	0.517
0.53	0.069	0.034	0.062	0.038	0.034	0.056	0.685
0.63	0.066	0.034	0.058	0.040	0.031	0.054	0.730
0.74	0.065	0.031	0.055	0.040	0.028	0.052	0.743
0.84	0.061	0.029	0.051	0.036	0.026	0.047	0.610
0.95	0.059	0.028	0.048	0.030	0.025	0.044	0.533
1.16	0.057	0.027	0.044	0.025	0.023	0.040	0.460
1.38	0.058	0.028	0.042	0.023	0.023	0.038	0.429
1.59	0.059	0.028	0.040	0.023	0.021	0.036	0.399
1.80	0.060	0.029	0.040	0.022	0.021	0.036	0.383
2.01	0.061	0.029	0.039	0.020	0.019	0.034	0.346
2.23	0.062	0.030	0.037	0.019	0.018	0.032	0.316
2.44	0.064	0.030	0.037	0.019	0.016	0.032	0.298
2.66	0.063	0.030	0.035	0.018	0.017	0.031	0.248
2.87	0.062	0.029	0.033	0.017	0.015	0.029	0.205
3.08	0.058	0.027	0.030	0.016	0.013	0.027	0.179
3.29	0.053	0.024	0.027	0.015	0.013	0.024	0.126
3.50	0.048	0.022	0.024	0.015	0.014	0.023	0.090
3.72	0.038	0.017	0.019	0.015	0.011	0.019	0.063
3.93	0.031	0.014	0.015	0.016	0.014	0.018	0.045
4.14	0.023	0.011	0.011	0.016			0.028

TABLE 10.- Continued.

CENTERBODY IV, X = 26.4 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.13	0.067	0.038	0.083				
0.16	0.075	0.039	0.086	0.038	0.062	0.079	
0.21	0.092	0.045	0.097	0.040	0.064	0.086	
0.26	0.104	0.051	0.105	0.041	0.062	0.091	
0.31	0.109	0.053	0.106	0.040	0.058	0.090	
0.37	0.110	0.054	0.105	0.039	0.054	0.088	
0.42	0.105	0.051	0.097	0.036	0.053	0.084	
0.53	0.086	0.041	0.076	0.034	0.045	0.066	
0.63	0.079	0.037	0.068	0.039	0.040	0.062	0.523
0.74	0.076	0.036	0.064	0.045	0.038	0.062	0.729
0.84	0.072	0.034	0.059	0.047	0.034	0.058	0.861
0.95	0.065	0.031	0.052	0.050	0.029	0.055	0.829
1.16	0.061	0.028	0.049	0.036	0.026	0.045	0.581
1.38	0.058	0.028	0.042	0.028	0.024	0.040	0.427
1.59	0.059	0.028	0.040	0.023	0.022	0.036	0.408
1.80	0.061	0.028	0.039	0.022	0.021	0.035	0.392
2.01	0.062	0.029	0.038	0.020	0.019	0.033	0.348
2.23	0.063	0.030	0.037	0.019	0.018	0.032	0.294
2.44	0.065	0.031	0.036	0.018	0.017	0.031	0.312
2.65	0.065	0.030	0.035	0.017	0.016	0.030	0.261
2.86	0.064	0.030	0.033	0.016	0.015	0.028	0.215
3.08	0.061	0.029	0.030	0.017	0.014	0.027	0.202
3.29	0.055	0.026	0.027	0.016	0.012	0.024	0.134
3.50	0.047	0.023	0.023	0.016	0.011	0.021	0.093
3.72	0.035	0.017	0.017	0.017	0.011	0.019	0.051
3.93	0.027	0.013	0.013	0.016	0.012	0.017	0.034
4.14	0.021	0.010	0.009		0.011		

TABLE 10.- Continued.

CENTERBODY IV, X = 28.4 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.13	0.054	0.029	0.062				
0.16	0.062	0.033	0.069	0.032	0.052	0.065	
0.21	0.076	0.039	0.081	0.036	0.053	0.072	
0.27	0.091	0.047	0.093	0.039	0.057	0.081	
0.32	0.101	0.052	0.098	0.036	0.055	0.083	
0.37	0.109	0.054	0.100	0.035	0.055	0.084	
0.42	0.111	0.055	0.098	0.036	0.055	0.084	
0.53	0.106	0.053	0.087	0.033	0.049	0.075	
0.64	0.099	0.048	0.076	0.030	0.043	0.066	
0.74	0.096	0.045	0.070	0.029	0.039	0.060	
0.85	0.091	0.045	0.064	0.030	0.036	0.056	0.601
0.96	0.089	0.043	0.060	0.036	0.035	0.056	0.765
1.17	0.080	0.039	0.052	0.047	0.031	0.055	0.962
1.38	0.071	0.034	0.045	0.043	0.028	0.049	0.759
1.59	0.066	0.031	0.040	0.036	0.024	0.042	0.576
1.81	0.064	0.030	0.038	0.028	0.021	0.037	0.413
2.02	0.065	0.031	0.037	0.019	0.018	0.032	0.371
2.23	0.067	0.032	0.036	0.018	0.017	0.031	0.344
2.44	0.068	0.032	0.035	0.017	0.014	0.030	0.316
2.66	0.068	0.032	0.034	0.016	0.015	0.029	0.261
2.87	0.067	0.032	0.031	0.017	0.014	0.027	0.216
3.08	0.062	0.029	0.029	0.018	0.013	0.026	0.143
3.29	0.055	0.024	0.026	0.019	0.012	0.024	0.087
3.51	0.045	0.019	0.021	0.021	0.013	0.023	0.061
3.73	0.035	0.015	0.016	0.019	0.014	0.021	0.043
3.93	0.023	0.010	0.010	0.017	0.013	0.017	0.022
4.01	0.018	0.008	0.008				

TABLE 10.- Continued.

CENTERBODY IV, X = 30.4 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.13	0.059	0.031	0.061				
0.16	0.066	0.035	0.066	0.032	0.047	0.062	
0.21	0.077	0.041	0.075	0.033	0.049	0.068	
0.27	0.090	0.047	0.084	0.034	0.049	0.072	
0.32	0.098	0.051	0.089	0.035	0.048	0.075	
0.37	0.107	0.056	0.094	0.035	0.049	0.078	
0.42	0.109	0.057	0.092	0.033	0.048	0.077	
0.53	0.110	0.057	0.087	0.031	0.045	0.073	
0.64	0.105	0.052	0.077	0.029	0.040	0.065	
0.74	0.102	0.051	0.071	0.029	0.035	0.060	
0.85	0.101	0.050	0.068	0.028	0.034	0.057	
0.95	0.099	0.048	0.064	0.026	0.032	0.054	0.536
1.17	0.098	0.048	0.058	0.027	0.030	0.050	0.747
1.38	0.096	0.047	0.054	0.030	0.028	0.048	0.854
1.60	0.090	0.043	0.047	0.035	0.026	0.046	0.842
1.81	0.082	0.039	0.042	0.037	0.024	0.043	0.726
2.02	0.078	0.037	0.038	0.032	0.021	0.038	0.568
2.23	0.075	0.036	0.035	0.024	0.018	0.033	0.462
2.44	0.075	0.036	0.034	0.018	0.014	0.029	0.335
2.66	0.073	0.035	0.033	0.015	0.014	0.027	0.287
2.87	0.069	0.033	0.031	0.015	0.013	0.026	0.188
3.08	0.058	0.028	0.026	0.018	0.013	0.025	0.099
3.30	0.040	0.019	0.018	0.023	0.012	0.023	0.093
3.51	0.031	0.015	0.014	0.020	0.011	0.019	0.032
3.72	0.020	0.010	0.009	0.015	0.012	0.015	0.026
3.93	0.013	0.006	0.006	0.015	0.012	0.014	0.021
4.01	0.012	0.006	0.005				

TABLE 10.- Continued.

CENTERBODY IV, X = 32.4 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.13	0.064	0.035	0.060				
0.16	0.070	0.039	0.064	0.028	0.041	0.057	
0.21	0.074	0.042	0.068	0.030	0.041	0.060	
0.26	0.085	0.046	0.073	0.031	0.042	0.063	
0.32	0.091	0.049	0.075	0.031	0.043	0.065	
0.37	0.095	0.050	0.075	0.030	0.042	0.064	
0.42	0.097	0.051	0.074	0.031	0.040	0.063	
0.53	0.097	0.050	0.071	0.029	0.038	0.061	
0.63	0.098	0.050	0.069	0.028	0.036	0.058	
0.74	0.096	0.049	0.064	0.027	0.034	0.055	
0.84	0.065	0.048	0.061	0.027	0.032	0.052	
0.95	0.094	0.046	0.058	0.027	0.030	0.050	
1.17	0.092	0.045	0.053	0.026	0.027	0.046	0.748
1.38	0.094	0.046	0.050	0.025	0.024	0.043	[illegible]
1.59	0.096	0.045	0.048	0.024	0.023	0.041	[illegible]
1.80	0.098	0.046	0.046	0.022	0.022	0.039	0.627
2.02	0.098	0.046	0.043	0.024	0.021	0.038	0.608
2.23	0.093	0.044	0.039	0.029	0.020	0.038	0.478
2.44	0.086	0.041	0.036	0.032	0.018	0.037	0.287
2.66	0.077	0.037	0.032	0.042	0.016	0.039	-0.328
2.87	0.061	0.029	0.025	0.036	0.015	0.033	-0.229
3.08	0.047	0.022	0.020	0.028	0.014	0.026	-0.113
3.29	0.033	0.016	0.014	0.024	0.013	0.022	0.000
3.50	0.021	0.011	0.010	0.017	0.014	0.017	0.030
3.72	0.015	0.007	0.006	0.010	0.013	0.012	0.000
3.93	0.012	0.005	0.005	0.012	0.012	0.013	0.000
4.01	0.011	0.005	0.005				

TABLE 10.- Continued.

CENTERBODY IV, X = 34.4 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.13	0.075	0.040	0.064				
0.16	0.076	0.041	0.064	0.023	0.040	0.057	
0.20	0.079	0.042	0.064	0.030	0.041	0.058	
0.26	0.083	0.044	0.065	0.030	0.040	0.058	
0.31	0.085	0.045	0.066	0.029	0.039	0.057	
0.36	0.086	0.045	0.065	0.028	0.037	0.056	
0.41	0.087	0.045	0.064	0.028	0.036	0.056	
0.52	0.089	0.045	0.064	0.028	0.034	0.055	
0.62	0.091	0.046	0.062	0.028	0.033	0.053	
0.73	0.090	0.045	0.059	0.027	0.031	0.051	
0.84	0.089	0.045	0.056	0.026	0.030	0.049	
0.94	0.092	0.045	0.056	0.027	0.029	0.049	0.775
1.16	0.091	0.044	0.052	0.026	0.027	0.045	0.865
1.37	0.089	0.043	0.047	0.024	0.024	0.041	0.769
1.58	0.089	0.043	0.045	0.023	0.022	0.039	0.697
1.80	0.092	0.044	0.043	0.022	0.020	0.037	0.664
2.01	0.094	0.045	0.042	0.020	0.018	0.035	0.530
2.22	0.092	0.043	0.039	0.018	0.016	0.032	0.402
2.43	0.092	0.043	0.037	0.017	0.014	0.030	0.257
2.65	0.088	0.041	0.034	0.020	0.017	0.030	0.165
2.86	0.075	0.035	0.029	0.032	0.020	0.034	-0.226
3.07	0.055	0.025	0.022	0.041	0.018	0.035	-0.671
3.28	0.032	0.015	0.013	0.029	0.010	0.024	-0.322
3.50	0.031	0.015	0.013	0.025	0.012	0.022	-0.202
3.71	0.021	0.010	0.009	0.019	0.008	0.016	-0.063
3.92	0.015	0.007	0.008	0.017	0.010	0.015	0.000
4.12	0.011	0.005	0.005				

TABLE 10.- Continued.

CENTERBODY IV, X = 36.4 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.15	0.059	0.032	0.048	0.024	0.036	0.045	
0.20	0.062	0.033	0.049	0.026	0.036	0.047	
0.25	0.064	0.034	0.050	0.025	0.034	0.046	
0.30	0.067	0.035	0.050	0.026	0.033	0.047	
0.36	0.071	0.037	0.053	0.027	0.033	0.048	
0.41	0.075	0.039	0.055	0.027	0.033	0.049	
0.52	0.079	0.041	0.055	0.026	0.032	0.049	
0.62	0.081	0.042	0.055	0.025	0.030	0.047	
0.73	0.083	0.041	0.054	0.025	0.030	0.047	
0.83	0.086	0.042	0.055	0.026	0.029	0.048	
0.94	0.088	0.043	0.054	0.026	0.028	0.046	0.759
1.15	0.088	0.043	0.052	0.026	0.026	0.044	0.796
1.37	0.089	0.043	0.048	0.024	0.024	0.042	0.751
1.58	0.089	0.043	0.045	0.023	0.022	0.039	0.677
1.79	0.090	0.043	0.043	0.021	0.020	0.037	0.593
2.00	0.091	0.043	0.041	0.020	0.017	0.034	0.550
2.22	0.091	0.043	0.039	0.018	0.016	0.032	0.436
2.43	0.088	0.042	0.037	0.017	0.015	0.031	0.338
2.64	0.082	0.039	0.034	0.020	0.016	0.030	0.244
2.85	0.069	0.033	0.028	0.020	0.017	0.027	0.136
3.07	0.051	0.024	0.021	0.021	0.013	0.023	0.028
3.28	0.033	0.015	0.014	0.017	0.014	0.018	-0.006
3.49	0.024	0.011	0.010	0.013	0.013	0.015	0.000
3.71	0.017	0.008	0.007	0.014	0.012	0.014	0.000
3.93	0.014	0.007	0.006	0.012	0.013	0.013	0.000
4.06	0.013	0.006	0.006				

TABLE 10.- Continued.

CENTERBODY IV, X = 38.4 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.14	0.048	0.025	0.039				
0.16	0.050	0.025	0.039	0.021	0.034	0.040	
0.20	0.052	0.027	0.041	0.022	0.034	0.041	
0.26	0.058	0.030	0.045	0.024	0.034	0.043	
0.31	0.063	0.032	0.047	0.025	0.033	0.044	
0.36	0.064	0.033	0.049	0.025	0.032	0.045	
0.42	0.068	0.034	0.050	0.025	0.032	0.046	
0.52	0.071	0.036	0.051	0.026	0.031	0.046	
0.63	0.075	0.037	0.053	0.027	0.031	0.047	
0.73	0.078	0.038	0.054	0.027	0.030	0.048	0.721
0.84	0.080	0.039	0.054	0.028	0.029	0.048	0.751
0.94	0.081	0.039	0.052	0.027	0.028	0.046	0.737
1.16	0.083	0.040	0.050	0.026	0.026	0.044	0.689
1.37	0.084	0.040	0.048	0.025	0.025	0.042	0.678
1.59	0.085	0.040	0.046	0.023	0.023	0.040	0.636
1.80	0.086	0.041	0.044	0.022	0.021	0.038	0.575
2.01	0.088	0.042	0.043	0.022	0.019	0.037	0.526
2.22	0.089	0.042	0.041	0.019	0.017	0.034	0.444
2.44	0.087	0.041	0.039	0.019	0.016	0.033	0.368
2.65	0.081	0.038	0.036	0.017	0.016	0.030	0.247
2.86	0.069	0.033	0.031	0.019	0.016	0.028	0.180
3.08	0.055	0.026	0.024	0.021	0.016	0.026	0.148
3.29	0.041	0.020	0.018	0.025	0.016	0.025	0.083
3.50	0.029	0.014	0.013	0.021	0.017	0.021	0.046
3.71	0.020	0.009	0.009	0.015	0.014	0.016	0.026
3.93	0.014	0.007	0.007	0.015	0.015	0.016	0.017
4.02	0.012	0.006	0.006				

TABLE 10.- Concluded.

CENTERBODY IV, X = 40.4 CM

Y(CM)	RHOU'/ RHOU INF	RHO'/ RHO INF	U'/ U INF	V'/ U INF	W'/ U INF	SQRTK/ U INF	TAU*E03/ RHOUU INF
0.13	0.043	0.022	0.037	0.018	0.033	0.037	
0.16	0.046	0.023	0.039	0.020	0.033	0.039	
0.19	0.048	0.024	0.041	0.021	0.033	0.040	
0.24	0.049	0.025	0.041	0.021	0.031	0.039	
0.29	0.051	0.025	0.042	0.022	0.031	0.040	
0.35	0.055	0.027	0.045	0.024	0.031	0.042	
0.40	0.058	0.028	0.047	0.025	0.030	0.043	0.551
0.51	0.064	0.031	0.051	0.027	0.030	0.046	0.640
0.61	0.067	0.032	0.053	0.028	0.029	0.047	0.696
0.72	0.071	0.034	0.054	0.028	0.029	0.048	0.707
0.83	0.072	0.035	0.053	0.027	0.028	0.046	0.685
0.93	0.073	0.035	0.052	0.027	0.027	0.045	0.658
1.15	0.076	0.036	0.050	0.026	0.026	0.044	0.637
1.36	0.079	0.037	0.049	0.025	0.025	0.043	0.656
1.57	0.080	0.038	0.047	0.024	0.024	0.041	0.630
1.78	0.081	0.039	0.044	0.023	0.021	0.038	0.583
2.00	0.083	0.039	0.043	0.021	0.020	0.037	0.520
2.21	0.083	0.039	0.042	0.021	0.019	0.036	0.455
2.42	0.082	0.039	0.041	0.019	0.016	0.034	0.399
2.64	0.079	0.037	0.038	0.017	0.017	0.032	0.311
2.85	0.073	0.034	0.035	0.018	0.015	0.030	0.218
3.06	0.064	0.030	0.032	0.018	0.014	0.028	0.151
3.27	0.049	0.023	0.025	0.017	0.014	0.024	0.106
3.48	0.037	0.017	0.019	0.016	0.013	0.020	0.080
3.70	0.027	0.013	0.014	0.017	0.013	0.018	0.062
3.91	0.019	0.009	0.010	0.015	0.012	0.015	0.040
4.01	0.018	0.008	0.008				

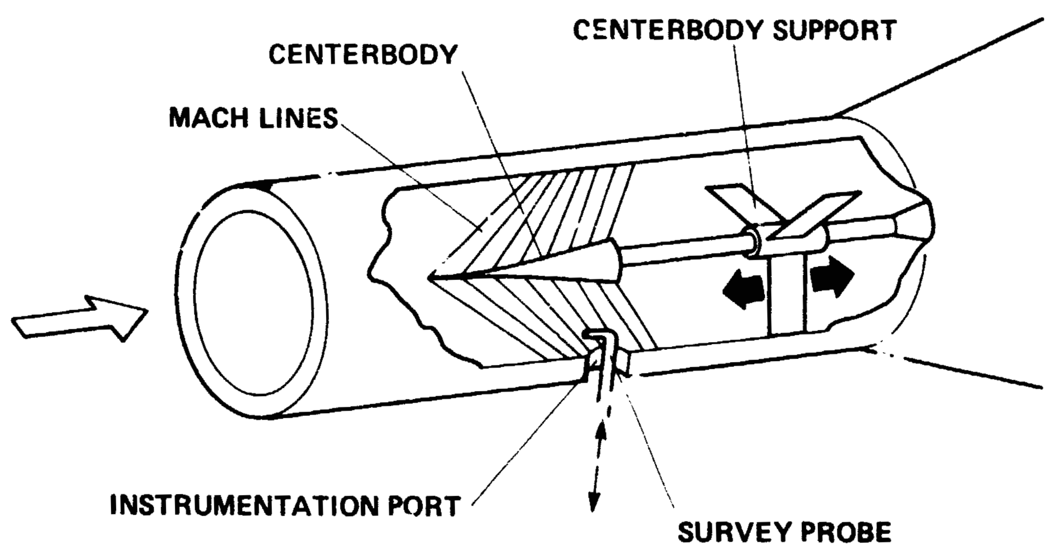


Figure 1.- Experimental test setup.

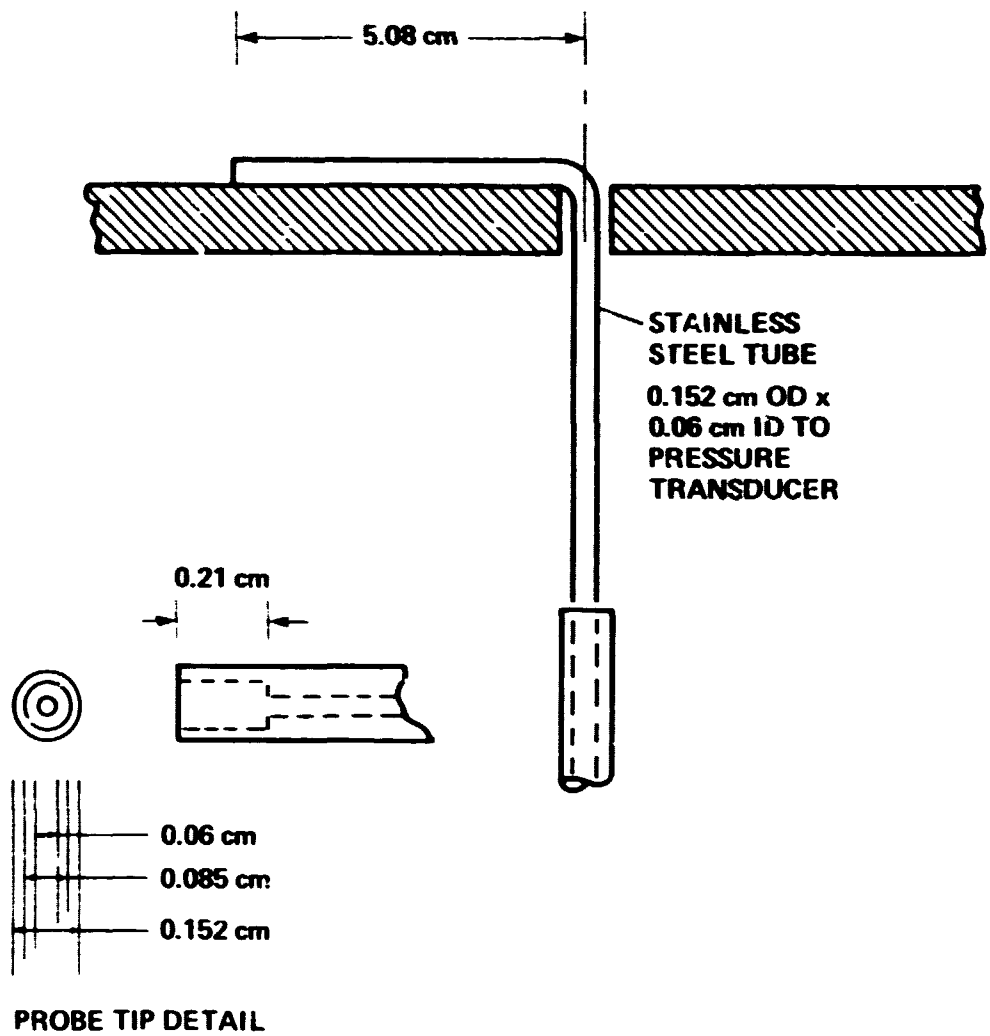


Figure 2.- Preston tube details.

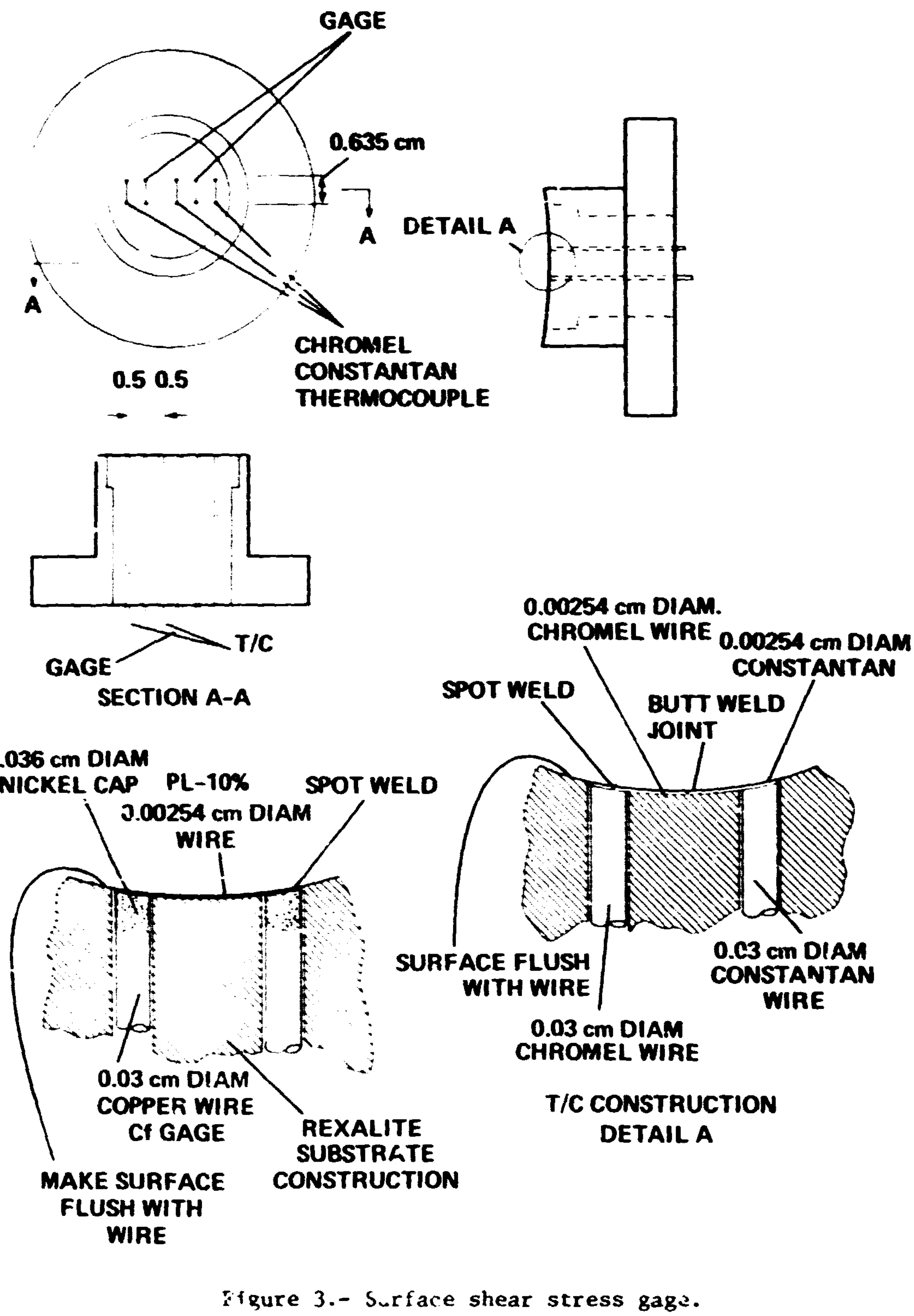


Figure 3.- Surface shear stress gage.

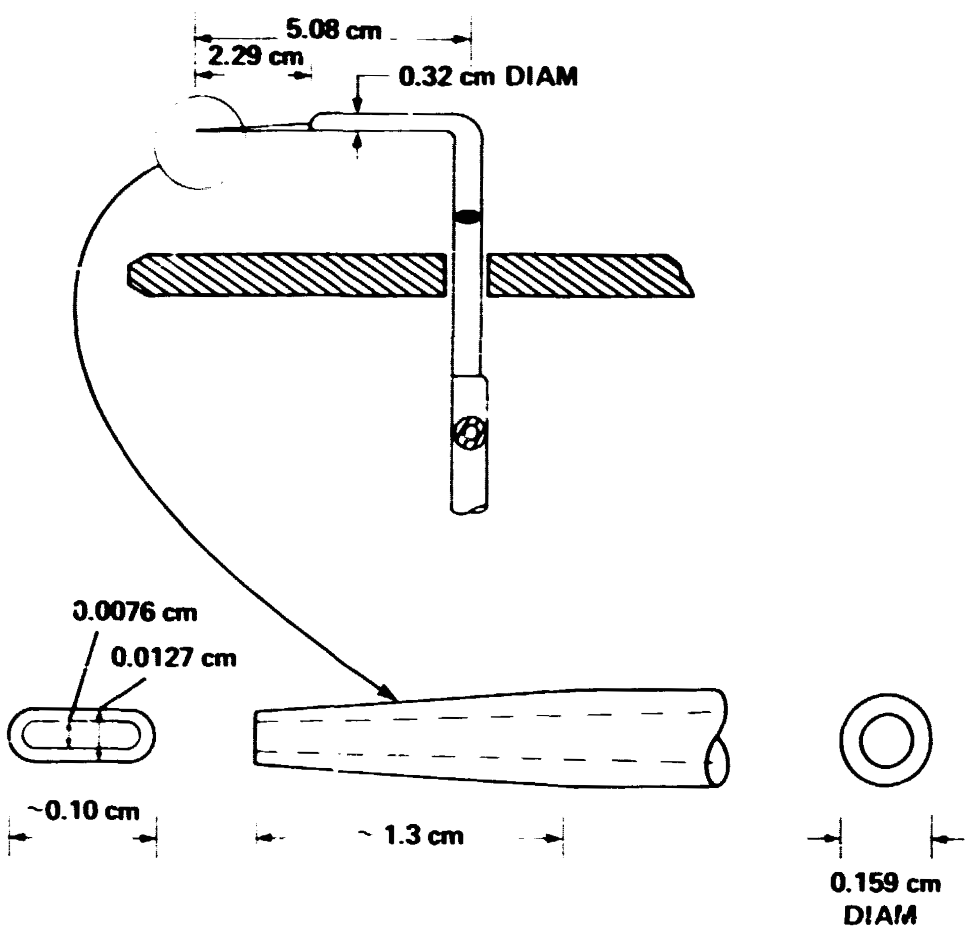


Figure 4.- Pitot pressure probe.

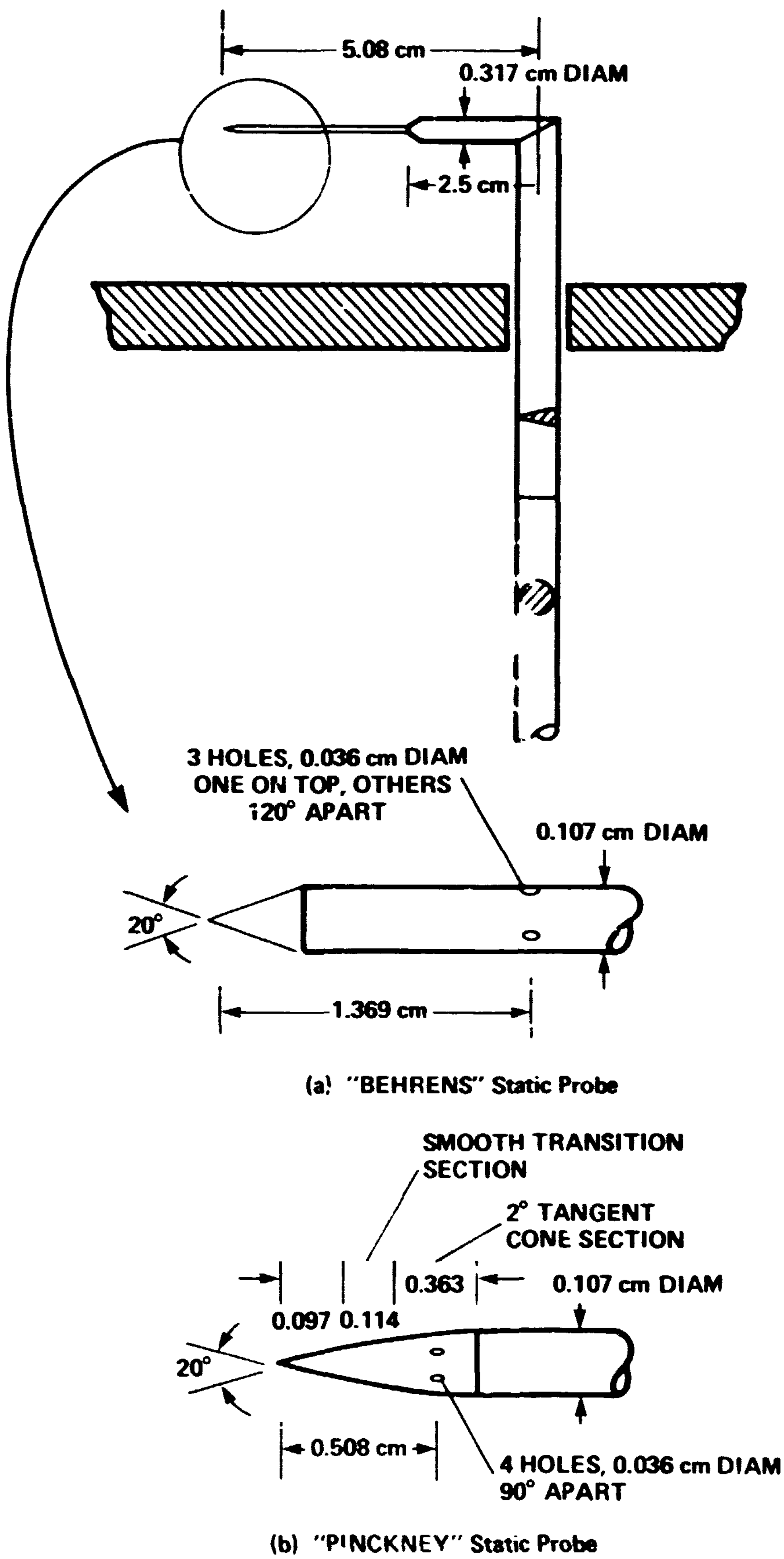


Figure 5.- Static pressure probes.

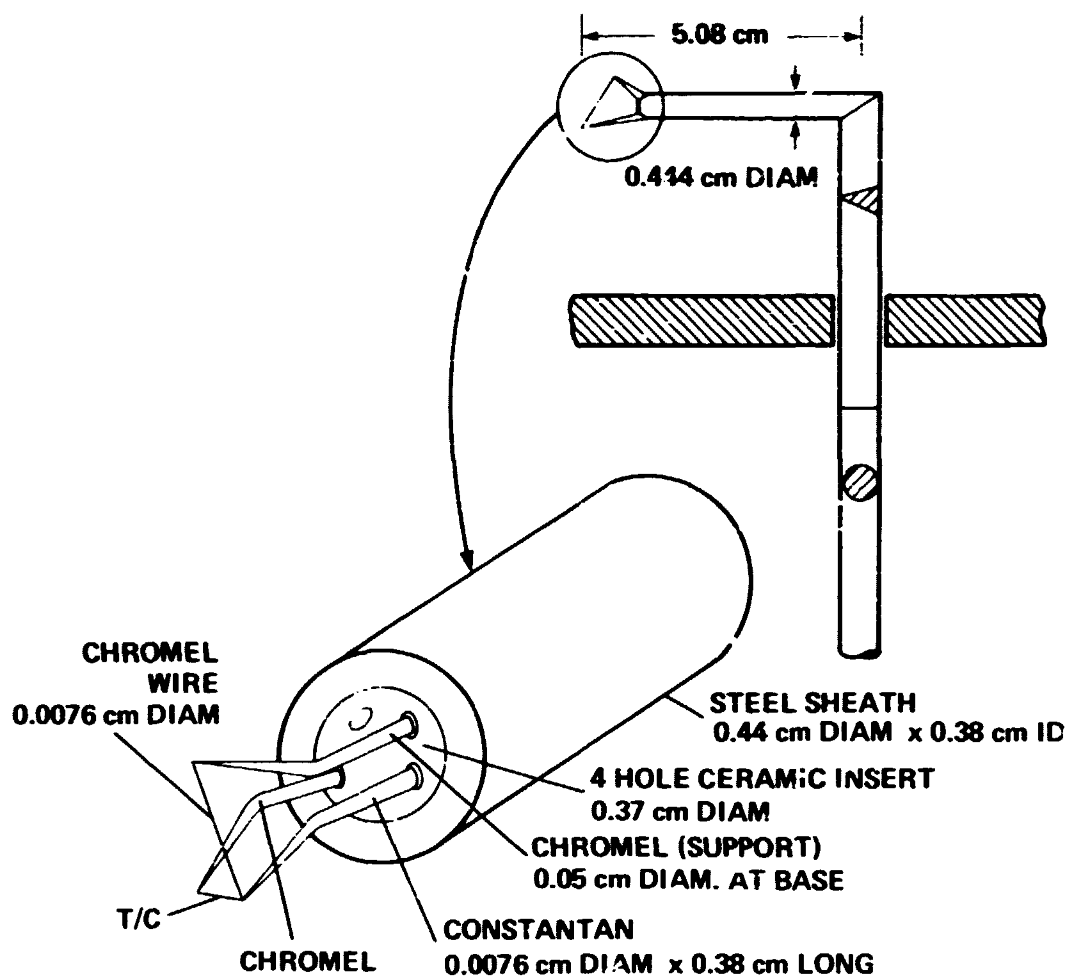
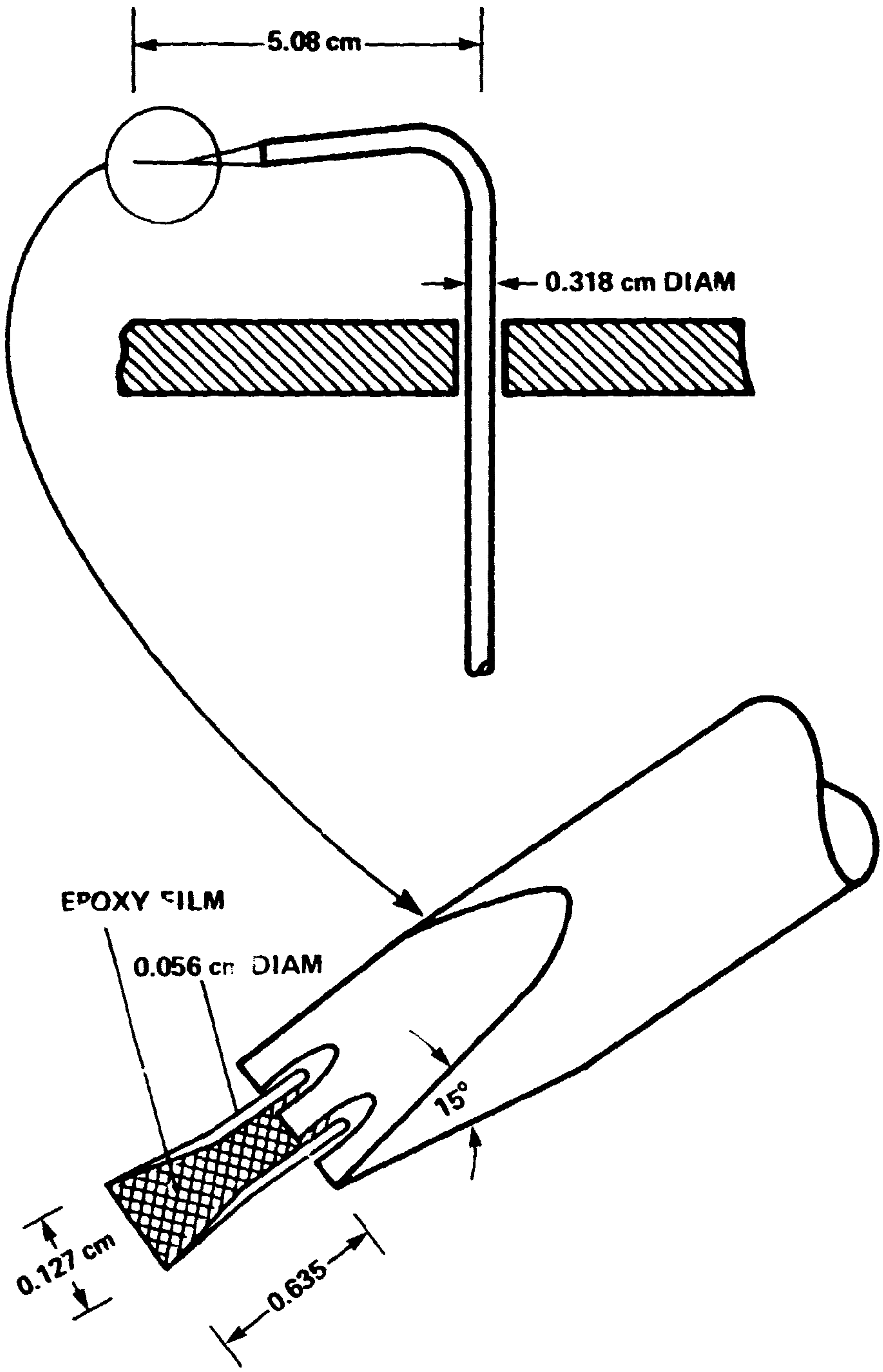
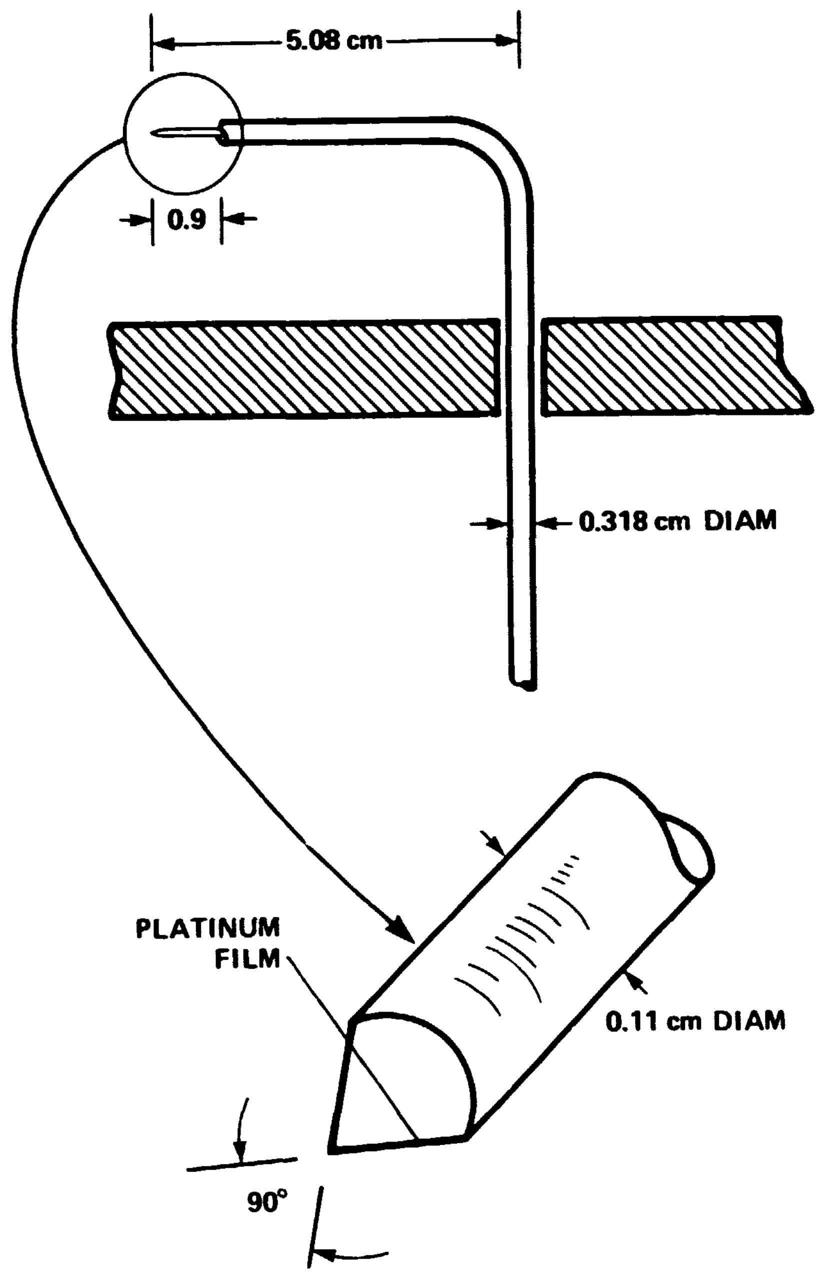


Figure 6.- Total temperature probe.



(a) Single hot wire (shown with epoxy backing).

Figure 7.- Hot-wire and hot-film probes.



(b) Hot-film probe.

Figure 7.- Concluded.

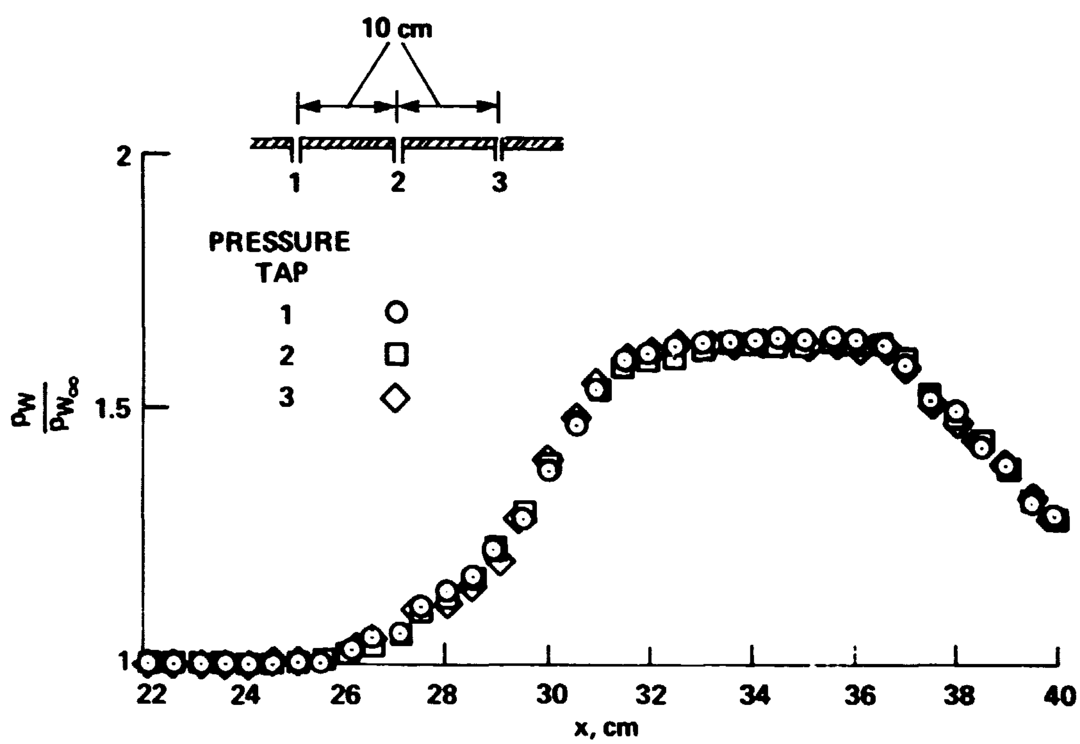
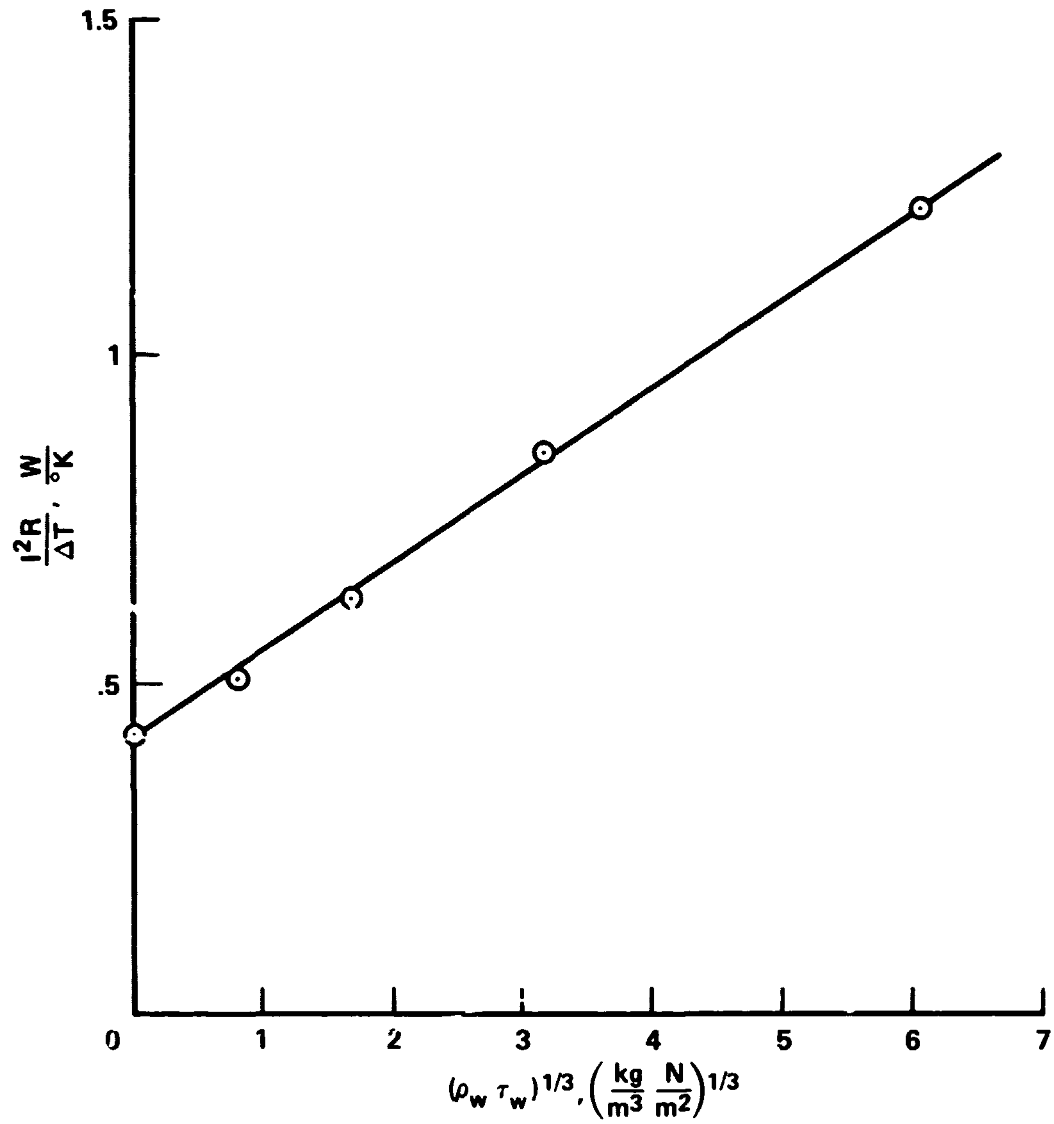


Figure 8.- Typical wall-pressure distributions, centerbody IV, $Re_{x'_o} = 35.3 \times 10^6$.



..gure 9.- Typical calibration of surface shear s'ress gage.

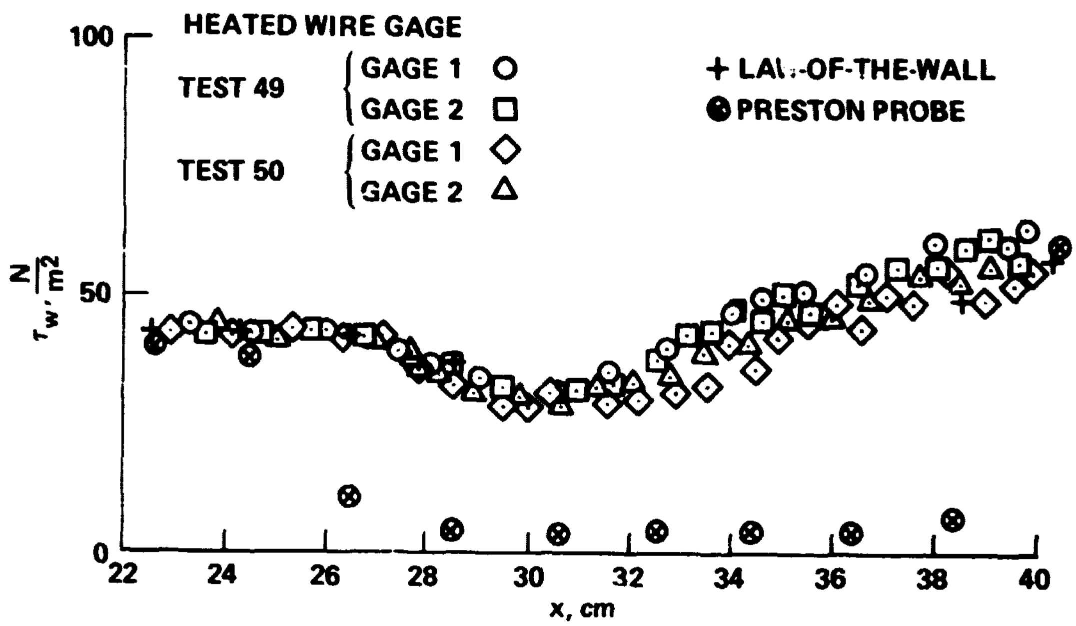


Figure 10.- Typical surface shear stress distribution, centerbody IV, $Re_{x',o} = 35.3 \times 10^6$.

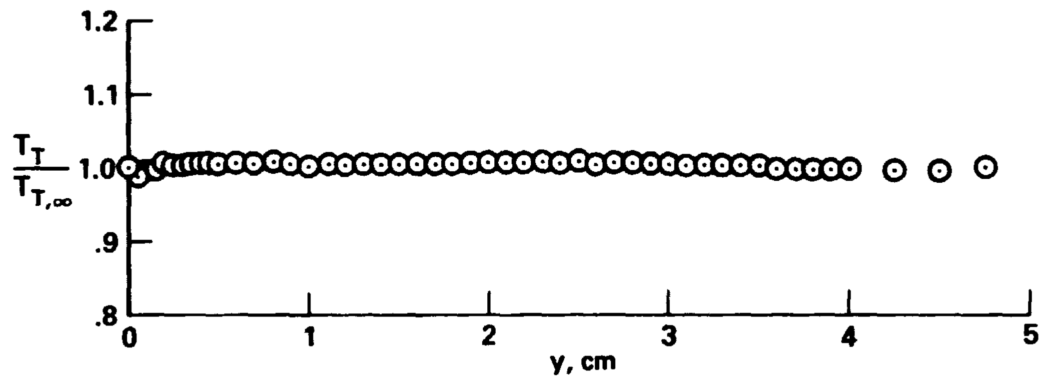


Figure 11.- Typical total temperature variation across the boundary layer, centerbody II, $Re_{x',o} = 35.3 \times 10^6$.

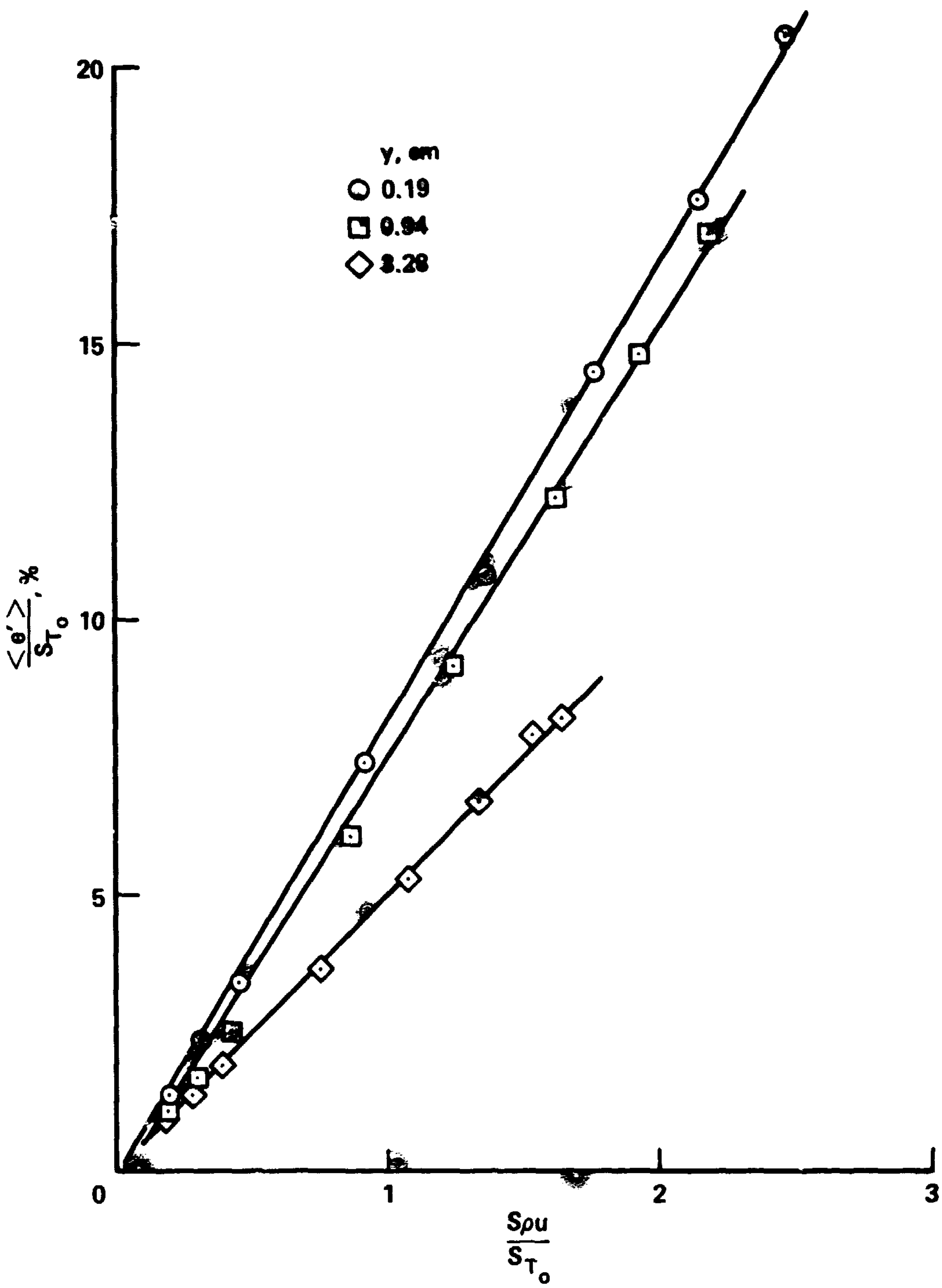


Figure 12.- Mode diagrams for the upstream boundary layer, $Re_{x'_o} = 35.3 \times 10^6$.

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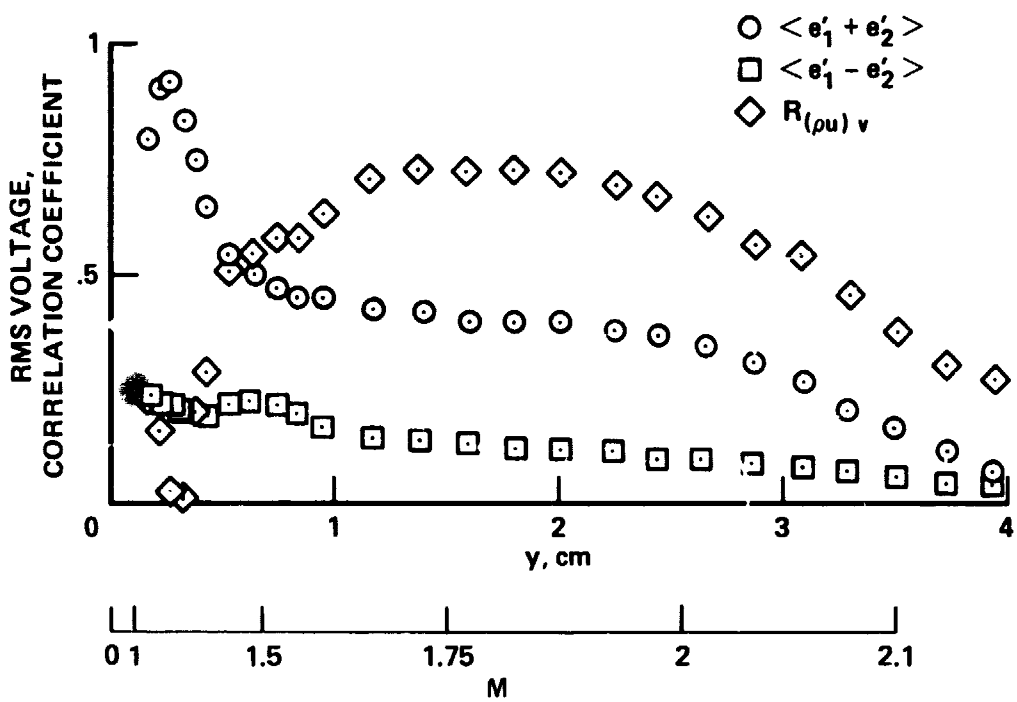
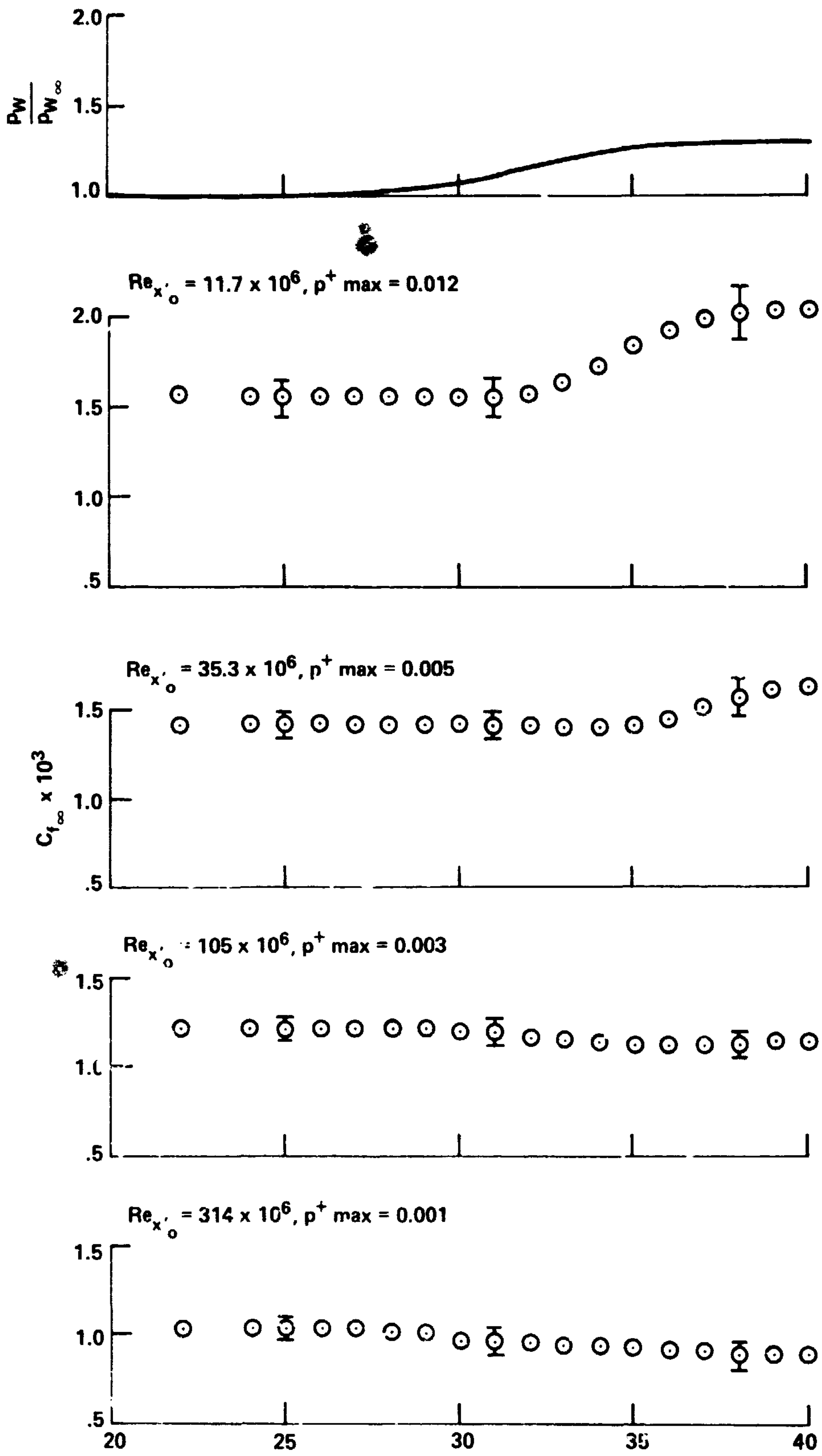
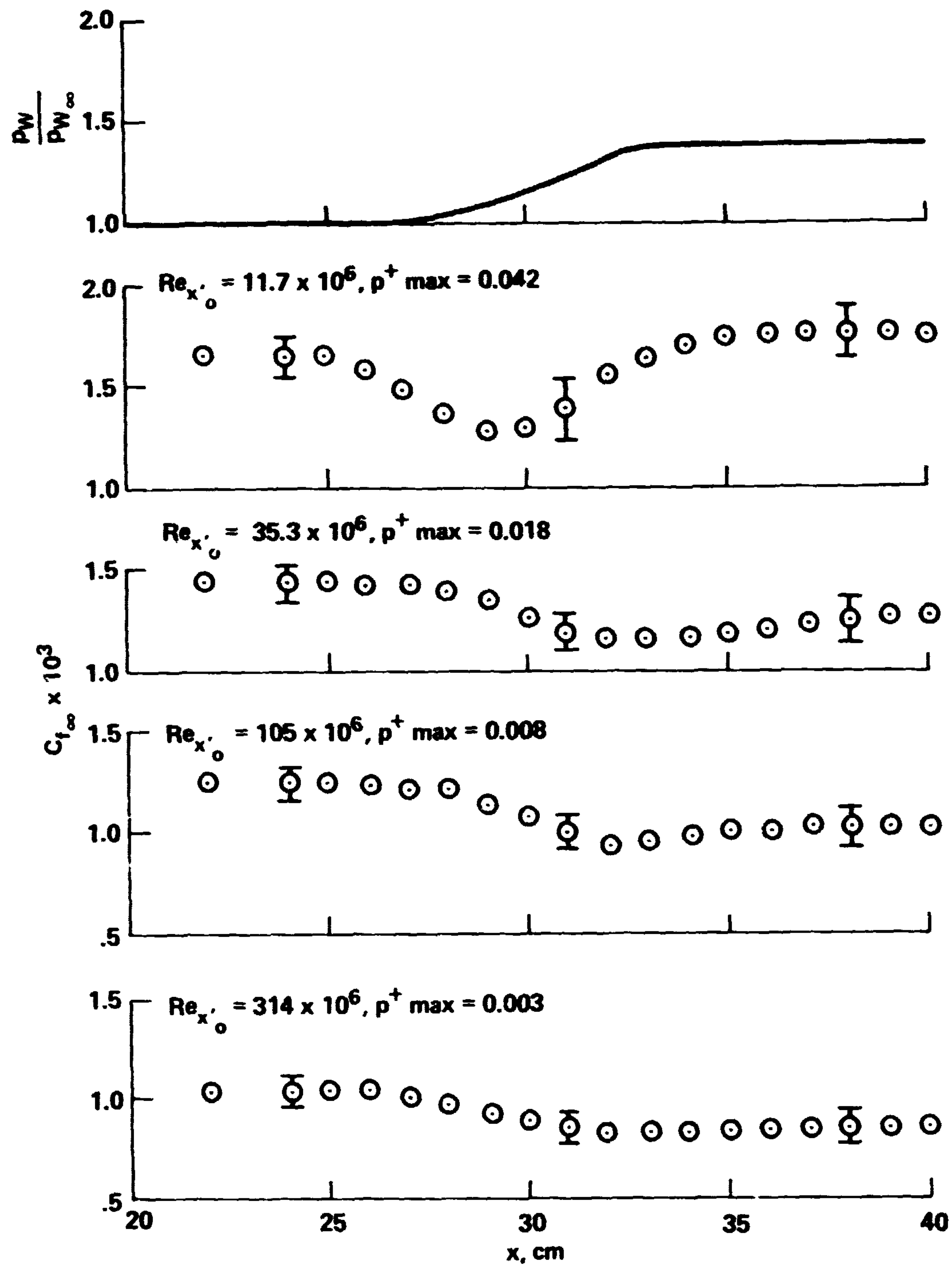


Figure 13.- Fluctuating voltage and correlation coefficient distributions across the boundary layer, centerbody IV, x = 24.4 cm, $Re_{x'_o} = 35.3\times10^6$.



(a) Centerbody I.

Figure 14.- Surface pressure and skin-friction measurements at four Reynolds numbers.



(b) Centerbody II.

Figure 14.- Continued.

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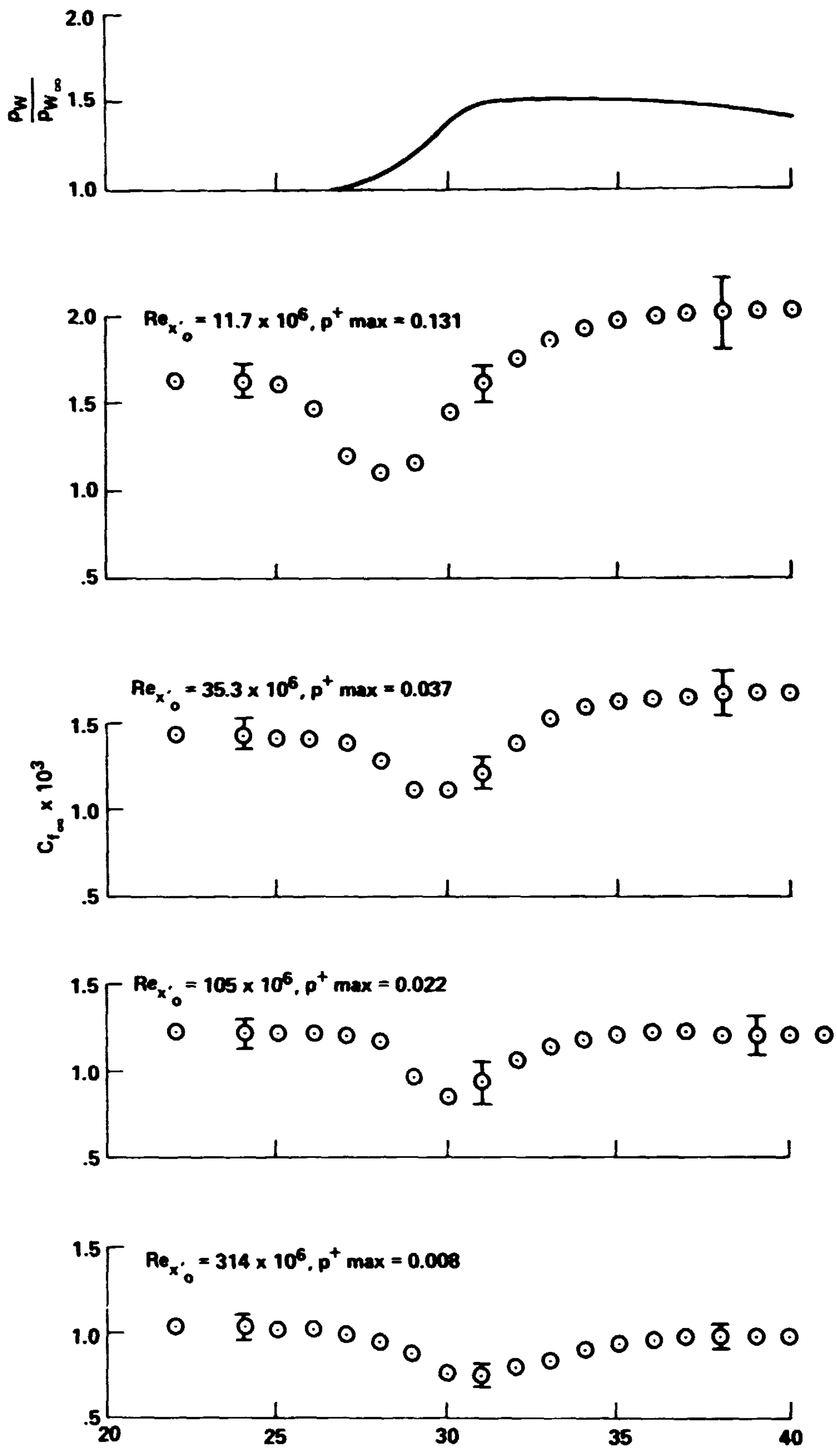
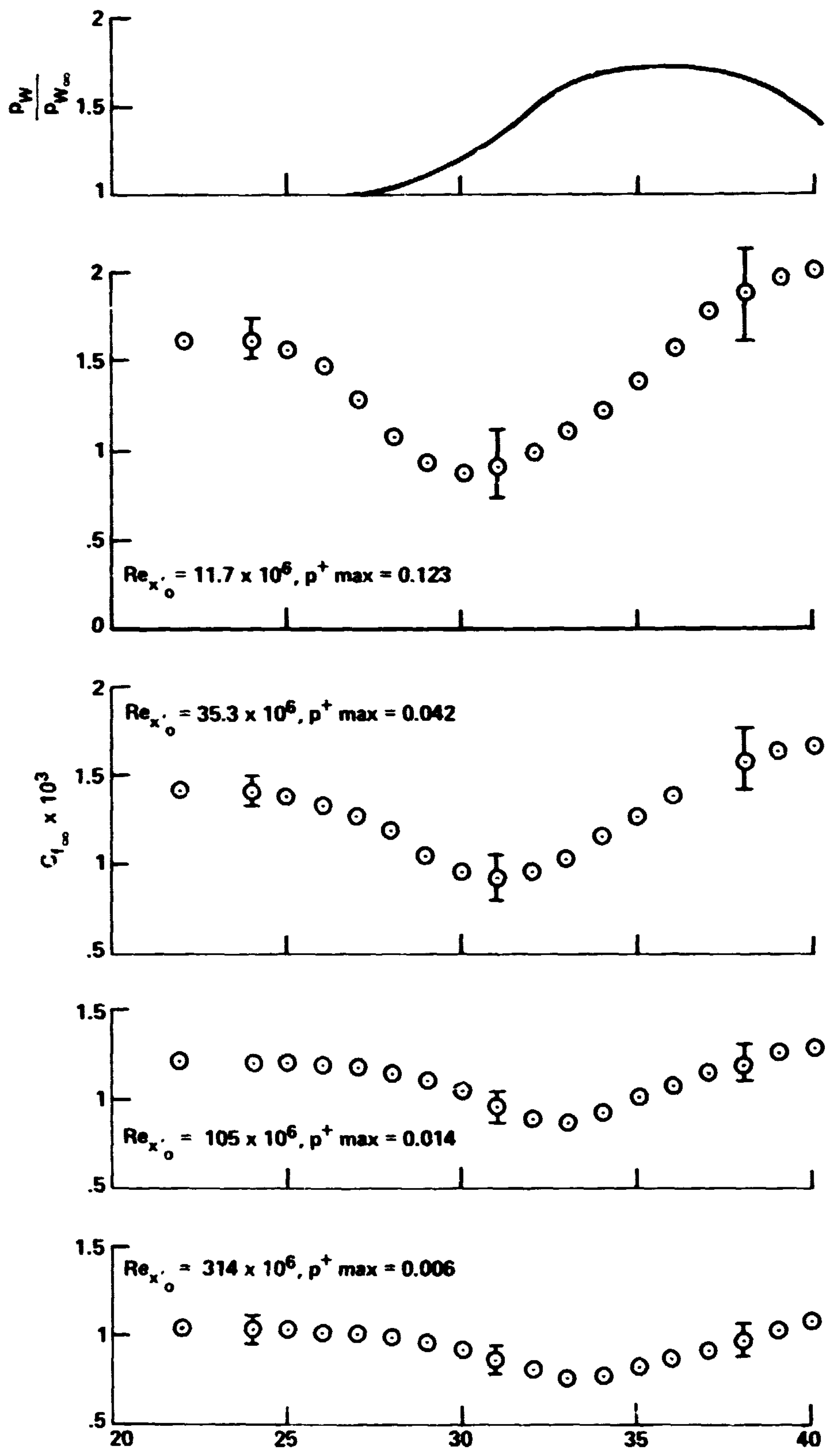


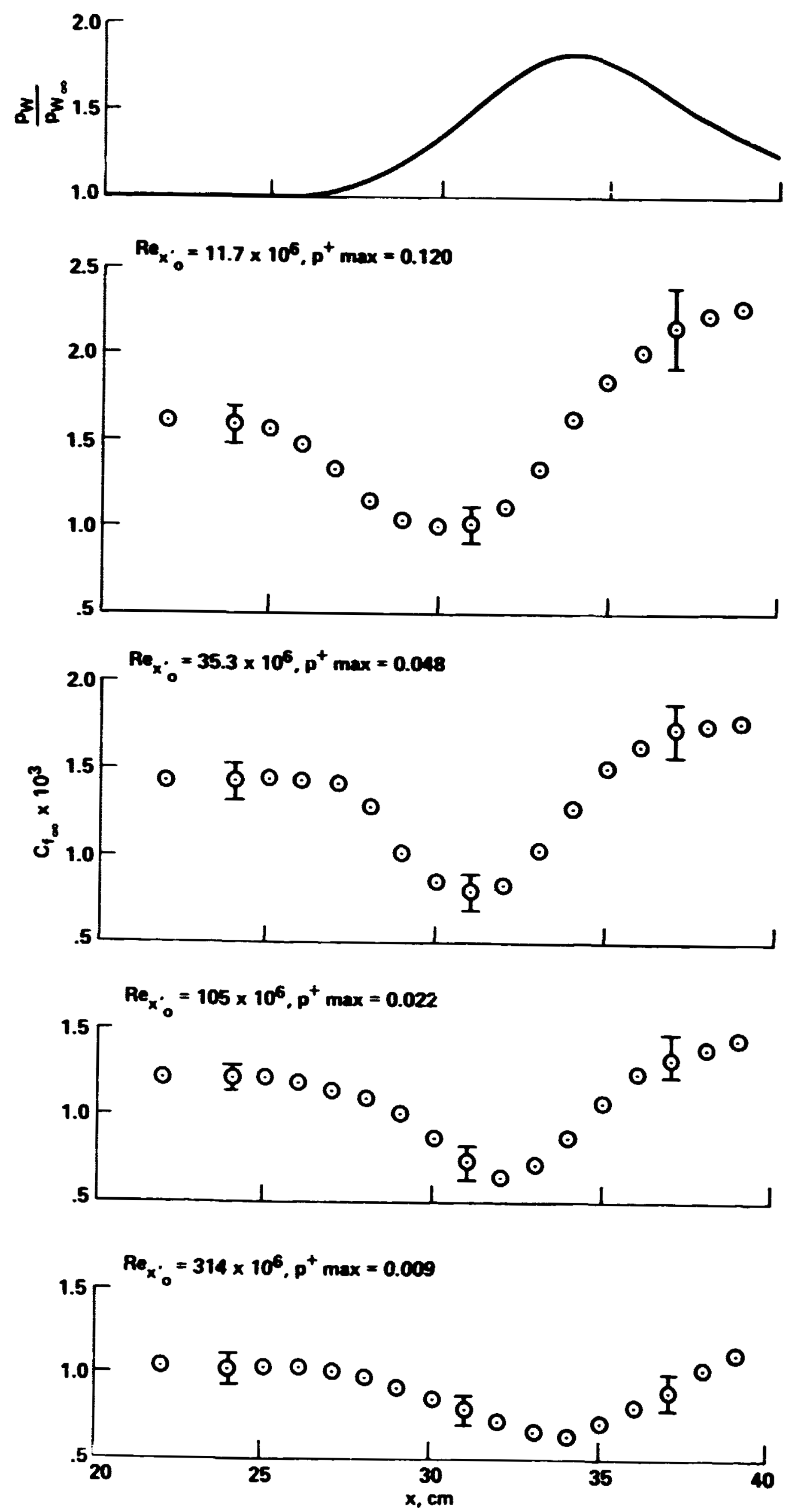
(c) Centerbody III.

Figure 14.- Continued.



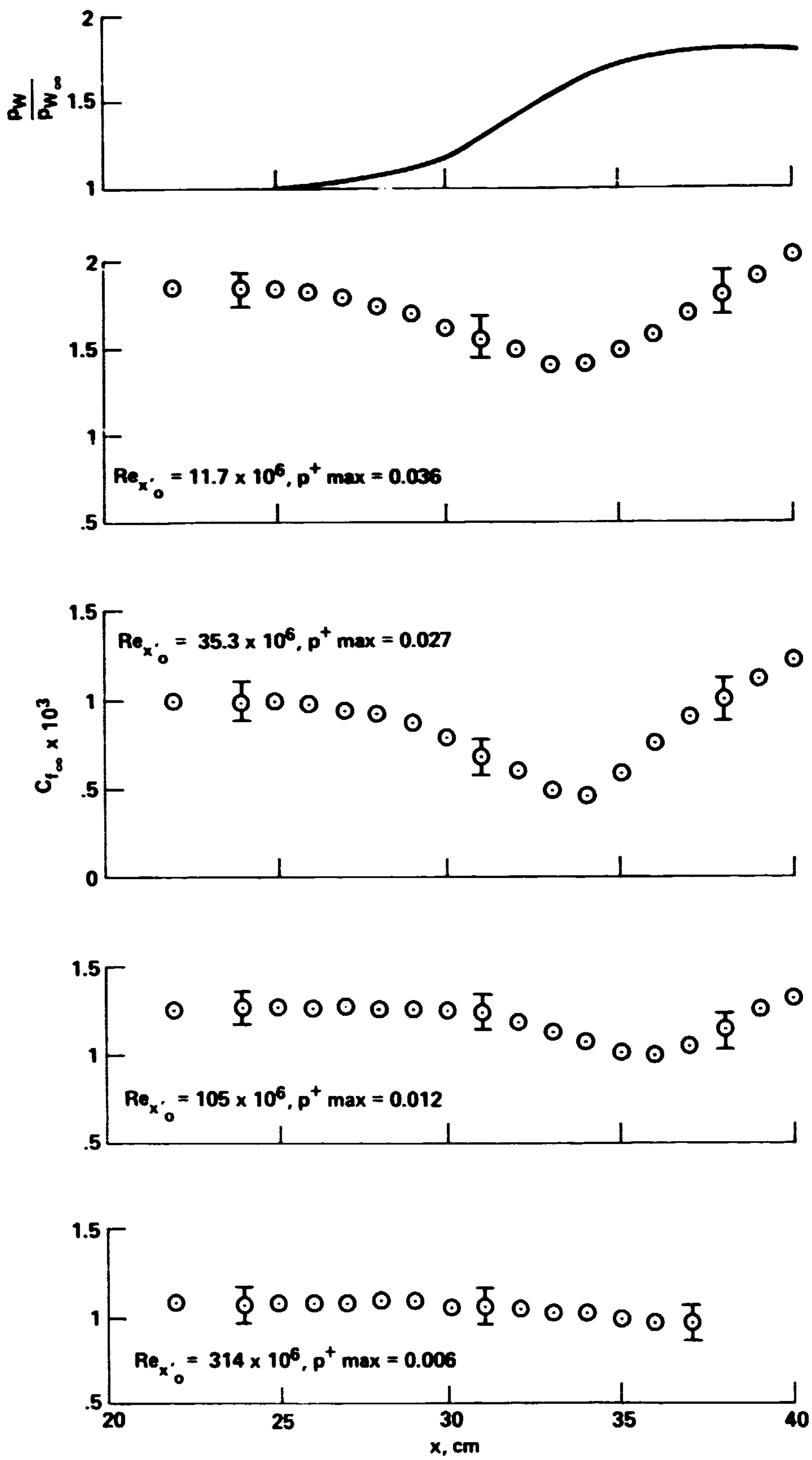
(d) Centerbody IV.

Figure 14.- Continued.



(e) Centerbody V.

Figure 14.- Continued.



(f) Centerbody VI.

Figure 14.- Concluded.

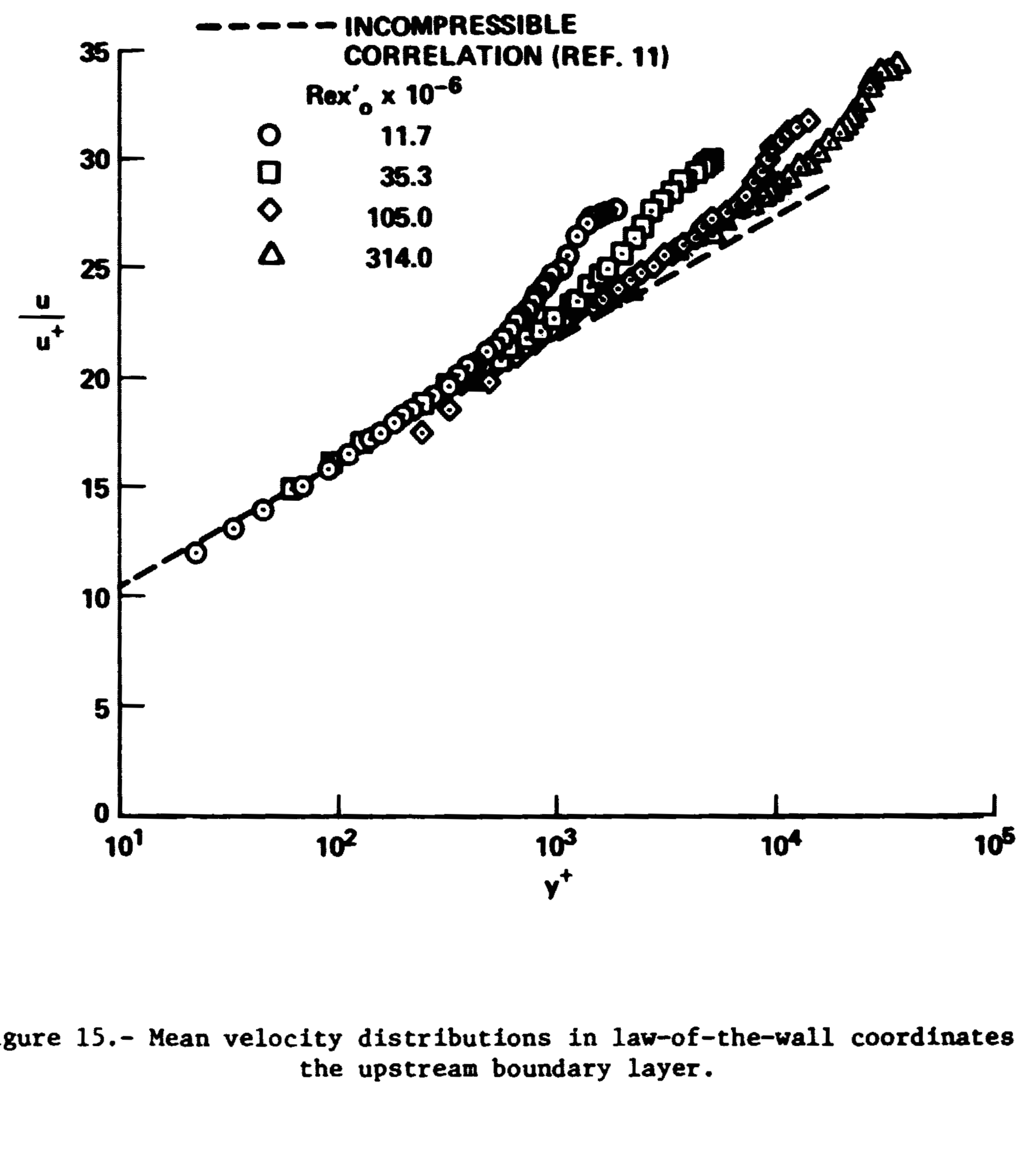
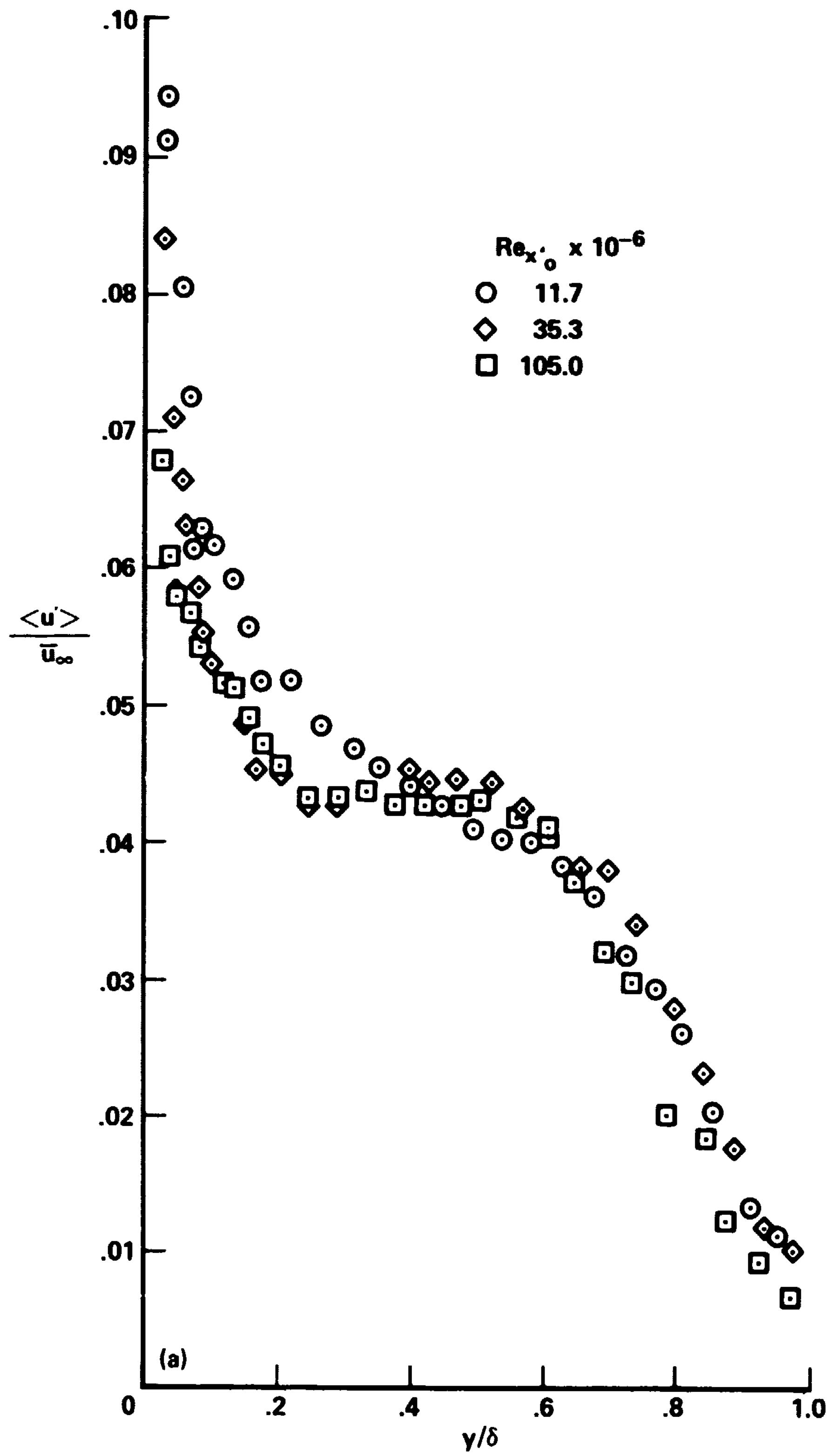
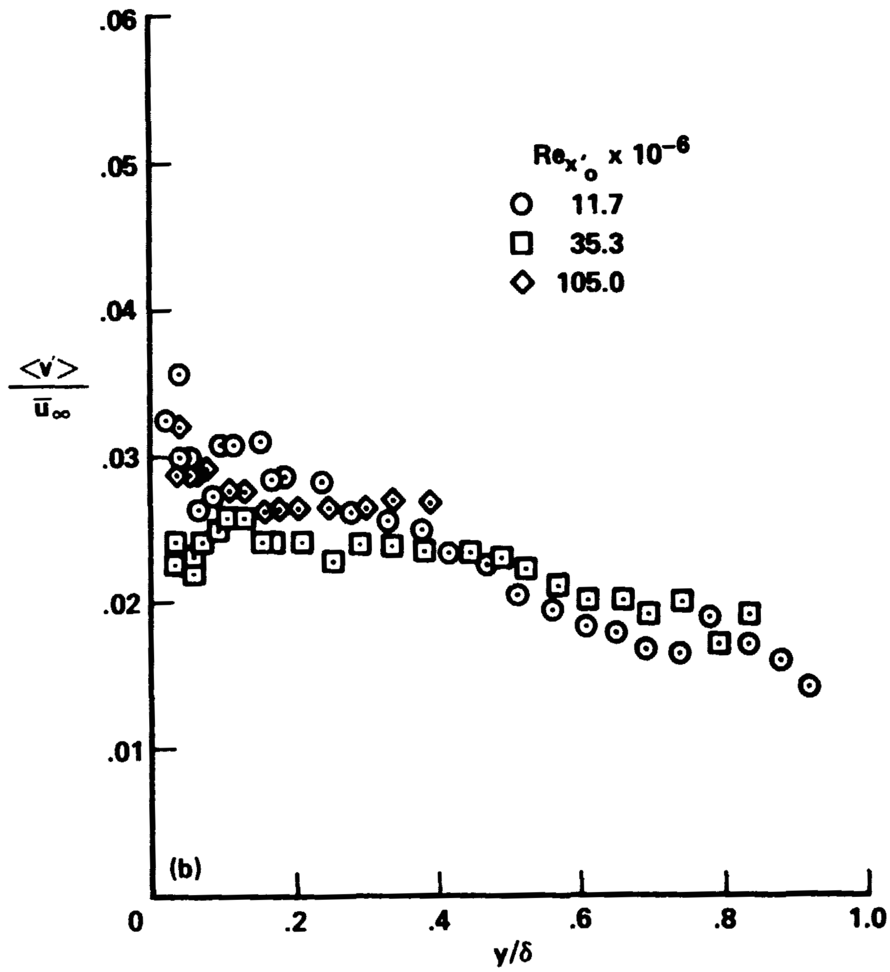


Figure 15.- Mean velocity distributions in law-of-the-wall coordinates for the upstream boundary layer.



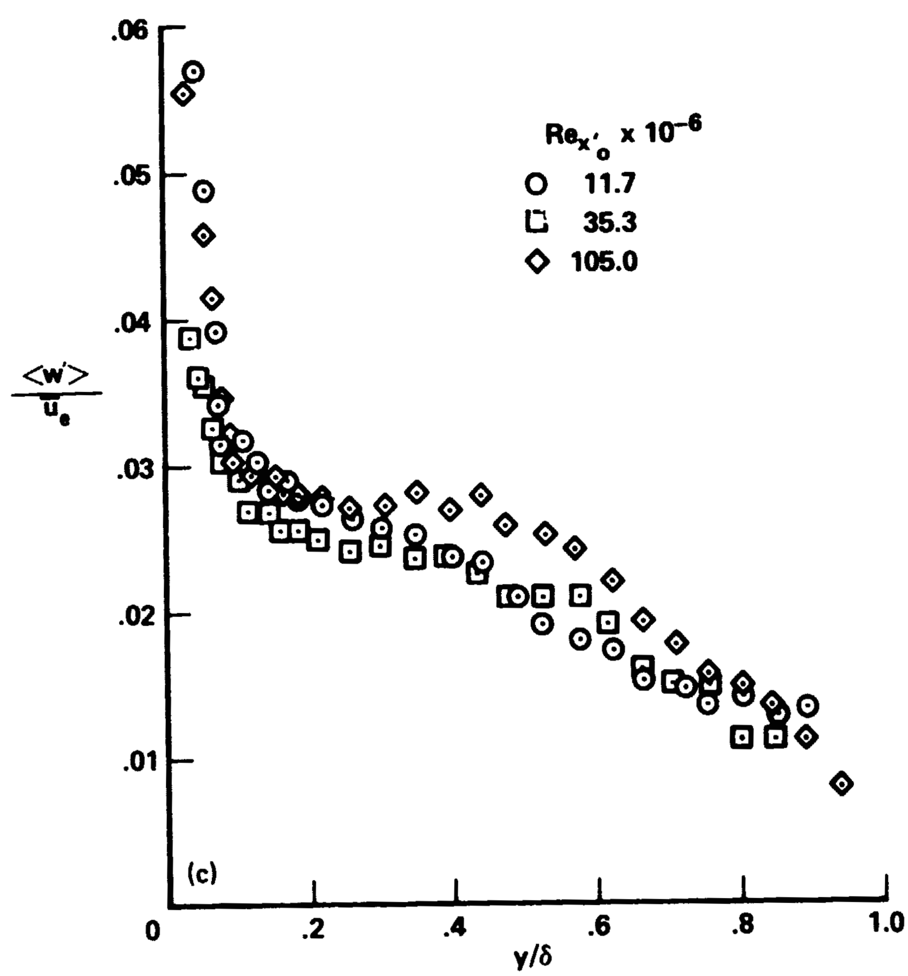
(a) <u'>.

Figure 16.- Velocity fluctuation distributions across the upstream boundary layer at three Reynolds numbers.



(b) <v'>.

Figure 16.- Continued.



(c) <w'>.

Figure 16.- Concluded.

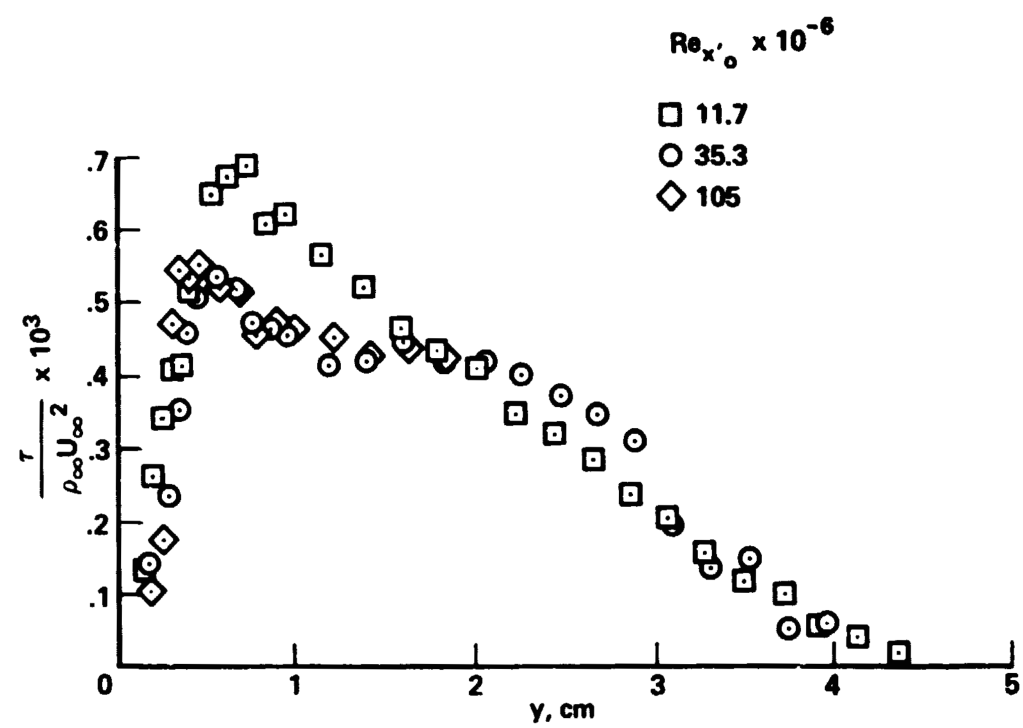
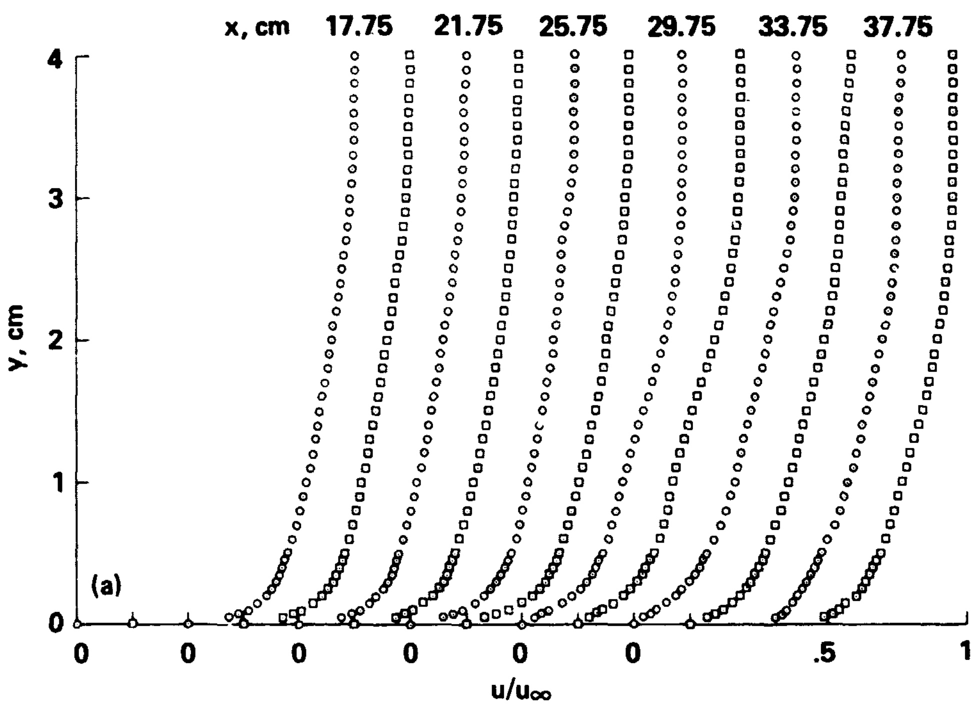
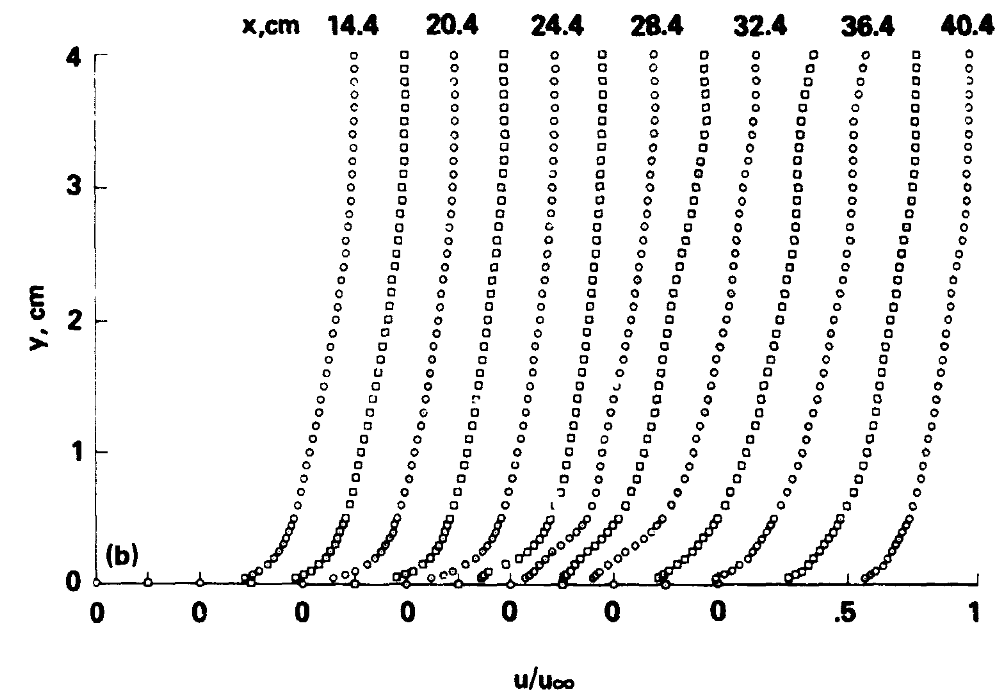


Figure 17.- Turbulent shear stress distributions across the upstream boundary layer at three Reynolds numbers.



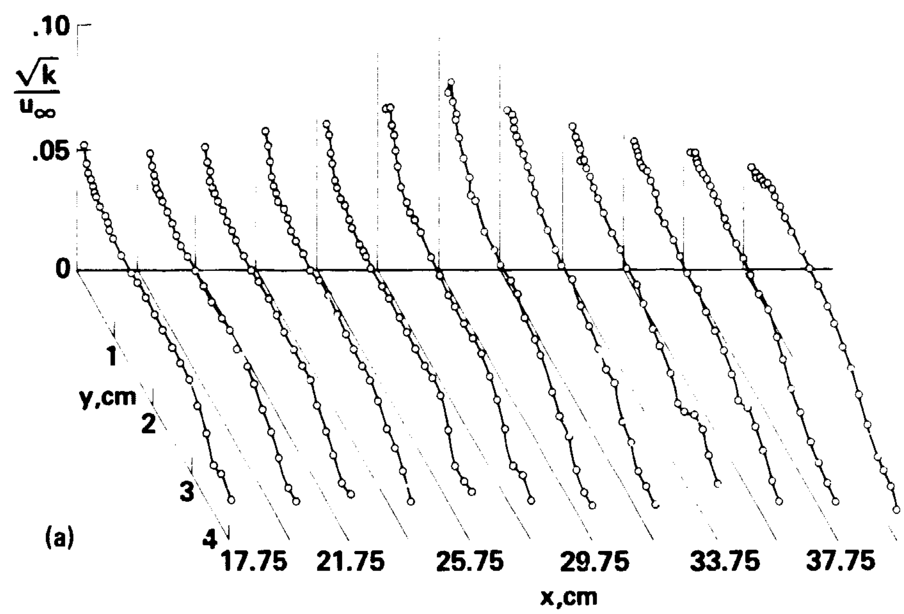
(a) Centerbody II.

Figure 18.- Velocity profiles across the flow field, $Re_{x'_o} = 35.3\times10^6$.



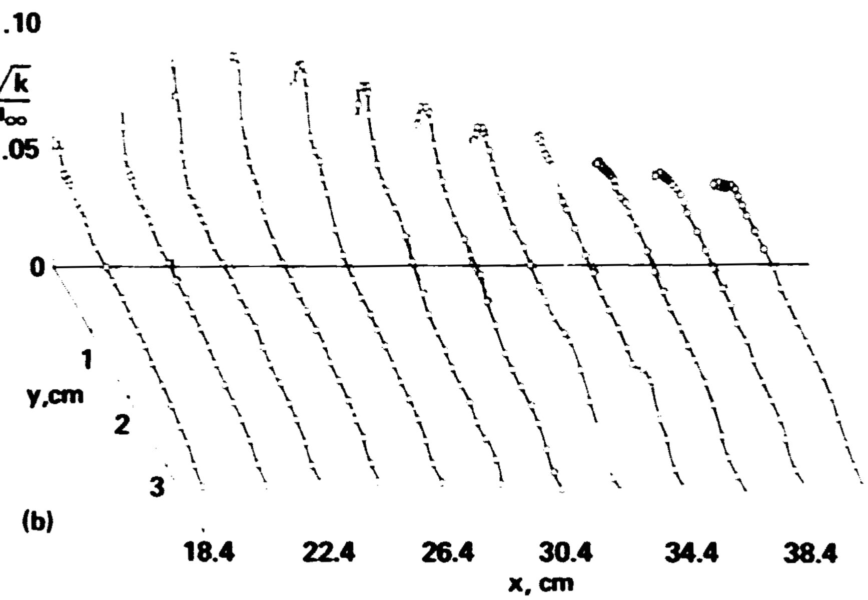
(b) Centerbody IV.

Figure 18.- Concluded.



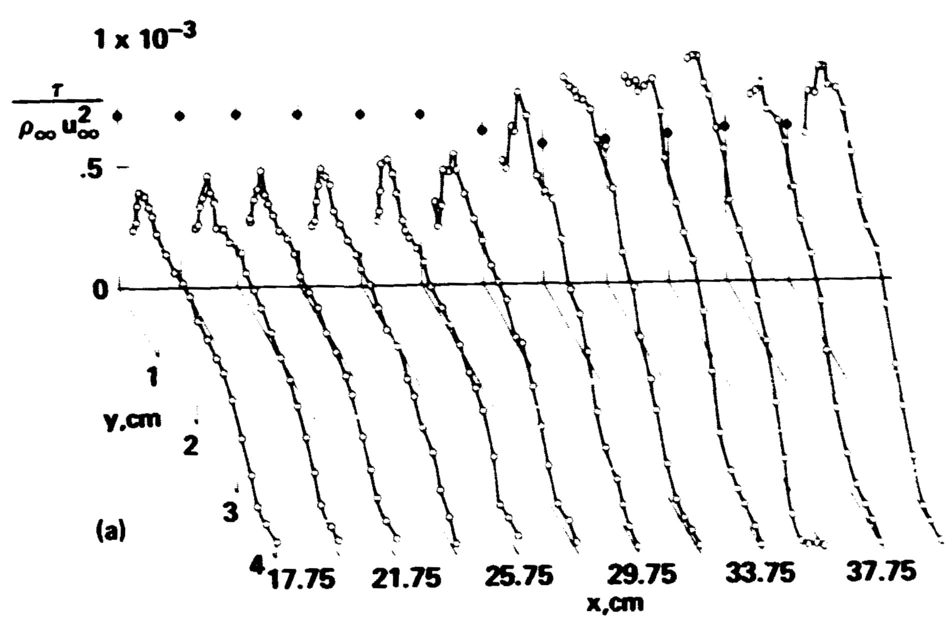
(a) Centerbody II.

Figure 19.- Turbulent kinetic energy profiles across the flow field, $Re_{x'_o} = 35.3 \times 10^6$.



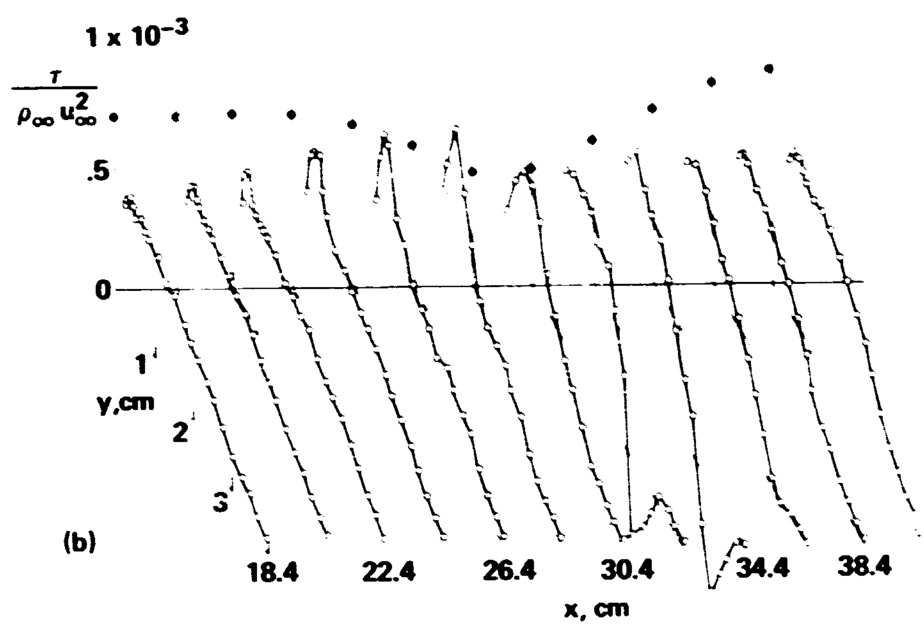
(b) Centerbody IV.

Figure 19.- Concluded.



(a) Centerbody II.

Figure 20.- Turbulent shear stress profiles across the flow field, $Re_{x'_o} = 35.3 \times 10^6$.



(b) Centerbody IV.

Figure 20.- Concluded.

1. Report No.: NASA TM-78488

2. Government Accession No.:

3. Recipient's Catalog No.:

4. Title and Subtitle: An Experimental Documentation of Pressure Gradient and Reynolds Number Effects on Compressible Turbulent Boundary Layers

5. Report Date:

6. Performing Organization Code:

7. Author(s): M. I. Kussoy, C. C. Horstman, and M. Acharya*

8. Performing Organization Report No.: A-7426

9. Performing Organization Name and Address: NASA Ames Research Center, Moffett Field, Calif. 94035

10. Work Unit No.: 506-26-11

11. Contract or Grant No.:

12. Sponsoring Agency Name and Address: National Aeronautics and Space Administration, Washington, D.C. 20546

13. Type of Report and Period Covered: Technical Memorandum

14. Sponsoring Agency Code:

15. Supplementary Notes:

*NRC Research Associate

16. Abstract

An experiment is described in which attached supersonic turbulent boundary layers, with a wide range of adverse pressure gradient strengths, were investigated for Reynolds numbers from 11.7×10^6 to 314×10^6. Surface pressure and surface shear measurements were obtained for six flow fields over the entire Reynolds number range. In addition, two flow fields — one with a moderate pressure gradient and the other with a severe pressure gradient — are thoroughly documented at a single Reynolds number. This experimental documentation includes both mean and fluctuating profiles throughout the flow field, and is sufficient to define the complete flow field, including the upstream undisturbed flow region. These data are provided in graphical and tabular form in sufficient detail to validate present or future computer codes and/or turbulence models.

17. Key Words (Suggested by Author(s)): Fluid mechanics; Boundary layer

18. Distribution Statement: Unlimited

STAR Category - 34

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price*
Unclassified	Unclassified	114	$5.50

*For sale by the National Technical Information Service, Springfield, Virginia 22161

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