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Single-Stage Experimental Evaluation of Boundary Layer Blowing Techniques for High Lift Stator Blades

II - Data and Performance of Flow Generation Rotor and Single-Slotted 0.75 Hub Diffusion Factor Stator

Prepared for

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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ABSTRACT

The test described in this report is part of an overall program to establish experimentally the extent to which it is feasible to increase compressor stator loading and stall-free flow margin by employing suction surface boundary layer blowing techniques. A secondary objective was to obtain blade element data for design use.

The test was conducted in three phases. In the first phase, blade element and overall performance data was obtained from a state-of-the-art single-stage flow generation rotor with inlet guide vanes. In the second phase, mid-span suction surface static pressure data was obtained with a row of 0.75 diffusion factor unslotted stator vanes for evaluation of boundary layer separation which could be used for selection of slot locations. In the third phase, a row of 0.75 diffusion factor single-slotted stators with self-energized blowing boundary layer control was tested. Preliminary discussion of test results and correlations of data are presented.

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SINGLE-STAGE EXPERIMENTAL EVALUATION OF BOUNDARY LAYER BLOWING TECHNIQUES FOR HIGH LIFT STATOR BLADES

II—DATA AND PERFORMANCE OF FLOW GENERATION ROTOR AND SINGLE-SLOTTED 0.75 HUB DIFFUSION FACTOR STATOR

By

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SUMMARY

To establish the feasibility of increasing compressor stator loading and stall-free flow margin by the use of boundary layer blowing techniques and to determine the extent to which such concepts may be employed, a single-stage compressor provided with a single-slotted stator row was tested. The stator was designed using NACA 65-series airfoils with a hub diffusion factor of 0.75. An unslotted stator of identical geometry was also tested to obtain suction surface static pressure distributions at mid span.

The single blowing slot was designed to reenergize the boundary layer air on the suction surface with the slot located at about 40% chord. For this purpose, the air is inducted into the vane core through a full-span slot near the leading edge of the vane pressure surface and is discharged through a single full-span blowing slot upstream of the point on the suction surface where flow separation is estimated to take place on the unslotted vane. The orientation of the blowing slot relative to the suction surface is as nearly tangential as mechanically feasible. To ensure an attached stator end wall boundary layer and to minimize secondary flows, annulus wall bleed was employed during all stator testing from a point forward of to a point behind the stator. The flow into each stator row tested was generated by the same state-of-the-art flow generation rotor, with prewhirl established by a row of inlet guide vanes.

Overall performance of the rotor and inlet guide vanes was evaluated separately before the stators were tested. Compared with design values of 1.370 pressure ratio, 88.2 lb/sec inlet flow, and 88.8% overall adiabatic efficiency, at design pressure ratio, corrected inlet flow was 95.0 lb/sec with an adiabatic efficiency of 89.4%. In general, this performance was duplicated during the slotted stator test. The slotted stator stage was found to have a pressure ratio of 1.33 at the 95.0 lb/sec airflow corresponding to the flow generation rotor design pressure ratio. Stage design values are 1.35:1 pressure ratio at 88.2 lb/sec flow rate.

Blade element performance was obtained for inlet guide vane, rotor blade, and stator vane rows. Experimental values are presented in terms of diffusion factor, deviation angle, and loss coefficient as a function of incidence for various annulus heights with rotative speed as a parameter. Minimum loss values are determined and compared with the NACA loss parameter versus diffusion factor correlation curves. Experimental rotor and stator blade element radial variations near their design inlet flow conditions are also compared with the design values.

Surface pressure distributions and wake surveys were obtained for the slotted stator, and suction surface pressure distributions were obtained for the unslotted stator at mid span. The unslotted stator suction surface pressure was measured to guide the selection of slot location and sizing.

Test results indicate that the flow generation rotor performed well. The single-slotted blowing 0.75 hub diffusion factor stator performance exceeded the design flow turning values with acceptable total pressure losses at these high loadings. Blade element performance loss correlations for these stators compared favorably with an extension of the existing NACA correlations.

As flow was decreased, rotating stall first appeared at the hub and spread rapidly to cover the entire span. Hysteresis effects for the slotted stator stage were found to be insignificant at low speeds.

Experimental results for the unslotted stator at 80% corrected speed were surprisingly good. Flow turning was nearly equal to the slotted stator turning and only small penalties in efficiency were seen with respect to the slotted stator performance. Suction surface boundary layers appeared to remain attached at mid span until incidence angles greater than about -4° were achieved. Boundary layer separation appeared to occur at 65 to 70% chord for an incidence angle of -3°. Results of this test indicate that a complete performance evaluation of the unslotted 0.75 hub diffusion factor stator is warranted.

INTRODUCTION

Advanced airbreathing propulsion systems require lightweight, compact compressors capable of high levels of performance. These compressors should have a broad range of operation and a large stall margin. High reliability and relative insensitivity to inlet flow distortion are generally required of all compressors. In meeting the more demanding compressor design requirements, compromises must be made that are strongly dependent on the particular application. New applications are steadily increasing the range of requirements which the compressor must meet.

Compressor technology has been advanced continuously by extending, among other parameters, the usable rotational speeds; increasing stage loadings or diffusion factors; and reducing stage length through the use of high aspect ratios. Whereas further advancements can be made through optimizations and improved combinations of the aforementioned parameters, severe aerodynamic limitations such as increasing losses and decreased stall margin are being encountered. Significant advancements in compressor technology require the application of advanced concepts in terms of improved blading for high flow Mach numbers and application of high lift devices to extend the stall-free flow range for compressor rotors and stators. Advanced concepts in these areas may result in sizable reductions in the number of compressor stages and improved performance as to range and efficiency.

Airfoils, designed to provide high lift, experience steep blade surface pressure gradients which become steeper as angle of attack is increased. As a result, the suction surface boundary layer separates and high total pressure losses and a decrease in stall-free flow margin result. To some extent, however, separation of the suction surface boundary layer can be delayed by energizing it with high energy air. In view of these considerations, an experimental single-stage compressor rig was designed and constructed to test highly loaded stators using internal blowing concepts to reduce losses and to improve stall-free flow margin.

The objectives of this program are to establish experimentally the feasibility of increasing blade loading and stall-free flow margin by boundary layer blowing and the extent to which it may be employed. A secondary objective is to obtain blade element data for design use. The stator designs were to be representative of those for middle and latter stages of highly loaded axial-flow compressors. Stator inlet flow was to be generated by a state-of-the-art flow generation rotor. This report presents the test results of the flow generation rotor performance, the mid-span suction surface pressure distribution for an unslotted 0.75 hub diffusion factor stator and the single-slot 0.75 hub diffusion factor stator performance.

SYMBOLS

A_a	Annulus area, ft^2
c	Airfoil chord, in.
C_W	Flow coefficient
D_f	Diffusion factor
g	Gravitational constant, 32.2 $ft\text{-}lb_m/lb_f\text{-}sec^2$
H	Hysteresis loop data point
h	Height of blowing slot, in.
i	Incidence angle based on mean camber line, degrees
L	Net slot length, in.
M	Mach number
$\dot{m}$	Blowing mass flow rate in blowing slot per blade, lb_m/sec
n	Number of blades per row
N	Rotational speed, rpm
P_t	Total pressure, psia
p	Static pressure, psia
q	Dynamic pressure, psia
R	Radius, in.
$\mathcal{R}$	Gas constant, 53.35 $lb_f\text{-}ft/lb_m\text{-}°R$
R_c	Pressure ratio
S	Airfoil surface pressure coefficient, Equation (A13)
T_t	Total temperature, °R
t	Static temperature, °R

t/c	Thickness-to-chord ratio
V	Air velocity, ft/sec
W_a	Compressor airflow, lb_m/sec
W_{BL}	Annulus wall bleed flow, lb_m/sec
x	Distance from blade leading edge, in.

Greek

β	Air angle measured from axial direction, degrees
γ	Ratio of specific heats
$\gamma°$	Blade chord angle, degrees
δ	Ratio of total pressure to standard sea level pressure of 2116.2 psfa
$\delta°$	Deviation angle, degrees
Δ	Incremental value
η	Efficiency
θ	Ratio of total temperature to standard sea level temperature of 518.6°R
κ	Blade metal angle measured from axial direction, degrees
ρ	Density, lb_m/ft^3
ψ	Slot angle with respect to chord, degrees
σ	Blade row solidity
ϕ	Camber angle, degrees
ω	Angular velocity of rotor, radians/sec
$\bar{\omega}$	Total pressure loss coefficient
$\frac{\bar{\omega}\cos\beta}{2\sigma}$	Loss parameter

Subscripts

0	Guide vane inlet
1	Rotor inlet
2	Stator inlet or rotor exit
3	Stator exit
θ	Tangential direction
ma	Mass averaged
ad	Adiabatic
m	Mean or 50% streamline
z	Axial direction

Superscripts

'	Relative value, rotor property

APPARATUS AND PROCEDURES

TEST FACILITY

A general arrangement of the test facility is shown in Figure 1. Air enters the test compressor after passing through the test facility filter house, an inlet duct, plenum, and bell-mouth and is exhausted to atmosphere through a diffuser. Provisions exist for maintaining compressor inlet pressures above or below atmospheric if necessary.

Two power units can be used simultaneously to drive the test compressor. One is a T56 power turbine with combustors which burn fuel mixed with high pressure air from test facility compressors; the other is a complete T56 power section. The two units are coupled by a primary gearbox whose output shaft drives a secondary gearbox which in turn drives the test compressor. Control of the test compressor speed is effected by throttling the turbine air supply with a hydraulically-operated valve and by independent fuel controls for each unit.

COMPRESSOR TEST RIG

The mechanical arrangement of the test compressor is shown in Figure 2. It consists of a cylindrical inlet section, the test compressor section and an exhaust diffuser. The single-stage rotor is supported on two bearings whose housings are linked by a vertically-split compressor case. The compressor case houses the inlet guide vanes, the rotor tip abradable coating, the stator vanes, and the case and hub bleed manifolds.

The design of the rig allows the rapid exchange of design and off-design guide vanes, if necessary, without dismantling the remainder of the compressor, and the exchange of stator vanes without disassembly of the entire test rig.

Airflow rate and pressure ratio are varied by throttle plates located in the exhaust diffuser. The throttles are linked by a ring and operated by a common actuator.

Provision is made in the rig for bleeding the wall boundary layers at stator tip and hub. This is accomplished by fabricating the stator flow passage walls from perforated sheet metal. Manifolds behind the perforated metal surfaces are connected by multiple tubes to separate vacuum headers for tip and hub wall bleeds.

BLADING

The design of the stator vanes, rotor blade, design inlet guide vanes, and off-design inlet guide vanes is described in detail in Reference 1. See Reference Section. For convenience, however, the principal geometric details of

these components are repeated in Table I. Selected airfoil sections are: (1) 63-006 series for the inlet guide vanes, (2) double circular arc for the rotor blade, and (3) 65 series with circular arc meanline for the stator vane.

The unslotted and slotted stator vanes, whose performance is reported herein, are identical in all respects except for the slotting in the slotted stator. Basic details of the slot configurations of the single-slotted 0.75 hub diffusion factor stator are shown in Figure 3.

INSTRUMENTATION

Instrumentation was provided to obtain blade element performance for each blade row and to measure overall performance. The locations of instrumentation planes are shown in Figure 4; Figure 5 shows schematically the circumferential location of the probes installed at each plane. The radial element locations at each plane were selected along design streamlines passing through the 10, 30, 50, 70, and 90% annulus height stations from the tip at the stator inlet measurement plane. The streamline locations are shown schematically in Figure 6. Dimensioned sketches of the probes used are shown in Figure 7. Instrumentation was distributed so as to minimize area blockages and prevent immersion in upstream instrument wakes. Duplicate instrumentation was located so as to average out any inlet guide vane effects.

Compressor Inlet Conditions

Weight flow was measured with an ASME thin plate orifice located in each branch of the triple-inlet header. Six total pressure probes and two 6-element temperature rakes were located in the cylindrical section approximately 3 ft upstream of the test compressor inlet for measurement of inlet total pressure and temperature. See Figure 5a. Inlet static pressure was measured at the same axial station by two static taps in the inlet wall.

Inlet Guide Vane Inlet—Station 0

Four equally spaced static pressure taps were located on both the inner and outer walls to measure static pressure for the determination of the inlet velocity. These taps were disconnected after inlet guide vane blade element data were obtained.

Rotor Inlet—Station 1

Four approximately equally spaced static pressure taps were located on both the inner and outer walls as shown in Figure 5b. An 8-degree wedge (static pressure) traverse probe was also installed to measure the radial static pressure distribution. Three radial traverse combination total pressure and yaw probes were used to measure the distribution of these parameters across the annulus except for the flow generation rotor test. During these tests a 16-

element radially traversing circumferential total pressure rake which replaced one combination probe, was used to evaluate inlet guide vane wake losses. This rake spanned 0.66 vane spaces at the 10% streamline and 0.92 vane spaces at the 90% streamline. When the circumferential rake was installed, a mid-channel element measurement was used with the two combination total pressure probe measurements in the mass flow computation for a check on data accuracy. Total temperature was obtained from plenum thermocouples.

Stator Inlet or Rotor Exit—Station 2

Four approximately equally spaced static pressure taps were located on both the inner and outer walls, and the radial distribution of static pressure was measured by two 8-degree wedge traverse probes as shown in Figure 5c. Three radial traverse combination probes were installed at this station to measure the radial distribution of total pressure, total temperature, and yaw.

Stator Exit—Station 3

Four approximately equally spaced static pressure taps were located on both inner and outer walls and two 8-degree wedge traverse probes were installed for measurement of the radial static pressure distribution as shown in Figure 5d. One traverse combination (P_t, T_t, and yaw) probe was installed primarily to measure flow angle. A 16-element total pressure circumferential rake, shown in Figure 7d, was installed at this station to measure discharge total pressure and stator vane wake. This rake spanned 1.08 vane spaces at the 10% streamline and 1.43 vane spaces at the 90% streamline. Total temperature was measured by four 5-element radial rakes. Inner and outer wall boundary layers were surveyed by fixed 5-element total pressure probes. All taps, probes, and radial rakes were located on extensions of mid-channel streamlines.

A special 16-element circumferential rake, shown in Figure 7e, was installed at this station during the flow generation rotor test to measure inlet guide vane persistence through the rotor. This rake was held fixed at the 50% streamline station and spanned 2.28 inlet guide vane passages.

Special Instrumentation

In addition to the instrumentation already enumerated for blade element and overall performance, the following special instrumentation was provided. At the rotor exit, two fixed and one traverse hot wire anemometers were installed to signal the onset of compressor stall and to provide rotating stall data. Shaft whip was monitored by means of a whip pickup mounted in the plane of the rotor blades and strain gages were mounted on eight rotor blades to monitor blade stresses.

Along the 50% streamline, the unslotted vanes were equipped with a total of 12 suction surface static pressure taps distributed among four vanes as shown in Figure 8a.

The 10, 50, and 90% streamline sections of the slotted vanes were each provided with 11 suction surface and 7 pressure surface static pressure taps as indicated in Figure 8b. One blowing discharge slot static tap and one core static pressure tap were provided at each section to estimate blowing flow rate. The 20 static pressure taps for each streamline section were distributed among four vanes.

DETERMINATION OF ANNULUS WALL BLEED FLOW FOR STATOR VANE TESTS

With the compressor operating at design speed and pressure ratio, the circumferential total pressure rake at the stator exit was set at the streamline station 10% from the tip. Hub and tip wall bleeds were set at a nominal flow of less than 1% of compressor flow. The stator wake pattern at this bleed flow was noted, and the tip wall bleed was then increased until no further improvement in wake pattern was visually observed on a manometer bank. This bleed flow rate was defined as the "optimum" bleed rate. One limiting consideration set as a reasonable upper value, however, was to extract no more than 2.5% of compressor inlet flow per wall at design conditions.

The circumferential rake was then set at the streamline station 90% from the tip. The tip wall bleed flow rate was reset at its original low value, and the procedure described was repeated for the hub bleed.

After hub and tip wall bleed flows had been optimized, the circumferential rake was moved to the mean position. Hub and tip wall bleeds were varied simultaneously in increments from the original nominal flow rate to optimum flow. The effects on the stator wake at mean depth were studied to check that optimum hub and tip wall bleeds coincided with an optimum wake at mid-span. The valve settings for these optimum bleed flow rates were left unchanged for all subsequent speed and flow conditions.

HYSTERESIS TEST WITH SLOTTED 0.75 HUB DIFFUSION FACTOR STATOR

The following method was employed to determine the characteristics of this stage at entry into, and when recovering from stall. With corrected speed set at 80%, the throttle was closed until stall cells were indicated by the three hot-wire anemometers (two of which were at the 10% and one at the 90% station from the tip) thus signalling the onset of stall. At this first hysteresis data point setting, a partial data recording was obtained which consisted only of data required for air flow and pressure ratio calculation. The throttle was then closed further until stage pressure ratio levelled off at a

lower pressure ratio value and another partial data recording was obtained. The throttle was then gradually opened until indications of stall (as signalled by the hot-wire anemometers) disappeared, and a third short data cycle was recorded.

Rotor blade stresses were monitored continuously during this hysteresis test to ensure that excessive vibratory stresses were not encountered.

OVERALL AND BLADE ELEMENT PERFORMANCE DATA

Overall and blade element performance data were obtained at a sufficient number of points per speed line to define rotor or stage performance between choke and stall. For the stage test, the near-stall test point was taken as close to the rotating stall condition as could be set without actually being in rotating stall. This type of near stall setting permitted a full data point recording. The stage stall point is defined as the onset of a steady stall cell indication on the hot wire anemometers. At each full data point recording, fixed and traverse pressure and temperature data were recorded at five radial locations corresponding to streamlines passing through the 10, 30, 50, 70, and 90% span stations at the stator inlet measurement plane.

DATA REDUCTION

Overall performance and blade element data reduction is accomplished in one program. A second program is used to calculate pressure coefficients and slot blowing flow rates for the stator vanes.

In the first program, raw data from the test stand is read in and printed. The program converts wedge probe static pressure transducer readings to inches of mercury absolute and applies a Mach number correction. All yaw units are converted to degrees. Data recording system, wire calibration, and Mach number corrections are applied to all temperatures. Pressures recorded on the data recording system are corrected to standard inlet total pressure. The corrected data is then printed.

Circumferential arithmetical averages of total pressures, static pressures, total temperatures, and yaw angles are calculated and printed. Individual data readings are compared with the averages to validate the data. Any individual readings which differ by more than prescribed deviations (0.5 in. Hg for pressures, 3° for yaw angles, 1.5°R, 2°R, and 3°R respectively reference, inlet and all other temperatures), are not used in the final calculations. Mass-averaged values required for performance calculations are determined.

The program provides a choice of two radial distributions of static pressure: (1) distribution measured by the wedge probes, and (2) a linear distribution across the flow annulus calculated from the arithmetically-averaged hub and case wall static pressure taps. Overall and blade element perfor-

mance are calculated and printed using the two static pressure distributions mentioned. If a continuity check at any data measurement station is not satisfied within 5%, a simple radial equilibrium solution is provided to give an indication of the problem.

Pressure ratios are calculated for the inlet guide vane and rotor combination in the flow generation rotor test and for the flow generation rotor and stage in the stator tests. The following operations are performed to determine these ratios.

At the inlet station two total temperatures are arithmetically averaged at each radial station. Mass flow is integrated radially, assuming that averaged wall static pressure exists over the entire cross section. Total pressure (and temperature) are then mass-averaged. Behind the rotor, total pressures, total temperatures, and wall statics are each arithmetically averaged circumferentially for each radial station. Mass flow is radially integrated and total pressures (and temperatures) are mass averaged.

At the stator exit four total temperatures are arithmetically-averaged circumferentially at each radial station. Mass flow is computed using an area average of the circumferential rake total pressure readings spanning a stator vane passage at each radial station. A radial integration is made for weight flow and the total pressures and temperatures are mass averaged radially. The overall pressure ratio and adiabatic efficiency are obtained using the radially mass-averaged values of pressure and temperature.

The calculation of performance variables, as programmed in the data reduction programs, are delineated in the Appendix.

PRESENTATION OF RESULTS

Experimental results obtained in the test program are summarized in detail for the flow generation rotor with design and off-design inlet guide vane sets, the unslotted stator vane, and the single-slotted stator vane. The reduced data presented was based on a linear static pressure distribution across the annulus. The reason for selection of the linear static pressures was primarily based on the lack of reliable static probe readings for the flow generation rotor test. Since differences in reduced data between reliable wedge static pressure distributions and linear distribution were found to be small and primarily affect the rotor relative values, it was concluded that data from tests reported herein should be compared on a consistent basis. A comparison of blade element parameters for the rotor blade affected by static pressure evaluation is shown in Figure 9. This comparison verifies the selection of linear static pressures for data reduction.

OVERALL PERFORMANCE OF FLOW GENERATION ROTOR AND STAGE

Overall pressure ratio and adiabatic efficiency are each plotted versus corrected inlet flow with percent corrected speed as a parameter. These are plotted in Figures 10 and 11 for the flow generation rotor with design and off-design inlet guide vane sets; Figures 12 and 13 for the flow generation rotor during the stage test; and Figures 14 and 15 for the complete stage with design inlet guide vanes and both slotted and unslotted stators.

To indicate whether the rotor or the single-slotted stator caused the stage to choke or stall, rotor incidence range is summarized in Table II for the flow generation rotor and single-slotted stator stage test.

Stage rotating stall characteristics at the single-slotted stator stall points and hysteresis points are summarized in Table III.

BLADE ELEMENT PERFORMANCE

Inlet guide vane, rotor blade and stator vane blade element characteristics were computed on the five streamline positions previously defined. The blade element characteristics chosen to present the detailed performance of each blade row are listed in Table IV.

The design and off-design inlet guide vane element performance is plotted versus percent annulus height at flow rates near the design value in Figures 16 through 18. Design data are also plotted for comparison and performance analysis. Typical design inlet guide vane exit wake surveys are shown in Figure 19. The attenuation of the design inlet guide vane wake as it passed through the rotor and as seen at the stator inlet meanline station is plotted in Figure 20.

Rotor blade element data are plotted as a function of incidence with corrected speed as a parameter for each of the streamline stations. The blade element data obtained during the flow generation rotor test are shown in Figure 21 and for the stage test in Figure 22. For comparison and for aiding the rotor blade performance analysis, blade element data for the rotor blade are plotted versus percent annulus height in Figure 23 for the flow which approached the best approximation of design incidence angle at design speed. Design values are also plotted for comparison. Mass flow distribution out of the rotor versus percent span near design flow rate is plotted and compared to the design distribution in Figure 24. Rotor blade element performance is also evaluated in Figure 25, by comparing the loss parameter versus diffusion factor at the 10, 50, and 90% streamline stations from the tip with the NACA correlation curve from Reference 2.

Stator vane blade element data are also plotted as a function of incidence with corrected speed as a parameter for each streamline station. The blade element data for the unslotted stator are plotted in Figure 26 and for the single-slotted stator in Figure 27. Also presented are the annulus wall bleed rates and the single-slotted stator slot blowing flow rates in Figures 28 through 30. For comparison and for aiding in the stator vane performance analysis, blade element data for the slotted stator vane are plotted versus percent annulus height in Figure 31 for conditions nearest to the design incidence angle and inlet Mach number. Design values are shown for comparison. Stator vane blade element performance is also evaluated in Figure 32 by comparing the loss parameter versus diffusion factor for the 10, 50, and 90% streamline stations from the tip with the NACA correlation curve from Reference 2.

To enable compressor designers to evaluate and apply the results of this test, a detailed summary of vector diagrams, blade element characteristics, and losses at each streamline station is provided. These summaries are listed in Table V for the flow generation rotor with design inlet guide vane, Table VI for the flow generation rotor with off-design inlet guide vane, Table VII for the unslotted stator stage and Table VIII for the single-slotted stator stage.

DISCUSSION OF RESULTS

The method of presentation using the overall and blade element parameters for evaluating the performance are described in detail in this report. Since the figures and tables are self-explanatory, only general observations are made.

OVERALL PERFORMANCE

Flow Generation Rotor

Flow generation rotor pressure ratio and adiabatic efficiency with the design and off-design inlet guide vanes are shown in Figures 10 and 11, respectively. The adiabatic efficiency shown in Figure 11 is based on the mass averaged temperature measured by the stator vane exit station radial temperature rakes.

In general, the flow generation rotor performed well and met or exceeded the design values. The design point pressure ratio and efficiency are 1.370 and 88.8%, respectively, at a design flow rate of 88.2 lb/sec with the design inlet guide vanes. At the design equivalent rotor speed, maximum efficiency was 92.6% with a corresponding pressure ratio of 1.45 and a flow rate of 89.0 lb/sec. At the design pressure ratio of 1.370, the flow rate was 7.7% higher than design (95.0 lb/sec flow rate) and the adiabatic efficiency was 89.4%. Stall pressure ratio at design speed was 1.48 at a flow rate of 82.8 lb/sec.

Design blockage at the rotor inlet was 1.5% of the annulus area and placed all at the hub. Thus, excessive design blockage could not account for much more than 1% of the excess flow. Comparison of the measured rotor deviation angles with the design deviation angles in Figure 23 show that the measured deviation angles for the rotor were less than design values by about 3.0° at the tip, 1.9° at the mean, and 0° at the hub. This resulted in greater work input and a higher than design pressure ratio at design flow.

For purposes of discussion of overall performance, the design point of the flow generation rotor will be taken as a 1.365 pressure ratio, 95.0 lb/sec flow, and adiabatic efficiency of 89.4%.

It is apparent that flow generation rotor efficiencies with the design inlet guide vanes (shown in Figure 11) are too high at 60% corrected speed. This is possibly due to experimental accuracy in measuring absolute total temperatures and total pressures at these low energy conditions. For example, an error of ± 0.75°F (i.e., stator-out thermocouple accuracy) out of 538.7°R rotor-out average total temperature at a pressure ratio of 1.125 for the 60% corrected speed condition results in a possible adiabatic efficiency variation of ±3.5% from the value of 95.0.

Flow generation rotor pressure ratio and adiabatic efficiency with design inlet guide vanes measured during test with the single-slotted stator are shown in Figures 12 and 13. The pressure ratio-flow results in Figure 12 are found to be in excellent agreement with the rotor test without stator vanes shown in Figure 10. Adiabatic efficiencies, however, were found to be higher than those of Figure 11 with the peak value at 100% speed 4.1 points higher. A temperature error of ±2.2°F could result in this difference in flow generation rotor adiabatic efficiencies. Since the thermocouple accuracy is ±0.75°F, this accuracy results in an adiabatic efficiency accuracy of ±1.2% at a pressure ratio of 1.4, and a possible maximum efficiency of 93.8%. There is obviously an additional error due to readout or calibration.

A prime concern during the design phase of the flow generation rotor discussed in Reference 1 was that sufficient flow range would be available to ensure that the rotor or facility would not excessively limit the stator operating range. A summary of rotor incidence angle near stall and choke at hub, mean, and tip streamlines is given in Table II. The stall incidence angles correspond to the minimum flow rate due to either rotor or stator stall. The choke incidence angles correspond to the maximum flow rate due either to rotor choke, stator choke, or facility pressure loss limitations.

Rotor incidence angle differences summarized between flow generation rotor stall and slotted stator stage stall are less than 1.2° maximum. No definite conclusion can be made that either the rotor or stator limited stage flow range based on rotor incidence angle. A comparison of stall flows (Figures 10 and 14), however, indicate that flow range was limited by the stator for complete stage tests. The rotor did not limit the stage flow range at the choke end in the expected low speed range of 60 to 80% corrected speed (Reference 1). At 100% corrected speed, the approximately equal rotor incidences for both tests indicate that either the rotor or stator are choking at nearly the same time or the facility pressure loss is controlling.

Unslotted Stator Stage

These stator vanes were tested with the primary objective of obtaining suction surface pressure distributions at mid span which could be used as an aid in the design of the blowing slot configurations on the slotted stator vane sets. Seven complete data points were recorded. Three of these points at 80% corrected speed are shown in Figures 14, 15, and 28 for pressure ratio, adiabatic efficiency, and annulus wall bleed flow. Wall bleed rates for these test points were set at the maximum facility capability for simplicity.

Pressure ratio and adiabatic efficiency results for this stage show only a slight penalty at 80% corrected speed with respect to the single-slotted stator. This result indicates that, contrary to aerodynamic design based on rotating and stationary cascade tests, highly cambered stators can turn the flow successfully at least under the condition of annulus wall bleed.

Single-Slotted Stator Stage

The overall stage pressure ratio and adiabatic efficiency for the single slotted stator stage are shown in Figures 14 and 15, respectively. Only the design inlet guide vanes were used in these tests.

Stage design pressure ratio and adiabatic efficiency are 1.35 and 85.5%, respectively, at a design flow rate of 88.2 lb/sec. At the design equivalent rotor speed, a maximum stage adiabatic efficiency of 88.2% was obtained with a pressure ratio of 1.39 and a flow rate of 91.0 lb/sec. At the flow generation rotor condition of 95.0 lb/sec corrected flow rate, which gives approximately design stator incidence, the stage pressure ratio was 1.33 and adiabatic efficiency was 86.5% For simplicity, the stage adiabatic efficiency (as presented herein) is not penalized for the energy removed from the system by the tip and hub wall bleed flows. Inasmuch as the rotor loading is not compatible with the stator loading, the stage efficiency is of secondary interest.

At the inlet flow rate of 95.0 lb/sec into the flow generation rotor, the stage pressure ratio is 1.33 and the adiabatic efficiency is 86.5%. Thus, the design average total pressure recovery of the slotted stator is 0.986 (1.35/1.37) and the measured "design" total pressure recovery is 0.971 (1.33/1.37). Since the stator inlet flow conditions are equivalent to a 1.6 pressure ratio rotor without inlet guide vanes, the stage efficiency of 86.5% would be increased by 2 to 3 points because of the additional work with the same average pressure recovery of 0.971 and equivalent rotor efficiency. The blowing boundary layer control concept for high lift stator shows promise.

Annulus Wall Bleed for Stator Test

Annulus wall bleed over the stator row at tip and hub surface was defined at 100% corrected speed and a rotor pressure ratio of 1.37 by monitoring visually the circumferential rake and boundary layer rakes at tip and hub. Except at very low wall bleed flows of about 0.5% where stator wakes are still relatively large, the boundary layer total pressure rakes indicated an attached boundary layer. That is, total pressures increased away from the wall. Once the wall boundary layer attached, additional wall bleed essentially affected only the 10 and 90% streamline stator wakes. When the stator wake reduction showed negligible improvement with increased wall bleeds, the tip and hub bleed valves were held fixed throughout all remaining test points.

The tip and hub wall bleed rates experienced throughout this test with the fixed bleed line valve settings are summarized in Figure 28.

For the unslotted stator test, the tip and hub wall bleed rates were set at the maximum facility capability for all test points. These bleed rates were selected since the primary objective here was to obtain stator vane suction surface static pressures at the 50% streamline.

Hysteresis and Rotating Stall Results—Slotted Stator Stage

This test was made to determine whether the stall of this stage is gradual or abrupt, and whether the stall would disappear and the stage recover smoothly. Flow values at the onset of rotating stall and during the hysteresis test are shown in Figure 14 and rotating stall data during the hysteresis test are summarized in Table III.

The onset of rotating stall at each corrected speed was indicated by the hot wire anemometer located at the 90% streamline station. Rotor stall was abrupt at all speeds as indicated by stall zone progression to the rotor tip with only a slight increase in back pressure.

A three-point hysteresis loop was conducted at 80% corrected speed. Data point H_1 in Figure 14 represents the onset of rotating stall as the back pressure was increased. Data point H_2 was recorded in deep stall. Data point H_3 was recorded at the flow rate just below that where stall cell indications just disappeared as back pressure was reduced. Essentially no hysteresis effect was observed in terms of pressure ratio versus flow rate in coming out of the stall. The exact paths from point H_1 to H_2 and from H_2 to H_3 were not determined.

Rotative speed and frequency and number of stall zones for rotating stall tests at 80% speed are summarized in Table III. Just after the onset of stall, one stall zone was recorded in the tip region and one or two intermittent stall zones were measured in the hub region. The rotative speed of the cells in both span regions was approximately 40% rotor speed in the direction of rotor rotation. Frequencies were 55 cps when one stall cell was observed and 110 cps for two stall cells. In deep stall, one zone was indicated in the tip region and two steady zones in the hub region. Rotative speed was approximately 26% rotor speed in the direction of rotation and frequencies were 30 cps for one stall cell and 60 cps for two stall cells. High rotor blade stresses prevented prolonged operation at this condition; therefore, radial traversing of the hot wire was not done. It appears, however, that one stall zone extended across the blade span and the second zone did not extend to the 10% streamline depth.

Average blade stresses encountered during the hysteresis test were measured to be 6800 psi, which is below the steady state limit value of 11,250 psi. Transient stresses of 17,300 psi were measured, which are

above the limit value of 16,900 psi. Blade stress limit values, which are determined from bench fatigue tests, are defined to prevent a high rate of blade life degradation—that is, to ensure that blade life (with sufficient margin) will sustain the test hours to be run. Based on the high transient stresses experienced during the hysteresis loop test at 80% corrected speed, hysteresis testing for subsequent stators will be carried out at 60% speed.

BLADE ELEMENT PERFORMANCE

Inlet Guide Vanes

Measured values of exit angle, total pressure recovery, and loss coefficient distributions for the design and off-design inlet guide vanes are shown in Figures 16, 17, and 18, respectively. These measured values are compared to the design values by selecting test inlet flow rate conditions which bound the design inlet flow rate. Design flow rate is 88.2 lb_m/sec for the design guide vane and 84.5 lb_m/sec for the off-design guide vane.

Average exit flow angles shown in Figure 16 are found to vary from the design values to 2° less for the design inlet guide vane. For the off-design guide vane, measured values vary from the design values to 2° higher. This agreement between experimental and design flow angle values is very good.

Inlet guide vane pressure recoveries shown in Figure 17 indicate that average total pressure recoveries are above 0.99 for both vane sets. The measured radial distribution of total pressure recovery; however, differ substantially from the design. This is shown clearly in Figure 18 where loss coefficient values are compared. This difference is probably due to the difficulty of obtaining small differences from separate absolute total pressure readings measured at vane row inlet and exit. A differential measurement across the vane row would possibly be more accurate. The large value of loss coefficient, however, is due to the low Mach number which results in a low dynamic head in the denominator of the loss coefficient definition (Equation (A11) of the Appendix).

Typical wake distributions for the design inlet guide vanes are shown in Figure 19 for three inlet Mach number or corrected weight flow values. Total pressure loss is seen to increase with increasing Mach number with little change in exit flow direction as indicated by the wake trough. Secondary flow and end wall effects are evidenced at the 10 and 90% streamline stations.

Possible persistence of the design inlet guide vane wake through the rotor was also investigated. Measured results are shown in Figure 20 for a circumferential rake spanning three guide vane trailing edges at the 50% streamline station. No appreciable persistence was indicated at the design

flow rate condition at 100% corrected speed. The guide vane wake is, therefore, considered to be effectively attenuated before the flow enters the stator row. This result coupled with the high total pressure recoveries will have a negligible effect on the flow generation rotor and stage performance.

Rotor

Diffusion factor, deviation angle, and loss coefficient data throughout the rotor operating range for both the flow generation rotor and slotted stator stage test are summarized in Figures 21 and 22. In general, the measured loss coefficients are found to be about equal to design values at the 0-degree design incidence value at the 30, 50, and 70% streamline stations, less than design values at the 10% streamline station, and greater than design values at the 90% streamline station.

Primary rotor blade element performance for the double circular arc blade is shown in Figure 23. Rotor blade measured data for both the flow generation rotor and slotted stator stage tests operating near the design incidence angle at 100% corrected speed are compared to the design values. The selected data was based on best agreement with design incidence angle values since the rotor exceeded its design pressure ratio. In general, the agreement between measured and design values is good.

Significant differences occur in the deviation angle and diffusion factor. The effect of lower than design deviation angle results in an effective overcambering of the rotor blade and hence more work into the flow. This higher work level results in lower leaving velocities out of the rotor for the same flow and rotative speed. The combination of higher work input and lower exit axial velocity results in higher than design values of diffusion factor.

The radial distributions of the mass flow for the flow generation rotor and slotted stator stage tests at the rotor outlet are compared with the design in Figure 24. A flow shift to the tip occurred experimetally with respect to the design distribution due to the low deviation angles in the tip region of the rotor. No further flow shift is indicated between the measured test values for the flow generation rotor test and slotted stator stage test. It appears, however, that a flow shift occurred as indicated by the diffusion factor results shown in Figure 23. This diffusion factor difference is a result of tangential and absolute velocity differences of less than 10% between tests. It is possible that rotor-stator interaction effects and/or the annulus wall bleed effect during the slotted stator test could alter the absolute velocities by 10%.

Rotor loss parameter data at the 10, 50, and 90% streamlines are shown in Figure 25. Minimum loss coefficient values are indicated as filled symbols

when they could be defined. The minimum values are selected as the data point nearest to the minimum value of the curve drawn through the data points in Figures 21 and 22. Minimum loss data for the 10% streamline are found to lie on the lower band of data scatter. Minimum loss data for the 50% streamline are found to be slightly below the correlation curve and for the 90% streamline slightly above the curve.

Stators

A comparison of the deviation angle and loss coefficient data for the unslotted stator (Figure 26) and the slotted stator (Figure 27) at 80% corrected speed shows there is no appreciable difference in flow turning and loss. It was anticipated in the design phase that the unslotted high lift stators would not perform well. It is possible that the end wall bleeds reduced or eliminated the passage secondary flow effects and prevented blade surface boundary layer disturbance.

A comparison of Figures 26c and 27c may indicate a flow shift towards the mean streamline from the hub and tip regions on the unslotted stator loading the mean section. The higher values obtained for the diffusion factors, however, are not consistent with the lower losses experienced in the mean region of the unslotted stator.

Measured results of greater flow turning and greater losses than design values are also clearly shown in Figure 27, which present diffusion factor, deviation angle, and loss coefficient over the entire test operating range for a given percent of annulus height. These data also indicate that the stall side of the loss coefficient versus incidence angle curve is not clearly defined. This might be due to limitations resulting from rotor stall.

Further study also shows, however, that the choke side of the loss coefficient versus incidence angle curve is quite flat over a wide range except at the 90% streamline height. It is indicated, therefore, that the operating range of this stator with blowing boundary layer control is good.

The radial variation of measured blade element data for the slotted stator operating at near design incidence is compared to the design values in Figure 31. The inlet axial velocity and incidence angle plots of Figure 31 indicate a mass flow shift with respect to the design. This mass flow shift is due to the rotor performance as previously discussed in the rotor section of this report. Figure 31 shows that flow turning was greater than expected, or deviation angles less than designed for, and that measured losses are greater than the design values.

Minimum loss points obtained from Figures 26 and 27 are compared with the NACA loss parameter versus diffusion factor correlation (Reference 2)

in Figure 32 for the 10, 50, and 90% streamlines from the tip. The data for the tip and hub streamlines generally agree with an extension of the correlation for stator results. Mean streamline data lie slightly above the correlation curve. The comparison with the unslotted stator data remains unclear at this point. Additional experimental data and analyses would be required to support a final result.

Wake survey measurements for the unslotted stator at 80% corrected speed are shown in Figure 40. Typical slotted stator wake distributions are shown in Figure 41. Selected cases nearest to 0° incidence which show the increasing wake trough pressure depressions as inlet Mach number increases are given in Figures 41a through 41c, 41e and 41h. Figures 41d through 41g illustrate the effect of incidence angle at an inlet Mach number near 0.7. The design location of the minimum wake value intersection on the circumferential rake shown in Figure 40a can be used to indicate the amount of exit flow angle turning with respect to design turning. Design turning for the 0.75 diffusion factor stator consists of axial exit flow.

Static pressure distributions are presented in Figures 33 and 34 for the unslotted stators, and in Figures 35 through 39 for the slotted stators.

Stator Static Pressure Distributions

Static pressure distribution measurements on the suction surface of the unslotted stator at the 50% streamline given in Figure 34 indicated that boundary layer separation did not occur until incidence angle values greater than -4.57° were experienced. Continuing this test at 80% corrected speed resulted in separation indications at 65 to 70% chord for -3° incidence angle with separation moving forward to 35 to 40% chord for -0.1° incidence angle. The stage operating conditions at this point with the unslotted stators were near the onset of stall. However, the separation indicated by the pressure distribution (Figure 34d) is not consistent with the wake survey (Figure 40c) or the loss coefficient (Figure 26c).

Suction surface static pressure distributions for the slotted stator resulted in apparent boundary layer separation at 55 to 70% chord throughout the entire range of tests as shown in Figures 35 through 39. The blowing slot was located at 39.25% chord. None of the operating conditions indicated a reattachment of the boundary layer. The apparent boundary layer separation from the suction surface is not corroborated by flow turning and pressure loss levels. Therefore, the flow separation must not be as severe as indicated by the static pressure distributions.

Stator Slot Blowing Flow

The experimental slot blowing flow rates attained over the test range are shown in Figure 29. The variation of slot blowing flow along the span of the stator is given in Figure 30a. The test points representing design incidence

angles at each corrected speed were selected to give the best approximation over the blade span. Experimental flow rates are found to be about 50% of the design values at 100% corrected speed. The flow rates were calculated from a measured static pressure in the core of the stator which was assumed equal to core total pressure and a static tap located in the slot. Design values for the hub, mean, and tip section slots (i. e., separated by slot bridges) taken as an average for each slot section are 0.00726, 0.00693, and 0.00652 lb_m/sec-in., respectively. Experimental blowing flow spanwise gradients were not large. Figure 30b shows that the variation in blowing rates from the value at design incidence to either test extreme on the speed line characteristic was within 10% of the value at design incidence.

CONCLUDING REMARKS

Discussion of the experimental results is based on analysis work completed to date. Considerably more effort is required in addition to the beneficial experience to be obtained on continuing stator tests before final conclusions can be drawn. Analysis of the data to date, however, indicates the following points.

- Performance of the flow generation rotor was good, and its flow range was sufficient to give a wide range of stator negative incidence angle with design inlet guide vanes. Rotor stall may have limited attainment of stator stall incidence angles.
- Blowing boundary layer control techniques for high lift stators show promising results based on the measured flow turning achieved at acceptable loss levels.
- Flow turning and pressure loss levels do not indicate severe boundary layer separation. The blade surface static pressure distributions, however, do indicate extensive flow separation.
- Rotor blade steady state plus transient stresses were above the prescribed limit values during the hysteresis loop test at 80% corrected speed.

REFERENCES

1. Miller, M. L. and Chapman, D. C., Single-Stage Experimental Evaluation of Boundary Layer Blowing Techniques for High Lift Stator Blades, I - Compressor Design. NASA CR-54564, Allison Division, GMC, EDR 5636, February 1968.

2. Aerodynamic Design of Axial Flow Compressors. NASA SP-36, 1965.

APPENDIX

PERFORMANCE EQUATIONS

The following overall and blade element performance parameters were calculated for the analysis of test data and the evaluation of the slotted and unslotted stator performance.

WEIGHT FLOW

Overall performance is presented as a function of corrected weight flow, defined as

$$\frac{W_a\sqrt{\theta}}{\delta} \tag{A1}$$

ADIABATIC EFFICIENCY

Adiabatic efficiency for the inlet guide vane and rotor combination is

$$\eta_{ad_2} = \frac{\left[\left(\frac{P_{t_{2,ma}}}{P_{t_0}}\right)\right]^{(\gamma-1)/\gamma} - 1}{\frac{T_{t_{3,ma}}}{T_{t_0}} - 1} \tag{A2}$$

and for the guide vane, rotor and stator is

$$\eta_{ad_3} = \frac{\left[\left(\frac{P_{t_{3,ma}}}{P_{t_0}}\right)\right]^{(\gamma-1)/\gamma} - 1}{\frac{T_{t_{3,ma}}}{T_{t_0}} - 1} \tag{A3}$$

DIFFUSION FACTOR

For the rotor, diffusion factor is defined as

$$D_{f_2} = 1 - \frac{V_2'}{V_1'} + \frac{V_{\theta_2} - V_{\theta_1}}{2\sigma V_1'} \tag{A4}$$

and for the stator as

$$D_{f_3} = 1 - \frac{V_3}{V_2} + \frac{V_{\theta_2} - V_{\theta_3}}{2\sigma V_2} \tag{A5}$$

These quantities are calculated using the appropriate velocity triangle values previously computed by the program.

DEVIATION ANGLE

Rotor blade deviation is defined as

$$\delta_2^\circ = \beta_2' - \kappa_2' \tag{A6}$$

and stator deviation as

$$\delta_3^\circ = \beta_3 - \kappa_3 \tag{A7}$$

where κ_2' is the rotor blade exit metal angle based on the mean camber line for a double circular arc airfoil and κ_3 is the stator vane exit metal angle based on the equivalent circular arc camber line for the 65-series airfoil.

INCIDENCE ANGLE

Rotor blade incidence is defined as

$$i_1' = \beta_1' - \kappa_1' \tag{A8}$$

and stator incidence as

$$i_2 = \beta_2 - \kappa_2 \tag{A9}$$

where κ_1' is the rotor blade inlet metal angle based on the mean camber line for a double-circular arc airfoil and κ_2 is the stator vane inlet metal angle based on the circular arc camber line.

TOTAL PRESSURE LOSS COEFFICIENT

Total pressure loss coefficient for the rotor is defined as

$$\bar{\omega}' = \frac{\left[1 + \frac{\gamma-1}{2}\frac{(\omega R_2)^2}{\gamma g \mathcal{R} T'_{t_1}}\left(1 - \frac{R_1^2}{R_2^2}\right)\right]^{\gamma/(\gamma-1)}\left[1 - \frac{(P_{t_2}/P_{t_1})}{(T_{t_2}/T_{t_1})^{\gamma/(\gamma-1)}}\right]}{1 - \left[1 + \frac{\gamma-1}{2}(M'_1)^2\right]^{-\gamma/(\gamma-1)}} \tag{A10}$$

and for the inlet guide vane as

$$\bar{\omega} = \frac{1 - \frac{P_{t_1}}{P_{t_0}}}{1 - \left[1 + \frac{\gamma-1}{2}(M_0)^2\right]^{-\gamma/(\gamma-1)}} \tag{A11}$$

and stator as

$$\bar{\omega} = \frac{1 - \frac{P_{t_3}}{P_{t_2}}}{1 - \left[1 + \frac{\gamma-1}{2}(M_2)^2\right]^{-\gamma/(\gamma-1)}} \tag{A12}$$

PRESSURE COEFFICIENT

Pressure coefficient (S) is defined by

$$S = \frac{P_{t_2} - p}{q_2} \tag{A13}$$

where:

P_{t_2} = total pressure at stator inlet
p = static pressure at a given point on the vane surface
$q_2 = \frac{1}{2}\gamma\, p_2\, M_2^2$ = dynamic pressure at stator inlet

VANE BLOWING FLOW

Vane blowing flow per unit slot length is first calculated at each station at which surface static pressure taps exist and is defined as

$$\dot{m} = C_W \rho_{slot} h V_{slot} \tag{A14}$$

where:

C_W = slot flow coefficient = 0.82

$$\rho_{slot} = \frac{p_{slot}}{\mathcal{R} t_{slot}}$$

Slot flow conditions were based on stator inlet free stream total temperature, the core measured pressure taken as total pressure at the streamline in question, and the measured slot static pressure. The values thus obtained are used to calculate blowing flow through each segment of the slot and thence total blowing flow taking account of the blockage introduced by the interruption between slot segments.

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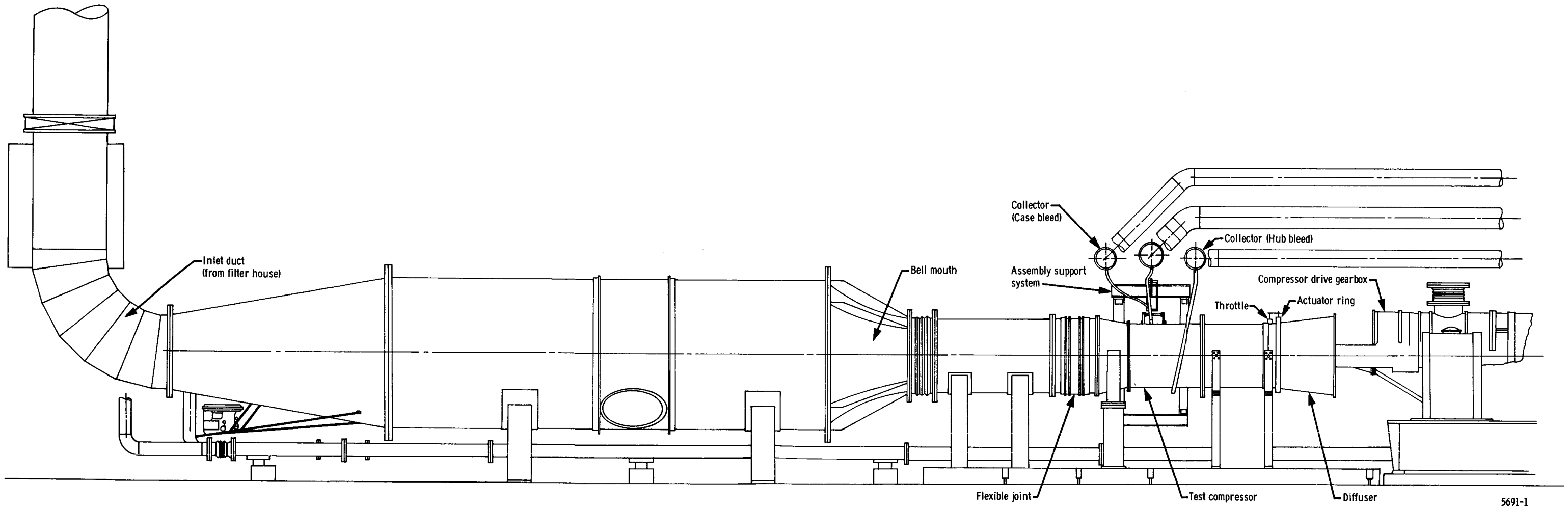

Figure 1. Compressor test facility.

FOLDOUT FRAME 1

FOLDOUT FRAME 2

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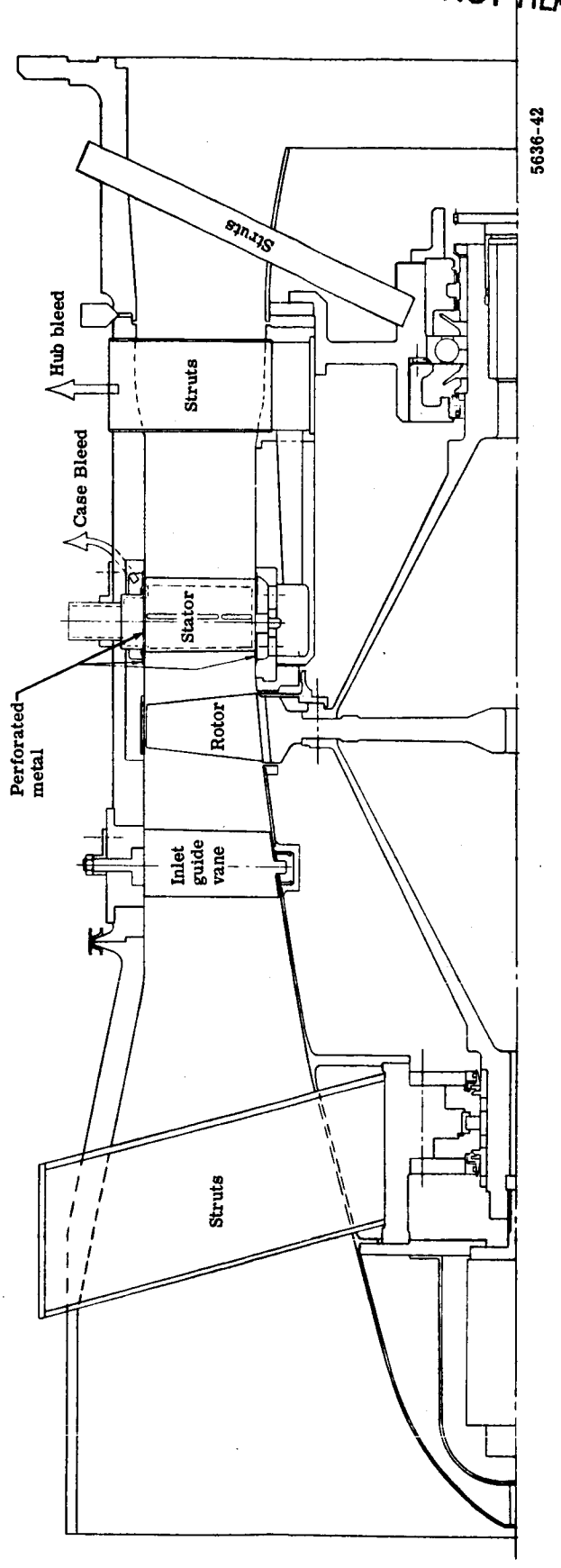
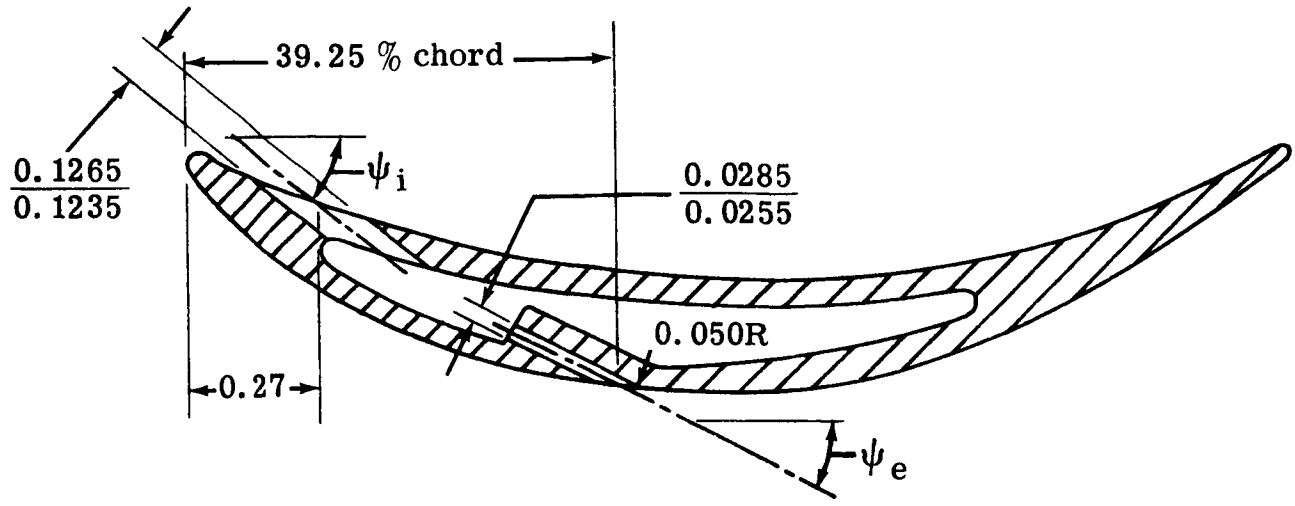
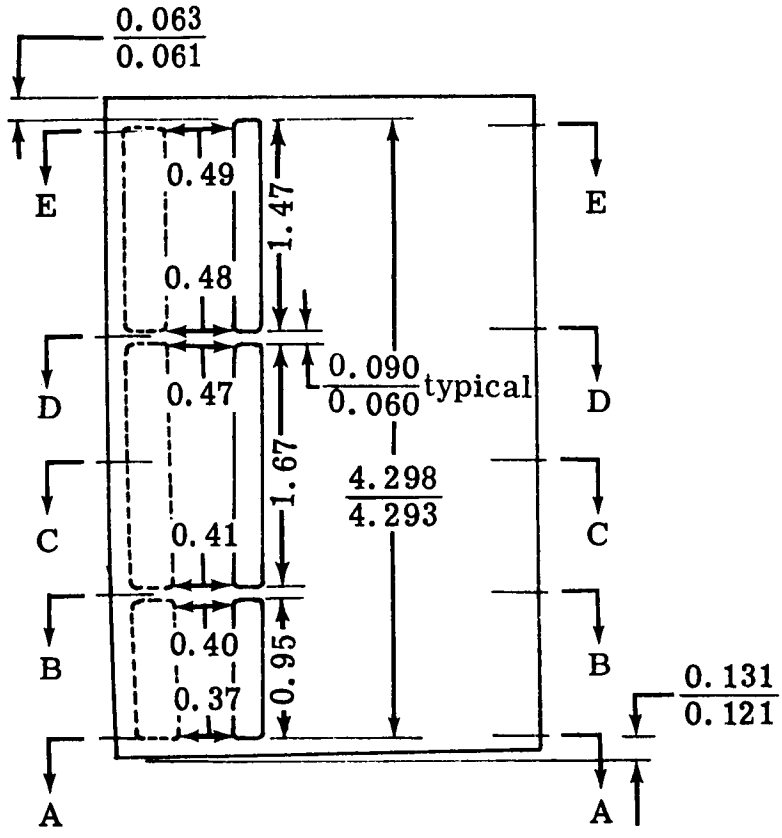


Figure 2. Layout of compressor test rig.



Note: All dimensions are in inches



Section	ψ_i	ψ_e
A-A	36°30'	22°30'
B-B	37°35'	23°35'
C-C	38°19'	24°19'
D-D	38°50'	24°50'
E-E	39°42'	25°42'

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Figure 3. Single-slotted 0.75 hub diffusion factor stator slot configuration.

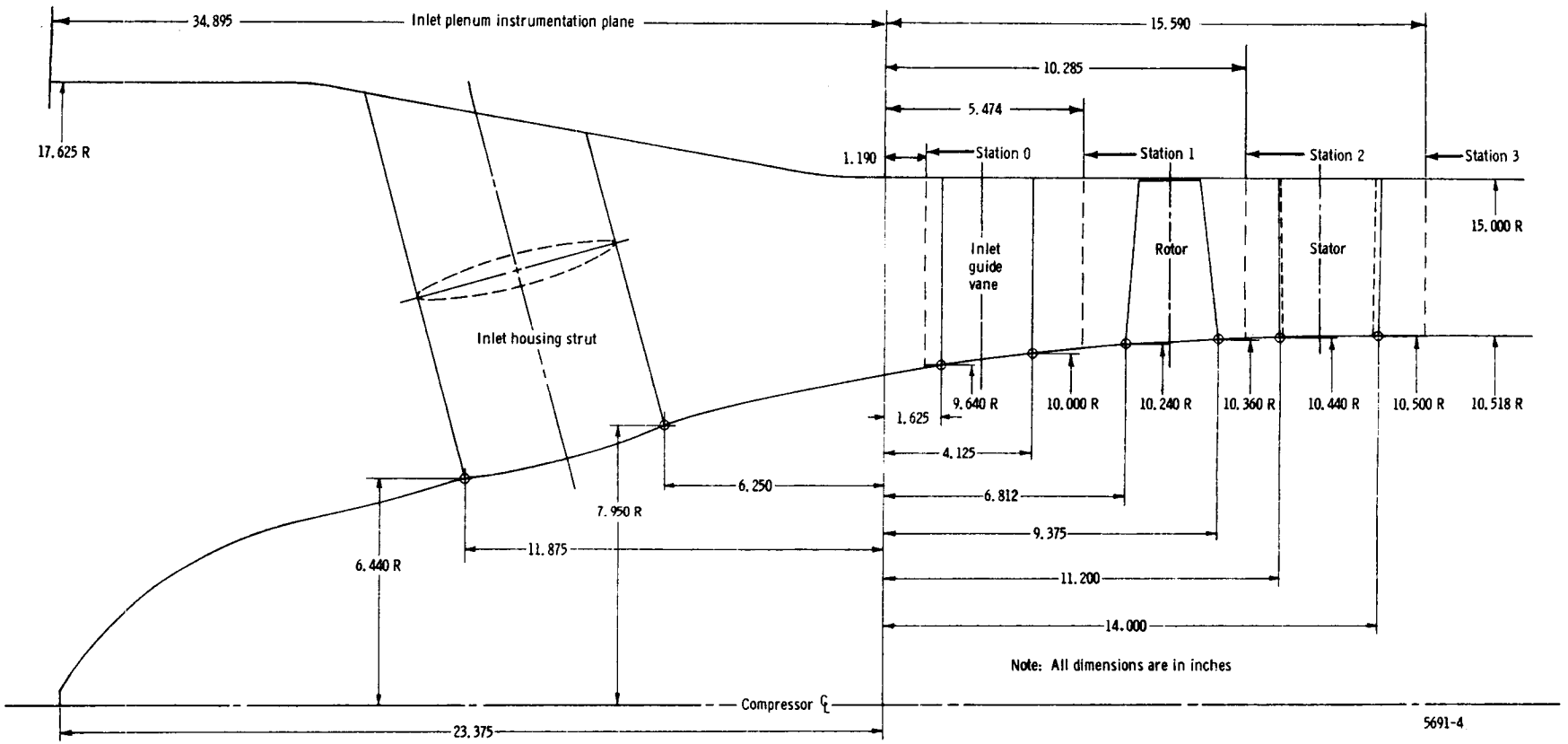


Figure 4. Test rig compressor flow path.

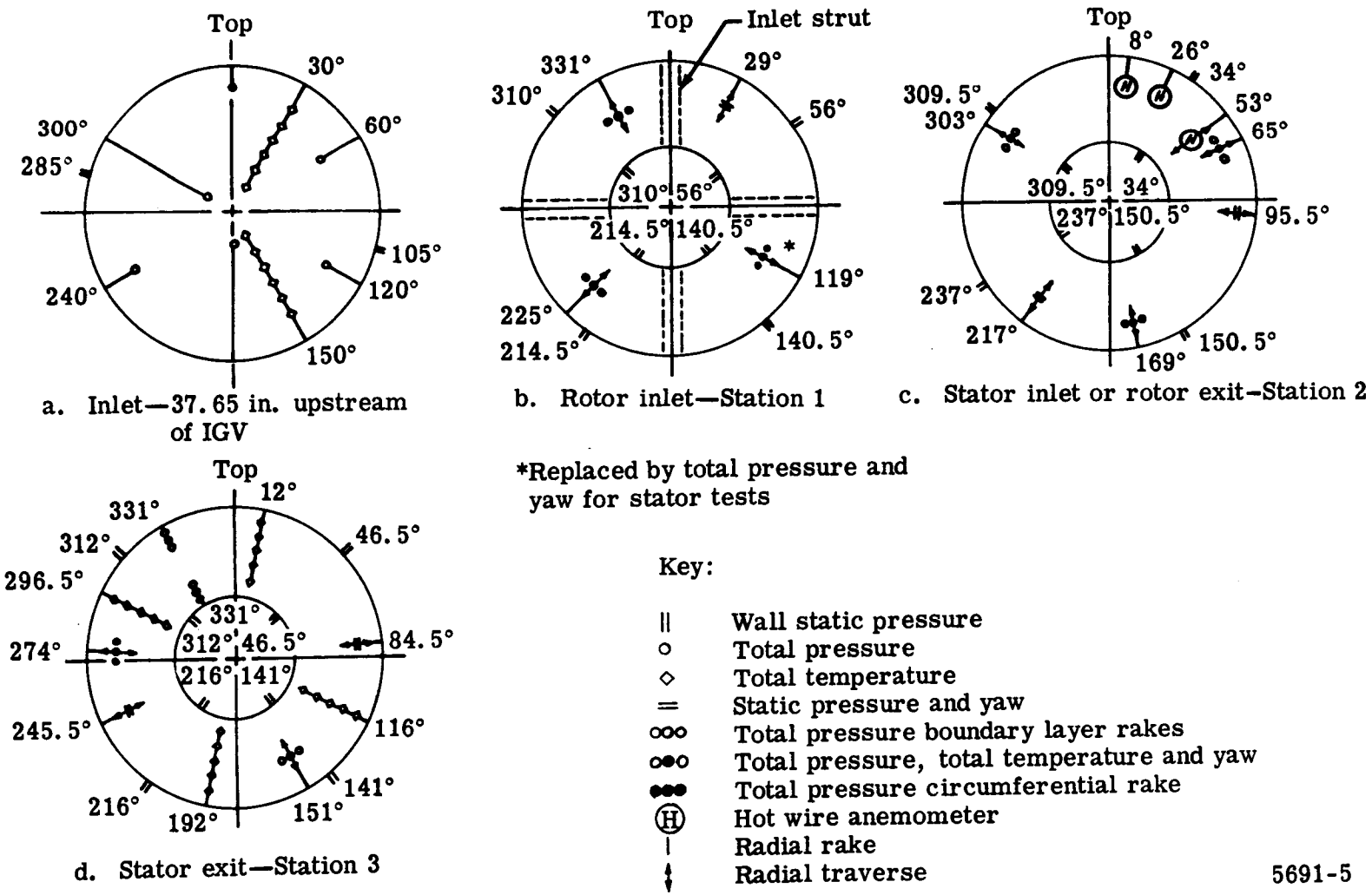


Figure 5. Circumferential location of instrumentation viewed downstream.

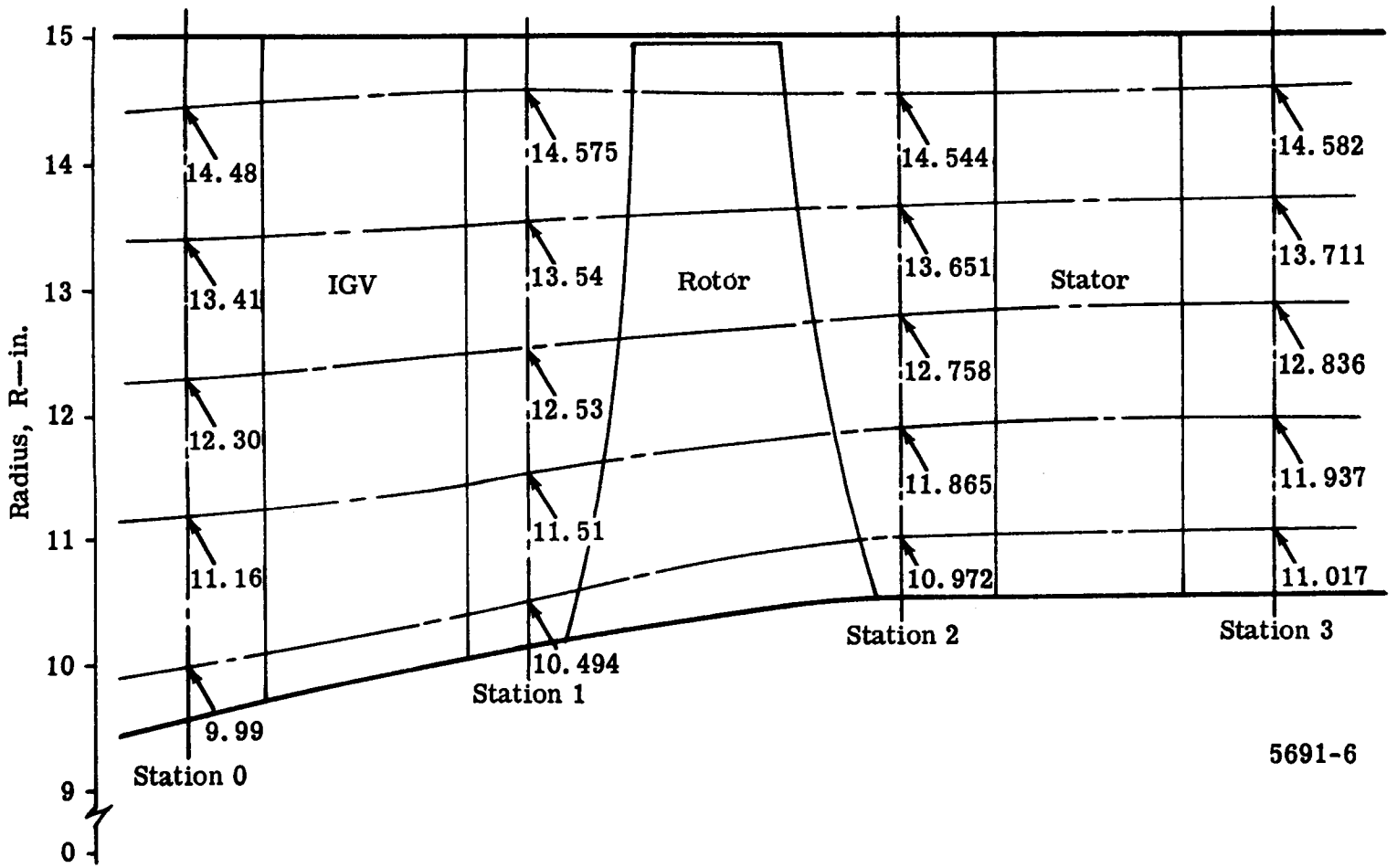
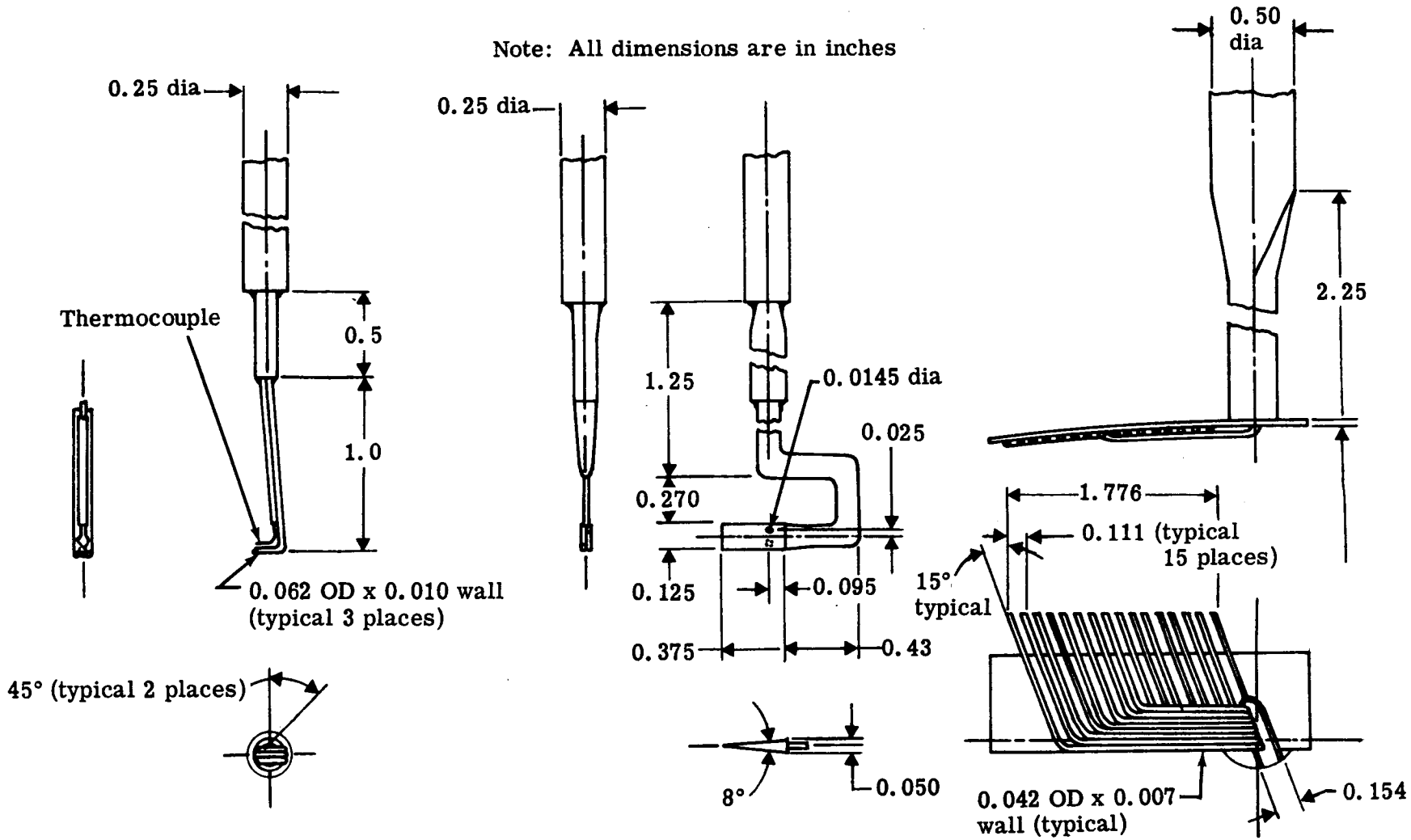


Figure 6. Radial location of streamlines for instrumentation positions.



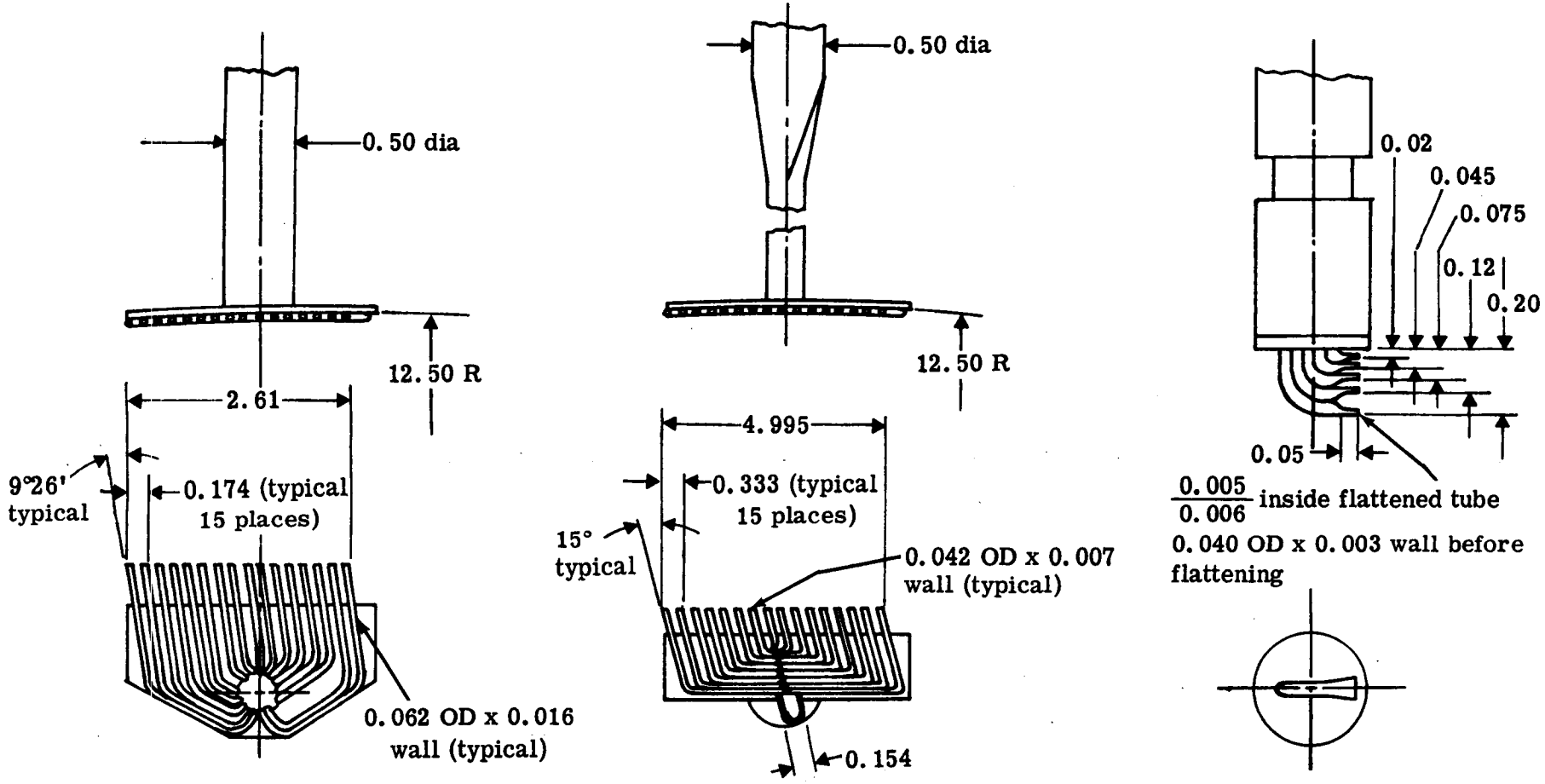
a. Total pressure, total temperature, and yaw probe

b. Static pressure and yaw probe

c. IGV circumferential rake

Figure 7. Schematics of survey instrumentation.

Note: All dimensions are in inches



d. Stator circumferential rake

e. IGV wake persistence circumferential rake

f. Boundary layer probe for tip and hub

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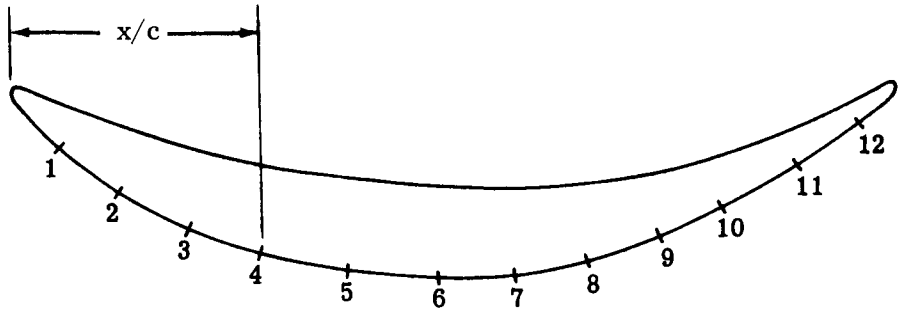
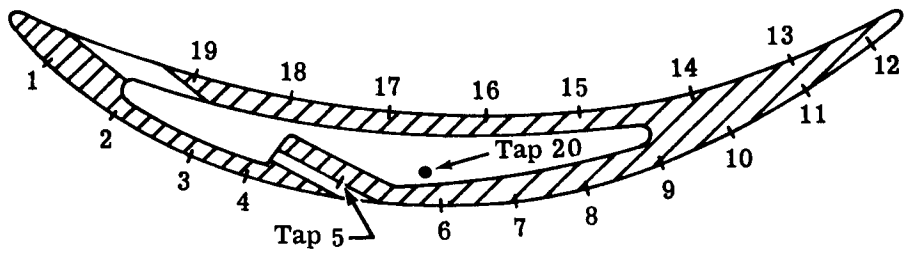
Figure 7. Schematics of survey instrumentation.



Tap	1	2	3	4	5	6	7	8	9	10	11	12
x/c–%	4.98	11.62	19.59	27.56	37.85	47.48	56.11	64.74	73.04	81.34	88.98	96.28
Vane No.	1	2	3	4	1	2	3	4	1	2	3	4

a. Unslotted stator vane at 50% streamline



Tap	1	2	3	4	5	6	7	8	9	10	11	12
x/c–%	4.65	11.96	19.94	26.25	—	47.85	56.49	65.13	73.44	81.42	89.39	96.70
Vane No.	1	2	3	4	1	2	3	4	1	2	3	4

Tap	13	14	15	16	17	18	19	20
x/c–%	87.73	76.43	64.14	53.50	42.20	30.90	20.60	—
Vane No.	1	2	3	4	1	2	3	4

b. Single-slotted stator vane at 10, 50, and 90% streamlines

5691-9

Figure 8. Stator vane static pressure tap locations.

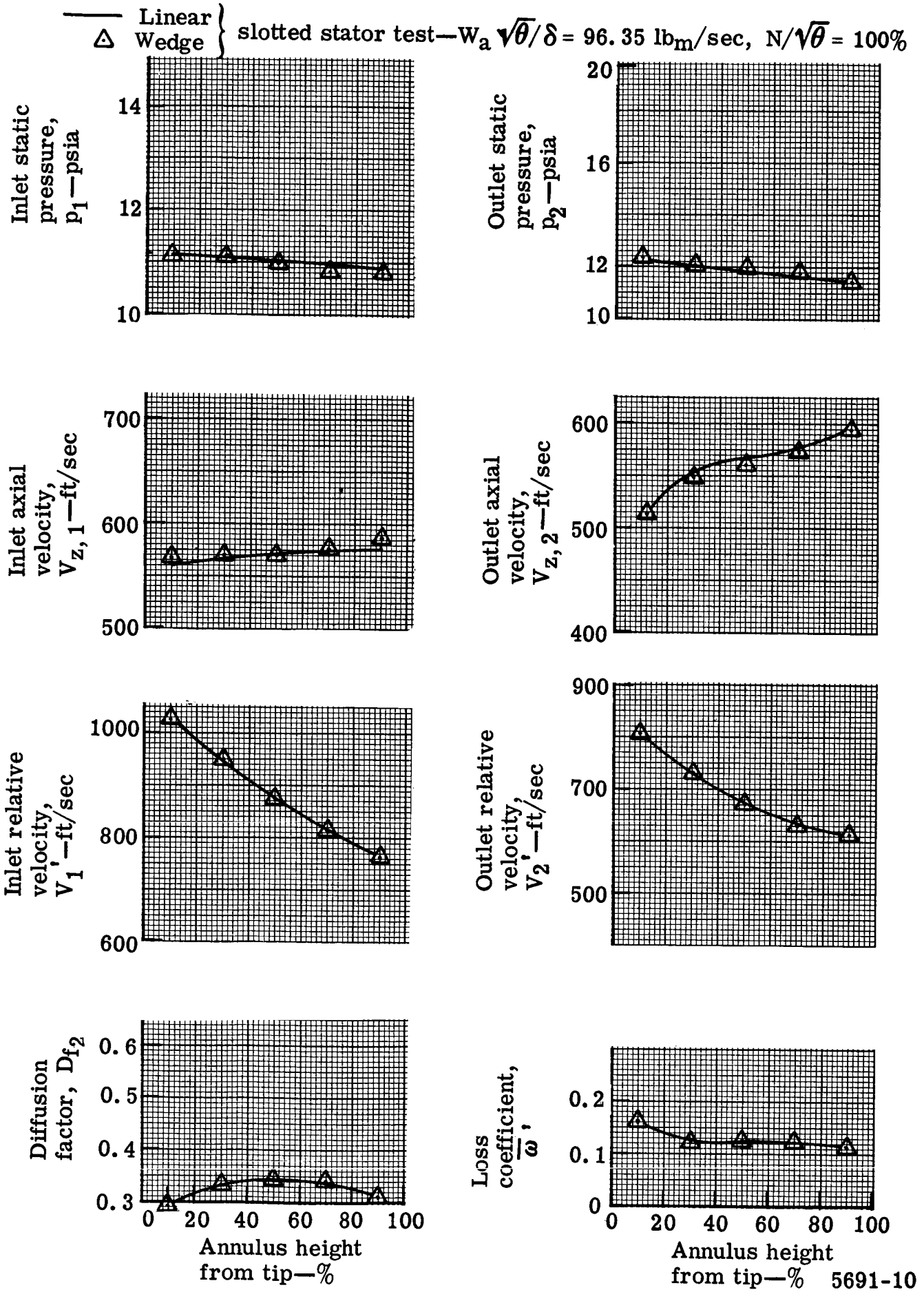


Figure 9. Comparison of wedge and linear static pressure data—rotor.

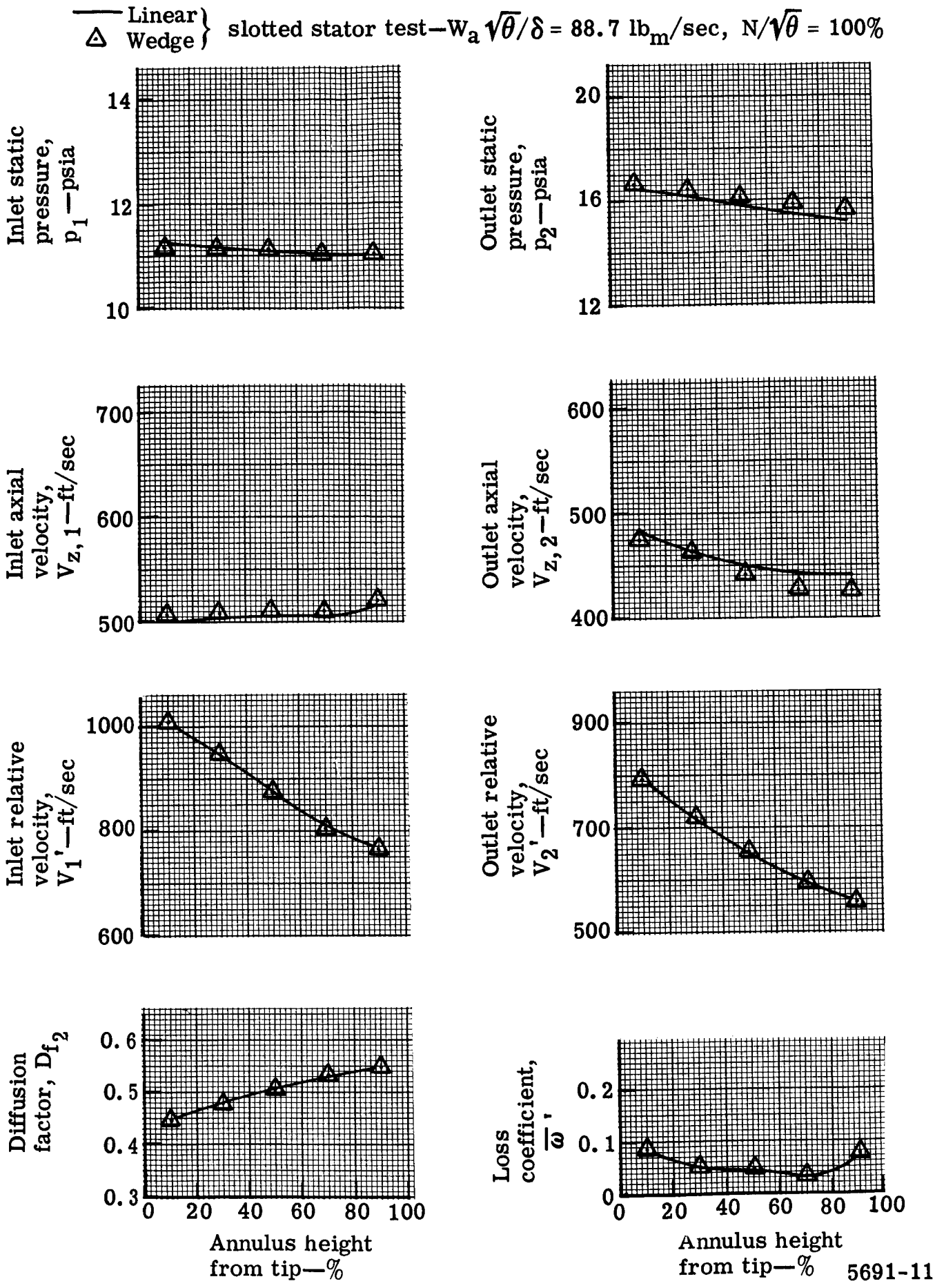


Figure 9. Comparison of wedge and linear static pressure data—rotor.

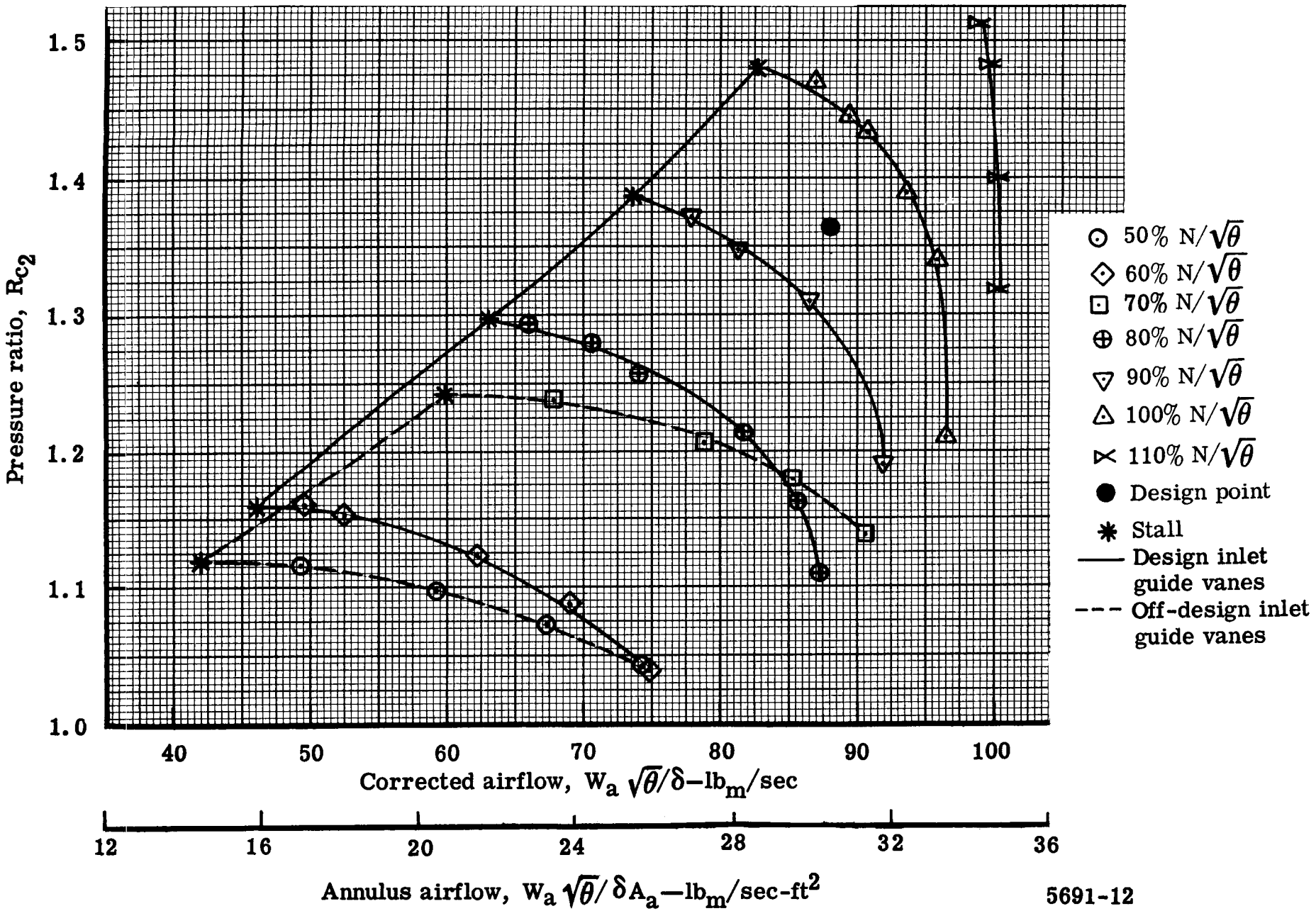


Figure 10. Flow generation rotor overall performance—pressure ratio.

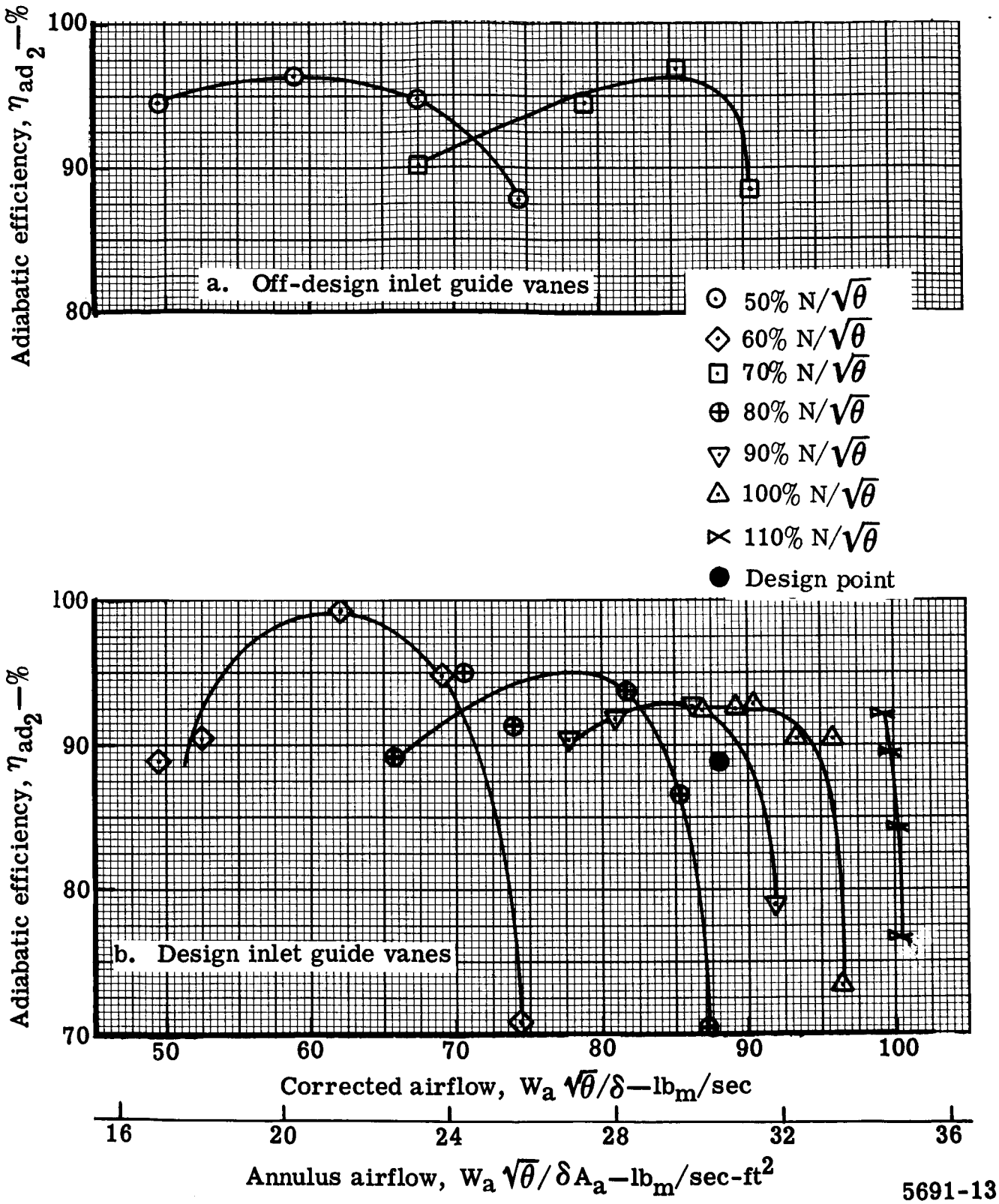


Figure 11. Flow generation rotor overall performance—adiabatic efficiency.

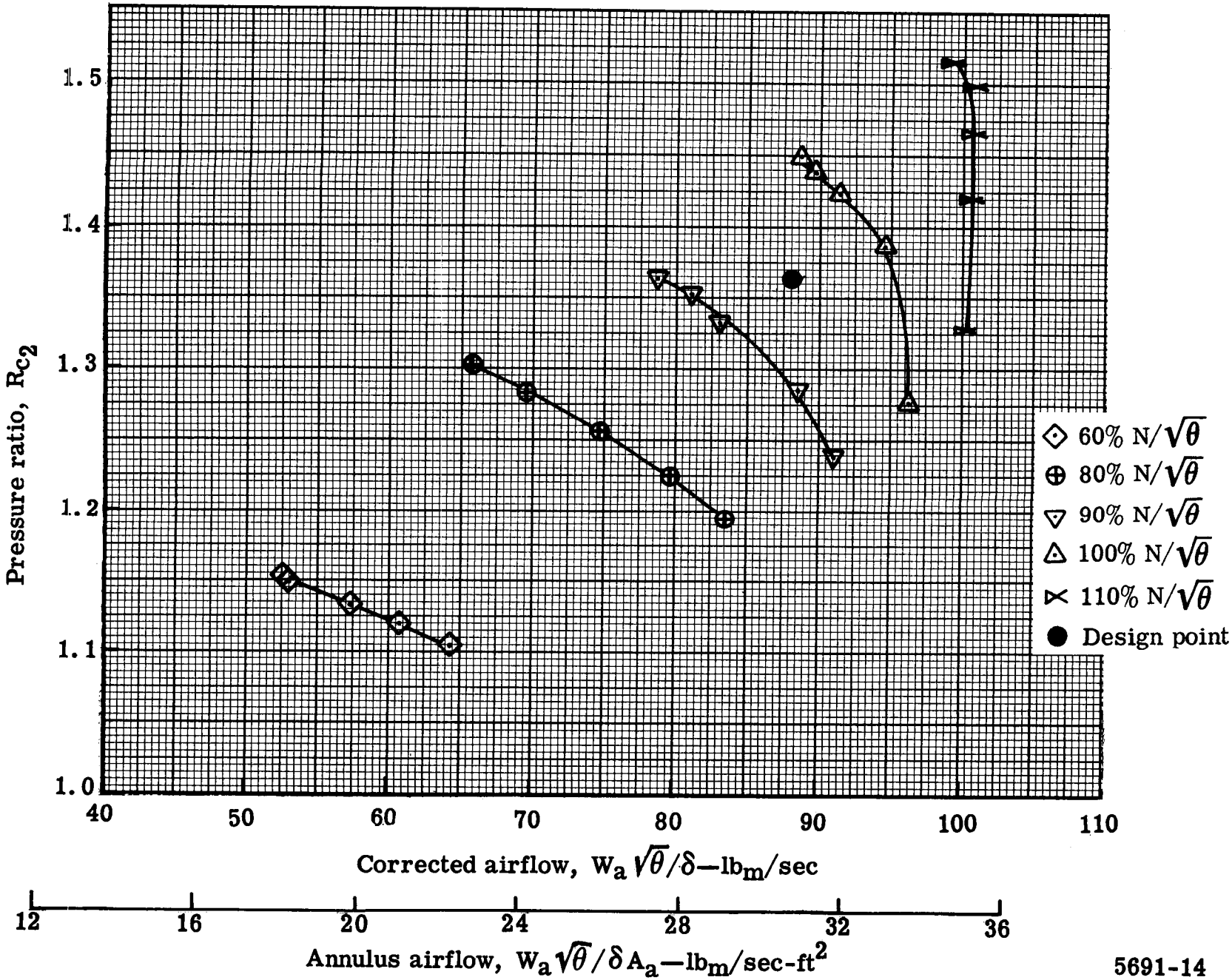


Figure 12. Flow generation rotor overall performance in stage test—pressure ratio.

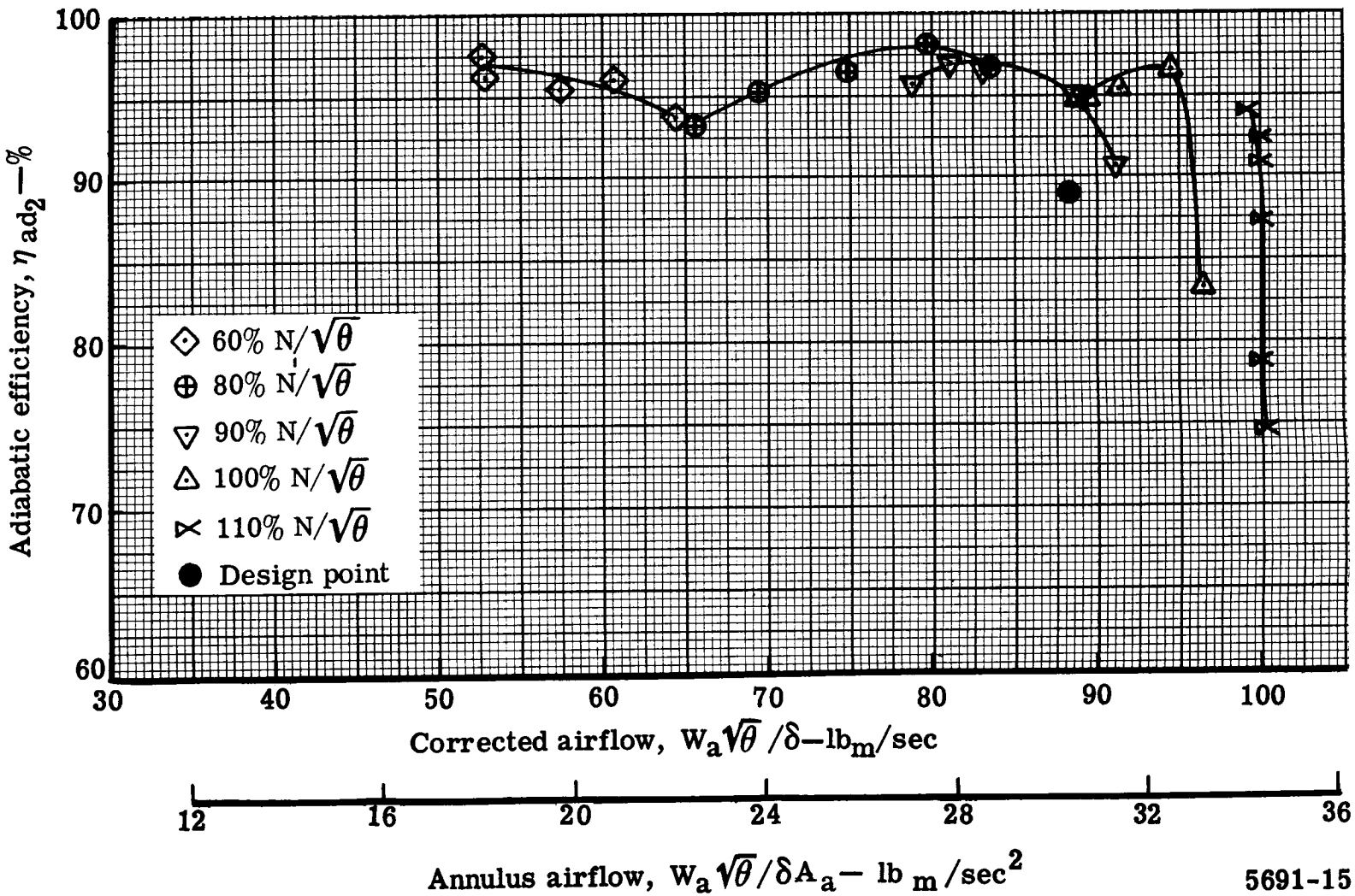
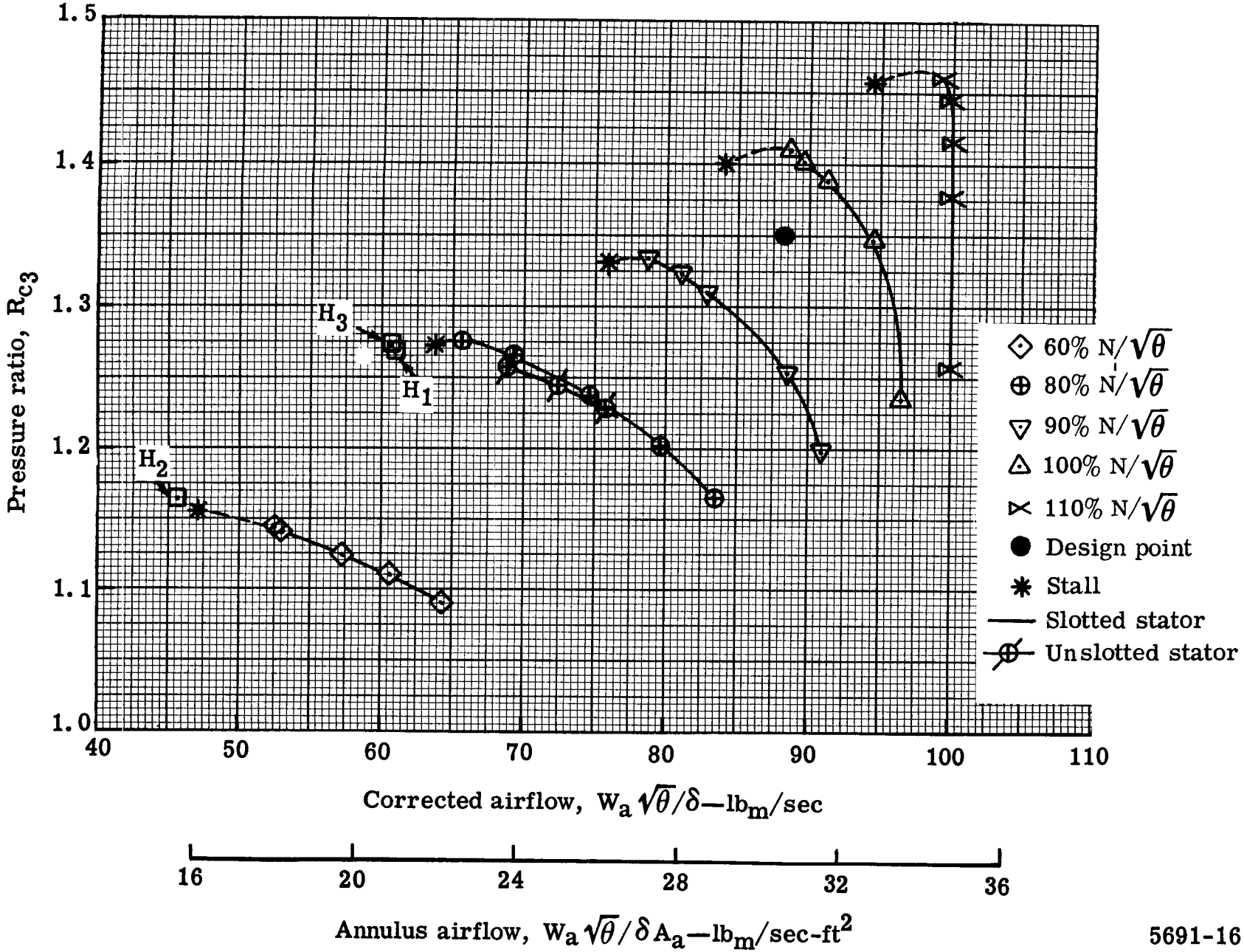


Figure 13. Flow generation rotor overall performance in stage test—adiabatic efficiency.



5691-16

Figure 14. Stage overall performance—pressure ratio.

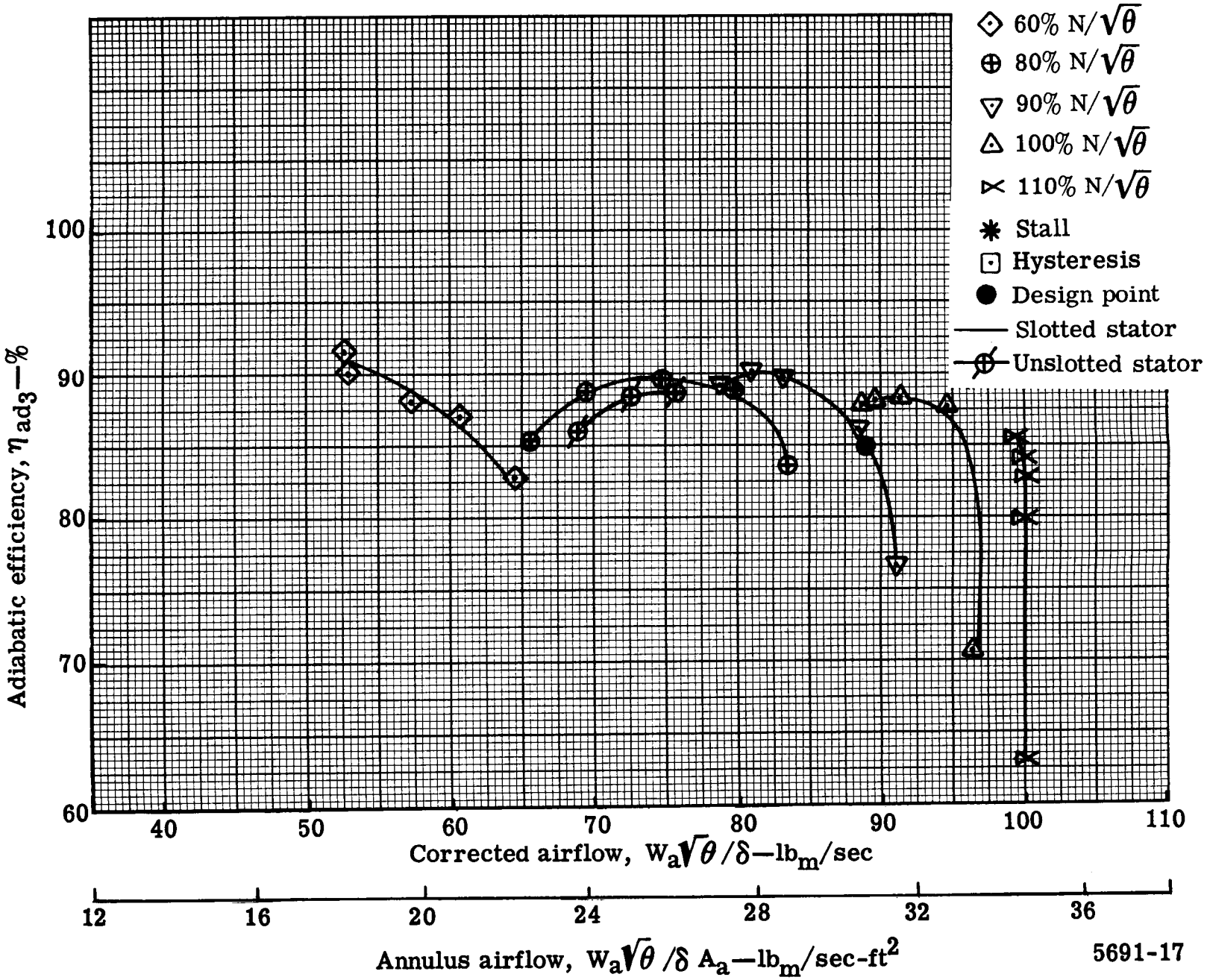


Figure 15. Stage overall performance—adiabatic efficiency.

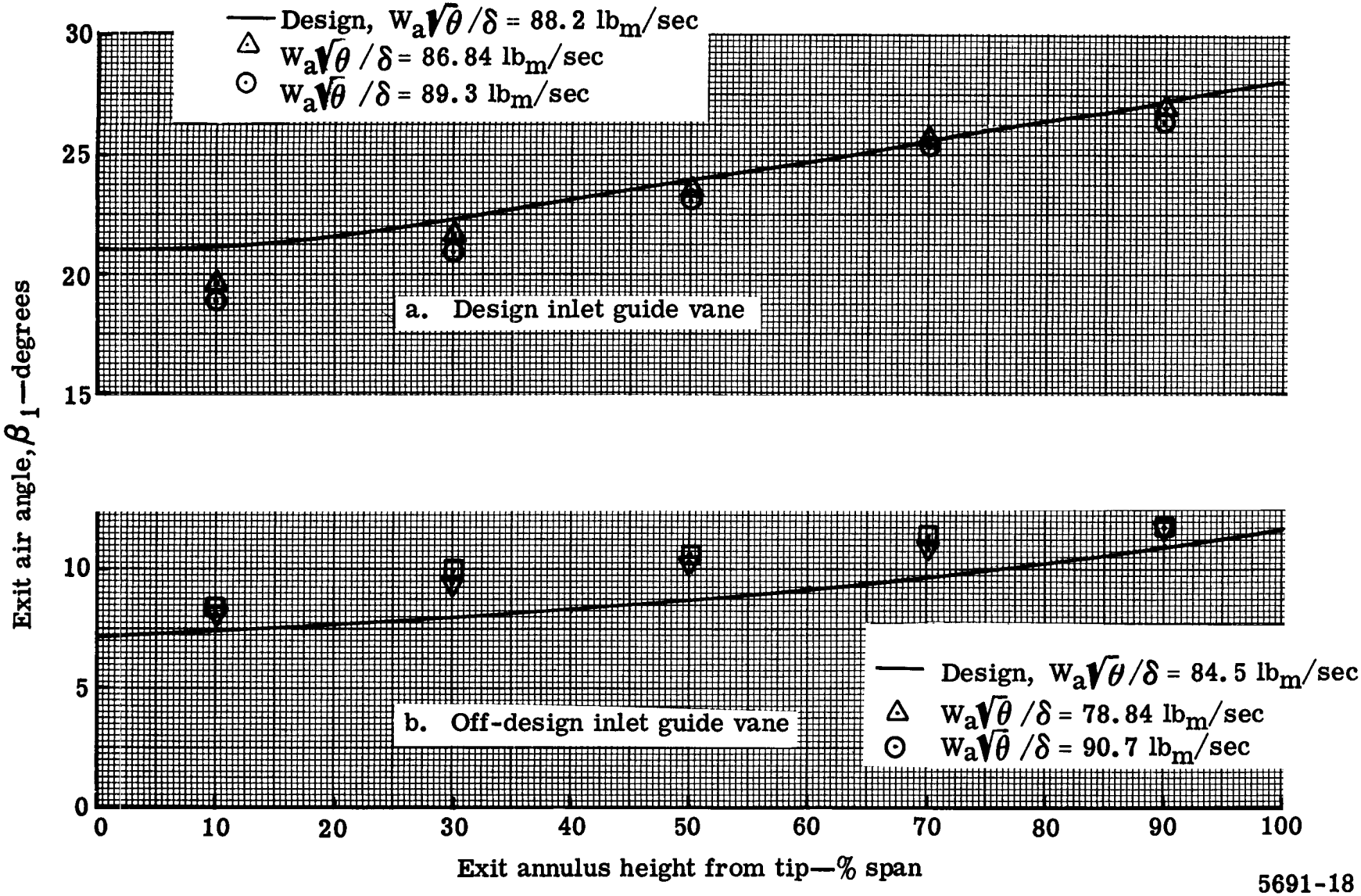


Figure 16. Comparison of inlet guide vane design and measured exit air angles.

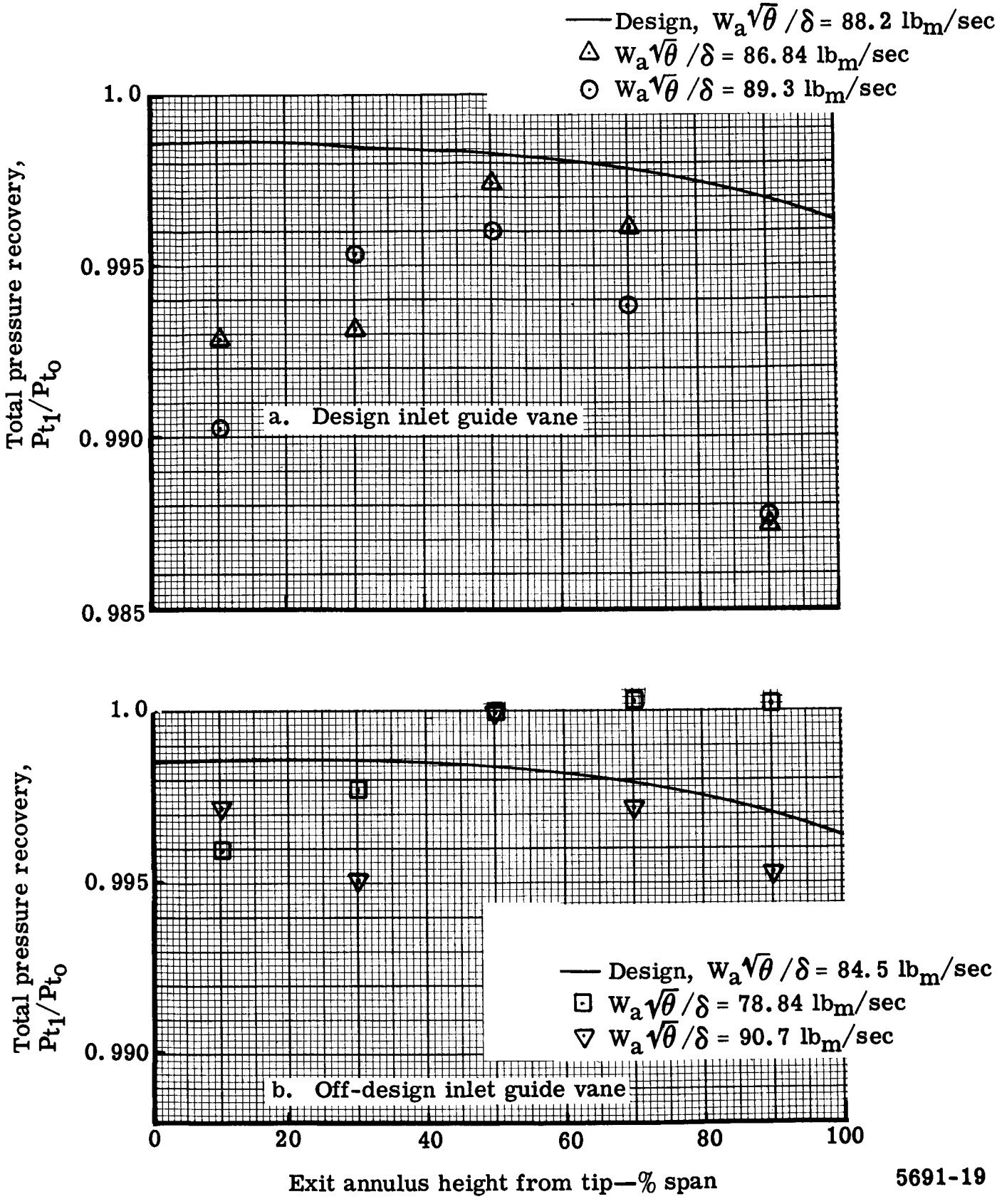


Figure 17. Comparison of inlet guide vane design and measured total pressure recovery.

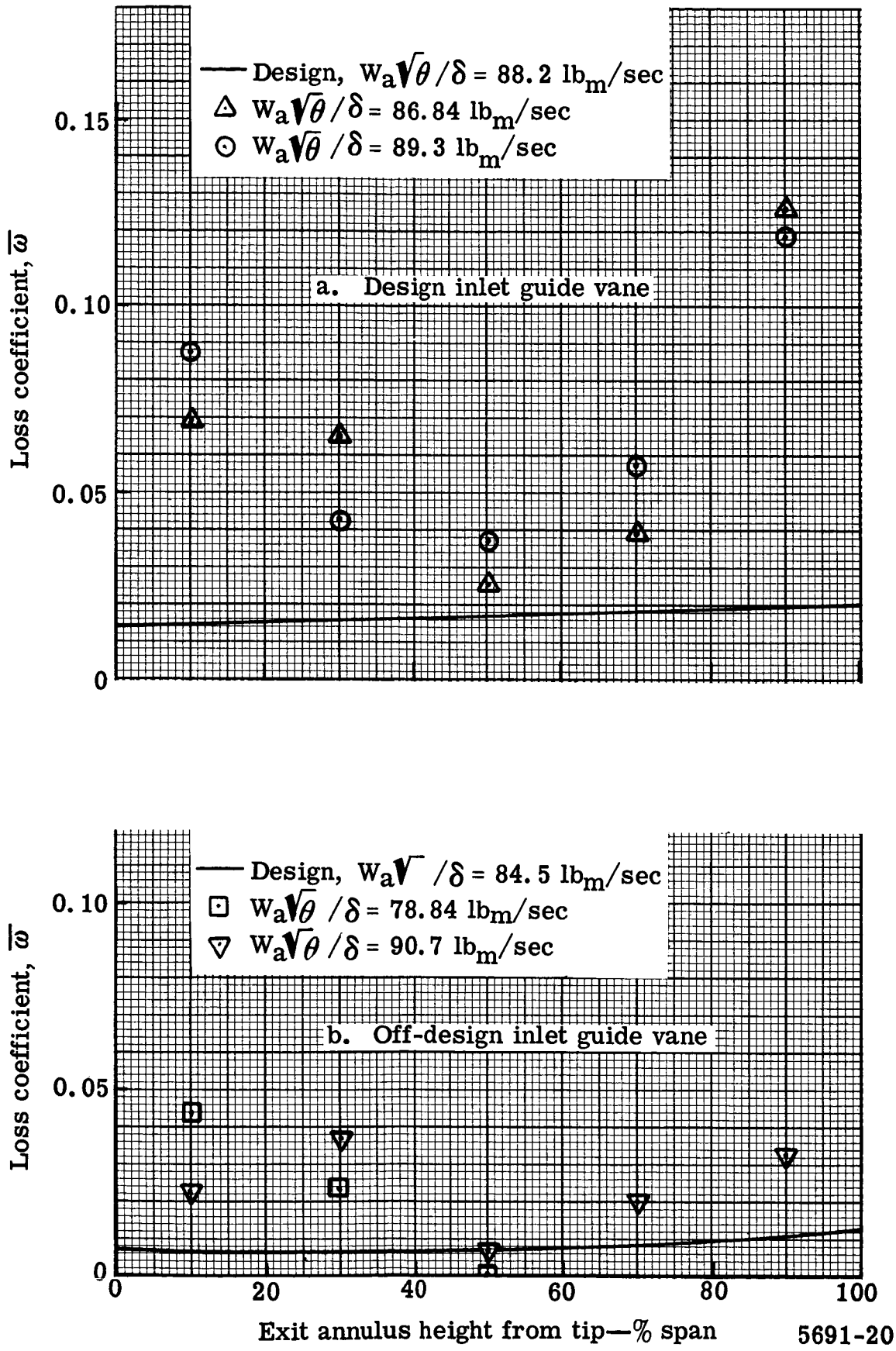


Figure 18. Comparison of inlet guide vane design and measured loss coefficients.

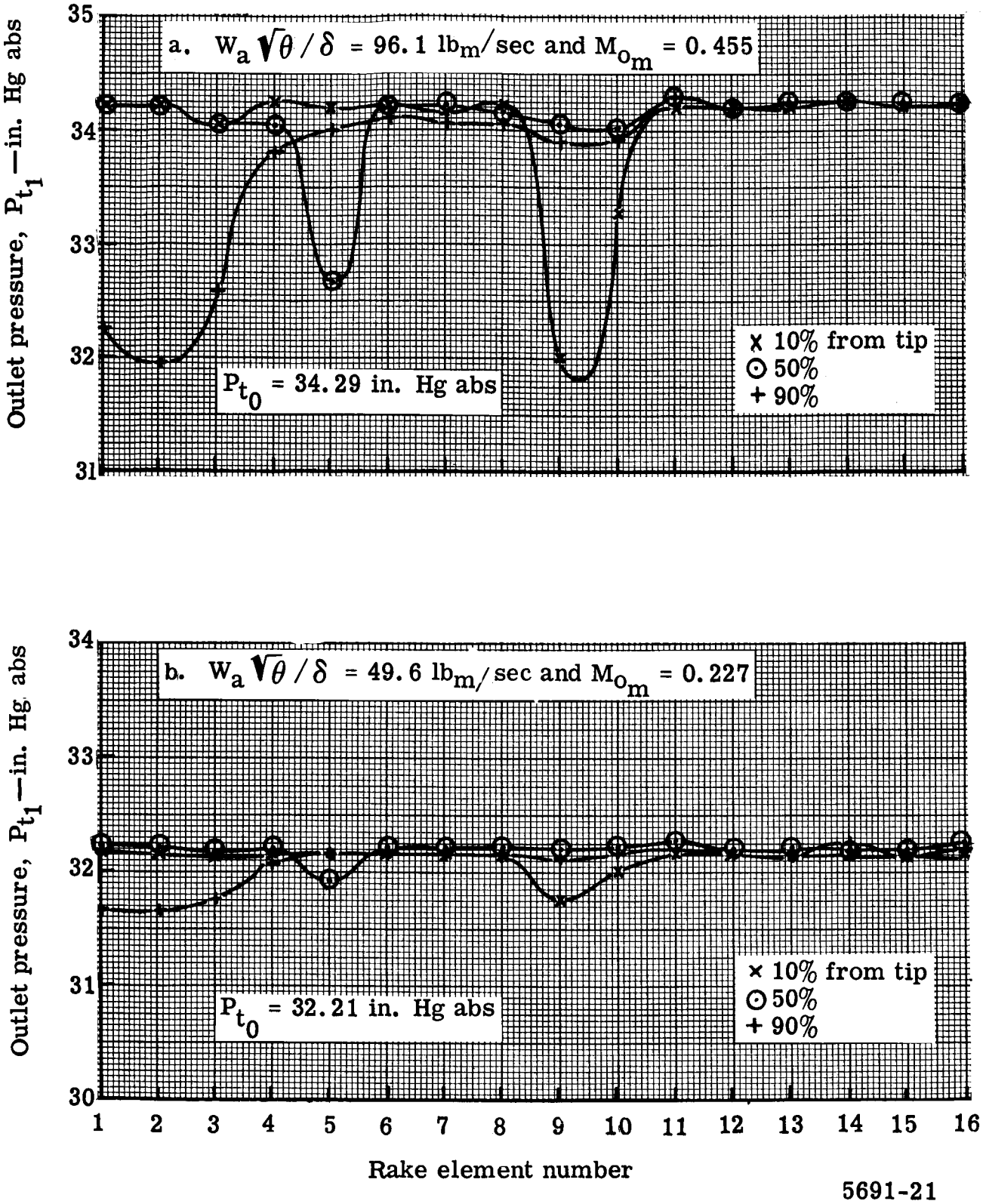
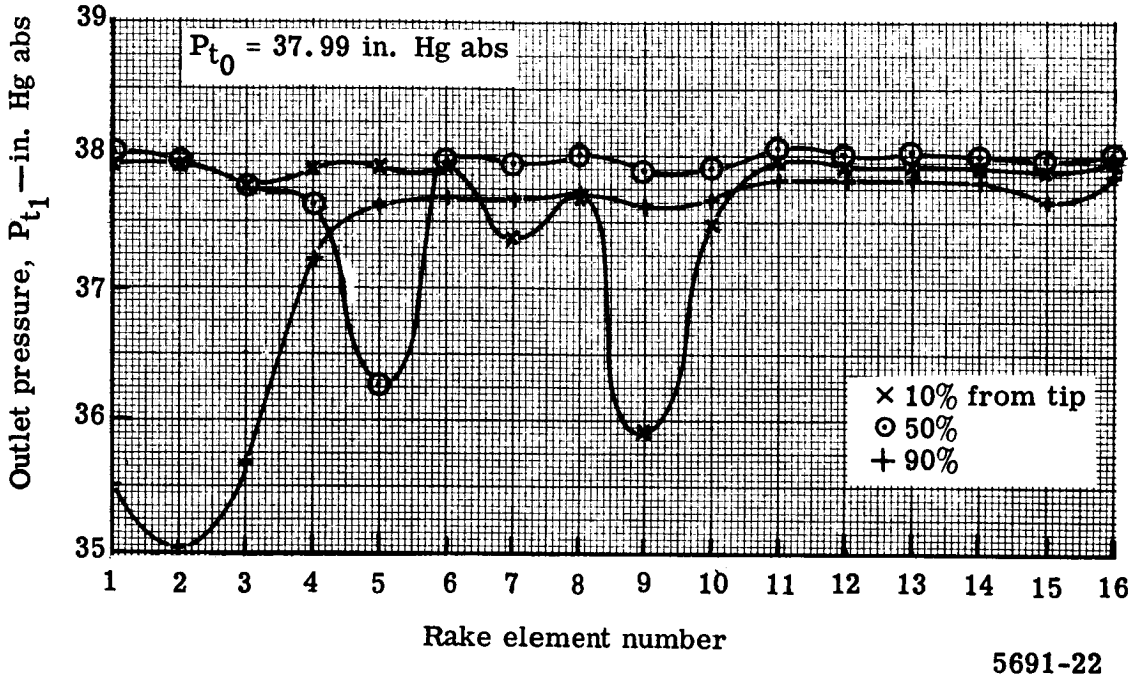


Figure 19. Design inlet guide vane wake survey at Station 1.



c. $W_a\sqrt{\theta}/\delta$ = 100.3 lb_m/sec and M_{o_m} = 0.469

Figure 19. Design inlet guide vane wake survey at Station 1.

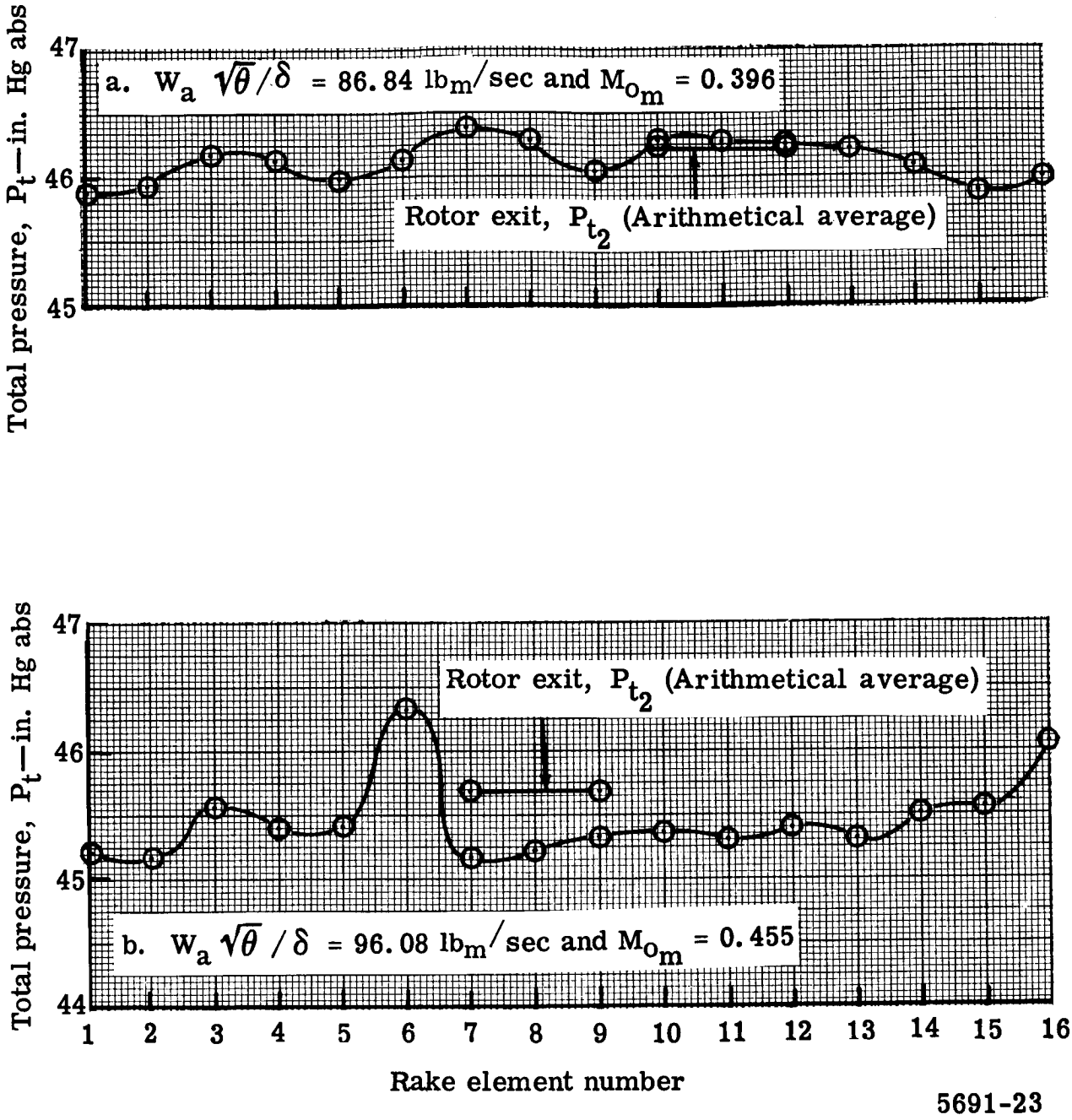
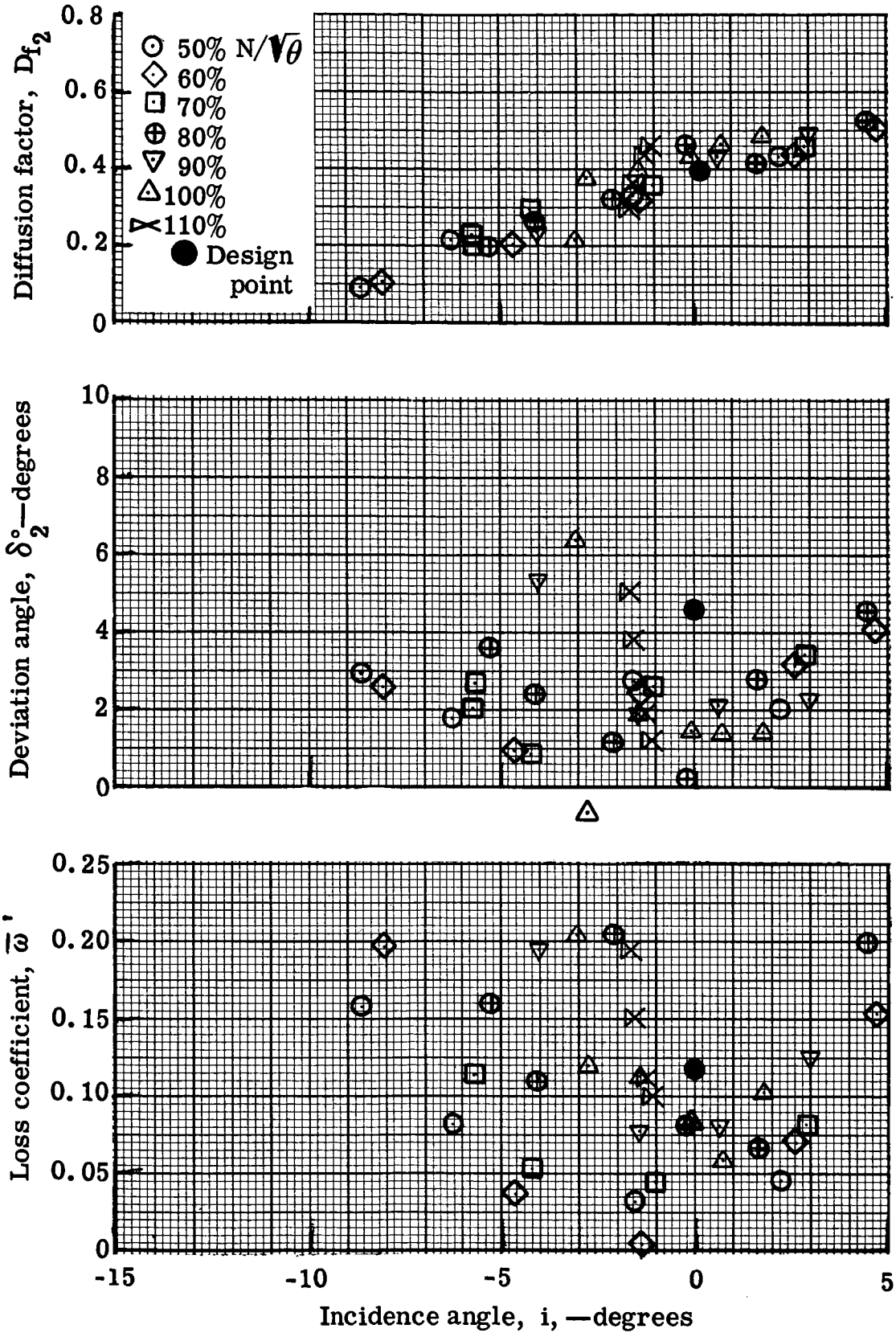


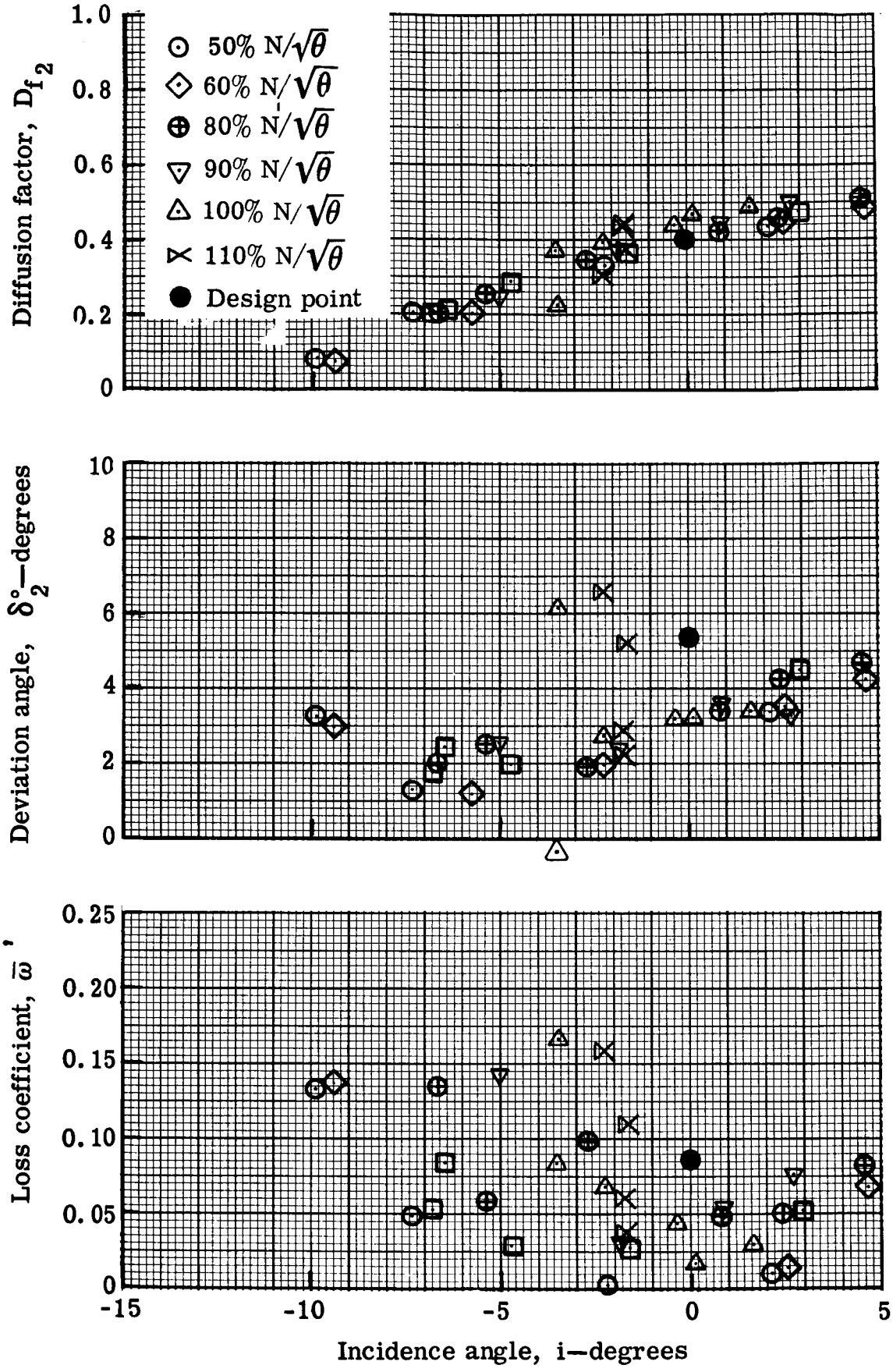
Figure 20. Design inlet guide vane wake survey measured at Station 3 and 50% streamline.



5691-24

a. 10% streamline from tip

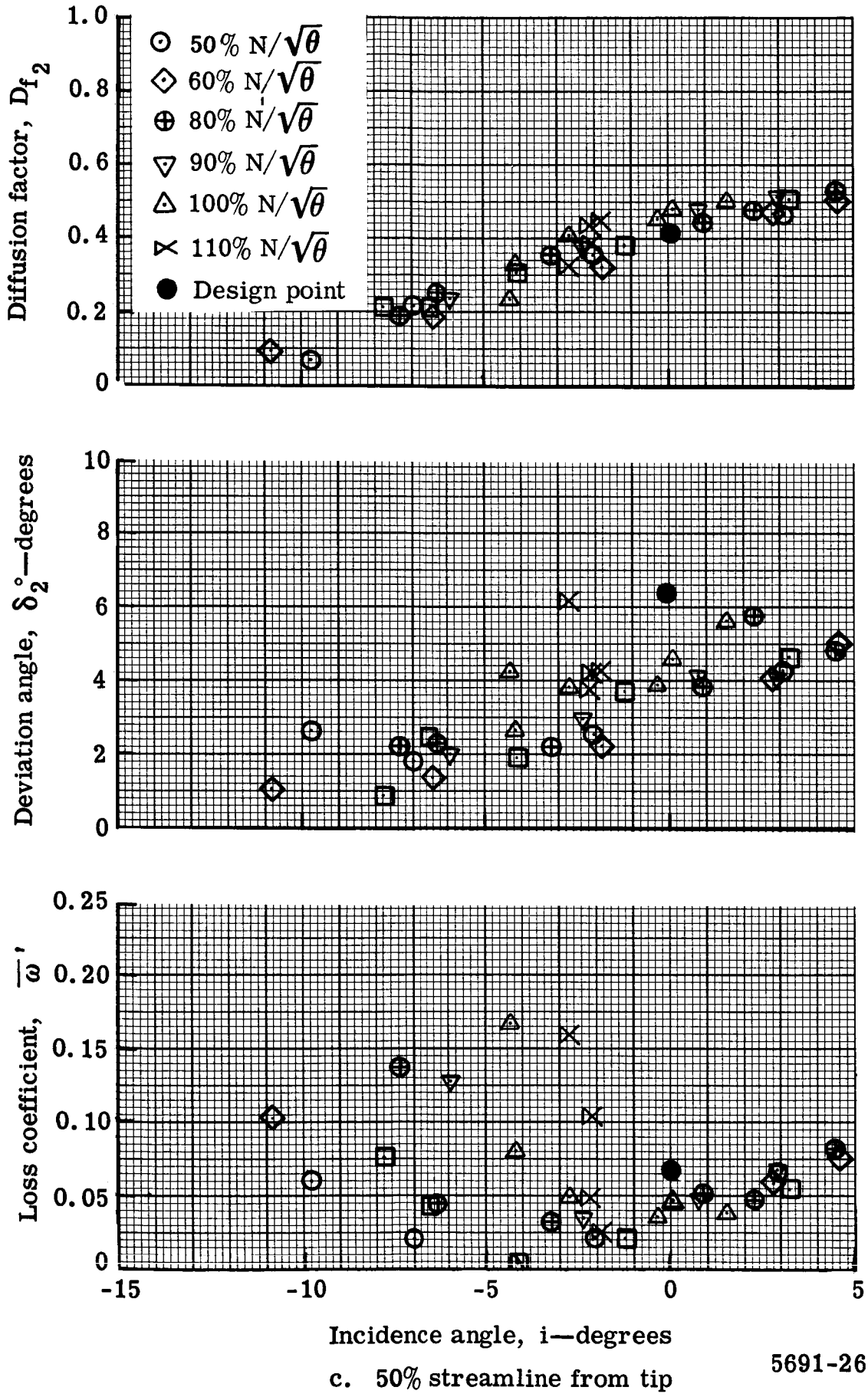
Figure 21. Rotor blade element performance for flow generation rotor test.



b. 30% Streamline From Tip

5691-25

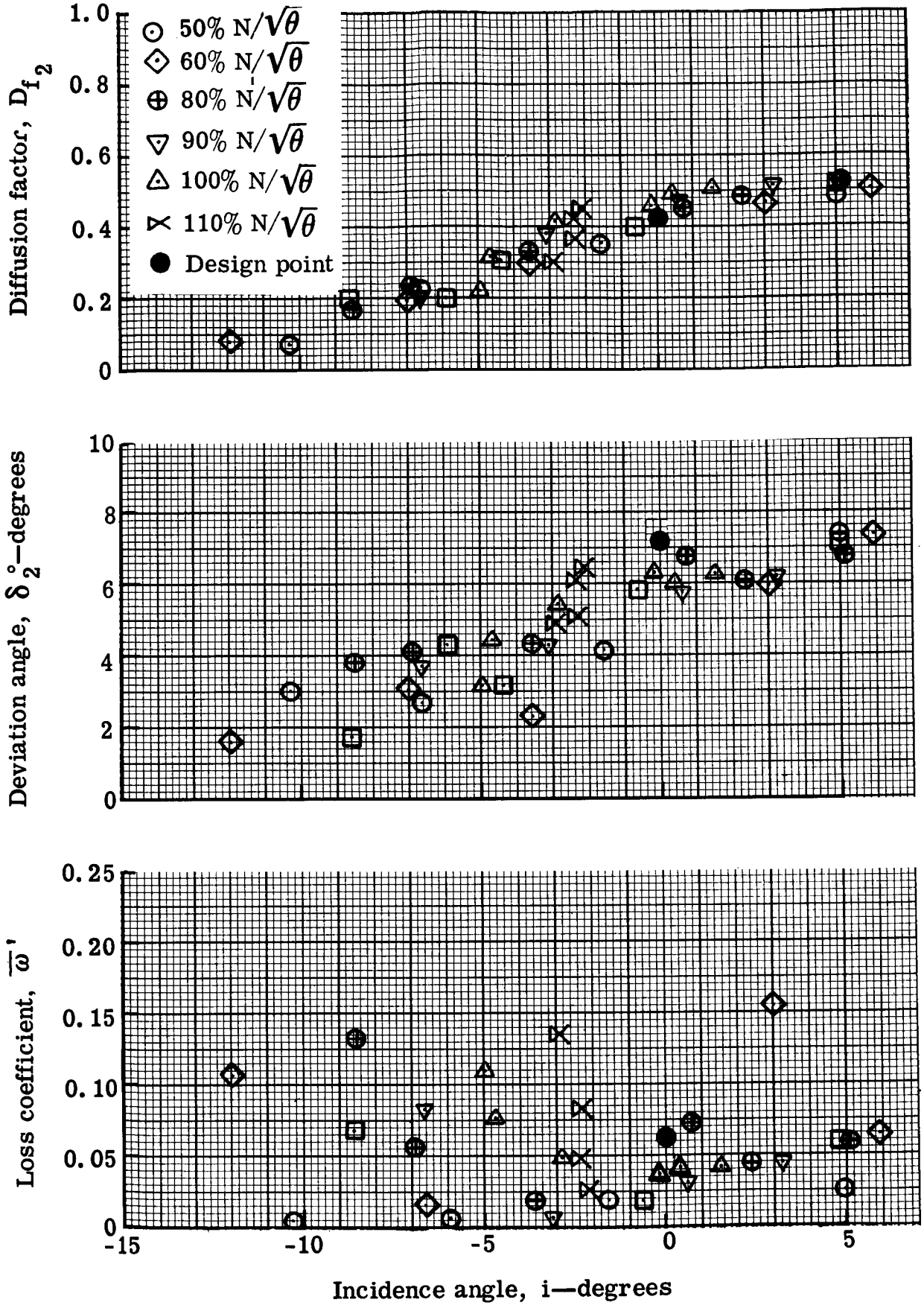
Figure 21. Rotor blade element performance for flow generation rotor test.



c. 50% streamline from tip

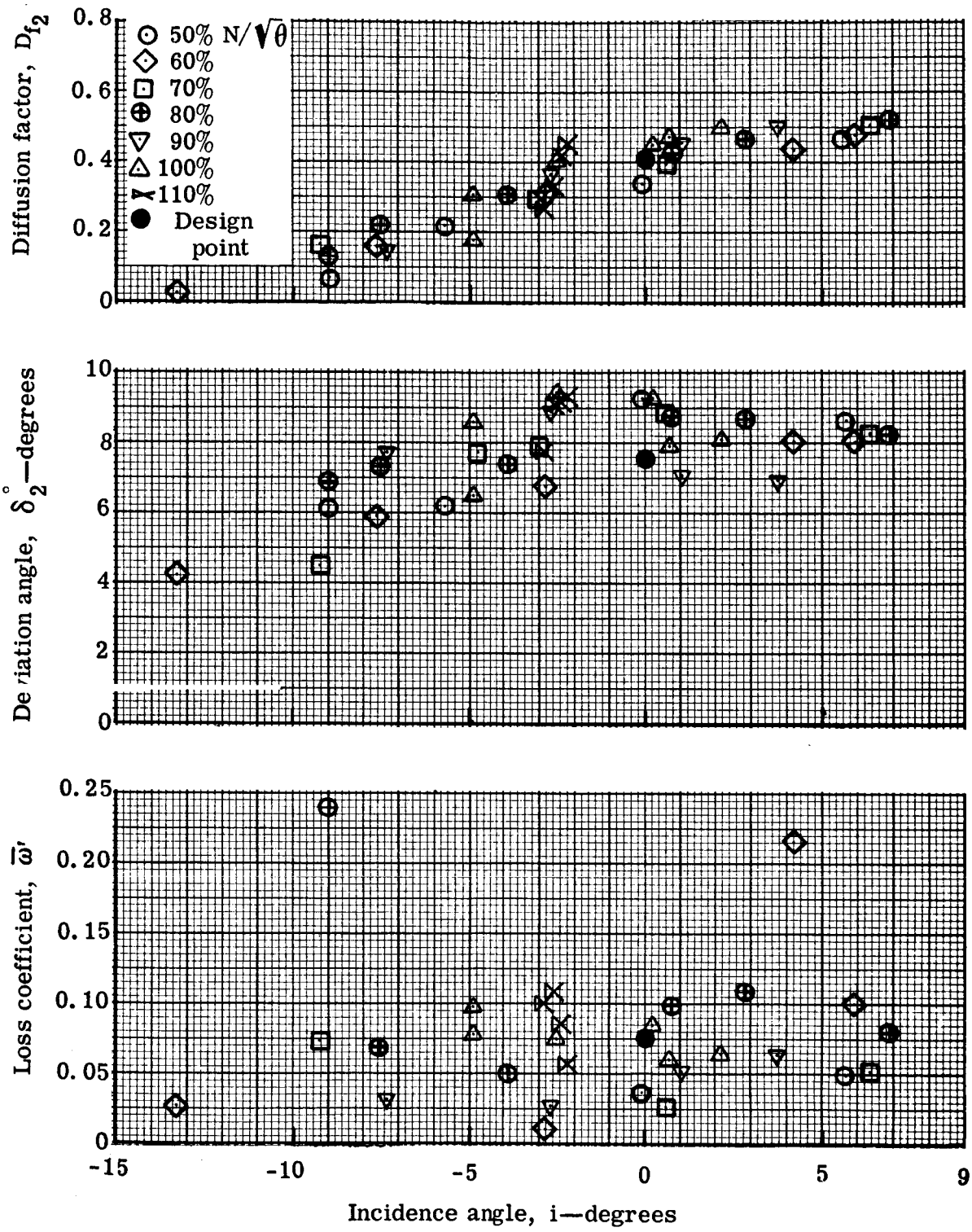
5691-26

Figure 21. Rotor blade element performance for flow generation rotor test.



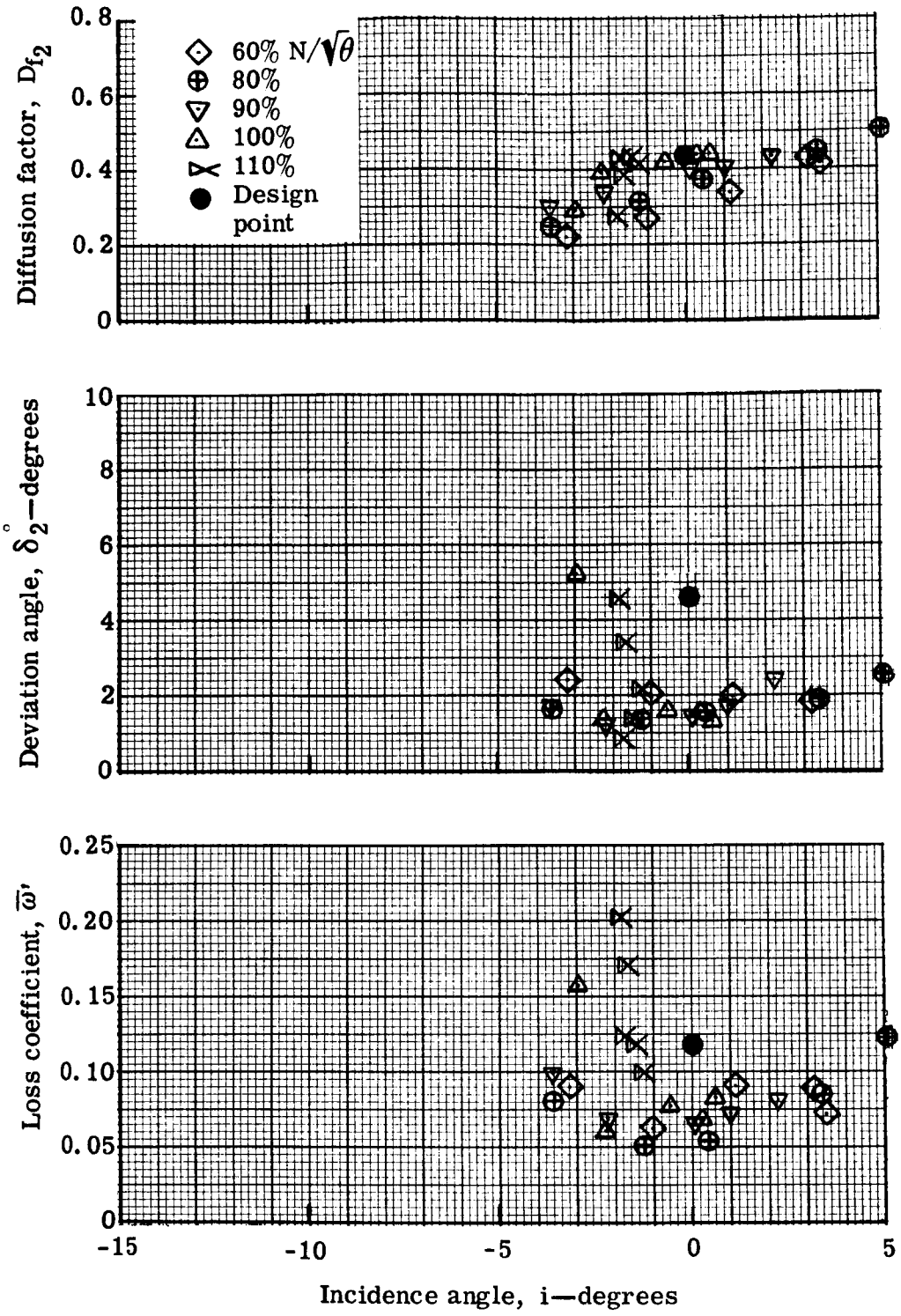
d. 70% streamline from tip 5691-27

Figure 21. Rotor blade element performance for flow generation rotor test.



e. 90% streamline from tip

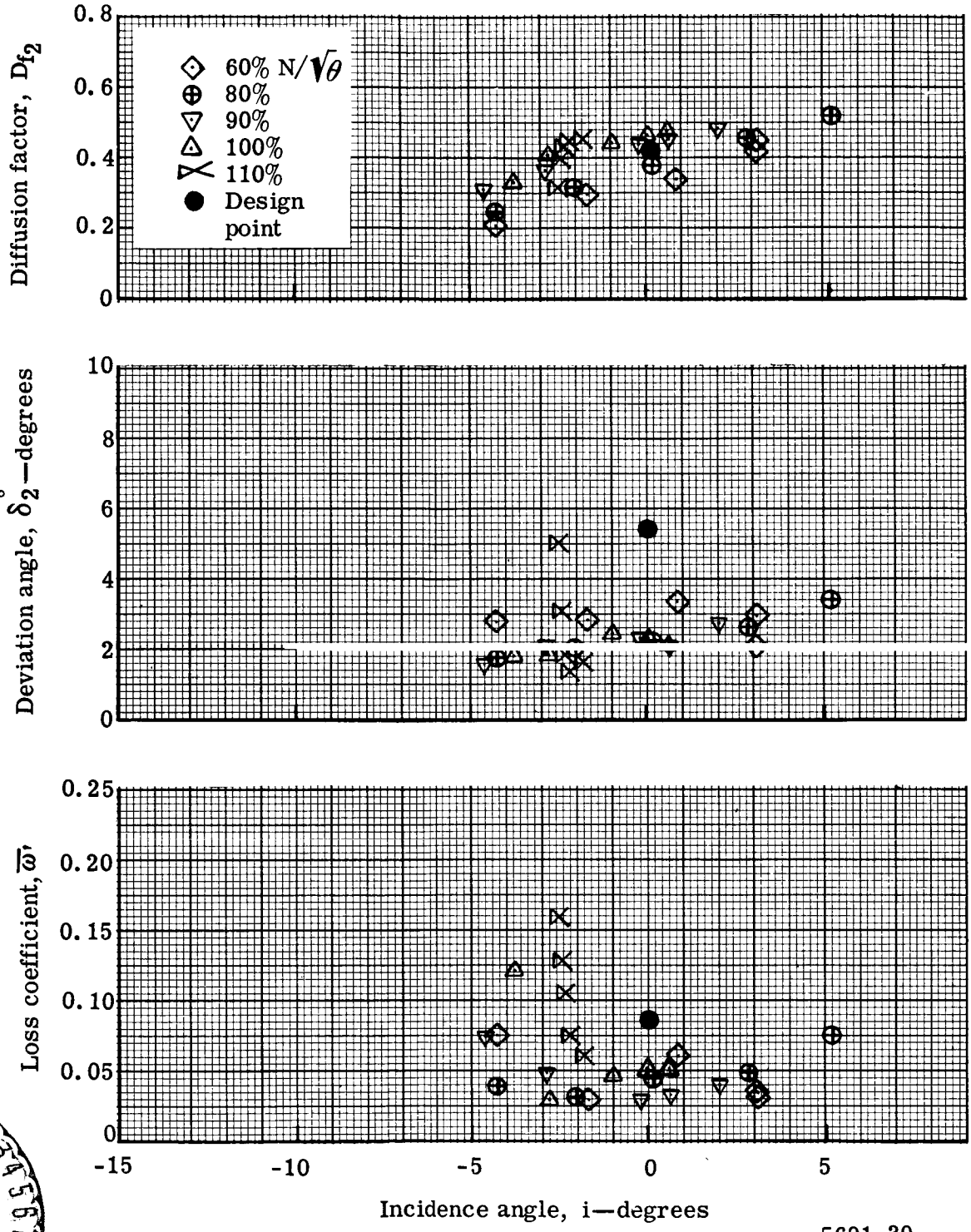
Figure 21. Rotor blade element performance for flow generation rotor test.



5691-29

a. 10% streamline from tip

Figure 22. Rotor blade element performance for stage test.



b. 30% streamline from tip

Figure 22. Rotor blade element performance for stage test.

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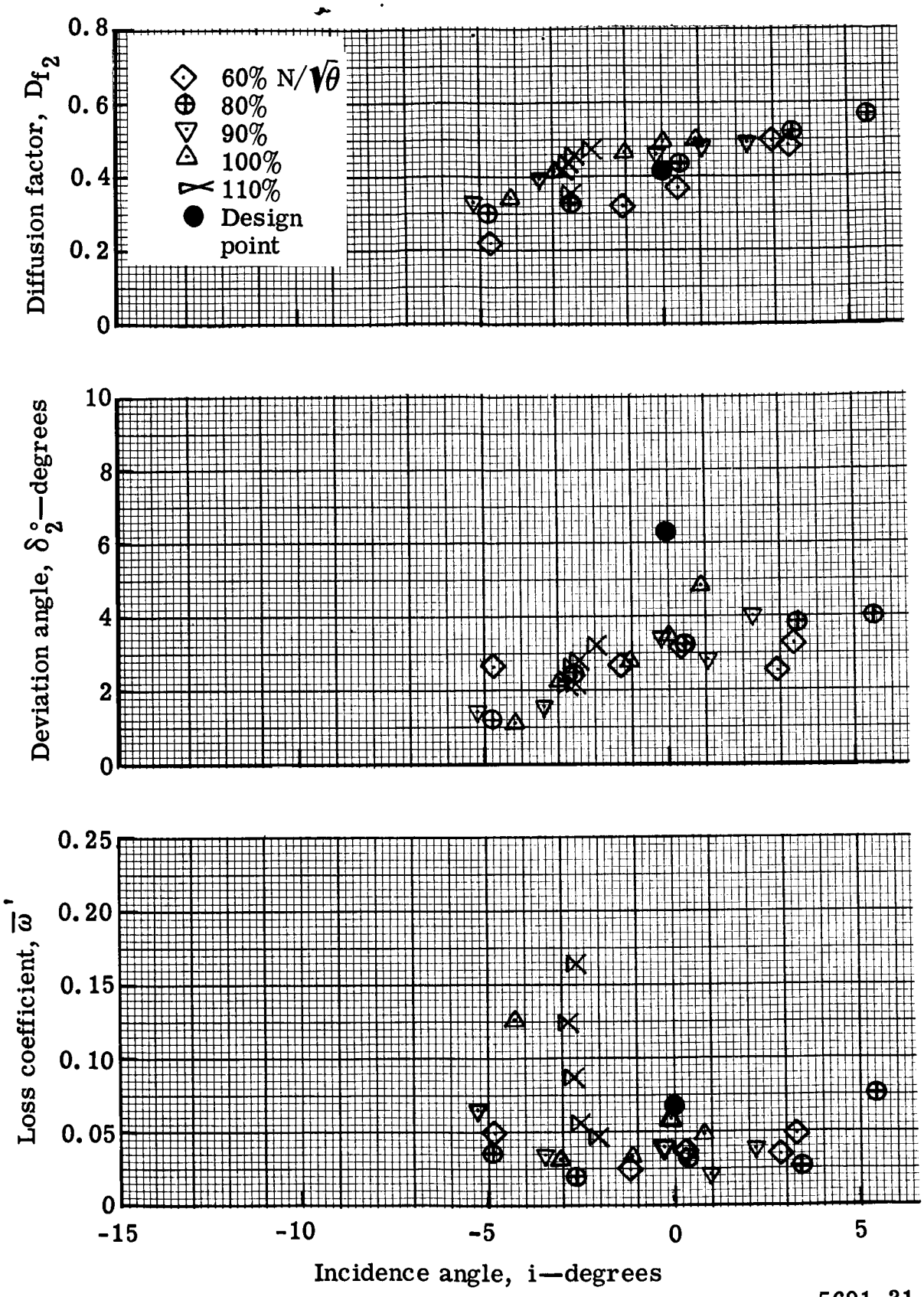
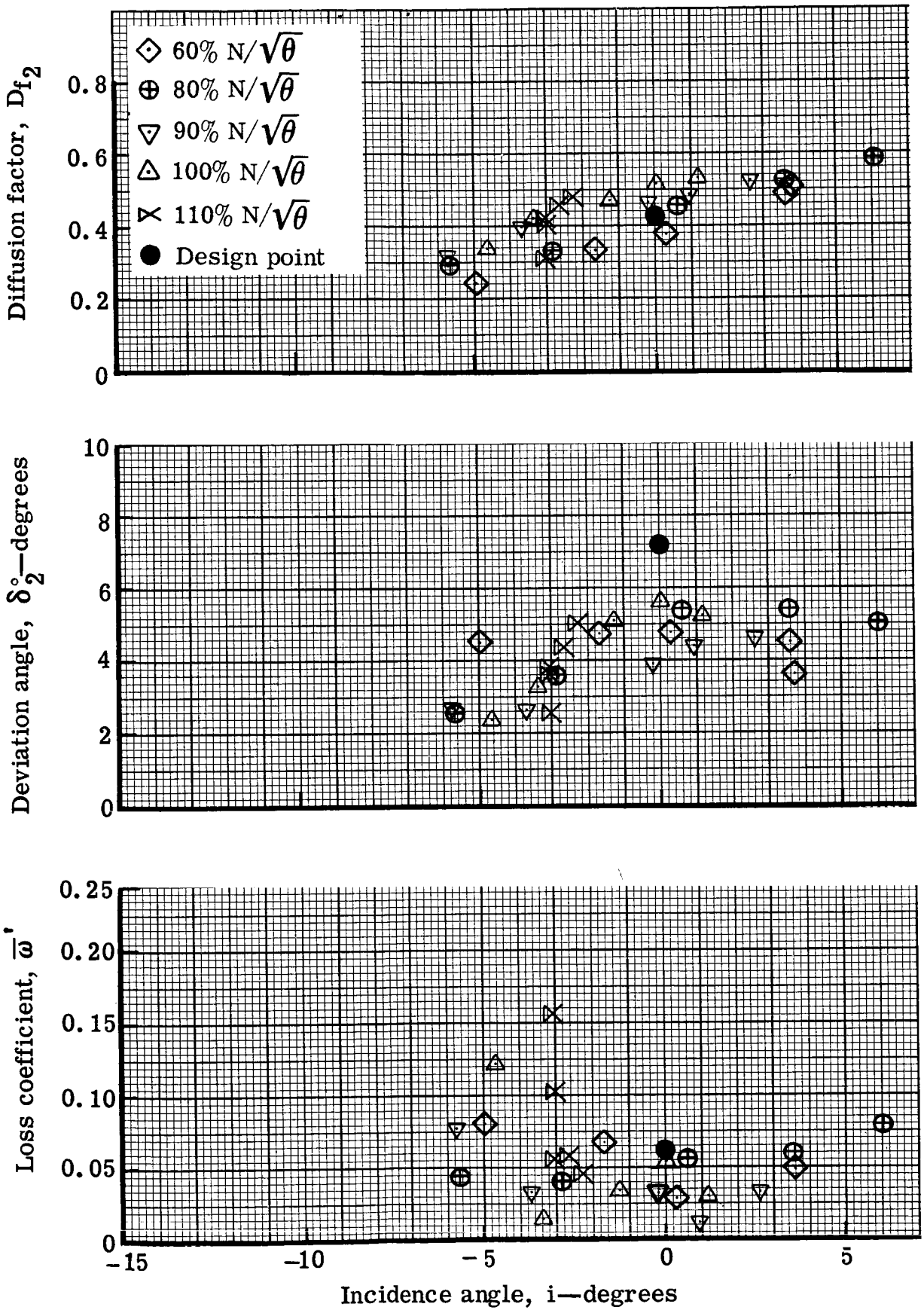


c. 50% streamline from tip

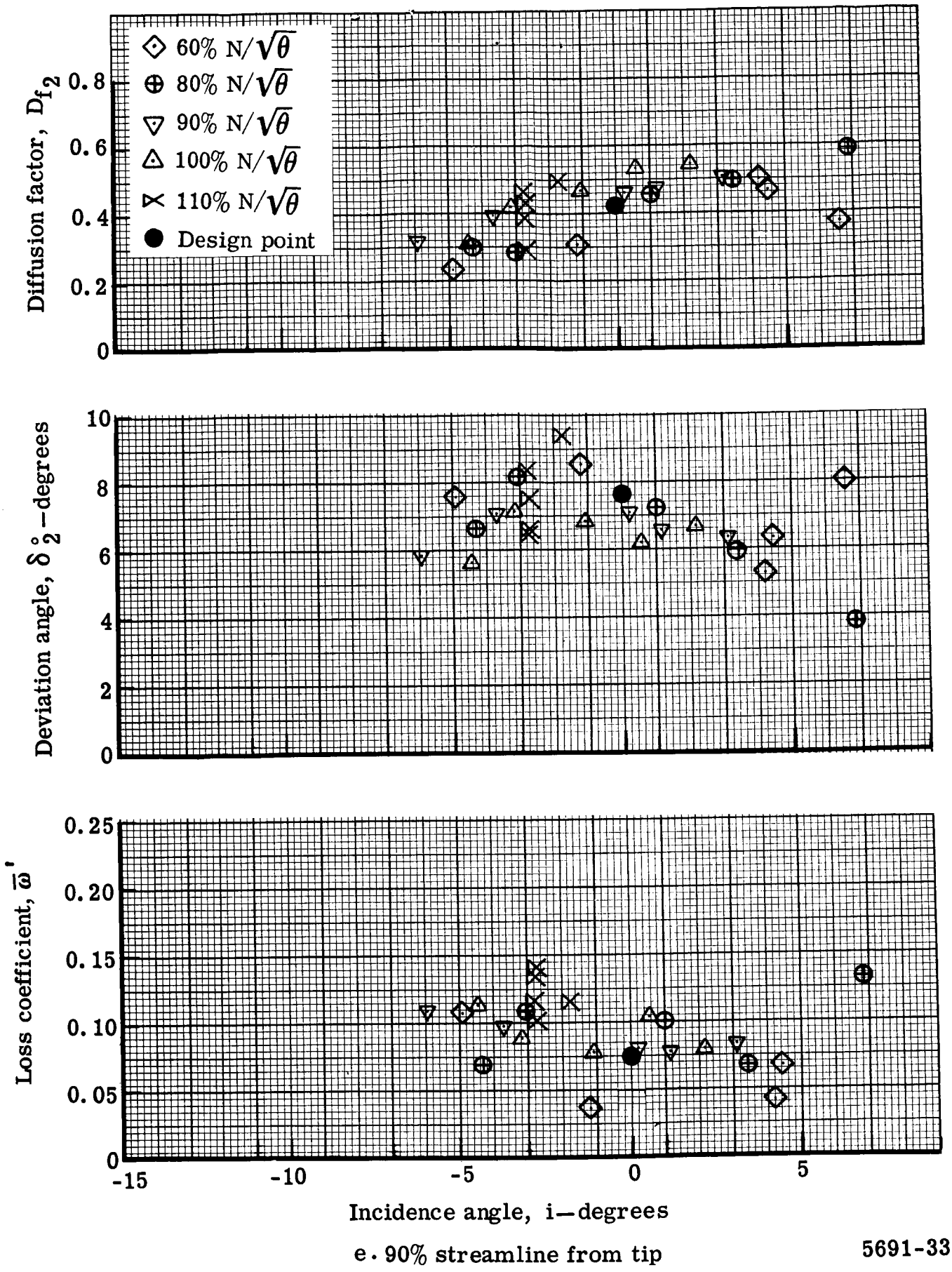
Figure 22. Rotor blade element performance for stage test.



d. 70% streamline from tip

5691-32

Figure 22. Rotor blade element performance for stage test.



e. 90% streamline from tip

5691-33

Figure 22. Rotor blade element performance for stage test.

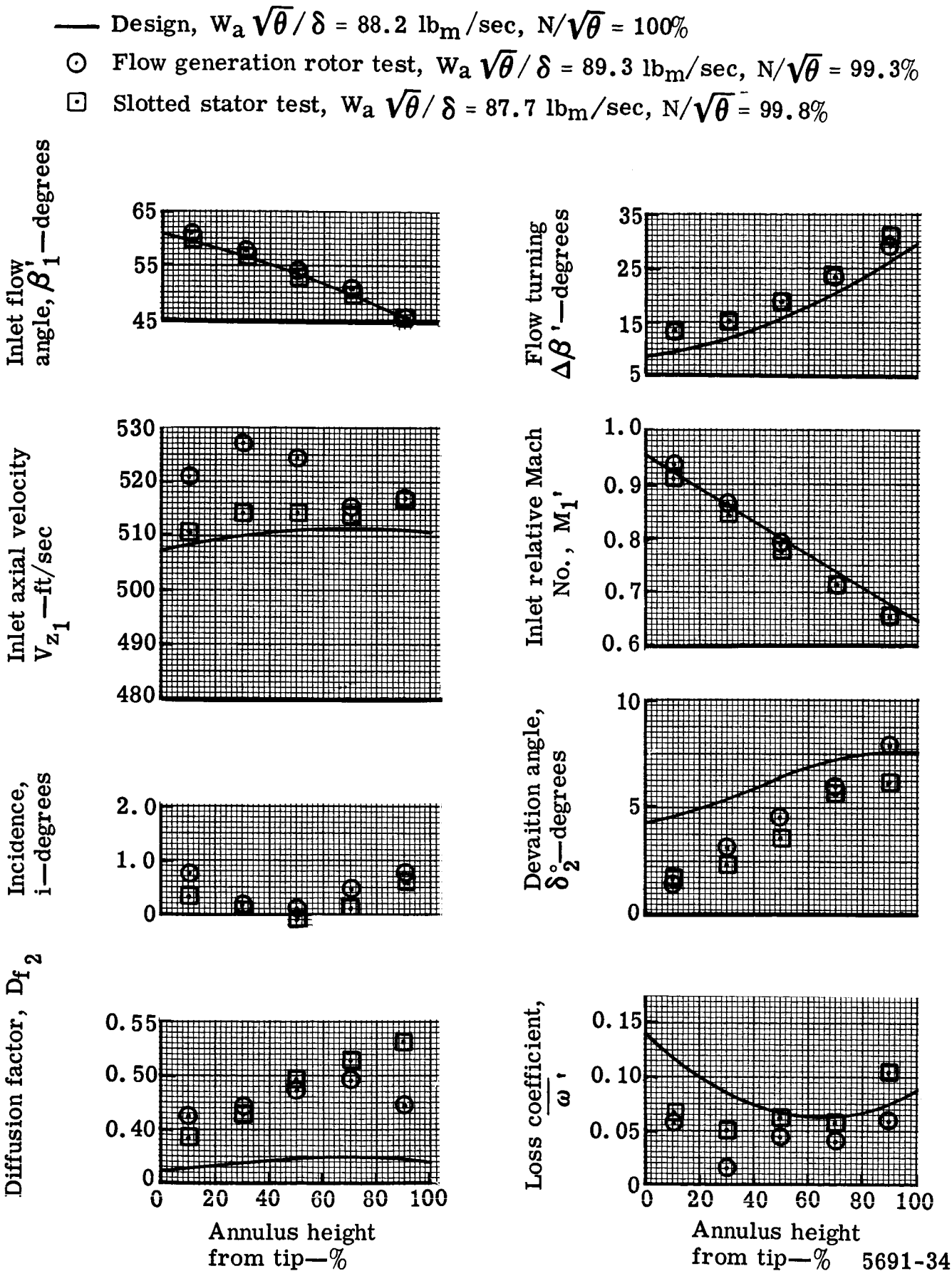


Figure 23. Radial variation of rotor blade element performance.

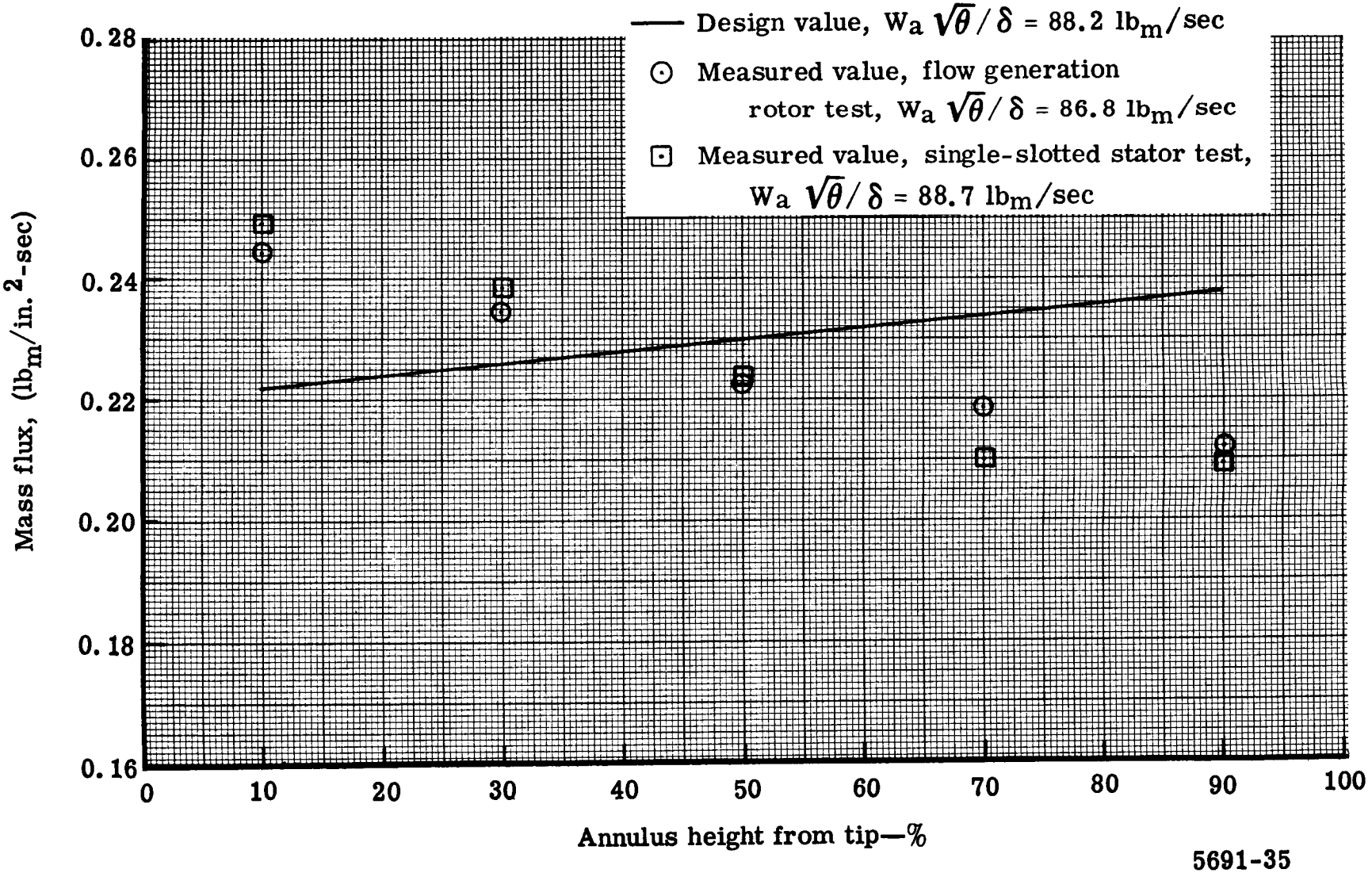


Figure 24. Rotor outlet radial mass flux distribution at design speed.

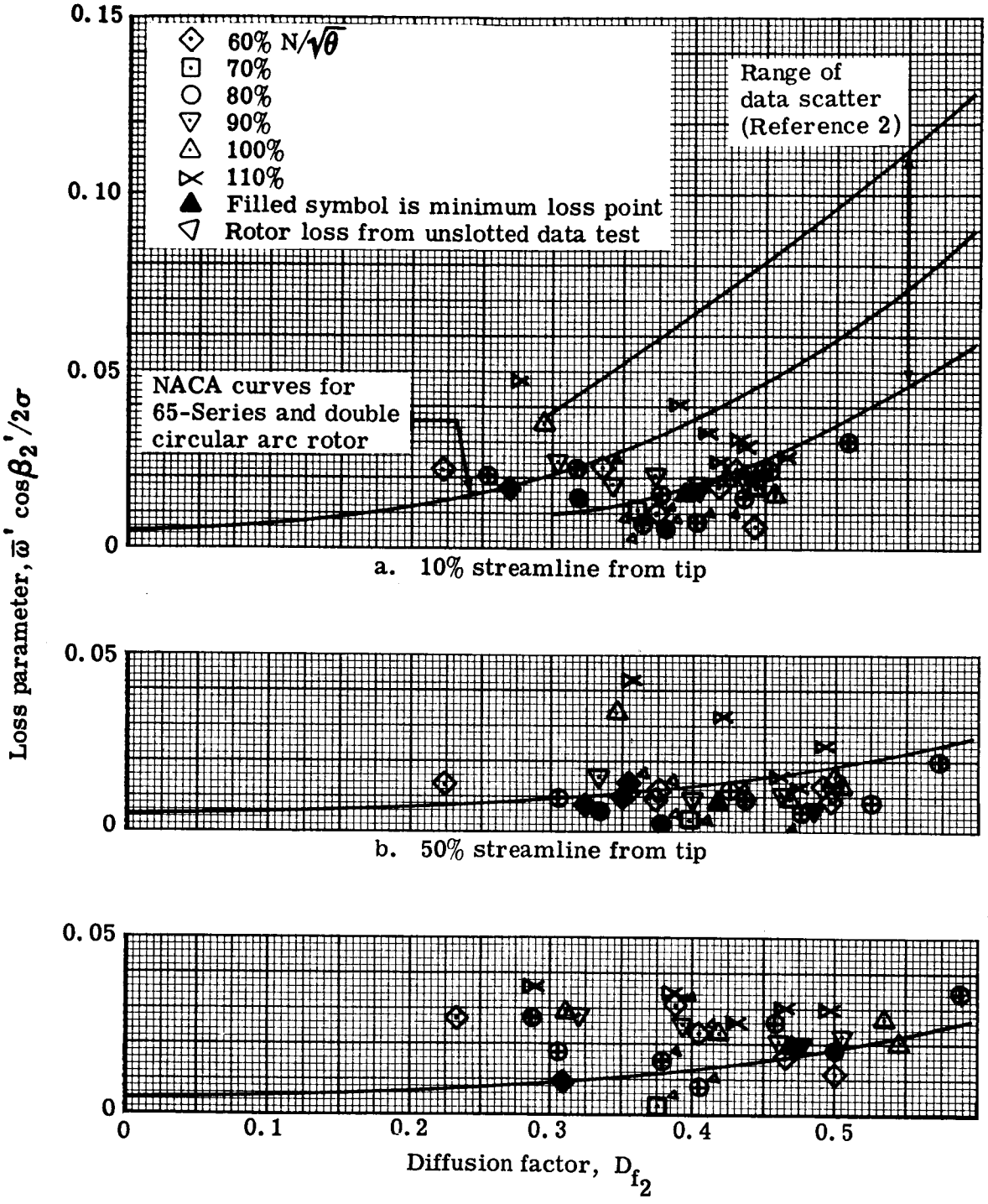
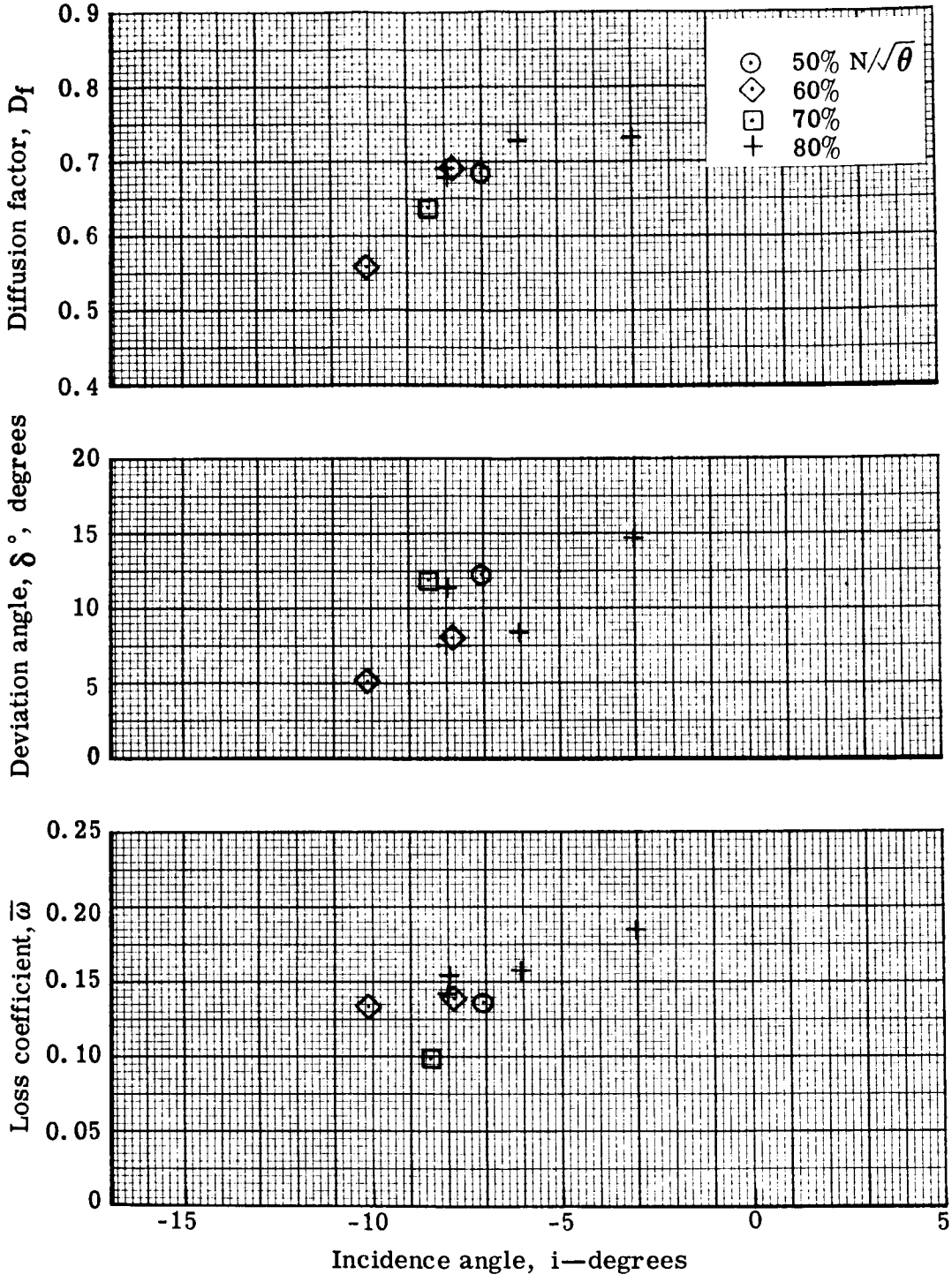


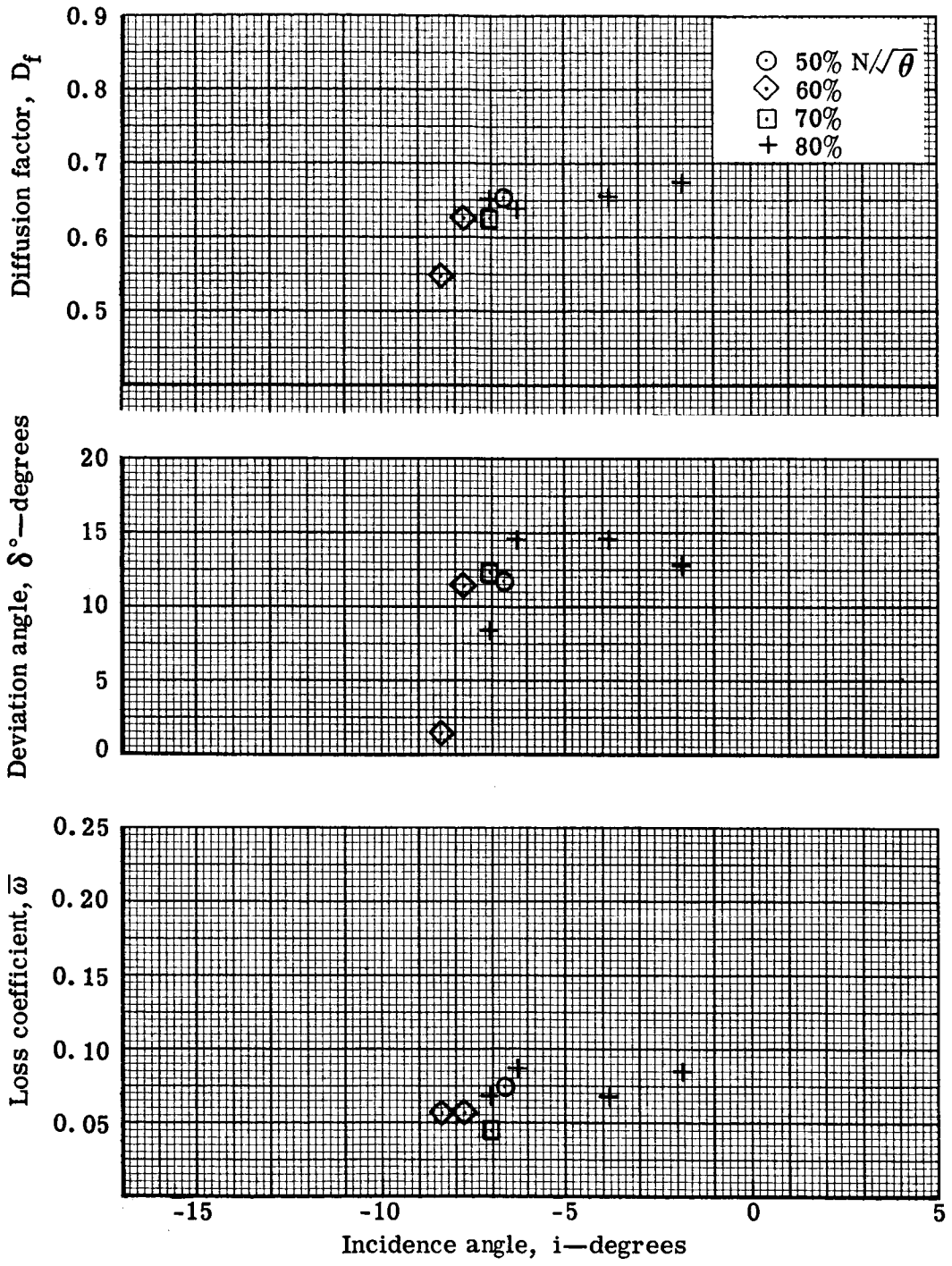
Figure 25. Rotor loss parameter versus diffusion factor.



a. 10% streamline from tip

5691-37

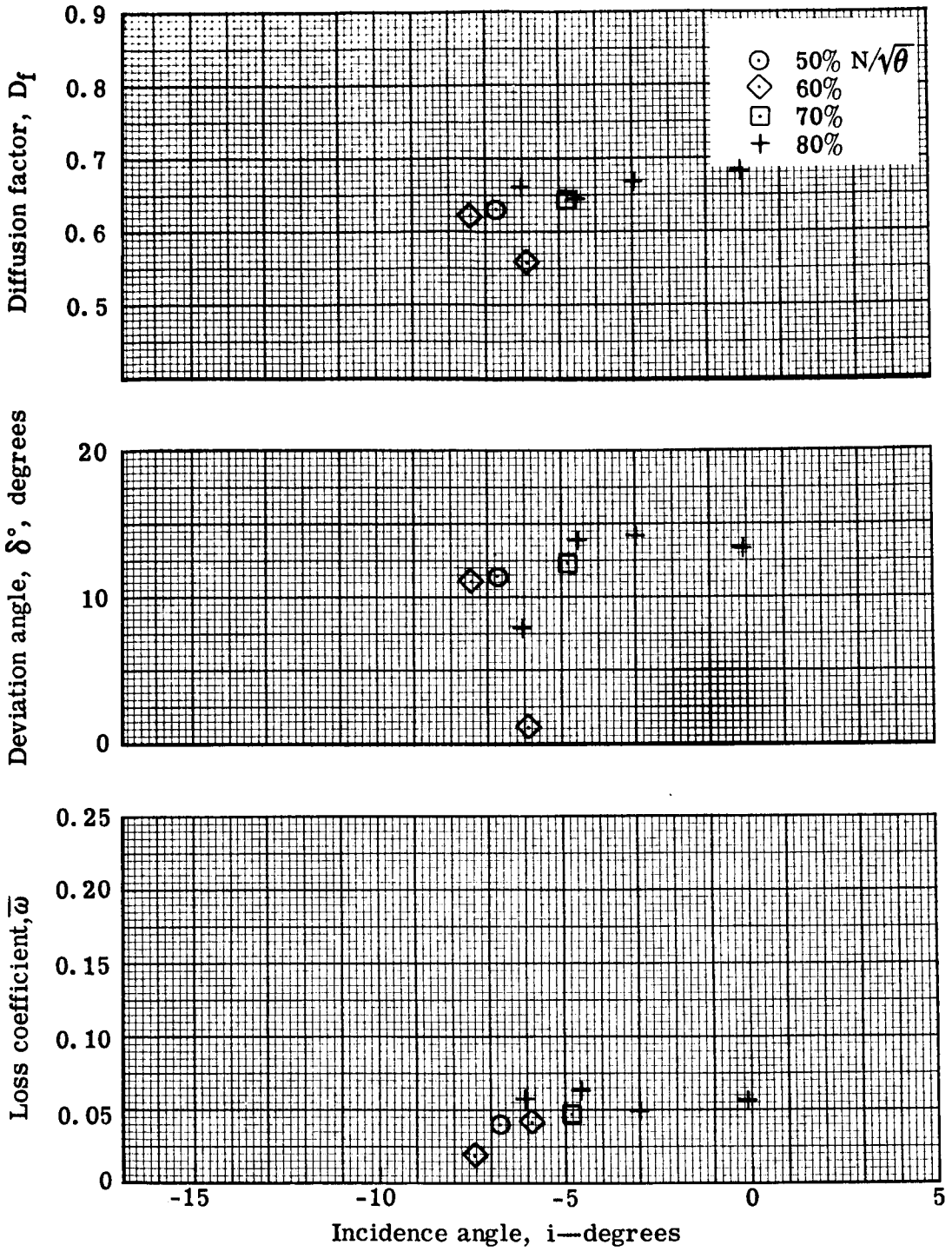
Figure 26. Unslotted stator blade element performance.



b. 30% streamline from tip

5691-38

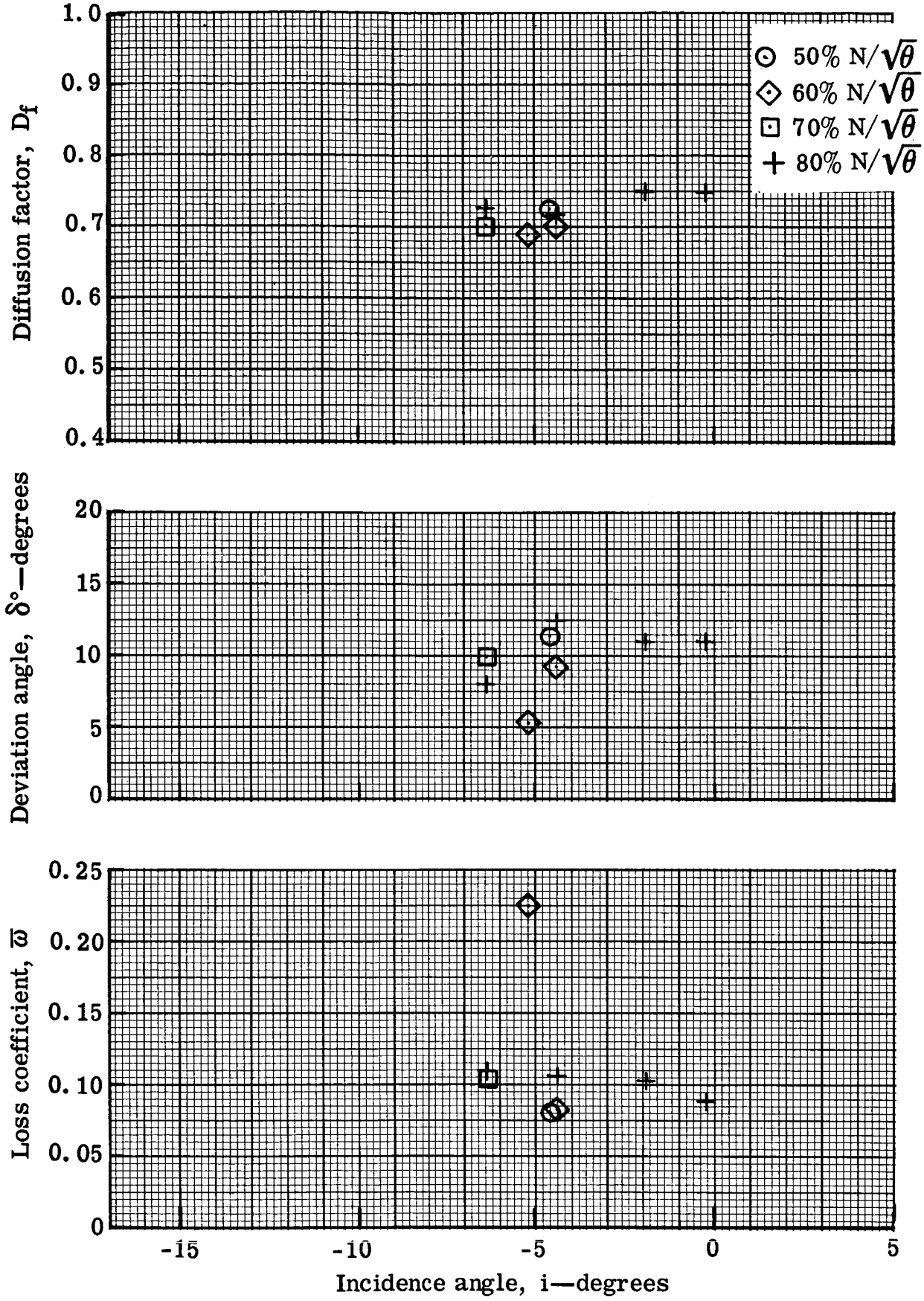
Figure 26. Unslotted stator blade element performance.



5631-39

c. 50% streamline from tip

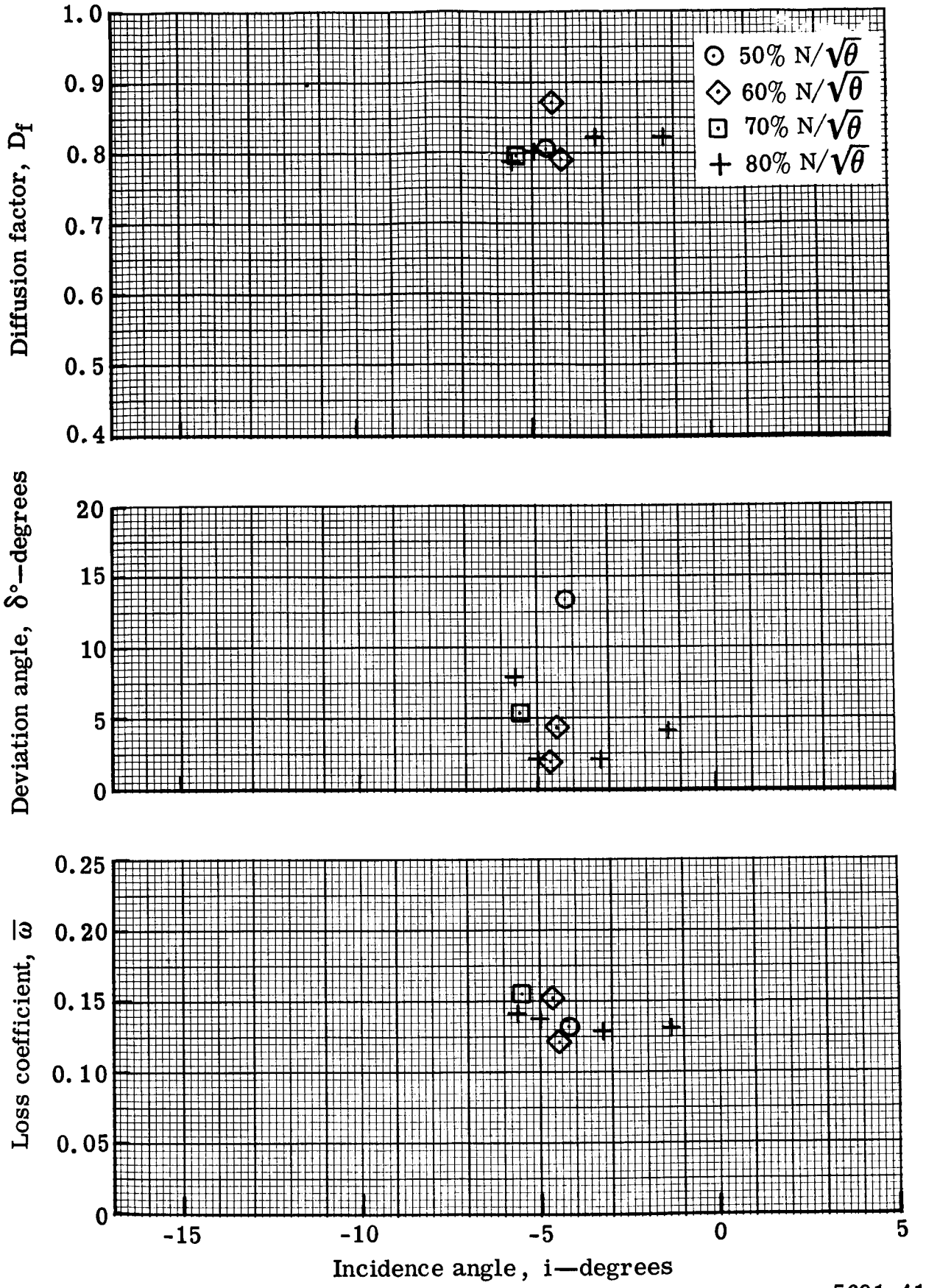
Figure 26. Unslotted stator blade element performance.



d. 70% streamline from tip

5691-40

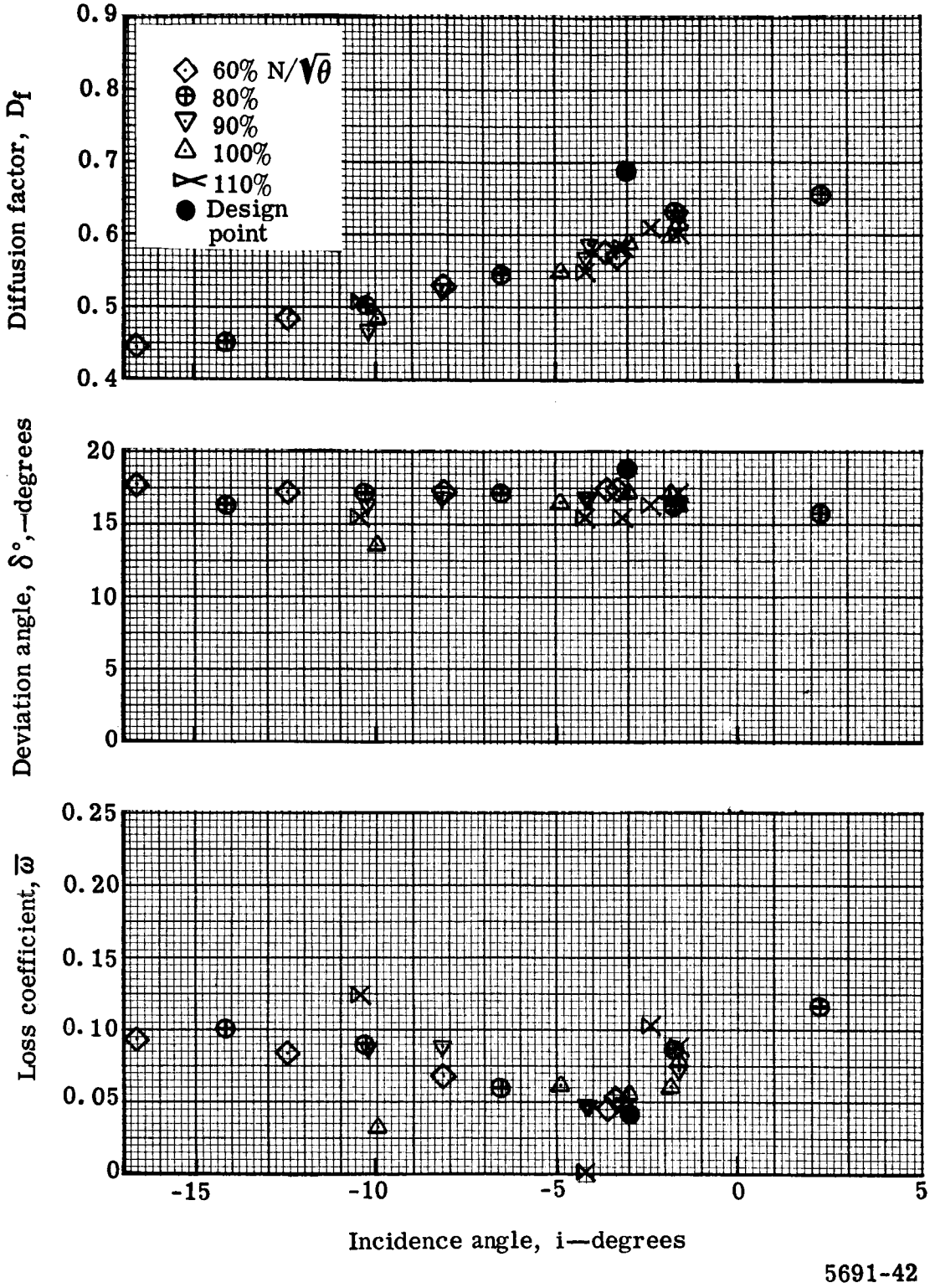
Figure 26. Unslotted stator blade element performance.



5691-41

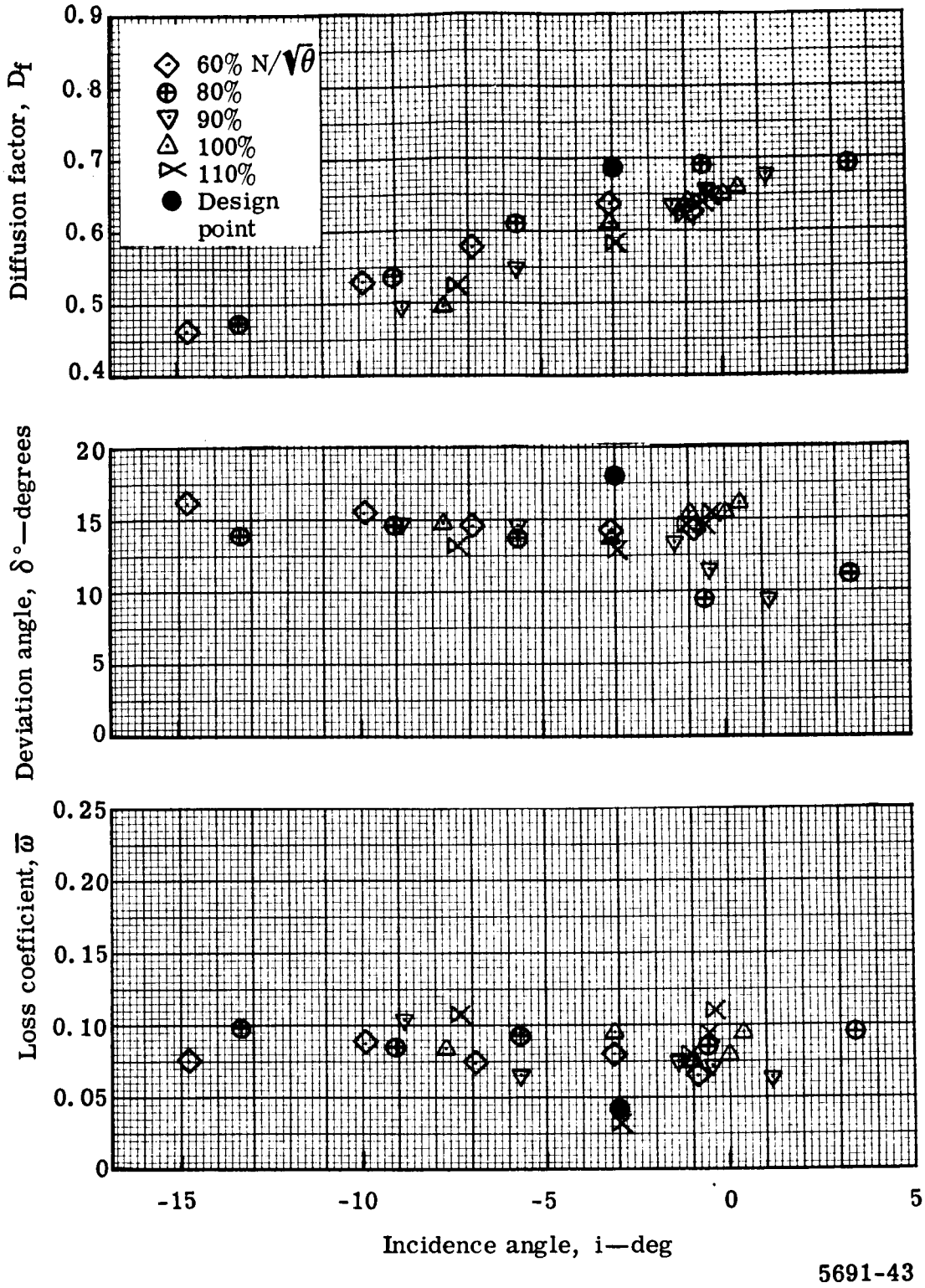
e. 90% streamline from tip

Figure 26. Unslotted stator blade element performance.



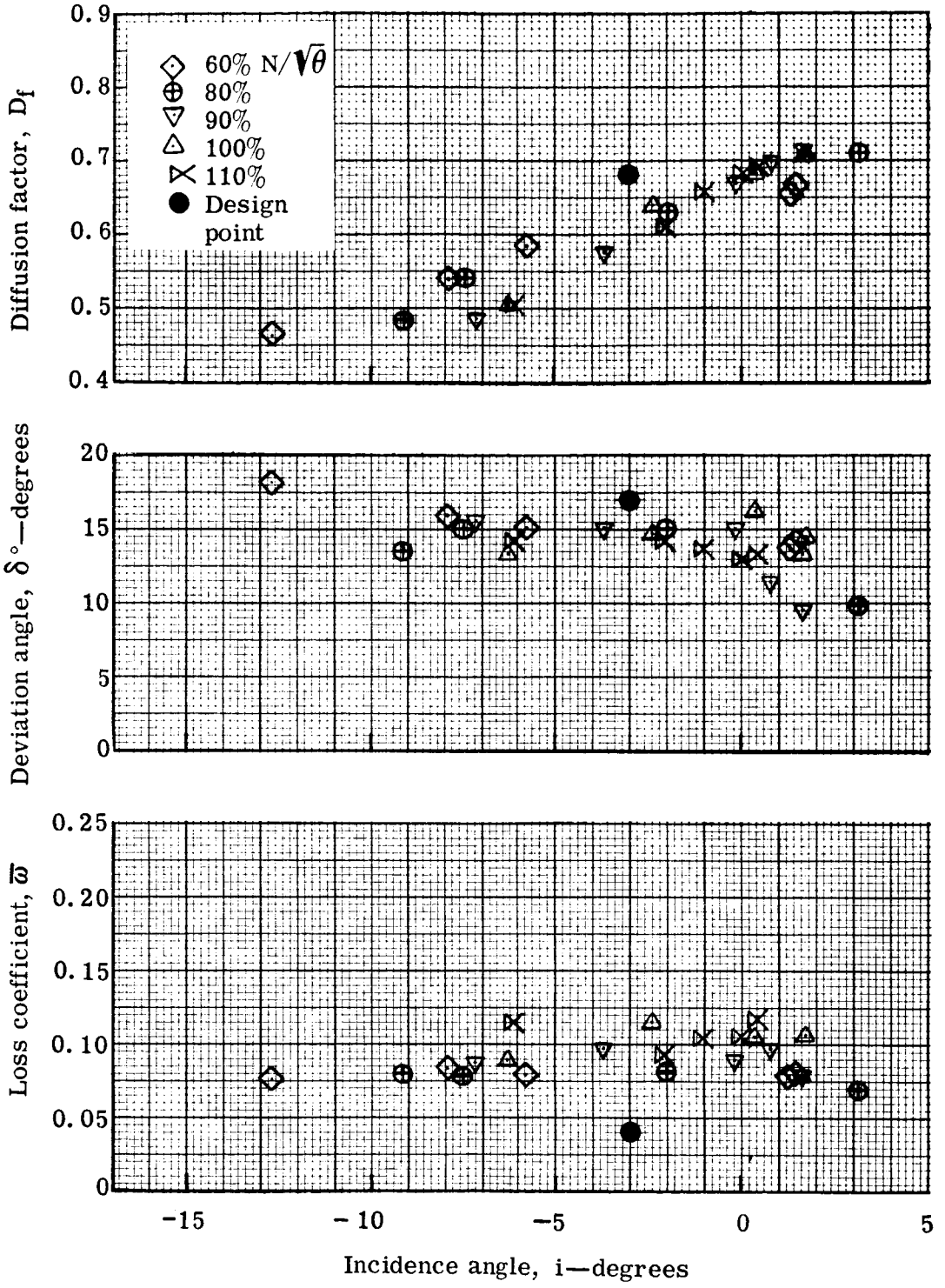
a. 10% streamline from tip

Figure 27. Slotted stator blade element performance.



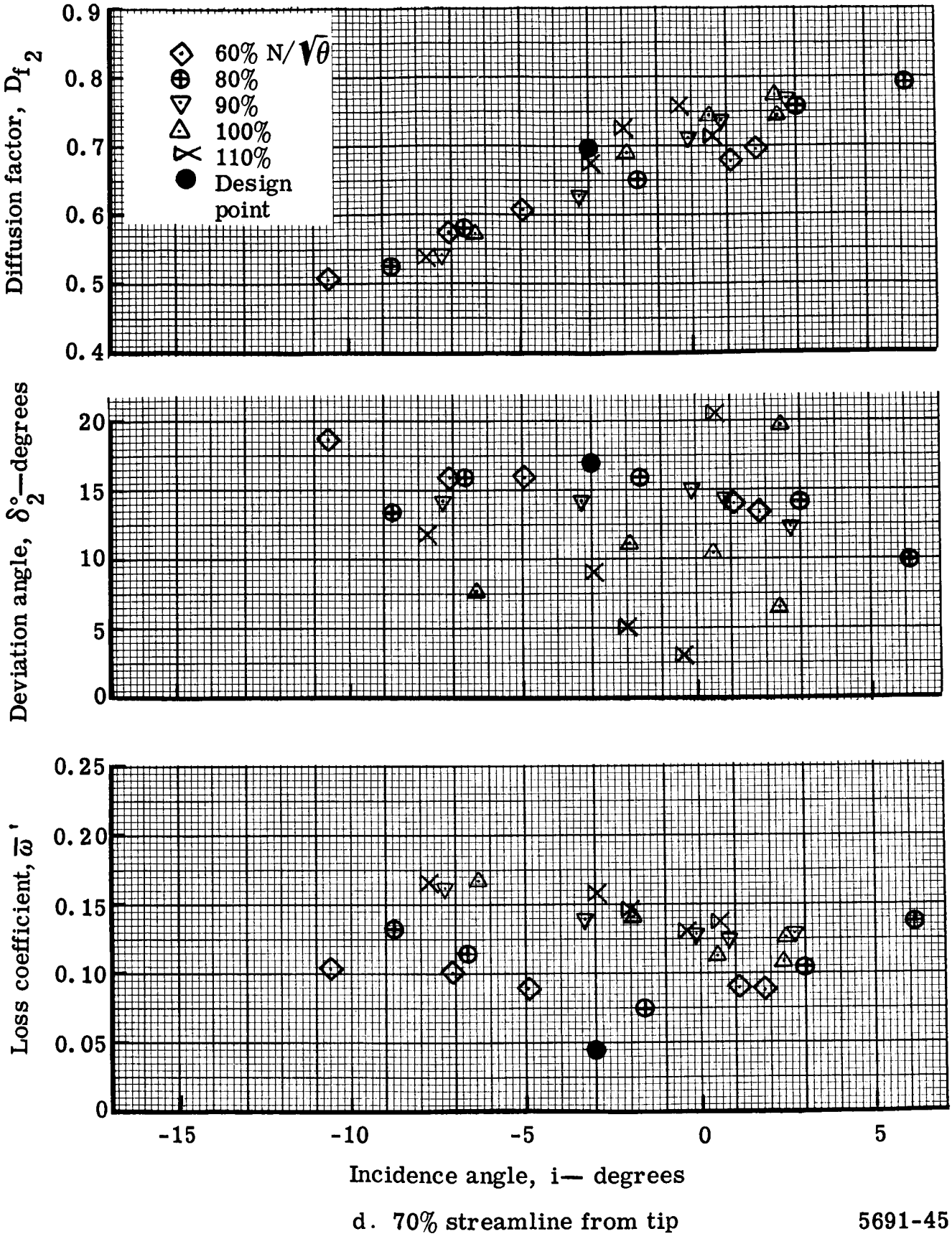
b. 30% streamline from tip

Figure 27. Slotted stator blade element performance.



c. 50% streamline from tip

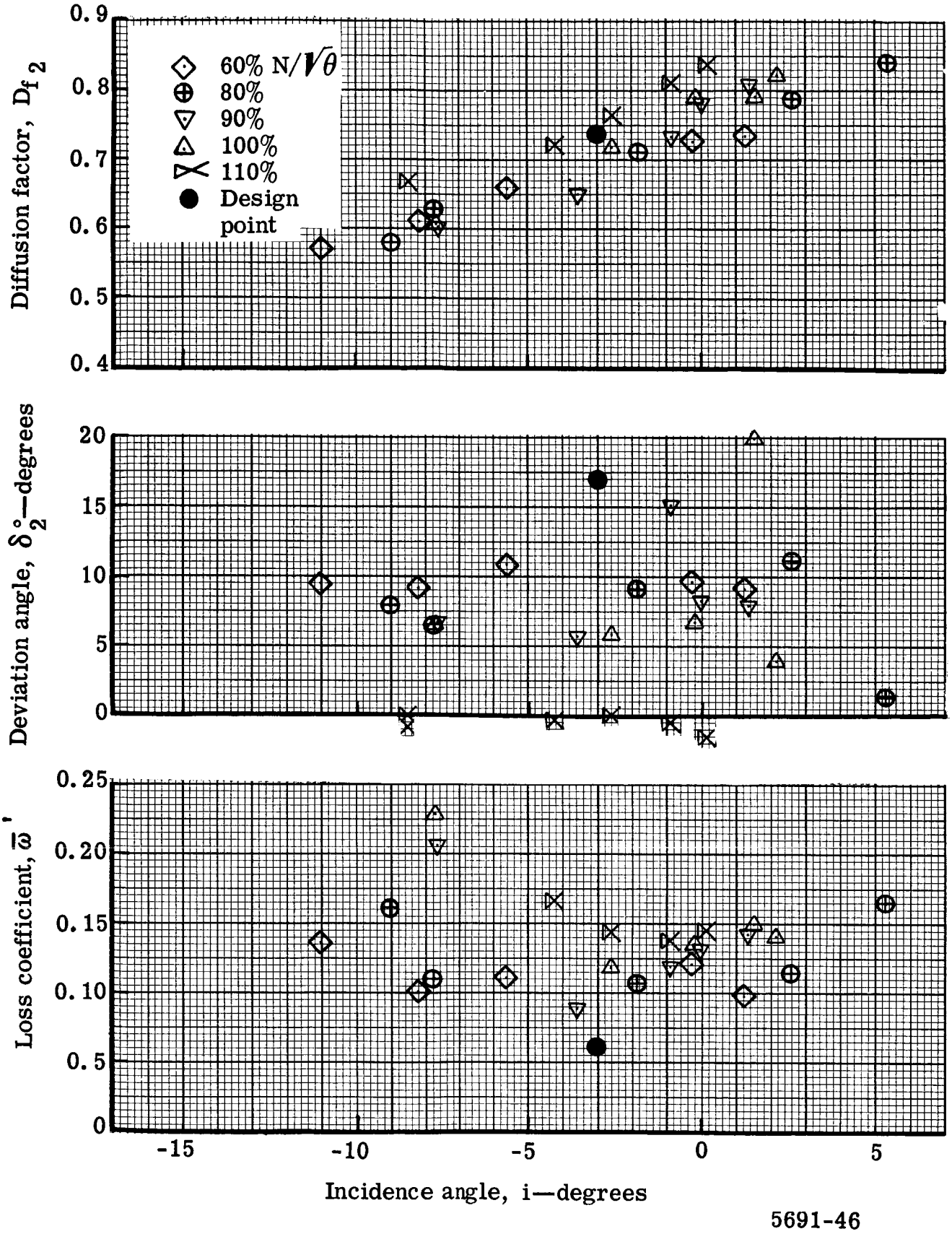
Figure 27. Slotted stator blade element performance.



d. 70% streamline from tip

5691-45

Figure 27. Slotted stator blade element performance.



e. 90% streamline from tip

Figure 27. Slotted stator blade element performance.

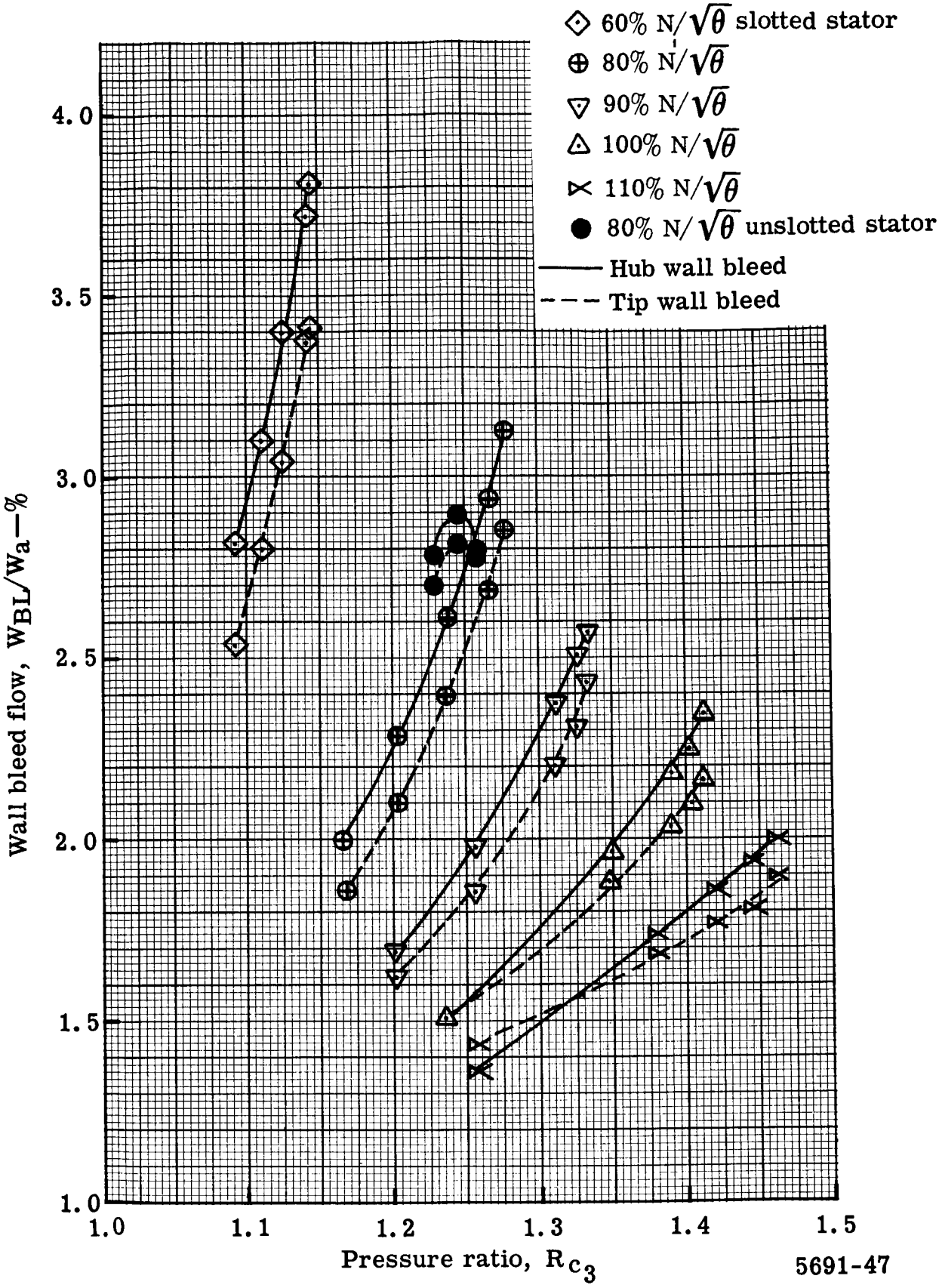


Figure 28. Variation of wall bleed flows with stage pressure ratio.

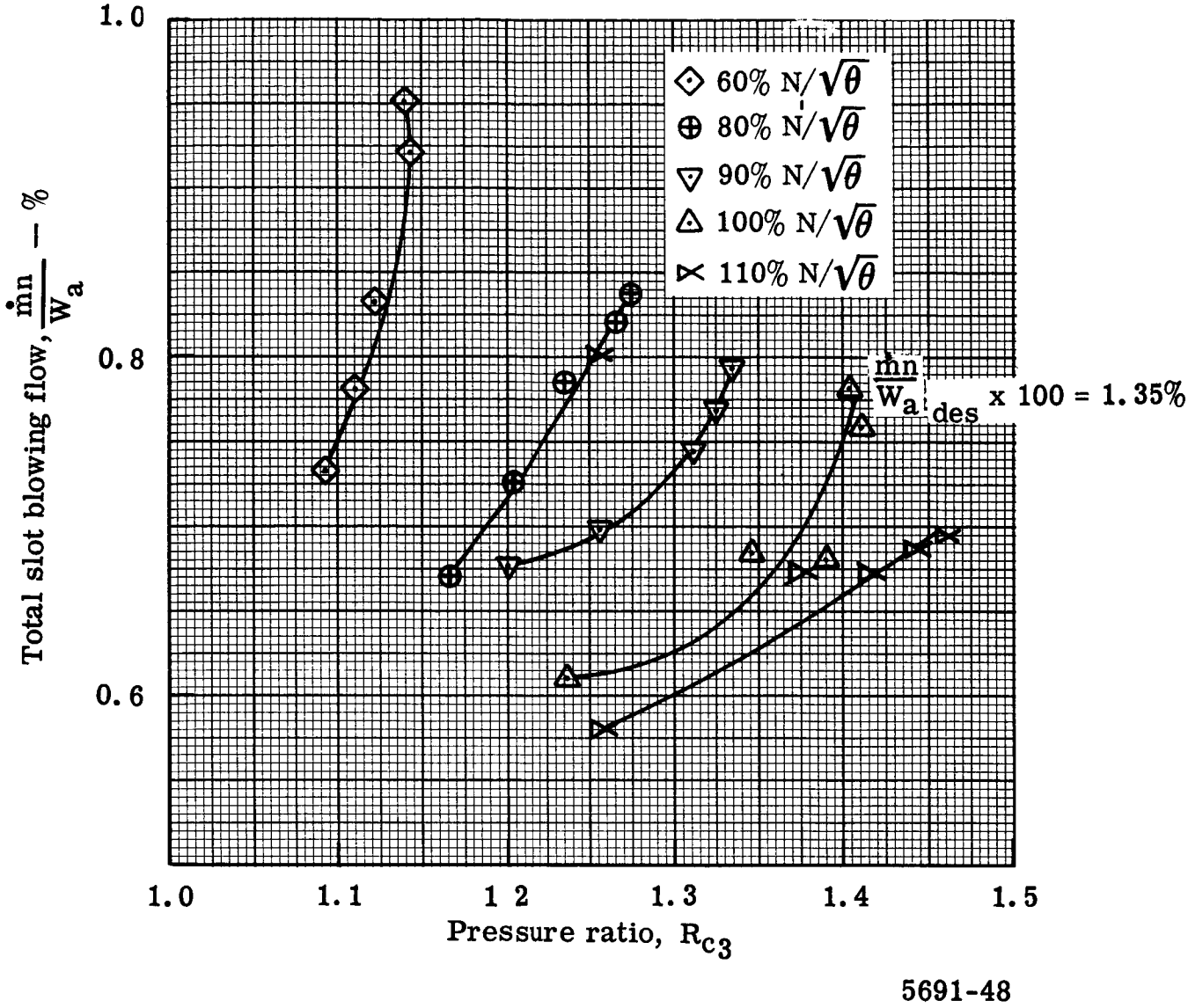


Figure 29. Stator slot blowing flow versus stage pressure ratio.

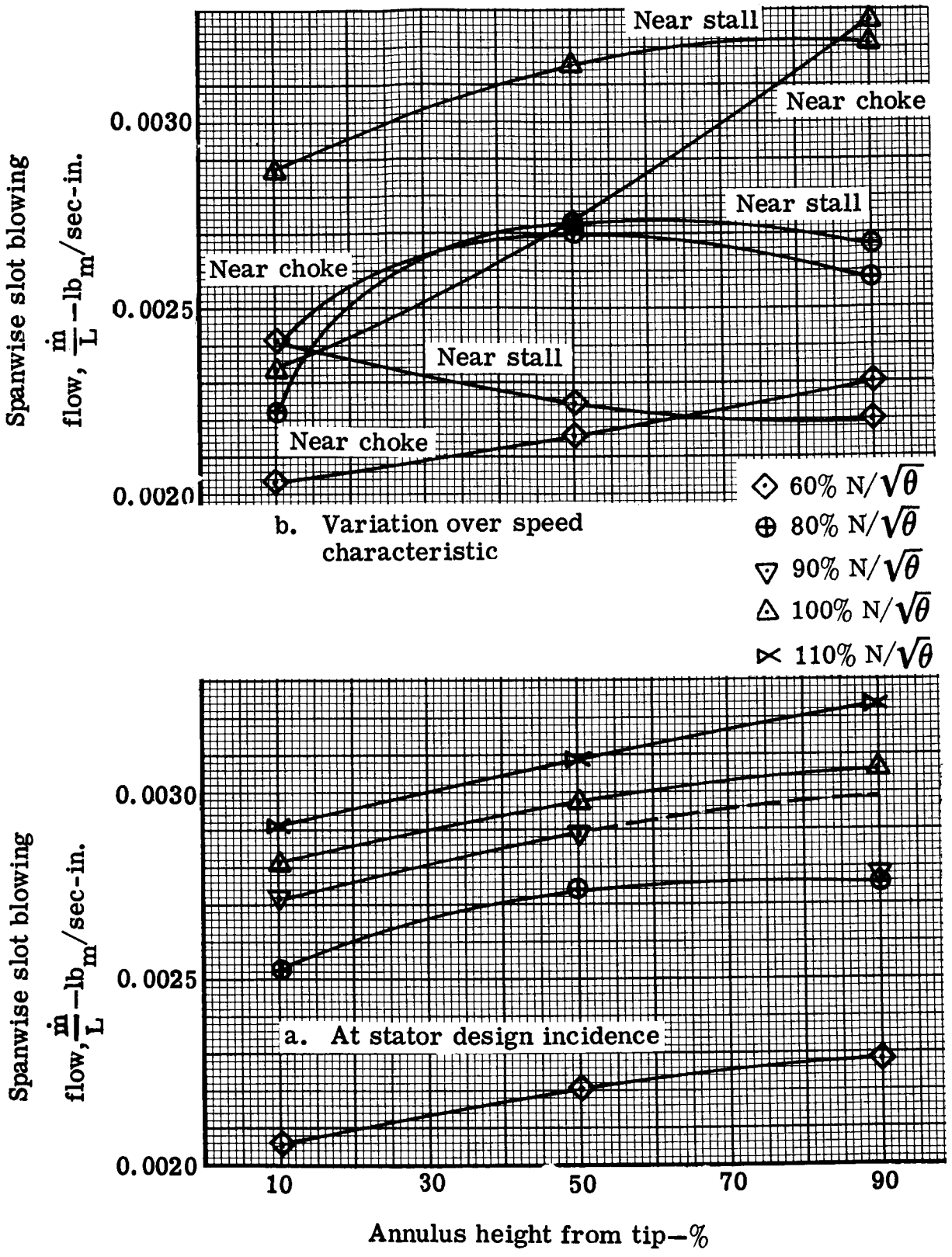


Figure 30. Stator slot blowing flow—spanwise distribution.

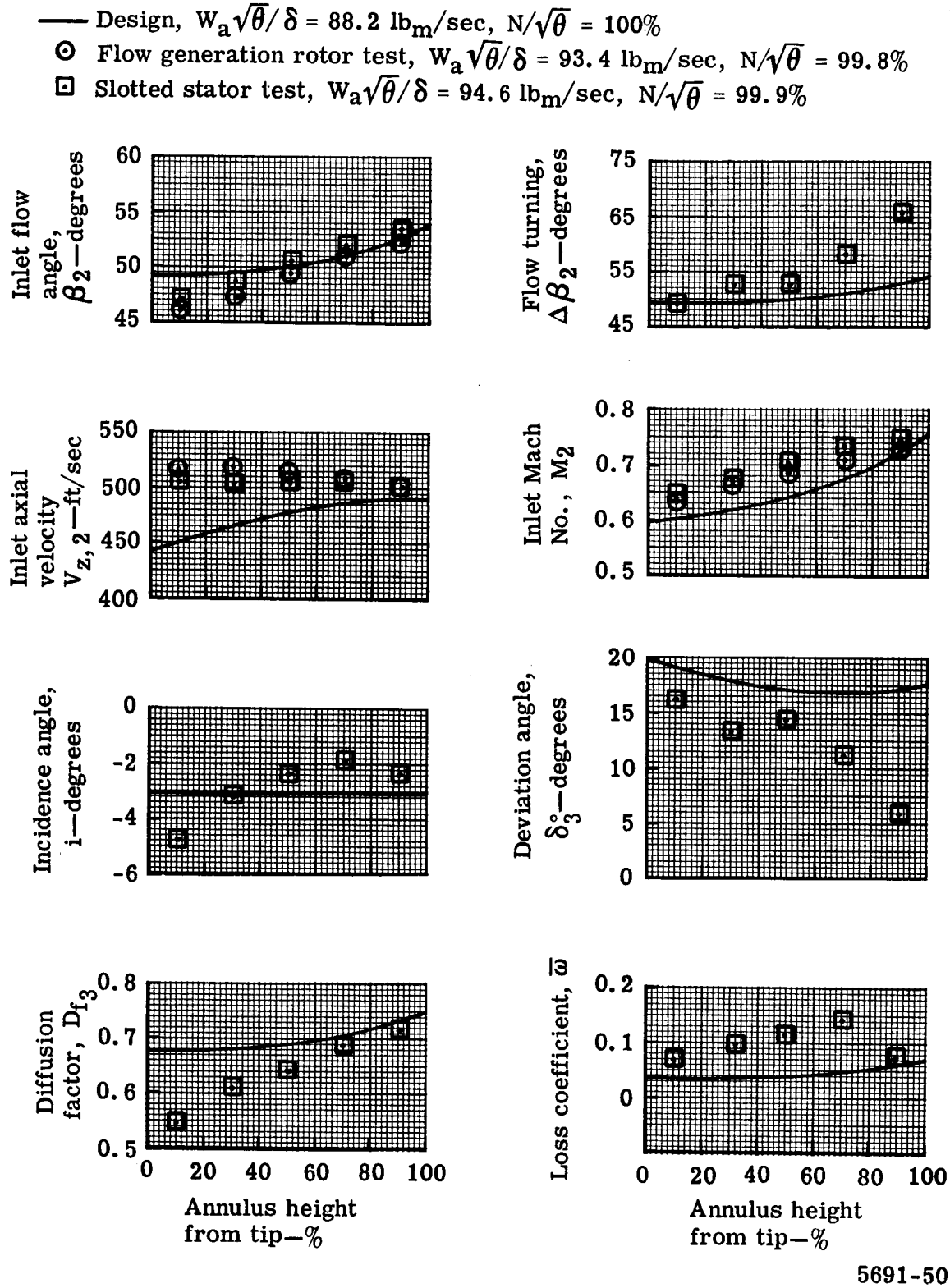
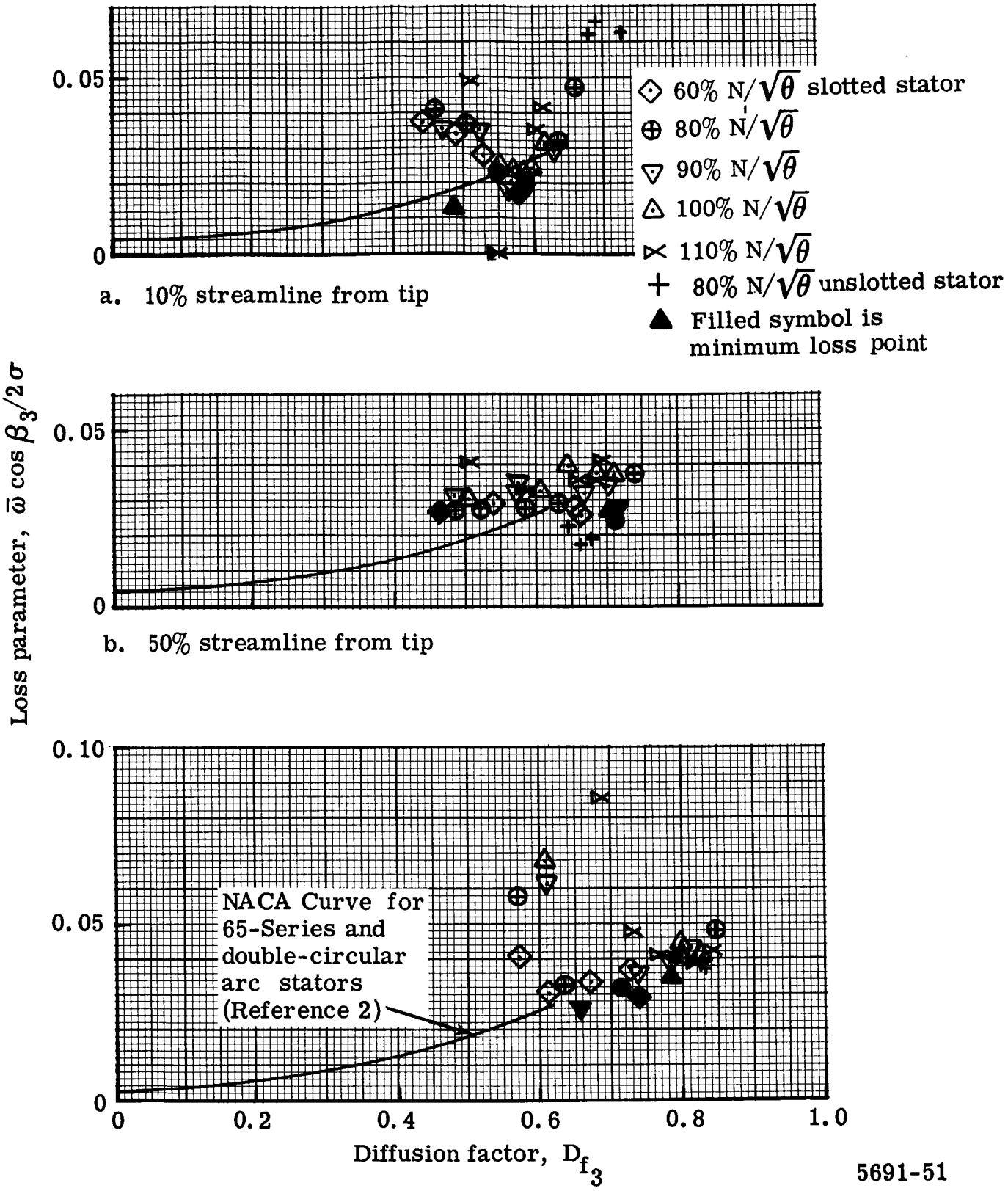


Figure 31. Radial variation of 0.75 D_f slotted stator blade element performance.



c. 90% streamline from tip

Figure 32. Stator loss parameter versus diffusion factor.

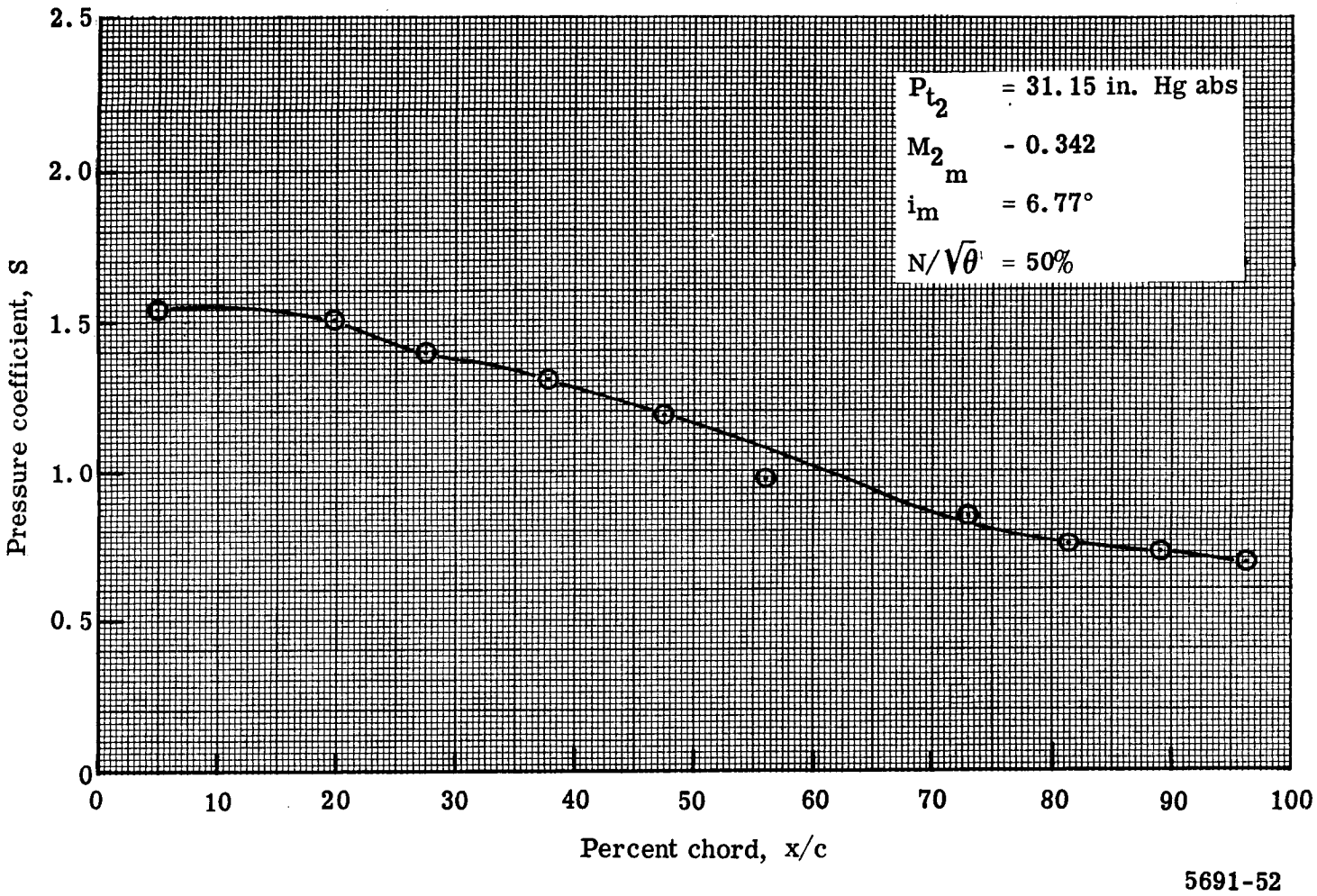


Figure 33a. Unslotted stator suction surface static pressure distribution at 50% streamline.

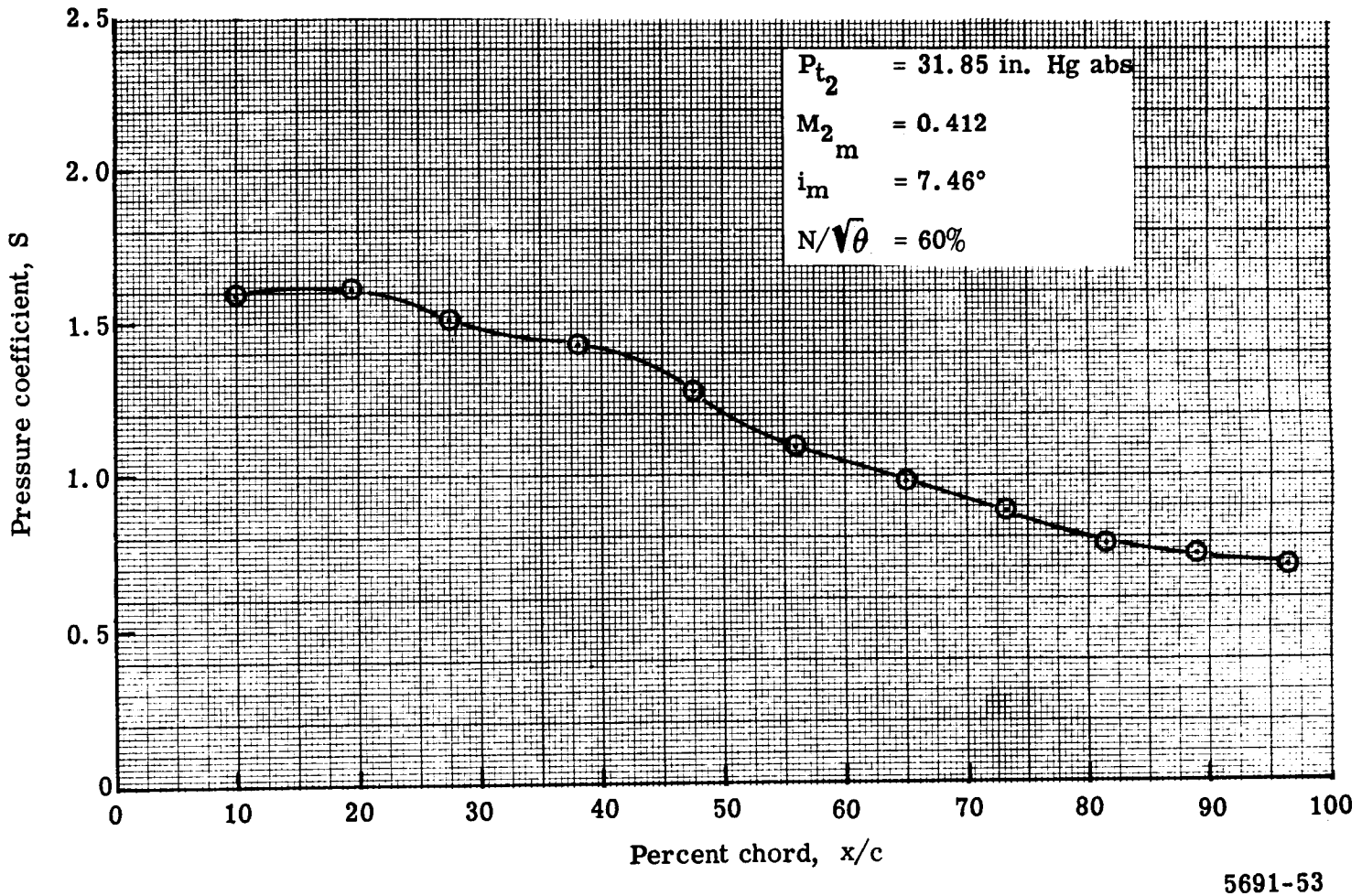


Figure 33b. Unslotted stator suction surface static pressure distribution at 50% streamline.

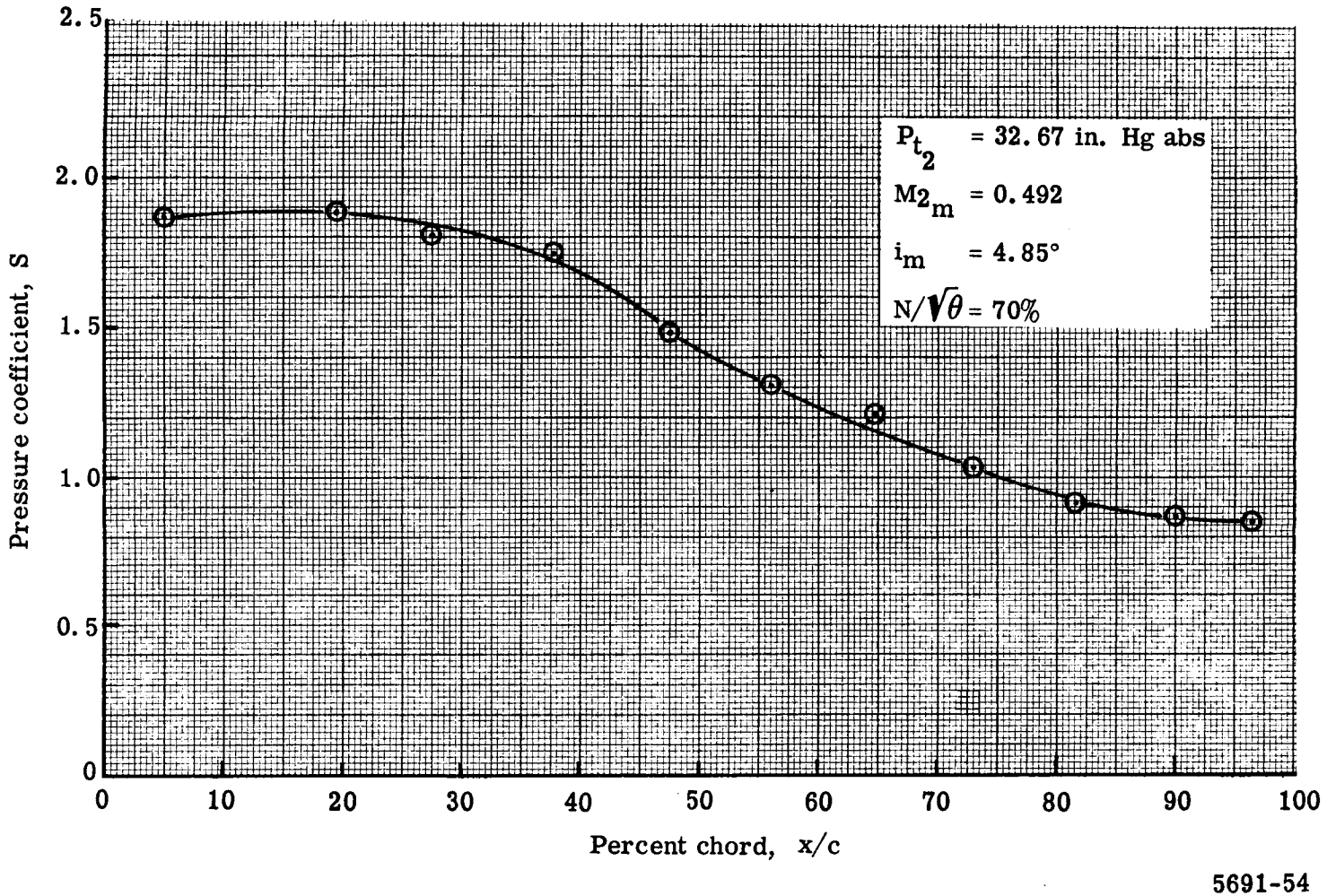


Figure 33c. Unslotted stator suction surface static pressure distribution at 50% streamline.

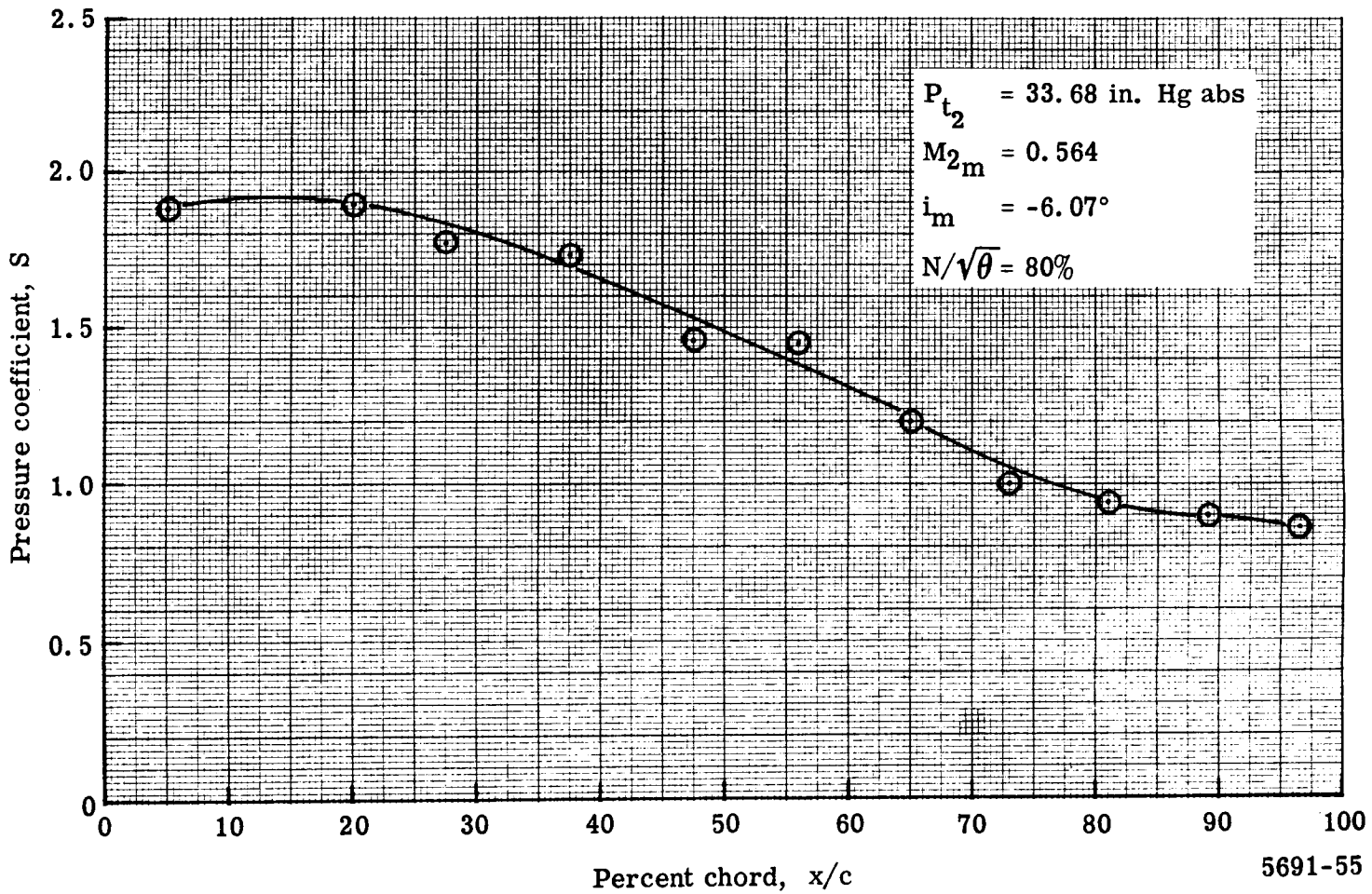


Figure 34a. Unslotted stator suction surface static pressure distribution at 80% speed and 50% streamline.

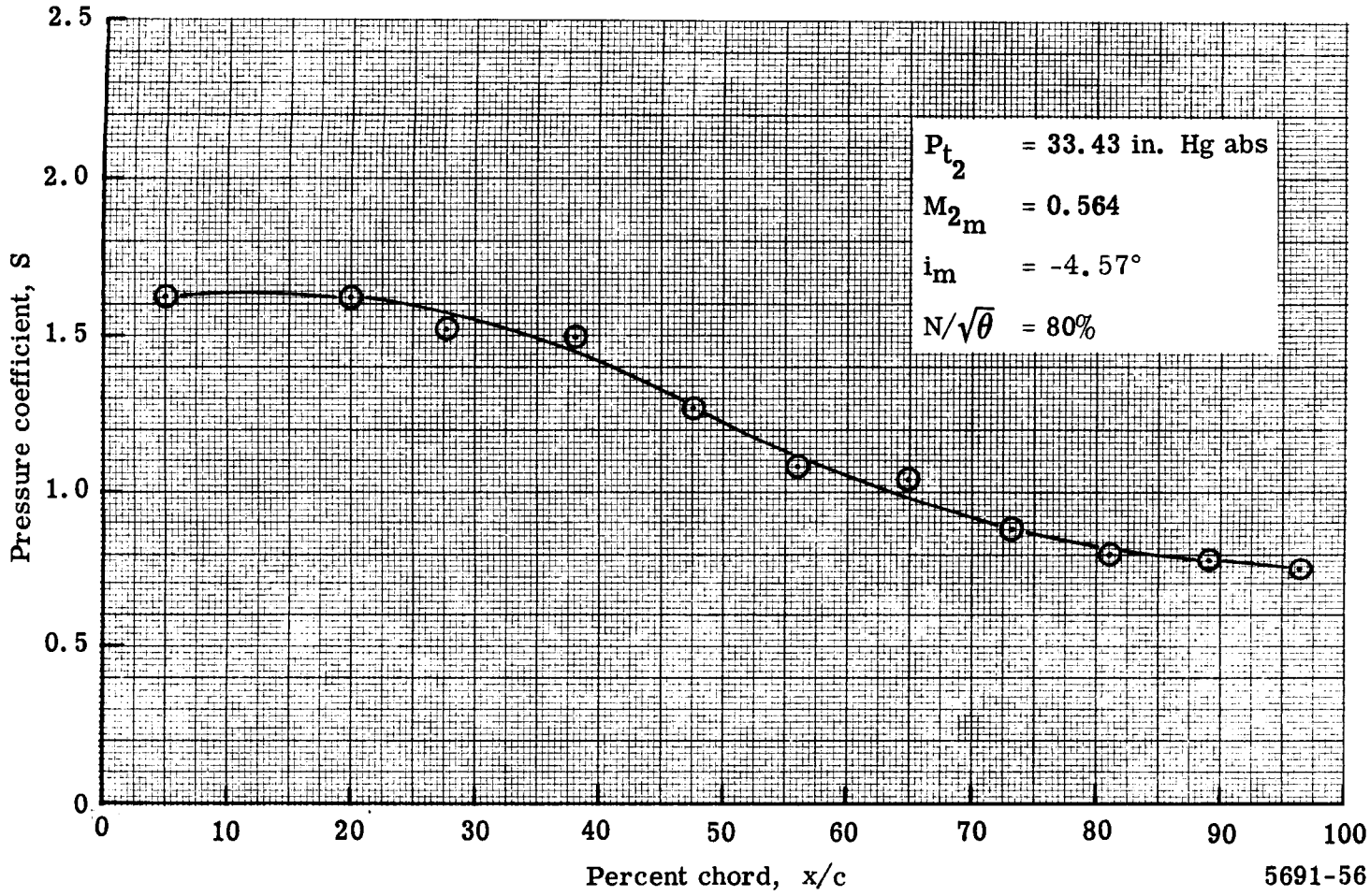


Figure 34b. Unslotted stator suction surface static pressure distribution at 80% speed and 50% streamline.

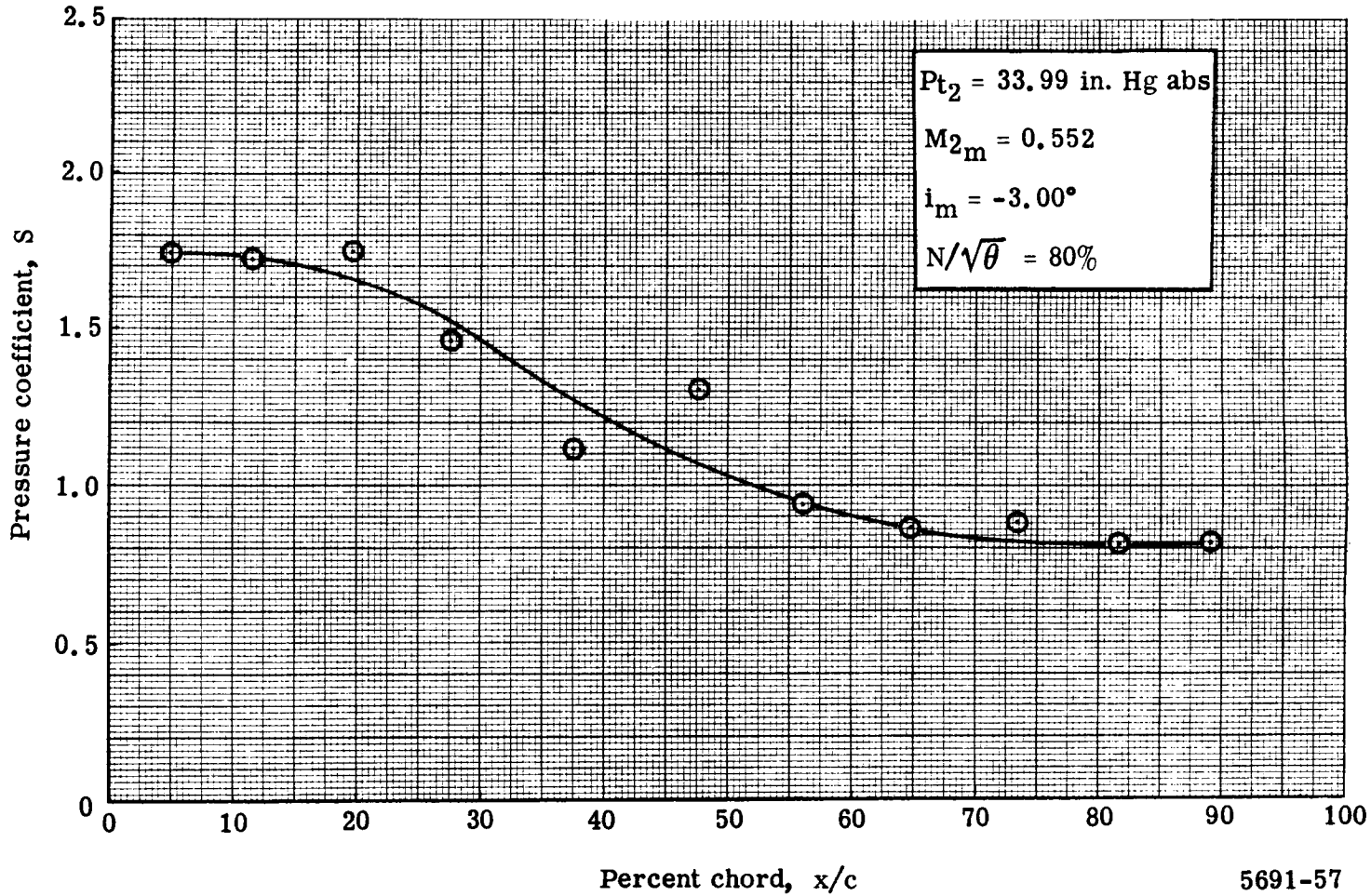


Figure 34c. Unslotted stator suction surface static pressure distribution at 80% speed and 50% streamline.

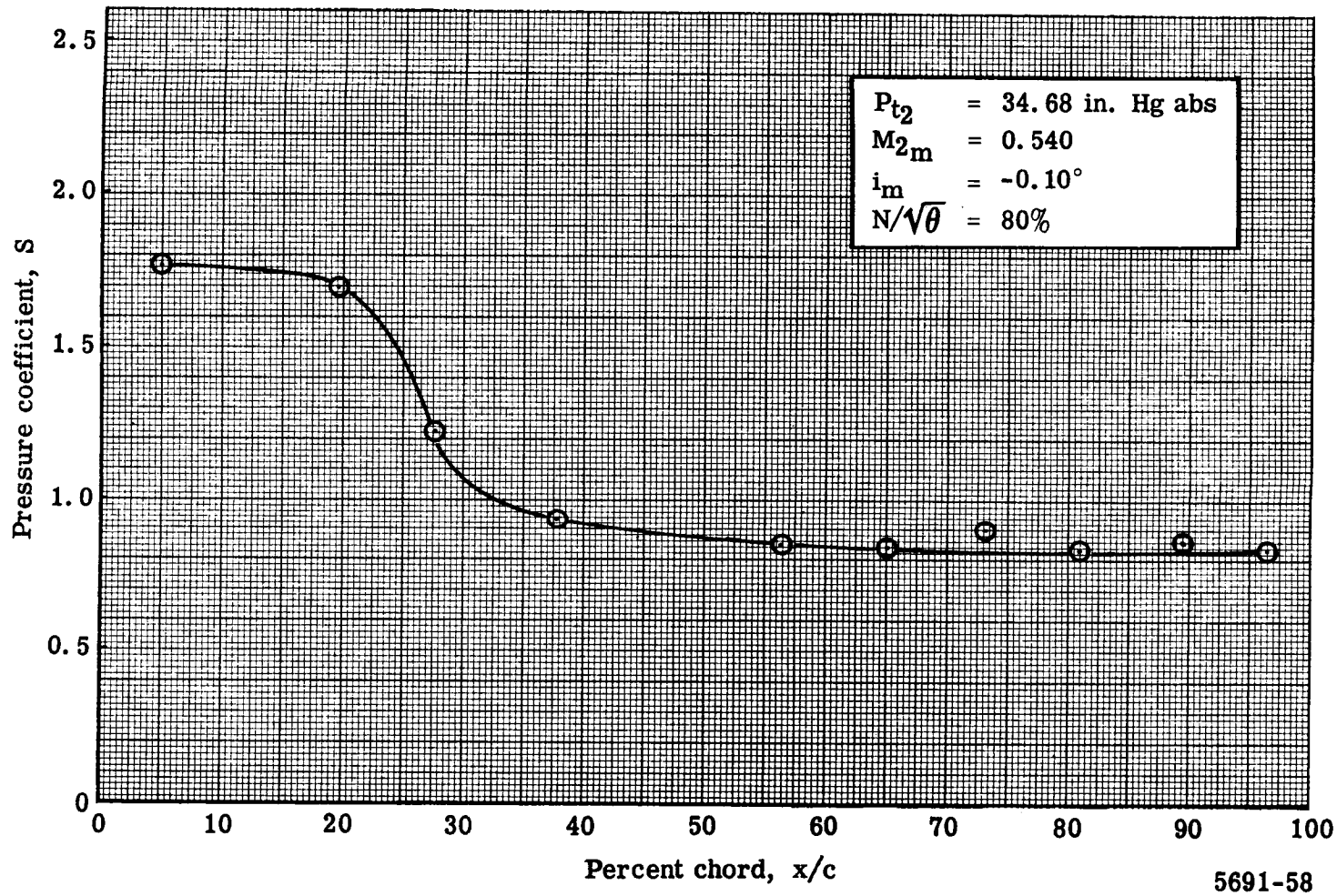


Figure 34d. Unslotted stator suction surface static pressure distribution at 80% speed and 50% streamline.

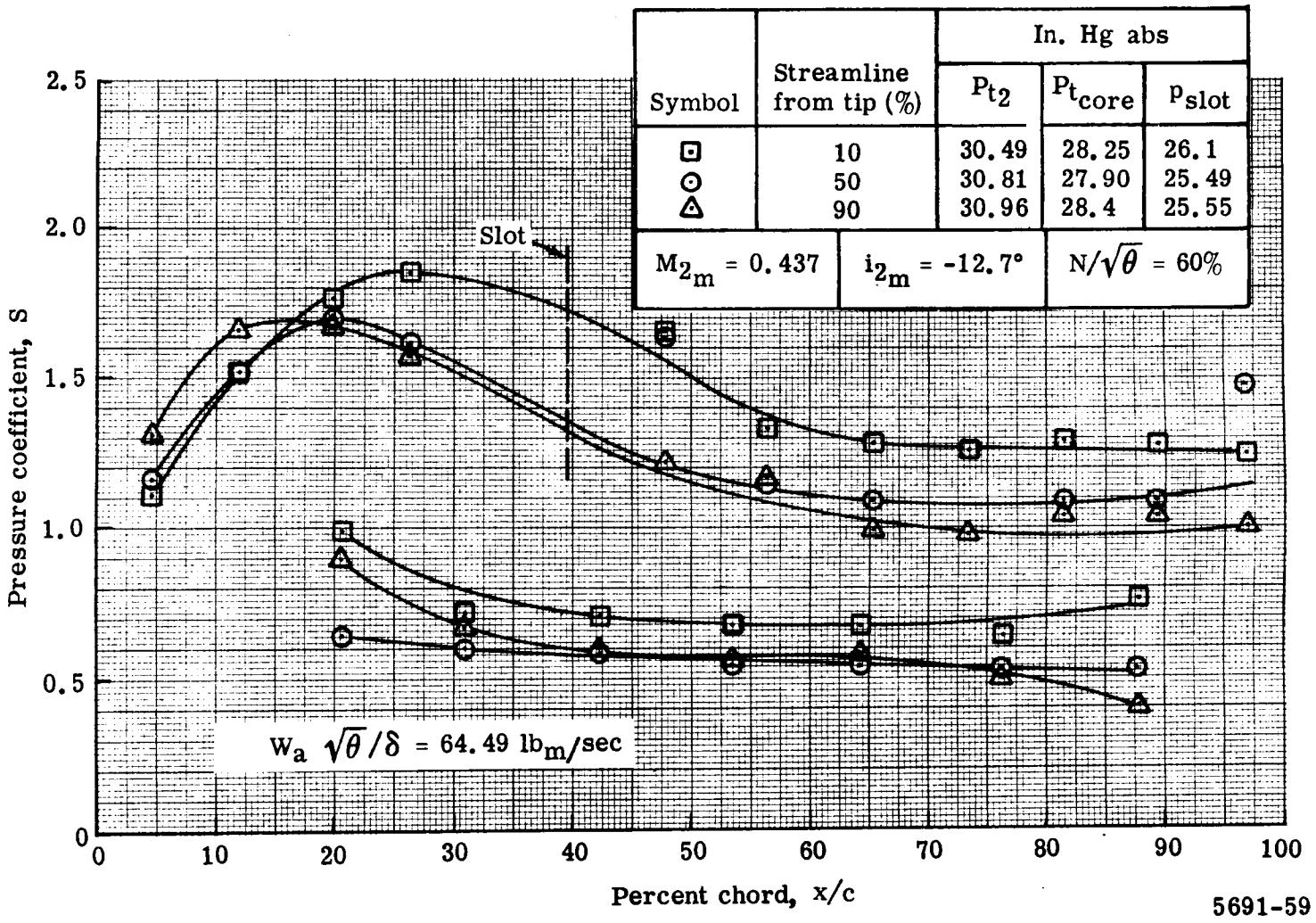


Figure 35a. Slotted stator static pressure distribution at 60% speed.

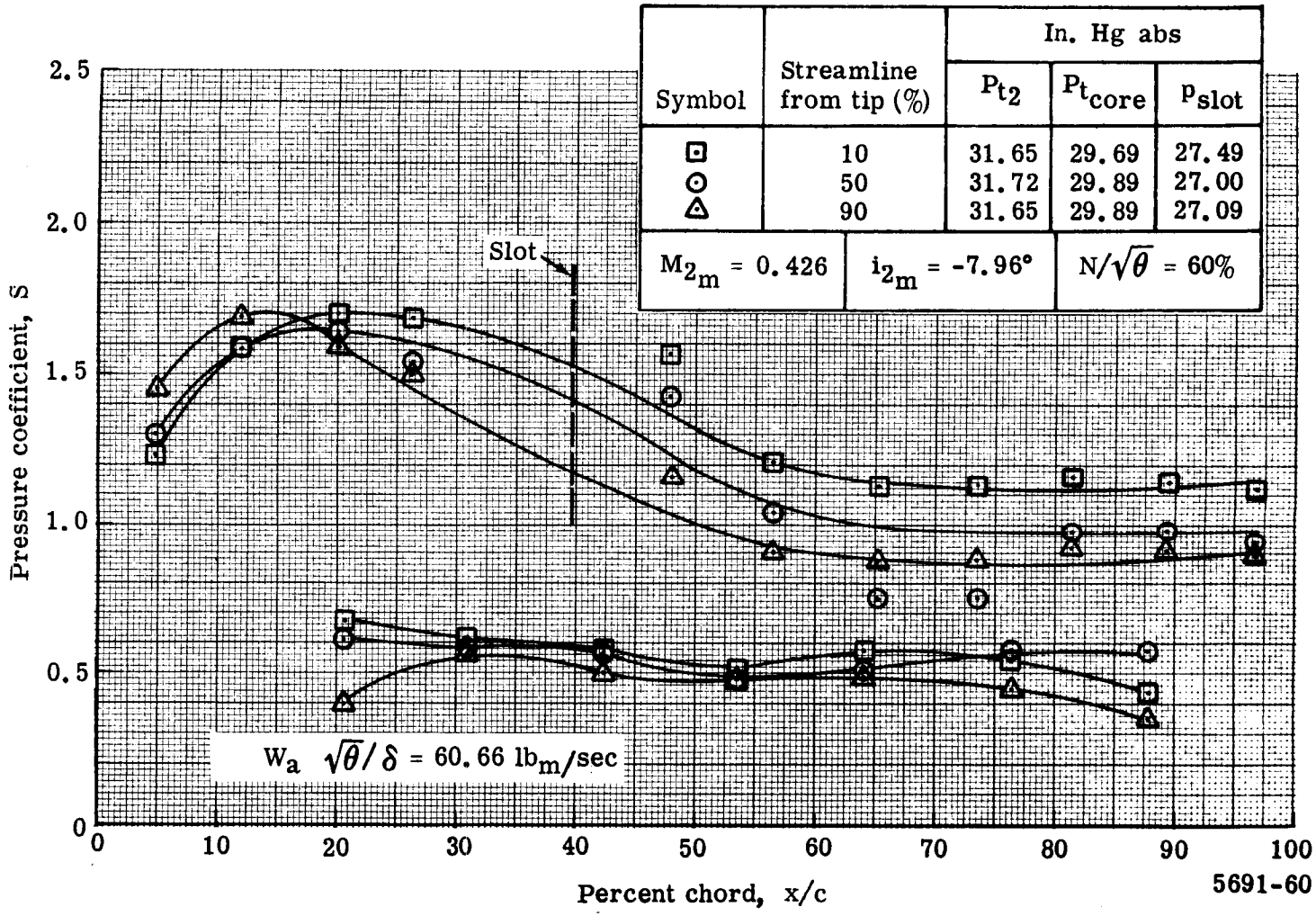


Figure 35b. Slotted stator static pressure distribution at 60% speed.

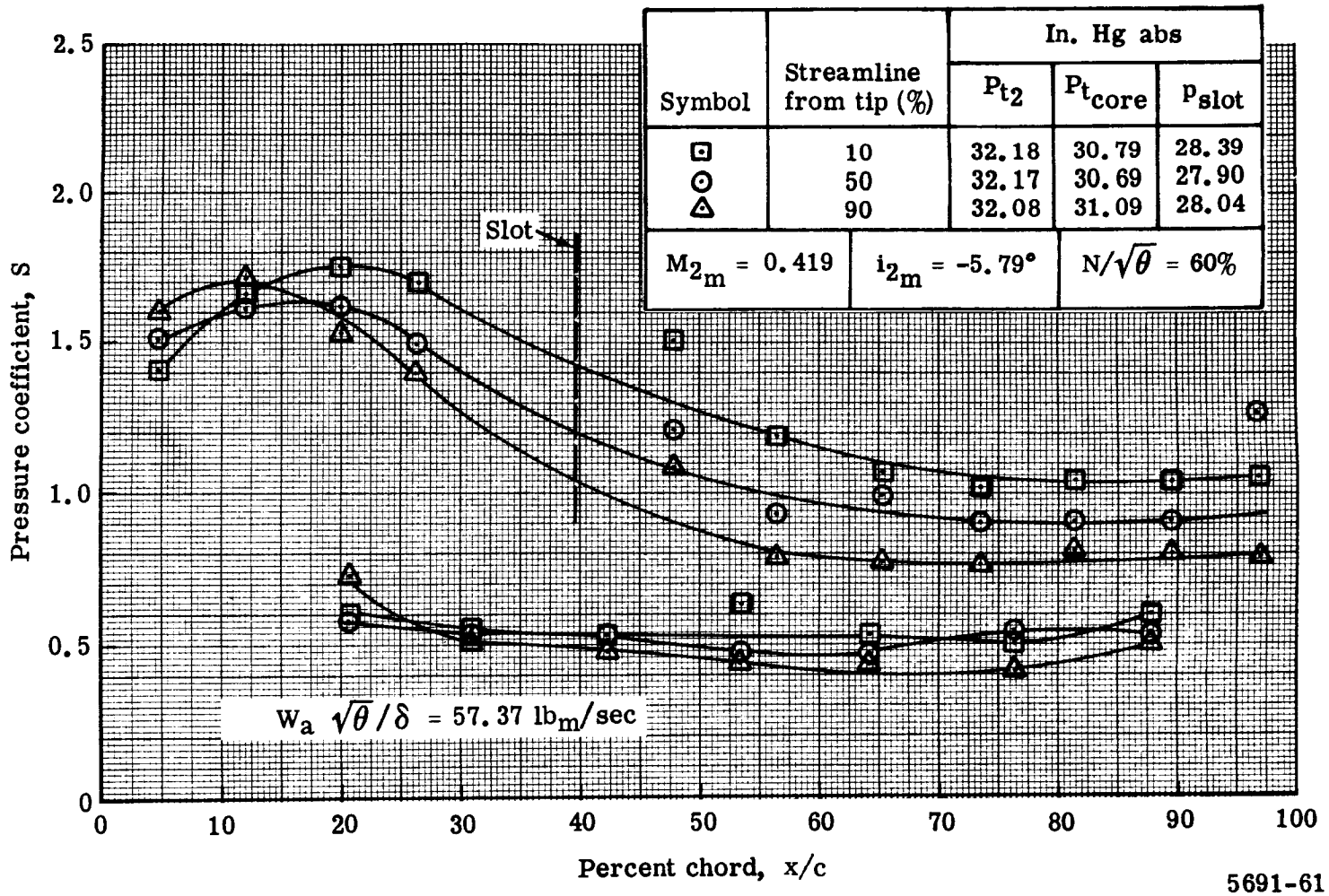


Figure 35c. Slotted stator static pressure distribution at 60% speed.

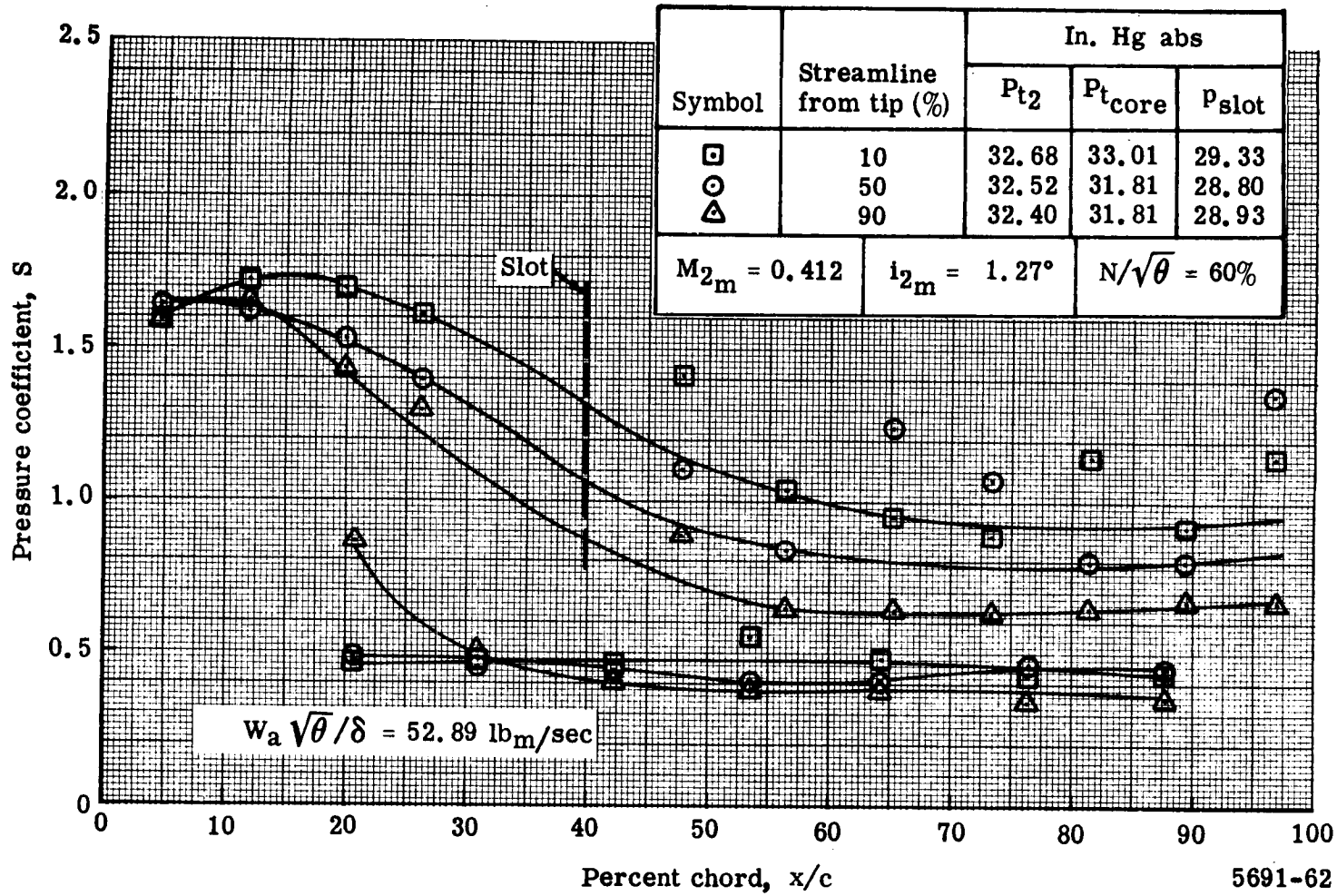


Figure 35d. Slotted stator static pressure distribution at 60% speed.

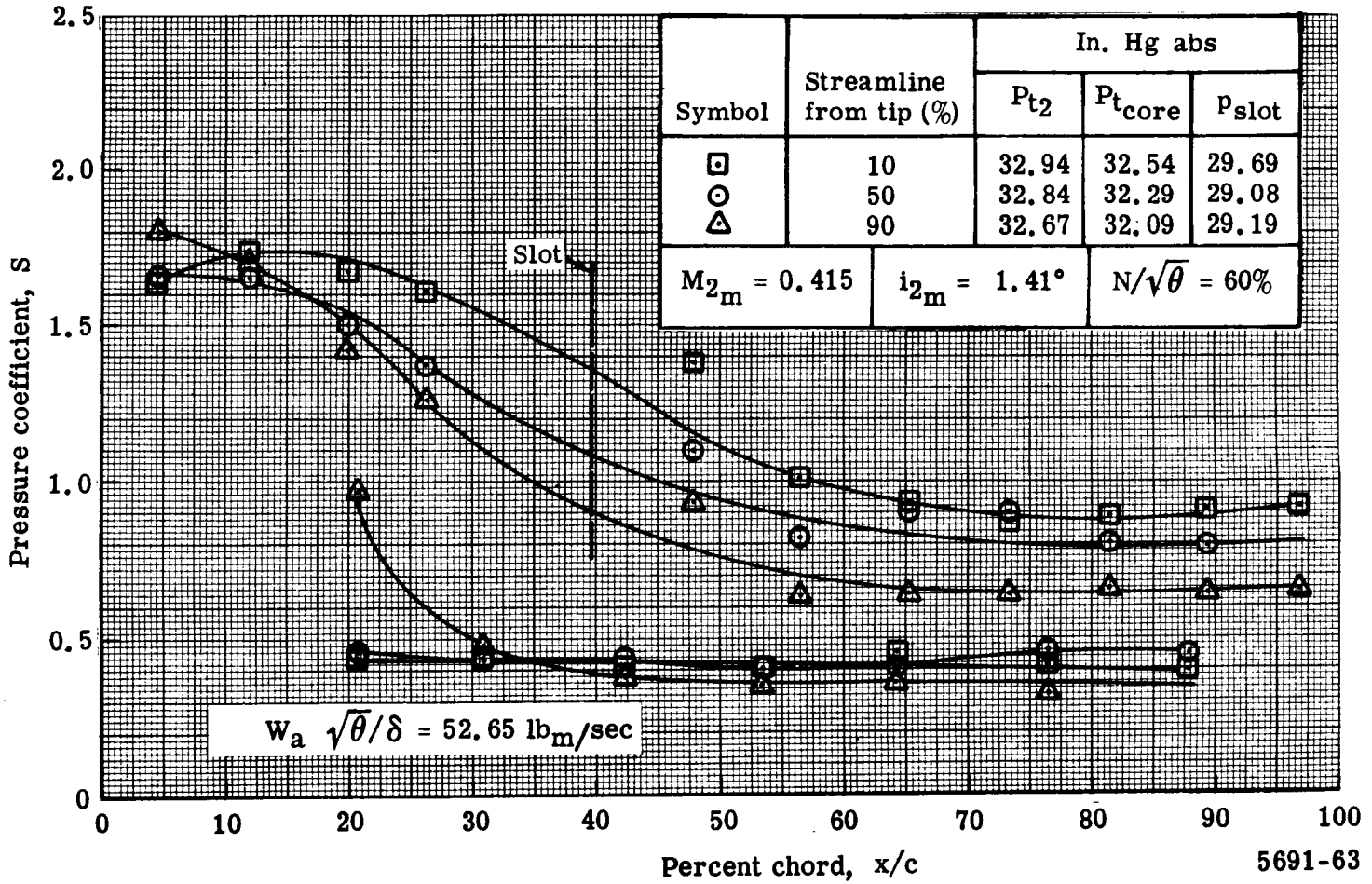


Figure 35e. Slotted stator static pressure distribution at 60% speed.

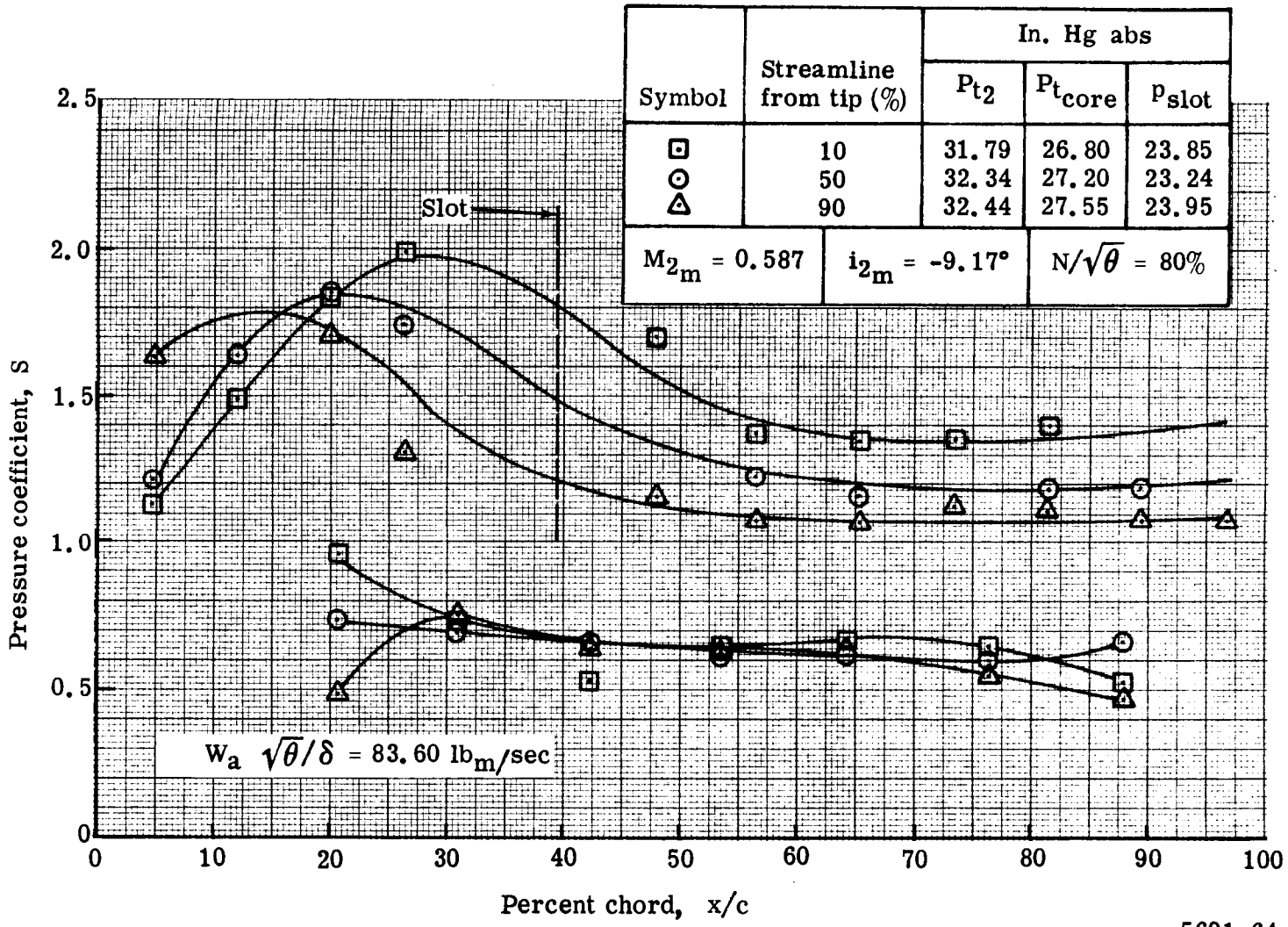


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Figure 36a. Slotted stator static pressure distribution at 80% speed.

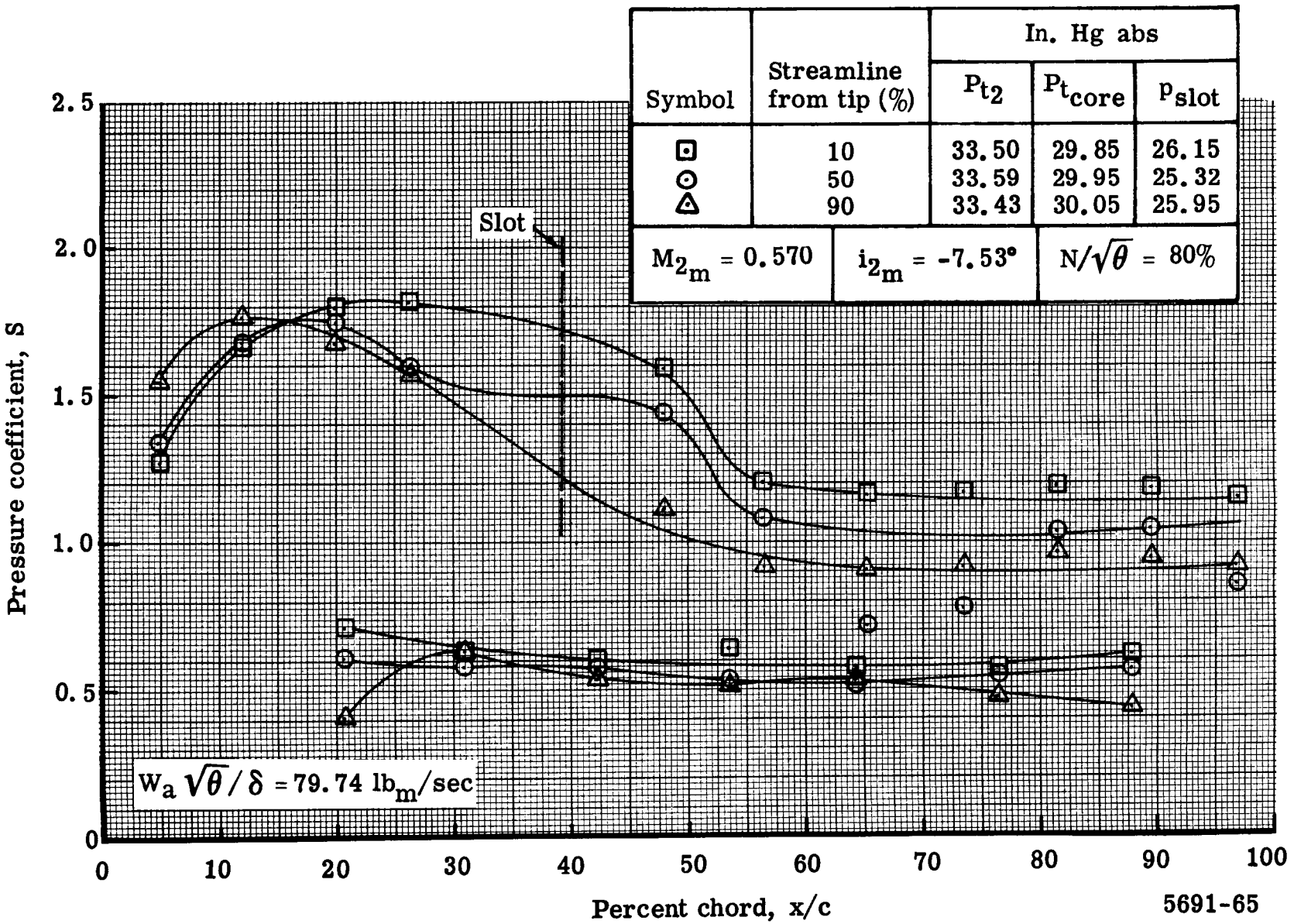


Figure 36b. Slotted stator static pressure distribution at 80% speed.

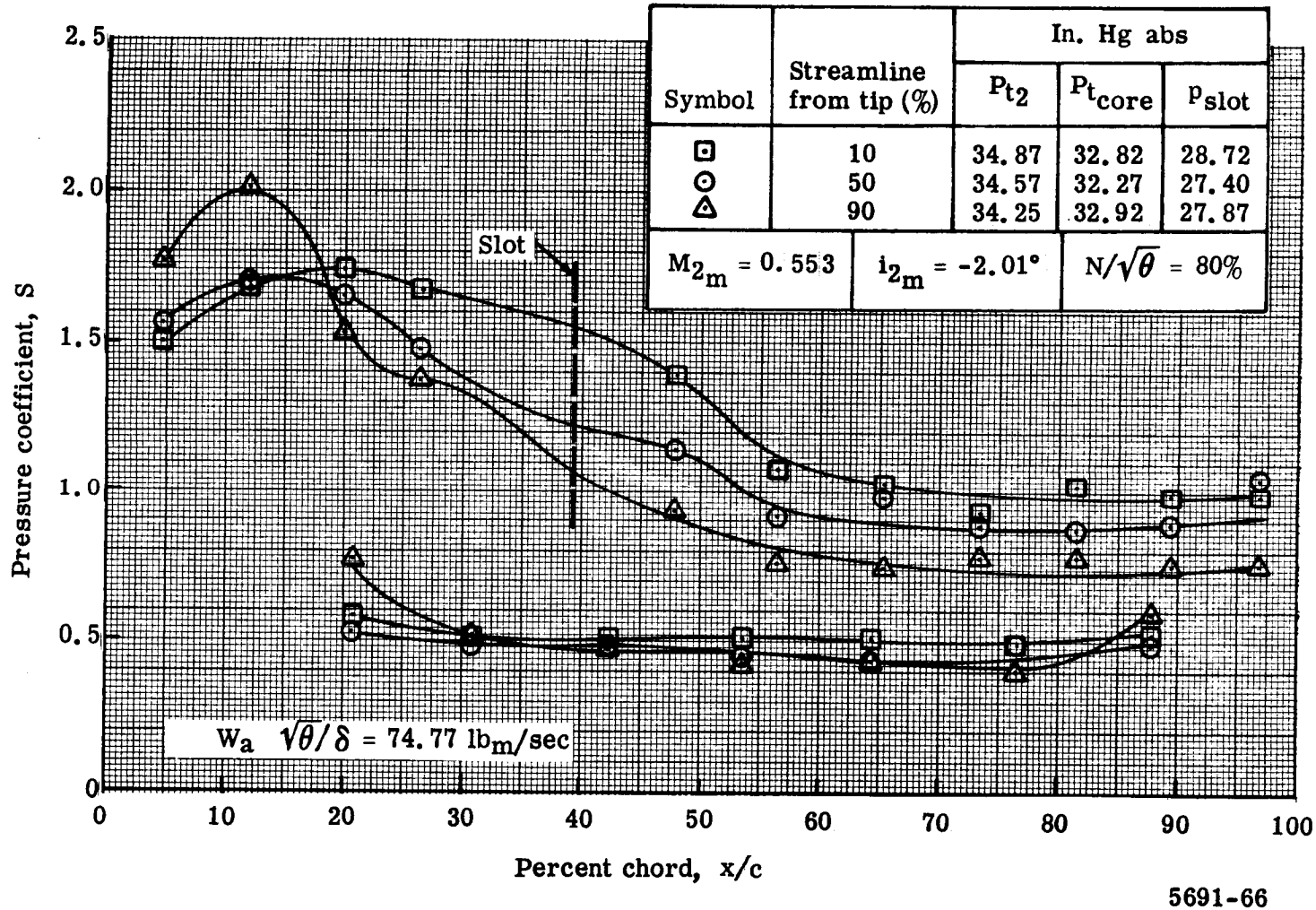


Figure 36c. Slotted stator static pressure distribution at 80% speed.

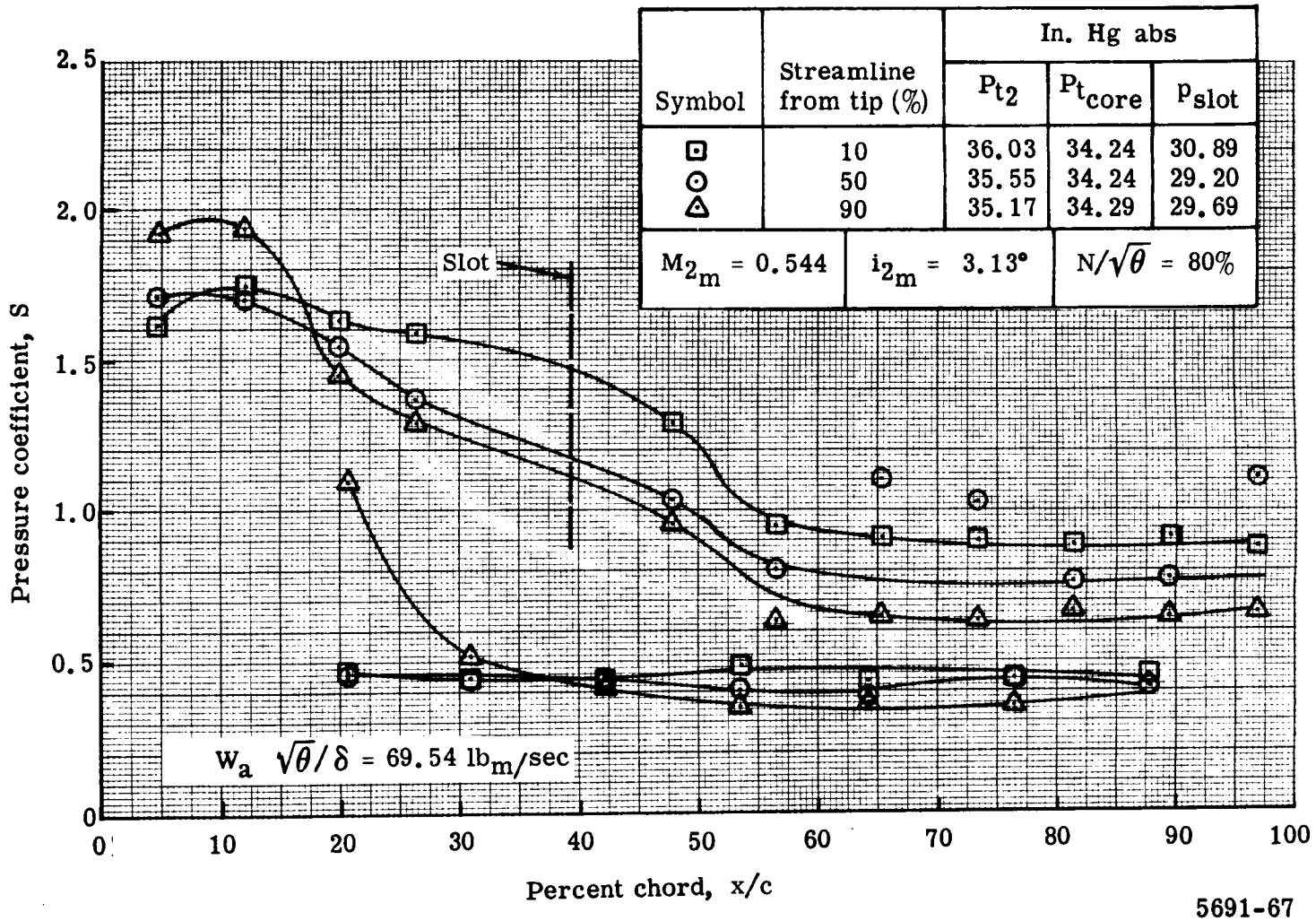


Figure 36d. Slotted stator static pressure distribution at 80% speed.

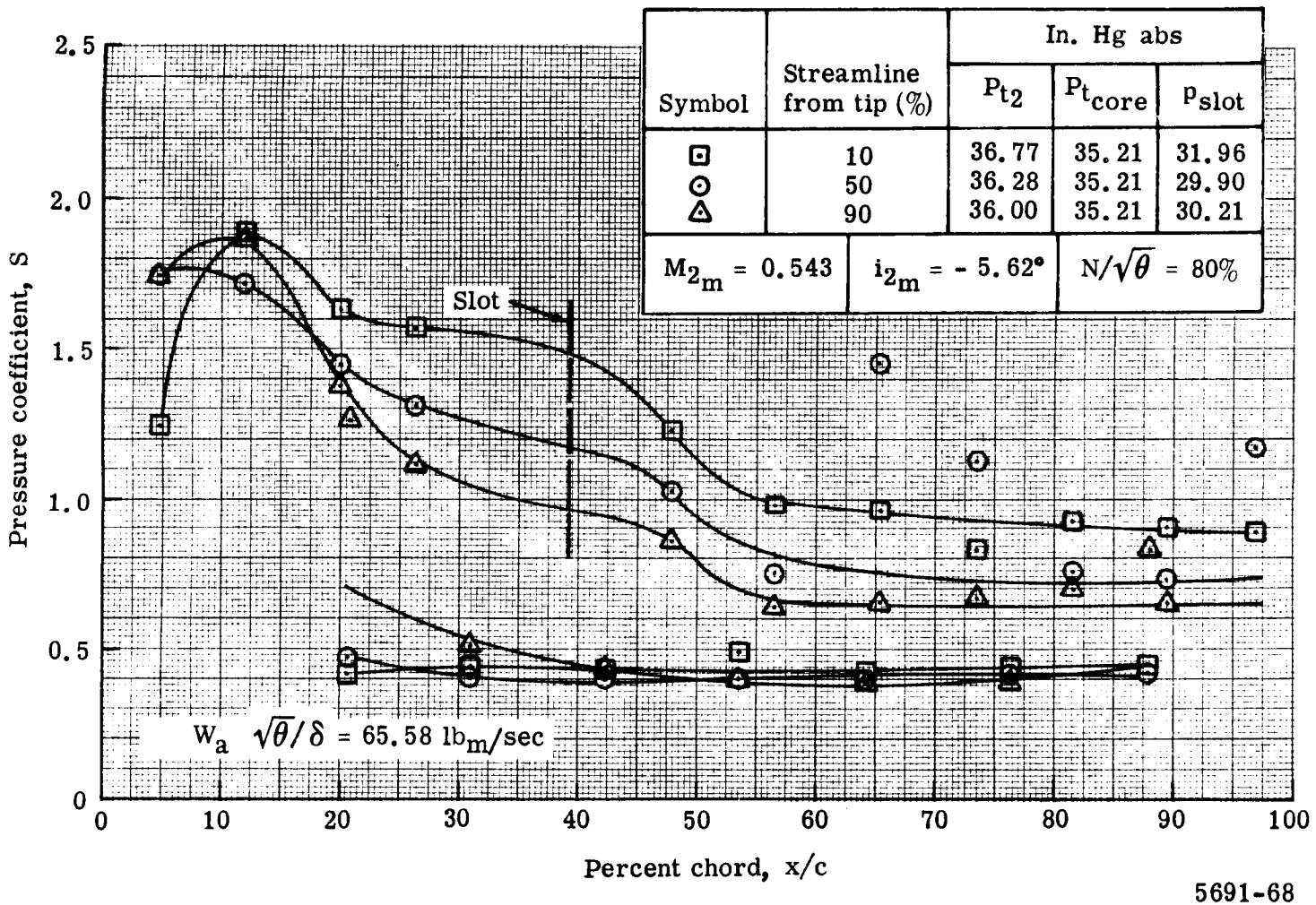


Figure 36e. Slotted stator static pressure distribution at 80% speed.

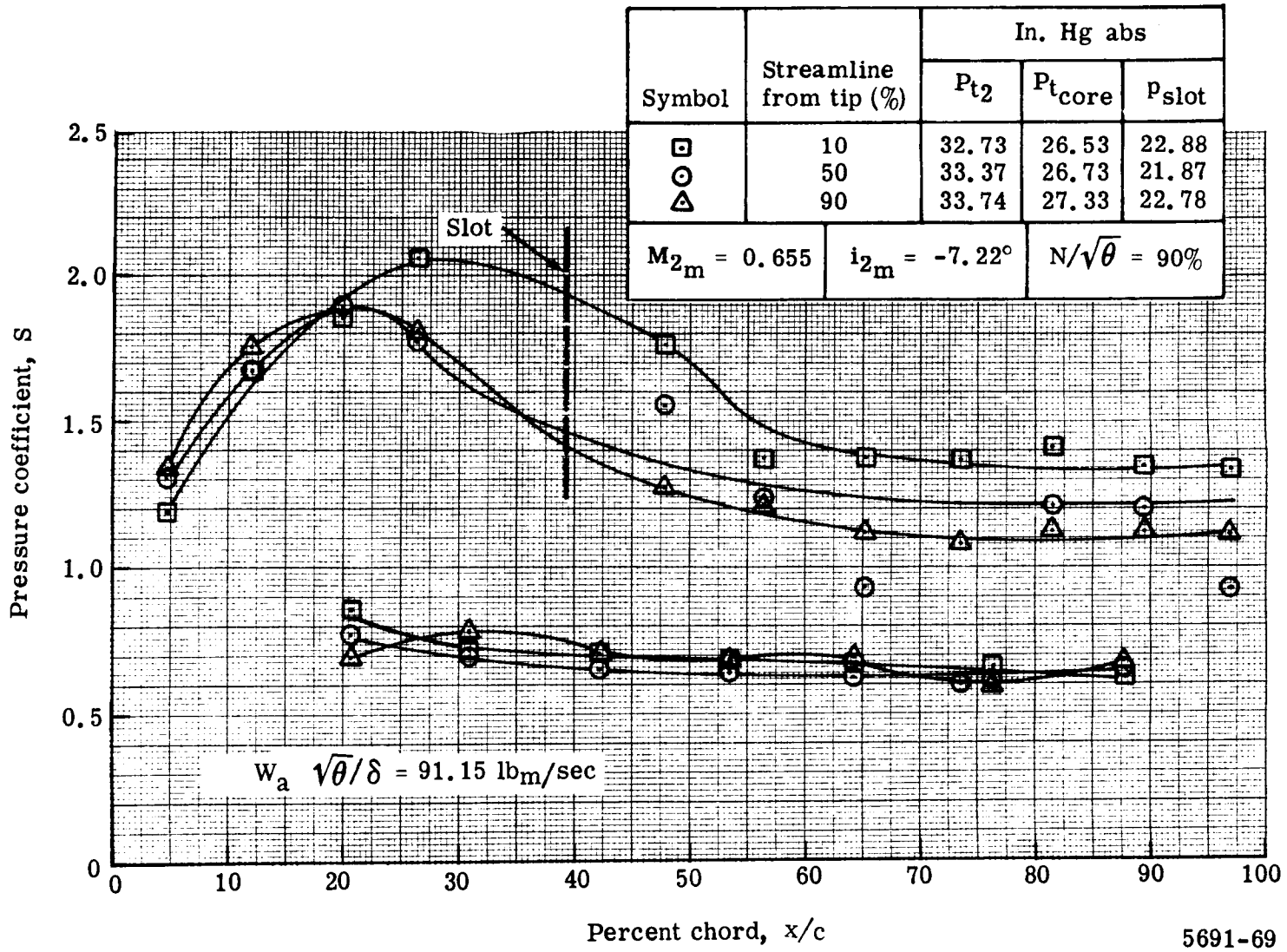


Figure 37a. Slotted stator static pressure distribution at 90% speed.

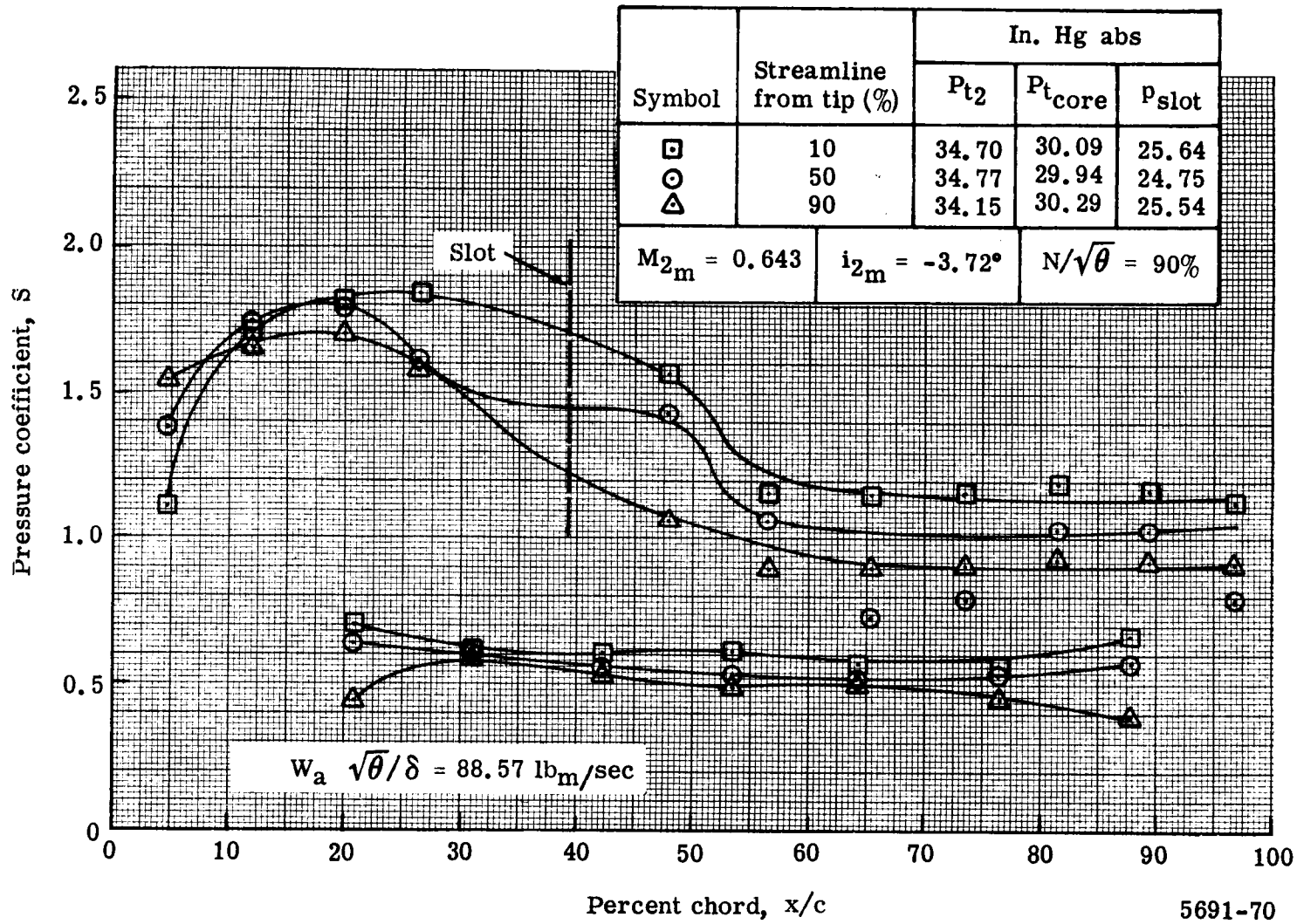


Figure 37b. Slotted stator static pressure distribution at 90% speed.

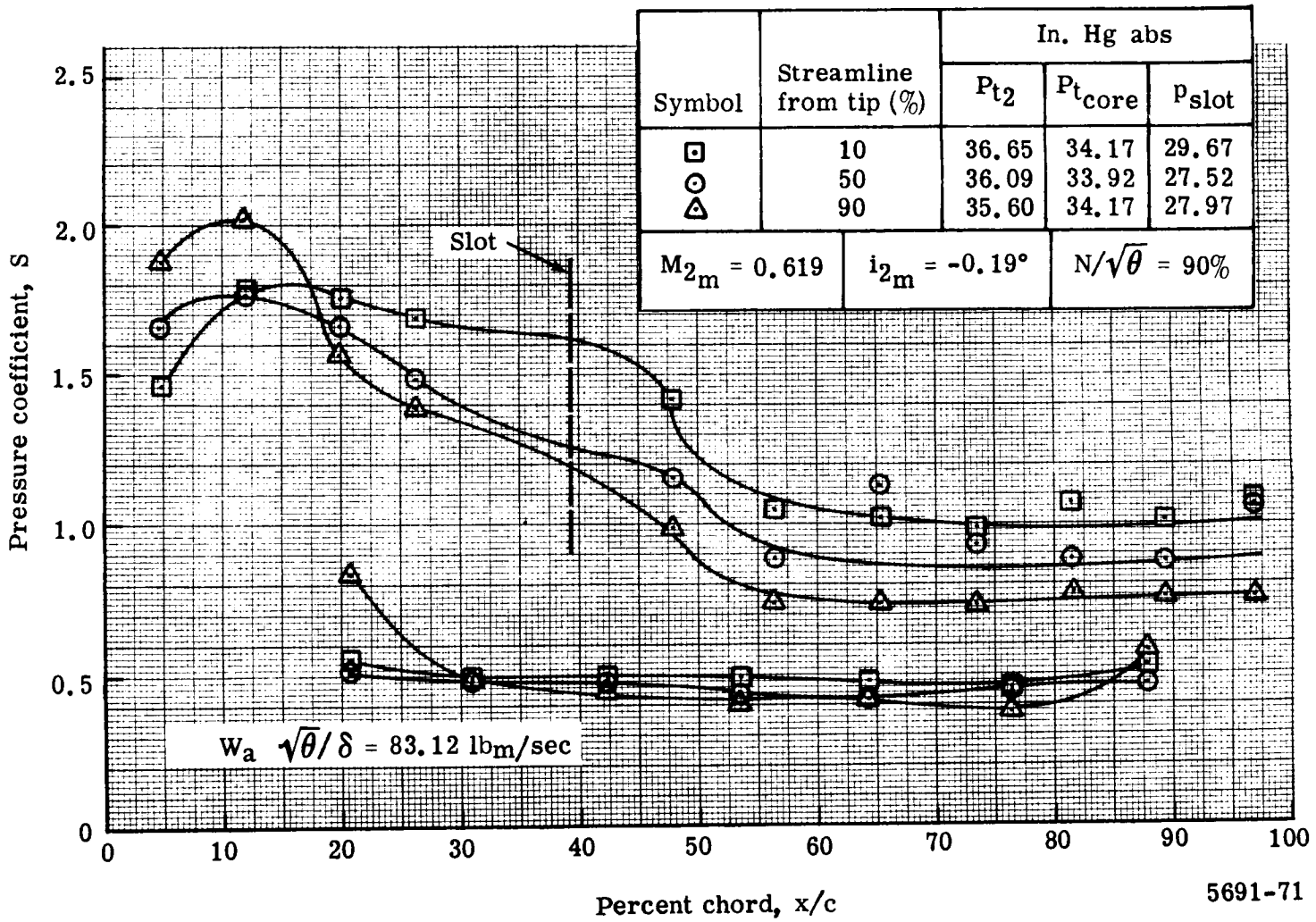


Figure 37c. Slotted stator static pressure distribution at 90% speed.

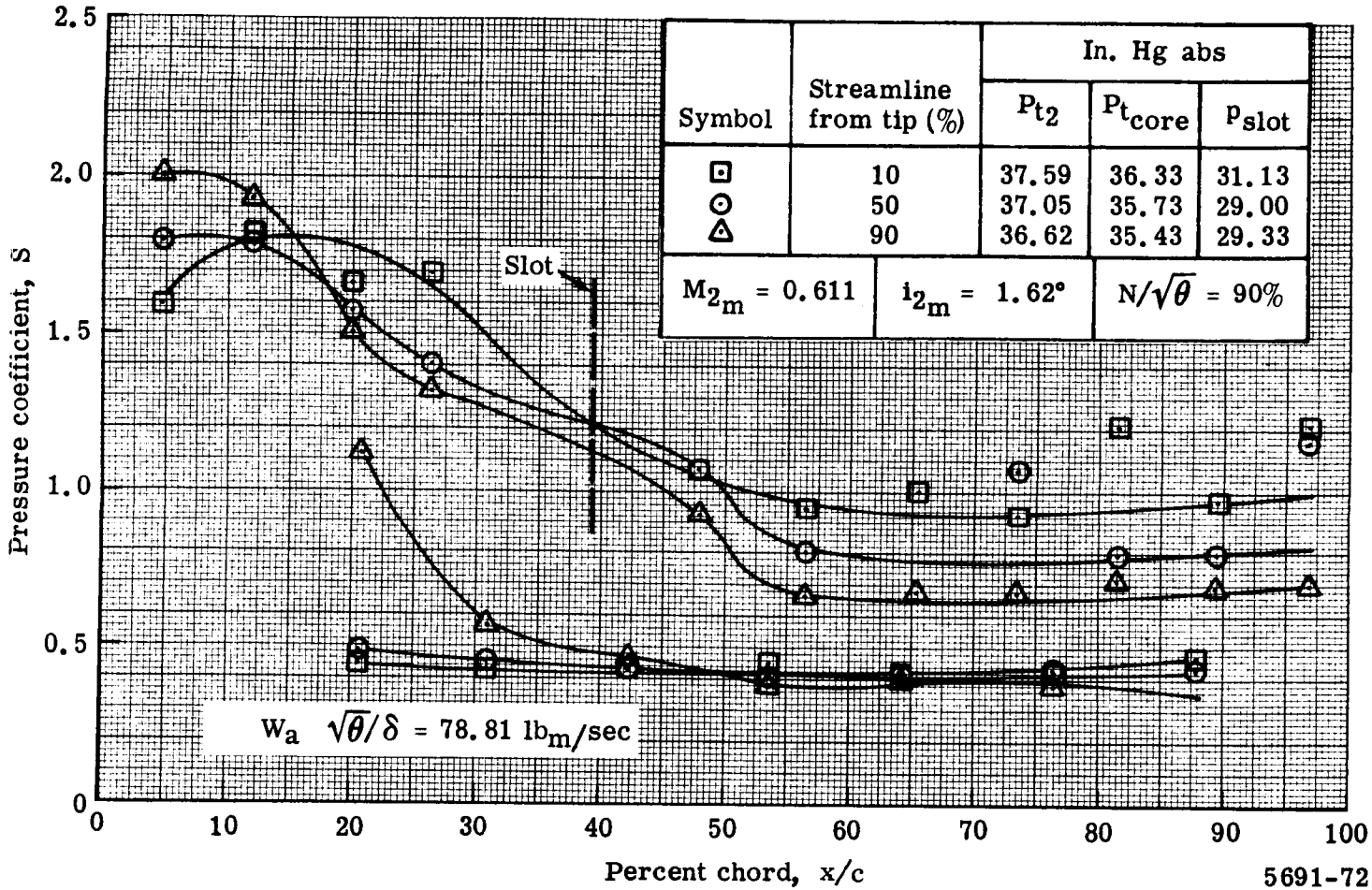


Figure 37d. Slotted stator static pressure distribution at 90% speed.

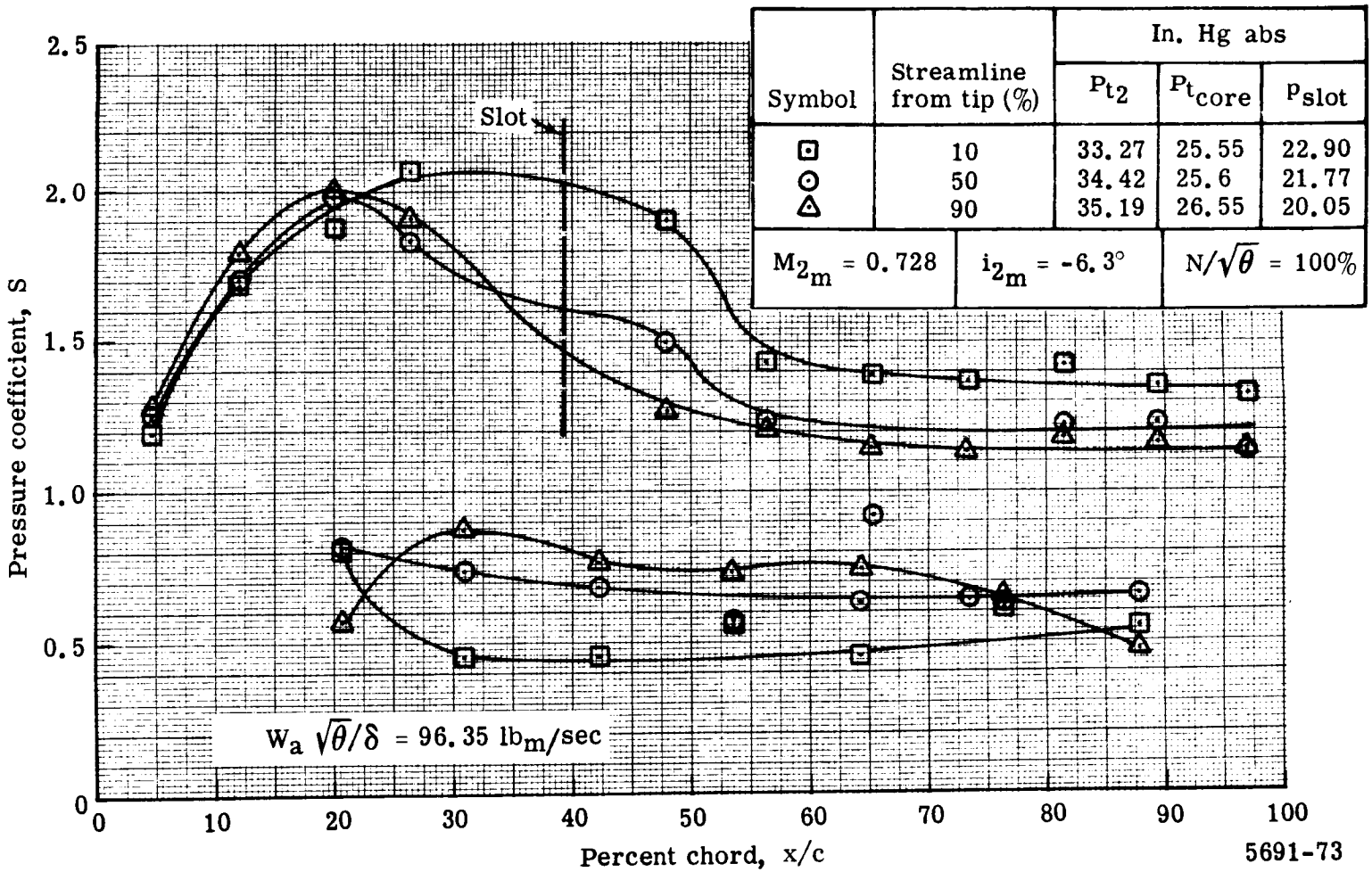


Figure 38a. Slotted stator static pressure distribution at 100% speed.

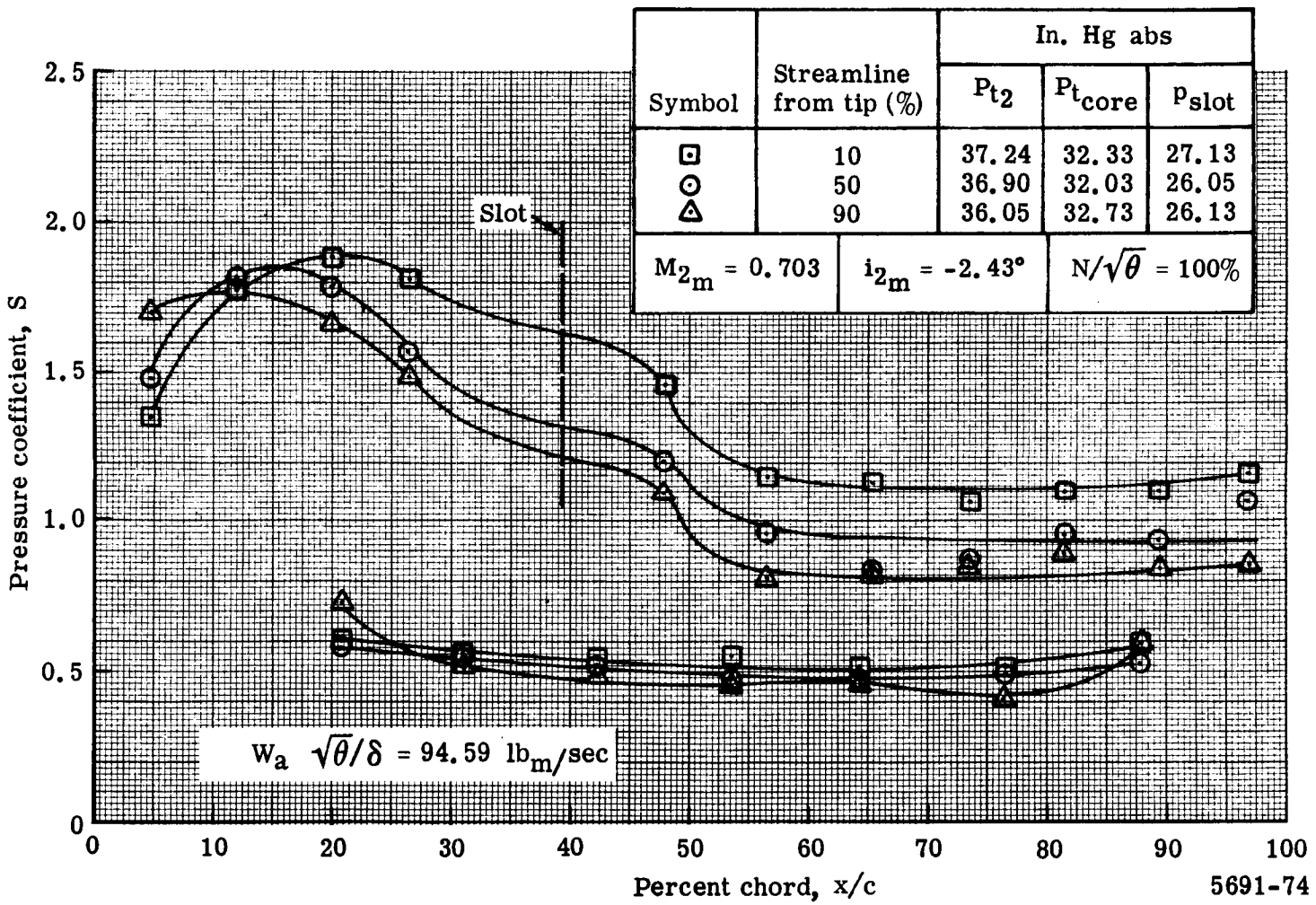


Figure 38b. Slotted stator static pressure distribution at 100% speed.

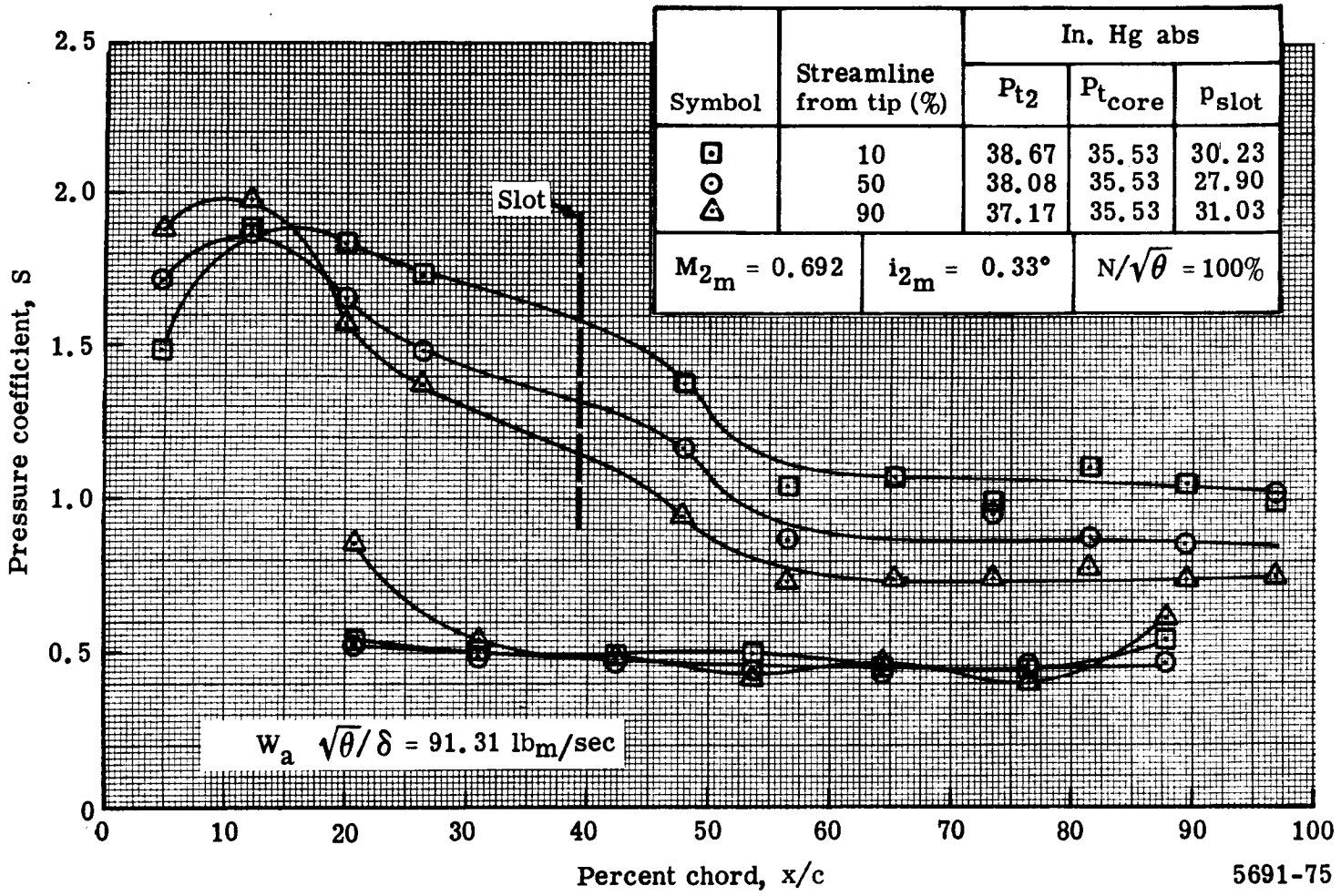


Figure 38c. Slotted stator static pressure distribution at 100% speed.

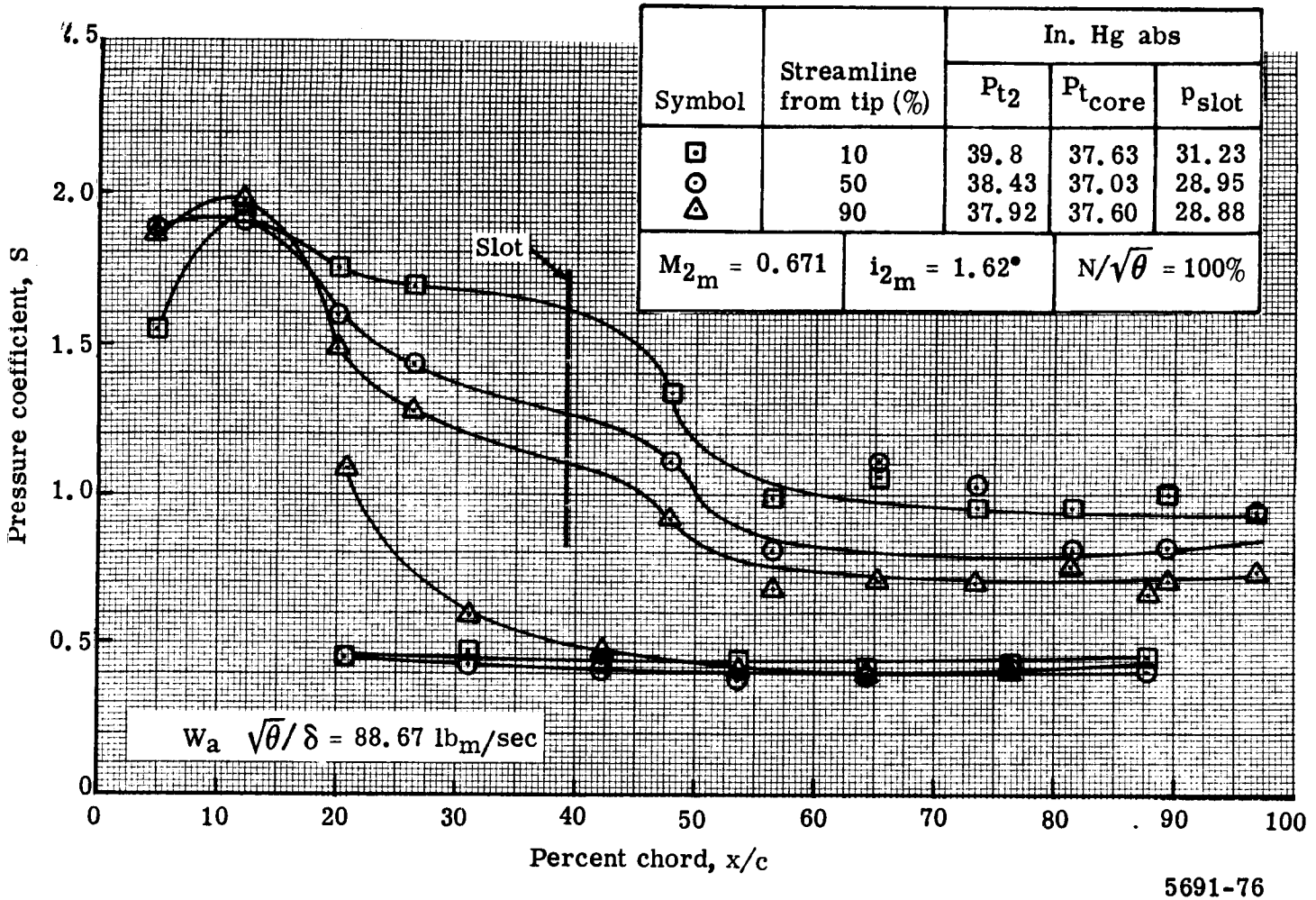


Figure 38d. Slotted stator static pressure distribution at 100% speed.

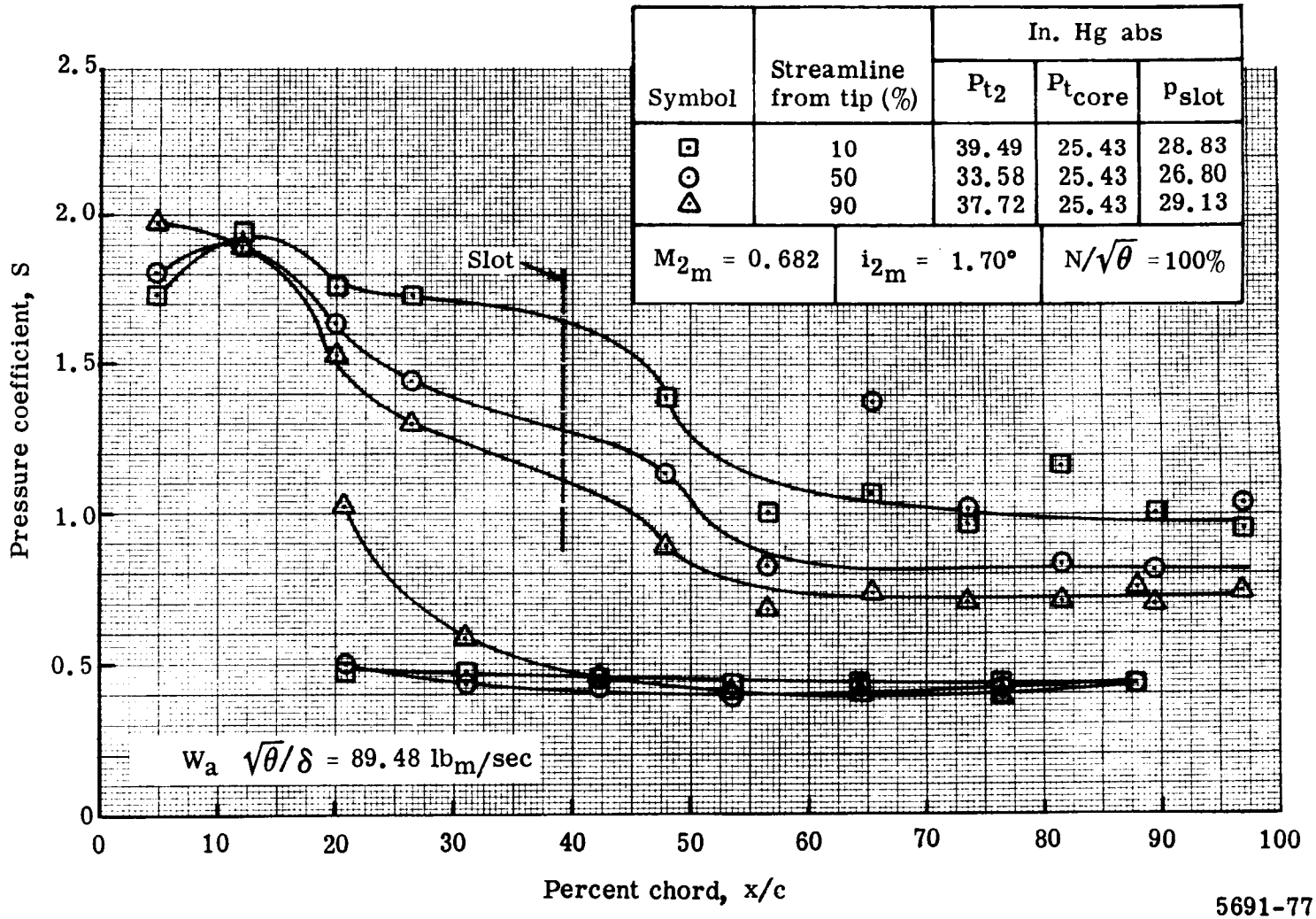


Figure 38e. Slotted stator static pressure distribution at 100% speed.

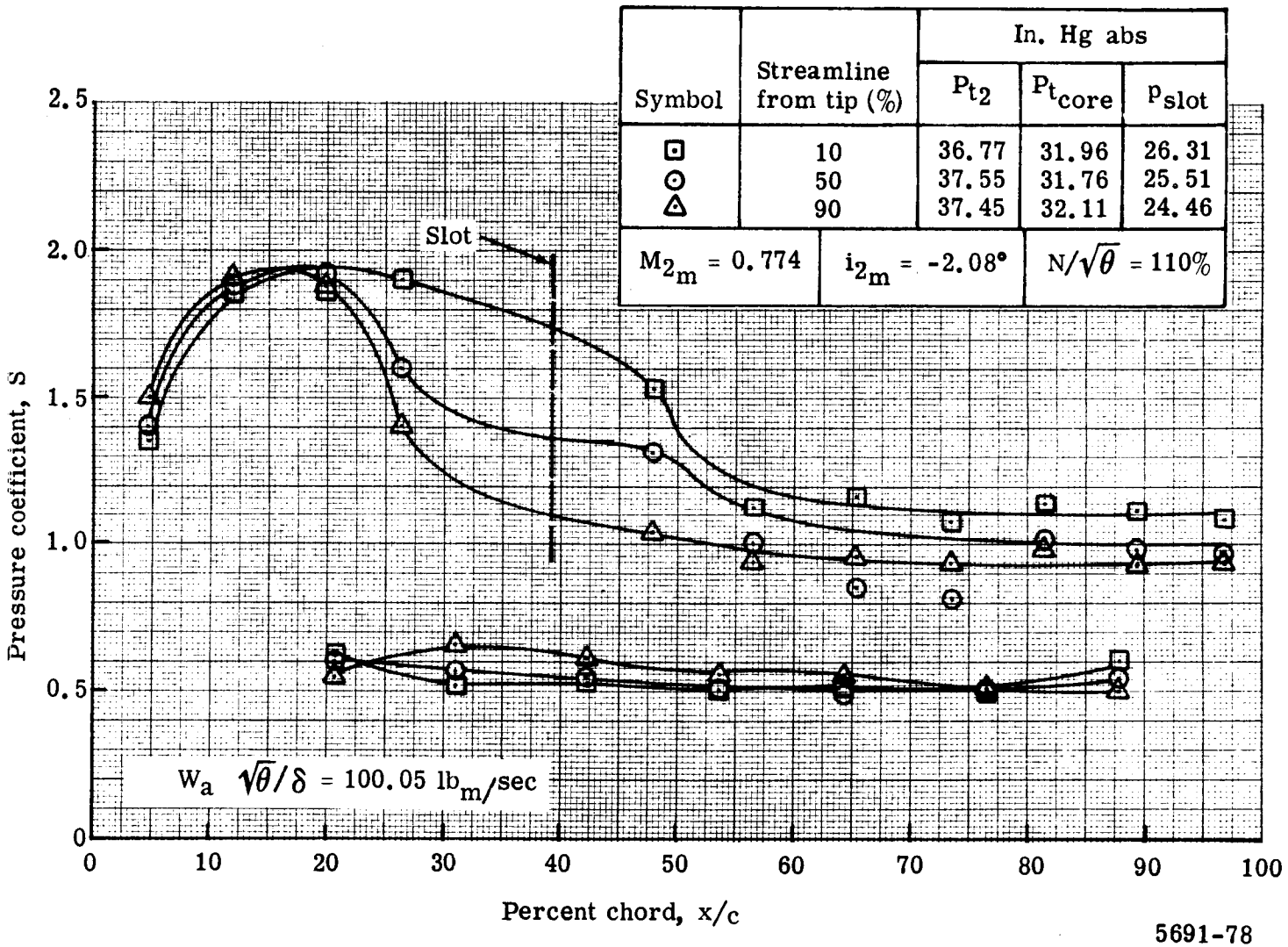


Figure 39a. Slotted stator static pressure distribution at 110% speed.

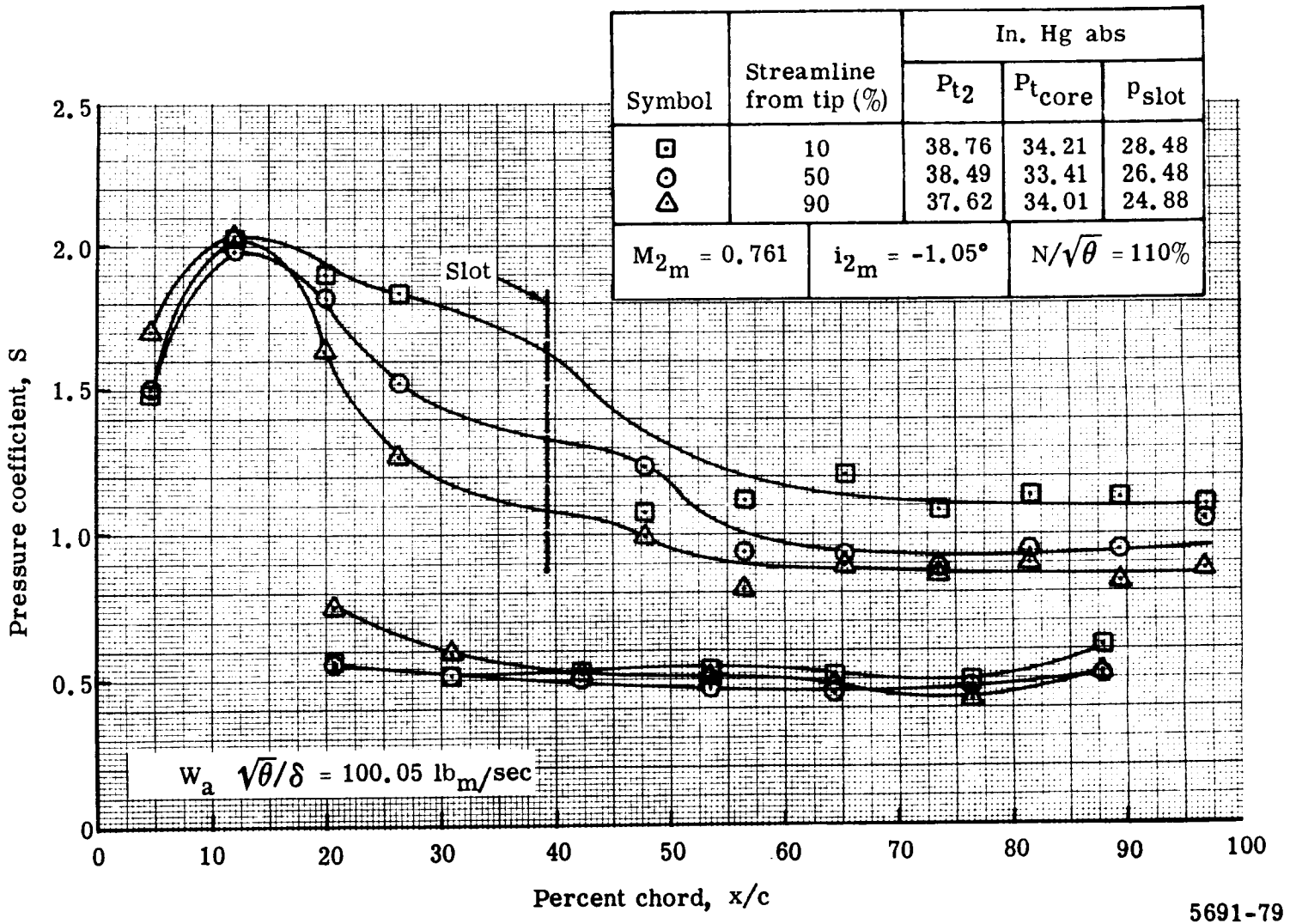


Figure 39b. Slotted stator static pressure distribution at 110% speed.

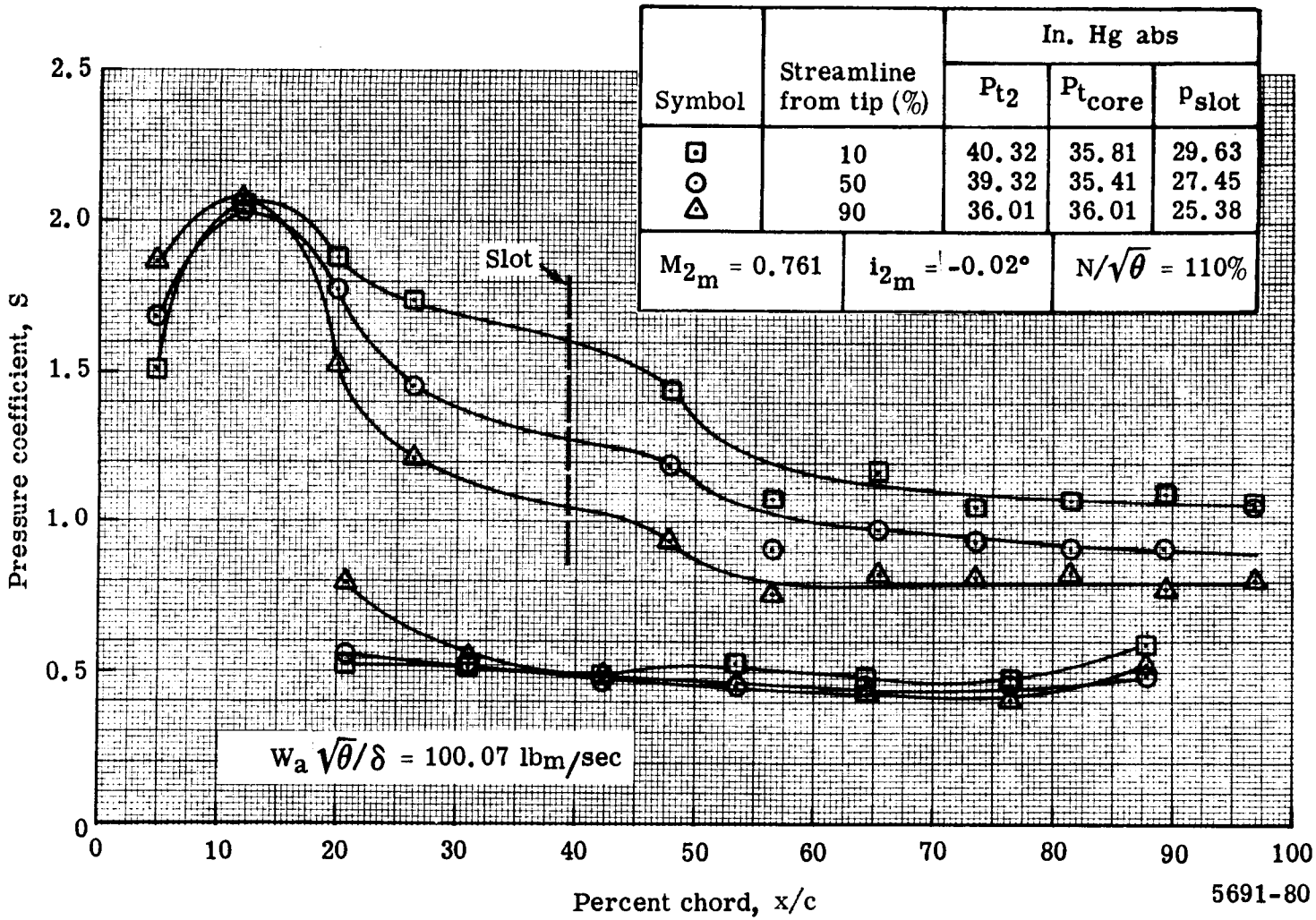


Figure 39c. Slotted stator static pressure distribution at 110% speed.

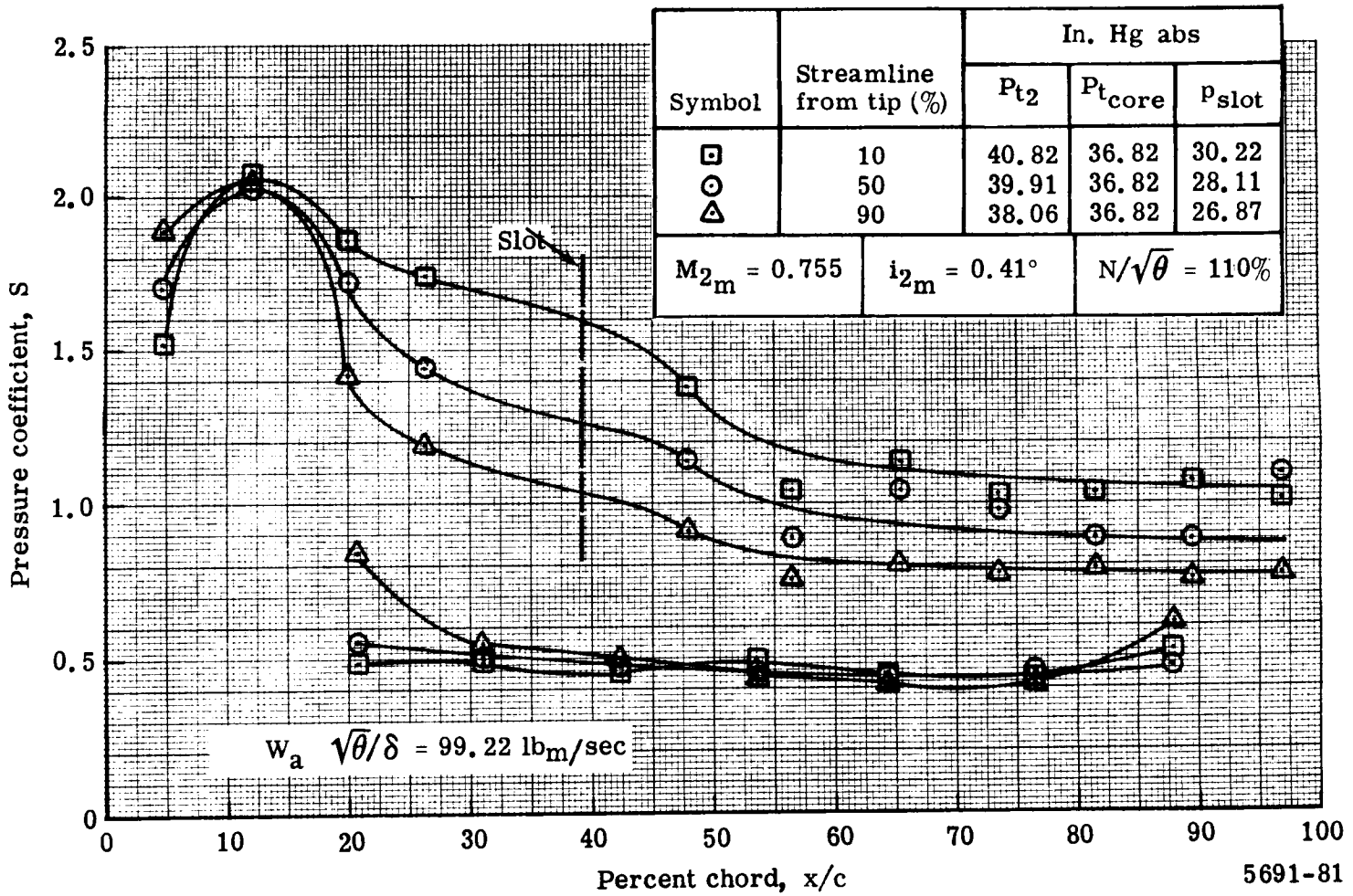
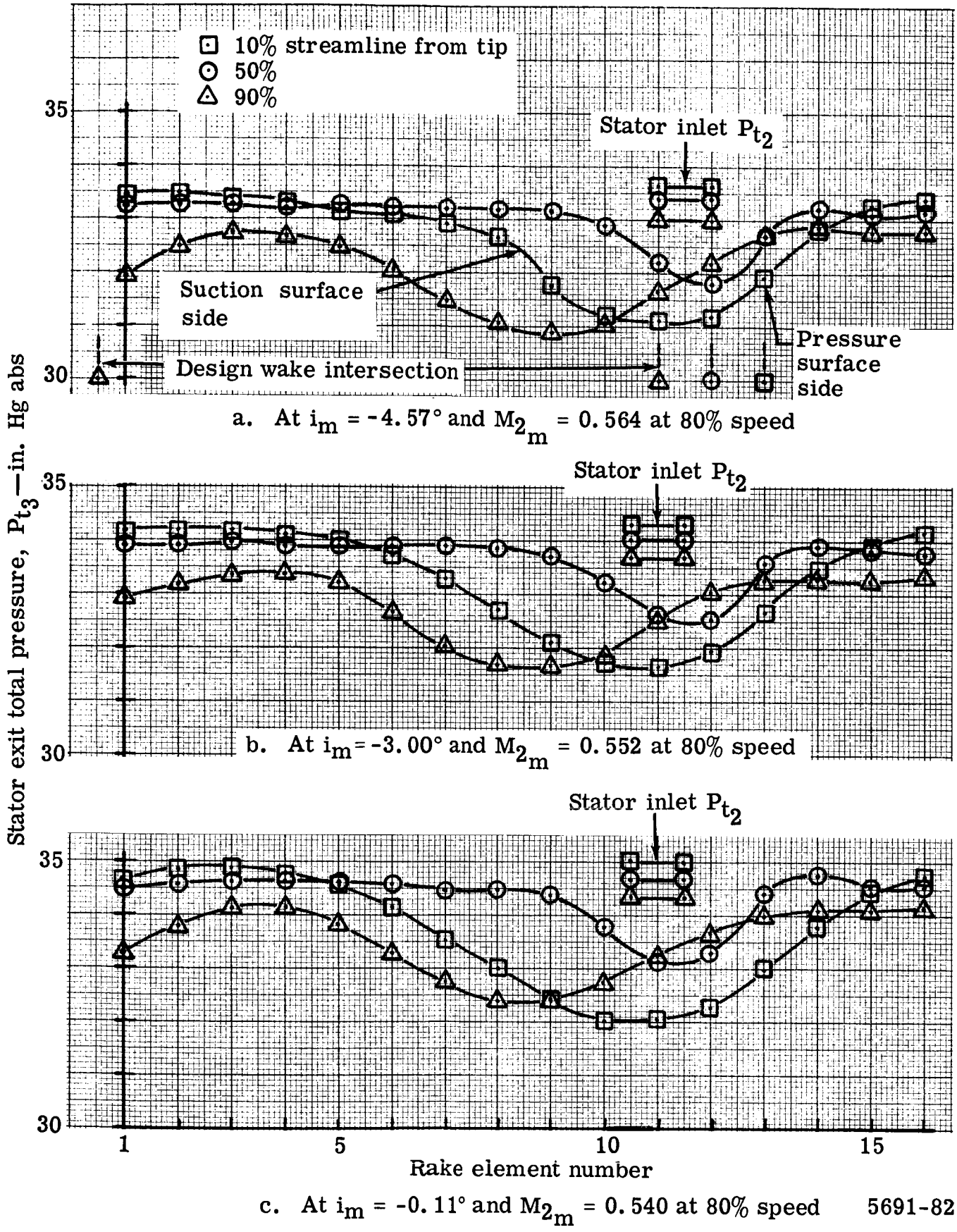


Figure 39d. Slotted stator static pressure distribution at 110% speed.

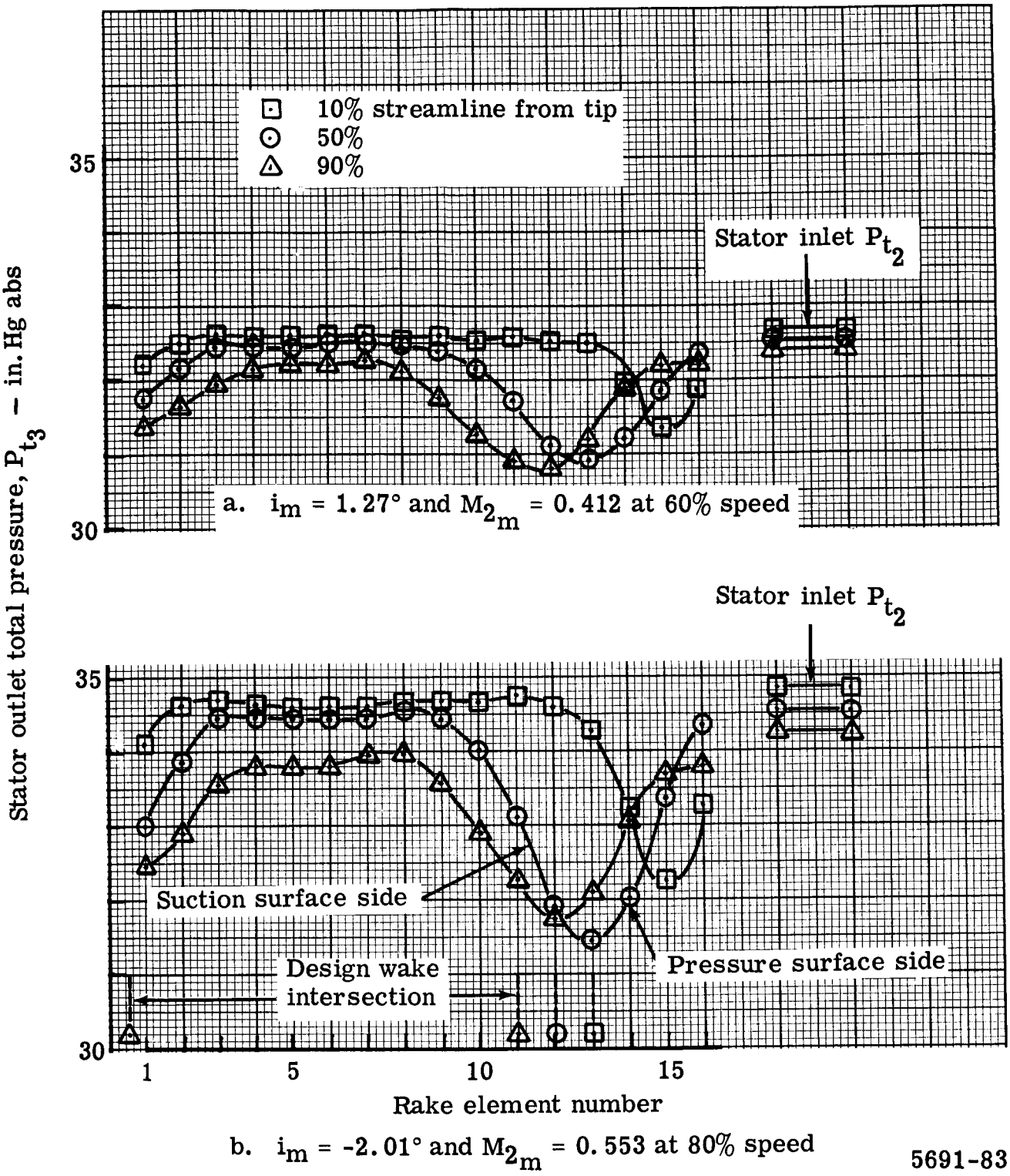


a. At $i_m = -4.57°$ and $M_{2_m} = 0.564$ at 80% speed

b. At $i_m = -3.00°$ and $M_{2_m} = 0.552$ at 80% speed

c. At $i_m = -0.11°$ and $M_{2_m} = 0.540$ at 80% speed 5691-82

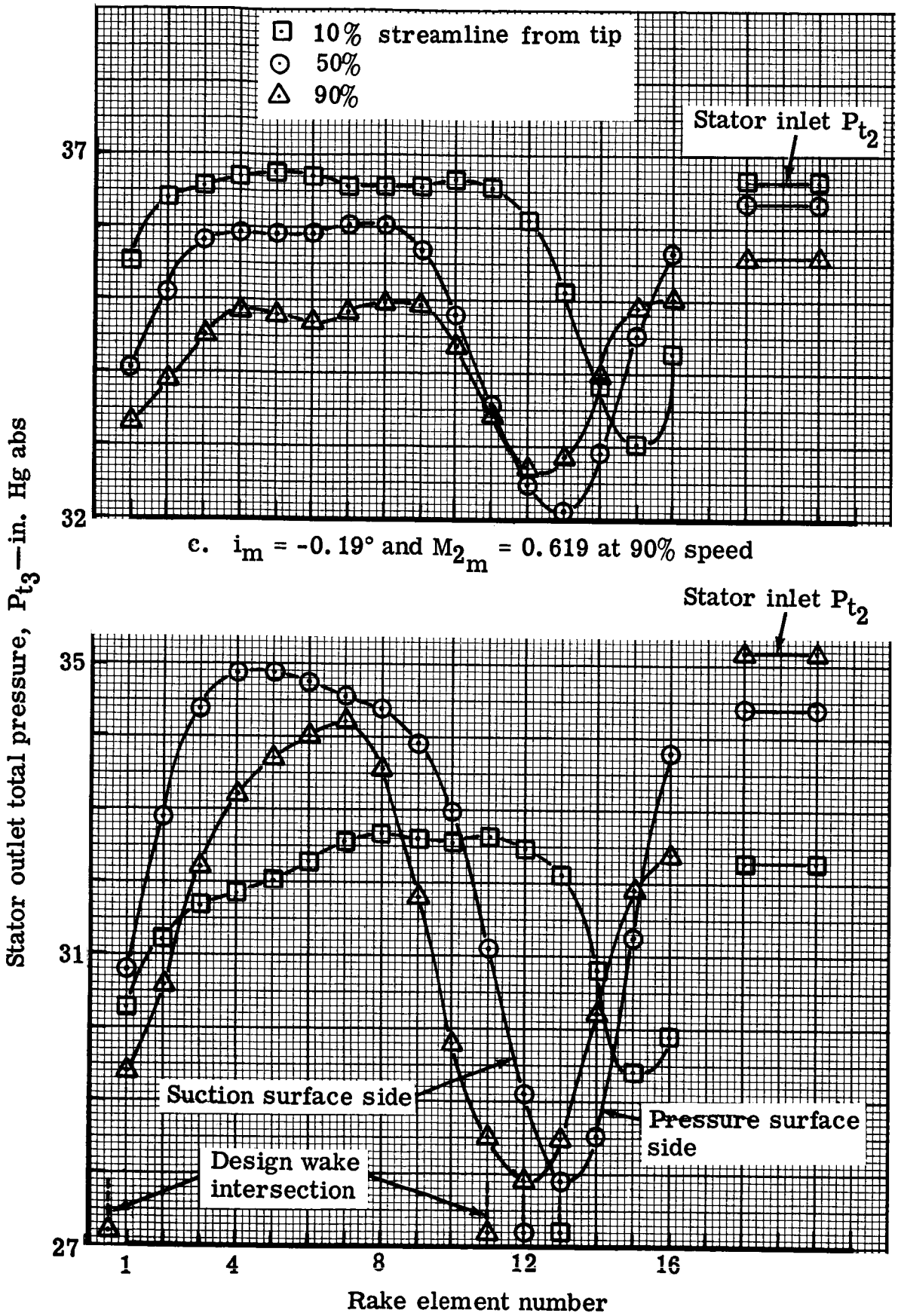
Figure 40. Unslotted stator wake surveys.



b. i_m = -2.01° and M_{2_m} = 0.553 at 80% speed

5691-83

Figure 41. Single-slotted stator wake surveys.



c. $i_m = -0.19°$ and $M_{2_m} = 0.619$ at 90% speed

d. $I_m = 6.3°$ and $M_{2_m} = 0.728$ at 100% speed 5691-84

Figure 41. Single-slotted stator wake surveys.

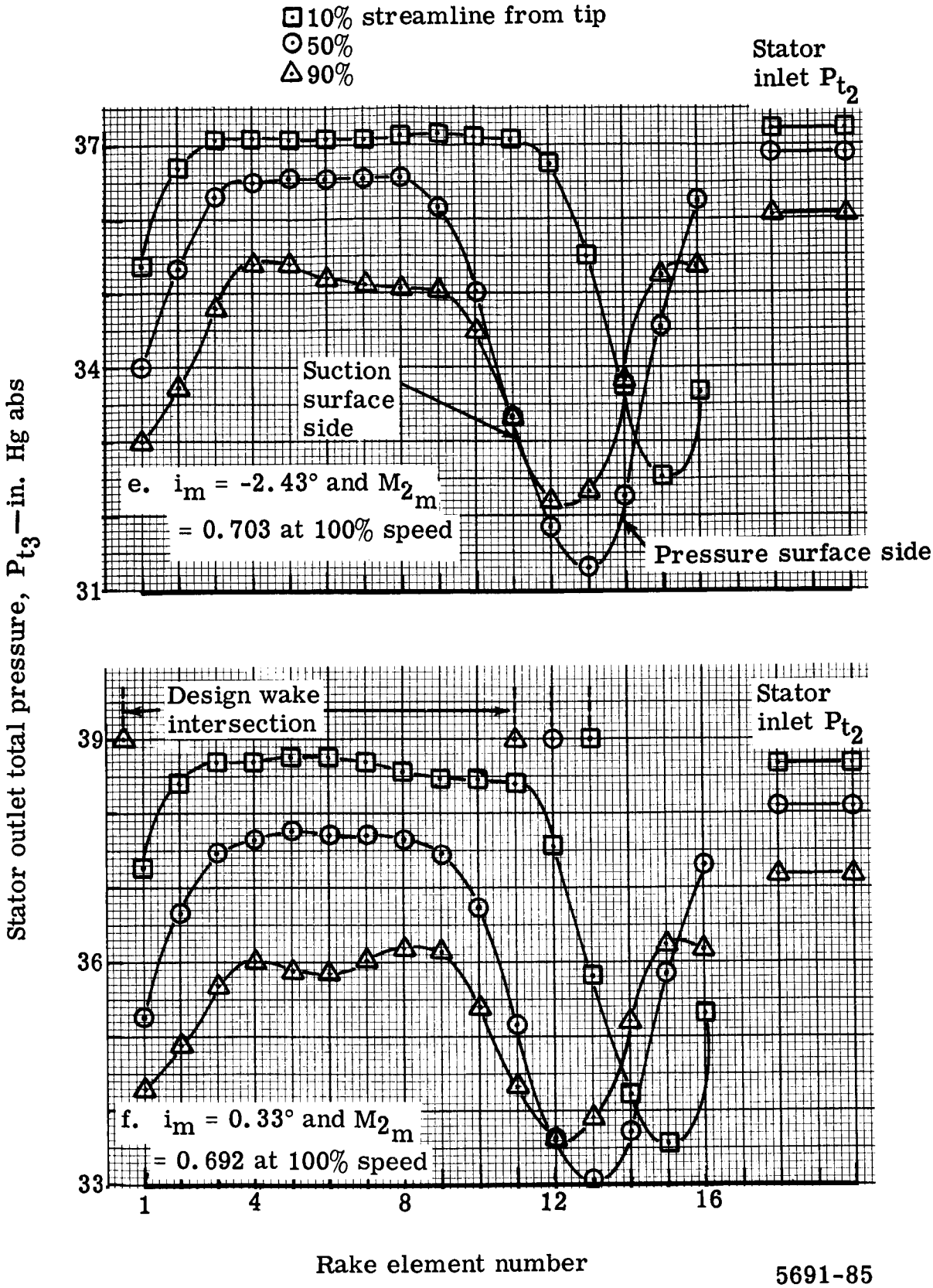
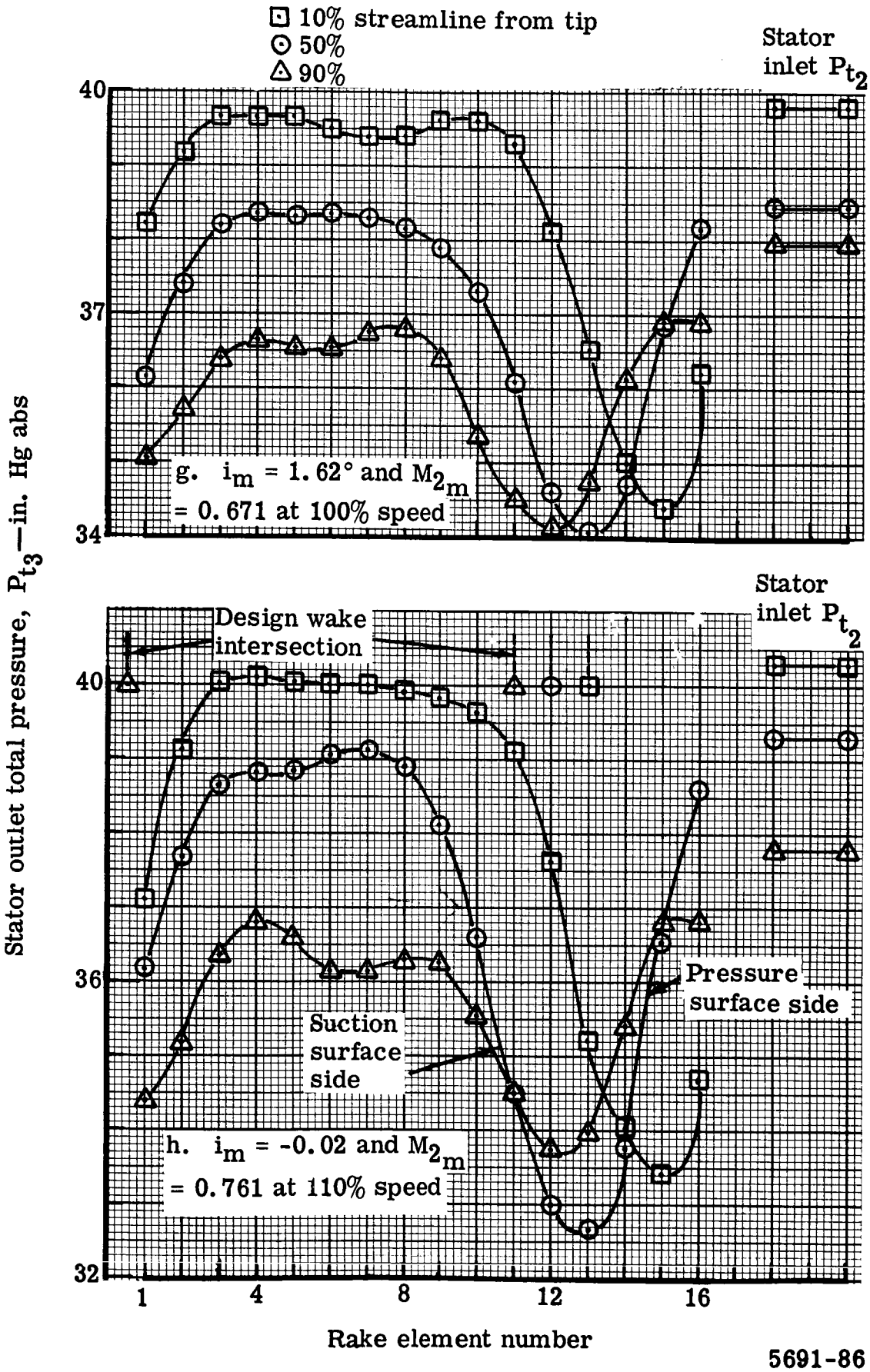


Figure 41. Single-slotted stator wake surveys.



5691-86

Figure 41. Single-slotted stator wake surveys.

Table I.
Blade and vane geometry summary.

Blade row	Exit radius (in.)*	κ_1 (degrees)	κ_2 (degrees)	$\Delta\kappa$ ($\kappa_1 - \kappa_2$)	c (in.)	σ —	t/c —	δ° (degrees)	i_{des} (degrees)	α_{des} (degrees)	n —
Design inlet guide vanes (63-006 series)	10.49	-	-	-	2.733	1.41	0.06	-	-	17.80	34
	11.51	-	-	-	2.733	1.29	0.06	-	-	16.25	
	12.53	-	-	-	2.733	1.18	0.06	-	-	15.16	
	13.54	-	-	-	2.733	1.09	0.06	-	-	14.36	
	14.58	-	-	-	2.733	1.02	0.06	-	-	13.30	
Off-design inlet guide vanes (63-006 series)	10.49	-	-	-	2.733	1.41	0.06	-	-	6.96	34
	11.51	-	-	-	2.733	1.29	0.06	-	-	6.34	
	12.53	-	-	-	2.733	1.18	0.06	-	-	5.92	
	13.54	-	-	-	2.733	1.09	0.06	-	-	5.56	
	14.58	-	-	-	2.733	1.02	0.06	-	-	5.17	
Rotor blade (double circular arc)	10.97	43.1	9.1	34.0	2.875	1.89	0.078	7.81	0	-	45
	11.86	49.2	21.0	28.2	2.875	1.74	0.052	7.38	0	-	
	12.76	53.4	31.2	22.2	2.875	1.61	0.039	6.34	0	-	
	13.65	56.7	39.1	17.6	2.875	1.51	0.033	5.52	0	-	
	14.54	59.6	44.4	15.2	2.875	1.42	0.032	4.85	0	-	
Stator blade 0.75 D_f (65 series—circular arc meanline)	11.02	56.16	-17.80	73.96	3.0	1.65	0.10	17.82	-3	-	38
	11.94	54.15	-17.70	71.85	3.0	1.52	0.10	17.70	-3	-	
	12.84	52.74	-17.75	70.49	3.0	1.41	0.10	17.74	-3	-	
	13.71	52.12	-18.05	70.17	3.0	1.32	0.10	18.06	-3	-	
	14.58	50.09	-18.96	69.05	3.0	1.24	0.10	19.03	-3	-	

*Radii listed represent those for instrumentation (see Figure 6)

Table II.
Rotor incidence at minimum and maximum flow for flow generation rotor and slotted stator stage tests.

		Flow generation rotor test		Slotted stator stage test	
Corrected speed (percent)	Streamline from tip (percent)	i_{max} (stall) (degrees)	i_{min} (choke) (degrees)	i_{max} (stall) (degrees)	i_{min} (choke) (degrees)
60	10	6.2	- 8.0	6.3	-3.3
	50	6.0	-12.0	6.1	-5.0
	90	7.6	-13.0	8.2	-5.0
80	10	5.4	- 8.0	6.4	-3.5
	50	5.4	- 7.5	6.1	-5.0
	90	8.0	- 8.0	8.0	-4.3
100	10	4.0	- 3.0	3.0	-3.0
	50	4.0	- 4.3	2.8	-4.3
	90	4.7	- 5.0	5.0	-4.5

Table III.
Rotating stall results for single slotted stator stage test.

Corrected speed (percent)	Corrected airflow (lb_m/sec)	Number of stall cells at streamline from tip		Rotative cell speed (percent rpm)	Stall cell frequency (cps)	Comment
		10%	90%			
80	63.8	1	1 and 2	43*	55 (1 cell) 110 (2 cells)	Stall point; fixed throttle setting; one cell at 90% span intermittent.
80	60.9	1	1 and 2	39	46 (1 cell) 92 (2 cells)	Throttle closing; data recorded as throttle actuation stopped. One cell at 90% intermittent.
80	60.9	1	2	27	30 (1 cell) 60 (2 cells)	Hysteresis point H_1; throttle fixed; quasi-steady flow.
80	45.6	1	2	26	30 (1 cell) 60 (2 cells)	Hysteresis point H_2; throttle fixed; quasi-steady flow.
80	60.9	1	1	39	46	Hysteresis point H_3; stage unloaded from H_2; throttle fixed.
90	76.0	2	-	33	43	Stall point; fixed throttle; hot wire at 90% span failed.
100	84.0	1	1	44	64	Stall point; fixed throttle.

*Stall cell rotation in direction of rotor rotation.

Table IV.
Detailed performance of each blade row.

Blade element parameter	Inlet guide vane	Rotor	Stator
Incidence angle, i		X	X
Total pressure loss coefficient, $\bar{\omega}'$ or $\bar{\omega}$	X	X	X
Total pressure ratio, $P_{t_{out}}/P_{t_{in}}$	X		
Exit air angle, β	X		
Diffusion factor, D_f		X	X
Deviation angle, $\delta°$		X	X
Inlet flow angle, β' or β		X	X
Flow turning, $\Delta\beta'$ or $\Delta\beta$		X	X
Inlet axial velocity, V_z		X	X
Inlet Mach number, M' or M		X	X

Table V.

Blade element performance—design IGV and rotor.

PERCENT DESIGN SPEED = 60.20

CORRECTED WEIGHT FLOW = 74.42

CORRECTED ROTOR SPEED = 5036.54

PRESSURE RATIO = 1.0383

ADIABATIC EFFICIENCY = 70.5941

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	19.804	22.015	23.644	25.447	26.475
V 0	379.17	377.41	375.57	373.67	371.71
V 1	423.86	432.50	443.90	450.56	465.49
VZ 0	379.17	377.41	375.57	373.67	371.71
VZ 1	398.80	400.96	406.64	406.85	416.67
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	143.61	162.12	178.03	193.59	207.52
M 0	0.3408	0.3392	0.3375	0.3357	0.3339
M 1	0.3821	0.3901	0.4007	0.4069	0.4209
TURN	19.80	22.02	23.64	25.45	26.48
UUBAR	0.0666	0.0467	0.0202	0.0273	0.0373
DFAC	0.068	0.050	0.017	-0.007	-0.058
LOSS PARA	0.0307	0.0197	0.0078	0.0095	0.0116
INCID	0.00	0.00	0.00	0.00	0.00
DEV	0.686	0.415	0.196	-0.067	1.255

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.022	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	19.804	22.015	23.644	25.447	26.475
BETA 2	26.927	27.990	32.226	35.180	36.469
BETA(PR) 1	51.565	47.535	42.867	37.894	31.734
BETA(PR) 2	47.676	41.782	31.882	22.292	12.914
V 1	423.86	432.50	443.90	450.56	465.49
V 2	450.28	480.92	533.84	577.22	624.57
VZ 1	398.80	400.96	406.64	406.85	416.67
VZ 2	401.46	424.66	451.60	471.79	502.26
V-THETA 1	143.61	162.12	178.03	193.59	207.52
V-THETA 2	203.91	225.70	284.67	332.56	371.24
V(PR) 1	641.5	593.9	554.8	515.6	489.9
V(PR) 2	596.2	569.5	531.8	519.9	515.3
VTHETA PR1	502.5	438.1	377.4	316.7	257.7
VTHETA PR2	440.8	379.5	280.9	193.4	115.2
U 1	646.12	600.24	555.47	510.25	465.21
U 2	644.75	605.16	565.57	525.99	486.40
M 1	0.3821	0.3901	0.4007	0.4069	0.4209
M 2	0.4038	0.4327	0.4815	0.5213	0.5659
M(PR) 1	0.5783	0.5357	0.5008	0.4656	0.4429
M(PR) 2	0.5346	0.5124	0.4797	0.4605	0.4669
TURN(PR)	3.888	5.753	10.985	15.602	18.820
UUBAR	0.1963	0.1373	0.1030	0.1067	0.0267
DFAC	0.1045	0.0737	0.0948	0.0789	0.0240
EFFP	0.1612	0.4030	0.6974	0.7954	0.9597
EFF	0.1602	0.4016	0.6958	0.7937	0.9592
LOSS PARA	0.0466	0.0338	0.0268	0.0281	0.0068
INCID	-8.04	-9.36	-10.83	-11.91	-13.27
DEV	2.576	2.982	1.082	1.592	4.214

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	74.42
UPSTREAM OF STATOR	74.42

Table V. (cont)

PERCENT DESIGN SPEED = 59.98

CORRECTED WEIGHT FLOW = 68.99

CORRECTED ROTOR SPEED = 5017.56

PRESSURE RATIO = 1.0869

ADIABATIC EFFICIENCY = 94.4838

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	18.766	21.964	23.658	25.189	26.560
V 0	343.38	341.11	338.74	336.28	333.75
V 1	388.56	395.64	401.24	406.24	414.12
VZ 0	343.38	341.11	338.74	336.28	333.75
VZ 1	367.90	366.92	367.52	367.62	370.42
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	125.00	147.98	161.01	172.90	185.17
M 0	0.3047	0.3026	0.3005	0.2983	0.2960
M 1	0.3456	0.3521	0.3572	0.3618	0.3690
TURN	18.77	21.96	23.66	25.19	26.56
UUBAR	0.0340	0.0197	0.0300	0.1037	0.0879
DFAC	0.047	0.038	0.015	-0.011	-0.048
LOSS PARA	0.0158	0.0083	0.0116	0.0360	0.0273
INCID	0.00	0.00	0.00	0.00	0.00
DEV	1.724	0.466	0.182	0.191	1.170

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	18.766	21.964	23.658	25.189	26.560
BETA 2	32.857	35.881	37.839	40.227	41.848
BETA(PR) 1	55.008	51.202	47.300	42.838	37.404
BETA(PR) 2	46.028	40.008	32.203	23.757	14.606
V 1	388.56	395.64	401.24	406.24	414.12
V 2	459.36	481.24	512.66	539.39	568.63
VZ 1	367.90	366.92	367.52	367.62	370.42
VZ 2	385.87	389.92	404.86	411.83	423.59
V-THETA 1	125.00	147.98	161.01	172.90	185.17
V-THETA 2	249.22	282.06	314.49	348.35	379.36
V(PR) 1	641.5	585.6	541.9	501.3	466.3
V(PR) 2	555.8	509.1	478.5	450.0	437.7
VTHETA PR1	525.6	456.4	398.3	340.9	283.2
VTHETA PR2	400.0	327.3	255.0	181.3	110.4
U 1	650.58	604.38	559.30	513.77	468.42
U 2	649.19	609.33	569.47	529.61	489.75
M 1	0.3456	0.3521	0.3572	0.3618	0.3690
M 2	0.4058	0.4262	0.4545	0.4789	0.5055
M(PR) 1	0.5707	0.5212	0.4825	0.4465	0.4155
M(PR) 2	0.4910	0.4509	0.4242	0.3995	0.3891
TURN(PR)	8.980	11.194	15.097	19.081	22.798
UUBAR	0.0360	-0.0155	-0.0118	-0.0353	-0.0414
DFAC	0.2027	0.2035	0.1982	0.1929	0.1578
EFFP	0.9103	1.0369	1.0218	1.0518	1.0484
EFF	0.9093	1.0373	1.0221	1.0524	1.0491
LOSS PARA	0.0088	-0.0039	-0.0031	-0.0092	-0.0104
INCID	-4.59	-5.70	-6.40	-6.96	-7.60
DEV	0.928	1.208	1.403	3.057	5.906

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	68.99
UPSTREAM OF STATOR	68.99

Table V. (cont)

PERCENT DESIGN SPEED = 59.83

CORRECTED WEIGHT FLOW = 62.11

CORRECTED ROTOR SPEED = 5005.67

PRESSURE RATIO = 1.1208

ADIABATIC EFFICIENCY = 98.4170

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	19.804	21.936	23.395	25.961	26.648
V 0	310.28	308.80	307.26	305.67	304.03
V 1	348.27	357.51	355.42	371.25	370.21
VZ 0	310.28	308.80	307.26	305.67	304.03
VZ 1	327.68	331.63	326.20	333.78	330.88
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	118.00	133.56	141.13	162.52	166.04
M 0	0.2753	0.2740	0.2726	0.2712	0.2697
M 1	0.3096	0.3180	0.3161	0.3305	0.3295
TURN	19.80	21.94	23.40	25.96	26.65
UUBAR	0.0630	0.0084	0.0591	-0.0517	0.0771
DFAC	0.064	0.039	0.036	-0.010	-0.028
LOSS PARA	0.0291	0.0036	0.0228	-0.0179	0.0239
INCID	0.00	0.00	0.00	0.00	0.00
DEV	0.686	0.494	0.445	-0.581	1.082

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	19.804	21.936	23.395	25.961	26.648
BETA 2	40.989	42.361	44.498	46.557	48.191
BETA(PR) 1	58.269	54.698	51.890	46.288	42.240
BETA(PR) 2	47.510	40.777	33.053	23.004	15.467
V 1	348.27	357.51	355.42	371.25	370.21
V 2	436.86	462.84	486.79	518.11	524.55
VZ 1	327.68	331.63	326.20	333.78	330.88
VZ 2	329.75	342.00	347.22	356.27	349.69
V-THETA 1	118.00	133.56	141.13	162.52	166.04
V-THETA 2	286.54	311.86	341.19	376.18	390.98
V(PR) 1	623.0	573.9	528.5	483.0	446.9
V(PR) 2	488.2	451.6	414.3	387.1	362.8
VTHETA PR1	529.9	468.3	415.9	349.1	300.5
VTHETA PR2	360.0	295.0	225.9	151.3	96.8
U 1	647.90	601.90	557.00	511.66	466.49
U 2	646.53	606.83	567.13	527.44	487.74
M 1	0.3096	0.3180	0.3161	0.3305	0.3295
M 2	0.3842	0.4079	0.4295	0.4580	0.4641
M(PR) 1	0.5539	0.5105	0.4701	0.4300	0.3978
M(PR) 2	0.4293	0.3980	0.3655	0.3422	0.3210
TURN(PR)	10.759	13.921	18.836	23.283	26.774
UUBAR	0.0032	-0.0119	-0.0212	-0.0162	0.0100
DFAC	0.3126	0.3127	0.3264	0.3151	0.3069
EFFP	0.9956	1.0186	1.0270	1.0174	0.9921
EFF	0.9955	1.0189	1.0275	1.0177	0.9920
LOSS PARA	0.0008	-0.0030	-0.0054	-0.0042	0.0025
INCID	-1.33	-2.20	-1.81	-3.51	-2.76
DEV	2.410	1.977	2.253	2.304	6.767

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR 62.11

UPSTREAM OF STATOR 62.11

Table V. (cont)

PERCENT DESIGN SPEED = 59.90

CORRECTED WEIGHT FLOW = 52.49

CORRECTED ROTOR SPEED = 5011.07

PRESSURE RATIO = 1.1509

ADIABATIC EFFICIENCY = 90.0576

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	18.930	21.545	23.283	25.880	26.736
V 0	277.79	276.43	275.01	273.55	272.04
V 1	308.67	313.10	315.88	318.66	317.61
VZ 0	277.79	276.43	275.01	273.55	272.04
VZ 1	291.97	291.23	290.16	286.70	283.66
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	100.13	114.98	124.86	139.09	142.89
M 0	0.2433	0.2421	0.2408	0.2395	0.2382
M 1	0.2707	0.2747	0.2771	0.2796	0.2787
TURN	18.93	21.54	23.28	25.88	26.74
UUBAR	0.0635	0.0396	0.0476	0.0496	0.1411
DFAC	0.066	0.057	0.042	0.030	0.015
LOSS PARA	0.0294	0.0168	0.0184	0.0171	0.0437
INCID	0.00	0.00	0.00	0.00	0.00
DEV	1.560	0.885	0.557	-0.500	0.994

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	18.930	21.545	23.283	25.880	26.736
BETA 2	48.446	50.728	52.480	53.856	54.028
BETA(PR) 1	62.291	59.504	56.546	52.893	49.273
BETA(PR) 2	48.227	42.334	34.922	26.641	16.772
V 1	308.67	313.10	315.88	318.66	317.61
V 2	439.09	454.88	471.34	484.01	500.71
VZ 1	291.97	291.23	290.16	286.70	283.66
VZ 2	291.26	287.94	287.07	285.48	294.11
V-THETA 1	100.13	114.98	124.86	139.09	142.89
V-THETA 2	328.58	352.14	373.84	390.85	405.23
V(PR) 1	627.9	573.9	526.3	475.2	434.7
V(PR) 2	437.2	389.5	350.1	319.4	307.2
VTHETA PR1	555.9	494.5	439.1	379.0	329.5
VTHETA PR2	326.1	262.3	200.4	143.2	88.6
U 1	656.05	609.46	564.00	518.09	472.35
U 2	654.65	614.46	574.26	534.07	493.87
M 1	0.2707	0.2747	0.2771	0.2796	0.2787
M 2	0.3789	0.3938	0.4083	0.4194	0.4342
M(PR) 1	0.5507	0.5034	0.4618	0.4170	0.3814
M(PR) 2	0.3773	0.3372	0.3033	0.2767	0.2664
TURN(PR)	14.064	17.170	21.624	26.253	32.501
UUBAR	0.0692	0.0136	0.0589	0.1546	0.2157
DFAC	0.4328	0.4548	0.4739	0.4689	0.4377
EFFP	0.9203	0.9863	0.9477	0.8883	0.8698
EFF	0.9186	0.9860	0.9466	0.8861	0.8672
LOSS PARA	0.0163	0.0033	0.0148	0.0393	0.0538
INCID	2.69	2.60	2.85	3.09	4.27
DEV	3.127	3.534	4.122	5.941	8.072

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	52.49
UPSTREAM OF STATOR	52.49

Table V. (cont)

PERCENT DESIGN SPEED = 59.90

CORRECTED WEIGHT FLOW = 49.58

CORRECTED ROTOR SPEED = 5011.34

PRESSURE RATIO = 1.1587

ADIABATIC EFFICIENCY = 88.8017

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	19.279	21.545	23.630	25.707	26.736
V 0	262.36	260.37	258.30	256.15	253.93
V 1	284.53	290.64	298.12	293.47	303.31
VZ 0	262.36	260.37	258.30	256.15	253.93
VZ 1	268.58	270.33	273.13	264.42	270.88
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	93.94	106.73	119.49	127.30	136.45
M 0	0.2304	0.2286	0.2268	0.2249	0.2229
M 1	0.2501	0.2555	0.2622	0.2580	0.2668
TURN	19.28	21.54	23.63	25.71	26.74
UUBAR	0.0728	0.0314	0.0103	0.0853	0.1137
DFAC	0.091	0.071	0.040	0.045	-0.008
LOSS PARA	0.0337	0.0133	0.0040	0.0295	0.0353
INCID	0.00	0.00	0.00	0.00	0.00
DEV	1.211	0.885	0.210	-0.327	0.994

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	19.279	21.545	23.630	25.707	26.736
BETA 2	53.391	52.789	54.951	55.560	55.913
BETA(PR) 1	64.380	61.642	58.330	55.806	50.994
BETA(PR) 2	49.144	43.061	35.835	28.076	16.758
V 1	284.53	290.64	298.12	293.47	303.31
V 2	437.34	449.89	464.15	472.67	493.85
VZ 1	268.58	270.33	273.13	264.42	270.88
VZ 2	260.81	272.07	266.55	267.31	276.78
V-THETA 1	93.94	106.73	119.49	127.30	136.45
V-THETA 2	351.07	358.30	379.98	389.82	408.99
V(PR) 1	621.1	569.1	520.2	470.5	430.4
V(PR) 2	398.7	372.4	328.8	303.0	289.1
VTHETA PR1	560.1	500.8	442.8	389.2	334.4
VTHETA PR2	301.6	254.3	192.5	142.6	83.3
U 1	654.01	607.57	562.25	516.48	470.89
U 2	652.62	612.55	572.48	532.41	492.34
M 1	0.2501	0.2555	0.2622	0.2580	0.2668
M 2	0.3773	0.3897	0.4027	0.4108	0.4298
M(PR) 1	0.5459	0.5003	0.4575	0.4137	0.3786
M(PR) 2	0.3439	0.3226	0.2953	0.2633	0.2516
TURN(PR)	15.236	18.580	22.495	27.730	34.236
UUBAR	0.1531	0.0677	0.0762	0.0641	0.1003
DFAC	0.5049	0.4887	0.5155	0.5050	0.4803
EFFP	0.8468	0.9354	0.9364	0.9541	0.9390
EFF	0.8434	0.9340	0.9350	0.9531	0.9377
LOSS PARA	0.0353	0.0163	0.0189	0.0161	0.0250
INCID	4.78	4.74	4.63	6.01	5.99
DEV	4.044	4.261	5.035	7.376	8.058

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	49.58
UPSTREAM OF STATOR	49.58

Table V. (cont)

PERCENT DESIGN SPEED = 80.44

CORRECTED WEIGHT FLOW = 87.43

CORRECTED ROTOR SPEED = 6729.62

PRESSURE RATIO = 1.1085

ADIABATIC EFFICIENCY = 70.3146

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	18.942	21.248	22.960	25.962	26.647
V 0	465.07	461.76	458.30	454.72	451.02
V 1	528.43	543.88	551.33	558.79	569.56
VZ 0	465.07	461.76	458.30	454.72	451.02
VZ 1	499.82	506.91	507.65	502.40	509.06
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	171.54	197.11	215.06	244.63	255.44
M 0	0.4174	0.4143	0.4111	0.4078	0.4044
M 1	0.4767	0.4913	0.4984	0.5055	0.5157
TURN	18.94	21.25	22.96	25.96	26.65
UUBAR	0.0623	0.0198	0.0325	0.0716	0.0797
DFAC	0.045	0.017	-0.006	-0.022	-0.066
LOSS PARA	0.0289	0.0084	0.0126	0.0247	0.0247
INCID	0.00	0.00	0.00	0.00	0.00
DEV	1.548	1.182	0.880	-0.582	1.083

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	18.942	21.248	22.960	25.962	26.647
BETA 2	32.707	35.339	36.803	39.384	40.350
BETA(PR) 1	54.391	50.300	46.362	41.339	36.051
BETA(PR) 2	48.682	40.836	33.050	24.519	15.586
V 1	528.43	543.88	551.33	558.79	569.56
V 2	579.33	634.48	679.47	717.05	761.02
VZ 1	499.82	506.91	507.65	502.40	509.06
VZ 2	487.48	517.57	544.05	554.22	579.97
V-THETA 1	171.54	197.11	215.06	244.63	255.44
V-THETA 2	313.04	366.99	407.05	454.98	492.73
V(PR) 1	858.4	793.6	735.6	669.1	629.6
V(PR) 2	738.3	684.1	649.1	609.1	602.1
VTHETA PR1	697.9	610.6	532.4	442.0	370.5
VTHETA PR2	554.5	447.3	354.0	252.8	161.8
U 1	869.43	807.69	747.44	686.60	625.99
U 2	867.58	814.31	761.04	707.77	654.50
M 1	0.4767	0.4913	0.4984	0.5055	0.5157
M 2	0.5155	0.5671	0.6087	0.6441	0.6831
M(PR) 1	0.7744	0.7169	0.6650	0.6053	0.5701
M(PR) 2	0.6570	0.6114	0.5815	0.5471	0.5405
TURN(PR)	5.708	9.465	13.311	16.820	20.465
UUBAR	0.1599	0.1354	0.1378	0.1326	0.2398
DFAC	0.1988	0.2059	0.1920	0.1700	0.1301
EFFP	0.5564	0.6887	0.7526	0.8118	0.7514
EFF	0.5521	0.6848	0.7488	0.8085	0.7463
LOSS PARA	0.0372	0.0338	0.0354	0.0343	0.0601
INCID	-5.21	-6.60	-7.34	-8.46	-8.95
DEV	3.582	2.036	2.250	3.819	6.886

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR 87.43

UPSTREAM OF STATOR 87.43

Table V. (cont)

PERCENT DESIGN SPEED = 80.25

CORRECTED WEIGHT FLOW = 85.59

CORRECTED ROTOR SPEED = 6714.01

PRESSURE RATIO = 1.1610

ADIABATIC EFFICIENCY = 86.4271

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	19.200	21.248	23.732	25.534	26.047
V 0	443.27	440.49	437.59	434.59	431.50
V 1	508.57	524.48	533.31	539.13	553.61
VZ 0	443.27	440.49	437.59	434.59	431.50
VZ 1	480.28	488.82	488.21	486.48	497.38
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	167.26	190.07	214.64	232.39	243.10
M 0	0.3970	0.3944	0.3917	0.3890	0.3861
M 1	0.4578	0.4727	0.4810	0.4865	0.5002
TURN	19.20	21.25	23.73	25.53	26.05
UUBAR	0.0939	0.0419	0.0225	0.0810	0.0493
DFAC	0.038	0.006	-0.013	-0.035	-0.087
LOSS PARA	0.0435	0.0178	0.0087	0.0281	0.0154
INCID	0.00	0.00	0.00	0.00	0.00
DEV	1.290	1.182	0.108	-0.154	1.683

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	19.200	21.248	23.732	25.534	26.047
BETA 2	37.325	38.433	40.733	42.106	43.559
BETA(PR) 1	55.570	51.575	47.430	42.959	37.510
BETA(PR) 2	47.501	41.343	33.128	24.807	16.022
V 1	508.57	524.49	533.31	539.13	553.61
V 2	587.48	620.13	662.32	697.17	728.22
VZ 1	480.28	488.82	488.21	486.48	497.38
VZ 2	467.17	485.77	501.88	517.24	527.71
V-THETA 1	167.26	190.07	214.64	232.39	243.10
V-THETA 2	356.21	385.47	432.19	467.46	501.81
V(PR) 1	849.5	786.5	721.7	664.7	627.[illegible]
V(PR) 2	691.5	647.0	599.3	569.8	549.0
VTHETA PR1	700.6	616.2	531.5	453.0	381.8
VTHETA PR2	509.8	427.4	327.5	239.1	151.5
U 1	867.90	806.27	746.13	685.39	624.89
U 2	866.06	812.88	759.70	706.53	653.35
M 1	0.4578	0.4727	0.4810	0.4865	0.5002
M 2	0.5189	0.5507	0.5900	0.6222	0.6515
M(PR) 1	0.7646	0.7089	0.6509	0.5999	0.5666
M(PR) 2	0.6108	0.5746	0.5338	0.5085	0.4912
TURN(PR)	8.068	10.232	14.303	18.152	21.488
UUBAR	0.1092	0.0582	0.0450	0.0559	0.0686
DFAC	0.2651	0.2566	0.2563	0.2342	0.2200
EFFP	0.7927	0.8944	0.9336	0.9334	0.9285
EFF	0.7887	0.8923	0.9321	0.9318	0.9268
LOSS PARA	0.0260	0.0144	0.0116	0.0144	0.0172
INCID	-4.03	-5.32	-6.27	-6.84	-7.49
DEV	2.401	2.543	2.328	4.107	7.322

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR 85.59

UPSTREAM OF STATOR 85.59

Table V. (cont)

PERCENT DESIGN SPEED = 80.04

CORRECTED WEIGHT FLOW = 81.77

CORRECTED ROTOR SPEED = 6696.04

PRESSURE RATIO = 1.2133

ADIABATIC EFFICIENCY = 93.7954

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	19.368	20.911	23.387	25.018	25.961
V 0	411.03	408.29	405.44	402.48	399.43
V 1	477.91	487.51	493.83	500.14	510.66
VZ 0	411.03	408.29	405.44	402.48	399.43
VZ 1	450.86	455.40	453.25	453.22	459.13
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	158.49	174.00	196.02	211.51	223.55
M 0	0.3661	0.3636	0.3610	0.3583	0.3555
M 1	0.4277	0.4366	0.4425	0.4484	0.4582
TURN	19.37	20.91	23.39	25.02	25.96
UUBAR	0.0495	0.0335	0.0261	0.0272	0.0514
DFAC	0.026	0.000	-0.015	-0.041	-0.084
LOSS PARA	0.0229	0.0143	0.0101	0.0095	0.0160
INCID	0.00	0.00	0.00	0.00	0.00
DEV	1.122	1.519	0.453	0.362	1.769

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	19.368	20.911	23.387	25.018	25.961
BETA 2	41.013	43.754	46.099	46.595	47.718
BETA(PR) 1	57.576	54.252	50.530	46.295	41.178
BETA(PR) 2	46.259	40.733	33.034	25.037	16.104
V 1	477.91	487.51	493.83	500.14	510.66
V 2	599.74	619.10	648.81	674.80	699.77
VZ 1	450.86	455.40	453.25	453.22	459.13
VZ 2	452.54	447.19	449.90	463.69	479.80
V-THETA 1	158.49	174.00	196.02	211.51	223.55
V-THETA 2	393.56	428.15	467.50	490.26	517.72
V(PR) 1	840.9	779.5	713.0	655.9	610.0
V(PR) 2	654.5	590.1	536.6	511.8	490.0
VTHETA PR1	709.8	632.6	550.4	474.2	401.6
VTHETA PR2	472.9	385.1	292.5	216.6	135.9
U 1	868.28	806.63	746.46	685.69	625.16
U 2	866.44	813.24	760.04	706.84	653.64
M 1	0.4277	0.4366	0.4425	0.4484	0.4582
M 2	0.5216	0.5428	0.5718	0.5965	0.6198
M(PR) 1	0.7526	0.6981	0.6389	0.5881	0.5474
M(PR) 2	0.5692	0.5174	0.4730	0.4524	0.4341
TURN(PR)	11.317	13.519	17.497	21.258	25.074
UUBAR	0.2049	0.0985	0.0324	0.0186	0.0500
DFAC	0.3210	0.3477	0.3583	0.3313	0.3101
EFFP	0.7456	0.8746	0.9630	0.9820	0.9567
EFF	0.7385	0.8711	0.9619	0.9815	0.9555
LOSS PARA	0.0499	0.0246	0.0083	0.0048	0.0125
INCID	-2.02	-2.65	-3.17	-3.51	-3.82
DEV	1.159	1.933	2.234	4.337	7.404

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR 81.77

UPSTREAM OF STATOR 81.77

Table V. (cont)

PERCENT DESIGN SPEED = 79.99

CORRECTED WEIGHT FLOW = 73.88

CORRECTED ROTOR SPEED = 6691.69

PRESSURE RATIO = 1.2552

ADIABATIC EFFICIENCY = 91.2572

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	18.934	21.626	22.980	25.700	26.732
V 0	381.18	379.00	376.72	374.37	371.94
V 1	422.72	437.26	442.34	447.92	456.48
VZ 0	381.18	379.00	376.72	374.37	371.94
VZ 1	399.85	406.48	407.23	403.61	407.69
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	137.16	161.15	172.69	194.24	205.33
M 0	0.3388	0.3368	0.3348	0.3326	0.3304
M 1	0.3767	0.3901	0.3948	0.3999	0.4078
TURN	18.93	21.63	22.98	25.70	26.73
UUBAR	0.0855	0.0205	0.0141	0.0417	0.0581
DFAC	0.068	0.040	0.018	0.003	-0.036
LOSS PARA	0.0397	0.0087	0.0054	0.0144	0.0180
INCID	0.00	0.00	0.00	0.00	0.00
DEV	1.556	0.804	0.860	-0.320	0.998

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	18.934	21.626	22.980	25.700	26.732
BETA 2	47.161	49.139	50.947	53.105	53.449
BETA(PR) 1	61.313	57.786	54.619	50.588	45.822
BETA(PR) 2	47.889	42.235	34.681	27.472	17.455
V 1	422.72	437.26	442.34	447.92	456.48
V 2	583.01	602.02	626.56	635.43	659.56
VZ 1	399.85	406.48	407.23	403.61	407.69
VZ 2	396.41	393.86	394.76	381.48	392.79
V-THETA 1	137.16	161.15	172.69	194.24	205.33
V-THETA 2	427.50	455.31	486.56	508.17	529.84
V(PR) 1	833.0	762.5	703.3	635.7	585.0
V(PR) 2	591.2	532.0	480.0	430.0	411.7
VTHETA PR1	730.7	645.1	573.4	491.1	419.6
VTHETA PR2	438.6	357.6	273.1	198.4	123.5
U 1	867.90	806.27	746.13	685.39	624.89
U 2	866.06	812.88	759.70	706.53	653.35
M 1	0.3767	0.3901	0.3948	0.3999	0.4078
M 2	0.5058	0.5247	0.5476	0.5568	0.5795
M(PR) 1	0.7424	0.6802	0.6277	0.5676	0.5226
M(PR) 2	0.5129	0.4636	0.4196	0.3767	0.3618
TURN(PR)	13.424	15.550	19.938	23.115	28.367
UUBAR	0.0660	0.0484	0.0519	0.0724	0.0990
DFAC	0.4140	0.4268	0.4484	0.4545	0.4280
EFFP	0.9235	0.9486	0.9513	0.9400	0.9282
EFF	0.9208	0.9469	0.9497	0.9382	0.9260
LOSS PARA	0.0156	0.0118	0.0131	0.0182	0.0246
INCID	1.71	0.89	0.92	0.79	0.82
DEV	2.789	3.435	3.881	6.772	8.755

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR 73.88

UPSTREAM OF STATOR 73.88

Table V. (cont)

PERCENT DESIGN SPEED = 79.98

CORRECTED WEIGHT FLOW = 70.61

CORRECTED ROTOR SPEED = 6690.87

PRESSURE RATIO = 1.2779

ADIABATIC EFFICIENCY = 94.7857

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	18.934	21.795	23.658	25.700	26.732
V 0	369.83	367.81	365.70	363.53	361.28
V 1	450.00	415.40	423.97	429.19	434.33
VZ 0	369.83	367.81	365.70	363.53	361.28
VZ 1	425.65	385.71	388.34	386.73	387.91
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	146.01	154.23	170.13	186.12	195.37
M 0	0.3284	0.3266	0.3247	0.3227	0.3207
M 1	0.4017	0.3699	0.3778	0.3826	0.3873
TURN	18.93	21.80	23.66	25.70	26.73
UUBAR	-0.2060	0.0658	0.0263	0.0747	0.0843
DFAC	-0.023	0.062	0.036	0.016	-0.014
LOSS PARA	-0.0956	0.0278	0.0101	0.0258	0.0261
INCID	0.00	0.00	0.00	0.00	0.00
DEV	1.556	0.635	0.182	-0.320	0.998

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	18.934	21.795	23.658	25.700	26.732
BETA 2	49.570	51.464	53.363	54.747	55.353
BETA(PR) 1	59.479	59.399	56.017	52.244	47.920
BETA(PR) 2	45.314	43.074	36.605	26.794	17.407
V 1	450.00	415.40	423.97	429.19	434.33
V 2	611.34	595.74	609.95	637.70	652.86
VZ 1	425.65	385.71	388.34	386.73	387.91
VZ 2	396.47	371.15	363.98	368.07	371.16
V-THETA 1	146.01	154.23	170.13	186.12	195.37
V-THETA 2	465.35	466.00	489.45	520.76	537.09
V(PR) 1	838.1	757.7	694.8	631.6	578.8
V(PR) 2	563.8	508.1	453.4	412.3	389.0
VTHETA PR1	722.0	652.2	576.1	499.4	429.6
VTHETA PR2	400.8	347.0	270.4	185.9	116.4
U 1	868.03	806.39	746.24	685.49	624.98
U 2	866.18	813.00	759.82	706.63	653.45
M 1	0.4017	0.3699	0.3778	0.3826	0.3873
M 2	0.5302	0.5175	0.5316	0.5576	0.5717
M(PR) 1	0.7482	0.6748	0.6191	0.5630	0.5161
M(PR) 2	0.4889	0.4414	0.3952	0.3605	0.3406
TURN(PR)	14.165	16.324	19.412	25.450	30.513
UUBAR	0.0803	0.0504	0.0473	0.0435	0.1088
DFAC	0.4625	0.4623	0.4824	0.4882	0.4689
EFFP	0.9115	0.9503	0.9578	0.9670	0.9277
EFF	0.9082	0.9486	0.9563	0.9658	0.9253
LOSS PARA	0.0199	0.0121	0.0116	0.0110	0.0270
INCID	-0.12	2.50	2.32	2.44	2.92
DEV	0.214	4.274	5.805	6.094	8.707

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	70.61
UPSTREAM OF STATOR	70.61

Table V. (cont)

PERCENT DESIGN SPEED = 79.58

CORRECTED WEIGHT FLOW = 65.76

CORRECTED ROTOR SPEED = 6657.92

PRESSURE RATIO = 1.2922

ADIABATIC EFFICIENCY = 89.0970

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	19.274	21.158	23.040	25.187	26.048
V 0	351.36	349.20	346.95	344.62	342.22
V 1	383.92	390.62	400.67	402.34	396.87
VZ 0	351.36	349.20	346.95	344.62	342.22
VZ 1	362.40	364.28	368.71	364.09	356.56
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	126.73	140.99	156.81	171.23	174.27
M 0	0.3075	0.3056	0.3036	0.3015	0.2994
M 1	0.3366	0.3426	0.3517	0.3532	0.3483
TURN	19.27	21.16	23.04	25.19	26.05
UUBAR	0.0948	0.0414	0.0244	0.0389	0.1890
DFAC	0.084	0.065	0.035	0.023	0.017
LOSS PARA	0.0439	0.0176	0.0094	0.0135	0.0590
INCID	0.00	0.00	0.00	0.00	0.00
DEV	1.216	1.272	0.800	0.193	1.682

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	19.274	21.158	23.040	25.187	26.048
BETA 2	54.919	54.247	55.688	56.583	57.542
BETA(PR) 1	64.167	61.543	58.243	55.001	51.973
BETA(PR) 2	49.639	43.498	35.678	27.494	16.974
V 1	383.92	390.62	400.67	402.34	396.87
V 2	584.39	600.15	622.53	635.46	653.94
VZ 1	362.40	364.28	368.71	364.09	356.56
VZ 2	335.87	350.67	350.92	349.96	350.96
V-THETA 1	126.73	140.99	156.81	171.23	174.27
V-THETA 2	478.23	487.05	514.20	530.40	551.79
V(PR) 1	831.7	764.5	700.5	634.8	578.8
V(PR) 2	518.6	483.4	432.0	394.5	366.9
VTHETA PR1	748.6	672.1	595.7	520.0	455.9
VTHETA PR2	395.2	332.7	252.0	182.1	107.1
U 1	875.28	813.13	752.47	691.22	630.20
U 2	873.42	819.79	766.16	712.54	658.91
M 1	0.3366	0.3426	0.3517	0.3532	0.3483
M 2	0.4946	0.5123	0.5334	0.5465	0.5636
M(PR) 1	0.7292	0.6706	0.6149	0.5572	0.5079
M(PR) 2	0.4390	0.4127	0.3701	0.3393	0.3162
TURN(PR)	14.528	18.045	22.564	27.507	34.999
UUBAR	0.1994	0.0822	0.0827	0.0588	0.0800
DFAC	0.5262	0.5142	0.5338	0.5297	0.5230
EFFP	0.8183	0.9262	0.9338	0.9584	0.9514
EFF	0.8111	0.9234	0.9313	0.9569	0.9497
LOSS PARA	0.0455	0.0197	0.0206	0.0148	0.0199
INCID	4.57	4.64	4.54	5.20	6.97
DEV	4.539	4.698	4.878	6.794	8.274

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	65.76
UPSTREAM OF STATOR	65.76

Table V. (cont)

PERCENT DESIGN SPEED = 89.77

CORRECTED WEIGHT FLOW = 91.96

CORRECTED ROTOR SPEED = 7510.16

PRESSURE RATIO = 1.1892

ADIABATIC EFFICIENCY = 78.8908

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	20.062	22.023	23.902	25.791	26.905
V 0	490.39	487.35	484.18	480.91	477.53
V 1	568.11	581.24	593.16	601.03	614.77
VZ 0	490.39	487.35	484.18	480.91	477.53
VZ 1	533.64	538.83	542.29	541.16	548.22
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	194.88	217.95	240.33	261.50	278.19
M 0	0.4388	0.4360	0.4331	0.4300	0.4269
M 1	0.5117	0.5242	0.5356	0.5431	0.5563
TURN	20.06	22.02	23.90	25.79	26.91
UUBAR	0.0892	0.0332	0.0326	0.0563	0.0657
DFAC	0.036	0.011	-0.016	-0.041	-0.085
LOSS PARA	0.0411	0.0140	0.0125	0.0195	0.0203
INCID	0.00	0.00	0.00	0.00	0.00
DEV	0.428	0.407	-0.062	-0.411	0.825

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	20.062	22.023	23.902	25.791	26.905
BETA 2	36.209	38.500	40.071	40.875	41.266
BETA(PR) 1	55.623	51.921	47.787	43.212	37.702
BETA(PR) 2	50.440	41.367	32.830	24.399	16.422
V 1	568.11	581.24	593.16	601.03	614.77
V 2	620.65	696.13	750.24	795.71	832.95
VZ 1	533.64	538.83	542.29	541.16	548.22
VZ 2	500.78	544.80	574.12	601.67	626.09
V-THETA 1	194.88	217.95	240.33	261.50	278.19
V-THETA 2	366.64	433.36	482.95	520.72	549.38
V(PR) 1	945.1	873.7	807.1	742.5	692.9
V(PR) 2	786.3	725.9	683.2	660.7	652.7
VTHETA PR1	780.0	687.7	597.8	508.4	423.7
VTHETA PR2	606.2	479.7	370.4	272.9	184.5
U 1	974.91	905.68	838.12	769.90	701.94
U 2	972.84	913.11	853.37	793.64	733.91
M 1	0.5117	0.5242	0.5356	0.5431	0.5563
M 2	0.5450	0.6155	0.6662	0.7101	0.7472
M(PR) 1	0.8513	0.7880	0.7288	0.6709	0.6270
M(PR) 2	0.6905	0.6418	0.6067	0.5896	0.5855
TURN(PR)	5.183	10.554	14.957	18.812	21.280
UUBAR	0.1944	0.1432	0.1283	0.0826	0.0314
DFAC	0.2329	0.2477	0.2399	0.2003	0.1479
EFFP	0.6219	0.7648	0.8255	0.9052	0.9685
EFF	0.6151	0.7594	0.8210	0.9024	0.9675
LOSS PARA	0.0437	0.0355	0.0331	0.0214	0.0078
INCID	-3.98	-4.98	-5.91	-6.59	-7.30
DEV	5.340	2.567	2.030	3.699	7.722

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	91.96
UPSTREAM OF STATOR	91.96

Table V. (cont)

PERCENT DESIGN SPEED = 89.89

CORRECTED WEIGHT FLOW = 86.48

CORRECTED ROTOR SPEED = 7520.21

PRESSURE RATIO = 1.3072

ADIABATIC EFFICIENCY = 92.6847

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	19.969	21.941	24.164	26.219	26.820
V 0	449.12	445.94	442.63	439.20	435.65
V 1	526.00	533.01	541.54	552.96	555.79
VZ 0	449.12	445.94	442.63	439.20	435.65
VZ 1	494.38	494.41	494.09	496.07	496.00
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	179.63	199.16	221.68	244.30	250.76
M 0	0.4003	0.3974	0.3943	0.3912	0.3879
M 1	0.4716	0.4782	0.4862	0.4970	0.4996
TURN	19.97	21.94	24.16	26.22	26.82
UUBAR	0.0704	0.0677	0.0469	0.0025	0.1113
DFAC	0.025	0.008	-0.013	-0.046	-0.076
LOSS PARA	0.0325	0.0286	0.0180	0.0009	0.0345
INCID	0.00	0.00	0.00	0.00	0.00
DEV	0.521	0.489	-0.324	-0.839	0.910

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	19.969	21.941	24.164	26.219	26.820
BETA 2	44.514	46.012	47.745	49.658	50.534
BETA(PR) 1	58.203	55.093	51.372	46.748	42.389
BETA(PR) 2	46.985	41.202	33.801	24.994	17.601
V 1	526.00	533.01	541.54	552.96	555.79
V 2	665.37	689.35	718.51	747.57	755.45
VZ 1	494.38	494.41	494.09	496.07	496.00
VZ 2	474.46	478.76	483.15	483.94	480.18
V-THETA 1	179.63	199.16	221.68	244.30	250.76
V-THETA 2	466.48	495.98	531.82	569.80	583.21
V(PR) 1	938.3	864.0	791.5	724.0	671.6
V(PR) 2	695.5	636.3	581.4	533.9	503.8
VTHETA PR1	797.4	708.5	618.3	527.3	452.7
VTHETA PR2	508.5	419.2	323.4	225.6	152.3
U 1	977.07	907.69	839.98	771.60	703.49
U 2	975.00	915.13	855.27	795.40	735.54
M 1	0.4716	0.4782	0.4862	0.4970	0.4996
M 2	0.5769	0.6013	0.6290	0.6578	0.6665
M(PR) 1	0.8413	0.7751	0.7106	0.6506	0.6037
M(PR) 2	0.7030	0.5551	0.5090	0.4698	0.4445
TURN(PR)	11.218	13.891	17.571	21.754	24.788
UUBAR	0.0768	0.0310	0.0351	0.0066	0.0267
DFAC	0.3673	0.3740	0.3797	0.3809	0.3664
EFFP	0.9068	0.9653	0.9656	0.9950	0.9788
EFF	0.9030	0.9639	0.9643	0.9948	0.9781
LOSS PARA	0.0185	0.0077	0.0089	0.0017	0.0066
INCID	-1.40	-1.81	-2.33	-3.05	-2.61
DEV	1.885	2.402	3.001	4.294	8.901

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR 86.48

UPSTREAM OF STATOR 86.48

Table V. (cont)

PERCENT DESIGN SPEED = 89.82

CORRECTED WEIGHT FLOW = 81.20

CORRECTED ROTOR SPEED = 7513.92

PRESSURE RATIO = 1.3481

ADIABATIC EFFICIENCY = 91.9003

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	19.452	22.100	23.990	25.876	27.249
V 0	422.54	419.79	416.91	413.94	410.88
V 1	492.49	491.18	498.28	505.79	509.54
VZ 0	422.54	419.79	416.91	413.94	410.88
VZ 1	464.38	455.09	455.23	455.08	452.99
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	164.01	184.79	202.59	220.74	233.30
M 0	0.3753	0.3728	0.3702	0.3675	0.3647
M 1	0.4397	0.4385	0.4451	0.4520	0.4555
TURN	19.45	22.10	23.99	25.88	27.25
UUBAR	0.0049	0.0693	0.0437	0.0293	0.1221
DFAC	0.025	0.031	0.009	-0.017	-0.043
LOSS PARA	0.0023	0.0293	0.0168	0.0101	0.0377
INCID	0.00	0.00	0.00	0.00	0.00
DEV	1.038	0.330	-0.150	-0.496	0.481

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	19.452	22.100	23.990	25.876	27.249
BETA 2	48.364	50.688	53.364	54.141	55.093
BETA(PR) 1	60.287	57.829	54.488	50.465	46.096
BETA(PR) 2	47.212	42.409	34.968	26.457	15.793
V 1	492.49	491.18	498.28	505.79	509.54
V 2	665.89	677.11	701.62	722.27	749.56
VZ 1	464.38	455.09	455.23	455.08	452.99
VZ 2	442.41	428.98	418.67	423.09	428.93
V-THETA 1	164.01	184.79	202.59	220.74	233.30
V-THETA 2	497.67	523.89	563.01	585.37	614.70
V(PR) 1	936.9	854.7	783.7	714.9	653.2
V(PR) 2	651.3	581.0	510.9	472.6	445.8
VTHETA PR1	813.7	723.5	637.9	551.4	470.7
VTHETA PR2	478.0	391.8	292.8	210.5	121.3
U 1	977.71	908.28	840.53	772.11	703.95
U 2	975.63	915.73	855.82	795.92	736.02
M 1	0.4397	0.4385	0.4451	0.4520	0.4555
M 2	0.5732	0.5856	0.6093	0.6301	0.6560
M(PR) 1	0.8364	0.7630	0.7000	0.6389	0.5840
M(PR) 2	0.5606	0.5024	0.4437	0.4123	0.3901
TURN(PR)	13.075	15.420	19.520	24.008	30.303
UUBAR	0.0804	0.0545	0.0478	0.0308	0.0517
DFAC	0.4312	0.4483	0.4832	0.4744	0.4569
EFFP	0.9139	0.9468	0.9584	0.9764	0.9655
EFF	0.9100	0.9445	0.9566	0.9754	0.9641
LOSS PARA	0.0193	0.0133	0.0120	0.0078	0.0130
INCID	0.69	0.93	0.79	0.66	1.10
DEV	2.112	3.609	4.168	5.757	7.093

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR 81.20

UPSTREAM OF STATOR 81.20

Table V. (cont)

PERCENT DESIGN SPEED = 88.54

CORRECTED WEIGHT FLOW = 77.81

CORRECTED ROTOR SPEED = 7406.85

PRESSURE RATIO = 1.3718

ADIABATIC EFFICIENCY = 90.4070

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	19.452	21.082	23.135	25.191	26.305
V 0	405.54	403.05	400.44	397.75	394.97
V 1	451.64	462.91	467.72	471.52	477.79
VZ 0	405.54	403.05	400.44	397.75	394.97
VZ 1	425.86	431.92	430.10	426.68	428.31
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	150.40	166.51	183.77	200.70	211.73
M 0	0.3560	0.3537	0.3514	0.3490	0.3465
M 1	0.3977	0.4079	0.4123	0.4158	0.4215
TURN	19.45	21.08	23.14	25.19	26.30
UUBAR	0.0893	0.0437	0.0681	0.0866	0.1307
DFAC	0.068	0.040	0.025	0.008	-0.024
LOSS PARA	0.0413	0.0186	0.0263	0.0301	0.0407
INCID	0.00	0.00	0.00	0.00	0.00
DEV	1.038	1.348	0.705	0.189	1.425

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	19.452	21.082	23.135	25.191	26.305
BETA 2	52.164	53.300	54.896	55.978	56.860
BETA(PR) 1	62.655	59.649	56.648	53.105	48.813
BETA(PR) 2	47.364	42.102	34.908	26.899	15.657
V 1	451.64	462.91	467.72	471.52	477.79
V 2	667.45	679.79	699.10	712.53	740.13
VZ 1	425.86	431.92	430.10	426.68	428.31
VZ 2	409.42	406.26	402.03	398.67	404.62
V-THETA 1	150.40	166.51	183.77	200.70	211.73
V-THETA 2	527.13	545.04	571.94	590.56	619.74
V(PR) 1	927.1	855.3	782.3	710.7	650.4
V(PR) 2	604.5	547.6	490.2	447.0	420.2
VTHETA PR1	823.5	738.2	653.9	568.4	489.5
VTHETA PR2	444.7	367.1	280.9	202.3	113.4
U 1	973.89	904.73	837.25	769.09	701.20
U 2	971.82	912.15	852.48	792.81	733.14
M 1	0.3977	0.4079	0.4123	0.4158	0.4215
M 2	0.5646	0.5790	0.5980	0.6123	0.6382
M(PR) 1	0.8163	0.7537	0.6896	0.6267	0.5738
M(PR) 2	0.5113	0.4664	0.4193	0.3842	0.3624
TURN(PR)	15.290	17.567	21.740	26.206	33.156
UUBAR	0.1248	0.0761	0.0683	0.0442	0.0635
DFAC	0.4921	0.5030	0.5196	0.5174	0.5045
EFFP	0.8841	0.9324	0.9457	0.9686	0.9608
EFF	0.8783	0.9292	0.9432	0.9672	0.9591
LOSS PARA	0.0298	0.0186	0.0172	0.0112	0.0159
INCID	3.05	2.77	2.95	3.31	3.81
DEV	2.264	3.302	4.108	6.199	6.957

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	77.81
UPSTREAM OF STATOR	77.81

Table V. (cont)

PERCENT DESIGN SPEED = 99.91

CORRECTED WEIGHT FLOW = 96.44

CORRECTED ROTOR SPEED = 8358.67

PRESSURE RATIO = 1.2111

ADIABATIC EFFICIENCY = 72.9867

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	19.630	20.923	23.990	25.534	26.562
V 0	509.29	505.57	501.68	497.66	493.51
V 1	617.79	625.67	636.32	647.20	653.22
VZ 0	509.29	505.57	501.68	497.66	493.51
VZ 1	581.88	584.41	581.35	583.99	584.27
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	207.54	223.43	258.72	278.98	292.10
M 0	0.4542	0.4508	0.4472	0.4435	0.4396
M 1	0.5564	0.5640	0.5742	0.5847	0.5905
TURN	19.63	20.92	23.99	25.53	26.56
UUBAR	0.0261	0.0416	0.0241	-0.0051	0.0990
DFAC	-0.013	-0.036	-0.052	-0.085	-0.118
LOSS PARA	0.0121	0.0177	0.0092	-0.0018	0.0308
INCID	0.00	0.00	0.00	0.00	0.00
DEV	0.860	1.507	-0.150	-0.154	1.168

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.086	25.060	23.[illegible]	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	19.630	20.923	23.990	25.534	26.562
BETA 2	34.718	36.823	40.[illegible]53	41.931	42.891
BETA(PR) 1	56.602	53.480	49.465	44.895	40.143
BETA(PR) 2	51.472	44.964	35.077	23.869	15.2[illegible]4
V 1	617.79	625.67	636.32	647.20	653.22
V 2	679.06	729.86	807.93	889.68	932.70
VZ 1	581.88	584.41	581.35	583.99	584.27
VZ 2	558.17	584.25	618.43	661.88	683.4[illegible]
V-THETA 1	207.54	223.43	258.72	278.98	292.1[illegible]
V-THETA 2	386.75	437.44	519.90	594.51	634.87
V(PR) 1	1057.1	982.0	893.4	824.4	764.3
V(PR) 2	896.1	825.7	755.7	723.8	7[illegible]8.2
VTHETA PR1	882.5	789.2	678.4	581.9	492.7
VTHETA PR2	701.0	583.5	434.3	292.9	185.7
U 1	1090.06	1012.66	937.12	860.83	784.85
U 2	1087.74	1020.96	954.17	887.38	82[illegible].59
M 1	0.5564	0.5640	0.5742	0.5847	0.5905
M 2	0.5952	0.6438	0.7157	0.7934	0.8356
M(PR) 1	0.9521	0.8852	0.8062	0.7448	0.6909
M(PR) 2	0.7854	0.7284	0.6694	0.6455	0.6344
TURN(PR)	5.130	8.516	14.328	21.[illegible]27	24.939
UUBAR	0.2036	0.1669	0.1677	0.1[illegible]98	0.0781
DFAC	0.2129	0.2283	0.2380	0.2216	0.178[illegible]
EFFP	0.5705	0.6821	0.7615	0.8782	0.9275
EFF	0.5628	0.6754	0.7550	0.8740	0.9247
LOSS PARA	0.0447	0.0390	0.0421	0.0285	0.0196
INCID	-3.00	-3.42	-4.29	-4.90	-4.88
DEV	6.372	6.164	4.277	3.169	6.5[illegible]4

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	96.44
UPSTREAM OF STATOR	96.44

Table V. (cont)

PERCENT DESIGN SPEED = 99.83

CORRECTED WEIGHT FLOW = 96.08

CORRECTED ROTOR SPEED = 8351.51

PRESSURE RATIO = 1.3425

ADIABATIC EFFICIENCY = 90.3678

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	19.704	22.274	24.157	26.219	26.991
V 0	518.45	514.52	510.42	506.18	501.80
V 1	611.62	622.33	633.02	639.97	650.80
VZ 0	518.45	514.52	510.42	506.18	501.80
VZ 1	575.81	575.89	577.58	574.12	579.91
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	206.21	235.88	259.05	282.74	295.37
M 0	0.4626	0.4590	0.4552	0.4512	0.4472
M 1	0.5504	0.5606	0.5709	0.5776	0.5880
TURN	19.70	22.27	24.16	26.22	26.99
UUBAR	0.0407	0.0345	0.0336	0.0474	0.1027
DFAC	0.015	-0.001	-0.027	-0.050	-0.093
LOSS PARA	0.0188	0.0145	0.0129	0.0163	0.0318
INCID	0.00	0.00	0.00	0.00	0.00
DEV	0.786	0.156	-0.317	-0.839	0.739

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	19.704	22.274	24.157	26.219	26.991
BETA 2	44.230	45.788	45.206	46.472	47.876
BETA(PR) 1	56.898	53.426	49.552	45.172	40.140
BETA(PR) 2	44.403	38.438	33.486	25.143	17.299
V 1	611.62	622.33	633.02	639.97	650.80
V 2	776.89	803.30	811.08	846.01	862.74
VZ 1	575.81	575.89	577.58	574.12	579.91
VZ 2	556.68	560.15	571.46	582.66	578.67
V-THETA 1	206.21	235.88	259.05	282.74	295.37
V-THETA 2	541.91	575.78	575.58	613.39	639.89
V(PR) 1	1054.3	966.5	890.3	814.4	758.6
V(PR) 2	779.2	715.1	685.2	643.6	606.1
VTHETA PR1	883.2	776.2	677.5	577.6	489.0
VTHETA PR2	545.2	444.6	378.0	273.5	180.2
U 1	1089.43	1012.06	936.57	860.33	784.39
U 2	1087.11	1020.36	953.61	886.86	820.12
M 1	0.5504	0.5606	0.5709	0.5776	0.5880
M 2	0.6728	0.7006	0.7109	0.7449	0.7627
M(PR) 1	0.9488	0.8707	0.8029	0.7350	0.6854
M(PR) 2	0.6748	0.6237	0.6005	0.5667	0.5358
TURN(PR)	12.494	14.988	16.067	20.029	22.841
UUBAR	0.1194	0.0837	0.0806	0.0764	0.0976
DFAC	0.3740	0.3733	0.3336	0.3157	0.3070
EFFP	0.8532	0.9045	0.9128	0.9285	0.9154
EFF	0.8466	0.9002	0.9092	0.9255	0.9120
LOSS PARA	0.0301	0.0216	0.0206	0.0196	0.0243
INCID	-2.70	-3.47	-4.15	-4.63	-4.86
DEV	-0.697	-0.362	2.686	4.443	8.599

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR 96.08

UPSTREAM OF STATOR 96.08

Table V. (cont)

PERCENT DESIGN SPEED = 99.77

CORRECTED WEIGHT FLOW = 93.41

CORRECTED ROTOR SPEED = 8346.75

PRESSURE RATIO = 1.3882

ADIABATIC EFFICIENCY = 90.2786

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	19.368	21.936	23.649	26.218	26.905
V 0	499.94	496.81	493.55	490.18	486.71
V 1	586.41	600.36	610.14	611.81	616.04
VZ 0	499.94	496.81	493.55	490.18	486.71
VZ 1	553.22	556.89	558.90	548.87	549.36
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	194.47	224.28	244.75	270.29	278.77
M 0	0.4459	0.4430	0.4400	0.4368	0.4336
M 1	0.5269	0.5402	0.5495	0.5511	0.5552
TURN	19.37	21.94	23.65	26.22	26.91
UUBAR	0.0855	0.0443	0.0333	0.0545	0.1460
DFAC	0.018	-0.003	-0.028	-0.036	-0.067
LOSS PARA	0.0396	0.0187	0.0128	0.0188	0.0452
INCID	0.00	0.00	0.00	0.00	0.00
DEV	1.122	0.494	0.191	-0.838	0.825

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	19.368	21.936	23.649	26.218	26.905
BETA 2	46.011	47.287	49.264	51.331	52.254
BETA(PR) 1	58.230	54.690	51.009	47.007	42.559
BETA(PR) 2	46.974	41.548	34.656	26.140	18.150
V 1	586.41	600.36	610.14	611.81	616.04
V 2	741.65	762.64	787.66	814.34	825.96
VZ 1	553.22	556.89	558.90	548.87	549.36
VZ 2	515.09	517.31	514.01	508.82	505.62
V-THETA 1	194.47	224.28	244.75	270.29	278.77
V-THETA 2	533.60	560.36	596.83	635.81	653.12
V(PR) 1	1050.7	963.5	888.3	804.9	745.8
V(PR) 2	754.9	691.2	624.9	566.8	532.1
VTHETA PR1	893.3	786.3	690.4	588.7	504.4
VTHETA PR2	551.9	458.5	355.3	249.7	165.8
U 1	1087.77	1010.53	935.15	859.02	783.20
U 2	1085.46	1018.81	952.16	885.52	818.87
M 1	0.5269	0.5402	0.5495	0.5511	0.5552
M 2	0.6367	0.6601	0.6859	0.7122	0.7249
M(PR) 1	0.9442	0.8670	0.8000	0.7251	0.6721
M(PR) 2	0.6481	0.5983	0.5441	0.4957	0.4670
TURN(PR)	11.256	13.142	16.353	20.867	24.409
UUBAR	0.1124	0.0681	0.0496	0.0486	0.0747
DFAC	0.3961	0.3949	0.4122	0.4155	0.4048
EFFP	0.8757	0.9283	0.9520	0.9593	0.9421
EFF	0.8693	0.9248	0.9497	0.9574	0.9395
LOSS PARA	0.0271	0.0168	0.0125	0.0124	0.0185
INCID	-1.37	-2.21	-2.69	-2.79	-2.44
DEV	1.874	2.748	3.856	5.440	9.450

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	93.41
UPSTREAM OF STATOR	93.41

Table V. (cont)

PERCENT DESIGN SPEED = 99.74

CORRECTED WEIGHT FLOW = 90.49

CORRECTED ROTOR SPEED = 8344.06

PRESSURE RATIO = 1.4338

ADIABATIC EFFICIENCY = 92.7256

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	20.127	22.018	23.985	25.876	26.992
V 0	476.07	472.13	468.01	463.75	459.34
V 1	560.91	568.82	572.79	575.12	579.92
VZ 0	476.07	472.13	468.01	463.75	459.34
VZ 1	526.66	527.34	523.33	517.46	516.75
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	193.02	213.25	232.84	251.00	263.20
M 0	0.4227	0.4191	0.4153	0.4114	0.4074
M 1	0.5016	0.5090	0.5127	0.5149	0.5195
TURN	20.13	22.02	23.99	25.88	26.99
UUBAR	0.0426	0.0248	0.0309	0.0507	0.1337
DFAC	0.021	0.001	-0.015	-0.032	-0.064
LOSS PARA	0.0196	0.0105	0.0119	0.0175	0.0413
INCID	0.00	0.00	0.00	0.00	0.00
DEV	0.363	0.412	-0.145	-0.496	0.738

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	20.127	22.018	23.985	25.876	26.992
BETA 2	48.563	50.196	51.954	53.491	54.569
BETA(PR) 1	59.583	56.589	53.385	49.684	45.270
BETA(PR) 2	46.549	42.005	34.722	27.009	17.986
V 1	560.91	568.82	572.79	575.12	579.92
V 2	751.07	759.22	785.58	801.59	818.13
VZ 1	526.66	527.34	523.33	517.46	516.75
VZ 2	497.06	486.02	484.15	476.90	474.29
V-THETA 1	193.02	213.25	232.84	251.00	263.20
V-THETA 2	563.06	583.26	618.65	644.29	666.62
V(PR) 1	1040.2	957.7	877.4	799.8	734.3
V(PR) 2	722.7	654.1	589.0	535.3	498.7
VTHETA PR1	897.0	799.4	704.3	609.8	521.6
VTHETA PR2	524.7	437.7	335.5	243.1	154.0
U 1	1090.06	1012.66	937.12	860.83	784.85
U 2	1087.74	1020.96	954.17	887.38	820.59
M 1	0.5016	0.5090	0.5127	0.5149	0.5195
M 2	0.6413	0.6531	0.6791	0.6961	0.7127
M(PR) 1	0.9302	0.8570	0.7854	0.7161	0.6577
M(PR) 2	0.6172	0.5626	0.5092	0.4648	0.4344
TURN(PR)	13.034	14.584	18.663	22.675	27.285
UUBAR	0.0843	0.0439	0.0360	0.0367	0.0848
DFAC	0.4314	0.4417	0.4576	0.4610	0.4513
EFFP	0.9147	0.9576	0.9691	0.9717	0.9409
EFF	0.9099	0.9553	0.9674	0.9703	0.9381
LOSS PARA	0.0205	0.0108	0.0091	0.0093	0.0210
INCID	-0.02	-0.31	-0.31	-0.12	0.27
DEV	1.449	3.205	3.922	6.309	9.286

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	90.49
UPSTREAM OF STATOR	90.49

Table V. (cont)

PERCENT DESIGN SPEED = 99.31

CORRECTED WEIGHT FLOW = 89.30

CORRECTED ROTOR SPEED = 8307.99

PRESSURE RATIO = 1.4428

ADIABATIC EFFICIENCY = 92.6564

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	18.935	20.987	23.131	25.361	26.391
V 0	472.86	469.23	465.44	461.52	457.47
V 1	550.28	564.65	570.17	570.25	577.43
VZ 0	472.86	469.23	465.44	461.52	457.47
VZ 1	520.50	527.19	524.33	515.29	517.25
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	178.56	202.23	223.98	244.25	256.67
M 0	0.4164	0.4131	0.4096	0.4061	0.4024
M 1	0.4876	0.5009	0.5061	0.5062	0.5129
TURN	18.94	20.99	23.13	25.36	26.39
UUBAR	0.0872	0.0426	0.0366	0.0577	0.1184
DFAC	0.022	-0.007	-0.023	-0.032	-0.067
LOSS PARA	0.0405	0.0182	0.0142	0.0200	0.0368
INCID	0.00	0.00	0.00	0.00	0.00
DEV	1.555	1.443	0.709	0.019	1.339

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	18.935	20.987	23.131	25.361	26.391
BETA 2	49.923	51.396	53.134	54.959	55.395
BETA(PR) 1	60.375	57.070	53.800	50.251	45.748
BETA(PR) 2	46.487	42.039	35.430	26.733	16.624
V 1	550.28	564.65	570.17	570.25	577.43
V 2	756.28	762.28	780.45	803.74	829.56
VZ 1	520.50	527.19	524.33	515.29	517.25
VZ 2	486.91	475.61	468.23	461.48	471.13
V-THETA 1	178.56	202.23	223.98	244.25	256.67
V-THETA 2	578.69	595.70	624.39	658.06	682.80
V(PR) 1	1053.0	969.8	887.8	805.9	741.2
V(PR) 2	707.2	640.4	574.6	516.7	491.7
VTHETA PR1	915.3	814.0	716.4	619.6	530.9
VTHETA PR2	512.9	428.8	333.1	232.4	140.7
U 1	1093.88	1016.20	940.40	863.85	787.59
U 2	1091.55	1024.53	957.51	890.49	823.47
M 1	0.4876	0.5009	0.5061	0.5062	0.5129
M 2	0.6405	0.6506	0.6683	0.6914	0.7169
M(PR) 1	0.9330	0.8604	0.7880	0.7153	0.6584
M(PR) 2	0.5989	0.5466	0.4920	0.4445	0.4249
TURN(PR)	13.888	15.030	18.371	23.518	29.123
UUBAR	0.0578	0.0170	0.0466	0.0412	0.0601
DFAC	0.4632	0.4707	0.4852	0.4953	0.4738
EFFP	0.9422	0.9840	0.9596	0.9687	0.9590
EFF	0.9388	0.9832	0.9575	0.9671	0.9570
LOSS PARA	0.0140	0.0042	0.0116	0.0105	0.0150
INCID	0.77	0.17	0.10	0.45	0.75
DEV	1.387	3.239	4.630	6.033	7.924

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	89.30
UPSTREAM OF STATOR	89.30

Table V. (cont)

PERCENT DESIGN SPEED = 99.42

CORRECTED WEIGHT FLOW = 86.84

CORRECTED ROTOR SPEED = 8317.58

PRESSURE RATIO = 1.4682

ADIABATIC EFFICIENCY = 92.6993

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	19.630	21.504	23.301	25.617	26.906
V 0	456.02	453.19	450.24	447.19	444.04
V 1	529.81	538.01	547.27	553.85	556.50
VZ 0	456.02	453.19	450.24	447.19	444.04
VZ 1	499.02	500.56	502.64	499.41	496.26
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	177.98	197.22	216.48	239.46	251.83
M 0	0.4011	0.3986	0.3959	0.3931	0.3903
M 1	0.4687	0.4763	0.4848	0.4910	0.4934
TURN	19.63	21.50	23.30	25.62	26.91
UUBAR	0.0681	0.0643	0.0252	0.0385	0.1264
DFAC	0.030	0.011	-0.013	-0.033	-0.056
LOSS PARA	0.0315	0.0273	0.0097	0.0133	0.0391
INCID	0.00	0.00	0.00	0.00	0.00
DEV	0.860	0.926	0.539	-0.237	0.824

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	19.630	21.504	23.301	25.617	26.906
BETA 2	51.610	52.855	54.521	55.823	56.918
BETA(PR) 1	61.447	58.600	55.263	51.386	47.236
BETA(PR) 2	46.512	42.214	36.463	26.984	16.813
V 1	529.81	538.01	547.27	553.85	556.50
V 2	759.62	762.59	770.99	800.68	822.01
VZ 1	499.02	500.56	502.64	499.41	496.26
VZ 2	471.73	460.48	447.48	449.79	448.68
V-THETA 1	177.98	197.22	216.48	239.46	251.83
V-THETA 2	595.39	607.87	627.84	662.41	688.76
V(PR) 1	1044.0	960.8	882.1	800.2	730.9
V(PR) 2	685.5	621.7	556.4	504.7	468.7
VTHETA PR1	917.0	820.0	724.9	625.3	536.6
VTHETA PR2	497.3	417.7	330.7	229.0	135.6
U 1	1095.03	1017.27	941.38	864.75	788.42
U 2	1092.70	1025.60	958.51	891.42	824.33
M 1	0.4687	0.4763	0.4848	0.4910	0.4934
M 2	0.6398	0.6483	0.6584	0.6871	0.7082
M(PR) 1	0.9236	0.8505	0.7815	0.7094	0.6480
M(PR) 2	0.5774	0.5286	0.4752	0.4331	0.4038
TURN(PR)	14.935	16.386	18.800	24.403	30.424
UUBAR	0.1019	0.0296	0.0387	0.0415	0.0638
DFAC	0.4852	0.4911	0.5063	0.5100	0.5016
EFFP	0.9064	0.9739	0.9681	0.9701	0.9592
EFF	0.9006	0.9724	0.9664	0.9686	0.9571
LOSS PARA	0.0247	0.0072	0.0095	0.0105	0.0159
INCID	1.85	1.70	1.56	1.59	2.24
DEV	1.412	3.414	5.663	6.284	8.113

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	86.84
UPSTREAM OF STATOR	86.84

Table V. (cont)

PERCENT DESIGN SPEED = 109.88

CORRECTED WEIGHT FLOW = 100.25

CORRECTED ROTOR SPEED = 9192.39

PRESSURE RATIO = 1.3167

ADIABATIC EFFICIENCY = 76.8227

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	19.965	21.680	23.821	25.276	26.648
V 0	532.58	528.23	523.69	519.00	514.15
V 1	647.28	660.28	669.83	676.35	683.49
VZ 0	532.58	528.23	523.69	519.00	514.15
VZ 1	608.38	613.57	612.77	611.60	610.89
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	221.02	243.93	270.53	288.79	306.55
M 0	0.4775	0.4735	0.4692	0.4648	0.4603
M 1	0.5868	0.5994	0.6087	0.6151	0.6221
TURN	19.97	21.68	23.82	25.28	26.65
UUBAR	0.0372	0.0230	0.0272	0.0316	0.1274
DFAC	-0.012	-0.039	-0.062	-0.090	-0.122
LOSS PARA	0.0172	0.0097	0.0105	0.0110	0.0395
INCID	0.00	0.00	0.00	0.00	0.00
DEV	0.525	0.750	0.019	0.104	1.082

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	19.965	21.680	23.821	25.276	26.648
BETA 2	40.426	42.370	44.904	45.367	46.409
BETA(PR) 1	58.008	54.686	51.001	46.956	42.193
BETA(PR) 2	50.145	45.398	36.999	25.600	16.459
V 1	647.28	660.28	669.83	676.35	683.49
V 2	764.16	786.44	843.75	927.97	969.33
VZ 1	608.38	613.57	612.77	611.60	610.89
VZ 2	581.71	581.03	597.62	651.96	668.35
V-THETA 1	221.02	243.93	270.53	288.79	306.55
V-THETA 2	495.53	530.00	595.63	66[illegible].37	7[illegible]2.[illegible]7
V(PR) 1	1148.3	1061.4	973.7	896.[illegible]	824.5
V(PR) 2	907.7	827.5	748.3	722.9	696.9
VTHETA PR1	973.9	866.1	756.7	654.8	553.8
VTHETA PR2	696.8	589.2	45[illegible].3	312.4	197.5
U 1	1194.91	1110.[illegible]6	1027.25	943.63	860.33
U 2	1192.37	1119.16	1045.94	972.73	899.52
M 1	0.5868	0.5994	0.6087	0.6151	0.6221
M 2	0.6649	0.6900	0.7442	0.8236	0.8658
M(PR) 1	1.0410	0.9636	0.8849	0.8149	0.7505
M(PR) 2	0.7898	0.7260	0.6600	0.6416	0.6225
TURN(PR)	7.862	9.288	14.002	21.356	25.734
UUBAR	0.1941	0.1588	0.1600	0.1352	0.10[illegible]1
DFAC	0.2946	0.3065	0.3280	0.3018	0.2673
EFFP	0.7111	0.7679	0.8030	0.8688	0.9157
EFF	0.7007	0.7599	0.7955	0.8629	0.9116
LOSS PARA	0.0439	0.0368	0.0392	0.0346	0.0250
INCID	-1.59	-2.21	-2.70	-2.84	-2.81
DEV	5.045	6.598	6.199	4.900	7.759

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR 100.25

UPSTREAM OF STATOR 100.25

Table V. (cont)

PERCENT DESIGN SPEED = 110.73

CORRECTED WEIGHT FLOW = 100.26

CORRECTED ROTOR SPEED = 9263.85

PRESSURE RATIO = 1.3976

ADIABATIC EFFICIENCY = 84.2522

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	20.389	22.015	22.810	25.189	26.216
V 0	526.23	522.21	518.02	513.68	509.20
V 1	644.40	647.45	662.32	666.83	680.98
VZ 0	526.23	522.21	518.02	513.68	509.20
VZ 1	604.03	600.24	610.52	603.42	610.93
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	224.50	242.70	256.77	283.80	300.83
M 0	0.4754	0.4716	0.4677	0.4636	0.4594
M 1	0.5889	0.5919	0.6064	0.6109	0.6248
TURN	20.39	22.02	22.81	25.19	26.22
UUBAR	0.0170	0.0682	0.0307	0.0432	0.0982
DFAC	-0.015	-0.028	-0.070	-0.086	-0.132
LOSS PARA	0.0078	0.0288	0.0119	0.0150	0.0306
INCID	0.00	0.00	0.00	0.00	0.00
DEV	0.101	0.415	1.030	0.191	1.514

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.736	21.944
BETA 1	20.369	22.015	22.810	25.189	26.216
BETA 2	44.848	46.651	47.640	48.403	48.669
BETA(PR) 1	58.100	55.315	51.607	47.557	42.484
BETA(PR) 2	48.900	44.018	35.048	25.789	17.801
V 1	644.40	647.45	662.32	666.83	680.98
V 2	785.52	804.86	863.31	910.28	934.12
VZ 1	604.03	600.24	610.52	603.42	610.93
VZ 2	556.92	552.50	581.69	604.33	616.97
V-THETA 1	224.50	242.70	256.77	283.80	300.83
V-THETA 2	553.97	585.29	637.92	680.73	701.44
V(PR) 1	1143.0	1054.8	983.0	894.1	828.4
V(PR) 2	847.2	768.3	710.5	671.2	647.9
VTHETA PR1	970.4	867.4	770.5	659.8	559.5
VTHETA PR2	638.4	533.9	408.0	292.0	198.1
U 1	1194.91	1110.06	1027.25	943.63	860.33
U 2	1192.37	1119.16	1045.94	972.73	899.52
M 1	0.5889	0.5919	0.6064	0.6109	0.6248
M 2	0.6851	0.7073	0.7633	0.8098	0.8348
M(PR) 1	1.0446	0.9642	0.9001	0.8191	0.7601
M(PR) 2	0.7388	0.6752	0.6283	0.5971	0.5790
TURN(PR)	9.200	11.297	16.560	21.769	24.683
UUBAR	0.1505	0.1101	0.1045	0.0827	0.1088
DFAC	0.3613	0.3760	0.3903	0.3662	0.3315
EFFP	0.8083	0.8661	0.8887	0.9253	0.9109
EFF	0.7992	0.8599	0.8832	0.9214	0.9064
LOSS PARA	0.0349	0.0261	0.0262	0.0212	0.0270
INCID	-1.50	-1.58	-2.09	-2.24	-2.52
DEV	3.800	5.218	4.248	5.089	9.181

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	100.26
UPSTREAM OF STATOR	100.26

Table V. (cont)

PERCENT DESIGN SPEED = 109.94

CORRECTED WEIGHT FLOW = 99.95

CORRECTED ROTOR SPEED = 9197.38

PRESSURE RATIO = 1.4831

ADIABATIC EFFICIENCY = 89.5215

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.950	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	19.269	21.289	22.810	25.189	26.216
V 0	523.45	519.18	514.72	510.10	505.33
V 1	636.31	646.53	658.49	662.65	672.97
VZ 0	523.45	519.18	514.72	510.10	505.33
VZ 1	600.66	602.41	607.00	599.64	603.74
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	209.99	234.73	255.28	282.02	297.29
M 0	0.4728	0.4688	0.4646	0.4602	0.4557
M 1	0.5810	0.5909	0.6027	0.6067	0.6169
TURN	19.27	21.29	22.81	25.19	26.22
UUBAR	0.0636	0.0384	0.0292	0.0541	0.1067
DFAC	-0.019	-0.039	-0.071	-0.087	-0.127
LOSS PARA	0.0294	0.0163	0.0113	0.0188	0.0332
INCID	0.00	0.00	0.00	0.00	0.00
DEV	1.221	1.141	1.030	0.191	1.514

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	19.269	21.289	22.810	25.189	26.216
BETA 2	48.459	49.402	50.279	51.163	52.614
BETA(PR) 1	58.401	55.220	51.556	47.521	42.689
BETA(PR) 2	47.001	41.693	34.590	26.809	17.870
V 1	636.31	646.53	658.49	662.65	672.97
V 2	811.06	829.88	858.35	881.43	901.83
VZ 1	600.66	602.41	607.00	599.64	603.74
VZ 2	537.86	540.05	548.53	552.75	547.57
V-THETA 1	209.99	234.73	255.28	282.02	297.29
V-THETA 2	607.06	630.12	660.21	686.58	716.56
V(PR) 1	1146.4	1056.1	976.3	887.9	821.4
V(PR) 2	788.7	723.2	666.3	619.3	575.3
VTHETA PR1	976.4	867.4	764.6	654.9	556.9
VTHETA PR2	576.8	481.1	378.3	279.2	176.5
U 1	1186.38	1102.14	1019.92	936.90	854.23
U 2	1183.86	1111.17	1038.48	965.79	893.10
M 1	0.5810	0.5909	0.6027	0.6067	0.6169
M 2	0.7014	0.7245	0.7544	0.7788	0.8004
M(PR) 1	1.0466	0.9653	0.8935	0.8130	0.7529
M(PR) 2	0.6820	0.6314	0.5856	0.5472	0.5106
TURN(PR)	11.400	13.527	16.966	20.720	24.820
UUBAR	0.1112	0.0605	0.0489	0.0478	0.0853
DFAC	0.4349	0.4359	0.4389	0.4228	0.4292
EFFP	0.8813	0.9380	0.9538	0.9598	0.9340
EFF	0.8740	0.9343	0.9512	0.9576	0.9305
LOSS PARA	0.0268	0.0149	0.0123	0.0121	0.0211
INCID	-1.20	-1.68	-2.14	-2.28	-2.31
DEV	1.901	2.893	3.790	6.100	9.170

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	99.95
UPSTREAM OF STATOR	99.95

Table V. (cont)

PERCENT DESIGN SPEED = 109.87

CORRECTED WEIGHT FLOW = 99.21

CORRECTED ROTOR SPEED = 9192.14

PRESSURE RATIO = 1.5144

ADIABATIC EFFICIENCY = 92.0015

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.680	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	18.934	21.120	22.980	25.189	26.044
V 0	523.63	519.29	514.76	510.08	505.24
V 1	635.90	648.52	654.74	661.12	673.34
VZ 0	523.63	519.29	514.76	510.08	505.24
VZ 1	601.49	604.95	602.78	598.25	604.97
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	206.33	233.68	255.61	281.37	295.64
M 0	0.4711	0.4670	0.4628	0.4584	0.4538
M 1	0.5782	0.5905	0.5965	0.6028	0.6148
TURN	18.93	21.12	22.98	25.19	26.04
UUBAR	0.0684	0.0099	0.0320	0.0394	0.0609
DFAC	-0.021	-0.044	-0.063	-0.084	-0.130
LOSS PARA	0.0317	0.0042	0.0124	0.0137	0.0190
INCID	0.00	0.00	0.00	0.00	0.00
DEV	1.556	1.310	0.860	0.191	1.686

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	18.934	21.120	22.980	25.189	26.044
BETA 2	49.639	49.812	51.167	52.696	54.055
BETA(PR) 1	58.560	55.249	51.858	47.746	42.856
BETA(PR) 2	46.301	41.043	35.098	27.165	18.034
V 1	635.90	648.52	654.74	661.12	673.34
V 2	824.95	840.86	854.20	875.70	895.35
VZ 1	601.49	604.95	602.78	598.25	604.97
VZ 2	534.24	542.60	535.62	530.71	525.57
V-THETA 1	206.33	233.68	255.61	281.37	295.64
V-THETA 2	628.60	642.36	665.41	696.56	724.86
V(PR) 1	1153.2	1061.3	976.0	859.7	825.3
V(PR) 2	773.3	719.4	654.7	596.5	552.7
VTHETA PR1	983.9	872.0	767.6	658.5	561.3
VTHETA PR2	559.1	472.4	376.4	272.3	171.1
U 1	1190.20	1105.68	1023.21	939.91	856.94
U 2	1187.67	1114.75	1041.82	968.90	895.98
M 1	0.5782	0.5905	0.5965	0.6028	0.6148
M 2	0.7090	0.7303	0.7465	0.7696	0.7908
M(PR) 1	1.0486	0.9663	0.8892	0.8112	0.7535
M(PR) 2	0.6646	0.6249	0.5721	0.5242	0.4882
TURN(PR)	12.259	14.216	16.760	20.581	24.822
UUBAR	0.0995	0.0374	0.0254	0.0258	0.0566
DFAC	0.4593	0.4464	0.4522	0.4529	0.4534
EFFP	0.8989	0.9634	0.9771	0.9791	0.9564
EFF	0.8923	0.9611	0.9757	0.9779	0.9541
LOSS PARA	0.0242	0.0093	0.0064	0.0065	0.0114
INCID	-1.04	-1.65	-1.84	-2.05	-2.14
DEV	1.201	2.243	4.298	6.465	9.334

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	99.21
UPSTREAM OF STATOR	99.21

Table VI.

Blade element performance—off-design IGV and rotor.

PERCENT DESIGN SPEED = 49.71

CORRECTED WEIGHT FLOW = 74.31

CORRECTED ROTOR SPEED = 4159.12

PRESSURE RATIO = 1.0408

ADIABATIC EFFICIENCY = 86.2817

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.900
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	8.717	9.662	10.350	11.294	11.551
V 0	375.49	373.82	372.07	370.27	368.41
V 1	395.41	409.36	412.22	424.95	427.18
VZ 0	375.49	373.82	372.07	370.27	368.41
VZ 1	390.85	403.56	405.52	416.72	418.53
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	59.93	68.71	74.06	83.22	85.54
M 0	0.3311	0.3296	0.3281	0.3264	0.3248
M 1	0.3491	0.3618	0.3644	0.3759	0.3779
TURN	8.72	9.66	10.35	11.29	11.55
UUBAR	0.0332	0.0137	0.0208	-0.0425	-0.0361
DFAC	0.025	-0.011	-0.024	-0.061	-0.079
LOSS PARA	0.0161	0.0061	0.0086	-0.0160	-0.0123
INCID	0.00	0.00	0.00	0.00	0.00
DEV	-0.617	-0.962	-0.990	-1.114	-0.371

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	8.717	9.662	10.350	11.294	11.551
BETA 2	15.515	17.414	20.353	24.508	28.270
BETA(PR) 1	51.050	47.222	44.112	39.697	36.148
BETA(PR) 2	48.030	42.064	33.459	23.724	14.831
V 1	395.41	409.36	412.22	424.95	427.18
V 2	405.06	438.65	491.73	543.02	578.79
VZ 1	390.85	403.56	405.52	416.72	418.53
VZ 2	390.30	418.55	461.03	494.10	509.75
V-THETA 1	59.93	68.71	74.06	83.22	85.54
V-THETA 2	108.35	131.28	171.02	225.26	274.13
V(PR) 1	621.7	594.2	564.8	541.6	518.3
V(PR) 2	583.6	563.8	552.6	539.7	527.3
VTHETA PR1	483.5	436.1	393.1	345.9	305.7
VTHETA PR2	433.9	377.7	304.7	217.1	135.0
U 1	543.44	504.85	467.19	429.16	391.28
U 2	542.29	508.99	475.69	442.40	409.10
M 1	0.3491	0.3618	0.3644	0.3759	.3779
M 2	0.3560	0.3863	0.4340	0.4803	.5127
M(PR) 1	0.5490	0.5251	0.4992	0.4791	0.4584
M(PR) 2	0.5130	0.4965	0.4877	0.4774	0.4671
TURN(PR)	3.019	5.158	10.653	15.974	21.318
UUBAR	0.1576	0.1334	0.0600	0.0045	-0.0607
DFAC	0.0894	0.0836	0.0696	0.0711	0.0684
EFFP	0.1460	0.3736	0.8040	0.9904	1.1114
EFF	0.1454	0.3724	0.8029	0.9904	1.1126
LOSS PARA	0.0372	0.0327	0.0154	0.0012	-0.0151
INCID	-8.62	-9.85	-9.77	-10.26	-8.96
DEV	2.930	3.264	2.659	3.024	6.131

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	74.31
UPSTREAM OF STATOR	74.31

Table VI. (cont)

PERCENT DESIGN SPEED = 49.73

CORRECTED WEIGHT FLOW = 67.37

CORRECTED ROTOR SPEED = 4160.83

PRESSURE RATIO = 1.0722

ADIABATIC EFFICIENCY = 94.5975

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA C	28.960	26.820	24.600	22.320	19.980
BETA C	0.000	0.000	0.000	0.000	0.000
BETA 1	8.634	9.578	10.350	11.209	12.068
V C	347.30	346.21	345.06	343.89	342.68
V 1	366.87	379.77	380.41	383.58	386.72
VZ C	347.30	346.21	345.06	343.89	342.68
VZ 1	362.71	374.48	374.23	376.27	378.17
V-THETA C	0.00	0.00	0.00	0.00	0.00
V-THETA 1	55.08	63.19	68.34	74.57	80.86
M C	0.3053	0.3043	0.3033	0.3022	0.3011
M 1	0.3228	0.3344	0.3350	0.3379	0.3407
TURN	8.63	9.58	10.35	11.21	12.07
UUBAR	0.0439	-0.0028	0.0144	0.0312	0.0284
DFAC	0.021	-0.014	-0.019	-0.032	-0.047
LOSS PARA	0.0213	-0.0012	0.0060	0.0118	0.0096
INCID	0.00	0.00	0.00	0.00	0.00
DEV	-0.534	-0.878	-0.990	-1.029	-0.888

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	8.634	9.578	10.350	11.209	12.068
BETA 2	25.018	26.181	29.174	32.626	35.389
BETA(PR) 1	53.463	49.774	46.895	43.374	39.455
BETA(PR) 2	46.873	40.123	32.644	23.396	14.890
V 1	366.87	379.77	380.41	383.58	386.72
V 2	390.86	425.94	455.38	490.66	515.10
VZ 1	362.71	374.48	374.23	376.27	378.17
VZ 2	354.19	382.24	397.61	413.24	419.94
V-THETA 1	55.08	63.19	68.34	74.57	80.86
V-THETA 2	165.29	187.93	221.98	264.54	298.30
V(PR) 1	609.2	579.9	547.6	517.6	489.8
V(PR) 2	518.1	499.9	472.2	452.3	434.5
VTHETA PR1	489.5	442.7	399.8	355.5	311.2
VTHETA PR2	378.1	322.1	254.7	178.8	111.7
U 1	544.59	505.91	468.18	430.06	392.10
U 2	543.43	510.06	476.70	443.33	409.96
M 1	0.3228	0.3344	0.3350	0.3379	0.3407
M 2	0.3410	0.3724	0.3986	0.4299	0.4519
M(PR) 1	0.5361	0.5106	0.4823	0.4559	0.4315
M(PR) 2	0.4520	0.4370	0.4134	0.3945	0.3813
TURN(PR)	6.590	9.651	14.251	19.978	24.565
UUBAR	0.0812	0.0487	0.0205	0.0152	-0.0288
DFAC	0.2141	0.2066	0.2190	0.2272	0.2189
EFFP	0.7883	0.8847	0.9601	0.9774	1.0399
EFF	0.7867	0.8837	0.9597	0.9771	1.0404
LOSS PARA	0.0196	0.0123	0.0053	0.0040	-0.0072
INCID	-6.21	-7.30	-6.99	-6.59	-5.65
DEV	1.773	1.323	1.844	2.696	6.190

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR 67.37

UPSTREAM OF STATOR 67.37

Table VI. (cont)

PERCENT DESIGN SPEED = 49.79

CORRECTED WEIGHT FLOW = 58.89

CORRECTED ROTOR SPEED = 4165.69

PRESSURE RATIO = 1.0956

ADIABATIC EFFICIENCY = 96.0483

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	9.166	9.834	10.691	11.377	12.500
V 0	304.27	302.79	301.24	299.64	297.99
V 1	311.55	321.71	326.38	330.27	328.32
VZ 0	304.27	302.79	301.24	299.64	297.99
VZ 1	307.57	316.98	320.71	323.78	320.53
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	49.63	54.95	60.55	65.15	71.06
M 0	0.2670	0.2657	0.2643	0.2629	0.2614
M 1	0.2735	0.2825	0.2867	0.2902	0.2884
TURN	9.17	9.83	10.69	11.38	12.50
UUBAR	0.0519	0.0522	0.0328	0.0082	0.0027
DFAC	0.056	0.020	0.001	-0.019	-0.019
LOSS PARA	0.0251	0.0235	0.0136	0.0031	0.0045
INCID	0.00	0.00	0.00	0.00	0.00
DEV	-1.066	-1.134	-1.331	-1.197	-1.020

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	9.166	9.834	10.691	11.377	12.500
BETA 2	35.085	35.857	38.607	40.243	41.709
BETA(PR) 1	58.163	54.918	51.827	48.441	45.070
BETA(PR) 2	47.845	41.450	33.377	24.849	17.989
V 1	311.55	321.71	326.38	330.27	328.32
V 2	367.77	392.16	418.89	443.85	451.95
VZ 1	307.57	316.98	320.71	323.78	320.53
VZ 2	300.95	317.84	327.34	338.80	337.40
V-THETA 1	49.63	54.95	60.55	65.15	71.06
V-THETA 2	211.39	229.71	261.38	286.74	300.69
V(PR) 1	583.1	551.5	518.9	488.1	453.9
V(PR) 2	448.4	424.0	392.0	373.4	354.7
VTHETA PR1	495.3	451.3	408.0	365.2	321.3
VTHETA PR2	332.4	280.7	215.7	156.9	109.6
U 1	544.97	506.27	468.50	430.37	392.38
U 2	543.81	510.42	477.03	443.64	410.25
M 1	0.2735	0.2825	0.2867	0.2902	0.2884
M 2	0.3194	0.3412	0.3647	0.3869	0.3941
M(PR) 1	0.5118	0.4844	0.4558	0.4288	0.3987
M(PR) 2	0.3894	0.3690	0.3413	0.3254	0.3094
TURN(PR)	10.318	13.468	18.450	23.592	27.081
UUBAR	0.0309	0.0024	0.0221	0.0186	0.0367
DFAC	0.3295	0.3332	0.3583	0.3563	0.3399
EFFP	0.9469	0.9971	0.9708	0.9791	0.9634
EFF	0.9463	0.9971	0.9704	0.9788	0.9629
LOSS PARA	0.0073	0.0006	0.0056	0.0048	0.0091
INCID	-1.51	-2.15	-2.05	-1.52	-0.04
DEV	2.745	2.650	2.577	4.149	9.289

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR 58.89

UPSTREAM OF STATOR 58.89

Table VI. (cont)

PERCENT DESIGN SPEED = 49.79

CORRECTED WEIGHT FLOW = 49.34

CORRECTED ROTOR SPEED = 4165.76

PRESSURE RATIO = 1.1146

ADIABATIC EFFICIENCY = 94.4277

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	8.467	9.926	10.611	11.379	11.897
V 0	252.69	252.40	252.10	251.79	251.48
V 1	271.74	276.60	275.79	269.09	278.25
VZ 0	252.69	252.40	252.10	251.79	251.48
VZ 1	268.78	272.46	271.07	263.80	272.29
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	40.01	47.68	50.78	53.09	57.36
M 0	0.2215	0.2212	0.2209	0.2207	0.2204
M 1	0.2383	0.2426	0.2419	0.2360	0.2441
TURN	8.47	9.93	10.61	11.38	11.90
UUBAR	-0.0069	0.0123	0.0478	0.1125	0.0264
DFAC	0.002	-0.010	-0.009	0.012	-0.027
LOSS PARA	-0.0034	0.0055	0.0198	0.0423	0.0090
INCID	0.00	0.00	0.00	0.00	0.00
DEV	-0.367	-1.226	-1.251	-1.199	-0.717

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	21.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	8.467	9.926	10.611	11.379	11.897
BETA 2	42.647	43.857	46.464	48.578	49.292
BETA(PR) 1	61.951	59.259	56.992	55.[illegible]	5[illegible].868
BETA(PR) 2	47.082	42.193	35.126	28.124	17.372
V 1	271.74	276.60	275.79	269.09	278.25
V 2	369.97	378.71	394.[illegible]3	4[illegible]1.66	426.[illegible]5
VZ 1	268.78	272.46	271.07	263.8[illegible]	272.28
VZ 2	272.12	273.07	271.41	265.74	277.93
V-THETA 1	40.01	47.68	50.78	53.09	57.36
V-THETA 2	250.65	262.39	285.65	3[illegible]1.19	322.92
V(PR) 1	571.6	533.0	497.6	46[illegible]	431.4
V(PR) 2	399.6	368.6	331.8	3[illegible]1.3	291.2
VTHETA PR1	504.4	458.1	417.3	376.9	334.6
VTHETA PR2	292.7	247.6	19[illegible].9	142.[illegible]	86.9
U 1	544.46	505.80	468.07	429.96	392.[illegible]1
U 2	543.30	509.94	476.58	443.23	4[illegible]9.87
M 1	0.2383	0.2426	0.2419	0.236[illegible]	0.2441
M 2	0.3204	0.3286	0.3423	0.3490	0.37[illegible]5
M(PR) 1	0.5013	0.4676	0.4365	0.4[illegible]34	0.3785
M(PR) 2	0.3461	0.3198	0.2882	0.2618	0.2533
TURN(PR)	14.869	17.065	21.865	26.685	33.496
UUBAR	0.0447	0.0099	-0.0006	0.0247	0.0492
DFAC	0.4315	0.4389	0.4726	0.490[illegible]	0.4745
EFFP	0.9420	0.9885	1.0017	0.9774	0.96[illegible]6
EFF	0.941[illegible]	0.9884	1.0017	0.977[illegible]	0.9600
LOSS PARA	0.0107	0.0024	-0.0001	0.0062	0.0122
INCID	2.28	2.19	3.11	5.05	5.76
DEV	1.982	3.393	4.326	7.424	8.672

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	49.34
UPSTREAM OF STATOR	49.34

Table VI. (cont)

PERCENT DESIGN SPEED = 69.63

CORRECTED WEIGHT FLOW = 90.70

CORRECTED ROTOR SPEED = 5824.89

PRESSURE RATIO = 1.1366

ADIABATIC EFFICIENCY = 88.4345

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	8.375	9.916	10.606	11.294	11.812
V 0	464.30	462.21	460.04	457.79	455.48
V 1	503.52	513.69	520.97	523.29	527.13
VZ 0	464.30	462.21	460.04	457.79	455.48
VZ 1	498.15	506.01	512.07	513.15	515.97
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	73.34	88.46	95.89	102.48	107.90
M 0	0.4128	0.4109	0.4089	0.4068	0.4047
M 1	0.4490	0.4585	0.4653	0.4674	0.4710
TURN	8.38	9.92	10.61	11.29	11.81
UUBAR	0.0223	0.0374	0.0064	0.0200	0.0335
DFAC	-0.007	-0.024	-0.045	-0.057	-0.075
LOSS PARA	0.0108	0.0168	0.0026	0.0075	0.0114
INCID	0.00	0.00	0.00	0.00	0.00
DEV	-0.275	-1.216	-1.246	-1.114	-0.632

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	8.375	9.916	10.606	11.294	11.812
BETA 2	25.947	27.119	29.467	31.224	34.318
BETA(PR) 1	54.015	50.643	47.403	44.095	40.382
BETA(PR) 2	47.138	41.261	33.259	25.009	16.443
V 1	503.52	513.69	520.97	523.29	527.13
V 2	538.76	575.10	625.34	673.91	707.90
VZ 1	498.15	506.01	512.07	513.15	515.97
VZ 2	484.46	511.87	544.45	576.29	584.67
V-THETA 1	73.34	88.46	95.89	102.48	107.90
V-THETA 2	235.73	262.15	307.62	349.34	399.10
V(PR) 1	847.8	797.9	756.6	714.5	677.4
V(PR) 2	712.2	680.9	651.1	635.9	609.6
VTHETA PR1	686.0	617.0	556.9	497.2	438.8
VTHETA PR2	522.0	449.1	357.1	268.8	172.5
U 1	759.37	705.44	652.82	599.68	546.74
U 2	757.75	711.23	664.70	618.17	571.65
M 1	0.4490	0.4585	0.4653	0.4674	0.4710
M 2	0.4725	0.5061	0.5521	0.5964	0.6276
M(PR) 1	0.7561	0.7122	0.6757	0.6382	0.6052
M(PR) 2	0.6246	0.5992	0.5748	0.5627	0.5404
TURN(PR)	6.878	9.382	14.144	19.087	23.940
UUBAR	0.1132	0.0843	0.0429	0.0063	-0.0142
DFAC	0.2282	0.2161	0.2204	0.2008	0.2024
EFFP	0.7231	0.8132	0.9200	0.9914	1.0192
EFF	0.7193	0.8104	0.9185	0.9912	1.0197
LOSS PARA	0.0272	0.0209	0.0110	0.0016	-0.0036
INCID	-5.65	-6.43	-6.48	-5.86	-4.73
DEV	2.038	2.461	2.459	4.309	7.743

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR 90.70

UPSTREAM OF STATOR 90.70

Table VI. (cont)

PERCENT DESIGN SPEED = 69.61

CORRECTED WEIGHT FLOW = 85.36

CORRECTED ROTOR SPEED = 5823.88

PRESSURE RATIO = 1.1794

ADIABATIC EFFICIENCY = 96.8041

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	8.630	9.924	10.003	11.296	11.895
V 0	441.23	439.23	437.14	434.99	432.77
V 1	479.15	487.26	489.27	501.49	502.04
VZ 0	441.23	439.23	437.14	434.99	432.77
VZ 1	473.73	479.97	481.83	491.77	491.26
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	71.90	83.97	84.99	98.23	103.48
M 0	0.3906	0.3888	0.3869	0.3849	0.3829
M 1	0.4253	0.4328	0.4346	0.4459	0.4464
TURN	8.63	9.92	10.00	11.30	11.89
UUBAR	0.0138	0.0444	0.0261	-0.0283	-0.0112
DFAC	-0.006	-0.022	-0.038	-0.066	-0.077
LOSS PARA	0.0067	0.0199	0.0108	-0.0106	-0.0038
INCID	0.00	0.00	0.00	0.00	0.00
DEV	-0.530	-1.224	-0.643	-1.116	-0.715

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	8.630	9.924	10.003	11.296	11.895
BETA 2	31.282	32.491	34.892	37.092	39.067
BETA(PR) 1	55.504	52.399	49.765	45.644	42.148
BETA(PR) 2	45.948	40.802	32.735	23.870	16.599
V 1	479.15	487.26	489.27	501.49	502.04
V 2	541.60	563.64	606.17	648.20	665.09
VZ 1	473.73	479.97	481.83	491.77	491.26
VZ 2	462.86	475.63	497.20	517.04	516.39
V-THETA 1	71.90	83.97	84.99	98.23	103.48
V-THETA 2	281.22	302.44	346.75	390.93	419.16
V(PR) 1	836.5	786.6	746.0	703.4	662.6
V(PR) 2	665.7	628.3	591.1	565.4	538.8
VTHETA PR1	689.4	623.2	569.5	503.0	444.6
VTHETA PR2	478.4	410.6	319.6	228.8	153.9
U 1	761.28	707.22	654.46	601.19	548.12
U 2	759.66	713.01	666.37	619.73	573.08
M 1	0.4253	0.4328	0.4346	0.4459	0.4464
M 2	0.4713	0.4920	0.5303	0.5686	0.5840
M(PR) 1	0.7425	0.6987	0.6627	0.6255	0.5892
M(PR) 2	0.5793	0.5484	0.5171	0.4959	0.4732
TURN(PR)	9.556	11.597	17.031	21.774	25.549
UUBAR	0.0522	0.0287	0.0036	-0.0083	-0.0059
DFAC	0.2931	0.2905	0.3104	0.3069	0.3010
EFFP	0.9037	0.9506	0.9955	1.0117	1.0077
EFF	0.9016	0.9495	0.9954	1.0120	1.0079
LOSS PARA	0.0128	0.0072	0.0009	-0.0022	-0.0015
INCID	-4.17	-4.67	-4.11	-4.32	-2.96
DEV	0.848	2.002	1.935	3.170	7.899

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	85.36
UPSTREAM OF STATOR	85.36

Table VI. (cont)

PERCENT DESIGN SPEED = 69.63

CORRECTED WEIGHT FLOW = 78.84

CORRECTED ROTOR SPEED = 5824.86

PRESSURE RATIO = 1.2049

ADIABATIC EFFICIENCY = 94.3274

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	8.463	9.490	10.437	10.950	11.725
V 0	402.47	401.11	399.70	398.24	396.74
V 1	430.15	442.56	445.52	451.13	454.05
VZ 0	402.47	401.11	399.70	398.24	396.74
VZ 1	425.46	436.51	438.15	442.92	444.57
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	63.31	72.97	80.71	85.70	92.27
M 0	0.3549	0.3537	0.3524	0.3511	0.3498
M 1	0.3800	0.3913	0.3940	0.3991	0.4018
TURN	8.46	9.49	10.44	10.95	11.72
UUBAR	0.0431	0.0229	0.0008	-0.0216	-0.0205
DFAC	0.008	-0.020	-0.030	-0.050	-0.064
LOSS PARA	0.0209	0.0103	0.0003	-0.0081	-0.0070
INCID	0.00	0.00	0.00	0.00	0.00
DEV	-0.363	-0.790	-1.077	-0.770	-0.545

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	8.463	9.490	10.437	10.950	11.725
BETA 2	36.748	37.991	40.199	42.256	44.211
BETA(PR) 1	58.672	55.503	52.675	49.374	45.764
BETA(PR) 2	47.703	41.762	34.542	26.537	17.520
V 1	430.15	442.56	445.52	451.13	454.05
V 2	514.32	541.20	569.72	595.51	621.34
VZ 1	425.46	436.51	438.15	442.92	444.57
VZ 2	412.11	426.52	435.15	440.76	445.37
V-THETA 1	63.31	72.97	80.71	85.70	92.27
V-THETA 2	307.72	333.13	367.72	400.45	433.26
V(PR) 1	818.3	770.7	722.6	680.2	637.3
V(PR) 2	612.4	571.8	528.3	492.7	467.0
VTHETA PR1	699.0	635.2	574.6	516.3	456.6
VTHETA PR2	453.0	380.8	299.5	220.1	140.6
U 1	762.29	708.16	655.34	601.99	548.85
U 2	760.67	713.97	667.26	620.56	573.85
M 1	0.3800	0.3913	0.3940	0.3991	0.4018
M 2	0.4441	0.4687	0.4944	0.5179	0.5412
M(PR) 1	0.7229	0.6815	0.6391	0.6019	0.5639
M(PR) 2	0.5287	0.4952	0.4585	0.4285	0.4068
TURN(PR)	10.968	13.741	18.133	22.838	28.244
UUBAR	0.0439	0.0275	0.0213	0.0182	0.0264
DFAC	0.3577	0.3670	0.3857	0.3994	0.3963
EFFP	0.9348	0.9624	0.9745	0.9808	0.9755
EFF	0.9331	0.9614	0.9738	0.9802	0.9748
LOSS PARA	0.0104	0.0068	0.0054	0.0046	0.0065
INCID	-1.00	-1.57	-1.21	-0.59	0.65
DEV	2.603	2.962	3.742	5.837	8.820

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR 78.84

UPSTREAM OF STATOR 78.84

Table VI. (cont)

PERCENT DESIGN SPEED = 69.59

CORRECTED WEIGHT FLOW = 67.66

CORRECTED ROTOR SPEED = 5822.26

PRESSURE RATIO = 1.2362

ADIABATIC EFFICIENCY = 90.0203

INLET GUIDE VANE 1

STATION 0 - STATION 1

	10	30	50	70	90
DIA 0	28.960	26.820	24.600	22.320	19.980
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	8.550	9.493	10.354	11.197	11.876
V 0	352.28	351.01	349.68	348.32	346.92
V 1	370.50	377.02	384.60	376.82	381.98
VZ 0	352.28	351.01	349.68	348.32	346.92
VZ 1	366.38	371.85	378.34	369.65	373.80
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	55.08	62.18	69.13	73.17	78.61
M 0	0.3096	0.3085	0.3073	0.3061	0.3048
M 1	0.3260	0.3318	0.3387	0.3317	0.3363
TURN	8.55	9.49	10.35	11.20	11.88
UUBAR	0.0761	0.0657	0.0108	0.0931	0.0333
DFAC	0.025	0.007	-0.017	-0.001	-0.022
LOSS PARA	0.0369	0.0295	0.0045	0.0351	0.0113
INCID	0.00	0.00	0.00	0.00	0.00
DEV	-0.450	-0.793	-0.994	-1.017	-0.696

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	8.550	9.493	10.354	11.197	11.876
BETA 2	45.020	46.584	48.861	50.211	51.102
BETA(PR) 1	62.613	60.074	57.162	55.046	51.518
BETA(PR) 2	48.526	43.319	35.492	27.832	16.999
V 1	370.50	377.02	384.60	376.82	381.98
V 2	504.75	519.44	545.93	560.94	591.46
VZ 1	366.38	371.85	378.34	369.65	373.80
VZ 2	356.79	357.01	359.16	358.98	371.40
V-THETA 1	55.08	62.18	69.13	73.17	78.61
V-THETA 2	357.04	377.32	411.15	431.03	460.31
V(PR) 1	796.5	745.4	697.7	645.2	600.7
V(PR) 2	538.7	490.7	441.1	405.9	388.4
VTHETA PR1	707.2	646.0	586.2	528.8	470.2
VTHETA PR2	403.6	336.7	256.1	189.5	113.5
U 1	762.29	708.16	655.34	601.99	548.85
U 2	760.67	713.97	667.26	620.56	573.85
M 1	0.3260	0.3318	0.3387	0.3317	0.3363
M 2	0.4322	0.4464	0.4703	0.4839	0.5116
M(PR) 1	0.7008	0.6560	0.6143	0.5679	0.5289
M(PR) 2	0.4613	0.4217	0.3800	0.3502	0.3359
TURN(PR)	14.087	16.754	21.670	27.213	34.519
UUBAR	0.0811	0.0522	0.0549	0.0589	0.0519
DFAC	0.4580	0.4786	0.5129	0.5202	0.5081
EFFP	0.9069	0.9433	0.9463	0.9495	0.9612
EFF	0.9039	0.9415	0.9446	0.9480	0.9600
LOSS PARA	0.0189	0.0125	0.0137	0.0148	0.0129
INCID	2.94	3.00	3.28	5.09	6.41
DEV	3.426	4.519	4.692	7.132	8.299

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	67.66
UPSTREAM OF STATOR	67.66

Table VII.

Blade element performance—unslotted stator stage.

PERCENT DESIGN SPEED = 49.86

CORRECTED WEIGHT FLOW = 45.15

CORRECTED ROTOR SPEED = 4171.91

PRESSURE RATIO = 1.0884

ADIABATIC EFFICIENCY = 85.3107

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	19.366	21.111	22.675	24.571	25.687
BETA 2	44.949	45.493	45.931	49.391	51.741
BETA(PR) 1	63.369	61.275	57.129	57.003	51.629
BETA(PR) 2	48.000	42.649	35.469	29.797	19.881
V 1	234.93	234.19	246.48	226.03	238.18
V 2	347.61	358.34	374.85	373.92	387.83
VZ 1	221.64	218.47	227.43	205.57	214.64
VZ 2	246.01	251.20	260.72	243.38	240.16
V-THETA 1	77.90	84.35	95.02	93.99	103.24
V-THETA 2	245.58	255.56	269.33	283.87	304.53
V(PR) 1	494.5	454.6	419.0	377.5	345.8
V(PR) 2	367.7	341.5	320.1	280.5	255.4
VTHETA PR1	442.0	398.6	351.9	316.6	271.1
VTHETA PR2	273.2	231.4	185.8	139.4	86.8
U 1	519.90	482.98	446.95	410.57	374.33
U 2	518.80	486.94	455.09	423.23	391.38
M 1	0.2159	0.2152	0.2266	0.2076	0.2189
M 2	0.3161	0.3263	0.3419	0.3411	0.3542
M(PR) 1	0.4544	0.4177	0.3852	0.3467	0.3178
M(PR) 2	0.3343	0.3110	0.2920	0.2558	0.2332
TURN(PR)	15.369	18.626	21.660	27.206	31.748
UUBAR	0.0956	0.0650	0.0536	0.0674	0.0825
DFAC	0.3768	0.3701	0.3577	0.3904	0.4002
EFFP	0.8856	0.9303	0.9490	0.9474	0.9441
EFF	0.8840	0.9294	0.9483	0.9467	0.9434
LOSS PARA	0.0226	0.0158	0.0134	0.0166	0.0202
INCID	3.77	4.38	3.43	7.20	6.63
DEV	2.900	3.849	4.669	9.097	11.181

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	45.15
UPSTREAM OF STATOR	45.15
DOWNSTREAM OF STATOR	42.89

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	44.949	45.493	45.931	49.391	51.741
BETA 3	-6.659	-6.304	-6.304	-6.304	-4.360
V 2	347.61	358.34	374.85	373.92	387.83
V 3	217.96	229.97	242.17	202.94	176.59
VZ 2	246.01	251.20	260.72	243.38	240.16
VZ 3	216.49	228.58	240.71	201.72	176.07
V-THETA 2	245.58	255.56	269.33	283.87	304.53
V-THETA 3	-25.27	-25.25	-26.59	-22.28	-13.42
M 2	0.3161	0.3263	0.3419	0.3411	0.3542
M 3	0.1971	0.2083	0.2195	0.1838	0.1597
TURN	51.608	51.797	52.235	55.695	56.101
UUBAR	0.1372	0.0739	0.0397	0.0800	0.1325
DFAC	0.6859	0.6535	0.6315	0.7250	0.7924
LOSS PARA	0.0547	0.0277	0.0139	0.0260	0.0399
INCID	-7.13	-6.65	-6.77	-4.61	-4.21
DEV	12.301	11.736	11.446	11.376	13.440

Table VII. (cont)

PERCENT DESIGN SPEED = 59.78

CORRECTED WEIGHT FLOW = 55.47

CORRECTED ROTOR SPEED = 5001.92

PRESSURE RATIO = 1.1290

ADIABATIC EFFICIENCY = 87.8907

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	44.172	44.358	45.235	49.566	51.305
BETA 3	-10.873	-6.659	-6.659	-8.442	-15.822
V 2	424.71	440.32	452.53	472.22	485.71
V 3	270.80	294.16	296.18	272.63	227.09
VZ 2	304.62	314.83	318.67	306.27	303.65
VZ 3	265.94	292.17	294.18	269.67	218.49
V-THETA 2	295.94	307.85	321.29	359.43	379.09
V-THETA 3	-51.08	-34.11	-34.34	-40.02	-61.92
M 2	0.3853	0.4001	0.4118	0.4302	0.4428
M 3	0.2433	0.2649	0.2669	0.2455	0.2041
TURN	55.046	51.016	51.893	58.008	67.127
UUBAR	0.1392	0.0558	0.0183	0.0820	0.1525
DFAC	0.6905	0.6246	0.6218	0.6993	0.8068
LOSS PARA	0.0549	0.0209	0.0064	0.0265	0.0443
INCID	-7.91	-7.78	-7.47	-4.43	-4.65
DEV	8.087	11.381	11.091	9.238	1.978

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	19.891	20.937	22.239	24.142	25.687
BETA 2	44.172	44.358	45.235	49.566	51.305
BETA(PR) 1	61.018	58.581	54.988	50.939	46.816
BETA(PR) 2	47.093	41.397	35.319	25.997	16.754
V 1	306.68	307.81	316.10	321.87	322.90
V 2	424.71	440.32	452.53	472.22	485.71
VZ 1	288.39	287.48	292.59	293.72	290.99
VZ 2	304.62	314.83	318.67	306.27	303.65
V-THETA 1	104.34	109.99	119.64	131.65	139.96
V-THETA 2	295.94	307.85	321.29	359.43	379.09
V(PR) 1	595.2	551.5	510.0	466.1	425.2
V(PR) 2	447.4	419.7	390.6	340.7	317.1
VTHETA PR1	520.7	470.6	417.7	361.9	310.0
VTHETA PR2	327.7	277.5	225.8	149.4	91.4
U 1	625.00	580.62	537.31	493.57	450.00
U 2	623.67	585.38	547.09	508.79	470.50
M 1	0.2820	0.2830	0.2908	0.2962	0.2971
M 2	0.3853	0.4001	0.4118	0.4302	0.4428
M(PR) 1	0.5473	0.5071	0.4691	0.4289	0.3913
M(PR) 2	0.4059	0.3814	0.3554	0.3104	0.2891
TURN(PR)	13.925	17.184	19.669	24.942	30.062
UUBAR	0.0399	0.0247	0.0347	0.0689	0.1237
DFAC	0.3625	0.3545	0.3496	0.3985	0.3881
EFFP	0.9488	0.9721	0.9647	0.9414	0.9125
EFF	0.9478	0.9715	0.9641	0.9403	0.9109
LOSS PARA	0.0096	0.0061	0.0087	0.0176	0.0308
INCID	1.42	1.68	1.29	1.14	1.82
DEV	1.993	2.597	4.519	5.297	8.054

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	55.47
UPSTREAM OF STATOR	55.47
DOWNSTREAM OF STATOR	52.84

Table VII. (cont)

PERCENT DESIGN SPEED = 69.78

CORRECTED WEIGHT FLOW = 66.35

CORRECTED ROTOR SPEED = 5838.77

PRESSURE RATIO = 1.1778

ADIABATIC EFFICIENCY = 90.0214

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	43.545	45.067	47.847	47.606	50.456
BETA 3	-7.014	-5.772	-5.418	-7.727	-12.418
V 2	511.41	522.72	545.97	567.62	579.68
V 3	342.73	348.45	348.61	320.54	270.14
VZ 2	370.69	369.19	366.41	382.71	369.07
VZ 3	340.16	346.68	347.06	317.63	263.82
V-THETA 2	352.33	370.05	404.76	419.20	447.01
V-THETA 3	-41.85	-35.04	-32.92	-43.10	-58.09
M 2	0.4593	0.4704	0.4924	0.5132	0.5247
M 3	0.3041	0.3097	0.3100	0.2848	0.2394
TURN	50.559	50.839	53.265	55.333	62.874
UUBAR	0.0986	0.0438	0.0468	0.1032	0.1555
DFAC	0.6394	0.6254	0.6433	0.7016	0.7972
LOSS PARA	0.0393	0.0164	0.0164	0.0335	0.0459
INCID	-8.53	-7.07	-4.85	-6.39	-5.49
DEV	11.946	12.268	12.332	9.953	5.382

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	19.188	20.829	22.377	24.319	25.291
BETA 2	43.545	45.067	47.847	47.606	50.456
BETA(PR) 1	60.128	58.093	54.622	50.044	46.321
BETA(PR) 2	45.904	40.893	33.214	25.229	16.224
V 1	373.27	368.47	376.21	387.85	385.91
V 2	511.41	522.72	545.97	567.62	579.68
VZ 1	352.53	344.39	347.88	353.43	348.92
VZ 2	370.69	369.19	366.41	382.71	369.07
V-THETA 1	122.69	131.02	143.22	159.72	164.87
V-THETA 2	352.33	370.05	404.76	419.20	447.01
V(PR) 1	707.8	651.6	600.9	550.4	505.2
V(PR) 2	532.7	488.4	438.0	423.1	384.4
VTHETA PR1	613.8	553.1	489.9	421.9	365.4
VTHETA PR2	382.6	319.7	239.9	180.3	107.4
U 1	736.46	684.17	633.13	581.59	530.25
U 2	734.90	689.77	644.65	599.53	554.41
M 1	0.3412	0.3367	0.3440	0.3549	0.3531
M 2	0.4593	0.4704	0.4924	0.5132	0.5247
M(PR) 1	0.6471	0.5955	0.5494	0.5036	0.4622
M(PR) 2	0.4784	0.4395	0.3950	0.3825	0.3479
TURN(PR)	14.225	17.200	21.408	24.815	30.097
UUBAR	0.0333	0.0174	0.0117	0.0181	0.0445
DFAC	0.3626	0.3687	0.3988	0.3560	0.3722
EFFP	0.9574	0.9806	0.9890	0.9849	0.9670
EFF	0.9563	0.9801	0.9887	0.9845	0.9662
LOSS PARA	0.0082	0.0043	0.0030	0.0047	0.0111
INCID	0.53	1.19	0.92	0.24	1.32
DEV	0.804	2.093	2.414	4.529	7.524

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	66.35
UPSTREAM OF STATOR	66.35
DOWNSTREAM OF STATOR	62.80

Table VII. (cont)

PERCENT DESIGN SPEED = 79.75

CORRECTED WEIGHT FLOW = 75.64

CORRECTED ROTOR SPEED = 6672.66

PRESSURE RATIO = 1.2285

ADIABATIC EFFICIENCY = 88.0794

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	44.014	45.054	46.631	47.621	50.337
BETA 3	-11.389	-9.666	-9.839	-9.666	-9.839
V 2	583.54	601.66	625.83	642.50	658.11
V 3	372.26	394.60	395.41	350.22	307.62
VZ 2	419.67	425.03	429.76	433.07	420.06
VZ 3	364.93	389.00	389.59	345.25	303.09
V-THETA 2	405.46	425.84	454.94	474.62	506.62
V-THETA 3	-73.51	-66.25	-67.56	-58.80	-52.56
M 2	0.5230	0.5410	0.5643	0.5806	0.5957
M 3	0.3282	0.3487	0.3497	0.3092	0.2710
TURN	55.403	54.720	56.469	57.286	60.175
UUBAR	0.1426	0.0676	0.0577	0.1096	0.1416
DFAC	0.6917	0.6523	0.6618	0.7264	0.7893
LOSS PARA	0.0561	0.0251	0.0200	0.0353	0.0421
INCID	-8.07	-7.09	-6.07	-6.38	-5.61
DEV	7.571	8.374	7.911	8.014	7.961

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	19.409	21.181	22.435	24.434	24.948
BETA 2	44.014	45.054	46.631	47.621	50.337
BETA(PR) 1	60.002	57.107	53.973	50.129	45.923
BETA(PR) 2	46.024	40.497	33.297	25.975	16.871
V 1	428.36	433.92	438.12	442.32	446.47
V 2	583.54	601.66	625.83	642.50	658.11
VZ 1	404.02	404.61	404.96	402.70	404.81
VZ 2	419.67	425.03	429.76	433.07	420.06
V-THETA 1	142.35	156.79	167.20	182.96	188.31
V-THETA 2	405.46	425.84	454.94	474.62	506.62
V(PR) 1	808.1	745.0	688.5	628.2	581.9
V(PR) 2	604.4	558.9	514.2	481.7	438.9
VTHETA PR1	699.9	625.6	556.8	482.1	418.1
VTHETA PR2	434.9	363.0	282.3	211.0	127.4
U 1	842.20	782.39	724.03	665.09	606.38
U 2	840.41	788.81	737.21	685.61	634.00
M 1	0.3928	0.3980	0.4020	0.4060	0.4099
M 2	0.5230	0.5410	0.5643	0.5806	0.5957
M(PR) 1	0.7410	0.6834	0.6318	0.5766	0.5343
M(PR) 2	0.5417	0.5026	0.4636	0.4353	0.3973
TURN(PR)	13.978	16.611	20.677	24.154	29.052
UUBAR	0.0253	0.0085	0.0034	0.0127	0.0542
DFAC	0.3677	0.3661	0.3756	0.3558	0.3758
EFFP	0.9686	0.9911	0.9975	0.9897	0.9588
EFF	0.9675	0.9908	0.9975	0.9893	0.9576
LOSS PARA	0.0062	0.0021	0.0009	0.0032	0.0135
INCID	0.40	0.21	0.27	0.33	0.92
DEV	0.924	1.697	2.497	5.275	8.171

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	75.64
UPSTREAM OF STATOR	75.64
DOWNSTREAM OF STATOR	71.43

Table VII. (cont)

PERCENT DESIGN SPEED = 79.88

CORRECTED WEIGHT FLOW = 75.74

CORRECTED ROTOR SPEED = 6683.74

PRESSURE RATIO = 1.2274

ADIABATIC EFFICIENCY = 89.4422

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	44.064	45.869	48.133	49.584	50.973
BETA 3	-7.549	-3.482	-3.833	-5.242	-15.653
V 2	586.91	606.06	630.75	646.20	662.12
V 3	371.65	391.53	397.88	354.25	310.73
VZ 2	421.73	422.00	420.96	418.96	416.93
VZ 3	368.43	390.81	396.99	352.77	299.21
V-THETA 2	408.18	434.99	469.72	491.99	514.37
V-THETA 3	-48.82	-23.78	-26.59	-32.36	-83.84
M 2	0.5214	0.5402	0.5639	0.5790	0.5943
M 3	0.3249	0.3431	0.3490	0.3101	0.2715
TURN	51.613	49.350	51.966	54.825	66.626
UUBAR	0.1545	0.0867	0.0634	0.1061	0.1380
DFAC	0.6795	0.6392	0.6459	0.7171	0.8037
LOSS PARA	0.0615	0.0326	0.0222	0.0345	0.0401
INCID	-8.02	-6.27	-4.57	-4.42	-4.98
DEV	11.411	14.558	13.917	12.438	2.147

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	18.430	20.051	21.836	23.714	23.798
BETA 2	44.064	45.869	48.133	49.584	50.973
BETA(PR) 1	60.175	57.359	54.360	50.393	46.346
BETA(PR) 2	46.287	40.636	33.183	25.615	16.858
V 1	431.81	436.98	439.03	445.53	449.75
V 2	586.91	606.06	630.75	646.20	662.12
VZ 1	409.67	410.49	407.54	407.91	411.51
VZ 2	421.73	422.00	420.96	418.96	416.93
V-THETA 1	136.52	149.82	163.30	179.18	181.48
V-THETA 2	408.18	434.99	469.72	491.99	514.37
V(PR) 1	823.7	761.0	699.4	639.8	596.1
V(PR) 2	610.3	556.1	503.0	464.6	435.7
VTHETA PR1	714.6	640.8	568.4	492.9	431.3
VTHETA PR2	441.1	362.2	275.3	200.9	126.3
U 1	851.11	790.67	731.69	672.13	612.80
U 2	849.30	797.15	745.00	692.86	640.71
M 1	0.3924	0.3973	0.3992	0.4053	0.4093
M 2	0.5214	0.5402	0.5639	0.5790	0.5943
M(PR) 1	0.7486	0.6919	0.6360	0.5821	0.5425
M(PR) 2	0.5422	0.4956	0.4497	0.4163	0.3911
TURN(PR)	13.887	16.723	21.177	24.778	29.488
UUBAR	0.0177	0.0029	-0.0166	-0.0047	0.0281
DFAC	0.3762	0.3902	0.4094	0.4035	0.4024
EFFP	0.9778	0.9976	1.0184	1.0053	0.9781
EFF	0.9770	0.9975	1.0190	1.0055	0.9774
LOSS PARA	0.0043	0.0007	-0.0043	-0.0012	0.0070
INCID	0.57	0.46	0.66	0.59	1.35
DEV	1.187	1.836	2.383	4.915	8.158

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	75.74
UPSTREAM OF STATOR	75.74
DOWNSTREAM OF STATOR	71.58

Table VII. (cont)

PERCENT DESIGN SPEED = 79.80

CORRECTED WEIGHT FLOW = 72.48

CORRECTED ROTOR SPEED = 6676.71

PRESSURE RATIO = 1.2444

ADIABATIC EFFICIENCY = 88.4282

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	45.981	48.307	49.699	52.073	52.710
BETA 3	-10.529	-3.482	-3.482	-6.659	-15.653
V 2	580.93	600.29	619.27	639.76	657.23
V 3	350.89	384.41	378.95	337.79	297.92
VZ 2	403.68	399.28	400.55	393.23	398.18
VZ 3	344.98	383.70	378.25	335.51	286.87
V-THETA 2	417.76	448.25	472.29	504.64	522.88
V-THETA 3	-64.12	-23.34	-23.01	-39.17	-80.38
M 2	0.5140	0.5332	0.5516	0.5713	0.5881
M 3	0.3052	0.3353	0.3310	0.2946	0.2594
TURN	56.510	51.789	53.180	58.732	68.363
UUBAR	0.1583	0.0674	0.0492	0.1024	0.1294
DFAC	0.7291	0.6556	0.6693	0.7500	0.8240
LOSS PARA	0.0625	0.0254	0.0173	0.0333	0.0376
INCID	-6.10	-3.83	-3.00	-1.93	-3.24
DEV	8.431	14.558	14.268	11.021	2.147

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	18.863	20.472	22.266	23.629	24.568
BETA 2	45.981	48.307	49.699	52.073	52.710
BETA(PR) 1	61.666	58.794	55.802	52.202	47.971
BETA(PR) 2	46.893	41.129	34.227	25.554	16.459
V 1	409.40	416.83	420.20	424.74	429.96
V 2	580.93	600.29	619.27	639.76	657.23
VZ 1	387.41	390.51	388.87	389.13	391.04
VZ 2	403.68	399.28	400.55	393.23	398.18
V-THETA 1	132.36	145.78	159.22	170.24	178.77
V-THETA 2	417.76	448.25	472.29	504.64	522.88
V(PR) 1	816.3	753.7	691.9	634.9	584.1
V(PR) 2	590.7	530.1	484.4	435.9	415.2
VTHETA PR1	718.5	644.6	572.3	501.7	433.8
VTHETA PR2	431.3	348.7	272.5	188.0	117.6
U 1	850.85	790.43	731.47	671.93	612.61
U 2	849.04	796.91	744.78	692.65	640.52
M 1	0.3712	0.3781	0.3813	0.3855	0.3904
M 2	0.5140	0.5332	0.5516	0.5713	0.5881
M(PR) 1	0.7401	0.6837	0.6278	0.5763	0.5303
M(PR) 2	0.5227	0.4709	0.4315	0.3893	0.3716
TURN(PR)	14.773	17.665	21.575	26.648	31.512
UUBAR	0.0274	0.0023	-0.0012	-0.0029	0.0264
DFAC	0.4004	0.4263	0.4327	0.4539	0.4301
EFFP	0.9681	0.9984	1.0022	1.0035	0.9813
EFF	0.9669	0.9983	1.0023	1.0036	0.9807
LOSS PARA	0.0066	0.0006	-0.0003	-0.0007	0.0066
INCID	2.07	1.89	2.10	2.40	2.97
DEV	1.793	2.329	3.427	4.854	7.759

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	72.48
UPSTREAM OF STATOR	72.48
DOWNSTREAM OF STATOR	68.34

Table VII. (cont)

PERCENT DESIGN SPEED = 79.81

CORRECTED WEIGHT FLOW = 68.89

CORRECTED ROTOR SPEED = 6677.48

PRESSURE RATIO = 1.2567

ADIABATIC EFFICIENCY = 86.0580

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	49.003	50.280	52.595	53.751	54.619
BETA 3	-4.184	-5.242	-4.360	-6.659	-13.614
V 2	571.96	593.84	608.76	623.14	646.02
V 3	335.62	378.53	372.40	333.66	293.47
VZ 2	375.21	379.49	369.79	368.46	374.05
VZ 3	334.73	376.94	371.32	331.41	285.23
V-THETA 2	431.68	456.76	483.58	502.54	526.71
V-THETA 3	-24.49	-34.58	-28.31	-38.69	-69.08
M 2	0.5037	0.5250	0.5398	0.5539	0.5755
M 3	0.2901	0.3290	0.3240	0.2902	0.2547
TURN	53.187	55.521	56.955	60.410	68.233
UUBAR	0.1856	0.0845	0.0567	0.0880	0.1318
DFAC	0.7335	0.6743	0.6839	0.7486	0.8243
LOSS PARA	0.0743	0.0317	0.0199	0.0286	0.0387
INCID	-3.08	-1.86	-0.11	-0.25	-1.33
DEV	14.776	12.798	13.390	11.021	4.186

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	18.609	20.640	22.516	23.629	24.483
BETA 2	49.003	50.280	52.595	53.751	54.619
BETA(PR) 1	63.352	60.711	57.795	54.402	50.515
BETA(PR) 2	48.105	41.941	35.316	27.381	17.016
V 1	385.80	391.54	395.89	400.23	403.72
V 2	571.96	593.84	608.76	623.14	646.02
VZ 1	365.63	366.41	365.71	366.68	367.42
VZ 2	375.21	379.49	369.79	368.46	374.05
V-THETA 1	123.11	138.02	151.60	160.42	167.31
V-THETA 2	431.68	456.76	483.58	502.54	526.71
V(PR) 1	815.2	749.0	686.2	629.9	577.8
V(PR) 2	561.9	510.2	453.2	414.9	391.2
VTHETA PR1	728.6	653.2	580.6	512.2	445.9
VTHETA PR2	418.2	341.0	262.0	190.8	114.5
U 1	851.74	791.26	732.24	672.63	613.25
U 2	849.93	797.75	745.56	693.37	641.19
M 1	0.3489	0.3543	0.3583	0.3623	0.3656
M 2	0.5037	0.5250	0.5398	0.5539	0.5755
M(PR) 1	0.7373	0.6777	0.6210	0.5703	0.5232
M(PR) 2	0.4948	0.4511	0.4019	0.3689	0.3485
TURN(PR)	15.248	18.771	22.479	27.022	33.498
UUBAR	0.0550	0.0253	0.0184	0.0266	0.0507
DFAC	0.4450	0.4564	0.4820	0.4862	0.4724
EFFP	0.9399	0.9755	0.9844	0.9798	0.9665
EFF	0.9376	0.9746	0.9838	0.9791	0.9653
LOSS PARA	0.0130	0.0062	0.0046	0.0067	0.0126
INCID	3.75	3.81	4.10	4.60	5.51
DEV	3.005	3.141	4.516	6.681	8.316

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	68.89
UPSTREAM OF STATOR	68.89
DOWNSTREAM OF STATOR	65.05

Table VIII.

Blade element performance—slotted stator stage.

PERCENT DESIGN SPEED = 59.88

CORRECTED WEIGHT FLOW = 64.49

CORRECTED ROTOR SPEED = 5010.12

PRESSURE RATIO = 1.0921

ADIABATIC EFFICIENCY = 82.7218

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	20.355	23.332	25.029	26.651	26.908
BETA 2	35.421	37.318	39.958	43.382	44.923
BETA(PR) 1	56.477	52.659	48.925	44.909	40.166
BETA(PR) 2	47.523	41.589	33.444	25.203	16.267
V 1	363.51	372.21	376.70	377.86	382.87
V 2	435.17	457.51	488.47	507.08	528.58
VZ 1	340.81	341.77	341.33	337.71	341.42
VZ 2	354.63	363.85	374.43	368.55	374.27
V-THETA 1	126.44	147.41	159.37	169.49	173.27
V-THETA 2	252.22	277.36	313.71	348.29	373.26
V(PR) 1	617.1	563.5	519.5	476.8	446.8
V(PR) 2	525.1	486.5	448.7	407.3	389.9
VTHETA PR1	514.5	448.0	391.6	336.6	288.2
VTHETA PR2	387.3	322.9	247.3	173.4	109.2
U 1	640.91	595.39	550.98	506.13	461.45
U 2	639.54	600.28	561.01	521.74	482.47
M 1	0.3274	0.3354	0.3395	0.3406	0.3452
M 2	0.3874	0.4082	0.4367	0.4536	0.4733
M(PR) 1	0.5557	0.5077	0.4682	0.4298	0.4028
M(PR) 2	0.4675	0.4340	0.4012	0.3644	0.3491
TURN(PR)	8.954	11.070	15.481	19.706	23.899
UUBAR	0.0900	0.0754	0.0488	0.0805	0.1071
DFAC	0.2217	0.2099	0.2214	0.2430	0.2317
EFFP	0.8444	0.8856	0.9381	0.9168	0.9058
EFF	0.8424	0.8840	0.9372	0.9155	0.9043
LOSS PARA	0.0214	0.0186	0.0125	0.0207	0.0268
INCID	-3.12	-4.24	-4.78	-4.89	-4.83
DEV	2.423	2.789	2.644	4.503	7.567

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	35.421	37.318	39.958	43.382	44.923
BETA 3	-1.244	-1.932	0.476	0.992	-8.296
V 2	435.17	457.51	488.47	507.08	528.58
V 3	346.57	355.36	371.19	362.33	355.44
VZ 2	354.63	363.85	374.43	368.55	374.27
VZ 3	346.49	355.16	371.18	362.28	351.72
V-THETA 2	252.22	277.36	313.71	348.29	373.26
V-THETA 3	-7.52	-11.98	3.08	6.27	-51.29
M 2	0.3874	0.4082	0.4367	0.4536	0.4733
M 3	0.3070	0.3151	0.3294	0.3213	0.3147
TURN	36.665	39.250	39.482	42.390	53.219
UUBAR	0.0929	0.0744	0.0763	0.1035	0.1365
DFAC	0.4433	0.4616	0.4637	0.5060	0.5702
LOSS PARA	0.0373	0.0280	0.0268	0.0338	0.0408
INCID	-16.66	-14.82	-12.74	-10.62	-11.03
DEV	17.716	16.108	18.226	18.672	9.504

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	64.49
UPSTREAM OF STATOR	64.49
DOWNSTREAM OF STATOR	61.05

Table VIII. (cont)

PERCENT DESIGN SPEED = 59.96

CORRECTED WEIGHT FLOW = 60.66

CORRECTED ROTOR SPEED = 5017.08

PRESSURE RATIO = 1.1103

ADIABATIC EFFICIENCY = 87.1303

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	39.598	42.172	44.743	46.893	47.756
BETA 3	-1.760	-2.620	-1.760	-1.760	-8.640
V 2	445.26	461.08	487.68	505.36	519.72
V 3	348.16	339.77	349.08	339.49	333.69
VZ 2	343.08	341.72	346.39	345.34	349.40
VZ 3	348.00	339.41	348.91	339.33	329.90
V-THETA 2	283.81	309.55	343.29	368.95	384.75
V-THETA 3	-10.69	-15.53	-10.72	-10.43	-50.13
M 2	0.3874	0.4022	0.4260	0.4418	0.4552
M 3	0.3015	0.2942	0.3024	0.2938	0.2886
TURN	41.358	44.792	46.503	48.653	56.396
UUBAR	0.0831	0.0868	0.0838	0.1002	0.1009
DFAC	0.4837	0.5288	0.5395	0.5737	0.6107
LOSS PARA	0.0334	0.0327	0.0294	0.0328	0.0301
INCID	-12.48	-9.97	-7.96	-7.11	-8.19
DEV	17.200	15.420	15.990	15.920	9.160

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	21.928	22.788	24.229	25.219	26.040
BETA 2	39.598	42.172	44.743	46.893	47.756
BETA(PR) 1	58.638	55.259	52.562	48.187	43.863
BETA(PR) 2	47.149	41.653	33.593	25.441	17.230
V 1	345.58	354.46	351.62	359.86	362.08
V 2	445.26	461.08	487.68	505.36	519.72
VZ 1	320.58	326.80	320.65	325.56	325.33
VZ 2	343.08	341.72	346.39	345.34	349.40
V-THETA 1	129.05	137.29	144.30	153.33	158.95
V-THETA 2	283.81	309.55	343.29	368.95	384.75
V(PR) 1	616.0	573.5	527.5	488.3	451.2
V(PR) 2	504.5	457.3	415.8	382.4	365.8
VTHETA PR1	526.0	471.2	418.8	364.0	312.7
VTHETA PR2	369.8	304.0	230.1	164.3	108.4
U 1	655.03	608.52	563.12	517.28	471.62
U 2	653.64	613.50	573.37	533.24	493.10
M 1	0.3045	0.3125	0.3099	0.3173	0.3193
M 2	0.3874	0.4022	0.4260	0.4418	0.4552
M(PR) 1	0.5427	0.5055	0.4649	0.4306	0.3979
M(PR) 2	0.4390	0.3990	0.3632	0.3343	0.3204
TURN(PR)	11.489	13.606	18.969	22.746	26.633
UUBAR	0.0623	0.0294	0.0239	0.0675	0.0357
DFAC	0.2704	0.2988	0.3214	0.3330	0.3072
EFFP	0.9112	0.9607	0.9740	0.9363	0.9702
EFF	0.9097	0.9601	0.9736	0.9352	0.9697
LOSS PARA	0.0149	0.0072	0.0061	0.0173	0.0089
INCID	-0.96	-1.64	-1.14	-1.61	-1.14
DEV	2.049	2.853	2.793	4.741	8.530

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	60.66
UPSTREAM OF STATOR	60.66
DOWNSTREAM OF STATOR	57.07

Table VIII. (cont)

PERCENT DESIGN SPEED = 59.97

CORRECTED WEIGHT FLOW = 57.37

CORRECTED ROTOR SPEED = 5017.35

PRESSURE RATIO = 1.1228

ADIABATIC EFFICIENCY = 88.1473

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	22.006	23.572	23.377	25.219	24.887
BETA 2	43.902	45.188	46.912	49.056	50.349
BETA(PR) 1	60.799	57.796	54.068	50.155	51.658
BETA(PR) 2	47.094	42.164	34.007	25.483	16.695
V 1	321.80	327.69	338.22	342.20	300.54
V 2	444.63	454.79	480.88	498.95	512.44
VZ 1	298.35	300.35	310.46	309.58	272.63
VZ 2	320.37	320.53	328.50	326.97	326.99
V-THETA 1	120.58	131.04	134.20	145.81	126.47
V-THETA 2	308.32	322.64	351.19	376.88	394.55
V(PR) 1	611.5	563.6	529.0	483.2	439.5
V(PR) 2	470.6	432.4	396.3	362.2	341.4
VTHETA PR1	533.8	476.9	428.4	371.0	344.7
VTHETA PR2	344.7	290.3	221.6	155.8	98.1
U 1	654.39	607.92	562.58	516.78	471.16
U 2	653.00	612.91	572.81	532.72	492.63
M 1	0.2835	0.2888	0.2982	0.3018	0.2645
M 2	0.3862	0.3960	0.4196	0.4361	0.4479
M(PR) 1	0.5387	0.4966	0.4665	0.4261	0.3868
M(PR) 2	0.4087	0.3765	0.3458	0.3166	0.2984
TURN(PR)	13.705	15.633	20.061	24.672	34.963
UUBAR	0.0905	0.0606	0.0381	0.0282	-0.0321
DFAC	0.3396	0.3420	0.3709	0.3769	0.3693
EFFP	0.8889	0.9310	0.9610	0.9756	1.0238
EFF	0.8868	0.9297	0.9602	0.9752	1.0243
LOSS PARA	0.0217	0.0148	0.0097	0.0072	-0.0080
INCID	1.20	0.90	0.37	0.35	6.66
DEV	1.994	3.364	3.207	4.783	7.995

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	57.37
UPSTREAM OF STATOR	57.37
DOWNSTREAM OF STATOR	53.67

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	43.902	45.188	46.912	49.056	50.349
BETA 3	-1.760	-3.480	-2.620	-1.760	-6.920
V 2	444.63	454.79	480.88	498.95	512.44
V 3	338.13	321.39	328.00	322.14	305.12
VZ 2	320.37	320.53	328.50	326.97	326.99
VZ 3	337.97	320.79	327.66	321.99	302.90
V-THETA 2	308.32	322.64	351.19	376.88	394.55
V-THETA 3	-10.38	-19.51	-14.99	-9.89	-36.76
M 2	0.3862	0.3960	0.4196	0.4361	0.4479
M 3	0.2922	0.2778	0.2837	0.2786	0.2636
TURN	45.662	48.668	49.532	50.816	57.269
UUBAR	0.0676	0.0733	0.0795	0.0889	0.1111
DFAC	0.5274	0.5768	0.5857	0.6079	0.6589
LOSS PARA	0.0271	0.0276	0.0279	0.0291	0.0333
INCID	-8.18	-6.95	-5.79	-4.94	-5.60
DEV	17.200	14.560	15.130	15.920	10.880

Table VIII. (cont)

PERCENT DESIGN SPEED = 59.93

CORRECTED WEIGHT FLOW = 52.89

CORRECTED ROTOR SPEED = 5014.48

PRESSURE RATIO = 1.1404

ADIABATIC EFFICIENCY = 90.0561

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	48.737	51.224	53.973	55.089	55.691
BETA 3	-1.508	-3.824	-3.996	-3.652	-8.124
V 2	449.40	459.49	476.51	490.87	506.11
V 3	333.55	314.60	306.24	295.77	276.06
VZ 2	296.39	287.77	280.26	280.92	285.28
VZ 3	333.42	313.90	305.49	295.17	273.29
V-THETA 2	337.80	358.22	385.37	402.53	418.05
V-THETA 3	-9.24	-20.98	-21.34	-18.84	-39.01
M 2	0.3880	0.3977	0.4129	0.4260	0.4398
M 3	0.2860	0.2701	0.2629	0.2539	0.2368
TURN	50.325	55.048	57.969	58.741	63.815
UUBAR	0.0522	0.0642	0.0789	0.0890	0.1211
DFAC	0.5679	0.6263	0.6574	0.6782	0.7274
LOSS PARA	0.0210	0.0241	0.0277	0.0291	0.0362
INCID	-3.34	-0.92	1.27	1.09	-0.26
DEV	17.372	14.216	13.754	14.028	9.676

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.989
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	22.433	23.694	25.300	26.685	27.423
BETA 2	48.737	51.224	53.973	55.089	55.691
BETA(PR) 1	63.172	60.055	57.049	53.469	49.535
BETA(PR) 2	46.991	41.776	34.088	25.211	15.009
V 1	297.36	306.46	309.95	313.43	315.13
V 2	449.40	459.49	476.51	490.87	506.11
VZ 1	274.86	280.63	280.22	280.05	279.72
VZ 2	296.39	287.77	280.26	280.92	285.28
V-THETA 1	113.47	123.15	132.46	140.76	145.14
V-THETA 2	337.80	358.22	385.37	402.53	418.05
V(PR) 1	609.0	562.2	515.2	470.5	431.0
V(PR) 2	434.5	385.9	338.4	310.5	295.4
VTHETA PR1	543.5	487.1	432.3	378.0	327.9
VTHETA PR2	317.7	257.1	189.7	132.3	76.5
U 1	656.94	610.29	564.76	518.79	473.00
U 2	655.54	615.29	575.04	534.79	494.54
M 1	0.2605	0.2686	0.2717	0.2748	0.2763
M 2	0.3880	0.3977	0.4129	0.4260	0.4398
M(PR) 1	0.5335	0.4927	0.4515	0.4124	0.3778
M(PR) 2	0.3751	0.3340	0.2933	0.2695	0.2566
TURN(PR)	16.181	18.279	22.961	28.258	34.521
UUBAR	0.0717	0.0343	0.0486	0.0482	0.0668
DFAC	0.4172	0.4487	0.4876	0.4884	0.4666
EFFP	0.9207	0.9649	0.9574	0.9637	0.9572
EFF	0.9190	0.9642	0.9565	0.9630	0.9563
LOSS PARA	0.0172	0.0084	0.0124	0.0124	0.0168
INCID	3.57	3.15	3.35	3.67	4.53
DEV	1.891	2.976	3.288	4.511	6.309

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	52.89
UPSTREAM OF STATOR	52.89
DOWNSTREAM OF STATOR	49.15

Table VIII. (cont)

PERCENT DESIGN SPEED = 59.73

CORRECTED WEIGHT FLOW = 52.65

CORRECTED ROTOR SPEED = 4997.78

PRESSURE RATIO = 1.1431

ADIABATIC EFFICIENCY = 91.5683

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	48.466	48.979	54.115	55.832	57.208
BETA 3	-1.588	-3.996	-3.480	-4.340	-8.640
V 2	444.94	460.35	475.89	489.48	501.80
V 3	326.16	306.29	299.88	288.50	272.44
VZ 2	295.02	302.15	278.95	274.90	271.77
VZ 3	326.03	305.54	299.32	287.67	269.35
V-THETA 2	333.07	347.32	385.57	404.99	421.83
V-THETA 3	-9.04	-21.34	-18.20	-21.83	-40.93
M 2	0.3867	0.4012	0.4154	0.4281	0.4392
M 3	0.2815	0.2648	0.2592	0.2494	0.2354
TURN	50.054	52.975	57.595	60.172	65.848
UUBAR	0.0444	0.0796	0.0800	0.0871	0.0979
DFAC	0.5758	0.6364	0.6682	0.6957	0.7357
LOSS PARA	0.0178	0.0299	0.0281	0.0284	0.0293
INCID	-3.61	-3.16	1.41	1.83	1.26
DEV	17.372	14.044	14.270	13.340	9.160

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	20.362	22.576	24.538	25.989	27.587
BETA 2	48.466	48.979	54.115	55.832	57.208
BETA(PR) 1	62.874	60.038	56.604	53.587	49.280
BETA(PR) 2	46.931	40.879	33.332	24.314	13.955
V 1	298.48	304.13	311.32	309.85	313.53
V 2	444.94	460.35	475.89	489.48	501.80
VZ 1	279.82	280.83	283.20	278.52	277.89
VZ 2	295.02	302.15	278.95	274.90	271.77
V-THETA 1	103.85	116.76	129.29	135.78	145.20
V-THETA 2	333.07	347.32	385.57	404.99	421.83
V(PR) 1	613.7	562.3	514.5	469.2	426.0
V(PR) 2	432.0	399.6	333.9	301.7	280.0
VTHETA PR1	546.2	487.1	429.6	377.6	322.9
VTHETA PR2	315.6	261.5	183.5	124.2	67.5
U 1	650.07	603.91	558.86	513.36	468.05
U 2	648.69	608.86	569.03	529.20	489.37
M 1	0.2634	0.2684	0.2749	0.2736	0.2769
M 2	0.3867	0.4012	0.4154	0.4281	0.4392
M(PR) 1	0.5415	0.4963	0.4543	0.4142	0.3761
M(PR) 2	0.3754	0.3483	0.2915	0.2638	0.2451
TURN(PR)	15.943	19.158	23.272	29.273	35.325
UUBAR	0.0874	0.0351	0.0345	-0.0010	0.0408
DFAC	0.4285	0.4217	0.4978	0.5105	0.4987
EFFP	0.9025	0.9646	0.9699	1.0018	0.9744
EFF	0.9004	0.9638	0.9692	1.0018	0.9739
LOSS PARA	0.0210	0.0088	0.0088	-0.0002	0.0103
INCID	3.27	3.14	2.90	3.79	4.28
DEV	1.831	2.079	2.532	3.614	5.255

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	52.65
UPSTREAM OF STATOR	52.65
DOWNSTREAM OF STATOR	48.85

Table VIII. (cont)

PERCENT DESIGN SPEED = 79.79

CORRECTED WEIGHT FLOW = 83.60

CORRECTED ROTOR SPEED = 6675.84

PRESSURE RATIO = 1.1662

ADIABATIC EFFICIENCY = 83.6369

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	37.896	38.758	43.527	45.228	46.931
BETA 3	-2.620	-4.168	-4.168	-4.340	-9.844
V 2	586.59	618.24	654.74	686.70	700.64
V 3	475.33	484.64	508.62	498.00	473.17
VZ 2	462.90	482.10	474.72	483.64	478.45
VZ 3	474.84	483.36	507.27	496.57	466.21
V-THETA 2	360.30	387.04	450.91	487.49	511.84
V-THETA 3	-21.73	-35.22	-36.97	-37.69	-80.90
M 2	0.5223	0.5529	0.5871	0.6172	0.6302
M 3	0.4197	0.4287	0.4504	0.4405	0.4170
TURN	40.516	42.926	47.695	49.568	56.775
UUBAR	0.1002	0.0978	0.0802	0.1323	0.1617
DFAC	0.4512	0.4734	0.4852	0.5249	0.5802
LOSS PARA	0.0402	0.0368	0.0281	0.0431	0.0481
INCID	-14.18	-13.38	-9.17	-8.77	-9.02
DEV	16.340	13.872	13.582	13.340	7.956

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	21.184	22.167	23.879	25.637	24.956
BETA 2	37.896	38.758	43.527	45.228	46.931
BETA(PR) 1	56.081	52.677	48.868	44.199	40.764
BETA(PR) 2	46.748	40.584	32.011	23.256	15.331
V 1	488.66	498.45	505.79	515.17	511.00
V 2	586.59	618.24	654.74	686.70	700.64
VZ 1	455.64	461.61	462.50	464.46	463.29
VZ 2	462.90	482.10	474.72	483.64	478.45
V-THETA 1	176.59	188.07	204.75	222.90	215.60
V-THETA 2	360.30	387.04	450.91	487.49	511.84
V(PR) 1	816.5	761.3	703.1	647.8	611.7
V(PR) 2	675.6	634.8	559.8	526.4	496.1
VTHETA PR1	677.6	605.4	529.6	451.6	399.4
VTHETA PR2	492.0	413.0	296.8	207.8	131.2
U 1	854.16	793.50	734.31	674.54	615.00
U 2	852.34	800.01	747.68	695.34	643.01
M 1	0.4438	0.4531	0.4600	0.4689	0.4650
M 2	0.5223	0.5529	0.5871	0.6172	0.6302
M(PR) 1	0.7416	0.6920	0.6395	0.5897	0.5566
M(PR) 2	0.6015	0.5677	0.5020	0.4731	0.4463
TURN(PR)	9.333	12.093	16.857	20.943	25.433
UUBAR	0.0810	0.0393	0.0357	0.0441	0.0688
DFAC	0.2528	0.2496	0.3053	0.2944	0.3031
EFFP	0.8687	0.9413	0.9556	0.9541	0.9364
EFF	0.8655	0.9399	0.9545	0.9528	0.9346
LOSS PARA	0.0196	0.0099	0.0093	0.0115	0.0173
INCID	-3.52	-4.22	-4.83	-5.60	-4.24
DEV	1.648	1.784	1.211	2.556	6.631

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	83.60
UPSTREAM OF STATOR	83.60
DOWNSTREAM OF STATOR	80.38

Table VIII. (cont)

PERCENT DESIGN SPEED = 79.93

CORRECTED WEIGHT FLOW = 79.74

CORRECTED ROTOR SPEED = 6687.48

PRESSURE RATIO = 1.2024

ADIABATIC EFFICIENCY = 88.7598

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	41.748	43.022	45.169	47.329	48.184
BETA 3	-1.760	-3.480	-2.620	-1.760	-11.220
V 2	599.58	621.20	651.39	681.84	693.13
V 3	463.85	458.36	468.07	454.88	438.81
VZ 2	447.33	454.15	459.24	462.14	462.14
VZ 3	463.63	457.52	467.58	454.66	430.42
V-THETA 2	399.23	423.83	461.96	501.33	516.58
V-THETA 3	-14.25	-27.82	-21.40	-13.97	-85.38
M 2	0.5212	0.5421	0.5703	0.5980	0.6084
M 3	0.3994	0.3950	0.4036	0.3918	0.3775
TURN	43.508	46.502	47.789	49.089	59.404
UUBAR	0.0900	0.0845	0.0784	0.1144	0.1104
DFAC	0.5033	0.5361	0.5424	0.5800	0.6293
LOSS PARA	0.0361	0.0318	0.0275	0.0374	0.0327
INCID	-10.33	-9.12	-7.53	-6.67	-7.77
DEV	17.200	14.560	15.130	15.920	6.580

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	20.944	22.400	24.238	26.040	28.711
BETA 2	41.748	43.022	45.169	47.329	48.184
BETA(PR) 1	58.426	54.918	51.108	47.020	42.022
BETA(PR) 2	46.493	40.887	33.298	24.317	16.868
V 1	464.75	477.43	486.70	490.96	494.29
V 2	599.58	621.20	651.39	681.84	693.13
VZ 1	434.04	441.40	443.79	441.12	433.52
VZ 2	447.33	454.15	459.24	462.14	462.14
V-THETA 1	166.12	181.93	199.81	215.53	237.45
V-THETA 2	399.23	423.83	461.96	501.33	516.58
V(PR) 1	828.9	768.0	706.8	647.1	583.6
V(PR) 2	649.8	600.7	549.4	507.1	482.9
VTHETA PR1	706.2	628.5	550.2	473.4	390.6
VTHETA PR2	471.3	393.2	301.6	208.8	140.1
U 1	872.36	810.41	749.96	688.91	628.10
U 2	870.50	817.05	763.60	710.15	656.71
M 1	0.4130	0.4246	0.4332	0.4371	0.4402
M 2	0.5212	0.5421	0.5703	0.5980	0.6084
M(PR) 1	0.7366	0.6831	0.6291	0.5761	0.5197
M(PR) 2	0.5648	0.5242	0.4810	0.4448	0.4239
TURN(PR)	11.933	14.031	17.810	22.703	25.154
UUBAR	0.0514	0.0316	0.0195	0.0410	0.1084
DFAC	0.3161	0.3189	0.3305	0.3324	0.2843
EFFP	0.9300	0.9605	0.9791	0.9632	0.9181
EFF	0.9280	0.9593	0.9785	0.9620	0.9158
LOSS PARA	0.0125	0.0079	0.0050	0.0106	0.0270
INCID	-1.17	-1.98	-2.59	-2.78	-2.98
DEV	1.393	2.087	2.498	3.617	8.168

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	79.74
UPSTREAM OF STATOR	79.74
DOWNSTREAM OF STATOR	76.23

Table VIII. (cont)

PERCENT DESIGN SPEED = 79.94

CORRECTED WEIGHT FLOW = 74.77

CORRECTED ROTOR SPEED = 6688.31

PRESSURE RATIO = 1.2364

ADIABATIC EFFICIENCY = 89.6969

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	45.568	46.420	50.688	52.400	54.115
BETA 3	-1.760	-4.340	-2.620	-1.760	-8.640
V 2	596.54	615.08	633.81	649.08	670.41
V 3	447.49	419.19	411.59	398.49	374.05
VZ 2	417.61	424.02	401.55	396.03	392.97
VZ 3	447.27	417.99	411.16	398.31	369.80
V-THETA 2	425.98	445.57	490.38	514.26	543.16
V-THETA 3	-13.74	-31.72	-18.81	-12.24	-56.19
M 2	0.5173	0.5351	0.5530	0.5675	0.5871
M 3	0.3836	0.3595	0.3531	0.3418	0.3204
TURN	47.328	50.760	53.308	54.160	62.755
UUBAR	0.0594	0.0924	0.0821	0.0739	0.1072
DFAC	0.5459	0.6109	0.6331	0.6513	0.7122
LOSS PARA	0.0238	0.0347	0.0288	0.0242	0.0320
INCID	-6.51	-5.72	-2.01	-1.60	-1.84
DEV	17.200	13.700	15.130	15.920	9.160

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	21.131	21.928	23.803	23.940	25.202
BETA 2	45.568	46.420	50.688	52.400	54.115
BETA(PR) 1	60.111	57.118	54.136	50.472	46.084
BETA(PR) 2	46.665	41.084	34.069	26.139	15.923
V 1	438.88	447.16	448.31	454.21	458.96
V 2	596.54	615.08	633.81	649.08	670.41
VZ 1	409.37	414.81	410.17	415.13	415.27
VZ 2	417.61	424.02	401.55	396.03	392.97
V-THETA 1	158.21	166.99	180.93	184.31	195.43
V-THETA 2	425.98	445.57	490.38	514.26	543.16
V(PR) 1	821.5	764.1	700.1	652.3	598.7
V(PR) 2	608.5	562.6	484.7	441.1	408.6
VTHETA PR1	712.2	641.6	567.4	503.1	431.3
VTHETA PR2	442.6	369.7	271.5	194.3	112.1
U 1	870.45	808.63	748.32	687.40	626.72
U 2	868.60	815.26	761.93	708.60	655.27
M 1	0.3902	0.3978	0.3988	0.4043	0.4086
M 2	0.5173	0.5351	0.5530	0.5675	0.5871
M(PR) 1	0.7304	0.6797	0.6229	0.5805	0.5331
M(PR) 2	0.5277	0.4894	0.4230	0.3857	0.3579
TURN(PR)	13.446	16.034	20.067	24.333	30.162
UUBAR	0.0538	0.0448	0.0316	0.0563	0.1004
DFAC	0.3750	0.3812	0.4372	0.4581	0.4563
EFFP	0.9365	0.9516	0.9702	0.9517	0.9262
EFF	0.9343	0.9500	0.9692	0.9501	0.9239
LOSS PARA	0.0130	0.0111	0.0080	0.0144	0.0251
INCID	0.51	0.22	0.44	0.67	1.08
DEV	1.565	2.284	3.269	5.439	7.223

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	74.77
UPSTREAM OF STATOR	74.77
DOWNSTREAM OF STATOR	71.02

Table VIII. (cont)

PERCENT DESIGN SPEED = 79.90

CORRECTED WEIGHT FLOW = 69.54

CORRECTED ROTOR SPEED = 6684.86

PRESSURE RATIO = 1.2647

ADIABATIC EFFICIENCY = 88.7775

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	50.346	51.544	55.832	57.036	58.585
BETA 3	-2.620	-8.640	-7.780	-3.480	-6.576
V 2	598.51	613.34	628.14	642.36	663.72
V 3	412.56	392.21	381.63	338.47	321.62
VZ 2	381.94	381.45	352.78	349.52	345.95
VZ 3	412.12	387.76	378.12	337.85	319.50
V-THETA 2	460.80	480.30	519.72	538.95	566.43
V-THETA 3	-18.86	-58.92	-51.66	-20.55	-36.83
M 2	0.5145	0.5298	0.5443	0.5577	0.5779
M 3	0.3499	0.3334	0.3247	0.2876	0.2730
TURN	52.966	60.184	63.612	60.516	65.161
UUBAR	0.0868	0.0846	0.0698	0.1044	0.1149
DFAC	0.6325	0.6918	0.7123	0.7579	0.7900
LOSS PARA	0.0348	0.0315	0.0243	0.0341	0.0345
INCID	-1.73	-0.60	3.13	3.04	2.64
DEV	16.340	9.400	9.970	14.200	11.224

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	21.422	23.053	24.768	26.628	31.119
BETA 2	50.346	51.544	55.832	57.036	58.585
BETA(PR) 1	63.097	59.818	57.166	53.459	48.508
BETA(PR) 2	47.027	41.459	34.682	26.124	14.655
V 1	396.65	410.73	410.81	416.52	423.17
V 2	598.51	613.34	628.14	642.36	663.72
VZ 1	369.25	377.93	373.02	372.34	362.27
VZ 2	381.94	381.45	352.78	349.52	345.95
V-THETA 1	144.87	160.83	172.10	186.68	218.70
V-THETA 2	460.80	480.30	519.72	538.95	566.43
V(PR) 1	816.1	751.7	688.0	625.4	546.8
V(PR) 2	560.3	509.0	429.0	389.3	357.6
VTHETA PR1	727.7	649.8	578.1	502.4	409.6
VTHETA PR2	410.0	337.0	244.1	171.4	90.5
U 1	872.61	810.64	750.18	689.11	628.28
U 2	870.75	817.29	763.83	710.36	656.90
M 1	0.3506	0.3634	0.3634	0.3686	0.3747
M 2	0.5145	0.5298	0.5443	0.5577	0.5779
M(PR) 1	0.7213	0.6650	0.6086	0.5534	0.4841
M(PR) 2	0.4816	0.4397	0.3717	0.3380	0.3113
TURN(PR)	16.071	18.358	22.484	27.334	33.852
UUBAR	0.0846	0.0486	0.0264	0.0600	0.0671
DFAC	0.4507	0.4602	0.5253	0.5279	0.4980
EFFP	0.9144	0.9542	0.9782	0.9566	0.9612
EFF	0.9111	0.9525	0.9775	0.9551	0.9598
LOSS PARA	0.0203	0.0120	0.0067	0.0153	0.0169
INCID	3.50	2.92	3.47	3.66	3.51
DEV	1.927	2.659	3.882	5.424	5.955

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	69.54
UPSTREAM OF STATOR	69.54
DOWNSTREAM OF STATOR	65.62

Table VIII. (cont)

PERCENT DESIGN SPEED = 79.96

CORRECTED WEIGHT FLOW = 65.58

CORRECTED ROTOR SPEED = 6690.41

PRESSURE RATIO = 1.2755

ADIABATIC EFFICIENCY = 85.3143

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	54.346	55.538	58.319	60.141	61.307
BETA 3	-3.136	-6.920	-8.640	-7.780	-16.380
V 2	603.64	614.73	632.05	645.67	672.26
V 3	412.78	398.44	374.49	331.63	309.69
VZ 2	351.85	347.85	331.94	321.45	322.76
VZ 3	412.16	395.54	370.24	328.57	297.12
V-THETA 2	490.49	506.85	537.86	559.96	589.71
V-THETA 3	-22.58	-48.01	-56.26	-44.89	-87.33
M 2	0.5141	0.5261	0.5425	0.5557	0.5796
M 3	0.3464	0.3358	0.3160	0.2794	0.2607
TURN	57.482	62.458	66.959	67.921	77.687
UUBAR	0.1167	0.0943	0.1077	0.1371	0.1657
DFAC	0.6575	0.6919	0.7380	0.7927	0.8436
LOSS PARA	0.0468	0.0353	0.0375	0.0444	0.0480
INCID	2.27	3.40	5.62	6.14	5.36
DEV	15.824	11.120	9.110	9.900	1.420

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	22.845	24.043	25.145	27.448	28.30[illegible]
BETA 2	54.346	55.538	58.319	60.141	61.307
BETA(PR) 1	64.781	62.191	59.204	55.932	51.949
BETA(PR) 2	47.658	42.247	34.844	25.767	12.506
V 1	374.61	381.54	388.54	391.22	395.56
V 2	603.64	614.73	632.05	645.67	672.26
VZ 1	345.23	348.44	351.72	347.18	348.28
VZ 2	351.85	347.85	331.94	321.45	322.76
V-THETA 1	145.44	155.45	165.09	18[illegible].33	187.53
V-THETA 2	490.49	506.85	537.86	559.95	589.71
V(PR) 1	810.2	746.9	687.0	619.8	565.1
V(PR) 2	522.4	469.9	404.5	356.9	330.6
VTHETA PR1	733.0	660.6	590.1	513.4	445.0
VTHETA PR2	386.1	315.9	231.1	155.2	71.6
U 1	878.46	816.[illegible]8	755.21	693.73	632.49
U 2	876.59	822.77	768.95	715.13	661.3[illegible]
M 1	0.3287	0.3349	0.3412	0.3436	0.3475
M 2	0.5141	0.5261	0.5425	0.5557	0.5796
M(PR) 1	0.7110	0.6556	0.6033	0.5444	0.4964
M(PR) 2	0.4449	0.4022	0.3472	0.3072	0.285[illegible]
TURN(PR)	17.124	19.945	24.360	30.165	39.442
UUBAR	0.1226	0.0754	0.0764	0.[illegible]794	0.1323
DFAC	0.5063	0.5232	0.5716	0.5883	0.5870
EFFP	0.8873	0.9351	0.9414	0.9476	0.9271
EFF	0.8827	0.9325	0.9392	0.9457	0.9245
LOSS PARA	0.0291	0.0184	0.0192	0.0203	0.0336
INCID	5.18	5.29	5.50	6.13	6.95
DEV	2.558	3.447	4.044	5.067	3.806

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	65.58
UPSTREAM OF STATOR	65.58
DOWNSTREAM OF STATOR	61.66

Table VIII. (cont)

PERCENT DESIGN SPEED = 89.91

CORRECTED WEIGHT FLOW = 91.15

CORRECTED ROTOR SPEED = 7522.52

PRESSURE RATIO = 1.1998

ADIABATIC EFFICIENCY = 76.5796

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	41.802	43.239	45.476	46.683	48.287
BETA 3	-2.620	-3.308	-2.104	-3.480	-11.648
V 2	670.70	705.05	744.35	780.60	804.63
V 3	546.38	550.98	576.28	554.56	531.68
VZ 2	499.98	513.63	521.95	535.52	535.40
VZ 3	545.80	550.06	575.89	553.54	522.02
V-THETA 2	447.06	482.99	530.69	567.94	600.64
V-THETA 3	-24.98	-31.79	-21.16	-33.66	-101.92
M 2	0.5848	0.6178	0.6546	0.6881	0.7109
M 3	0.4708	0.4757	0.4988	0.4788	0.4576
TURN	44.422	46.547	47.580	50.163	59.335
UUBAR	0.0868	0.1034	0.0876	0.1618	0.2064
DFAC	0.4680	0.4936	0.4865	0.5416	0.6028
LOSS PARA	0.0348	0.0389	0.0308	0.0528	0.0612
INCID	-10.28	-8.90	-7.22	-7.32	-7.56
DEV	16.340	14.732	15.646	14.200	6.752

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.[illegible]	23.[illegible]	21.988
DIA 2	29.088	27.302	25.516	23.73[illegible]	21.944
BETA 1	22.213	23.581	24.833	26.269	26.553
BETA 2	41.802	43.239	45.476	46.683	48.287
BETA(PR) 1	56.039	52.323	48.468	44.128	39.128
BETA(PR) 2	46.838	4[illegible].393	32.236	23.397	14.536
V 1	56[illegible].48	575.87	584.57	591.[illegible]6	6[illegible]2.[illegible]6
V 2	670.70	705.05	744.35	780.60	8[illegible]4.63
VZ 1	518.89	527.[illegible]5	53[illegible].52	53[illegible].[illegible]1	536.56
VZ 2	499.98	513.63	521.95	535.52	535.4[illegible]
V-THETA 1	211.89	2[illegible].[illegible]5	245.51	261.6[illegible]	269.14
V-THETA 2	447.06	482.99	530.69	567.94	6[illegible].64
V(PR) 1	928.8	862.3	8[illegible].1	738.4	694.3
V(PR) 2	730.9	674.4	617.1	583.5	553.1
VTHETA PR1	770.4	682.5	599.[illegible]	514.1	4[illegible]8.1
VTHETA PR2	533.1	437.[illegible]	329.1	231.7	138.8
U 1	982.29	912.54	844.47	775.72	7[illegible]7.25
U 2	98[illegible].2[illegible]	92[illegible].[illegible]2	854.83	799.65	739.44
M 1	0.5014	0.5151	0.5241	0.5[illegible]3	0.5[illegible]7
M 2	0.5848	0.6178	0.6546	0.6881	0.71[illegible]9
M(PR) 1	0.8309	0.7724	0.7174	0.6624	0.6235
M(PR) 2	0.6373	0.5916	0.5426	0.5144	0.4887
TURN(PR)	9.2[illegible]	11.93[illegible]	16.232	2[illegible].732	24.592
UUBAR	0.0991	0.0743	0.[illegible]652	0.[illegible]775	[illegible].10[illegible]
DFAC	0.3032	0.3119	0.3322	0.3184	.3156
EFFP	0.8470	0.8954	0.921[illegible]	0.9219	.9[illegible]24
EFF	0.8425	0.8923	0.9185	0.9194	[illegible].8992
LOSS PARA	0.0239	0.0187	0.0169	0.0252	[illegible].275
INCID	-3.56	-4.58	-5.23	-5.67	-5.87
DEV	1.738	1.593	1.436	2.697	5.836

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	91.15
UPSTREAM OF STATOR	91.15
DOWNSTREAM OF STATOR	88.15

Table VIII. (cont)

PERCENT DESIGN SPEED = 89.96

CORRECTED WEIGHT FLOW = 88.57

CORRECTED ROTOR SPEED = 7527.10

PRESSURE RATIO = 1.2551

ADIABATIC EFFICIENCY = 86.0983

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	43.867	46.420	48.979	50.688	52.400
BETA 3	-2.104	-3.480	-2.620	-3.480	-12.080
V 2	676.52	695.58	734.39	763.43	766.50
V 3	518.35	515.99	513.64	486.78	481.50
VZ 2	487.74	479.51	482.01	483.67	467.68
VZ 3	518.00	515.04	513.10	485.88	470.84
V-THETA 2	468.81	503.88	554.07	590.67	607.29
V-THETA 3	-19.03	-31.32	-23.48	-29.55	-100.77
M 2	0.5869	0.6063	0.6428	0.6704	0.6739
M 3	0.4441	0.4427	0.4409	0.4169	0.4121
TURN	45.971	49.900	51.599	54.168	64.480
UUBAR	0.0881	0.0646	0.0976	0.1392	0.0887
DFAC	0.5234	0.5481	0.5771	0.6280	0.6509
LOSS PARA	0.0354	0.0243	0.0343	0.0454	0.0262
INCID	-8.21	-5.72	-3.72	-3.31	-3.55
DEV	16.856	14.560	15.130	14.200	5.720

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	21.873	23.394	24.937	26.628	28.048
BETA 2	43.867	46.420	48.979	50.688	52.400
BETA(PR) 1	57.481	54.062	50.271	46.176	41.377
BETA(PR) 2	46.342	40.936	32.370	23.347	15.759
V 1	537.17	548.53	558.11	562.13	566.71
V 2	676.52	695.58	734.39	763.43	766.50
VZ 1	498.50	503.44	506.08	502.51	500.15
VZ 2	487.74	479.51	482.01	483.67	467.68
V-THETA 1	200.12	217.79	235.31	251.95	266.47
V-THETA 2	468.81	503.88	554.07	590.67	607.29
V(PR) 1	927.3	857.8	791.8	725.7	666.5
V(PR) 2	706.5	634.7	570.7	526.8	485.9
VTHETA PR1	781.9	694.5	608.9	523.6	440.6
VTHETA PR2	511.1	415.9	305.5	208.8	132.0
U 1	982.04	912.30	844.25	775.52	707.07
U 2	979.95	919.78	859.61	799.44	739.27
M 1	0.4800	0.4906	0.4996	0.5034	0.5077
M 2	0.5869	0.6063	0.6428	0.6704	0.6739
M(PR) 1	0.8286	0.7673	0.7088	0.6499	0.5972
M(PR) 2	0.6129	0.5533	0.4995	0.4626	0.4272
TURN(PR)	11.139	13.126	17.901	22.829	25.618
UUBAR	0.0687	0.0485	0.0343	0.0329	0.0972
DFAC	0.3411	0.3672	0.3968	0.3973	0.3915
EFFP	0.9114	0.9417	0.9644	0.9709	0.9219
EFF	0.9082	0.9396	0.9631	0.9698	0.9192
LOSS PARA	0.0167	0.0121	0.0089	0.0086	0.0244
INCID	-2.12	-2.84	-3.43	-3.62	-3.62
DEV	1.242	2.136	1.570	2.647	7.059

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	88.57
UPSTREAM OF STATOR	88.57
DOWNSTREAM OF STATOR	85.16

Table VIII. (cont)

PERCENT DESIGN SPEED = 90.00

CORRECTED WEIGHT FLOW = 83.12

CORRECTED ROTOR SPEED = 7530.51

PRESSURE RATIO = 1.3107

ADIABATIC EFFICIENCY = 89.5290

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	47.877	50.706	52.511	53.886	55.089
BETA 3	-2.104	-4.684	-2.620	-2.620	-2.620
V 2	673.18	690.37	709.17	738.94	750.09
V 3	498.33	467.49	438.39	414.01	390.16
VZ 2	451.52	437.21	431.61	435.53	429.28
VZ 3	497.99	465.93	437.93	413.58	389.75
V-THETA 2	499.30	534.28	562.71	596.95	615.11
V-THETA 3	-18.30	-38.18	-20.04	-18.93	-17.83
M 2	0.5826	0.6008	0.6190	0.6473	0.6584
M 3	0.4248	0.3989	0.3740	0.3531	0.3324
TURN	49.981	55.390	55.131	56.506	57.709
UUBAR	0.0476	0.0741	0.0898	0.1282	0.1192
DFAC	0.5685	0.6353	0.6708	0.7123	0.7348
LOSS PARA	0.0191	0.0278	0.0315	0.0419	0.0360
INCID	-4.20	-1.43	-0.19	-0.11	-0.86
DEV	16.856	13.356	15.130	15.060	15.180

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	22.191	23.303	24.748	26.389	27.017
BETA 2	47.877	50.706	52.511	53.886	55.089
BETA(PR) 1	59.748	56.726	53.479	49.665	45.285
BETA(PR) 2	46.562	41.139	34.222	24.598	15.777
V 1	497.75	506.22	511.23	515.19	520.16
V 2	673.18	690.37	709.17	738.94	750.09
VZ 1	460.88	464.93	464.28	461.51	463.40
VZ 2	451.52	437.21	431.61	435.53	429.28
V-THETA 1	188.00	200.26	214.01	228.99	236.29
V-THETA 2	499.30	534.28	562.71	596.95	615.11
V(PR) 1	914.8	847.4	780.1	713.0	658.6
V(PR) 2	656.7	580.5	522.0	479.0	446.1
VTHETA PR1	790.2	708.5	627.0	543.5	468.0
VTHETA PR2	476.8	381.9	293.6	199.4	121.3
U 1	978.22	908.75	840.97	772.51	704.32
U 2	976.14	916.20	856.27	796.33	736.40
M 1	0.4454	0.4532	0.4579	0.4616	0.4663
M 2	0.5826	0.6008	0.6190	0.6473	0.6584
M(PR) 1	0.8185	0.7587	0.6988	0.6389	0.5904
M(PR) 2	0.5684	0.5052	0.4556	0.4196	0.3916
TURN(PR)	13.186	15.588	19.257	25.067	29.508
UUBAR	0.0655	0.0294	0.0395	0.0319	0.0799
DFAC	0.4029	0.4421	0.4620	0.4653	0.4598
EFFP	0.9284	0.9701	0.9641	0.9752	0.9436
EFF	0.9253	0.9689	0.9626	0.9742	0.9414
LOSS PARA	0.0159	0.0073	0.0100	0.0082	0.0200
INCID	0.15	-0.17	-0.22	-0.13	0.28
DEV	1.462	2.339	3.422	3.898	7.077

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	83.12
UPSTREAM OF STATOR	83.12
DOWNSTREAM OF STATOR	79.31

Table VIII. (cont)

PERCENT DESIGN SPEED = 89.98

CORRECTED WEIGHT FLOW = 81.07

CORRECTED ROTOR SPEED = 7528.45

PRESSURE RATIO = 1.3251

ADIABATIC EFFICIENCY = 90.1667

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	21.780	23.763	24.538	26.159	27.361
BETA 2	47.967	51.655	53.457	54.831	55.949
BETA(PR) 1	60.669	57.569	54.736	50.788	46.227
BETA(PR) 2	46.832	40.905	33.641	25.103	15.245
V 1	482.94	492.54	493.71	500.87	507.48
V 2	669.56	692.53	713.13	731.72	749.87
VZ 1	448.46	450.78	449.12	449.57	450.71
VZ 2	448.31	429.64	424.61	421.46	419.88
V-THETA 1	179.19	198.47	205.04	220.82	233.24
V-THETA 2	497.32	543.14	572.94	598.15	621.29
V(PR) 1	915.5	840.6	777.9	711.1	651.5
V(PR) 2	655.3	568.5	510.0	465.4	435.2
VTHETA PR1	798.1	709.5	635.2	551.0	470.4
VTHETA PR2	477.9	372.2	282.6	197.5	114.4
U 1	977.33	907.93	840.20	771.80	703.68
U 2	975.25	915.37	855.49	795.61	735.73
M 1	0.4319	0.4408	0.4419	0.4485	0.4547
M 2	0.5786	0.6019	0.6220	0.6407	0.6577
M(PR) 1	0.8187	0.7522	0.6962	0.6368	0.5838
M(PR) 2	0.5662	0.4940	0.4449	0.4075	0.3817
TURN(PR)	13.837	16.664	21.095	25.684	30.981
UUBAR	0.0723	0.0329	0.0210	0.0115	0.0772
DFAC	0.4076	0.4561	0.4834	0.4867	0.4743
EFFP	0.9238	0.9685	0.9822	0.9918	0.9483
EFF	0.9203	0.9671	0.9815	0.9915	0.9462
LOSS PARA	0.0174	0.0082	0.0054	0.0030	0.0194
INCID	1.07	0.67	1.04	0.99	1.23
DEV	1.732	2.105	2.841	4.403	6.545

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	47.967	51.655	53.457	54.831	55.949
BETA 3	-2.104	-6.576	-6.232	-3.308	-9.500
V 2	669.56	692.53	713.13	731.72	749.87
V 3	483.50	462.28	431.92	394.84	368.61
VZ 2	448.31	429.64	424.61	421.46	419.88
VZ 3	483.17	459.24	429.37	394.18	363.55
V-THETA 2	497.32	543.14	572.94	598.15	621.29
V-THETA 3	-17.75	-52.94	-46.89	-22.78	-60.84
M 2	0.5786	0.6019	0.6220	0.6407	0.6577
M 3	0.4111	0.3941	0.3681	0.3363	0.3134
TURN	50.071	58.231	59.689	58.139	65.449
UUBAR	0.0472	0.0712	0.0976	0.1245	0.1316
DFAC	0.5868	0.6568	0.6999	0.7379	0.7833
LOSS PARA	0.0189	0.0266	0.0341	0.0407	0.0392
INCID	-4.11	-0.48	0.76	0.83	-0.00
DEV	16.856	11.464	11.518	14.372	8.300

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	81.07
UPSTREAM OF STATOR	81.07
DOWNSTREAM OF STATOR	77.16

Table VIII. (cont)

PERCENT DESIGN SPEED = 89.96

CORRECTED WEIGHT FLOW = 78.81

CORRECTED ROTOR SPEED = 7527.16

PRESSURE RATIO = 1.3354

ADIABATIC EFFICIENCY = 89.1011

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	50.453	53.286	54.316	56.722	57.325
BETA 3	-2.448	-8.640	-8.124	-5.372	-9.844
V 2	663.22	685.68	700.48	724.34	743.80
V 3	460.55	453.98	419.77	376.63	348.19
VZ 2	422.28	409.91	408.60	397.44	401.56
VZ 3	460.13	448.83	415.56	374.97	343.06
V-THETA 2	511.41	549.66	568.97	605.56	626.10
V-THETA 3	-19.67	-68.20	-59.32	-35.26	-59.53
M 2	0.5730	0.5959	0.6109	0.6339	0.6523
M 3	0.3910	0.3871	0.3576	0.3208	0.2959
TURN	52.901	61.926	62.440	62.094	67.169
UUBAR	0.0721	0.0628	0.0795	0.1287	0.1426
DFAC	0.6272	0.6774	0.7161	0.7694	0.8104
LOSS PARA	0.0289	0.0234	0.0277	0.0419	0.0425
INCID	-1.63	1.15	1.62	2.72	1.38
DEV	16.512	9.400	9.626	12.308	7.956

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	23.028	23.303	24.671	26.166	27.303
BETA 2	50.453	53.286	54.316	56.722	57.325
BETA(PR) 1	61.902	58.966	55.049	52.496	48.190
BETA(PR) 2	47.536	41.561	34.840	25.324	15.029
V 1	460.97	471.20	475.64	478.85	483.37
V 2	663.22	685.68	700.48	724.34	743.80
VZ 1	424.24	432.76	432.23	429.86	429.52
VZ 2	422.28	409.91	408.60	397.44	401.56
V-THETA 1	180.32	186.41	198.54	210.81	221.72
V-THETA 2	511.41	549.66	568.97	605.56	626.10
V(PR) 1	900.8	839.4	771.9	704.7	644.3
V(PR) 2	625.5	547.8	497.8	439.7	415.8
VTHETA PR1	794.6	719.3	639.6	559.1	480.2
VTHETA PR2	461.4	563.4	264.4	188.1	107.8
U 1	974.91	905.68	839.12	769.90	701.94
U 2	972.84	913.11	853.37	793.64	733.91
M 1	0.4125	0.4220	0.4261	0.4284	0.4333
M 2	0.5730	0.5959	0.6109	0.6339	0.6523
M(PR) 1	0.8061	0.7518	0.6916	0.6315	0.5776
M(PR) 2	0.5404	0.4761	0.4341	0.3848	0.3646
TURN(PR)	14.366	17.405	21.109	27.172	33.161
UUBAR	0.0812	0.0400	0.0367	0.0328	0.0833
DFAC	0.4360	0.4873	0.4962	0.5256	0.5052
EFFP	0.9192	0.9629	0.9677	0.9764	0.9477
EFF	0.9154	0.9612	0.9662	0.9754	0.9454
LOSS PARA	0.0193	0.0099	0.0098	0.0084	0.0209
INCID	2.30	2.07	2.25	2.70	3.19
DEV	2.436	2.761	4.040	4.624	6.329

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	78.81
UPSTREAM OF STATOR	78.81
DOWNSTREAM OF STATOR	74.88

Table VIII. (cont)

PERCENT DESIGN SPEED = 99.90

CORRECTED WEIGHT FLOW = 94.59

CORRECTED ROTOR SPEED = 8358.87

PRESSURE RATIO = 1.3483

ADIABATIC EFFICIENCY = 87.6184

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	47.187	48.988	50.274	52.080	53.369
BETA 3	-2.448	-4.340	-2.964	-6.576	-11.908
V 2	745.00	768.82	799.01	829.24	838.40
V 3	564.72	533.44	512.11	489.04	468.08
VZ 2	506.30	504.51	510.66	509.61	500.24
VZ 3	564.20	531.91	511.43	485.83	458.01
V-THETA 2	546.51	580.14	614.52	654.16	672.81
V-THETA 3	-24.12	-40.37	-26.48	-56.01	-96.58
M 2	0.6483	0.6733	0.7026	0.7328	0.7421
M 3	0.4828	0.4566	0.4383	0.4180	0.4000
TURN	49.635	53.328	53.238	58.656	65.277
UUBAR	0.0612	0.0947	0.1156	0.1408	0.1189
DFAC	0.5496	0.6103	0.6412	0.6903	0.7189
LOSS PARA	0.0246	0.0356	0.0406	0.0457	0.0351
INCID	-4.89	-3.15	-2.43	-1.92	-2.58
DEV	16.512	13.700	14.786	11.104	5.892

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	21.840	23.579	25.354	27.132	27.708
BETA 2	47.187	48.988	50.274	52.080	53.369
BETA(PR) 1	57.411	54.149	50.691	46.498	41.897
BETA(PR) 2	46.484	40.659	33.079	23.981	15.821
V 1	593.20	602.51	607.23	613.07	618.68
V 2	745.00	768.82	799.01	829.24	838.40
VZ 1	550.62	552.20	548.74	545.61	547.74
VZ 2	506.30	504.51	510.66	509.61	500.24
V-THETA 1	220.68	241.01	260.02	279.59	287.66
V-THETA 2	546.51	580.14	614.52	654.16	672.81
V(PR) 1	1022.3	942.8	866.2	792.6	735.9
V(PR) 2	735.3	665.0	609.4	557.8	519.9
VTHETA PR1	861.4	764.2	670.2	574.9	491.4
VTHETA PR2	533.2	433.3	332.6	226.7	141.8
U 1	1082.05	1005.21	930.23	854.52	779.07
U 2	1079.75	1013.45	947.15	880.86	814.56
M 1	0.5372	0.5461	0.5507	0.5563	0.5617
M 2	0.6483	0.6733	0.7026	0.7328	0.7421
M(PR) 1	0.9258	0.8546	0.7855	0.7192	0.6681
M(PR) 2	0.6399	0.5824	0.5359	0.4929	0.4602
TURN(PR)	19.928	13.490	17.612	22.517	26.076
UUBAR	0.0607	0.0295	0.0314	0.0142	0.0882
DFAC	0.3939	0.4105	0.4160	0.4211	0.4172
EFFP	0.9291	0.9683	0.9704	0.9887	0.9328
EFF	0.9256	0.9667	0.9690	0.9882	0.9298
LOSS PARA	0.0147	0.0074	0.0081	0.0037	0.0221
INCID	-2.19	-2.75	-3.01	-3.30	-3.10
DEV	1.384	1.859	2.279	3.281	7.121

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	94.59
UPSTREAM OF STATOR	94.59
DOWNSTREAM OF STATOR	90.95

Table VIII. (cont)

PERCENT DESIGN SPEED = 100.06

CORRECTED WEIGHT FLOW = 91.31

CORRECTED ROTOR SPEED = 8372.18

PRESSURE RATIO = 1.3894

ADIABATIC EFFICIENCY = 88.4424

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	49.076	51.136	53.027	54.487	55.777
BETA 3	-1.760	-2.620	-1.416	-7.264	-11.048
V 2	746.26	764.55	792.42	806.85	830.95
V 3	539.98	507.21	477.26	439.04	404.02
VZ 2	488.84	479.73	476.59	468.69	467.34
VZ 3	539.72	506.68	477.12	435.51	396.53
V-THETA 2	563.86	595.31	633.08	656.77	687.07
V-THETA 3	-16.58	-23.19	-11.79	-55.51	-77.42
M 2	0.6446	0.6647	0.6924	0.7081	0.7315
M 3	0.4574	0.4304	0.4052	0.3726	0.3423
TURN	50.836	53.756	54.443	61.751	66.825
UUBAR	0.0554	0.0743	0.1057	0.1125	0.1356
DFAC	0.5888	0.6414	0.6839	0.7445	0.7917
LOSS PARA	0.0222	0.0280	0.0372	0.0365	0.0402
INCID	-3.00	-1.00	0.33	0.49	-0.17
DEV	17.200	15.420	16.334	10.416	6.752

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	22.185	23.672	25.338	27.023	27.881
BETA 2	49.076	51.136	53.027	54.487	55.777
BETA(PR) 1	59.096	55.953	52.609	48.592	43.974
BETA(PR) 2	46.710	41.269	33.608	25.800	15.521
V 1	563.83	573.76	579.24	585.12	591.66
V 2	746.26	764.55	792.42	806.85	830.95
VZ 1	522.09	525.48	523.52	521.24	522.98
VZ 2	488.84	479.73	476.59	468.69	467.34
V-THETA 1	212.90	230.36	247.89	265.84	276.68
V-THETA 2	563.86	595.31	633.08	656.77	687.07
V(PR) 1	1016.5	938.6	862.1	788.1	726.7
V(PR) 2	712.9	638.3	572.2	520.6	485.0
VTHETA PR1	872.2	777.7	685.0	591.1	504.6
VTHETA PR2	518.9	421.0	316.7	226.6	129.8
U 1	1085.10	1008.05	932.85	856.91	781.27
U 2	1082.79	1016.31	949.83	883.34	816.86
M 1	0.5085	0.5180	0.5232	0.5288	0.5350
M 2	0.6446	0.6647	0.6924	0.7081	0.7315
M(PR) 1	0.9168	0.8473	0.7787	0.7122	0.6572
M(PR) 2	0.6158	0.5549	0.5000	0.4569	0.4270
TURN(PR)	12.386	14.684	19.001	22.792	28.454
UUBAR	0.0773	0.0467	0.0330	0.0340	0.0774
DFAC	0.4212	0.4454	0.4672	0.4708	0.4669
EFFP	0.9195	0.9545	0.9715	0.9735	0.9462
EFF	0.9151	0.9521	0.9700	0.9722	0.9436
LOSS PARA	0.0187	0.0116	0.0084	0.0087	0.0194
INCID	-0.50	-0.95	-1.09	-1.21	-1.03
DEV	1.610	2.469	2.808	5.100	6.821

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	91.31
UPSTREAM OF STATOR	91.31
DOWNSTREAM OF STATOR	87.46

Table VIII. (cont)

PERCENT DESIGN SPEED = 99.84

CORRECTED WEIGHT FLOW = 89.48

CORRECTED ROTOR SPEED = 8353.57

PRESSURE RATIO = 1.4042

ADIABATIC EFFICIENCY = 88.1097

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	50.238	52.121	54.402	56.387	58.143
BETA 3	-1.760	-2.620	-3.136	-11.220	-13.800
V 2	751.94	770.30	788.67	801.98	829.37
V 3	540.68	506.96	463.83	426.42	386.93
VZ 2	480.94	472.96	459.08	443.96	437.75
VZ 3	540.43	506.43	463.14	418.27	375.76
V-THETA 2	578.02	608.00	641.28	667.88	704.44
V-THETA 3	-16.61	-23.17	-25.37	-82.97	-92.30
M 2	0.6440	0.6634	0.6820	0.6968	0.7225
M 3	0.4536	0.4264	0.3900	0.3585	0.3245
TURN	51.998	54.741	57.538	67.607	71.943
UUBAR	0.0602	0.0790	0.1069	0.1078	0.1410
DFAC	0.5985	0.6506	0.7091	0.7745	0.8237
LOSS PARA	0.0241	0.0297	0.0375	0.0346	0.0414
INCID	-1.84	-0.02	1.70	2.39	2.19
DEV	17.200	15.420	14.614	6.460	4.000

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	21.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	22.154	23.238	24.791	26.150	26.435
BETA 2	50.238	52.121	54.402	56.387	58.143
BETA(PR) 1	59.932	56.965	53.671	49.891	45.617
BETA(PR) 2	46.679	41.141	34.296	26.330	14.884
V 1	551.53	560.35	566.75	571.60	577.17
V 2	751.94	770.30	788.67	801.98	829.37
VZ 1	510.82	514.89	514.52	513.10	516.82
VZ 2	480.94	472.96	459.08	443.96	437.75
V-THETA 1	207.98	221.09	237.64	251.91	256.95
V-THETA 2	578.02	608.00	641.28	667.88	704.44
V(PR) 1	1019.5	944.5	868.5	796.4	738.9
V(PR) 2	701.0	628.0	555.7	495.3	452.9
VTHETA PR1	882.3	791.8	699.7	609.1	528.1
VTHETA PR2	510.0	413.2	313.1	219.7	116.3
U 1	1090.32	1012.89	937.34	861.03	785.03
U 2	1088.00	1021.20	954.39	887.59	820.79
M 1	0.4932	0.5015	0.5075	0.5121	0.5174
M 2	0.6440	0.6634	0.6820	0.6968	0.7225
M(PR) 1	0.9118	0.8453	0.7778	0.7135	0.6623
M(PR) 2	0.6004	0.5409	0.4806	0.4304	0.3946
TURN(PR)	13.253	15.824	19.376	23.561	30.733
UUBAR	0.0684	0.0512	0.0585	0.0542	0.1038
DFAC	0.4412	0.4674	0.4967	0.5169	0.5321
EFFP	0.9312	0.9522	0.9505	0.9583	0.9294
EFF	0.9273	0.9496	0.9479	0.9563	0.9259
LOSS PARA	0.0166	0.0127	0.0148	0.0138	0.0261
INCID	0.33	0.07	-0.03	0.09	0.62
DEV	1.579	2.341	3.496	5.630	6.184

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	89.48
UPSTREAM OF STATOR	89.48
DOWNSTREAM OF STATOR	85.58

Table VIII. (cont)

PERCENT DESIGN SPEED = 99.95

CORRECTED WEIGHT FLOW = 88.67

CORRECTED ROTOR SPEED = 8362.43

PRESSURE RATIO = 1.4109

ADIABATIC EFFICIENCY = 87.6762

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	50.449	52.512	54.316	56.464	57.497
BETA 3	-2.620	-1.932	-4.340	2.024	2.196
V 2	750.38	767.58	770.26	799.75	822.59
V 3	530.16	496.92	456.60	417.43	375.86
VZ 2	477.82	467.15	449.31	441.83	442.01
VZ 3	529.60	496.64	455.29	417.17	375.58
V-THETA 2	578.59	609.07	625.64	666.63	693.74
V-THETA 3	-24.23	-16.75	-34.55	14.74	14.40
M 2	0.6467	0.6657	0.6709	0.7002	0.7220
M 3	0.4474	0.4206	0.3865	0.3533	0.3173
TURN	53.069	54.444	58.656	54.440	55.301
UUBAR	0.0779	0.0942	0.0791	0.1258	0.1500
DFAC	0.6161	0.6598	0.7086	0.7446	0.7926
LOSS PARA	0.0313	0.0355	0.0278	0.0411	0.0453
INCID	-1.63	0.37	1.62	2.46	1.55
DEV	16.340	16.108	13.410	19.704	19.996

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	22.494	22.715	23.377	24.529	23.510
BETA 2	50.449	52.512	54.316	56.464	57.497
BETA(PR) 1	60.274	57.528	54.564	51.035	47.242
BETA(PR) 2	46.416	40.939	35.052	25.944	15.368
V 1	541.28	548.05	551.96	555.32	560.70
V 2	750.38	767.58	770.26	799.75	822.59
VZ 1	500.10	505.54	506.65	505.20	514.15
VZ 2	477.82	467.15	449.31	441.83	442.01
V-THETA 1	207.09	211.63	219.01	230.55	223.67
V-THETA 2	578.59	609.07	625.64	666.63	693.74
V(PR) 1	1008.6	941.6	873.8	803.4	757.3
V(PR) 2	693.1	618.4	552.9	491.3	458.4
VTHETA PR1	875.8	794.4	712.0	624.7	556.0
VTHETA PR2	502.0	405.2	322.3	215.0	121.5
U 1	1082.94	1006.04	930.99	855.20	779.72
U 2	1080.63	1014.28	947.93	881.58	815.23
M 1	0.4876	0.4940	0.4977	0.5009	0.5060
M 2	0.6467	0.6657	0.6709	0.7002	0.7220
M(PR) 1	0.9086	0.8488	0.7880	0.7247	0.6835
M(PR) 2	0.5973	0.5363	0.4816	0.4302	0.4023
TURN(PR)	13.858	16.589	18.912	25.092	31.874
UUBAR	0.0827	0.0519	0.0483	0.0298	0.0793
DFAC	0.4435	0.4797	0.5040	0.5333	0.5441
EFFP	0.9194	0.9523	0.9579	0.9773	0.9439
EFF	0.9148	0.9497	0.9557	0.9761	0.9411
LOSS PARA	0.0201	0.0129	0.0121	0.0076	0.0199
INCID	0.67	0.63	0.86	1.24	2.24
DEV	1.316	2.139	4.852	5.244	6.668

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	88.67
UPSTREAM OF STATOR	88.67
DOWNSTREAM OF STATOR	84.69

Table VIII. (cont)

PERCENT DESIGN SPEED = 109.92

CORRECTED WEIGHT FLOW = 100.02

CORRECTED ROTOR SPEED = 9196.81

PRESSURE RATIO = 1.2570

ADIABATIC EFFICIENCY = 63.1096

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	23.596	24.770	24.447	25.993	26.516
BETA 2	41.597	44.776	46.573	46.230	47.443
BETA(PR) 1	57.848	54.429	51.143	46.817	42.353
BETA(PR) 2	49.672	43.848	32.976	24.522	15.293
V 1	641.12	655.56	663.43	673.93	679.64
V 2	769.55	804.94	889.59	934.60	973.20
VZ 1	587.52	595.58	603.95	615.76	618.20
VZ 2	575.50	571.40	611.52	646.52	658.20
V-THETA 1	256.63	273.94	274.57	295.36	303.32
V-THETA 2	510.89	566.96	646.07	674.90	716.87
V(PR) 1	1104.0	1023.9	962.6	885.2	823.0
V(PR) 2	889.3	792.3	729.0	71[illegible].6	682.4
VTHETA PR1	934.7	832.8	749.6	645.5	554.4
VTHETA PR2	677.9	548.9	390.8	294.9	180.0
U 1	1191.35	1106.75	1024.19	940.82	857.77
U 2	1188.81	1115.82	1042.83	969.83	896.84
M 1	0.5830	0.5971	0.6047	0.6150	0.6207
M 2	0.6733	0.7103	0.7882	0.8325	0.8712
M(PR) 1	1.0039	0.9325	0.8775	0.8078	0.7516
M(PR) 2	0.7781	0.6991	0.6459	0.6339	0.6109
TURN(PR)	8.177	10.582	18.167	22.295	27.060
UUBAR	0.2028	0.1600	0.1644	0.1563	0.1406
DFAC	0.2766	0.3177	0.3552	0.3597	0.2894
EFFP	0.7053	0.7785	0.8191	0.8527	0.8848
EFF	0.6951	0.7707	0.8114	0.8460	0.8793
LOSS PARA	0.0463	0.0381	0.0423	0.0404	0.0353
INCID	-1.75	-2.47	-2.56	-2.98	-2.65
DEV	4.572	5.048	2.176	3.822	6.593

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	100.02
UPSTREAM OF STATOR	100.02
DOWNSTREAM OF STATOR	97.24

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	41.597	44.776	46.573	46.230	47.443
BETA 3	-3.430	-4.856	-3.480	-5.888	-18.616
V 2	769.55	804.94	889.59	934.60	973.20
V 3	598.85	617.00	681.63	674.87	597.44
VZ 2	575.50	571.40	611.52	646.52	658.20
VZ 3	597.74	614.78	680.37	671.31	566.18
V-THETA 2	510.89	566.96	646.07	674.90	716.87
V-THETA 3	-36.35	-52.23	-41.38	-69.23	-190.72
M 2	0.6733	0.7103	0.7882	0.8325	0.8712
M 3	0.5145	0.5322	0.5891	0.5824	0.5108
TURN	45.077	49.632	50.053	52.118	66.059
UUBAR	0.1239	0.1070	0.1152	0.1658	0.3004
DFAC	0.5074	0.5233	0.5055	0.5383	0.6679
LOSS PARA	0.0497	0.0402	0.0404	0.0539	0.0860
INCID	-10.48	-7.36	-6.13	-7.77	-8.51
DEV	15.480	13.184	14.270	11.792	-0.816

Table VIII. (cont)

PERCENT DESIGN SPEED = 109.90

CORRECTED WEIGHT FLOW = 100.05

CORRECTED ROTOR SPEED = 9195.48

PRESSURE RATIO = 1.3789

ADIABATIC EFFICIENCY = 79.7560

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	47.869	49.156	50.616	51.046	51.735
BETA 3	-3.490	-5.200	-3.480	-8.640	-18.100
V 2	800.31	838.76	889.56	934.70	950.79
V 3	614.37	610.05	600.03	569.46	540.00
VZ 2	536.86	548.55	564.44	587.64	588.83
VZ 3	613.24	607.54	598.92	563.00	513.28
V-THETA 2	593.52	634.52	687.55	726.87	746.52
V-THETA 3	-37.29	-55.29	-36.42	-85.55	-167.76
M 2	0.6864	0.7259	0.7742	0.8185	0.8355
M 3	0.5178	0.5152	0.5066	0.4796	0.4543
TURN	51.349	54.356	54.096	59.686	69.835
UUBAR	0.0009	0.0312	0.0931	0.1578	0.1666
DFAC	0.5489	0.5826	0.6116	0.6750	0.7226
LOSS PARA	0.0004	0.0117	0.0327	0.0510	0.0478
INCID	-4.21	-2.98	-2.08	-2.95	-4.22
DEV	15.480	12.840	14.270	9.040	-0.300

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	22.931	24.517	25.601	26.683	27.140
BETA 2	47.869	49.156	50.616	51.046	51.735
BETA(PR) 1	58.021	54.517	50.913	46.860	42.317
BETA(PR) 2	48.513	41.912	32.934	23.260	15.132
V 1	645.25	660.88	670.65	677.47	684.07
V 2	800.31	838.76	889.56	934.70	950.79
VZ 1	594.25	601.30	604.81	605.32	608.75
VZ 2	536.86	548.55	564.44	587.64	588.83
V-THETA 1	251.40	274.24	289.79	304.22	312.04
V-THETA 2	593.52	634.52	687.55	726.87	746.52
V(PR) 1	1122.1	1035.9	959.3	885.2	823.3
V(PR) 2	810.4	737.1	672.5	639.6	610.0
VTHETA PR1	951.8	843.5	744.6	645.9	554.2
VTHETA PR2	607.1	492.4	365.6	252.6	159.2
U 1	1203.18	1117.74	1034.36	950.16	860.29
U 2	1200.62	1126.90	1053.18	979.47	905.75
M 1	0.5808	0.5958	0.6053	0.6119	0.6183
M 2	0.6864	0.7259	0.7742	0.8185	0.8355
M(PR) 1	1.0099	0.9339	0.8657	0.7995	0.7441
M(PR) 2	0.6951	0.6379	0.5853	0.5601	0.5361
TURN(PR)	9.507	12.605	17.979	23.599	27.185
UUBAR	0.1708	0.1287	0.1244	0.1026	0.1336
DFAC	0.3860	0.4003	0.4201	0.4037	0.3840
EFFP	0.7995	0.8586	0.8810	0.9145	0.8985
EFF	0.7897	0.8516	0.8748	0.9099	0.8933
LOSS PARA	0.0399	0.0316	0.0320	0.0268	0.0336
INCID	-1.58	-2.38	-2.79	-2.94	-2.68
DEV	3.413	3.112	2.134	2.560	6.432

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	100.05
UPSTREAM OF STATOR	100.05
DOWNSTREAM OF STATOR	96.62

Table VIII. (cont)

PERCENT DESIGN SPEED = 109.96

CORRECTED WEIGHT FLOW = 100.10

CORRECTED ROTOR SPEED = 9200.19

PRESSURE RATIO = 1.4193

ADIABATIC EFFICIENCY = 82.7347

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	22.162	24.861	25.547	26.904	26.737
BETA 2	48.908	51.052	51.650	51.995	53.369
BETA(PR) 1	58.423	54.610	51.063	46.827	42.345
BETA(PR) 2	47.287	40.662	33.453	24.309	16.196
V 1	639.39	659.18	669.01	678.00	686.24
V 2	820.15	856.21	882.95	919.82	929.30
VZ 1	592.15	598.10	603.60	604.62	612.87
VZ 2	539.06	538.23	547.84	566.37	554.48
V-THETA 1	241.20	277.13	288.52	306.79	308.74
V-THETA 2	618.11	665.89	692.45	724.78	745.76
V(PR) 1	1130.8	1032.7	960.4	883.7	829.2
V(PR) 2	794.7	709.5	656.6	621.5	577.4
VTHETA PR1	963.4	841.9	747.0	644.5	558.6
VTHETA PR2	583.9	462.3	362.0	255.8	161.0
U 1	1204.58	1119.04	1035.57	951.27	867.30
U 2	1202.02	1128.21	1054.41	980.61	906.80
M 1	0.5747	0.5938	0.6033	0.6120	0.6200
M 2	0.7021	0.7375	0.7656	0.8032	0.8142
M(PR) 1	1.0165	0.9302	0.8660	0.7976	0.7491
M(PR) 2	0.6803	0.6112	0.5693	0.5427	0.5059
TURN(PR)	11.135	13.948	17.009	22.518	26.150
UUBAR	0.0997	0.1056	0.0870	0.0557	0.1015
DFAC	0.4156	0.4373	0.4393	0.4217	0.4285
EFFP	0.8905	0.8958	0.9202	0.9545	0.9227
EFF	0.8841	0.8899	0.9158	0.9519	0.9183
LOSS PARA	0.0238	0.0264	0.0223	0.0144	0.0253
INCID	-1.18	-2.29	-2.64	-2.97	-2.65
DEV	2.187	1.862	2.653	3.609	7.496

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	48.908	51.052	51.650	51.995	53.369
BETA 3	-3.480	-3.480	-3.996	-12.596	-17.756
V 2	820.15	856.21	882.95	919.82	929.30
V 3	605.33	589.44	558.12	526.36	488.27
VZ 2	539.06	538.23	547.84	566.37	554.48
VZ 3	604.22	588.35	556.76	513.69	465.01
V-THETA 2	618.11	665.89	692.45	724.78	745.76
V-THETA 3	-36.74	-35.78	-38.89	-114.79	-148.90
M 2	0.7021	0.7375	0.7656	0.8032	0.8142
M 3	0.5059	0.4946	0.4684	0.4414	0.4088
TURN	52.388	54.532	55.646	64.591	71.125
UUBAR	0.0544	0.0793	0.1046	0.1461	0.1440
DFAC	0.5826	0.6204	0.6591	0.7262	0.7654
LOSS PARA	0.0218	0.0298	0.0367	0.0466	0.0414
INCID	-3.17	-1.09	-1.05	-2.01	-2.58
DEV	15.480	14.560	13.754	5.084	0.044

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	100.10
UPSTREAM OF STATOR	100.10
DOWNSTREAM OF STATOR	96.47

Table VIII. (cont)

PERCENT DESIGN SPEED = 109.92

CORRECTED WEIGHT FLOW = 100.07

CORRECTED ROTOR SPEED = 9197.12

PRESSURE RATIO = 1.4485

ADIABATIC EFFICIENCY = 84.0196

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.73[illegible]	21.944
BETA 1	22.527	24.252	25.450	26.678	27.249
BETA 2	49.683	51.566	52.682	53.628	55.089
BETA(PR) 1	57.947	54.745	51.232	47.214	42.281
BETA(PR) 2	45.965	40.184	33.619	25.[illegible]61	17.044
V 1	648.14	657.96	666.29	672.49	684.85
V 2	839.51	862.23	879.79	905.79	910.82
VZ 1	598.68	599.89	601.63	600.89	608.85
VZ 2	543.17	535.97	533.36	537.15	521.27
V-THETA 1	248.32	270.25	286.33	301.93	313.56
V-THETA 2	640.11	675.41	699.68	729.32	746.91
V(PR) 1	1128.1	1039.3	960.8	884.6	822.9
V(PR) 2	781.4	701.6	640.5	593.[illegible]	545.2
VTHETA PR1	956.1	848.7	749.1	649.2	553.6
VTHETA PR2	561.8	452.7	354.6	251.2	159.8
U 1	1204.45	1118.92	1035.46	951.17	867.21
U 2	1201.89	1128.[illegible]9	1054.30	98[illegible].50	9[illegible]6.71
M 1	0.5830	0.5924	0.6005	0.6065	0.6185
M 2	0.7152	0.7412	0.7613	0.7878	0.795[illegible]
M(PR) 1	1.0147	0.9358	0.8659	0.7978	0.7432
M(PR) 2	0.6658	0.6031	0.5542	0.5158	0.4759
TURN(PR)	11.983	14.560	17.613	22.153	25.238
UUBAR	0.1239	0.0753	0.0560	0.0580	0.1159
DFAC	0.4306	0.4507	0.4593	0.4575	0.4621
EFFP	0.8754	0.9284	0.9504	0.9538	0.9127
EFF	0.8676	0.9241	0.9475	0.9512	0.9081
LOSS PARA	0.0304	0.0190	0.0143	0.0149	0.0288
INCID	-1.65	-2.16	-2.47	-2.59	-2.72
DEV	0.865	1.384	2.819	4.361	8.344

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	100.07
UPSTREAM OF STATOR	100.07
DOWNSTREAM OF STATOR	96.32

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	49.683	51.566	52.682	53.628	55.089
BETA 3	-2.620	-3.480	-4.684	-14.660	-19.272
V 2	839.51	862.23	879.79	905.79	910.82
V 3	595.67	579.19	539.35	498.86	438.03
VZ 2	543.17	535.97	533.36	537.15	521.27
VZ 3	595.05	578.12	537.55	482.62	415.95
V-THETA 2	640.11	675.41	699.68	729.32	746.91
V-THETA 3	-27.23	-35.16	-44.04	-126.25	-137.34
M 2	0.7152	0.7412	0.7613	0.7878	0.7950
M 3	0.4950	0.4840	0.4511	0.4169	0.3650
TURN	52.303	55.046	57.366	68.288	73.361
UUBAR	0.1029	0.0936	0.1059	0.1302	0.1379
DFAC	0.6097	0.6388	0.6842	0.7581	0.8124
LOSS PARA	0.0413	0.0352	0.0371	0.0412	0.0396
INCID	-2.40	-0.57	-0.02	-0.37	-0.86
DEV	16.340	14.560	13.066	3.020	-0.472

Table VIII. (cont)

PERCENT DESIGN SPEED = 109.87

CORRECTED WEIGHT FLOW = 99.22

CORRECTED ROTOR SPEED = 9192.67

PRESSURE RATIO = 1.4643

ADIABATIC EFFICIENCY = 85.6420

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	23.323	23.884	24.633	26.279	26.224
BETA 2	50.451	51.738	53.112	54.574	56.121
BETA(PR) 1	58.234	55.141	51.716	47.594	43.311
BETA(PR) 2	46.500	40.454	34.033	25.732	18.075
V 1	638.12	648.49	657.17	664.69	671.47
V 2	829.67	855.13	870.82	892.00	891.75
VZ 1	585.98	592.95	597.37	595.99	601.46
VZ 2	528.29	529.55	522.72	517.05	497.10
V-THETA 1	252.65	262.56	273.91	294.28	296.27
V-THETA 2	639.74	671.43	696.49	726.86	740.35
V(PR) 1	1113.1	1037.4	964.2	883.8	826.6
V(PR) 2	767.5	695.9	630.8	574.0	522.9
VTHETA PR1	946.3	851.3	756.8	652.6	567.0
VTHETA PR2	556.7	451.5	353.0	249.2	162.2
U 1	1198.98	1113.84	1030.75	946.84	863.27
U 2	1196.43	1122.97	1049.51	976.05	902.59
M 1	0.5759	0.5859	0.5943	0.6015	0.6072
M 2	0.7083	0.7369	0.7550	0.7775	0.7789
M(PR) 1	1.0045	0.9373	0.8719	0.7998	0.7485
M(PR) 2	0.6552	0.5997	0.5469	0.5003	0.4568
TURN(PR)	11.734	14.687	17.583	21.863	25.235
UUBAR	0.1184	0.0608	0.0463	0.0456	0.1149
DFAC	0.4339	0.4564	0.4743	0.4802	0.4949
EFFP	0.8846	0.9434	0.9597	0.9641	0.9145
EFF	0.8772	0.9399	0.9572	0.9620	0.9094
LOSS PARA	0.0287	0.0153	0.0118	0.0117	0.0284
INCID	-1.37	-1.76	-1.98	-2.21	-1.69
DEV	1.400	1.654	3.233	5.032	9.375

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	50.451	51.738	53.112	54.574	56.121
BETA 3	-1.760	-2.620	-4.340	2.884	-19.304
V 2	829.67	855.13	870.82	892.00	891.75
V 3	594.20	563.67	525.82	484.41	408.59
VZ 2	528.29	529.55	522.72	517.05	497.10
VZ 3	593.91	563.08	524.31	483.79	385.62
V-THETA 2	639.74	671.43	696.49	726.86	740.35
V-THETA 3	-18.25	-25.77	-39.79	24.37	-135.07
M 2	0.7083	0.7369	0.7550	0.7775	0.7789
M 3	0.4955	0.4723	0.4409	0.4060	0.3410
TURN	52.211	54.358	57.452	51.690	75.425
UUBAR	0.0883	0.1096	0.1179	0.1370	0.1453
DFAC	0.6023	0.6480	0.6935	0.7145	0.8384
LOSS PARA	0.0354	0.0413	0.0413	0.0447	0.0414
INCID	-1.63	-0.40	0.41	0.57	0.17
DEV	17.200	15.420	13.410	20.564	-1.504

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	99.22
UPSTREAM OF STATOR	99.22
DOWNSTREAM OF STATOR	95.33

Table VIII. (cont)

PERCENT DESIGN SPEED = 99.89

CORRECTED WEIGHT FLOW = 96.35

CORRECTED ROTOR SPEED = 8357.65

PRESSURE RATIO = 1.2354

ADIABATIC EFFICIENCY = 70.5218

ROTOR 1

STATION 1 - STATION 2

	10	30	50	70	90
DIA 1	29.150	27.080	25.060	23.020	20.988
DIA 2	29.088	27.302	25.516	23.730	21.944
BETA 1	22.330	23.430	25.244	26.204	26.435
BETA 2	42.084	44.387	46.396	47.658	48.228
BETA(PR) 1	56.715	53.177	49.490	45.221	40.623
BETA(PR) 2	50.342	40.626	31.926	23.074	14.308
V 1	608.27	622.81	629.89	638.55	645.74
V 2	693.60	776.47	825.50	863.32	894.56
VZ 1	562.65	571.46	569.74	572.92	578.22
VZ 2	514.77	554.89	569.32	581.50	595.93
V-THETA 1	231.11	247.65	268.63	281.96	287.47
V-THETA 2	464.86	543.14	597.77	638.11	667.17
V(PR) 1	1025.2	953.5	877.1	813.4	761.8
V(PR) 2	806.6	731.1	670.8	632.1	615.0
VTHETA PR1	857.0	763.2	666.8	577.4	496.0
VTHETA PR2	621.0	476.0	354.7	247.7	152.0
U 1	1088.15	1010.88	935.48	859.32	783.47
U 2	1085.84	1019.17	952.50	885.83	819.16
M 1	0.5483	0.5622	0.5690	0.5774	0.5843
M 2	0.6055	0.6824	0.7280	0.7643	0.7950
M(PR) 1	0.9242	0.8607	0.7923	0.7355	0.6893
M(PR) 2	0.7042	0.6425	0.5915	0.5596	0.5466
TURN(PR)	6.372	12.551	17.564	22.147	26.315
UUBAR	0.1575	0.1216	0.1261	0.1220	0.1130
DFAC	0.2944	0.3326	0.3444	0.3381	0.3103
EFFP	0.7415	0.8347	0.8584	0.8819	0.9033
EFF	0.7342	0.8290	0.8531	0.8773	0.8993
LOSS PARA	0.0354	0.0305	0.0328	0.0319	0.0285
INCID	-2.89	-3.72	-4.21	-4.58	-4.38
DEV	5.242	1.826	1.126	2.374	5.608

CORRECTED WEIGHT FLOW

UPSTREAM OF ROTOR	96.35
UPSTREAM OF STATOR	96.35
DOWNSTREAM OF STATOR	93.44

STATOR 1

STATION 2 - STATION 3

	10	30	50	70	90
DIA 3	29.164	27.422	25.672	23.874	22.034
BETA 2	42.084	44.387	46.396	47.658	48.228
BETA 3	-5.372	-3.308	-4.340	-10.016	-11.220
V 2	693.60	776.47	825.50	863.32	894.56
V 3	565.65	610.61	635.05	612.62	587.52
VZ 2	514.77	554.89	569.32	581.50	595.93
VZ 3	563.17	609.60	633.23	603.28	576.29
V-THETA 2	464.86	543.14	597.77	638.11	667.17
V-THETA 3	-52.96	-35.23	-48.06	-106.55	-114.32
M 2	0.6055	0.6824	0.7280	0.7643	0.7950
M 3	0.4866	0.5270	0.5479	0.5281	0.5048
TURN	47.456	47.695	50.736	57.674	59.448
UUBAR	0.0320	0.0833	0.0896	0.1671	0.2288
DFAC	0.4843	0.4943	0.5058	0.5725	0.6072
LOSS PARA	0.0128	0.0313	0.0314	0.0538	0.0678
INCID	-10.00	-7.75	-6.30	-6.34	-7.72
DEV	13.588	14.732	13.410	7.664	6.580