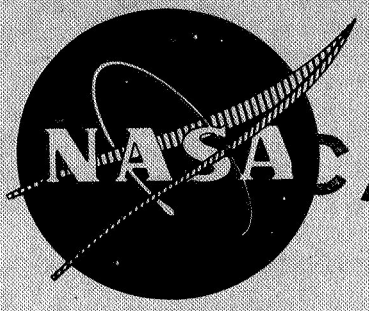
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SINGLE STAGE EXPERIMENTAL EVALUATION OF VARIABLE GEOMETRY GUIDE VANES AND STATOR BLADING

PART IV - DATA AND PERFORMANCE FOR VARIABLE CAMBER GUIDE VANE AND STATOR B

BY

B.A. JONES AND R.P. OSCARSON

Prepared For
National Aeronautics And Space Administration

Contract NAS3-7604

Pratt & Whitney Aircraft DIVISION OF UNITED AIRCRAFT CORPORATION
FLORIDA RESEARCH AND DEVELOPMENT CENTER
BOX 2691, WEST PALM BEACH, FLORIDA 33402

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Technical Management
NASA Lewis Research Center
Cleveland, Ohio

NASA Program Manager: James J. Watt
Air Breathing Engines Division

NASA Research Advisor: L. Joseph Herrig
Fluid Systems Components Division

Pratt & Whitney Aircraft
DIVISION OF UNITED AIRCRAFT CORPORATION
FLORIDA RESEARCH AND DEVELOPMENT CENTER
BOX 2691, WEST PALM BEACH, FLORIDA 33402

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ABSTRACT

A single-stage experimental investigation was conducted to determine the extent that a variable camber inlet guide vane and a two-part stator having adjustable leading and trailing edge metal angles can increase the stable operating range of a compressor front stage. The stage was designed with zero rotor prewhirl at design equivalent rotor speed (SLTO conditions) and 35-degree hub - 20-degree tip prewhirl at 70% of design rotor speed (high Mach number cruise conditions). The cruise configuration permitted stable operation at a lower flow for a given speed than those attainable with the SLTO configuration. At cruise rotor speed and flow conditions, the adiabatic efficiency of the cruise configuration was approximately 7% higher than that of the SLTO configuration.

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SUMMARY

An experimental investigation was conducted with a 0.5 hub/tip ratio single-stage compressor to determine the extent that a variable camber guide vane and a two-part stator having adjustable leading and trailing edge metal angles can extend the range of stable compressor operation. The stage, which resembled the front stage of a typical high cruise flight Mach number compressor, was designed with zero rotor prewhirl at design equivalent rotor speed (sea level takeoff, SLTO conditions), and 35-degree hub - 20-degree tip prewhirl at 70% of design rotor speed (high Mach number cruise conditions). The design rotor tip relative Mach number for the SLTO configuration was 1.15, and the design stage pressure ratio and efficiency were respectively 1.32 and 85.1%. The SLTO configuration was tested over a range of speeds from 50 to 110% of design equivalent rotor speed. The cruise configuration and an intermediate configuration (approximately halfway between the SLTO and cruise IGV and stator settings) were tested from 50 to 100% of design equivalent rotor speed. Design performance goals were met with the SLTO and cruise configurations. The cruise configuration permitted stable operation at a lower flow for a given speed than that attainable with the SLTO configuration. At cruise rotor speed and flow conditions, adiabatic efficiency was approximately 7% higher for the cruise configuration. Moreover, the cruise configuration exhibited a substantial improvement in stall margin over that obtained with the SLTO configuration in the range of rotor speeds between 50 and 80% of design equivalent rotor speed. The intermediate setting of the guide vanes and stator (halfway between the SLTO and cruise configurations) resulted in flow reductions at SLTO and cruise design pressure ratio equal to approximately 40% of the reduction in flow between the SLTO and cruise configuration. The stall limit flow for the intermediate configuration at cruise rotor speed

was approximately 2% less than that for the SLTO configuration and 10% greater than that for the cruise configuration.

INTRODUCTION

The supersonic cruise operating point of fixed-geometry front stages of turbojet engine compressors tends to approach the stall line as cruise Mach number increases. This results from the flow limitation in the compressor rear stages at cruise rotor speed and pressure ratio conditions. This imposes a reduction in compressor inlet flow and axial velocity below that for which the front stages are designed to operate efficiently. When the reduction in front-stage axial velocity becomes proportionally greater than the reduction in blade tip velocity, rotor incidence angle increases above the sea level takeoff design value. If the increase in incidence angle is sufficiently large, the front stage(s) may be subject to stall, which can lead to reduced compressor performance and possibly to compressor surge. One approach in overcoming this problem is to provide mechanical adjustment of the guide vane and stator leading and/or trailing edge metal angles to permit selection of the proper stage velocity triangles over the required operating range.

A single-stage compressor experimental investigation was conducted to evaluate the extent to which variable geometry concepts can be applied to increase the stable operating range of a compressor front stage. A variable camber inlet guide vane, rotor, and two variable geometry stator configurations were designed, fabricated, and tested over a range of equivalent rotor speeds from 50 to 110% of the design rotor speed. The stage was designed with zero rotor prewhirl at design equivalent rotor speed and 35-degree hub - 20-degree tip prewhirl at cruise conditions. Design point (sea level takeoff, SLTO) equivalent rotor speed and flow were respectively 6050 rpm and 265 lb/sec; off-design (simulated high Mach number cruise) equivalent rotor speed and flow were respectively 4235 rpm and 143 lb/sec.

The variable-camber guide vanes comprised modified 63-series airfoil sections and were configured with a fixed leading-edge segment and two articulated flap segments. The rotor, designed with circular arc airfoils, had a tip inlet relative Mach number of 1.15. The stator configurations, comprised of 65-series airfoil sections, were designed to turn the flow back to the near axial direction at the SLTO operating point and to provide a (hypothetical) 2nd-stage rotor prewhirl distribution of

approximately 30-degree hub - 25-degree tip at the cruise operating point. One stator design had a fixed-geometry leading edge and an adjustable trailing edge (Stator A), and the other stator design had adjustable leading and trailing edge geometry (Stator B).

Details of the experimental stage aerodynamic and mechanical design are presented in Reference 1. The results of an annular cascade test program for the preliminary evaluation of candidate variable geometry concepts are presented in Reference 2. The data and performance obtained with the variable camber guide vane, rotor, and Stator A are presented in Reference 3. This report presents the data and performance obtained with the variable camber guide vane, rotor, and Stator B design that had variable leading and trailing edge geometry. The variable-geometry stage was tested with the guide vanes and stator in their SLTO position, cruise position, and an intermediate position halfway between the SLTO and cruise positions.

TEST EQUIPMENT

Facility

The compressor test facility is shown in figure 1. The compressor rotor is driven by a single-stage free turbine that is powered by exhaust gases from a J75 slave engine. Drive turbine speed is controlled by means of the engine throttle. Air entered the compressor test section through a 103-ft combined inlet duct, plenum, and bellmouth inlet and exhausted through an exit diffuser to the atmosphere. A 7-degree diffuser at the plenum inlet and 10:1 bellmouth contraction ratio ensured uniform flow conditions at the compressor inlet.

Compressor Test Rig

The compressor rig, shown in figure 2, comprises bellmouth inlet, test section , and exhaust section. The rotor assembly and shaft are supported on two bearings that transmit loads to the outer case through the stationary leading-edge segments of the variable-geometry inlet guide vanes and the struts in the exhaust case. A set of motor-driven throttle vanes is located in the exhaust case to vary flowrate. A section view of the flowpath is shown in figure 3. The guide vane inlet station is preceded by a flow-straightening section approximately 10-in. long. The inner flowpath wall converges from a diameter of 18.70 in. at the guide vane inlet to a diameter of 25.60 in. at the stator exit. The outer wall diameter converges slightly from 43.20 to 42.10 in. The hub/tip ratio at

the rotor leading edge is 0.492. In general, the flowpath is designed to resemble the front-stage environment of a state-of-the-art high cruise Mach number compressor. The blade rows were spaced sufficiently apart to permit the installation of instrumentation.

A machined aluminum shroud was used for the rotor to prevent damage to the blade tips in the event a rub occurred during operation near or in stall. The nominal blade tip clearance was 0.050 in.

Blading Design

Inlet Guide Vane

The variable camber inlet guide vane was designed to provide axial inlet flow (zero swirl) in the SLTO configuration and 35-degree hub - 20-degree tip swirl distribution in the cruise configuration. Slightly-modified 63-series airfoil sections were used. The basic camber was selected to provide approximately two-thirds of the anticipated air turning requirement at the cruise operating point.

The SLTO and cruise positions were achieved by actuating two articulated flap segments in the appropriate direction to reduce or increase camber angle from the basic design camber angle. A photograph of the guide vane is shown in figure 4. Guide vane geometry details are summarized in table 1a; symbols are defined in Appendix A. Table 1a includes the leading and trailing edge metal angles for an intermediate guide vane setting that was tested following the tests with the SLTO and cruise geometries. Additional design information for the inlet guide vane is presented in Reference 1.

Rotor

The rotor was comprised of 34 blades, designed with circular-arc airfoil sections. The design point inlet relative Mach number at the tip was 1.15 and the design diffusion factor was nominally 0.40. Blade chord length and solidity were representative state-of-the-art values for a high cruise Mach number front stage. A part span shroud was added at 40% span from the tip to reduce blade resonance stress. Rotor geometry details are summarized in table 1b, and additional rotor design information is contained in Reference 1.

Table 1. Design Data

a. Inlet Guide Vane Geometry

Airfoil Series: 63
No. of Blades: 20
Aspect Ratio: 2.642
Thickness Ratio: 0.09

SLTO Configuration

Percent Span (from tip)	κ_1	κ_2	ϕ	γ°	c	σ	δ°
90	-20.2	5.4	25.6	1.2	4.55	1.412	Approximately
70	-20.2	3.7	23.9	0.5	4.55	1.245	1.0 Degree
50	-20.2	1.9	22.1	-0.2	4.55	1.080	Estimated
30	-20.2	0.3	20.5	-0.9	4.55	0.913	
10	-20.2	-1.6	18.6	-1.6	4.55	0.748	

Cruise Configuration

Percent Span (from tip)	κ_1	κ_2	ϕ	γ°	c	σ	δ°
90	-20.2	36.0	56.2	21.1	4.47	1.412	2.2
70	-20.2	34.3	54.5	20.5	4.47	1.245	3.2
50	-20.2	32.5	52.7	19.9	4.47	1.080	4.3
30	-20.2	30.9	51.1	19.2	4.47	0.913	5.9
10	-20.2	29.0	49.2	18.5	4.47	0.748	7.1

Intermediate Configuration

Percent Span (from tip)	κ_1	κ_2
90	-20.2	20.7
70	-20.2	19.0
50	-20.2	17.2
30	-20.2	15.6
10	-20.2	13.7

Table 1. Design Data (Continued)

b. Rotor Geometry

Airfoil Series: Circular Arc
No. of Blades: 34
Aspect Ratio: 2.829

SLTO Configuration

Percent Span (from tip)	κ_1	κ_2	ϕ	$\gamma°$	i_m	c	σ	t/c	δ	$\bar{\omega}'$
90	48.6	18.8	29.8	31.2	1.4	3.24	1.42	0.0744	6.1	0.024
70	52.5	32.5	20.0	41.2	1.4	3.43	1.30	0.0641	4.3	0.024
50	56.1	42.1	14.0	48.2	1.2	3.63	1.20	0.0542	3.8	0.033
30	59.6	48.6	11.0	53.6	0.4	3.82	1.12	0.0445	3.3	0.058
10	63.2	52.9	10.3	57.9	0.0	4.01	1.06	0.0355	3.8	0.097

Cruise Configuration

Percent Span (from tip)	κ_1	κ_2	ϕ	$\gamma°$	i_m	c	σ	t/c	δ	$\bar{\omega}'$
90	Same as SLTO Configuration				-1.7	Same as SLTO Configuration			6.2	0.030
70	Same as SLTO Configuration				2.3	Same as SLTO Configuration			4.3	0.018
50	Same as SLTO Configuration				4.3	Same as SLTO Configuration			2.9	0.030
30	Same as SLTO Configuration				4.9	Same as SLTO Configuration			2.3	0.064
10	Same as SLTO Configuration				4.5	Same as SLTO Configuration			2.5	0.125

Table 1. Design Data (Continued)

c. Stator B geometry

Airfoil Series: 65
No. of Blades: 40
Aspect Ratio: 2.939
Thickness Ratio: 0.08

SLTO Configuration

Percent Span (from tip)	κ_1	κ_2	ϕ	$\gamma°$	i_m	c	σ	$\delta°$	$\bar{\omega}$
90	40.9	-8.7	49.6	16.0	-4.2	2.75	1.28	12.8	0.026
70	37.1	-7.5	44.6	14.5	-3.3	2.88	1.19	10.1	0.025
50	34.7	-7.5	42.2	13.5	-3.2	3.00	1.12	9.3	0.026
30	34.0	-8.0	42.0	13.2	-3.2	3.13	1.07	9.8	0.029
10	36.0	-8.9	44.9	13.5	-4.8	3.27	1.02	11.0	0.032

Cruise Configuration

Percent Span (from tip)	κ_1	κ_2	ϕ	$\gamma°$	i_m	c	σ	$\delta°$	$\bar{\omega}$
90	49.9	17.3	----	----	-2.2	----	1.28	11.9	0.040
70	46.1	18.5	----	----	1.7	----	1.19	9.0	0.038
50	43.7	18.5	----	----	3.2	----	1.12	8.2	0.030
30	43.0	18.0	----	----	3.2	----	1.07	8.4	0.024
10	45.0	17.1	----	----	1.2	----	1.02	9.3	0.027

Intermediate Configuration

Percent Span (from tip)	κ_1	κ_2
90	45.4	4.3
70	41.6	5.5
50	39.2	5.5
30	38.5	5.0
10	40.5	4.1

Stator B

A photograph and section view of Stator B are shown in figure 4. The design point geometry was developed from 65-series airfoil sections; the vanes were designed to preserve as much as possible of the basic 65-series airfoil shape. Pursuant to this objective, the two flap segments were selected to have approximately the same chord length and an overlap of 15% of the basic 65-series chord length. The leading edge of the forward flap is identical to the basic 65-series airfoil up to 30% of the forward flap chord. The geometry of the remainder of the forward flap was generated by combining the thickness distribution for a 65-series airfoil (having a chord length equal to the flap chord and thickness at 30% chord as defined by the basic airfoil) with the basic airfoil suction surface contour. For the rear flap, the uncovered section (55 to 100% of the basic airfoil chord) is identical to the basic 65-series airfoil geometry. A NACA-4-digit series airfoil shape was used for the covered leading edge section (40 to 55% basic chord) to permit low-loss operation over a wide range of incidence angles. A small slot was provided between the two segments in this position to reduce recirculation in the pressure surface cavity that is formed by the two segments.

Minimum loss incidence angle, loss, and deviation angle for the SLTO geometry airfoil were predicted from conventional 65-series airfoil cascade data. Midspan values of stator inlet Mach number and diffusion factor were 0.56 and 0.33, respectively. Additional design information is presented in Reference 1.

To obtain the desired incidence and exit angle distributions for operation at the cruise conditions, the forward segment was rotated to increase the leading edge metal angle 9 degrees and the rear segment was rotated to increase the trailing edge metal angle 26 degrees. The net effect was a decrease in camber angle of 17 degrees. For the intermediate geometry setting, the forward segment was rotated 4.5 degrees and the rear segment was rotated 13 degrees. Stator design details are presented in table 1c.

Instrumentation

Instrumentation was provided to obtain overall and blade element performance data for each blade row. Axial locations of instrumentation stations are indicated in figure 2 and the circumferential locations of instrumentation at each axial station is shown in figures 5 through 7.

Airflow was measured with an ASME standard thin-plate orifice located in the inlet duct, as indicated in figure 1. Inlet total pressure and temperature were measured in the plenum by means of three Kiel-type total pressure probes and six half-shielded total temperature probes. Four equally spaced static pressure taps were located on both the inner and outer wall at Station 0. The static pressure measurements at this station were used to check the orifice weight flow.

Air angles were measured by means of 20-degree wedge traverse probes. Behind the inlet guide vane and stator these probes were located circumferentially as required to keep them out of vane wakes. Each 20-degree wedge probe includes a total pressure tube for total pressure measurement as shown in figure 8.

Total pressure measurement behind the guide vane and stator was accomplished by means of two stationary wake probes at each station. One wake probe had sets of 14-tube rakes at 10, 50, and 90% span locations; the other wake probe had sets of 14-tube rakes at 30 and 70% span locations. The angle settings of both the rake heads and the probe stem were selected to permit alignment with the airstream within approximately ± 5 degrees for both SLTO and cruise geometry. The acceptance yaw angle (pressure accuracy within $\pm 1\%$ of $P - p$) of the rake tubes is ± 10 degrees. The wake probe was translated circumferentially to keep the wake centered on the rakes when the guide vane and stator flaps were in the cruise position. A typical rake head is shown in figure 9. The 20-degree wedge traverse probes used for air angle measurement behind the guide vane and stator also measured total pressure, which provided a check on the midchannel total pressures obtained with wake probes. Total pressures behind the rotor were measured with the two 20-degree wedge traverse probes and two radial rakes with Kiel heads at 10, 30, 50, 70, and 90% span. The traverse probes and radial rakes were spaced so as to approximately average the circumferential total pressure profile generated by the inlet guide vanes. Total temperatures were measured behind the stator using Kiel-type probes mounted on four radial rakes. The temperature rakes were spaced as shown in figure 7; they were located with respect to each other at 0, 1/4, 1/2, and 3/4 of a guide vane gap. Total pressure and temperature rakes are shown in figure 10.

Radial distribution of static pressures behind the guide vanes, rotor, and stator were measured by means of 8-degree wedge traverse probes, which are shown in figure 11. Four approximately equally spaced static pressure taps were provided on the inner and outer walls behind

the guide vane and stator. Four taps were located on the inner wall and twelve taps were located on the outer wall behind the rotor. The eight additional outer wall taps behind the rotor were spaced across a guide vane gap to determine the static pressure variation associated with guide vanes wakes and/or stator flow fields.

Three Kistler high response pressure transducers were installed approximately 30 and 60 degrees apart at 10% span behind the rotor to measure the number, size, and rotational speed of rotating stall zones.

Rotor blades and stator vanes were instrumented with strain gages to measure torsional and bending stresses.

Rotor speed was measured with an electromagnetic sensor mounted adjacent to a 60-tooth gear on the rotor shaft. Gear-tooth-passing frequency was displayed as rpm on an Anadex digital counter.

Steady-state pressure measurements were recorded on a scannivalve multichannel pressure transducer system. Traverse probe data (total and static pressures, air angle, and radial position) were recorded on magnetic tape at the rate of 60 samples (2.0 in. probe travel) per minute. Temperatures were indicated on precision potentiometers and manually recorded.

Orifice static pressure, bellmouth static pressure, plenum pressure, and representative stage exit pressure instrumentation were close-coupled to transducers for high response transient recording of flow and pressure ratio during operation into and out of stall. Similar instrumentation was connected to manometers in the control room to permit setting the desired steady-state pressure ratio and flow conditions.

PROCEDURES

Test Procedure

Overall and blade element performance data were obtained at three settings of the variable camber inlet guide vane and variable geometry Stator B: sea level takeoff, cruise, and an intermediate setting approximately halfway between the SLTO and cruise settings. Data were obtained at 50, 70, 80, 100, and 110 percent of design equivalent rotor speed with the SLTO configuration, and 50, 70, 80, and 100 percent of design rotor speed with the cruise and intermediate configuration. Data points were distributed between maximum flow and near stall flow at each rotor speed.

For the SLTO configuration, points near stall at 100 and 110% of design speed were obtained with a reduced inlet pressure (approximately 11 psia) because of the test stand horsepower limit. For each data point the fixed pressure and temperature instrumentation data were recorded with the traverse probes withdrawn. The traverse probes were subsequently immersed in the airstream and recorded as they were traversed from the inner to the outer wall.

The compressor was operated into and out of stall at each of the test rotor speeds; orifice and bellmouth static pressures, exit total pressure, and rotor speed were recorded on magnetic tape at the rate of 600 samples per minute. Kistler transducer data were also recorded during the excursions into stall to define the rotating stall patterns. Time correlation between the Kistler and stall transient pressure recordings permitted correlation of the Kistler and stall transient data.

Data Reduction Procedure

Data reduction was accomplished in four steps. Initially, the raw data compiled on magnetic tape and IBM cards were converted to engineering units that were subsequently recompiled on a storage tape and tabulated for preliminary inspection. The second data reduction step accomplished the following:

1. Mach number corrections, as required, for traverse probe data

2. Correction of pressure and temperature data to NASA Standard Day conditions

3. Mass averaging of guide vane and stator wake pressures (these were subsequently performed in a separate computer program)

4. Calculation of corrected flow

5. Calculation of radial distribution of flow parameter (for radial mass flow averaging of total pressures in subsequent procedure)

6. Circumferential arithmetic averaging of fixed and traverse instrumentation data.

The results of this data reduction step were printed to permit a more detailed inspection of the data to eliminate apparent inconsistencies prior to the calculation of performance and vector diagram variables.

Pressure ratios were calculated for the rotor, guide vane-rotor, and the entire stage. Stage inlet total pressure was corrected to the NASA Standard Day conditions, 14.69 psia. The guide vane, rotor, and stator exit total pressures were weighed according to local mass flow to obtain the average values. The guide vane and stator wake total pressures at each radial measuring station were mass-averaged using the local total pressures in the wake and the 8-degree wedge probe static pressure to define the local Mach numbers. Mass flux was then obtained from the relationship

$$\bar{m} = \frac{W\sqrt{T}}{PA} = \sqrt{\gamma g/_R}\ M\left[1 + \frac{\gamma-1}{2} M^2\right]^{1/2} p/P$$

where T is measured total temperature and A is the flow area associated with each total pressube tube. With the radial distribution of total pressure and mass flux thus calculated, the total pressures were mass-averaged in the radial direction. Behind the rotor, the total pressures obtained with the two 20-degree wedge probes were arithmetically averaged, and the resulting radial distribution was mass-flow-averaged using the 8-degree wedge probe static pressure and stator exit radial temperature distribution to define weight flow.

Performance and vector diagram calculations were performed two ways: one method used the measured static pressure distributions to define the velocity distributions at each axial station; the second method, a streamline analysis, calculated a static pressure distribution that satisfied radial equilibrium and continuity. For the streamline analysis calculation, adjustments could be made to an input boundary layer displacement factor to achieve agreement between the calculated and measured static pressure. The primary purpose for using the streamline analysis computer program was to permit translation of the velocity diagram data from instrumentation axial stations to the respective adjacent blade row leading and trailing edge stations for comparison with the design velocity diagram results (Reference 1). The translation was performed with the assumption of isentropic flow and constant angular momentum along design stream annuli whose centers intersected each blade row leading edge at 10, 30, 50, 70, and 90% span positions from the tip. The velocity diagram data presented herein were calculated by means of the streamline analysis computer program and correspond to the leading and trailing edges of the rotor and stator blade rows as defined by the dashed lines in figure 3. Loss coefficient calculations for the guide vane and stator were performed in a separate computer program to permit use of the wake freestream total pressure

as the upstream pressure and to permit the elimination of certain rake tube pressures that were apparently faulty and affected the credibility of the calculated loss coefficient. Rotor overall performance and loss coefficients were based on inlet total pressures that resulted from integration of the as-measured guide vane wake pressures. The discrepancies in guide vane wake pressures that influenced guide vane loss coefficients had a negligible effect on the calculated rotor loss. Because of the sensitivity of the calculated rotor blade relative total pressure to static pressure, the rotor loss coefficients were based on the static pressure values measured at the instrumentation stations rather than those calculated for the leading and trailing edge stations. Consequently, the loss coefficient data for the three blade rows correspond to the instrumentation stations upstream and downstream of each blade row (along the aforementioned design streamline) rather than to the blade row leading and trailing edges.

PRESENTATION OF DATA

Overall Performance

Overall performance data are presented in terms of pressure ratio and adiabatic efficiency as functions of corrected weight flow, $W\sqrt{\theta}/\delta$; specific weight flow, $W\sqrt{\theta}/\delta A_A$; and equivalent rotor speed, $N/\sqrt{\theta}$. Overall performance is also summarized in terms of pressure rise coefficient, Ψ , as a function of flow coefficient, ϕ . Definitions of calculated performance variables and symbols are presented in Appendix A.

Pressure ratio and efficiency for the rotor, guide vane-rotor, and guide vane-rotor-stator B are presented respectively in figures 12, 13, and 14 for the SLTO configuration; in figures 15, 16, and 17 for the cruise configuration; and in figures 18, 19, and 20 for the intermediate configuration. The dashed-line portion of the curves in figures 14, 17, and 20 refer to transient data, and the data point on the stall line is the incipient stall point determined from the transient data. The corrected flows and pressure ratios for steady-state data points are tabulated in table B-1. Efficiency contours are presented for the three configurations in figure 21, and the pressure rise coefficient, Ψ , is presented as a function of the flow coefficient, ϕ, in figure 22.

Two qualifying statements must be made concerning the efficiency data presented in figures 12, 13, 15, 16, 18, and

19. First, the mass-average temperature used in the efficiency calculations was based on the temperature and flow distributions measured at Station 2A downstream of the stator. Redistribution of the flow through the stator may produce a slight difference between the mass-average temperature behind the rotor and the value based on stator exit conditions. This temperature difference would be reflected in the rotor and guide vane-rotor efficiencies. The second qualification concerns the use of measured guide vane wake total pressure (as discussed under Data Reduction Procedure) in the calculation of rotor pressure ratio and efficiency. Discrepancies in rotor efficiency, resulting from observed discrepancies in the guide vane wake profiles, are within $\pm$1.0 percent.

Although the performance levels in figures 12, 13, 15, 16, 18 and 19 are generally correct for the rotor and guide vane-rotor combination, a more valid assessment of stage and blade-row performance is presented in the overall performance data in figures 14, 17, and 20, and the detailed blade element data in the following section.

Figure 14 indicates that the SLTO configuration slightly exceeded its predicted performance. The predicted stage pressure ratio and efficiency were 1.32 and 85.1% compared with measured values of 1.347 and 87.8% at the design flowrate. The higher measured performance is partially attributable to slightly high rotor tip loading due to slightly negative swirl produced by the guide vanes in their SLTO position, as seen in figure 23.

(Note in figures 12 through 14 and in table B-1 that only three data points were processed for the 110% of design rotor speed condition. Discrepancies in the plenum pressure measurement were noted for the other three data points, which resulted in questionable performance values. The source of error was not discovered and the three questionable data points were, therefore, omitted from the data presentation).

Figure 17 shows that the predicted stage pressure ratio of 1.129 and efficiency of 88.3% for the cruise configuration geometry were exceeded with a measured pressure ratio of 1.15 and corresponding efficiency of 90% at the cruise design flow.

The intermediate configuration efficiency for cruise design flow in figure 20 is about halfway between the SLTO and cruise configuration efficiencies for the same flow in figures 14 and 17. The corresponding pressure ratio for the intermediate configuration was close to that obtained with the SLTO geometry. The improvement in

efficiency at cruise design conditions, as the stage geometry was changed from the SLTO configuration to the cruise configuration, is indicated by the efficiency contours in figure 21.

The pressure coefficient-flow coefficient characteristics in figure 22 indicate that the SLTO and cruise configurations are fairly well matched with their respective design conditions.

Blade Element Performance for Sea Level Takeoff Configuration

Inlet Guide Vane; SLTO

Guide vane exit air angle distributions for the sea level takeoff configuration are presented in figure 23. The design distribution is shown for comparison with the data. The distribution in figure 23 indicates only a slight variation from the zero swirl design distribution. The swirl distribution corresponding to design flow imposed slightly higher incidence on the rotor tip relative to design incidence conditions. The wide variation of swirl angle with flow in the tip region is attributable to (1) influence of the rotor on the static pressure gradient in the tip region ahead of the rotor and (2) possible influence of the relief cut in the tip of the guide vane flap to permit wall clearance in the cruise configuration. A similar trend of tip region swirl angle variation with flow was noted in the Stator A test program reported in Reference 3.

Guide vane loss coefficient for the hub, mean, and tip sections are presented in figure 24. Because the guide vane loss coefficients were calculated in a separate computer program and involved the detailed inspection of each guide vane wake, only the data for the 70 and 100% design rotor speeds at the hub, mean, and tip sections were processed. These results provide assessment of the guide vane losses with respect to spanwise variation and Mach number. The loss coefficient values obtained with the Stator A SLTO configuration of Reference 3, also presented in figure 24, indicate good agreement with the Stator B SLTO configuration results.

Guide vane velocity diagram data for all five spanwise measuring stations are presented in table B-2.

Rotor; SLTO

The rotor inlet relative Mach number and air angle distributions achieved with the variable camber guide vane and Stator B in the sea level takeoff position at design equivalent rotor speed are shown in figure 25. The distributions of both Mach number and air angle that correspond to near design flow are in good agreement with the indicated design distribution.

Rotor diffusion factor, deviation angle, and loss coefficient for design equivalent rotor speed are shown in figures 26 through 30. The measured diffusion factors and deviation angles are in generally good agreement with the design values.* The rotor losses are generally greater than the predicted values. Minimum loss incidence angles for the 10 and 30% span locations (figures 26 and 27) are approximately 4 degrees greater than the predicted incidence angles for minimum loss.

Static pressure measurements obtained behind the rotor at the outer wall locations shown in figure 6 are presented as a function of equivalent guide vane and stator blade gap in figure 31. The pressure distribution indicates two regions of high and low pressure relative to a guide vane gap and one region of high and low pressure relative to a stator gap. The circumferential variation in static pressure is considered to be associated with the stator flow field because (1) the measured guide vane wake at 10% span from the tip was relatively small (figure 32) and (2) the static pressure taps at Station 2 were in close proximity to the stator leading edge (figure 3).

The outer wall value of static pressure obtained from extrapolation of the 8-degree wedge traverse probe static pressure data is shown in figure 31. The extrapolated value is in good agreement with the average of the wall static pressures.

Additional rotor velocity diagram and blade element performance data are presented in table B-2.

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* The rotor diffusion factor design points presented in figures 23 through 27 are defined by the corresponding equation in Appendix A. This definition accounts for the effect of the streamline diameter change across the rotor. The effect of this change was significant in the rotor hub region. The predicted rotor diffusion factors presented in Reference 1 do not account for the streamline diameter change and should not be used for comparison with the data in these figures.

Stator B; SLTO

Stator B inlet conditions for the sea level takeoff configuration are shown in figure 33. The air angle distribution for design flow is in fair agreement with the indicated design distribution. The Mach numbers for design flow are low relative to the design values between hub and midspan.

Stator B diffusion factor, deviation angle, and loss coefficient are presented as functions of incidence angle at the five spanwise measuring stations in figures 34 through 38. In general, the measured diffusion factor, deviation angle, and loss coefficient are in favorable agreement with the respective predicted values with the exception of the hub section loss coefficient, which is substantially greater than the predicted value.

Exit air angle distributions for the Stator B SLTO configuration are compared in figure 39 with the design exit air angle distribution. The measured air angles are slightly less (approximately 2 degrees) than the design values across the span.

Additional Stator B blade element data are presented in table B-2.

Blade Element Performance for Cruise Configuration

Inlet Guide Vane; Cruise

The swirl distribution achieved with the variable camber inlet guide vane in the cruise configuration at cruise (70% of design equivalent) rotor speed is compared with the design distribution in figure 40. The measured swirl distribution is relatively flat in the hub and tip regions with the exception of the unusually high angle at 10% span for the near stall flow conditions. The swirl distributions in figure 40 are characteristically different from the distributions obtained with the same guide vane configuration in the Stator A tests of Reference 3. Possible reasons for this difference will be discussed in the final report under the contract program. Guide vane loss coefficients for the hub, mean, and tip sections are presented as a function of Mach number in figure 41. Additional guide vane data are contained in table B-3.

Rotor; Cruise

Rotor inlet relative Mach number and air angle achieved with the cruise guide vane configuration at cruise rotor speed are shown in figure 42. The measured Mach number distribution is close to the design Mach number distribution. The Mach numbers in the hub region are slightly high compared to the design values. The experimental values of inlet relative air angle for design flow agree with the design values between 10 and 50% span and increase to about 4 degrees higher than the design value at 90% span.

As a matter of interest, the relative air angle distribution obtained with the SLTO guide vane configuration at cruise rotor speed and flow conditions is included in figure 42 for comparative purposes. This comparison illustrates the high incidence angles that a fixed sea level takeoff geometry stage would encounter at the specified cruise conditions.

Rotor diffusion factor, deviation angle, and loss coefficient for cruise rotor speed conditions are presented in figures 43 through 47. In general, the experimental values compare well with the predicted values at all span locations. The rotor losses are slightly higher than predicted between the midspan and hub region. The minimum loss incidence angle in the tip region appears to occur at a lower incidence than the predicted minimum loss incidence.

Stator B; Cruise

Stator B inlet conditions for the cruise configuration at cruise rotor speed are shown in figure 48. The experimental Mach number distribution for design flow is in good agreement with the design values. The experimental air angles for design flow agree with the design values in the hub and tip regions and are slightly higher at midspan.

Stator B diffusion factor, deviation angle, and loss coefficient for cruise configuration at cruise rotor speed are shown in figures 49 through 53. The measured diffusion factors are slightly lower than the values predicted for the design air turning at cruise conditions. Deviation angles are in good agreement with the predicted values. The stator losses are appreciably higher than the losses predicted for a conventional stator designed for the same air turning and operation at minimum loss incidence. The relatively high losses are attributed to the relatively

broad wake generated by the two segments of the Stator B cruise configuration. A midspan wake total pressure profile for near cruise design flow conditions is shown in figure 54.

Exit air angles for the Stator B cruise configuration are compared with the design exit air angles in figure 55. Good agreement is seen between the measured and design air angle values, particularly for the cruise design flow point.

Additional Stator B velocity diagram and performance data for the cruise geometry configuration are presented in table B-3.

Blade Element Performance for Intermediate Configuration

Blade element performance was obtained with the variable guide vanes and Stator B positioned midway between the SLTO and cruise configuration positions. The blade element performance results obtained with this configuration at the 70, 80, and 100% equivalent rotor speed operating conditions are presented in figures 56 through 69. In each figure the predicted design information for the SLTO and cruise operating points are presented for comparison with the data. Inlet guide vane exit air angles and losses are presented only for the 70 and 100% rotor speeds. Additional velocity diagram and blade element performance data for the intermediate configuration are presented in table B-4.

Inlet Guide Vane; Intermediate

Inlet guide vane swirl distributions for 70 and 100% design equivalent rotor speed conditions are shown in figure 56. The swirl distribution is similar to that obtained with the cruise geometry (figure 40).

Guide vane loss coefficient at the root, midspan, and tip sections for the 70 and 100% rotor speed conditions are presented in figure 57. The loss coefficient levels are similar to those obtained with the SLTO guide vane configuration.

Rotor; Intermediate

Rotor inlet relative Mach number and air angle distributions for the 70, 80, and 100% rotor speed conditions are shown in figure 58. The maximum and near

stall flow data points are presented to show the overall range at each rotor speed condition.

Rotor diffusion factor, deviation angle, and loss coefficient are presented as functions of incidence angle in figures 59 through 63. The general agreement between experimental results and those predicted for the respective SLTO and cruise configurations indicates that the intermediate guide vane configuration permits the rotor to operate within its low-loss range at both SLTO and cruise rotor speeds. It should be recalled, however, that the intermediate configuration overall pressure ratio and flow did not match either the SLTO or cruise design conditions, and would not be a suitable fixed-geometry stage for the specified operating range.

Stator B; Intermediate

Stator inlet Mach number and air angle distributions for maximum and near stall flow conditions are compared in figure 64 with the SLTO and cruise design distributions.

Blade element performance for the Stator B intermediate configuration is presented in figures 65 through 69. The values of diffusion factor, deviation angle, and loss coefficient obtained with the intermediate position are consistent with SLTO and cruise configuration values.

Stall Transient Performance

Stall transient data are presented in figures 70, 71, and 72 in terms of pressure ratio versus corrected weight flow. Each figure includes (1) the steady-state overall performance curve for reference, (2) the transient overall performance curve based on the arithmetic average of stage exit total pressures measured with a single radial rake, and (3) a tabulation of rotating stall pattern results derived from Kistler transducer data. The transient data pressure ratios may be less than or slightly greater than the steady-state (mass flow average) pressure ratios depending upon the radial rake position with respect to stator wakes.

The rotating stall patterns determined from the three Kistler transducers located at 10% span are characterized by a single stall zone that covers approximately one-half of the annulus (circumferentially) and rotates at about one-half of the rotor speed. The stall zone appearance is coincident with the stall point determined from the stall transient data. This point is indicated as point number (1) in the figures. When the throttle vanes are opened and the stage comes out of stall, the size of the

stall zone diminishes, as indicated by the values of percent area tabulated for the last point number in each figure. For the SLTO configuration operating at 70% rotor speed (figure 71) the rotating stall zone disappeared after the stage's initial stall, and operation in stall was fairly steady. The stall zone reappeared as the stage was operated out of stall, and finally diminished in size as indicated in the figure. A similar result was obtained with the Stator A configuration of Reference 3.

A sample of the stall transient data and Kistler transducer traces are presented for the SLTO configuration operating at 100% rotor speed in figure 73. The method used for determining the rotating stall patterns from Kistler transducer data is discussed in Appendix C.

CONCLUDING DISCUSSION

Tests were conducted with a 0.5 hub/tip ratio compressor stage comprising a variable camber inlet guide vane, rotor, and a variable geometry stator having adjustable leading and trailing edge metal angles. Two design configurations that corresponded to SLTO and supersonic Mach number cruise operating conditions, and a third configuration geometrically midway between the two design configurations, were evaluated. Each of the three configurations were tested over a range of rotor speed and flow that encompassed both the SLTO and cruise design point conditions.

At the SLTO design conditions the SLTO configuration achieved a pressure ratio and adiabatic efficiency of 1.347 and 87.8%, respectively, compared to predicted values of 1.32 and 85.1%. At cruise design conditions the cruise configuration achieved a pressure ratio and efficiency of 1.15 and 90%, compared to predicted values of 1.129 and 88.3%. The efficiency of the SLTO configuration at cruise rotor speed and flow was 83%. In general, the cruise configuration permitted operation at lower flows and with correspondingly higher efficiencies than the SLTO configuration at the cruise rotor speed. Thus, the variable geometry features of the stage permitted efficient, stall-free operation over a wider range of corrected flow than that possible with the SLTO (fixed-geometry) configuration.

The Stator B configuration permitted adjustment of both the leading and trailing edge metal angles for operation at other than SLTO design conditions. This adjustment resulted in the desired match between rotor exit and stator inlet, and stator exit and hypothetical 2nd-stage rotor inlet conditions at the cruise design point. However, for the cruise setting the stator minimum

losses at all span locations were significantly higher than those predicted for a conventional stator designed with the same air turning requirement. The high losses resulted from the generation of a broad wake that was considered to be the product of mixed wakes from the two airfoil segments of Stator B. Although the Stator B rear airfoil segment leading edge was designed to operate with low losses over a wide range of incidence angle (Reference 1), it is apparent that additional design criteria, pertinent to tandem airfoil design, are necessary to define a low-loss Stator B type configuration.

REFERENCES

1. "Single Stage Experimental Evaluation of Variable Geometry Guide Vanes and Stators, Part I - Analysis and Design," NASA CR-54554, PWA FR-2112, August, 1968.

2. "Single Stage Experimental Evaluation of Variable Geometry Guide Vanes and Stators, Part II - Annular Cascade Investigation of Candidate Variable Geometry Designs," NASA CR-54555, PWA FR-2297, July, 1967.

3. "Single Stage Experimental Evaluation of Variable Geometry Guide Vanes and Stators, Part III - Data and Performance for Variable Camber Guide Vanes and Stator A," NASA CR-54556, PWA FR-2638, December 1968.

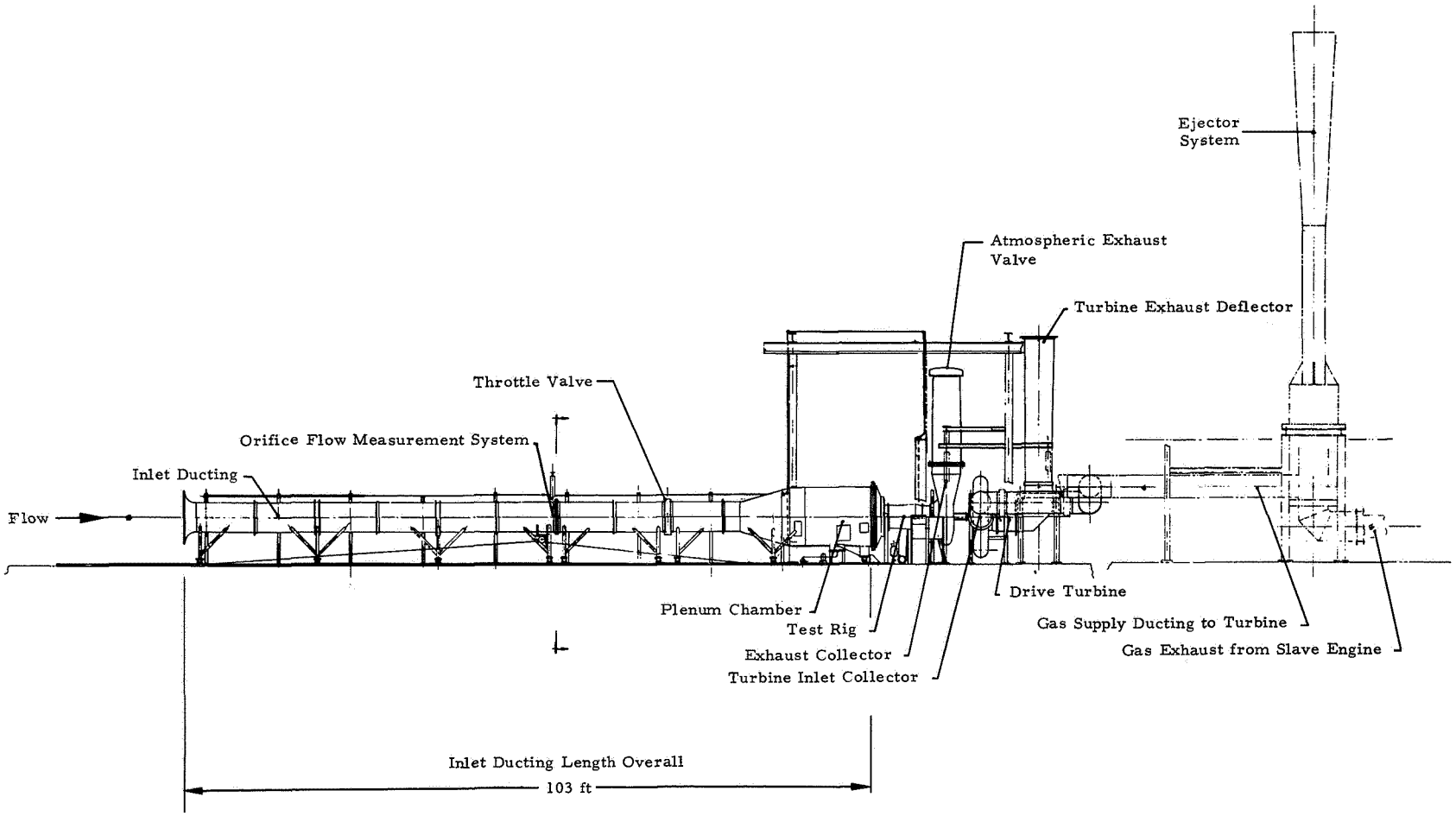


Figure 1. Compressor Research Facility

FD 10891D

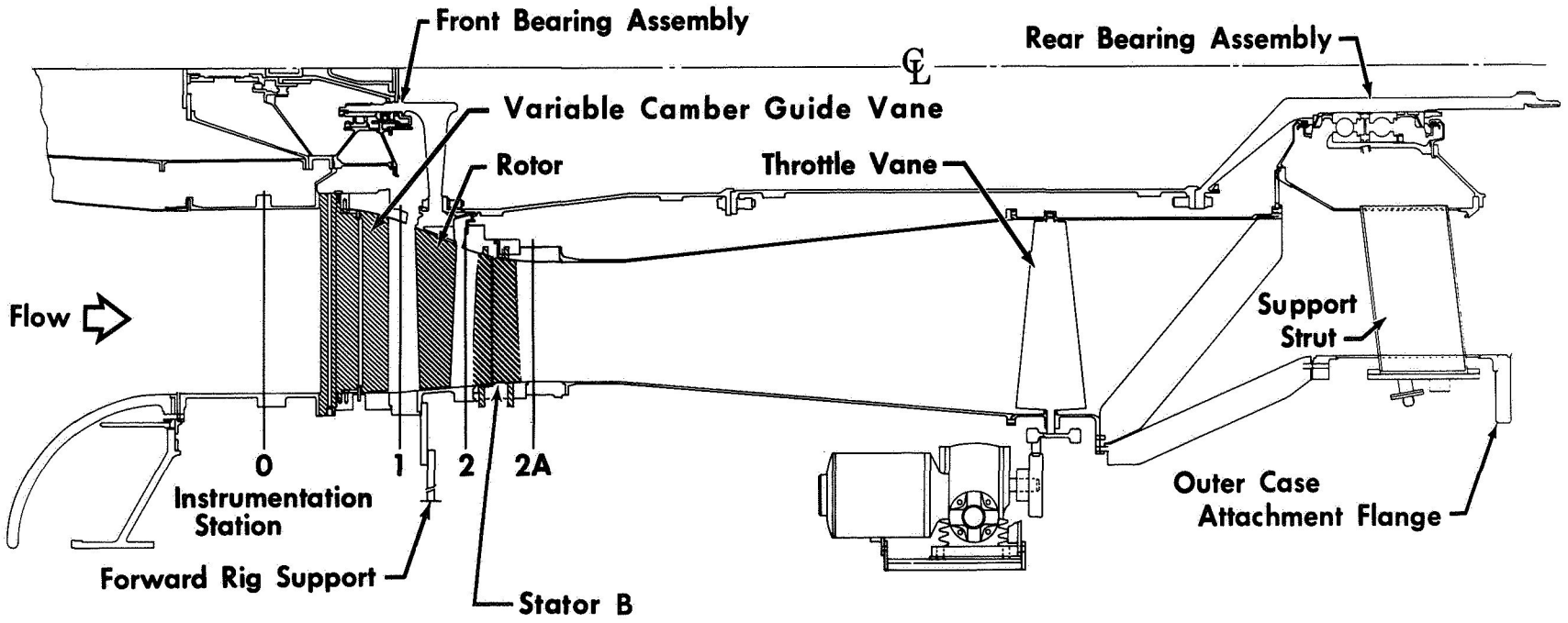


Figure 2. Compressor Rig

GS 2120D

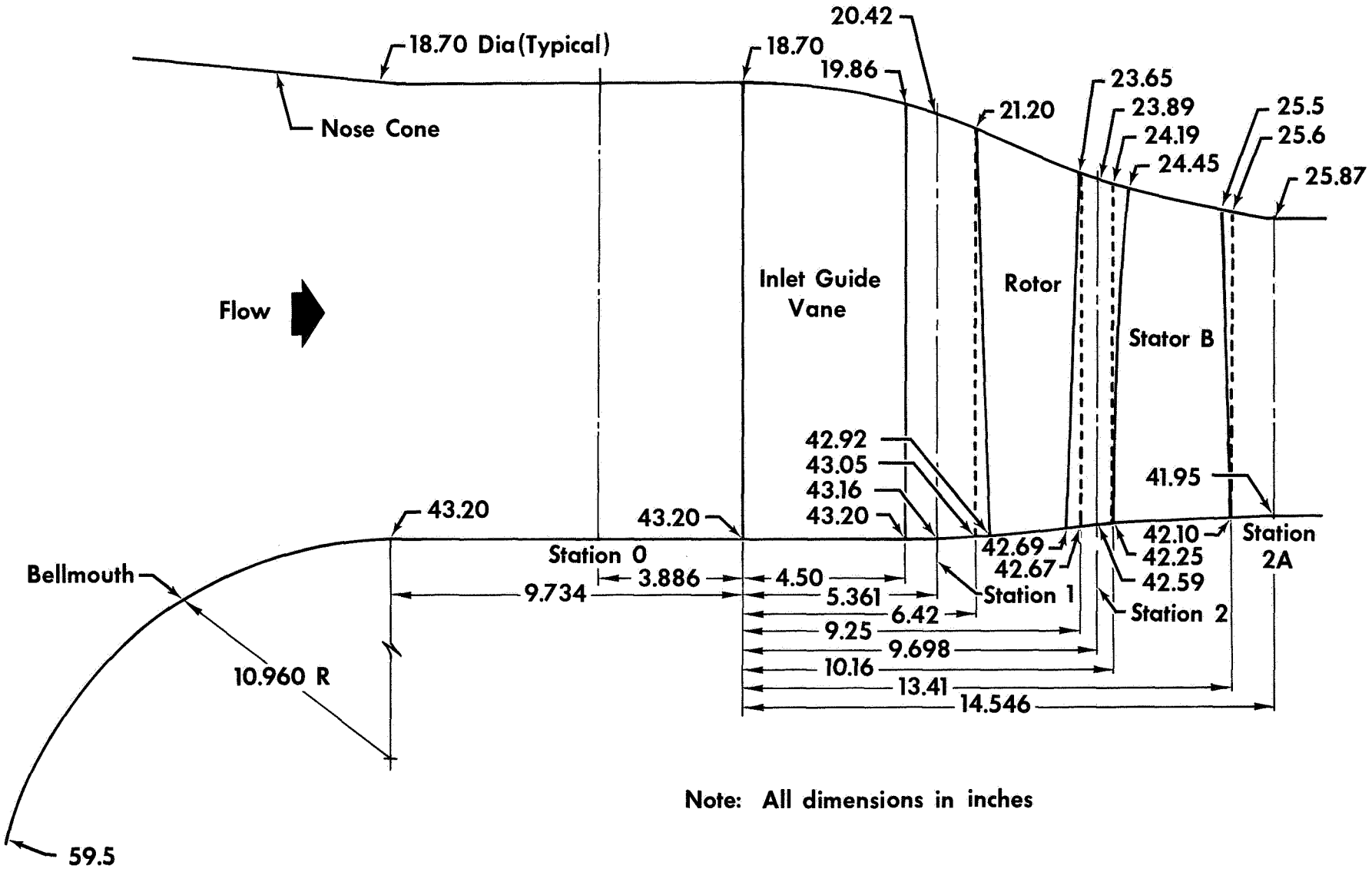


Figure 3. Section View of Flowpath

GS 6614A

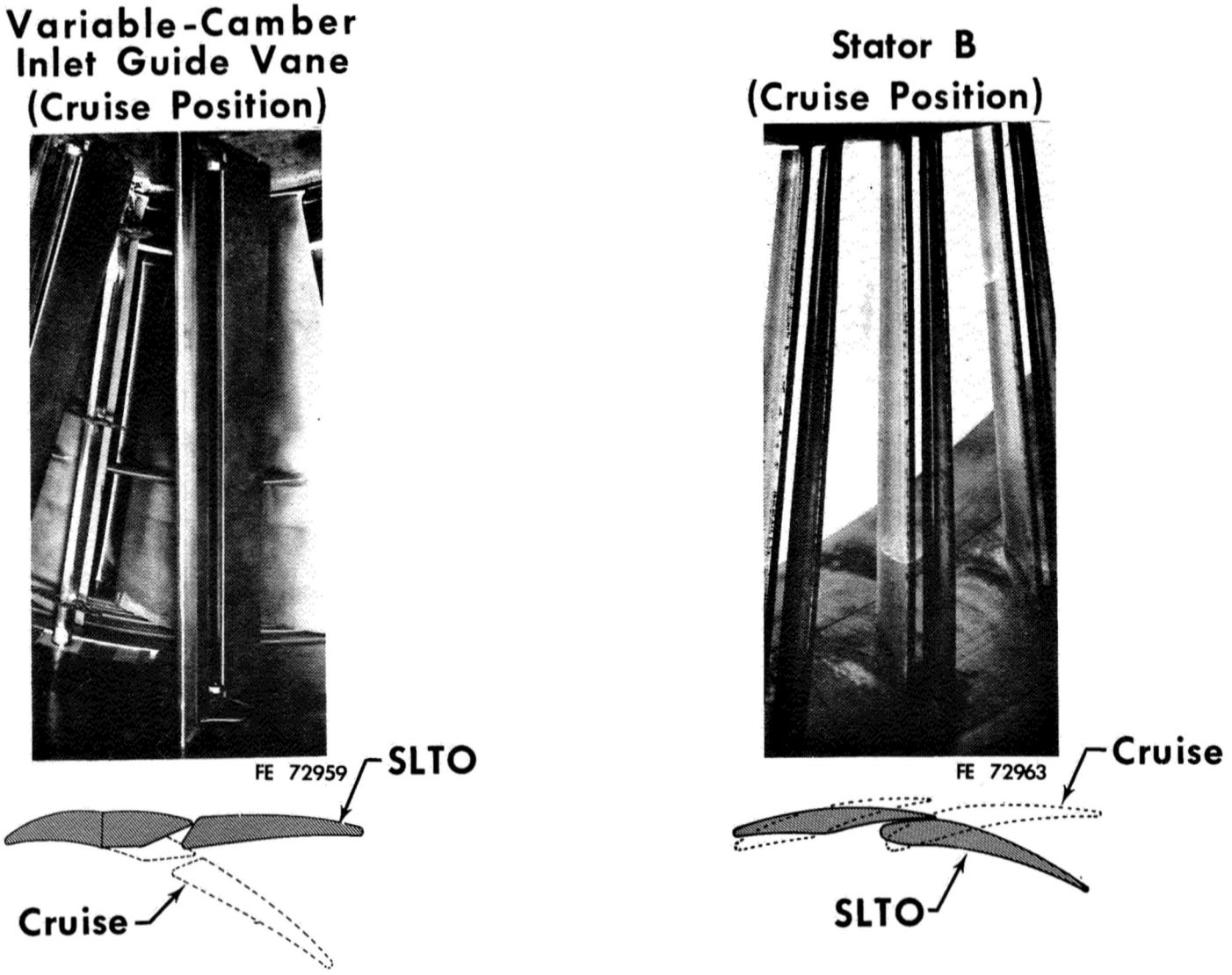
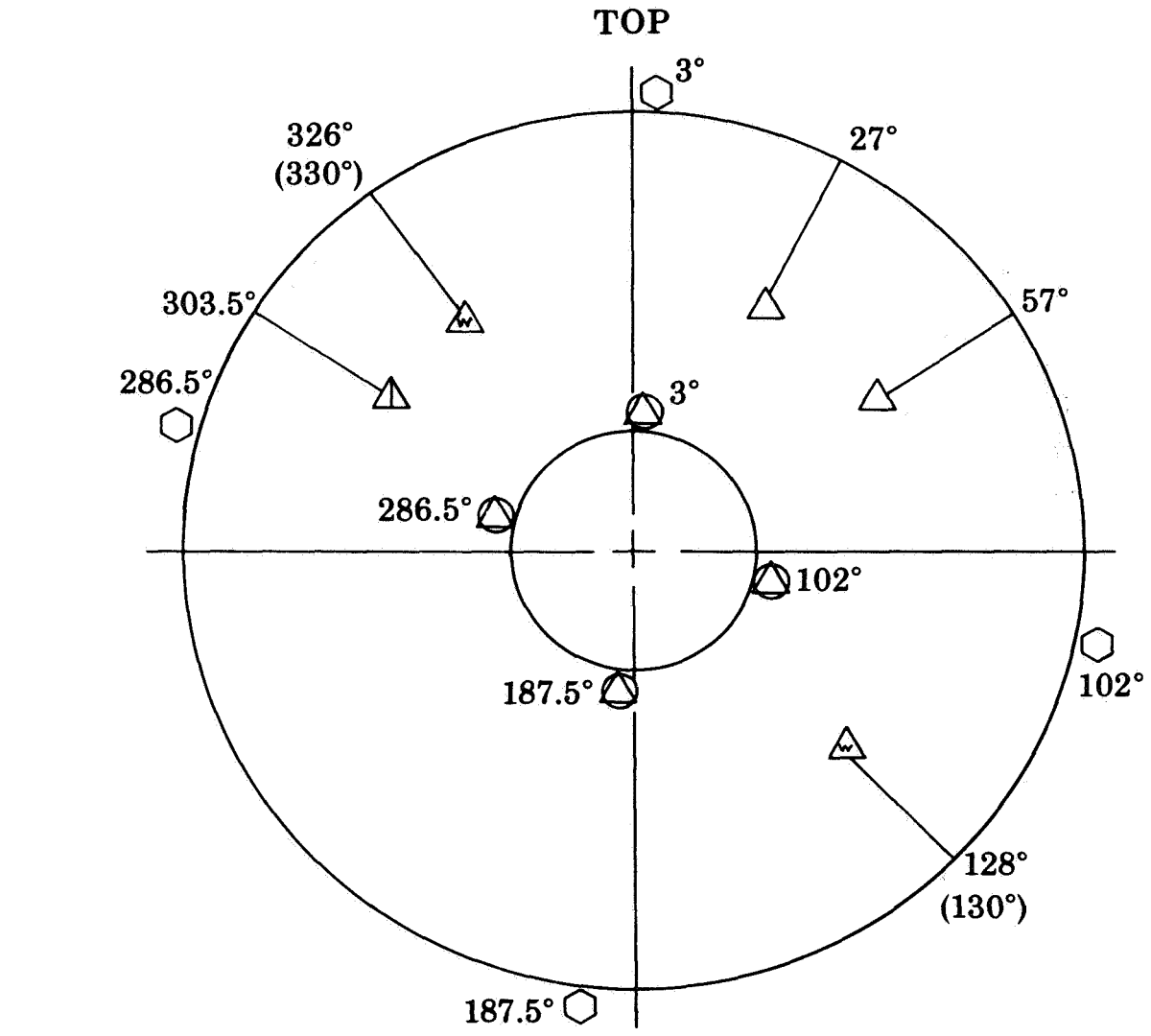


Figure 4. Variable Geometry Inlet Guide Vane and Stator B GS 6613C



OD Wall Static Pressure (4)
ID Wall Static Pressure (4)
20-Degree Wedge Traverse Probe (2)
8-Degree Wedge Traverse Probe (1)
Wake Total Pressure Rake (2)
(°) Indicates Wake Rake Location For Cruise Configuration

Figure 5. Instrumentation Station 1, View Looking Forward FD 25194

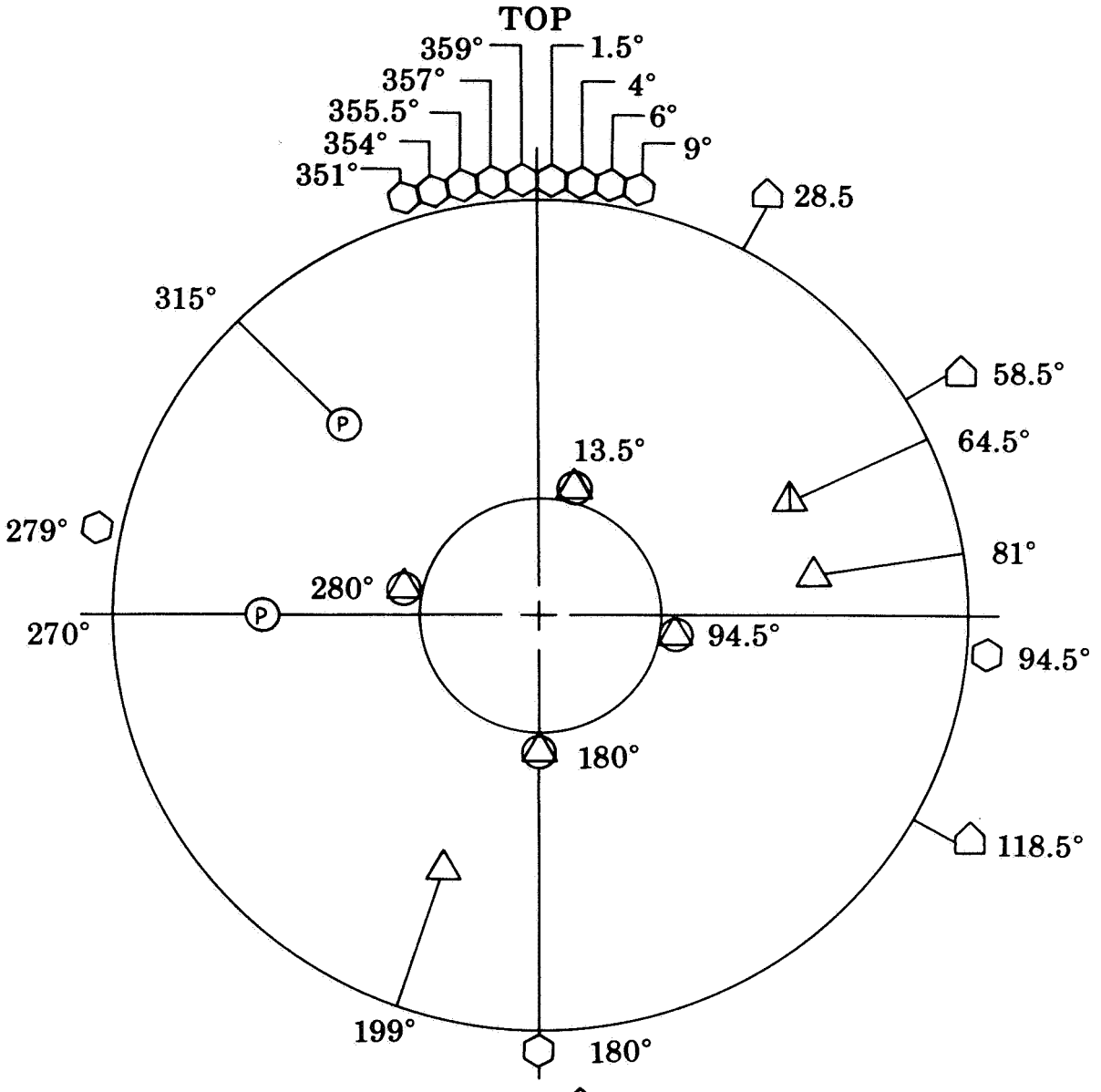
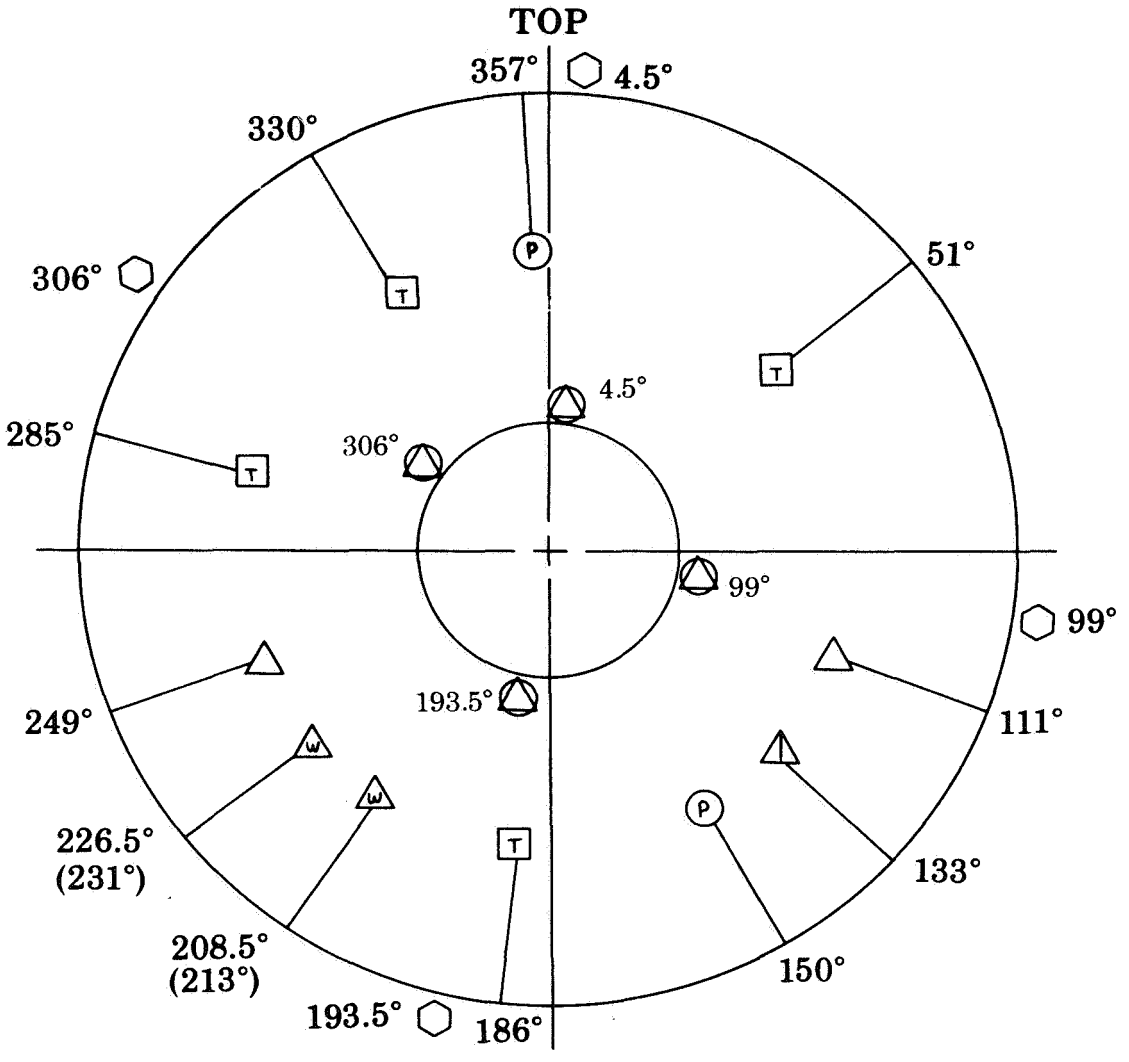


Figure 6. Instrumentation Station 2, View Looking Forward FD 25195



- OD Wall Static Pressure (4)
- ID Wall Static Pressuree(4)
- 20-Degree Wedge Probe (2)
- 8-Degree Wedge Traverse Probe (1)
- Wake Total Pressure Rake (2)
- (°) Indicates Wake Rake Location For Cruise Configuration
- T Temperature Rake (10, 30, 50, 70 and 90% Span) (4)
- P Kiel Total Pressure Probe (10, 30, 50, 70 and 90% Span) (2)

Figure 7. Instrumentation Station 2A, View Looking Forward FD 25196

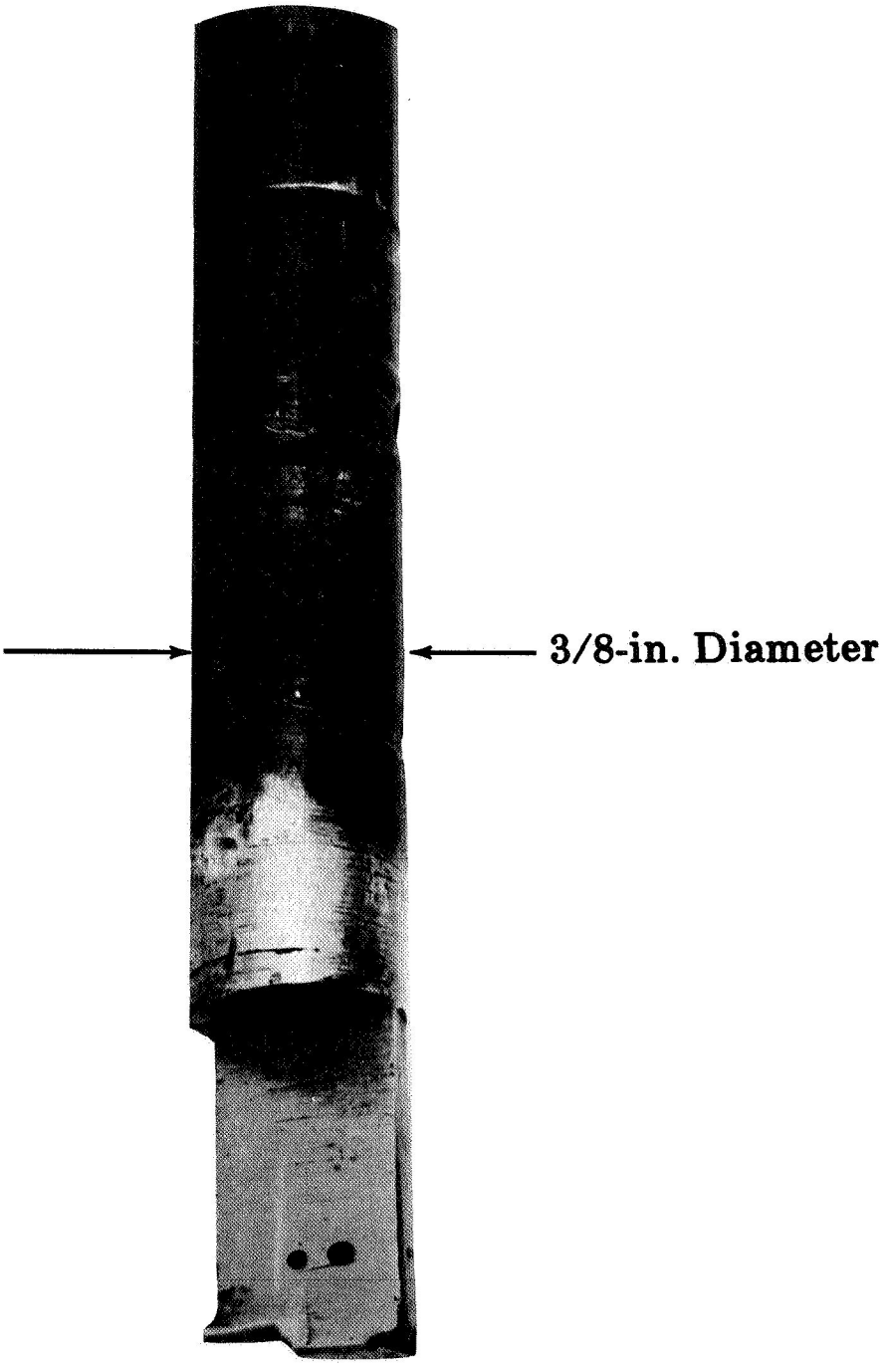


Figure 8. 20-Degree Wedge Probe FD 25197

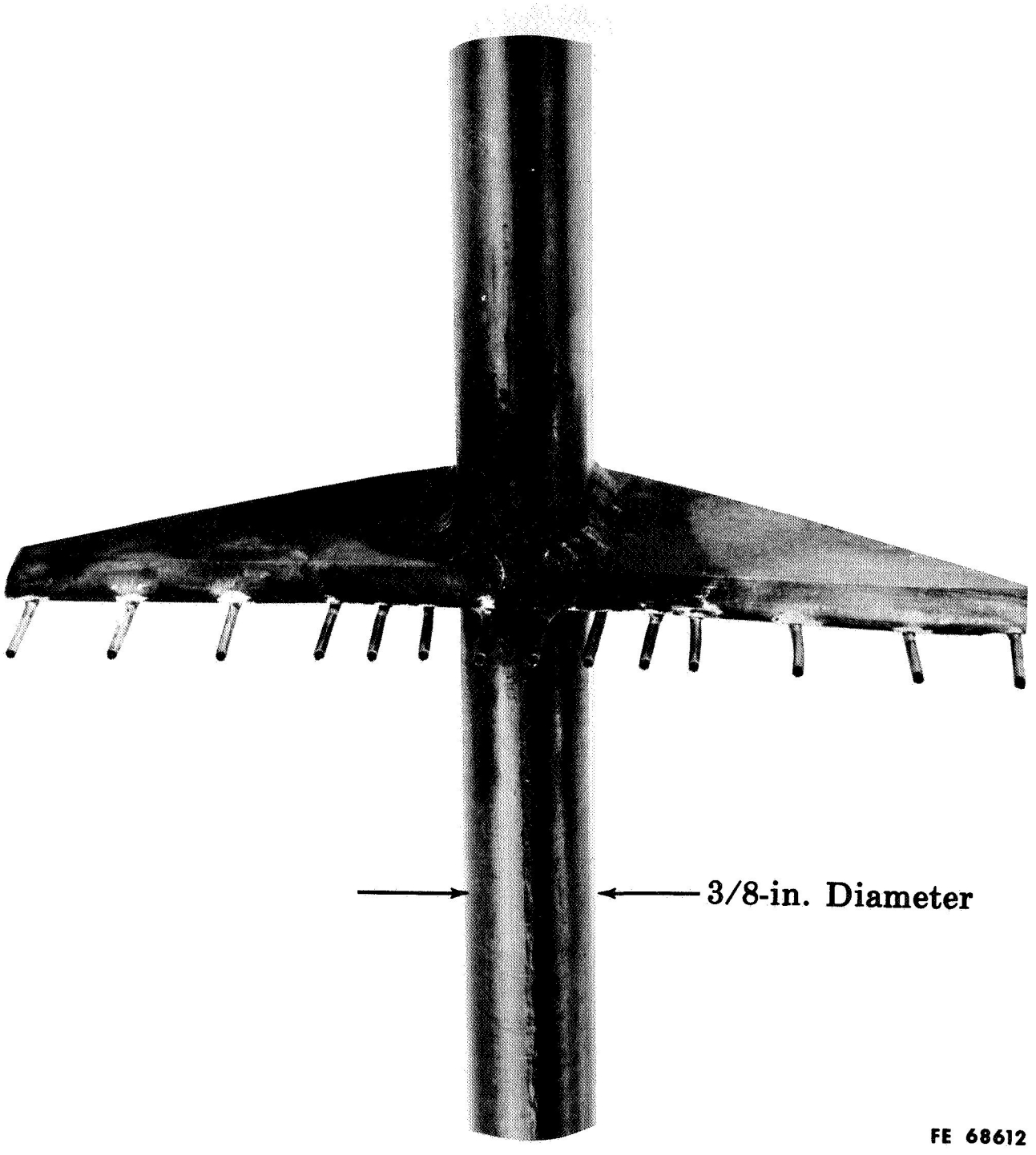


Figure 9. Typical Wake Probe Rake FD 25198

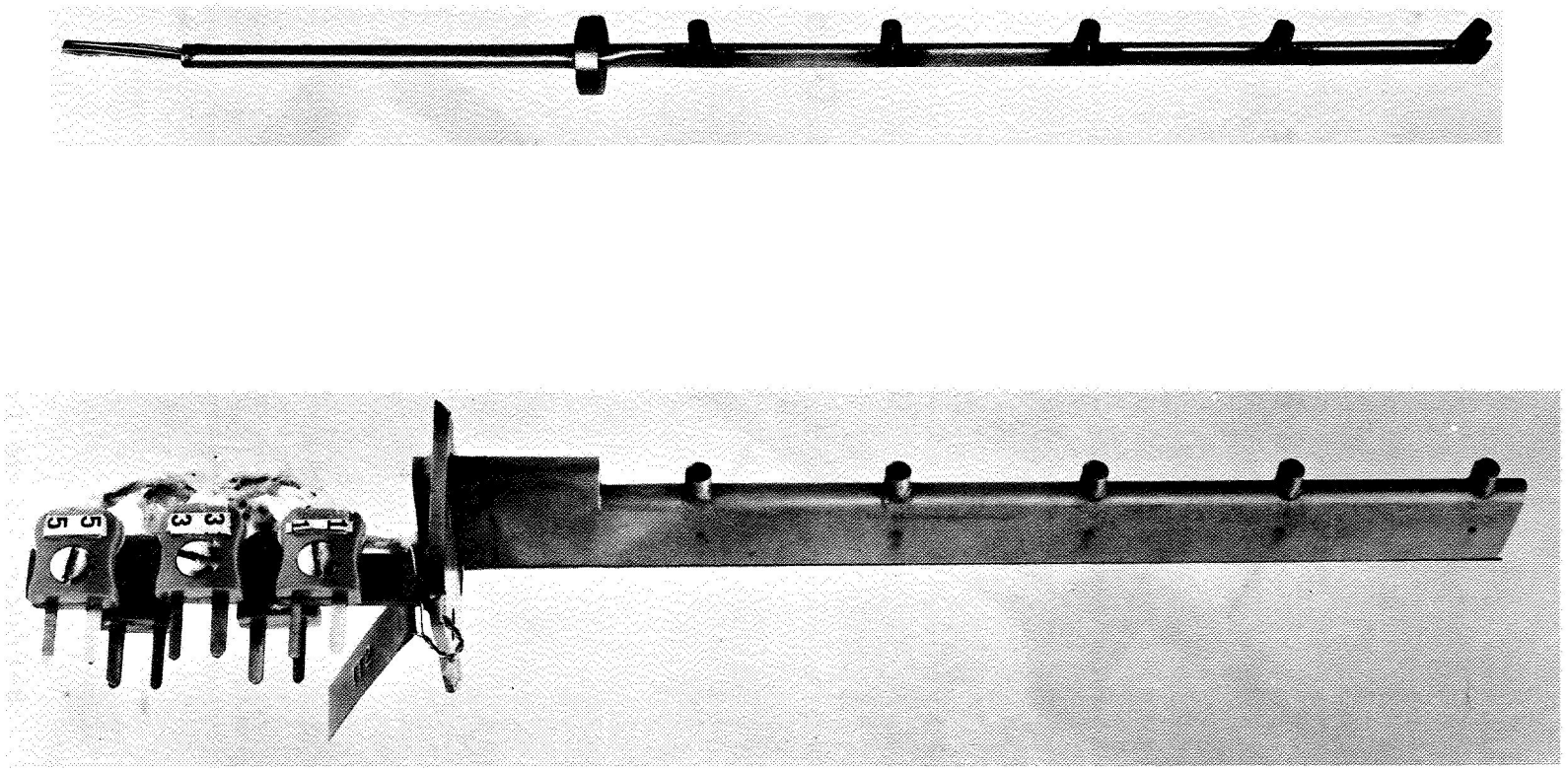


Figure 10. Total Temperature and Total Pressure Rakes

FE 80200

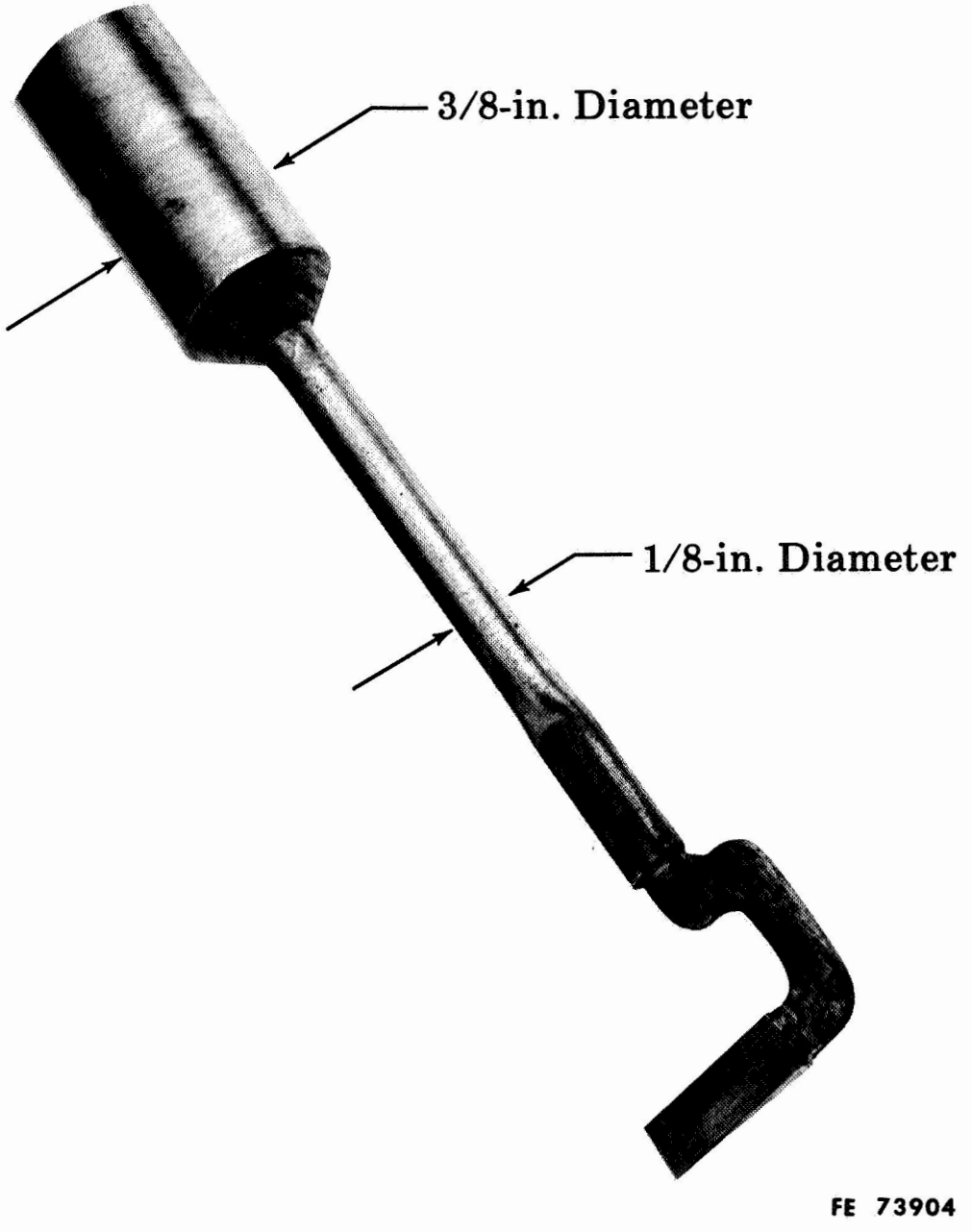
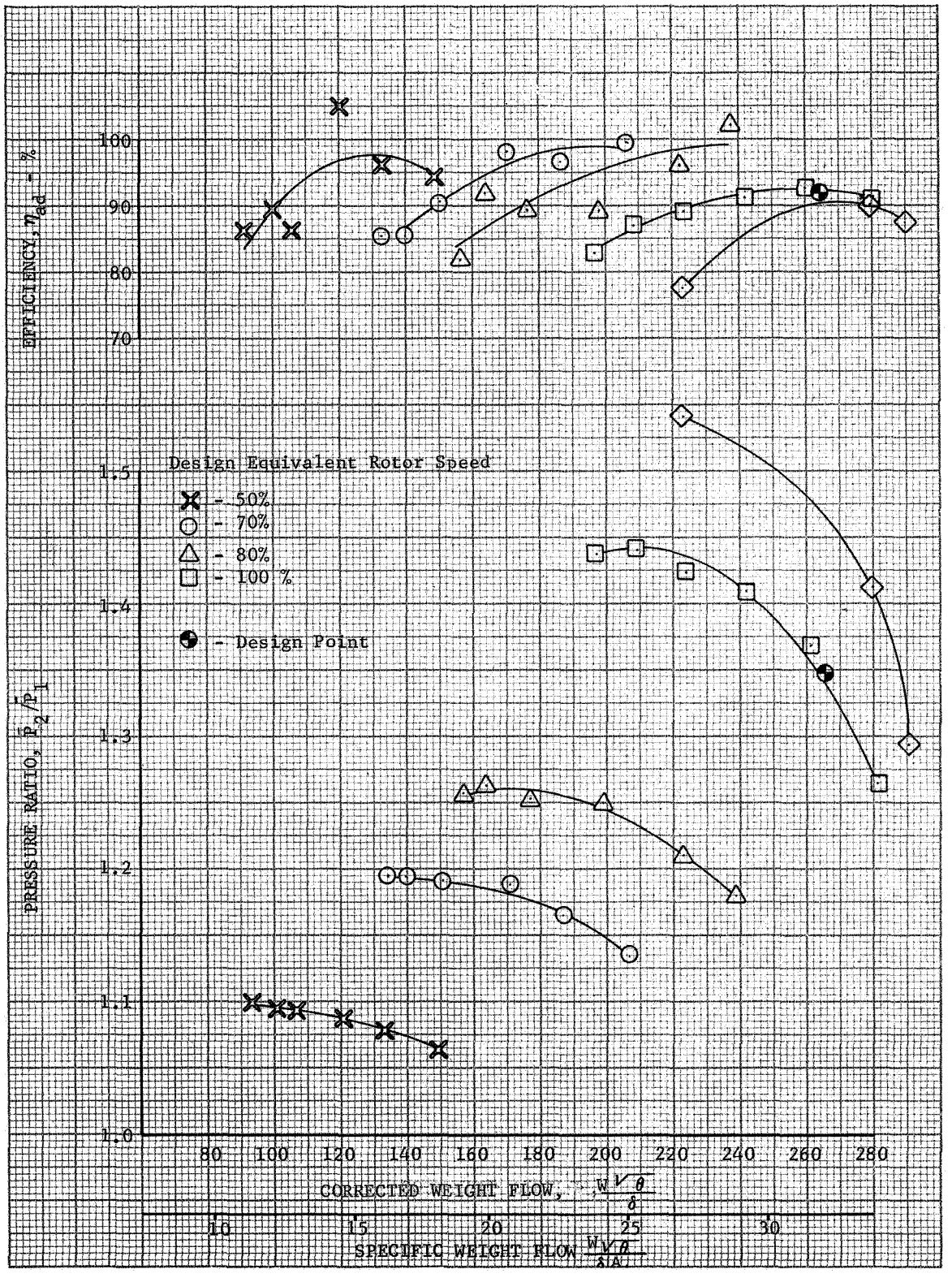
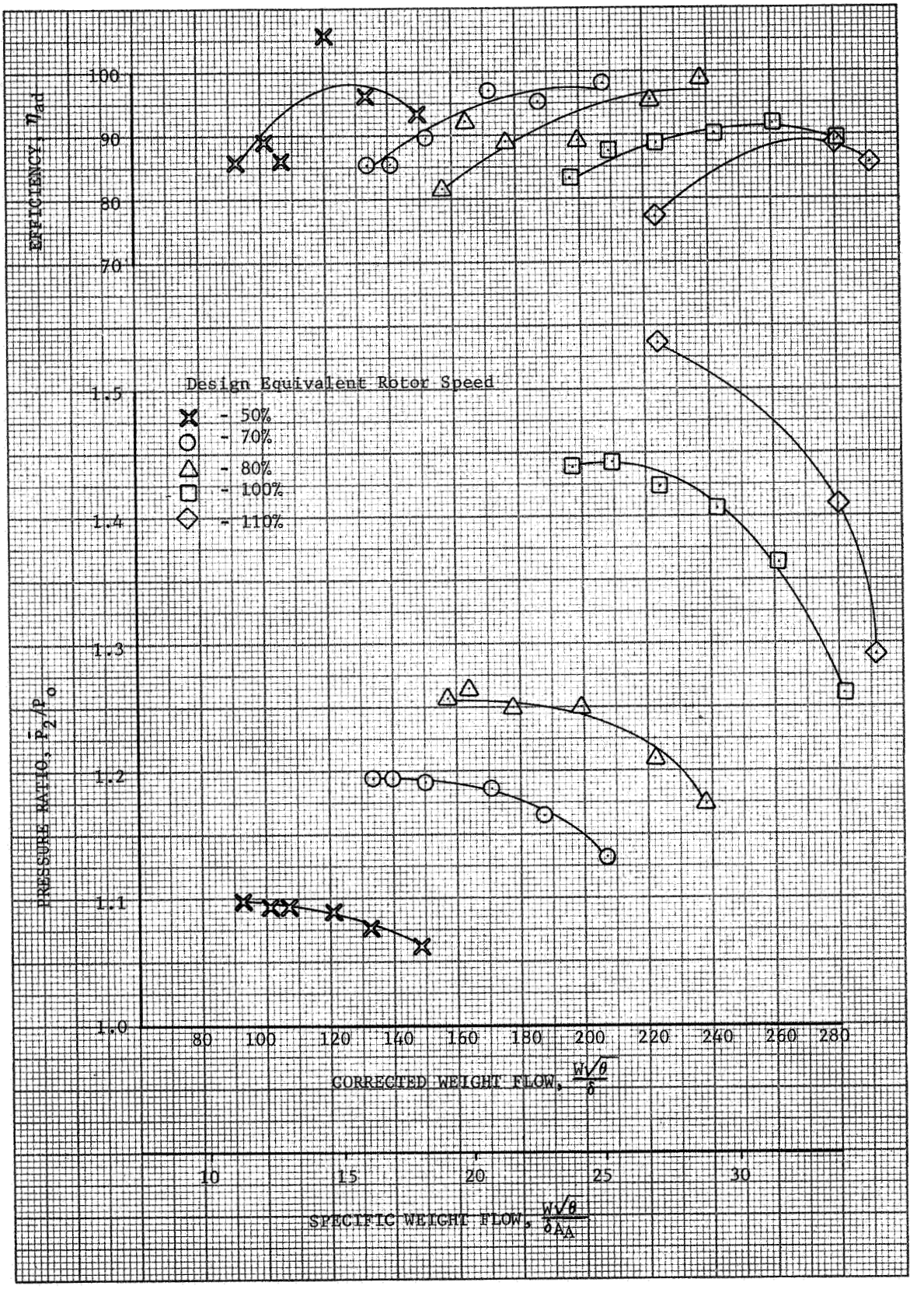


Figure 11. 8-Degree Wedge Probe FD 25200



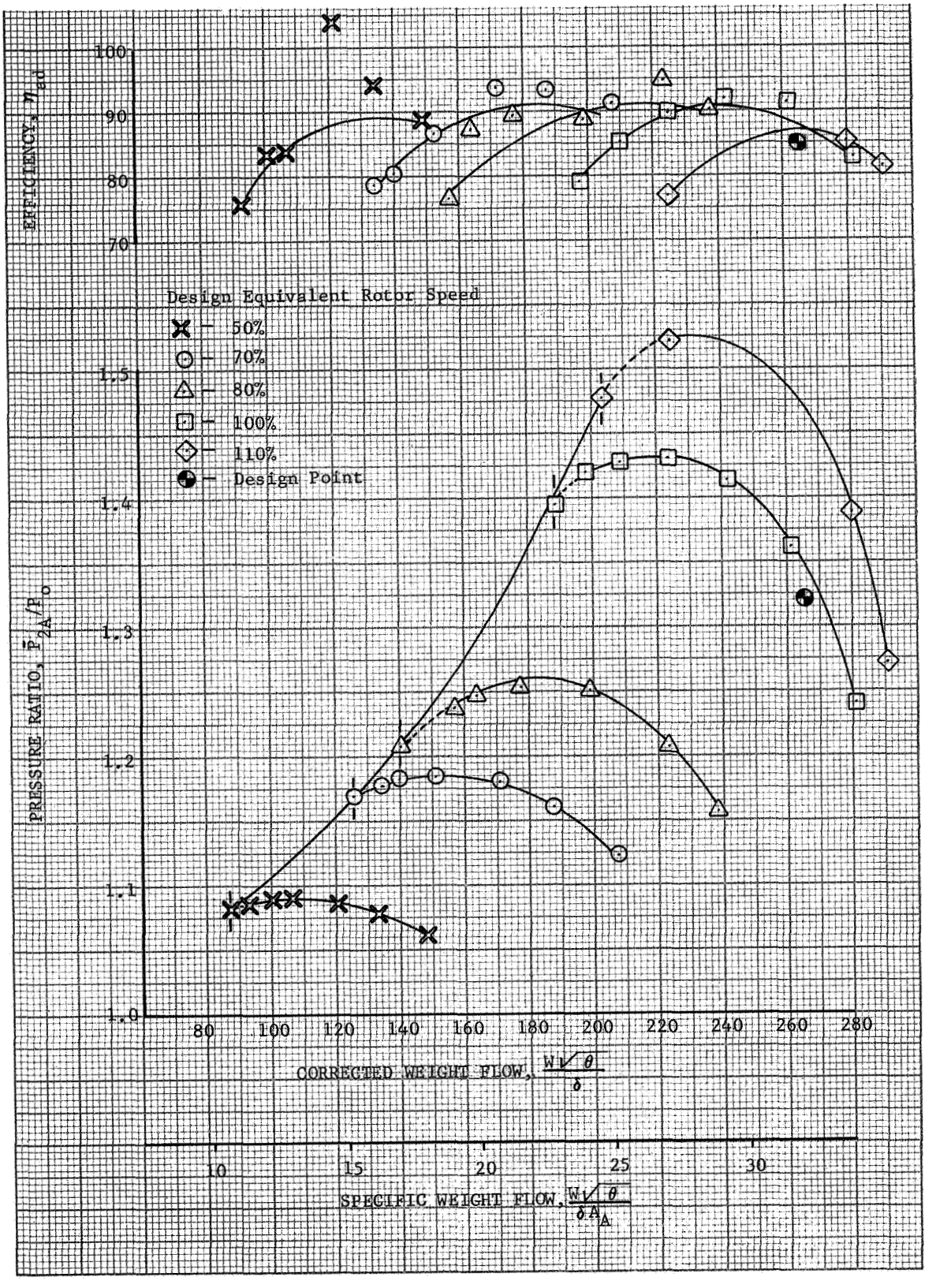
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Figure 12. Overall Performance:
Rotor Only, SLTO Configuration



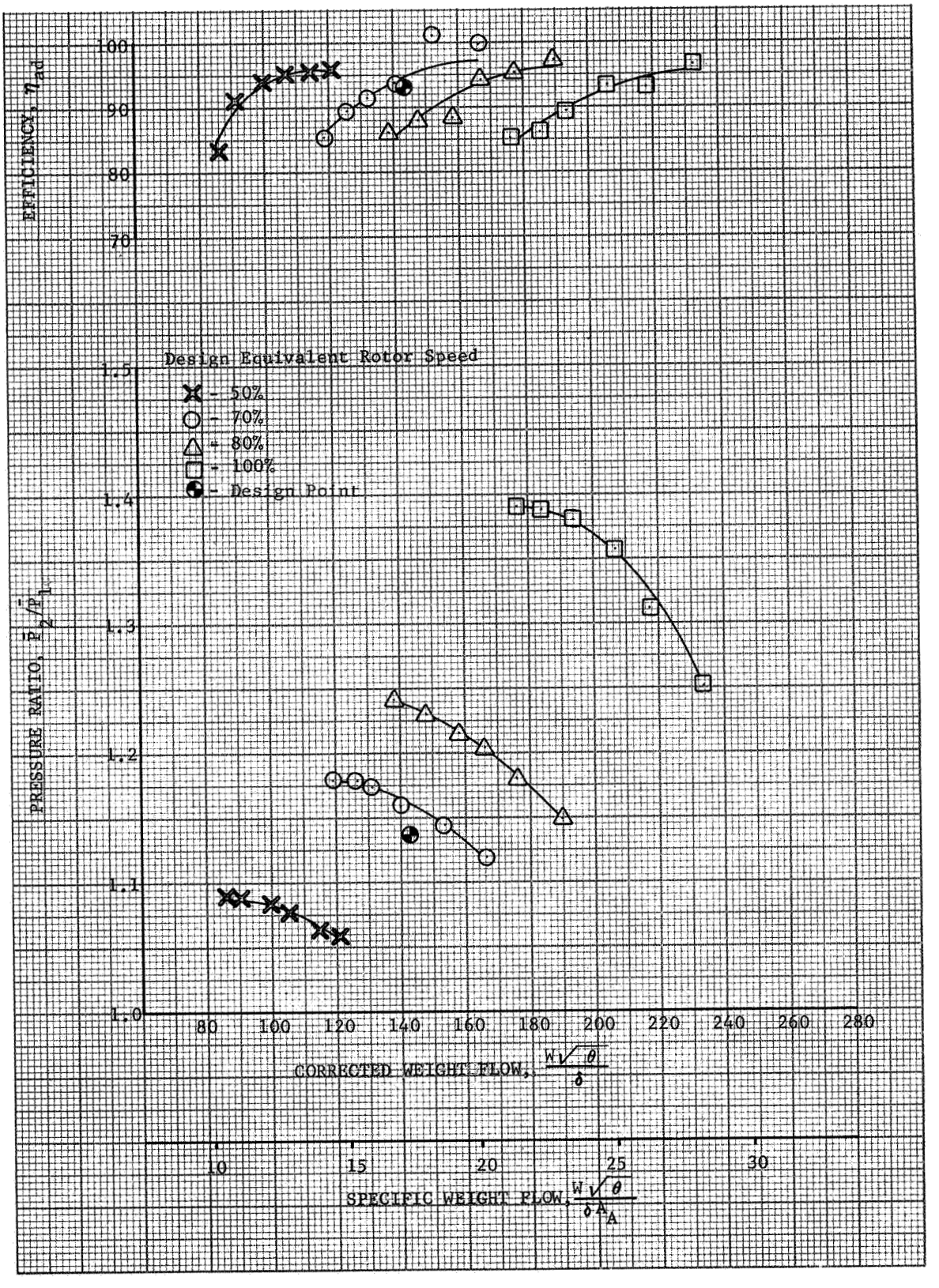
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Figure 13. Overall Performance: Guide Vane Rotor, SLTO Configuration



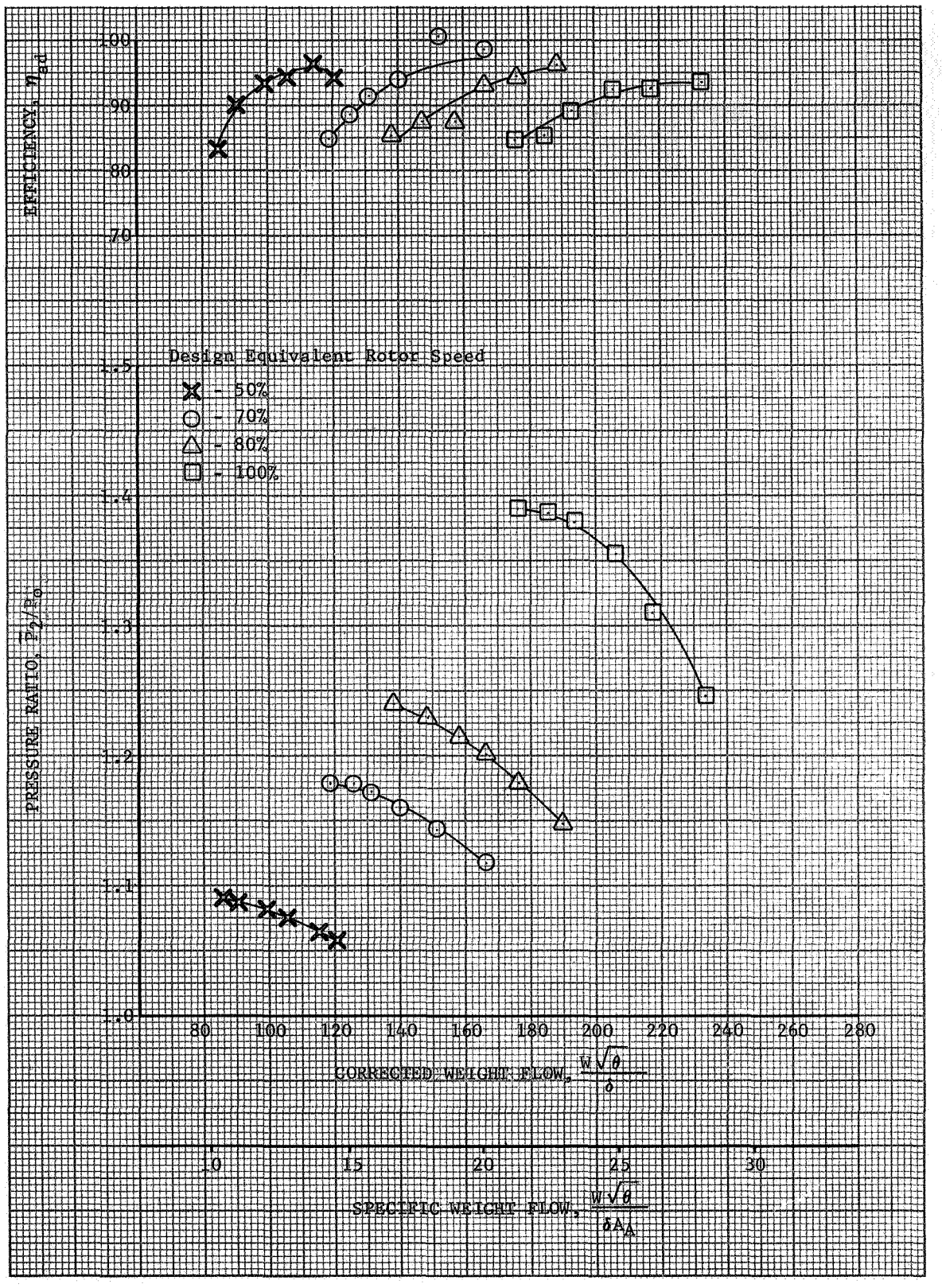
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Figure 14. Overall Performance: Guide Vane, Rotor, Stator B, SLTO Configuration



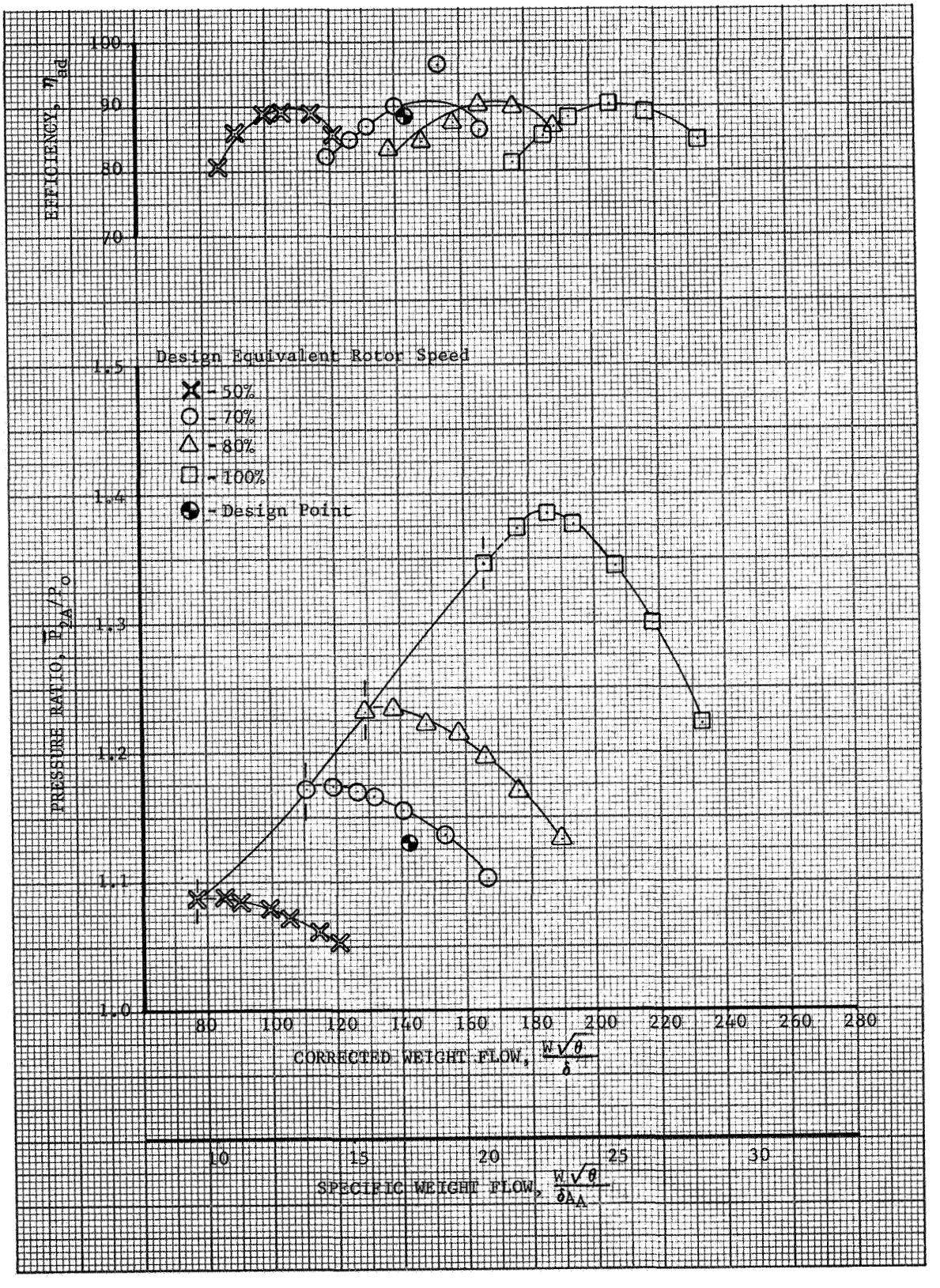
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Figure 15. Overall Performance:
Rotor Only, Cruise Configuration



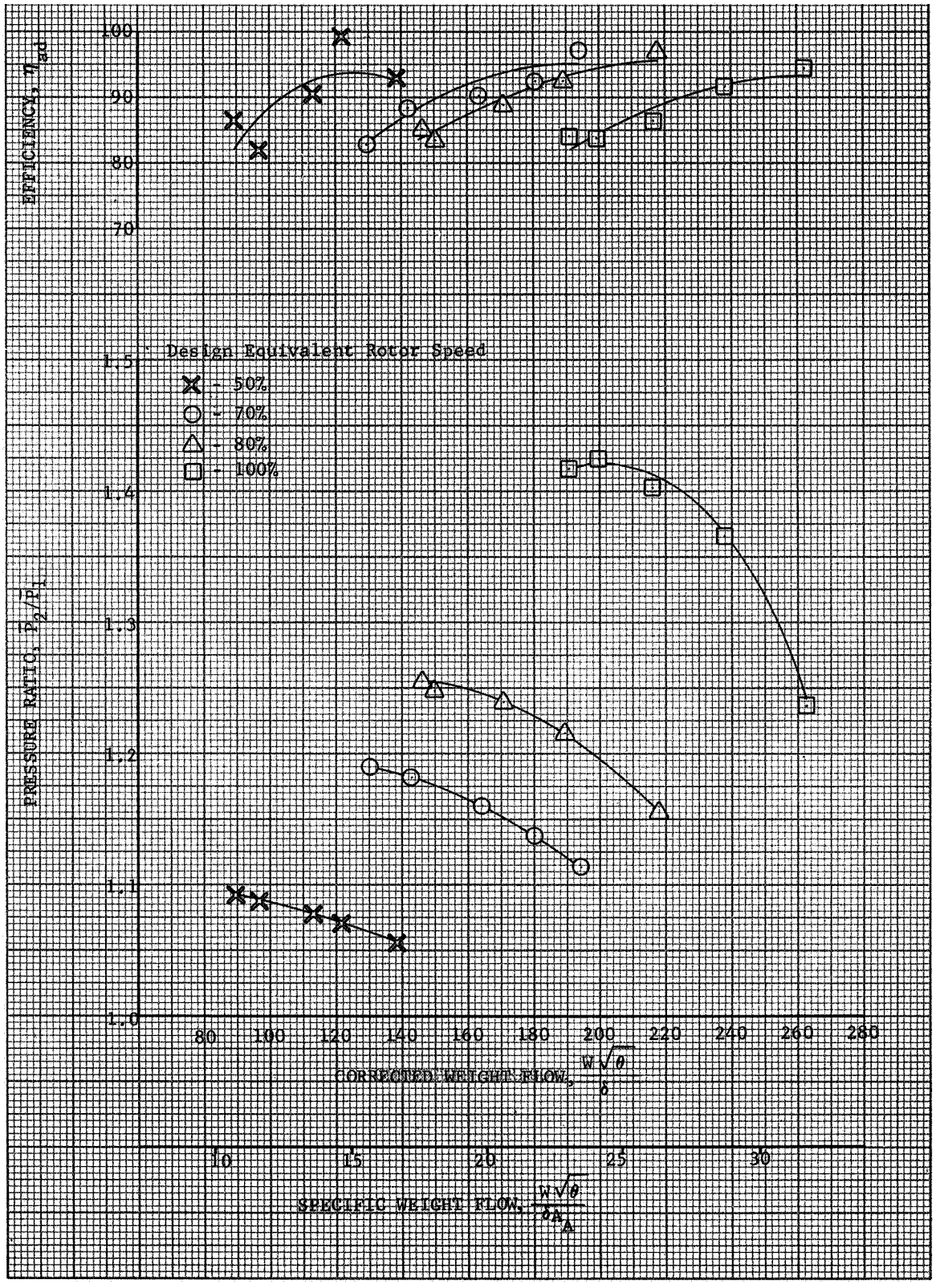
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Figure 16. Overall Performance: Guide Vane, Rotor, Cruise Configuration



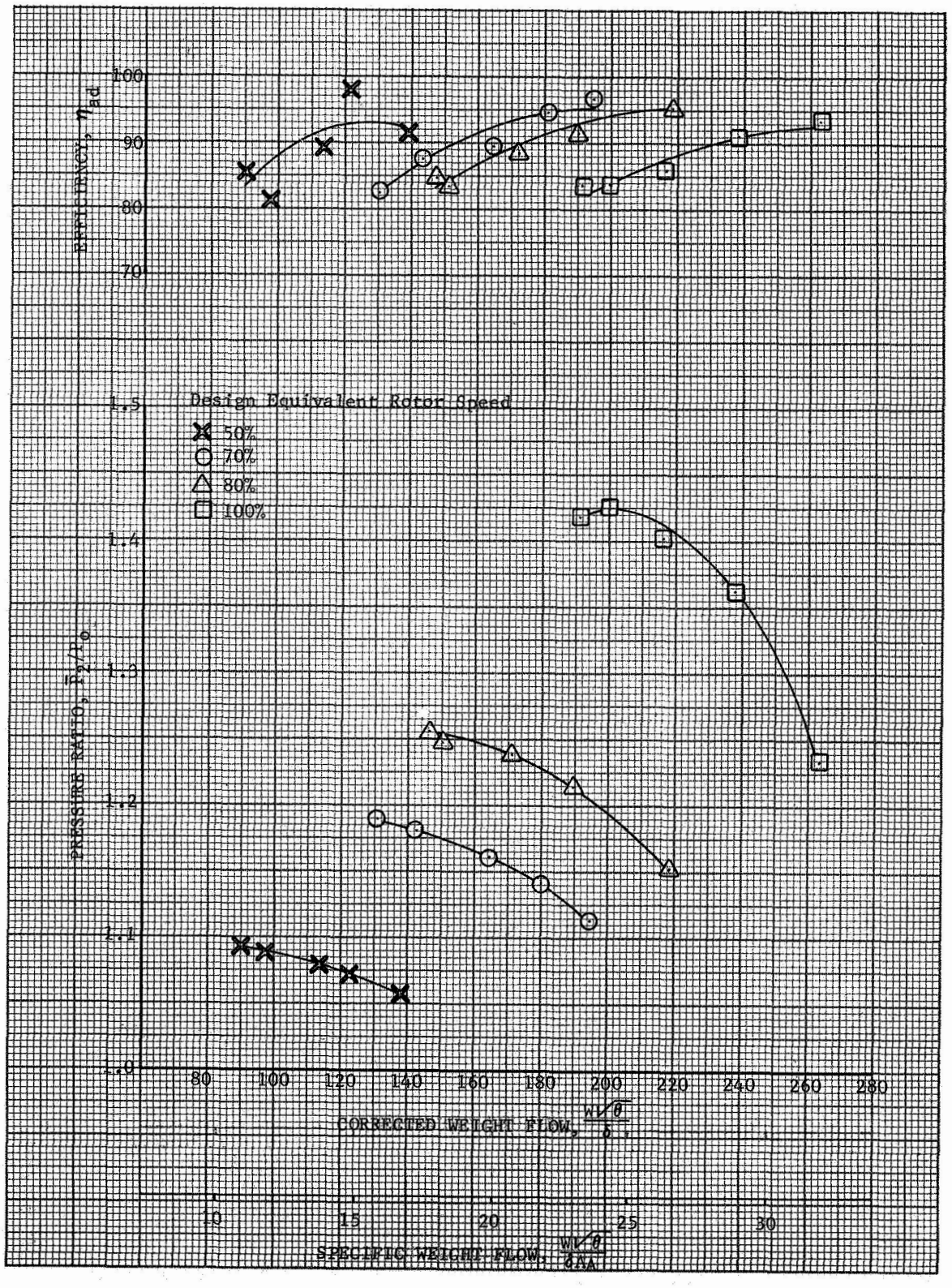
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Figure 17. Overall Performance: Guide Vane, Rotor, Stator B, Cruise Configuration



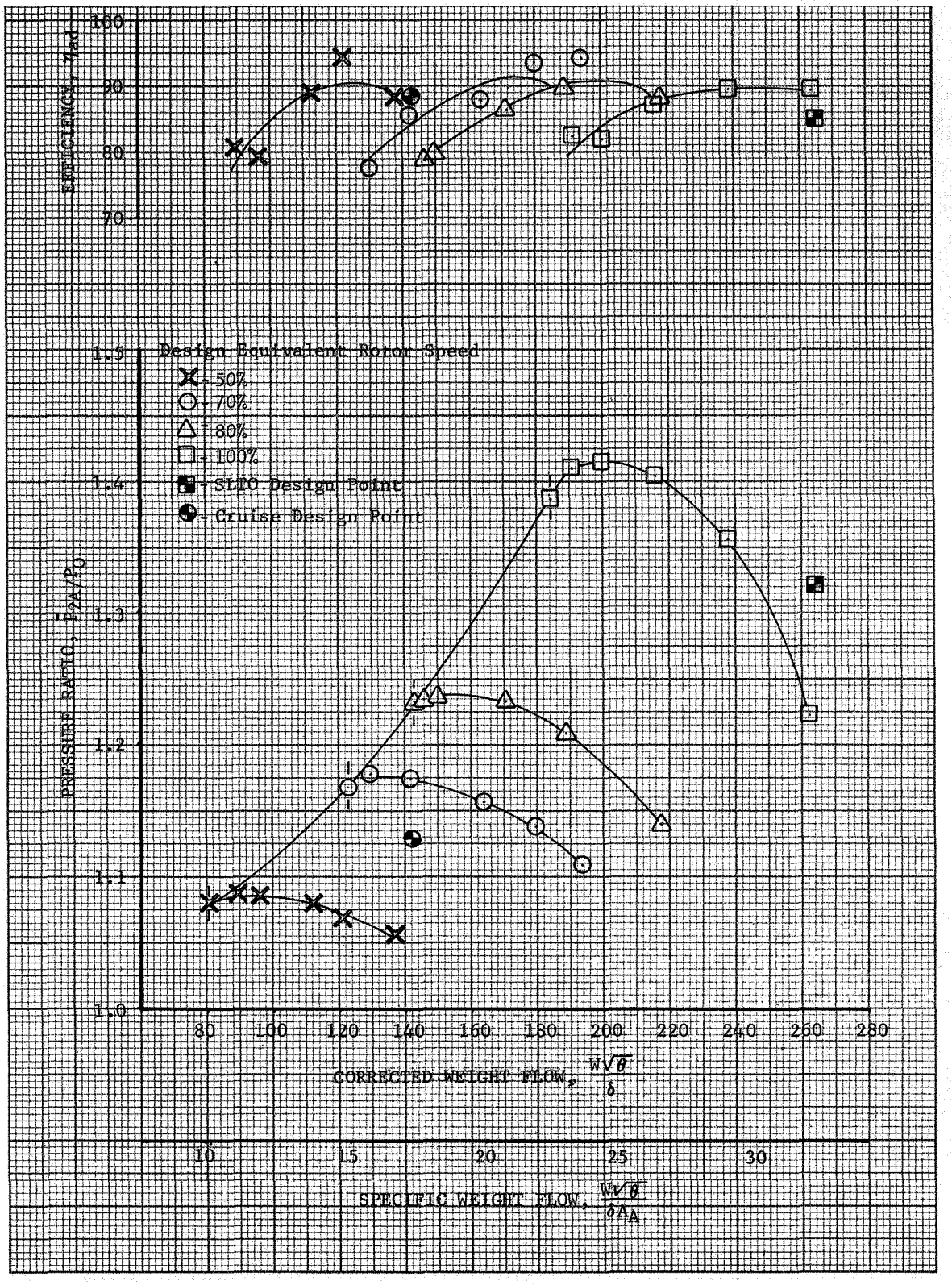
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Figure 18. Overall Performance:
Rotor Only, Intermediate Configuration



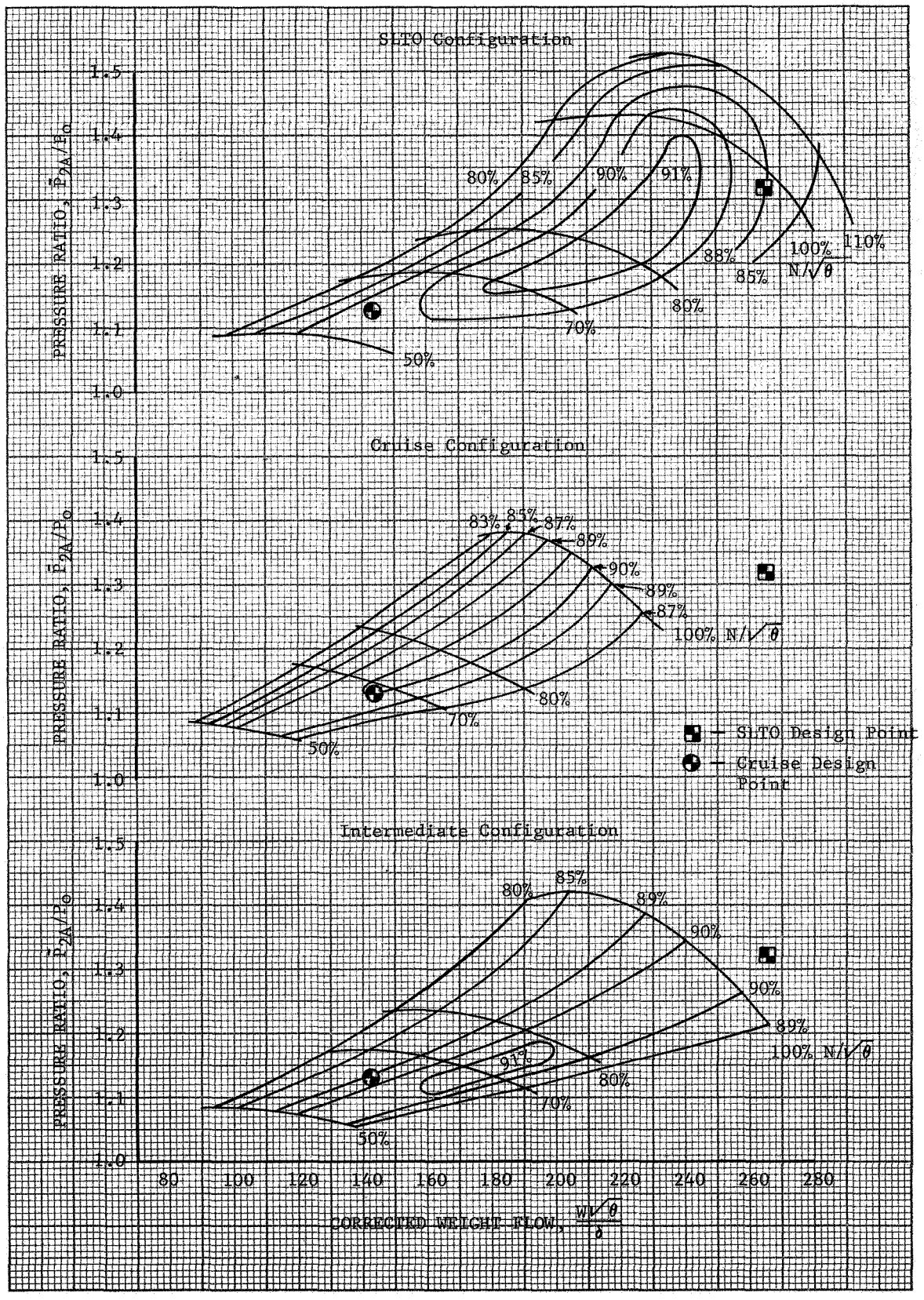
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Figure 19. Overall Performance: Guide Vane, Rotor, Intermediate Configuration



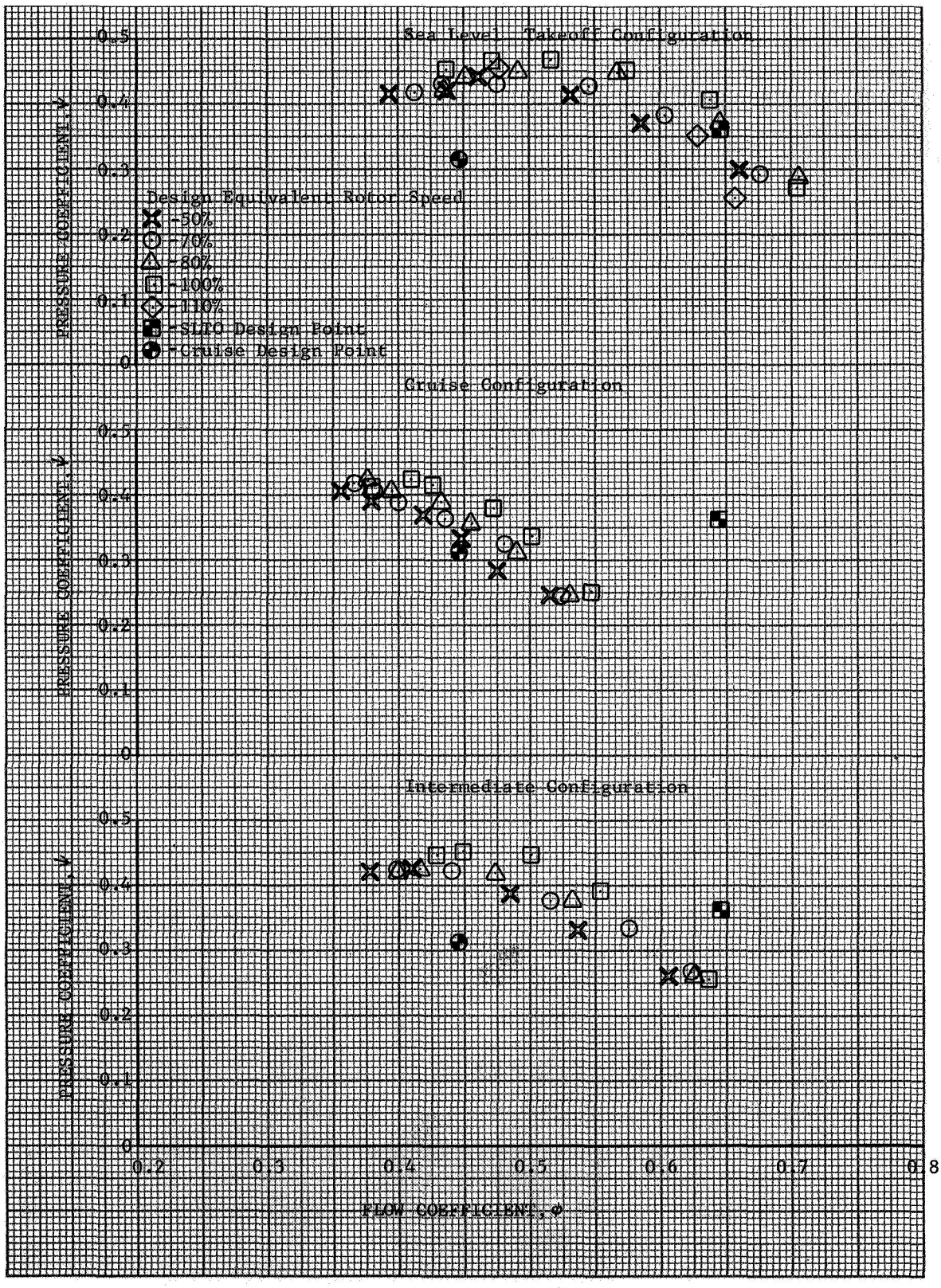
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Figure 20. Overall Performance: Guide Vane, Rotor, Stator B, Intermediate Configuration



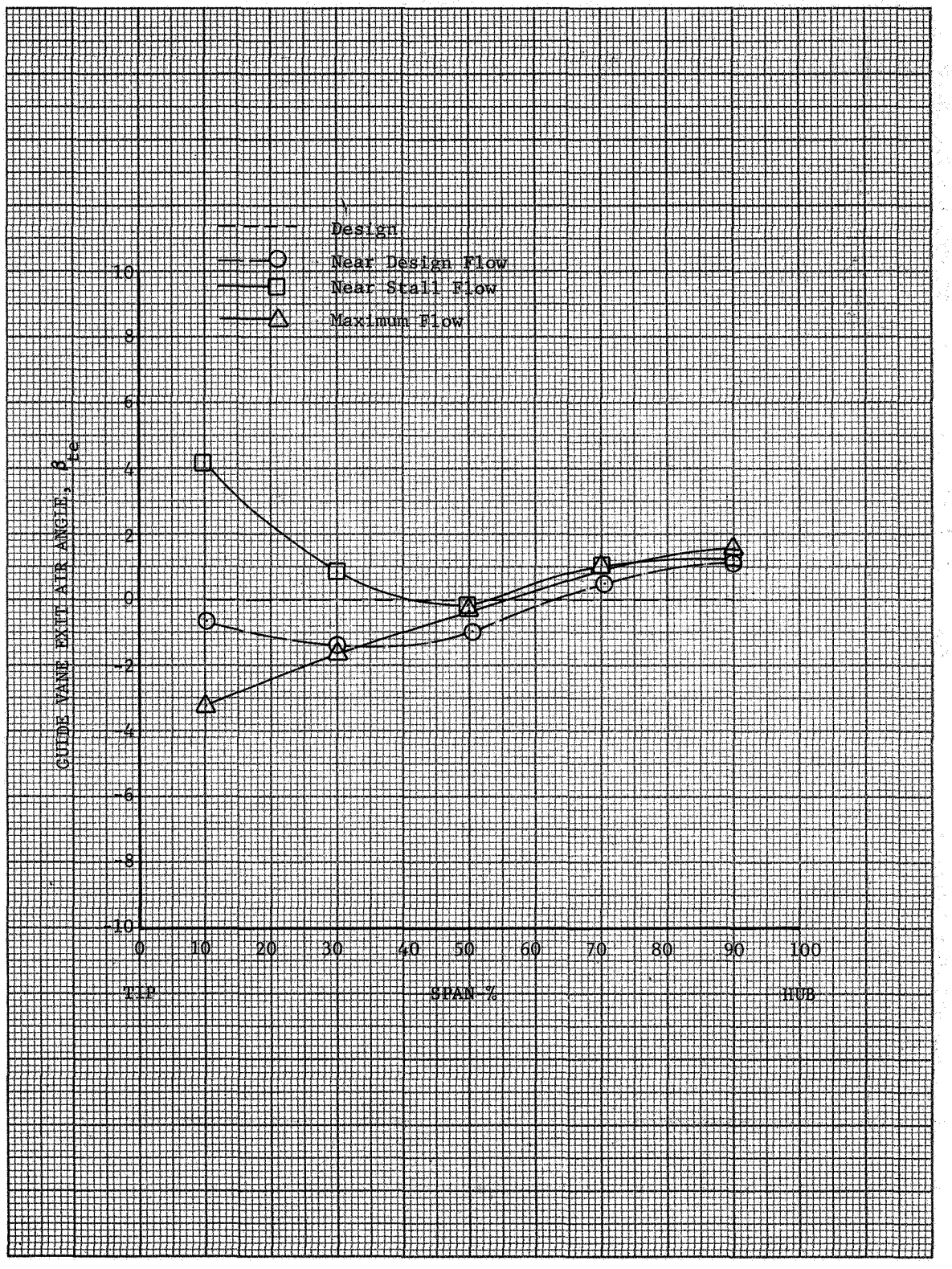
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Figure 21. Stage Efficiency Contours



DF 68763

Figure 22. Pressure Rise Coefficient vs Flow Coefficient



DF 68764

Figure 23. Guide Vane Exit Air Angle: SLTO Configuration,100% Equivalent Rotor Speed

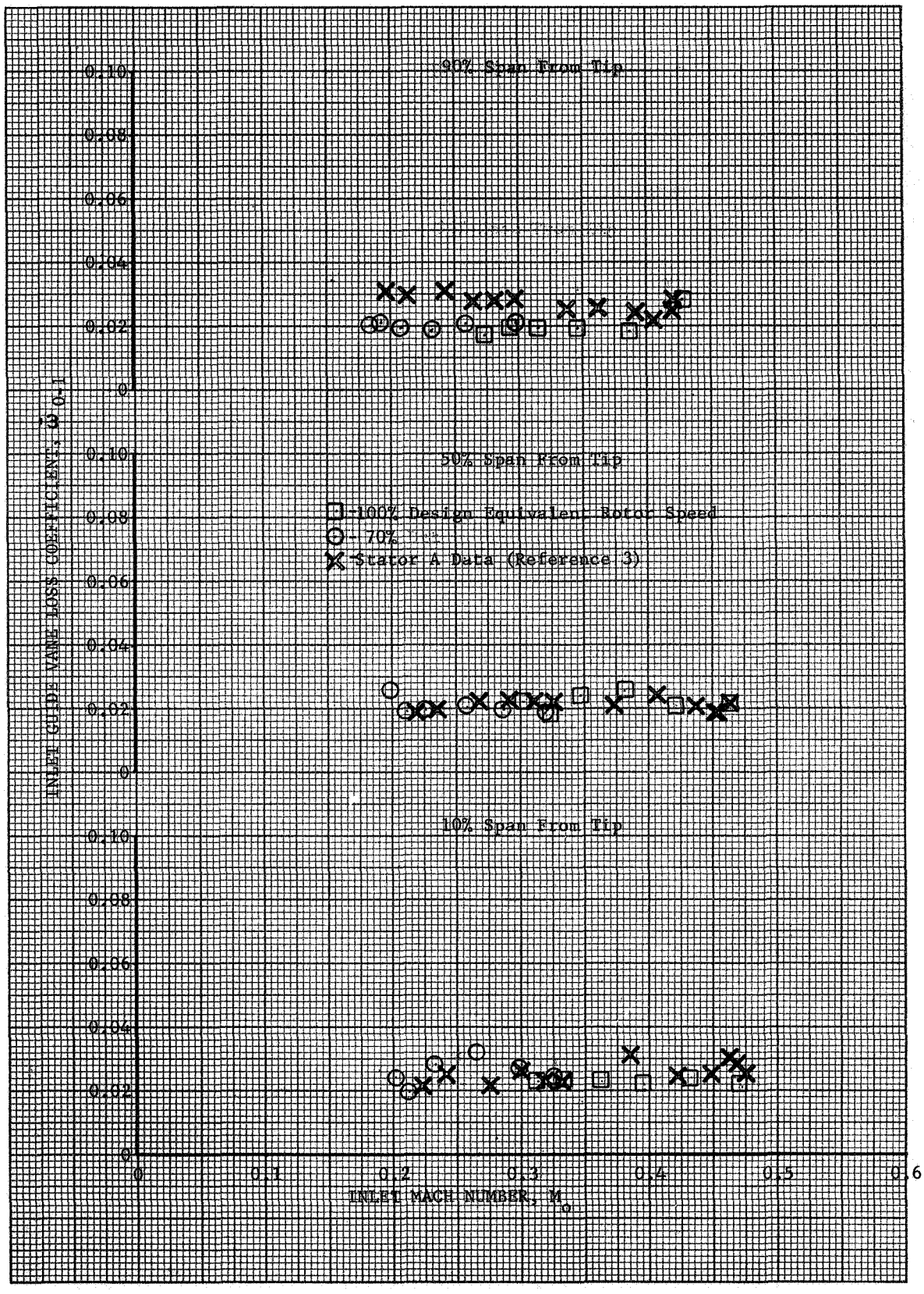
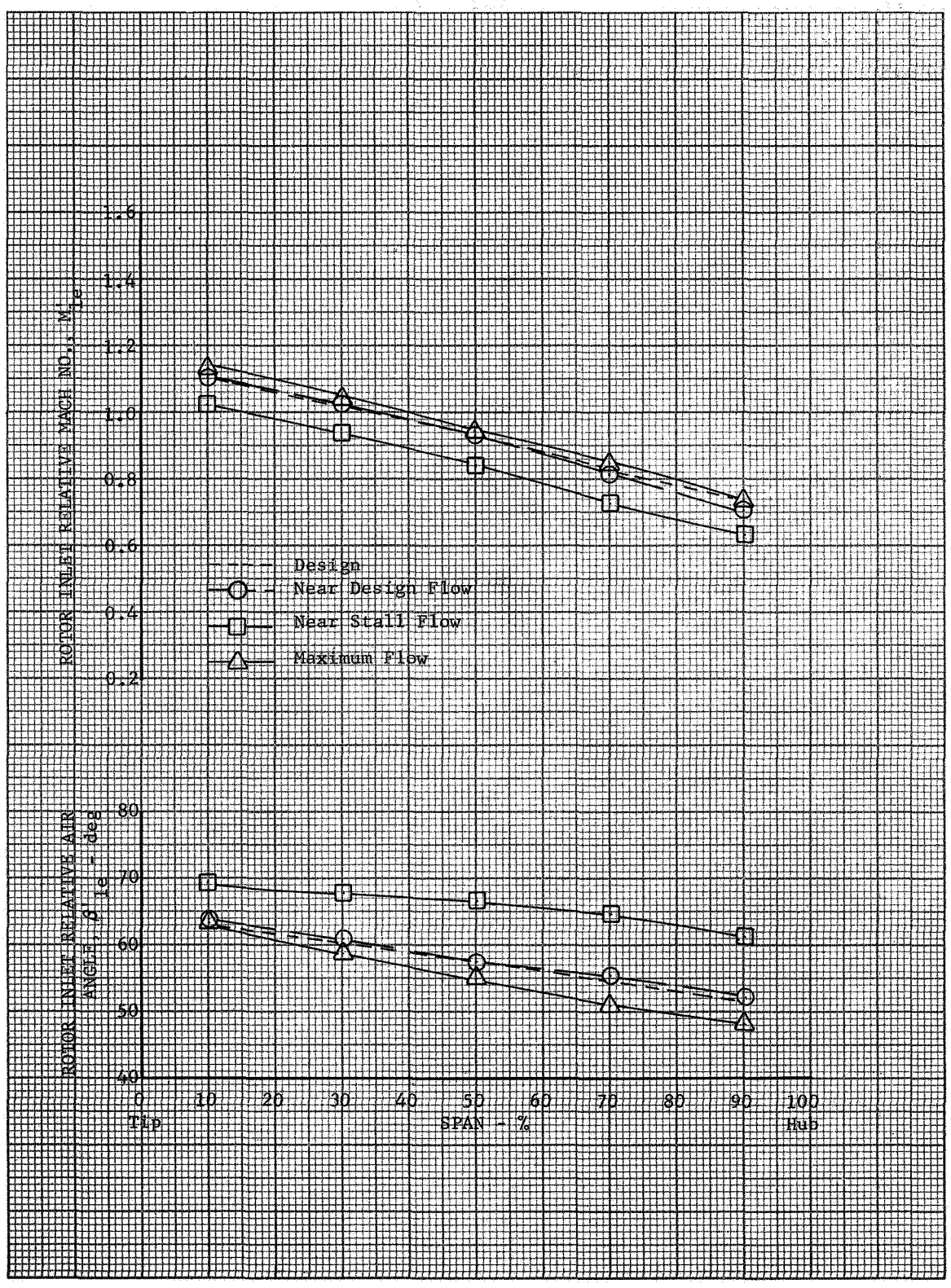
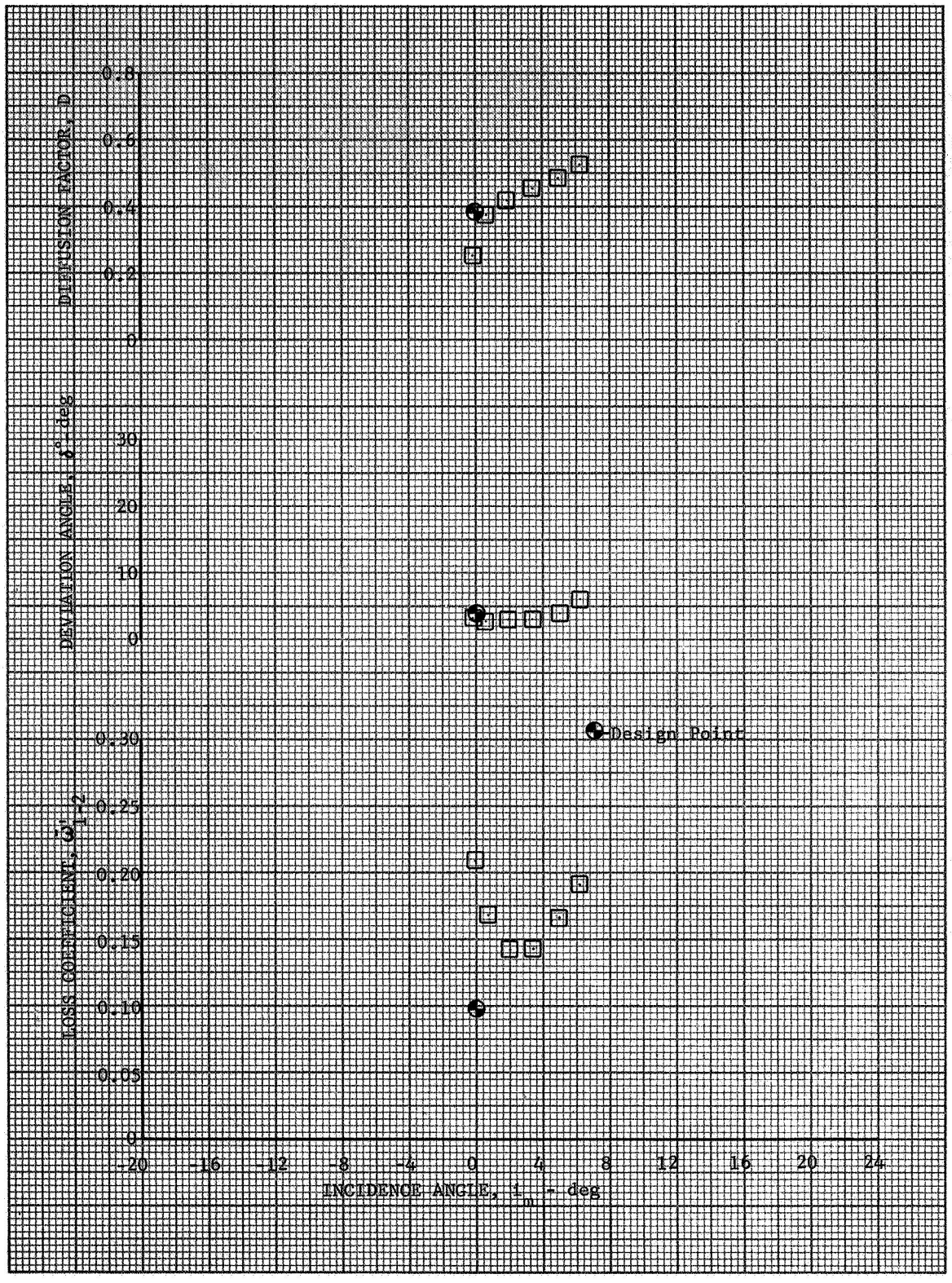


Figure 24. Inlet Guide Vane Loss Coefficient vs Inlet Mach Number: SLTO Configuration



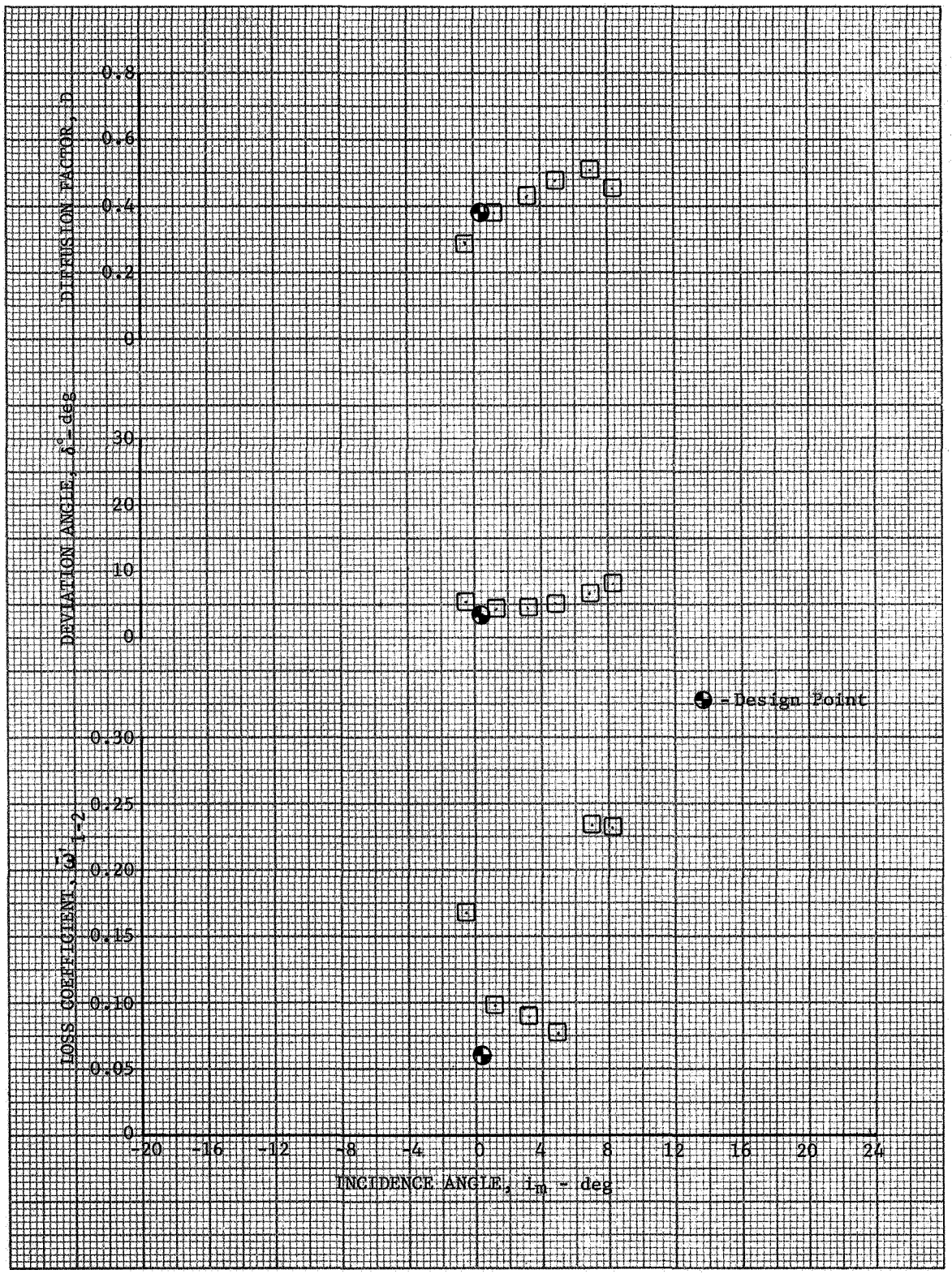
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Figure 25. Rotor Inlet Air Angle and Mach Number Distribution: SLTO Configuration, 100% Equivalent Rotor Speed



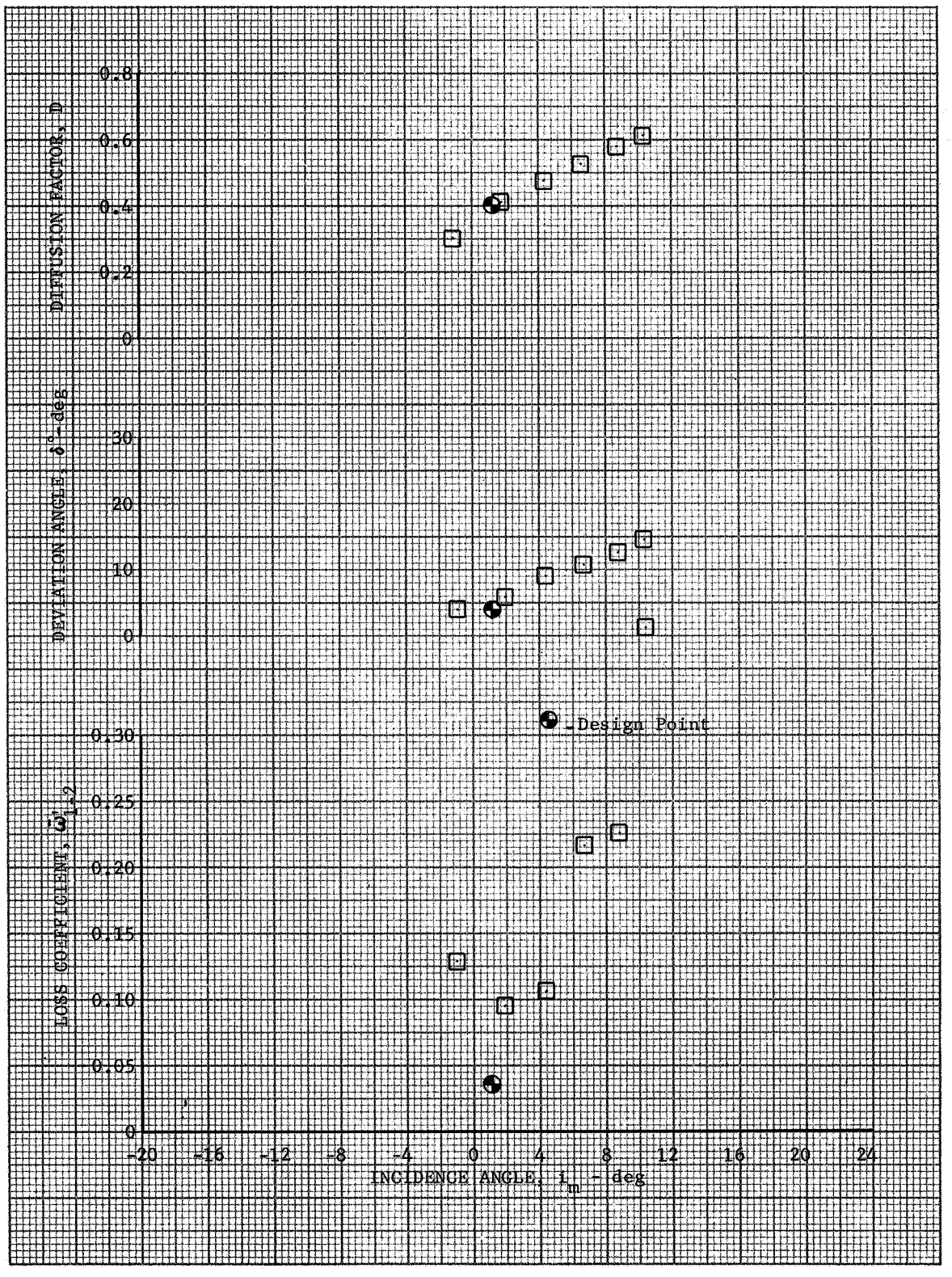
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Figure 26. Rotor Blade Element Performance: SLTO Configuration, 100% Equivalent Rotor Speed, 10% Span From Tip



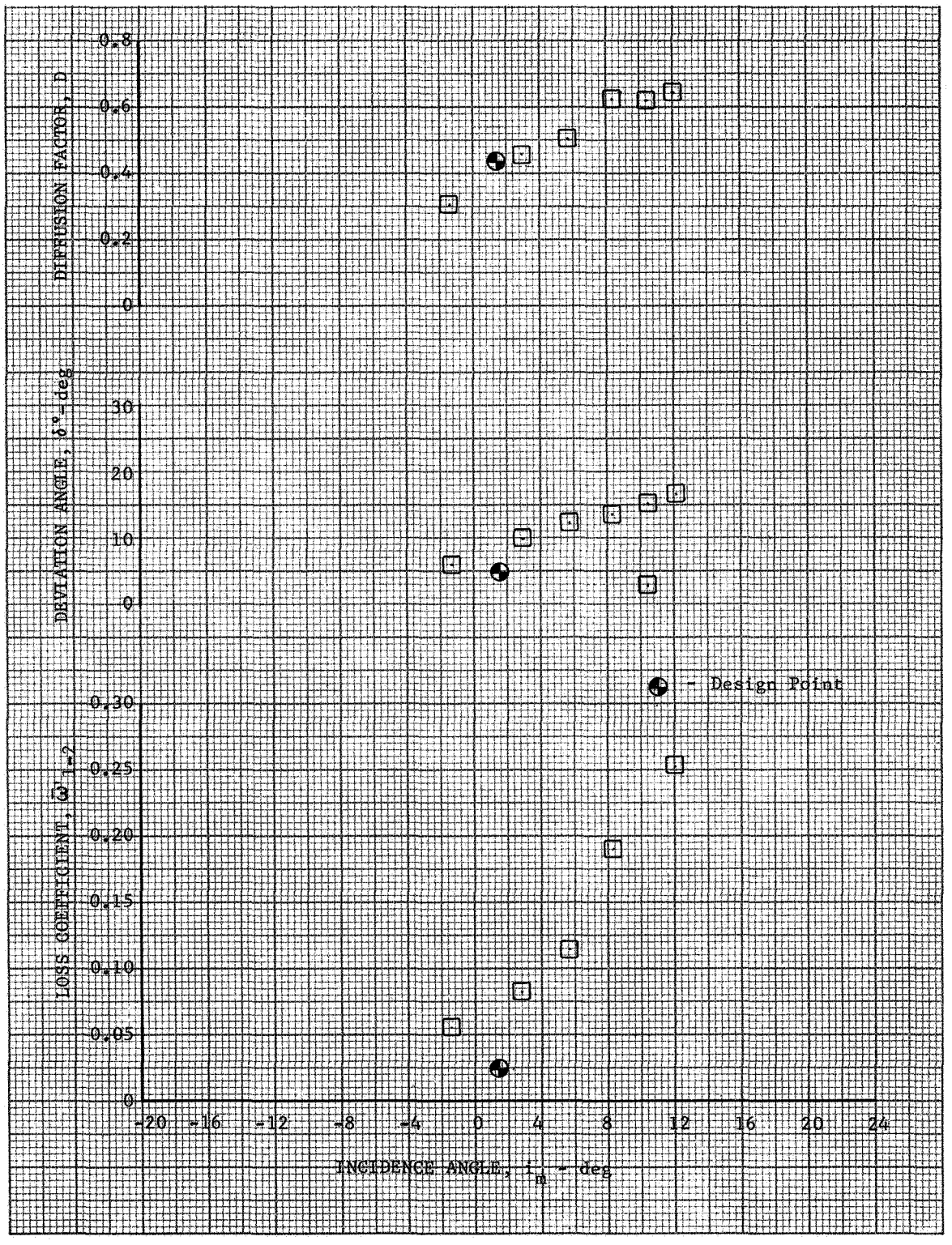
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Figure 27. Rotor Blade Element Performance: SLTO Configuration, 100% Equivalent Rotor Speed, 30% Span From Tip



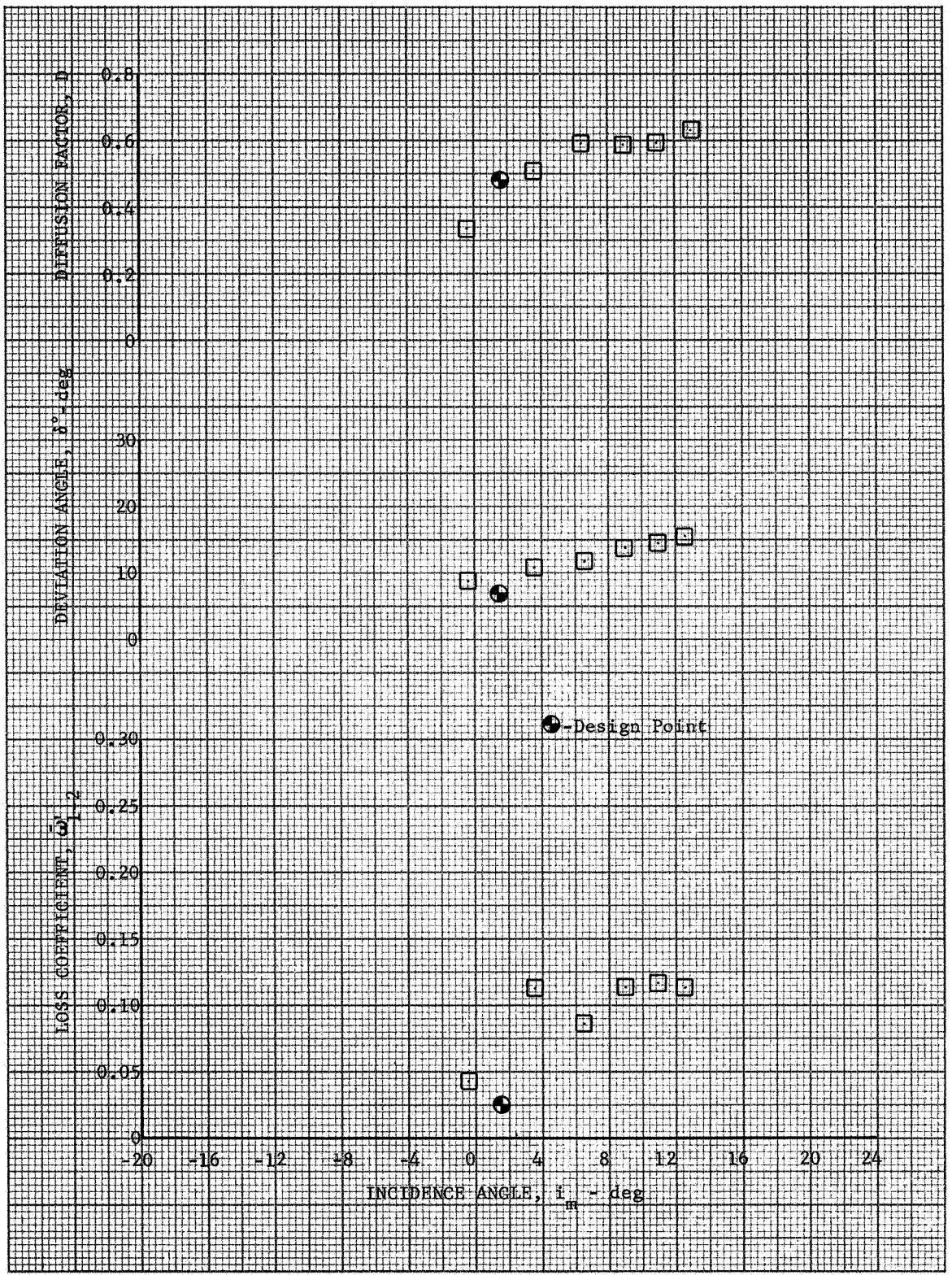
DF 68769

Figure 28. Rotor Blade Element Performance: SLTO Configuration, 100% Equivalent Rotor Speed, 50% Span From Tip



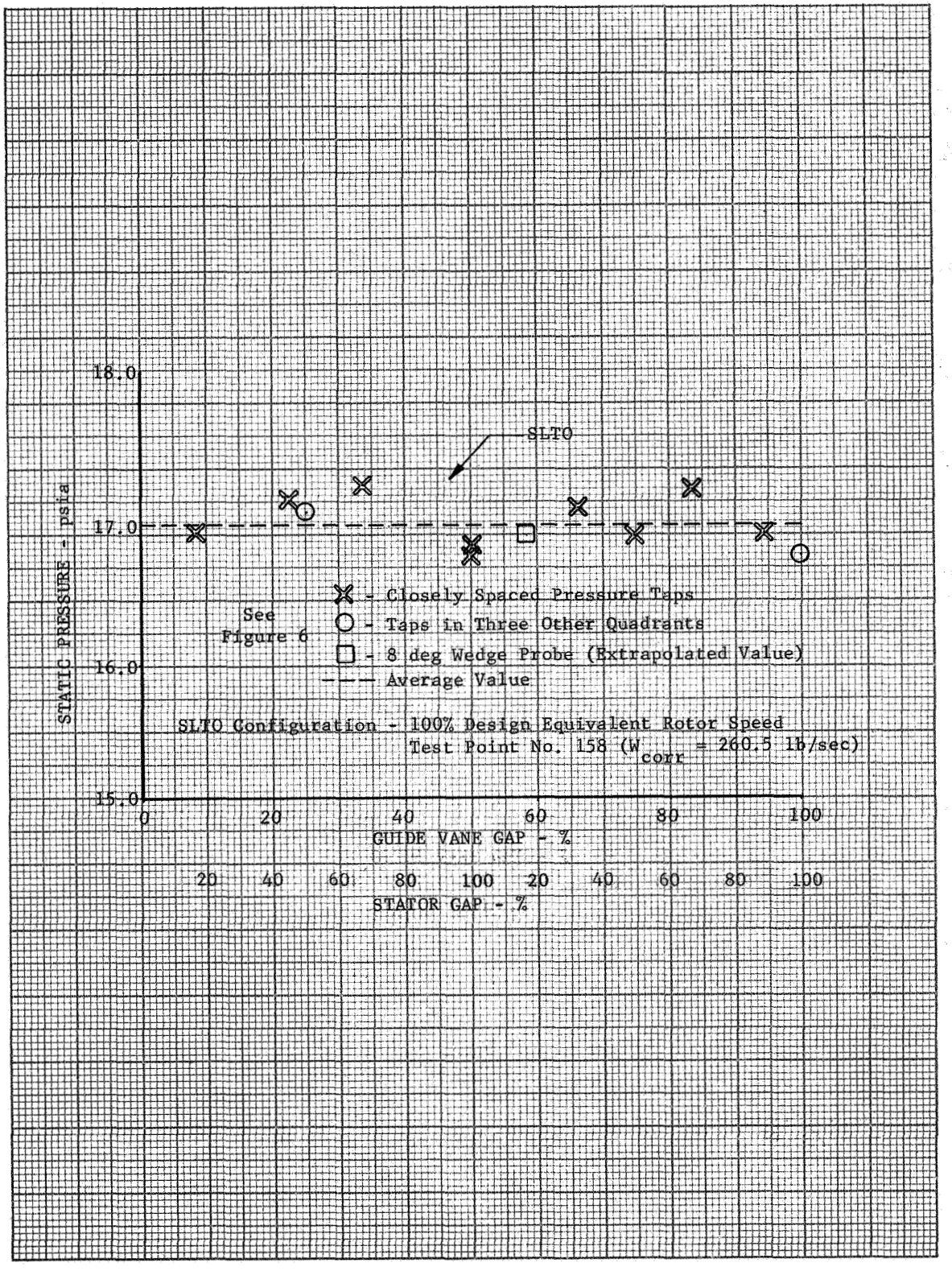
DF 68770

Figure 29. Rotor Blade Element Performance: SLTO Configuration, 100% Equivalent Rotor Speed, 70% Span From Tip



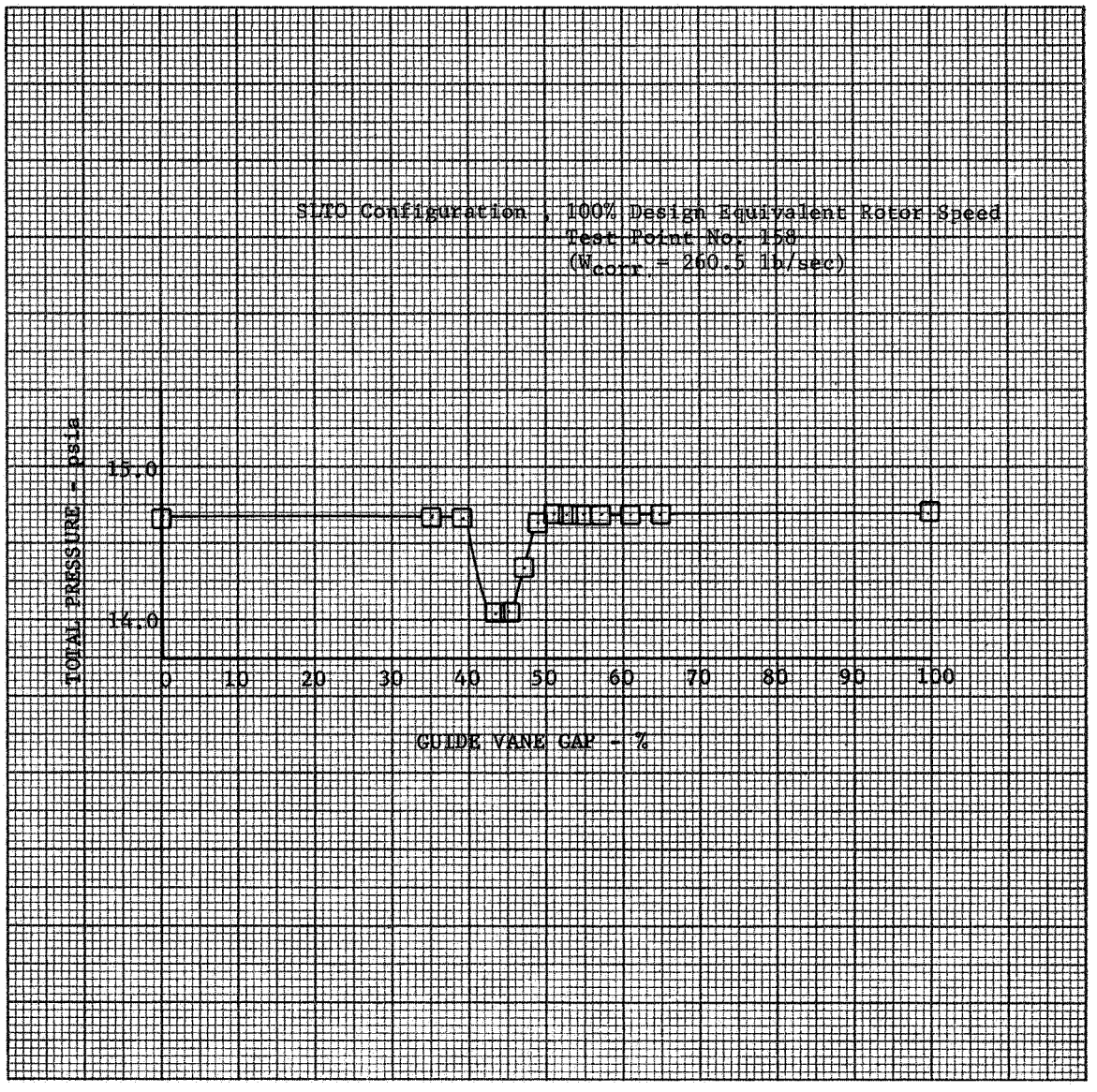
DF 68771

Figure 30. Rotor Blade Element Performance: SLTO Configuration, 100% Equivalent Rotor Speed, 90% Span From Tip



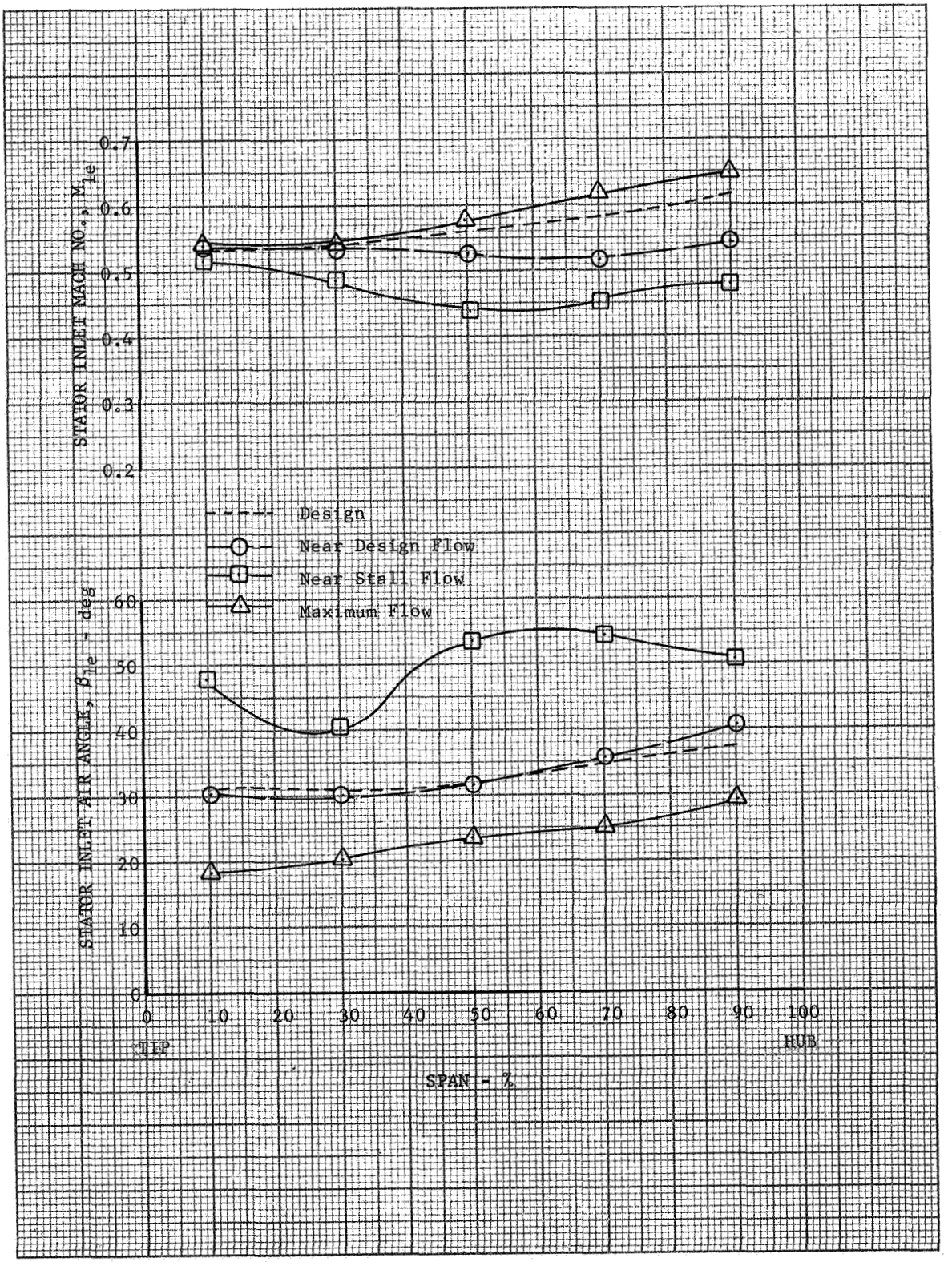
DF 68772

Figure 31. Influence of Guide Vane Wake and Stator on Station 2 Outer Wall Static Pressure



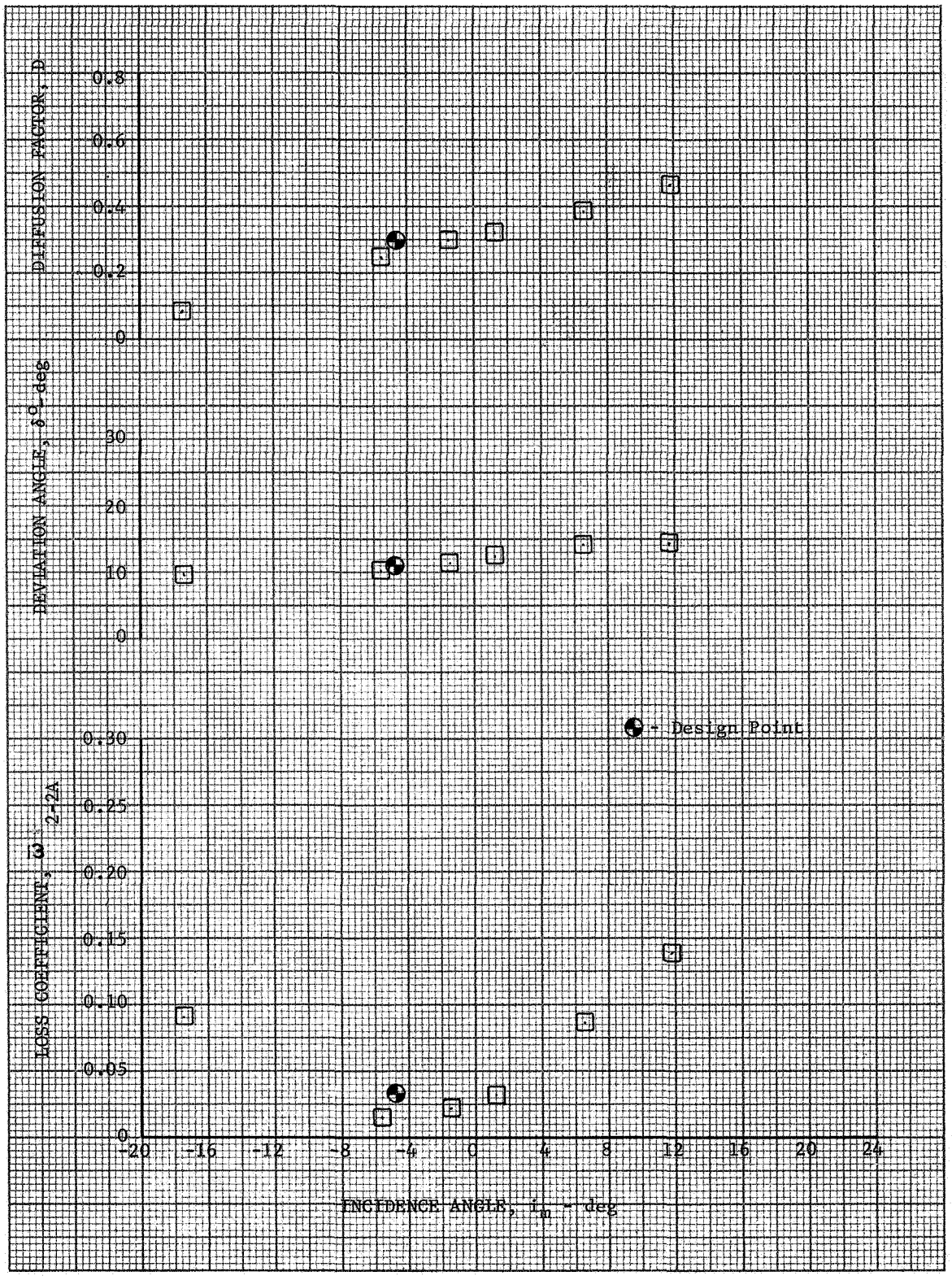
DF 68992

Figure 32. Guide Vane Wake 10% From Tip



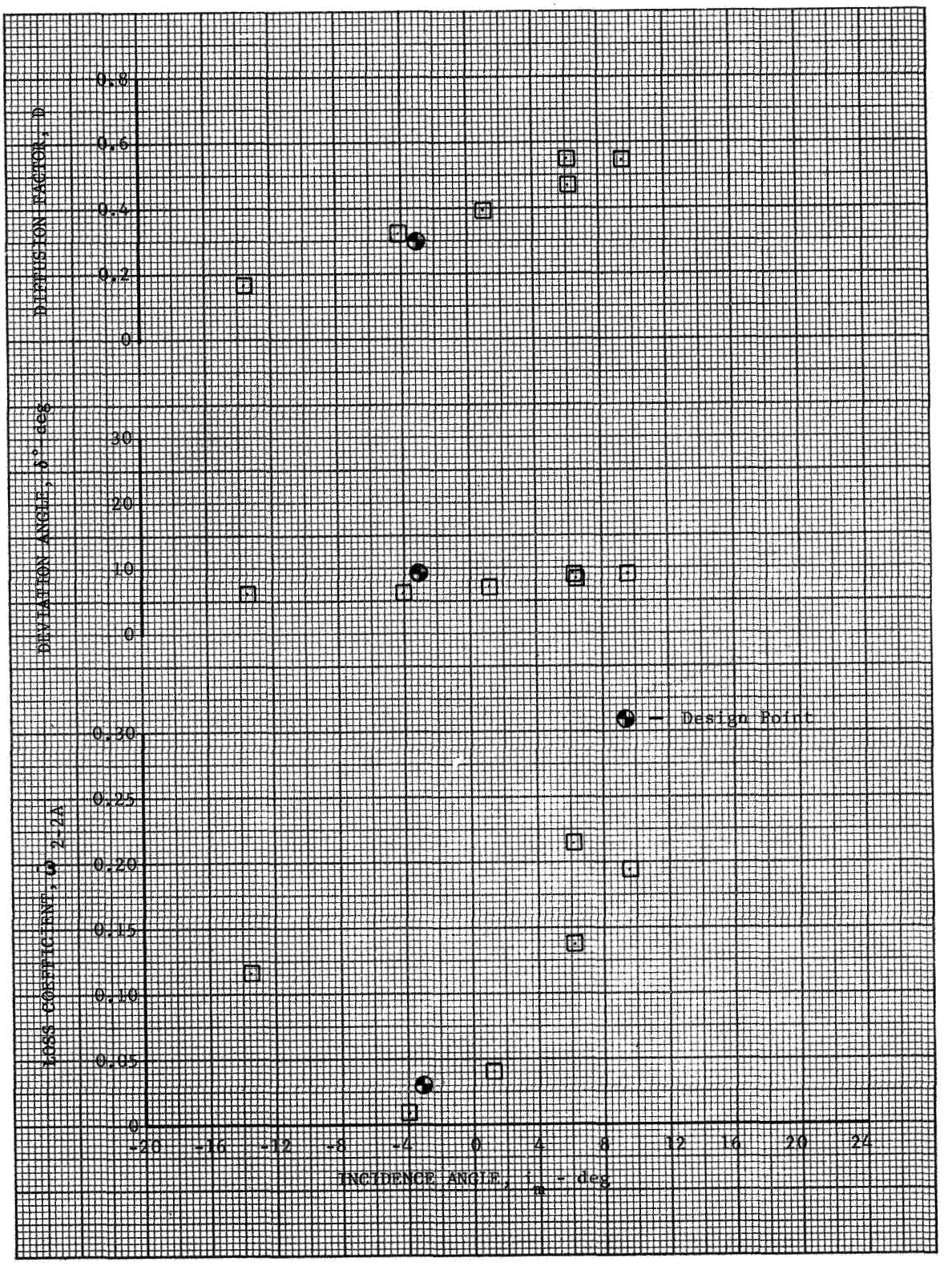
DF 68773

Figure 33. Stator Inlet Air Angle and Mach Number Distribution: SLTO Configuration, 100% Equivalent Rotor Speed



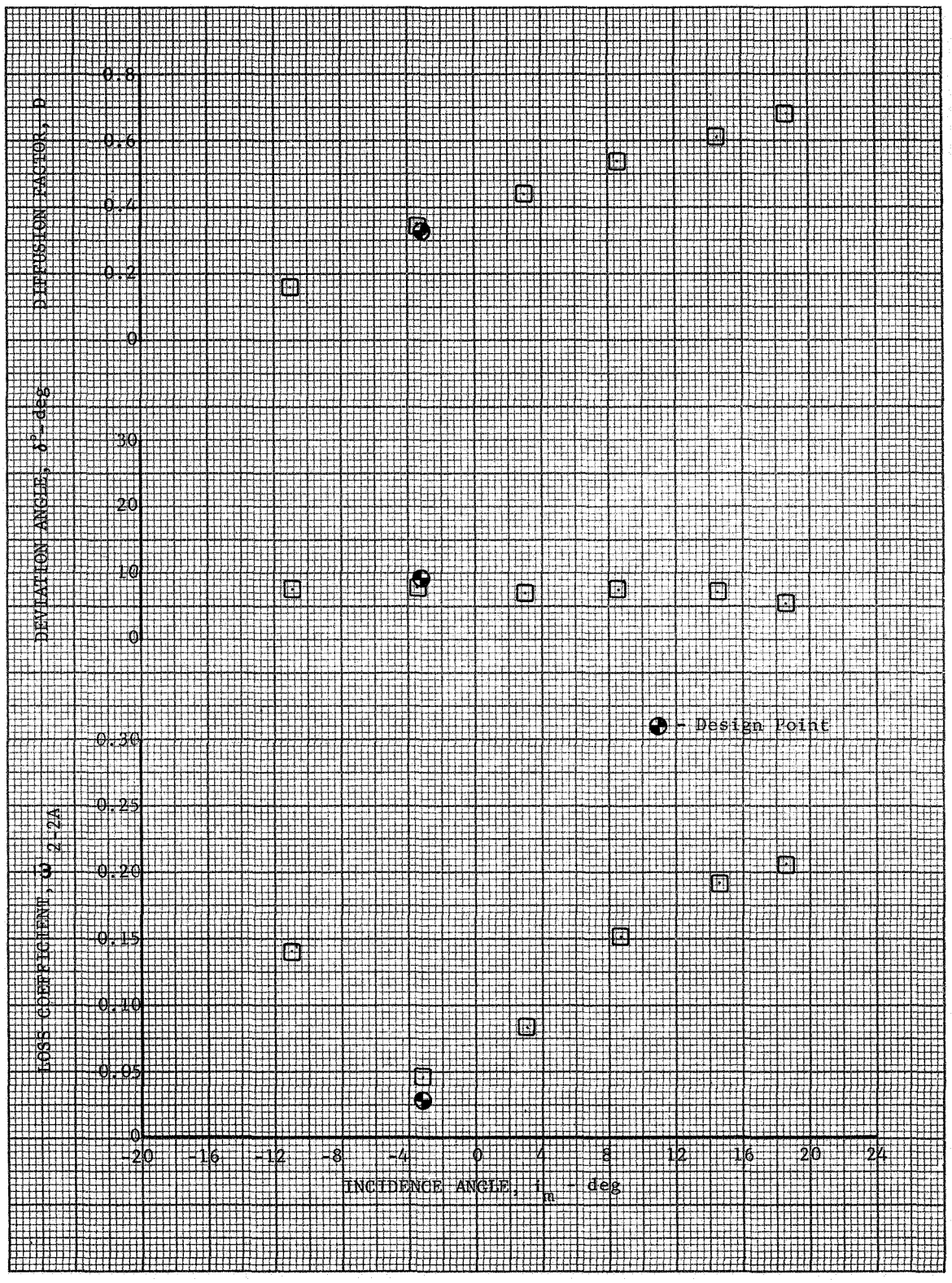
DF 68774

Figure 34. Stator Blade Element Performance: SLTO Configuration, 100% Equivalent Rotor Speed, 10% Span From Tip



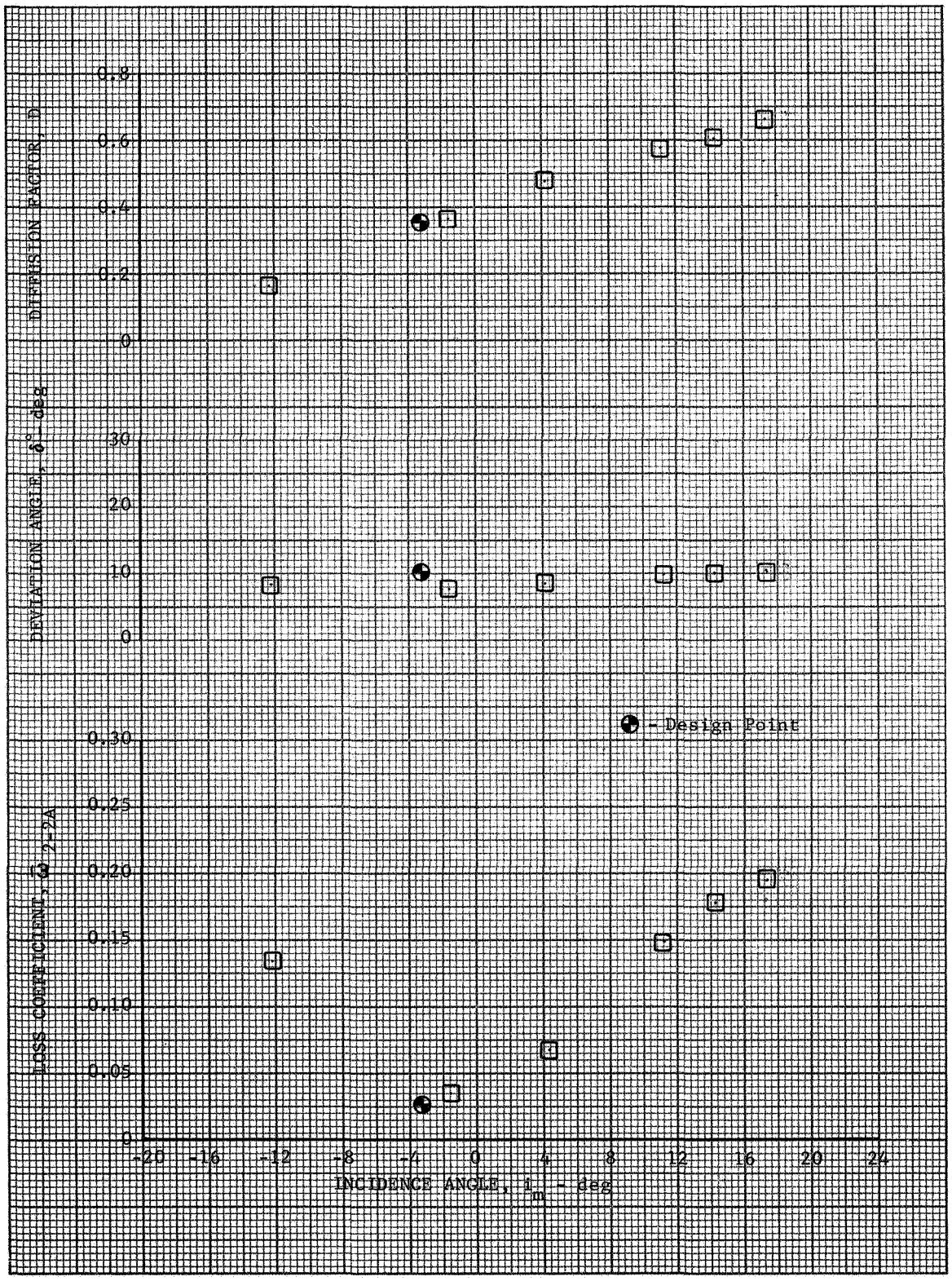
DF 68775

Figure 35. Stator Blade Element Performance: SLTO Configuration, 100% Rotor Speed, 30% Span From Tip



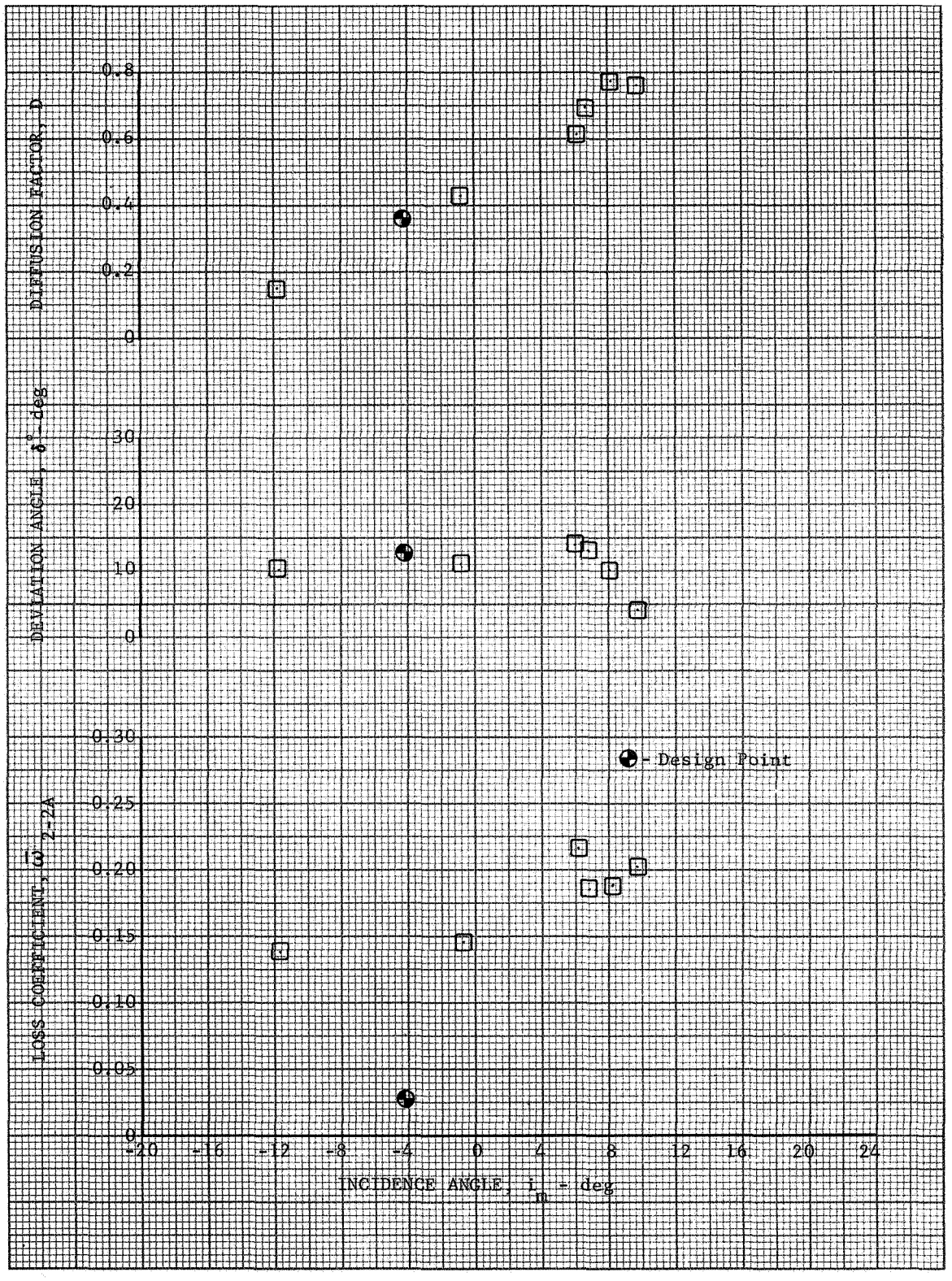
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Figure 36. Stator Blade Element Performance: SLTO Configuration, 100% Equivalent Rotor Speed, 50% Span From Tip



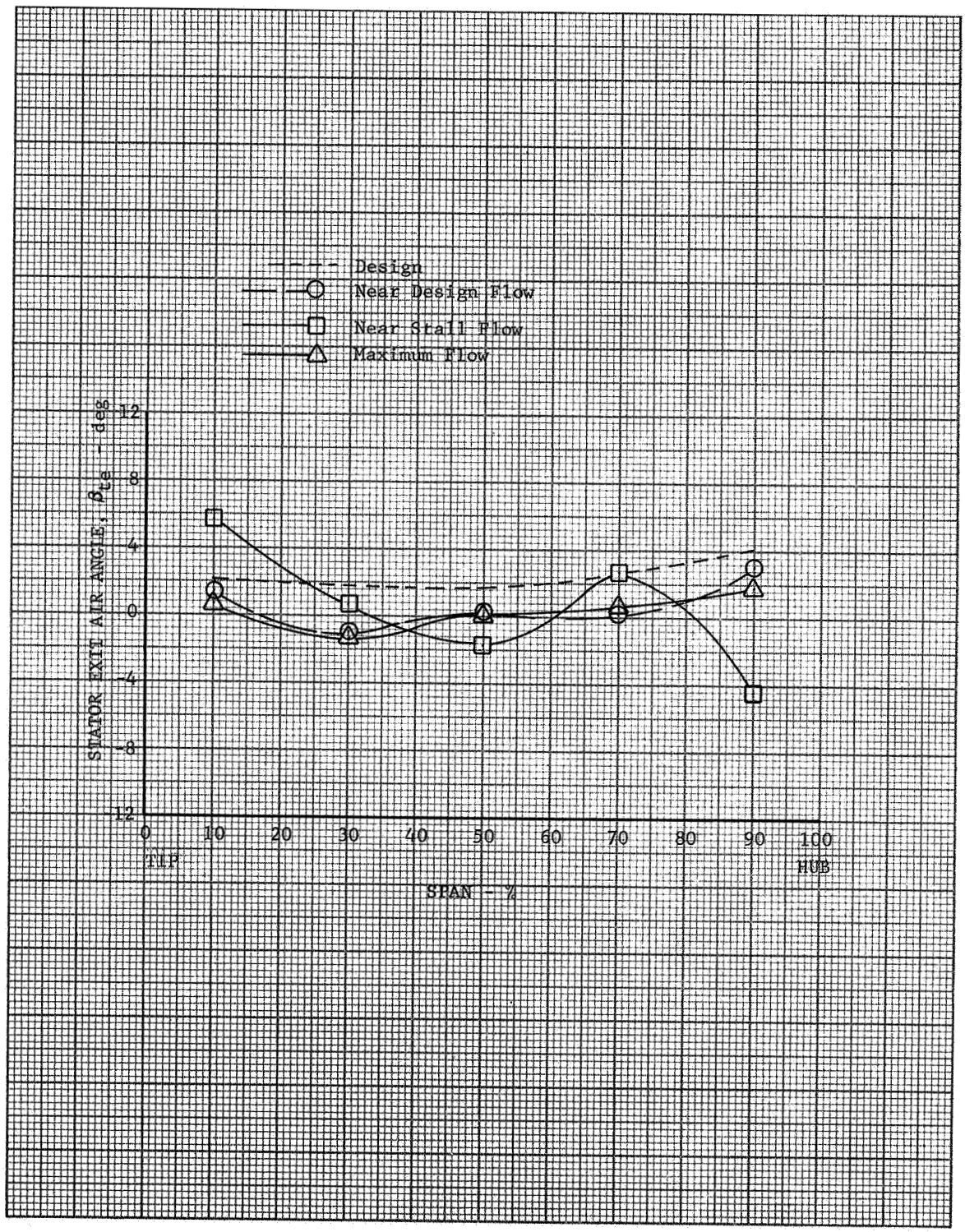
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Figure 37. Stator Blade Element Performance: SLTO Configuration, 100% Equivalent Rotor Speed, 70% Span From Tip



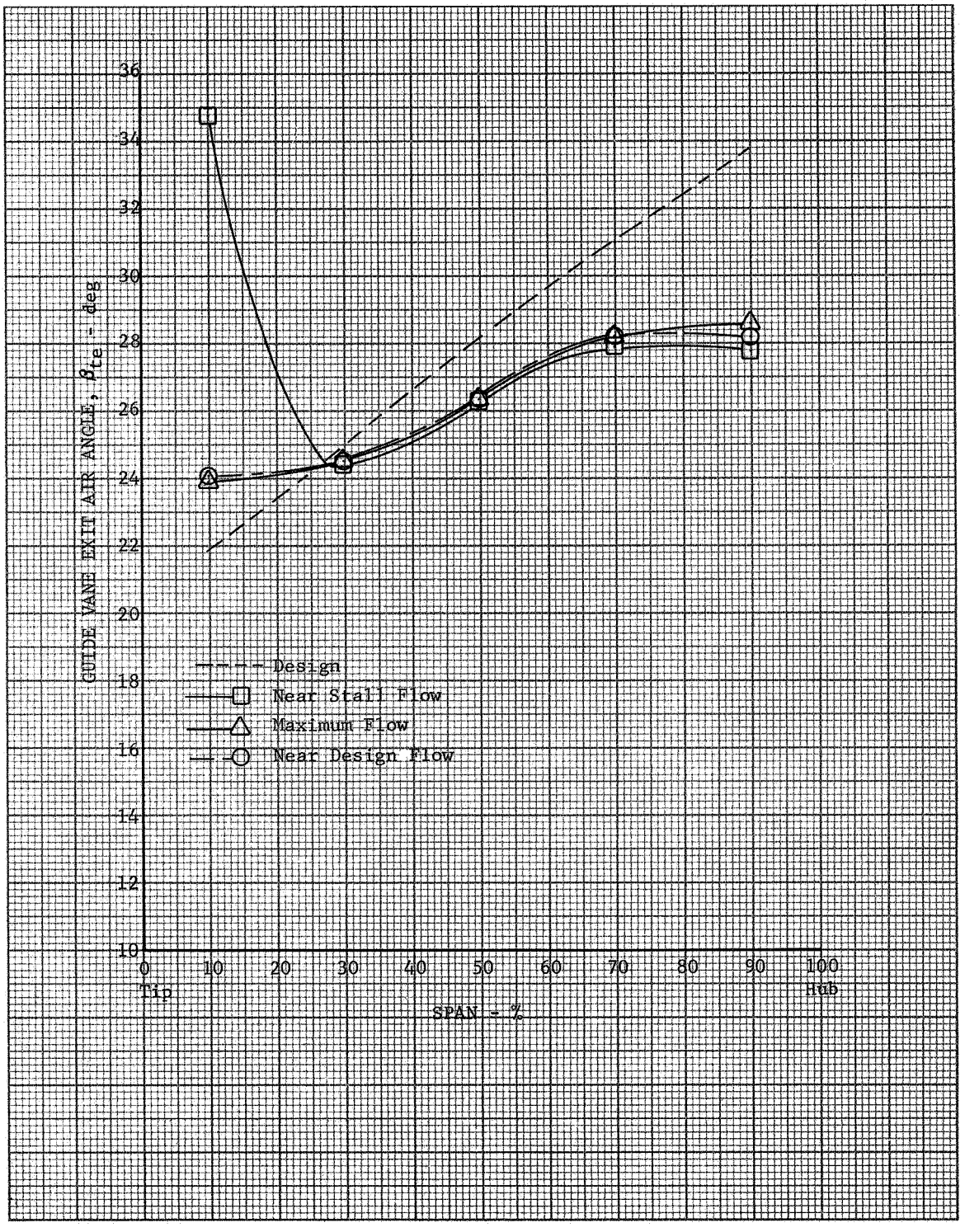
DF 68778

Figure 38. Stator Blade Element Performance: SLTO Configuration, 100% Equivalent Rotor Speed, 90% Span From Tip



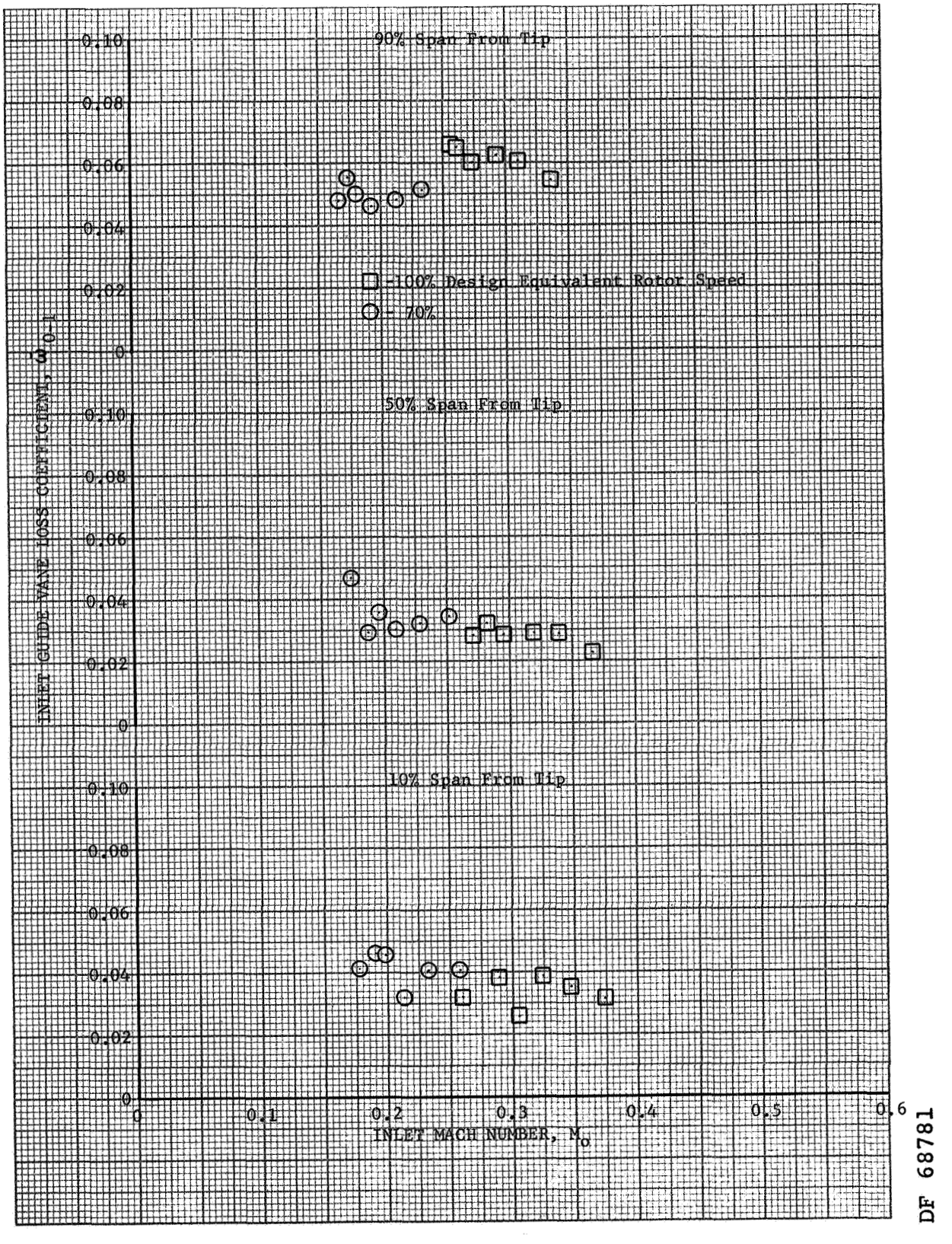
DF 68779

Figure 39. Stator Exit Air Angle vs Percent Span: SLTO Configuration, 100% Equivalent Rotor Speed



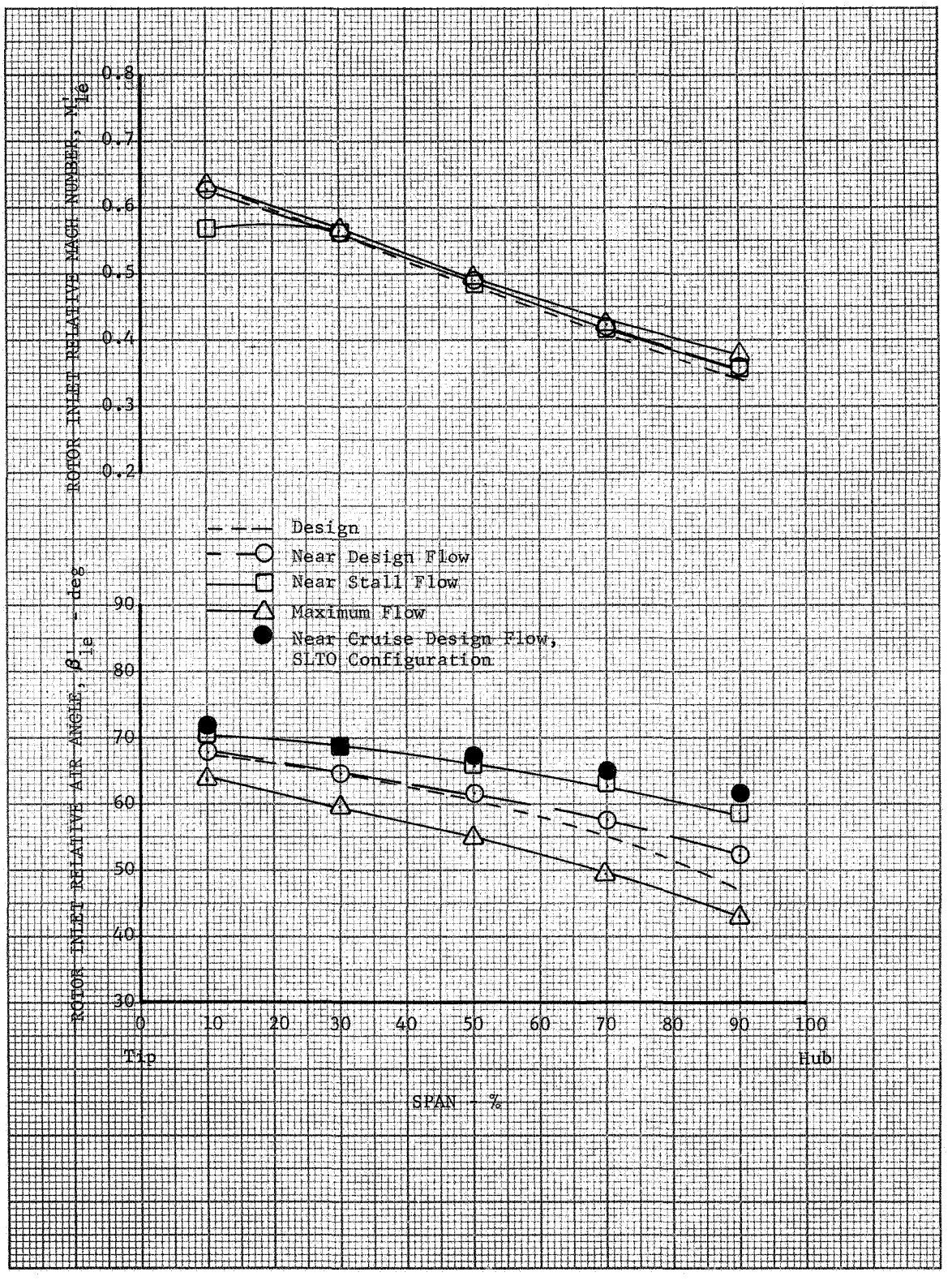
DF 68780

Figure 40. Guide Vane Exit Air Angle: Cruise Configuration, 70% Equivalent Rotor Speed



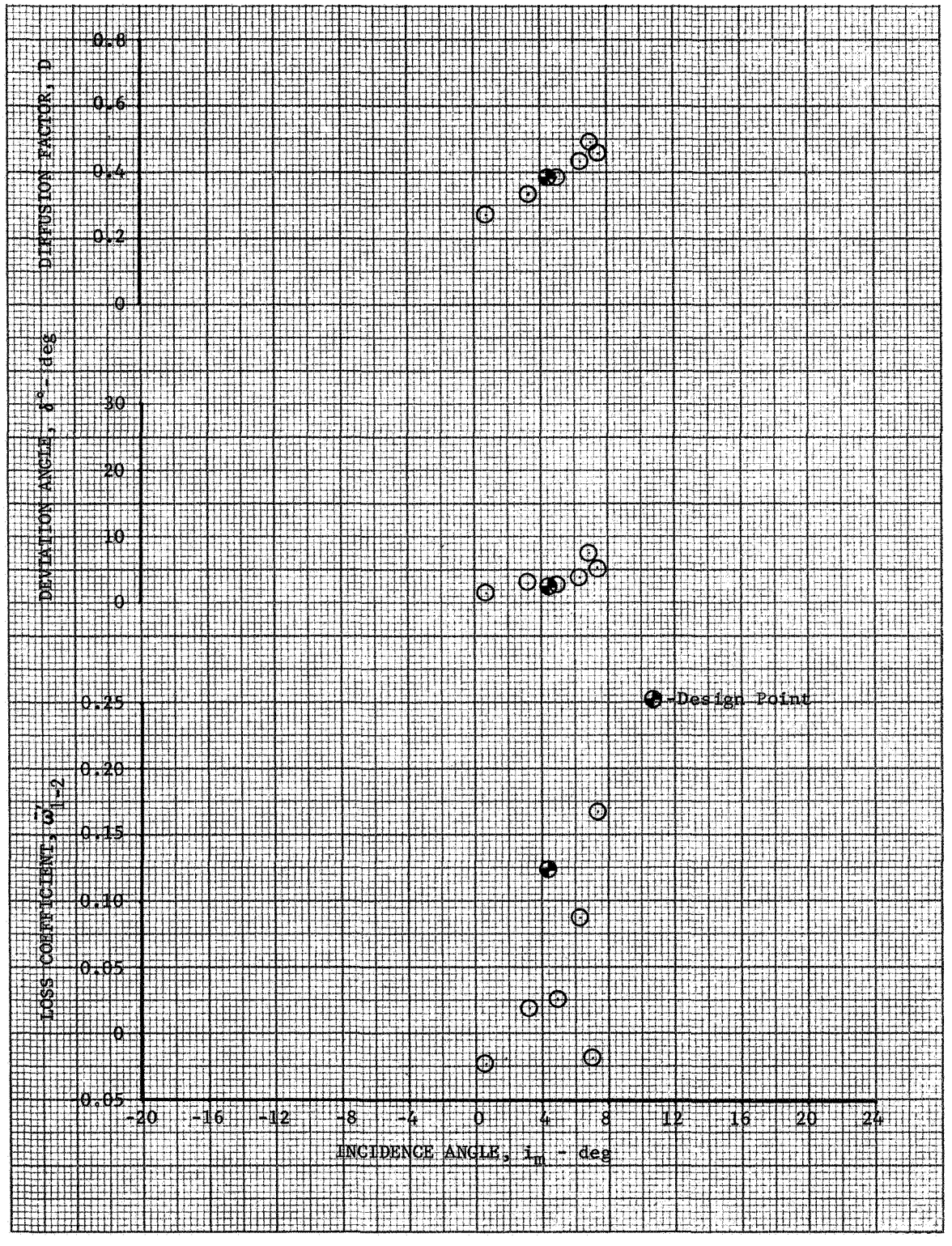
DF 68781

Figure 41. Inlet Guide Vane Loss Coefficient vs Inlet Mach Number: Cruise Configuration



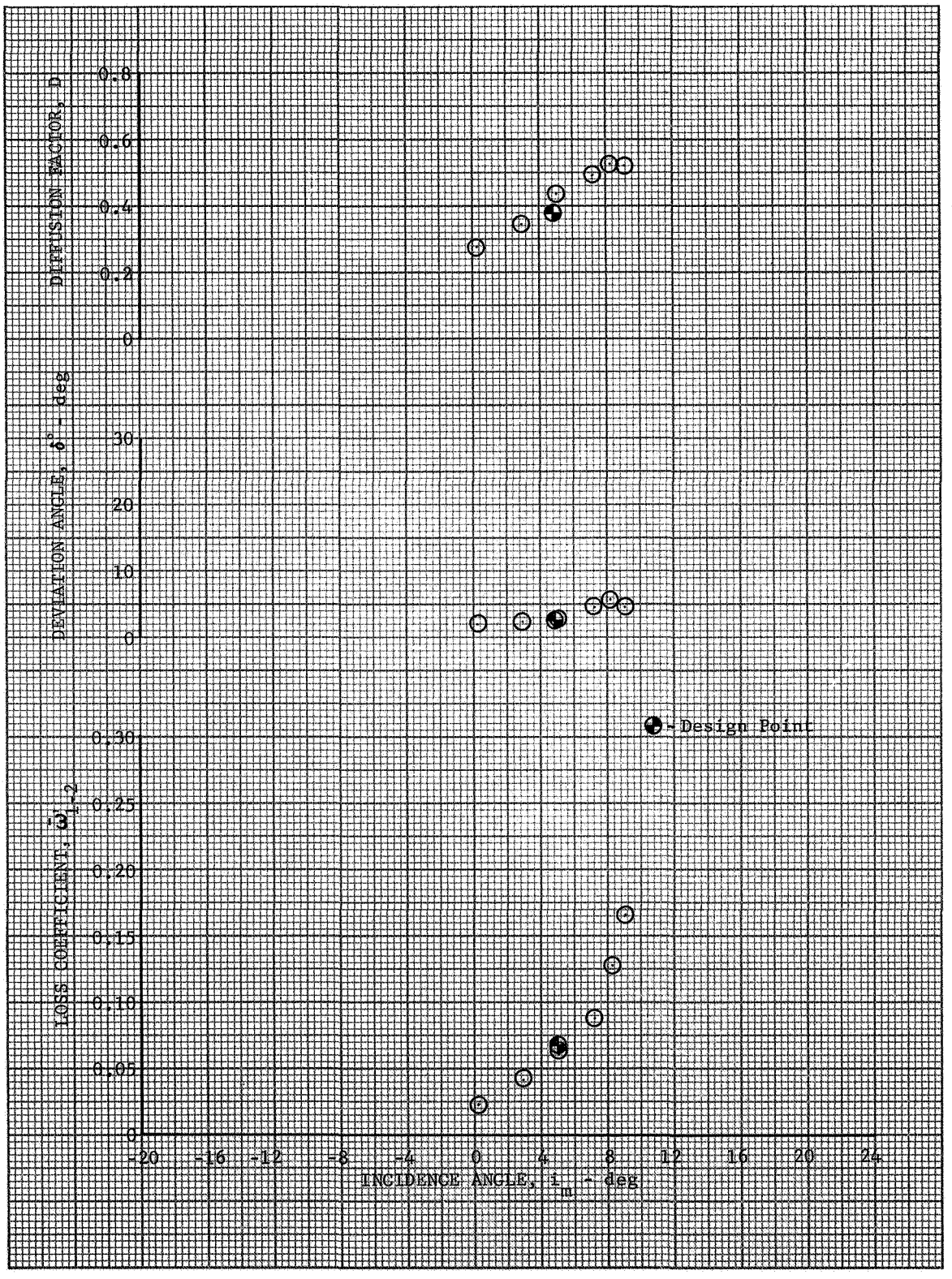
DF 68782

Figure 42. Rotor Inlet Air Angle and Mach Number Distribution: Cruise Configuration, 70% Equivalent Rotor Speed



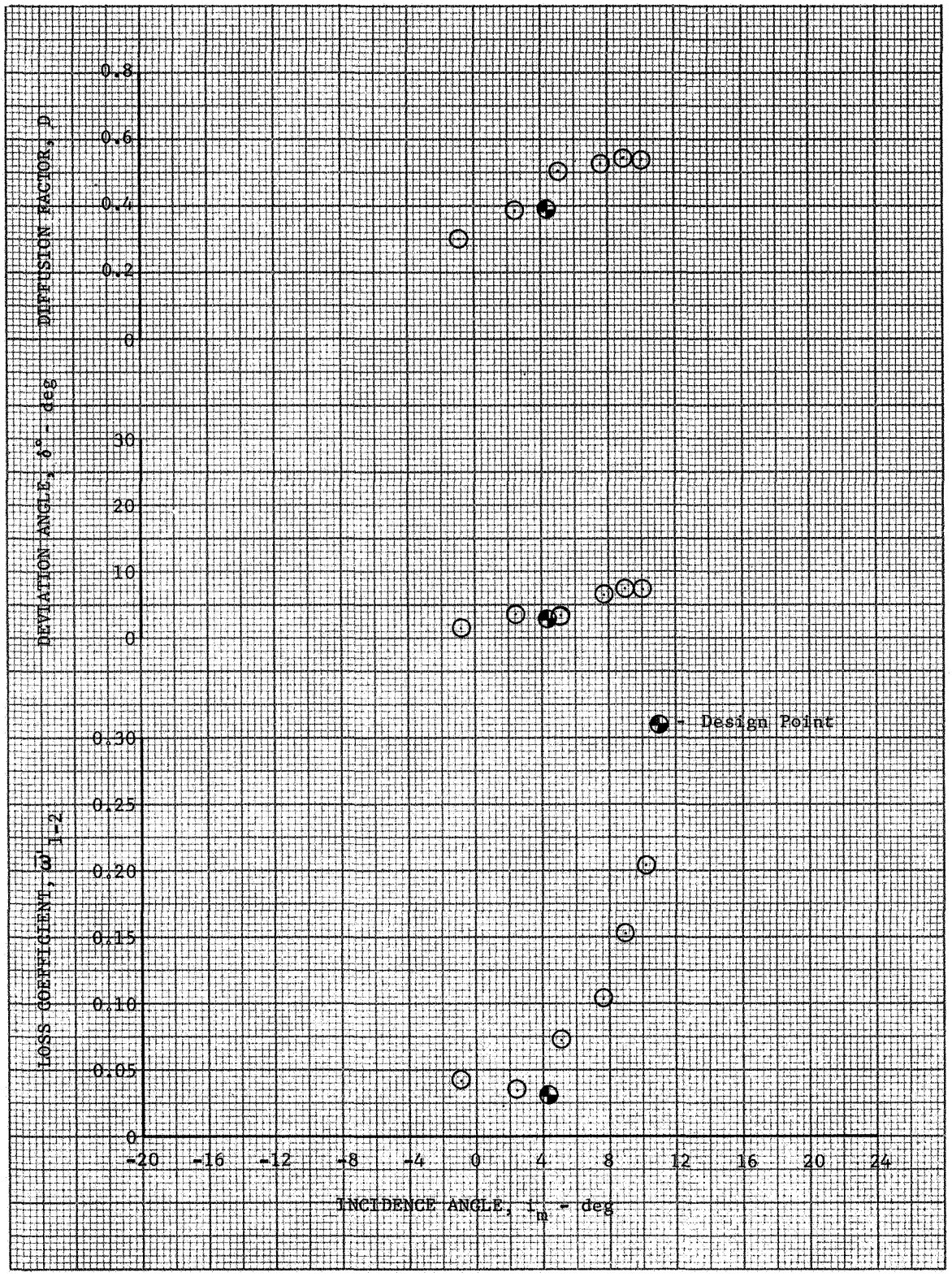
DF 68783

Figure 43. Rotor Blade Element Performance: Cruise Configuration, 70% Equivalent Rotor Speed, 10% Span From Tip



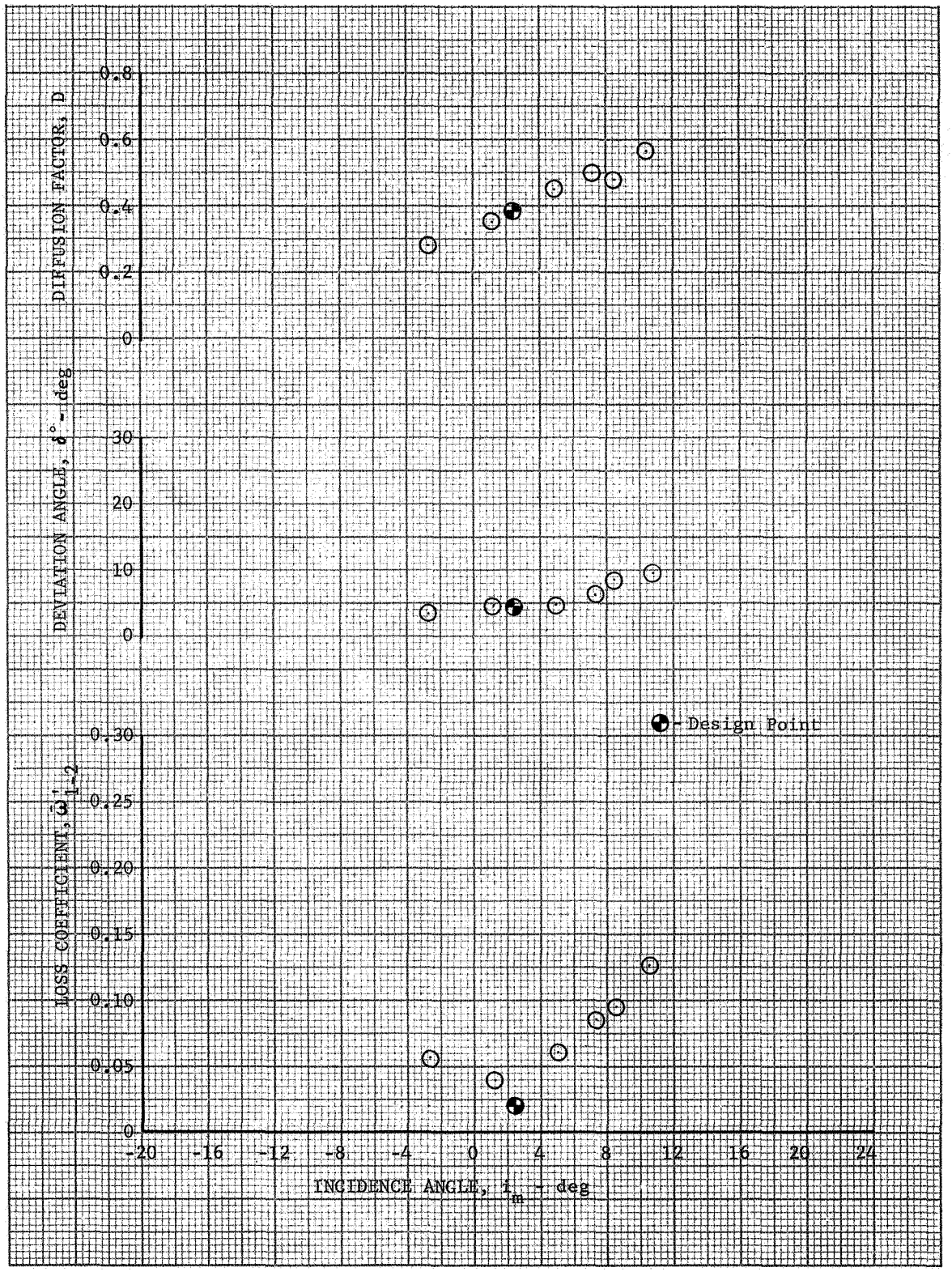
DF 68784

Figure 44. Rotor Blade Element Performance: Cruise Configuration, 70% Equivalent Rotor Speed, 30% Span From Tip



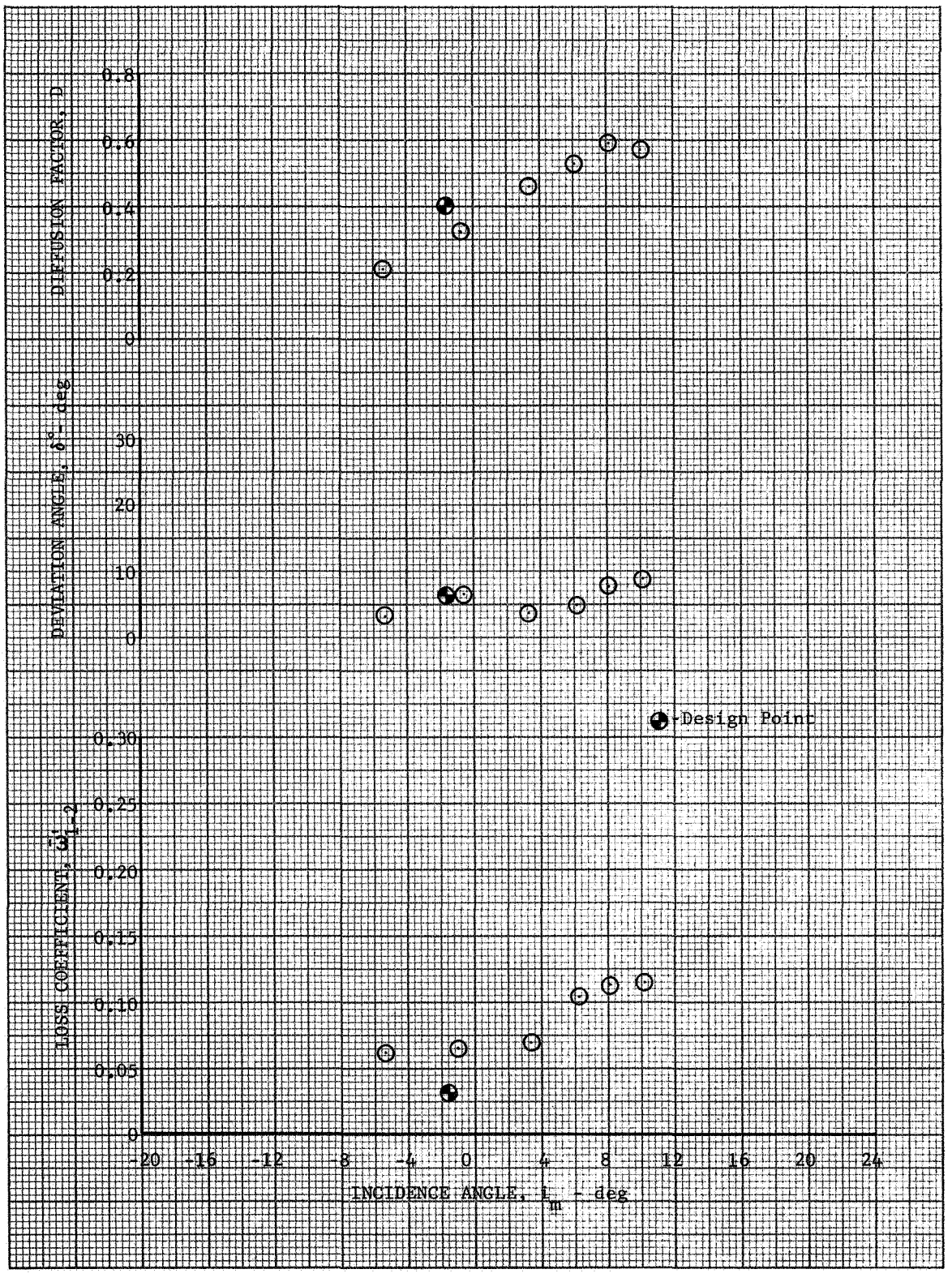
DF 68785

Figure 45. Rotor Blade Element Performance: Cruise Configuration, 70% Equivalent Rotor Speed, 50% Span From Tip



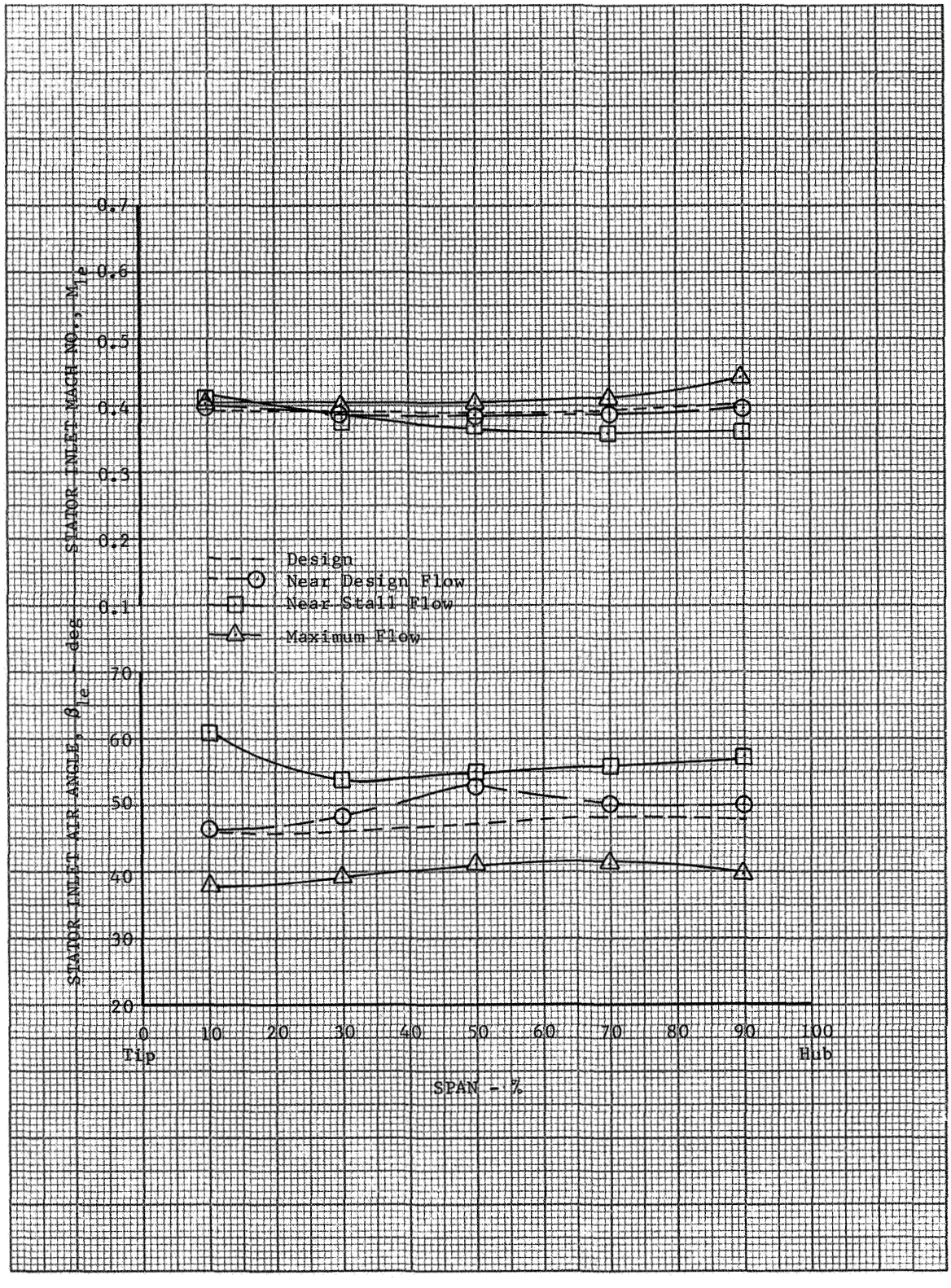
DF 68786

Figure 46. Rotor Blade Element Performance: Cruise Configuration, 70% Equivalent Rotor Speed, 70% Span From Tip



DF 68787

Figure 47. Rotor Blade Element Performance: Cruise Configuration, 70% Equivalent Rotor Speed, 90% Span From Tip



DF 68788

Figure 48. Stator Inlet Air Angle and Mach Number Distribution: Cruise Configuration, 70% Equivalent Rotor Speed

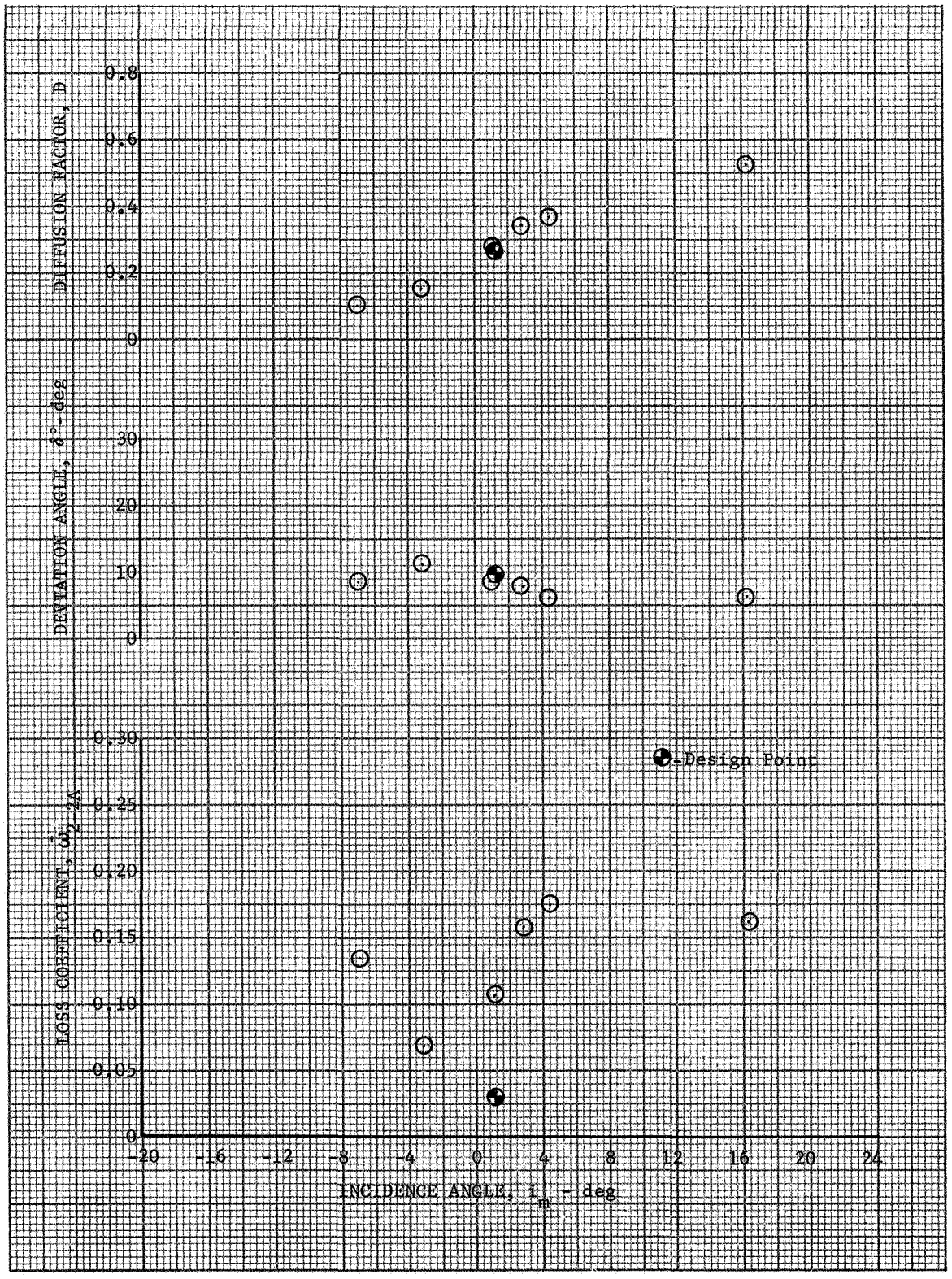
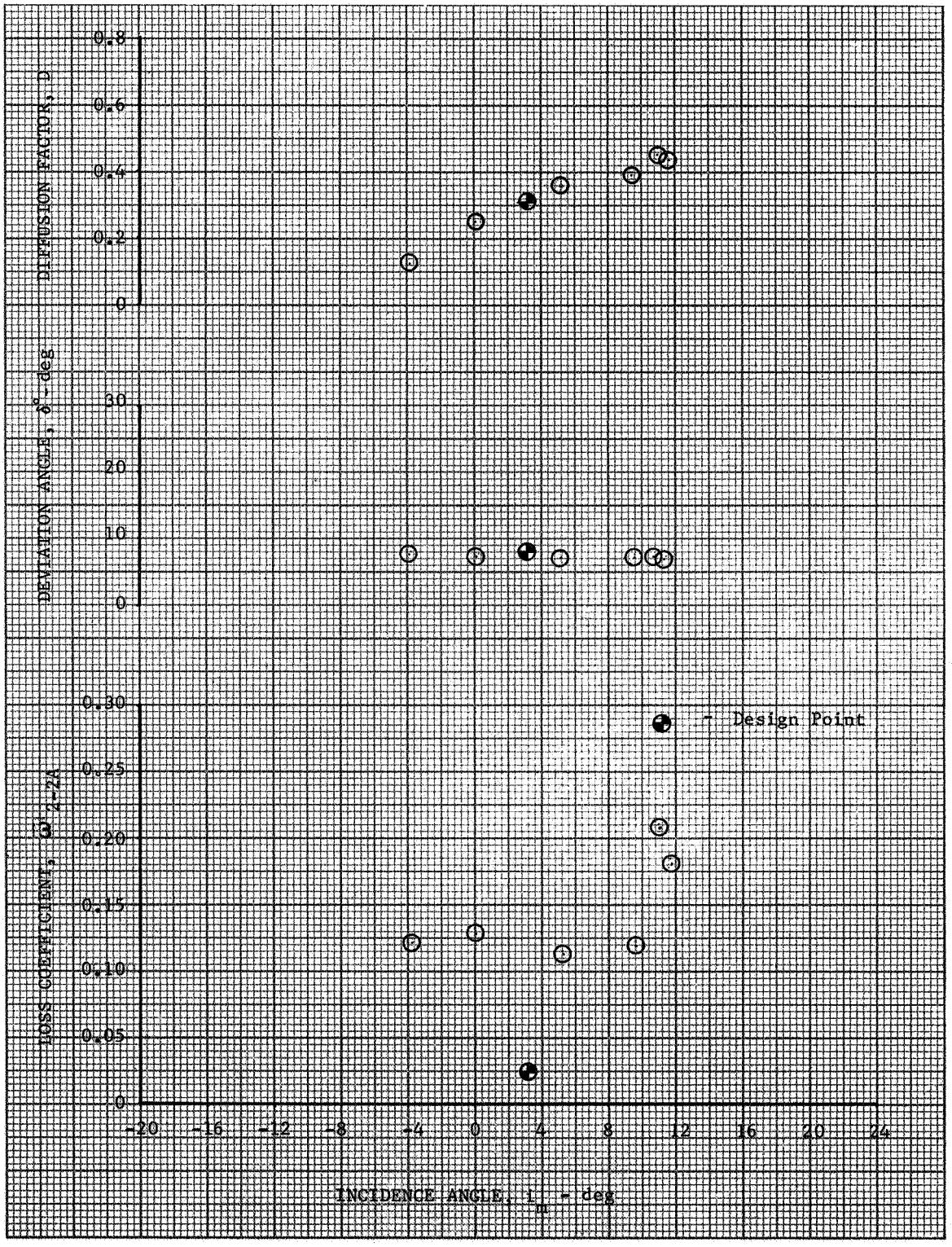
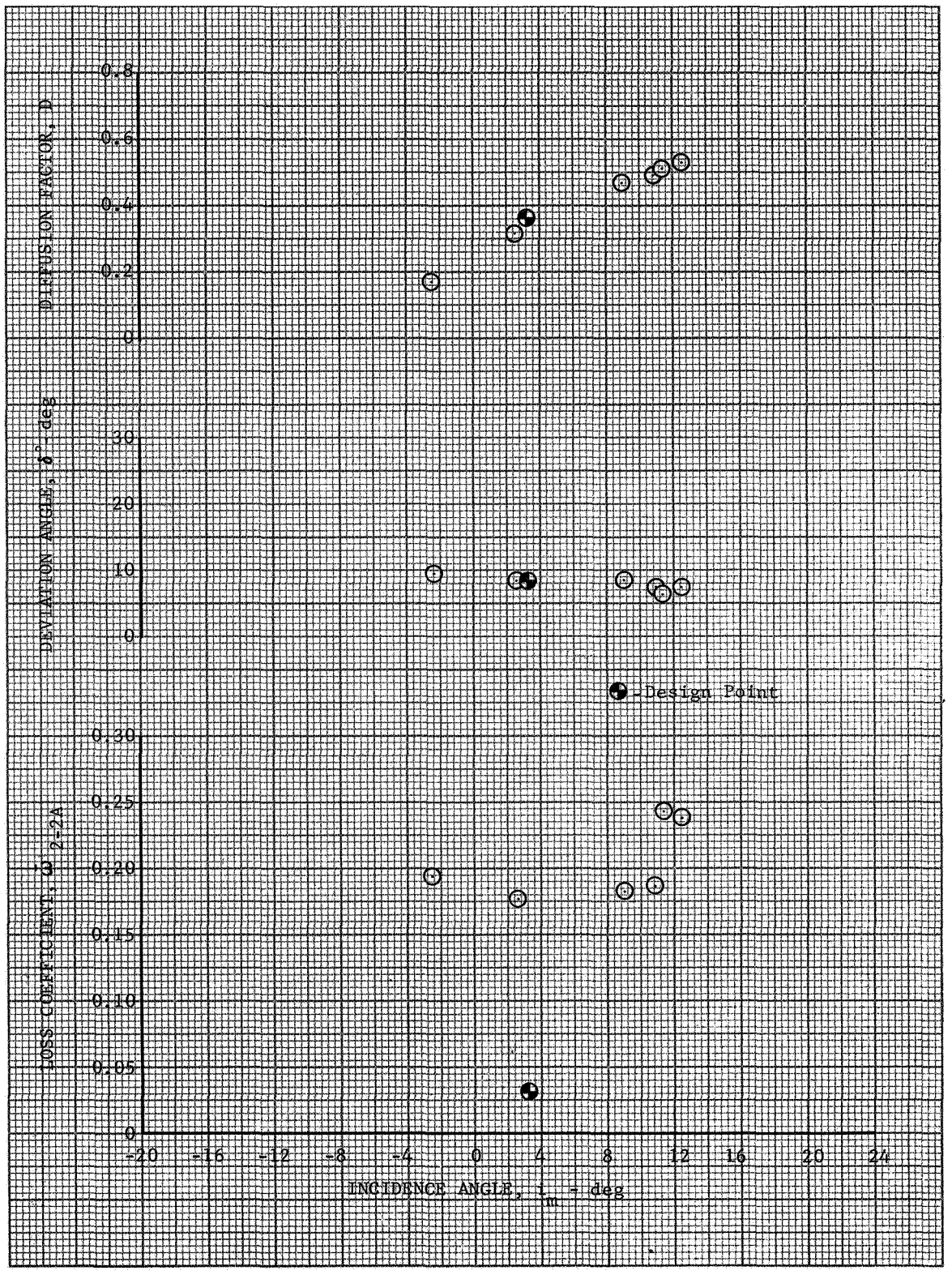


Figure 49. Stator Blade Element Performance: Cruise Configuration, 70% Equivalent Rotor Speed, 10% Span From Tip



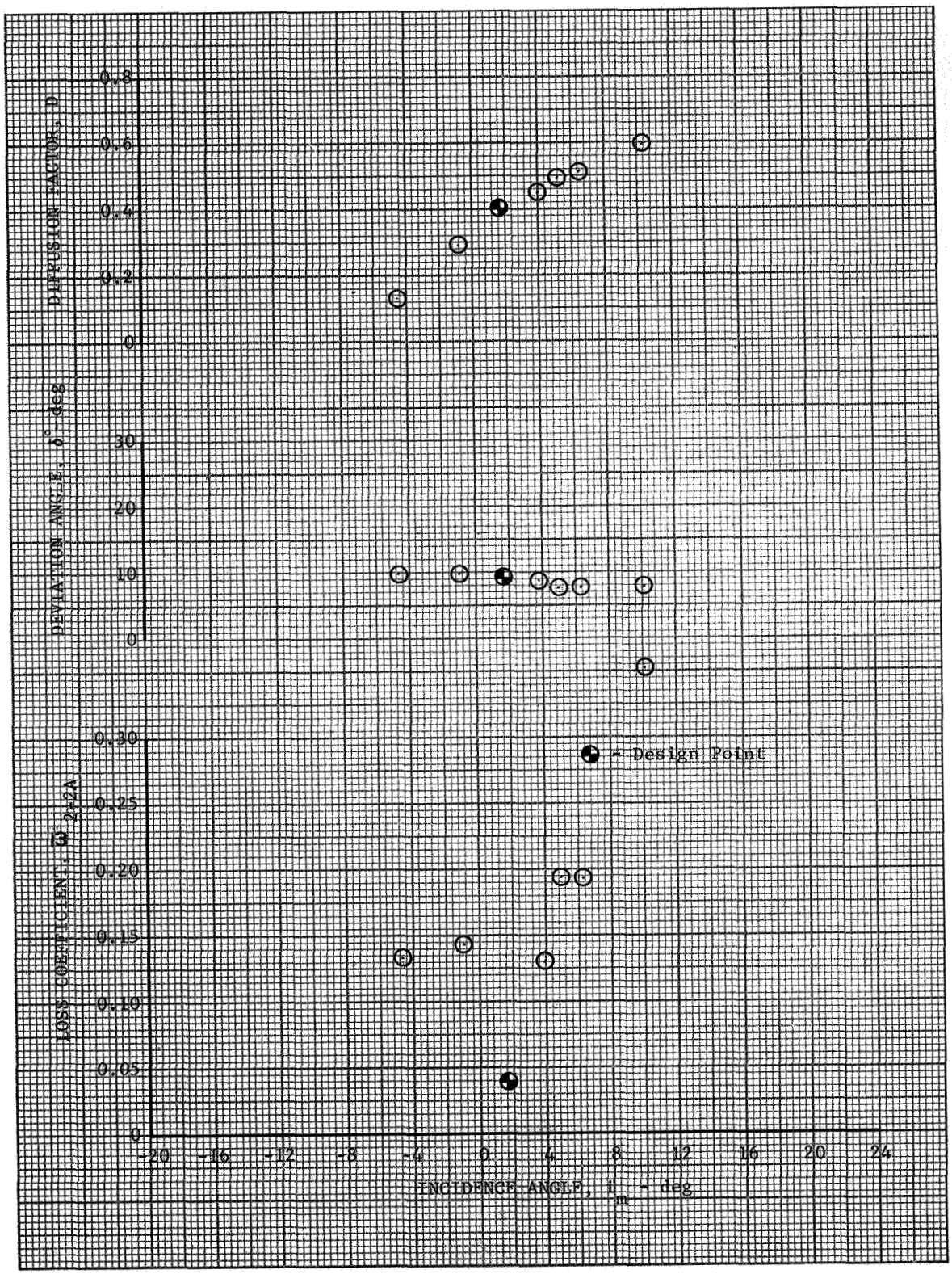
DF 68790

Figure 50. Stator Blade Element Performance: Cruise Configuration, 70% Equivalent Rotor Speed, 30% Span From Tip



DF 68791

Figure 51. Stator Blade Element Performance: Cruise Configuration, 70% Equivalent Rotor Speed, 50% Span From Tip



DF 68792

Figure 52. Stator Blade Element Performance: Cruise Configuration, 70% Equivalent Rotor Speed, 70% Span From Tip

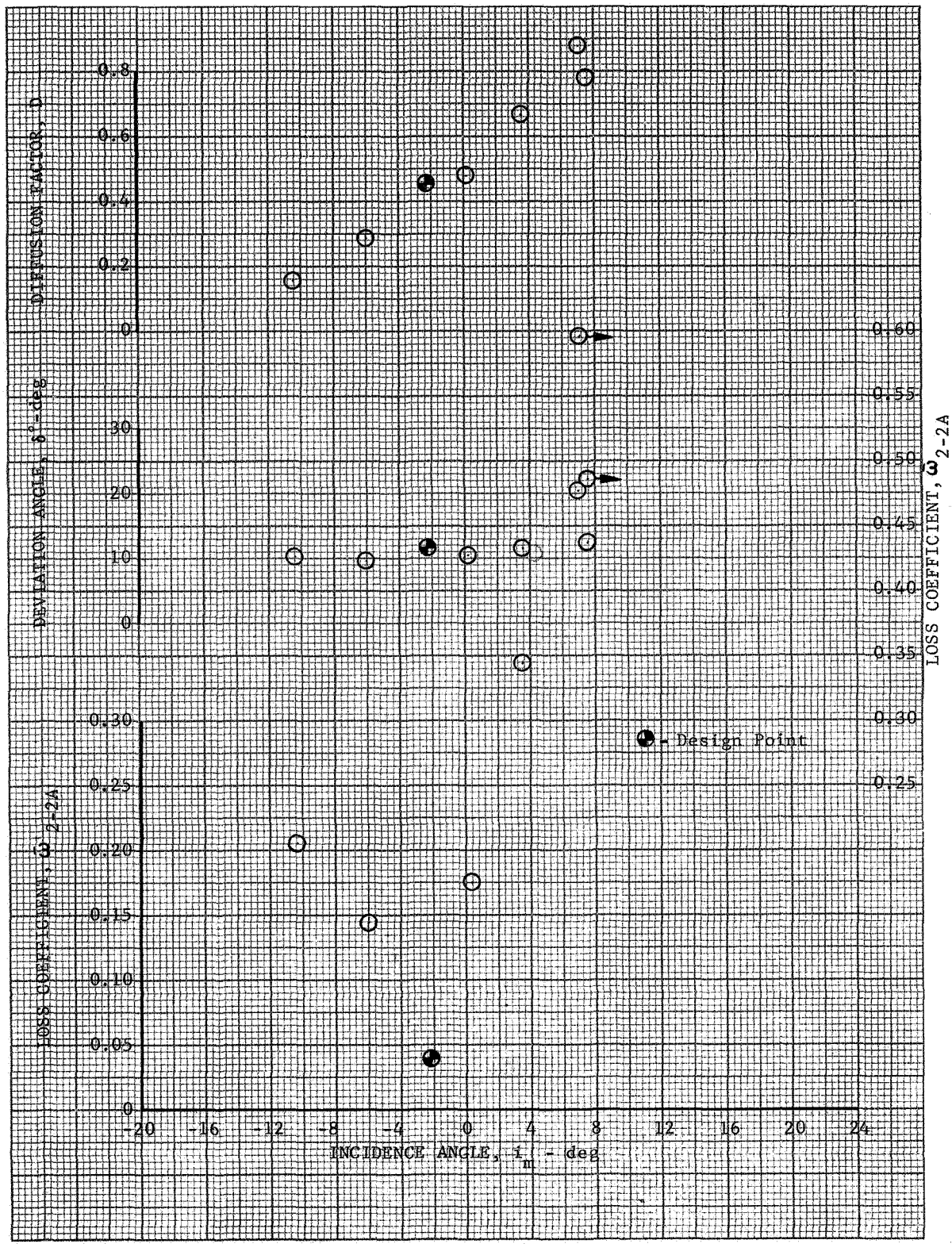
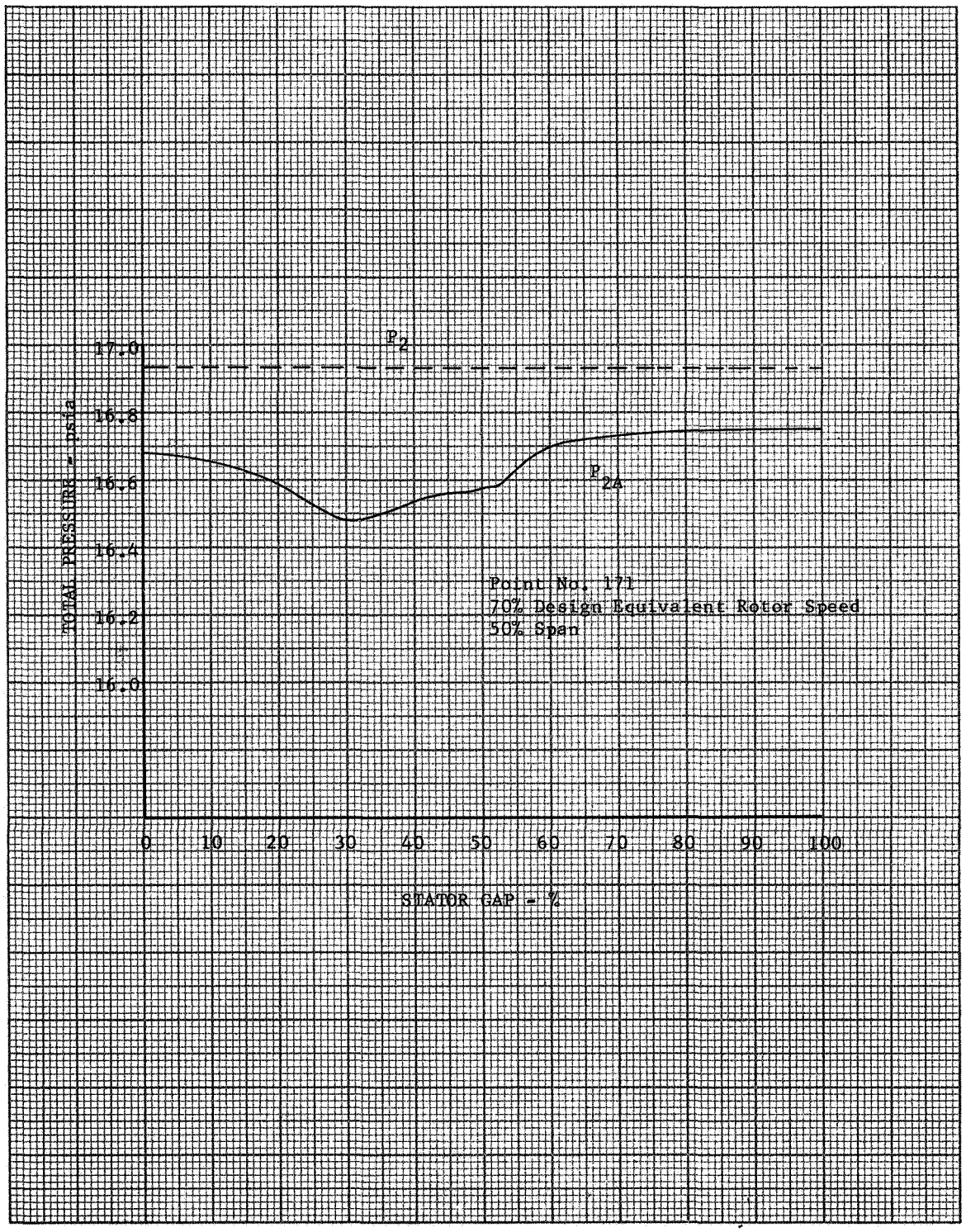
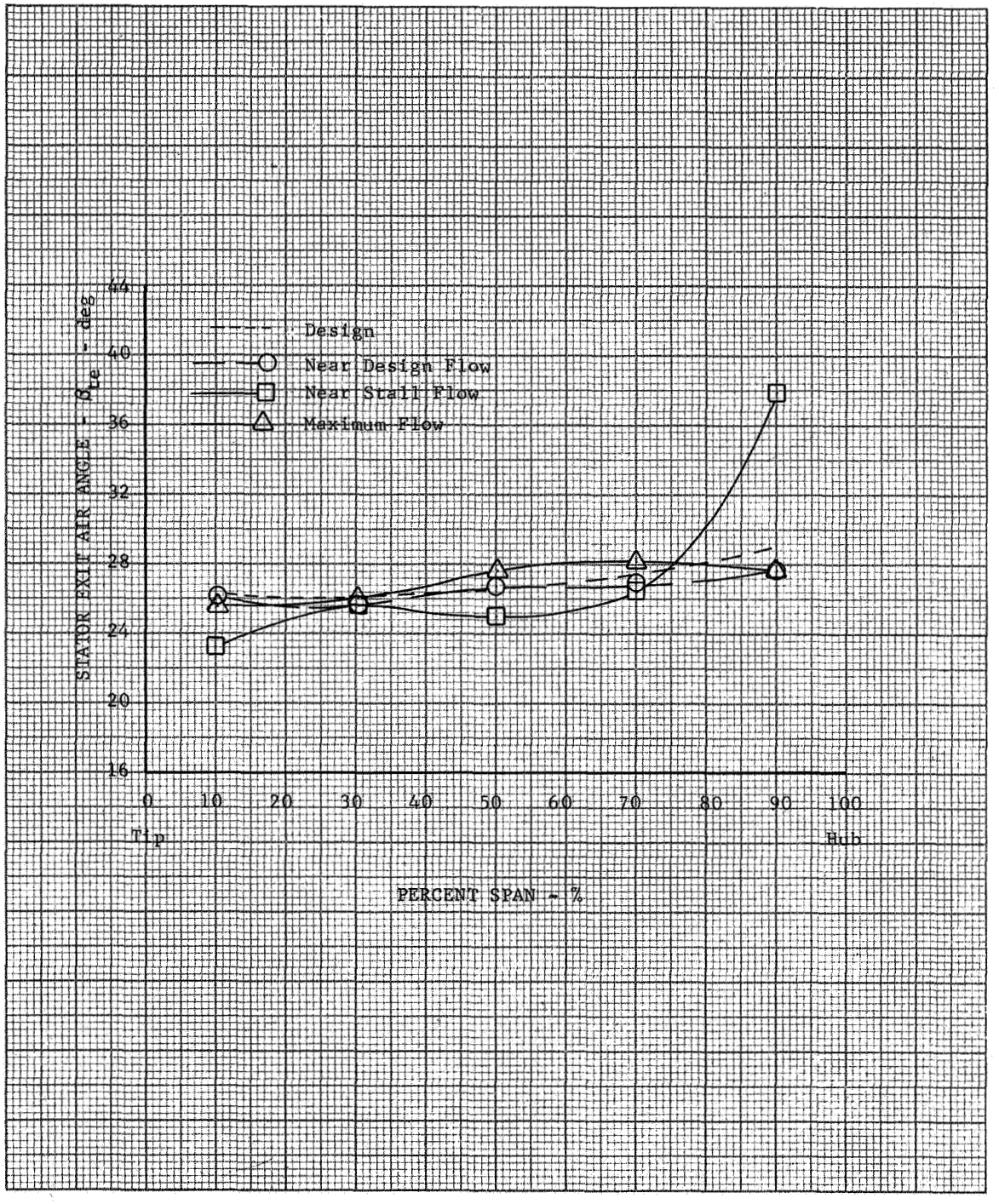


Figure 53. Stator Blade Element Performance: Cruise Configuration, 70% Equivalent Rotor Speed, 90% Span From Tip



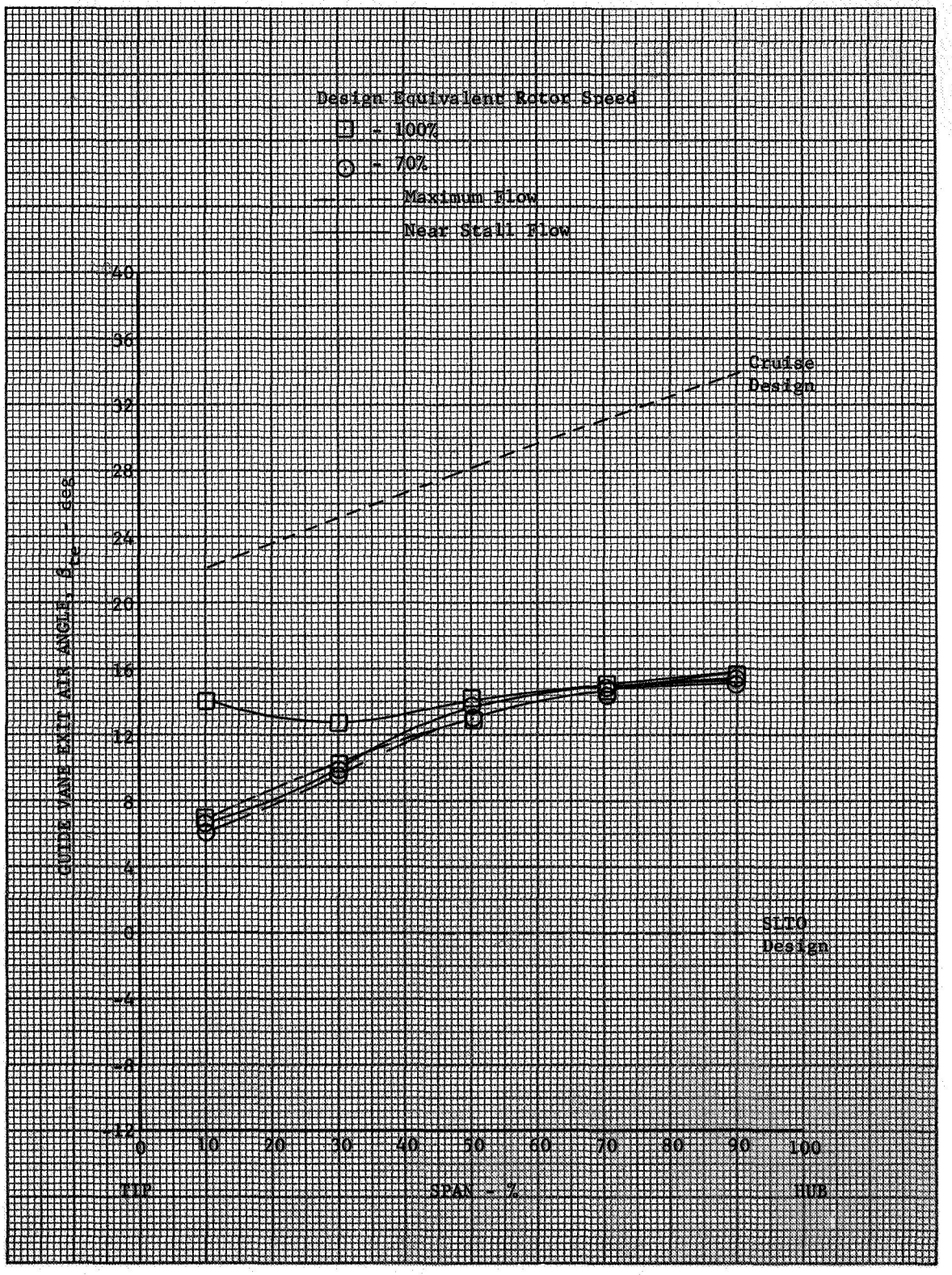
DF 68795

Figure 54. Stator B Cruise Configuration Wake Total Pressure Profile



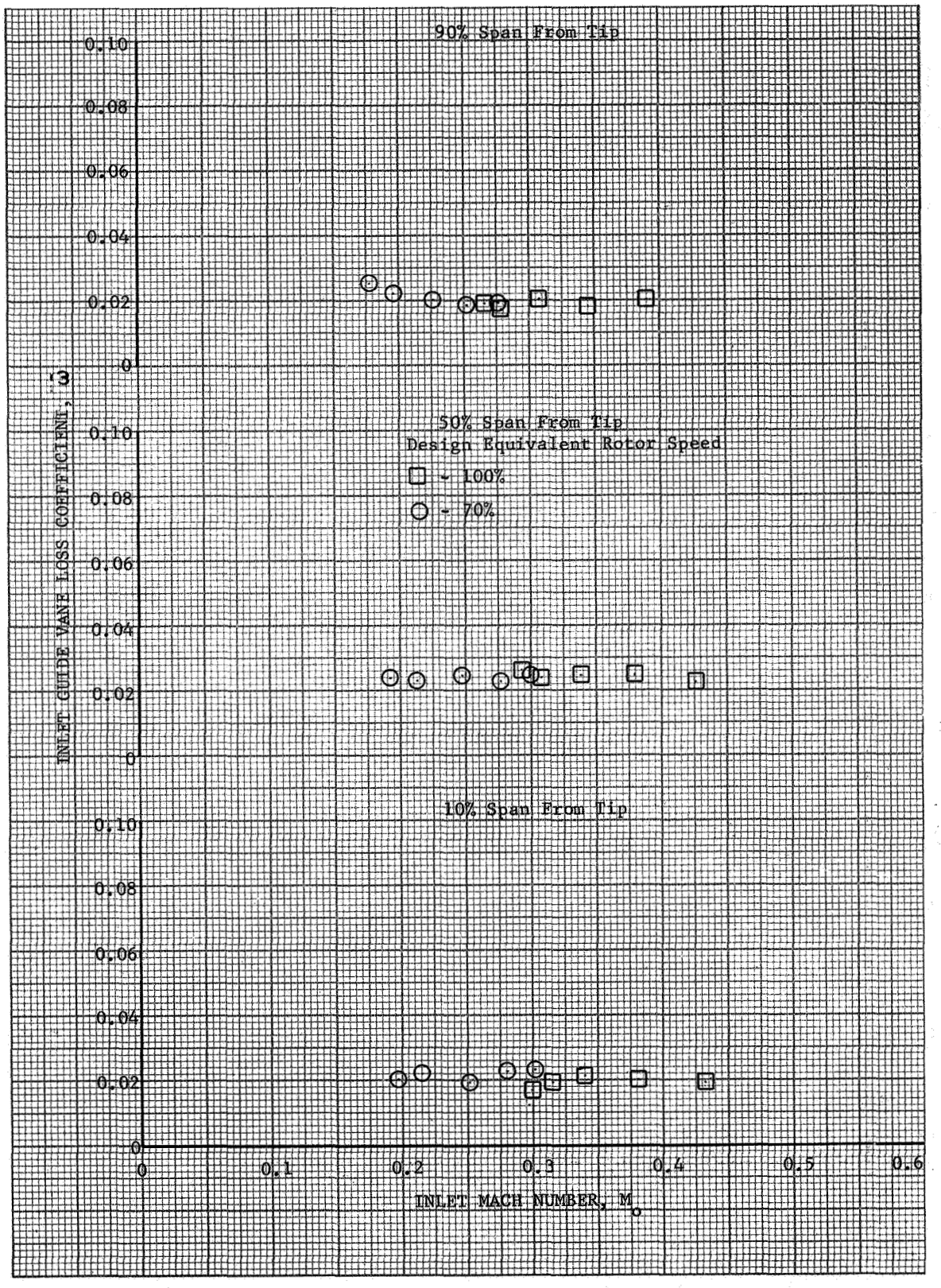
DF 68794

Figure 55. Stator Exit Air Angle vs Percent Span: Cruise Configuration, 70% Equivalent Rotor Speed



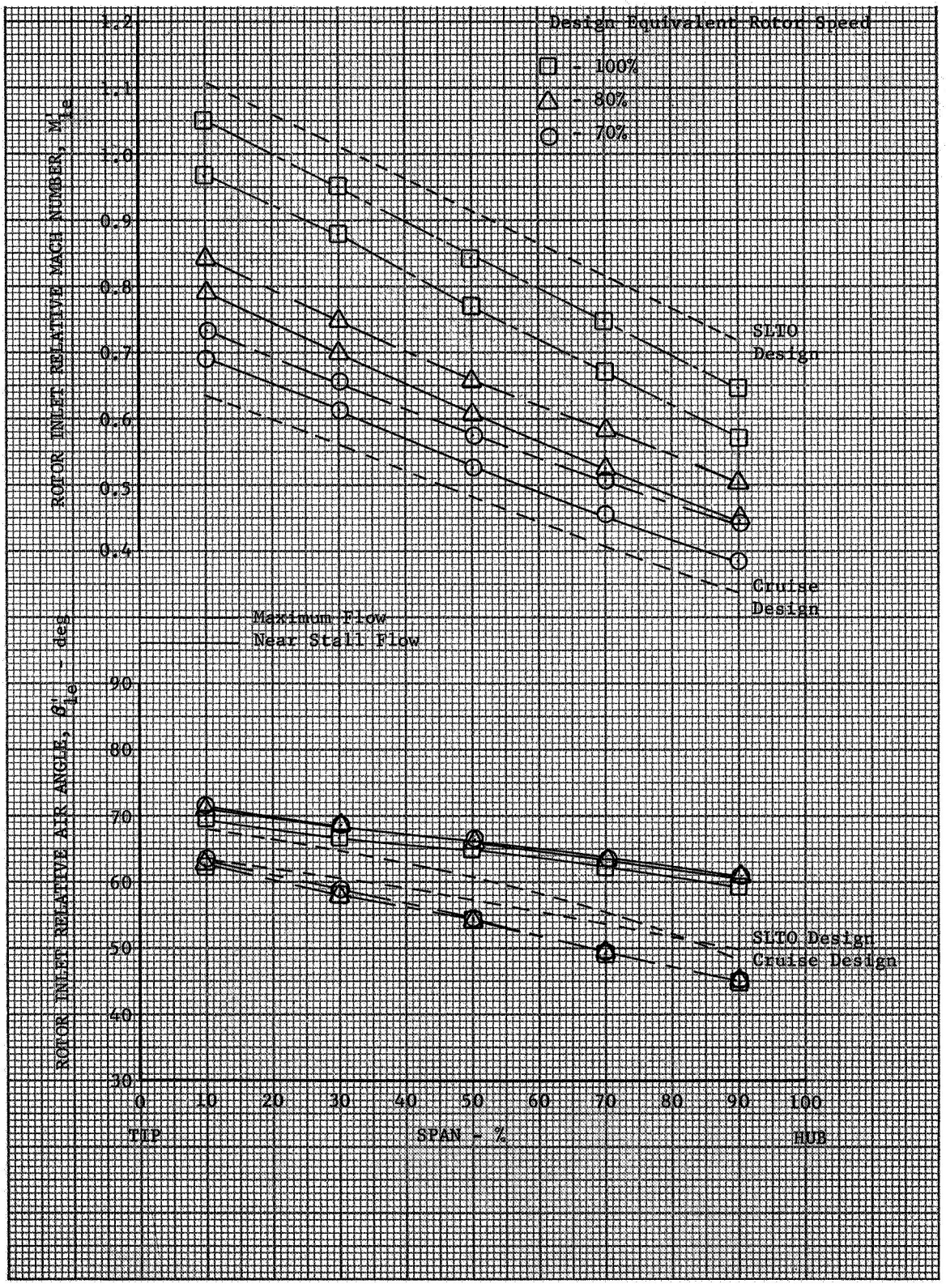
DF 68796

Figure 56. Guide Vane Exit Air Angle: Intermediate Configuration



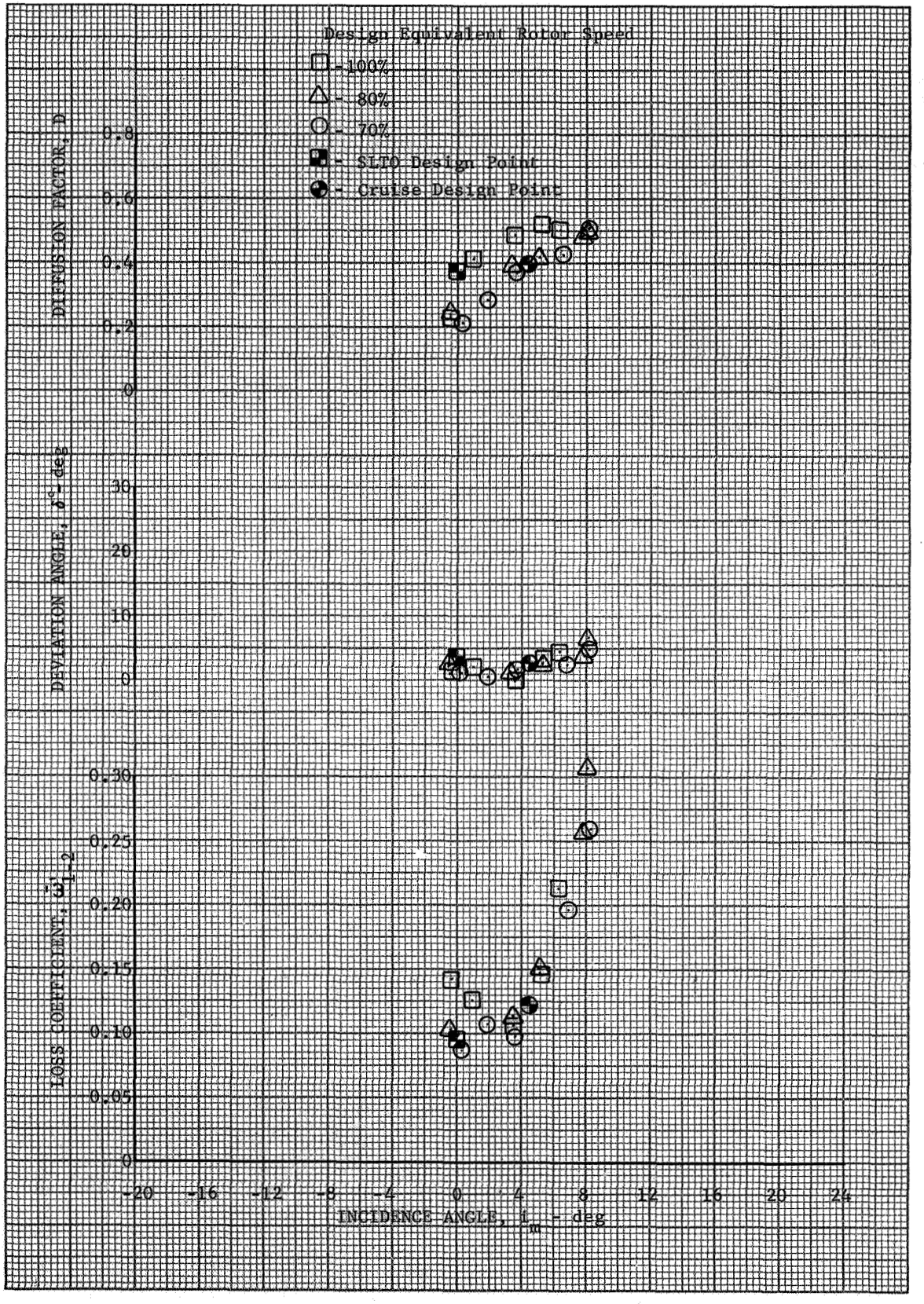
DF 68797

Figure 57. Inlet Guide Vane Loss Coefficient vs Inlet Mach Number: Intermediate Configuration



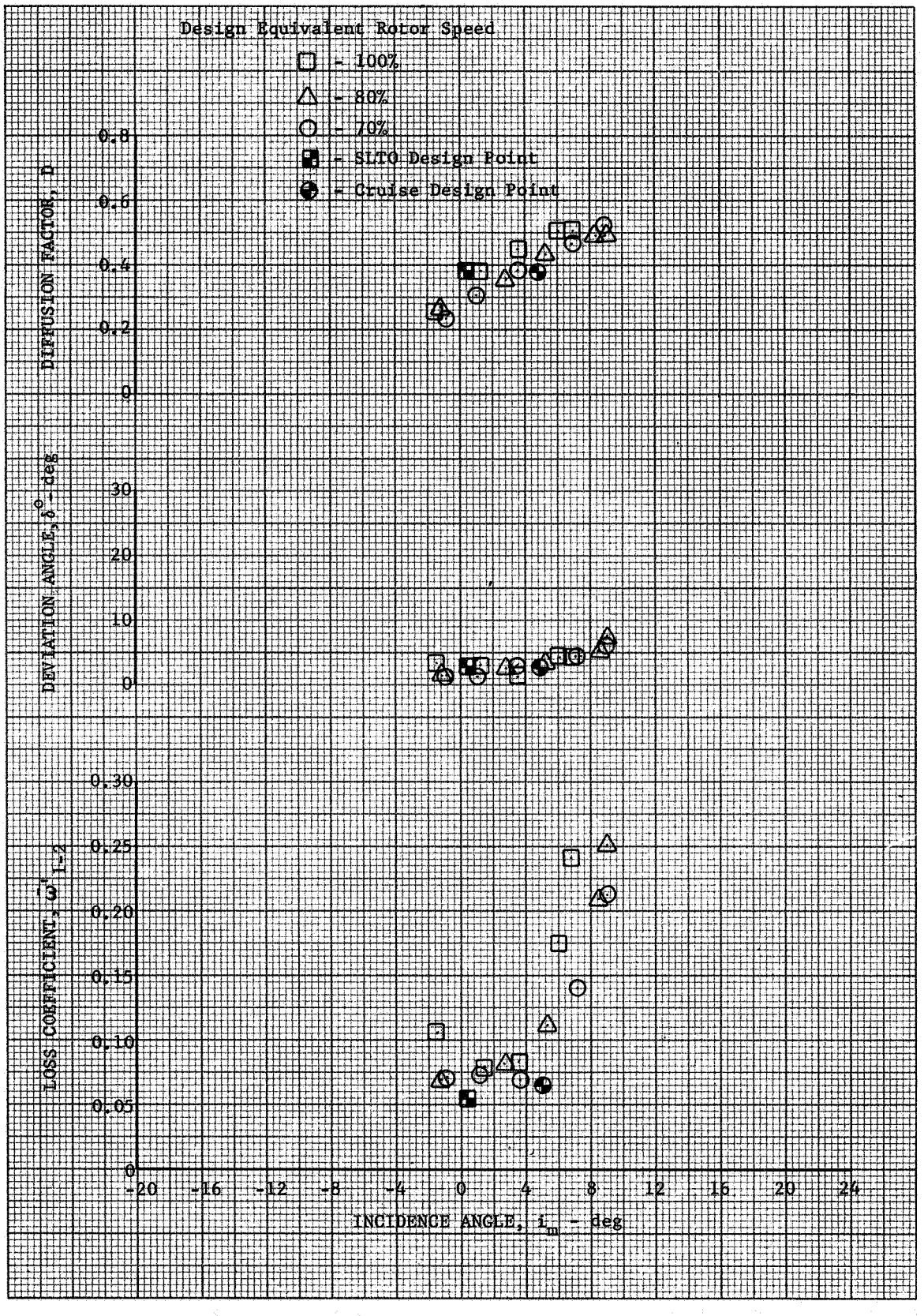
DF 68798

Figure 58. Rotor Inlet Relative Air Angle and Mach Number Distribution: Intermediate Configuration



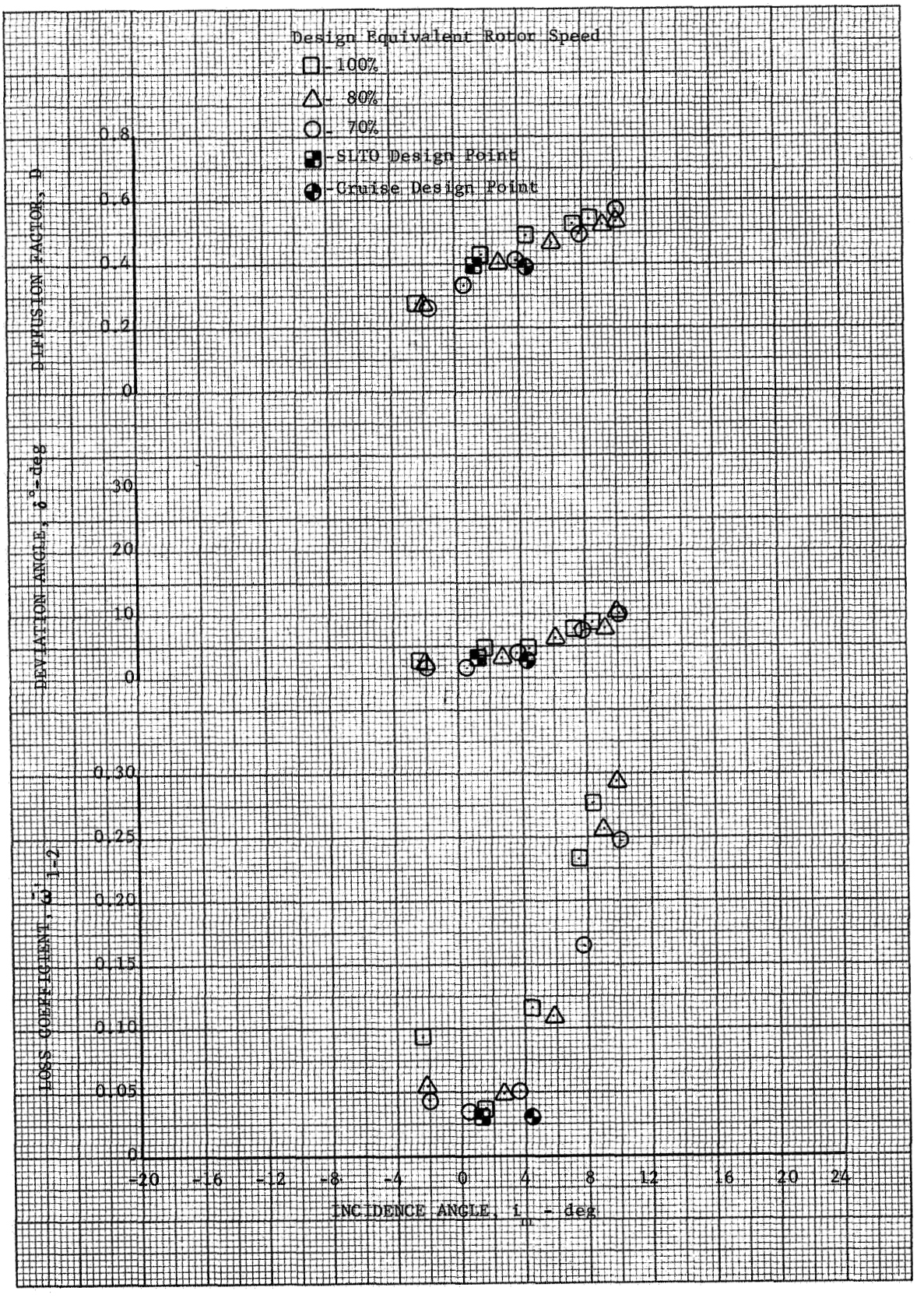
DF 68799

Figure 59. Rotor Blade Element Performance: Intermediate Configuration, 10% Span From Tip



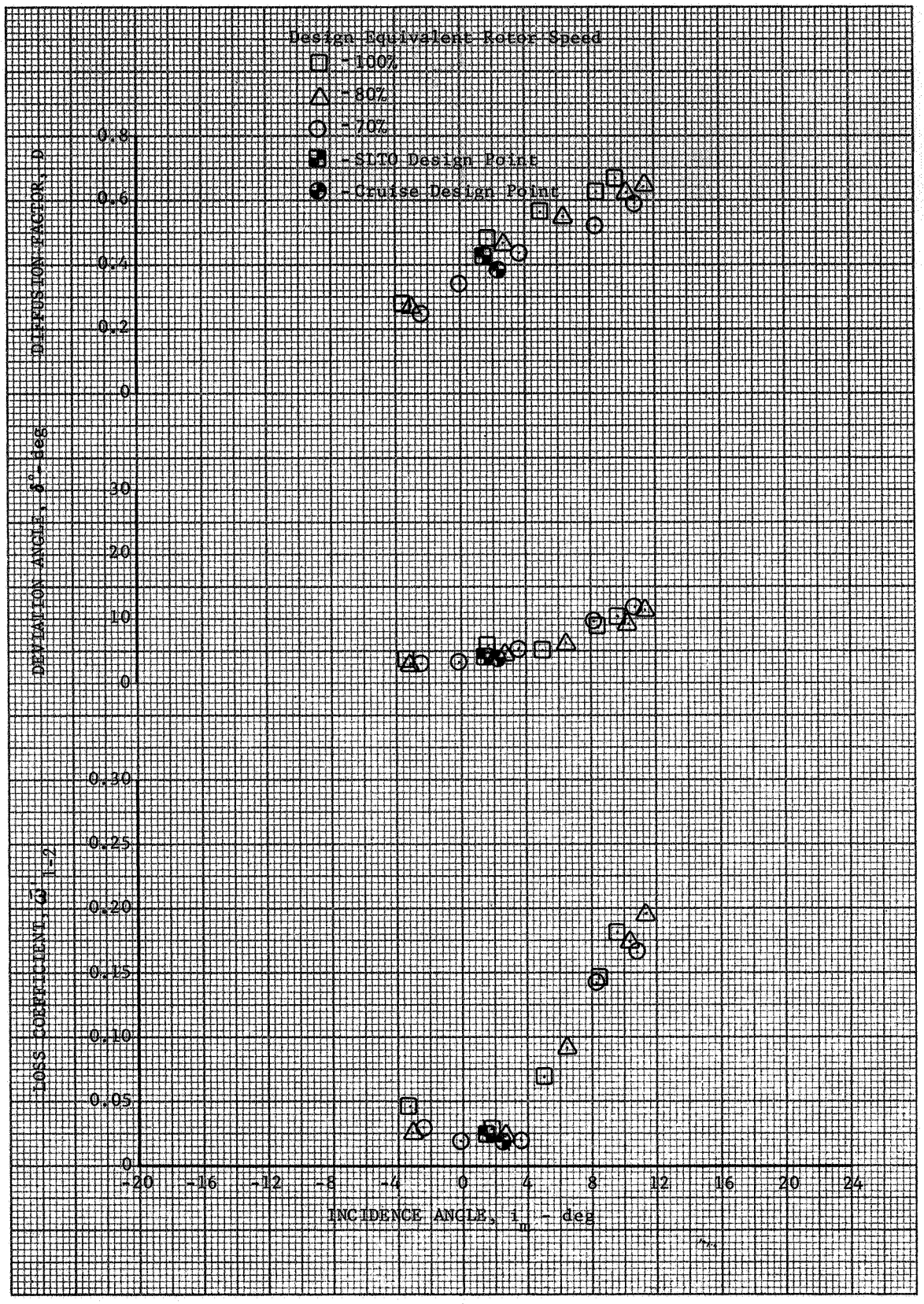
DF 68941

Figure 60. Rotor Blade Element Performance: Intermediate Configuration, 30% Span From Tip



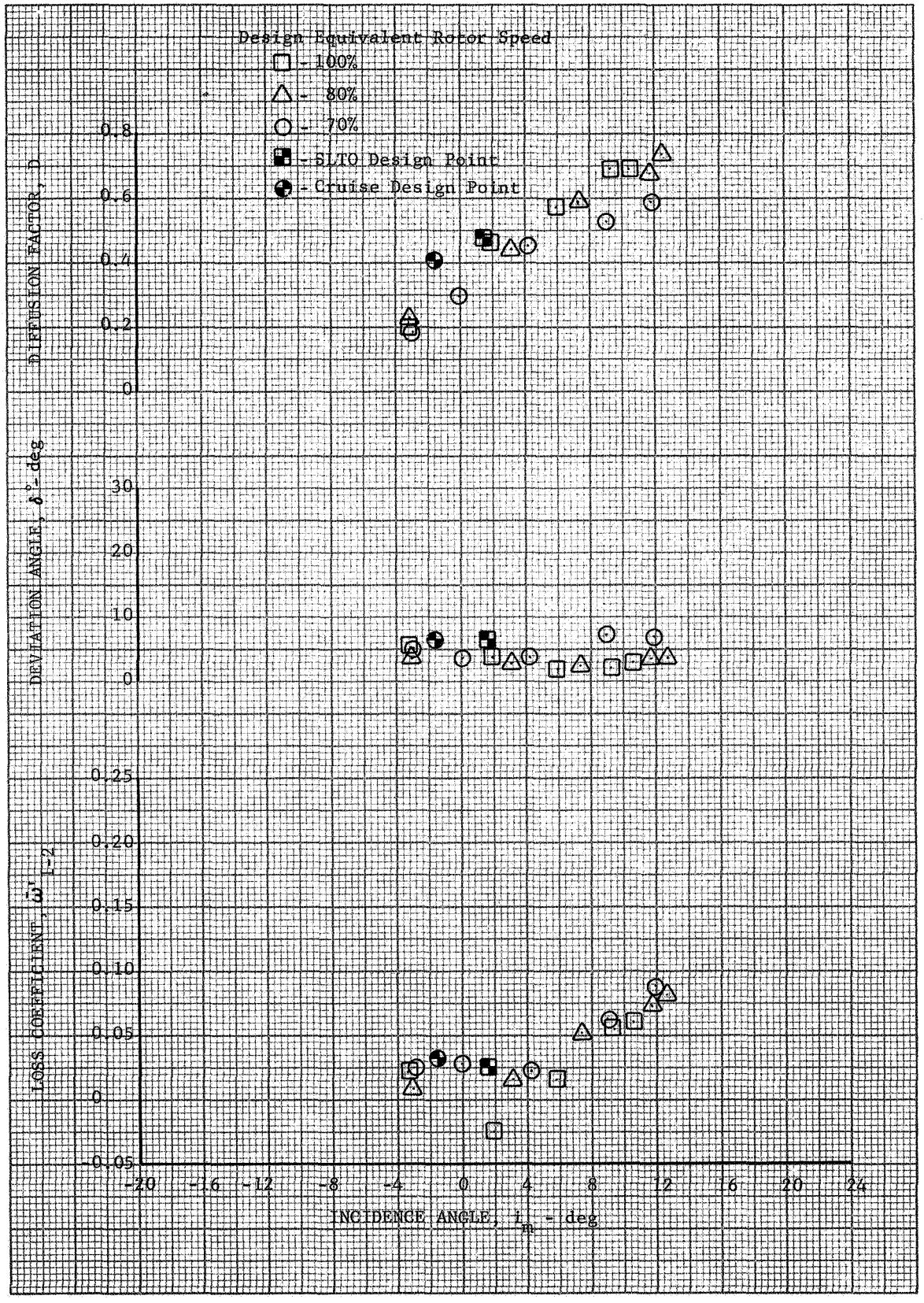
DF 68940

Figure 61. Rotor Blade Element Performance: Intermediate Configuration, 50% Span From Tip



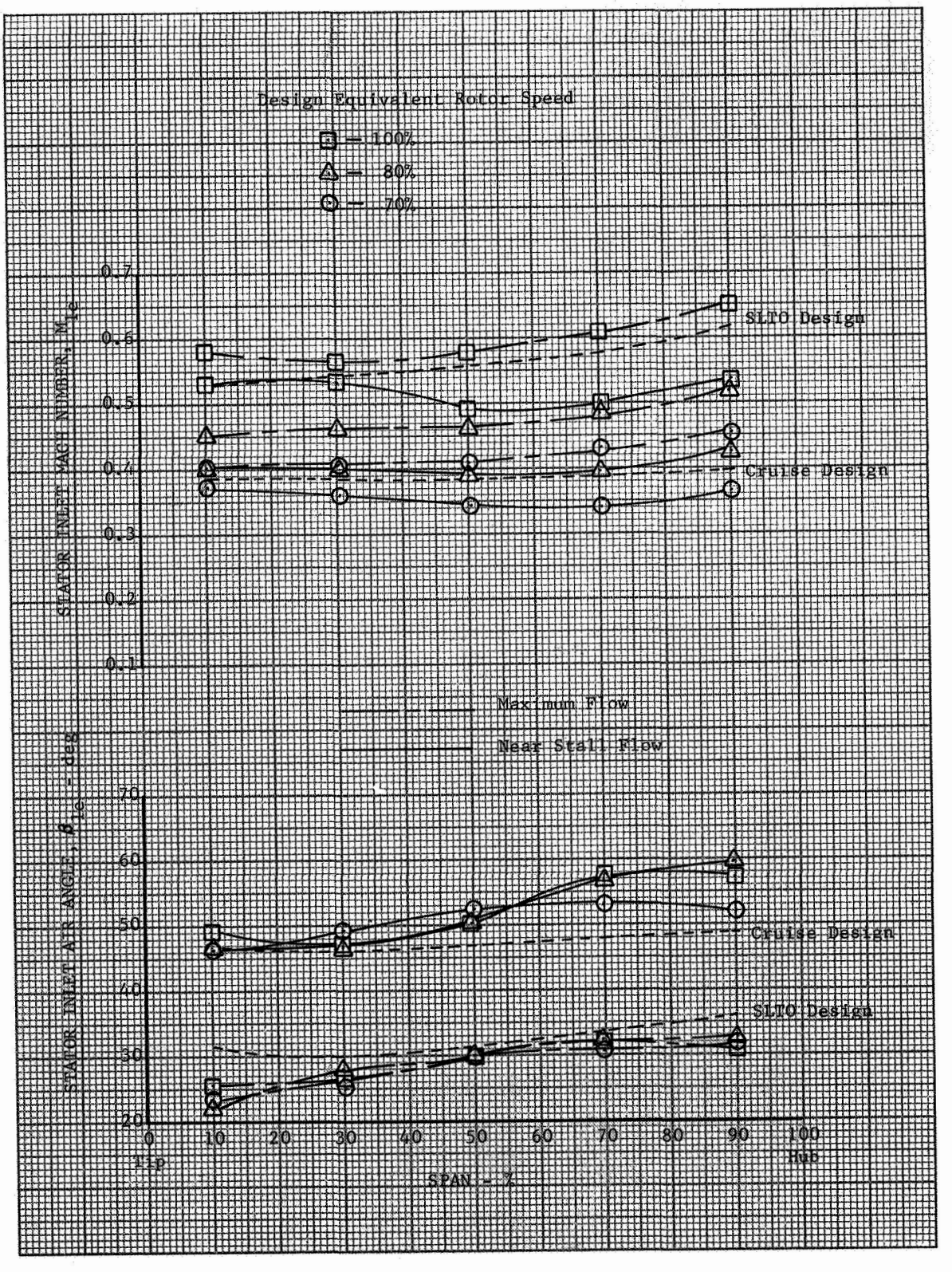
DF 68939

Figure 62. Rotor Blade Element Performance: Intermediate Configuration, 70% Span From Tip



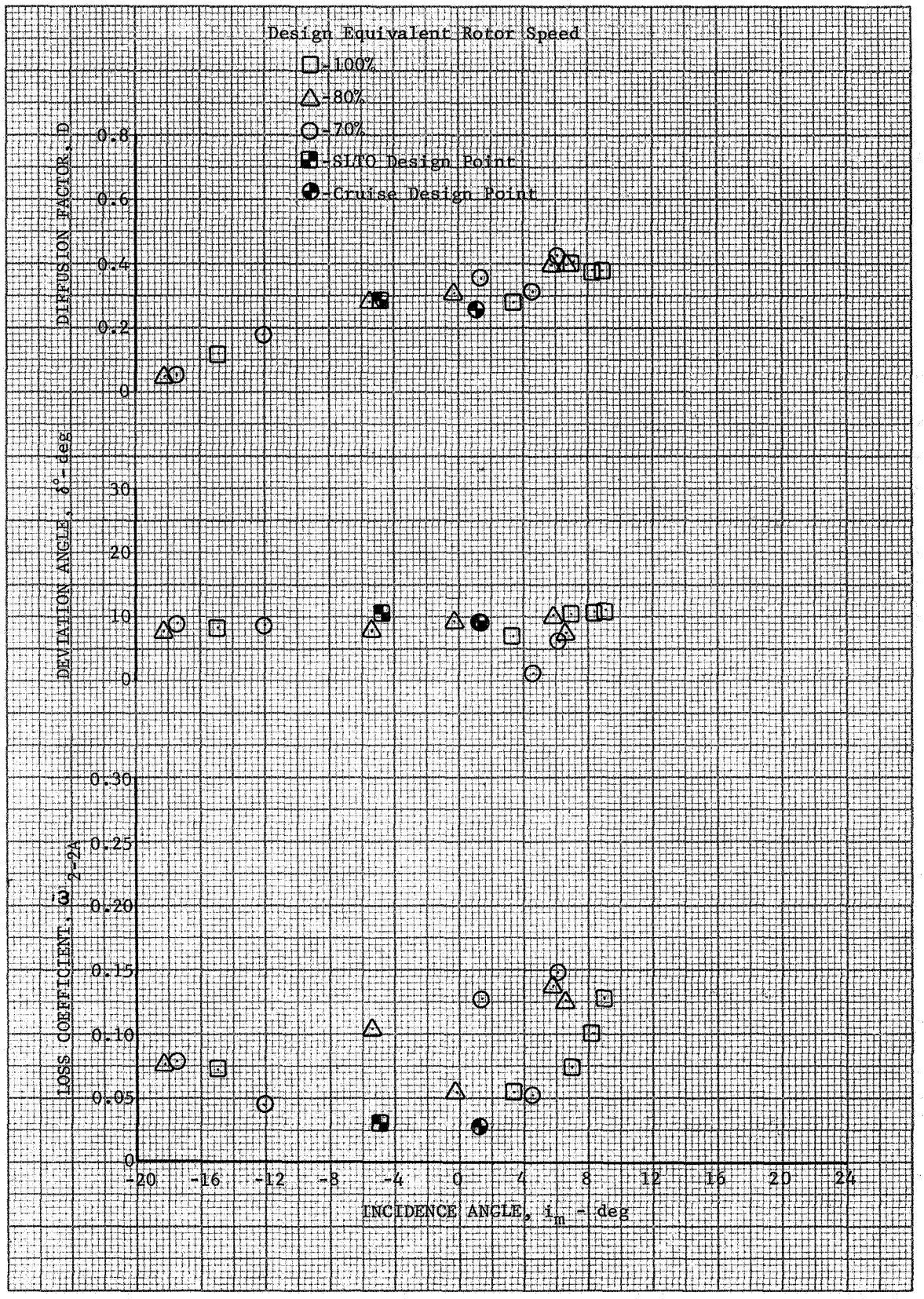
DF 68938

Figure 63. Rotor Blade Element Performance: Intermediate Configuration, 90% Span From Tip



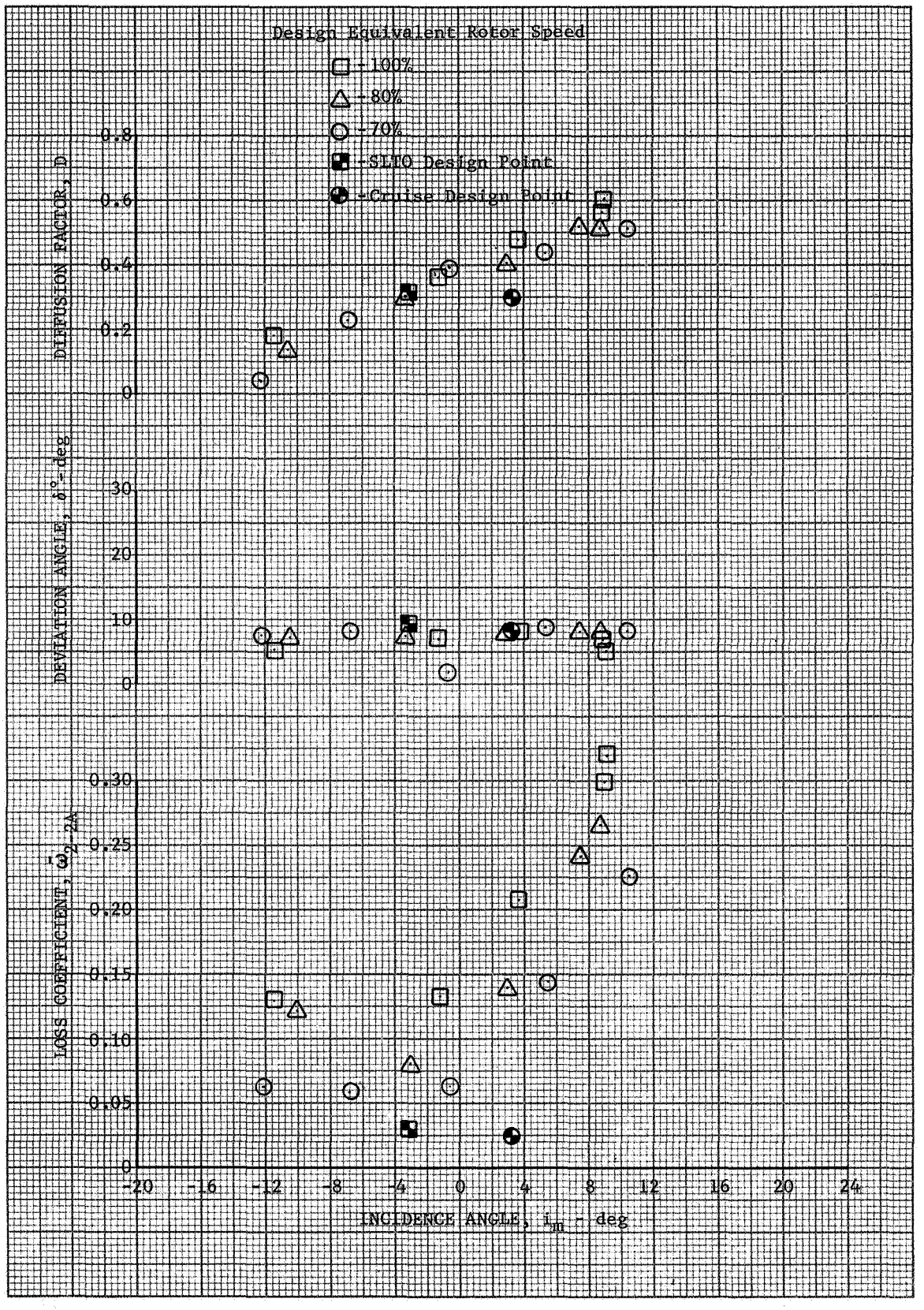
DF 68937

Figure 64. Stator Inlet Air Angle and Mach Number Distribution: Intermediate Configuration



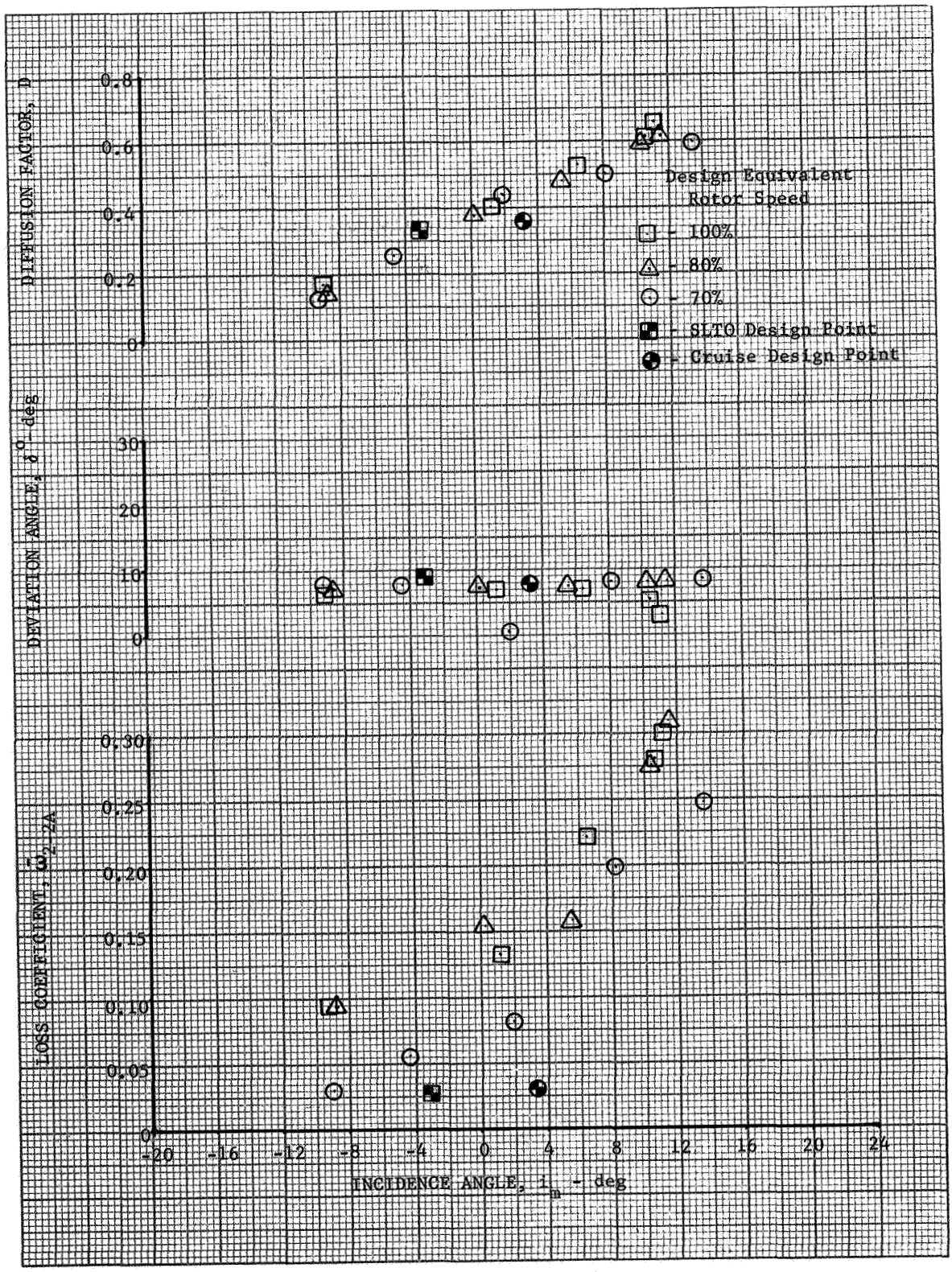
DF 68936

Figure 65. Stator Blade Element Performance: Intermediate Configuration, 10% Span From Tip



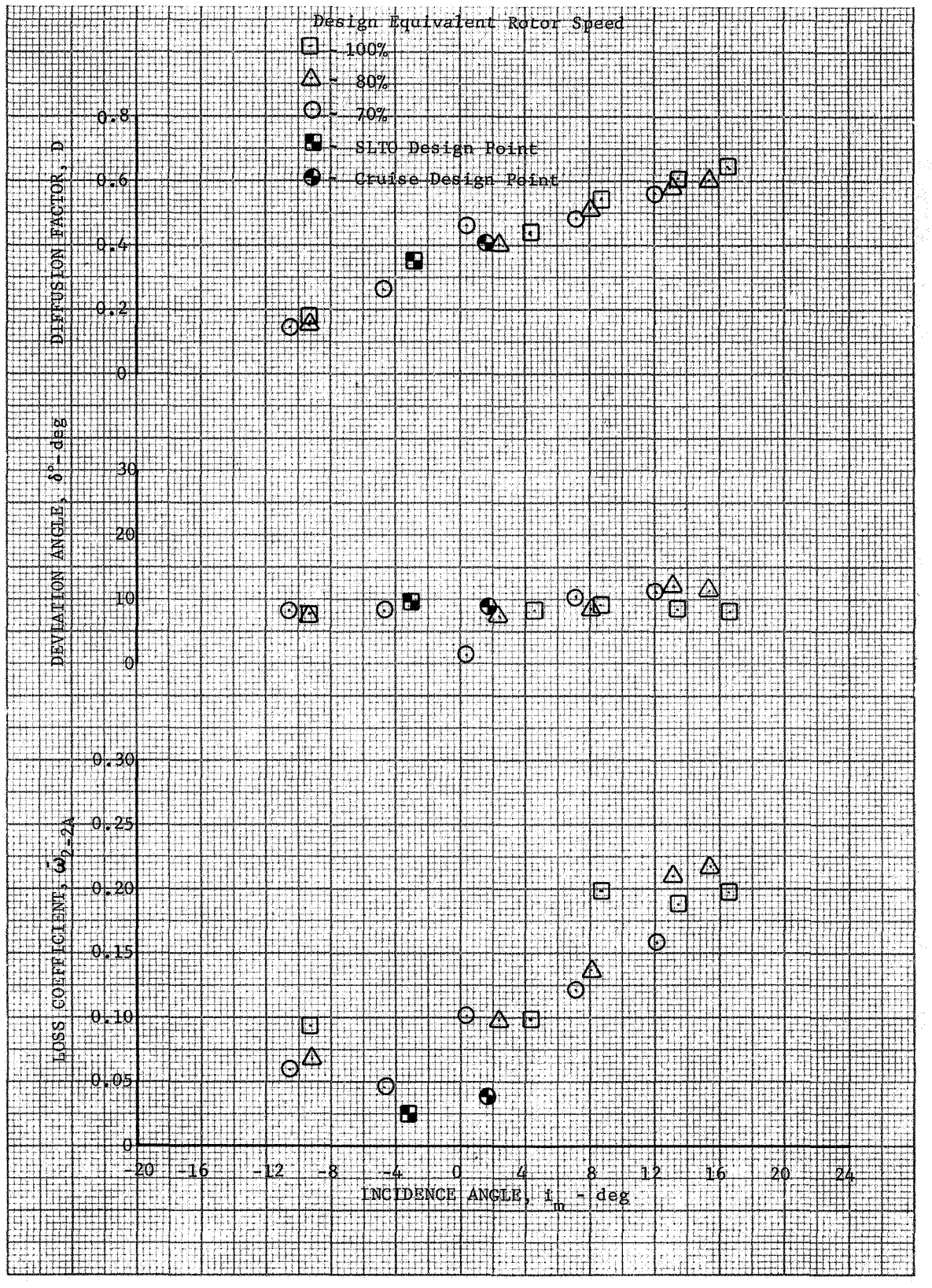
DF 68935

Figure 66. Stator Blade Element Performance: Intermediate Configuration, 30% Span From Tip



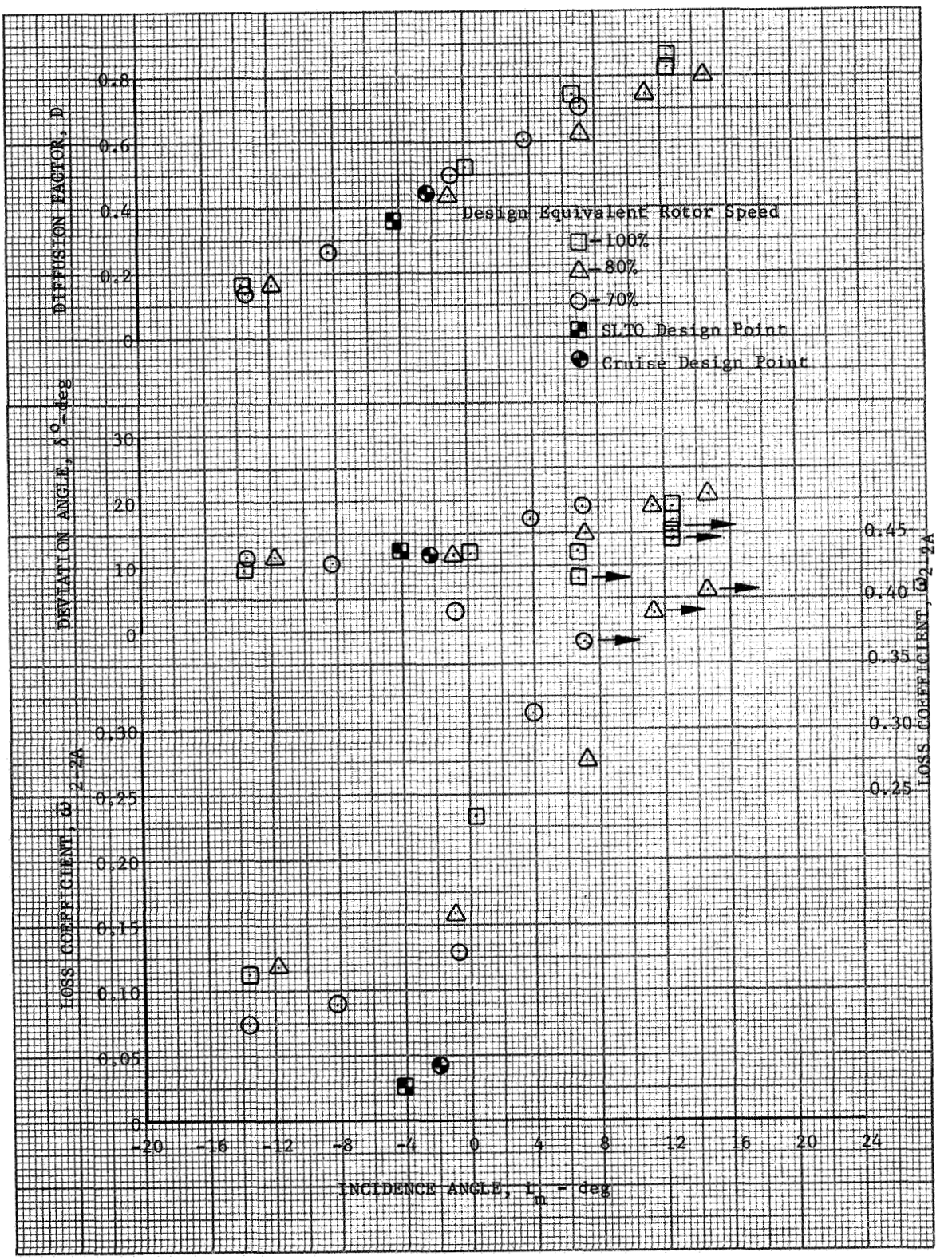
DF 68942

Figure 67. Stator Blade Element Performance: Intermediate Configuration, 50% Span From Tip



DF 68808

Figure 68. Stator Blade Element Performance: Intermediate Configuration, 70% Span From Tip



DF 68809

Figure 69. Stator Blade Element Performance: Intermediate Configuration, 90% Span From Tip

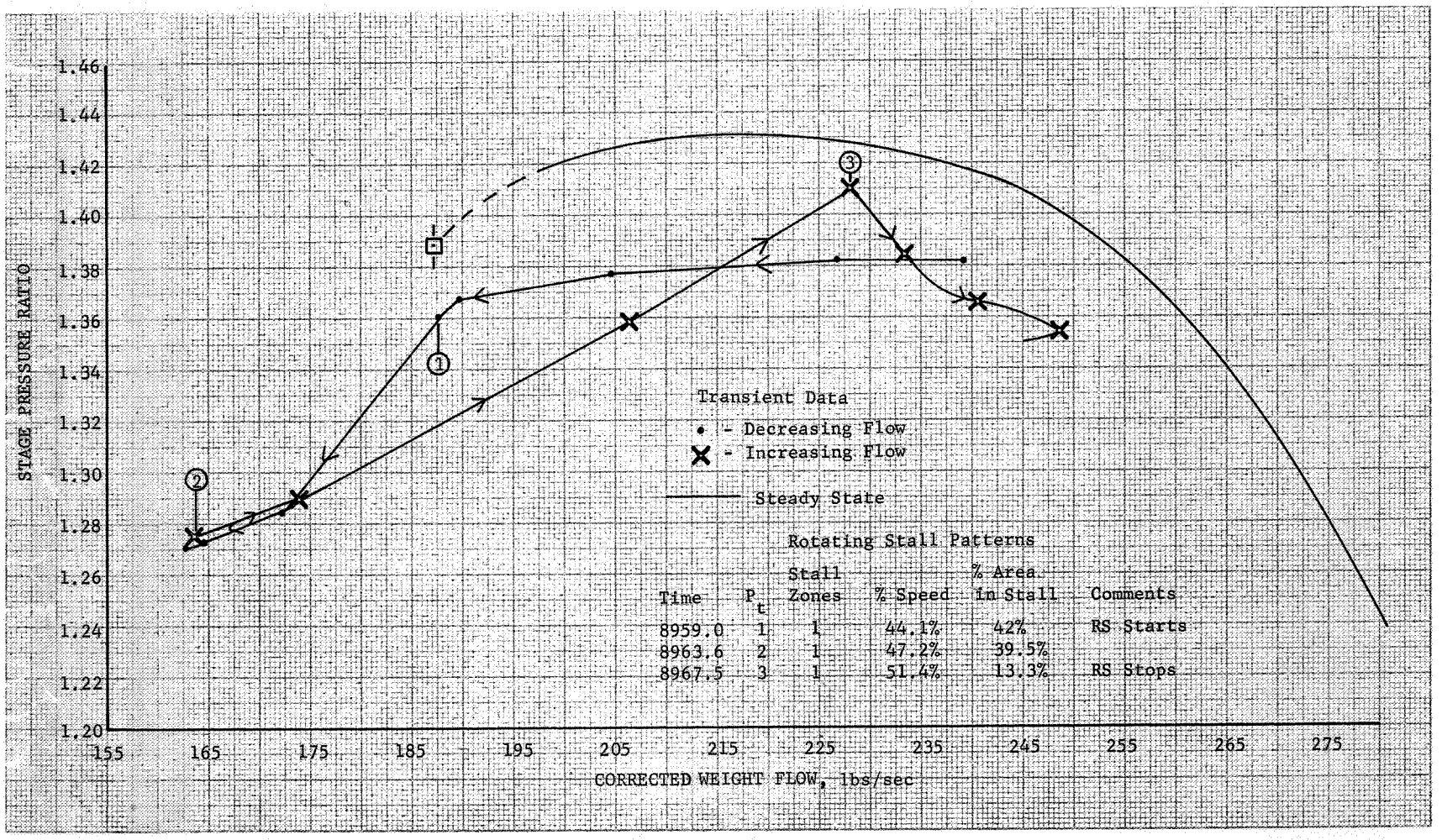


Figure 70. Transient Stall Data: SLTO Configuration, 100% Design Equivalent Rotor Speed

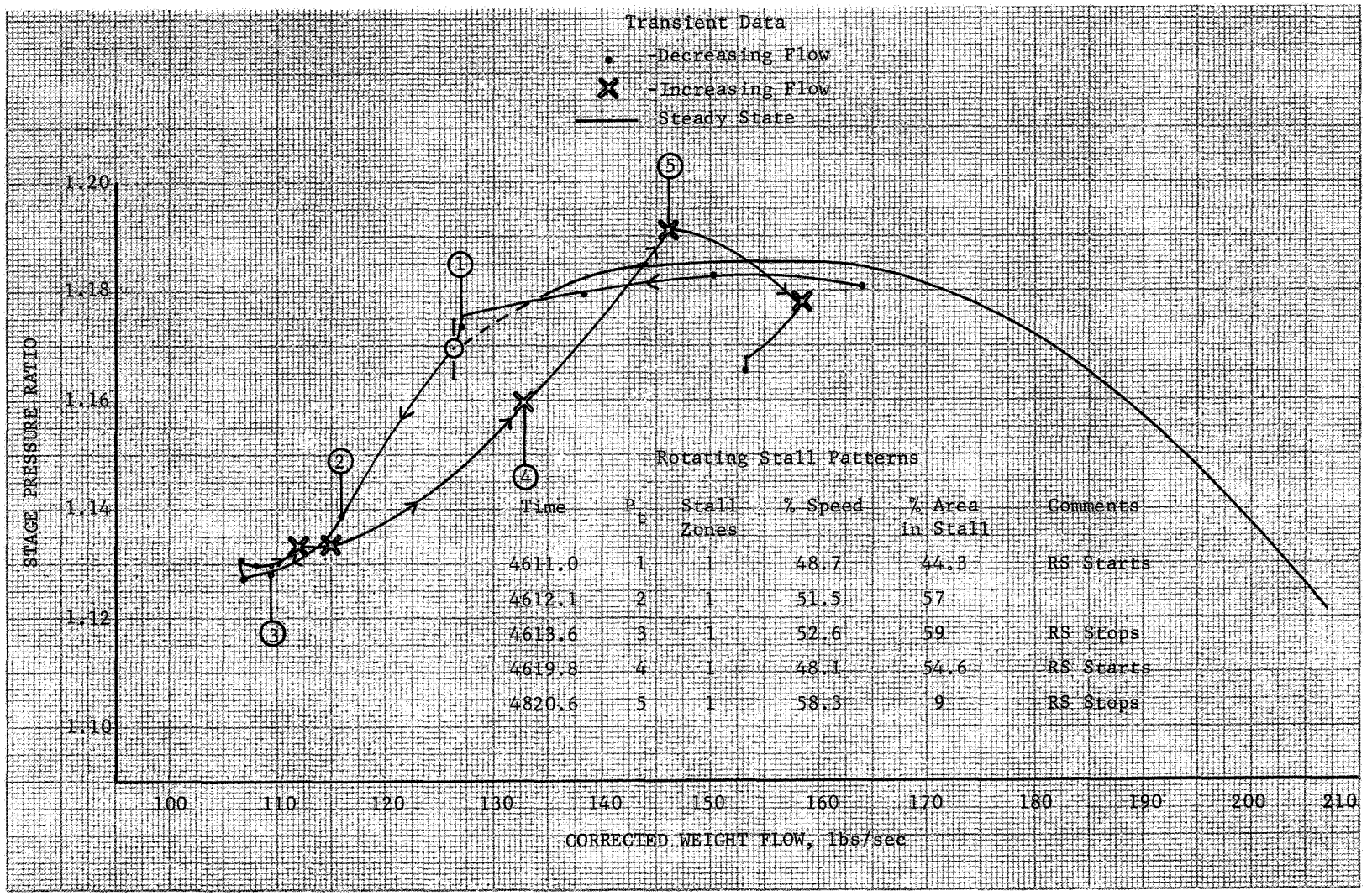


Figure 71. Transient Stall Data: SLTO Configuration, 70% Design Equivalent Rotor Speed

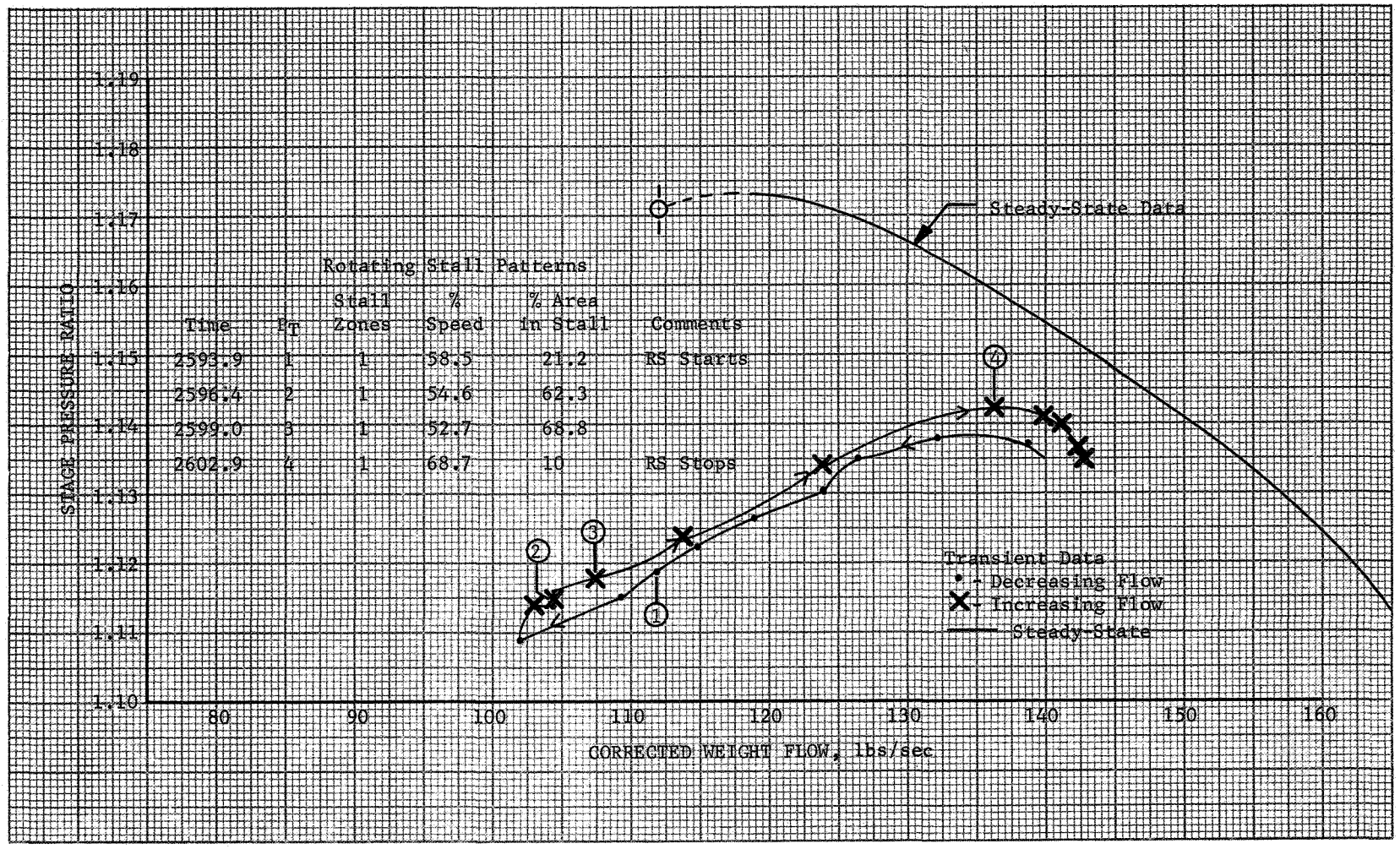


Figure 72. Transient Stall Data: Cruise Configuration, 70% Design Equivalent Rotor Speed

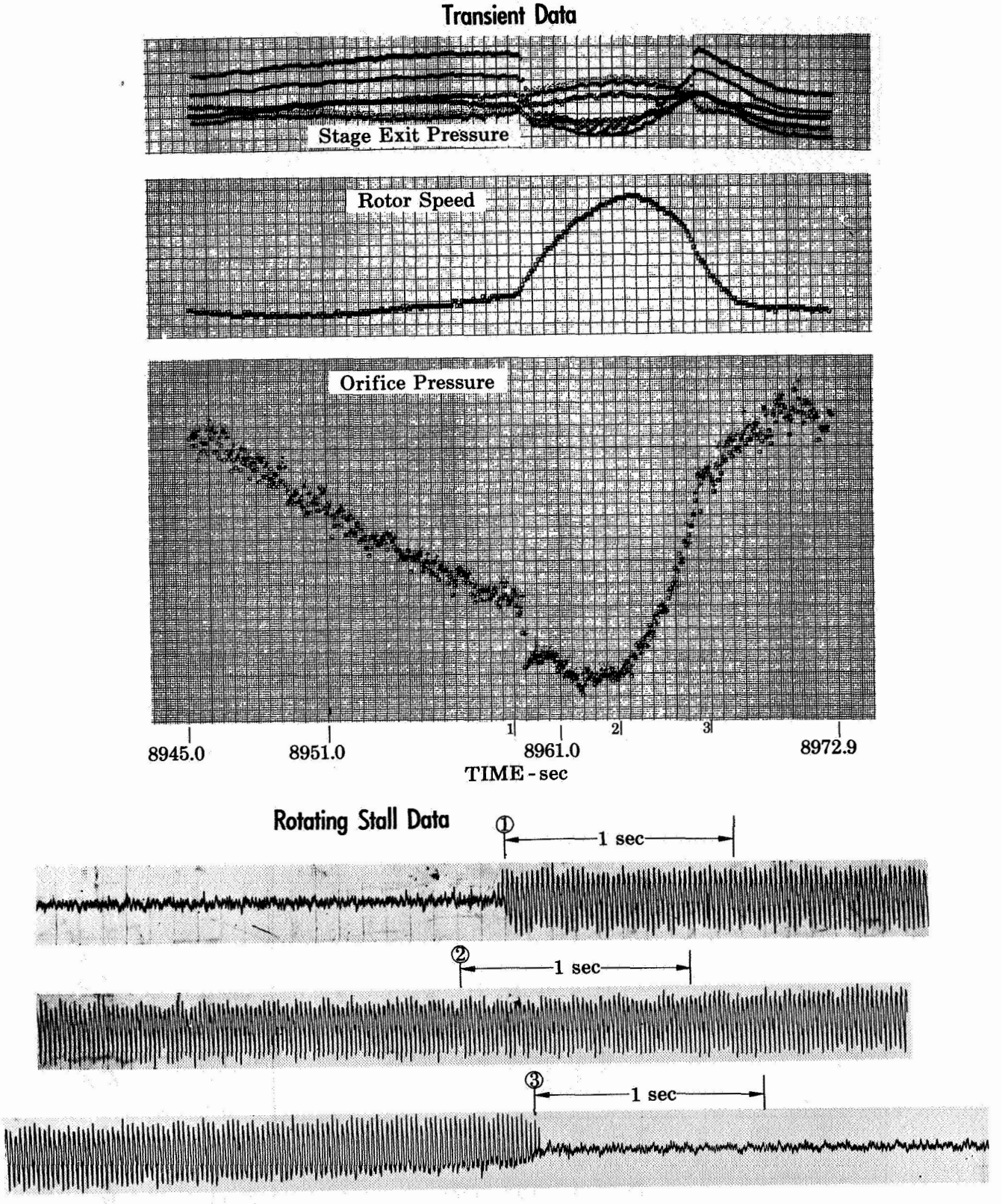


Figure 73. Transient and Rotating Stall FD 25734 (Kistler Trace) Data

APPENDIX A
DEFINITION OF SYMBOLS

A_A	Flowpath annular area, $in.^2$
a'_{0_1}	Inlet relative stagnation velocity of sound, ft/sec
c	Chord length, in.
C_P	Specific heat of air, 0.24 Btu/lb^oF
d	Diameter
D	Diffusion factor
g	Gravitational constant, 32.2 ft/sec^2
i_m	Incidence angle, deg (based on equivalent circular arc for stators)
J	Mechanical equivalent of heat, 778 ft-lb/Btu
$\bar{m}$	Mass flow parameter, $\sqrt{\gamma g/R}\ M \left[1 + \frac{\gamma-1}{2} M^2\right]^{1/2} p/P$
M	Absolute Mach number
P	Total pressure, psia
p	Static pressure, psia
q	Pressure equivalent of the velocity head, psia
R	Gas constant for air, 53.3 $\frac{\text{ft-lbs}}{\text{lb-}^oR}$
S	Blade spacing, in.
s	Blade span, in.
T	Total temperature, ^oR
T_s	Static temperature, ^oR
t	Blade maximum thickness, in.
U	Rotor speed, ft/sec
V	Absolute velocity, ft/sec
W	Actual flow rate, lb_m/sec
β	Absolute air angle, deg
γ	Ratio of specific heats

γ^{o}	Blade-Chord angle, deg
δ	Ratio of total pressure to NASA standard sea level pressure of 2116 psf
δ^{o}	Deviation angle, deg
η_{ad}	Adiabatic efficiency
η_{p}	Polytropic Efficiency
θ	Ratio of total temperature to NASA standard sea level temperature of $518.7^{o}R$
κ	Blade metal angle, deg (based on equivalent circular arc for stators)
ρ	Density, lb_m/ft^3
σ	Solidity, c/S
ϕ	Blade camber angle, deg (based on equivalent circular arc for stator B and on the 0.5% chord and 95% chord for the IGV)
ψ	Pressure rise coefficient
$\bar{\omega}$	Total pressure loss coefficient

Subscripts

0	Compressor inlet instrumentation station
1	Guide vane exit/rotor inlet instrumentation station
2	Rotor exit/stator inlet instrumentation station
2A	Stator exit instrumentation station
fs	Freestream value of guide vane or stator rake total pressure
id	Isentropic condition
le	Leading edge
te	Trailing edge
m	Midspan
s	Static condition
z	Axial component
θ	Tangential component

Superscripts

'	Relative rotor blade
-	Mass average value (used for overall and blade element performance)

Nomenclature used for blade element data tabulation (tables B-2, B-3, and B-4)

PCT SPAN	Percent Span
DIA	Diameter, inches
BETA	Absolute air angle, degrees
BETA (PR)	Relative air angle, degrees
V	Absolute velocity, ft/sec
VZ	Axial component of velocity, ft/sec
V-THETA	Tangential component of absolute velocity, ft/sec
V(PR)	Relative velocity, ft/sec
V-THETA PR	Tangential component of relative velocity, ft/sec
U	Wheel speed, ft/sec
M	Absolute Mach number
M(PR)	Relative Mach number
TURN	Air Turning, degrees
TURN (PR)	Relative air turning, degrees
$\bar{\omega}$	Loss coefficient
DFAC	Diffusion factor
EFFP	Polytropic efficiency
EFF	Adiabatic efficiency
INCIDM	Incidence, degrees
DEVM	Deviation, degrees

NOTE

The numbers following the nomenclature in Tables B-2, B-3, and B-4 refer to the leading and trailing edges of the respective blade rows, as indicated below:

3	IGV_{le}
4	IGV_{te}
6	$Rotor_{le}$
7	$Rotor_{te}$
9	$Stator_{le}$
10	$Stator_{te}$

DEFINITION OF CALCULATED PERFORMANCE VARIABLES

Overall Performance Data

Inlet Mach Number:

$$\frac{W\sqrt{\theta}\sqrt{518.7}}{\delta P_o A_{A_o}} = g\sqrt{\gamma/g}\, M_o \left[1 + \frac{\gamma - 1}{2} M_o^2\right]^{1/2}$$

Pressure Ratio:

Rotor: $\frac{\overline{P}_2}{\overline{P}_1}$ Rotor-Guide Vane: $\frac{\overline{P}_2}{14.696}$ Stage: $\frac{\overline{P}_{2A}}{14.696}$

Corrected Flow

$W\sqrt{\theta}/\delta$

Corrected Specific Flow:

$\frac{W\sqrt{\theta}}{\delta A_A}$

Corrected Rotor Speed:

$N/\sqrt{\theta}$

Adiabatic Efficiency (overall):

$$\eta_{ad} = \frac{(\overline{P}_2/\overline{P}_1)^{\frac{\gamma-1}{\gamma}} - 1}{\overline{T}_{2A}/\overline{T}_1 - 1} \text{ (e.g., for rotor)}$$

Pressure Rise Coefficient:

$$\psi = \frac{C_p J g T_o \left[(\overline{P}_{2A}/P_o)^{\frac{\gamma-1}{\gamma}} - 1\right]}{U^2_{le_m}\Big|_{rotor}}$$

Flow Coefficient:

$$\phi = V_{zle_m}/U_{le_m\ rotor}$$

Blade Element Data

Incidence Angle:

$$i_m = \beta_{1e} - \kappa_{1e}$$

Diffusion Factor:

$$\text{Rotor:}\quad D = 1 - \frac{V'_{te}}{V'_{1e}} + \left(\frac{d_{te} V_{\theta te} - d_{1e} V_{\theta 1e}}{(d_{1e} + d_{te})\, \sigma V'_{1e}} \right)$$

$$\text{Stator:}\quad D = 1 - \frac{V_{te}}{V_{1e}} + \left(\frac{d_{1e} V_{\theta 1e} - d_{te} V_{\theta te}}{(d_{1e} + d_{te})\, \sigma V_{1e}} \right)$$

Deviation Angle:

$$\delta^o = \beta_{te} - \kappa_{te}$$

Loss Coefficient:

$$\text{IGV:}\quad \bar{\omega} = \frac{P_{fs} - \bar{P}_1}{P_{fs} - P_o}$$

(p_o was found from linear interpolation of inner and outer wall static pressures at Station 0.)

$$\text{Rotor:}\quad \bar{\omega} = \frac{\bar{P}'_{2id} - P'_2}{\bar{P}'_1 - p_1}$$

where:

$$P'_{2id} = P'_1 \left\{ 1 + \frac{\gamma - 1}{2} \left(\frac{U_{te}^2}{a'^2_{01}} \right) \left[1 - \left(\frac{d_{1e}}{d_{te}} \right)^2 \right] \right\}^{\frac{\gamma}{\gamma - 1}}$$

P' is found from $p/P' = \left[1 + \frac{\gamma - 1}{2} M'^2 \right]^{\frac{\gamma}{\gamma - 1}}$

and M' is calculated using trigonometric functions and the measurements of U, β, P, and p.

$$\text{Stator:}\quad \bar{\omega} = \frac{P_{fs} - \bar{P}_{2a}}{P_{fs} - P_2}$$

Adiabatic Efficiency:

$$\text{Rotor: } \frac{\left[\left(P_{te}/\overline{P}_{le}\right)^{\frac{\gamma-1}{\gamma}} - 1\right]}{T_{te}/T_o - 1}$$

Polytropic Efficiency:

$$\text{IGV: } \eta_p = \frac{\ln \left(T_{s_{le}}/T_{s_{te}}\right)}{\frac{\gamma-1}{\gamma} \ln p_{le}/P_{te}}$$

$$\text{Rotor: } \eta_p = \frac{\frac{\gamma-1}{\gamma} \ln \left(P_{te}/P_{le}\right)}{\ln T_{te}/T_o}$$

$$\text{Stator: } \eta_p = \frac{\frac{\gamma-1}{\gamma} \ln \left(P_{te}/P_{le}\right)}{\ln T_{s_{te}}/T_{s_{le}}}$$

APPENDIX B

TABULATED PERFORMANCE

The stage overall performance, rotor performance, and corrected weight flow for each test point are presented in table B-1.

Tables B-2 and B-3, respectively, present SLTO and cruise configuration blade element data for each test point. Table B-4 presents blade element data for the intermediate configuration.* Definition of the blade element velocity triangle and performance variables as tabulated in the computer printout is given in Appendix A.

*At 110% of design rotor speed for the SLTO configuration, three data points were omitted from the data presentation because of questionable plenum pressure data.

Table B-1. Overall Performance
SLTO Configuration

Point Number	Corrected Weight Flow $W\sqrt{\theta}/\delta$ lb/sec	Rotor			Guide Vane Rotor			Stage		
		$\bar{P}_2/\bar{P}_1$	η_{ad}%	η_p%	$\bar{P}_2/P_0$	η_{ad}%	η_p%	$\bar{P}_{2A}/P_o$	η_{ad}%	η_p%
		50% Design Equivalent Rotor Speed								
147	92.57	1.0980	86.12	86.4	1.0978	85.95	86.2	1.0862	76.04	76.3
148	100.76	1.0943	89.47	89.7	1.0941	89.25	89.6	1.0876	83.32	83.5
149	106.95	1.0938	86.64	86.9	1.0937	86.53	86.7	1.0908	83.97	84.2
150	121.23	1.0877	106.52	----	1.0874	106.09	----	1.0858	104.20	----
151	133.18	1.0781	96.45	96.6	1.0778	96.18	96.3	1.0768	95.00	95.1
146	149.44	1.0650	94.81	94.9	1.0643	93.76	93.8	1.0608	88.78	88.9
		70% Design Equivalent Rotor Speed								
140	133.86	1.1959	85.74	86.1	1.1953	85.47	85.8	1.1783	78.44	78.9
141	140.30	1.1951	85.48	85.9	1.1945	85.23	85.6	1.1831	80.55	81.0
142	151.31	1.1918	90.40	90.7	1.1908	89.96	90.3	1.1844	87.11	87.4
143	171.33	1.1893	98.07	98.2	1.1877	97.29	97.4	1.1809	93.99	94.1
144	187.25	1.1657	96.66	96.8	1.1641	95.39	95.5	1.1607	93.53	93.7
139	207.02	1.1329	99.83	99.9	1.1311	98.55	98.6	1.1217	91.79	91.9

Table B-1. Overall Performance (Continued)
SLTO Configuration

Point Number	Corrected Weight Flow $W\sqrt{\theta}/\delta$ lb/sec	Rotor			Guide Vane Rotor			Stage		
		$\bar{P}_2/\bar{P}_1$	η_{ad}%	η_p%	$\bar{P}_2/P_0$	η_{ad}%	η_p%	$\bar{P}_{2A}/P_0$	η_{ad}%	η_p%
		80% Design Equivalent Rotor Speed								
137	157.40	1.2581	82.32	82.9	1.2569	81.97	82.6	1.2379	76.34	77.1
133	164.03	1.2647	92.59	92.9	1.2652	92.75	93.0	1.2495	87.67	88.1
134	176.83	1.2534	89.95	90.3	1.2507	89.05	89.5	1.2524	89.63	90.0
135	198.66	1.2521	89.61	90.0	1.2516	89.46	89.9	1.2527	89.80	90.1
136	222.84	1.2107	96.58	96.7	1.2098	96.12	96.3	1.2073	95.05	95.2
132	238.36	1.1800	102.18	----	1.1748	99.35	99.4	1.1599	91.33	91.5
		100% Design Equivalent Rotor Speed								
154	197.35	1.4423	82.90	83.8	1.4440	83.18	84.1	1.4194	79.09	80.1
155	209.34	1.4416	87.23	87.9	1.4437	87.60	88.2	1.4301	85.24	86.0
156	224.10	1.4252	89.34	89.9	1.4237	89.07	89.7	1.4312	90.45	90.9
157	242.44	1.4105	91.40	91.6	1.4078	90.85	91.3	1.4149	92.27	92.6
158	260.52	1.3686	92.92	93.2	1.3646	92.02	92.4	1.3629	91.63	92.0
153	280.52	1.2646	91.04	91.4	1.2601	89.61	90.0	1.2400	83.19	83.7

Table B-1. Overall Performance (Continued)
SLTO Configuration

Point Number	Corrected Weight Flow $W\sqrt{\theta}/\delta$ lb/sec	Rotor			Guide Vane Rotor			Stage		
		$\overline{P}_2/\overline{P}_1$	η_{ad}%	η_p%	$\overline{P}_2/P_0$	η_{ad}%	η_p%	$\overline{P}_{2A}/P_0$	η_{ad}%	η_p%
110% Design Equivalent Rotor Speed										
161	223.62	1.5422	77.85	79.2	1.5385	77.72	79.1	1.5237	75.88	77.4
165	279.67	1.4131	90.11	90.6	1.4106	89.74	90.2	1.3896	85.66	86.3
160	290.69	1.2956	87.62	88.1	1.2907	86.43	86.9	1.2737	81.77	82.4

Table B-1. Overall Performance (Continued)
Cruise Configuration

Point Number	Corrected Weight Flow $W\sqrt{\theta}/\delta$ lb/sec	Rotor			Guide Vane Rotor			Stage		
		$\overline{P}_2/\overline{P}_1$	η_{ad}%	η_p%	$\overline{P}_2/P_0$	η_{ad}%	η_p%	$\overline{P}_{2A}/P_0$	η_{ad}%	η_p%
		50% Design Equivalent Rotor Speed								
182	85.57	1.0912	83.59	84.0	1.0908	83.30	83.7	1.0875	80.32	80.6
183	91.01	1.0890	91.11	91.3	1.0884	90.52	90.7	1.0837	85.85	86.0
184	99.51	1.0835	94.06	94.1	1.0830	93.53	93.7	1.0786	88.71	88.8
185	106.21	1.0763	95.23	95.3	1.0754	94.12	94.2	1.0710	88.75	88.9
186	114.70	1.0647	95.88	96.0	1.0639	96.68	96.8	1.0598	88.83	88.9
181	121.02	1.0586	96.13	96.2	1.0573	94.06	94.1	1.0519	85.32	85.4
		70% Design Equivalent Rotor Speed								
168	118.88	1.1800	85.03	85.4	1.1792	84.70	85.1	1.1739	82.33	82.7
169	125.53	1.1796	89.35	89.6	1.1781	88.64	88.9	1.1704	85.03	85.4
170	131.27	1.1744	91.93	92.2	1.1733	91.41	91.7	1.1648	87.14	87.4
171	140.07	1.1600	93.68	93.9	1.1604	93.93	94.0	1.1536	90.15	90.4
173	152.68	1.1441	101.47	----	1.1433	100.93	----	1.1365	96.35	96.4
167	166.46	1.1187	100.01	100.0	1.1168	98.49	98.6	1.1022	86.56	86.7

Table B-1. Overall Performance (Continued)
Cruise Configuration

Point Number	Corrected Weight Flow $W\sqrt{\theta}/\delta$ lb/sec	Rotor			Guide Vane Rotor			Stage		
		$\overline{P}_2/\overline{P}_1$	η_{ad}%	η_p%	$\overline{P}_2/P_0$	η_{ad}%	η_p%	$\overline{P}_{2A}/P_0$	η_{ad}%	η_p%
		80% Design Equivalent Rotor Speed								
175	138.10	1.2421	86.29	86.7	1.2406	85.82	86.3	1.2341	83.65	84.1
177	147.54	1.2312	88.22	88.6	1.2298	87.72	88.1	1.2217	84.83	85.3
178	157.91	1.2170	88.66	89.0	1.2147	87.80	88.2	1.2140	87.53	87.9
179	166.19	1.2059	94.71	94.8	1.2022	93.10	93.3	1.1955	90.19	90.4
180	176.48	1.1815	95.82	96.0	1.1790	94.55	94.7	1.1701	90.09	90.3
174	189.09	1.1507	97.86	98.0	1.1480	96.15	96.3	1.1334	87.08	87.3
		100% Design Equivalent Rotor Speed								
190	175.83	1.3922	85.12	85.8	1.3908	84.85	85.5	1.3732	81.43	82.3
191	184.90	1.3889	86.26	86.9	1.3865	85.79	86.4	1.3856	85.60	86.3
192	193.09	1.3822	89.67	90.2	1.3795	89.10	89.6	1.3758	88.32	88.8
193	205.90	1.3582	93.61	93.9	1.3551	92.87	93.2	1.3436	90.15	90.6
194	217.46	1.3126	93.31	93.6	1.3099	92.58	92.9	1.2991	89.62	90.0
189	232.54	1.2526	95.94	96.1	1.2460	93.60	93.8	1.2216	84.96	85.4

Table B-1 Overall Performance (Continued)
Intermediate Configuration

Point Number	Corrected Weight Flow $W\sqrt{\theta}/\delta$ lb/sec	Rotor			Guide Vane Rotor			Stage		
		$\bar{P}_2/\bar{P}_1$	$\eta_{ad}\%$	$\eta_p\%$	$\bar{P}_2/P_0$	$\eta_{ad}\%$	$\eta_p\%$	$\bar{P}_{2A}/P_0$	$\eta_{ad}\%$	$\eta_p\%$
		50% Design Equivalent Rotor Speed								
215	89.71	1.0937	86.28	86.5	1.0933	85.95	86.2	1.0872	80.44	80.7
216	97.29	1.0888	81.87	82.2	1.0886	81.66	82.0	1.0859	79.28	79.5
217	113.09	1.0810	90.35	90.6	1.0801	89.40	89.6	1.0798	89.06	89.2
218	121.61	1.0719	99.21	99.2	1.0710	97.99	98.1	1.0684	94.45	94.5
214	138.41	1.0572	92.93	93.1	1.0563	91.52	91.7	1.0545	88.61	88.7
		70% Design Equivalent Rotor Speed								
209	129.82	1.1899	82.79	83.3	1.1892	82.49	83.0	1.1777	77.76	78.3
210	142.02	1.1820	88.24	88.6	1.1809	87.73	88.0	1.1764	85.65	86.0
211	163.55	1.1610	90.15	90.4	1.1509	89.05	89.3	1.1572	88.09	88.3
212	180.36	1.1367	92.59	92.8	1.1397	94.53	94.6	1.1384	93.73	93.8
208	193.55	1.1138	97.61	97.7	1.1128	96.78	96.9	1.1097	94.23	94.3

Table B-1. Overall Performance (Continued)
Intermediate Configuration

Point Number	Corrected Weight Flow $W\sqrt{\theta}/\delta$ lb/sec	Rotor $\bar{P}_2/\bar{P}_1$	Rotor $\eta_{ad\%}$	Rotor $\eta_{p\%}$	Guide Vane Rotor $\bar{P}_2/P_0$	Guide Vane Rotor $\eta_{ad\%}$	Guide Vane Rotor $\eta_{p\%}$	Stage $\bar{P}_{2A}/P_0$	Stage $\eta_{ad\%}$	Stage $\eta_{p\%}$
		80% Design Equivalent Rotor Speed								
203	146.41	1.2555	85.27	85.8	1.2542	84.87	85.4	1.2364	79.36	80.0
204	150.21	1.2473	83.35	84.0	1.2462	83.01	83.6	1.2362	79.86	80.5
205	171.33	1.2394	88.92	89.3	1.2375	88.28	88.6	1.2328	86.65	87.0
206	188.93	1.2158	92.47	92.7	1.2132	91.45	91.8	1.2085	89.55	89.8
202	217.93	1.1558	97.29	97.4	1.1520	95.03	95.1	1.1410	88.50	88.7
		100% Design Equivalent Rotor Speed								
197	190.95	1.4165	83.83	84.7	1.4165	83.83	84.7	1.4105	82.75	83.6
198	199.54	1.4242	83.59	84.4	1.4239	83.53	84.4	1.4158	82.12	83.0
199	216.15	1.4030	86.30	86.9	1.4010	85.93	86.6	1.4085	87.36	88.0
200	238.11	1.3645	91.75	92.1	1.3615	91.07	91.4	1.3565	89.92	90.3
196	262.57	1.2362	94.44	94.6	1.2325	93.06	93.3	1.2230	89.52	89.8

Table B-2. Blade Element Data SLTO Configuration

	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
50 PERCENT SPEED PT. 147	SLTO	3010.	92.57

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	0.284	0.984	-0.426	-1.177	-3.459
V 3	138.93	146.54	151.75	155.09	155.85
V 4	139.12	154.69	160.03	165.16	163.45
VZ 3	138.93	146.32	151.74	155.08	155.84
VZ 4	139.11	153.83	160.02	165.12	163.16
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	0.69	2.66	-1.19	-3.39	-9.86
M 3	0.1246	0.1315	0.1362	0.1392	0.1399
M 4	0.1248	0.1388	0.1436	0.1483	0.1467
TURN	-0.28	-0.98	0.43	1.18	3.46
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.001	-0.046	-0.059	-0.076	-0.080
EFFP	0.2800	1.1960	0.8399	1.0855	0.7933
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.116	2.716	2.326	1.477	1.859

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	47.597	53.512	50.039	44.301	43.054
BETA 10	0.288	1.200	0.030	1.342	2.281
V 9	288.30	265.71	262.73	285.37	285.89
V 10	166.33	184.79	187.35	219.23	249.19
VZ 9	191.48	156.71	168.04	204.06	208.90
VZ 10	164.62	183.02	186.51	218.93	249.00
V-THETA 9	212.88	213.62	201.38	199.31	195.18
V-THETA 10	0.84	3.87	0.10	5.14	9.92
M 9	0.2570	0.2362	0.2333	0.2533	0.2533
M 10	0.1477	0.1639	0.1660	0.1941	0.2205
TURN	47.309	52.312	50.009	42.958	40.773
$\bar{\omega}$	0.2531	0.1709	0.1983	0.2049	0.1413
DFAC	0.7034	0.6286	0.6240	0.5503	0.4439
EFFP	0.4012	0.5218	0.2770	0.1000	-0.0443
INCIDM	6.697	16.412	15.339	10.301	7.054
DEVM	8.988	8.700	7.530	9.342	11.181

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	0.240	0.874	-0.462	-1.120	-3.352
BETA 7	48.502	54.707	51.618	45.963	44.933
BETA(PR) 6	63.368	65.938	68.607	70.056	72.540
BETA(PR) 7	30.876	47.209	54.368	55.273	59.822
V 6	153.73	161.86	165.85	175.21	172.28
V 7	291.19	266.26	260.66	278.50	276.09
VZ 6	153.69	161.67	165.81	175.16	171.98
VZ 7	191.80	153.66	161.75	193.56	195.45
V-THETA 6	0.64	2.47	-1.34	-3.42	-10.07
V-THETA 7	218.10	217.32	204.33	200.21	195.00
V(PR) 6	342.9	396.6	454.6	513.5	573.2
V(PR) 7	224.8	226.5	277.8	339.8	388.8
VTHETA PR6	-306.5	-362.1	-423.3	-482.7	-546.8
VTHETA PR7	-115.4	-166.2	-225.8	-279.3	-336.1
U 6	307.13	364.52	421.92	479.31	536.70
U 7	333.46	383.50	430.13	479.51	531.12
M 6	0.1380	0.1453	0.1489	0.1573	0.1547
M 7	0.2596	0.2367	0.2315	0.2471	0.2446
M(PR) 6	0.3077	0.3560	0.4081	0.4611	0.5147
M(PR) 7	0.2004	0.2013	0.2467	0.3016	0.3444
TURN(PR)	32.486	18.706	14.234	14.782	12.717
$\bar{\omega}$	0.1318	0.2543	0.3237	0.2437	0.2687
DFAC	.5765	.6423	.5792	.5150	.4899
EFFP	1.0564	0.9054	0.8970	0.9115	0.8529
EFF	1.0570	0.9043	0.8957	0.9102	0.8508
INCIDM	14.768	13.438	12.507	10.456	9.340
DEVM	12.076	14.709	12.268	6.673	6.922

Table B-2. Blade Element Data SLTO Configuration (Continued)

CONFIGURATION $N/\sqrt{\theta}$ $\omega\sqrt{\theta}/\delta$

50 PERCENT SPEED PT. 148 SLTO 3000. 100.7

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	0.326	0.622	-0.862	-1.665	-4.510
V 3	150.55	159.36	165.53	169.10	169.78
V 4	153.60	168.11	174.74	180.01	178.68
VZ 3	150.55	159.14	165.53	169.10	169.77
VZ 4	153.59	166.96	174.71	179.93	178.13
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	0.87	1.82	-2.63	-5.23	-14.05
M 3	0.1351	0.1430	0.1486	0.1518	0.1524
M 4	0.1378	0.1509	0.1569	0.1617	0.1605
TURN	-0.33	-0.62	0.86	1.67	4.51
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	-0.017	-0.049	-0.064	-0.080	-0.094
EFFP	0.9649	1.0899	0.9150	1.0369	0.8061
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.074	3.078	2.762	1.965	2.910

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	47.965	48.107	43.694	39.883	37.275
BETA 10	1.304	1.902	1.701	2.104	0.743
V 9	289.91	268.67	270.04	286.94	284.13
V 10	180.92	200.68	211.36	238.19	264.09
VZ 9	190.62	177.71	194.48	220.04	226.09
VZ 10	179.19	198.45	210.35	237.83	264.06
V-THETA 9	215.32	200.00	186.54	183.99	172.08
V-THETA 10	4.12	6.66	6.27	8.75	3.42
M 9	0.2584	0.2391	0.2401	0.2550	0.2521
M 10	0.1606	0.1782	0.1875	0.2113	0.2341
TURN	46.661	46.205	41.992	37.778	36.532
$\bar{\omega}$	0.2395	0.1033	0.0736	0.1172	0.0543
DFAC	0.6534	0.5484	0.5109	0.4558	0.3595
EFFP	0.4330	0.5225	0.3956	0.2535	0.2300
INCIDM	7.065	11.007	8.994	5.883	1.275
DEVM	10.004	9.402	9.201	10.104	9.643

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	0.276	0.534	-0.887	-1.586	-4.519
BETA 7	48.993	49.520	45.455	41.272	39.167
BETA(PR) 6	61.326	64.022	66.554	68.395	71.223
BETA(PR) 7	29.845	45.663	52.070	54.267	59.140
V 6	167.02	176.45	183.66	191.37	187.59
V 7	293.84	268.22	265.81	280.42	274.41
VZ 6	166.97	176.23	183.61	191.29	186.91
VZ 7	191.72	173.94	186.35	210.72	212.75
V-THETA 6	0.80	1.64	-2.84	-5.30	-14.77
V-THETA 7	221.74	204.02	189.44	184.97	173.31
V(PR) 6	348.0	402.4	461.5	519.5	580.6
V(PR) 7	222.3	249.2	303.3	360.9	414.8
VTHETA PR6	-305.3	-361.7	-423.4	-483.0	-549.7
VTHETA PR7	-110.6	-178.2	-239.3	-292.9	-356.9
U 6	306.11	363.31	420.52	477.72	534.92
U 7	332.35	382.23	428.70	477.91	529.36
M 6	0.1499	0.1584	0.1650	0.1719	0.1684
M 7	0.2620	0.2387	0.2363	0.2491	0.2434
M(PR) 6	0.3124	0.3614	0.4145	0.4667	0.5215
M(PR) 7	0.1982	0.2217	0.2697	0.3206	0.3679
TURN(PR)	31.474	18.331	14.480	14.127	12.083
$\bar{\omega}$	0.1926	0.2622	0.2575	0.1808	0.1850
DFAC	.5938	.5790	.5182	.4685	.4381
EFFP	1.0029	0.9454	0.9404	0.9458	0.8902
EFF	1.0030	0.9447	0.9396	0.9451	0.8887
INCIDM	12.726	11.522	10.454	8.795	8.020
DEVM	11.045	13.163	9.970	5.667	6.240

Table B-2. Blade Element Data SLTO Configuration (Continued)

CONFIGURATION $N/\sqrt{\theta}$ $\omega\sqrt{\theta}/\delta$

50 PERCENT SPEED PT. 149 SLTO 3040. 106.9

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	0.615	0.790	-0.845	-1.587	-4.456
V 3	159.90	169.54	176.11	179.65	180.32
V 4	164.46	178.24	185.27	190.94	190.37
VZ 3	159.89	169.31	176.10	179.64	180.31
VZ 4	164.45	176.95	185.25	190.87	189.80
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	1.76	2.46	-2.73	-5.29	-14.79
M 3	0.1435	0.1522	0.1581	0.1613	0.1619
M 4	0.1476	0.1601	0.1664	0.1715	0.1710
TURN	-0.61	-0.79	0.85	1.59	4.46
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	-0.023	-0.044	-0.060	-0.078	-0.097
EFFP	1.1669	1.1205	0.9217	1.0265	0.8979
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	4.785	2.910	2.765	1.887	2.856

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	48.970	45.675	40.951	39.127	35.494
BETA 10	4.261	1.866	1.186	1.726	1.027
V 9	302.60	284.37	286.24	297.89	295.98
V 10	195.73	214.24	226.40	251.83	276.30
VZ 9	194.82	196.83	215.45	230.98	240.97
VZ 10	193.46	211.92	225.50	251.56	276.24
V-THETA 9	228.27	203.43	187.60	187.98	171.85
V-THETA 10	14.54	6.97	4.69	7.58	4.95
M 9	0.2697	0.2532	0.2546	0.2647	0.2627
M 10	0.1737	0.1902	0.2009	0.2234	0.2450
TURN	44.709	43.809	39.765	37.401	34.467
$\bar{\omega}$	0.2241	0.0769	0.1043	0.0759	0.0392
DFAC	0.6216	0.5301	0.4902	0.4381	0.3410
EFFP	0.5576	0.6465	0.5567	0.5599	0.8047
INCIDM	8.070	8.575	6.251	5.127	-0.506
DEVM	12.961	9.366	8.686	9.726	9.927

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	0.533	0.679	-0.793	-1.521	-4.599
BETA 7	50.150	47.238	42.449	40.483	37.310
BETA(PR) 6	60.149	62.805	65.426	67.517	70.427
BETA(PR) 7	27.222	43.031	49.689	53.155	57.828
V 6	177.13	188.26	196.16	202.66	199.04
V 7	306.91	283.13	281.23	290.99	286.77
VZ 6	177.07	188.02	196.10	202.58	198.40
VZ 7	195.59	192.02	207.39	221.28	228.08
V-THETA 6	1.65	2.23	-2.71	-5.38	-15.04
V-THETA 7	235.62	207.87	189.91	188.92	173.89
V(PR) 6	355.8	411.5	471.6	529.7	592.2
V(PR) 7	221.2	263.0	320.8	369.1	428.4
VTHETA PR6	-308.5	-365.9	-428.9	-489.5	-558.0
VTHETA PR7	-101.2	-179.5	-244.6	-295.4	-362.6
U 6	310.19	368.16	426.12	484.09	542.05
U 7	336.79	387.32	434.41	484.29	536.42
M 6	0.1591	0.1691	0.1763	0.1821	0.1789
M 7	0.2736	0.2520	0.2502	0.2585	0.2544
M(PR) 6	0.3195	0.3697	0.4237	0.4761	0.5322
M(PR) 7	0.1971	0.2341	0.2853	0.3279	0.3805
TURN(PR)	32.920	19.745	15.732	14.360	12.599
$\bar{\omega}$	0.1949	0.2400	0.2251	0.1522	0.1555
DFAC	.6192	.5578	.4916	.4667	.4275
EFFP	0.9201	0.9231	0.9301	0.9084	0.8712
EFF	0.9192	0.9222	0.9383	0.9072	0.8694
INCIDM	11.549	10.305	9.326	7.917	7.227
DEVM	8.422	10.531	7.589	4.555	4.928

Table B-2. Blade Element Data SLTO Configuration (Continued)

CONFIGURATION $N/\sqrt{\theta}$ $\omega\sqrt{\theta}/\delta$

50 PERCENT SPEED PT. 150 SLTO 3020 121.2

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	0.537	0.129	-0.942	-1.560	-4.469
V 3	181.78	192.95	200.36	204.42	205.32
V 4	187.93	203.54	211.87	216.97	214.93
VZ 3	181.77	192.69	200.35	204.41	205.31
VZ 4	187.92	202.14	211.84	216.89	214.27
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	1.76	0.46	-3.48	-5.91	-16.75
M 3	0.1633	0.1734	0.1801	0.1837	0.1845
M 4	0.1688	0.1829	0.1905	0.1951	0.1932
TURN	-0.54	-0.13	0.94	1.56	4.47
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	-0.029	-0.054	-0.066	-0.076	-0.088
EFFP	0.7981	0.9806	0.8969	0.9900	0.8292
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	4.863	3.571	2.842	1.860	2.869

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	37.778	32.848	31.462	29.254	25.252
BETA 10	3.504	1.119	0.587	-0.062	0.882
V 9	295.15	282.34	282.54	290.42	298.32
V 10	251.77	251.40	260.72	277.07	295.25
VZ 9	228.99	235.16	240.25	253.25	269.90
VZ 10	249.49	249.03	259.85	276.92	295.20
V-THETA 9	180.81	153.14	147.47	141.92	127.26
V-THETA 10	15.39	4.91	2.67	-0.30	4.55
M 9	0.2637	0.2521	0.2520	0.2589	0.2658
M 10	0.2245	0.2242	0.2323	0.2469	0.2630
TURN	34.274	31.728	30.875	29.316	24.370
$\bar{\omega}$	0.1240	0.0281	0.0494	0.0019	0.0081
DFAC	0.3597	0.3251	0.3027	0.2752	0.2106
EFFP	0.4467	0.4137	0.4486	0.3464	-1.5058
INCIDM	-3.122	-4.252	-3.238	-4.746	-10.748
DEVM	12.204	8.619	8.087	7.938	9.782

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	0.456	0.027	-0.934	-1.480	-4.555
BETA 7	39.448	34.407	32.838	30.467	26.576
BETA(PR) 6	56.462	59.349	62.333	64.782	68.045
BETA(PR) 7	32.812	44.814	50.592	54.346	57.504
V 6	203.24	216.91	223.91	229.36	224.98
V 7	295.23	277.86	275.78	281.58	287.83
VZ 6	203.18	216.67	223.85	229.27	224.27
VZ 7	226.90	229.01	231.59	242.67	257.41
V-THETA 6	1.62	0.10	-3.65	-5.02	-17.87
V-THETA 7	187.59	157.01	149.55	142.77	128.77
V(PR) 6	367.8	425.1	482.1	538.1	599.9
V(PR) 7	271.3	323.2	365.0	416.4	479.1
VTHETA PR6	-306.5	-365.6	-427.0	-486.8	-556.4
VTHETA PR7	-147.6	-227.8	-282.5	-338.3	-404.1
U 6	308.15	365.73	423.32	480.90	538.49
U 7	334.57	384.78	431.55	481.10	532.89
M 6	0.1827	0.1950	0.2014	0.2063	0.2024
M 7	0.2637	0.2481	0.2459	0.2510	0.2563
M(PR) 6	0.3305	0.3823	0.4336	0.4841	0.5395
M(PR) 7	0.2423	0.2885	0.3255	0.3711	0.4267
TURN(PR)	23.643	14.508	11.738	10.435	10.541
$\bar{\omega}$	0.1127	0.1260	0.1112	0.0083	0.1124
DFAC	.4475	.3853	.3766	.3493	.3158
EFFP	1.1251	1.1687	1.1052	1.0882	1.0721
EFF	1.1264	1.1705	1.1065	1.0893	1.0737
INCIDM	7.862	6.849	6.233	5.182	4.845
DEVM	14.012	12.314	8.492	5.746	4.604

Table B-2. Blade Element Data SLTO Configuration (Continued)

	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
50 PERCENT SPEED PT. 151	SLTO	3040	133.1

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	0.765	0.230	-0.989	-1.571	-3.603
V 3	201.81	213.86	221.41	224.85	224.80
V 4	209.04	225.49	233.35	237.63	236.37
VZ 3	201.79	213.59	221.39	224.84	224.79
VZ 4	209.02	224.18	233.30	237.54	235.90
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	2.79	0.90	-4.03	-6.51	-14.85
M 3	0.1814	0.1923	0.1991	0.2022	0.2022
M 4	0.1879	0.2028	0.2099	0.2138	0.2127
TURN	-0.76	-0.23	0.99	1.57	3.60
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	-0.029	-0.052	-0.063	-0.071	-0.084
EFFP	0.9543	1.0426	0.9280	1.0217	0.8914
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	4.635	3.470	2.889	1.871	2.003

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	34.339	30.600	27.558	25.609	22.189
BETA 10	2.086	0.412	0.169	-0.676	1.157
V 9	333.83	317.64	315.30	320.11	318.71
V 10	305.68	291.50	294.44	299.54	309.26
VZ 9	270.97	271.50	279.03	288.66	295.02
VZ 10	303.61	289.40	293.92	299.51	309.09
V-THETA 9	188.31	161.69	145.87	138.36	120.37
V-THETA 10	11.13	2.09	0.87	-3.53	6.24
M 9	0.2987	0.2839	0.2817	0.2858	0.2844
M 10	0.2731	0.2602	0.2628	0.2672	0.2758
TURN	32.253	30.188	27.389	26.285	21.032
$\bar{\omega}$	0.0501	0.0259	0.0405	0.0237	0.0233
DFAC	0.2861	0.2886	0.2685	0.2718	0.2040
EFFP	0.6206	0.5071	0.4567	0.3866	0.8364
INCIDM	-6.561	-6.500	-7.142	-8.391	-13.811
DEVM	10.786	7.912	7.669	7.324	10.057

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	0.666	0.124	-0.893	-1.540	-3.781
BETA 7	36.206	32.184	28.739	26.752	23.041
BETA(PR) 6	53.505	56.661	59.957	62.836	66.581
BETA(PR) 7	27.929	40.132	46.819	51.194	55.051
V 6	227.60	242.06	248.77	252.32	242.23
V 7	330.69	310.82	306.97	310.34	314.04
VZ 6	227.53	241.85	248.69	252.21	241.70
VZ 7	265.62	262.80	269.02	277.07	288.99
V-THETA 6	2.64	0.52	-3.88	-6.78	-15.97
V-THETA 7	195.33	165.56	147.60	139.69	122.91
V(PR) 6	382.6	440.2	496.8	551.9	608.1
V(PR) 7	302.0	344.1	393.3	442.2	504.5
VTHETA PR6	-307.5	-367.6	-430.0	-490.9	-558.0
VTHETA PR7	-141.5	-221.8	-286.8	-344.6	-413.5
U 6	310.19	368.16	426.12	484.09	542.05
U 7	336.79	387.32	434.41	484.29	536.42
M 6	0.2047	0.2179	0.2240	0.2272	0.2180
M 7	0.2958	0.2777	0.2742	0.2770	0.2801
M(PR) 6	0.3441	0.3961	0.4472	0.4969	0.5473
M(PR) 7	0.2701	0.3075	0.3513	0.3947	0.4500
TURN(PR)	25.569	16.506	13.133	11.610	11.530
$\bar{\omega}$	0.0978	0.0677	0.0825	0.0774	0.1028
DFAC	.3958	.3656	.3362	.3174	.2773
EFFP	1.0141	1.0138	1.0241	0.9922	0.9801
EFF	1.0143	1.0140	1.0243	0.9921	0.9799
INCIDM	4.905	4.161	3.857	3.206	3.381
DEVM	9.129	7.632	4.719	2.594	2.151

Table B-2. Blade Element Data SLTO Configuration (Continued)

	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}\,\delta$
50 PERCENT SPEED PT. 146	SLTO	3040.	149.4

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	0.880	0.320	-0.864	-1.107	-3.890
V 3	227.95	241.46	249.67	253.41	253.36
V 4	236.38	255.73	263.69	269.01	264.48
VZ 3	227.92	241.16	249.65	253.39	253.35
VZ 4	236.35	254.37	263.64	268.95	263.87
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	3.63	1.43	-3.98	-5.20	-17.94
M 3	0.2050	0.2173	0.2248	0.2282	0.2281
M 4	0.2127	0.2303	0.2375	0.2424	0.2382
TURN	-0.88	-0.32	0.86	1.11	3.89
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	-0.029	-0.056	-0.064	-0.072	-0.079
EFFP	0.8320	1.0064	0.8527	1.0275	0.7459
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	4.520	3.380	2.764	1.407	2.290

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	28.330	24.832	22.059	19.654	17.069
BETA 10	1.614	0.717	0.147	-0.655	1.044
V 9	370.11	353.28	341.80	337.11	326.57
V 10	367.32	349.12	340.57	336.21	337.98
VZ 9	320.57	318.63	316.31	317.46	312.12
VZ 10	365.17	346.90	340.09	336.18	337.83
V-THETA 9	175.64	148.36	128.37	113.38	95.86
V-THETA 10	10.34	4.37	0.87	-3.84	6.16
M 9	0.3320	0.3167	0.3062	0.3019	0.2922
M 10	0.3295	0.3129	0.3050	0.3011	0.3026
TURN	26.717	24.115	21.911	20.309	16.025
$\bar{\omega}$	0.0465	0.0301	0.0245	0.0264	0.0436
DFAC	0.1773	0.1791	0.1677	0.1654	0.0988
EFFP	-3.4494	-1.9349	-8.3529	-15.6625	1.4936
INCIDM	-12.570	-12.268	-12.641	-14.346	-18.931
DEVM	10.314	8.217	7.647	7.345	9.944

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	0.766	0.187	-0.842	-1.116	-3.870
BETA 7	30.180	26.316	23.190	20.672	17.097
BETA(PR) 6	49.819	53.086	56.860	59.912	64.249
BETA(PR) 7	26.199	37.425	44.726	50.253	54.903
V 6	259.12	276.10	280.99	283.75	270.90
V 7	362.89	342.99	333.08	327.64	324.29
VZ 6	259.03	275.89	280.90	283.68	270.28
VZ 7	312.35	307.15	306.02	306.50	309.96
V-THETA 6	3.47	0.90	-4.13	-5.53	-18.28
V-THETA 7	182.43	152.05	131.16	115.66	95.34
V(PR) 6	401.5	459.5	513.9	565.9	522.1
V(PR) 7	349.6	387.1	430.9	479.4	539.1
VTHETA PR6	-306.7	-367.3	-430.3	-489.6	-560.3
VTHETA PR7	-154.4	-235.3	-303.2	-368.6	-441.1
U 6	310.19	368.16	426.12	484.09	542.05
U 7	336.79	387.32	434.41	484.29	536.42
M 6	0.2334	0.2488	0.2533	0.2558	0.2441
M 7	0.3254	0.3073	0.2982	0.2932	0.2901
M(PR) 6	0.3616	0.4141	0.4632	0.5102	0.5605
M(PR) 7	0.3135	0.3468	0.3858	0.4291	0.4822
TURN(PR)	23.613	15.639	12.129	9.658	9.345
$\bar{\omega}$	0.1106	0.0840	0.0752	0.0713	0.0941
DFAC	.2926	.2875	.2726	.2486	.2188
EFFP	0.9984	0.9826	0.9791	0.9651	0.9606
EFF	0.9984	0.9825	0.9790	0.9647	0.9602
INCIDM	1.219	0.586	0.760	0.312	1.049
DEVM	7.399	4.925	2.626	1.653	2.003

Table B-2. Blade Element Data SLTO Configuration (Continued)

	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
70 PERCENT SPEED PT. 140	SLTO	4255.	133.8

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	1.113	0.772	-0.424	-0.839	-2.870
V 3	205.49	216.49	222.70	225.74	225.24
V 4	202.69	224.35	234.07	241.83	239.48
VZ 3	205.49	216.09	222.69	225.73	225.23
VZ 4	202.61	223.41	233.97	241.77	239.18
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	3.94	3.02	-1.73	-3.54	-11.99
M 3	0.1847	0.1947	0.2003	0.2030	0.2026
M 4	0.1822	0.2018	0.2106	0.2176	0.2155
TURN	-1.11	-0.77	0.42	0.84	2.87
$\bar{\omega}$	0.0201		0.0257		0.0240
DFAC	0.023	-0.029	-0.055	-0.079	-0.090
EFFP	6.8871	1.0923	0.8388	1.1130	0.8089
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	4.287	2.928	2.324	1.139	1.270

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	46.618	48.963	48.717	43.577	42.177
BETA 10	2.473	1.747	-0.207	1.092	4.663
V 9	394.58	376.19	369.48	394.81	401.99
V 10	238.07	264.76	260.57	300.34	346.98
VZ 9	267.33	245.69	243.35	286.00	297.82
VZ 10	235.12	263.02	260.06	300.25	345.74
V-THETA 9	286.78	283.75	277.65	272.15	269.91
V-THETA 10	10.27	8.07	-0.94	5.72	28.21
M 9	0.3502	0.3325	0.3255	0.3475	0.3525
M 10	0.2097	0.2329	0.2285	0.2631	0.3035
TURN	44.146	47.216	48.924	42.484	37.515
$\bar{\omega}$	0.2298	0.1710	0.1975	0.2128	0.1285
DFAC	0.6633	0.5970	0.6266	0.5552	0.4297
EFFP	0.4058	0.4741	0.3223	0.2466	0.2754
INCIDM	5.718	11.863	14.017	9.577	6.177
DEVM	11.173	9.247	7.293	9.092	13.563

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	0.965	0.571	-0.480	-0.878	-3.052
BETA 7	47.772	50.060	50.163	44.975	42.970
BETA(PR) 6	62.364	64.923	67.707	69.335	72.246
BETA(PR) 7	33.673	46.543	54.452	55.874	58.853
V 6	225.46	240.25	245.48	257.11	247.49
V 7	396.71	375.37	365.32	387.20	396.76
VZ 6	225.34	240.01	245.37	257.05	247.14
VZ 7	264.90	240.62	233.84	273.84	290.31
V-THETA 6	3.80	2.39	-2.06	-3.94	-13.18
V-THETA 7	293.76	287.80	280.52	273.67	270.44
V(PR) 6	485.8	566.4	646.9	728.4	810.5
V(PR) 7	320.4	350.4	402.5	488.2	561.3
VTHETA PR6	-430.4	-512.9	-598.5	-681.5	-771.9
VTHETA PR7	-177.6	-254.3	-327.5	-404.2	-480.4
U 6	434.16	515.30	596.43	677.56	758.70
U 7	471.39	542.13	608.03	677.84	750.81
M 6	0.2028	0.2162	0.2210	0.2315	0.2228
M 7	0.3522	0.3318	0.3219	0.3407	0.3479
M(PR) 6	0.4370	0.5097	0.5823	0.6559	0.7295
M(PR) 7	0.2844	0.3097	0.3547	0.4296	0.4922
TURN(PR)	28.680	18.360	13.247	13.458	13.393
$\bar{\omega}$	0.1346	0.2803	0.3620	0.2696	0.3202
DFAC	.5590	.5794	.5617	.5001	.4712
EFFP	1.0937	0.9790	0.9121	0.9195	0.8634
EFF	1.0959	0.9785	0.9100	0.9173	0.8595
INCIDM	13.764	12.423	11.607	9.735	9.046
DEVM	14.873	14.043	12.352	7.274	5.953

Table B-2. Blade Element Data SLTO Configuration (Continued)

CONFIGURATION	$N/\sqrt{\theta}$	$\omega V\sqrt{\theta}/\delta$
70 PERCENT SPEED PT. 141	SLTO	4250.	140.

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	0.982	0.425	-0.623	-1.326	-4.254
V 3	214.12	225.98	233.45	237.40	237.48
V 4	213.99	236.12	245.91	253.40	252.51
VZ 3	214.12	225.61	233.44	237.39	237.47
VZ 4	213.93	234.94	245.85	253.31	251.82
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	3.67	1.75	-2.67	-5.86	-18.73
M 3	0.1925	0.2033	0.2100	0.2136	0.2137
M 4	0.1924	0.2125	0.2213	0.2282	0.2274
TURN	-0.98	-0.43	0.62	1.33	4.25
$\bar{\omega}$	0.0210		0.0195		0.0200
DFAC	0.009	-0.041	-0.059	-0.080	-0.103
EFFP	-0.0842	1.0569	0.8501	1.0329	0.8482
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	4.418	3.275	2.523	1.626	2.654

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	47.000	49.040	46.631	42.010	39.022
BETA 10	5.319	2.240	1.247	1.707	3.636
V 9	408.08	383.74	379.09	404.44	410.98
V 10	241.49	275.49	279.92	316.25	362.89
VZ 9	274.00	249.80	259.64	300.45	319.23
VZ 10	237.87	273.08	279.05	316.01	362.10
V-THETA 9	298.45	289.79	275.58	270.67	258.76
V-THETA 10	22.38	10.77	6.09	9.42	23.01
M 9	0.3622	0.3392	0.3343	0.3562	0.3609
M 10	0.2126	0.2423	0.2456	0.2773	0.3179
TURN	41.682	46.801	45.384	40.302	35.386
$\bar{\omega}$	0.0225	0.1370	0.1769	0.1704	0.0915
DFAC	0.6652	0.5805	0.5743	0.5204	0.3964
EFFP	0.4405	0.5643	0.4359	0.3406	0.4370
INCIDM	6.100	11.940	11.931	8.010	3.022
DEVM	14.019	9.740	8.747	9.707	12.536

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	0.854	0.260	-0.632	-1.270	-4.221
BETA 7	47.945	50.332	48.236	43.385	39.771
BETA(PR) 6	61.270	64.021	66.658	68.413	71.377
BETA(PR) 7	30.794	45.283	52.832	54.637	57.541
V 6	235.90	250.50	258.41	270.24	262.60
V 7	412.39	382.83	373.87	395.71	405.79
VZ 6	235.79	250.24	258.31	270.14	261.88
VZ 7	274.50	244.05	248.84	287.52	311.88
V-THETA 6	3.51	1.14	-2.85	-5.99	-19.33
V-THETA 7	306.20	294.68	278.86	271.82	259.59
V(PR) 6	490.6	571.4	652.0	734.3	820.1
V(PR) 7	321.6	347.3	412.2	496.9	581.1
VTHETA PR6	-430.1	-513.6	-598.6	-682.8	-777.1
VTHETA PR7	-164.6	-246.8	-328.5	-405.2	-490.3
U 6	433.65	514.69	595.73	676.77	757.81
U 7	470.84	541.49	607.32	677.05	749.92
M 6	0.2123	0.2255	0.2327	0.2435	0.2365
M 7	0.3662	0.3383	0.3296	0.3484	0.3563
M(PR) 6	0.4414	0.5144	0.5872	0.6616	0.7387
M(PR) 7	0.2855	0.3070	0.3634	0.4375	0.5102
TURN(PR)	30.467	18.715	13.819	13.774	13.836
$\bar{\omega}$	0.1270	0.2450	0.3129	0.2299	0.2722
DFAC	.5704	.5942	.5497	.4918	.4507
EFFP	1.0500	0.9404	0.9112	0.9192	0.8823
EFF	1.0512	0.9390	0.9091	0.9170	0.8789
INCIDM	12.670	11.521	10.558	8.813	8.177
DEVM	11.994	12.783	10.732	6.037	4.641

Table B-2. Blade Element Data SLTO Configuration (Continued)

	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
70 PERCENT SPEED PT. 142	SLTO	4250.	151.3

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	0.918	0.395	-0.913	-1.865	-5.195
V 3	230.32	243.85	252.68	257.26	257.17
V 4	233.53	256.47	266.80	274.31	272.78
VZ 3	230.31	243.48	252.67	257.25	257.16
VZ 4	233.49	254.93	266.74	274.15	271.66
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	3.74	1.77	-4.25	-8.93	-24.70
M 3	0.2072	0.2195	0.2275	0.2317	0.2316
M 4	0.2101	0.2310	0.2404	0.2472	0.2458
TURN	-0.92	-0.40	0.91	1.87	5.20
$\bar{\omega}$	0.0196		0.0197		0.0280
DFAC	-0.006	-0.048	-0.064	-0.084	-0.109
EFFP	0.5825	1.0600	0.8827	1.0221	0.7747
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	4.482	3.305	2.813	2.165	3.595

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	46.746	45.171	41.013	36.963	34.260
BETA 10	6.511	1.885	1.235	1.602	3.648
V 9	413.92	389.12	385.79	417.88	418.40
V 10	263.64	298.77	308.29	343.75	379.03
VZ 9	278.62	272.06	290.26	333.84	345.70
VZ 10	259.39	295.87	307.25	343.53	378.16
V-THETA 9	301.47	275.97	253.17	251.27	235.54
V-THETA 10	29.90	9.82	6.65	9.61	24.12
M 9	0.3674	0.3445	0.3410	0.3689	0.3686
M 10	0.2322	0.2632	0.2714	0.3023	0.3332
TURN	40.235	43.286	39.777	35.361	30.612
$\bar{\omega}$	0.2354	0.1041	0.1143	0.1083	0.0611
DFAC	0.6119	0.5129	0.4820	0.4481	0.3402
EFFP	0.4202	0.5934	0.5266	0.4318	0.7182
INCIDM	5.846	8.071	6.313	2.963	-1.740
DEVM	15.211	9.385	8.735	9.602	12.548

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	0.804	0.302	-0.882	-1.757	-5.270
BETA 7	47.872	46.606	42.636	38.590	34.378
BETA(PR) 6	59.425	62.107	64.801	66.776	70.246
BETA(PR) 7	29.699	44.326	51.576	53.313	56.821
V 6	254.20	271.97	282.48	294.43	282.65
V 7	418.80	387.42	378.46	404.72	410.49
VZ 6	254.10	271.68	282.37	294.27	281.46
VZ 7	279.27	265.85	278.25	316.28	338.79
V-THETA 6	3.57	1.43	-4.35	-9.03	-25.96
V-THETA 7	310.60	281.52	256.34	252.44	231.79
V(PR) 6	499.6	580.9	663.2	746.3	832.8
V(PR) 7	323.4	372.1	448.0	529.5	619.1
VTHETA PR6	-430.1	-513.3	-600.1	-685.8	-783.8
VTHETA PR7	-160.2	-260.0	-351.0	-424.6	-518.1
U 6	433.65	514.69	595.73	676.77	757.81
U 7	470.84	541.49	607.32	677.05	749.92
M 6	0.2289	0.2451	0.2547	0.2656	0.2548
M 7	0.3719	0.3429	0.3344	0.3571	0.3615
M(PR) 6	0.4498	0.5234	0.5979	0.6732	0.7508
M(PR) 7	0.2872	0.3293	0.3959	0.4672	0.5451
TURN(PR)	29.718	17.756	13.219	13.461	13.426
$\bar{\omega}$	0.1141	0.2111	0.2370	0.1804	0.1974
DFAC	.5785	.5488	.4893	.4464	.4023
EFFP	1.0208	0.9655	0.9613	0.9617	0.9326
EFF	1.0212	0.9647	0.9604	0.9607	0.9307
INCIDM	10.825	9.607	8.701	7.176	7.046
DEVM	10.899	11.826	9.476	4.713	3.921

Table B-2. Blade Element Data SLTO Configuration (Continued)

CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
70 PERCENT SPEED PT. 143	SLTO 4255.	171.3

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	0.987	0.444	-0.424	-1.494	-4.780
V 3	260.21	276.65	287.95	294.28	295.33
V 4	269.90	293.28	304.54	314.98	309.70
VZ 3	260.19	276.31	287.93	294.26	295.32
VZ 4	269.86	291.01	304.53	314.87	308.63
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	4.65	2.27	-2.25	-8.21	-25.81
M 3	0.2344	0.2493	0.2597	0.2654	0.2664
M 4	0.2432	0.2645	0.2748	0.2844	0.2796
TURN	-0.99	-0.44	0.42	1.49	4.78
$\bar{\omega}$	0.0199		0.0216		0.032
DFAC	-0.028	-0.056	-0.062	-0.084	-0.092
EFFP	0.7169	0.9698	0.8296	1.0426	0.7068
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	4.413	3.256	2.324	1.794	3.180

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	43.432	37.720	35.157	32.729	29.005
BETA 10	4.192	1.087	0.871	-0.258	1.669
V 9	423.95	404.56	412.28	423.91	423.95
V 10	325.14	343.27	359.27	384.88	413.62
VZ 9	301.72	316.86	335.84	356.42	370.76
VZ 10	321.82	339.55	357.83	384.63	413.43
V-THETA 9	291.46	247.51	237.39	229.19	205.57
V-THETA 10	23.77	6.51	5.46	-1.73	12.05
M 9	0.3769	0.3593	0.3656	0.3753	0.3746
M 10	0.2874	0.3038	0.3176	0.3400	0.3652
TURN	39.240	36.633	34.285	32.986	27.336
$\bar{\omega}$	0.1676	0.0189	0.0567	0.0303	0.0253
DFAC	0.4728	0.3960	0.3760	0.3471	0.2466
EFFP	0.4739	0.5314	0.3883	0.2866	0.0131
INCIDM	2.532	.620	.457	-1.271	-6.995
DEVM	12.892	8.587	8.371	7.742	10.569

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	0.870	0.352	-0.386	-1.450	-4.753
BETA 7	44.845	39.393	36.554	34.272	30.345
BETA(PR) 6	55.980	58.742	61.580	63.946	67.596
BETA(PR) 7	29.177	43.025	48.668	52.731	56.905
V 6	290.20	311.99	324.00	335.54	325.00
V 7	428.12	399.82	402.96	411.03	410.43
VZ 6	290.10	311.63	323.94	335.42	323.88
VZ 7	302.03	308.68	323.53	339.62	354.20
V-THETA 6	4.41	1.91	-2.18	-8.49	-26.93
V-THETA 7	301.90	253.74	239.99	231.46	207.35
V(PR) 6	518.5	600.7	680.7	763.7	849.8
V(PR) 7	347.7	422.7	490.1	560.9	648.7
VTHETA PR6	-429.8	-513.4	-598.6	-686.1	-785.6
VTHETA PR7	-169.5	-288.4	-368.0	-446.4	-543.5
U 6	434.16	515.30	596.43	677.56	758.70
U 7	471.39	542.13	608.03	677.84	750.81
M 6	0.2617	0.2817	0.2927	0.3033	0.2936
M 7	0.3807	0.3550	0.3572	0.3637	0.3624
M(PR) 6	0.4677	0.5424	0.6149	0.6903	0.7677
M(PR) 7	0.3091	0.3753	0.4345	0.4963	0.5727
TURN(PR)	26.796	15.688	12.908	11.213	10.690
$\bar{\omega}$	0.0988	0.1239	0.1091	0.0987	0.1148
DFAC	.5396	.4611	.4133	.4062	.3665
EFFP	1.0110	1.0564	1.0520	1.0159	0.9922
EFF	1.0113	1.0576	1.0532	1.0163	0.9919
INCIDM	7.380	6.242	5.480	4.346	4.396
DEVM	10.377	10.525	6.568	4.131	4.005

Table B-2. Blade Element Data SLTO Configuration (Continued)

CONFIGURATION $N/\sqrt{\theta}$ $\omega\sqrt{\theta}/\delta$

70 PERCENT SPEED PT. 144 SLTO 4255. 187.2

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	0.891	0.275	-0.828	-1.693	-4.454
V 3	288.13	305.89	317.51	323.43	323.91
V 4	300.27	324.89	336.27	344.71	339.68
VZ 3	288.10	305.52	317.48	323.41	323.89
VZ 4	300.23	322.75	336.23	344.56	338.65
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	4.67	1.56	-4.86	-10.18	-26.38
M 3	0.2598	0.2761	0.2867	0.2922	0.2926
M 4	0.2709	0.2935	0.3040	0.3118	0.3071
TURN	-0.89	-0.27	0.83	1.69	4.45
$\bar{\omega}$	0.0213		0.0191		0.027
DFAC	-0.034	-0.060	-0.067	-0.082	-0.089
EFFP	0.8244	0.9939	0.8608	1.0135	0.7361
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	4.509	3.425	2.728	1.993	2.854

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	36.247	32.121	29.374	27.047	24.385
BETA 10	2.280	0.458	0.549	-0.576	1.032
V 9	460.43	440.56	435.90	440.42	443.00
V 10	410.63	398.19	404.44	414.18	436.08
VZ 9	364.60	370.09	378.90	392.18	403.43
VZ 10	407.83	394.79	403.40	414.07	435.93
V-THETA 9	272.24	234.24	213.81	200.27	182.90
V-THETA 10	16.33	3.18	3.88	-4.16	7.85
M 9	0.4110	0.3927	0.3880	0.3915	0.3931
M 10	0.3653	0.3539	0.3592	0.3675	0.3868
TURN	33.967	31.663	28.825	27.623	23.353
$\bar{\omega}$	0.1514	0.0405	0.0455	0.205	0.0201
DFAC	0.3194	0.3115	0.2840	0.2769	0.2080
EFFP	0.6005	0.4975	0.4429	0.2585	-0.3022
INCIDM	-4.653	-4.979	-5.326	-6.953	-11.615
DEVM	10.980	7.958	8.049	7.424	9.932

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	0.783	0.186	-0.786	-1.669	-4.373
BETA 7	38.029	33.782	30.616	28.315	24.638
BETA(PR) 6	52.825	55.895	59.185	61.970	65.908
BETA(PR) 7	27.627	40.073	46.991	51.610	55.126
V 6	325.97	348.49	358.79	366.58	352.28
V 7	458.41	431.88	424.65	427.54	436.23
VZ 6	325.87	348.18	358.70	366.41	351.26
VZ 7	359.44	358.63	365.28	376.33	396.51
V-THETA 6	4.46	1.13	-4.92	-10.67	-26.86
V-THETA 7	282.40	240.14	216.26	202.79	181.86
V(PR) 6	539.3	621.1	700.2	779.7	860.5
V(PR) 7	407.6	469.1	535.8	606.1	693.5
VTHETA PR6	-429.7	-514.2	-601.4	-688.2	-785.6
VTHETA PR7	-189.0	-302.0	-391.8	-475.0	-569.0
U 6	434.16	515.30	596.43	677.56	758.70
U 7	471.39	542.13	608.03	677.84	750.81
M 6	0.2945	0.3152	0.3248	0.3320	0.3187
M 7	0.4091	0.3847	0.3777	0.3798	0.3869
M(PR) 6	0.4873	0.5619	0.6338	0.7001	0.7786
M(PR) 7	0.3637	0.4178	0.4766	0.5383	0.6151
TURN(PR)	25.192	15.799	12.190	10.359	10.782
$\bar{\omega}$	0.0862	0.0772	0.0823	0.0912	0.1120
DFAC	.5022	.3965	.3678	.3452	.3078
EFFP	1.0078	1.0195	1.0188	0.9928	0.9941
EFF	1.0079	1.0199	1.0192	0.9926	0.9940
INCIDM	4.225	3.395	3.085	2.370	2.708
DEVM	8.827	7.573	4.891	3.010	2.226

Table B-2. Blade Element Data SLTO Configuration (Continued)

	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
70 PERCENT SPEED PT.139	SLTO	4260.	207.

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	0.960	0.344	-0.866	-1.839	-3.970
V 3	323.81	343.06	354.75	360.03	359.84
V 4	336.82	363.85	376.09	384.09	379.10
VZ 3	323.76	342.64	354.71	360.01	359.81
VZ 4	336.76	361.93	376.02	383.88	378.19
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	5.64	2.19	-5.68	-12.32	-26.25
M 3	0.2925	0.3102	0.3210	0.3259	0.3257
M 4	0.3045	0.3294	0.3408	0.3482	0.3436
TURN	-0.96	-0.34	0.87	1.84	3.97
$\bar{\omega}$	0.0219		0.0188		0.0250
DFAC	-0.031	-0.057	-0.068	-0.084	-0.090
EFFP	0.7928	0.9298	0.8270	0.9917	0.7970
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	4.440	3.356	2.766	2.139	2.370

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	27.739	24.050	21.461	18.634	15.594
BETA 10	1.597	0.556	0.212	-0.325	1.833
V 9	509.07	489.18	473.48	467.78	462.05
V 10	509.30	486.00	474.36	468.22	469.56
VZ 9	443.27	443.96	440.03	443.25	444.92
VZ 10	506.28	482.93	473.72	468.21	469.15
V-THETA 9	236.94	199.35	173.23	149.47	124.21
V-THETA 10	14.19	4.71	1.76	-2.66	15.02
M 9	0.4574	0.4389	0.4242	0.4188	0.4132
M 10	0.4576	0.4359	0.4250	0.4193	0.4202
TURN	26.142	23.494	21.248	18.960	13.761
$\bar{\omega}$	0.0418	0.0279	0.0213	0.0178	0.0315
DFAC	0.1659	0.1698	0.1575	0.1513	0.0989
EFFP	70.4983	-6.0340	24.2595	36.6491	2.6005
INCIDM	-13.161	-13.050	-13.239	-15.366	-20.406
DEVM	10.297	8.056	7.712	7.675	10.733

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	0.832	0.204	-0.845	-1.774	-3.971
BETA 7	29.596	25.612	22.628	19.678	16.128
BETA(PR) 6	49.231	52.484	56.223	59.482	63.792
BETA(PR) 7	27.520	38.413	45.491	51.072	54.942
V 6	370.29	395.30	403.51	407.54	388.06
V 7	498.40	473.07	459.88	451.67	456.46
VZ 6	370.16	395.01	403.38	407.32	387.13
VZ 7	431.47	426.17	424.26	425.23	438.49
V-THETA 6	5.38	1.41	-5.95	-12.62	-26.87
V-THETA 7	246.15	204.50	176.94	152.09	126.80
V(PR) 6	566.9	648.8	725.6	802.1	876.5
V(PR) 7	488.7	544.4	605.5	676.9	763.4
VTHETA PR6	-429.3	-514.5	-603.1	-691.0	-786.5
VTHETA PR7	-225.8	-338.3	-431.8	-526.5	-624.9
U 6	434.67	515.90	597.13	678.36	759.59
U 7	471.94	542.76	608.75	678.64	751.69
M 6	0.3354	0.3586	0.3663	0.3700	0.3519
M 7	0.4474	0.4239	0.4116	0.4039	0.4081
M(PR) 6	0.5135	0.5886	0.6586	0.7283	0.7949
M(PR) 7	0.4387	0.4878	0.5419	0.6053	0.6825
TURN(PR)	21.704	14.051	10.727	8.408	8.849
$\bar{\omega}$	0.0589	0.0530	0.0726	0.0876	0.1113
DFAC	.2939	.2842	.2719	.2476	.2114
EFFP	1.0542	1.0482	1.0329	1.0023	1.0068
EFF	1.0552	1.0491	1.0335	1.0023	1.0070
INCIDM	.631	-.016	.123	-.118	.592
DEVM	8.720	5.913	3.391	2.472	2.042

Table B-2. Blade Element Data SLTO Configuration (Continued)

80 PERCENT SPEED PT. 137	CONFIGURATION SLTO	$N/\sqrt{\theta}$ 4815.	$\omega\sqrt{\theta}/\delta$ 157.3

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	2.414	1.800	0.611	-0.446	-1.657
V 3	243.97	256.99	264.24	267.32	266.65
V 4	241.01	265.16	277.42	286.32	285.70
VZ 3	243.96	256.51	264.23	267.31	266.64
VZ 4	240.74	263.94	277.25	286.23	285.57
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	10.15	8.33	2.96	-2.23	-8.26
M 3	0.2196	0.2314	0.2380	0.2408	0.2402
M 4	0.2169	0.2389	0.2500	0.2582	0.2576
TURN	-2.41	-1.80	-0.61	0.45	1.66
$\bar{\omega}$		(REFER TO 70% & 100% SPEED DATA)			
DFAC	0.033	-0.015	-0.044	-0.075	-0.087
EFFP	-3.5686	0.8482	0.7890	0.9801	0.8348
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	2.986	1.900	1.289	.746	.057

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	48.166	49.802	48.840	45.068	42.220
BETA 10	2.534	2.107	0.543	1.529	4.834
V 9	474.23	454.64	443.18	465.52	477.51
V 10	266.33	312.99	304.14	344.36	402.59
VZ 9	311.86	291.97	291.30	328.78	353.50
VZ 10	262.98	310.96	303.65	344.22	401.02
V-THETA 9	353.34	347.26	333.66	329.56	320.88
V-THETA 10	11.77	11.51	2.88	9.19	33.93
M 9	0.4199	0.4004	0.3887	0.4073	0.4165
M 10	0.2331	0.2736	0.2648	0.2993	0.3496
TURN	45.633	47.695	48.298	43.538	37.386
$\bar{\omega}$	0.2278	0.1577	0.1733	0.0967	0.1049
DFAC	0.7125	0.6147	0.6421	0.5824	0.4496
EFFP	0.4476	0.5617	0.4357	0.3897	0.4939
INCIDM	7.266	12.702	14.140	11.068	6.220
DEVM	11.234	9.607	8.043	9.529	13.734

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	2.104	1.549	0.424	-0.470	-1.967
BETA 7	49.203	51.105	50.062	46.436	43.319
BETA(PR) 6	60.956	63.663	66.453	68.431	71.282
BETA(PR) 7	28.727	42.596	51.196	54.187	57.106
V 6	267.67	285.22	293.32	304.15	294.30
V 7	478.35	452.55	439.64	456.66	449.16
VZ 6	267.37	284.84	293.18	304.09	294.15
VZ 7	310.47	283.71	281.98	314.61	341.32
V-THETA 6	9.82	7.71	2.17	-2.49	-9.59
V-THETA 7	362.12	352.21	337.09	330.90	321.87
V(PR) 6	550.8	642.2	733.9	827.2	916.6
V(PR) 7	356.4	386.0	450.4	537.8	628.5
VTHETA PR6	-481.5	-575.4	-672.8	-769.2	-868.1
VTHETA PR7	-171.3	-261.3	-351.0	-436.2	-527.7
U 6	491.30	583.12	674.93	766.74	858.55
U 7	533.43	613.47	688.06	767.05	849.62
M 6	0.2412	0.2572	0.2646	0.2745	0.2655
M 7	0.4237	0.3985	0.3856	0.3995	0.4091
M(PR) 6	0.4962	0.5790	0.6620	0.7465	0.8268
M(PR) 7	0.3157	0.3399	0.3951	0.4705	0.5480
TURN(PR)	32.218	21.045	15.248	14.240	14.176
$\bar{\omega}$	0.1258	0.2678	0.3319	0.2699	0.2557
DFAC	.5880	.6104	.5780	.5299	.4837
EFFP	1.0354	0.9370	0.8850	0.8720	0.8460
EFF	1.0365	0.9350	0.8813	0.8675	0.8403
INCIDM	12.356	11.163	10.353	8.831	8.082
DEVM	9.927	10.096	9.096	5.587	4.206

Table B-2. Blade Element Data SLTO Configuration (Continued)

	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
80 PERCENT SPEED PT. 133	SLTO	4820.	164.0

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	2.355	2.140	0.531	0.093	-2.023
V 3	250.80	265.14	274.71	280.43	282.01
V 4	254.41	276.29	291.84	298.62	297.07
VZ 3	250.79	264.74	274.70	280.42	282.00
VZ 4	254.18	274.45	291.81	298.62	296.88
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	10.45	10.31	2.71	0.49	-10.49
M 3	0.2258	0.2388	0.2476	0.2528	0.2542
M 4	0.2291	0.2490	0.2632	0.2694	0.2680
TURN	-2.35	-2.14	-0.53	-0.09	2.02
$\bar{\omega}$		(REFER TO 70% & 100% SPEED DATA)			
DFAC	0.007	-0.022	-0.057	-0.064	-0.072
EFFP	-2.2464	1.3886	1.1912	1.1254	0.9722
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	3.045	1.560	1.369	.207	.423

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	48.594	47.954	46.492	42.869	37.905
BETA 10	3.984	2.670	1.012	2.155	0.467
V 9	444.50	433.82	415.91	444.50	470.68
V 10	261.26	307.46	324.39	354.25	424.76
VZ 9	268.86	288.16	285.25	325.49	371.38
VZ 10	257.82	304.16	322.95	353.62	424.75
V-THETA 9	333.39	322.16	301.65	302.40	289.16
V-THETA 10	18.15	14.32	5.73	13.32	3.46
M 9	0.3933	0.3825	0.3654	0.3897	0.4121
M 10	0.2289	0.2693	0.2836	0.3090	0.3708
TURN	44.610	45.284	45.481	40.715	37.438
$\bar{\omega}$	0.2099	0.1264	0.1400	0.1473	0.0729
DFAC	0.6819	0.5824	0.5331	0.5075	0.3930
EFFP	0.4053	0.4323	0.4840	0.2303	0.1149
INCIDM	7.694	10.854	11.792	8.869	1.905
DEVM	12.684	10.170	8.512	10.155	9.367

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	2.080	1.927	0.425	0.056	-1.959
BETA 7	49.464	49.353	47.906	44.554	39.847
BETA(PR) 6	60.078	62.964	65.630	67.586	70.094
BETA(PR) 7	33.106	45.433	54.169	56.329	58.269
V 6	277.52	293.33	305.10	316.46	315.30
V 7	451.08	432.45	412.33	433.51	451.83
VZ 6	277.26	292.85	305.02	316.44	315.11
VZ 7	291.38	281.36	276.24	308.86	346.89
V-THETA 6	10.07	9.86	2.27	0.31	-10.78
V-THETA 7	342.82	328.12	305.97	304.14	289.51
V(PR) 6	555.9	644.4	739.3	829.9	925.5
V(PR) 7	350.0	401.4	472.2	557.2	659.6
VTHETA PR6	-481.7	-573.9	-673.4	-767.2	-870.2
VTHETA PR7	-191.2	-286.0	-382.8	-463.7	-561.0
U 6	491.81	583.72	675.63	767.53	859.44
U 7	533.98	614.11	688.77	767.85	850.50
M 6	0.2501	0.2646	0.2754	0.2858	0.2847
M 7	0.3994	0.3813	0.3623	0.3800	0.3951
M(PR) 6	0.5010	0.5813	0.6672	0.7495	0.8357
M(PR) 7	0.3099	0.3539	0.4148	0.4884	0.5768
TURN(PR)	26.964	17.506	11.456	11.256	11.825
$\bar{\omega}$	0.1563	0.2292	0.2976	0.2138	0.1668
DFAC	.5900	.5717	.5338	.4924	.4393
EFFP	1.0734	1.0242	0.9644	0.9594	0.9557
EFF	1.0756	1.0249	0.9633	0.9579	0.9540
INCIDM	11.478	10.464	9.530	7.986	6.894
DEVM	14.306	12.933	12.069	7.729	5.369

Table B-2. Blade Element Data SLTO Configuration (Continued)

	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
80 PERCENT SPEED PT. 134	SLTO	4845.	176.8

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	2.186	1.777	0.469	-0.281	-1.428
V 3	273.06	288.54	298.24	303.37	303.12
V 4	274.15	301.47	315.62	323.95	325.26
VZ 3	273.05	288.05	298.23	303.35	303.10
VZ 4	273.92	299.78	315.53	323.90	325.15
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	10.46	9.35	2.58	-1.59	-8.11
M 3	0.2461	0.2602	0.2691	0.2738	0.2735
M 4	0.2471	0.2720	0.2850	0.2927	0.2939
TURN	-2.19	-1.78	-0.47	0.28	1.43
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.016	-0.028	-0.054	-0.070	-0.086
EFFP	0.1121	0.7070	0.7142	0.8453	0.7804
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	3.214	1.923	1.431	.581	-.172

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	45.863	44.769	41.831	36.501	35.818
BETA 10	7.367	1.955	0.797	1.469	2.613
V 9	487.45	453.81	436.14	487.67	492.37
V 10	296.96	340.43	347.23	393.55	439.24
VZ 9	333.93	319.87	324.15	391.97	399.08
VZ 10	291.27	337.46	346.26	393.36	438.63
V-THETA 9	349.83	319.59	290.88	290.08	288.14
V-THETA 10	38.08	11.62	4.83	10.09	20.02
M 9	0.4320	0.4007	0.3841	0.4294	0.4320
M 10	0.2602	0.2986	0.3042	0.3445	0.3842
TURN	38.496	42.814	41.034	35.032	33.205
$\bar{\omega}$	0.2182	0.0190	0.0960	0.0828	0.0384
DFAC	0.6332	0.5284	0.4924	0.4618	0.3731
EFFP	0.4286	0.6723	0.7977	0.6728	1.2023
INCIDM	4.963	7.669	7.131	2.501	-.182
DEVM	16.067	9.455	8.297	9.469	11.513

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	1.915	1.577	0.357	-0.282	-1.584
BETA 7	46.950	46.156	43.625	38.371	36.149
BETA(PR) 6	58.180	60.950	63.811	65.702	68.957
BETA(PR) 7	27.711	43.004	52.123	52.626	55.569
V 6	300.80	321.44	333.13	349.15	336.07
V 7	492.74	451.48	427.22	468.59	483.60
VZ 6	300.52	320.99	333.00	349.10	335.94
VZ 7	334.22	312.30	309.02	367.27	390.48
V-THETA 6	10.05	8.85	2.07	-1.72	-9.29
V-THETA 7	360.07	325.62	294.75	290.87	285.27
V(PR) 6	570.0	661.2	754.6	848.4	935.6
V(PR) 7	379.9	427.6	503.7	605.2	690.6
VTHETA PR6	-484.3	-577.9	-677.1	-773.2	-873.2
VTHETA PR7	-176.7	-291.7	-397.6	-481.0	-569.6
U 6	494.37	586.75	679.13	771.52	863.90
U 7	536.75	617.30	692.34	771.83	854.91
M 6	0.2714	0.2903	0.3011	0.3159	0.3038
M 7	0.4369	0.3986	0.3761	0.4122	0.4242
M(PR) 6	0.5144	0.5973	0.6820	0.7675	0.8457
M(PR) 7	0.3369	0.3775	0.4434	0.5323	0.6058
TURN(PR)	30.459	17.922	11.679	13.073	13.387
$\bar{\omega}$	0.1203	0.2091	0.2195	0.1576	0.1386
DFAC	.5596	.5418	.4951	.4409	.4097
EFFP	1.0517	0.9817	0.9448	0.9667	0.9329
EFF	1.0533	0.9812	0.9432	0.9656	0.9295
INCIDM	9.580	8.450	7.711	6.102	5.757
DEVM	8.911	10.504	10.023	4.026	2.669

Table B-2. Blade Element Data SLTO Configuration (Continued)

	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
80 PERCENT SPEED PT. 135	SLTO	4850.	198.6

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	2.248	1.755	0.320	-0.320	-2.432
V 3	306.61	325.57	338.66	345.53	346.11
V 4	315.17	339.75	359.17	368.26	368.55
VZ 3	306.59	325.07	338.65	345.51	346.09
VZ 4	314.92	337.26	359.14	368.23	368.22
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	12.36	10.40	2.01	-2.06	-15.64
M 3	0.2767	0.2941	0.3062	0.3125	0.3130
M 4	0.2846	0.3072	0.3251	0.3335	0.3338
TURN	-2.25	-1.75	-0.32	0.32	2.43
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	-0.007	-0.027	-0.058	-0.069	-0.087
EFFP	0.6211	0.7399	0.9946	1.1072	0.9970
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	3.152	1.945	1.580	-.020	.832

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	46.161	40.347	37.202	34.312	31.783
BETA 10	4.224	C.960	0.344	-0.561	2.341
V 9	516.03	490.39	493.67	521.66	524.74
V 10	358.69	388.17	409.09	438.84	475.53
VZ 9	350.44	370.31	392.02	430.80	445.95
VZ 10	354.53	384.32	407.79	438.70	475.02
V-THETA 9	372.21	317.49	298.49	294.06	276.39
V-THETA 10	26.42	6.50	2.45	-4.30	19.43
M 9	0.4575	0.4343	0.4361	0.4603	0.4616
M 10	0.3146	0.3414	0.3593	0.3849	0.4169
TURN	41.937	39.387	36.858	34.873	29.442
$\bar{\omega}$	0.01853	0.0482	0.0623	0.0292	0.0162
DFAC	0.5595	0.4688	0.4352	0.4265	0.3323
EFFP	0.5970	0.7643	0.7743	0.6825	1.0839
INCIDM	5.261	3.247	2.502	.312	-4.217
DEVM	12.924	8.460	7.844	7.439	11.241

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	2.002	1.610	0.250	-0.292	-2.459
BETA 7	47.510	42.020	38.799	35.864	32.460
BETA(PR) 6	54.913	57.859	60.494	62.888	66.537
BETA(PR) 7	23.339	39.144	46.182	49.508	53.202
V 6	339.61	363.18	383.89	396.49	382.87
V 7	522.25	485.01	481.70	503.34	514.09
VZ 6	339.30	362.62	383.78	396.45	382.52
VZ 7	350.84	359.85	375.15	407.81	433.76
V-THETA 6	11.87	10.21	1.67	-2.02	-16.50
V-THETA 7	385.10	324.66	301.83	294.88	275.92
V(PR) 6	590.3	681.8	779.3	869.9	960.7
V(PR) 7	384.2	464.6	542.2	628.2	724.2
VTHETA PR6	-483.0	-577.1	-678.2	-774.3	-881.3
VTHETA PR7	-152.2	-293.3	-391.2	-477.7	-579.9
U 6	494.88	587.35	679.83	772.31	864.79
U 7	537.31	617.93	693.06	772.63	855.80
M 6	0.3071	0.3288	0.3480	0.3597	0.3471
M 7	0.4633	0.4293	0.4253	0.4436	0.4520
M(PR) 6	0.5338	0.6173	0.7064	0.7893	0.8709
M(PR) 7	0.3408	0.4113	0.4788	0.5537	0.6367
TURN(PR)	31.566	18.686	14.305	13.378	13.335
$\bar{\omega}$	0.1069	0.1096	0.1159	0.0883	0.1036
DFAC	.5814	.5008	.4660	.4303	.3889
EFFP	0.9332	0.9784	0.9590	0.9578	0.9363
EFF	0.9312	0.9778	0.9577	0.9564	0.9339
INCIDM	6.313	5.359	4.394	3.288	3.337
DEVM	4.539	6.644	4.082	.908	.302

Table B-2. Blade Element Data SLTO Configuration (Continued)

80 PERCENT SPEED	PT. 136	CONFIGURATION SLTO	$N/\sqrt{\theta}$ 4850.	$\omega\sqrt{\theta}/\delta$ 222.8

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	2.328	1.764	0.159	-0.896	-2.296
V 3	350.21	371.52	385.15	391.72	392.04
V 4	365.36	393.91	409.02	416.36	414.65
VZ 3	350.17	371.07	385.12	391.70	392.02
VZ 4	365.05	391.35	409.01	416.30	414.32
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	14.84	12.12	1.13	-6.51	-16.61
M 3	0.3168	0.3365	0.3492	0.3553	0.3556
M 4	0.3308	0.3573	0.3714	0.3783	0.3767
TURN	-2.33	-1.76	-0.16	0.90	2.30
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	-0.022	-0.044	-0.061	-0.071	-0.079
EFFP	0.9986	1.0361	0.9500	0.9910	0.8835
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	3.072	1.936	1.741	1.196	.696

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	34.480	30.892	28.176	25.242	22.770
BETA 10	1.858	0.270	0.438	-0.310	1.663
V 9	549.06	527.32	520.48	525.21	528.43
V 10	497.62	479.30	484.54	489.06	510.80
VZ 9	444.62	449.13	457.86	475.02	487.13
VZ 10	494.38	475.57	483.53	489.01	510.44
V-THETA 9	310.83	270.73	245.76	223.97	204.52
V-THETA 10	16.14	2.26	3.71	-2.65	14.82
M 9	0.4909	0.4705	0.4635	0.4671	0.4691
M 10	0.4430	0.4260	0.4303	0.4338	0.4529
TURN	32.622	30.622	27.738	25.552	21.107
$\bar{\omega}$	0.0563	0.0402	0.0440	0.0218	0.0270
DFAC	0.2978	0.3001	0.2737	0.2708	0.2082
EFFP	0.6333	0.5468	0.5486	0.4074	0.9698
INCIDM	-6.420	-6.208	-6.524	-8.758	-13.230
DEVM	10.558	7.770	7.938	7.690	10.563

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	2.053	1.536	0.159	-0.928	-2.467
BETA 7	36.342	32.595	29.468	26.700	23.619
BETA(PR) 6	50.338	53.554	57.097	60.269	64.175
BETA(PR) 7	26.105	38.145	45.226	50.354	53.816
V 6	398.80	425.82	439.14	445.26	427.84
V 7	544.22	514.79	506.08	505.83	517.64
VZ 6	398.45	425.33	439.06	445.18	427.44
VZ 7	436.33	433.29	440.39	451.82	474.27
V-THETA 6	14.29	11.41	1.22	-7.21	-18.42
V-THETA 7	322.50	277.32	248.96	227.28	207.39
V(PR) 6	624.3	716.2	808.3	897.7	981.2
V(PR) 7	488.2	551.5	625.6	708.2	803.4
VTHETA PR6	-480.6	-575.9	-678.6	-779.5	-883.2
VTHETA PR7	-214.8	-340.6	-444.1	-545.3	-648.4
U 6	494.88	587.35	679.83	772.31	864.79
U 7	537.31	617.93	693.06	772.63	855.80
M 6	0.3619	0.3871	0.3996	0.4053	0.3890
M 7	0.4864	0.4589	0.4502	0.4493	0.4592
M(PR) 6	0.5665	0.6510	0.7355	0.8172	0.8921
M(PR) 7	0.4363	0.4916	0.5565	0.6291	0.7127
TURN(PR)	24.226	15.388	11.867	9.914	10.358
$\bar{\omega}$	0.0936	0.0630	0.0700	0.0727	0.0950
DFAC	.3996	.3764	.3549	.3276	.2890
EFFP	1.0089	1.0191	1.0109	0.9973	0.9897
EFF	1.0091	1.0196	1.0112	0.9972	0.9893
INCIDM	1.738	1.054	.997	.669	.975
DEVM	7.305	5.645	3.126	1.754	.916

Table B-2. Blade Element Data SLTO Configuration (Continued)

CONFIGURATION $N/\sqrt{\theta}$ $\omega\sqrt{\theta}/\delta$

80 PERCENT SPEED PT. 132 SLTO 4850. 239.3

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	2.339	1.421	0.107	-0.543	-1.673
V 3	379.32	402.20	416.35	423.05	422.91
V 4	395.48	428.63	443.22	455.45	446.84
VZ 3	379.26	401.70	416.31	423.01	422.88
VZ 4	395.14	426.22	443.19	455.41	446.65
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	16.14	10.63	3.82	-4.29	-13.04
M 3	0.3438	0.3650	0.3782	0.3845	0.3844
M 4	0.3588	0.3897	0.4034	0.4140	0.4068
TURN	-2.34	-1.42	-0.11	0.54	1.67
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	-0.021	-0.052	-0.064	-0.082	-0.072
EFFP	0.6021	0.8046	0.7327	0.9542	0.6935
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	3.061	2.279	1.793	.840	.073

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	28.411	24.869	21.886	18.746	17.734
BETA 10	1.567	-0.456	-0.007	-0.926	1.432
V 9	593.20	566.69	546.94	540.01	540.43
V 10	592.15	564.57	547.81	542.74	543.33
VZ 9	510.59	510.84	506.74	511.35	514.62
VZ 10	588.62	560.89	547.02	542.64	548.99
V-THETA 9	280.82	238.32	203.88	173.54	164.62
V-THETA 10	16.19	4.49	-1.76	-8.77	13.72
M 9	0.5312	0.5090	0.4905	0.4838	0.4836
M 10	0.5331	0.5070	0.4913	0.4864	0.4921
TURN	26.844	24.414	21.893	19.672	16.303
$\bar{\omega}$	0.0476	0.0444	0.0364	0.0262	0.0286
DFAC	0.1672	0.1731	0.1625	0.1530	0.1195
EFFP	14.2247	-11.7738	32.8036	10.2293	3.0620
INCIDM	-12.489	-12.231	-12.814	-15.254	-18.266
DEVM	10.267	7.956	7.493	7.074	10.332

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	2.045	1.235	0.158	-0.717	-1.579
BETA 7	30.334	26.460	23.002	20.197	18.068
BETA(PR) 6	47.735	51.022	54.855	58.081	60.389
BETA(PR) 7	26.235	37.342	44.853	50.528	53.774
V 6	436.00	467.55	477.76	484.92	489.11
V 7	577.49	547.53	530.46	520.33	532.23
VZ 6	435.61	467.11	477.66	484.86	488.94
VZ 7	496.21	489.68	488.12	488.25	515.98
V-THETA 6	15.56	10.08	1.32	-6.07	-12.65
V-THETA 7	291.67	243.96	207.28	179.65	165.07
V(PR) 6	647.8	742.8	829.8	917.1	995.2
V(PR) 7	555.7	616.5	688.8	768.2	856.2
VTHETA PR6	-479.3	-577.3	-678.5	-778.4	-877.4
VTHETA PR7	-245.6	-374.0	-485.8	-593.0	-690.7
U 6	494.88	587.35	679.83	772.31	864.79
U 7	537.31	617.93	693.06	772.63	855.87
M 6	0.3966	0.4264	0.4360	0.4428	0.4184
M 7	0.5191	0.4909	0.4750	0.4655	0.4763
M(PR) 6	0.5893	0.6773	0.7573	0.8374	0.9024
M(PR) 7	0.4995	0.5528	0.6168	0.6872	0.7657
TURN(PR)	21.493	13.660	9.997	7.552	8.613
$\bar{\omega}$	0.0680	0.0654	0.0844	0.0957	0.0874
DFAC	.2989	.2942	.2744	.2524	.2192
EFFP	1.0692	1.0605	1.0645	1.0186	1.0501
EFF	1.0709	1.0620	1.0660	1.0196	1.0514
INCIDM	-.865	-1.478	-1.245	-1.519	-.811
DEVM	7.435	4.842	2.753	1.928	.876

Table B-2. Blade Element Data SLTO Configuration (Continued)

	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
100 PERCENT SPEED PT. 154	SLTO	6070.	197.3

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	1.299	1.056	-0.173	0.831	4.149
V 3	303.52	320.83	334.49	343.55	346.36
V 4	307.81	333.39	357.90	360.06	375.85
VZ 3	303.51	320.28	334.48	343.54	346.35
VZ 4	307.71	331.05	357.89	360.01	374.87
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	6.98	6.14	-1.08	5.22	27.19
M 3	0.2739	0.2898	0.3023	0.3107	0.3133
M 4	0.2778	0.3013	0.3239	0.3259	0.3406
TURN	-1.30	-1.06	0.17	-0.83	-4.15
$\bar{\omega}$	0.0170		0.0212		0.0230
DFAC	-0.002	-0.029	-0.072	-0.040	-0.046
EFFP	0.4715	0.5512	1.0339	0.8095	1.4089
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	4.101	2.644	2.073	-.531	-5.749

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	50.754	54.324	53.414	40.242	47.824
BETA 10	-4.627	2.652	-1.780	0.462	5.675
V 9	548.84	520.90	509.46	558.01	603.55
V 10	303.15	343.66	344.13	410.32	516.47
VZ 9	341.07	300.45	301.84	425.51	405.22
VZ 10	298.78	339.09	341.84	409.76	513.92
V-THETA 9	425.05	423.14	409.08	360.49	447.29
V-THETA 10	-24.45	15.90	-10.69	3.31	51.07
M 9	0.4813	0.4529	0.4403	0.4851	0.5181
M 10	0.2619	0.2957	0.2943	0.3532	0.4409
TURN	55.381	51.672	55.194	39.780	42.149
$\bar{\omega}$	0.2021	0.1963	0.2074	0.2154	0.1396
DFAC	0.7606	0.6611	0.6872	0.5643	0.4641
EFFP	0.5266	0.5650	0.3480	0.1494	0.1538
INCIDM	9.854	17.224	16.714	6.242	11.824
DEVM	4.073	10.152	5.720	8.462	14.575

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	1.139	0.919	-0.173	0.778	3.628
BETA 7	51.401	55.500	55.039	41.857	49.803
BETA(PR) 6	61.223	64.514	66.442	67.791	69.381
BETA(PR) 7	34.155	49.149	57.092	56.627	58.913
V 6	336.67	348.23	371.59	392.54	398.54
V 7	558.15	522.85	508.73	537.81	583.91
VZ 6	336.50	347.74	371.47	392.46	397.73
VZ 7	346.08	295.73	291.30	400.43	376.84
V-THETA 6	6.69	5.58	-1.12	5.33	25.22
V-THETA 7	436.22	430.90	416.93	358.87	446.01
V(PR) 6	699.0	808.4	929.5	1038.3	1129.5
V(PR) 7	420.8	452.8	536.6	728.2	729.9
VTHETA PR6	-612.7	-729.5	-852.0	-961.3	-1057.1
VTHETA PR7	-236.2	-342.5	-450.5	-608.1	-625.1
U 6	619.36	735.10	850.84	966.58	1082.32
U 7	672.46	773.37	867.40	966.98	1071.07
M 6	0.3044	0.3150	0.3366	0.3560	0.3616
M 7	0.4899	0.4547	0.4397	0.4671	0.5011
M(PR) 6	0.6319	0.7312	0.8420	0.9418	1.0248
M(PR) 7	0.3694	0.3937	0.4637	0.6324	0.6263
TURN(PR)	27.060	15.337	9.343	11.162	10.468
$\bar{\omega}$	0.1133	0.2525	0.3817	0.2334	0.1919
DFAC	.6337	.6472	.6121	.4510	.5287
EFFP	1.0471	0.9430	0.8794	1.0484	0.8776
EFF	1.0493	0.9403	0.8735	1.0511	0.8702
INCIDM	12.623	12.014	10.342	8.191	6.181
DEVM	15.355	16.649	14.992	6.027	6.013

Table B-2. Blade Element Data SLTO Configuration (Continued)

CONFIGURATION $N/\sqrt{\theta}$ $\omega\sqrt{\theta}/\delta$

100 PERCENT SPEED PT. 155 SLTO 6050. 209.3

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	1.102	C.790	-0.337	0.385	2.705
V 3	325.10	343.43	357.21	365.91	369.13
V 4	327.74	354.44	382.24	387.53	399.19
VZ 3	325.09	342.82	357.20	365.90	369.11
VZ 4	327.65	352.14	382.20	387.51	398.74
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	6.30	4.89	-2.25	2.60	18.84
M 3	0.2937	0.3106	0.3233	0.3313	0.3343
M 4	0.2961	C.3207	0.3465	0.3514	0.3622
TURN	-1.10	-0.79	0.34	-0.38	-2.71
$\bar{\omega}$	0.0197		0.0180		0.0230
DFAC	0.002	-0.025	-0.073	-0.056	-0.056
EFFP	0.4678	0.5287	1.0283	0.8168	1.2199
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	4.298	2.910	2.237	-.065	-4.305

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	49.046	51.462	48.954	43.678	42.438
BETA 10	1.418	2.507	-0.126	1.368	4.294
V 9	555.31	527.50	517.03	578.76	617.49
V 10	286.81	364.52	373.12	437.04	561.29
VZ 9	357.55	325.40	337.81	418.11	455.72
VZ 10	283.14	360.00	371.02	436.31	559.71
V-THETA 9	419.39	412.60	389.93	399.70	416.68
V-THETA 10	7.10	15.94	-0.82	10.43	42.03
M 9	0.4876	0.4595	0.4483	0.5010	0.5331
M 10	0.2477	0.3145	0.3206	0.3747	0.4825
TURN	47.628	48.955	49.080	42.311	38.143
$\bar{\omega}$	0.1871	0.1782	0.1910	0.1926	0.0873
DFAC	0.7663	0.6176	0.6109	0.5597	0.3865
EFFP	0.3985	0.5239	0.3843	0.2062	0.2589
INCIDM	8.146	14.362	14.254	9.678	6.438
DEVM	10.118	10.007	7.374	9.368	13.194

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	0.963	0.654	-0.368	0.374	2.417
BETA 7	49.419	52.691	50.312	45.499	44.693
BETA(PR) 6	59.629	62.925	64.875	66.520	68.110
BETA(PR) 7	33.004	47.562	54.928	55.123	56.972
V 6	358.39	372.84	399.05	417.36	426.59
V 7	567.04	528.59	514.88	560.72	594.13
VZ 6	358.22	372.34	398.91	417.31	426.20
VZ 7	366.37	319.90	328.54	392.89	422.33
V-THETA 6	6.03	4.26	-2.56	2.72	17.99
V-THETA 7	430.66	420.43	396.21	399.93	417.85
V(PR) 6	708.6	818.3	939.5	1047.4	1143.2
V(PR) 7	439.8	474.8	572.2	687.3	774.9
VTHETA PR6	-611.3	-728.4	-850.6	-960.7	-1060.8
VTHETA PR7	-239.6	-350.4	-468.3	-563.9	-649.7
U 6	617.32	732.68	848.04	963.40	1078.76
U 7	670.25	770.82	864.54	963.79	1067.54
M 6	0.3244	0.3378	0.3621	0.3792	0.3878
M 7	0.4985	0.4605	0.4465	0.4849	0.5121
M(PR) 6	0.6414	0.7413	0.8526	0.9516	1.0393
M(PR) 7	0.3867	0.4136	0.4962	0.5944	0.6679
TURN(PR)	26.617	15.335	9.940	11.395	11.138
$\bar{\omega}$	0.1160	0.3883	0.2283	0.2338	0.1660
DFAC	.5989	.6203	.5695	.5132	.4860
EFFP	1.0506	0.9567	0.9143	0.9419	0.9322
EFF	1.0530	0.9547	0.9102	0.9386	0.9281
INCIDM	11.029	10.425	8.775	6.920	4.910
DEVM	14.204	15.062	12.828	6.523	4.072

Table B-2. Blade Element Data SLTO Configuration (Continued)

CONFIGURATION $N/\sqrt{\theta}$ $\omega\sqrt{\theta}/\delta$

100 PERCENT SPEED PT. 156 SLTO 6001. 224.1

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	1.048	0.501	-0.605	0.294	-0.213
V 3	349.14	369.96	385.92	395.81	399.53
V 4	356.48	385.29	413.08	422.15	432.23
VZ 3	349.13	369.36	385.91	395.80	399.51
VZ 4	356.40	382.35	413.05	422.14	432.23
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	6.52	3.37	-4.36	2.17	-1.61
M 3	0.3158	0.3351	0.3499	0.3591	0.3626
M 4	0.3226	0.3493	0.3752	0.3837	0.3931
TURN	-1.05	-0.50	0.61	-0.29	0.21
$\bar{\omega}$	0.0193		0.0240		0.0230
DFAC	-0.011	-0.037	-0.076	-0.064	-0.084
EFFP	0.4718	0.5426	0.8869	0.7875	1.0581
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	4.352	-3.199	2.505	.006	-1.387

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	47.736	48.245	43.316	40.152	37.192
BETA 10	4.393	2.244	-0.049	1.052	3.468
V 9	557.15	534.24	526.85	585.43	623.02
V 10	317.14	384.76	404.83	479.37	585.24
VZ 9	367.23	351.74	381.26	446.91	496.30
VZ 10	312.53	379.51	402.36	478.56	584.17
V-THETA 9	412.32	398.54	361.43	377.49	376.61
V-THETA 10	24.29	15.06	-0.34	8.80	35.40
M 9	0.4898	0.4665	0.4589	0.5090	0.5400
M 10	0.2745	0.3327	0.3498	0.4136	0.5058
TURN	43.343	46.001	43.365	39.100	33.724
$\bar{\omega}$	0.1878	0.1472	0.1519	0.1317	0.0328
DFAC	0.6955	0.5744	0.5338	0.4760	0.3274
EFFP	0.4282	0.5543	0.4809	0.4177	0.7716
INCIDM	6.836	11.145	8.616	6.152	1.192
DEVM	13.093	9.744	7.451	9.052	12.368

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	0.919	0.426	-0.575	0.272	-0.357
BETA 7	48.175	49.584	44.975	42.022	39.532
BETA(PR) 6	57.544	60.815	62.782	64.483	66.633
BETA(PR) 7	32.331	45.891	53.036	53.987	56.006
V 6	385.66	404.79	435.03	455.16	463.58
V 7	569.55	534.61	520.73	565.19	594.80
VZ 6	385.50	404.24	434.89	455.11	463.56
VZ 7	377.34	346.13	368.10	419.75	458.74
V-THETA 6	6.18	3.01	-4.37	2.16	-2.89
V-THETA 7	424.43	407.03	368.05	378.35	378.59
V(PR) 6	718.4	829.2	950.9	1056.5	1168.8
V(PR) 7	449.5	498.0	612.6	714.1	820.5
VTHETA PR6	-606.1	-723.7	-845.5	-953.4	-1072.9
VTHETA PR7	-240.4	-357.5	-489.5	-577.6	-680.3
U 6	612.32	726.75	841.17	955.60	1070.02
U 7	664.82	764.58	857.54	955.99	1058.89
M 6	0.3497	0.3675	0.3957	0.4147	0.4226
M 7	0.5013	0.4669	0.4535	0.4908	0.5145
M(PR) 6	0.6513	0.7528	0.8650	0.9625	1.0655
M(PR) 7	0.3956	0.4349	0.5335	0.6202	0.7097
TURN(PR)	25.205	14.892	9.739	10.494	10.626
$\bar{\omega}$	0.1137	0.1900	0.2190	0.0758	0.1428
DFAC	.5877	.6340	.5207	.4829	.4511
EFFP	1.0366	0.9643	0.9561	0.9722	0.9487
EFF	1.0383	0.9627	0.9541	0.9707	0.9456
INCIDM	8.944	8.315	6.682	4.883	3.433
DEVM	13.531	13.391	10.936	5.387	3.106

Table B-2. Blade Element Data SLTO Configuration (Continued)

	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
100 PERCENT SPEED PT. 157	SLTO	6054.	242.

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	1.188	0.490	-0.609	-0.921	-0.488
V 3	381.69	405.62	423.21	433.41	436.76
V 4	396.36	425.30	453.33	461.36	471.04
VZ 3	381.67	405.05	423.19	433.39	436.74
VZ 4	396.27	421.86	453.30	461.30	471.03
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	8.21	3.64	-4.82	-7.41	-4.01
M 3	0.3460	0.3682	0.3847	0.3942	0.3974
M 4	0.3596	0.3866	0.4129	0.4205	0.4297
TURN	-1.19	-0.49	0.61	0.92	0.49
$\bar{\omega}$	0.0192		0.0260		0.0210
DFAC	-0.027	-0.044	-0.077	-0.073	-0.083
EFFP	0.6579	0.6285	0.8808	0.7477	0.9787
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	4.212	3.210	2.509	1.221	-1.112

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	47.087	41.316	37.667	35.140	34.506
BETA 10	5.270	0.875	-0.655	-0.833	2.523
V 9	579.62	551.74	556.10	597.16	621.44
V 10	374.96	428.86	464.51	520.64	588.25
VZ 9	386.14	409.73	438.16	487.93	512.10
VZ 10	369.65	423.45	462.11	520.07	587.67
V-THETA 9	424.50	364.26	339.82	343.71	352.04
V-THETA 10	34.44	6.55	-5.31	-7.57	25.89
M 9	0.5097	0.4843	0.4867	0.5213	0.5400
M 10	0.3249	0.3730	0.4038	0.4519	0.5099
TURN	41.816	40.441	38.322	35.973	31.983
$\bar{\omega}$	0.2160	0.0657	0.0825	0.0384	0.0216
DFAC	0.6086	0.4889	0.4378	0.4035	0.3090
EFFP	0.4506	0.5545	0.6400	0.6313	1.1017
INCIDM	6.187	4.216	2.967	1.140	-1.494
DEVM	13.970	8.375	6.845	7.167	11.423

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	1.049	0.408	-0.562	-0.835	-0.622
BETA 7	47.943	42.865	39.346	36.772	36.422
BETA(PR) 6	55.136	58.203	60.420	62.768	65.181
BETA(PR) 7	30.261	44.712	51.064	53.399	56.007
V 6	425.12	453.09	484.51	499.98	501.76
V 7	591.80	548.64	543.70	575.03	597.78
VZ 6	424.94	452.54	484.38	499.89	501.73
VZ 7	394.06	401.65	420.19	460.49	481.00
V-THETA 6	7.78	3.22	-4.75	-7.29	-5.45
V-THETA 7	439.40	373.23	344.70	344.23	354.92
V(PR) 6	743.4	859.1	981.3	1092.4	1195.3
V(PR) 7	459.0	565.9	669.0	772.5	860.4
VTHETA PR6	-609.9	-729.9	-853.3	-971.3	-1084.9
VTHETA PR7	-231.3	-398.1	-520.4	-620.2	-713.3
U 6	617.73	733.16	848.60	964.04	1079.47
U 7	670.69	771.33	865.11	964.43	1068.25
M 6	0.3864	0.4127	0.4424	0.4571	0.4588
M 7	0.5210	0.4815	0.4756	0.5014	0.5186
M(PR) 6	0.6758	0.7826	0.8960	0.9988	1.0930
M(PR) 7	0.4041	0.4966	0.5852	0.6736	0.7464
TURN(PR)	24.868	13.460	9.351	9.367	9.174
$\bar{\omega}$	0.0867	0.1150	0.1061	0.0878	0.1435
DFAC	.5958	.5109	.4681	.4365	.4217
EFFP	0.9814	1.0298	1.0041	1.0063	0.9487
EFF	0.9806	1.0312	1.0043	1.0067	0.9458
INCIDM	6.536	5.703	4.326	3.168	1.981
DEVM	11.461	12.212	8.964	4.799	3.107

Table B-2. Blade Element Data SLTO Configuration (Continued)

100 PERCENT SPEED PT. 158	CONFIGURATION SLTO	$N/\sqrt{\theta}$ 6040.	$\omega\sqrt{\theta}/\delta$ 260.5

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	1.223	C.450	-0.974	-1.433	-0.695
V 3	416.80	443.11	461.87	471.37	473.54
V 4	438.04	468.15	497.46	503.22	510.20
VZ 3	416.77	442.52	461.84	471.35	473.51
VZ 4	437.93	464.69	497.38	503.05	510.17
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	9.35	3.68	-8.46	-12.58	-6.19
M 3	0.3787	0.4033	0.4210	0.4300	0.4320
M 4	0.3986	0.4269	0.4547	0.4602	0.4669
TURN	-1.22	-0.45	0.97	1.43	0.70
$\bar{\omega}$	0.0184		0.0214		0.0240
DFAC	-0.039	-0.052	-0.086	-0.081	-0.084
EFFP	0.7110	0.6677	0.9482	0.7759	0.9205
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	4.177	3.250	2,874	1.733	-.905

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	40.135	35.480	31.351	29.924	30.403
BETA 10	2.901	0.051	0.050	-1.261	1.350
V 9	609.69	588.24	600.14	609.60	615.01
V 10	489.01	507.26	529.51	555.16	604.83
VZ 9	456.62	474.31	510.87	528.16	530.40
VZ 10	484.78	502.02	527.69	554.80	604.59
V-THETA 9	393.00	341.43	312.24	304.09	311.24
V-THETA 10	24.75	0.45	0.46	-12.21	14.25
M 9	0.5396	0.5194	0.5291	0.5356	0.5372
M 10	0.4284	0.4449	0.4660	0.4856	0.5280
TURN	37.233	35.430	31.301	31.184	29.053
$\bar{\omega}$	0.1448	0.0344	0.0445	0.0088	0.0143
DFAC	0.4275	0.3757	0.3463	0.3322	0.2517
EFFP	0.4870	0.5575	0.4318	0.5210	3.5717
INCIDM	-0.765	-1.620	-3.349	-4.076	-5.597
DEVM	11.601	7.551	7.550	6.739	10.250

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	1.076	0.351	-0.921	-1.325	-0.895
BETA 7	41.572	37.274	32.874	31.352	31.885
BETA(PR) 6	52.082	55.319	57.849	60.819	63.730
BETA(PR) 7	29.711	42.337	48.098	52.751	55.838
V 6	473.35	504.50	537.75	544.32	535.76
V 7	613.63	578.33	583.67	585.51	598.95
VZ 6	473.16	504.00	537.58	544.14	535.70
VZ 7	456.69	459.70	489.92	499.91	508.56
V-THETA 6	8.89	3.09	-8.64	-12.59	-8.36
V-THETA 7	407.18	350.25	316.81	304.63	316.37
V(PR) 6	770.0	886.0	1010.3	1116.1	1210.3
V(PR) 7	528.6	622.6	734.0	826.1	905.7
VTHETA PR6	-607.4	-728.4	-855.3	-974.4	-1085.3
VTHETA PR7	-262.0	-419.3	-546.3	-657.6	-749.4
U 6	616.30	731.47	846.64	961.81	1076.98
U 7	669.14	769.55	863.11	962.20	1065.77
M 6	0.4318	0.4614	0.4933	0.4996	0.4914
M 7	0.5433	0.5102	0.5139	0.5136	0.5227
M(PR) 6	0.7025	0.8104	0.9267	1.0243	1.1100
M(PR) 7	0.4680	0.5492	0.6463	0.7246	0.7903
TURN(PR)	22.365	12.956	9.746	8.067	7.893
$\bar{\omega}$	0.1137	0.0815	0.0940	0.0965	0.1673
DFAC	.5035	.4516	.4089	.3867	.3776
EFFP	0.9932	1.0262	1.0328	1.0017	0.9292
EFF	0.9929	1.0273	1.0343	1.0018	0.9257
INCIDM	3.482	2.819	1.749	1.219	.530
DEVM	10.911	9.837	5.998	4.151	2.938

Table B-2. Blade Element Data SLTO Configuration (Continued)

	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
100 PERCENT SPEED PT.153	SLTO	6020.	280.5

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	1.606	0.907	-0.383	-1.653	-3.249
V 3	463.70	491.39	507.59	514.29	514.09
V 4	483.04	523.00	544.97	557.14	545.55
VZ 3	463.62	490.80	507.54	514.25	514.05
VZ 4	482.83	520.49	544.90	556.89	544.68
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	13.54	8.28	-3.64	-16.07	-30.92
M 3	0.4227	0.4489	0.4644	0.4708	0.4706
M 4	0.4410	0.4791	0.5002	0.5120	0.5008
TURN	-1.61	-0.91	0.38	1.65	3.25
$\bar{\omega}$	0.0281		0.0216		0.0220
DFAC	-0.027	-0.056	-0.077	-0.099	-0.091
EFFP	0.8119	0.9487	0.9143	1.0087	0.7728
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	3.794	2.793	1.517	1.953	1.649

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	29.165	24.917	23.710	20.645	18.538
BETA 10	1.843	C.592	0.193	-1.398	0.652
V 9	715.34	692.76	648.96	614.17	616.27
V 10	725.69	690.43	654.82	614.44	652.85
VZ 9	614.96	624.98	593.57	574.71	584.18
VZ 10	721.41	686.70	654.12	614.25	652.64
V-THETA 9	348.60	291.86	260.95	216.54	195.93
V-THETA 10	23.34	7.13	2.21	-15.00	7.43
M 9	0.6437	0.6223	0.5796	0.5466	0.5465
M 10	0.6538	C.6201	0.5852	0.5468	0.5813
TURN	27.321	24.325	23.517	22.043	17.885
$\bar{\omega}$	0.1357	0.1339	0.1386	0.1160	0.0905
DFAC	0.1583	0.1721	0.1664	0.1760	0.0896
EFFP	4.2002	-14.7944	6.7688	117.9792	1.1808
INCIDM	-11.735	-12.183	-10.990	-13.355	-17.462
DEVM	10.543	8.092	7.693	6.602	9.552

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	1.382	0.717	-0.240	-1.658	-3.297
BETA 7	31.426	26.761	24.522	22.199	19.349
BETA(PR) 6	48.081	51.129	54.996	58.867	63.078
BETA(PR) 7	27.224	38.376	45.873	53.654	56.251
V 6	540.09	582.15	592.80	589.62	562.45
V 7	694.44	662.72	635.81	586.14	609.27
VZ 6	539.81	581.78	592.69	589.34	561.52
VZ 7	589.99	591.17	578.17	542.62	574.86
V-THETA 6	13.03	7.29	-2.49	-17.06	-32.35
V-THETA 7	362.07	298.40	263.88	221.46	201.86
V(PR) 6	808.1	927.2	1033.3	1139.9	1240.2
V(PR) 7	666.4	754.8	830.8	915.7	1034.8
VTHETA PR6	-601.2	-721.8	-846.3	-975.7	-1105.8
VTHETA PR7	-304.8	-468.6	-596.4	-737.6	-860.4
U 6	614.26	729.05	843.83	958.62	1073.41
U 7	666.92	767.00	860.25	959.02	1062.25
M 6	0.4955	0.5362	0.5466	0.5435	0.5171
M 7	0.6234	0.5934	0.5672	0.5203	0.5402
M(PR) 6	0.7414	0.8541	0.9528	1.0508	1.1402
M(PR) 7	0.5982	0.6759	0.7411	0.8129	0.9174
TURN(PR)	20.851	12.738	9.118	5.211	6.826
$\bar{\omega}$	0.0423	0.0550	0.1296	0.1682	0.2093
DFAC	.3341	.3096	.3044	.2901	.2543
EFFP	1.0467	1.0583	0.9908	0.8358	0.8728
EFF	1.0485	1.0604	0.9905	0.8309	0.8685
INCIDM	-.519	-1.371	-1.104	-.733	-.122
DEVM	8.424	5.876	3.773	5.054	3.351

Table B-2. Blade Element Data SLTO Configuration (Continued)

110 PERCENT SPEED Pt. 161 CONFIGURATION SLTO $N/\sqrt{\theta}$ 6654.0 $\omega\sqrt{\theta}/\delta$ 223.62

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	4.859	5.395	5.124	7.590	7.757
V 3	356.13	375.33	386.90	392.72	393.36
V 4	352.51	388.39	416.07	426.56	429.34
VZ 3	356.13	374.61	386.89	392.71	393.35
VZ 4	351.16	384.99	414.26	422.77	425.41
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	29.86	36.52	37.16	56.34	57.95
M 3	0.3223	0.3401	0.3508	0.3562	0.3568
M 4	0.3190	0.3522	0.3780	0.3878	0.3904
TURN	-4.86	-5.39	-5.12	-7.59	-7.76
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.053	0.015	-0.027	-0.014	-0.018
EFFP	-0.8387	0.6735	0.9356	0.8945	0.8693
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	0.541	-1.695	-3.224	-7.290	-9.357

STATOR 8

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	49.936	51.295	53.127	49.652	51.367
BETA 10	-7.170	3.191	-1.317	1.257	4.493
V 9	641.29	607.34	606.90	665.42	691.10
V 10	319.48	380.16	388.56	454.35	574.98
VZ 9	406.78	377.53	363.30	430.67	431.46
VZ 10	312.59	376.76	387.30	453.99	573.19
V-THETA 9	490.80	473.96	485.50	507.13	539.86
V-THETA 10	-39.88	21.16	-8.93	9.97	45.04
M 9	0.5618	0.5280	0.5231	0.5725	0.5880
M 10	0.2736	0.3256	0.3303	0.3849	0.4848
TURN	57.106	48.105	54.444	48.395	46.874
$\bar{\omega}$	.0927	.1791	.1849	.1980	.1217
DFAC	0.8184	0.6800	0.7183	0.6669	0.5167
EFFP	0.5514	0.6942	0.6367	0.4551	0.7280
INCIDM	9.036	14.195	18.427	15.652	15.367
DEVM	1.530	10.691	6.183	9.257	13.393

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	4.220	4.946	4.899	7.218	6.929
BETA 7	50.533	52.310	54.280	51.122	53.819
BETA(PR) 6	58.983	61.672	64.144	65.804	68.399
BETA(PR) 7	29.404	44.611	52.656	53.765	57.965
V 6	392.10	416.96	435.75	454.13	451.70
V 7	652.23	607.96	602.93	648.34	670.68
VZ 6	390.88	415.02	433.98	450.47	448.39
VZ 7	411.50	371.12	351.73	406.83	395.91
V-THETA 6	28.86	35.95	37.21	57.06	54.49
V-THETA 7	503.52	481.10	489.51	504.72	541.35
V(PR) 6	758.6	874.8	995.2	1099.1	1217.5
V(PR) 7	475.9	522.1	580.3	688.4	745.4
VTHETA PR6	-650.1	-769.9	-895.5	-1002.5	-1132.3
VTHETA PR7	-233.6	-366.7	-461.3	-555.3	-632.8
U 6	678.95	805.83	932.70	1059.58	1186.45
U 7	737.16	847.78	950.85	1060.01	1174.12
M 6	0.3556	0.3788	0.3964	0.4137	0.4114
M 7	0.5721	0.5287	0.5198	0.5573	0.5702
M(PR) 6	0.6881	0.7948	0.9053	1.0012	1.1089
M(PR) 7	0.4174	0.4540	0.5003	0.5918	0.6345
TURN(PR)	29.569	17.039	11.479	12.036	10.425
$\bar{\omega}$	.0688	.2295	.3851	.1804	.2947
DFAC	.6032	.6042	.6084	.5555	.5744
EFFP	1.0152	0.9529	0.8733	0.9036	0.8268
EFF	1.0161	0.9503	0.8661	0.8973	0.8145
INCIDM	10.383	9.172	8.044	6.204	5.190
DEVM	10.604	12.111	10.556	5.165	5.066

Table B-2. Blade Element Data SLTO Configuration (Continued)

CONFIGURATION: SLTO

$N/\sqrt{\theta}$ = 6652.0

$\omega\sqrt{\theta}/\delta$ = 279.67

110 PERCENT SPEED Pt. 165

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	-2.242	-2.257	-2.184	-2.178	-2.200
V 3	458.93	467.02	505.22	513.52	514.52
V 4	478.23	515.44	541.58	551.39	555.22
VZ 3	458.89	486.40	505.19	513.50	514.49
VZ 4	477.66	511.99	541.15	550.97	554.81
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	-18.71	-20.30	-20.64	-20.95	-21.32
M 3	0.4182	0.4448	0.4621	0.4700	0.4710
M 4	0.4365	0.4719	0.4970	0.5064	0.5101
TURN	2.24	2.26	2.18	2.18	2.20
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	-0.063	-0.079	-0.093	-0.094	-0.100
EFFP	0.8291	0.6575	0.9492	0.8812	0.9548
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	7.642	5.957	4.084	2.478	0.600

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.083	33.345	37.007	40.669
BETA 9	36.812	31.659	29.765	29.052	30.561
BETA 10	3.548	1.619	1.256	0.613	1.709
V 9	647.02	626.44	644.41	629.81	625.76
V 10	542.74	565.29	589.17	588.32	616.52
VZ 9	508.38	528.01	556.31	547.38	538.76
VZ 10	537.85	560.65	587.81	588.27	616.21
V-THETA 9	387.69	330.66	319.92	311.58	318.17
V-THETA 10	33.58	16.05	12.56	0.13	18.39
M 9	0.5712	0.5521	0.5653	0.5503	0.5436
M 10	0.4746	0.4954	0.5192	0.5123	0.5349
TURN	33.264	30.641	28.515	29.039	28.851
$\bar{\omega}$	.1707	.1775	.1741	.2111	.2516
DFAC	0.3689	0.3077	0.2953	0.2974	0.2479
EFFP	0.0923	0.2039	0.2175	0.3008	0.2459
INCIDM	-4.088	-5.241	-4.935	-4.348	-5.439
DEVM	12.248	8.519	8.750	8.013	10.609

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	-1.980	-2.043	-1.989	-2.014	-2.124
BETA 7	38.556	33.649	31.279	31.057	30.980
BETA(PR) 6	53.081	55.682	58.181	61.176	64.498
BETA(PR) 7	33.458	45.062	49.689	55.242	58.418
V 6	524.01	564.42	591.78	594.83	576.37
V 7	646.41	610.45	622.68	605.41	614.76
VZ 6	523.57	563.64	591.30	594.42	575.97
VZ 7	502.81	507.63	531.86	518.52	527.05
V-THETA 6	-18.10	-20.12	-20.54	-20.90	-21.36
V-THETA 7	402.90	338.25	323.30	312.33	316.44
V(PR) 6	871.7	1000.0	1121.6	1232.9	1337.8
V(PR) 7	605.9	719.4	822.6	909.7	1006.4
VTHETA PR6	-696.8	-825.7	-953.0	-1080.2	-1207.5
VTHETA PR7	-334.0	-509.3	-627.3	-747.4	-857.3
U 6	678.75	805.58	932.42	1059.26	1186.10
U 7	736.94	847.52	958.56	1059.70	1173.76
M 6	0.4801	0.5190	0.5456	0.5486	0.5306
M 7	0.5706	0.5372	0.5464	0.5281	0.5332
M(PR) 6	0.7986	0.9195	1.0341	1.1372	1.2316
M(PR) 7	0.5349	0.6331	0.7219	0.7935	0.8729
TURN(PR)	19.617	10.600	8.487	5.932	6.081
$\bar{\omega}$	.1881	.1832	.1844	.2216	.2663
DFAC	.4814	.4213	.3954	.3828	.3663
EFFP	1.0155	1.0348	1.0203	0.9339	0.8659
EFF	1.0162	1.0365	1.0213	0.9305	0.8588
INCIDM	4.481	3.182	2.081	1.576	1.298
DEVM	14.658	12.562	7.589	6.642	5.518

Table B-2. Blade Element Data SLTO Configuration (Continued)

CONFIGURATION $N/\sqrt{\theta}$ $\omega\sqrt{\theta}/\delta$

110 PERCENT SPEED Pt. 160 SLTO 668.2 290.69

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	5.389	5.176	3.996	2.936	-0.545
V 3	487.00	515.20	531.18	538.40	540.37
V 4	509.28	550.00	575.38	585.40	571.17
VZ 3	486.93	514.60	531.13	538.37	540.34
VZ 4	507.01	545.44	573.93	584.63	571.15
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	47.83	49.62	40.10	29.99	-5.44
M 3	0.4448	0.4716	0.4870	0.4939	0.4958
M 4	0.4660	0.5051	0.5297	0.5394	0.5256
TURN	-5.39	-5.18	-4.00	-2.94	0.55
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.005	-0.019	-0.045	-0.059	-0.062
EFFP	0.9248	0.9473	0.9110	0.9379	0.7668
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	0.011	-1.476	-2.096	-2.636	-1.055

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	29.664	26.707	26.493	24.771	20.295
BETA 10	2.442	1.380	-0.454	-0.289	2.701
V 9	778.60	749.17	649.39	643.21	692.95
V 10	773.27	728.65	656.86	624.58	708.72
VZ 9	666.71	666.22	580.56	583.90	649.90
VZ 10	768.36	724.89	656.02	624.50	707.85
V-THETA 9	385.34	336.70	289.69	269.50	240.35
V-THETA 10	32.94	17.55	-5.20	-3.15	33.40
M 9	0.7026	0.6741	0.5785	0.5713	0.6152
M 10	0.6973	0.6540	0.5856	0.5536	0.6305
TURN	27.223	25.327	26.947	25.060	17.593
$\bar{\omega}$	0.0654	0.0571	0.0292	0.0229	0.0259
DFAC	0.1787	0.2022	0.1884	0.2274	0.1228
EFFP	-6.5320	-0.9675	3.9187	-2.0430	2.6309
INCIDM	-11.236	-10.393	-8.207	-9.229	-15.705
DEVM	11.142	8.880	7.046	7.711	11.601

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	4.599	4.485	3.591	2.721	-0.572
BETA 7	31.993	28.758	26.777	26.797	21.093
BETA(PR) 6	47.929	51.095	55.488	59.425	53.364
BETA(PR) 7	28.177	38.935	48.528	55.812	56.179
V 6	575.74	616.37	618.69	612.21	600.60
V 7	752.21	715.79	653.73	603.15	572.79
VZ 6	573.76	614.17	617.37	611.49	599.57
VZ 7	635.26	626.91	583.35	538.32	527.71
V-THETA 6	46.16	48.20	38.76	29.06	-5.99
V-THETA 7	398.53	344.38	294.52	271.91	242.12
V(PR) 6	856.4	978.1	1089.7	1202.1	1339.5
V(PR) 7	723.7	806.7	881.3	958.1	1127.8
VTHETA PR6	-635.6	-761.0	-897.9	-1035.0	-1197.4
VTHETA PR7	-341.7	-507.0	-660.3	-792.6	-935.9
U 6	681.81	809.22	936.63	1064.04	1191.45
U 7	740.26	851.35	954.85	1064.48	1179.05
M 6	0.5300	0.5698	0.5720	0.5657	0.5543
M 7	0.6765	0.6415	0.5827	0.5339	0.5964
M(PR) 6	0.7884	0.9042	1.0075	1.1107	1.2363
M(PR) 7	0.6509	0.7230	0.7855	0.8480	0.9997
TURN(PR)	19.746	12.145	6.955	3.611	7.195
$\bar{\omega}$	0.0535	0.0625	0.2086	0.1977	0.2423
DFAC	.4466	.4851	.5168	.5480	.5554
EFFP	1.0577	1.0545	0.9508	0.7637	0.9334
EFF	1.0602	1.0568	0.9490	0.7565	0.8894
INCIDM	-0.671	-1.405	-0.612	-0.175	0.164
DEVM	9.377	6.435	6.428	7.212	3.279

Table B-3. Blade Element Data Cruise Configuration

CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
50PERCENT SPEED PT.182 CRUISE	3078.	85.5

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	30.821	27.804	26.025	23.444	20.421
V 3	130.94	137.07	140.43	142.15	142.04
V 4	153.75	158.86	162.70	165.09	160.03
VZ 3	130.94	136.88	140.43	142.14	142.04
VZ 4	132.02	139.92	146.15	151.43	149.97
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	78.78	74.10	71.39	65.68	55.84
M 3	0.1175	0.1230	0.1260	0.1275	0.1274
M 4	0.1380	0.1426	0.1460	0.1482	0.1436
TURN	-30.82	-27.80	-26.03	-23.44	-20.42
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.134	0.115	0.097	0.071	0.070
EFFP	0.9635	0.9575	0.9458	1.0498	0.8521
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.179	6.496	6.475	7.456	8.579

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	57.942	55.735	56.814	53.012	47.628
BETA 10	30.949	26.816	25.991	25.801	25.328
V 9	306.98	302.18	302.80	315.56	322.35
V 10	126.13	204.73	209.41	238.75	257.81
VZ 9	160.15	169.21	165.45	189.83	217.19
VZ 10	106.30	181.40	187.79	214.90	232.97
V-THETA 9	260.17	249.73	253.41	252.06	238.15
V-THETA 10	64.86	92.36	91.77	103.91	110.29
M 9	0.2741	0.2696	0.2696	0.2807	0.2865
M 10	0.1119	0.1820	0.1859	0.2117	0.2285
TURN	26.993	28.919	30.823	27.212	22.301
$\bar{\omega}$	0.4963	0.2149	0.2296	0.2039	0.2438
DFAC	0.8264	0.5335	0.5413	0.4618	0.3900
EFFP	0.4558	0.6940	0.6494	0.5562	0.3993
INCIDM	8.042	9.635	13.114	10.012	2.628
DEVM	13.649	8.316	7.491	7.801	8.228

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	27.835	25.845	24.619	22.061	19.589
BETA 7	57.841	57.070	58.237	54.701	48.751
BETA(PR) 6	58.688	63.422	66.920	69.283	72.479
BETA(PR) 7	23.778	40.090	49.339	52.785	55.116
V 6	163.56	166.90	169.24	173.45	165.34
V 7	315.42	302.38	300.63	310.93	319.94
VZ 6	144.59	150.08	153.81	160.73	155.77
VZ 7	166.46	164.18	158.15	179.62	210.94
V-THETA 6	76.37	72.76	70.50	65.15	55.43
V-THETA 7	267.03	253.80	255.60	253.77	240.55
V(PR) 6	278.2	335.5	392.4	454.4	517.4
V(PR) 7	183.5	214.9	242.9	297.1	368.8
VTHETA PR6	-237.7	-300.0	-360.9	-425.0	-493.4
VTHETA PR7	-74.0	-138.4	-184.2	-236.6	-302.6
U 6	314.07	372.76	431.45	490.14	548.83
U 7	341.00	392.16	439.84	490.34	543.12
M 6	0.1468	0.1498	0.1519	0.1557	0.1484
M 7	0.2818	0.2697	0.2677	0.2766	0.2843
M(PR) 6	0.2498	0.3012	0.3523	0.4080	0.4645
M(PR) 7	0.1639	0.1917	0.2163	0.2642	0.3278
TURN(PR)	34.902	23.314	17.574	16.496	17.363
$\bar{\omega}$	0.1155	0.1767	0.2237	0.1828	0.2952
DFAC	.4896	.5302	.5672	.5740	.5710
EFFP	0.9570	0.9738	0.9182	0.9192	0.9442
EFF	0.9566	0.9735	0.9172	0.9181	0.9434
INCIDM	10.088	10.922	10.820	9.683	9.279
DEVM	4.978	7.590	7.239	4.185	2.216

Table B-3. Blade Element Data Cruise Configuration (Continued)

CONFIGURATION CRUISE $N/\sqrt{\theta}$ 3057. $\omega\sqrt{\theta}/\delta$ 91.0

50PERCENT SPEED PT.183

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	30.294	27.761	25.934	23.344	19.766
V 3	136.98	144.39	148.98	151.96	153.04
V 4	161.62	169.92	174.55	175.29	169.75
VZ 3	136.98	144.19	148.97	151.95	153.04
VZ 4	139.55	149.53	156.96	160.94	159.75
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	81.53	79.15	76.34	69.46	57.40
M 3	0.1229	0.1296	0.1337	0.1364	0.1373
M 4	0.1451	0.1526	0.1567	0.1574	0.1524
TURN	-30.29	-27.76	-25.93	-23.34	-19.77
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.125	0.101	0.086	0.076	0.078
EFFP	0.8113	0.9138	0.9518	1.0192	0.8198
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.706	6.539	6.566	7.556	9.234

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	55.417	53.779	56.684	51.936	44.303
BETA 10	30.112	27.115	26.771	26.090	25.488
V 9	310.97	300.43	301.69	311.94	320.18
V 10	164.18	209.83	214.29	249.14	267.63
VZ 9	173.44	176.23	165.10	192.13	229.13
VZ 10	140.32	185.07	190.53	223.50	241.58
V-THETA 9	256.02	242.37	252.11	245.60	223.63
V-THETA 10	82.37	95.64	96.52	109.57	115.17
M 9	0.2778	0.2682	0.2688	0.2777	0.2850
M 10	0.1459	0.1867	0.1903	0.2212	0.2377
TURN	25.304	26.664	29.914	25.847	18.815
$\bar{\omega}$	0.3494	0.1601	0.2183	0.1709	0.2132
DFAC	0.6789	0.4992	0.5145	0.4042	0.3264
EFFP	0.5491	0.7276	0.6442	0.5136	0.2465
INCIDM	5.517	7.679	12.984	8.936	-0.697
DEVM	12.812	8.615	8.271	8.090	8.388

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	27.538	25.927	24.771	22.128	18.562
BETA 7	56.129	55.046	57.528	53.850	46.384
BETA(PR) 6	57.021	61.408	65.257	67.925	70.811
BETA(PR) 7	23.084	39.692	48.937	52.878	55.645
V 6	170.59	177.51	179.39	182.96	179.18
V 7	317.16	300.73	299.22	306.90	311.24
VZ 6	151.22	159.48	162.84	169.47	169.85
VZ 7	175.64	172.10	160.56	181.01	214.70
V-THETA 6	78.87	77.61	75.16	68.92	57.04
V-THETA 7	263.34	246.49	252.44	247.81	225.33
V(PR) 6	277.8	333.3	389.1	450.9	516.8
V(PR) 7	192.1	223.9	244.6	300.0	380.5
VTHETA PR6	-233.1	-292.6	-353.3	-417.9	-488.0
VTHETA PR7	-75.3	-143.0	-184.4	-239.2	-314.1
U 6	311.92	370.22	428.50	486.79	545.09
U 7	338.67	389.49	436.84	487.00	539.42
M 6	0.1532	0.1594	0.1611	0.1643	0.1609
M 7	0.2834	0.2685	0.2666	0.2732	0.2769
M(PR) 6	0.2495	0.2993	0.3494	0.4050	0.4641
M(PR) 7	0.1717	0.1999	0.2179	0.2670	0.3385
TURN(PR)	33.930	21.691	16.314	15.046	15.166
$\bar{\omega}$	0.0739	0.1160	0.1554	0.1191	0.1890
DFAC	.4662	.5053	.5561	.5634	.5566
EFFP	0.9778	0.9974	0.9310	0.9431	1.0108
EFF	0.9776	0.9974	0.9302	0.9423	1.0110
INCIDM	8.421	8.908	9.157	8.325	7.611
DEVM	4.284	7.192	6.837	4.278	2.745

Table B-3. Blade Element Data Cruise Configuration (Continued)

50PERCENT SPEED PT.184 CONFIGURATION CRUISE $N/\sqrt{\theta}$ 3070. $\omega\sqrt{\theta}\ \delta$ 99.5

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	31.103	27.866	25.986	23.297	20.042
V 3	150.24	158.42	163.51	166.56	167.18
V 4	182.69	187.70	191.33	191.96	185.43
VZ 3	150.23	158.25	163.50	166.55	167.17
VZ 4	156.42	164.96	171.98	176.30	174.20
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	94.37	87.73	83.83	75.92	63.55
M 3	0.1348	0.1422	0.1468	0.1495	0.1501
M 4	0.1641	0.1686	0.1719	0.1725	0.1666
TURN	-31.10	-27.87	-25.99	-23.30	-20.04
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.106	0.096	0.088	0.076	0.081
EFFP	0.9519	0.9388	0.9562	1.0331	0.8428
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	4.897	6.434	6.514	7.603	8.958

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	52.076	50.185	52.887	47.584	42.618
BETA 10	28.701	27.234	26.871	26.096	25.802
V 9	324.66	312.41	310.52	318.29	320.11
V 10	223.65	230.12	232.57	265.21	279.23
VZ 9	195.98	198.59	186.81	214.58	235.56
VZ 10	194.57	202.85	206.77	238.02	251.38
V-THETA 9	256.10	239.97	247.63	234.98	216.75
V-THETA 10	107.41	105.31	105.12	116.66	121.54
M 9	0.2904	0.2792	0.2770	0.2838	0.2853
M 10	0.1992	0.2050	0.2068	0.2359	0.2484
TURN	23.375	22.951	26.017	21.487	16.815
$\bar{\omega}$	0.1736	0.1472	0.1810	0.1293	0.1423
DFAC	0.4788	0.4374	0.4508	0.3398	0.2704
EFFP	0.7140	0.7266	0.6186	0.5860	0.4492
INCIDM	2.176	4.085	9.187	4.584	-2.382
DEVM	11.401	8.734	8.371	8.096	8.702

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	28.321	25.924	24.637	21.976	19.119
BETA 7	53.397	51.466	54.188	49.450	44.136
BETA(PR) 6	52.616	58.285	62.648	65.741	69.347
BETA(PR) 7	21.230	37.198	46.248	50.999	55.242
V 6	192.63	196.58	197.96	201.02	193.14
V 7	328.79	311.65	308.48	312.97	313.02
VZ 6	169.54	176.65	179.91	186.41	182.49
VZ 7	195.02	193.99	180.43	203.44	224.65
V-THETA 6	91.38	85.94	82.53	75.23	63.26
V-THETA 7	263.95	243.79	250.16	237.81	217.98
V(PR) 6	279.2	336.1	391.6	453.7	517.4
V(PR) 7	210.3	243.7	261.0	323.3	394.0
VTHETA PR6	-221.9	-285.9	-347.8	-413.6	-484.1
VTHETA PR7	-76.2	-147.4	-188.5	-251.3	-323.7
U 6	313.25	371.79	430.33	488.86	547.40
U 7	340.11	391.15	438.70	489.07	541.71
M 6	0.1731	0.1766	0.1779	0.1807	0.1735
M 7	0.2942	0.2785	0.2751	0.2790	0.2789
M(PR) 6	0.2509	0.3020	0.3519	0.4077	0.4648
M(PR) 7	0.1882	0.2178	0.2328	0.2882	0.3519
TURN(PR)	31.380	21.065	16.397	14.741	14.105
$\bar{\omega}$	0.0361	0.0847	0.1063	0.0780	0.1059
DFAC	.4829	.4645	.5153	.4474	.3783
EFFP	0.9613	1.0014	0.9163	0.9701	1.0059
EFF	0.9610	1.0015	0.9154	0.9697	1.0060
INCIDM	4.016	+5.785	6.548	6.141	6.147
DEVM	2.430	4.698	4.148	2.399	2.342

Table B-3. Blade Element Data Cruise Configuration (Continued)

50PERCENT SPEED PT.185 | CONFIGURATION CRUISE | $N/\sqrt{\theta}$ 3062. | $\omega\sqrt{\theta}/\delta$ 106.2

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	30.713	27.731	25.678	23.433	19.829
V 3	160.31	169.17	174.77	178.06	178.96
V 4	194.81	202.34	204.18	204.69	197.58
VZ 3	160.30	169.00	174.76	178.05	178.95
VZ 4	167.48	178.05	184.01	187.81	185.86
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	99.50	94.15	88.47	81.40	67.02
M 3	0.1439	0.1519	0.1569	0.1599	0.1607
M 4	0.1750	0.1818	0.1835	0.1840	0.1775
TURN	-30.71	-27.73	-25.68	-23.43	-19.83
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.103	0.086	0.086	0.080	0.083
EFFP	0.8489	0.9378	0.9098	0.9789	0.7922
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.287	6.569	6.822	7.467	9.171

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	47.982	48.115	49.104	45.006	40.523
BETA 10	27.511	27.300	27.240	26.255	26.028
V 9	332.03	318.88	312.09	317.04	315.61
V 10	255.82	254.57	251.94	277.19	292.81
VZ 9	218.47	211.34	203.73	224.04	239.91
VZ 10	225.33	224.32	223.28	248.44	263.11
V-THETA 9	246.68	237.40	235.91	224.21	205.07
V-THETA 10	118.17	116.76	115.32	122.62	128.49
M 9	0.2974	0.2852	0.2787	0.2830	0.2815
M 10	0.2283	0.2270	0.2244	0.2470	0.2609
TURN	20.471	20.815	21.864	18.751	14.495
$\bar{\omega}$	0.1431	0.1410	0.1727	0.1203	0.1068
DFAC	0.3699	0.3538	0.3606	0.2748	0.1890
EFFP	0.7028	0.6642	0.5218	0.4702	0.2947
INCIDM	-1.918	2.015	5.404	2.006	-4.477
DEVM	10.211	8.800	8.740	8.255	8.928

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	27.817	25.760	24.332	22.182	18.692
BETA 7	49.454	49.474	50.438	46.655	42.413
BETA(PR) 6	49.863	55.647	60.604	64.055	67.877
BETA(PR) 7	21.446	35.844	45.294	50.697	55.665
V 6	206.18	211.76	211.52	213.79	205.98
V 7	334.13	317.30	309.35	311.54	307.80
VZ 6	182.31	190.56	192.71	197.96	195.11
VZ 7	216.17	206.02	196.96	213.82	227.25
V-THETA 6	96.21	92.03	87.15	80.72	66.01
V-THETA 7	253.90	241.18	238.49	226.56	207.60
V(PR) 6	282.8	337.8	392.6	452.5	518.1
V(PR) 7	233.4	254.3	280.1	337.6	402.9
VTHETA PR6	-216.2	-278.8	-342.1	-406.9	-480.0
VTHETA PR7	-85.3	-148.9	-199.1	-261.2	-332.7
U 6	312.44	370.82	429.21	487.59	545.98
U 7	339.22	390.13	437.56	487.79	540.30
M 6	0.1853	0.1904	0.1902	0.1922	0.1851
M 7	0.2993	0.2838	0.2763	0.2781	0.2745
M(PR) 6	0.2542	0.3037	0.3530	0.4068	0.4657
M(PR) 7	0.2090	0.2275	0.2501	0.3013	0.3593
TURN(PR)	28.411	19.781	15.306	13.357	12.213
$\bar{\omega}$	0.0143	0.0321	0.0629	0.0462	0.0745
DFAC	.3915	.4259	.4505	.3978	.3500
EFFP	0.9813	0.9821	0.9334	0.9823	0.9956
EFF	0.9812	0.9820	0.9327	0.9821	0.9956
INCIDM	1.263	3.147	4.504	4.455	4.677
DEVM	2.646	3.344	3.194	2.097	2.765

Table B-3. Blade Element Data Cruise Configuration (Continued)

50PERCENT SPEED PT.186 CONFIGURATION CRUISE $N/\sqrt{\theta}$ 3056. $\omega\sqrt{\theta}/\delta$ 114.7

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	30.554	27.842	26.059	23.698	22.190
V 3	178.12	187.18	192.02	193.01	185.99
V 4	209.38	213.44	213.86	216.12	227.54
VZ 3	178.11	186.84	192.01	193.00	185.98
VZ 4	180.28	187.90	191.81	197.40	210.42
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	106.44	99.68	93.95	86.86	85.94
M 3	0.1600	0.1681	0.1725	0.1734	0.1671
M 4	0.1882	0.1919	0.1923	0.1943	0.2047
TURN	-30.55	-27.84	-26.06	-23.70	-22.19
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.131	0.130	0.132	0.106	0.007
EFFP	0.9193	0.8754	0.8556	1.0065	0.9144
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.446	6.458	6.441	7.202	6.810

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	42.946	42.802	42.312	40.123	41.385
BETA 10	27.160	27.257	27.608	27.113	26.266
V 9	339.21	324.50	320.22	319.43	314.22
V 10	288.79	287.23	281.83	297.75	308.66
VZ 9	244.23	236.57	236.49	244.17	231.36
VZ 10	255.05	253.63	249.37	265.03	276.37
V-THETA 9	231.10	220.49	215.56	205.85	207.73
V-THETA 10	131.82	131.55	130.61	135.70	136.59
M 9	0.3043	0.2908	0.2866	0.2858	0.2808
M 10	0.2584	0.2569	0.2518	0.2661	0.2757
TURN	15.786	15.545	14.704	13.009	15.119
$\bar{\omega}$	0.1832	0.1193	0.1713	0.1020	0.1208
DFAC	0.2527	0.2238	0.2344	0.1701	0.1268
EFFP	0.4222	0.5146	0.3179	0.2278	-1.3793
INCIDM	-6.954	-3.298	-1.388	-2.877	-3.615
DEVM	9.860	8.757	9.108	9.112	9.166

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	27.652	25.675	24.405	22.428	21.945
BETA 7	44.651	44.424	43.792	41.488	43.175
BETA(PR) 6	46.790	53.470	58.733	62.361	64.718
BETA(PR) 7	22.668	35.948	44.008	50.165	55.965
V 6	221.70	224.48	224.11	226.77	233.11
V 7	338.59	319.71	314.32	311.99	305.69
VZ 6	196.27	202.11	203.89	209.52	216.22
VZ 7	239.44	227.93	226.61	233.57	222.81
V-THETA 6	102.89	97.26	92.60	86.52	87.12
V-THETA 7	237.96	223.79	217.53	206.68	209.14
V(PR) 6	286.7	339.7	392.9	451.7	506.3
V(PR) 7	261.0	282.0	315.5	364.8	398.3
VTHETA PR6	-208.9	-272.8	-335.8	-400.1	-457.8
VTHETA PR7	-100.6	-165.6	-219.2	-280.2	-330.1
U 6	311.82	370.09	428.36	486.64	544.91
U 7	338.56	389.36	436.70	486.84	539.24
M 6	0.1994	0.2019	0.2016	0.2040	0.2097
M 7	0.3037	0.2864	0.2813	0.2790	0.2730
M(PR) 6	0.2579	0.3055	0.3534	0.4063	0.4555
M(PR) 7	0.2342	0.2527	0.2823	0.3263	0.3558
TURN(PR)	24.106	17.495	14.700	12.185	8.754
$\bar{\omega}$	0.0398	0.0556	0.0452	0.0322	0.0650
DFAC	.2728	.3217	.3326	.3111	.3256
EFFP	1.0160	1.0083	0.9967	1.0137	1.0156
EFF	1.0161	1.0084	0.9967	1.0138	1.0158
INCIDM	-1.810	0.970	2.633	2.761	1.518
DEVM	3.868	3.448	1.908	1.565	3.065

Table B-3. Blade Element Data Cruise Configuration (Continued)

CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
50PERCENT SPEED PT.181 CRUISE	3080.	121.0

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	30.882	27.581	25.717	23.274	19.867
V 3	184.56	194.21	200.22	203.28	203.72
V 4	227.31	230.30	233.27	233.70	225.37
VZ 3	184.54	194.03	200.21	203.27	203.71
VZ 4	195.08	203.06	210.16	214.68	211.96
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	116.67	106.63	101.22	92.34	76.59
M 3	0.1658	0.1745	0.1799	0.1827	0.1831
M 4	0.2045	0.2072	0.2099	0.2103	0.2027
TURN	-30.88	-27.58	-25.72	-23.27	-19.87
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.092	0.092	0.089	0.078	0.081
EFFP	0.9056	0.8651	0.8825	0.9607	0.7777
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.118	6.719	6.783	7.626	9.133

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	41.352	40.131	39.949	37.712	35.045
BETA 10	27.858	27.618	27.788	26.995	27.104
V 9	353.36	332.97	324.07	322.93	312.80
V 10	318.75	313.64	303.24	315.74	319.75
VZ 9	260.94	253.03	248.00	255.44	256.06
VZ 10	280.19	276.05	267.78	281.30	284.58
V-THETA 9	233.46	214.61	208.09	197.53	179.61
V-THETA 10	148.95	145.40	141.37	143.31	145.68
M 9	0.3173	0.2987	0.2904	0.2892	0.2798
M 10	0.2857	0.2811	0.2715	0.2827	0.2861
TURN	13.494	12.514	12.161	10.718	7.940
$\bar{\omega}$	0.2217	0.1295	0.1729	0.0927	0.0692
DFAC	0.1812	0.1396	0.1525	0.1005	0.0309
EFFP	0.0097	-0.0626	-0.2452	-1.1556	1.8556
INCIDM	-8.548	-5.969	-3.751	-5.288	-9.955
DEVM	10.558	9.118	9.288	8.995	10.004

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	27.869	25.392	24.148	22.016	18.975
BETA 7	43.055	41.685	41.208	39.169	36.394
BETA(PR) 6	43.310	50.803	56.173	60.476	65.181
BETA(PR) 7	21.192	35.428	43.772	49.876	55.469
V 6	241.63	242.86	243.84	243.79	231.73
V 7	353.23	328.02	319.04	316.25	308.20
VZ 6	213.56	219.25	222.47	226.00	219.13
VZ 7	256.93	244.79	239.93	245.15	248.16
V-THETA 6	112.95	104.14	99.75	91.39	75.35
V-THETA 7	241.15	218.15	210.18	199.74	182.92
V(PR) 6	293.5	347.0	399.6	458.6	522.1
V(PR) 7	276.8	300.6	332.4	380.5	437.7
VTHETA PR6	-201.3	-268.9	-332.0	-399.1	-473.8
VTHETA PR7	-100.1	-174.3	-229.9	-290.9	-360.6
U 6	314.27	373.00	431.73	490.46	549.19
U 7	341.22	392.42	440.13	490.66	543.47
M 6	0.2175	0.2186	0.2195	0.2194	0.2085
M 7	0.3172	0.2942	0.2859	0.2831	0.2757
M(PR) 6	0.2642	0.3123	0.3597	0.4128	0.4697
M(PR) 7	0.2486	0.2696	0.2978	0.3406	0.3914
TURN(PR)	22.113	15.357	12.397	10.599	9.719
$\bar{\omega}$	0.0106	0.0469	0.0506	0.0446	0.0623
DFAC	.2282	.2686	.2864	.2758	.2576
EFFP	1.0078	1.0347	1.0092	1.0000	0.9659
EFF	1.0079	1.0349	1.0093	1.0000	0.9655
INCIDM	-5.290	-1.697	0.073	0.876	1.981
DEVM	2.392	2.928	1.672	1.276	2.562

Table B-3. Blade Element Data Cruise Configuration (Continued)

70 PERCENT SPEED PT. 168	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
	CRUISE	4240.	118.8

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	27.752	27.942	26.346	24.417	34.815
V 3	184.67	192.96	197.38	198.82	196.41
V 4	212.14	222.14	228.94	235.57	255.22
VZ 3	184.67	192.69	197.38	198.81	196.41
VZ 4	187.71	195.43	205.02	214.42	209.53
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	98.78	104.09	101.60	97.38	145.71
M 3	0.1659	0.1734	0.1774	0.1787	0.1765
M 4	0.1907	0.1998	0.2059	0.2120	0.2298
TURN	-27.75	-27.94	-26.35	-24.42	-34.81
$\bar{\omega}$	0.0481		0.0476		0.0420
DFAC	0.125	0.122	0.099	0.061	0.071
EFFP	0.9195	0.8930	0.9092	1.0001	0.9537
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	8.248	6.358	6.154	6.483	-5.815

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	57.059	56.334	55.120	53.905	61.280
BETA 10	37.892	26.491	25.119	25.604	23.217
V 9	405.26	404.65	414.88	431.61	475.93
V 10	139.20	253.06	295.86	332.72	355.65
VZ 9	216.29	223.08	236.91	254.27	228.56
VZ 10	107.54	224.73	267.26	299.99	326.79
V-THETA 9	340.11	336.79	340.35	348.76	417.38
V-THETA 10	85.50	112.88	125.59	143.79	140.20
M 9	0.3607	0.3597	0.3679	0.3818	0.4214
M 10	0.1225	0.2234	0.2610	0.2928	0.3125
TURN	19.166	29.843	30.001	28.301	38.063
$\bar{\omega}$	0.5982	0.3502	0.2426	0.2095	0.1604
DFAC	0.8908	0.5992	0.5126	0.4501	0.5307
EFFP	0.3561	0.4970	0.6198	0.5706	0.6810
INCIDM	7.159	10.234	11.420	10.905	16.280
DEVM	20.592	7.991	6.619	7.604	6.117

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	25.011	26.050	24.810	23.131	37.590
BETA 7	56.382	57.580	56.766	55.241	61.586
BETA(PR) 6	58.711	63.018	66.221	68.591	70.114
BETA(PR) 7	27.473	42.261	49.454	53.176	60.080
V 6	226.11	233.13	239.76	246.59	269.95
V 7	419.16	405.78	410.19	426.69	438.45
VZ 6	204.83	209.30	217.54	226.74	213.90
VZ 7	229.56	217.27	224.64	243.21	208.62
V-THETA 6	95.60	102.38	100.60	96.87	164.67
V-THETA 7	349.06	342.53	343.10	350.55	385.63
V(PR) 6	394.4	461.4	539.6	621.2	678.8
V(PR) 7	261.6	293.9	345.8	405.9	418.3
VTHETA PR6	-337.0	-411.1	-493.7	-578.3	-591.4
VTHETA PR7	-120.7	-197.7	-262.8	-324.9	-362.5
U 6	432.63	513.48	594.33	675.18	756.02
U 7	469.73	540.21	605.89	675.45	748.16
M 6	0.2034	0.2097	0.2158	0.2220	0.2432
M 7	0.3734	0.3607	0.3637	0.3774	0.3872
M(PR) 6	0.3548	0.4151	0.4856	0.5592	0.5666
M(PR) 7	0.2330	0.2613	0.3067	0.3590	0.3694
TURN(PR)	31.229	20.741	16.759	15.412	10.033
$\bar{\omega}$	0.1144	0.1253	0.2031	0.1658	-0.0184
DFAC	.5794	.5720	.5497	.5289	.4984
EFFP	0.9734	1.0011	0.9703	0.9423	0.9110
EFF	0.9729	1.0011	0.9696	0.9409	0.9086
INCIDM	10.111	10.518	10.121	8.991	6.914
DEVM	8.673	9.761	7.354	4.576	7.180

Table B-3. Blade Element Data Cruise Configuration (Continued)

70 PERCENT SPEED PT. 169	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
	CRUISE	4255.	125.

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	28.104	28.214	26.129	24.339	22.887
V 3	193.01	202.45	207.55	210.51	211.44
V 4	227.28	236.38	243.91	247.75	239.88
VZ 3	193.00	202.20	207.55	210.50	211.43
VZ 4	200.47	207.36	218.95	225.73	221.00
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	107.07	111.75	107.42	102.11	93.29
M 3	0.1734	0.1819	0.1866	0.1892	0.1901
M 4	0.2044	0.2127	0.2195	0.2230	0.2159
TURN	-28.10	-28.21	-26.13	-24.34	-22.89
$\bar{\omega}$	0.0559		0.0297		0.0470
DFAC	0.107	0.112	0.085	0.067	0.086
EFFP	0.8755	0.8710	0.8889	0.9645	0.8260
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	7.896	6.086	6.371	6.561	6.113

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	57.432	51.155	56.208	54.559	49.411
BETA 10	29.828	25.604	25.779	25.819	23.346
V 9	412.33	413.43	415.40	430.00	436.45
V 10	185.29	290.13	292.46	337.50	363.94
VZ 9	217.86	257.90	230.51	249.19	283.97
VZ 10	158.02	259.67	262.54	303.56	334.15
V-THETA 9	347.49	322.00	345.22	350.32	331.44
V-THETA 10	92.16	125.38	127.19	146.99	144.22
M 9	0.3671	0.3684	0.3684	0.3804	0.3858
M 10	0.1632	0.2575	0.2579	0.2970	0.3203
TURN	27.604	25.550	30.429	28.739	26.065
$\bar{\omega}$	0.4871	0.1942	0.2387	0.1844	0.1740
DFAC	0.7813	0.4907	0.5249	0.4351	0.3712
EFFP	0.4153	1.0757	0.6335	0.5565	0.4033
INCIDM	7.532	5.055	12.508	11.559	4.411
DEVM	12.528	7.104	7.279	7.819	6.246

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	25.479	26.108	24.920	23.289	21.775
BETA 7	57.453	52.476	57.514	56.204	51.807
BETA(PR) 6	56.659	61.041	65.017	67.742	70.630
BETA(PR) 7	26.653	40.527	49.592	54.049	58.066
V 6	240.94	249.95	251.95	256.71	251.85
V 7	423.54	412.64	412.39	424.18	422.28
VZ 6	217.45	224.28	228.44	235.77	233.88
VZ 7	226.08	251.08	221.37	235.91	261.10
V-THETA 6	103.65	110.00	106.16	101.49	93.43
V-THETA 7	357.02	327.26	347.86	352.50	331.88
V(PR) 6	395.7	463.3	540.9	622.5	705.2
V(PR) 7	254.9	330.7	341.7	401.9	493.6
VTHETA PR6	-330.5	-405.3	-490.3	-576.1	-665.3
VTHETA PR7	-114.4	-214.9	-260.2	-325.3	-418.9
U 6	434.16	515.30	596.43	677.56	758.70
U 7	471.39	542.13	608.03	677.84	750.81
M 6	0.2168	0.2250	0.2268	0.2312	0.2268
M 7	0.3773	0.3676	0.3657	0.3752	0.3729
M(PR) 6	0.3561	0.4171	0.4870	0.5605	0.6349
M(PR) 7	0.2271	0.2946	0.3030	0.3554	0.4359
TURN(PR)	29.999	20.497	15.420	13.691	12.564
$\bar{\omega}$	0.1112	0.0938	0.1518	0.1260	0.1661
DFAC	.5983	.4936	.5578	.5344	.4581
EFFP	0.9734	1.1008	0.9597	0.9376	0.9653
EFF	0.9729	1.1029	0.9588	0.9360	0.9644
INCIDM	8.059	8.541	8.917	8.142	7.430
DEVM	7.853	8.027	7.492	5.449	5.166

Table B-3. Blade Element Data Cruise Configuration (Continued)

	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
70 PERCENT SPEED PT. 170	CRUISE	4260.	131.

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	27.905	28.223	26.087	24.317	23.385
V 3	201.08	211.15	217.20	220.82	222.12
V 4	239.85	248.42	255.14	258.08	252.82
VZ 3	201.07	210.92	217.20	220.82	222.11
VZ 4	211.95	217.76	229.13	235.19	232.05
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	112.25	117.48	112.19	106.27	100.35
M 3	0.1807	0.1898	0.1953	0.1986	0.1998
M 4	0.2158	0.2236	0.2297	0.2324	0.2276
TURN	-27.90	-28.22	-26.09	-24.32	-23.39
$\bar{\omega}$	0.0499		0.0362		0.0460
DFAC	0.093	0.105	0.085	0.073	0.087
EFFP	0.9153	0.8863	0.9222	0.9919	0.8922
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	8.095	6.077	6.413	6.583	5.615

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	53.534	52.407	54.579	52.541	47.807
BETA 10	28.939	25.990	26.056	25.879	25.081
V 9	432.34	423.50	420.83	432.42	445.65
V 10	228.78	291.79	302.98	349.31	372.04
VZ 9	252.22	256.67	243.23	262.81	299.32
VZ 10	197.78	260.07	271.24	314.01	336.96
V-THETA 9	347.69	335.56	342.94	343.25	330.18
V-THETA 10	110.70	127.87	133.08	152.46	157.70
M 9	0.3855	0.3772	0.3735	0.3830	0.3946
M 10	0.2019	0.2581	0.2673	0.3079	0.3279
TURN	24.595	26.417	28.523	26.662	22.726
$\bar{\omega}$	0.3440	0.1928	0.1874	0.1207	0.1575
DFAC	0.6740	0.5096	0.4974	0.3975	0.3504
EFFP	0.5606	0.6823	0.6868	0.6695	0.4987
INCIDM	3.634	6.307	10.079	9.541	2.807
DEVM	11.639	7.490	7.556	7.879	7.981

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	25.238	26.307	24.834	23.171	22.345
BETA 7	54.041	53.696	55.887	54.311	49.976
BETA(PR) 6	54.798	59.745	63.786	66.709	69.501
BETA(PR) 7	23.765	38.801	48.354	53.268	56.845
V 6	254.45	260.72	263.89	268.24	266.15
V 7	441.90	423.39	417.36	425.76	429.48
VZ 6	230.11	233.53	239.44	246.59	246.16
VZ 7	257.77	250.45	233.95	248.35	276.20
V-THETA 6	108.49	115.54	110.83	105.55	101.18
V-THETA 7	357.69	341.20	345.54	345.80	328.88
V(PR) 6	399.2	463.6	542.1	623.6	702.9
V(PR) 7	283.5	321.7	352.2	415.3	505.0
VTHETA PR6	-326.2	-400.4	-486.3	-572.8	-658.4
VTHETA PR7	-114.3	-201.6	-263.2	-332.8	-422.8
U 6	434.67	515.90	597.13	678.36	759.59
U 7	471.94	542.76	608.75	678.64	751.69
M 6	0.2291	0.2348	0.2377	0.2417	0.2398
M 7	0.3943	0.3772	0.3705	0.3770	0.3799
M(PR) 6	0.3595	0.4175	0.4883	0.5619	0.6332
M(PR) 7	0.2530	0.2865	0.3127	0.3678	0.4467
TURN(PR)	31.027	20.924	15.428	13.440	12.656
$\bar{\omega}$	0.1034	0.0840	0.1029	0.0856	0.0874
DFAC	.5966	.5022	.5341	.5060	.4329
EFFP	0.9702	1.0394	0.9531	0.9429	0.9820
EFF	0.9696	1.0402	0.9521	0.9415	0.9815
INCIDM	6.198	7.245	7.086	7.109	6.301
DEVM	4.965	6.301	6.254	4.668	3.945

Table B-3. Blade Element Data Cruise Configuration (Continued)

70 PERCENT SPEED PT.171	CONFIGURATION CRUISE	$N/\sqrt{\theta}$ 4245.	$\omega\sqrt{\theta}/\delta$ 140.06

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	28.166	28.252	26.588	24.418	23.912
V 3	214.18	225.45	232.77	236.88	237.32
V 4	256.86	265.72	276.96	278.11	270.99
VZ 3	214.17	225.20	232.76	236.89	237.31
VZ 4	226.44	232.79	247.66	253.23	247.73
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	121.25	125.78	123.96	114.97	109.84
M 3	0.1926	0.2028	0.2094	0.2132	0.2135
M 4	0.2313	0.2394	0.2496	0.2507	0.2442
TURN	-28.17	-28.25	-26.59	-24.42	-23.91
$\bar{\omega}$	0.0460		0.0307		0.0320
DFAC	0.091	0.104	0.078	0.070	0.089
EFFP	0.8887	0.8867	1.0825	1.2081	1.0722
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	7.834	6.048	5.912	6.482	5.088

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	50.157	50.079	52.668	48.183	46.102
BETA 10	27.622	26.812	26.757	25.624	26.087
V 9	447.37	432.74	431.63	442.14	442.40
V 10	303.72	317.13	318.63	364.24	385.04
VZ 9	281.61	275.80	261.04	294.67	306.73
VZ 10	266.74	280.73	283.63	328.24	345.79
V-THETA 9	343.49	331.88	343.21	329.52	318.78
V-THETA 10	140.81	143.05	143.45	157.52	169.32
M 9	0.3997	0.3861	0.3838	0.3929	0.3926
M 10	0.2691	0.2811	0.2815	0.3221	0.3404
TURN	22.536	23.267	25.911	22.560	20.015
$\bar{\omega}$	0.1768	0.1283	0.1837	0.1146	0.1065
DFAC	0.4872	0.4434	0.4633	0.3572	0.2916
EFFP	0.7280	0.7807	0.6571	0.6727	0.6165
INCIDM	0.257	3.979	8.968	5.183	1.102
DEVM	10.322	8.312	8.257	7.624	8.987

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	25.436	26.298	25.162	23.174	23.225
BETA 7	51.330	51.357	54.049	49.756	47.488
BETA(PR) 6	52.067	57.383	61.277	64.516	68.146
BETA(PR) 7	22.410	37.118	45.866	50.870	55.638
V 6	272.78	278.96	286.55	291.09	281.83
V 7	452.88	431.43	428.81	434.21	434.12
VZ 6	246.28	249.89	259.31	267.59	258.99
VZ 7	281.44	269.16	251.64	280.49	293.35
V-THETA 6	117.16	123.59	121.84	114.55	111.14
V-THETA 7	353.59	336.97	347.13	331.43	320.00
V(PR) 6	400.7	463.7	539.6	621.9	695.8
V(PR) 7	306.1	337.9	361.5	444.5	519.7
VTHETA PR6	-316.0	-390.5	-473.2	-561.4	-645.8
VTHETA PR7	-116.7	-203.9	-259.5	-344.8	-429.0
U 6	433.14	514.09	595.03	675.97	756.91
U 7	470.28	540.85	606.61	676.25	749.04
M 6	0.2458	0.2515	0.2584	0.2625	0.2541
M 7	0.4048	0.3849	0.3813	0.3857	0.3851
M(PR) 6	0.3611	0.4180	0.4866	0.5609	0.6272
M(PR) 7	0.2736	0.3015	0.3215	0.3948	0.4610
TURN(PR)	29.650	20.245	15.407	13.645	12.508
$\bar{\omega}$	0.0686	0.0593	0.0706	0.0619	0.0257
DFAC	.1609	.1573	.5075	.4416	.3932
EFFP	0.9564	1.0084	0.9174	0.9701	0.9936
EFF	0.9557	1.0086	0.9158	0.9694	0.9934
INCIDM	3.467	4.883	5.177	4.916	4.946
DEVM	3.610	4.618	3.766	2.270	2.738

Table B-3. Blade Element Data Cruise Configuration (Continued)

70 PERCENT SPEED PT.173 CONFIGURATION CRUISE $N/\sqrt{\theta}$ 4260. $\omega\sqrt{\theta}/\delta$ 152.6

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	28.256	28.051	26.290	24.567	22.381
V 3	235.25	247.41	254.97	258.84	259.18
V 4	288.66	295.05	300.96	301.02	293.51
VZ 3	235.24	247.21	254.96	258.83	259.16
VZ 4	254.27	258.98	269.83	273.77	271.40
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	136.65	138.75	133.30	125.15	111.76
M 3	0.2117	0.2227	0.2296	0.2331	0.2334
M 4	0.2603	0.2662	0.2716	0.2716	0.2647
TURN	-28.26	-28.05	-26.29	-24.57	-22.38
$\bar{\omega}$	0.0482		0.0324		0.0410
DFAC	0.071	0.092	0.083	0.080	0.083
EFFP	0.9746	0.9142	0.9628	1.0073	0.9200
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	7.744	6.249	6.210	6.333	6.619

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	43.882	45.037	46.245	43.077	41.748
BETA 10	26.980	27.721	26.714	25.620	28.200
V 9	451.58	438.72	433.59	439.55	432.83
V 10	370.82	367.73	361.46	391.36	412.45
VZ 9	319.85	308.02	299.25	321.01	322.89
VZ 10	328.40	323.09	322.13	352.80	363.44
V-THETA 9	313.03	310.42	313.19	300.21	288.20
V-THETA 10	168.24	171.05	162.49	169.23	194.91
M 9	0.4050	0.3927	0.3871	0.3921	0.3852
M 10	0.3308	0.3277	0.3213	0.3480	0.3666
TURN	16.901	17.317	19.532	17.457	13.547
$\bar{\omega}$	0.1439	0.1413	0.1761	0.1299	0.0666
DFAC	0.2938	0.2888	0.3171	0.2483	0.1511
EFFP	0.6176	0.5893	0.4494	0.4366	0.4681
INCIDM	-6.018	-1.063	2.545	0.077	-3.252
DEVM	9.680	9.221	8.214	7.620	11.100

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	25.452	25.983	24.792	23.101	21.679
BETA 7	45.287	46.492	47.521	44.811	43.027
BETA(PR) 6	47.482	53.650	58.500	62.400	66.495
BETA(PR) 7	25.097	37.234	45.418	50.726	56.027
V 6	307.33	310.99	314.18	315.26	303.10
V 7	453.72	434.74	427.86	431.61	425.35
VZ 6	277.46	279.39	285.19	289.97	281.66
VZ 7	317.66	299.11	288.85	306.17	310.94
V-THETA 6	132.08	136.25	131.75	123.69	111.97
V-THETA 7	322.43	315.30	315.56	304.19	290.23
V(PR) 6	410.6	471.5	545.8	625.9	706.2
V(PR) 7	352.5	375.9	411.6	483.7	556.4
VTHETA PR6	-302.6	-379.7	-465.4	-554.7	-647.6
VTHETA PR7	-149.5	-227.5	-293.2	-374.4	-461.5
U 6	434.67	515.90	597.13	678.36	759.59
U 7	471.94	542.76	608.75	678.64	751.69
M 6	0.2774	0.2808	0.2837	0.2847	0.2735
M 7	0.4069	0.3891	0.3819	0.3848	0.3784
M(PR) 6	0.3706	0.4256	0.4928	0.5652	0.6373
M(PR) 7	0.3162	0.3364	0.3674	0.4313	0.4951
TURN(PR)	22.379	16.400	13.079	11.674	10.468
$\bar{\omega}$	0.0620	0.0388	0.0336	0.0399	0.0190
DFAC	.3209	.3575	.3895	.3559	.3298
EFFP	1.0677	1.1058	1.0342	1.0632	1.0336
EFF	1.0688	1.1076	1.0348	1.0645	1.0343
INCIDM	-1.118	1.150	2.400	2.800	3.295
DEVM	6.297	4.734	3.318	2.126	3.127

Table B-3. Blade Element Data Cruise Configuration (Continued)

CONFIGURATION $M/\sqrt{\theta}$ $\omega\sqrt{\theta}/\delta$

70 PERCENT SPEED PT. 167 CRUISE 4255. 166.

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	28.581	28.195	26.357	24.605	23.856
W 3	258.40	271.37	279.48	283.62	284.36
W 4	317.14	326.54	330.48	330.36	321.47
WZ 3	258.38	271.15	279.46	283.61	284.35
WZ 4	278.49	286.38	296.12	300.37	294.00
W-THETA 3	0.00	0.00	0.00	0.00	0.00
W-THETA 4	151.72	154.29	146.72	137.55	130.02
M 3	0.2327	0.2445	0.2519	0.2557	0.2564
M 4	0.2864	0.2950	0.2987	0.2985	0.2904
TURN	-28.58	-28.20	-26.36	-24.60	-23.86
$\bar{\omega}$	0.0518		0.0347		0.0110
DFAC	0.074	0.085	0.082	0.079	0.098
EFFP	0.9280	0.9062	0.9318	0.9880	0.8623
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	7.419	6.105	6.143	6.295	5.144

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	39.503	41.493	41.169	39.063	37.861
BETA 10	27.821	28.262	27.647	25.978	25.576
W 9	489.66	453.47	448.87	447.92	450.25
W 10	447.99	431.74	417.95	432.50	444.04
WZ 9	371.73	337.64	337.26	347.72	355.45
WZ 10	393.62	377.72	369.46	388.71	400.48
W-THETA 9	311.48	300.44	295.48	282.27	276.34
W-THETA 10	209.09	204.43	193.94	189.44	191.70
M 9	0.4410	0.4073	0.4025	0.4012	0.4026
M 10	0.4022	0.3872	0.3740	0.3870	0.3968
TURN	11.681	13.231	13.522	13.086	12.284
$\bar{\omega}$	0.2077	0.1343	0.1954	0.1245	0.1345
DFAC	0.1568	0.1309	0.1661	0.1309	0.1046
EFFP	-0.2006	-0.3292	-0.2854	-0.9187	-3.2708
INCIDM	-10.397	-4.607	-2.531	-3.937	-7.139
DEVM	10.521	9.762	9.147	7.970	8.176

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	25.478	26.157	24.974	23.370	23.131
BETA 7	40.860	43.086	42.364	40.566	39.832
BETA(PR) 6	43.065	49.766	55.277	59.697	63.988
BETA(PR) 7	22.134	35.930	43.635	49.861	54.388
W 6	340.85	343.27	344.74	344.41	333.15
W 7	490.09	447.17	441.14	436.98	438.37
WZ 6	307.66	307.95	312.47	316.15	306.37
WZ 7	368.90	326.37	325.84	331.92	336.63
W-THETA 6	146.62	151.32	145.55	136.62	130.88
W-THETA 7	320.62	305.46	297.26	284.18	280.80
W(PR) 6	421.1	476.9	548.6	626.6	698.6
W(PR) 7	400.1	403.3	450.4	514.9	578.1
WTHETA PR6	-287.5	-364.0	-450.9	-540.9	-627.8
WTHETA PR7	-150.8	-236.7	-310.8	-393.7	-470.0
U 6	434.16	515.30	596.43	677.56	758.70
U 7	471.39	542.13	608.03	677.84	750.81
M 6	0.3082	0.3104	0.3118	0.3115	0.3011
M 7	0.4414	0.4014	0.3954	0.3911	0.3917
M(PR) 6	0.3808	0.4313	0.4962	0.5667	0.6314
M(PR) 7	0.3604	0.3621	0.4036	0.4609	0.5166
TURN(PR)	20.926	13.821	11.639	9.835	9.600
$\bar{\omega}$	0.0600	0.0550	0.0413	0.0216	-0.0228
DFAC	.2115	.2874	.3038	.2834	.272
EFFP	1.0589	1.0385	1.0328	1.0404	1.0211
EFF	1.0598	1.0391	1.0333	1.0411	1.0215
INCIDM	-5.535	-2.734	-0.823	0.097	0.788
DEVM	3.334	3.430	1.535	1.261	1.488

Table B-3. Blade Element Data Cruise Configuration (Continued)

80PERCENT SPEED PT.175 | CONFIGURATION CRUISE | $N/\sqrt{\theta}$ 4810. | $\omega\sqrt{\theta}/\delta$ 138.0

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	30.178	27.880	26.088	23.381	20.275
V 3	212.16	222.91	229.13	232.97	234.08
V 4	245.99	258.51	269.00	273.09	266.24
VZ 3	212.15	222.54	229.12	232.96	234.07
VZ 4	212.62	227.36	241.52	250.65	249.75
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	123.66	120.88	118.29	108.37	92.26
M 3	0.1907	0.2005	0.2061	0.2096	0.2106
M 4	0.2214	0.2328	0.2424	0.2461	0.2399
TURN	-30.18	-27.88	-26.09	-23.38	-20.28
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.139	0.115	0.086	0.061	0.059
EFFP	0.8606	0.8844	0.9345	0.9926	0.8707
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.822	6.420	6.412	7.519	8.725

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	60.417	55.432	57.408	53.796	47.454
BETA 10	37.741	26.327	25.407	25.791	21.343
V 9	461.79	462.78	467.38	486.77	500.75
V 10	143.68	275.69	346.45	383.11	412.24
VZ 9	223.88	260.78	250.99	287.32	338.60
VZ 10	111.28	244.73	311.68	344.62	383.96
V-THETA 9	401.59	381.08	393.78	392.78	368.92
V-THETA 10	87.94	122.27	148.64	166.69	150.03
M 9	0.4101	0.4107	0.4129	0.4289	0.4407
M 10	0.1257	0.2422	0.3044	0.3355	0.3606
TURN	22.676	29.104	32.001	28.005	26.110
$\bar{\omega}$	0.6653	0.4558	0.2493	0.2496	0.2452
DFAC	0.9428	0.6315	0.4874	0.4291	0.3856
EFFP	0.2665	0.3138	0.5901	0.3639	0.1756
INCIDM	10.517	9.332	13.708	10.796	2.454
DEVM	20.441	7.827	6.907	7.791	4.243

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	27.554	25.936	24.739	22.059	19.054
BETA 7	59.644	56.627	58.925	55.652	49.924
BETA(PR) 6	58.253	62.265	65.565	68.036	70.907
BETA(PR) 7	26.477	41.400	50.406	53.906	56.830
V 6	259.01	271.45	278.99	286.51	280.55
V 7	478.08	464.25	464.25	479.05	484.95
VZ 6	229.54	243.85	253.29	265.50	265.17
VZ 7	239.22	255.02	239.43	270.22	312.21
V-THETA 6	119.81	118.72	116.75	107.60	91.59
V-THETA 7	412.54	387.69	397.63	395.52	371.08
V(PR) 6	436.3	524.1	612.4	709.9	810.7
V(PR) 7	269.9	340.5	376.0	458.8	570.6
VTHETA PR6	-371.0	-463.8	-557.5	-658.3	-766.1
VTHETA PR7	-120.3	-225.1	-289.7	-370.7	-477.7
U 6	490.79	582.51	674.23	765.94	857.66
U 7	532.87	612.84	687.34	766.26	848.74
M 6	0.2333	0.2446	0.2515	0.2583	0.2529
M 7	0.4251	0.4120	0.4102	0.4220	0.4264
M(PR) 6	0.3929	0.4723	0.5520	0.6401	0.7308
M(PR) 7	0.2400	0.3021	0.3322	0.4042	0.5017
TURN(PR)	31.767	20.841	15.151	14.128	14.077
$\bar{\omega}$	0.0103	0.1035	0.1687	0.1511	0.2420
DFAC	.6353	.5565	.5805	.5348	.4574
EFFP	0.9947	1.0549	0.9665	0.9594	0.9798
EFF	0.9946	1.0564	0.9655	0.9581	0.9791
INCIDM	9.653	9.765	9.465	8.436	7.707
DEVM	7.677	8.900	8.306	5.306	3.930

Table B-3. Blade Element Data Cruise Configuration (Continued)

	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
80PERCENT SPEED PT.177	CRUISE	4820.	147.5

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	30.299	27.744	26.072	23.137	21.434
V 3	228.14	240.02	246.95	250.46	247.07
V 4	266.98	276.09	282.36	286.16	297.29
VZ 3	228.14	239.59	246.94	250.45	247.06
VZ 4	230.48	243.09	253.43	262.91	276.63
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	134.70	128.52	124.09	112.44	108.64
M 3	0.2052	0.2160	0.2223	0.2255	0.2224
M 4	0.2405	0.2488	0.2546	0.2580	0.2682
TURN	-30.30	-27.74	-26.07	-23.14	-21.43
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.132	0.121	0.109	0.083	0.016
EFFP	0.9113	0.8911	0.9012	0.9676	0.9257
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.701	6.556	6.428	7.763	7.566

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	56.443	53.726	55.523	52.642	49.095
BETA 10	30.201	25.654	26.018	25.775	24.436
V 9	482.17	476.26	480.42	491.76	504.79
V 10	214.20	328.88	339.01	393.41	425.00
VZ 9	261.56	279.60	271.16	298.36	328.67
VZ 10	182.34	293.62	303.51	354.04	386.80
V-THETA 9	401.81	383.96	396.04	390.88	381.51
V-THETA 10	107.75	142.38	148.71	171.07	175.81
M 9	0.4291	0.4231	0.4250	0.4337	0.4448
M 10	0.1879	0.2897	0.2975	0.3448	0.3723
TURN	26.243	28.072	29.505	26.867	24.658
$\bar{\omega}$	0.4783	0.1884	0.2250	0.1543	0.1957
DFAC	0.7828	0.5150	0.5188	0.4080	0.3530
EFFP	0.4739	0.7058	0.6581	0.5952	0.3437
INCIDM	6.543	7.626	11.823	9.642	4.095
DEVM	12.901	7.154	7.518	7.275	7.336

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	27.653	25.837	24.631	21.802	20.281
BETA 7	56.570	55.141	56.926	54.527	51.093
BETA(PR) 6	55.491	60.419	64.290	66.962	68.513
BETA(PR) 7	23.869	39.393	48.040	53.035	56.822
V 6	280.73	289.00	293.31	300.52	314.88
V 7	495.19	476.08	476.69	484.30	489.15
VZ 6	248.55	259.85	266.45	278.94	295.36
VZ 7	270.51	271.65	259.85	280.91	307.13
V-THETA 6	130.29	125.95	122.24	111.61	109.14
V-THETA 7	413.27	390.66	399.45	394.41	380.64
V(PR) 6	438.8	526.5	614.3	712.8	806.3
V(PR) 7	298.3	352.1	389.1	467.4	561.4
VTHETA PR6	-361.5	-457.8	-553.4	-655.9	-750.3
VTHETA PR7	-120.7	-223.5	-289.3	-373.4	-469.9
U 6	491.81	583.72	675.63	767.53	859.44
U 7	533.98	614.11	688.77	767.85	850.50
M 6	0.2531	0.2606	0.2646	0.2712	0.2843
M 7	0.4412	0.4230	0.4217	0.4270	0.4305
M(PR) 6	0.3956	0.4748	0.5541	0.6432	0.7281
M(PR) 7	0.2658	0.3128	0.3442	0.4121	0.4941
TURN(PR)	31.610	21.001	16.234	13.920	11.691
$\bar{\omega}$	-0.0069	0.0694	0.1172	0.1070	0.1606
DFAC	.5652	.5336	.5580	.5214	.4631
EFFP	0.9859	1.0125	0.9422	0.9394	0.9713
EFF	0.9855	1.0128	0.9406	0.9375	0.9703
INCIDM	6.891	7.919	8.190	7.362	5.313
DEVM	5.069	6.893	5.940	4.435	3.922

Table B-3. Blade Element Data Cruise Configuration (Continued)

CONFIGURATION: CRUISE — $N/\sqrt{\theta}$: 4804. — $\omega\sqrt{\theta}/\delta$: 157.9

80PERCENT SPEED PT.178

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	30.897	27.828	26.109	23.333	18.815
V 3	243.56	256.10	263.74	268.37	269.70
V 4	296.61	301.03	307.24	309.55	304.39
VZ 3	243.55	255.80	263.74	268.36	269.69
VZ 4	254.51	264.78	275.85	284.21	288.12
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	152.31	140.52	135.21	122.60	98.17
M 3	0.2192	0.2306	0.2376	0.2418	0.2430
M 4	0.2676	0.2716	0.2773	0.2794	0.2747
TURN	-30.90	-27.83	-26.11	-23.33	-18.82
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.103	0.103	0.093	0.076	0.053
EFFP	0.9134	0.8416	0.8447	0.9286	0.8634
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.103	6.472	6.391	7.567	10.185

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	53.383	50.694	53.417	49.003	41.684
BETA 10	27.931	26.422	26.224	25.541	26.223
V 9	511.98	495.12	498.25	513.31	509.15
V 10	294.95	349.24	360.76	409.96	435.48
VZ 9	299.77	311.48	296.20	336.65	380.18
VZ 10	257.79	310.15	322.70	369.77	390.59
V-THETA 9	410.93	383.11	400.09	387.42	338.60
V-THETA 10	138.15	155.40	159.41	176.76	192.43
M 9	0.4570	0.4410	0.4417	0.4543	0.4495
M 10	0.2597	0.3082	0.3171	0.3603	0.3824
TURN	25.452	24.272	27.193	23.462	15.461
$\bar{\omega}$	0.2718	0.1197	0.1465	0.1027	0.1292
DFAC	0.6210	0.4806	0.4864	0.3923	0.2825
EFFP	0.6733	0.8138	0.7808	0.7558	0.7778
INCIDM	3.483	4.594	9.717	6.003	-3.316
DEVM	10.631	7.922	7.724	7.541	9.123

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	28.114	25.786	24.581	21.892	17.477
BETA 7	54.156	52.080	54.813	50.932	44.227
BETA(PR) 6	51.128	57.318	61.705	64.819	68.373
BETA(PR) 7	19.655	36.233	44.789	49.724	53.567
V 6	313.19	316.64	319.93	326.05	316.54
V 7	521.90	493.93	494.13	503.42	508.11
VZ 6	276.16	284.87	290.86	302.51	301.92
VZ 7	303.70	303.23	284.55	317.19	364.08
V-THETA 6	147.58	137.74	133.09	121.57	95.06
V-THETA 7	423.06	389.64	403.84	390.86	354.41
V(PR) 6	440.1	527.7	613.7	711.0	819.2
V(PR) 7	324.5	376.3	401.2	490.8	613.1
VTHETA PR6	-342.6	-444.0	-540.3	-643.4	-761.5
VTHETA PR7	-109.2	-222.4	-282.6	-374.4	-493.3
U 6	490.18	581.78	673.39	764.99	856.59
U 7	532.21	612.07	686.49	765.30	847.68
M 6	0.2828	0.2859	0.2890	0.2946	0.2858
M 7	0.4662	0.4400	0.4381	0.4453	0.4486
M(PR) 6	0.3974	0.4765	0.5542	0.6424	0.7398
M(PR) 7	0.2899	0.3352	0.3557	0.4341	0.5413
TURN(PR)	31.466	21.063	16.910	15.093	14.806
$\bar{\omega}$	0.0068	0.0462	0.0862	0.0697	0.1274
DFAC	.5019	.4796	.5336	.4788	.3996
EFFP	0.9496	1.0096	0.9241	0.9497	0.9720
EFF	0.9484	1.0099	0.9221	0.9481	0.9710
INCIDM	2.528	11.218	5.605	5.219	5.173
DEVM	0.855	3.733	2.689	1.124	0.667

Table B-3. Blade Element Data Cruise Configuration (Continued)

	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
80PERCENT SPEED PT.179	CRUISE	4842.	166.1

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	30.527	27.592	25.825	23.415	19.640
V 3	255.08	269.45	278.54	284.09	285.32
V 4	313.56	322.38	327.52	329.95	317.04
VZ 3	255.07	269.16	278.53	284.08	285.31
VZ 4	270.09	283.99	294.81	302.78	298.60
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	159.27	149.32	142.67	131.12	106.56
M 3	0.2297	0.2428	0.2511	0.2561	0.2573
M 4	0.2831	0.2912	0.2959	0.2982	0.2863
TURN	-30.53	-27.59	-25.82	-23.41	-19.64
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.091	0.084	0.082	0.070	0.075
EFFP	0.8932	0.8930	0.8907	0.9843	0.7083
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.473	6.708	6.675	7.485	9.360

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	49.553	48.400	51.389	46.976	40.050
BETA 10	27.500	27.129	27.202	25.853	26.501
V 9	518.19	500.40	494.43	504.97	506.47
V 10	373.41	382.24	374.88	423.37	453.97
VZ 9	330.13	329.68	307.56	344.34	387.66
VZ 10	328.74	337.16	332.26	380.74	406.25
V-THETA 9	394.35	374.20	386.34	369.16	325.89
V-THETA 10	172.42	174.30	171.37	184.62	202.57
M 9	0.4636	0.4466	0.4391	0.4479	0.4487
M 10	0.3307	0.3384	0.3303	0.3734	0.4006
TURN	22.053	21.271	24.187	21.123	13.549
$\bar{\omega}$	0.1543	0.1209	0.1866	0.1299	0.1163
DFAC	0.4358	0.3971	0.4310	0.3316	0.2208
EFFP	0.7342	0.7638	0.6009	0.5815	0.5549
INCIDM	-0.347	2.300	7.689	3.976	-4.950
DEVM	10.200	8.629	8.702	7.853	9.401

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	27.767	25.601	24.407	22.037	18.435
BETA 7	51.010	49.730	52.719	48.934	42.843
BETA(PR) 6	49.290	55.283	60.124	63.421	67.401
BETA(PR) 7	21.507	36.358	45.415	50.728	54.835
V 6	330.69	338.44	339.68	346.09	332.65
V 7	523.24	497.98	490.64	495.30	496.52
VZ 6	292.55	304.96	309.27	320.79	315.58
VZ 7	327.56	321.61	297.05	325.33	364.05
V-THETA 6	154.06	146.24	140.36	129.86	105.20
V-THETA 7	406.69	379.97	390.39	373.43	337.63
V(PR) 6	448.6	535.6	620.9	717.0	821.2
V(PR) 7	353.9	399.7	423.4	514.0	632.1
VTHETA PR6	-340.0	-440.1	-538.4	-641.2	-758.2
VTHETA PR7	-129.7	-236.9	-301.5	-397.9	-516.8
U 6	494.06	586.39	678.71	771.04	863.36
U 7	536.42	616.91	691.92	771.35	854.38
M 6	0.2989	0.3060	0.3071	0.3130	0.3007
M 7	0.4683	0.4444	0.4357	0.4391	0.4396
M(PR) 6	0.4054	0.4842	0.5614	0.6485	0.7422
M(PR) 7	0.3167	0.3567	0.3760	0.4557	0.5596
TURN(PR)	27.777	18.903	14.705	12.692	12.566
$\bar{\omega}$	0.0004	0.0119	0.0613	0.0390	0.0780
DFAC	.4276	.4305	.4893	.4348	.3625
EFFP	0.9878	1.0215	0.9250	0.9690	1.0229
EFF	0.9876	1.0220	0.9231	0.9681	1.0237
INCIDM	0.690	2.783	4.024	3.821	4.201
DEVM	2.707	3.858	3.315	2.128	1.935

Table B-3. Blade Element Data Cruise Configuration (Continued)

80PERCENT SPEED PT.180 CONFIGURATION CRUISE $N/\sqrt{\theta}$ 4829. $\omega\sqrt{\theta}/\delta$ 176.4

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	31.087	27.876	26.439	23.559	18.269
V 3	273.48	288.16	297.40	302.65	303.80
V 4	338.39	344.86	349.41	349.06	339.23
VZ 3	273.46	287.87	297.39	302.64	303.79
VZ 4	289.79	303.12	312.85	319.96	322.13
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	174.72	161.24	155.58	139.52	106.34
M 3	0.2465	0.2599	0.2683	0.2731	0.2742
M 4	0.3059	0.3119	0.3161	0.3158	0.3067
TURN	-31.09	-27.88	-26.44	-23.56	-18.27
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.090	0.087	0.088	0.078	0.058
EFFP	0.9295	0.8987	0.9070	0.9738	0.8301
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	4.913	6.424	6.061	7.341	10.731

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	45.705	44.970	46.361	42.338	34.912
BETA 10	27.287	27.968	27.310	26.002	26.490
V 9	530.01	510.93	502.48	510.84	504.32
V 10	430.50	425.05	420.90	451.19	473.12
VZ 9	363.72	358.93	345.96	377.54	413.48
VZ 10	380.08	372.46	373.06	405.44	423.35
V-THETA 9	379.35	361.09	363.65	344.05	288.63
V-THETA 10	197.36	199.34	193.11	197.80	211.03
M 9	0.4759	0.4575	0.4483	0.4553	0.4482
M 10	0.3836	0.3782	0.3733	0.4003	0.4196
TURN	18.418	17.002	19.051	16.336	8.421
$\bar{\omega}$	0.1506	0.1580	0.1788	0.1384	0.1438
DFAC	0.3113	0.2946	0.3095	0.2500	0.1364
EFFP	0.6386	0.5770	0.4672	0.4186	0.4082
INCIDM	-4.195	-1.130	2.661	-0.662	-10.088
DEVM	9.987	9.468	8.810	8.002	9.390

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	28.125	25.729	24.765	22.079	16.911
BETA 7	47.239	46.407	47.901	44.117	37.246
BETA(PR) 6	45.650	52.564	57.677	61.612	66.129
BETA(PR) 7	21.679	35.437	44.154	49.655	53.773
V 6	358.77	363.24	365.15	367.84	351.05
V 7	532.81	506.41	495.42	499.10	503.65
VZ 6	316.34	326.98	331.51	340.84	335.87
VZ 7	359.98	348.89	331.97	358.25	400.91
V-THETA 6	169.12	157.69	152.96	138.27	102.11
V-THETA 7	391.18	366.77	367.59	347.44	304.83
V(PR) 6	452.6	538.1	620.0	716.9	829.9
V(PR) 7	389.3	428.6	462.9	553.5	678.4
VTHETA PR6	-323.6	-427.1	-523.9	-630.7	-758.9
VTHETA PR7	-143.8	-248.5	-322.5	-421.8	-547.3
U 6	492.73	584.81	676.89	768.97	861.05
U 7	534.98	615.26	690.06	769.28	852.09
M 6	0.3247	0.3289	0.3306	0.3331	0.3176
M 7	0.4785	0.4533	0.4418	0.4445	0.4477
M(PR) 6	0.4097	0.4872	0.5614	0.6493	0.7509
M(PR) 7	0.3496	0.3836	0.4129	0.4929	0.6030
TURN(PR)	23.966	17.107	13.518	11.956	12.355
$\bar{\omega}$	-0.0165	0.0134	0.0307	0.0267	0.0855
DFAC	.3306	.3618	.4010	.3582	.2134
EFFP	1.0057	1.0419	0.9748	1.0125	1.0336
EFF	1.0058	1.0429	0.9742	1.0128	1.0346
INCIDM	-2.950	0.064	1.577	2.012	2.928
DEVM	2.879	2.937	2.054	1.055	0.873

Table B-3. Blade Element Data Cruise Configuration (Continued)

80PERCENT SPEED PT.174 | CONFIGURATION CRUISE | $N/\sqrt{\theta}$ 4850. | $\omega\sqrt{\theta}/\delta$ 189.0

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	31.109	27.957	26.242	23.706	19.921
V 3	295.40	310.87	320.48	325.73	326.80
V 4	369.11	373.79	375.61	376.99	368.23
VZ 3	295.38	310.58	320.46	325.72	326.78
VZ 4	316.03	328.41	336.87	345.16	346.20
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	190.71	175.24	166.08	151.56	125.46
M 3	0.2665	0.2806	0.2895	0.2943	0.2953
M 4	0.3343	0.3386	0.3403	0.3416	0.3335
TURN	-31.11	-27.96	-26.24	-23.71	-19.92
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.081	0.083	0.089	0.076	0.065
EFFP	0.9360	0.8949	0.8631	0.9615	0.8679
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	4.891	6.343	6.258	7.194	9.079

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	41.238	40.419	40.238	37.721	32.394
BETA 10	28.342	28.414	27.665	26.431	26.566
V 9	552.29	521.05	513.60	514.38	502.56
V 10	501.71	490.39	480.11	496.66	504.42
VZ 9	408.32	394.11	391.34	406.83	424.26
VZ 10	438.91	428.24	424.42	444.70	451.04
V-THETA 9	364.06	337.83	331.77	314.71	269.24
V-THETA 10	238.18	233.34	222.91	221.07	225.59
M 9	0.4981	0.4686	0.4608	0.4608	0.4488
M 10	0.4505	0.4400	0.4296	0.4443	0.4506
TURN	12.896	12.005	12.574	11.290	5.829
$\bar{\omega}$	0.2215	0.1491	0.1817	0.1224	0.1493
DFAC	0.1704	0.1373	0.1561	0.1192	0.0391
EFFP	-0.0368	-0.1641	-0.2726	-0.7171	5.4352
INCIDM	-8.662	-5.681	-3.462	-5.279	-12.606
DEVM	11.042	9.914	9.165	8.431	9.466

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	28.035	25.712	24.478	22.189	18.693
BETA 7	42.882	42.004	41.703	39.425	34.799
BETA(PR) 6	41.826	49.459	55.156	59.448	64.188
BETA(PR) 7	21.703	35.757	43.628	49.526	53.909
V 6	392.83	395.12	394.92	396.82	379.48
V 7	552.70	513.12	503.33	501.60	504.26
VZ 6	346.67	355.76	359.36	367.41	359.45
VZ 7	403.07	380.99	375.60	387.39	414.06
V-THETA 6	184.64	171.42	163.63	149.87	121.62
V-THETA 7	376.11	343.37	334.85	318.55	287.78
V(PR) 6	465.3	547.5	629.0	722.8	825.5
V(PR) 7	435.9	469.9	519.2	596.9	702.9
VTHETA PR6	-310.2	-415.9	-516.2	-622.4	-743.2
VTHETA PR7	-161.2	-274.6	-358.2	-454.1	-568.9
U 6	494.88	587.35	679.83	772.31	864.79
U 7	537.31	617.93	698.06	772.63	855.80
M 6	0.3563	0.3584	0.3583	0.3600	0.3439
M 7	0.4985	0.4612	0.4513	0.4490	0.4575
M(PR) 6	0.4220	0.4967	0.5706	0.6558	0.7482
M(PR) 7	0.3931	0.4223	0.4655	0.5343	0.6280
TURN(PR)	20.117	13.683	11.523	9.920	10.279
$\bar{\omega}$	-0.0125	0.0519	0.0368	0.0347	0.0552
DFAC	.2256	.2711	.2912	.2783	.2423
EFFP	1.0361	1.0653	1.0465	1.0370	1.0329
EFF	1.0367	1.0665	1.0474	1.0378	1.0337
INCIDM	-6.774	-3.041	-0.944	-0.152	0.988
DEVM	2.903	3.257	1.528	0.926	0.109

Table B-3. Blade Element Data Cruise Configuration (Continued)

CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
100 PERCENT SPEED PT.190 CRUISE	6045.	175.8

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	30.744	27.379	25.585	24.033	26.982
V 3	283.24	295.68	300.90	300.86	288.29
V 4	314.38	326.61	338.53	345.82	373.29
VZ 3	283.23	294.90	300.89	300.85	288.28
VZ 4	270.04	288.81	304.31	314.63	332.08
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	160.71	150.20	146.20	140.84	169.36
M 3	0.2554	0.2667	0.2715	0.2715	0.2600
M 4	0.2839	0.2951	0.3061	0.3128	0.3382
TURN	-30.74	-27.38	-25.59	-24.03	-26.98
$\bar{\omega}$	0.0666		0.0285		0.0320
DFAC	0.181	0.153	0.119	0.086	-0.001
EFFP	0.8377	0.8431	0.9111	0.9778	0.9833
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.256	6.921	6.915	6.867	2.018

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	58.853	54.755	57.399	54.422	58.728
BETA 10	41.794	26.575	25.489	26.099	26.332
V 9	580.51	582.02	580.99	614.28	612.30
V 10	178.60	356.26	422.91	468.15	519.26
VZ 9	295.64	334.18	312.63	357.29	311.41
VZ 10	130.08	316.39	380.94	420.37	464.75
V-THETA 9	496.83	475.33	489.46	499.61	523.34
V-THETA 10	119.03	159.38	181.99	205.95	230.33
M 9	0.5137	0.5140	0.5094	0.5365	0.5323
M 10	0.1545	0.3100	0.3676	0.4047	0.4479
TURN	17.059	28.180	31.911	28.323	32.396
$\bar{\omega}$	0.7783	0.4749	0.2650	0.2829	0.2006
DFAC	0.9353	0.6082	0.5029	0.4603	0.3808
EFFP	0.2389	0.3469	0.6490	0.3931	0.2901
INCIDM	8.953	8.655	13.699	11.422	13.728
DEVM	24.494	8.075	6.989	8.099	9.232

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	27.708	25.276	24.255	22.746	25.909
BETA 7	57.996	55.998	59.161	55.867	61.340
BETA(PR) 6	57.269	61.892	65.419	67.791	68.937
BETA(PR) 7	26.820	41.480	51.549	53.799	62.303
V 6	334.99	345.76	352.93	364.09	388.77
V 7	600.11	581.96	574.27	604.00	595.53
VZ 6	296.34	312.17	321.28	335.53	349.70
VZ 7	313.81	324.59	293.87	338.64	285.37
V-THETA 6	155.76	147.63	144.98	140.77	169.87
V-THETA 7	508.90	482.46	493.07	499.95	522.57
V(PR) 6	548.2	662.8	772.6	887.8	973.0
V(PR) 7	356.4	434.4	473.4	573.8	614.5
VTHETA PR6	-461.1	-584.4	-702.4	-821.8	-908.0
VTHETA PR7	-160.8	-287.7	-370.7	-463.0	-544.1
U 6	616.81	732.07	847.34	962.60	1077.87
U 7	669.69	770.19	863.82	963.00	1066.66
M 6	0.3028	0.3127	0.3193	0.3297	0.3525
M 7	0.5320	0.5139	0.5035	0.5274	0.5171
M(PR) 6	0.4955	0.5995	0.6990	0.8038	0.8823
M(PR) 7	0.3160	0.3836	0.4150	0.5010	0.5336
TURN(PR)	30.429	20.374	13.836	13.977	6.634
$\bar{\omega}$	-0.0259	0.0731	0.1501	0.1505	0.1610
DFAC	.5943	.5475	.5783	.5343	.5377
EFFP	1.0195	1.0567	0.9479	0.9556	0.9233
EFF	1.0203	1.0591	0.9456	0.9534	0.9192
INCIDM	8.669	9.392	9.319	8.191	5.737
DEVM	8.020	8.980	9.449	5.199	9.403

Table B-3. Blade Element Data Cruise Configuration (Continued)

	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
100 PERCENT SPEED PT. 191	CRUISE	6045.	184.

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	30.930	27.187	25.448	23.385	22.542
V 3	289.30	303.27	312.02	317.63	319.20
V 4	341.17	355.75	369.00	375.17	368.00
VZ 3	289.30	302.86	312.01	317.62	319.19
VZ 4	292.62	314.90	333.15	344.34	339.89
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	175.36	162.54	158.56	148.91	141.08
M 3	0.2609	0.2737	0.2817	0.2869	0.2883
M 4	0.3085	0.3219	0.3342	0.3399	0.3333
TURN	-30.93	-27.19	-25.45	-23.38	-22.54
$\bar{\omega}$	0.0656		0.0320		0.0380
DFAC	0.131	0.099	0.073	0.054	0.068
EFFP	0.8891	0.8963	0.9185	0.9914	0.9203
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.070	7.113	7.052	7.515	6.458

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	57.769	55.428	56.600	52.729	50.107
BETA 10	35.647	25.554	25.773	25.959	26.802
V 9	594.95	584.12	591.17	624.25	629.00
V 10	199.64	372.77	437.15	494.10	539.55
VZ 9	311.51	329.11	324.31	377.72	403.41
VZ 10	159.12	333.04	391.92	443.75	481.59
V-THETA 9	503.27	480.97	493.53	496.76	482.59
V-THETA 10	116.35	160.80	190.08	216.28	243.29
M 9	0.5275	0.5162	0.5192	0.5464	0.5486
M 10	0.1729	0.3248	0.3803	0.4282	0.4670
TURN	22.122	29.874	30.826	26.770	23.305
$\bar{\omega}$	0.7139	0.3876	0.2351	0.2187	0.1794
DFAC	0.9074	0.5843	0.4843	0.4175	0.3244
EFFP	0.3097	0.4708	0.6690	0.4767	0.3600
INCIDM	7.869	9.328	12.900	9.729	5.107
DEVM	18.347	7.054	7.273	7.959	9.702

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	27.951	25.407	24.220	22.010	21.064
BETA 7	56.893	56.618	58.130	54.725	52.648
BETA(PR) 6	54.354	59.592	63.250	65.809	68.900
BETA(PR) 7	24.423	41.038	49.690	52.623	57.401
V 6	362.80	372.20	381.84	394.77	388.02
V 7	616.84	586.15	586.99	612.46	611.74
VZ 6	320.39	335.92	348.14	365.97	362.09
VZ 7	333.73	322.15	309.74	353.63	371.14
V-THETA 6	170.05	159.69	156.65	147.94	139.46
V-THETA 7	516.70	489.45	498.50	500.01	486.29
V(PR) 6	549.8	663.8	773.5	893.1	1005.8
V(PR) 7	370.0	427.6	479.1	582.6	688.9
VTHETA PR6	-446.8	-572.4	-690.7	-814.7	-938.4
VTHETA PR7	-153.0	-280.7	-365.3	-463.0	-580.4
U 6	616.81	732.07	847.34	962.60	1077.87
U 7	669.69	770.19	863.92	963.00	1066.66
M 6	0.3285	0.3372	0.3461	0.3581	0.3518
M 7	0.5481	0.5180	0.5155	0.5357	0.5328
M(PR) 6	0.4978	0.6013	0.7011	0.8102	0.9121
M(PR) 7	0.3288	0.3779	0.4208	0.5096	0.6000
TURN(PR)	29.924	18.533	13.554	13.185	11.499
$\bar{\omega}$	-0.0464	0.0414	0.1023	0.1193	0.1011
DFAC	.5672	.5558	.5992	.5236	.4762
EFFP	1.0127	1.0198	0.9551	0.9607	0.9614
EFF	1.0132	1.0206	0.9531	0.9587	0.9593
INCIDM	5.754	7.092	7.150	6.209	5.700
DEVM	5.623	8.538	7.590	4.023	4.501

Table B-3. Blade Element Data Cruise Configuration (Continued)

	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
100 PERCENT SPEED PT. 192	CRUISE	6045.	193.0

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	30.800	27.432	25.636	23.143	22.016
V 3	301.61	316.93	326.99	333.52	335.78
V 4	361.17	374.67	385.73	390.91	384.40
VZ 3	301.60	316.54	326.98	333.51	335.77
VZ 4	310.22	330.66	347.73	359.44	356.36
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	184.93	172.61	166.88	153.64	144.10
M 3	0.2722	0.2862	0.2954	0.3015	0.3035
M 4	0.3270	0.3395	0.3497	0.3545	0.3485
TURN	-30.80	-27.43	-25.64	-23.14	-22.02
$\bar{\omega}$	0.0602		0.0289		0.0260
DFAC	0.117	0.094	0.077	0.059	0.070
EFFP	0.8848	0.8967	0.9113	0.9870	0.9197
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.200	6.868	6.864	7.757	6.984

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	55.995	54.101	55.307	51.142	47.305
BETA 10	30.942	25.716	25.876	26.280	27.306
V 9	609.09	597.23	606.74	633.43	642.05
V 10	246.37	413.29	435.31	504.79	548.98
VZ 9	334.04	347.38	344.05	397.06	435.37
VZ 10	208.09	368.50	389.88	452.10	487.81
V-THETA 9	504.93	483.79	498.87	493.26	471.89
V-THETA 10	126.67	179.33	189.98	223.50	251.84
M 9	0.5411	0.5287	0.5338	0.5556	0.5616
M 10	0.2138	0.3611	0.3785	0.4381	0.4762
TURN	25.054	28.385	29.431	24.862	19.999
$\bar{\omega}$	0.5785	0.2120	0.2295	0.1756	0.1547
DFAC	0.8271	0.5146	0.5045	0.4012	0.3092
EFFP	0.4312	0.7034	0.6845	0.5870	0.4669
INCIDM	6.095	8.001	11.607	8.142	2.305
DEVM	13.642	7.216	7.376	8.280	10.206

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	27.938	25.677	24.261	21.729	20.310
BETA 7	55.556	55.441	56.706	53.230	50.117
BETA(PR) 6	52.324	57.885	61.861	64.675	67.870
BETA(PR) 7	22.962	39.272	47.421	51.437	55.690
V 6	382.57	391.93	400.60	412.59	406.26
V 7	629.22	598.27	602.70	620.53	624.87
VZ 6	337.90	352.90	365.14	383.25	381.00
VZ 7	353.03	339.01	330.65	371.38	400.66
V-THETA 6	179.24	169.82	164.61	152.75	141.01
V-THETA 7	518.91	492.70	503.77	497.07	479.50
V(PR) 6	552.9	664.0	774.3	896.0	1011.4
V(PR) 7	386.5	438.4	489.0	595.9	710.8
VTHETA PR6	-437.6	-562.2	-682.7	-809.9	-936.9
VTHETA PR7	-150.8	-277.5	-360.1	-465.9	-587.2
U 6	616.81	732.07	847.34	962.60	1077.87
U 7	669.69	770.19	863.82	963.00	1066.66
M 6	0.3468	0.3555	0.3636	0.3747	0.3688
M 7	0.5601	0.5297	0.5303	0.5438	0.5458
M(PR) 6	0.5012	0.6022	0.7027	0.8138	0.9182
M(PR) 7	0.3441	0.3881	0.4302	0.5222	0.6209
TURN(PR)	29.355	18.589	14.435	13.236	12.179
$\bar{\omega}$	-0.0737	0.0082	0.0619	0.0818	0.0784
DFAC	.5356	.5359	.5544	.5065	.4536
EFFP	1.0049	1.0181	0.9594	0.9721	0.9887
EFF	1.0051	1.0189	0.9576	0.9707	0.9881
INCIDM	3.724	5.385	5.761	5.075	4.670
DEVM	4.162	6.772	5.321	2.837	2.790

Table B-3. Blade Element Data Cruise Configuration (Continued)

	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
100 PERCENT SPEED PT. 193	CRUISE	6045.	205.

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	30.690	27.632	25.995	23.571	21.180
V 3	323.93	341.57	352.24	357.94	359.90
V 4	397.61	409.33	418.45	418.38	412.32
VZ 3	323.92	341.19	352.23	357.93	358.89
VZ 4	341.92	360.61	376.09	383.45	384.47
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	202.94	189.84	183.40	167.30	148.97
M 3	0.2926	0.3089	0.3187	0.3240	0.3249
M 4	0.3608	0.3717	0.3802	0.3801	0.3745
TURN	-30.69	-27.63	-26.00	-23.57	-21.18
$\bar{\omega}$	0.0634		0.0299		0.0390
DFAC	0.094	0.083	0.074	0.066	0.058
EFFP	0.9302	0.9180	0.9372	0.9356	0.9064
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.310	6.668	6.505	7.329	7.820

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	52.180	49.590	52.020	48.220	43.884
BETA 10	27.948	27.129	27.025	25.991	28.260
V 9	648.83	629.42	633.24	645.58	654.99
V 10	390.48	446.54	452.50	516.61	555.35
VZ 9	390.36	405.09	388.73	430.03	472.02
VZ 10	341.57	393.96	401.91	464.21	489.08
V-THETA 9	512.53	479.25	499.14	481.41	454.04
V-THETA 10	183.01	203.62	205.61	226.39	262.94
M 9	0.5791	0.5603	0.5597	0.5691	0.5758
M 10	0.3413	0.3916	0.3943	0.4504	0.4838
TURN	24.232	22.461	24.995	22.229	15.624
$\bar{\omega}$	0.2915	0.1615	0.2196	0.1214	0.1346
DFAC	0.5856	0.4674	0.4873	0.3836	0.2922
EFFP	0.6554	0.7445	0.6506	0.7139	0.6848
INCIDM	2.280	3.490	8.320	5.220	-1.116
DEVM	10.648	8.629	8.525	7.991	11.160

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	27.880	25.541	24.392	23.016	21.167
BETA 7	53.064	50.978	53.452	50.319	45.664
BETA(PR) 6	48.544	54.474	59.075	62.746	66.599
BETA(PR) 7	19.578	35.539	43.970	49.838	53.443
V 6	420.16	432.17	438.37	442.68	429.77
V 7	661.08	627.88	626.95	630.97	643.43
VZ 6	371.31	389.65	399.17	410.37	402.49
VZ 7	394.81	394.97	373.16	402.81	449.66
V-THETA 6	196.47	196.33	181.03	165.95	147.82
V-THETA 7	528.41	487.80	503.67	495.60	460.22
V(PR) 6	560.9	670.7	776.8	896.1	1013.4
V(PR) 7	421.5	495.8	518.7	624.7	755.5
VTHETA PR6	-420.3	-545.7	-666.3	-796.7	-930.1
VTHETA PR7	-141.3	-292.4	-360.2	-477.4	-606.4
W 6	616.81	732.07	847.34	962.60	1077.87
W 7	669.69	770.19	863.82	963.00	1066.66
M 6	0.3819	0.3931	0.3989	0.4029	0.3899
M 7	0.5909	0.5588	0.5541	0.5556	0.5651
M(PR) 6	0.5097	0.6100	0.7068	0.8156	0.9214
M(PR) 7	0.3768	0.4324	0.4585	0.5571	0.6631
TURN(PR)	28.962	18.915	15.109	12.907	13.156
$\bar{\omega}$	-0.0613	-0.0000	0.0368	0.0523	0.0584
DFAC	.4755	.4577	.5088	.4621	.3989
EFFP	0.9775	1.0446	0.9627	0.9796	1.0181
EFF	0.9767	1.0463	0.9612	0.9787	1.0085
INCIDM	-0.056	1.974	2.975	3.146	3.399
DEVM	0.778	3.039	1.870	1.238	0.543

Table B-3. Blade Element Data Cruise Configuration (Continued)

100 PERCENT SPEED PT. 194 | CONFIGURATION CRUISE | $N/\sqrt{\theta}$ 6045. | $\omega\sqrt{\theta}/\delta$ 217.4

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	30.906	27.735	25.894	23.330	19.050
V 3	343.80	362.34	374.14	380.67	381.33
V 4	429.29	437.21	445.15	443.64	433.28
VZ 3	343.78	361.98	374.13	380.65	381.32
VZ 4	368.33	384.79	400.44	407.36	409.55
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	220.50	203.47	194.40	175.69	141.42
M 3	0.3109	0.3280	0.3390	0.3450	0.3456
M 4	0.3904	0.3978	0.4052	0.4038	0.3941
TURN	-30.91	-27.74	-25.89	-23.33	-19.05
$\bar{\omega}$	0.0613		0.0294		0.0350
DFAC	0.080	0.078	0.072	0.066	0.049
EFFP	0.9511	0.9328	0.9647	0.9919	0.8982
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.093	6.565	6.606	7.570	9.950

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	47.578	47.098	48.608	44.056	40.523
BETA 10	28.075	28.125	27.622	26.006	27.323
V 9	667.99	642.00	636.57	652.77	647.71
V 10	502.34	496.85	501.68	542.07	578.47
VZ 9	442.54	433.87	419.88	469.04	492.23
VZ 10	440.06	434.54	443.32	487.08	513.81
V-THETA 9	493.11	470.28	477.56	453.91	420.85
V-THETA 10	236.41	234.22	232.59	237.68	265.53
M 9	0.5997	0.5737	0.5654	0.5789	0.5720
M 10	0.4441	0.4384	0.4404	0.4760	0.5078
TURN	19.503	18.973	20.987	18.050	13.200
$\bar{\omega}$	0.1641	0.1562	0.1783	0.1579	0.1374
DFAC	0.3874	0.3738	0.3791	0.3237	0.2223
EFFP	0.7391	0.7066	0.6203	0.5679	0.6573
INCIDM	-2.322	0.998	4.908	1.056	-4.477
DEVM	10.775	9.625	9.122	8.006	10.223

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	27.941	25.595	24.275	21.672	17.848
BETA 7	48.972	48.463	50.074	45.942	40.761
BETA(PR) 6	45.029	51.989	56.995	60.928	65.603
BETA(PR) 7	20.002	34.655	43.482	48.721	53.296
V 6	455.98	461.85	467.02	471.68	448.14
V 7	674.19	638.15	627.99	637.42	639.12
VZ 6	402.75	416.24	425.66	438.32	426.57
VZ 7	440.23	422.82	402.87	443.18	484.08
V-THETA 6	213.65	199.52	192.00	174.19	137.35
V-THETA 7	508.60	477.67	481.59	458.07	417.29
V(PR) 6	569.9	676.1	781.5	902.1	1032.7
V(PR) 7	471.0	514.4	555.5	671.9	810.0
VTHETA PR6	-403.2	-532.5	-655.3	-788.4	-940.5
VTHETA PR7	-161.1	-292.5	-382.2	-504.9	-649.4
U 6	616.81	732.07	847.34	962.60	1077.87
U 7	669.69	770.19	863.82	963.00	1066.66
M 6	0.4154	0.4210	0.4259	0.4303	0.4080
M 7	0.6057	0.5701	0.5575	0.5647	0.5641
M(PR) 6	0.5192	0.6162	0.7126	0.8228	0.9403
M(PR) 7	0.4231	0.4596	0.4931	0.5952	0.7149
TURN(PR)	25.021	17.315	13.509	12.206	12.307
$\bar{\omega}$	-0.0689	0.0135	0.0445	0.0567	0.0919
DFAC	.3742	.4065	.3970	.4296	.3422
EFFP	0.9844	1.0095	0.9445	0.9973	1.0083
EFF	0.9839	1.0098	0.9425	0.9972	1.0087
INCIDM	-3.571	-0.511	0.895	1.328	2.403
DEVM	1.202	2.155	1.382	0.121	0.396

Table B-3. Blade Element Data Cruise Configuration (Continued)

	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
100PERCENT SPEED PT.189	CRUISE	6055.	232.5

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	30.687	27.709	26.007	23.428	19.704
V 3	370.78	391.33	404.25	411.12	412.31
V 4	465.50	476.56	482.51	482.42	473.06
VZ 3	370.75	390.92	404.23	411.10	412.29
VZ 4	400.31	419.59	433.63	442.63	445.36
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	237.57	221.59	211.57	191.81	159.50
M 3	0.3359	0.3549	0.3670	0.3734	0.3745
M 4	0.4244	0.4349	0.4405	0.4404	0.4316
TURN	-30.69	-27.71	-26.01	-23.43	-19.70
$\bar{\omega}$	0.0549		0.0230		0.0320
DFAC	0.073	0.069	0.070	0.061	0.046
EFFP	0.9021	0.8948	0.9049	0.9616	0.8298
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.313	6.591	6.493	7.472	9.296

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	41.783	41.337	41.751	39.515	31.108
BETA 10	28.417	28.667	27.851	25.906	28.591
V 9	685.92	652.94	645.07	639.83	645.02
V 10	613.98	604.97	593.75	612.97	636.40
VZ 9	502.64	486.86	480.25	493.53	552.12
VZ 10	536.57	526.78	523.81	551.28	558.68
V-THETA 9	457.03	431.26	429.55	407.11	333.25
V-THETA 10	292.18	290.21	277.39	267.80	304.55
M 9	0.6205	0.5882	0.5786	0.5722	0.5746
M 10	0.5512	0.5424	0.5299	0.5468	0.5659
TURN	13.366	12.670	13.900	13.609	2.517
$\bar{\omega}$	0.2422	0.1591	0.1957	0.1351	0.1260
DFAC	0.1885	0.1583	0.1810	0.1433	0.0361
EFFP	0.0376	0.0325	-0.1113	-0.4927	-0.8383
INCIDM	-8.117	-4.763	-1.949	-3.485	-13.892
DEVM	11.117	10.167	9.351	7.906	11.491

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	27.653	25.450	24.218	21.962	18.406
BETA 7	43.384	43.011	43.180	41.269	37.310
BETA(PR) 6	41.504	48.547	54.091	58.647	63.178
BETA(PR) 7	21.753	35.331	43.086	49.834	52.986
V 6	495.16	505.26	508.40	508.52	492.46
V 7	686.68	642.64	633.26	622.28	643.20
VZ 6	438.50	455.91	463.57	471.58	467.27
VZ 7	496.59	469.49	461.54	467.63	511.56
V-THETA 6	229.81	217.12	208.55	190.18	155.49
V-THETA 7	471.67	438.37	433.33	410.45	389.86
V(PR) 6	585.6	688.9	790.5	906.4	1035.6
V(PR) 7	537.3	576.0	632.3	725.1	849.8
VTHETA PR6	-388.0	-516.2	-640.2	-774.0	-924.2
VTHETA PR7	-199.1	-333.1	-431.9	-554.1	-678.6
U 6	617.83	733.28	848.74	964.19	1079.65
U 7	670.80	771.46	865.25	964.59	1068.42
M 6	0.4525	0.4621	0.4652	0.4653	0.4500
M 7	0.6212	0.5784	0.5675	0.5557	0.5722
M(PR) 6	0.5352	0.6301	0.7232	0.8293	0.9462
M(PR) 7	0.4861	0.5184	0.5666	0.6476	0.7560
TURN(PR)	19.746	13.197	10.999	8.812	10.192
$\bar{\omega}$	0.0232	0.0838	0.0679	0.0575	0.0578
DFAC	.2453	.2960	.3219	.3085	.2849
EFFP	1.0492	1.0578	1.0238	1.0111	0.9643
EFF	1.0506	1.0595	1.0246	1.0115	0.9630
INCIDM	-7.096	-3.953	-2.009	-0.953	-0.022
DEVM	2.953	2.831	0.986	1.234	0.086

Table B-4. Blade Element Data Intermediate Configuration (Continued)

50 PERCENT SPEED PT. 215 | CONFIGURATION INTERMEDIATE | $N/\sqrt{\theta}$ 3020. | $\omega\sqrt{\theta}/\delta$ 89.71

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	15.052	14.771	13.883	10.292	7.446
V 3	135.77	142.77	146.86	149.55	150.34
V 4	140.12	152.54	158.51	163.06	160.34
VZ 3	135.77	142.53	146.86	149.55	150.33
VZ 4	135.29	146.84	153.95	160.43	158.99
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	36.39	38.89	38.03	29.13	20.78
M 3	0.1218	0.1281	0.1318	0.1342	0.1349
M 4	0.1257	0.1369	0.1423	0.1464	0.1439
TURN	-15.05	-14.77	-13.86	-10.29	-7.45
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.106	0.070	0.051	0.008	0.003
EFFP	0.8572	1.0482	0.8412	0.9662	0.7647
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.648	4.229	3.317	5.308	7.854

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	52.366	53.467	54.159	49.489	45.857
BETA 10	21.572	18.535	15.440	14.703	11.737
V 9	299.70	279.36	276.74	292.72	293.52
V 10	151.84	185.66	183.52	235.36	250.54
VZ 9	180.36	165.51	161.56	189.99	204.42
VZ 10	159.28	174.63	176.25	227.43	245.30
V-THETA 9	237.54	224.29	224.34	222.55	210.63
V-THETA 10	95.83	59.02	48.86	59.74	50.97
M 9	0.2674	0.2489	0.2462	0.2600	0.2605
M 10	0.1348	0.1649	0.1628	0.2087	0.2219
TURN	30.794	34.872	38.716	34.736	34.120
$\bar{\omega}$	0.3605	0.1866	0.2603	0.1306	0.1152
DFAC	0.7204	0.5746	0.6159	0.4552	0.4120
EFFP	0.4961	0.6356	0.5159	0.6027	0.4698
INCIDM	6.966	11.807	14.959	10.989	5.357
DEVM	17.227	13.023	9.940	9.703	7.637

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	13.502	13.764	13.216	9.699	6.830
BETA 7	52.735	54.316	55.432	51.362	48.257
BETA(PR) 6	61.691	64.466	67.552	69.558	72.049
BETA(PR) 7	25.727	43.810	52.743	55.167	59.448
V 6	151.20	161.19	163.81	170.97	169.14
V 7	307.62	280.48	274.98	286.65	284.35
VZ 6	146.97	156.40	159.42	168.51	167.94
VZ 7	184.97	163.39	155.90	178.94	189.31
V-THETA 6	35.30	38.35	37.45	28.80	20.11
V-THETA 7	244.82	227.82	226.43	223.90	212.16
V(PR) 6	309.9	362.9	417.5	482.5	544.9
V(PR) 7	206.8	226.7	257.7	313.3	372.4
VTHETA PR6	-272.8	-327.4	-385.9	-452.1	-518.4
VTHETA PR7	-89.8	-157.0	-205.1	-257.2	-320.7
U 6	308.15	365.73	423.32	480.90	538.49
U 7	334.57	384.78	431.55	481.10	532.89
M 6	0.1357	0.1447	0.1471	0.1535	0.1519
M 7	0.2745	0.2499	0.2446	0.2546	0.2522
M(PR) 6	0.2781	0.3257	0.3748	0.4332	0.4892
M(PR) 7	0.1845	0.2020	0.2292	0.2783	0.3304
TURN(PR)	35.955	20.633	14.802	14.389	12.602
$\bar{\omega}$	0.1229	0.2067	0.2780	0.2199	0.2665
DFAC	.5839	.5828	.5739	.5312	.4818
EFFP	1.0038	0.9792	0.9283	0.9031	0.8774
EFF	1.0038	0.9790	0.9274	0.9018	0.8757
INCIDM	13.019	11.966	11.422	9.958	8.849
DEVM	6.927	11.310	10.643	6.567	6.588

Table B-4. Blade Element Data Intermediate Configuration (Continued)

50PERCENT SPEED PT.216 CONFIGURATION INTERMEDIATE $N/\sqrt{\theta}$ 3027. $\omega\sqrt{\theta}/\delta$ 97.2

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	15.387	14.925	13.648	9.762	6.804
V 3	147.69	154.82	159.53	162.35	162.70
V 4	163.71	164.55	169.83	174.47	173.55
VZ 3	147.68	154.68	159.53	162.34	162.69
VZ 4	157.84	158.11	165.03	171.93	172.33
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	43.44	42.38	40.67	29.58	20.56
M 3	0.1325	0.1390	0.1432	0.1457	0.1460
M 4	0.1470	0.1477	0.1525	0.1567	0.1558
TURN	-15.39	-14.93	-13.65	-9.76	-6.80
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.042	0.076	0.062	0.017	-0.004
EFFP	4.3323	0.9059	0.7536	0.8476	0.7223
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.313	4.075	3.552	5.838	8.496

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	51.209	51.492	49.155	45.708	44.537
BETA 10	22.584	17.216	15.137	14.820	9.562
V 9	312.79	292.95	290.55	305.20	304.75
V 10	182.73	207.39	206.21	238.12	266.30
VZ 9	192.34	181.05	189.52	213.07	217.20
VZ 10	167.11	196.34	198.43	230.11	262.57
V-THETA 9	243.80	229.24	219.80	218.46	213.74
V-THETA 10	70.18	61.38	53.85	60.91	44.24
M 9	0.2792	0.2611	0.2587	0.2714	0.2705
M 10	0.1623	0.1842	0.1830	0.2112	0.2360
TURN	28.624	34.276	34.018	30.887	34.976
$\bar{\omega}$	0.2858	0.1323	0.1976	0.1623	0.0715
DFAC	0.6229	0.5270	0.5415	0.4604	0.3976
EFFP	0.6030	0.7519	0.6155	0.6276	0.7923
INCIDM	5.809	9.892	9.955	7.208	4.037
DEVM	18.248	11.761	9.637	9.820	5.462

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	13.976	13.902	12.718	9.041	6.358
BETA 7	51.646	52.785	50.687	47.303	45.789
BETA(PR) 6	57.601	62.615	65.478	68.051	70.085
BETA(PR) 7	22.597	40.661	40.152	32.412	37.013
V 6	174.47	173.52	178.44	184.91	190.24
V 7	321.60	293.00	297.14	298.42	298.22
VZ 6	169.27	169.30	174.02	182.48	178.12
VZ 7	198.43	177.11	191.92	202.33	207.95
V-THETA 6	42.14	41.69	38.78	29.47	19.96
V-THETA 7	252.27	233.41	222.14	219.33	213.75
V(PR) 6	315.9	366.0	422.5	486.2	549.8
V(PR) 7	216.2	233.7	278.1	331.8	391.3
VTHETA PR6	-266.7	-324.9	-385.0	-452.8	-519.8
VTHETA PR7	-83.1	-152.3	-210.4	-262.9	-320.4
U 6	308.86	366.58	424.30	482.02	539.74
U 7	335.35	395.67	432.55	482.22	524.13
M 6	0.1547	0.1558	0.1602	0.1660	0.1619
M 7	0.2873	0.2612	0.2657	0.2653	0.2646
M(PR) 6	0.2837	0.3286	0.3795	0.4385	0.4937
M(PR) 7	0.1931	0.2083	0.2476	0.2950	0.3389
TURN(PR)	34.999	21.934	16.522	15.638	13.972
$\bar{\omega}$	0.1252	0.1652	0.1897	0.1587	0.1919
DFAC	.5634	.5698	.5246	.4942	.4706
EFFP	0.9074	0.9199	0.9183	0.8934	0.8394
EFF	0.9065	0.9190	0.9174	0.8880	0.8372
INCIDM	9.001	10.115	9.576	8.451	7.785
DEVM	3.797	8.161	7.052	3.812	4.113

Table B-4. Blade Element Data Intermediate Configuration (Continued)

50PERCENT SPEED PT.217	CONFIGURATION INTERMEDIATE	$N/\sqrt{\theta}$ 3037.	$\omega\sqrt{\sigma}/\delta$ 113.0

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	15.814	14.632	13.608	9.668	6.965
V 3	170.63	180.48	186.54	189.77	190.13
V 4	162.40	196.28	200.96	205.25	201.09
VZ 3	170.62	180.25	186.53	189.76	190.12
VZ 4	175.49	188.84	195.31	202.33	199.61
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	49.71	49.56	47.26	34.47	24.39
M 3	0.1532	0.1621	0.1676	0.1705	0.1708
M 4	0.1636	0.1764	0.1806	0.1845	0.1807
TURN	-15.81	-14.63	-13.61	-9.67	-6.96
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.081	0.052	0.050	0.010	0.006
EFFP	0.7971	1.0127	0.8173	0.9329	0.6683
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	4.886	4.368	3.592	5.912	8.335

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	45.216	42.880	41.437	38.393	37.163
BETA 10	17.642	15.060	14.080	13.982	11.970
V 9	325.81	306.08	303.04	306.72	306.80
V 10	243.22	244.42	249.88	270.14	285.72
VZ 9	229.51	222.69	226.65	240.34	244.52
VZ 10	229.98	234.14	241.75	262.06	279.48
V-THETA 9	231.12	208.28	200.55	190.49	185.37
V-THETA 10	72.71	63.51	60.79	65.27	59.26
M 9	0.2911	0.2734	0.2704	0.2734	0.2731
M 10	0.2166	0.2178	0.2225	0.2404	0.2541
TURN	27.576	27.820	27.356	24.412	25.193
$\bar{\omega}$	0.1375	0.0844	0.0843	0.2490	-0.0076
DFAC	0.4329	0.3951	0.3781	0.3096	0.2698
EFFP	0.7113	0.7642	0.7484	0.9252	1.2011
INCIDM	-0.182	1.280	2.237	-0.107	-3.337
DEVM	13.342	9.560	8.580	8.982	7.870

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	14.333	13.525	12.586	9.030	6.623
BETA 7	46.468	44.236	42.983	39.809	38.140
BETA(PR) 6	54.260	57.605	61.451	64.580	68.189
BETA(PR) 7	22.894	38.733	46.615	51.777	56.118
V 6	194.46	208.41	211.65	216.39	208.48
V 7	331.21	304.13	298.11	299.46	299.57
VZ 6	188.36	202.44	206.52	213.70	207.09
VZ 7	226.96	217.68	217.96	230.00	235.61
V-THETA 6	48.14	48.74	46.12	33.96	24.05
V-THETA 7	240.12	212.17	203.25	191.72	185.01
V(PR) 6	322.5	378.0	432.1	497.9	557.4
V(PR) 7	247.6	279.3	317.5	371.8	422.6
VTHETA PR6	-261.7	-319.1	-379.6	-449.6	-517.5
VTHETA PR7	-96.3	-174.8	-230.7	-292.1	-350.9
U 6	309.88	367.79	425.70	483.61	541.52
U 7	336.45	386.94	433.98	483.81	535.89
M 6	0.1747	0.1873	0.1903	0.1946	0.1874
M 7	0.2962	0.2717	0.2660	0.2669	0.2666
M(PR) 6	0.2898	0.3397	0.3885	0.4476	0.5010
M(PR) 7	0.2214	0.2495	0.2833	0.3314	0.3761
TURN(PR)	31.359	18.848	14.831	12.801	12.071
$\bar{\omega}$	0.0714	0.0867	0.0838	0.0999	0.1051
DFAC	.4547	.4337	.4191	.3947	.3820
EFFP	0.9587	0.9995	0.9886	0.9492	0.8990
EFF	0.9582	0.9995	0.9885	0.9487	0.8978
INCIDM	5.660	5.105	5.351	4.980	4.989
DEVM	4.094	6.233	4.515	3.177	3.288

Table B-4. Blade Element Data Intermediate Configuration (Continued)

CONFIGURATION $N/\sqrt{\theta}$ $\omega\sqrt{\theta}/\delta$

SUPERCENT SPEED PT.218 INTERMEDIATE 2974. 121.6

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	15.[illegible]	14.574	13.271	9.392	5.623
V 3	183.62	194.31	201.02	204.59	204.99
V 4	197.99	212.30	216.77	220.40	215.55
VZ 3	183.60	194.08	201.01	204.58	204.98
VZ 4	190.43	204.28	210.98	217.44	214.12
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	54.19	53.42	49.76	35.97	24.86
M 3	0.1649	0.1746	0.1807	0.1839	0.1842
M 4	0.1779	0.1909	0.1949	0.1982	0.1936
TURN	-15.88	-14.57	-13.27	-9.39	-6.62
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.073	0.047	0.040	0.011	0.009
EFFP	0.8256	1.0062	0.8453	0.9535	0.6592
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	4.817	4.426	3.929	6.208	8.677

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	39.183	37.893	35.775	32.703	30.464
BETA 10	15.981	14.426	13.874	13.605	13.385
V 9	329.49	309.32	304.99	306.42	303.85
V 10	284.35	274.09	273.43	284.54	297.13
VZ 9	251.21	242.36	246.85	257.79	252.06
VZ 10	271.68	263.42	264.84	276.50	289.01
V-THETA 9	208.17	189.98	178.30	165.55	153.79
V-THETA 10	78.29	68.28	65.56	66.93	68.78
M 9	0.2951	0.2766	0.2727	0.2738	0.2712
M 10	0.2541	0.2449	0.2442	0.2540	0.2651
TURN	23.202	23.467	21.901	19.098	17.015
$\bar{\omega}$	0.0965	0.0850	0.1057	0.0944	0.0722
DFAC	0.2827	0.2746	0.2656	0.2215	0.1593
EFFP	0.6407	0.5829	0.4180	0.3202	-0.0330
INCIDM	-6.217	-3.707	-3.425	-5.797	-10.096
DEVM	11.681	8.926	8.374	8.605	9.285

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	14.365	13.479	12.237	8.806	6.129
BETA 7	40.611	39.381	37.241	33.882	31.688
BETA(PR) 6	50.777	54.528	58.769	62.352	66.357
BETA(PR) 7	24.003	38.118	45.656	51.096	55.451
V 6	211.52	225.58	228.63	232.22	223.00
V 7	333.13	305.35	299.35	298.68	297.97
VZ 6	204.86	219.17	223.39	229.47	221.72
VZ 7	251.74	235.80	238.19	247.92	253.55
V-THETA 6	52.48	52.58	48.46	35.55	23.81
V-THETA 7	216.84	193.73	181.15	166.51	156.52
V(PR) 6	324.0	377.8	430.9	494.5	552.9
V(PR) 7	276.8	300.0	340.9	394.8	447.1
VTHETA PR6	-251.0	-307.6	-368.4	-438.0	-506.5
VTHETA PR7	-112.6	-185.2	-243.8	-307.3	-368.2
U 6	303.46	360.16	416.87	473.58	530.29
U 7	329.47	378.91	424.98	473.77	524.77
M 6	0.1902	0.2029	0.2057	0.2089	0.2006
M 7	0.2984	0.2732	0.2676	0.2668	0.2658
M(PR) 6	0.2913	0.3398	0.3876	0.4449	0.4972
M(PR) 7	0.2480	0.2684	0.3048	0.3527	0.3989
TURN(PR)	26.763	16.386	13.108	11.254	10.906
$\bar{\omega}$	0.0360	0.0354	0.0346	0.0659	0.0869
DFAC	.3364	.3556	.3393	.3199	.3038
EFFP	1.0491	1.0650	1.0782	1.0410	0.9938
EFF	1.0496	1.0656	1.0790	1.0414	0.9938
INCIDM	2.177	2.208	2.669	2.752	3.157
DEVM	5.208	5.618	3.556	2.496	2.551

Table B-4. Blade Element Data Intermediate Configuration (Continued)

	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
50PERCENT SPEED PT.214	INTERMEDIATE	3017.	138.4

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	15.396	14.370	13.033	9.668	6.298
V 3	211.01	222.89	229.99	233.65	234.02
V 4	227.86	242.60	248.65	251.36	246.56
VZ 3	210.98	222.63	229.97	233.63	234.01
VZ 4	219.68	233.86	242.23	247.78	245.07
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	60.50	60.21	56.07	42.21	27.05
M 3	0.1897	0.2005	0.2069	0.2102	0.2106
M 4	0.2050	0.2183	0.2238	0.2263	0.2219
TURN	-15.40	-14.37	-13.03	-9.67	-6.30
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.067	0.049	0.042	0.015	0.004
EFFP	0.8879	0.9432	0.8516	0.9386	0.7475
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.304	4.630	4.167	5.932	9.002

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	33.385	31.906	30.921	27.211	23.375
BETA 10	15.756	14.730	14.113	13.465	13.356
V 9	371.28	348.29	330.41	330.48	327.75
V 10	351.45	333.98	320.69	321.52	326.62
VZ 9	305.36	293.96	283.00	293.88	300.81
VZ 10	336.36	321.03	310.53	312.66	317.71
V-THETA 9	204.30	184.08	169.78	151.12	130.04
V-THETA 10	95.43	84.92	78.20	74.87	75.45
M 9	0.3335	0.3125	0.2961	0.2961	0.2935
M 10	0.3153	0.2994	0.2873	0.2879	0.2924
TURN	17.628	17.176	16.807	13.746	10.020
$\bar{\omega}$	0.0656	0.0445	0.0277	0.0667	0.0915
DFAC	0.1604	0.1567	0.1506	0.1347	0.0854
EFFP	0.5142	0.5365	0.5276	-0.1006	-8.9810
INCIDM	-12.015	-9.694	-8.279	-11.289	-17.125
DEVM	11.456	9.230	8.613	8.465	9.256

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	13.820	13.159	12.081	9.089	5.844
BETA 7	34.954	33.404	32.142	28.366	23.693
BETA(PR) 6	46.307	50.430	55.144	59.285	63.780
BETA(PR) 7	21.643	34.641	43.287	49.152	53.707
V 6	245.29	260.04	262.18	263.99	263.55
V 7	372.15	340.98	324.26	321.97	322.51
VZ 6	238.13	253.03	256.32	260.66	262.23
VZ 7	303.71	284.39	274.43	283.27	294.64
V-THETA 6	58.59	59.19	54.87	41.70	25.93
V-THETA 7	213.21	187.72	172.51	152.97	131.14
V(PR) 6	344.8	397.3	448.5	510.3	570.9
V(PR) 7	328.2	346.0	377.2	433.2	497.9
VTHETA PR6	-249.2	-306.2	-368.0	-438.7	-512.1
VTHETA PR7	-121.0	-196.7	-258.6	-327.7	-401.2
U 6	307.84	365.37	422.90	480.43	537.95
U 7	334.24	384.39	431.13	480.62	532.36
M 6	0.2208	0.2342	0.2361	0.2378	0.2382
M 7	0.3343	0.3058	0.2905	0.2883	0.2887
M(PR) 6	0.3103	0.3578	0.4040	0.4597	0.5142
M(PR) 7	0.2947	0.3103	0.3379	0.3879	0.4456
TURN(PR)	24.657	15.768	11.852	10.132	10.072
$\bar{\omega}$	0.0326	0.0388	0.0508	0.0611	0.0910
DFAC	.2175	.2592	.2703	.2484	.2144
EFFP	0.9642	0.9860	0.9331	0.9415	0.9714
EFF	0.9639	0.9859	0.9337	0.9410	0.9711
INCIDM	-2.293	-2.070	-0.956	-0.315	0.580
DEVM	2.843	2.141	1.187	0.552	0.807

Table B-4. Blade Element Data Intermediate Configuration (Continued)

70PERCENT SPEED PT.209 CONFIGURATION INTERMEDIATE $N/\sqrt{\theta}$ 4223. $\omega\sqrt{\theta}/\delta$ 129.8

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	15.450	14.805	13.770	9.872	6.553
V 3	198.07	208.47	214.94	218.65	219.27
V 4	205.42	223.38	232.27	238.25	235.88
VZ 3	198.06	208.12	214.94	218.65	219.26
VZ 4	197.97	214.93	225.54	234.70	234.34
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	54.72	57.08	55.28	40.84	26.92
M 3	0.1780	0.1874	0.1933	0.1966	0.1972
M 4	0.1846	0.2009	0.2090	0.2144	0.2122
TURN	-15.45	-14.80	-13.77	-9.87	-6.55
ω	0.0250		0.0240		0.0200
DFAC	0.105	0.067	0.049	0.004	-0.014
EFFP	0.8255	1.0221	0.9021	0.9789	0.8144
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.250	4.195	3.430	5.728	8.747

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	52.409	53.685	52.804	49.016	46.602
BETA 10	23.853	16.868	14.378	13.971	10.724
V 9	419.38	388.73	394.27	416.16	427.50
V 10	211.81	264.72	264.12	310.97	360.01
VZ 9	251.93	228.65	237.68	272.81	293.71
VZ 10	191.18	251.22	254.98	301.57	353.71
V-THETA 9	332.31	313.22	314.06	314.16	310.62
V-THETA 10	85.65	76.81	65.59	75.08	66.99
M 9	0.3728	0.3446	0.3486	0.3669	0.3756
M 10	0.1864	0.2333	0.2321	0.2728	0.3151
TURN	28.556	36.817	38.425	35.045	35.878
ω	0.3699	0.1575	0.2490	0.2257	0.1483
DFAC	0.7150	0.5686	0.6075	0.5206	0.4360
EFFP	0.5027	0.7265	0.5494	0.4756	0.4468
INCIDM	7.009	12.085	13.604	10.516	6.102
DEVM	19.553	11.368	8.878	8.971	6.624

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	13.898	13.794	12.978	9.258	5.984
BETA 7	52.725	54.769	54.129	50.530	48.622
BETA(PR) 6	60.428	63.345	66.316	68.571	71.324
BETA(PR) 7	25.565	44.342	51.359	54.033	57.730
V 6	220.94	235.55	242.07	251.36	247.14
V 7	431.01	389.72	391.02	408.19	414.62
VZ 6	214.40	228.52	235.81	248.05	245.79
VZ 7	259.22	224.51	228.95	259.41	274.07
V-THETA 6	53.07	56.16	54.36	40.44	25.77
V-THETA 7	342.97	318.33	316.86	315.11	311.12
V(PR) 6	434.5	509.5	587.1	679.0	767.6
V(PR) 7	289.4	314.4	366.9	441.8	513.3
VTHETA PR6	-377.8	-455.3	-537.6	-632.0	-727.2
VTHETA PR7	-124.9	-219.7	-286.6	-357.6	-434.7
U 6	430.90	511.42	591.95	672.47	752.99
U 7	467.84	538.05	608.46	672.74	745.14
M 6	0.1987	0.2119	0.2179	0.2263	0.2225
M 7	0.3834	0.3455	0.3457	0.3599	0.3641
M(PR) 6	0.3907	0.4584	0.5293	0.6113	0.6911
M(PR) 7	0.2574	0.2787	0.3244	0.3895	0.4508
TURN(PR)	34.853	18.980	14.949	14.531	13.596
ω	0.0863	0.1686	0.2466	0.2125	0.2588
DFAC	.5821	.5875	.5639	.5299	.5055
EFFP	1.0037	0.9638	0.9353	0.9048	0.8524
EFF	1.0038	0.9631	0.9338	0.9023	0.8482
INCIDM	11.828	10.845	10.216	8.991	8.126
DEVM	6.765	11.842	9.259	5.438	4.830

Table B-4. Blade Element Data Intermediate Configuration (Continued)

	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
70PERCENT SPEED PT.210	INTERMEDIATE	4246.	142.0

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	16.104	14.628	13.501	9.995	6.416
V 3	217.55	229.42	236.60	240.10	239.43
V 4	228.53	246.09	254.85	261.25	259.69
VZ 3	217.55	229.06	236.59	240.09	239.42
VZ 4	219.54	236.92	247.74	257.25	258.06
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	63.39	62.15	59.50	45.35	29.02
M 3	0.1956	0.2064	0.2129	0.2161	0.2155
M 4	0.2056	0.2215	0.2295	0.2353	0.2339
TURN	-16.10	-14.63	-13.50	-10.00	-6.42
$\bar{\omega}$	0.0220		0.0226		0.0220
DFAC	0.099	0.065	0.050	0.007	-0.024
EFFP	0.8201	0.9621	0.8723	0.9802	0.8045
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	4.596	4.372	3.699	5.605	8.884

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	49.303	48.786	47.297	43.936	41.839
BETA 10	21.760	15.806	13.931	14.176	13.657
V 9	424.94	402.50	406.34	426.65	437.75
V 10	250.08	295.26	295.75	337.59	375.39
VZ 9	272.56	263.41	275.00	307.22	325.97
VZ 10	229.65	281.87	286.36	327.27	364.65
V-THETA 9	322.18	302.78	298.61	296.03	292.00
V-THETA 10	92.71	80.42	71.20	82.68	88.64
M 9	0.3783	0.3575	0.3601	0.3773	0.3862
M 10	0.2206	0.2608	0.2607	0.2971	0.3300
TURN	27.544	32.980	33.366	29.760	28.182
$\bar{\omega}$	0.3136	0.1211	0.1987	0.1444	0.1279
DFAC	0.6130	0.4930	0.5184	0.4419	0.3695
EFFP	0.5449	0.7462	0.6135	0.6618	0.6645
INCIDM	3.903	7.186	8.097	5.436	1.339
DEVM	17.460	10.306	8.431	9.176	9.557

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	14.548	13.565	12.556	9.306	5.898
BETA 7	49.874	50.049	48.843	45.435	41.430
BETA(PR) 6	57.508	60.766	63.935	66.478	69.921
BETA(PR) 7	25.997	42.107	49.269	52.435	55.172
V 6	244.71	261.04	269.04	278.40	268.09
V 7	435.99	401.63	399.91	416.30	430.74
VZ 6	236.78	253.52	262.52	274.70	266.67
VZ 7	279.15	257.57	263.00	292.06	322.95
V-THETA 6	61.47	61.23	58.49	45.02	27.55
V-THETA 7	333.37	307.89	301.09	296.59	285.02
V(PR) 6	440.8	519.2	597.5	688.3	776.8
V(PR) 7	312.6	347.6	403.4	479.2	565.5
VTHETA PR6	-371.8	-453.0	-536.7	-631.1	-729.5
VTHETA PR7	-137.0	-233.1	-305.7	-379.8	-464.2
U 6	433.25	514.21	595.17	676.13	757.09
U 7	470.39	540.98	606.75	676.41	749.22
M 6	0.2203	0.2351	0.2424	0.2509	0.2415
M 7	0.3884	0.3567	0.3544	0.3680	0.3799
M(PR) 6	0.3968	0.4677	0.5383	0.6204	0.6998
M(PR) 7	0.2785	0.3088	0.3575	0.4236	0.4988
TURN(PR)	31.501	18.636	14.657	14.041	14.749
$\bar{\omega}$	0.0611	0.1429	0.1645	0.1406	0.1918
DFAC	.5211	.5197	.4964	.4669	.4274
EFFP	1.0153	1.0022	0.9747	0.9386	0.9283
EFF	1.0156	1.0023	0.9742	0.9371	0.9264
INCIDM	8.908	8.266	7.835	6.887	6.721
DEVM	7.147	9.607	7.169	3.835	2.272

Table B-4. Blade Element Data Intermediate Configuration (Continued)

70PERCENT SPEED	PT.211	CONFIGURATION	INTERMEDIATE	$N/\sqrt{\theta}$	4227.	$\omega\sqrt{\theta}/\delta$	153.5

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	15.194	14.516	13.354	9.732	6.957
V 3	249.92	264.58	273.96	279.28	280.22
V 4	268.77	286.85	295.62	303.33	297.89
VZ 3	249.90	264.23	273.95	279.27	280.21
VZ 4	259.37	276.00	287.61	298.96	295.69
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	70.44	71.90	68.28	51.28	36.08
M 3	0.2250	0.2383	0.2469	0.2517	0.2526
M 4	0.2422	0.2587	0.2667	0.2737	0.2686
TURN	-15.19	-14.52	-13.35	-9.73	-6.96
$\bar{\omega}$	0.0200		0.0247		0.0190
DFAC	0.069	0.054	0.046	0.006	0.001
EFFP	0.7646	0.8644	0.7805	0.9485	0.7273
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.506	4.484	3.846	5.868	8.343

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	44.566	41.918	41.112	37.902	36.004
BETA 10	7.544	6.165	5.962	6.108	5.789
V 9	456.47	434.67	426.34	435.19	441.22
V 10	330.15	336.44	342.94	371.73	400.29
VZ 9	319.48	320.93	320.36	343.28	356.92
VZ 10	324.83	331.64	340.11	369.48	398.21
V-THETA 9	320.32	290.38	280.33	267.34	269.37
V-THETA 10	43.34	36.13	35.62	39.55	40.37
M 9	0.4075	0.3876	0.3793	0.3865	0.3907
M 10	0.2924	0.2983	0.3036	0.3289	0.3535
TURN	37.023	35.753	35.150	31.793	30.215
$\bar{\omega}$	0.1292	0.1007	0.0817	0.0654	0.0506
DFAC	0.5058	0.4670	0.4486	0.3898	0.3349
EFFP	0.7603	0.7663	0.7727	0.8096	0.8748
INCIDM	-0.834	0.318	1.912	-0.598	4.496
DEVM	3.244	0.665	0.462	1.108	1.289

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	13.794	13.412	12.353	9.113	6.443
BETA 7	45.737	43.407	42.578	39.292	37.439
BETA(PR) 6	52.603	56.067	59.891	63.031	66.765
BETA(PR) 7	22.631	37.766	45.994	51.095	54.845
V 6	285.93	305.39	312.27	326.74	319.59
V 7	464.08	430.84	418.77	423.73	429.79
VZ 6	277.61	296.76	304.07	316.68	308.62
VZ 7	322.90	312.67	308.31	327.92	341.34
V-THETA 6	68.17	70.83	66.30	59.74	54.84
V-THETA 7	332.99	296.06	284.02	258.28	241.17
V(PR) 6	457.1	531.8	607.9	698.3	782.2
V(PR) 7	351.6	395.9	444.9	521.2	592.8
VTHETA PR6	-363.1	-441.1	-525.7	-622.4	-718.9
VTHETA PR7	-135.3	-242.5	-330.9	-405.1	-484.7
U 6	431.31	511.91	592.51	673.11	753.70
U 7	468.29	538.56	604.83	673.38	745.87
M 6	0.2578	0.2756	0.2810	0.2897	0.2804
M 7	0.4154	0.3841	0.3734	0.3762	0.3804
M(PR) 6	0.4122	0.4799	0.5497	0.6307	0.7062
M(PR) 7	0.3141	0.3539	0.3959	0.4627	0.5247
TURN(PR)	29.964	18.274	13.983	12.025	11.020
$\bar{\omega}$	0.0203	0.0186	0.0496	0.0694	0.0971
DFAC	.4470	.4301	.4193	.3927	.3778
EFFP	0.9526	1.0101	0.9886	0.9612	0.9134
EFF	0.9517	1.0105	0.9884	0.9604	0.9113
INCIDM	4.003	3.567	3.781	3.431	3.565
DEVM	3.831	5.266	3.894	2.405	1.945

Table B-4. Blade Element Data Intermediate Configuration (Continued)

	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
70PERCENT SPEED PT.212	INTERMEDIATE	4230.	180.3

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	15.445	14.792	13.199	9.715	5.467
V 3	279.56	295.34	304.90	309.63	309.72
V 4	300.10	320.65	327.97	332.32	327.61
VZ 3	279.53	294.98	304.88	309.61	309.71
VZ 4	289.25	308.44	319.28	327.54	326.12
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	79.92	81.86	74.89	56.08	31.21
M 3	0.2520	0.2664	0.2752	0.2795	0.2796
M 4	0.2708	0.2896	0.2964	0.3003	0.2960
TURN	-15.45	-14.79	-13.20	-9.71	-5.47
$\bar{\omega}$	0.0180		0.0228		0.0230
DFAC	0.073	0.055	0.048	0.018	-0.007
EFFP	1.9216	1.7942	1.4591	1.7423	1.4428
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.255	4.208	4.001	5.885	9.833

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	37.055	36.847	34.636	31.700	28.368
BETA 10	15.212	13.869	13.445	13.162	12.935
V 9	492.91	460.99	452.70	455.48	455.47
V 10	423.88	409.06	404.94	414.35	427.59
VZ 9	387.19	366.59	371.86	387.51	400.66
VZ 10	406.47	394.50	393.20	403.45	416.60
V-THETA 9	297.02	276.45	257.30	239.34	216.41
V-THETA 10	111.22	98.06	94.16	94.35	95.71
M 9	0.4424	0.4127	0.4047	0.4065	0.4057
M 10	0.3785	0.3649	0.3608	0.3688	0.3802
TURN	21.843	22.978	21.191	18.538	15.433
$\bar{\omega}$	0.0880	0.0444	0.0553	0.0576	0.0445
DFAC	0.2794	0.2707	0.2636	0.2387	0.1910
EFFP	0.7183	0.8066	0.7234	0.7319	1.0414
INCIDM	-8.345	-4.753	-4.564	-6.800	-12.132
DEVM	10.912	8.369	7.945	8.162	8.835

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	13.868	13.530	12.092	9.086	5.124
BETA 7	38.397	38.408	36.119	32.973	28.685
BETA(PR) 6	48.505	52.332	56.778	60.611	65.186
BETA(PR) 7	22.269	35.884	43.771	49.490	53.522
V 6	322.84	343.26	348.34	352.47	336.19
V 7	497.45	453.59	443.37	441.54	447.88
VZ 6	313.35	333.48	340.53	348.02	334.85
VZ 7	388.03	355.09	357.96	370.35	392.90
V-THETA 6	77.38	80.31	72.97	55.66	30.03
V-THETA 7	308.97	281.80	261.35	240.30	214.98
V(PR) 6	473.0	545.9	621.6	709.2	797.9
V(PR) 7	421.3	438.7	496.0	570.2	660.9
VTHETA PR6	-354.2	-432.0	-520.0	-617.9	-724.2
VTHETA PR7	-159.6	-257.1	-343.1	-433.6	-531.4
U 6	431.61	512.27	592.93	673.58	754.24
U 7	468.62	538.94	604.46	673.86	746.39
M 6	0.2916	0.3104	0.3151	0.3189	0.3039
M 7	0.4466	0.4059	0.3961	0.3938	0.3988
M(PR) 6	0.4273	0.4937	0.5623	0.6417	0.7213
M(PR) 7	0.3782	0.3925	0.4431	0.5086	0.5885
TURN(PR)	26.228	16.426	13.001	11.120	11.664
$\bar{\omega}$	0.0278	0.0187	0.0342	0.0745	0.1075
DFAC	.2936	.3443	.3305	.3122	.2803
EFFP	0.9990	0.9840	0.9967	0.9629	0.9370
EFF	0.9990	0.9837	0.9966	0.9622	0.9357
INCIDM	-0.095	-0.168	0.678	1.011	1.986
DEVM	3.469	3.384	1.671	0.890	0.622

Table B-4. Blade Element Data Intermediate Configuration

70PERCENT SPEED PT.208	CONFIGURATION INTERMEDIATE	$N/\sqrt{\theta}$ 4245.	$\omega\sqrt{\theta}/\delta$ 133.5

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	15.294	14.590	13.252	9.566	6.105
V 3	301.87	318.99	329.21	334.33	334.48
V 4	325.46	349.51	357.87	361.43	352.83
VZ 3	301.83	318.62	329.19	334.31	334.46
VZ 4	313.93	335.65	348.32	356.40	350.83
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	85.85	87.79	82.04	60.06	37.52
M 3	0.2724	0.2881	0.2975	0.3022	0.3023
M 4	0.2940	0.3153	0.3239	0.3272	0.3192
TURN	-15.29	-14.59	-13.25	-9.57	-6.19
$\bar{\omega}$	0.0180		0.0254		0.0230
DFAC	0.068	0.047	0.038	0.009	0.091
EFFP	1.0006	1.1037	0.9833	1.0736	0.7719
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.406	4.050	3.948	6.034	9.195

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	31.657	31.099	29.875	26.229	23.170
BETA 10	15.579	13.899	13.590	12.885	13.157
V 9	514.98	485.15	460.96	460.52	451.76
V 10	491.21	467.68	450.83	451.06	458.38
VZ 9	431.76	413.02	399.07	413.07	415.25
VZ 10	470.49	451.20	437.53	439.67	446.24
V-THETA 9	270.28	250.59	229.61	203.53	177.75
V-THETA 10	131.92	112.34	105.93	100.59	104.33
M 9	0.4641	0.4363	0.4136	0.4129	0.4044
M 10	0.4419	0.4201	0.4042	0.4042	0.4106
TURN	16.078	17.200	16.286	13.344	10.013
$\bar{\omega}$	0.0729	0.0588	0.0290	0.0626	0.0784
DFAC	0.1438	0.1518	0.1393	0.1243	0.0653
EFFP	0.3507	0.3428	0.4084	-0.2657	1.6330
INCIDM	-13.743	-10.501	-9.325	-12.271	-17.330
DEVM	11.279	8.399	8.090	7.885	9.057

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	13.662	13.310	12.111	8.967	5.513
BETA 7	33.077	32.551	31.332	27.393	23.197
BETA(PR) 6	45.672	49.524	54.302	58.579	62.394
BETA(PR) 7	23.543	35.519	44.039	49.843	54.395
V 6	351.94	375.20	378.91	381.32	383.22
V 7	516.34	474.55	450.97	447.15	446.69
VZ 6	341.91	364.97	370.41	376.64	381.64
VZ 7	430.76	399.64	385.03	396.96	410.88
V-THETA 6	83.12	86.40	79.56	59.44	34.91
V-THETA 7	281.75	255.33	234.50	205.73	175.23
V(PR) 6	489.4	562.4	634.8	722.5	827.5
V(PR) 7	472.1	491.5	535.6	615.6	705.7
VTHETA PR6	-350.3	-427.7	-515.5	-616.5	-722.6
VTHETA PR7	-188.5	-285.5	-372.1	-470.5	-573.8
U 6	433.14	514.09	595.03	675.97	756.91
U 7	470.28	540.85	606.61	676.25	749.04
M 6	0.3184	0.3400	0.3434	0.3456	0.3292
M 7	0.4654	0.4265	0.4044	0.4006	0.3998
M(PR) 6	0.4428	0.5096	0.5753	0.6549	0.7311
M(PR) 7	0.4254	0.4417	0.4803	0.5515	0.6316
TURN(PR)	22.122	13.986	10.289	8.734	8.999
$\bar{\omega}$	0.0241	0.0297	0.0439	0.0713	0.0874
DFAC	.1893	.2471	.2600	.2383	.2076
EFFP	1.0355	1.0439	0.9809	0.9845	1.0089
EFF	1.0362	1.0436	0.9806	0.9843	1.0091
INCIDM	-2.928	-2.976	-1.798	-1.021	0.194
DEVM	4.743	3.019	1.909	1.243	1.495

Table B-4. Blade Element Data Intermediate Configuration (Continued)

80PERCENT SPEED PT.203	CONFIGURATION INTERMEDIATE	$N/\sqrt{\theta}$ 4842.	$\omega\sqrt{\theta}/\delta$ 146.4

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	15.372	14.756	14.080	10.471	7.576
V 3	220.27	233.85	243.83	249.58	250.56
V 4	236.48	253.11	262.21	271.34	269.66
VZ 3	220.26	233.54	243.82	249.57	250.55
VZ 4	228.02	242.56	254.33	266.82	267.30
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	62.69	64.47	63.79	49.31	35.55
M 3	0.1981	0.2104	0.2195	0.2247	0.2256
M 4	0.2128	0.2279	0.2362	0.2445	0.2432
TURN	-15.37	-14.76	-14.08	-10.47	-7.58
$\bar{\omega}$	0.0806	0.1975	0.2936	0.2517	0.3063
DFAC	0.072	0.057	0.056	0.012	-0.005
EFFP	0.8219	0.9152	0.8703	0.9864	0.7994
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.328	4.244	3.120	5.129	7.724

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	60.076	57.187	50.682	47.030	47.114
BETA 10	24.851	17.066	13.945	13.185	11.562
V 9	484.80	453.55	445.85	462.05	470.83
V 10	217.82	227.02	290.13	340.44	407.86
VZ 9	236.45	242.75	281.15	314.73	326.41
VZ 10	195.50	280.01	290.02	331.13	399.57
V-THETA 9	420.17	381.18	344.93	338.08	344.99
V-THETA 10	91.54	87.17	69.92	77.65	81.75
M 9	0.4285	0.4000	0.3931	0.4061	0.4116
M 10	0.1898	0.2596	0.2535	0.2973	0.3552
TURN	35.225	40.122	36.738	33.945	35.552
$\bar{\omega}$	0.4073	0.2175	0.3109	0.2671	0.1257
DFAC	0.8051	0.6113	0.6208	0.5269	0.4067
EFFP	0.5021	0.5819	0.3573	0.3117	0.4150
INCIDM	14.676	15.587	11.482	8.530	6.614
DEVM	20.551	11.566	8.445	8.185	7.462

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.395	27.755	32.125	36.495	40.865
BETA 6	14.232	13.939	13.044	9.673	7.671
BETA 7	60.100	58.485	52.478	49.517	48.932
BETA(PR) 6	61.150	63.927	66.241	69.352	71.242
BETA(PR) 7	22.238	43.683	51.626	55.212	56.631
V 6	246.42	263.96	278.36	290.78	298.51
V 7	500.90	456.39	442.80	453.04	455.66
VZ 6	238.79	255.81	271.12	286.63	291.35
VZ 7	248.22	238.30	269.57	330.02	299.34
V-THETA 6	60.61	63.59	62.82	48.86	34.93
V-THETA 7	434.31	383.07	351.26	339.39	343.54
V(PR) 6	494.9	592.2	672.9	777.0	874.9
V(PR) 7	269.9	329.9	434.5	526.0	592.1
VTHETA PR6	-433.5	-522.8	-615.9	-722.2	-828.5
VTHETA PR7	-102.1	-227.8	-340.7	-432.0	-510.8
U 6	494.06	586.39	678.71	771.04	863.36
U 7	536.42	616.91	691.92	771.25	854.38
M 6	0.2219	0.2378	0.2509	0.2622	0.2556
M 7	0.4434	0.4026	0.3904	0.3982	0.3991
M(PR) 6	0.4455	0.5244	0.6066	0.7008	0.7888
M(PR) 7	0.2388	0.2910	0.3830	0.4623	0.5173
TURN(PR)	38.005	20.211	14.610	13.139	11.611
$\bar{\omega}$	0.0806	0.1975	0.2936	0.2517	0.3063
DFAC	.7353	.6554	.5353	.4900	.4886
EFFP	0.8967	0.9259	0.9967	0.9770	0.9936
EFF	0.8938	0.9238	0.9966	0.9762	0.9794
INCIDM	12.550	11.427	10.141	8.752	8.042
DEVM	3.438	11.183	9.526	6.612	6.731

Table B-4. Blade Element Data Intermediate Configuration (Continued)

CONFIGURATION $N/\sqrt{\theta}$ $\omega\sqrt{\theta}/\delta$

80PERCENT SPEED PT.204 INTERMEDIATE 4824. 150.2

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	15.372	14.873	13.864	10.459	8.267
V 3	229.33	242.54	251.12	255.24	254.92
V 4	241.82	259.96	269.82	277.05	276.59
VZ 3	229.33	242.17	251.12	255.23	254.91
VZ 4	233.16	249.67	261.90	272.42	273.71
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	64.10	66.73	64.65	50.29	39.77
M 3	0.2063	0.2183	0.2261	0.2298	0.2295
M 4	0.2176	0.2341	0.2431	0.2497	0.2493
TURN	-15.37	-14.87	-13.86	-10.46	-8.27
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.089	0.068	0.055	0.014	-0.007
EFFP	0.9277	0.9604	0.9182	0.9828	0.9327
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.328	4.127	3.336	5.141	7.033

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	56.647	54.699	49.473	46.182	46.414
BETA 10	23.820	16.810	13.579	13.555	14.212
V 9	487.29	461.97	455.25	478.00	489.59
V 10	235.25	305.77	302.58	351.02	410.27
VZ 9	262.81	264.64	295.06	330.93	337.41
VZ 10	212.68	289.79	293.22	341.18	397.59
V-THETA 9	407.03	377.02	346.04	344.89	354.63
V-THETA 10	95.01	88.43	71.04	82.27	100.73
M 9	0.4314	0.4080	0.4017	0.4204	0.4284
M 10	0.2054	0.2676	0.2647	0.3066	0.3574
TURN	32.827	37.889	35.893	32.627	32.202
$\bar{\omega}$	0.3910	0.2101	0.2766	0.2437	0.1399
DFAC	0.7573	0.5946	0.6013	0.5218	0.4153
EFFP	0.5261	0.6226	0.4692	0.4971	0.6899
INCIDM	11.247	13.099	10.273	7.682	5.914
DEVM	19.520	11.310	8.079	8.555	10.112

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	14.064	13.881	12.800	9.648	7.937
BETA 7	56.778	56.001	51.043	47.701	47.117
BETA(PR) 6	60.066	62.856	65.439	67.812	71.002
BETA(PR) 7	22.478	41.651	49.995	53.434	56.688
V 6	256.43	274.12	287.18	297.22	295.31
V 7	502.63	463.39	451.50	466.61	481.30
VZ 6	247.69	265.81	279.95	292.98	292.59
VZ 7	273.52	258.77	283.65	313.93	327.57
V-THETA 6	62.07	65.76	63.63	49.81	39.36
V-THETA 7	420.48	384.16	351.09	345.12	352.74
V(PR) 6	496.4	582.8	673.5	775.8	868.1
V(PR) 7	298.9	346.8	441.6	527.1	596.5
VTHETA PR6	-430.2	-518.4	-612.6	-718.4	-820.8
VTHETA PR7	-113.9	-230.5	-338.3	-423.4	-498.5
U 6	492.22	584.21	676.19	768.17	860.15
U 7	534.43	614.62	689.34	768.49	851.21
M 6	0.2300	0.2470	0.2590	0.2681	0.2573
M 7	0.4455	0.4093	0.3983	0.4103	0.4212
M(PR) 6	0.4475	0.5252	0.6074	0.6999	0.7827
M(PR) 7	0.2642	0.3063	0.3896	0.4635	0.5218
TURN(PR)	37.579	21.178	15.436	14.375	14.315
$\bar{\omega}$	0.0730	0.1749	0.2574	0.2097	0.2578
DFAC	.6680	.6221	.5247	.4905	.4820
EFFP	0.9149	0.9313	0.9776	0.9478	0.8748
EFF	0.9125	0.9294	0.9769	0.9460	0.8703
INCIDM	11.466	10.356	9.339	8.212	7.802
DEVM	3.678	9.151	7.895	4.834	3.788

Table B-4. Blade Element Data Intermediate Configuration (Continued)

80PERCENT SPEED	PT.205	CONFIGURATION	INTERMEDIATE	$N/\sqrt{\theta}$	4854.	$\omega\sqrt{\theta}/\delta$	171.3

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	15.331	14.421	13.248	9.936	6.343
V 3	261.38	277.18	288.08	294.29	294.83
V 4	281.05	301.07	310.77	319.48	316.97
VZ 3	261.37	276.83	288.07	294.27	294.82
VZ 4	271.05	289.40	302.50	314.69	315.03
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	74.31	74.98	71.22	55.13	35.02
M 3	0.2354	0.2498	0.2598	0.2655	0.2660
M 4	0.2534	0.2717	0.2806	0.2885	0.2862
TURN	-15.33	-14.42	-13.25	-9.94	-6.34
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.071	0.051	0.046	0.008	-0.016
EFFP	0.8361	0.9589	0.8601	0.9807	0.7838
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.369	4.579	3.952	5.664	8.957

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	52.598	49.663	44.798	41.489	40.156
BETA 10	19.361	14.230	12.893	13.635	13.201
V 9	507.20	480.76	469.41	494.46	494.66
V 10	296.86	344.59	351.94	399.13	442.37
VZ 9	301.86	308.02	331.84	370.24	378.01
VZ 10	277.52	330.21	341.63	387.66	430.64
V-THETA 9	402.91	366.46	330.75	327.56	318.99
V-THETA 10	98.42	84.70	78.52	94.09	101.02
M 9	0.4501	0.4258	0.4155	0.4365	0.4348
M 10	0.2600	0.3025	0.3092	0.3502	0.3875
TURN	33.237	35.433	31.906	27.854	26.955
$\bar{\omega}$	0.2774	0.1359	0.1576	0.1397	0.0549
DFAC	0.6396	0.5239	0.4867	0.4129	0.3211
EFFP	0.6368	0.7190	0.6514	0.6517	0.8655
INCIDM	7.198	8.063	5.598	2.989	-0.344
DEVM	15.016	8.730	7.393	8.635	9.101

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	14.069	13.467	12.219	9.191	5.735
BETA 7	53.001	51.115	44.638	43.164	40.839
BETA(PR) 6	55.889	59.096	52.304	54.814	50.413
BETA(PR) 7	20.953	38.966	48.251	51.687	50.889
V 6	295.72	316.89	329.44	342.25	331.27
V 7	522.55	480.85	462.55	481.04	493.43
VZ 6	286.78	307.82	321.91	337.79	329.49
VZ 7	312.67	301.55	318.15	351.38	367.43
V-THETA 6	71.89	73.80	69.72	54.85	33.91
V-THETA 7	417.33	374.30	334.96	328.45	314.14
V(PR) 6	511.4	599.3	690.4	793.8	695.4
V(PR) 7	336.7	389.2	478.1	566.9	665.1
VTHETA PR6	-423.4	-514.9	-410.7	-718.3	-699.6
VTHETA PR7	-120.4	-244.1	-356.7	-444.6	-543.4
U 6	495.28	587.84	686.30	772.45	665.57
U 7	537.75	618.44	693.62	773.27	766.57
M 6	0.2668	0.2862	0.2977	0.3094	0.3009
M 7	0.4643	0.4259	0.4151	.4244	.4243
M(PR) 6	0.4614	0.5412	0.6238	0.7178	0.8037
M(PR) 7	0.2992	0.3430	0.4232	.5052	.5756
TURN(PR)	34.929	29.091	13.949	13.125	12.523
$\bar{\omega}$	0.0512	0.0933	0.1092	0.1132	0.1511
DFAC	.5934	.5519	.4712	.4398	.4156
EFFP	0.8941	0.9417	0.9062	0.8749	0.8331
EFF	0.8913	0.9401	0.9061	.8749	.8312
INCIDM	7.289	6.586	6.104	5.214	5.213
DEVM	2.153	6.466	6.151	3.087	2.983

Table B-4. Blade Element Data Intermediate Configuration (Continued)

	CONFIGURATION	$N/\sqrt{\theta}$	$\omega\sqrt{\theta}/\delta$
PERCENT SPEED PT.206	INTERMEDIATE	4834.	188.9

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.851	40.751
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	15.595	14.402	13.386	9.747	6.496
V 3	291.83	309.10	321.49	326.46	326.49
V 4	315.29	338.00	346.93	353.59	347.90
VZ 3	291.81	308.72	321.47	326.44	326.48
VZ 4	303.68	325.30	337.46	348.39	345.67
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	84.76	84.07	80.31	59.85	39.30
M 3	0.2632	0.2790	0.2905	0.2950	0.2950
M 4	0.2847	0.3056	0.3138	0.3190	0.3147
TURN	-15.59	-14.47	-13.39	-9.75	-6.49
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.069	0.044	0.044	0.029	-0.005
EFFP	0.8527	0.9847	0.9811	0.9801	0.7192
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.105	4.598	3.814	5.853	8.814

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	44.443	44.049	39.443	35.252	34.990
BETA 10	15.818	13.363	12.938	12.821	12.425
V 9	530.30	498.96	496.13	502.92	511.68
V 10	392.17	397.07	401.16	432.91	456.05
VZ 9	371.83	355.61	382.13	410.65	419.59
VZ 10	374.67	382.83	389.06	422.04	446.12
V-THETA 9	371.32	346.92	315.19	290.27	292.69
V-THETA 10	106.95	91.77	99.82	96.07	98.32
M 9	0.4732	0.4438	0.4412	0.4466	0.4521
M 10	0.3465	0.3507	0.3543	0.3826	0.4024
TURN	28.625	30.686	26.504	22.430	22.465
$\bar{\omega}$	0.1581	0.0993	0.1564	0.0803	0.1025
DFAC	0.4465	0.4139	0.3911	0.3192	0.2927
EFFP	0.7093	0.7698	0.5988	0.7319	0.8761
INCIDM.	-0.957	2.449	0.243	-3.248	-5.610
DEVM	11.518	7.863	7.438	7.821	8.325

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.395	27.755	32.125	36.495	40.865
BETA 6	14.143	13.454	12.215	9.777	5.071
BETA 7	45.567	45.569	41.446	36.777	35.121
BETA(PR) 6	51.643	55.273	58.964	62.234	64.566
BETA(PR) 7	21.634	37.031	45.327	52.782	53.990
V 6	335.61	358.40	369.15	378.71	359.35
V 7	540.24	495.81	486.42	497.37	502.67
VZ 6	325.24	348.30	360.72	374.11	357.4
VZ 7	376.69	346.83	364.42	396.66	411.65
V-THETA 6	82.24	82.78	78.11	59.29	37.39
V-THETA 7	385.37	353.99	321.97	291.31	298.47
V(PR) 6	524.4	511.8	559.7	602.9	598.7
V(PR) 7	407.3	434.9	518.6	618.2	699.7
VTHETA PR6	-411.2	-502.6	-599.5	-710.5	-924.4
VTHETA PR7	-156.2	-261.9	-368.3	-478.8	-564.5
U 6	493.24	585.42	677.59	769.76	861.94
U 7	535.53	615.90	696.27	776.64	852.97
M 6	0.3034	0.3244	0.3343	0.3432	0.3253
M 7	0.4825	0.4409	0.4322	0.4324	0.4441
M(PR) 6	0.474	0.5537	0.6337	0.7276	0.8135
M(PR) 7	0.3634	0.3867	0.4608	0.5493	0.6172
TURN(PR)	30.009	18.217	13.632	11.453	12.667
$\bar{\omega}$	0.0157	0.0235	0.0489	0.0815	0.1128
DFAC	.4400	.4661	.4064	.3593	.3909
EFFP	0.9831	0.9602	1.0349	1.0416	0.9611
EFF	0.9673	0.9592	1.0359	1.0418	0.9567
INCIDM	3.049	2.773	2.864	2.636	3.366
DEVM	2.834	4.531	3.227	2.182	0.999

Table B-4. Blade Element Data Intermediate Configuration (Continued)

80PERCENT SPEED PT.202 | CONFIGURATION INTERMEDIATE | $N/\sqrt{\theta}$ 4832. | $\omega\sqrt{\theta}/\delta$ 217.9

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	15.650	14.543	13.138	9.951	5.830
V 3	343.02	362.78	375.11	381.70	382.19
V 4	373.55	398.92	409.72	415.77	407.85
VZ 3	342.98	362.36	375.08	381.68	382.16
VZ 4	359.70	384.14	398.98	409.52	405.76
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	100.77	100.17	93.13	71.85	41.22
M 3	0.3102	0.3284	0.3399	0.3460	0.3464
M 4	0.3384	0.3620	0.3720	0.3777	0.3703
TURN	-15.65	-14.54	-13.14	-9.95	-5.80
$\bar{\omega}$	(REFER TO 70% & 100% SPEED DATA)				
DFAC	0.062	0.040	0.033	0.005	-0.013
EFFP	0.8546	0.9318	0.8483	0.9356	0.7104
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	5.050	4.457	4.062	5.649	9.500

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	33.498	32.236	30.495	28.229	22.249
BETA 10	15.273	13.348	13.081	12.570	12.433
V 9	588.01	545.10	520.68	519.75	509.52
V 10	552.26	526.71	508.02	509.90	526.18
VZ 9	482.69	458.09	447.74	457.85	471.52
VZ 10	529.82	508.94	493.84	497.58	513.77
V-THETA 9	324.52	290.76	264.23	245.84	192.92
V-THETA 10	145.47	121.59	114.98	110.97	113.28
M 9	0.5303	0.4902	0.4671	0.4654	0.4555
M 10	0.4964	0.4729	0.4552	0.4562	0.4710
TURN	18.225	16.888	17.414	15.659	9.816
$\bar{\omega}$	0.1171	0.0687	0.0922	0.1205	0.0761
DFAC	0.1722	0.1601	0.1498	0.1402	0.0442
EFFP	0.1713	0.0341	-0.5561	-1.9369	1.7692
INCIDM	-11.902	-9.364	-8.705	-10.271	-18.251
DEVM	10.973	7.848	7.581	7.570	8.333

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	14.016	13.210	11.949	9.309	5.102
BETA 7	35.014	33.789	32.045	29.543	24.640
BETA(PR) 6	45.328	49.439	54.172	58.242	62.846
BETA(PR) 7	22.057	35.750	44.199	49.864	55.190
V 6	403.01	428.64	433.64	438.21	424.25
V 7	591.10	533.29	509.64	514.80	494.35
VZ 6	390.93	417.02	424.17	432.42	422.57
VZ 7	481.97	442.81	431.78	439.11	449.35
V-THETA 6	97.61	97.95	89.78	70.89	37.72
V-THETA 7	339.16	296.58	270.41	248.90	206.18
V(PR) 6	556.1	641.5	724.7	821.6	925.9
V(PR) 7	522.4	546.1	602.6	681.3	787.3
VTHETA PR6	-395.4	-487.2	-587.5	-698.6	-823.9
VTHETA PR7	-196.2	-319.1	-420.1	-532.9	-646.4
U 6	493.04	585.17	677.31	769.44	861.58
U 7	535.31	615.64	690.49	769.76	852.62
M 6	0.3658	0.3897	0.3944	0.3987	0.3856
M 7	0.5332	0.4791	0.4568	0.4515	0.4414
M(PR) 6	0.5048	0.5833	0.6592	0.7475	0.8416
M(PR) 7	0.4712	0.4906	0.5401	0.6093	0.7031
TURN(PR)	23.265	13.671	9.968	8.377	7.647
$\bar{\omega}$	0.0070	0.0265	0.0561	0.0690	0.1026
DFAC	.2250	.2734	.2743	.2675	.2348
EFFP	1.0151	1.0262	1.0086	0.9687	0.9826
EFF	1.0154	1.0267	1.0088	0.9680	0.9822
INCIDM	-3.272	-3.061	-1.928	-1.358	-0.354
DEVM	3.257	3.250	2.099	1.264	2.299

Table B-4. Blade Element Data Intermediate Configuration (Continued)

100 PERCENT SPEED PT.197 CONFIGURATION INTERMEDIATE $N/\sqrt{\theta}$ 6060. $\omega\sqrt{\theta}/\delta$ 190.

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	15.774	15.136	14.048	12.582	13.982
V 3	294.38	311.69	324.18	330.67	330.94
V 4	314.60	337.80	348.94	361.60	367.10
VZ 3	294.38	311.25	324.17	330.66	330.92
VZ 4	302.75	323.61	338.48	352.88	356.23
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	85.52	88.20	84.70	78.77	88.70
M 3	0.2655	0.2814	0.2929	0.2988	0.2991
M 4	0.2841	0.3054	0.3157	0.3274	0.3324
TURN	-15.77	-15.14	-14.05	-12.58	-13.98
$\bar{\omega}$	0.0180		0.0260		0.0170
DFAC	0.080	0.060	0.055	0.026	0.025
EFFP	0.9392	0.9900	0.9178	1.0386	1.0181
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	-4.926	-3.864	-3.152	-3.018	-1.318

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	57.915	58.129	50.346	47.702	49.397
BETA 10	21.730	13.812	8.691	10.651	16.202
V 9	613.52	575.68	567.82	613.82	613.96
V 10	245.00	364.51	357.73	415.08	529.26
VZ 9	318.98	300.52	360.94	412.99	399.48
VZ 10	224.61	349.45	351.99	407.73	508.15
V-THETA 9	519.82	488.89	437.17	454.02	466.14
V-THETA 10	90.71	87.02	54.06	76.72	147.67
M 9	0.5393	0.5034	0.4966	0.5347	0.5307
M 10	0.2104	0.3141	0.3084	0.3569	0.4548
TURN	36.186	44.318	41.655	37.051	33.195
$\bar{\omega}$	0.4518	0.1987	0.3017	0.3220	0.1288
DFAC	0.8640	0.6546	0.6674	0.6103	0.3915
EFFP	0.5275	0.6718	0.4608	0.4080	0.7288
INCIDM	12.515	16.529	11.146	9.202	8.897
DEVM	17.430	8.312	3.191	5.651	12.102

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	14.490	14.299	12.910	11.574	12.989
BETA 7	57.662	59.319	52.339	49.199	50.692
BETA(PR) 6	59.129	62.204	64.630	66.581	68.489
BETA(PR) 7	21.589	42.774	50.713	52.647	57.051
V 6	330.79	352.33	372.83	391.92	381.90
V 7	635.41	579.61	562.88	598.47	610.63
VZ 6	320.17	340.99	363.30	383.91	372.12
VZ 7	337.46	295.40	343.66	390.94	386.81
V-THETA 6	82.77	87.02	83.30	78.63	85.84
V-THETA 7	536.86	498.48	445.60	453.04	472.48
V(PR) 6	624.9	731.4	848.0	965.9	1062.0
V(PR) 7	365.5	402.9	543.1	644.5	711.2
VTHETA PR6	-535.6	-646.9	-766.1	-986.4	-994.7
VTHETA PR7	-134.5	-273.6	-420.4	-512.3	-596.8
U 6	618.34	733.89	849.44	964.99	1080.54
U 7	671.34	772.10	865.97	965.39	1069.37
M 6	0.2989	0.3188	0.3377	0.3555	0.3462
M 7	0.5599	0.5079	0.4921	0.5210	0.5280
M(PR) 6	0.5639	0.6618	0.7682	0.8761	0.9626
M(PR) 7	0.3220	0.3524	0.4748	0.5611	0.6150
TURN(PR)	37.533	19.401	13.911	13.932	12.438
$\bar{\omega}$	0.0597	0.1840	0.2781	0.2405	0.2149
DFAC	.6849	.6728	.5401	.5058	.5008
EFFP	0.9140	0.9000	0.9827	0.9678	0.9156
EFF	0.9102	0.8956	0.9819	0.9660	0.9107
INCIDM	10.529	9.704	8.530	6.981	6.289
DEVM	2.788	10.274	8.613	4.047	4.151

Table B-4. Blade Element Data Intermediate Configuration (Continued)

CONFIGURATION $N/\sqrt{\theta}$ $\omega\sqrt{\theta}/\delta$

100PERCENT SPEED PT.198 INTERMEDIATE 6063. 199.

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	15.717	15.057	13.749	11.680	12.674
V 3	308.36	326.80	339.95	347.29	348.49
V 4	330.50	352.93	367.52	381.20	384.24
VZ 3	308.35	326.35	339.94	347.27	348.48
VZ 4	318.14	338.16	356.97	373.30	374.88
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	89.53	91.68	87.35	77.17	84.30
M 3	0.2783	0.2953	0.3074	0.3141	0.3152
M 4	0.2987	0.3193	0.3328	0.3455	0.3483
TURN	-15.72	-15.06	-13.75	-11.68	-12.67
$\bar{\omega}$	0.0170		0.0235		0.0190
DFAC	0.077	0.062	0.048	0.014	0.018
EFFP	0.9135	0.9454	0.9167	1.0254	1.0019
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	-4.983	-3.943	-3.451	-3.920	-2.626

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	57.959	55.049	49.649	47.434	48.794
BETA 10	23.487	14.414	11.063	12.669	15.159
V 9	618.83	581.51	572.26	616.45	641.15
V 10	261.08	381.82	376.77	435.03	556.32
VZ 9	321.21	329.42	368.96	416.77	422.36
VZ 10	236.43	365.04	367.90	424.05	536.95
V-THETA 9	524.56	476.63	436.11	454.02	482.37
V-THETA 10	104.05	95.04	72.30	95.41	145.47
M 9	0.5441	0.5097	0.5009	0.5369	0.5545
M 10	0.2242	0.3298	0.3253	0.3743	0.4780
TURN	34.472	40.635	38.586	34.765	33.635
$\bar{\omega}$	0.4465	0.1896	0.2814	0.2999	0.1004
DFAC	0.8335	0.6131	0.6217	0.5655	0.3891
EFFP	0.5202	0.6593	0.4913	0.4301	0.6515
INCIDM	12.559	13.449	10.449	8.934	8.294
DEVM	19.87	8.914	5.563	7.669	11.059

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	[illegible]
BETA 6	14.509	14.126	12.707	10.829	[illegible]
BETA 7	57.721	56.345	51.339	48.977	[illegible]
BETA(PR) 6	57.823	60.898	63.493	[illegible]	[illegible]
BETA(PR) 7	20.722	41.475	49.932	[illegible]	[illegible]
V 6	345.84	370.08	390.67	409.44	[illegible]
V 7	641.24	584.21	568.17	[illegible]	[illegible]
VZ 6	334.72	358.44	381.00	[illegible]	[illegible]
VZ 7	340.09	323.38	354.69	394.49	[illegible]
V-THETA 6	86.65	90.32	85.93	76.93	[illegible]
V-THETA 7	542.14	486.29	443.45	453.57	[illegible]
V(PR) 6	628.6	737.2	853.7	975.3	[illegible]
V(PR) 7	366.1	432.1	552.0	[illegible]	[illegible]
VTHETA PR6	-532.0	-643.9	-763.0	-888.5	[illegible]
VTHETA PR7	-129.6	-286.2	-422.7	-512.3	[illegible]
U 6	618.65	734.25	849.96	[illegible]	[illegible]
U 7	671.69	772.48	866.40	[illegible]	[illegible]
M 6	0.3128	0.3352	0.3543	[illegible]	[illegible]
M 7	0.5651	0.5122	0.4972	[illegible]	[illegible]
M(PR) 6	0.5685	0.6677	0.7742	[illegible]	[illegible]
M(PR) 7	0.3226	0.3789	0.4931	[illegible]	[illegible]
TURN(PR)	37.094	19.392	13.505	13.254	[illegible]
$\bar{\omega}$	0.0549	0.1405	0.2314	0.1745	0.1462
DFAC	.6872	.6276	.5305	.5093	.5198
EFFP	0.8939	0.9304	0.9839	[illegible]	[illegible]
EFF	0.8894	0.9273	0.9832	[illegible]	[illegible]
INCIDM	9.223	8.398	7.393	6.051	5.200
DEVM	1.922	8.975	7.882	3.795	3.459

Table B-4. Blade Element Data Intermediate Configuration (Continued)

CONFIGURATION $N/\sqrt{\theta}$ $\omega\sqrt{\theta}/\delta$

100PERCENT SPEED PT.199 INTERMEDIATE 6036. 215.

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	16.625	14.911	13.420	11.981	11.235
V 3	341.44	361.05	373.22	378.38	375.55
V 4	362.47	388.76	403.69	416.61	422.02
VZ 3	341.43	360.46	373.20	378.36	375.53
VZ 4	348.36	373.48	392.55	408.74	413.92
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	100.06	100.02	93.69	80.07	82.23
M 3	0.3087	0.3268	0.3381	0.3429	0.3403
M 4	0.3282	0.3525	0.3664	0.3785	0.3835
TURN	-16.02	-14.91	-13.42	-11.08	-11.24
$\bar{\omega}$	0.0200		0.0256		0.0210
DFAC	0.089	0.064	0.045	0.005	-0.014
EFFP	0.8425	0.9404	0.8927	0.9936	0.9294
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	-4.675	-4.089	-3.780	-4.519	-4.065

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	52.108	50.348	45.569	42.203	47.430
BETA 10	16.492	14.629	12.925	13.339	15.018
V 9	632.48	668.89	691.19	642.71	669.38
V 10	316.38	419.03	423.80	475.81	560.68
VZ 9	381.10	385.46	420.02	476.11	451.82
VZ 10	299.69	401.74	412.21	462.96	541.22
V-THETA 9	499.13	468.80	429.31	431.75	493.44
V-THETA 10	89.76	105.93	94.07	109.77	145.29
M 9	0.5591	0.5362	0.5287	0.5636	0.5932
M 10	0.2734	0.3637	0.3677	0.4122	0.4846
TURN	35.626	35.719	32.744	28.864	32.472
$\bar{\omega}$	0.4153	0.1983	0.2207	0.2070	0.0773
DFAC	0.7434	0.5566	0.5405	0.4932	0.4165
EFFP	0.5395	0.6834	0.6144	0.6722	0.9591
INCIDM	6.708	8.748	6.369	3.703	6.990
DEVM	12.182	9.129	7.325	8.339	10.918

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	14.594	13.774	12.230	10.192	11.039
BETA 7	52.114	51.661	47.249	43.773	46.577
BETA(PR) 6	54.350	57.605	60.660	63.196	66.834
BETA(PR) 7	20.760	37.640	46.723	49.754	52.589
V 6	384.76	413.59	433.91	452.36	433.07
V 7	654.22	609.02	592.71	622.42	655.43
VZ 6	372.22	401.32	423.91	445.17	425.06
VZ 7	398.84	377.30	402.04	449.32	450.51
V-THETA 6	96.94	98.47	91.92	80.04	82.92
V-THETA 7	516.33	477.69	435.23	430.59	474.04
V(PR) 6	638.7	749.3	865.2	987.2	1080.5
V(PR) 7	429.7	477.1	586.9	695.6	741.6
VTHETA PR6	-518.9	-632.5	-754.2	-881.1	-993.3
VTHETA PR7	-152.4	-291.4	-427.3	-531.0	-589.0
U 6	615.80	730.98	846.08	961.17	1076.26
U 7	668.75	769.04	862.54	961.56	1065.07
M 6	0.3488	0.3757	0.3947	0.4120	0.3939
M 7	0.5796	0.5364	0.5209	0.5451	0.5707
M(PR) 6	0.5790	0.6806	0.7870	0.8992	0.9827
M(PR) 7	0.3807	0.4202	0.5159	0.6093	0.6457
TURN(PR)	33.572	19.941	13.928	13.440	14.245
$\bar{\omega}$	0.0144	0.0693	0.1162	0.0822	0.1062
DFAC	.5724	.5649	.4894	.4539	.4840
EFFP	0.9478	0.9608	1.0019	0.9870	0.9393
EFF	0.9456	0.9590	1.0020	0.9864	0.9369
INCIDM	5.750	5.105	4.560	3.596	3.634
DEVM	1.969	5.140	4.623	1.154	-0.311

Table B-4. Blade Element Data Intermediate Configuration (Continued)

100PERCENT SPEED PT.200 | CONFIGURATION INTERMEDIATE | $N/\sqrt{\theta}$ 6047. | $\omega\sqrt{\theta}/\delta$ 238.

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	15.996	14.647	13.506	10.145	7.616
V 3	379.33	401.76	416.97	424.52	420.25
V 4	408.20	435.66	449.21	461.04	475.67
VZ 3	379.31	401.22	416.96	424.50	420.23
VZ 4	392.39	418.84	436.72	453.74	471.45
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	112.49	110.16	104.91	81.21	63.04
M 3	0.3438	0.3646	0.3788	0.3859	0.3819
M 4	0.3706	0.3963	0.4091	0.4202	0.4340
TURN	-16.00	-14.65	-13.51	-10.14	-7.62
$\bar{\omega}$	0.0180		0.0253		0.0200
DFAC	0.076	0.055	0.049	0.010	-0.057
EFFP	0.9076	0.9780	0.9062	0.9822	0.8947
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	-4.704	-4.353	-3.694	-5.455	-7.684

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	45.407	45.786	40.498	37.043	43.803
BETA 10	15.357	13.601	12.678	12.401	11.625
V 9	650.69	614.48	608.01	625.79	616.42
V 10	438.03	469.81	482.39	520.23	582.80
VZ 9	448.09	424.42	460.92	499.47	443.76
VZ 10	418.97	451.90	468.97	507.93	570.68
V-THETA 9	463.36	440.42	394.86	376.98	426.67
V-THETA 10	116.00	110.48	105.87	111.72	117.44
M 9	0.5791	0.5438	0.5381	0.5522	0.5379
M 10	0.3829	0.4108	0.4224	0.4551	0.5075
TURN	30.050	32.185	27.820	24.642	32.177
$\bar{\omega}$	0.2330	0.0980	0.1309	0.1328	0.0535
DFAC	0.5267	0.4557	0.4156	0.3663	0.2996
EFFP	0.6555	0.7714	0.6758	0.6611	0.9317
INCIDM	0.007	4.186	1.298	-1.457	3.303
DEVM	11.057	8.101	7.178	7.401	7.525

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	14.549	13.560	12.321	9.295	7.079
BETA 7	46.061	47.244	42.560	38.605	38.434
BETA(PR) 6	50.460	54.310	57.827	60.882	64.180
BETA(PR) 7	22.261	37.640	46.254	51.358	54.001
V 6	433.48	461.56	479.38	496.13	495.74
V 7	667.17	612.52	596.50	605.49	614.03
VZ 6	419.46	448.29	468.78	491.53	491.95
VZ 7	460.19	415.35	439.04	473.05	473.99
V-THETA 6	108.90	108.22	102.42	80.45	61.93
V-THETA 7	480.41	449.75	423.46	377.79	360.44
V(PR) 6	659.0	768.6	880.5	1010.2	1129.3
V(PR) 7	500.2	525.1	636.6	752.8	836.9
VTHETA PR6	-508.1	-624.1	-745.2	-882.5	-1017.3
VTHETA PR7	-189.5	-320.7	-460.7	-585.5	-676.4
U 6	617.01	732.32	847.62	962.92	1078.23
U 7	669.92	770.44	864.11	963.32	1047.61
M 6	0.3943	0.4207	0.4381	0.4554	0.4531
M 7	0.5948	0.5420	0.5274	0.5337	0.5362
M(PR) 6	0.5994	0.7006	0.8037	0.9234	1.0333
M(PR) 7	0.4460	0.4646	0.5628	0.6635	0.7213
TURN(PR)	28.191	16.646	11.444	9.822	8.109
$\bar{\omega}$	-0.0255	0.0278	0.0362	0.0784	0.1277
DFAC	.4525	.4946	.4218	.3863	.4055
EFFP	0.9810	0.9594	1.0448	1.0458	1.0444
EFF	0.9803	0.9578	1.0447	1.0479	1.0415
INCIDM	1.860	1.810	1.727	1.282	0.989
DEVM	3.461	5.140	4.256	2.458	2.091

Table B-4. Blade Element Data Intermediate Configuration (Continued)

100PERCENT SPEED PT.196	CONFIGURATION INTERMEDIATE	$N/\sqrt{\theta}$ 6059.	$\omega\sqrt{\theta}/\delta$ 262.

INLET GUIDE VANE

PCT SPAN	90	70	50	30	10
DIA 3	21.150	26.050	30.950	35.850	40.750
BETA 3	0.000	0.000	0.000	0.000	0.000
BETA 4	15.753	14.682	13.093	10.359	6.933
V 3	428.60	452.65	466.99	473.76	473.69
V 4	466.03	496.52	514.37	519.44	510.79
VZ 3	428.55	452.09	466.96	473.73	473.66
VZ 4	448.50	478.18	500.93	510.95	507.05
V-THETA 3	0.00	0.00	0.00	0.00	0.00
V-THETA 4	126.52	125.85	116.52	93.40	61.65
M 3	0.3897	0.4123	0.4258	0.4322	0.4322
M 4	0.4249	0.4538	0.4708	0.4757	0.4674
TURN	-15.75	-14.68	-13.09	-10.36	-6.93
$\bar{\omega}$	0.0200		0.0231		0.0190
DFAC	0.064	0.044	0.024	0.003	-0.013
EFFP	0.9195	0.9238	0.9435	0.9794	0.8262
INCIDM	-20.200	-20.200	-20.200	-20.200	-20.200
DEVM	-4.947	-4.318	-4.107	-5.241	-8.367

STATOR 1

STATOR B

PCT SPAN	90	70	50	30	10
DIA 9	26.021	29.683	33.345	37.007	40.669
BETA 9	31.691	32.216	30.252	26.822	25.493
BETA 10	14.236	13.249	12.369	10.727	12.562
V 9	725.70	678.77	645.51	634.24	651.66
V 10	679.72	642.88	612.45	596.71	636.76
VZ 9	608.43	571.22	556.90	565.99	588.06
VZ 10	654.96	622.26	597.48	586.28	621.33
V-THETA 9	381.24	361.86	325.21	286.18	280.47
V-THETA 10	167.15	147.33	131.19	111.07	138.49
M 9	0.6581	0.6119	0.5799	0.5688	0.5824
M 10	0.6132	0.5774	0.5483	0.5332	0.5685
TURN	17.455	18.967	17.883	16.095	12.931
$\bar{\omega}$	0.1101	0.0915	0.0938	0.1300	0.0719
DFAC	0.1715	0.1816	0.1829	0.1879	0.1297
EFFP	0.3036	0.3258	0.2427	0.0740	0.5472
INCIDM	-13.709	- 9.384	- 8.948	-11.678	-15.007
DEVM	9.936	7.749	6.869	5.727	8.462

ROTOR

PCT SPAN	90	70	50	30	10
DIA 6	23.385	27.755	32.125	36.495	40.865
BETA 6	13.943	13.200	11.905	9.560	6.657
BETA 7	33.167	33.808	31.793	28.509	25.368
BETA(PR) 6	45.106	49.151	53.732	58.037	62.867
BETA(PR) 7	24.270	36.304	44.923	51.547	54.176
V 6	508.90	542.07	551.63	552.49	525.94
V 7	726.06	661.58	629.91	609.40	636.33
VZ 6	493.79	527.43	539.65	544.78	522.39
VZ 7	604.99	549.16	535.11	535.41	574.96
V-THETA 6	122.62	123.79	113.79	91.75	60.97
V-THETA 7	397.21	368.11	331.87	290.87	272.62
V(PR) 6	699.7	806.6	912.3	1029.1	1145.5
V(PR) 7	666.7	682.1	756.2	861.1	982.4
VTHETA PR6	-495.6	-610.0	-735.5	-873.1	-1019.4
VTHETA PR7	-274.0	-403.9	-534.0	-674.4	-796.5
U 6	618.24	733.77	849.30	964.83	1080.36
U 7	671.24	771.97	865.82	965.23	1069.13
M 6	0.4656	0.4974	0.5066	0.5075	0.4819
M 7	0.6585	0.5953	0.5650	0.5453	0.5681
M(PR) 6	0.6402	0.7402	0.8379	0.9453	1.0496
M(PR) 7	0.6046	0.6138	0.6782	0.7705	0.8770
TURN(PR)	20.829	12.830	8.804	6.488	8.691
$\bar{\omega}$	0.0200	0.0460	0.0922	0.1054	0.1422
DFAC	.1961	.2764	.2727	.2496	.2288
EFFP	1.0806	1.0289	0.9883	0.9572	0.9559
EFF	1.0832	1.0298	0.9880	0.9560	0.9544
INCIDM	-3.494	-3.349	-2.368	-1.563	-0.333
DEVM	5.470	3.804	2.823	2.947	1.276

APPENDIX C

Method of Deducing Rotating Stall Characteristics

The number, rotational speed, and size of rotating stall zones were determined from the results obtained with three Kistler high response pressure transducers located at Station 2, 10% of span from the outer wall, and spaced 30 and 60 degrees apart, respectively. A set of representative transducer signal traces is presented in figure C-1 to illustrate the method used. The method is predicated on a maximum number of stall zones equal to twelve, and equal rotational speed for all zones.

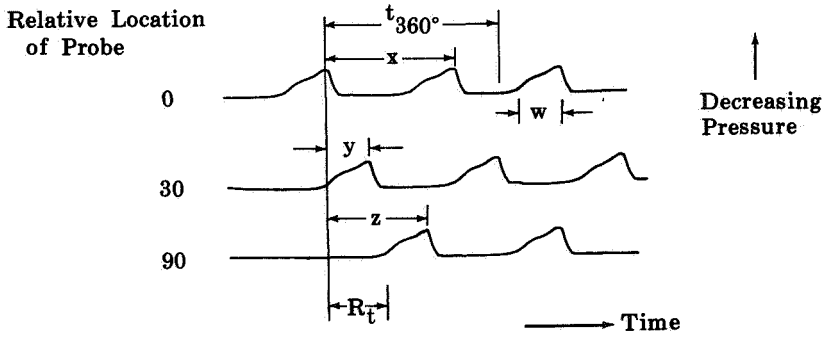


Figure C-1. Transducer Signal Diagram FD 25199

In figure C-1:

X = time between any two adjacent stall zones (or the cycle time of a single stall zone)

y = time for one of twelve or less stall zones to move from the 0-degree to the 30-degree probe.

z = time between a simultaneous stall zone intercept at the 0-degree probe and a stall zone intercept at the 90-degree probe.

w = the circumferential extent of a stall zone

R_t = time for one rotor revolution

t_{360^o} = time equivalent of 360 degrees on the transducer signal trace

The minimum angular spacing of stall zones is obtained from

$$\frac{30}{y/x}$$

Thus, if y = x, the minimum angular spacing would be 30 degrees. With the angular spacing known for any two adjacent zones, it is possible to identify the time-equivalent of 360 degrees on the transducer signal trace. The number of stall zones within this time period is the number of stall zones present. The rotational speed of the stall zone in terms of rotor speed is obtained from the ratio

$$\frac{R_t}{t_{360^\circ}}$$

The extent of the stall zone is

$$\frac{w}{t_{360^\circ}}$$

The third probe can be used for a check on the number of stall zones when the minimum spacing is equal to or greater than 60 or 90 degrees. The third probe also defines the direction of rotation of the stall zones, although this direction is usually that of the rotor.

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