NASA CR-54549
PWA FR-2286

SINGLE STAGE EXPERIMENTAL EVALUATION OF SLOTTED ROTOR AND STATOR BLADING

PART VI - DATA AND PERFORMANCE FOR SLOTTED STATOR 1 AND FLOW GENERATION ROTOR

FACILITY FORM 602

N 67-32098
(ACCESSION NUMBER)
(THRU)
101
(PAGES)
1
(CODE)
CR-54549
(NASA CR OR TMX OR AD NUMBER)
01
(CATEGORY)

PREPARED FOR

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

CONTRACT NAS3-7603

Pratt & Whitney Aircraft DIVISION OF UNITED AIRCRAFT CORPORATION
FLORIDA RESEARCH AND DEVELOPMENT CENTER

28

Printed in the United States of America

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CONTRACT NAS3-7603
21 JULY 1967

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ABSTRACT

An investigation of a slotted stator in a single-stage compressor was conducted as part of an overall program to evaluate the effect of slots on the performance of highly loaded compressor rotor and stator blade rows. The stator vanes were 65-series airfoils of constant camber and blade chord angle. The unslotted design diffusion factor and the design inlet Mach number were 0.521 and 0.644, respectively, at a radial position 90% of span from the vane tips. Measured deviation angles and loss coefficients were higher than predicted. The measured diffusion factor at 90% of span from the stator tip was 0.46 at design incidence.

CONTENTS

SECTION		PAGE
I	SUMMARY	I-1
II	INTRODUCTION	II-1
III	TEST EQUIPMENT	III-1
	A. Facility	III-1
	B. Compressor Test Rig	III-1
	C. Stage Blading Design	III-2
	D. Instrumentation	111-5
IV	PROCEDURES	IV-1
	A. Test Procedure	IV-1
	B. Data Reduction Procedures	IV-2
V	PRESENTATION AND DISCUSSION OF RESULTS	V-1
	A. Stage Performance	V-1
	B. Blade Element Performance	V-3
	C. Data Tabulation	V-5
VI	CONCLUDING DISCUSSION	VI-1
VII	ILLUSTRATIONS	VII-1
	APPENDIX A - Definition of Symbols	A-1
	APPENDIX B - Tabulated Performance	B-1
	APPENDIX C - References	C-1

ILLUSTRATIONS

FIGURE		PAGE
III-1	Compressor Research Facility	VII-2
111-2	Rotating Axial Flow Cascade Test Rig	VII-3
111-3	Flow Path and Instrumentation Stations	VII-4
III-4	Rotating Cascade Rig Bleed System	VII-5
111-5	Slot Geometry	VII-6
III-6	Typical Slotted Stator 1 Vane	VII-7
111-7	Instrumentation, Station 1, View Looking Downstream	VII-8
111-8	Instrumentation, Station 2, View Looking Downstream	VII-9

ILLUSTRATIONS (Continued)

FIGURE		PAGE
III-9	Instrumentation, Station 2A, View Looking Downstream.	VII-10
III-10	Instrumentation, Station 3, View Looking Downstream.	VII-11
III-11	Probe Configurations.	VII-12
III-12	Strain Gage Locations	VII-13
V-1	Overall Performance: Flow Generation Rotor Only	VII-14
v-2	Overall Performance: Inlet Guide Vane and Flow Generation Rotor.	VII-15
v-3	Overall Performance: Guide Vane - Flow Generation Rotor - Slotted Stator 1.	VII-16
v-4	Composite Overall Performance: Flow Generation Rotor	VII-17
v-5	Flow Generation Rotor Relative Inlet Air Angle: 50% Span, 100% Design Equivalent Rotor Speed	VII-18
V-6	Flow Generation Rotor Efficiency: Slotted Stator 1 Test.	VII-19
v-7	Overall Performance, Flow Generation Rotor Only: Efficiency Based on Velocity Diagram.	VII-20
v-8	Overall Performance: Inlet Guide Vane and Flow Generation Rotor, Efficiency Based on Velocity Diagram.	VII-21
v-9	Overall Performance: Guide Vane Flow Generation Rotor Slotted Stator 1, Efficiency Based on Velocity Diagram	VII-22
v-10	Airflow Continuity Comparison.	VII-23
V-11	Inlet Air Angle and Mach Number Distribution: Slotted Stator 1, 100% Design Equivalent Rotor Speed.	VII-24
v-12	Stator Blade Element Performance: 100% Design Equivalent Rotor Speed, 100% Span from Tip	VII-25
V-13	Stator Blade Element Performance: 100% Design Equivalent Rotor Speed, 30% Span from Tip.	VII-26
V-14	Stator Blade Element Performance: 100% Design Equivalent Rotor Speed, 50% Span from Tip.	VII-27
V-15	Stator Blade Element Performance: 100% Design Equivalent Rotor Speed, 70% Span from Tip.	VII-28

ILLUSTRATIONS (Continued)

FIGURE PAGE

V-16 Stator Blade Element Performance: 100% Design Equivalent Rotor Speed, 90% Span from Tip. . . . VII-29

V-17 Variation of Stator Blade Element Performance with Incidence: Slotted Stator 1, 10% Span from Tip VII-30

v-18 Variation of Stator Blade Element Performance with Incidence: Slotted Stator 1, 30% Span from Tip VII-31

v-19 Variation of Stator Blade Element Performance with Incidence: Slotted Stator 1, 50% Span from Tip VII-32

v-20 variation of Stator Blade Element Performance with Incidence: Slotted Stator 1, 70% Span from Tip.. . . . . VII-33

v-21 Variation of Stator Blade Element Performance with Incidence: Slotted Stator 1, 90% Span from Tip VII-34

v-22 Loss Parameter Versus Diffusion Factor: 10% Span (From Tip); 70, 90, and 100% Design Equivalent Rotor Speed VII-35

V-23 Loss Parameter Versus Diffusion Factor: 70 and 50% Span (From Tip); 70, 90, and 100% Design Equivalent Rotor Speed VII-36

V-24 Loss Parameter Versus Diffusion Factor: 90 and 30% Span (From Tip); 70, 90, and 100% Design Equivalent Rotor Speed VII-37

V-25 Variation of Blade Element Performance with Incidence: Flow Generation Rotor, 100% Design Equivalent Rotor Speed, 10% Span from Tip. . . . VII-38

V-26 Variation of Blade Element Performance with Incidence: Flow Generation Rotor, 100% Design Equivalent Rotor Speed, 30% Span from Tip. . . . VII-39

V-27 Variation of Blade Element Performance with Incidence: Flow Generation Rotor, 100% Design Equivalent Rotor Speed, 50% Span from Tip. . . . VII-40

V-28 Variation of Blade Element Performance with Incidence: Flow Generation Rotor, 100% Design Equivalent Rotor Speed, 70% Span from Tip. . . . VII-41

V-29 Variation of Blade Element Performance with Incidence: Flow Generation Rotor, 100% Design Equivalent Rotor Speed, 90% Span from Tip. . . . VII-42

SECTION I
SUMMARY

A performance investigation of a 65-series slotted stator was made in a single-stage axial flow compressor rig. This investigation was one portion of a performance evaluation program to determine the extent to which slotted blade concepts could be used to increase the allowable blade loadings and stable operating range of subsonic compressor stages.

The test stator was designed with an aspect ratio of *1.663*, a uniform chord length of 2.182 inches and midspan solidity of 1.099. The predicted unslotted hub values of diffusion factor and inlet Mach number were 0.521 and *0.644* respectively; the predicted deviation was *10.14* degrees. Flow into the stator vane row was provided by a flow generation rotor.

The measured stator root and tip diffusion factor corresponding to design rotor speed and flow conditions were 0.53 and *0.48*, respectively. Deviation angles at root and tip were about 8 and *6* degrees larger, respectively, than the predicted unslotted design values. Loss coefficients were also higher than predicted.

SECTION II
INTRODUCTION

Pratt & Whitney Aircraft is engaged in a program under NASA Contract NAS3-7603 to investigate the application of slots to axial flow compressor rotors and stators. A systematic investigation is being conducted to establish the feasibility and extent to which slotted blade concepts can be used to increase allowable blade loadings and the stable operating range of compressor stages. To accomplish this objective, three stator blade rows and three rotor blade rows representing a progression in design diffusion factors have been built for test. In the stator tests, a representative state-of-the-art rotor and inlet guide vanes are used to generate the stator inlet flow.

The aerodynamic analysis and design of the test blading and associated hardware were accomplished under the design phase of the program and are summarized in Reference 1. All rotors and stators were designed with the same rotor exit and stator inlet absolute velocities and air angle distributions to permit testing of any combination of rotor and stator. For design purposes, it was assumed that the flow deviation angles for slotted rotors and stators would be half that of corresponding unslotted rotors and stators. As part of the design effort, a series of annular cascade tests of slotted stators was conducted to establish preliminary criteria for the design of slotted rotors and stators for the rotating stage test program (Reference 2). Data and performance results obtained with slotted Rotors 1 and 2 are presented in References 3 and 4.

This report presents the data and performance results obtained with the first slotted stator configuration (Stator 1). This stator is comprised of 65-series airfoil sections having a design hub diffusion factor and inlet Mach number (unslotted) of 0.521 and 0.644, respectively. The design diffusion factor of Stator 1 is the lowest of the three stators designed for this program. The stator blades were slotted at approximately 55% chord and the slots extended from 5 to 95% span in each blade.

Overall performance and blade element data were obtained at 70, 90, 100, and 110% of the design equivalent rotor speed. Blade element data were obtained for all three blade rows at the 10, 30, 50, 70, and 90% span locations.

Details of the test equipment, procedures, and test results for the slotted Stator 1 test configuration and pertinent design details are presented in this report. Complete aerodynamic and mechanical design details are included in Reference 1.

SECTION III
TEST EQUIPMENT

A. FACILITY

The Compressor Research Facility is shown schematically in figure III-1. The compressor rotor is powered by a single-stage turbine using exhaust gases from a J75 slave engine. Turbine speed is regulated by a hydraulically actuated inlet flow control valve. A two-stage ejector system, driven by slave engine exhaust, is available at the compressor discharge and is used for the compressor boundary layer bleed system.

The compressor induces its flow through a 103-ft long combined inlet duct, diffuser, plenum, and bellmouth inlet, and exhausts through an exit diffuser to atmosphere. Downstream of the flow measuring orifice located in the inlet duct, the flow passes through a 7-deg conical diffuser and into a plenum. Flow uniformity is assured by a 10:1 area contraction ratio between the plenum and the compressor rig.

The inlet duct and plenum are mounted on a track enabling them to be rolled away to facilitate compressor rig configuration changes. The plenum is sealed to the compressor rig inlet section with an inflatable rubber tube seal.

B. COMPRESSOR TEST RIG

The compressor rig, shown in figure III-2, comprises bellmouth inlet, test section, and exhaust section. The test section has a hub/tip ratio of 0.8 and a rotor tip diameter of approximately *40* in. The rotor assembly and shaft are supported on two bearings that transmit loads to the outer case through struts located in the inlet and exhaust case assemblies. The test section has a split outer case that permits guide vane, rotor, and stator assembly changes without removing the rig from the test stand. A set of motor-driven throttle vanes is located in the exhaust case to vary flow rate.

A section view of the flow path is shown in figure 111-3. Flow is accelerated through the inlet strut station and guide vanes in a convergent passage to the rotor inlet. Thereafter, the inner wall diameter remains constant at 32.85 in. while the outer wall converges further

through the rotor blade and stator vane rows to a diameter of 40 in. In general, the flow path simulates that of a middle stage of a state-of-the-art multistage compressor.

Provisions were made for flow to be bled at the rotor tip and stator root and tip, as shown in figure 111-4. Bleed air flows through perforated plate shrouds, shroud manifolds, and 24 approximately equally spaced tubes to individual main collector manifolds for the rotor and stator. The collector manifolds are exhausted through the facilities ejector system. Rotor and stator bleed flow rates are controlled and measured separately.

C. STAGE BLADING DESIGN

To expedite this research program, the aerodynamic and mechanical design of the blading was completed and fabrication initiated prior to the completion of the annular cascade program. Final slot configurations were based on the results of the cascade tests. The design details for the inlet guide vane flow generation rotor and slotted Stator 1 are given in Reference 1. Pertinent design information is given below for convenience.

1. Inlet Guide Vane

The inlet guide vanes were designed to provide a rotor prewhirl distribution of 38.2 deg at the root (90% span) to 39.8 deg at the tip (10% span). NACA 63-series blade sections were chosen for this purpose. Details of the guide vane design are presented in table III-1.

2. Flow Generation Rotor

NACA 65-series blade sections were selected for the flow generation rotor blading. The blading was designed with a camber distribution of 36.8 deg at the root (90% span) to 34.5 deg at the tip (10% span) and with design diffusion factor at the rotor tip of 0.379. Details of the rotor design are presented in table III-1.

Table III-1 Geometry Design Data

INLET GUIDE VANE

Airfoil Series: 63
No. of Blades: 50
Aspect Ratio: 1.530

Percent Span (From Tip)	κ_1	κ_2	ϕ	γ°	c	σ	t/c	δ°
90	-26.50	42.10	-68.60	24.70	2.560	1.212	0.060	3.86
50	-27.30	43.70	-71.00	25.50	2.560	1.109	0.060	4.65
10	-28.10	45.30	-73.40	26.30	2.560	1.021	0.060	5.51

FLOW GENERATION ROTOR

Airfoil Series: 65
No. of Blades: 60
Aspect Ratio: 1.707

Percent Span (From Tip)	κ_1'	κ_2'	ϕ	γ°	i_m	O/O^*	c	σ	t/c	δ°	$\bar{\omega}$
90	31.44	-5.38	36.82	13.11	-1.26	1.449	2.210	1.250	0.075	8.54	0.051
50	39.23	2.16	37.07	20.55	-2.20	1.468	2.210	1.149	0.059	8.37	0.045
10	45.36	10.87	34.49	27.85	-2.60	1.476	2.210	1.071	0.044	8.74	0.045

STATOR 1

Airfoil Series: 65
No. of Blades: 58
Aspect Ratio: 1.663

Percent Span (From Tip)	κ_1	κ_2	ϕ	γ°	i_m	O/O^*	c	σ	t/c	δ°	$\bar{\omega}$
90	52.15	22.14	30.01	37.20	-1.68	1.187	2.182	1.192	0.090	10.14	0.040
50	52.15	22.14	30.01	37.20	-0.22	1.273	2.182	1.099	0.090	9.46	0.036
10	52.15	22.14	30.01	37.20	0.61	1.355	2.182	1.026	0.090	9.93	0.034

3. Stator 1

a. Blade Design

Slotted Stator 1 blading was designed with a constant equivalent circular arc camber of 30 deg and a constant (37.2 deg) blade chord angle. The stators are 65-series airfoil sections with a design root diffusion factor of 0.521 (unslotted) with an inlet Mach number of 0.644. Additional details of the Stator 1 design are presented in table III-1.

b. Slot Design

Slot geometry and location were based on the results of annular cascade tests of slotted stator vanes and an analysis of Stator 1 suction surface boundary layer separation point (References 1 and 2). Blade thickness at the intersection of slot centerline and blade meanline was selected as the characteristic dimension to scale the slot size from the oversize (6.5-in. chord) annular cascade vanes to the 2.18-in. chord Stator 1 blading.

By agreement between NASA and P&WA, the scaling technique was slightly modified from that described in Reference 1 for the Stator 1 slot to permit an increase in the Coanda radius, R, the slot leading edge radius, r_1, and radius, R_p, defined in figure III-5. The values according to the original scaling method are compared with the revised values as follows (dimensions in inches):

	R	R_p	r_1
Original	0.150	0.33	0.020
Revised	0.300	1.32	0.030

These modifications were intended to reduce the large adverse pressure gradients induced by the slot flow over the Coanda radius and to minimize losses associated with turning the pressure surface flow into the slot.

The angle between slot centerline and blade meanline was held constant over the Stator 1 blade span and the slot centerline intersected the blade suction surface at 55% chord, approximately halfway between the minimum pressure point and the calculated separation point. This slot location was determined to be superior to a location near the separation point as a result of the annular cascade tests. A schematic drawing of the blade

slot is presented in figure 111-5 and photographs of the slotted stator blades are presented in figure 111-6.

D. INSTRUMENTATION

Instrumentation was provided to measure the overall and blade element performance of each blade row. Axial locations of instrumentation stations are indicated in figure 111-3, and schematics showing the detailed instrumentation at each axial location are presented in figures 111-7 through III-10.

1. Rig Inlet Conditions

Weight flow was measured with an ASME standard thin plate orifice located in the inlet duct.

Six static pressure taps and six temperature probes were located in the plenum chamber for measurement of inlet total pressure and temperature.

Six equally-spaced static pressure taps were located on both the inner and outer walls upstream of the inlet guide vanes (Station 0). From a rig calibration over a wide range of weight flows, a calibration between these static pressures was derived and used to check subsequent weight flow measurements.

2. Guide Vane Exit/Rotor Inlet - Station 1

A sectional view of the flow path at Station 1 showing the circumferential and radial location of instrumentation is presented in figure 111-7. Rotor inlet air angle measurements were obtained at two circumferential locations by traversing 20-deg wedge probes. A 20-tube wake traverse probe aligned with the average guide vane exit air angle, was installed to measure guide vane wake total pressure distribution. Four static pressure taps were located on both the inner and outer wall. The wedge probes and static pressure taps were located approximately along extensions of guide vane midchannel lines. Redundant static and midpassage total pressure data were available from the 20-deg wedge probe.

3. Rotor Exit/Stator Inlet - Station 2

A sectional view of the flow path showing the circumferential and radial location of instrumentation at Station 2 is presented in figure 111-8. Two 20-deg wedge traverse probes were used for air angle, total pressure, and total temperature measurements. Three sets of Kiel head total pressure probes were located at radial positions corresponding to 30, 50, 70 and 90% span and two Kiel probes were located at 10% span. The Kiel probes were circumferentially positioned so that each set approximately averaged the pressures across a guide vane wake. Four static pressure taps were located on both the inner and outer wall. An 8-deg wedge traverse probe was used to measure the radial distribution of static pressure.

4. Stator Exit - Station 2A

A sectional view of the flow path showing circumferential and radial location of instrumentation at Station 2A is presented in figure III-9. A 20-tube rake traverse probe was used for measurement of stator vane wake total pressure distribution. Four static pressure taps were located on both the inner and outer wall, and an 8-deg wedge traverse probe was provided for static pressure measurement. The 20-deg wedge traverse probe at this station, normally used to measure stator exit air angles, did not function properly during this test; stator exit air angles were therefore measured at Station 3.

5. Station 3

Station 3 is one chord-length further from the stator exit plane than Station 2A. Instrumentation at this station (figure III-10) included two 20-deg wedge traverse probes, four sets of Kiel head total pressure probes at 10, 30, 50, 70 and 90% span locations, four sets of Kiel head temperature probes at the same five span locations, and four static pressure taps on both the inner and outer wall. Stator exit air angles were obtained with the two 20-deg wedge probes. Stage exit total temperature was based on the Kiel head probe temperature measurements at Station 3. Data obtained from the other instrumentation at this station were used for comparison with the Station 2A data.

6. Description of Probes

Details of the 20-deg and 8-deg wedge probes, wake probe, and Kiel pressure and temperature probes are shown in figure III-11. The 20-deg wedge probe contained side pressure pickups for air angle measurement, a total pressure pickup and a total temperature pickup.

The wake probe contained 20 total pressure pickups formed by 0.042-in. OD hypo tubing and spaced as shown in the figure.

7. Instrumentation Readout

Traverse probe data (total pressure, static pressure, air angle, total temperature, and radial travel) were recorded on magnetic tape at the rate of 60 samples (2.5-in. probe travel) per minute. Steady-state pressure measurements were obtained using a scannivalve multichannel pressure transducer system that includes automatic data recording on IBM cards. Kiel probe temperatures were indicated on a precision potentiometer, and manually recorded.

Plenum pressures, four OD static pressures at Station 0, primary and bleed system flow-measuring-orifice pressures, and four Station 3 midspan Kiel probe pressures were recorded on manometer tubes in the test stand control room to permit setting the desired flow conditions.

8. Special Instrumentation

a. Rotor Speed

Rotor rpm was measured with an electromagnetic pickup mounted adjacent to a 60-tooth gear on the rotor shaft. Gear tooth passing frequency was displayed as rpm on an Anadex digital readout system. A closed loop control system maintained rotor speed to within approximately ± 1%.

b. Vibration

Displacement pickups were mounted on forward and rear sections of the compressor rig outer case to monitor rig vibration.

c. Bleed Flow Rate

The bleed flow rate from the rotor and stator was determined using standard ASME thin plate orifices located in the bleed manifold exit pipes.

d. Stress Measurements

Five rotor blades were instrumented with strain gages located to monitor first bending stresses (figure 111-12). No stress measurements were required on the stator vanes.

SECTION IV
PROCEDURES

A. TEST PROCEDURE

1. Wall Bleed Flow Rate Selection

a. Rotor Bleed

With the compressor operating at design speed, the bleed flow rate was adjusted to ensure that there was no recirculation through the bleed manifold from Station 2 (rotor exit) to Station 1 (rotor inlet). This was accomplished by monitoring the static pressure difference between Station 1 and the bleed manifold and adjusting the bleed valve until the manifold pressure was less than that of Station 1. The maximum bleed flow rate attainable with the bleed system was required to produce the desired results at choke conditions (lowest Station 1 static pressure). The valve setting for this flow rate was not changed at other rotor speed and flow conditions.

b. Stator Bleed

With the rotor OD wall bleed set at the maximum rate, the procedure described above was repeated for the stator by monitoring the static pressure difference between Station 2 and the stator bleed manifold. It was also necessary to adjust the stator bleed valve for maximum flow to ensure no recirculation at choke conditions. This valve setting was used throughout the program.

2. Stress Survey

Blade stresses were monitored during rig operation at design speed and during operation into the stall region at all rotor speed conditions.

3. Performance Tests

Overall and blade element performance data were obtained at four rotor speed conditions (70, 90, 100, and 110% of design speed) and at approximately six points per speed line to define stator and stage performance between choke and stall. The near-stall point was determined on the basis of blade stress and stage exit total pressures indicated on manometers. At each set point the fixed pressure and temperature instrumentation data were recorded five times, corresponding to five discrete

radial locations of the inlet guide vane and stator vane wake probes. Traverse data were usually recorded during the last recording of fixed instrumentation. In this manner, representative average values of flow and pressures could be determined for the time period (approximately 45 min) of data recording at each point.

B. DATA REDUCTION PROCEDURES

1. Preliminary Data Reduction

Data reduction was accomplished in three steps using three computer programs. The first step involved conversion of raw data to engineering units. Traverse data (total pressure, static pressure, total temperature, and air angle) measured in approximately 0.04-in. increments across the span, were automatically plotted and tabulated. The plotted and tabulated data were reviewed to identify and eliminate any obviously questionable data prior to the subsequent data reduction step.

The second data reduction step accomplished the following:

1. Mach number corrections to temperature data
2. Mass average of wake probe data
3. Circumferential arithmetic average of fixed and traverse instrumentation data
4. Correction of all pressure and temperature data to NASA standard day ambient conditions
5. Selection by interpolation of total and static pressure, total temperature, and air angle values at specified radial locations for input for the final data reduction step.

All corrected data were available for further inspection of the printed results from this computer program, which included individual data values as well as averaged quantities. The third step in the data reduction procedure involved the calculation of overall and blade element performance data as defined in the following paragraphs.

2. Parameter Calculation

The overall and blade element performance test data were calculated prior to analysis and the evaluation of slotted Stator 1 performance. Symbols are defined in Appendix A.

a. Overall Performance

(1) Weight Flow

Weight flow is presented in terms of corrected weight flow, defined as

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

where:

W = actual weight flow

θ = ratio of total temperature (plenum) to NASA standard sea level temperature

δ = ratio of total pressure (plenum) NASA standard sea level pressure.

Values of corrected weight flow presented in the figures and tables include rotor and stator bleed flow rates. Percentage bleed flow rates for the respective blade rows are tabulated separately (table B-1).

(2) Pressure Ratio

Pressure ratios were calculated for the rotor, guide-vane-rotor, and guide-vane-rotor-stator blade row combinations. At the discharge of the rotor, fixed Kiel probe and traverse probe total pressure data were arithmetically averaged at each span location and the profile thus determined was mass-flow averaged across the span.

The wake probe pressures downstream of the guide vane and the stator were first mass-flow integrated at each span location, and the resulting average pressures were then mass-flow averaged in the radial direction.

(3) Adiabatic Efficiency

Adiabatic efficiency across the rotor is defined as

$$\eta_{ad} = \frac{\left(\frac{\bar{P}_2}{\bar{P}_1}\right)^{\frac{\gamma - 1}{\gamma}} - 1}{\frac{\bar{T}_3}{T_1} - 1}$$

where:

$\overline{P}_1$ = mass-averaged pressure behind the guide vane
T_1 = 518.7°R
$\overline{P}_2$ = mass-averaged pressure behind the rotor
$\overline{T}_3$ = mass-averaged temperature behind the stator

To obtain adiabatic efficiencies for the guide-vane-rotor combination or for the entire stage, appropriate average pressures were used.

b. Blade Element Performance

(1) Diffusion Factor

Diffusion factor for the rotor is defined as

$$D = 1 - \frac{V'_o}{V'_1} + \frac{\Delta V'_{\theta(1-2)}}{2\sigma V'_1}$$

Diffusion factor for the stator is defined as

$$D = 1 - \frac{V_{2A}}{V_2} + \frac{\Delta V_{\theta(2-2A)}}{24 V_2}$$

(2) Deviation

Rotor blade deviation is defined as

$$\delta_2^\circ = \beta'_2 - \kappa'_2$$

Stator deviation is defined as

$$\delta_{2A}^\circ = \beta_3 - \kappa_{2A} ,$$

where κ'_2 and κ_{2A} are the rotor blade and stator vane trailing edge metal angles based on equivalent circular arc camber lines for the 65-series airfoil.

(3) Incidence Angle

Rotor incidence is defined as

$$i_{m_1} = \beta'_1 - \kappa'_1$$

Stator incidence is defined as

$$i_{m_2} = \beta_2 - \kappa_2$$

where κ_1' and κ_2 are the rotor blade and stator vane leading edge metal angles based on equivalent circular arc camber lines for the 65-series airfoil.

(4) Total Pressure Loss Coefficient

Total pressure loss coefficient for the rotor is defined as

$$\bar{\omega}'_{(1-2)} = \frac{\bar{P}_1' - P_2'}{\bar{P}_1' - P_1}$$

For the inlet guide vanes, total pressure loss coefficient is defined as

$$\bar{\omega}_{(0-1)} = \frac{14.69 - \bar{P}_1}{q_o}$$

where q_o is obtained from isentropic flow relationships using orifice weight flow and the annular area at the guide vane inlet.

Total pressure loss coefficient for the stator is defined as

$$\bar{\omega}_{(2-2A)} = \frac{P_2 - \bar{P}_{2A}}{P_2 - p_2}$$

(5) Loss Parameter

Stator total pressure loss is also presented in terms of the loss parameter:

$$\frac{\bar{\omega}_{(2-2A)} \cos \beta_{2A}}{26}$$

SECTION V
PRESENTATION AM) DISCUSSION OF RESULTS

The overall and blade element performance data for each of the three rotors and three stators are presented in separate data reports. Following publication of these data reports, the results will be analyzed and discussed as part of the final report. The data relevant to the performance of slotted Stator 1 and the flow generation rotor are presented in this report.

A. STAGE PERFORMANCE

The overall performance data for the stage comprised of the flow generation rotor, its inlet guide vane, and slotted Stator 1 are presented in figures V-1 through V-3 in the form of pressure ratio and efficiency plotted against corrected weight flow. Constant equivalent rotor speed lines are represented on these figures. The performance of the rotor, rotor and inlet guide vane, and entire stage are presented in these figures to enable the performance of any of the three blade rows to be distinguished. The design point is shown on these figures to provide a basis for comparison.

It should be pointed out that the flow generation rotor produces very low pressure ratio and is only used to set up the desired stator inlet flow. Consequently, the stator loading is not matched with rotor work input and as a result even normal stator losses would result in very low stage efficiencies. Therefore, neither the stage pressure ratio nor the stage efficiency are considered to be of great significance.

The entire stage (inlet guide vane, rotor and stator, figure V-3) produced a 1.15 pressure ratio at the design flow (81 lb/sec) and equivalent rotor speed, which is greater than the design pressure ratio of 1.13. The indicated efficiency is approximately two points less than design. The principal deviation from design performance is in the flow generation rotor, as is evident from figures V-1 and V-2. The pressure ratio of the flow generation rotor exceeded the design value of 1.14 by 0.05, more than accounting for the observed difference in stage pressure ratio. In addition, the indicated efficiency of the rotor alone is approximately 99% at design flow and speed and exceeds 100% at higher flows. These efficiency data will be discussed in a following paragraph.

The composite overall performance of the flow generation rotor from the tests of the three slotted stators is presented in figure V-4. The data indicated a consistent and reproducible pressure rise characteristic and an efficiency scatter of about five points at design speed. The higher-than-design pressure rise produced by the flow generation rotor is attributable to three factors. First, the inlet guide vane deviation angle was greater than expected and as a result, the flow generation rotor was operating at an incidence angle approximately 3 deg greater than design when at design flow and speed (figure V-5). Secondly, the deviation angle of the rotor was less than expected, which further tended to increase the work and flow of the stage. Finally, the losses produced by the rotor were somewhat lower than expected. These latter two points will be illustrated in the subsequent presentation of blade element data.

The efficiency of the rotor as indicated in figure V-4 is excessively high; therefore, it is evident that these data must be qualified. Since the temperature rise of this stage is small (30°R), it is expected that the efficiency data will show considerable scatter and, further, that any consistent error, unaccounted for, will result in a noticeable bias. For these reasons these rotor efficiencies were recomputed using the velocity diagram data rather than the measured temperature ratio to calculate the work done. The rotor efficiency data from both methods of calculation are compared in figure V-6. The efficiency based on consideration of the momentum change across the rotor follows a typical parabolic characteristic with increasing flow as opposed to the monotonic increasing characteristic of the curves based on temperature ratio and is for this reason more believable. Further, with the exception of two points, these efficiencies are less than 100%, although the peak values of approximately 98% are optimistic. Figures V-7 through V-9 are identical to figures V-1 through V-3 except the efficiencies were computed using the velocity diagram data just described.

A comparison of the measured airflow with the airflow calculated from traverse and fixed probe data is presented in figure V-10. The data relating to rotor discharge flow are within the allowable 5% band. Downstream of the stator, a bias toward high integrated weight flows is noticeable and many of the data points fall outside the 5% band. A detailed examination of the data and reduction procedure has shown that

this bias is attributable to the numerical integration used in the calculation. As a part of this integration, the mass-average total pressure calculated from the stator wake data is used to generate a radial flow distribution that is then integrated to determine the total flow. The employment of the mass-average total pressure in this calculation leads to erroneously high flows since no accounting is made of the displacement thickness of the wakes. The magnitude of this flow difference is dependent upon the size of the wake and thus varies with spanwise location, the configuration of the stator, and the stator incidence and Mach number. Similar differences were noted in the results of the tests with slotted Stators 2 and 3 (reports to be published) and a numerical example from those data is used as an illustration. A data point from the slotted Stator 3 test was selected for which a large (10%) difference between integrated and orifice-measured flow was noted. The wake rake data were used to calculate the circumferential and radial distribution of flow without recourse to the use of average quantities. A double integration (area) was then performed to determine the flow. Thus computed, the flow was 84.5 lb/sec, compared with 82.7 lb/sec based on the measured orifice flow with deductions for the wall bleed. This difference, 2.1%, is in keeping with the acceptable deviation.

The mass-average pressure ratio was subsequently recomputed for this point to observe the extent to which pressure ratio is also affected by the employment of the mass-average total pressure at each radial location behind the stator. The recomputed value of 1.118 was well within the plotting accuracy of the value of 1.116 originally computed. Since the calculation of mass-average pressure ratio uses the flow computed from the mass-average total pressure at the various diameters in both the numerator and denominator of the weighting fraction $\Sigma WP/\Sigma W$, it is to be expected that the effect on pressure ratio would be small.

B. BLADE ELEMENT PERFORMANCE

1. Slotted Stator 1

The stator inlet air angle distribution at design speed is presented in figure V-11 for six values of corrected airflow together with the design distribution. The design stator inlet air angle was closely achieved at a flow approximately 5 lb/sec greater than design flow because of the

lower-than-design rotor deviation angles and higher rotor pressure rise. Thus, in general, the stator was operated at incidence angles approximately 3 deg closer to stall than was intended in the design.

The change in inlet air angle at the stator tip from choke to stall is approximately twice that of the root, indicating that the rotor tip losses are increasing and therefore the axial velocity into the stator is being reduced.

The loss coefficient, deviation and diffusion factor data are presented in figures V-12 through V-16 for five radial locations at the design rotor speed. The design loss coefficient was approached only at 30 and 50% span locations (from tip). Near the tip (10% span) operation in the region of the minimum loss incidence angle is indicated, but the loss level is high. Near the root (70 and 90% span), the loss level is also high and the slope of the loss characteristic indicates that the stator blade elements are operating more toward the stalled incidence side of their range.

The deviation data tend to follow the loss data in that the deviation angle is greater than the design value near the blade root and tip and is nearly equal to design in the midspan region.

As a result of the deviation characteristics, the diffusion factor would be expected to be less than the design value in the blade end regions. However, the high losses in these regions also produced a blockage effect giving an overall increase in axial velocity ratio; hence, the diffusion factor is everywhere lower than the design value at design incidence rather than only at the walls. Similar data for the four speed lines are presented in figures V-17 through V-21. The consistency of these data, which extend over a range of inlet Mach numbers from approximately 0.4 to 0.7, indicates that the effect of Mach number is small over the speed range tested. The loss data in the wall region does, however, begin to show some noticeable Mach number effects for the overspeed (110%) condition.

The variation of stator total pressure-loss parameter with diffusion factor is presented in figures V-22 through V-24 for comparison with the NASA correlation curve for NACA 65-(A_{10}) series and double circular arc blades (Reference 5). At the 70, 50, and 30% span locations the stator loss parameter

at minimum loss incidence is slightly higher than the correlation curve value. At the stator tip (10% span) the loss parameter is appreciably higher than the NASA correlation value.

2. Flow Generation Rotor

Blade element data at design equivalent rotor speed for all three slotted stator tests are presented in figures V-25 through V-29 following the format used for the slotted stator data. The blade loss coefficients are generally equal to or below the expected (design) values. It should be noted that the unreasonably high rotor efficiency values shown earlier would indicate that the measured temperature rises are low. Since temperature rise affects the calculated values of rotor loss, the loss coefficients shown are probably too low. As already noted, the deviation angle at design incidence angle is about 3 deg less than expected. The lower deviation angles and the higher work input attained result in higher diffusion factors both by increasing $\Delta V\theta$ and by decreasing the axial velocity ratio.

C. DATA TABULATION

Tabular overall and blade element performance data for each slotted Stator 1 test point are presented in Appendix B.

SECTION VI
CONCLUDING DISCUSSION

Slotted Stator 1 produced large losses in the end wall region as is typical of highly loaded blading. The use of wall boundary layer bleed was expected to largely eliminate the spanwise velocity gradient and thereby reduce wall-blade losses; however, this effect is not observed. It is probable that boundary layer suction, in these amounts, is not sufficient to eliminate the three-dimensional flow and permit even approximate attainment of two-dimensional losses. Together with the higher-than-expected deviation angles, this leads to the conclusion that the wall region is grossly affected by the secondary flow and that the effectiveness of the slots in this region cannot be ascertained. In the midspan region (30 to 50% span), losses approximating their design values were achieved but the associated diffusion factor was lower than design because of the effect of the high losses and deviation in the wall regions on the blade velocity ratio.

SECTION VII
ILLUSTRATIONS

This section contains the illustrations that have been referenced in the preceding sections.

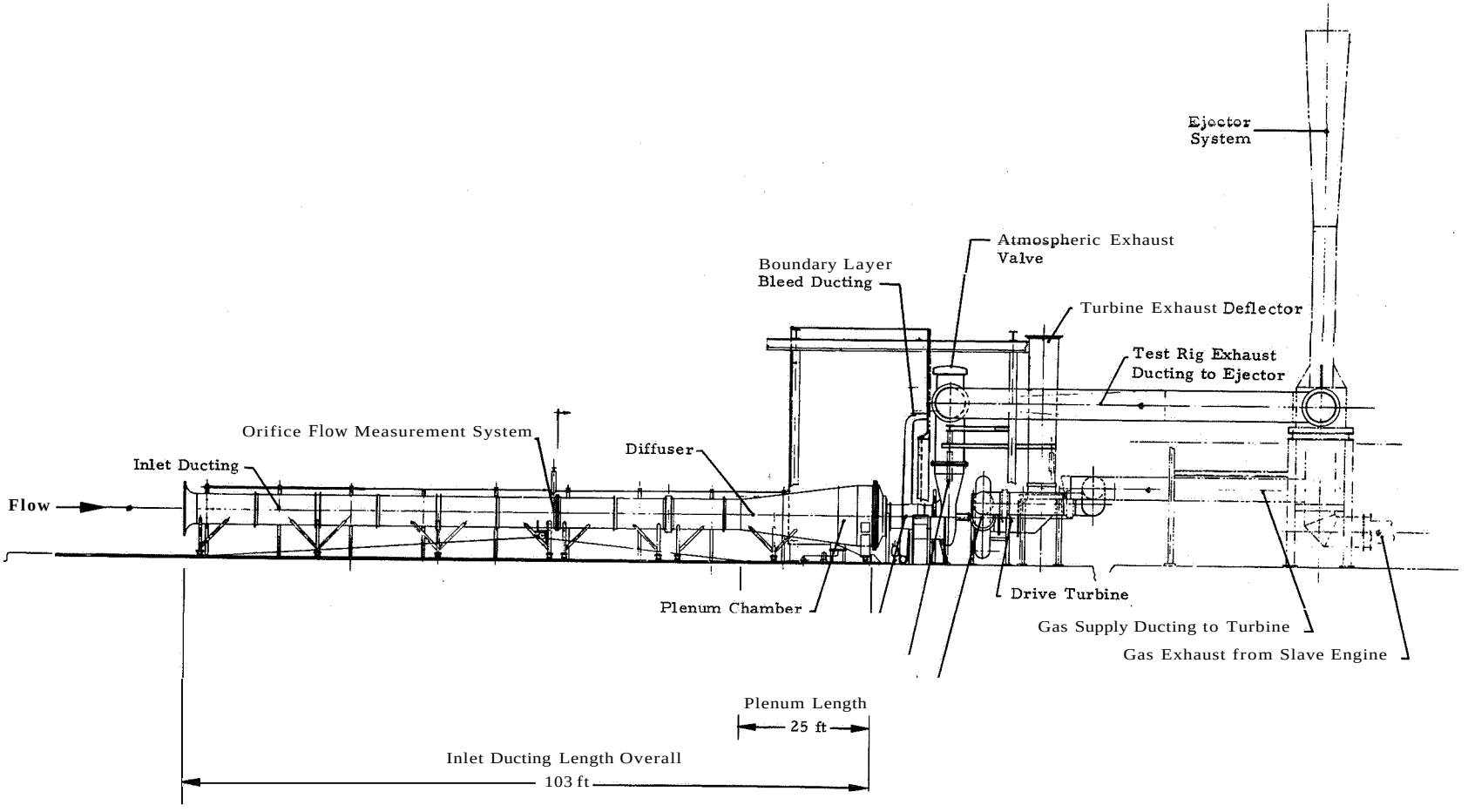


Figure III-1. Compressor Research Facility

FD 10891C

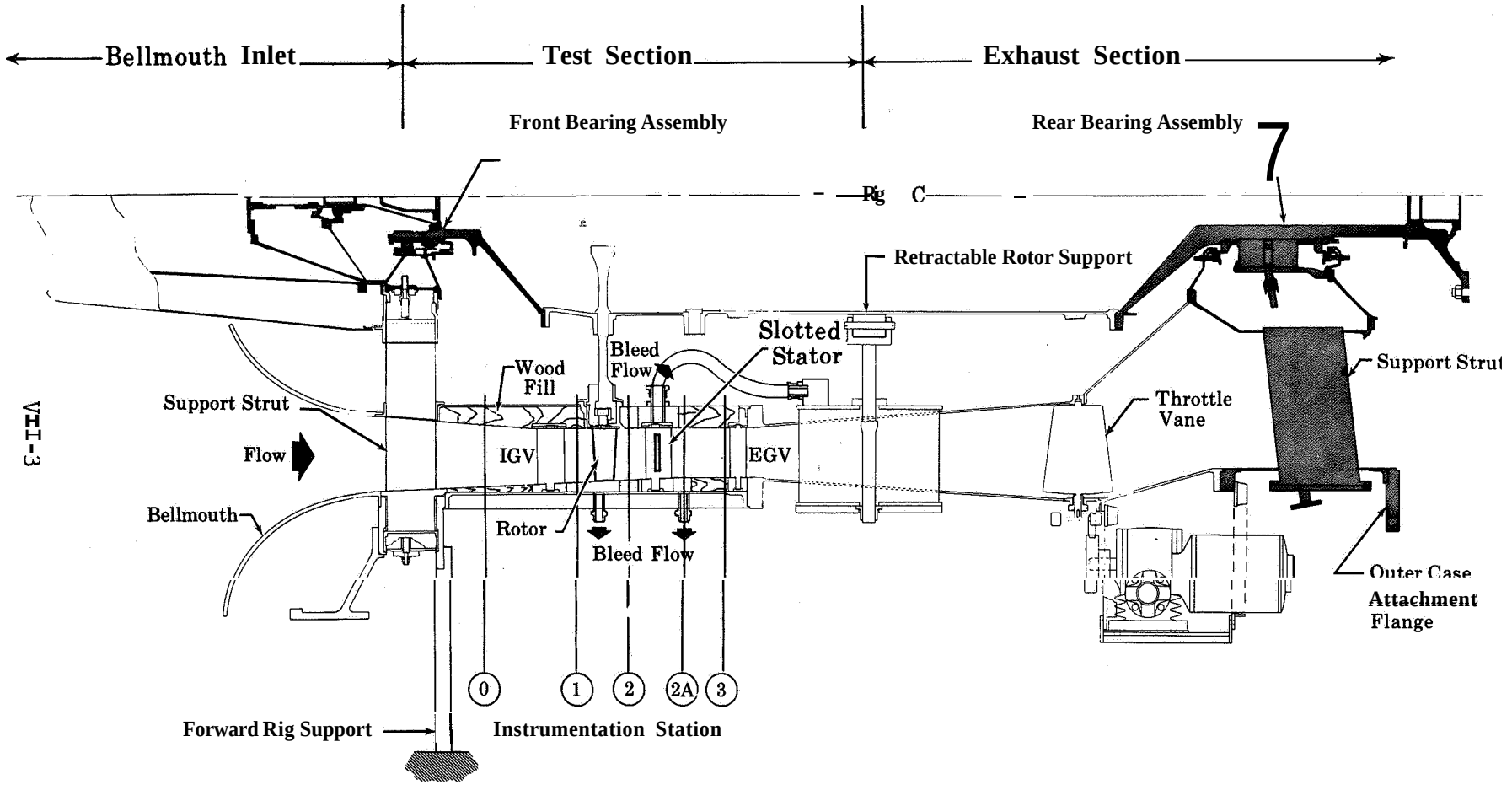


Figure III-2. Rotating Axial Flow Cascade Test Rig

FD 14681B

FD 14685A

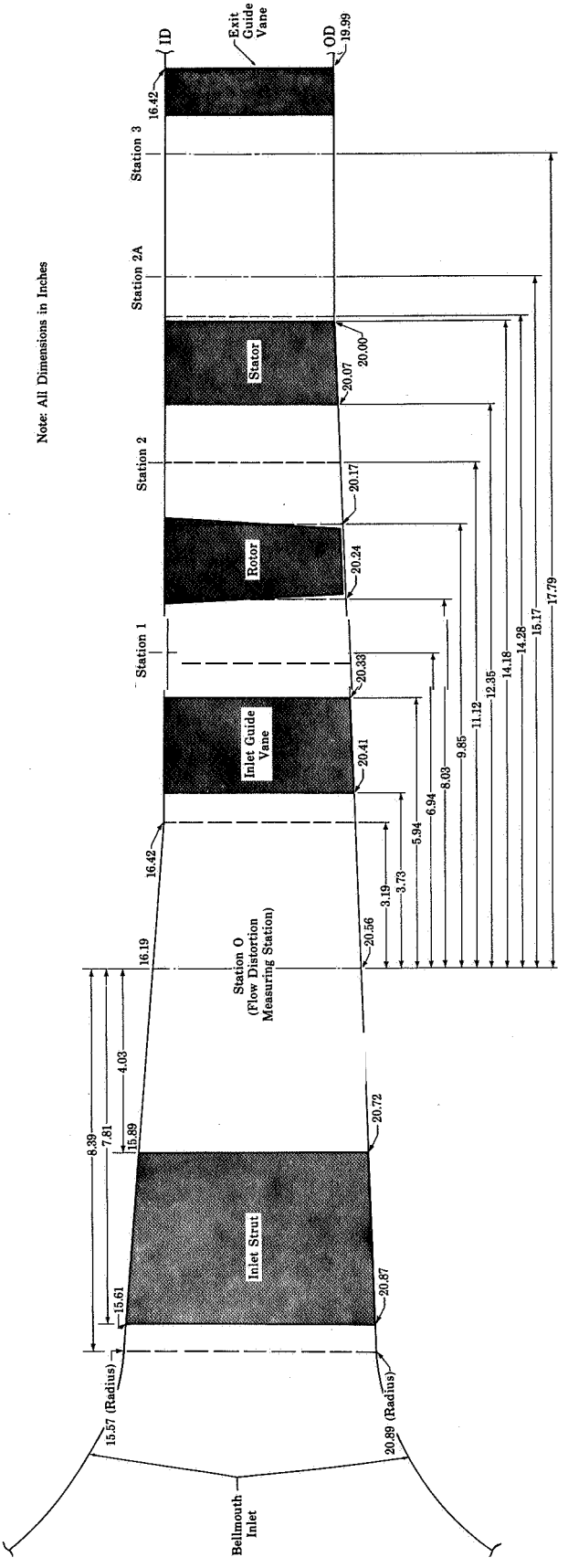


Figure III 3 Flow Path and Instrumentation Stations

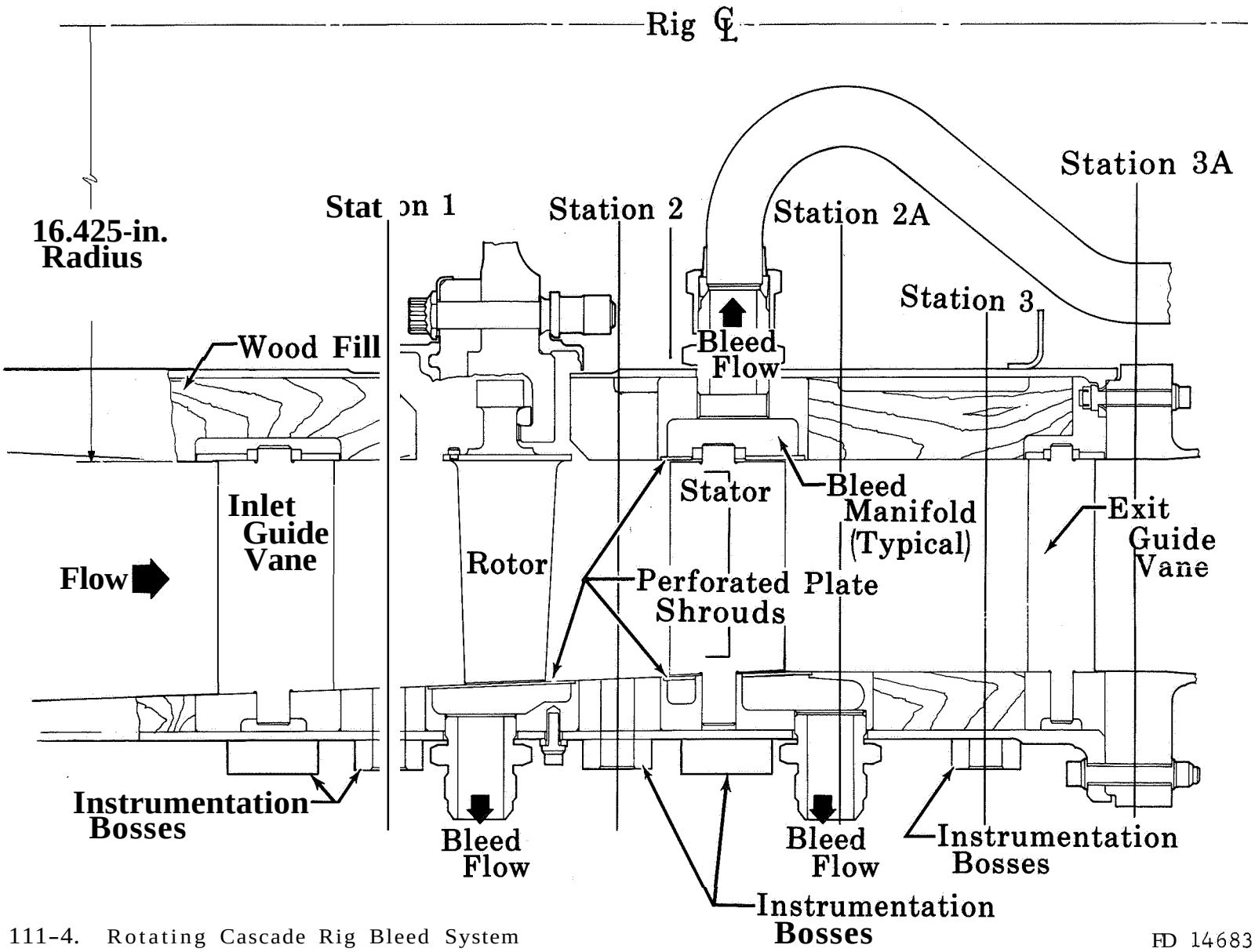
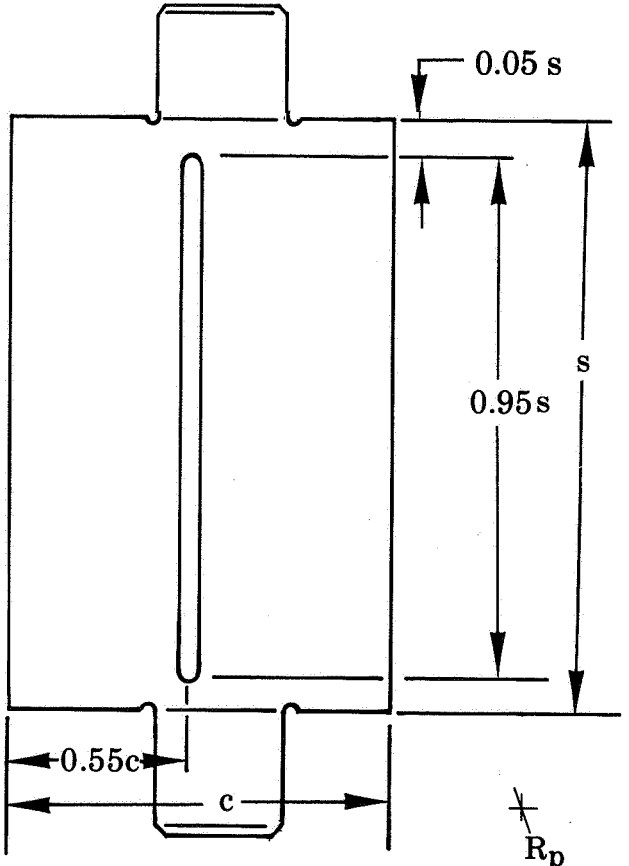


Figure 111-4. Rotating Cascade Rig Bleed System

FD 14683B



DIMENSIONS	
Y_2	0.050 in.
t	0.192 in.
R	0.300 in.
r_1	0.03 in.
Y_1	0.094 in.
r_2	0.005 in.
R_p	1.32 in.
ψ	30°

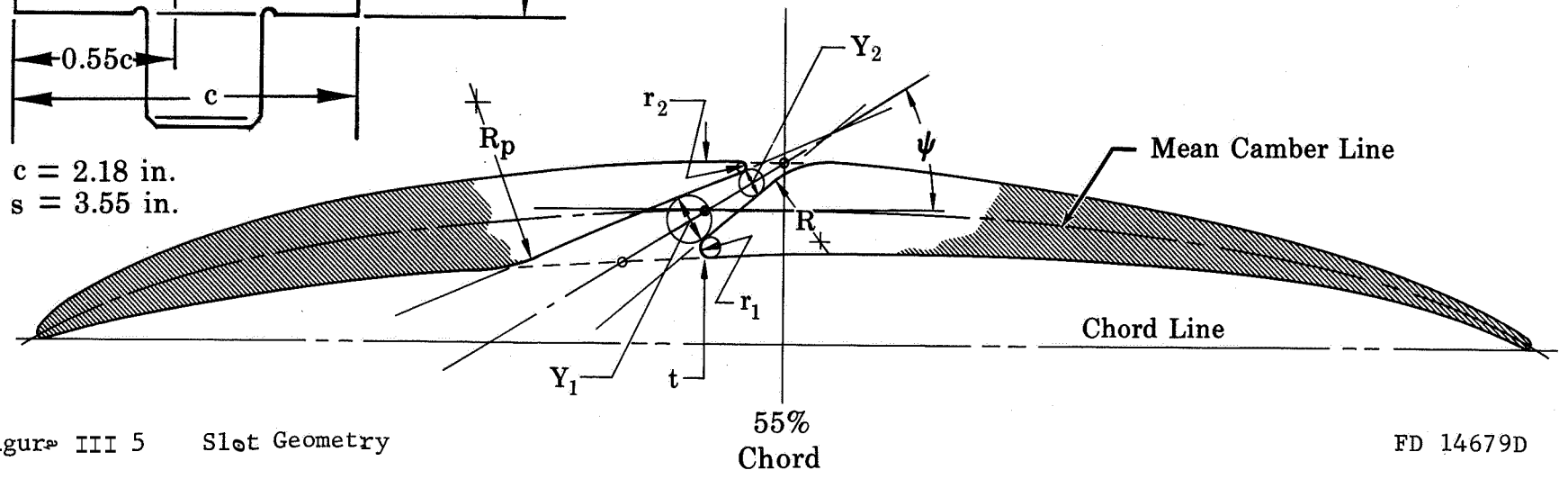


Figure III 5 Slot Geometry

FD 14679D

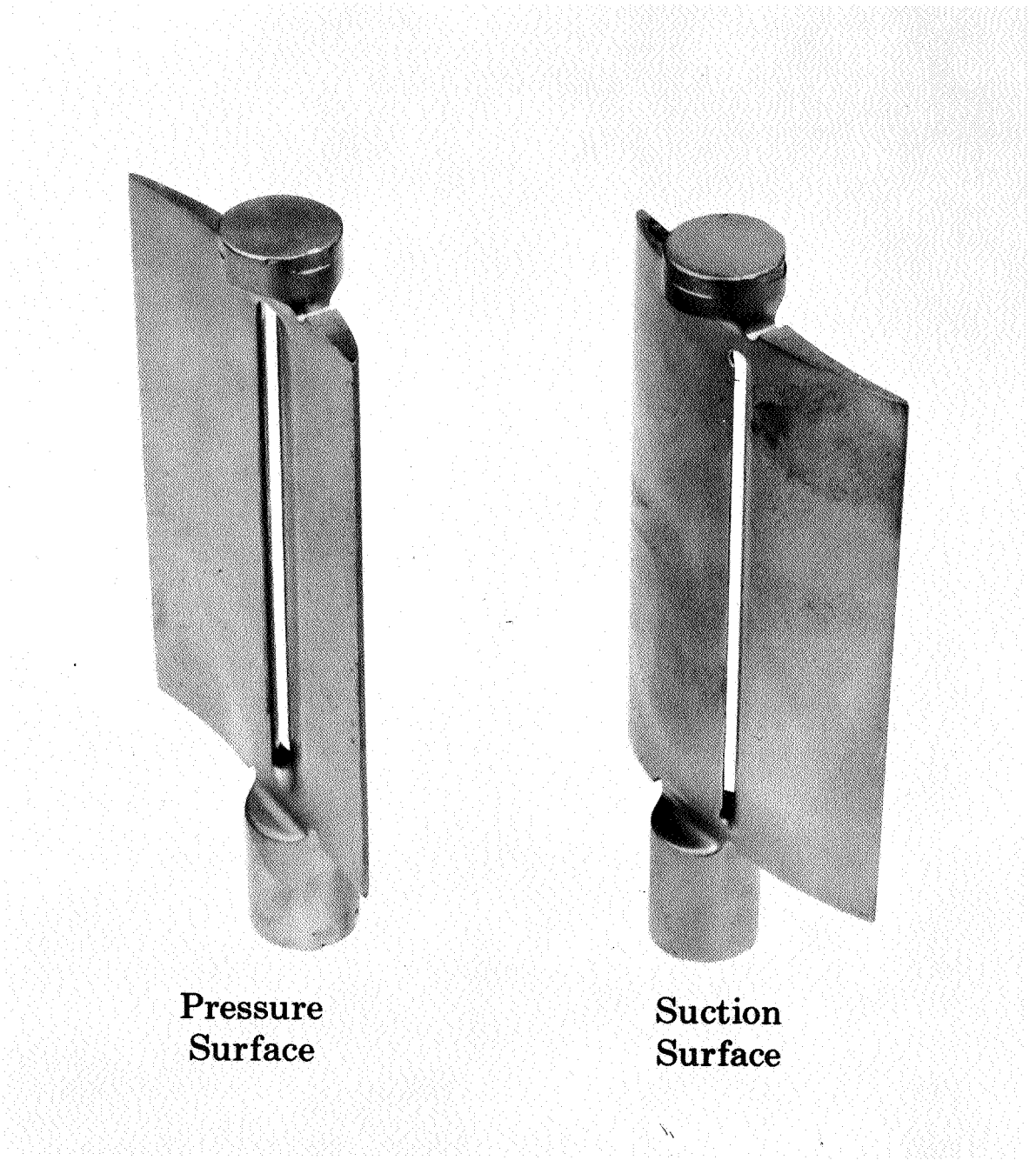
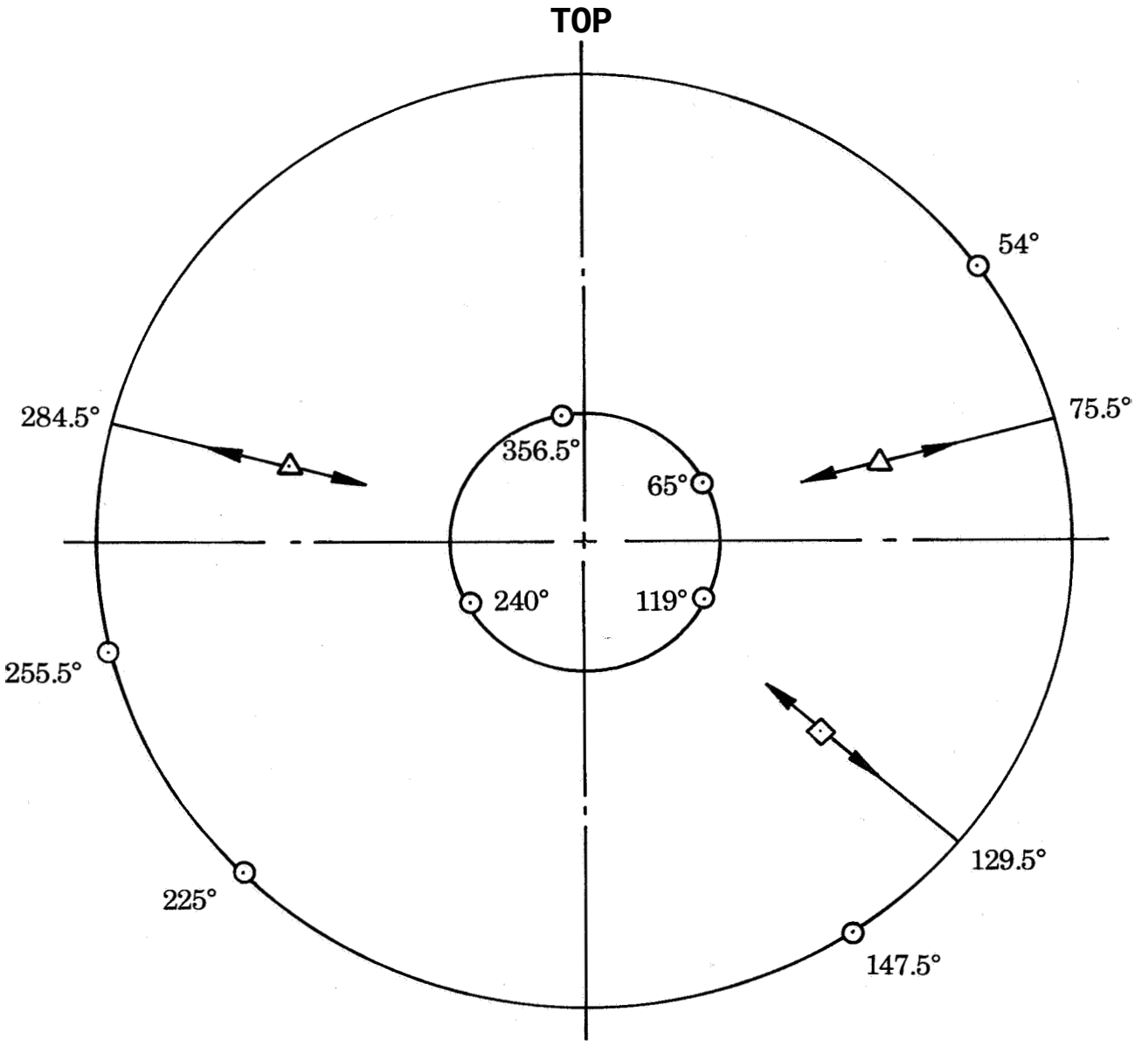


Figure III-6. Typical Slotted Stator 1 Vane

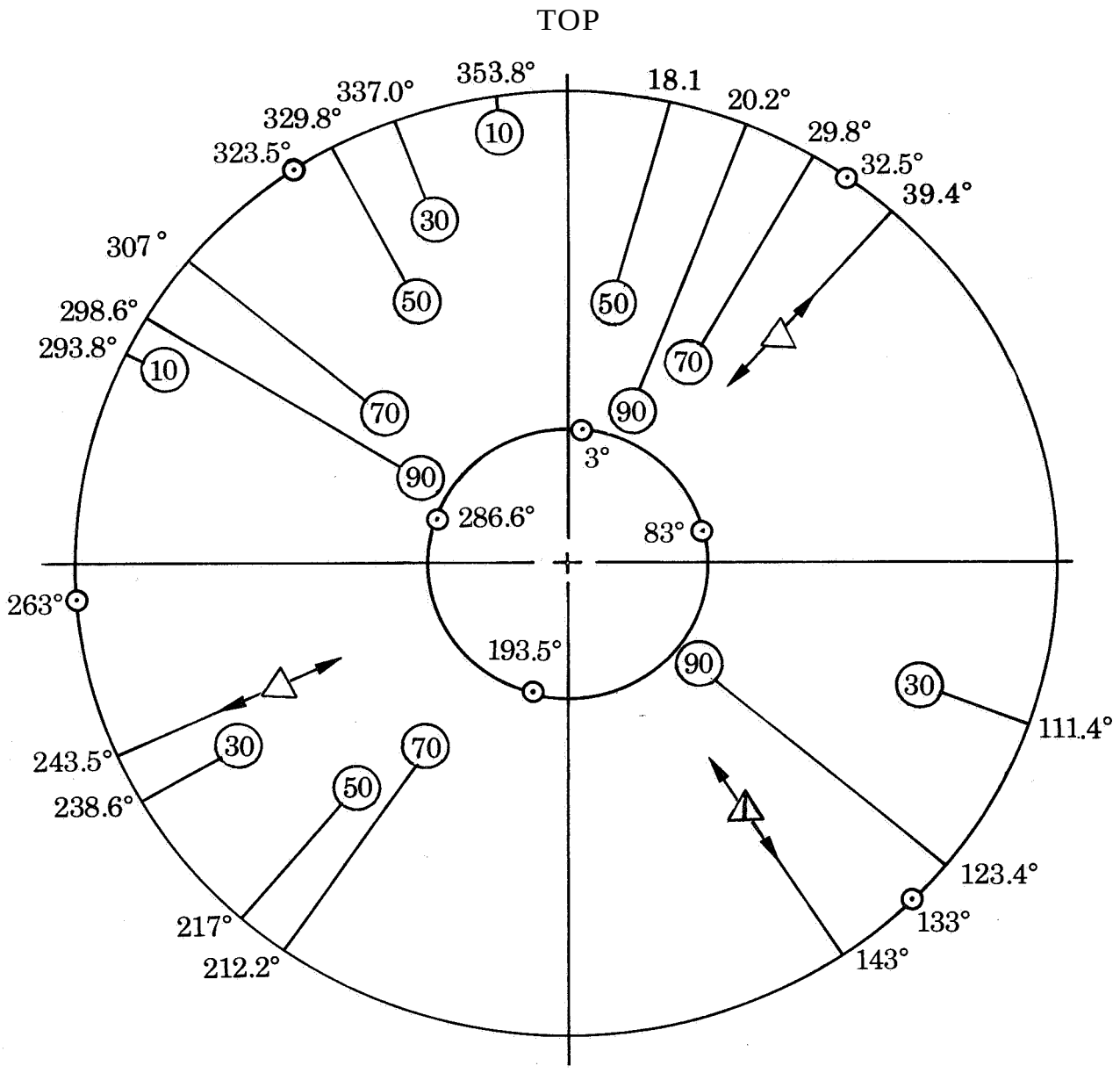
FD 21625



⊙ Wall Static Pressure
△ Traverse Wedge Probe, 20"
◇ **Traverse Wake Probe**

Figure 111-7. Instrumentation, Station 1, View Looking Downstream

HD 18596C



*Radial location as a percent of span from tip is denoted by the **number** within the symbol

Figure III-8. Instrumentation, Station 2, View Looking Downstream

FD 18595D

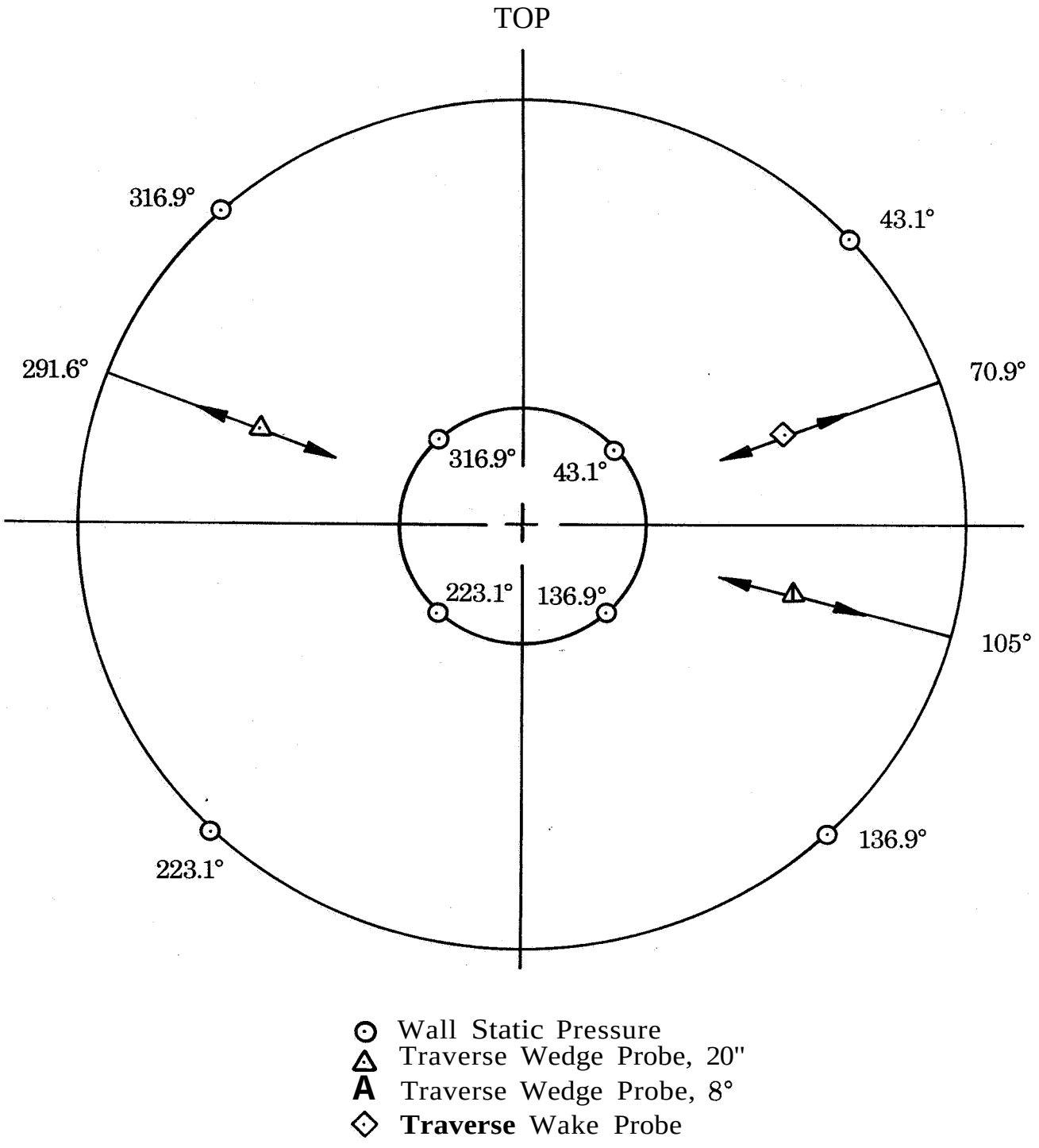
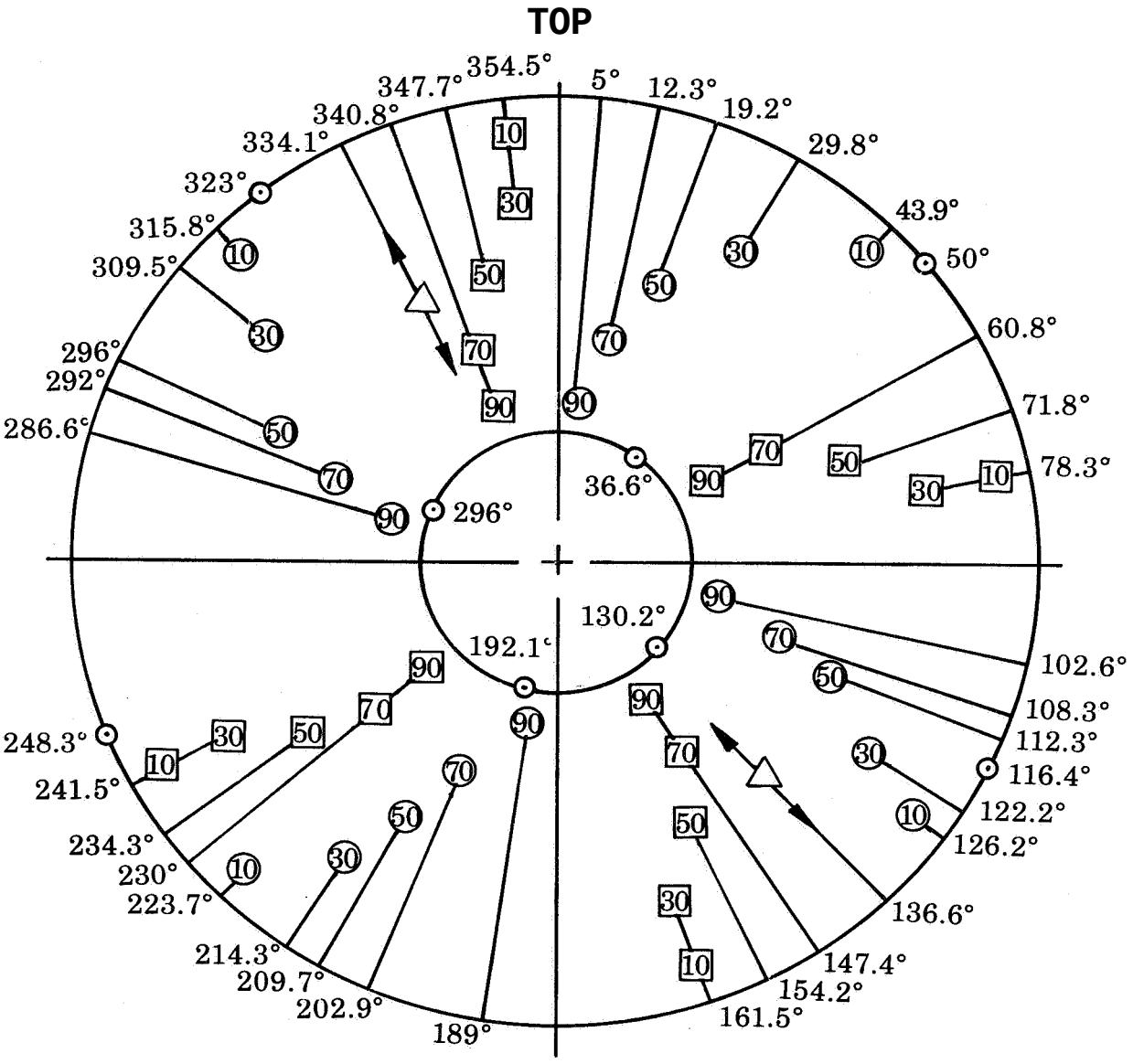


Figure III-9. Instrumentation, Station 2A, View Looking Downstream

FD 18594C

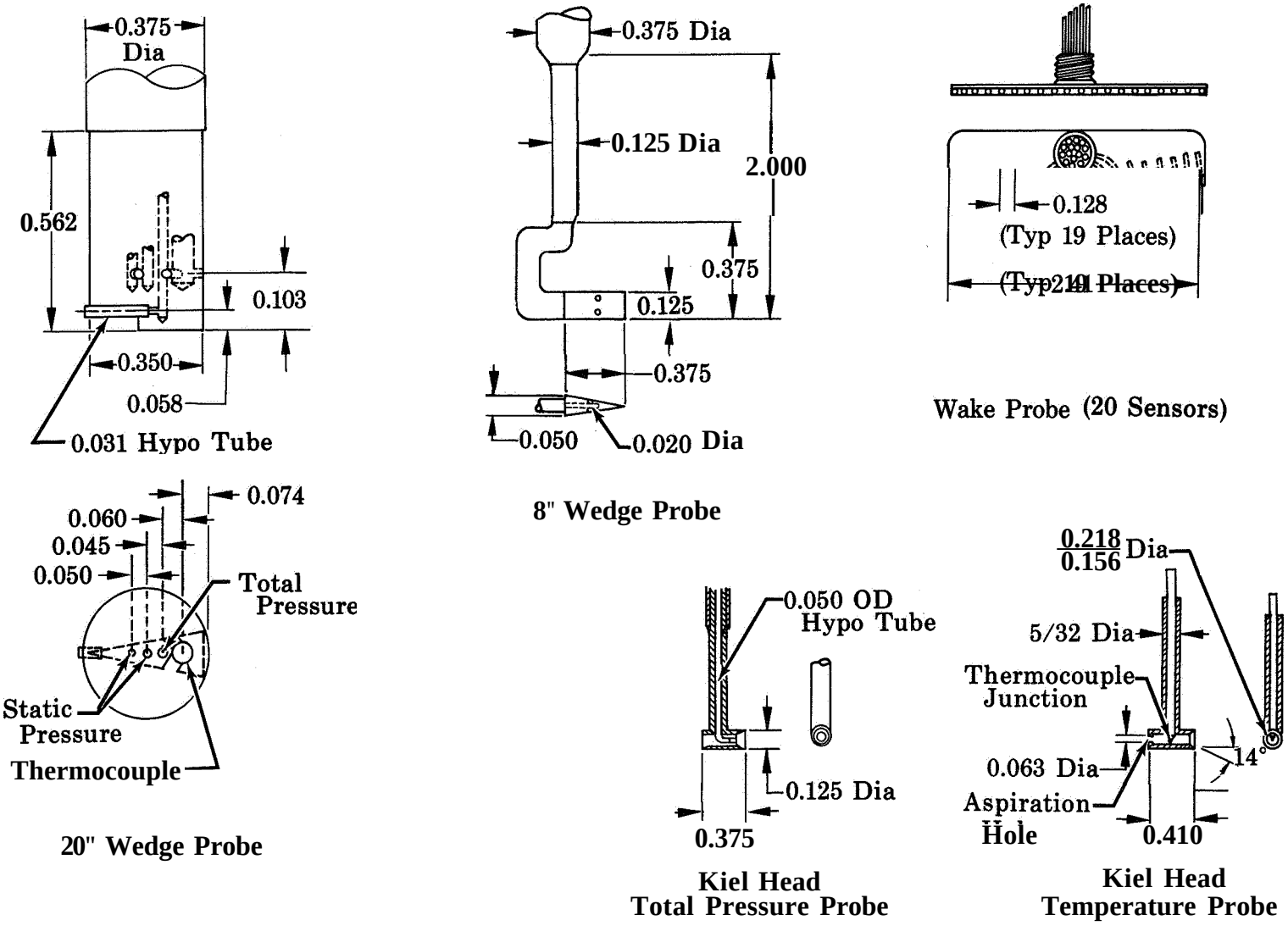


⊙ Wall Static
△ Traverse Wedge Probe, 20"
⊿ Traverse Wedge Probe, 8°
O Kiel Probe *
□ Temperature *

*Radial location as a percent of span from tip is denoted by the number within the symbol

Figure III-10. Instrumentation, Station 3, View Looking Downstream

FD 18597C



Note: All Dimensions Are in Inches.

Figure III-11. Probe Configurations

FD 18483B

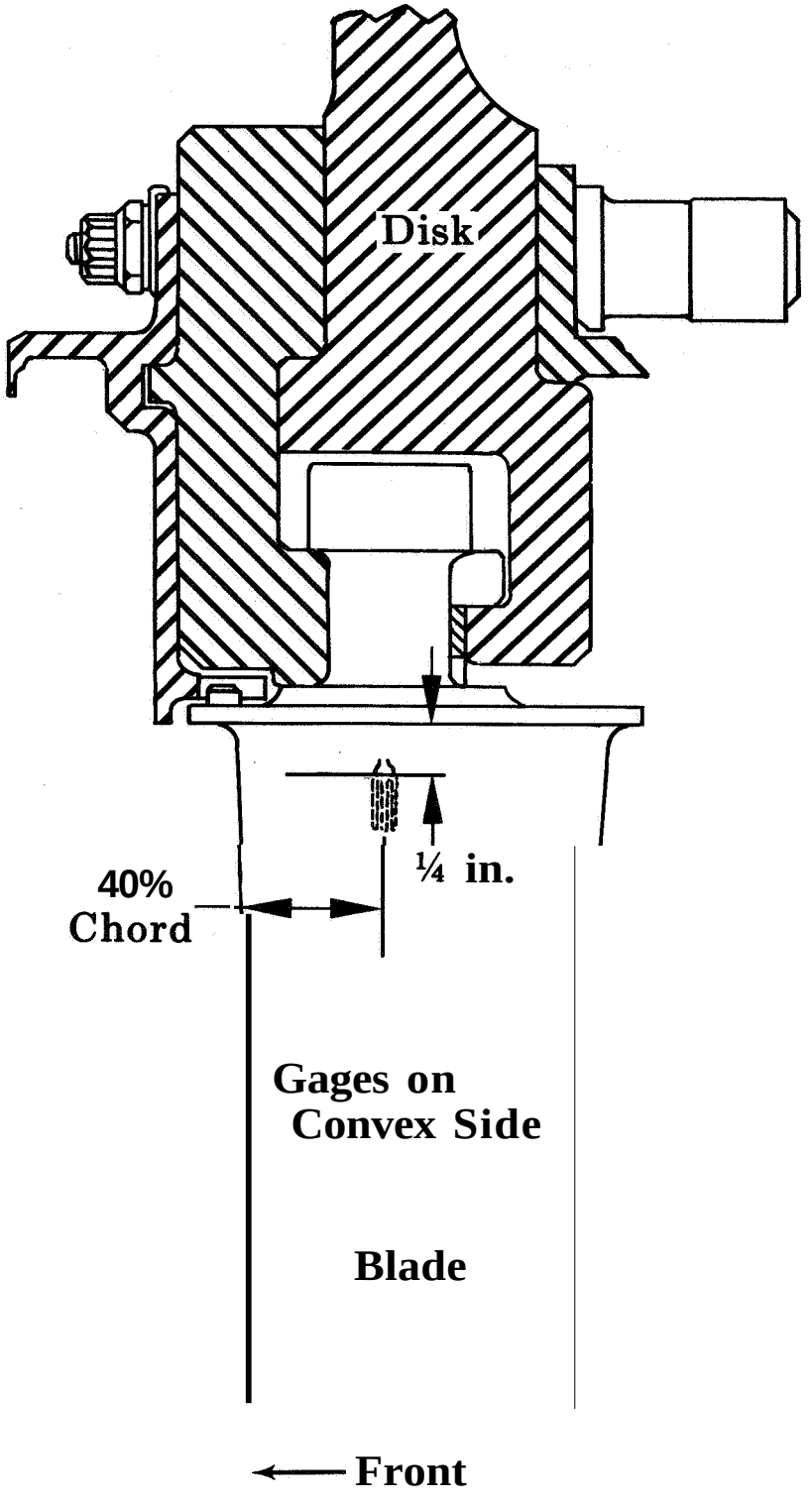


Figure 111-12. Strain Gage Locations

FD 18598A

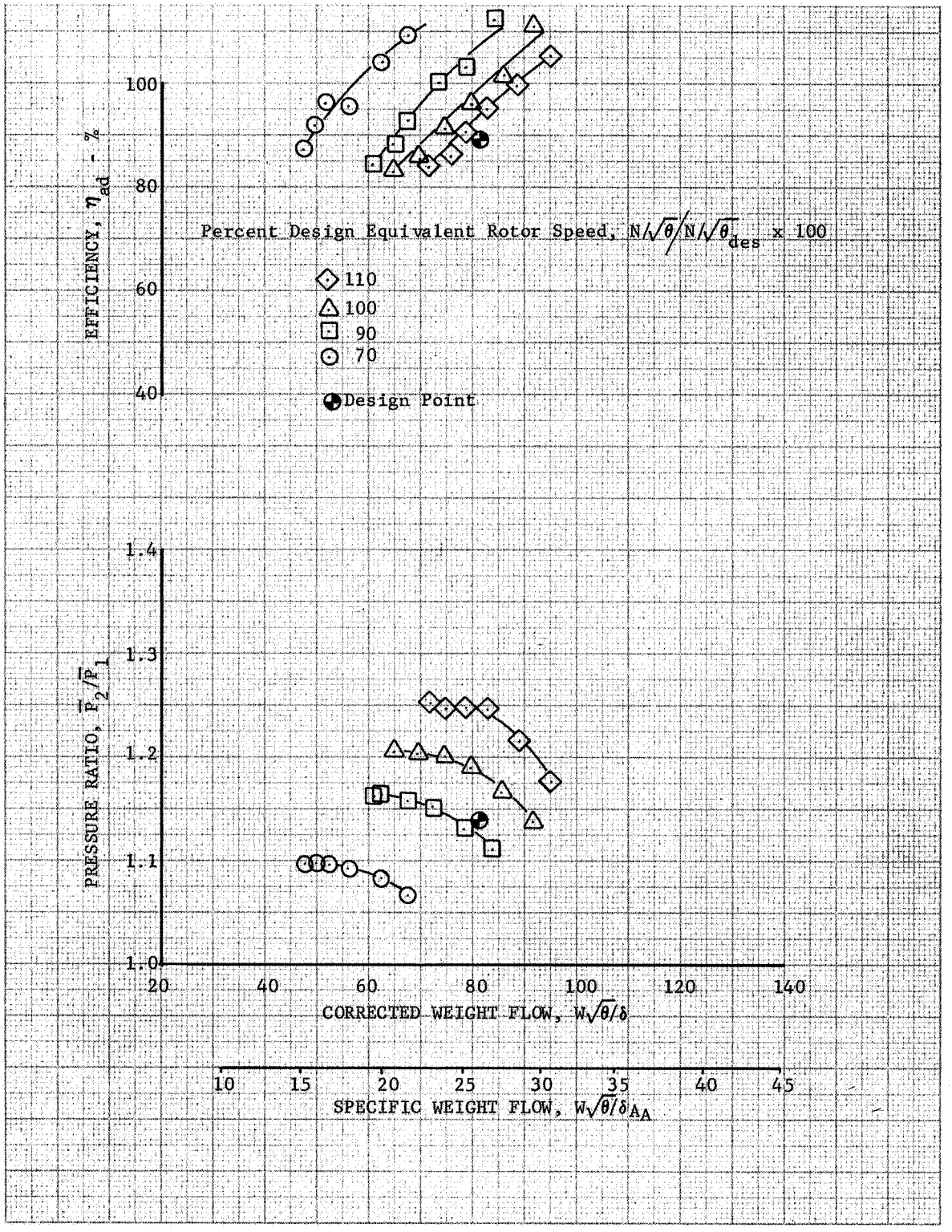


Figure V-1. Overall Performance: Flow Generation Rotor Only

DF 56628

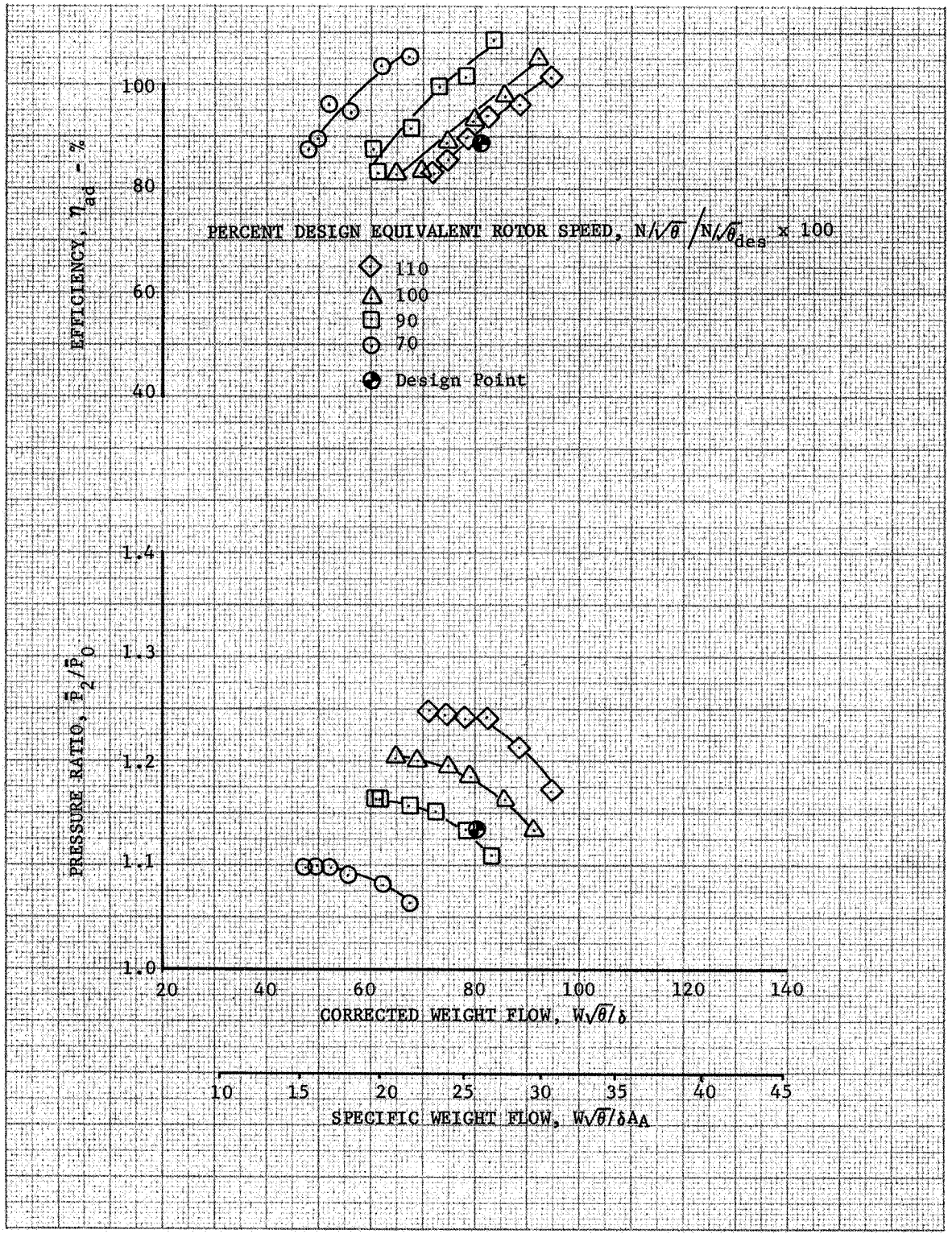


Figure V-2. **Overall Performance; Inlet Guide Vane and** Flow **Generation Rotor** DF 56629

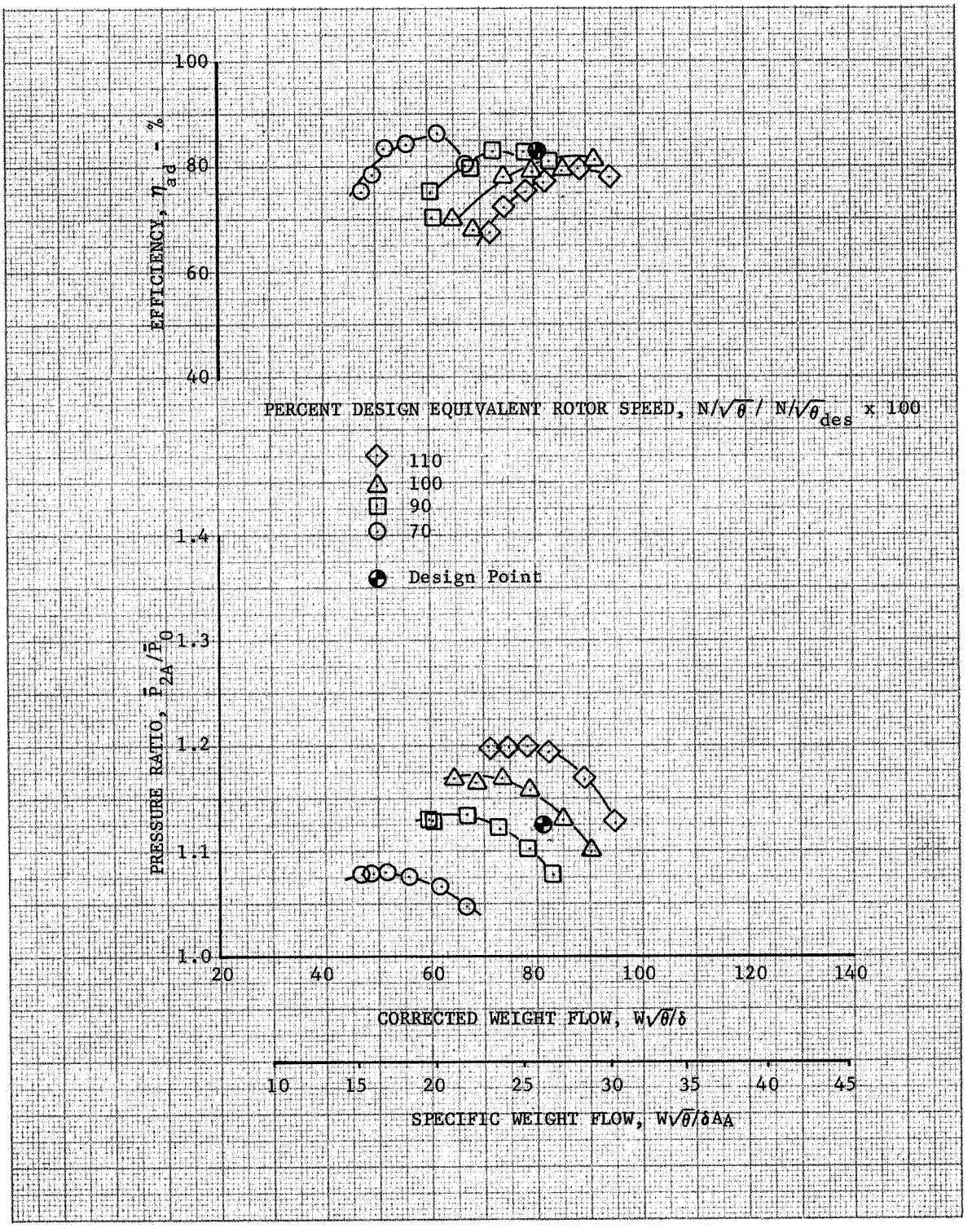


Figure V-3. Overall Performance: Guide Vane - Flow Generation Rotor - Slotted Stator 1 DF 56630

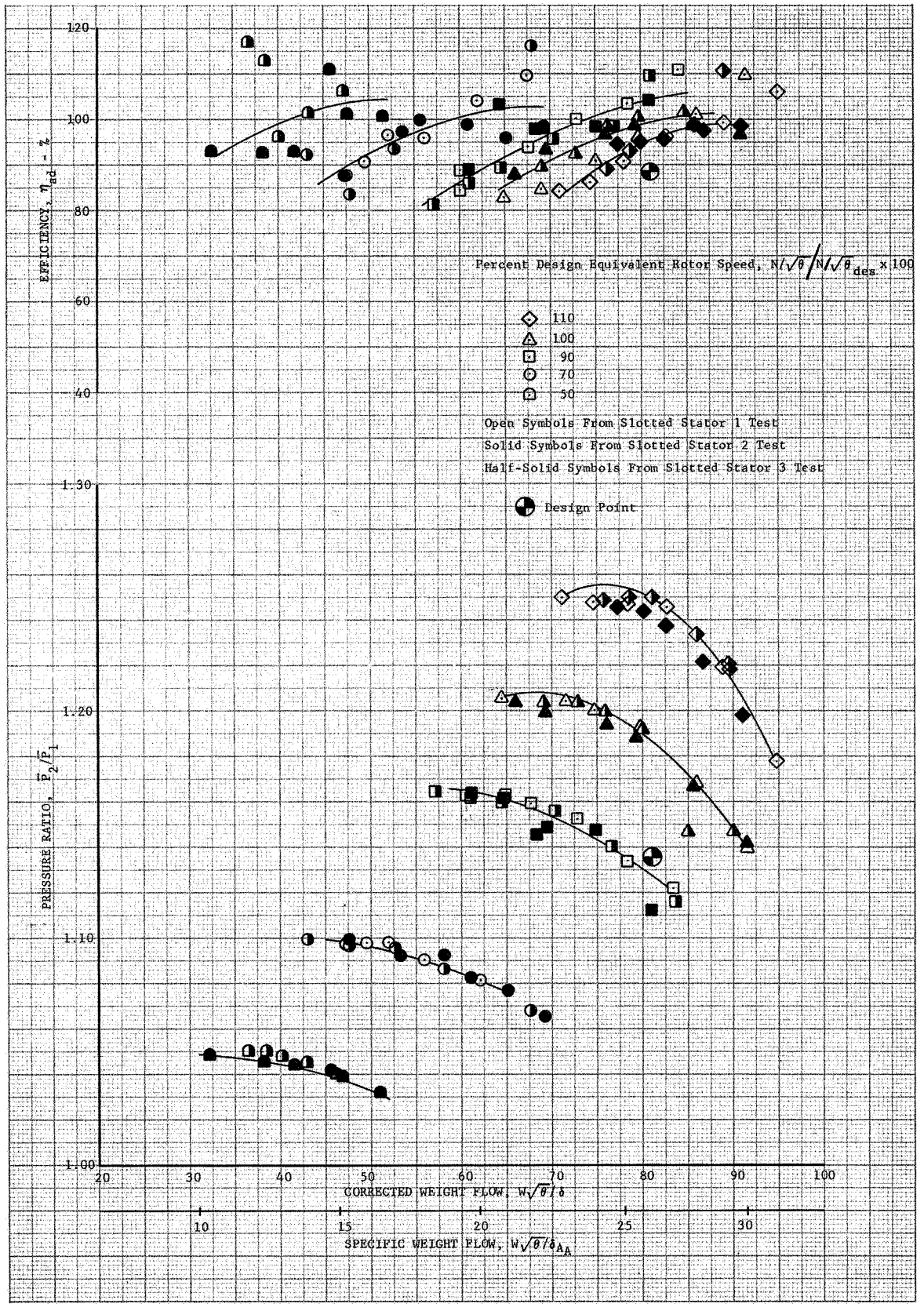
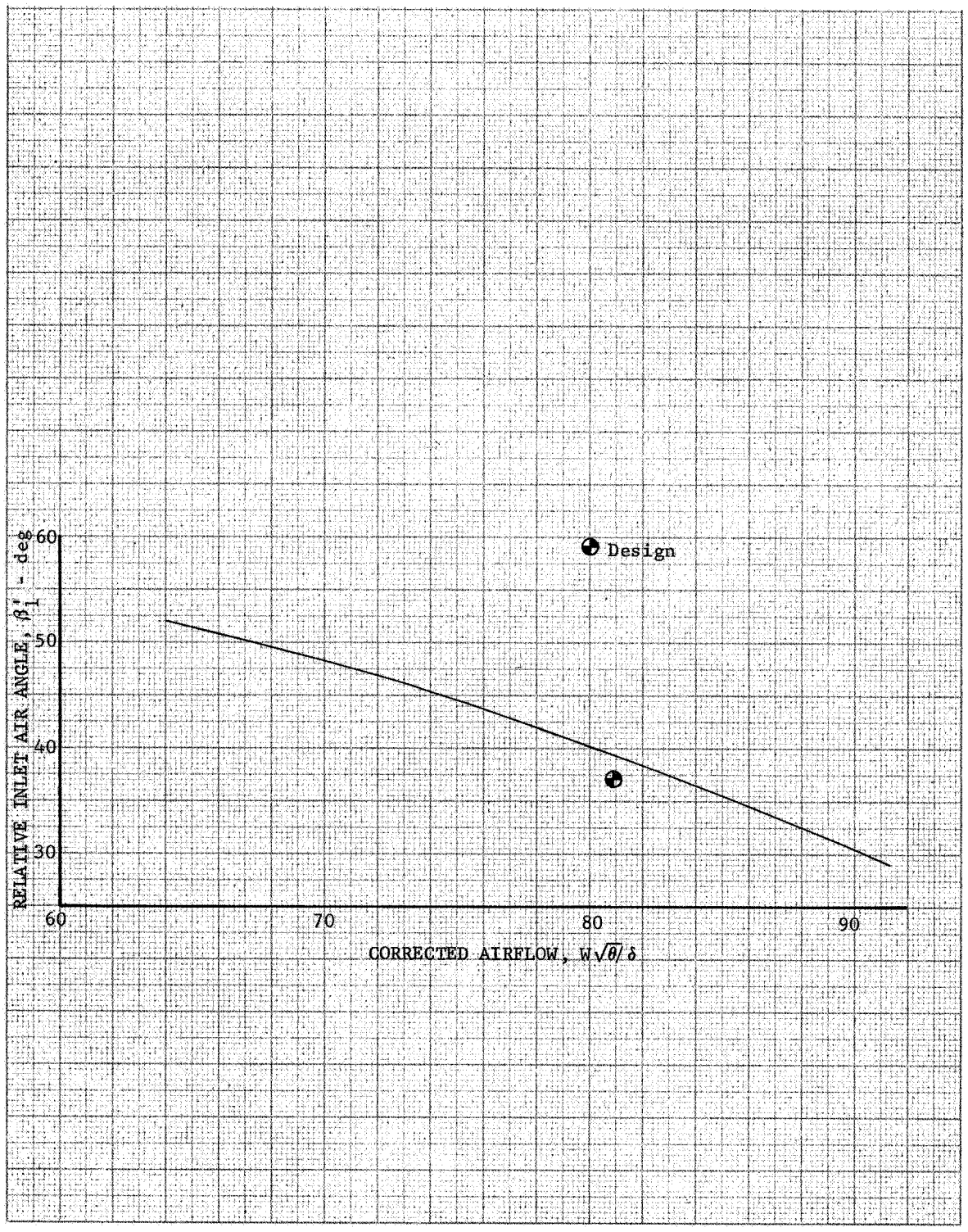


Figure *V-4.* **Composite Overall Performance: Flow Generation Rotor** DF *56634*



F ꝏ≥ꝏ V-5. Flow Generation Rotor Relative Inlet Air Angle: 50% Span, 100% Design Equivalent Rotor Speed DF 56635

DF 56636

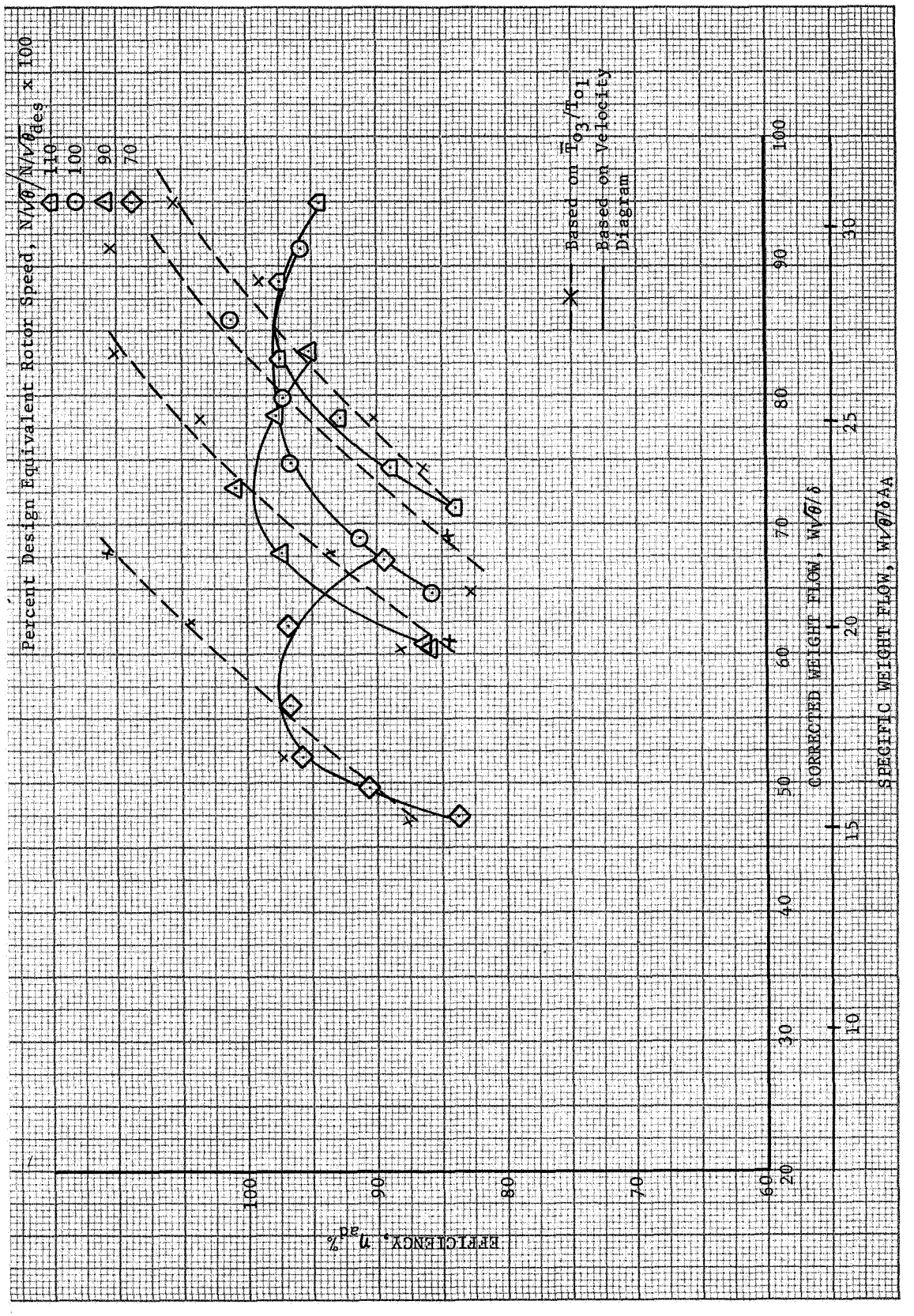


Figure D-6. Flow Generation Rotor Efficiency: Slotted Stator 1 Test

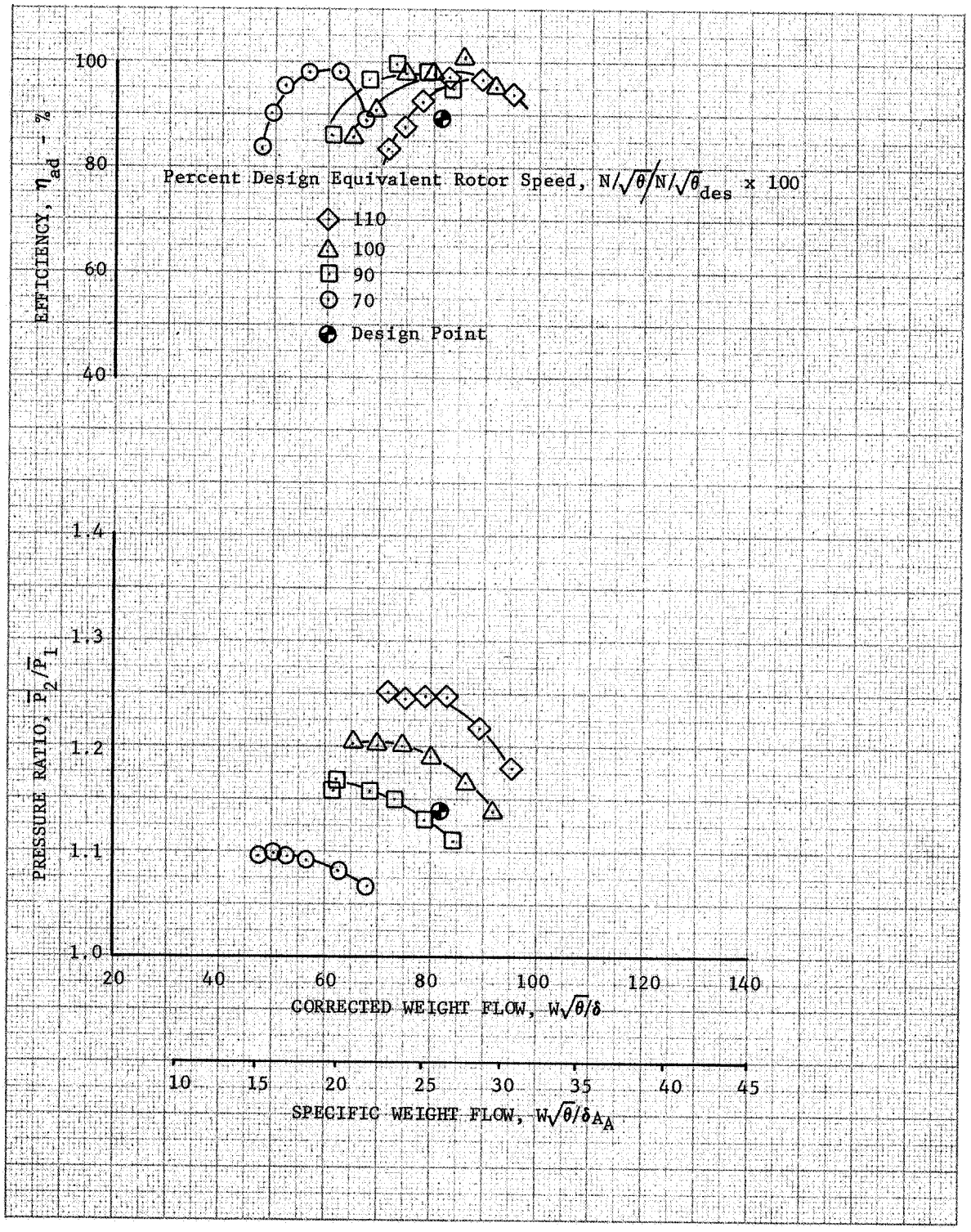


Figure V-7. Overall Performance, Flow Generation Rotor Only: Efficiency Based on Velocity Diagram

DF 56631

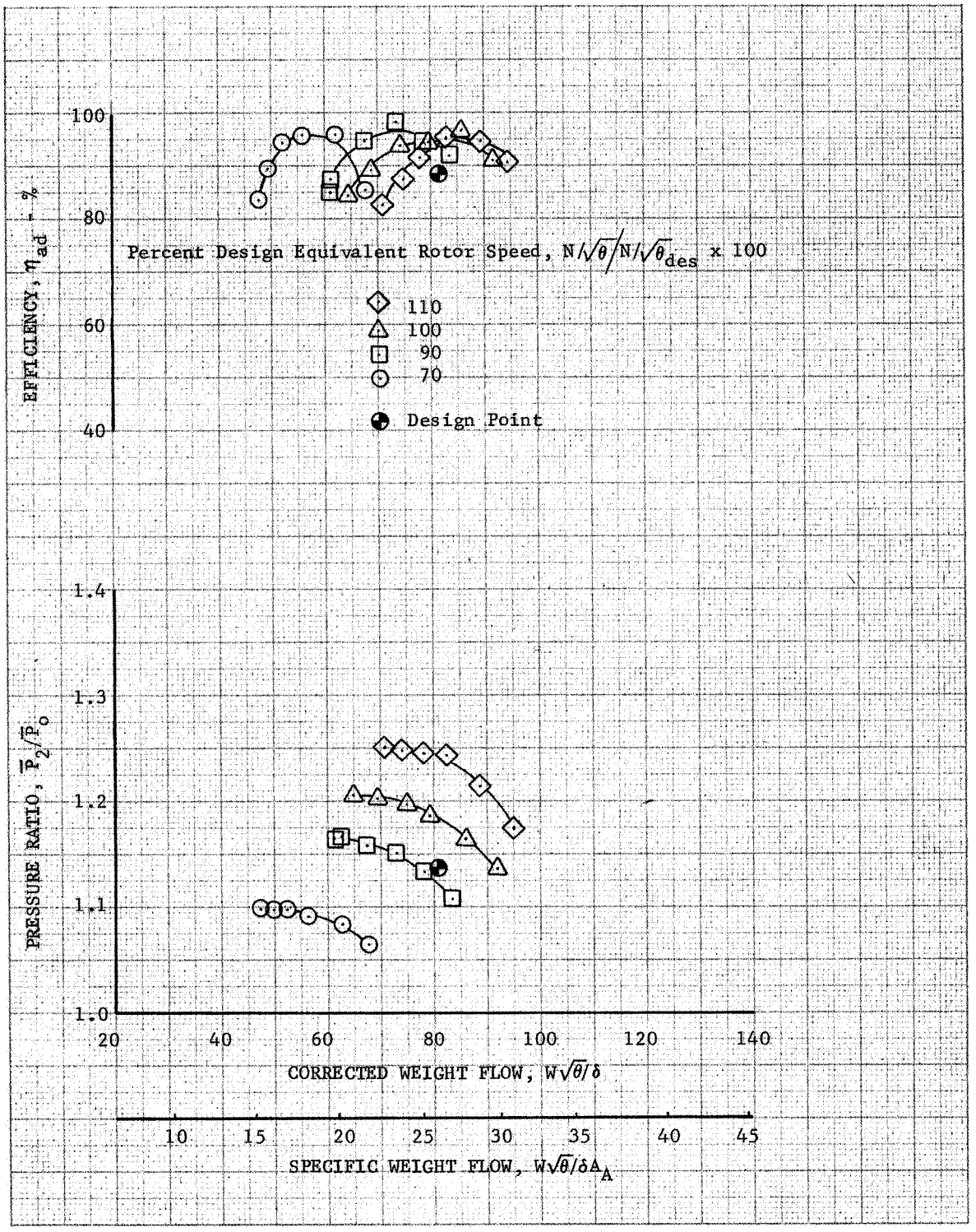


Figure V-8. Overall Performance: Inlet Guide Vane and Flow Generation Rotor, Efficiency Based on Velocity Diagram

DF 56632

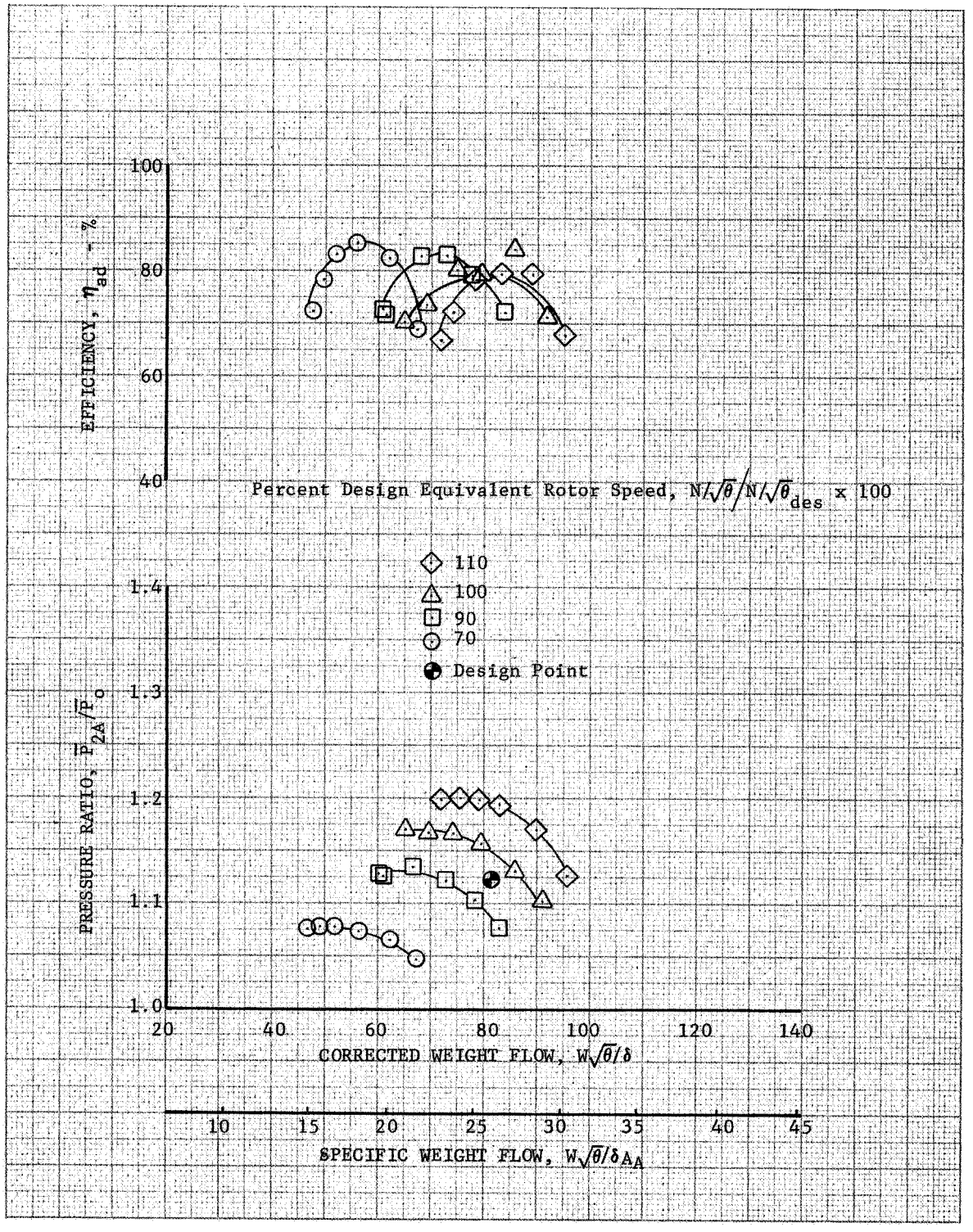


Figure V-9. Overall Performance: Guide Vane Flow Generation Rotor Slotted Stator 1, Efficiency Based on Velocity Diagram DF 56633

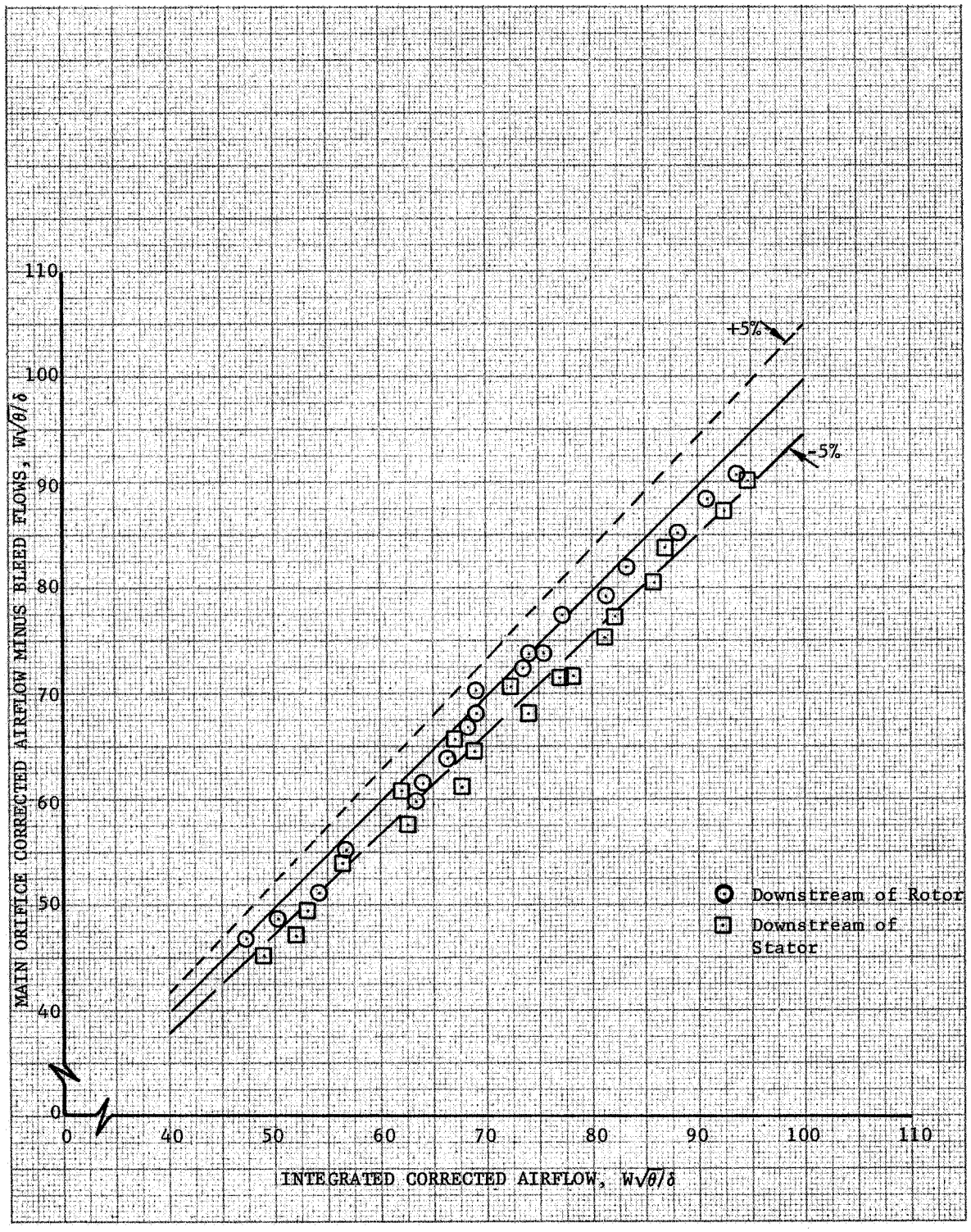
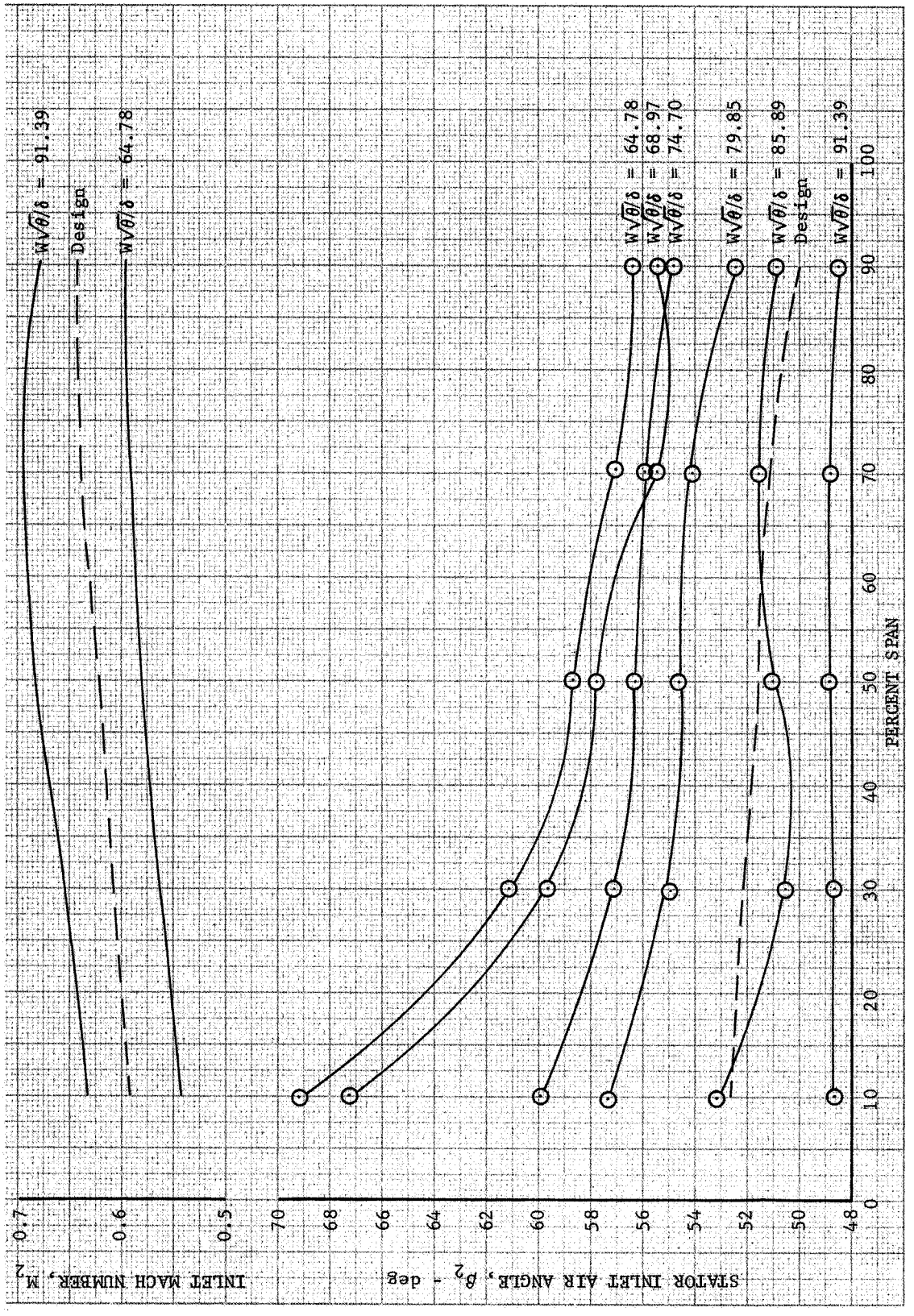


Figure V-10. Airflow Continuity Comparison DF 56637



DF 56638

Figure V-11. Inlet Air Angle and Mach Number Distribution: Slotted Stator 1, 100% Design Equivalent Rotor Speed

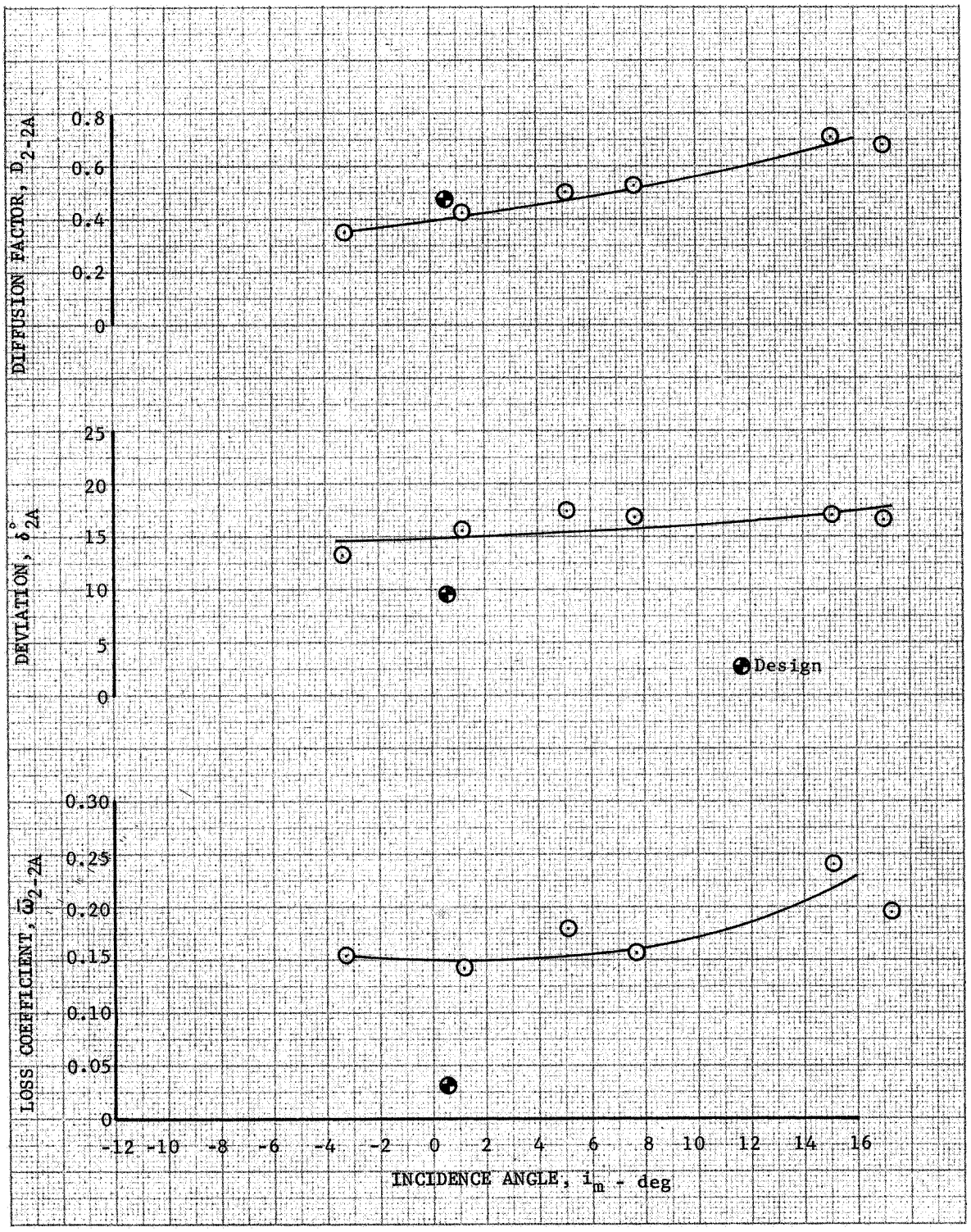


Figure V-12. Stator Blade Element Performance: 100% Design Equivalent Rotor Speed, 100% Span from Tip

DF 56639

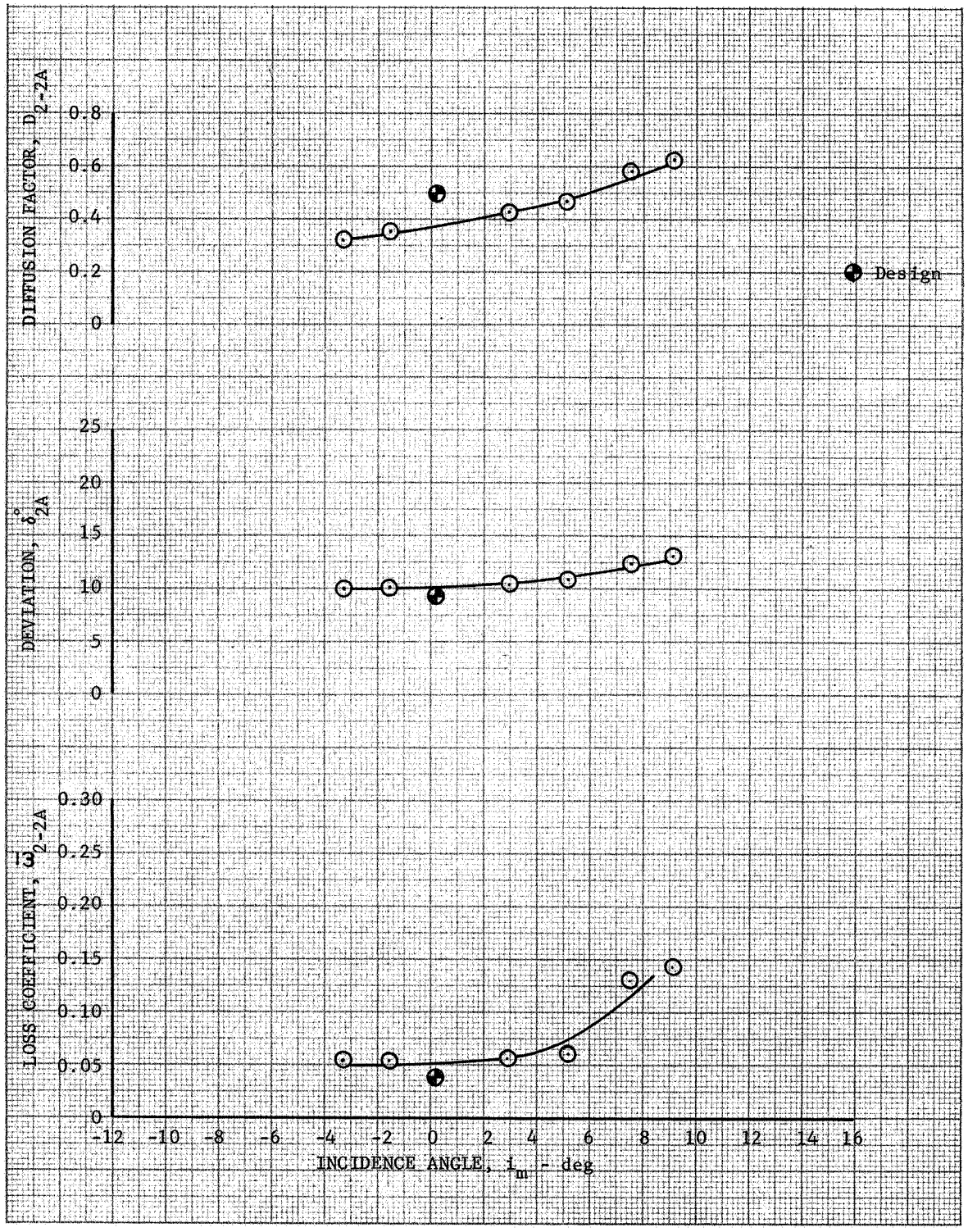


Figure V-13. Stator Blade Element Performance: 100% Design Equivalent Rotor Speed, 30% Span from Tip DF 56640

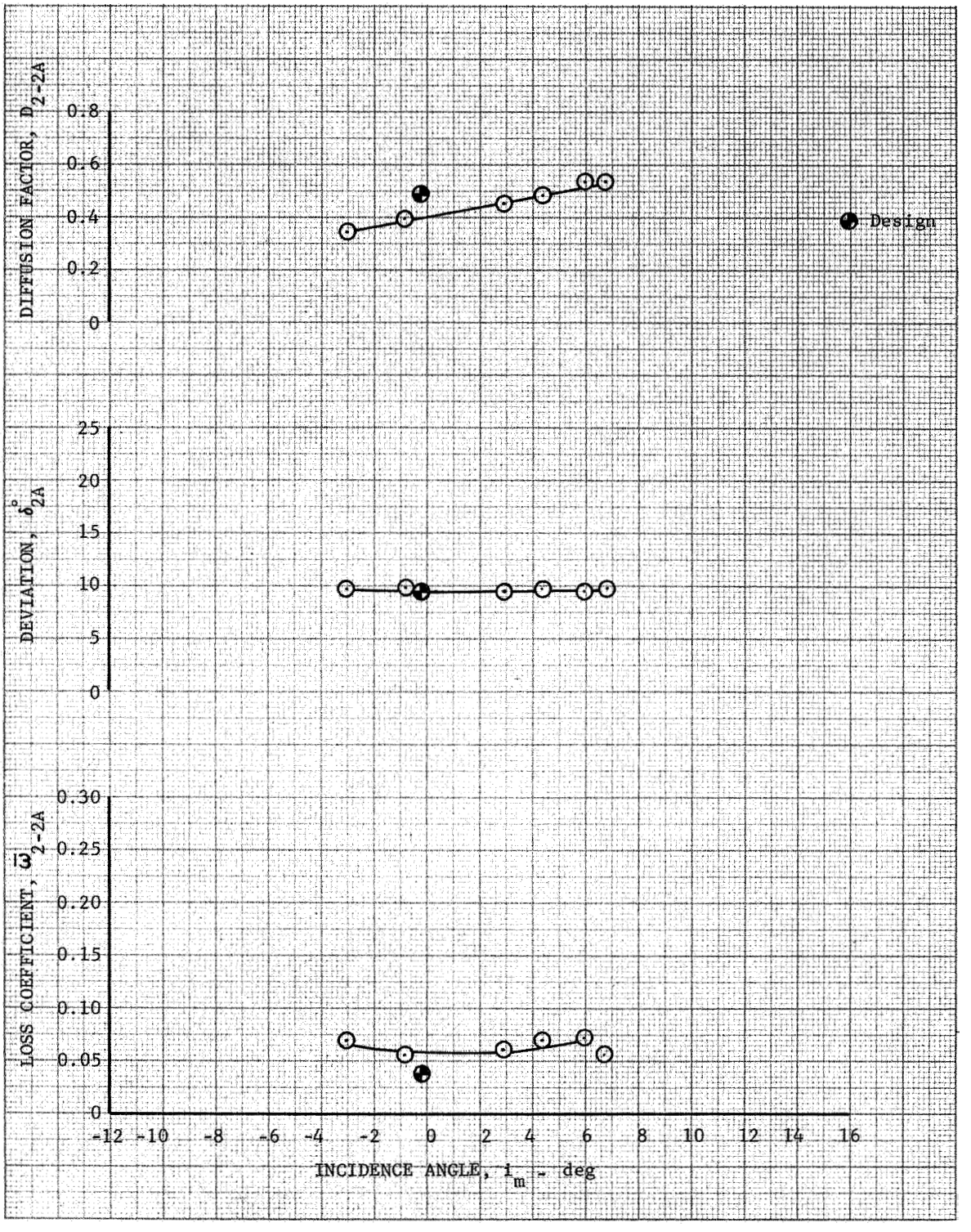


Figure *V-14.* Stator Blade Element Performance: 100% Design Equivalent Rotor Speed, 50% Span from Tip

DF *56641*

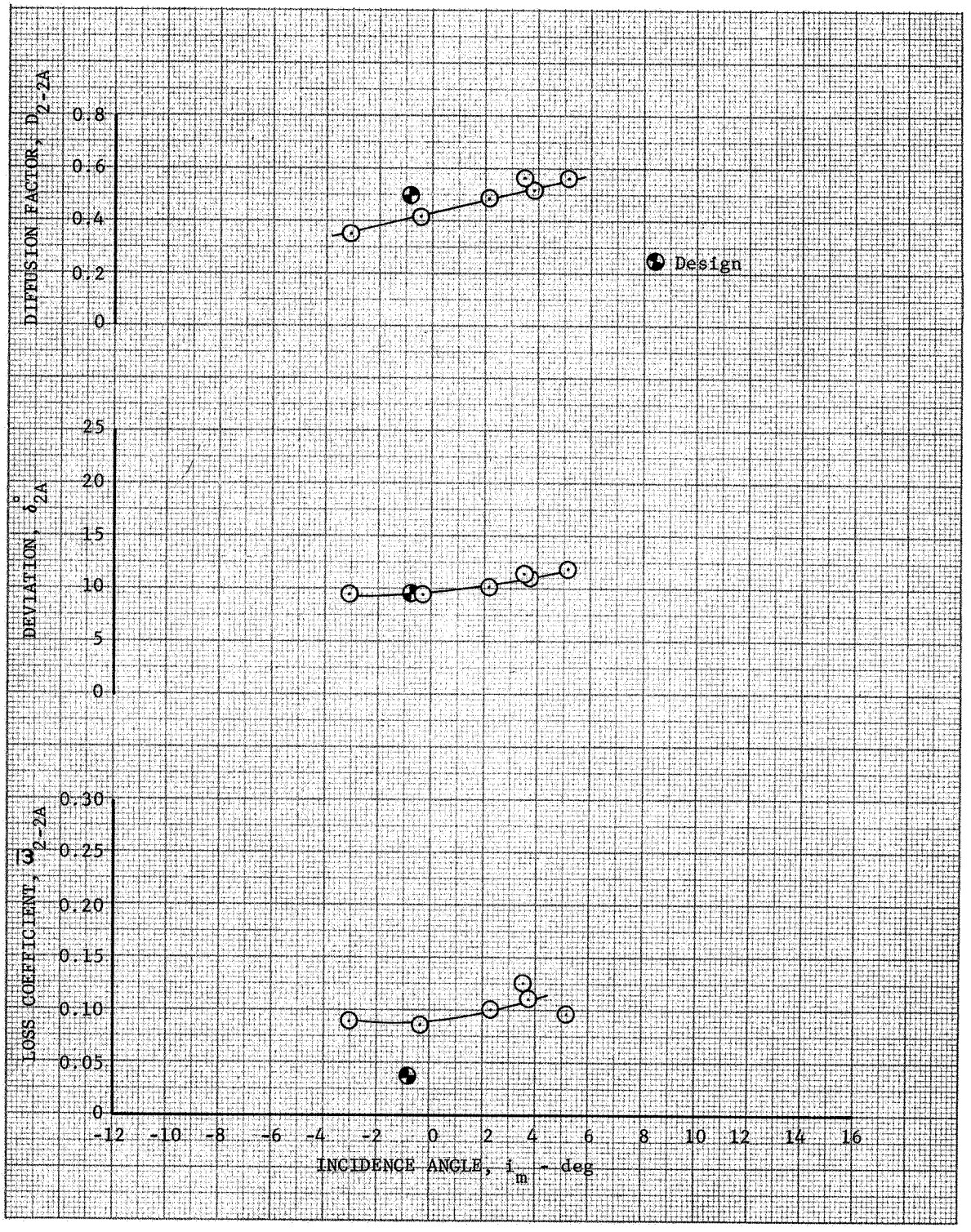


Figure V-15. Stator Blade Element Performance: 100% Design Equivalent Rotor Speed, 70% Span from Tip

DF 56642

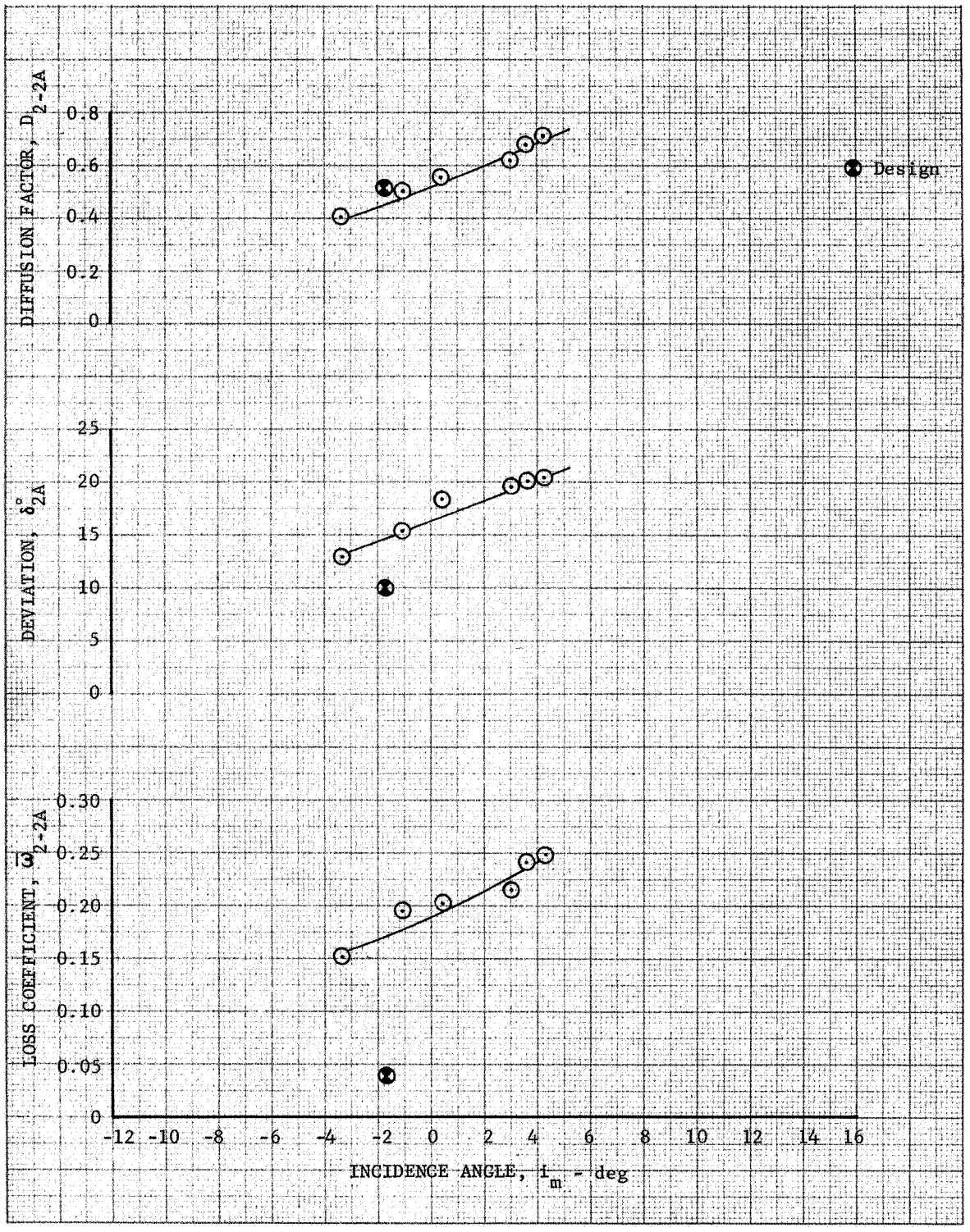


Figure V-16. Stator Blade Element Performance: 100% Design Equivalent Rotor Speed, 90% Span from Tip

DF 56643

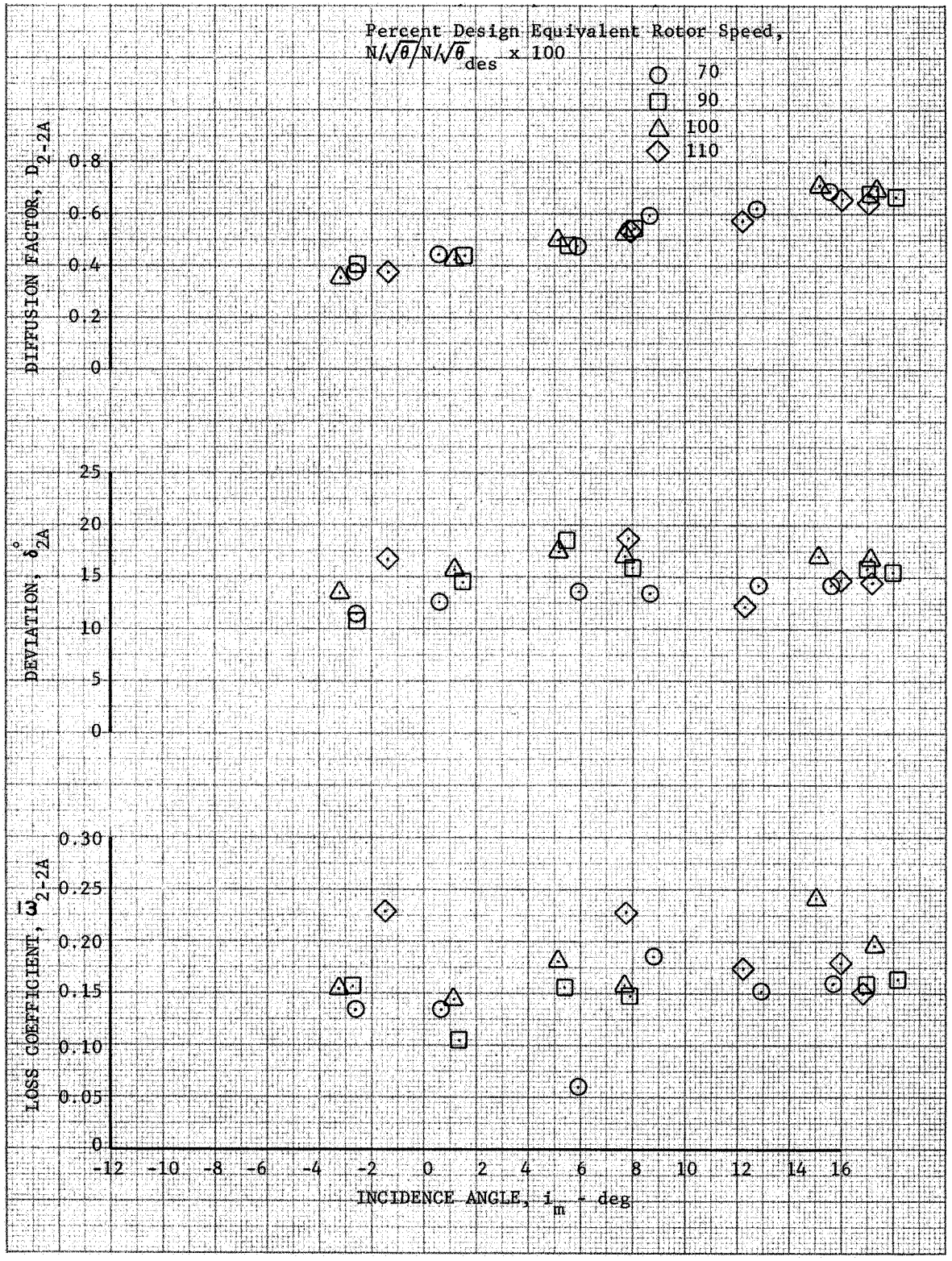


Figure V-17. Variation of Stator Blade Element Performance with Incidence: Slotted Stator 1, 10% Span from Tip DF 56644

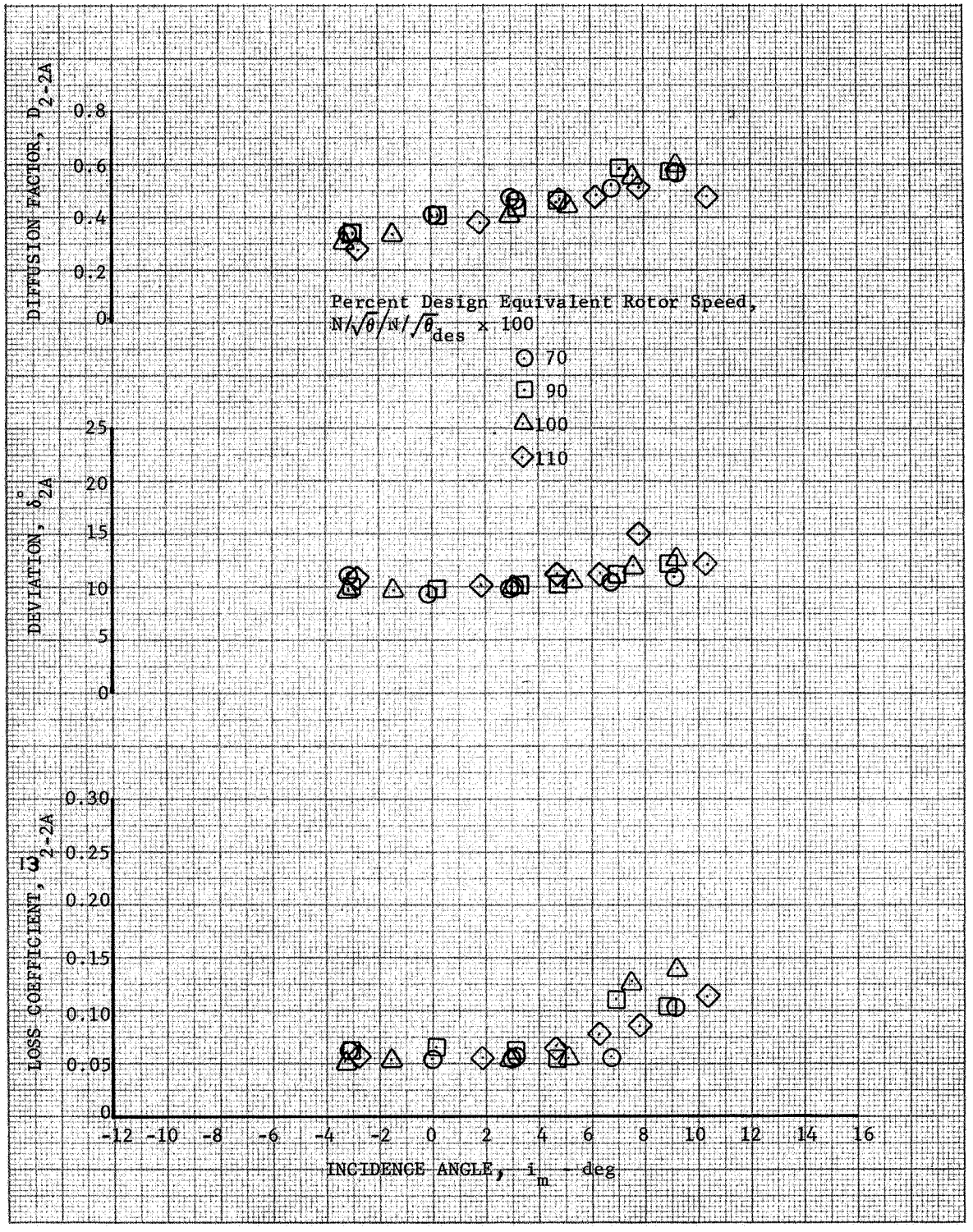


Figure V-18. Variation of Stator Blade Element Performance with Incidence: Slotted Stator 1, 30% Span from Tip

DF 56645

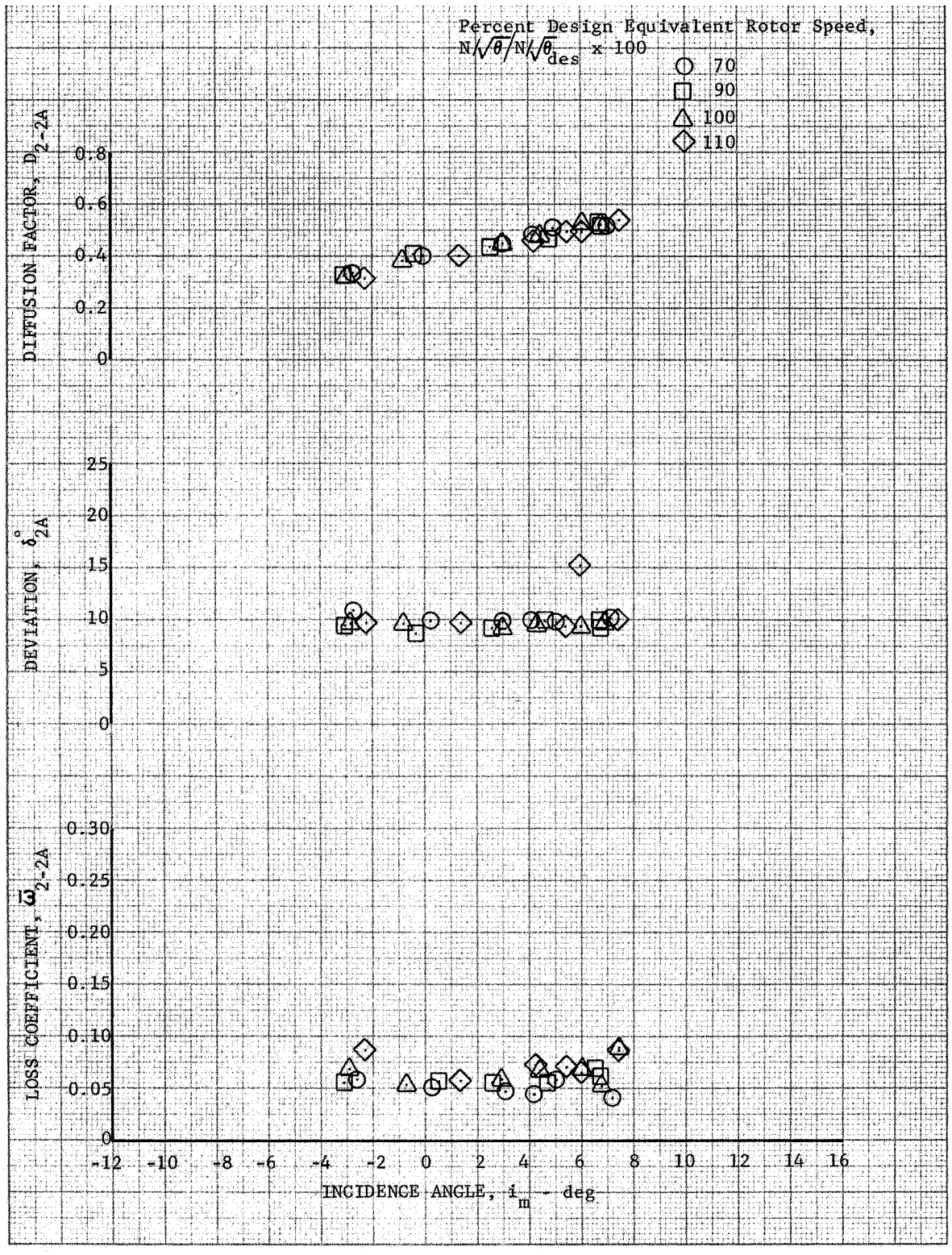


Figure V-19. Variation of Stator Blade Element Performance with Incidence: Slotted Stator 1, 50% Span from Tip

DF 56646

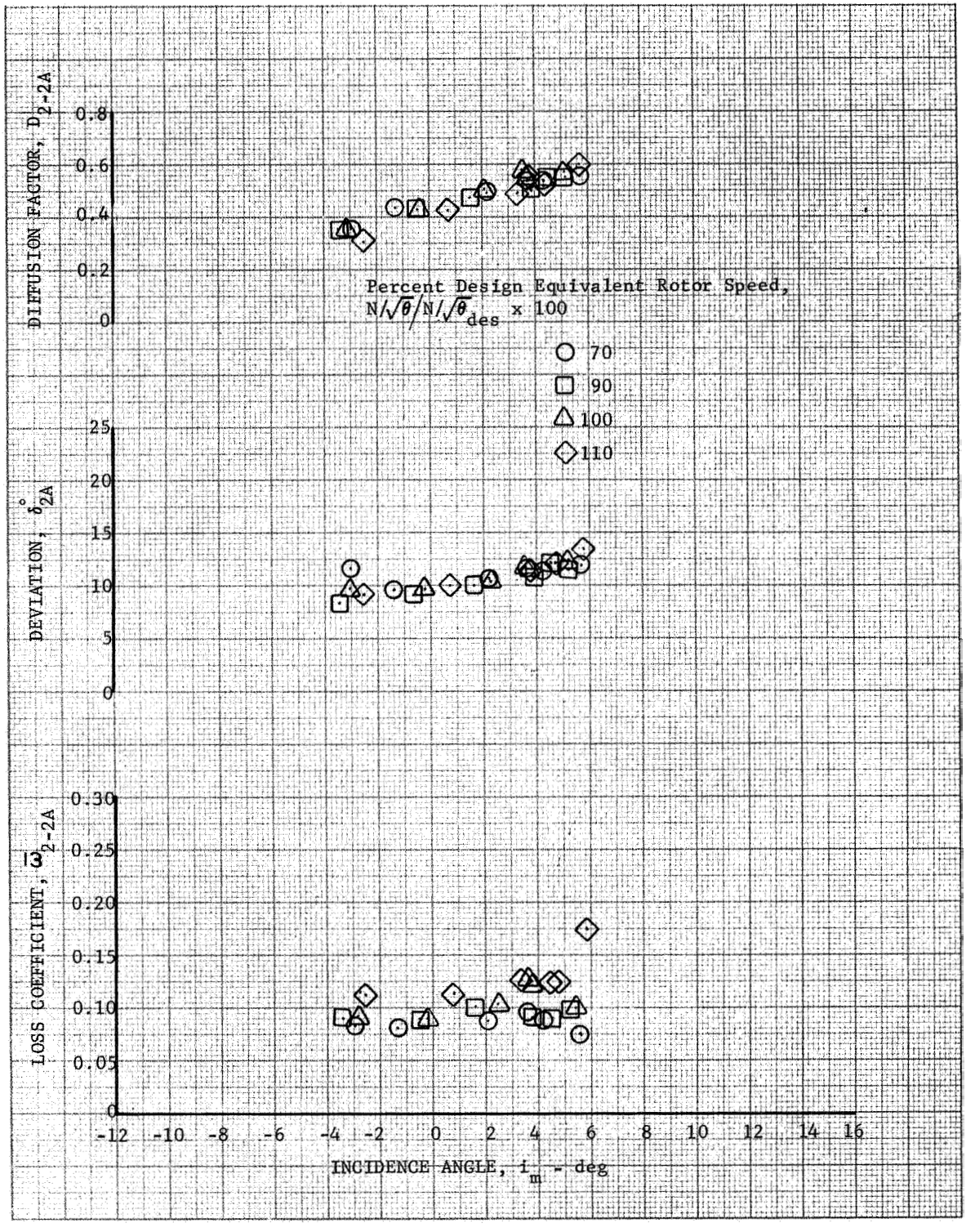


Figure V-20. Variation of Stator Blade Element Performance with Incidence: Slotted Stator 1, 70% Span from Tip

DF 56647

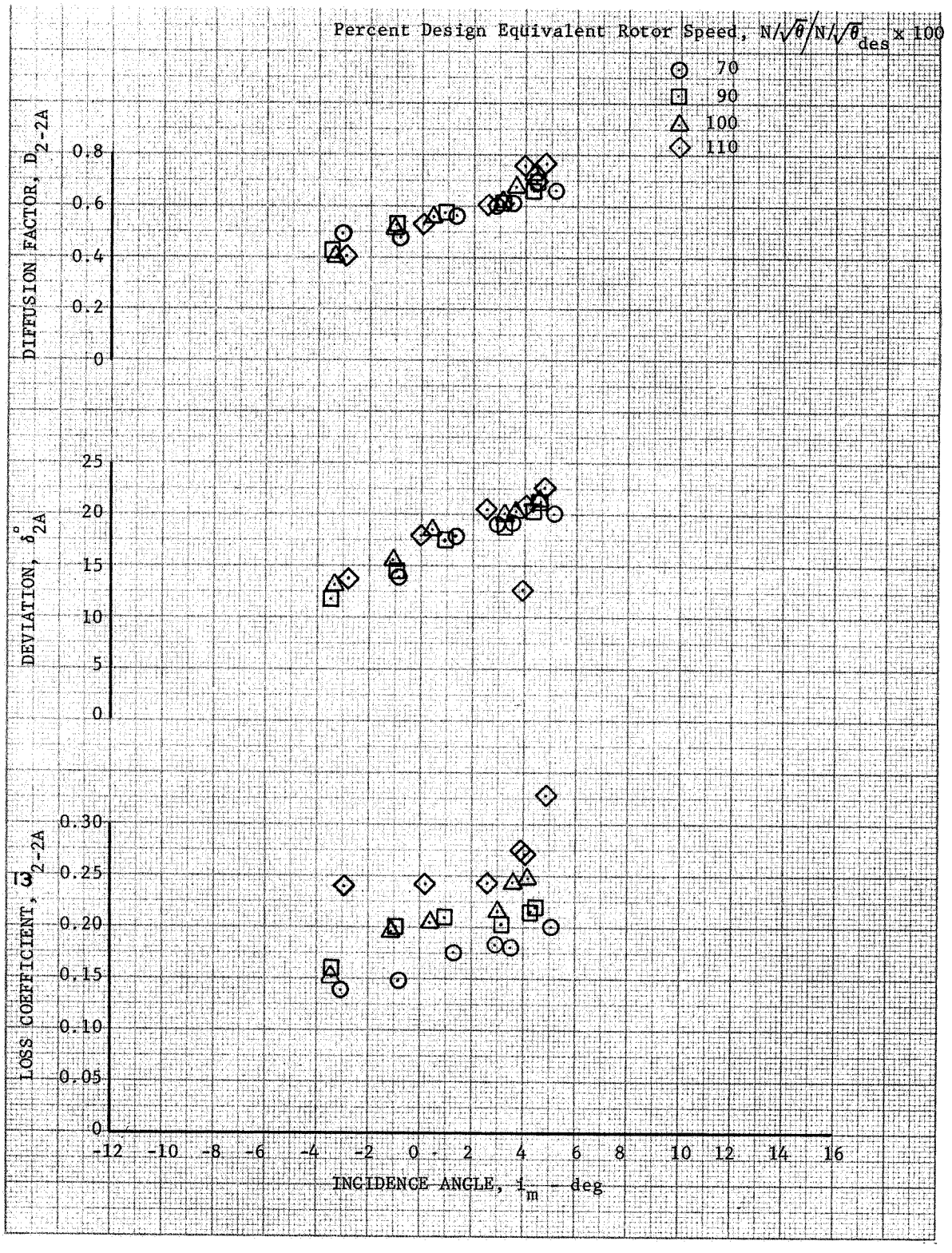


Figure V-21. Variation of Stator Blade Element Performance with Incidence: Slotted Stator 1, 90% Span from Tip

DF 56648

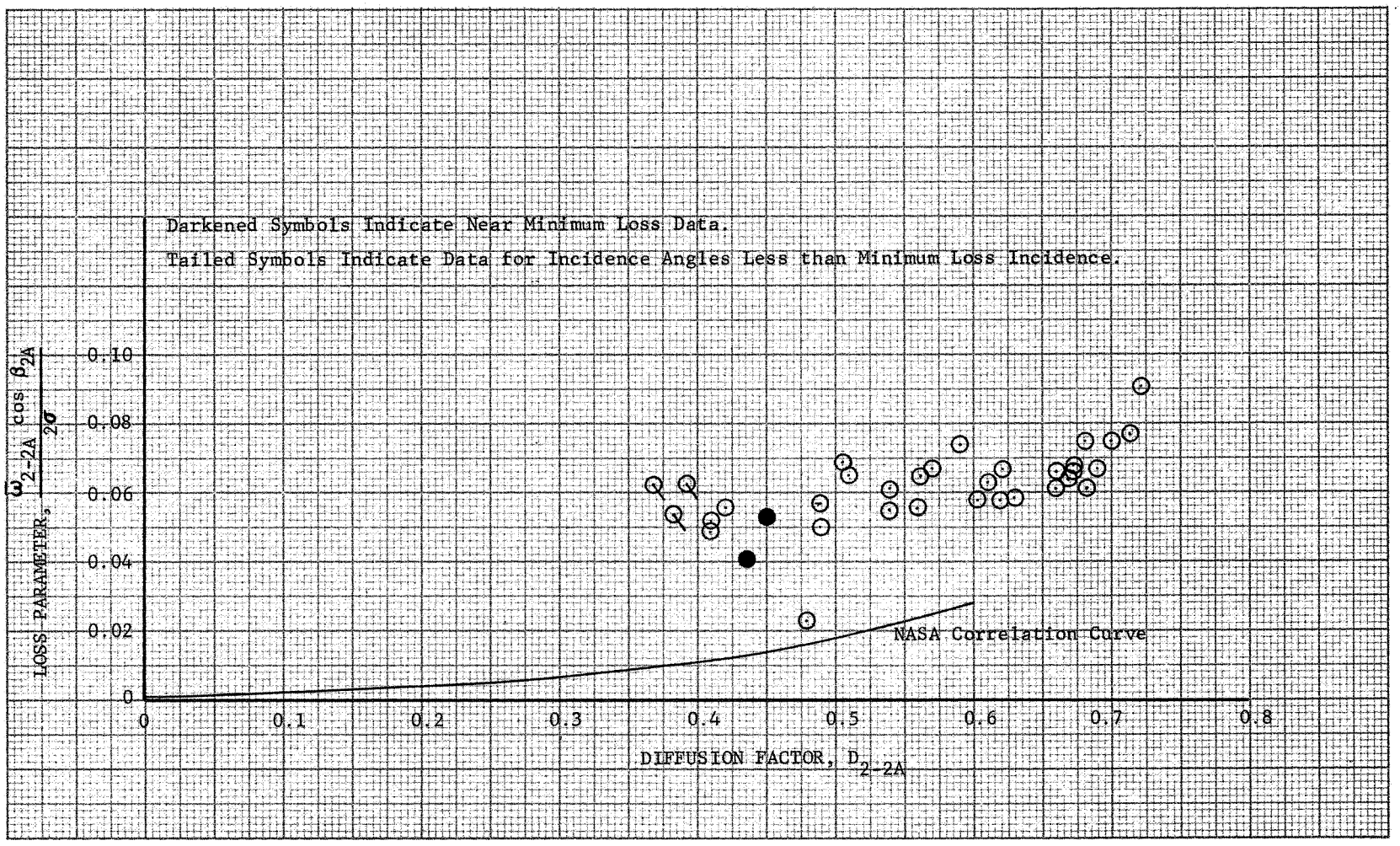


Figure 6-22 Loss Parameter Versus Diffusion Factor: 10% Span (From Tiaj; 70, 90, and 100% Design Equivalent Rotor Speed

DF 56649

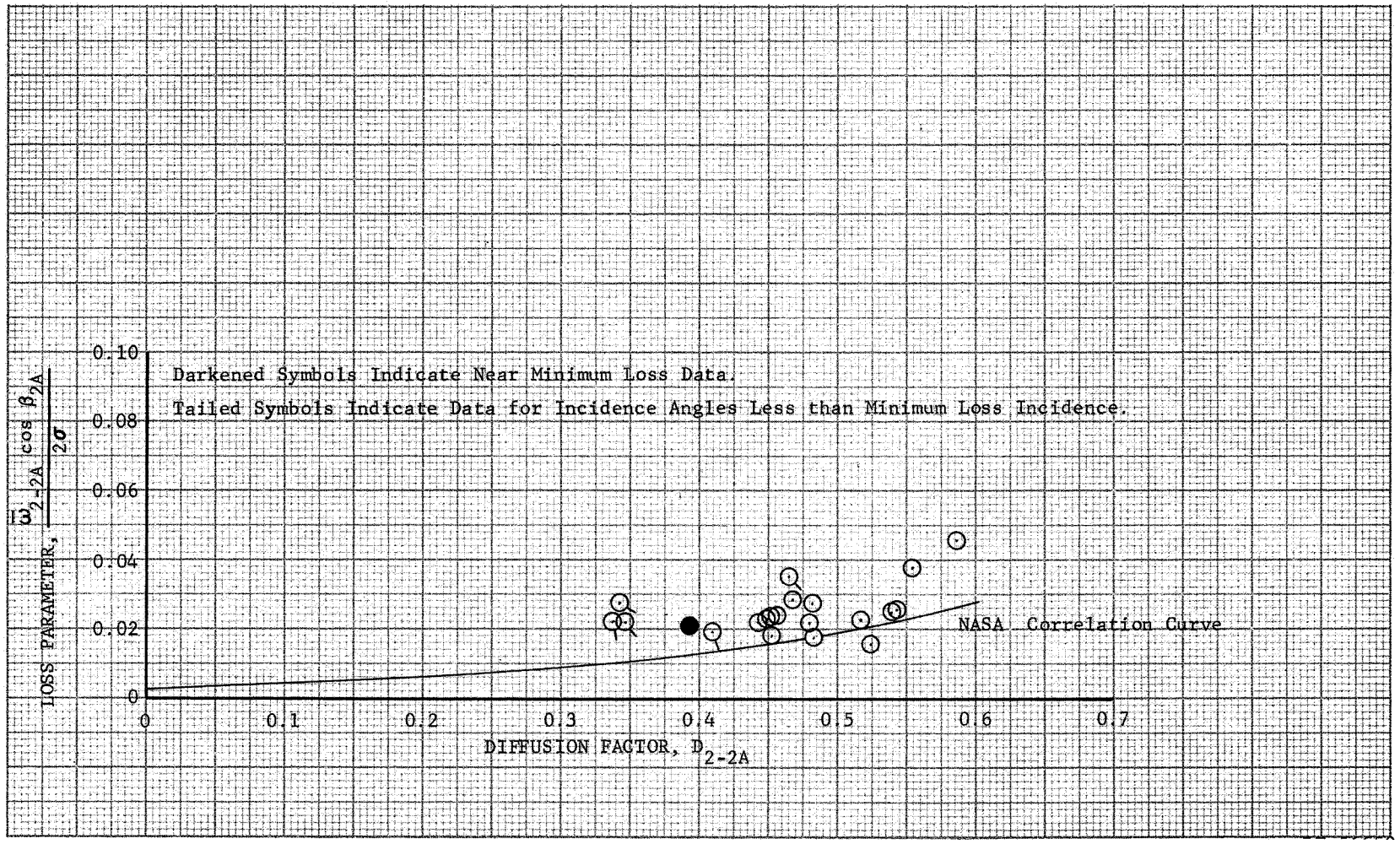


Figure V-23. Loss Parameter Versus Diffusion Factor: 70 and 50% Span (From Tip); 70, 90, and 100% Design Equivalent Rotor Speed

DF 56650

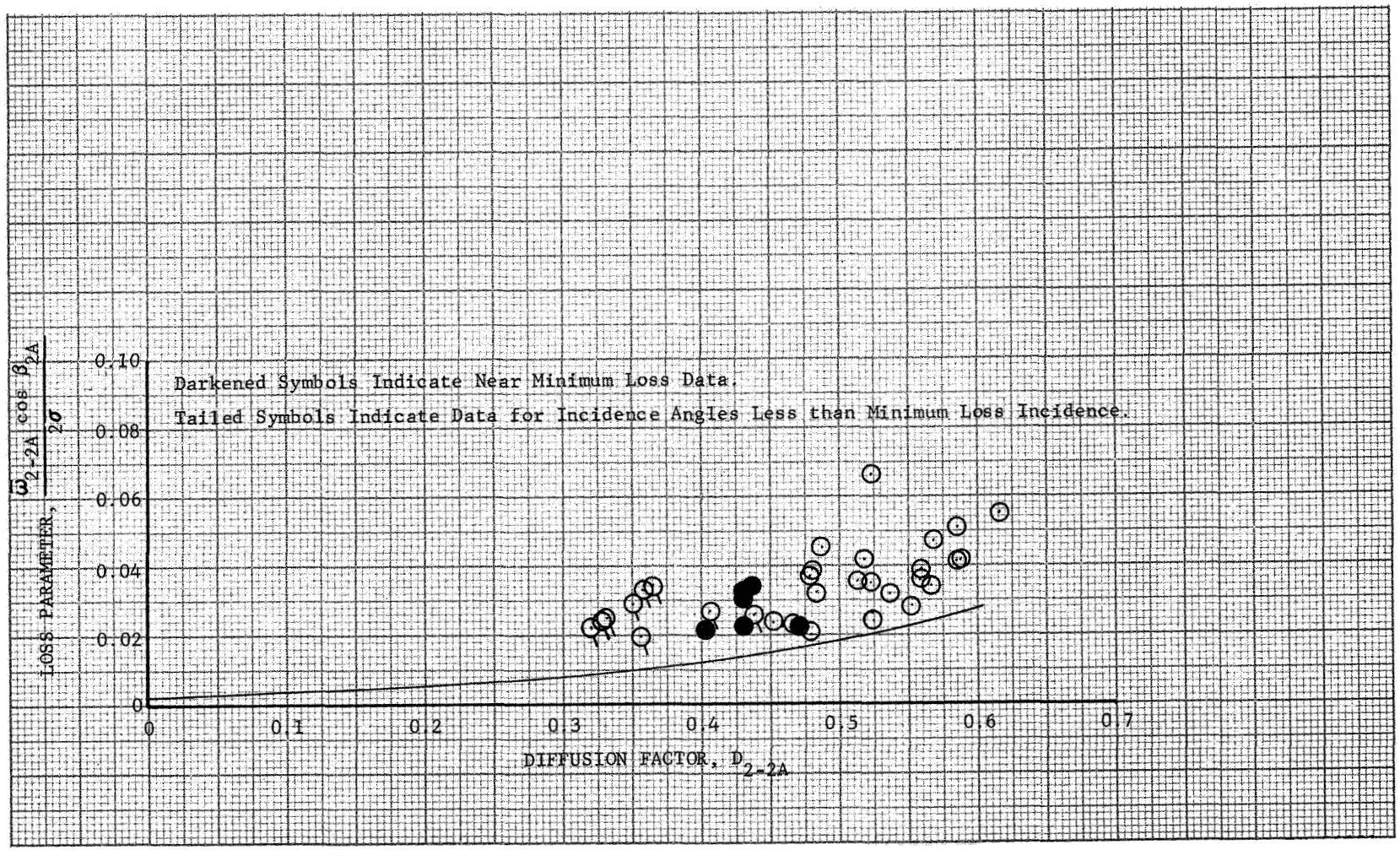


Figure V-24. Loss Parameter Versus Diffusion Factor: 90 and 30% Span (From Tip); 70, 90, and 100% Design Equivalent Rotor Speed

DF 56651

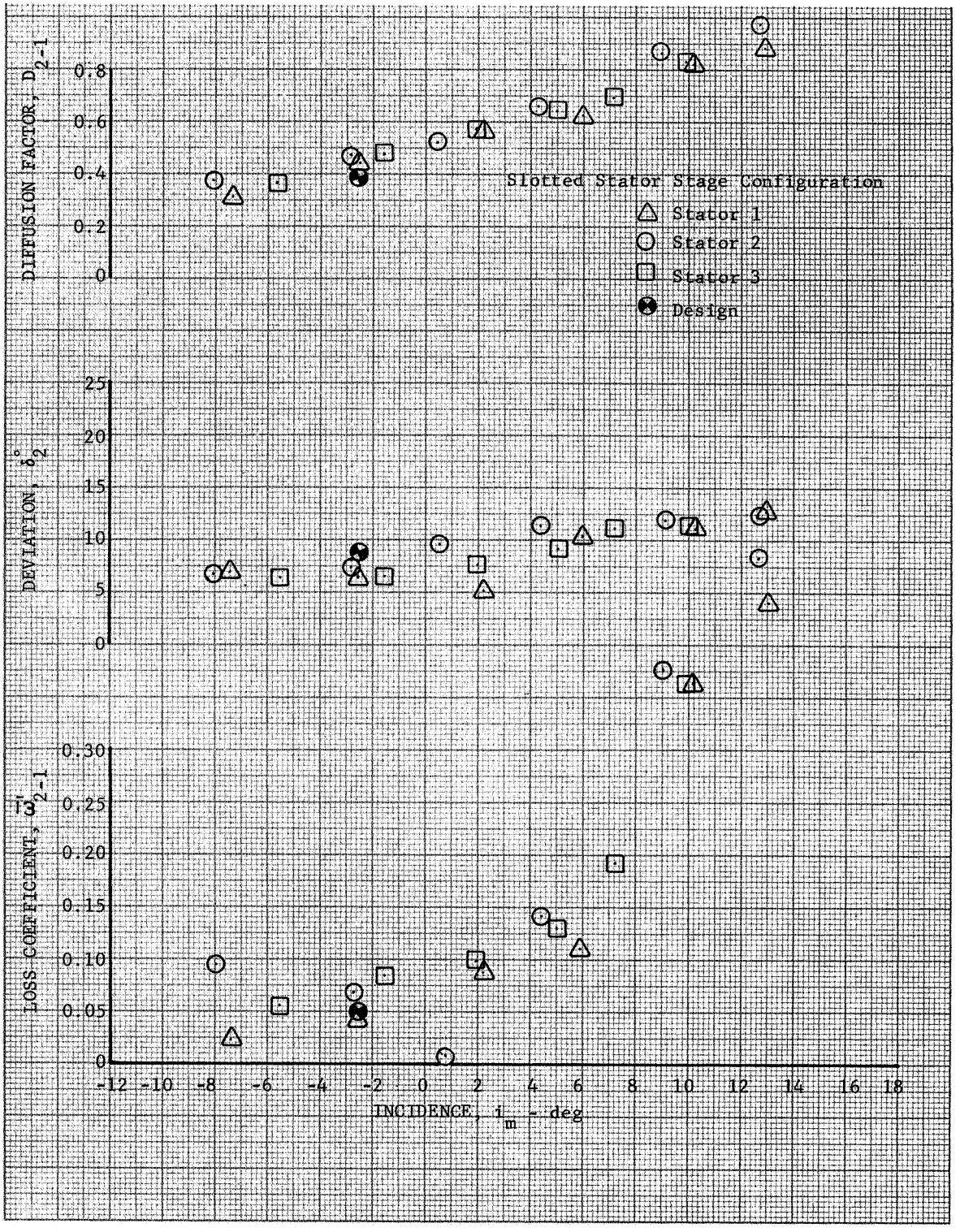


Figure V-25. Variation of Blade Element Performance with Incidence:Flow Generation Rotor, 100% Design Equivalent Rotor Speed, 10% Span from Tip

DF 56652

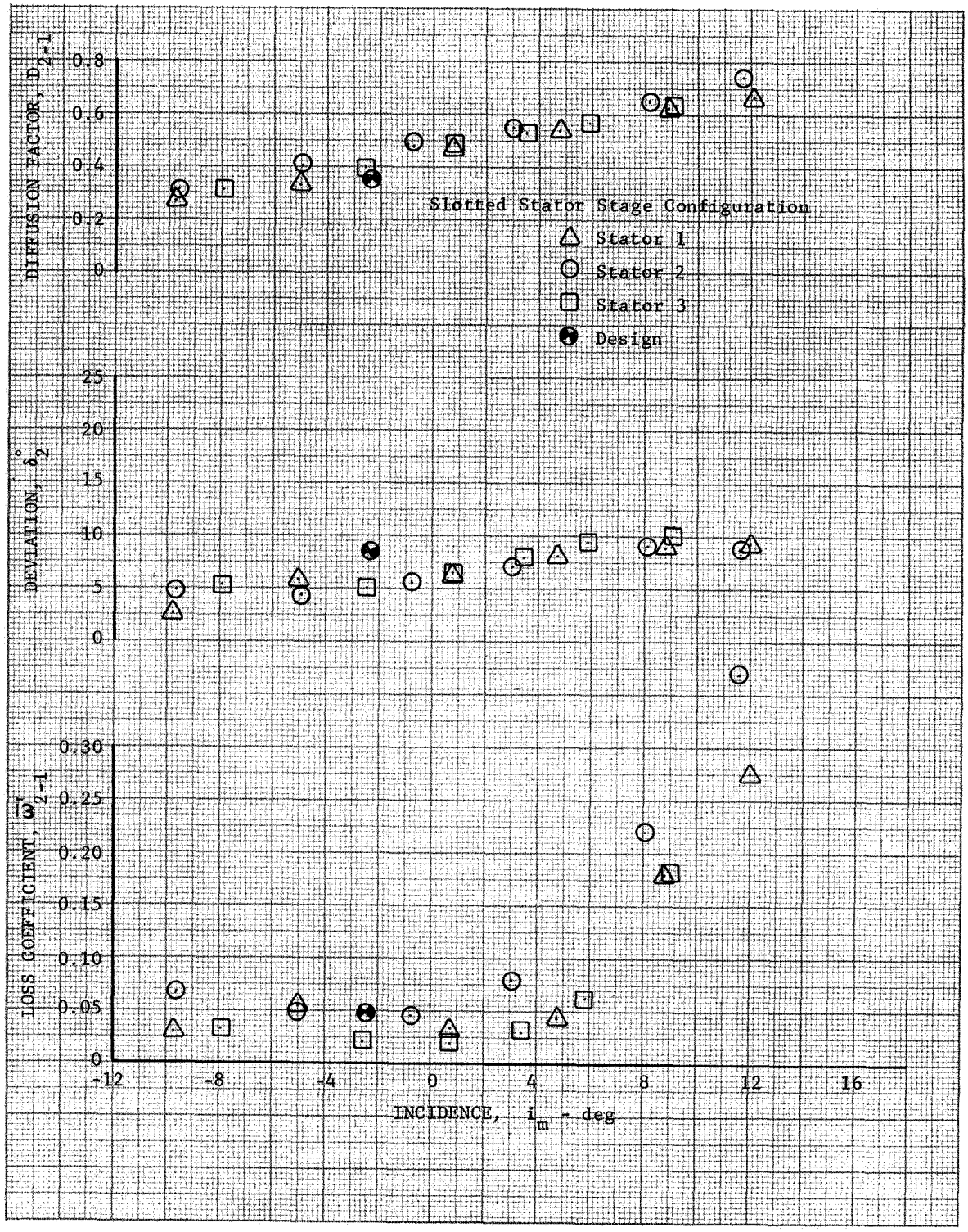


Figure V-26. Variation of Blade Element Performance with Incidence: Flow Generation Rotor, 100% Design Equivalent Rotor Speed, 30% Span from Tip

DF 56653

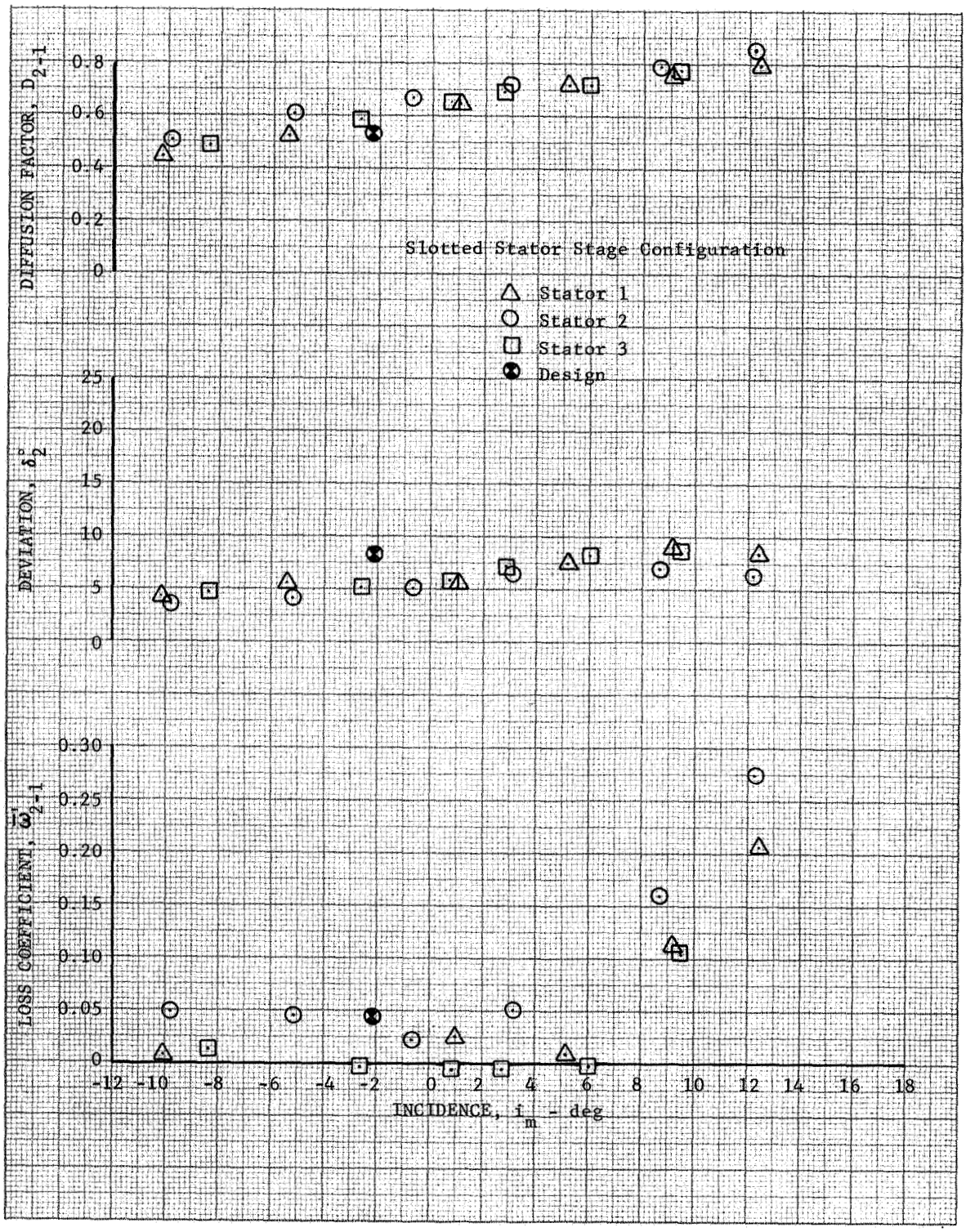


Figure V-27. Variation of Blade Element Performance with Incidence: Flow Generation Rotor, 100% Design Equivalent Rotor Speed, 50% Span from Tip

DF 56654

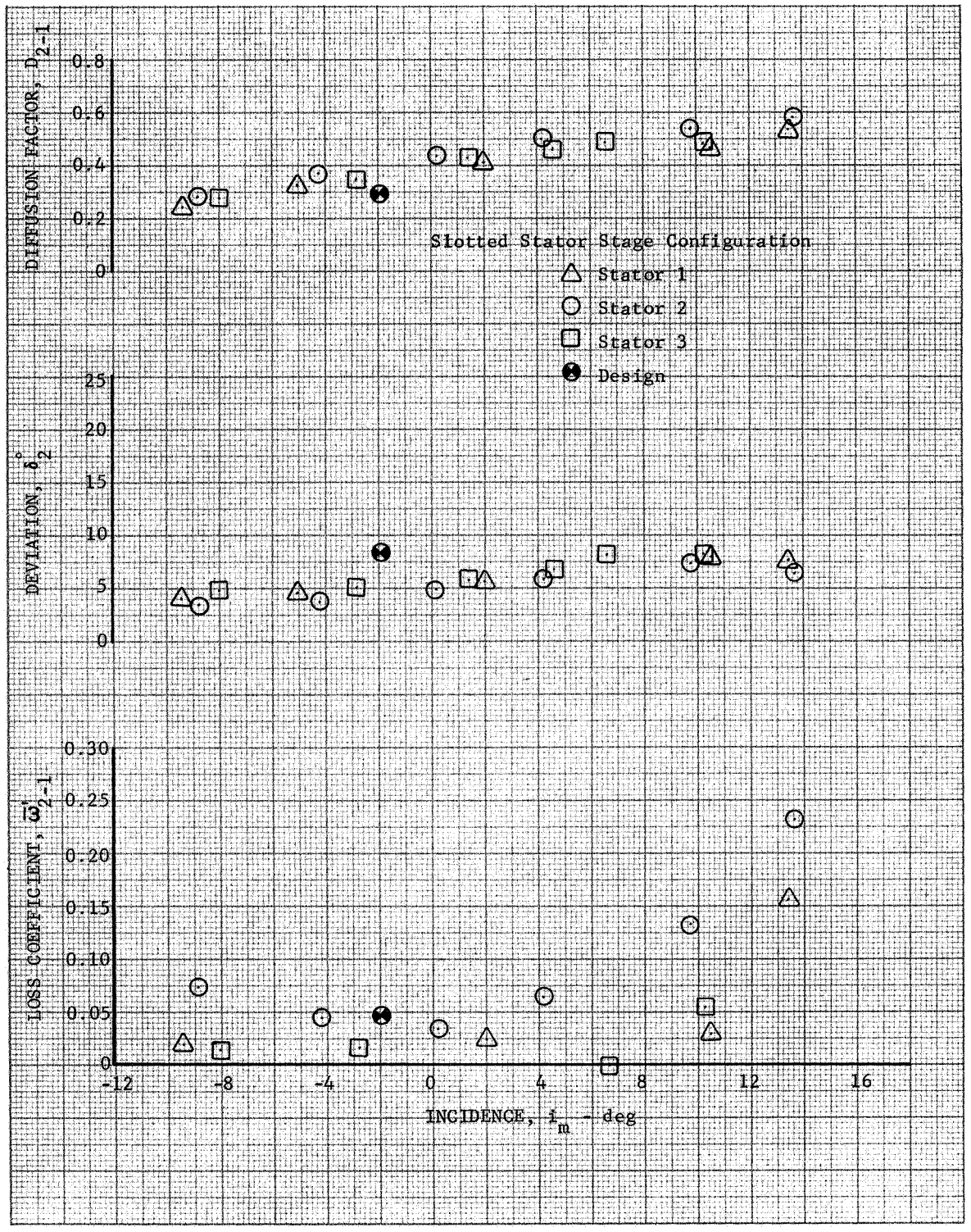


Figure V-28. Variation of Blade Element Performance with Incidence: Flow Generation Rotor, 100% Design Equivalent Rotor Speed, 70% Span from Tip

DF 56655

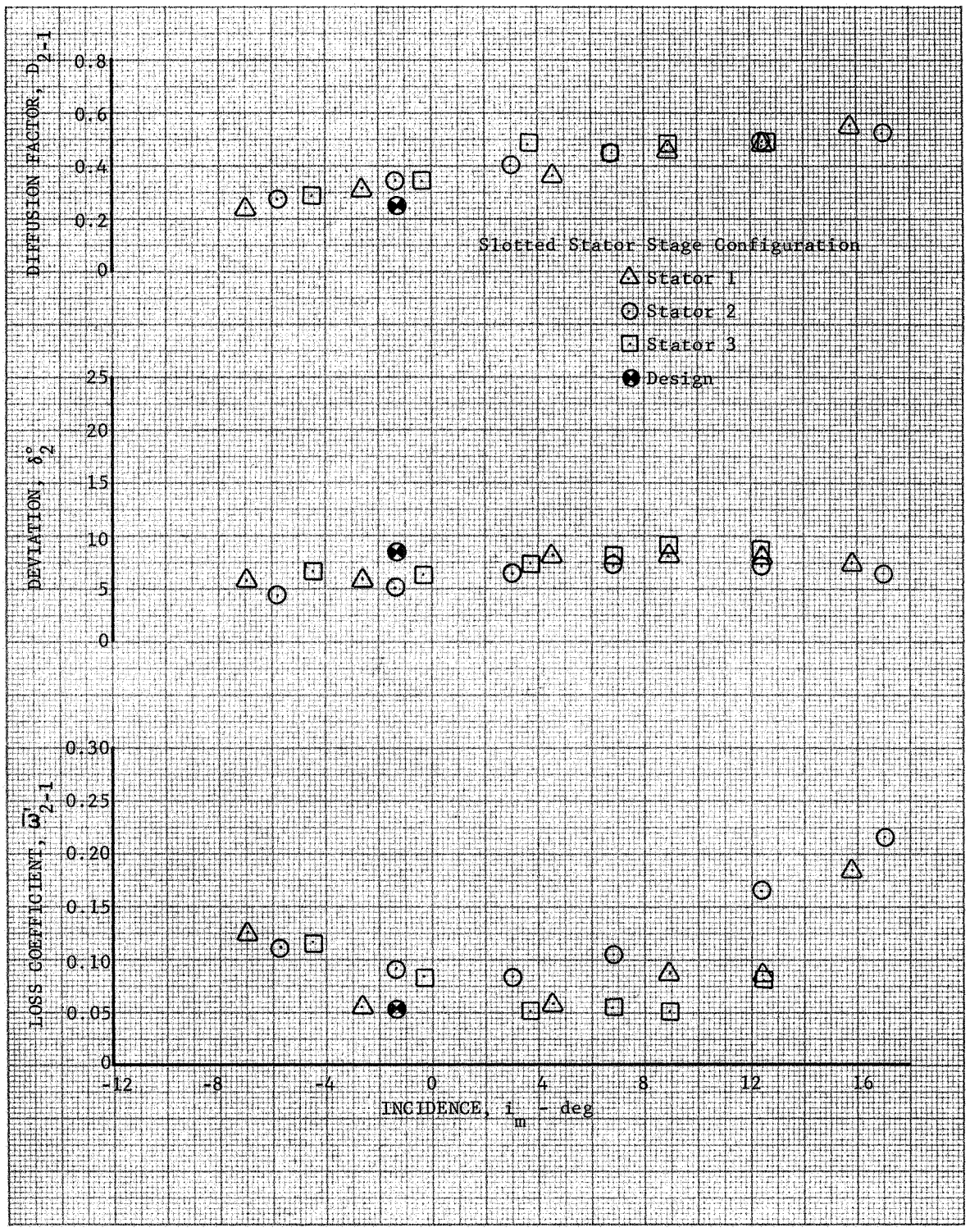


Figure V-29. Variation of Blade Element Performance with Incidence: Flow Generation Rotor, 100% Design Equivalent Rotor Speed, 90% Span from Tip

DF 56656

APPENDIX A
DEFINITION OF SYMBOLS

A. GENERAL NOMENCLATURE

A_A	Flow path annular area, $in.^2$
c	Chord length, in.
D	Diffusion factor
i_m	Incidence angle, deg
M	Absolute Mach number
O	Minimum blade passage gap, in.
O*	Critical blade passage gap, in.
P	Total pressure, psia
P	Static pressure, psia
q	Pressure equivalent of the velocity head, psia
R	Reynolds number based on chord length
S	Blade spacing, in.
s	Blade span, in.
T	Temperature, "R
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
$\gamma°$	Blade-chord angle, deg
δ	Ratio of total pressure to NASA standard sea level pressure of 2116 psf
6"	Deviation angle, deg
η_{ad}	Adiabatic efficiency

θ	Ratio of total temperature to NASA standard sea level temperature of 518.7 °R
K	Blade metal angle, deg (based on equivalent circular arc)
ρ	Density, lb_m/ft^3
σ	Solidity, c/S
ϕ	Blade camber angle, $\kappa_1 - \kappa_2$, deg
$\overline{\omega}$	Total pressure loss coefficient

Subscripts:

0	Guide vane inlet
1	Rotor inlet
2	Rotor exit
2A	Stator exit
z	Axial component
θ	Tangential component

Superscripts:

o	Related to rotor blade
—	Mass average value

B. SLOT NOMENCLATURE

A_2	Slot throat area, $in.^2$
R	Coanda radius, in.
R_P	Pressure surface edge radius, in.
	Slot leading edge radius, in.
r_2	Slot trailing edge radius, in.
t	Blade thickness at intersection of slot centerline and mean camber line, in.
Y_1	Slot capture dimension, in.
Y_2	Slot throat dimension, in.
ψ	Angle formed by slot centerline and mean camber line, deg

C. BLADE ELEMENT TABULATION NOMENCLATURE FOR TABLE B-2

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	Tangentia1 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
	Relative Mach number
TURN	Air turning, degrees
TURN (PR)	Relative air turning, degrees
UUBAR	Loss coefficient
DFAC	Diffusion factor
EFFP	Polytropic efficiency
EFF	Adiabatic efficiency
INCID	Incidence, degrees
DEV	Deviation, degrees
LOSS PARA	Loss parameter

APPENDIX B
TABULATED PERFORMANCE

The overall performance and percent rotor and stator bleed flow rates for each test point are presented in table B-1.

Table B-2 presents blade element data for each test point. Definitions of the blade element parameters as tabulated in the computer printouts are presented in Appendix A.

Table B-1. Tabulation of Overall Performance and Percent Bleed Flow

Corrected Weight Flow $W\sqrt{\theta}/\delta$, lb_m/sec	Overall Performance: Rotor $P_2/\bar{P}_1$	Rotor η_{ad}, %	Stage $\bar{P}_{2A}/P_0$	Stage η_{ad}, %	Percent Bleed: Rotor	Percent Bleed: Stator
70% Design Equivalent Rotor Speed						
47.52	1.03	87.91	1.08	76.11	1.47	3.51
49.65	1.03	90.20	1.09	79.39	1.36	3.24
52.00	1.03	96.75	1.08	83.43	1.25	2.91
56.00	1.03	95.77	1.08	84.18	.96	2.47
62.06	1.02	104.15	1.07	86.59	.62	1.74
67.38	1.02	109.83	1.05	80.67	1.88	.99
90% Design Equivalent Rotor Speed						
60.48	1.16	88.45	1.14	75.00	1.63	3.61
60.71	1.17	84.63	1.14	70.45	1.35	3.40
67.62	1.16	93.72	1.14	79.89	1.12	3.02
72.88	1.15	100.97	1.13	84.07	.77	2.33
78.42	1.13	103.70	1.11	83.15	.87	1.74
83.43	1.11	111.27	1.08	81.30	.87	.70
100% Design Equivalent Rotor Speed						
64.78	1.21	83.30	1.17	70.10	1.54	3.86
68.97	1.20	84.91	1.16	68.52	1.38	3.54
74.70	1.20	91.96	1.17	78.06	1.09	2.91
79.85	1.19	96.27	1.16	79.06	.92	2.39
85.89	1.17	101.34	1.13	79.58	.66	1.74
91.39	1.14	110.66	1.10	81.63	.35	.68
110% Design Equivalent Rotor Speed						
71.14	1.25	84.31	1.12	68.08	1.13	3.20
74.51	1.25	86.52	1.21	72.18	1.04	3.02
78.20	1.25	90.44	1.21	75.84	.92	2.68
82.79	1.25	95.71	1.20	77.82	.73	2.15
88.92	1.22	99.32	1.17	79.49	.41	1.33
94.94	1.18	105.75	1.13	78.00	.27	.82

Table B-2. Blade Element Performance

PERCENT DESIGN SPEED = 110.03

CORRECTED WEIGHT FLOW = 71.14

CORRECTED ROTOR SPEED = 4236.00

INLET GUIDE VANE 1

STATION 3 - STATION 1

PCT SPAN	90	70	50	30	10,
DIA	33.622	35.167	36.712	38.256,	39.801
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	34.331	36.439	37.385	37.151	37.177
V 0	299.94	298.94	298.94	293. Y't	298.94
V 1	427.48	426.79	420.95	414.04	390.30
VZ 0	298.94	298.94	299.94	299.44	298.94
VZ 1	353.01	163.35	334.48	330.01	310.98
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	241.09	753.50	255.59	250.05	235.85
M 0	0.2697	0.2697	0.2697	0.2697	0.2697
M 1	n. 3887	0.3880	0.3876	0.3761	n.3540
TURN	-3%.33	-36.44	-37.38	-37.15	-37.18
UURAR	0.0414	0.0055	0.0207	0.0456	0.7250
DFAC	-0.041	n.007	n.032	0.050	0.109
EFFP	0.9754	1.0075	0.9933	0.9681	0.7781
INCIDM	******	26.9001	27.3001	27.7001	7R. 1001
DEVM	7.769	6.461	5.315	7.749	8.123

SLOTTED STATOR 1

STATIOY 7 - STATION 2A

PCT SPAN	90	70	50	30	10
BETA 2	57.046	50.010	59.542	02.530	63.251
BETA 2A	44.7 h5	75.911	32.493	34.517	36.817
V 2	728.38	726.39	716.56	688.51	676.34
V 2A	328.78	442.38	487.41	451.20	428.16
VZ 2	396.21	384.82	363.23	311.60	239.61
VZ 2A	233.43	358.21	411.45	371.77	342.77
V-THETA 2	611.19	616.08	617.67	610.88	632.48
V-THETA 2A	731.57	754.59	262.05	255.67	256.59
M 2	0.6521	0.6502	0.6395	0.9113	0.5952
M 2A,	0.2862	0.3880	0.4786	0.3946	0.3740
TURN	12.281	22.079	27.049	28.013	32.434
UUBAR	0.3249	0.1756	0.0 895	0.1167	0.1514
LOSS PARAMETER	.0968	.0622	.0343	.0454	.0591
DFAC	0.7661	0.6052	0.5453	0.5895	0.6413
EFFP	0.7352	0.9540	1.1546	1.1234	2.1184
INCIDM	4.90	5.86	7.39	10.38	17.10
DEVM	22.63	13.79	10.35	12.38	14.69
DIA	33.564	34.992	36.420	37. H40	39.776

FLOW GENERATION ROTOR

STATION 1 - STATION 2

PCT SPAN	90	70	50	3c	10
DIA	33.589	35.067	36.545	38.023	39.501
RFTP 1	34.331	36.439	37.385	37.151	37.177
RETA 2	57.046	58.010	59.542	62.530	69.251
BFTA(PR) 1	47.135	49.109	51.662	54.149	58.109
BFTA(PR) 2	1.394	4.763	9.040	16.138	22.167
V 1	427.48	426.79	420.95	414.04	390.30
V 2	728.38	726.39	716.56	688.51	676.34
VZ 1	353.01	343.35	334.48	330.01	310.98
VZ 2	396.71	384.82	363.23	317.60	239.61
V-THFTA 1	241.09	253.50	255.59	250.05	235.85
V-THETA 2	611.19	616.08	617.67	610.88	632.48
V(PR) 1	51R.9	524.5	539.2	563.7	588.6
V(PR) 2	396.3	386.2	367.8	330.6	258.7
VTHFTA PR1	-380.4	-396.5	-423.0	-457.0	-499.8
VTHETA PR2	-9.6	-32.1	-57.8	-91.9	-97.6
U 1	621.44	649.99	678.54	707.09	735.64
U 2	620.83	648.14	675.46	702.78	730.10
M 1	0.3807	0.3880	0.3826	0.3761	0.3540
M 2	0.6521	0.6502	0.6395	0.6113	0.5952
M(PR) 1	0.4718	0.4769	0.4901	0.5121	0.5339
M(PR) 2	0.3548	0.3456	0.3283	0.2936	0.2277
TURN(PR)	45.741	44.346	42.622	38.031	35.942
UIJBAR	0.2068	0.1832	0.2141	0.3105	0.4410
OFAC	0.5206	0.5535	0.6133	0.7086	0.8848
EFFP	0.7487	0.7811	0.7658	0.7045	0.6311
FFF	0.7409	0.7740	0.7580	0.6951	0.6189
INCIDN	15.69	13.47	12.43	11.75	12.75
OFVH	6.774	6.723	6.880	9.518	11.297

Table B-2. Blade Element Performance (Continued)

PERCENT DESIGN SPEED = 109.92

CORRECTED CFIFHT FLOW = 74.51

CORRECTED ROTOR SPEED = 4232.00

INLET GUIDE VANE 1

STATION 0 - STATION 1

PCT SPAN	90	70	50	30	10
DIA	33.622	35.167	36.712	38.256	39.801
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	34.653	34.693	37.603	37.393	36.981
V 0	314.28	314.78	314.28	314.28	314.28
V 1	460.38	459.18	451.42	443.00	415.63
VZ 0	314.28	314.28	314.28	314.28	314.28
VZ 1	378.71	377.55	357.64	351.96	332.02
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	761.77	761.36	275.45	269.02	250.02
M 0	0.2838	0.2838	0.2838	0.2838	0.2838
M 1	0.4196	0.4185	0.4112	0.403 3	0.3776
TURN	-34.65	-34.69	-37.60	-37.39	-36.99
UUBAR	0.0263	-0.0213	-0.0063	0.0138	0.7027
DFAC	-0.063	-1.034	0.015	0.035	0.096
EFFP	0.9887	1.0289	1.0170	0.9987	0.8057
INCIDM	*****	7h.9001	27.3001	27.790 1	78.1001
OEVY	7.547	8.207	6.097	7.501	8.319

SLOTTED STATOR 1

STATION 2 - STATION 2A

PCT SPAN	90	70	50	30	10
BETA 2	56.210	56.914	58.123	60.01 3	68.100
BETA 2A	34.653	34.693	37.603	37.393	36.981
V 2	728.82	726.18	712.16	696.21	678.63
V 2A	372.35	477.30	496.49	477.90	471.44
VZ 2	405.33	396.42	37h.09	347.97	253. 12
VZ 2A	306.30	388.14	393.34	379.69	336.98
V-THETA 2	h05.71	h)8.43	604.76	603.02	629.65
V-THETA 2A	711.77	268.83	302.95	290.22	253.76
M 2	0.6549	0.6536	0.6391	0.6222	0.6010
M 2A	0.3740	0.4155	0.4373	0.4196	0.3686
TURN	71.557	22.221	70.520	22.620	31.119
UUBAR	0.7739	0.1285	0.0672	0.0891	0.1771
LOSS PARAMETER	.0945	.0462	.0242	.0334	.0689
DFAC	0.7147	0.5537	0.4961	0.5270	0.6518
EFFP	0.7036	0.8510	0.9692	0.9602	1.1851
INCIDM	4.06	4.76	5.97	7.86	15.05
OEVN	12.51	12.55	15.46	15.25	14.84
DIA	33.564	34. 992	36.470	37.848	39.275

FLOW GENERATION ROTOR

STATION 1 - STATION 2

PCT SPAN	90	70	50	70	10
DIA	33.5739	35.067	36.545	38.023	39.501
RFTA 1	34.653	34.693	37.603	37.393	36.901
RFTA 7	56.210	56.914	58.123	60.013	68.100
BETA(PR) 1	43.476	45.784	48.374	51.177	55.601
BETA(PR) 2	2.054	5.634	10.553	15.897	21.510
V 1	460.38	459.19	451.42	443.00	415.63
v 2	728.82	726.18	712.16	696.21	678.63
v7 1	378.71	377.55	357.64	351.96	332.02
v7 2	405.33	396.42	376.09	347.97	253.12
V-THFTA 1	761.77	261.36	275.45	269.02	250.02
V-THETA 2	605.71	608.43	604.76	603.02	629.65
VIPRI I	571.9	541.4	538.4	561.4	587.7
V(PR) 2	405.6	398.3	382.6	361.8	272.1
VTHETA PRI	-759.1	-388.0	-402.4	-437.4	-484.9
VTHETA PR2	-14.5	-79.1	-70.1	-99.1	-99.8
U 1	620.85	649.79	677.90	706.47	734.94
U 2	620.24	647.53	674.82	702.12	729.41
M 1	0.4196	0.4185	0.4112	0.4033	0.3776
M 7	0.6549	0.6536	0.6391	0.6772	0.6010
M(PR) 1	0.4757	0.4934	0.4904	0.5111	0.5339
M(PR) 2	0.3644	0.3585	0.3433	0.3233	0.2410
TURN(PR)	41.422	40.150	37.820	35.281	34.092
UUBAR	0.0988	0.1286	0.1083	0.1871	0.3859
OFAC	0.4 856	0.5330	0.5588	0.6301	0.8482
EFFP	0.8082	0.8812	0.8575	0.8056	0.7066
EFF	0.73022	0.8773	0.8529	0.7993	0.6970
INCIDM	12.04	10. 14	9.14	8.76	10.24
DEVM	7.434	7.594	8.393	9.277	10.640

Table B–2. Blade Element Performance (Continued)

PERCFYT OESIGN SPFFD = 110.03

CORRECTED WEIGHT FLOW = 78.21

CORRECTED ROTOR SPEED = 4736.00

INLET GUIDE VANE 1

STATION 0 - STATION 1

PCT SPAN	90	70	50	30	10
DIA	33.622	35.167	36.712	38.256	39.801
BETA 0	0.000	5.000	0.000	0.000	0.000
BETA 1	34.808	36.702	37.292	37.216	37.019
V 0	331.32	331.32	331.32	331.32	331.32
V 1	479.56	470.46	472.63	464.83	440.58
VZ 0	331.32	331.32	331.32	331.32	331.32
VZ 1	393.75	344.41	376.01	370.18	351.77
V–THETA 0	0.00	0.00	0.00	0.00	0.00
V–THETA 1	273.74	236.55	286.36	281.14	265.26
M 0	0.2994	0.2994	0.2914	0.2994	0.2994
M 1	0.4378	0.4777	0.4312	0.4238	0.4010
TURN	-34.81	-36.70	-37.29	-37.22	-37.02
UUBAR	0.0214	-0.0214	-0.0023	0.0248	0.1918
OFAC	-0.048	-0.003	0.018	0.038	0.091
EFFP	0.9913	1.0289	1.0174	0.9869	0.8180
INCIDM	******	26.9001	77.3001	27.1001	28.1001
OEVM	7.792	6.198	6.408	7.684	8.281

SLOTTED STATOR 1

STATION 2 - STATIONZA

PCT SPAN	90	70	50	30	10
BETA 2	56.249	56.656	57.571	58.376	64.300
BETA 2A	43.239	33.543	31.707	33.389	39.506
V 2	724.73	776.87	718.21	704.86	682.00
V 2A	383.06	435.21	515.77	509.97	451.35
VZ 2	402.65	399.54	385.14	369.59	295.76
VZ 2A	279.06	404.41	438.37	425.80	348.25
V–THETA 2	602.58	607.22	604.71	6110.19	614.53
V–THETA 2A	262.42	268.11	270.81	280.65	287.13
M 2	0.6511	0.6546	0.6453	0.6316	0.6064
M 2A	0.3357	0.4281	0.4553	0.4497	0.3957
TURN	13.010	23.113	25.864	24.987	24.794
UUBAR	0.2647	0.1258	0.0703	0.0782	0,1705
LOSS PARAMETER	.0808	.0459	.0272	.0308	.0641
DFAC	0.6673	0.5361	0.4953	0.4918	0.5754
EFFP	0.7588	0.9074	1.0277	0.9885	1.0291
INCIDM	4.10	4.51	5.42	6.23	12.15
DEVM	21.10	11.40	9.57	11.25	17.37
DIA	33.564	34.992	36.420	37.848	39.276

FLOW GENERATION ROTOR

STATION 1 - STATION 2

PCT SPAN	90	70,	50	30	10
DIA	13.589	35.067	36.545	38.023	39.501
SETA 1	34.808	36.702	37.292	37.716	37.019
RFTA 2	56.249	56.656	57.571	58.376	64.300
BETA(PR) 1	41.446	43.394	46.206	49.007	53.209
BETA(PR) 7	2.595	5.848	10.193	15.513	21.343
V 1	479.56	479.46	472.63	464.83	440.58
V 2	724.73	726.87	718.21	704.86	682.00
VZ 1	393.75	384.41	376.01	370.18	351.77
VZ 2	407.65	399.54	385.14	369.59	295.76
V–THETA 1	273.74	286.55	266.36	281.14	265.26
V–THETA 2	602.58	607.22	606.21	600.19	614.53
V(PR) 1	525.3	529.0	543.3	564.3	587.4
V(PR) 2	403.1	401.6	391.3	383.6	317.5
VTHETA PRI	-347.7	-363.4	-392.2	-425.9	-470.4
VTHETA PR2	-18.2	-40.9	-69.3	-102.6	-115.6
U 1	621.44	649.99	678.54	707.09	735.64
U 2	620.83	648.14	675.46	702.78	730.10
M 1	0.4378	0.4377	0.4312	0.4238	0.4010
M 2	0.6511	0.6546	0.6453	0.6316	0.6064
MIPR) 1	0.4795	0.4829	0.4957	0.5145	0.5346
M(PR) 2	0.3621	0.3617	0.3516	0.3437	0.2823
TURN(PR)	38.851	37.546	36.013	33.494	31.866
UUBAR	0.1010	0.0425	0.0567	0.0881	0.2462
DFAC	0.4823	0.4951	0.5391	0.5815	0.7463
EFFP	0.7734	0.8717	0.8708	0.8601	0.7731
EFF	0.7667	0.8676	0.8666	0.8555	0.7655
INCIDM	10.01	7.75	6.98	6.59	7.85
DEVM	7.975	7.808	8.033	8.893	10.473

Table B-2. Blade Element Performance (Continued)

PERCENT DESIGN SPEED = 110.16

CORRECTED WEIGHT FLOW = 82.79

CORRECTED ROTOR SPEED = 4241.00

INLET GUIDE VANE 1

STATION 0 - STATION 1

PCT SPAN	90	70	50	30	10
DIA	33.622	35.167	36.712	38.256	39.801
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	34.969	36.915	37.408	37.278	36.881
V 0	352.90	352.90	352.90	352.90	357.90
V 1	526.98	525.55	517.38	505.93	478.60
VZ 0	352.90	352.90	352.90	352.90	352.90
VZ 1	431.84	420.19	410.97	402.57	382.82
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	302.03	315.66	314.30	306.43	287.77
M 0	0.3193	0.3193	0.3193	0.3193	0.3193
M 1	0.4830	0.4816	0.4738	0.4628	0.4368
TURN	-34.97	-36.91	-37.41	-37.28	-36.88
UUBAR	0.0299	-0.0180	-0.0040	0.0254	0.2065
DFAC	-0.090	-0.030	-0.008	0.018	0.072
EFFP	0.9850	1.0219	1.0115	0.9860	0.8190
INCIDM	******	26.9001	27.3001	27.7031	28.1001
DEVY	7.131	5.985	6.292	7.622	8.419

SLOTTED STATOR 1

STATION 2 - STATION 2A

PCT SPAN	90	70	50	30	10
BETA 2	54.883	55.607	56.364	56.849	60.000
BETA 2A	42.643	33.163	31.916	33.538	40.765
V 2	738.79	744.85	735.77	721.41	726.56
V 2A	423.67	514.28	543.33	544.19	491.04
VZ 2	424.99	420.74	407.56	394.50	363.28
VZ 2A	311.65	430.51	461.19	453.60	371.91
V-THETA 2	604.31	614.64	617.59	603.99	629.22
V-THETA 2A	287.01	771.37	287.25	303.bh	320.63
M 2	0.6662	0.6734	0.6639	0.6490	0.6504
M 2A	0.3725	0.4559	0.4924	0.4818	0.4323
TURN	12.240	77.444	24.448	23.311	19.735
UUBAR	0.2433	0.1281	0.0734	0.0663	0.2247
LOSS PARAMETER	.0751	.0469	.0283	.0261	.0829
DFAC	0.6058	0.5049	0.4631	0.4455	0.5347
EFFP	0.7760	0.9211	1.0464	0.9645	0.8094
INCIDM	2.73	3.46	4.21	4.70	7.85
DEVM	20.50	11.02	9.76	11.40	18.63
D1A	33.564	34.992	36.420	37.848	39.276

FLOW GENERATION ROTOR

STATION 1 - STATION 2

PCT SPAN	90	70	50	30	10
DIA	33.589	35.067	16.545	38.023	39.501
BETA 1	34.969	36.915	37.408	37.778	36.881
YETA 2	54.883	55.607	56.364	56.849	60.000
BETA(PR) 1	36.552	38.572	41.613	44.973	
BETA(PR) 7	7.324	4.657	8.890	14.172	15.646
V 1	526.98	525.55	517.38	505.93	478.60
V 2	738.79	744.85	775.77	721.41	726.56
VZ 1	431.84	420.19	410.97	402.57	382.82
VZ 7	474.99	420.74	407.56	394.50	363.28
V-THETA 1	302.03	315.66	314.30	306.43	287.23
V-THETA 2	604.31	614.64	612.59	603.99	629.22
V(PR) 1	537.6	537.4	449.7	568.b	590.3
V(PR) 7	475.3	422.1	412.5	406.9	377.3
VTHETA PR1	-370.1	-335.1	-365.0	-401.5	-449.3
VTHETA PP7	-17.2	-34.3	-63.7	-99.6	-101.7
U 1	622.18	650.76	679.34	707.92	736.51
U 2	621.56	648.91	676.76	703.61	730.96
M 1	0.4830	0.4816	0.4738	0.4628	0.4368
M 7	Q.6662	0.6734	0.6639	0.6490	0.6504
M(PR) 1	0.4977	0.4975	0.5034	0.5201	0.5388
M(PR) 7	0.3836	0.3817	0.3722	0.3661	0.3377
TURN(PR)	34.778	33.915	32.733	30.751	33.920
UUPAR	0.0509	-0.0132	-0.0033	0.0 254	0.1110
DFAC	0.4330	0.4480	0.4888	0.5264	0.6405
EFFP	0.7750	0.9876	0.8950	0.8844	0.8697
EFF	0.7687	0.8841	0.8917	0.8807	0.8650
INCIDM	5.11	2.93	2.38	2.50	4.21
DEVM	7.704	6.617	6.770	7.552	4.776

Table B-2. Blade Element Performance (Continued)

PERCENT DESIGN SPEEO = 109.95

CORRECTED WEIGHT FLOW = 88.92

CORRECTED ROTOR SPEEO = 4233.00

INLET GUIOE VANE 1

STATION 0 - STATION 1

PCT SPAN	90	70	50	30	10
OIA	33.622	35.167	36.717	38.256	39.801
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	35.286	36.982	37.532	37.230	36.735
V 0	382.45	382.45	382.45	382.45	382.45
V 1	575.26	573.41	565.03	554.65	524.67
VZ 0	382.45	382.45	382.45	382.45	382.45
VZ 1	469.57	458.05	44A.08	441.62	420.45
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	332.30	344.94	344.22	335.57	313.79
n 0	0.3467	0.3467	0.3467	0.3467	0.3467
M 1	0.5296	0.5278	0.5197	0.5096	0.4807
TURN	-35.29	-36.98	-37.53	-37.23	-36.73
UUBAR	0.0247	-0.0162	-0.0008	0.0290	0.2116
OFAC	-0.092	-0.037	-0.014	0.006	0.060
EFFP	0.9882	1.0187	1.0073	0.9830	0.8274
INCIOW	******	26.9001	27.3001	27.7001	28.1001
OEVH	6.814	5.918	6.168	7.670	8.565

SLOTTED STATOR 1

STATION 2 - STATION 2A

PCT SPAN	90	70	50	30	10
BETA 2	52.350	52.993	53.465	54.043	55.411
BETA 2A	40.176	32.359	31.938	32.967	40.273
V 2	771.88	778.58	764.30	750.53	731.83
V 2A	484.71	575.06	594.49	591.78	536.25
VZ 2	471.49	468.64	455.00	440.70	415.45
VZ 2A	370.35	485.76	504.49	496.50	409.14
V-THETA 2	611.14	621.75	614.11	607.53	602.47
V-THETA 2A	312.70	307.78	314.48	322.02	346.65
M 2	0.7027	0.7101	0.6955	0.6814	0.6605
M 2A	0.4303	0.5148	0.5328	0.5283	0.4761
TURN	12.174	20.634	21.527	21.076	15.138
UUBAR	0.2408	0.1119	0.0569	0.0575	0.1586
LOSS PARAMETER	.0772	.0413	.022	.023	.0589
OFAC	0.5334	0.4375	0.4009	0.3924	0.4405
EFFP	0.7533	0.9436	1.0727	0.8920	0.8370
INCIOH	0.20	0.84	1.32	1.89	3.26
OEVH	18.04	10.22	9.80	10.83	18.13
DIA	33.564	34.992	36.420	37.848	39.276

FLOW GENERATION ROTOR

STATION 1 - STATION 2

PCT SPAN	90	70	50	30	10
OIA	33.589	35.067	36.545	38.023	39.501
BETA 1	35.286	36.982	37.532	37.230	36.735
BETA 2	52.350	52.993	53.465	54.043	55.41 1
BETA(PR) 1	31.584	33.623	36.688	40.034	'45.060
BETA(PR) 2	1.123	3.168	7.621	12.135	17.012
V 1	575.26	573.41	565.03	554.65	524.63
V 2	771.88	778.58	764.30	750.53	731.83
VZ I	469.57	458.05	448.08	441.62	420.45
VZ 2	471.49	468.64	455.00	440.70	415.45
V-THETA 1	332.30	344.94	344.22	335.57	313.79
V-THETA 2	611.14	621.75	614.11	607.53	602.47
V(PR) 1	551.2	550.1	558.8	576.8	595.7
V(PR) 2	471.6	469.4	459.1	450.8	434.5
VTHETA PR1	-288.7	-304.6	-333.8	-371.0	-421.3
VTHETA PRZ	-9.2	-25.9	-60.9	-94.8	-127.1
U 1	621.00	649.53	678.06	706.59	735.12
U 2	620.39	647.69	674.98	702.28	729.58
M 1	0.5296	0.5278	0.5197	0.5096	0.4807
M 2	0.7027	0.7101	0.6955	0.6814	0.6605
M(PR) 1	0.5075	0.5063	0.5139	0.5300	0.5454
M(PR) 2	0.4297	0.4281	0.4177	0.4093	0.3921
TURN(PR)	30.460	30.455	29.068	27.900	28.048
UUBAR	0.0494	-0.0129	-0.0051	0.0312	0.0877
OFAC	0.3462	0.3580	0.3916	0.4368	0.505 1
EFFP	0.8290	0.9381	0.9365	0.9398	0.8927
EFF	0.8246	0.9363	0.9347	0.9381	0.8894
INCIOM	0.14	-2.02	-2.54	-2.39	-0.30
DEVM	6.503	5.128	5.46 1	5.515	6.142

Table B-2. Blade Element Performance (Continued)

PERCENT DESIGN SPEED = 110.03

CORRECTED WEIGHT FLOW = 94.94

CORRECTED ROTOR SPEED = 4236.00

INLET GUIDE VANE 1

STATION 0 - STATION 1

PCT SPAN	90	70	50	30	10
OIA	73.622	35.167	3h.712	38.256	39.801
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	35.395	36.972	37.889	37.236	37.004
V 0	412.40	412.48	412.48	412.48	412.43
V 1	629.59	628.38	619.97	609.90	575.65
VZ 0	412.48	412.48	412.48	412.48	412.49
VZ 1	513.23	502.03	489.28	485.57	459.68
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	364.67	377.92	380.75	369.05	346.50
M 0	0.3746	0.3746	0.3746	0.3746	0.3745
M 1	0.5829	1.5817	0.5734	0.5634	0.5300
TURN	-35.39	-36.97	-37.89	-37.24	-37.01
UURAH	0.0287	-0.0133	0.0022	0.0310	0.2380
DFAC	-0.099	-0.053	-0.038	-0.014	0.046
EFFP	0.9854	1.1145	1.0037	0.9820	0.8152
INCIDM	******	25.9001	27.3001	27. 7001	28.1001
DEVM	6.715	5.928	5.811	7.664	8.292

SLOTTED STATOR 1

STATION 2 - STATION 2A

PCT SPAN	90	70	50	30	10
BETA 2	40.372	49.668	49.875	49.334	50.800
BETA 2A	15.877	31.550	31.865	32.963	38.639
V 2	801.37	714.13	796.24	778.77	780.49
V 2A	5R8.36	h69.16	668.04	669.20	598.59
VZ 2	521.81	576.02	513.14	507.48	497.30
VZ 2A	476.65	570.75	567.36	561.48	467.55
V-THETA 7	608.20	h70.61	608.84	590.71	604.84
V-THETA 2A	344.75	750.13	352.67	364.11	373.76
M 2	0.7407	(1.7558	0.7371	0.1180	0.7088
M 2A	0.5301	0.6099	0.6080	0.6063	0.5366
TUKY	13.495	18.118	18.010	16.311	12.161
UIJRAR	0.7387	0.1130	0.0881	U.0591	0.2284
MSS PARAMETER	.0812	.0421	.0340	.0234	.0869
OFAC	0.4032	0.3132	0.3079	0.2793	0.3800
EFFP	0.5490	0.7089	0.7088	0.6473	0.7914
INCIOM	-2.78	-2.48	-2.27	-2.82	-1.35
DEVM	13.74	9.41	9.73	10.82	16.20
DIA	33.564	34.992	36.420	37.848	39.716

FLOW GENERATION ROTOR

STATION 1 - STATION 7

PCT SPAN	90	70	50	30	10
DIA	33.589	35.067	36.545	38.023	39.501
RFTA 1'	35.395	36.977	37.889	37.736	37.008
BFTA 2	49.372	49.668	49.875	49.334	50.800
BETA(PR) 1	26.579	28.455	31.326	34. A44	40.249
BFTA(PR) 2	1.386	2.991	7.398	12.453	14.248
V 1	629.59	628.38	619.97	609.90	575.65
V 2	801.37	R14.13	796.74	778.77	780.49
v7 1	513.73	502.03	489.28	485.57	459.68
v7 7	571.81	526.92	513.14	507.48	493.30
V-THETA 1	364.67	377.97	380.75	369.0'5	346.50
V-THFTA 7	608.20	620.61	608.84	590.11	604.84
V(PR) 1	573.9	571.0	577.A	591.7	602.3
V(PR) 2	572.0	527.6	517.5	519.7	508.9
VTHFTA PR1	-756.8	-272.1	-797.8	-33R.0	-389.1
VTHFTA PR2	-12.6	-27.5	-66.6	-117.1	-125.3
U 1	621.44	649.99	678.54	707.09	735.64
U 2	620.83	648.14	675.46	702.78	730.10
M 1	0.5829	0.5817	0.5734	0.5634	0.5300
M 2	0.7407	0.7558	0.7371	0.7180	0.7088
MIPR) 1	0.5313	0.5286	0.5297	0.5466	0.5545
M(PR) 7	0.4824	0.4898	0.4790	0.4791	0.4622
TURN(PR)	25.193	25.464	73.918	22.392	26.002
UUBAR	0.1298	0.0434	0.0347	0.0475	0.0897
DFAC	0.7598	0.2546	0.2728	0.2959	0.3633
FFFP	0.9908	1.3012	1.2656	1.1611	0.7890
EFF	0.9906	1.3085	1.2720	1.1650	0.7833
INCIDY	-4.86	-7.19	-7.90	-7.58	-5.11
OFVM	6.766	4.951	5.238	5.833	3.378

Table B-2. Blade Element Performance (Continued)

PERCENT DESIGN SPEED = 100.00

CORRFCTEO WEIGHT FLOW = 64.78

CORRFCTED ROTOR SPEEO = 3850.00

INLFT GUIDE VANE 1

STATION 0 - STATION 1

PCT SPAN	90	70	50	30	10
OIA	33.677	35.167	3h.711	38.756	39.801
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	34.334	36.626	37.282	37.230	36.963
V 0	270.51	770.51	270.51	773.51	770.51
V 1	387.56	386.47	381.60	374.55	352.22
VZ 0	270.50	270.50	270.50	270.50	270.50
VZ 1	320.04	310.17	303.62	298.22	281.43
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	218.59	230.56	231.15	276.61	211.79
M 0	0.2437	0.2431	0.2437	0.7437	0.2437
M 1	0.3514	0.3504	0.3458	0.3793	0.3187
TURN	-34.33	-36.63	-37.24	-37.23	-36.96
UUBAR	0.0294	-0.0030	0.0057	0.0370	0.2714
OFAC	-0.043	0.009	0.079	0.051	0.110
EFFP	0.9588	0.9874	0.9783	0.9455	0.7453
INCIOM	******	76.9001	27.3001	27.7001	28.1001
OEVH	7.766	6.274	6.418	7.670	9.337

SLOTTED STATOR 1

STATION 2 - STATION 2A

PCT SPAN	90	70	50	30	10
BETA 2	56.450	57.336	58.990	61.368	49.300
BETA 2A	42.770	34.100	32.128	35.296	39.028
v 2	662.01	656.70	644.89	628.05	607.45
V 2A	327.90	423.65	440.70	393.68	353.29
VZ 2	365.87	354.43	332.74	300.95	214.96
VZ 2A	240.71	350.81	373.22	321.31	274.45
V-THETA 2	551.72	552.85	552.72	551.25	568.61
V-THETA 2A	222.66	237.51	234.37	227.47	772.47
M 2	0.5951	0.5912	0.5788	0.5611	0.5387
M 2A	0.2868	0.3731	0.3881	0.3454	0.3097
TURN	13.680	73.236	26.862	76.077	30.277
UUBAR	0.2499	0.0985	0.0583	0.1437	0.1973
LOSS PARAMETER	.0769	.0357	.0225	.0553	.0747
OFAC	0.7121	0.5644	0.5415	0.6178	0.6998
EFFP	0.6647	0.7744	0.8362	0.8170	1.0920
INCIOM	4.30	5.19	6.84	9.22	17.15
OEVM	20.63	11.96	9.99	13.16	16.49
DIA	33.564	34.992	36.420	37.848	39.276

FLOW GENERATION ROTOR

STATION 1 - STATION 2

PCT SPAN	90	70	50	30	10
DIA	33.589	35.067	36.545	38.023	39.501
RETA 1	34.334	36.626	37.282	37.230	36.963
RETA 2	56.450	57.336	58.990	61.368	69.300
BETAIPR) 1	47.251	49.268	51.780	54.347	58.364
BFTA(PR) 2	1.962	5.038	10.437	16.210	23. R43
V 1	387.56	386.47	3R1.60	374.55	357.77
V 2	662.01	656.70	644.89	h78.05	607.85
VZ 1	320.04	310.17	303.62	298.22	7R1.43
VZ 7	365.87	354.43	332.24	300.95	214. 86
V-THETA 1	218.59	230.56	231.15	226.61	211.79
V-THFTA 2	551.72	552.85	557.72	551.25	568.61
V(PR) 1	471.5	475.3	490. 8	511.9	536.5
V(PR) 7	366.1	356.3	337.8	313.4	234.9
VTHETA PRI	-346.2	-3b0.2	-385.6	-416.0	-456.8
VTHETA PR2	-12.5	-36.7	-61.2	-87.5	-95.0
U 1	564.81	590.76	616.71	642.66	668.60
u 7	564.25	589.08	613.91	638.74	663.57
H I	0.3514	0.3504	0.3458	0.3393	0.3187
M 2	0.5951	0.5912	0.5788	0.5611	0.5387
M(PR) 1	0.4275	0.4309	0.4448	0.4637	0.4854
M(PR) 2	0.3291	0.3207	0.3032	0.2800	0.2082
TURN(PR)	45.289	43.431	41.343	38.157	34.571
UUBAR	0.1869	0.1593	0.2044	0.7766	0.4431
DFAC	0.5052	0.5347	0.6000	0.6802	0.8824
EFFP	0.8529	0.9407	0.8933	0. 8129	0. 6982
EFF	0. 8490	0.9391	0.8903	0.8078	0.6900
INCIDM	15.81	13.63	17.55	11.95	13.00
DEVM	7.342	7.798	8.277	9.590	12.973

Table B-2. Blade Element Performance (Continued)

PERCENT DESIGN SPEED = 100.00

CORRECTED WEIGHT FLOW = 68.97

CORRECTED ROTOR SPEFO = 3850.00

INLET GUIOF VANF 1

STATION 0 - STATION 1

PCT SPAN	90	70	50	30	10
DIA	33.622	35.167	36.711	38.256	39.801
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	34.800	36.800	37.600	37.200	36.900
V 0	289.17	299.17	289.17	289.17	289.17
V 1	414.41	412.82	409.65	402.22	37R.51
VZ 0	289.17	289.17	289.17	299.17	289.17
VZ 1	340.30	330.56	324.56	321.38	302.69
V-THFTA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	236.51	747.29	749.94	243.18	277.77
M 0	0.2608	0.2608	0.2608	0.2608	0.2608
M 1	0.3765	0.3750	0.3720	0.3651	0.3431
TURN	-34.80	-36.80	-31.60	-37.70	-3h.90
UUBAR	0.0545	0.0206	(1.0079	0.0280	0.2078
DFAC	-0.039	0.011	0.028	0.046	0.105
EFFP	0.9657	0.9945	1.0111	0.7965	0.7957
INCIOM	******	26.9001	27.3001	27.7001	28.1001
DEVM	7.300	6.100	6.100	7.700	8.400

SLOTTED STATOR 1

STATION 2 - STATION 2A

PCT SPAN	90	70	50	30	10
BETA 2	55.848	55.745	58.199	59.795	67.300
BFTA 2A	42.340	33.670	31.830	34.510	3Q.440
V 2	662.53	659.R4	644.75	633.69	614.01
V 2A	343.44	420.96	477.90	411.60	342.86
VZ 2	371.94	371.41	339.51	314.80	236.45
VZ 2A	253.86	750.34	377.12	337.17	764.77
V-THFTA 7	548.28	545.39	547.53	547.65	566.44
V-THFTA 2A	731.32	233.38	230.99	233.19	717.81
M 2	0.5964	0.5950	0.5792	0.5676	0.5455
M 2A	0.3008	0.3709	0.3862	0.3618	0.3000
TURN	13.508	22.075	26.368	25.285	27.859
UIJRAR	0.2424	0.1279	0.0739	0.1317	0.2426
LOSS PARAMETER	.07520	.04660	.02857	.05119	.09135

OFAC	0.6813	0.5684	0.5440	0.5860	0.7218
EFFP	0.6480	0.7176	0.8032	0.7727	0.8860
INCIOM	3.70	3.60	6.05	7.65	15.15
OEVM	20.20	11.53	9.69	17.37	17.31
OIA	33.564	34.992	36.420	37.848	79.776

FLOW GENERATION ROTOR

STATION 1 - STATION 7

PCT SPAN	90	70	50	30	10
DIA	33.589	35.067	36.545	38.023	39.501
BETA 1	34.800	36.800	37.600	37.700	36.900
RFTA 2	55.848	55.745	58.198	59.795	67.300
BETA(PR) 1	43.972	46.098	48.494	51.270	55.556
BETA(PR) 2	2.460	6.710	11.063	15.946	22.288
V 1	414.41	412.82	409.65	402.22	378.51
V 2	662.53	659.84	644.25	633.69	614.01
VZ I	340.70	730.56	394.56	320.38	302.69
VZ 7	771.94	371.41	379.51	318.80	236.95
V-THFTA 1	236.51	747.74	249.94	743.1 P	777.77
V-THFTA 2	548.28	545.79	547.53	547.65	566.44
VIPRI 1	477.R	476.7	490.7	512.1	535.2
V(PR) 2	772.7	374.0	345.Q	331.h	256.1
VTHETA PR1	-328.3	-343.5	-366.9	-399.5	-441.3
VTHETA PR7	-16.0	-43.7	-66.4	-91.1	-97.1
U 1	564.81	590.76	616.71	642.66	668.60
U 2	564.25	589.08	613.41	638.74	663.57
M 1	0.3765	0.3750	0.3720	0.3651	0.3431
M 2	0.5964	0.5950	0.5792	0.5676	n.5455
MIPRI 1	0.4296	0.4330	0.4448	0.4648	0.4850
MIPR) 2	0.3351	0.3772	0.3110	0.2970	0.2275
TURN(PR)	41.513	39.388	37.471	35.324	33.268
UIJRAR	0.0846	0.0289	0.1134	0.1810	n.3653
DFAC	0.4756	0.4778	0.5613	0.6270	0.8269
EFFP	0.8804	0.9762	0.9217	0.8562	0.7707
FFF	0.8773	0.9756	0.9191	0.8523	0.7774
INCIOM	12.53	10.46	9.26	R.R5	10.20
DEVM	7.840	A.670	8.903	9.326	11.419

Table B-2. Blade Element Performance (Continued)

PERCENT DESIGN SPEED = 100.00

CORRECTED WEIGHT FLOW = 74.70

CORRECTED ROTOR SPEED = 3850.00

INLET GUIDE VANE 1

STATION 0 - STATION 1

PCT SPAN	90	70	50	30	10
DIA	33.622	35.167	36.711	38.256	39.801
BETA 1	0.000	0.000	0.000	0.000	0.000
BETA 1	34.909	35.79%	37.402	37.095	36.969
V 0	315.15	315.15	315.15	715.15	315.15
V 1	445.04	447.66	444.80	439.82	413.61
VZ 0	315.15	315.15	315.15	315.15	315.15
VZ 1	364.96	353.53	351.35	350.82	334.46
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	254.68	268.06	270.17	265.27	251.75
M 0	0.2846	0.2846	0.2846	0.2846	0.2846
M 1	0.4051	0.4076	0.4049	0.4002	0.3803
TURN	-34.91	-36.78	-37.40	-37.0')	-36.97
UUBAR	0.0672	0.0260	0.0366	0.0667	0.2414
DFAC	-0.022	0.016	0.033	0.047	0.092
FFFP	0.9290	0.9648	0.9544	0.9251	0.7545
INCIDM	******	26.9001	37.3001	27.7001	28.1001
DEVM	7.101	6.116	6.298	7.805	8.331

SLOTTED STATOR 1

STATION 2 - STATION 2A

PCT SPAN	90	70	50	30	10
BETA 7	55.263	56.047	56.523	57.336	60.019
BETA 2A	41.956	31.373	31.915	32.919	33.233
V 2	663.19	666.50	660.74	644.64	624.92
V 2A	374.11	451.33	477.78	477.34	422.59
VZ 7	377.4'1	177.75	364.47	347.92	313.23
VZ 2A	278.21	376.91	405.66	400.70	327.32
V-THETA 2	544.99	552.86	551.12	542.69	541.30
V-THETA 2A	250.12	249.27	252.69	250.41	267.65
M 2	0.5993	7.6034	0.5969	0.5807	0.5583
M 2A	0.3292	0.3996	0.4236	0.4726	0.3726
TURN	13.306	22.674	24.607	24.417	20.720
1111BAR	0.2143	'1.1115	0.0698	0.0581	0.1637
LOSS PARAMETER	.0667	,0408	.0270	.0230	.0608
DFAC	0.6215	0.5223	0.4828	0.4683	0.5403
EFFP	0.6479	0.7093	0.7839	0.7732	0.8630
INCIDM	3.11	3.90	4.37	5.19	7.87
DEVM	19.82	11.73	9.78	10.78	17.16
DIA	33.564	34.992	36.420	37.848	39.276

FLOW GENERATION ROTOR

STATION 1 - STATION 7

PCT SPAN	90	70	50	30	10
DIA	33.589	35.067	16.545	38.023	39.501
BETA 1	34.909	36.784	37.402	37.095	36.969
BETA 2	55.263	56.047	56.523	57.336	60.019
BETA(PR) 1	40.357	41.990	44.441	47.090	51.259
BETA(PR) 2	2.918	5.557	4.775	15.434	21.382
V 1	445.04	447.66	444.80	439.82	418.61
V 2	663.19	666.50	660.74	644.64	624.92
VZ 1	364.96	354.53	353.35	350.82	334.46
VZ 2	377.90	'177.75	364.47	347.92	312.28
V-THETA 1	254.68	268.06	771.17	265.27	251.75
V-THETA 2	544.99	552.86	551.12	542.69	541.30
V(PR) 1	478.9	482.4	494.4	515.3	534.4
V(PR) 2	378.4	374.0	369.8	360.0	335.4
VTHETA PR1	-310.1	-322.7	-346.5	-377.4	-416.0
VTHETA PR2	-19.3	-36.2	-62.8	-96.1	-122.3
U 1	564.81	590.76	616.71	642.66	668.60
U 2	564.25	589.08	613.91	638.74	663.57
M 1	0.4051	0.4076	0.4049	0.4002	0.3803
M 2	0.5993	0.6034	I.5969	0.5807	0.5583
M(PR) 1	0.4350	0.4392	1.4505	0.4688	0.4856
M(PR) 2	0.3420	0.3386	0.3341	0.3252	0.3093
TURN(PR)	37.439	36.432	34.668	31.656	29.877
UUBAR	0.0881	0.0265	0.0068	0.0422	0.1122
DFAC	0.4517	Q.47'4	0.5029	0.5484	0.6345
FFFP	0.9360	1.0643	1.0439	1.0091	0.8712
FFF	0.9345	1.0660	1.0451	1.0094	0.8783
INCIDM	8.32	6.35	5.21	4.67	5.99
DEVM	8.298	7.517	7.615	8.814	10.612

Table B-2 Blade Element Performance (Continued)

PERCENT DESIGN SPEED = 100.00

CORRECTED WEIGHT FLOW = 79.85

CORRECTED ROTOR SPEED = 3850.00

INLET GUIDE VANE 1

STATION 0 - STATION 1

PCT SPAN	90	70	50	30	10
DIA	33.622	35.167	36.711	38.256	39.801
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	35.061	36.814	37.340	37.004	36.484
V 0	339.01	339.01	339.01	339.01	339.01
V 1	483.94	486.25	481.72	475.90	453.49
VZ 0	339.01	339.01	339.01	339.01	339.01
VZ 1	396.13	389.28	383.00	389.05	364.62
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	278.00	291.37	292.19	286.43	269.64
M 0	0.3065	0.3065	0.3065	0.3065	0.3065
M 1	0.4418	0.4440	0.4397	0.4342	0.4130
TURN	-35.06	-36.81	-37.34	-37.00	-36.48
UUBAR	0.0586	0.0162	0.0351	0.0650	0.2337
DFAC	-0.038	0.007	0.022	0.035	0.081
EFFP	0.9397	0.9762	0.9587	0.9802	0.7888
INCIDM	******	26.9001	27.3001	27.8001	28.1001
DEVM	7.039	6.086	6.360	7.896	8.816

SLOTTED STATOR 1

STATION 2 - STATION 2A

PCT SPAN	90	70	50	30	10
BETA 2	52.619	54.397	55.089	55.146	57.400
BETA 2A	40.749	32.405	31.710	32.694	39.840
V 2	682.85	691.35	681.57	668.98	664.00
V 2A	412.12	489.23	507.04	509.72	460.03
VZ 2	414.57	402.48	390.07	382.31	357.74
VZ 2A	312.21	413.05	431.35	428.12	353.22
V-THETA 2	542.60	562.12	558.91	543.97	559.39
V-THETA 2A	269.01	262.18	266.51	274.78	294.72
M 2	0.6198	0.6286	0.6182	0.6058	0.5981
M 2A	0.3646	0.4354	0.4519	0.4524	0.4074
TURN	11.870	21.992	23.379	22.452	17.560
UUBAR	0.2046	0.1043	0.0634	0.0557	0.1834
LOSS PARAMETER	.0651	.0385	.0245	.0226	.0687
DFAC	0.5637	0.4817	0.4516	0.4343	0.5044
EFFP	0.6610	0.7447	0.8382	0.7491	0.7367
INCIDM	0.47	2.25	2.94	3.00	5.25
DEVM	18.[illegible]	10.[illegible]7	9.57	10.55	17.7[illegible]
DIA	33.5[illegible]	3.[illegible]2	36.420	37.848	39.27[illegible]

FLOW GENERATION ROTOR

STATION 1 - STATION 2

PCT SPAN	90	70	50	30	10
DIA	33.589	35.067	36.545	38.023	39.501
BETA 1	35.061	36.814	37.340	37.004	36.484
BETA 2	52.619	54.397	55.089	55.146	57.400
BETA(PR) 1	35.906	37.563	40.276	43.147	47.575
BETA(PR) 2	2.991	3.833	8.026	13.215	16.237
V 1	483.94	486.25	481.72	475.90	453.49
V 2	682.85	691.35	681.57	668.98	664.00
VZ 1	396.13	389.28	383.00	380.05	364.62
VZ 2	414.57	402.48	390.07	382.31	357.74
V-THETA 1	278.00	291.37	292.19	286.43	269.64
V-THETA 2	542.60	562.12	558.91	548.97	559.39
V(PR) 1	489.1	491.1	502.0	520.0	540.5
V(PR) 2	415.1	403.4	393.9	392.7	372.5
VTHETA PR1	-286.8	-299.4	-324.5	-356.2	-399.0
VTHETA PR2	-21.7	-27.0	-55.0	-89.8	-104.2
U 1	564.81	590.76	616.71	642.66	668.60
U 2	564.25	589.08	613.91	638.74	663.57
M 1	0.4418	0.4440	0.4397	0.4342	0.4130
M 2	0.6198	0.6286	0.6182	0.6058	0.5981
M(PR) 1	0.4465	0.4484	0.4582	0.4753	0.4923
M(PR) 2	0.3768	0.3668	0.3573	0.3556	0.3355
TURN(PR)	32.916	33.730	32.249	29.932	31.338
UUBAR	0.0584	0.0250	0.0258	0.0325	0.0974
DFAC	0.3669	0.4100	0.4495	0.4793	0.5697
EFFP	0.9457	1.0738	1.0434	1.0569	0.9733
EFF	0.9445	1.0756	1.0445	1.0584	0.9726
INCIDM	4.47	1.92	1.05	0.73	2.21
DEVM	8.371	5.7[illegible]3	5.[illegible]6	6.[illegible]5	5.[illegible]7

Table B-2 Blade Element Performance (Continued)

PERCENT DESIGN SPEED = 100.0

CORRECTED WEIGHT FLOW = 85.9

CORRECTED ROTOR SPEED = 38[illegible].0

INLET GUIDE VANE 1

STATION 0 - STATION 1

PCT SPAN	0	25	50	75	1
DIA	33.622	35.167	36.711	38.256	39.801
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	34.800	36.800	37.600	37.200	36.900
V 0	367.72	367.72	367.72	367.72	367.72
V 1	552.72	549.75	540.85	530.60	499.52
VZ 0	367.71	367.71	367.71	367.71	367.71
VZ 1	453.86	440.20	428.51	422.64	399.46
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	315.44	329.31	330.00	320.80	299.[illegible]
M 0	0.3330	0.3330	0.3330	0.3330	0.3330
M 1	0.5077	0.5049	0.4963	0.4865	0.4567
TURN	-34.80	-36.80	-37.60	-37.20	-36.90
UUBAR	0.0396	0.0064	0.0249	0.0534	0.2459
DFAC	-0.089	-0.036	-0.009	0.010	0.071
EFFP	0.9779	1.0020	0.9875	0.9632	0.912
INCIDM	******	26.9001	27.3001	27.7001	[illegible].001
DFM	7.[illegible]0	6.100	6.[illegible]0	7.7[illegible]	[illegible].400

SLOTTED STATOR 1

STATION 2 - STATION 3

PCT SPAN	0	25	50	75	1
BETA 2	51.163	51.825	51.285	50.675	53.372
BETA 2A	37.609	31.661	32.129	37.421	38.022
V 2	716.60	721.39	708.23	692.41	672.47
V 2A	465.51	538.35	547.62	543.19	494.39
VZ 2	449.39	445.87	442.96	438.79	401.21
VZ 2A	368.77	458.22	463.75	431.40	389.47
V-THETA 2	558.19	567.11	552.61	535.62	539.68
V-THETA 2A	284.08	282.57	291.24	330.08	304.53
M 2	0.6536	0.6582	0.6441	0.6286	0.6078
M 2A	0.4154	0.4833	0.4918	0.4864	0.4408
TURN	13.554	20.164	19.156	13.254	15.350
UUBAR	0.1972	0.0868	0.0550	0.0543	0.1463
LOSS PARAMETER	.0655	.0323	.0212	.0203	.0562
DFAC	0.5101	0.4260	0.3951	0.3570	0.4380
DFFP	0.7688	0.9580	1.1284	0.9490	0.8701
INCIDM	-0.99	-0.32	-0.86	-1.47	1.22
DEVM	15.47	9.52	9.10	9.99	15.28
DIA	33.564	34.992	36.420	37.848	39.276

FLOW GENERATION ROTOR

STATION 2 - STATION Z

PCT SPAN	0	70	30	70	0
DIA	33.589	35.067	36.545	38.023	39.501
BETA 1	34.800	36.800	37.600	37.200	36.900
BETA 2	51.163	51.825	51.285	50.675	53.372
BETA(PR) 1	28.786	30.707	33.786	37.290	42.706
BETA(PR) 2	0.774	2.822	7.879	13.225	17.161
V 1	552.72	549.75	540.85	530.60	499.52
V 2	716.60	721.39	708.23	692.41	672.47
VZ 1	453.86	440.20	428.51	422.64	399.46
VZ 2	449.39	445.87	442.96	438.79	401.21
V-THETA 1	315.44	329.31	330.00	320.80	299.92
V-THETA 2	558.19	567.11	552.61	535.62	539.68
V(PR) 1	517.9	512.0	515.6	531.2	543.6
V(PR) 2	449.4	446.4	447.2	450.7	419.9
VTHETA PR1	-249.4	-261.4	-286.7	-321.9	-368.7
VTHETA PR2	-6.1	-22.0	-61.3	-103.1	-123.9
U 1	564.81	590.76	616.71	642.66	668.60
U 2	564.25	589.08	613.91	638.74	663.57
M 1	0.5077	0.5049	0.4963	0.4865	0.4567
M 2	0.6536	0.6582	0.6441	0.6286	0.6078
M(PR) 1	0.4757	0.4702	0.4731	0.4870	0.4970
M(PR) 2	0.4099	0.4073	0.4067	0.4092	0.3795
TURN(PR)	28.013	27.885	25.907	24.065	25.545
UUBAR	0.0551	-0.0162	-0.0575	-0.0569	0.0405
DFAC	0.3191	0.3232	0.3235	0.3394	0.4417
EFFP	0.8808	0.9597	0.9139	0.9265	0.9054
EFF	0.8783	0.9589	0.9119	0.9248	0.9031
INCIDM	-2.65	-4.98	-5.44	-5.13	-2.65
DFM	6.54	4.72	5.719	6.605	6.201

Table B-2. Blade Element Performance (Continued)

PERCENT DESIGN SPEED = 100.00

CORRECTED HEIGHT FLOW = 91.39

CORRECTED ROTOR SPEED = 3850.00

IYLFT GUIDE VANF 1

STATION 0 - STATION 1

PCT SPAN	90	70	50	30	10
DIA	33.627	35.167	36.711	38.256	39.801
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	35.011	36.939	37.450	37.291	36.816
V 0	394.65	394.65	394. 65	394.65	394.65
V 1	597.26	595.10	586.57	575.95	546.61
VZ 0	394.64	394.64	394.64	394.64	394.64
VZ 1	489.18	475.65	464.42	459.21	437.60
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	342.67	351.63	358.30	145.94	327.55
H O	0.3580	0.3580	0.3580	0.3580	0.3580
M I	0.5509	0.5488	0.5405	0.5302	0.5017
TURN	-35.01	-36.94	-37.65	-37.29	-36.82
UUBAR	0.0315	-0.0033	0.0146	0.0484	0.2238
OFAC	-0.094	-0.043	-0.019	0.000	0.052
EFFP	0.9722	0.9966	0.9828	0.9553	0.8066
INCIOM	******	26.9001	27.3001	27.7001	28.1001
OEVM	7.089	5.961	6.050	7.609	8.484

SLOTTED STATOR 2A

STATION 2 - STATION 2A

PCT SPAN	90	701	50	301	101
BETA 2	48.717	49.079	49.178	48.929	48.889
BETA 2A	35.771	31.586	31,493	37.039	35.647
V 2	744.26	756.33	738.15	718.20	695.54
V 2A	541.93	598.81	597.57	595.26	547.18
VZ 2	491.05	495.41	482.54	471.85	457.11
VZ 2A	442.45	510.10	509.56	504.59	440.61
V-THETA 2	559.28	571.50	558.59	541.44	574.04
V-THETA 2A	312.93	313.64	312.17	315.78	115.94
M 2	0.6818	0.6956	0.6774	0.6566	0.6325
M 2A	0.4889	0.5440	0.5424	0.5383	0.4869
TURN	13.446	17.493	17.685	16.899	13.746
UUBAR	0.1527	0.0900	0.0733	0.0540	0.1556
LOSS PARAMETER	.0521	.0335	.0284	.0216	.0616
DFAC	0.4100	0.3572	0.3428	0.32 OR	0.3489
EFFP	0.9807	1.1334	1.1400	1.0278	0.8005
INCIOM	-3.43	-3.07	-2.97	-3.22	-1.76
DEVH	13.13	9.45	9.35	9.90	13.50
01A	33.564	34.992	36.470	37.848	39.276

FLOW GENERATION ROTOR

STATION 1 - STATION 2

PCT SPAN	90	70	50	30	10
OIA	33.589	35.067	36.545	38.023	39.501
BETA 1	35.011	36.4130	37.650	37.791	36.815
BET4 2	48.717	49.079	49.178	4R. 929	48.889
BETAIPRI 1	74.424	26.111	29.092	37. 660	37.032
BETA(PR) 7	0.580	7.033	6.541	11.652	16.067
V 1	597.26	595.10	586.57	575.95	546.61
V 2	744.26	756.31	738.15	718.20	695.54
VZ 1	489.18	475.65	464.47	459.21	437.60
VZ 2	491.05	495.41	4Q7.54	471.85	457.33
V-THETA 1	347.67	357.63	358.30	348.94	377.55
V-THETA 2	559.28	571.50	558.59	541.44	574.04
V(PR) 2	537.3	529.7	531.5	544.7	554.8
	491.1	495.7	485.7	481. 8	478.1
VTHETA PR1	-222.1	-233.1	-258.4	-293.7	-341.1
VTHFTA PR2	-5.0	-17.6	-55.1	-97.3	-119.5
U 1	564.81	590.76	616.71	642.66	66A 60
U 2	564.75	589.08	613.91	674.74	663.57
M 1	0.5509	0.5488	0.5405	n.5307	0.5017
M 2	0.6818	0.6956	0.6774	0.6566	0.6325
M(PR) 1	0.4056	0.4995	0.4897	0.501n	0.5093
M(PR) 2	0.4499	n,4559	0.4457	0.4404	0.4348
TURN(PR)	23.844	24.078	77.551	21.009	20.965
UUBAR	0.1280	0.0198	0.0091	0.0229	n 0263
DFAC	0.2469	0.2339	0.7529	0.2795	0.3117
EFFP	0.7437	0.9853	0.9844	0.9084	Q A5 e3
EFF	0.7395	0.9850	0.9841	0.9067	0.8554
INCIOM	-7.02	-9.53	-10.14	-9.76	-7.43
OEVY	5.960	1.993	4.381	5 032	6.097

Table B-2. Blade Element Performance (Continued)-

PERCENT DESIGN SPEED = 89.92

CORRECTFO WEIGHT FLOW = 60.48

CORRECTFD ROTOR SPEED = 3462.00

INLET GUIDE VANE 1

STATION 0 - STATION 1

PCT SPAN	90	70	50	30	10
DIP	37.627	35.167	36.712	38.256	39.801
BFTA 0	0.000	0.000	0.093	0.000	0.000
RETA 1	34.280	35.780	37.060	36.870	36.620
V 0	251.60	251.60	251.60	251.60	751.60
V 1	356.02	355.46	350.19	343.96	323.57
VZ n	251.60	351.60	251.60	251.60	751.60
VZ 1	294.18	286.55	270.45	275.17	759.66
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	200.57	210.34	211.04	206.38	192.98
M 0	0.2265	0.2265	0.7265	0.2265	0.2765
M 1	0.3222	0.371 7	0.3168	0.3111	0.2923
TURN	-34.28	-36.28	-37.06	-36.07	-36.67
UUBAR	0.0019	-0.0339	-0.0116	0.0194	0.7016
OFAC	-0.037	1.016	0.040	0.059	0.118
EFFP	1.0206	1.6525	1.0324	0.9998	0.7903
INCIOM	******	26.9001	77.3001	27.7001	38.1001
DEVM	7.820	6.620	6.640	8.030	8.680

SLOTTED STATOR 1

STATIOY 3 - STATION 2A

PCT SPAN	90	70	50	30	10
RET4 2	56.660	56.670	5H.830	61.100	69.270
BETA 2A	42.780	34.230	17.230	34.560	37.990
v 2	595.49	592.23	585.as	572.10	548.68
V 2A	305.35	379.02	393.40	372.95	328.39
VZ 2	327.79	375.4 1	303.24	276.48	194.21
VZ 2A	224.12	313.37	332.78	307.14	258.81
V-THETA 2	497.49	494.82	501.30	500.85	513.16
V-THFTA 2A	207.39	217.71	209.81	211.56	702.13
M 2	0.5343	0.5316	0.5248	0.5109	0.4862
M 2A	0.2688	0.3353	0.3480	0.3292	0.2894
TURN	13.880	27.440	26.600	26.540	31.280
UURAY	0.2180	0.0928	0.0701	0.1065	0.1606
LOSS PARAMETER	.0672	.0336	.0270	.0414	.0616
DFAC	0.6905	fl.5675	0.5552	0.5881	0.6817
EFFP	0.7890	0.9611	1.0489	1.0526	2.0793
INCIDM	4.51	4.52	6.68	8.95	17.12
DEVM	20.64	12.09	10.09	12.42	15.85
OIA	33.564	34.992	36.470	37.848	39.276

FLOW GENERATION ROTOR

STATION 1 - STATION 2

PCT SPAN	90	70	50	30	10
DIA	33.589	35.067	36.545	38.023	39.501
SFTA 1	34.280	36.280	37.060	36.870	36.620
RETA 2	56.660	56.670	58.830	61.100	69.270
BETAIPR) 1	46.256	48.236	50. R77	53.474	57.542
BFTA(PR) 2	1.733	6.121	9.499	14.891	23.273
V 1	356.02	355.46	350.19	343.96	323.52
v 2	595.49	592.23	585.88	572.10	548.68
VZ 1	294.18	286.55	279.45	275.17	259.66
VZ 2	327.29	325.41	303.24	276.48	194.21
V-THETA 1	200.52	210.34	211.04	706.38	192.98
V-THETA 2	497.49	494.82	501.30	500.85	513.16
V(PR) 1	425.5	430.2	442.8	462.3	483.8
V(PR) 2	327.4	327.3	307.5	286.1	211.4
VTHETA PR1	-307.4	-320.9	-343.5	-371.5	-408.2
VTHETA PR2	-9.9	-34.9	-50.7	-73.5	-83.5
U 1	507.89	511.23	554.56	577.89	601.22
U 2	507.39	529.72	552.04	574.37	596.70
M 1	0.3222	0.3217	0.3168	0.3111	0.2923
M 2	0.5343	0.5316	0.5248	0.5109	0.4862
MIPRI 1	0.3851	0.3994	0.4007	0.4182	0.4371
M(PR) 2	0.2938	0.2938	0.2754	0.2555	0.1873
TURN(PR)	44.574	42.115	41.372	-38.583	34.269
UUBAR	0.1897	0.1373	0.1896	0.2624	0.4370
OFAC	0.5087	0.51 65	0.5941	0.6749	0.8817
EFFP	0.7974	0.8508	0.8798	0.7771	0.6448
EFF	0.7932	0.8475	0.8250	0.7721	0.6370
INCIDM	14.82	12.60	11.64	11.05	12.18
DEVM	7.113	8.081	7.339	8.271	12.403

Table B-2. Blade Element Performance (Continued)

PERCENT DESIGN SPEED = 89.97

CORRECTED WEIGHT FLOW = 60.71

CORRECTED ROTOR SPEED = 3464.00

INLET GUIOE VANE 1

STATIDN 0 - STATION 1

PCT SPAN	90	70	50	30	10
DIA	33.622	35.167	36.712	38.756	39.801
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA L	34.395	36.154	37.159	37.060	37.039
V 0	252.58	252.58	252.58	252.58	252.58
V 1	356.00	356.77	351.69	345.14	375.12
VZ 0	252.58	252.58	252.58	252.58	252.58
VZ 1	293.15	288.07	280.28	275.42	259.57
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	201.10	210.48	212.43	2C8.90	195.84
M 0	0.2274	0.2274	0.2274	0.2274	0.2274
M 1	0.3222	0.3229	0.3182	0.3122	0.2938
TURN	-34.39	-36.15	-37.16	-37.06	-37.04
UUBAR	0.0500	0.0038	0.0250	0.0596	0.2386
OFAC	-0.031	0.015	0.040	0.061	0.121
EFFP	0.9710	1.0149	0.9940	0.9573	0.7589
INCIDM	******	26.9001	27.3001	27.7001	28.1001
DEVM	7.705	6.746	6.541	7.840	8.761

SLOTTED STATOR 1

STATION 2 - STATION 2A

PCT SPAN	90	70	50	30	10
BETA 2	56.603	57.422	58.832	61.194	70.200
BETA 2A	42.716	34.124	31.945	34.488	37.723
V 2	593.51	593.86	583.98	569.23	550.69
V 2A	317.48	385.95	399.50	368.77	336.04
VZ 2	326.09	319.76	302.74	274.28	196.54
VZ 2A	233.76	319.50	339.37	303.91	265.80
V-THETA 2	495.51	500.42	499.69	498.79	518.13
V-THETA 2A	215.37	216.51	210.71	208.78	205.61
M 2	0.5324	0.5330	0.5227	0.5079	0.48 RY
M 2A	0.2794	0.3412	0.3535	0.3251	9.2956
TURN	13.887	23.298	26.987	26.706	32.477
UURAR	0.2124	0.1019	0.0645	0.1213	0.1667
LOSS PARAMETER	.0655	.0369	.0249	.0453	.0643
DFAC	0.6621	0.5587	0.5412	0.5941	0.6699
EFFP	0.7606	C.9001	1.0513	0.9941	1.2085
INCIDM	4.45	5.27	6.68	9.04	18.05
DEVM	20.53	11.98	9.71	12.35	15.59
DIA	33.564	34.992	36.420	37.848	39.775

FLOW GENERATION ROTOR

STATION 1 - STATION 2

PCT SPAN	90	70	50	30	10
DIA	33.589	35.067	36.545	38.023	39.501
BETA 1	34.395	36.154	37.159	37.060	37.039
BETA 7	56.603	57.422	58.832	61.194	70.200
RETAIPRI 1	46.271	48.099	50.701	53.353	57.396
BETA(PR) 2	2.134	5.288	9.886	15.470	22.930
V 1	356.00	356.77	351.69	345.14	325.12
v 2	593.51	593.86	583.98	569.23	550.68
VZ 1	293.75	288.07	280.28	275.42	259.52
VZ 2	326.69	319.76	302.24	274.28	186.54
V-THFTA 1	701.10	210.48	212.43	208.00	195.84
V-THETA 2	495.51	500.42	499.69	498.79	518.13
V(PR) 1	425.0	431.3	442.5	461.4	481.6
VIPRI 2	326.9	371.1	306. 8	284.6	202.5
VTHETA PR1	-307.1	-371.1	-342.4	-370.2	-405.7
VTHFTA PR2	-12.2	-79.6	-52.7	-75.9	-7R.9
U 1	508.19	531.53	554.88	578.22	601.57
U 2	507.68	530.07	552.36	574.70	597.04
M 1	0.3772	0.3229	0.3182	0.3122	0.2938
M 2	0.5324	0.5330	0.5227	0.5079	0.4889
M(PR) 1	0.3846	0.3904	0.4004	0.4174	0.4357
M(PR) 2	0.7932	0.2882	0.7746	0.2539	0.1798
TURN(PR)	44.137	42.811	40.814	37.883	34.465
UUHAR	0.1736	0. 1504	0.1790	0.2540	0.4384
DFAC	0.5069	0.5373	0.5724	0.6738	0.9016
EFFP	0.7952	0.9491	2.8068	0.7545	0.6889
EFF'	9.7909	0.8458	0.8025	0.7491	0.6819
INCIDY	14.83	12.46	11.47	10.93	12.04
DEVM	7.514	7.749	7.726	8.950	12.060

Table B-2. Blade Element Performance (Continued)

PERCENT DESIGN SPEED = 89.12

CORRECTED WEIGHT FLOW = 67.62

CORRECTED ROTOR SPEED = 3431.00

INLET GUIDE VANE 1

STATION 0 - STATION 1

PCT SPAN	90	70	50	30	10
DIA	33.627	35.167	36.712	38.256	39.801
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	34.718	36.561	37.125	36.744	36.469
V 0	283.16	283.16	283.18	283.18	283.16
V 1	412.18	410.88	404.73	396.87	375.21
VZ 0	783.16	283.16	283.16	283.16	283.16
VZ 1	338.80	330.03	322.30	318.02	301.73
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	234.75	244.75	243.97	237.42	223.02
M 0	0.2553	0.7553	0.2553	0.2553	0.2553
M 1	0.3744	0.3732	0.3670	0.3601	0.3400
TURN	-34.72	-36.56	-37.12	-36.74	-36.47
UUBAR	0.0369	-0.0000	0.0700	0.0461	0.2119
DFAC	-0.055	-0.008	0.016	0.034	0.089
EFFP	0.9819	1.0133	n.9957	0.9705	0.8014
INCIOM	******	Lh.9001	27.3001	27.7001	28.1001
DEVM	7.382	6.339	6.575	8.156	8.831

SLOTTED STATOR 1

STATIOY 2 - STATION 2A

PCT SPAN	90	70	50	30	10
BETA 2	55.364	56.059	56.988	56.951	60.083
BETA 2A	41.165	33.150	31.982	32.791	38.291
V 2	595.82	599.17	594.08	582.45	562.46
V 2A	342.28	410.01	431.07	429.14	381.09
VZ 2	338.64	334.54	323.66	317.64	280.53
VZ 2A	257.67	343.27	365.64	360.75	199.11
V-THETA 2	490.23	497.08	498.17	488.21	487.51
V-THETA 2A	225.30	224.20	228.32	232.41	236.15
M 2	0.5359	0.5394	0.5340	0.5224	0.5018
M 2A	0.3025	0.3641	0.3832	0.3809	0.3373
TURN	14.199	72.909	25.006	24.160	21.792
UUBAR	0.2003	0.0946	0.0570	0.0565	0.1457
LOSS PARAMETER	.0633	.0347	.0220	.0224	.0558
DFAC	0.6111	0.5145	0.4814	0.4718	0.5434
EFFP	0.7756	0.9722	1.0700	1.0469	1.2827
INCIOM	3.21	3.91	4.84	4.80	7.93
DEVM	19.03	11.01	9.84	10.65	16.15
DIA	33.564	34.992	36.420	37.848	39.276

PLOW GENERATION ROTOR

STATION 1 - STATION 2

PCT SPAN	90	70	50	30	10
DIA	33.589	35.067	36.545	38,023	39.501
BETA 1	34.718	36.561	37.125	36.744	36.469
BETA 2	55.364	56.059	56.988	56.951	60.083
BETA(PR) 1	38.407	40.485	43.478	46.514	51.016
BETA(PR) 2	2.133	4.766	8.597	14.309	20.313
V 1	412.18	410.88	404.23	396.87	375.21
V 2	595.82	599.17	594.08	582.45	562.46
VZ 1	338.80	330.03	322.30	318.02	301.73
VZ 2	338.64	334.54	323.66	317.64	280.53
V-THETA 1	234.75	244.75	243.97	237.42	223.02
V-THETA 7	490.23	497.08	498.17	488.21	487.51
V(PR) 1	432.3	433.9	444.2	462.1	479.6
V(PR) 2	338.9	335.7	327.3	327.8	299.1
VTHETA PR1	-268.6	-281.7	-305.6	-335.3	-372.8
VTHETA PR2	-12.6	-27.9	-48.9	-81.0	-103.8
U 1	503.34	526.47	549.59	572.72	595.84
u 2	502.85	524.97	547.10	569.23	591.35
M 1	0.3744	0.3732	0.3670	0.3601	0.3400
M 2	0.5359	0.5394	0.5340	0.5224	0.5018
M(PR) 1	0.3927	0.3941	0.4032	0.4193	0.4346
M(PR) 2	0.3048	0.3022	0.2942	0.2940	0.2668
TURN(PR)	36.274	35.718	34.882	32.205	30.703
UURAR	0.0439	-0.0070	0.0053	0.0245	0.1254
DFAC	0.4518	0.4703	0.5152	0.5414	0.6429
EFFP	0.8154	0.8968	0.8943	0.8712	0.7794
EFF	0.8118	0.8946	0.8920	0.8683	0.7744
INCIOM	6.97	4.84	4.25	4.09	5.66
DEVW	7.513	6.726	6.437	7.689	9.443

Table B-2. Blade Element Performance (Continued)

PFRCEYT DESIGN SPFED = 88.05

CORRECTED WEIGHT FLOW = 72.88

CORRECTED ROTOR SPEED = 3390.00

INLFT GUIOF VANF 1

STATION 0 - STATION 1

PCT SPAN	90	70	50	30	10
DIA	33.622	35.167	36.712	38.256	39.801
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	34.796	36.750	37.287	36.873	36.489
V 0	706.85	306.85	306.85	306.85	306.85
V 1	449.75	447.47	441.08	433.44	408.03
VZ 0	306.85	3'16.85	306.85	306.85	306.85
VZ 1	368.51	358.50	350.93	346.74	328.05
V-THFTA 0	0.00	0.00	0.no	0.00	0.00
V-THFTA 1	256.08	267.70	267.21	260.08	242.65
M 0	0.2770	0.2770	0.2770	0.2770	0.2770
M 1	0.4087	0.4074	0.4015	0.3943	0.3705
TURN	-34.80	-36.75	-37.29	-36.87	-36.49
UUBAR	0.0144	-0.0723	-0.0002	0.0157	0.2033
DFAC	-0.059	-0.010	0.011	0.028	0.086
EFFP	0.9989	1.0306	1.0201	0.9974	0.8095
INCIOM	******	26.900 1	27.3001	27.7001	28.1001
DEVM	7.304	6.150	6.413	8.027	8.811

SLOTTED STATOR 1

STATION 2 - STATION 2A

PCT SPAN	90	70	50	30	10
BETA 2	53.204	53.709	54.796	55.335	57.599
BETA 2A	39.686	32.406	31.696	32.568	40.805
V 2	618.72	623.85	613.67	605.35	584.41
V 2A	372.14	441.27	458.28	458.35	410.59
VZ 2	370.59	369.25	353.71	344.31	313.15
VZ 2A	286.38	372.51	389.93	386.28	310.79
V-THETA 2	495.45	502.84	501.43	497.90	493.43
V-THFTA 2A	237.64	23h.46	240.79	246.73	268.31
M 2	0.5587	0.5641	0.5541	0.5456	0.5745
M 2A	0.3305	0.3937	0.4093	0.4086	0.3649
TURN	13.518	71.303	23.100	22.767	16.794
UUBAR	0.2068	0.1015	0.0582	0.0647	0.1541
LOSS, PARAMETER	.0668	.0375	.0225	.0257	.0568
DFAC	0.5724	0.4792	0.4468	0.4430	0.4881
EFFP	0.8155	0.9633	1.0697	0.9909	0.9971
INCIDM	1.05	1.56	2.65	3.19	5.45
DEVM	17.55	10.27	9.56	10.43	18.66
DIA	33.564	34.992	36.420	37.848	39.276

FLOW GENERATION ROTOR

STATION 1 - STATION 2

PCT SPAN	90	70	50	30	10
DIA	33.589	35.067	36.545	38.023	39.501
BETA 1	34.796	36.750	37.287	36.873	36.489
BFTA 2	53.204	53.709	54.796	55.335	57.599
BETA(PR) 1	33.211	35.155	38.165	41.409	46.532
BETA(PR) 2	0.214	2.460	6.311	10.614	16.179
V 1	448.75	447.42	441.08	433.44	408.03
V 2	618.72	623.85	613.67	605.35	584.41
VZ 1	368.51	358.50	350.93	346.74	328.05
VZ 7	370.59	369.25	353.77	344.31	313.15
V-THETA 1	256.08	267.70	267.21	260.08	242.65
V-THETA 2	495.45	502.84	501.43	497.90	493.43
V(PR) 1	440.5	438.5	446.3	462.3	416.8
V(PR) 7	370.6	369.6	355.9	350.3	326.1
VTHFTA PR1	-241.2	-252.5	-275.8	-305.8	-346.1
VTHFTA PR2	-1.4	-15.9	-39.1	-64.5	-90.9
U 1	497.33	520.18	543.07	565.87	588.72
U 2	496.84	518.70	540.56	562.42	584.29
M 1	0.4087	0.4074	0.4015	0.3943	0.3705
M 2	0.5587	0.5641	0.5541	0.5456	0.5245
M(PR) 1	0.4011	0.3993	0.4062	0.4705	0.4330
M(PR) 2	0.3347	0.3342	0.3214	0.3157	0.2926
TURN(PR)	32.997	32.695	31.854	30.795	30.353
UUBAR	0.0093	-0.0660	-0.0402	-0.0063	0.0767
DFAC	0.3753	0.3821	0.4339	0.4801	0.5705
EFFP	0.8308	0.9363	0.9375	0.9280	0.0725
EFF	0.8276	0.9350	0.9362	0.9265	0.0697
INCIDM	1.77	-0.48	-1.06	-1.01	1.17
DEVM	5.594	4.420	4.151	3.994	5.309

Table B-2. Blade Element Performance (Continued)

PERCENT DESIGN SPFFD = 88.23

CORRECTED WFIGHT FLOW = 83.43

CORRECTED ROTOR SPEED = 3397.00

INLFT GUIDE VANE 1

STATION 0 - STATION 1

PCT SPAN	90	70	50	30	10
DIA	33.622	35.167	36.717	38.256	39.801
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	34.981	36.959	37.442	37.083	36.509
V 0	355.93	355.93	355.93	355.93	355.93
V 1	523.00	523.92	519.76,	514.00	489.70
VZ 0	155.97	355.93	355.93	355.93	355.93
VZ 1	428.59	418.65	412.67	410.05	393.60
V-THFTA 0	0.00	0.00	0.00	0.00	0.00
V-THFTA 1	299.89	315.01	315.99	309.93	791.75
M 0	0.3221	0.3221	0.3221	0.322 1	0.3271
M 1	0.4792	0.4400	0.4761	0.4705	0.4474
TURN	-34.98	-36.96	-37.44	-37.08	-36.51
UUBAR	0.0157	-0.0147	-0.0070	0.3255	0.2070
DFAC	-0.063	-0.018	-0.004	0.008	0.055
EFFP	n.9957	1.0200	I. 0097	0.9865	0.8775
INCIDY	******	26.9001	27.3001	27. 7001	28.1001
DEVM	7.119	5.941	6.258	7.817	8.791

SLOTTED STATOR 1

STATIOY 7 - STATION 2A

PCT SPAN	90	70	50	30	10
BETA 7	48.760	45.790	49.170	49.080	49.45')
RETA 2A	34.000	30.820	30.770	31.980	34.060
v 2	673.41	680.20	660.41	b46.67	675.00
V 2A	487.66	535.70	535.13	529.71	481.38
VZ 2	443.92	4463.13	431.79	421.57	406.3%
VZ 2A	404.29	460.05	459.80	449.32	398. 80
V-THETA 7	506.38	511.72	499. 70	488.64	474.90
V-THFTA 2A	272.70	774.46	273.77	280.55	269.6')
M 2	0.6135	0.6208	0.6016	0.5881	0.5661
M 2A	0.4396	0.4854	0.4844	0.4781	0.4371
TURN	14.760	17.970	18.400	17.100	15.390
UUBAR	0.1607	0.0906	0.0595	0.0627	0.1569
LOSS PARAMETER	.0559	.0340	.0233	.0251	.0634
DFAC	0.4207	n. 3648	0.7455	0.3340	0.3925
EFFP	1.1342	1.5088	1.5905	1.2036	0.9180
INCIDM	-3.39	-3.36	-7.98	-3.07	-7.7')
DEVM	11.86	8.68	8.63	9.34	11.92
DIA	33.564	34.Q97	36.420	37.848	39.276

FLOW GENERATION ROTOR

STATION 1 - STATION 2

PCT SPAN	90	70	50	30	10
DIA	33.589	35.067	36.545	38.023	39.501
BETA 1	34.981	36.959	37.442	77.083	36.509
BETA 2	48.760	48.790	49.170	49.080	49.450
BETA(PR) 1	24.848	26.227	28.937	32.089	37.184
BETAIPRI 2	-1.099	1.039	5.553	10.034	15.227
V 1	523.09	523.92	519.76	514.00	489.70
V 2	673.41	680.20	660.41	646.67	625.00
VZ 1	428.59	418.65	412.67	410.05	393.60
VZ 2	443.92	448.13	431.79	423.57	406.32
V-THETA 1	299.89	315.01	315.99	309.93	291.35
V-THFTA 2	506.38	511.72	499.70	488.64	474.90
V(PR) 1	472.3	466.7	471.5	484.0	494.0
VIPRJ 2	444.0	448.7	433.8	430.2	421.1
VTHETA PR1	-198.5	-706.2	-728.2	-257.1	-298.6
VTHETA PR7	85	-8.1	-42.0	-74.9	-110.6
U 1	498.36	521.25	544.15	567.04	589.93
U 2	497.86	519.77	541.68	563.58	585.49
M 1	0.4792	0.4800	0.4761	0.4705	0.4474
M 2	0.6135	0.6208	0.6016	0.5881	0.5661
M(PR) 1	0.4377	0.4276	0.4319	0.4431	0.4514
M(PR) 2	0.4045	0.4091	0.3952	0.3912	0.3814
TURN(PR)	25.946	25.197	23.384	22.055	21.957
UUBAR	0.1280	0.0116	0.0241	0.0746	0.0369
DFAC	0.2343	0.2167	0.2523	0.2829	0.3288
EFFP	0.7141	0.8614	0.8391	0.8465	0.8176
EFF	0.7101	0.8592	0.8367	0.8441	0.8145
INCIOM	-6.59	-9.41	-10.29	-10.33	-8.18
OFVM	4.281	2.990	3.393	3.414	4.357

Table B-2. Blade Element Performance (Continued)

PFRCENT DESIGN SPFEO = 88.49

CORRECTED WEIGHT FLOW = 78.42

CORRECTED ROTOR SPEEO = 3407.00

INLET GUIDE VANE 1

STATION 0 - STATION 1

PCT SPAN	90	70	50	30	10
DIA	33.622	35.167	36.712	38.256	39.801
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	34.952	36.808	37.445	37.099	36.481
V 0	332.34	337.34	332.34	332.34	332.34
V 1	488.16	486.52	478.73	470.43	443.46
VZ 0	332.34	332.34	332.34	332.34	332.34
VZ 1	400.06	389.53	380.08	375.21	356.57
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	779.73	291.49	291.07	283.76	263.66
M 0	0.3004	0.3004	0.3004	0.3004	0.3004
M 1	0.4459	0.4444	0.4370	0.4291	0.4037
TURN	-34.96	-36.81	-37.44	-37.10	-36.48
UUBAR	0.0151	-0.0191	0.0034	0.0292	0.2142
OFAC	-0.062	-0.014	0.010	0.028	0.083
EFFP	0.9963	1.0255	1.0069	0.9833	0.8023
INCIOM	******	76.9001	27.3001	27.7001	7R.1001
DEVM	7.138	6.092	6.255	7.801	8.819

SLOTTED STATOR 1

STATIOY 2 - STATION 2A

PCT SPAN	90	70	50	30	10
BETA 7	51.246	51.667	52.426	52.297	53.600
BETA 2A	36.699	31.607	31.176	32.181	36.809
v 2	647.78	650.00	637.38	627.51	591.89
v2A	415.07	478.67	4R9.57	485.86	439.77
VZ 2	405.50	403.15	388.66	383.17	351.24
VZ 2A	337.80	407.66	41R.87	411.21	352.10
V-THETA 7	505.17	509.87	505.16	496.48	416.41
V-THETA 2A	248.05	250.87	253.44	258.76	263.49
n 2	0.5873	0.5900	0.5174	0.5677	0.5331
M 2A	0.3708	0.4296	0.4395	0.4352	0.3977
TURN	14.547	20.060	21.250	20.116	15.791
UUBAR	0.1975	0.0916	0.0550	0.0684	0.1019
LOSS PARAMETER	.0665	.0341	.0214	.0273	.0421
DFAC	0.5249	0.4376	0.4120	0.4058	0.4351
EFFP	0.9338	1.1261	1.2950	1.0736	1.1281
INCIOM	-0.90	-0.48	0.28	0.15	1.45
DEVM	14.56	9.47	9.04	10.04	14.67
DIA	33.564	34.992	36.420	37.848	39.276

FLOW GENERATION ROTOR

STATION 1 - STATION 2

PCT SPAN	90	70	50	30	10
DIA	33.589	35.067	36.545	38.023	39.501
SETA 1	34.962	36.808	37.445	37.099	36.481
RETA 2	51.246	51.667	52.426	52.997	53.600
BETA(PR) 1	28.817	30.701	33.825	37.214	42.611
BETA(PR) 2	-0.825	1.624	5.600	10.158	17.509
V 1	488.16	486.52	478.73	470.43	443.46
v 2	647.78	650.00	631.38	627.51	591.89
VZ 1	400.06	389.53	380.08	375.21	356.57
VZ 2	405.50	403.15	388.66	383.77	351.24
V-THETA 1	279.73	291.49	291.07	283.16	263.66
V-THETA 2	505.11	509.87	505.16	496.48	476.41
VIPRI 1	456.6	453.0	457.5	411.1	484.5
V(PR) 2	405.5	403.3	390.5	389.9	368.3
VTHETA PR1	-220.1	-231.3	-254.7	-284.9	-328.0
VTHETA PR2	5.8	-11.4	-38.1	-6R.8	-110.8
U 1	499.82	522.79	545.75	568.71	591.67
u 2	499.33	521.30	543.27	565.24	587.22
M 1	0.4459	0.4444	0.4370	0.4291	0.4037
M 2	0.5873	0.5900	0.5174	0.5677	0.5331
M(PR) 1	0.4111	0.4138	0.4176	0.4298	0.4410
M(PR) 2	0.3677	0.3661	0.3538	0.3527	0.3317
TURN(PR)	29.642	29.071	28.225	27.056	25.103
UUBAR	0.0523	-0.0173	-0.0037	0.0038	0.0826
DFAC	0.3088	0.3121	0.3529	0.3816	0.4531
EFFP	0.7870	0.8850	0.8728	0.8865	0.8199
EFF	0.1834	0.8829	0.8105	0.8843	0.8166
INCIDM	-2.62	-4.94	-5.40	-5.21	-2.75
DEVM	4.555	3.584	3.440	3.538	6.639

3

Table B-2. Blade Element Performance (Continued)

PFRCENT DESIGN SPEED = 69.68

CORRECTED WEIGHT FLOW = 47.52

CORRECTED ROTOR SPEED = 2682.50

INLET GUIDE VANE 1

STATION 0 - STATION 1

PCT SPAN	90	70	50	30	10
01A	33.622	35.167	36.711	38.256	39.801
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	34.220	35.870	36.910	36.720	36.690
V 0	195.80	195.80	195. 80	195.80	195.80
V 1	268.99	268.42	263.33	259.39	241.45
VZ 0	195.80	195.80	195.80	195.80	195.80
VZ 1	222.43	217.52	210.56	207.11	193.61
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	151.28	157.28	158.15	154.49	144.26
M 0	0.1759	0.1759	0.1759	0.1759	0.1759
M 1	0.2424	0.2419	0.2372	0.2327	0.2173
TURN	-34.22	-35.87	-36.91	-36.77	-36.69
UUBAR	0.0755	-0.0637	-0.0414	-0.0191	0.1592
OFAC	-0.007	0.041	0.071	0.090	0.154
EFFP	1.0649	1.1147	1.0935	1.0689	0.8142
INCIDH	******	26.9001	27.3001	27.7001	28.1001
DEVM	7.880	7.030	6.790	8.180	8.610

SMTTED STATOR 1

STATION 2 - STATION 2A

PCT SPAN	90	70	50	30	10
BETA 2	57.340	57.940	59.310	61.370	67.900
BETA 2A	42.320	33.840	32.310	33.340	36.250
V 2	462.85	460.15	454.15	444.39	425.21
V 2A	249.28	302.51	316.32	292.79	259.24
VZ 2	249.78	244.25	231.79	212.93	159.97
VZ 2A	184.31	251.26	267.34	244.60	209.07
V-THETA 2	389.66	389.97	390.54	390.05	393.97
V-THETA 2A	167.83	168.46	169.07	160.92	153.29
M 2	0.4142	0.4120	0.4061	0.3967	0.3790
M 2A	0.2210	0.2690	0.2813	0.2599	0.2299
TURN	15.020	24.100	27.000	28.030	31.650
UUBAR	0.2009	0.0792	0.0403	0.1041	0.1593
LOSS PARAMETER	.06232	.02873	.01550	.04104	.06266
UFAC	0.6614	0.5527	0.5256	0.5858	0.6696
EFFP	0.9238	1.1798	1.4289	1.3030	1.3704
INCIOH	5.19	5.79	7.16	9.22	15.75
DEVH	20.18	11.70	10.17	11.20	14.11
DIA	33.564	34.992	36.420	37.848	39.276

PLOW GENERATION ROTOR

STATION 1 - STATION 2

PCT SPAN	90	70	50	30	10
DIA	33.589	35.067	36.545	38.023	39.501
BETA 1	34.220	35.870	36.910	36.770	36.690
BFTA 2	51.340	51.940	59.310	61.370	67.900
BETA(PR) 1	47.444	49.462	52.210	54.771	58.950
BETA(PR) 2	0.799	4.791	9.119	14.481	73.142
V 1	268.99	268.42	263.33	258.39	741.45
V 2	462.85	460.15	454.15	444.39	425.21
VZ 1	222.43	717.52	210.56	707.11	193.61
VZ 2	249.78	244.25	231.79	712.93	159.97
V-THETA 1	151.28	157.28	158.16	154.49	144.76
V-THFTA 2	389.66	389.97	390.54	390.05	-491.97
V(PR) 1	378.9	334.7	343.6	359. 0	375.4
V(PR) 2	249.8	245.1	234.8	219.9	174.0
VTHFTA PRI	-242.3	-254.3	-771.5	-293.3	-371.6
VTHETA PR2	-3.5	-20.5	-37.2	-55.0	-68.4
U 1	393.54	411.61	429.69	447.17	465. 85
u 2	393.15	410.45	427.75	445.04	467.14
M 1	0.2424	0.2419	0.2372	0.2327	0.21 73
M 2	0.4147	0.4120	0.4061	0.3967	0.3790
M(PR) 1	0.2964	0.3015	0.3095	0.3234	0.3379
M(PR) 2	0.2236	0.2195	0.2099	0.1963	0.1551
TURN(PR)	46.645	44.671	43.092	40.289	35.808
UUBAR	0.2226	0.2071	0.2341	0.2994	0.4196
OFAC	0.5294	0.5590	0.6143	0.6898	0. 8568
EFFP	0.7211	0.7746	0.7472	0.7171	0.7028
EFF	0.7175	0.7716	0.7438	0.7132	0.6989
INCIDM	16.00	13.82	12.98	12.35	13.59
DEVM	6.179	6.751	6.959	7.861	12.272

Table B-2. Blade Element Performance (Continued)

PERCENT DESIGN SPEED = 69.89

CORRECTED HEIGHT FLOW = 49.65

CORRECTED ROTOR SPEED = 7690.70

INLET GUIDE VANE 1

STATION 0 - STATION 1

PCT SPAN	90	70	50	30	10
DIA	33.622	35.167	36.711	38.256	39.801
BFTA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	34.290	35.980	36.870	36.720	36.820
V 0	204.88	204.88	204.88	204.88	204.88
V 1	289.41	289.50	285.63	281.51	264.93
VZ 0	204.88	204.88	204.88	204.88	204.88
V I 1	239.11	234.27	228.50	225.65	212.08
V-THFTA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	163.05	170.08	171.38	168.31	158.77
M 0	0.1841	0.1841	0.1841	0.1841	0.1841
M 1	0.2610	0.2611	0.2576	0.2538	0.2387
TURN	-34.29	-35.98	-36.87	-36.72	-36.82
UU8AR	0.0087	-0.0466	-0.0320	-0.0116	0.1688
DFAC	-0.028	0.013	0.036	0.053	0.115
EFFP	1.0374	1.0779	1.0655	1.0453	0.8357
INCIDM	******	26.9001	27.3001	27.7001	28.1001
DEVM	7.810	6.920	6.830	8.180	8.480

SLOTTED STATOR 1

STATION 2 - STATIDN 2A

PCT SPAN	90	70	50	30	10
RETA 2	55.818	56.630	57.466	58.914	65.106
BETA 2A	41.304	33.337	31.905	32.548	36.275
v 2	461.97	461.18	454.59	443.27	425.62
V 2A	263.33	308.17	317.41	311.33	269.59
VZ 2	259.55	253.67	244.48	228.87	179.16
VZ 2A	197.82	257.46	269.23	262.43	217.34
V-THETA 2	382.17	385.15	383.26	379.62	386.07
V-THETA 2a	173.81	169.36	168.13	167.50	159.51
M 2	0.4141	0.4136	0.4076	0.3964	0.3801
M 2A	0.2337	0.2743	0.2825	0.2769	0.2397
TURN	14.514	23.293	25.481	26.366	28.831
UURAR	0.1834	0.0864	C.0607	0.0597	0.1501
LOSS PARAMETER	.05779	.03159	.02344	.02375	.05903
DFAC	0.6182	0.5360	0.5174	0.5248	0.6294
EFFP	0.8514	1.0349	1.0465	1.2503	1.0107
INCIDM	3.67	4.48	5.32	h.76	12.96
DEVM	19.16	11.20	9.85	10.41	14.14
DIA	33.564	34.992	36.420	37.948	39.276

FLOW GENERATION ROTOR

STATION 1 - STATION 2

PCT SPAN	90	70	50	30	10
DIA	33.589	35.067	36.545	3R.023	39.501
BETA 1	34.290	35.980	36.870	36.720	36.970
BETA 2	55.818	56.630	57.466	58.914	65.104
BETA(PR) 1	44.097	46.023	48.648	51.218	55.493
BETA(PR) 2	2.686	5.976	10.610	16.768	21.441
V 1	7R9.41	289.50	285.63	281.51	764.93
V 2	461.97	461.18	454.59	443.27	425.62
VZ 1	239.11	234.77	228.50	225.65	212.08
VZ 2	259.55	253.67	244.48	228.87	179.16
V-THETA 1	163.05	170.08	171.38	168.31	158.77
V-THETA 2	382.17	385.15	383.26	379.62	386.07
V(PR) 1	332.9	337.4	345.9	360.1	374.4
V(PR) 2	259.8	295.1	248.7	239.4	195.3
VTHETA PR1	-231.7	-242.8	-259.6	-780. 8	-308.5
VTHETA PR2	-12.2	-26.6	-45.8	-66.8	-77.7
U 1	394.74	412.87	431.01	449.14	467.28
U 2	394.35	411.70	429.05	446.40	467.76
M 1	0.7610	0.2611	0.2576	0.2538	0.2387
M 2	0.4141	0.4136	0.4076	0.3964	0.3801
M(PR) 1	0.3003	0.3043	0.3119	0.3248	0.3371
MIPRI 2	0.2329	0.2288	0.2230	0.2132	0.1744
TURN(PR)	41.410	40.047	38.038	34.950	32.052
UURAR	0.1067	0.0877	0.0996	0.1570	0.3056
DFAC	0.4820	0.5113	0.5506	0.6090	0.7713
EFFP	0.7772	0.8484	0.8683	0.7778	0.7759
EFF	0.7743	0.8464	0.8665	0.7748	0.7728
INCIDM	12.66	10.38	9.42	8.80	10.13
OEVY	8.066	7.936	R.450	9.648	12.571

Table B-2. Blade Element Performance (Continued)

PERCENT OESIGN SPEEO = 69.81

CORRFCTEO WEIGHT FLOW = 52.00

CORRECTED ROTOR SPEEO = 2687.73

INLET GUIDE VANE 1

STATION 0 - STATION 1

PCT SPAN	90	70	50	30	10
DIA	33.622	35.167	36.711	38.256	39.801
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	34.338	36.112	36.762	36.314	36.532
V 0	214.90	214.90	214.90	214.90	214.90
V 1	306.21	306.27	302.40	297.90	282.29
VZ 0	214.90	214.90	214.90	214.90	214.90
VZ 1	252.85	247.42	242.26	240.04	226.83
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	172.73	180.50	180.99	176.42	168.04
M 0	0.1932	0.1932	0.1932	0.1932	0.1932
M 1	0.2764	0.2765	0.2729	0.2688	0.2545
TURN	-34.34	-36.11	-36.76	-36.31	-36.53
UUBAR	0.0238	-0.0609	-0.0477	-0.0238	0.1404
OFAC	-0.037	0.006	0.026	0.040	0.098
EFFP	1.0488	1.0879	1.0776	1.0546	0.8702
INCIDM	******	26.9001	27.3001	27.7001	28.1001
OEVM	7.762	6.788	6.938	8.586	8.768

SLOTTED STATOR 1

STATION 2 - STATION 2A

PCT SPAN	90	70	50	30	10
BETA 2	55.160	56.007	56.498	55.136	61.000
BETA 2A	41.063	33.475	32.126	32.166	35.351
V 2	462.05	465.28	457.70	449.89	443.10
V 2A	267.35	315.11	330.64	328.61	289.63
VZ 2	263.96	260.14	252.63	257.17	214.82
VZ 2A	201.58	262.84	280.01	278.18	236.23
V-THETA 2	379.23	385.77	381.66	369.14	387.54
V-THETA 2A	175.62	173.81	175.83	174.95	167.58
M 2	0.4142	0.4175	0.4102	0.4028	0.3959
M 2A	0.2375	0.2808	0.2948	0.2928	0.2574
TURN	14.097	22.532	24.372	22.970	25.649
UUBAR	0.1834	0.0955	0.0459	0.0533	0.1847
LOSS PARAMETER	.05805	.03487	.01768	.02129	.07345
OFAC	0.6053	0.5216	0.4825	0.4746	0.5915
EFFP	0.9336	1.1413	1.3700	1.3323	1.1666
INCIDM	3.01	3.86	4.35	2.99	8.85
OEVM	18.92	11.34	9.99	10.03	13.21
01A	33.564	34.992	36.420	37.848	39.276

FLOW GENERATION ROTOR

STATION 1 - STATION 2

PCT SPAN	90	70	50	30	10
DIA	33.589	35.067	36.545	38.023	39.501
BETA 1	34.338	36.112	36.762	36.314	36.537
BETA 2	55.160	56.007	56.498	55.136	61.000
BETAIPR) 1	41.229	43.147	45.844	48.596	57.790
BETAIPRI 2	3.185	5.593	10.521	16.627	19.412
V 1	306.21	306.77	302.40	797.90	282.29
V 2	462.05	465.28	457.70	449.89	443.10
VZ 1	252.85	247.42	242.26	240.04	776.83
VL 2	763.96	260.14	252.63	257.17	214.82
V-THETA 1	172.73	180.50	180.99	176.42	168.04
V-THETA 2	379.23	385.77	381.66	369.14	387.54
VIPRI 1	336.7	339.1	347.8	362.9	375.1
V(PR) 2	264.4	261.4	257.0	268.4	227.9
VTHETA PR1	-221.6	-231.9	-249.5	-772.2	-298.7
VTHETA PR2	-14.7	-25.5	-46.9	-76.8	-75.7
U 1	394.30	412.42	430.53	448.65	466.76
U 2	393.91	411.25	428.58	445.91	463.25
M I	0.2764	0.2765	0.2729	0.2688	0.7545
M 2	0.4142	0.4175	0.4102	0.4028	0.3959
MIPRI 1	0.3035	0.3061	0.3139	0.3275	0.3382
MIPRI 2	0.2370	0.2345	0.2303	0.2403	0.2035
TURN(PR)	38,044	37.553	35.327	31.973	33.377
UUBAR	0.0734	0.0350	0.0411	0.0163	0.1721
OFAC	0.4586	0.4831	0.5154	n 5061	0.6757
EFFP	0.7490	0.8356	0.8261	0.8177	0.7907
EFF	0.7459	0.8334	0.8238	0.8153	0.7877
INCIDH	9.79	7.51	6.62	6.18	7.43
OEVM	8.565	7.553	8.361	10.002	8.542

Table B-2. Blade Element Performance (Continued)

PERCENT OESIGN SPEED = 69.83

CORRECTFO WFIGHT FLOW = 56.00

CORRECTED ROTOR SPEED = 2688.56

INLET GUIDE VANE 1

STATION 0 - STATION 1

PCT SPAN	90	70	50	30	10
OIA	33.622	35.167	36.711	38.256	39.801
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	34.556	36.328	36.869	36.513	36.366
V 0	232.14	232.14	232.14	232.14	232.14
V 1	334.75	334.20	329.33	323.66	306.07
VZ 0	232.14	232.14	232.14	232.14	232.14
VZ 1	275.69	269.24	263.47	260.13	246.43
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	189.89	197.98	157.59	192.58	1R1.45
M 0	0.2088	0.2088	0.2088	0.2 088	0.2088
M 1	0.3026	0.3021	0.2976	0.2 924	0.2762
TURN	-34.56	-36.33	-36.87	-36.51	-36.37
UUBAR	0.0227	-0.0568	-0.0386	-0.0114	0.1591
OFAC	-0.047	-0.002	0.019	0.037	0.093
EFFP	1.0418	1.0761	1.0611	1.0355	0.8503
INCIOH	******	26.9001	27.3001	77.7001	28.1001
OEVM	7.544	6.572	6.831	8.387	8.934

SLOTTED STATOR 1

STATION 2 - STATION 2A

PCT SPAN	90	70	50	30	10
BETA 2	53.534	54.470	55.088	55.387	58.200
BETA 2A	39.883	32.664	31.887	32.208	35.710
V 2	474.47	478.60	470.60	465.70	429.93
V 2A	289.53	337.40	349.18	349.20	312.95
VZ 2	282.00	278.13	269.33	264.53	226.55
VZ 2A	222.17	284.04	296.49	295.53	254.1 I
V-THETA 2	381.57	389.49	385.91	383.27	365.39
V-THETA 2A	185.65	182.10	184.45	186.16	182.66
M 2	0.4265	0.4307	0.4230	0.41 82	0.3845
M 2A	0.2578	0.3013	0.3119	0.3117	0.2787
TURN	13.651	21.806	23.201	23.179	22.490
UUBAR	0.1750	0.0868	0.0473	0.0591	0.0577
LOSS PARAMETER	.05639	.03199	.01827	.02262	.02283
DFAC	0.5621	0.4842	0.4531	0.4511	0.4823
FFFP	0.8687	0.9834	1.1397	1.0345	1.4007
INCIOM	1.38	2.32	2.94	3.24	6.05
DEVM	17.74	10.52	9.75	10.07	13.57
DIA	33.564	34.992	36.420	37.848	39.276

FLOW GENERATION ROTOR

STATION 1 - STATION 2

PCT SPAN	90	70	50	30	10
DIA	33.589	35.067	36.545	38.023	39.501
BETA 1	34,556	36.328	36.869	Ih. 513	36.366
BETA 2	53.534	54.470	55.088	55.387	58.200
BETA(PR) 1	36.574	38.552	41.497	44.564	49.195
BETA(PR) 2	2.530	4.499	9.030	13.351	23.391
V 1	334.75	334.20	329.33	323.66	306.07
V 2	474.47	418.60	470.60	465.70	429.93
VZ 1	275.69	269.24	763.47	260.13	246.43
VZ 2	282.00	279.13	269.33	264.53	276.55
V-THETA 1	189.88	197.98	197.59	192.59	181.45
V-THETA 2	381.57	389.49	385.91	383.27	365.39
V(PR) 1	343.3	344.3	351.8	365.1	377.1
V(PR) 2	282.3	279.0	777.7	271.9	246.8
VTHETA PR1	-204.5	-214.6	-233.1	-756.2	-285.4
VTHETA PR2	-17.5	-21.9	-42.8	-67. A	-98.0
U 1	394.43	412.54	430.66	448.78	466.90
U 2	394.03	411.37	428.71	446.05	463.39
M 1	0.3026	0.3021	0.2976	0.2924	0.2762
M 2	0.4265	0.4307	0.4230	0.4282	0.3845
M(PR) 1	0.3103	0.3112	0.3179	0.3299	0.3404
MIPRI 2	0.2538	0.2511	0.2451	0.2442	0.2208
TURN(PR)	34.043	34.053	37.467	31.713	25. 805
UUBAR	0.0469	0.0019	0.0135	0.0338	0.1387
OFAC	0.4004	0.4211	0.4607	0.4968	0.5819
EFFP	0.8018	0.9155	0.8965	0. 8972	0.7441
EFF	0.7995	0.9144	0.8951	0.8959	0.7410
INCIOM	5.13	2.91	2.27	7.14	3.84
OEVM	7.910	6.459	6.870	6.731	17.571

Table B-2. Blade Element Performance (Continued)

PFRCENT DESIGN SPEEO = 69.71

CORRECTED WEIGHT FLOW = 62.06

CORRECTED ROTOR SPEED = 2683.72

INLET GUIDE VANE 1

STATION 0 - STATION 1

PCT SPAN	90	70	50	30.	10
DIA	33.622	35.167	36.711	38.256	39.801
BETA 0	0.000	0.000	0.000	0.000	0.000
BETA 1	34.704	36.366	37.178	36.503	36.442
V 0	258.51	258.51	258.51	258.51	258.51
V 1	370.79	370.54	365.63	359.83	340.55
VZ 0	258.51	258.51	258.51	258.51	251.51
VZ I	304.83	298.37	291.32	289.24	273.96
V-THETA 0	0.00	0.00	0.00	0.00	0.00
V-THETA 1	211.10	219.71	220.95	214.05	202.29
M 0	0.2328	0.2328	0.2328	0.2328	0.2328
M 1	0.3359	0.3357	0.3311	0.3257	0.3080
TURN	-34.70	-36.37	-37.18	-36.50	-36.44
UUBAR	0.0257	-0.0625	-0.0441	-0.0184	0.1525
DFAC	-0.040	0.003	0.025	0.038	0.094
EFFP	1.0413	1.0787	1.0632	1.0387	0.8518
INCIDM	******	26.9001	27.3001	27.7001	28.1001
DEVM	7.396	6.534	6.522	8.397	8.858

SLOTTED STATOR 1

STATION 2 - STATION 2A

PCT SPAN	90	70	50	30	10
BFTA 2	51.339	51.014	52.416	52.202	52.864
BETA 2A	36.064	31.520	31.427	31.485	34.939
V 2	502.90	502.63	492. 08	483.65	465.87
V 2A	338.93	372.23	378.03	377.08	342.40
VZ 2	314.17	316.22	300.13	296.42	281.25
VZ 2A	273.98	317.31	322.57	321.56	290.69
V-THETA 2	392.69	390.70	389.95	382.17	371.39
V-THETA 2A	199.52	194.60	197.11	196.94	196.10
M 2	0.4533	0.4532	0.4431	0.4352	0.4186
M 2A	0.3033	0.3338	0.3389	0.3377	0.3060
TURN	15.275	19.494	20.989	20.717	17.925
UUBAR	0.1475	0.0798	0.0508	0.0535	0.1331
LOSS PARAMETER	.05005	.02976	.01972	.02066	.05320
DFAC	0.4864	0.4298	0.4105	0.4024	0.4512
EFFP	1.1467	1.4032	1.6032	1.3539	1.0592
INCIDM	-0.81	-1.14	0.27	0.05	0.71
DEVM	13.92	9.38	9.29	9.35	12.90
DIA	33.564	34.992	36.420	37.848	39.276

FLOW GENERATION ROTOR

STATION 1 - STATION 2

PCT SPAN	90	70	50	30	10
DIA	33.589	35.067	36.545	38.023	39.501
BETA 1	34.704	36.366	37.178	36.503	36.442
BETA 2	51.339	51.014	52.416	52.202	52.864
BETA(PR) 1	30.924	32.774	35.649	38.965	43.915
BETA(PR) 2	0.115	3.607	7.214	12.013	17.959
V 1	370.79	370.54	365.63	359. 83	340.55
V 2	507.90	502.63	492.08	483.65	465.87
VZ 1	304.83	298.37	291.32	289.24	773.96
VZ 2	314.17	316.22	300.13	296.42	281.25
V-THETA I	211.10	719.71	220.95	214.05	202.29
V-THETA 2	397.69	390.70	389.95	382.17	371.39
V(PR) 1	355.3	354.9	358.5	372.0	380.3
V(PR) 2	314.2	316.9	302.5	303.1	295.7
VTHETA PR1	-182.6	-192.1	-208.9	-233.9	-263.8
VTHETA PR2	-0.6	-19.9	-38.0	-63.1	-91.2
U 1	393.71	411.80	429.89	447.98	466.06
U 2	393.32	410. 63	427.94	445.25	462.45
M 1	n.3359	0.3357	0.331 1	0.3257	0.3080
M 2	0.4533	0.4532	0.4431	0.4352	0.41 85
M(PR) 1	0.3219	0.3215	0.3247	0.3368	0.3439
M(PR) 2	0.2832	0.2857	0.2124	0.2727	0.2656
TURN(PR)	30.809	29.166	28.435	76.952	25.956
UUBAR	0.0720	-0.0073	0.0233	0.0372	0.0565
DFAC	0.3197	0.3095	0.3642	0.3947	n 4385
EFFP	0.7531	0.8150	0.7955	0.8163	0.8317
EFF	0.7505	0.8130	0.7932	0.8142	0.8297
INCIDM	-0.52	-2.87	-3.58	-3.45	-1.45
OEVM	5.495	5.567	5.054	5.393	7.089

Table B–2. Blade Element Performance (Continued)

PERCENT DESIGN SPEED = 70.00

CORRECTED HEIGHT FLOW = 67.38

CORRECTED ROTOR SPEED = 2694.99

INLET GUIDE VANE 1

STATION 0 – STATION 1

PCT SPAN	90	70	50	30	10
OIA	33.622	35.167	36.711	38.256	39.801
BETA 0	0.000	0.000	0.000	0.000	0.000
SETA 1	34.731	36.472	37.104	36.460	36.288
V 0	282.07	282.07	282.07	7R2.07	282.07
V 1	400.26	399.30	397.89	356.87	365.66
VZ 0	282.07	282.07	282.07	282.07	2f12.07
VZ 1	328.95	321.10	314.15	311.15	294.74
V–THETA 0	0.00	0.00	0.00	0.00	0.00
V–THETA 1	228.04	237.36	237.62	229.90	216.41
M 0	0.2543	0.2543	02 543	0.2543	0.2543
M 1	0.3633	0.3624	0.3573	0.3508	0.3311
TURN	-34.73	-36.47	-37.10	-36.46	-36.29
UUBAR	0.0263	-0.0077	0.0062	0.0340	0.1981
DFAC	-0.029	0.016	0.037	0.052	0.107
EFFP	0.9898	1.0223	1.0093	0.9802	0.7967
INCIOM	******	26.9001	27.3001	27.7001	28.1001
OEVH	7.369	6.428	6.596	8.440	9.012

SLOTTED STATOR 1

STATION 2 – STATION 2A

PCT SPAN	90	70	50	30	10
BETA 2	49.160	49.265	49.485	49.043	49.529
BETA 2A	35.980	33.507	33.208	33.193	33.572
V 2	521.90	526.95	514.71	502.78	484.68
V 2A	379.86	414.73	415.34	410.21	377.76
VZ 2	341.29	343.87	334.38	729.57	314.59
VZ 2A	307.39	345.81	347.51	343.28	314.75
V–THETA 2	394.84	399.29	391.30	379.70	368.71
V–THETA 2A	223. 17	228.95	227.47	224.57	208.90
M 2	0.4713	0.4765	0.4649	0.4536	0.4369
M 2A	0.3415	0.3739	0.3742	0.3689	0.3380
TURN	13.180	15.759	16.277	15.850	15.957
UUBAR	0.1414	0.0808	0.0596	0.0600	0.1333
LOSS PARAMETER	.04893	.02947	.02268	.02370	.05417
DFAC	0.4095	0.3542	0.3384	0.3310	0.3839
FFFP	1.5655	2.3051	2.4813	1.7871	0.9737
INCIDH	-2.99	-2.88	-2.67	-3.11	-2.62
OEVH	13.84	11.37	11.07	11.05	11.43
DIA	33.564	34.992	36.420	37.848	39.276

FLOW GENERATION ROTOR

STATION 1 – STATION 2

PCT SPAN	90	70	50	30	10
DIA	33.589	35.067	36.545	78.023	39.501
BFTA 1	34.731	36.472	37.104	36.460	36.288
BETA 2	49.160	49.265	49.485	49. n43	49.529
BETA(PR) 1	26.961	28.752	11.707	35.257	40.486
BETA(PR) 2	0.024	2.176	6.558	11.560	16.935
V 1	400.26	399.30	393.89	386.87	365.66
V 2	521.90	526.95	514.71	502.78	484.69
VZ 1	328.95	321.10	314.15	311.15	794.74
VZ 7	341.29	343.07	334.78	779.57	314.59
V–THFTA 1	228.04	237.36	237.62	779.90	716.42
V–THETA 2	394.84	199.29	391.30	379.70	368.71
V(PR) 1	369.1	360.3	369.3	381.0	3R7.5
V(PR) 2	341.3	344.1	336.6	336.4	328.8
VTHFTA PR1	-167.3	-176.2	-194.1	-220.n	-251.6
VTHFTA PR2	-0.1	-13.1	-38.4	-67.4	-95.9
U 1	395.37	413.53	431.69	449.86	468.02
U 2	394.98	412.36	429.74	447.17	464.50
M 1	0.3633	0.3624	0.3573	0.3508	0.331 1
M 2	0.4713	0.4765	0.4649	0.4536	n. 4369
MIPR) 1	0.3350	0.3724	0.3350	0.3455	0.3509
M(PR) 2	0.3082	0.7112	0.3040	0.3035	0.2964
TURN(PR)	26.938	26.576	25.149	27.697	73.557
UUBAR	0.1677	0.0824	0.0833	Π 0931	01 0R5
DFAC	0.2555	0.2462	0.2724	0.2998	0.3428
EFFP	0.6298	0.7576	0.7439	0.7353	a 8076
EFF	0.6266	0.7557	0.7415	0.7328	0.8057
INCIDM	-4.40	-6.89	-7.52	-7.16	-4.87
OEVM	5.404	4.136	4.398	4.940	6.065

APPENDIX C
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