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STUDY OF CONTROLLED DIFFUSION STATOR BLADING
II. FINAL REPORT

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R.F. Behlke, J.D. Brooky and E. Canal

March 1983

United Technologies Corporation
Pratt & Whitney Aircraft Group
Commercial Engineering

Prepared for

National Aeronautics and Space Administration
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16. ABSTRACT

Tests were conducted on a high tip speed, highly loaded front compressor stage having low aspect ratio rotor and stator airfoils. The stator airfoils were designed by the controlled diffusion procedure recently developed by P&WA for designing transonic cascade airfoils. The rotor blades consisted of multiple-circular-arc airfoil sections. The stage had a tip speed of 442 m/sec (1450 ft/sec), a hub/tip ratio of 0.597, a rotor aspect ratio of 1.3, and a stator aspect ratio of 1.45. At design speed the rotor-stator stage achieved an adiabatic efficiency of 89.1% at design flow and pressure ratio. Surge margin was 14%. The stage efficiency exceeded the design goal by 0.6 percentage points. The rotor efficiency was 92.4%, exceeding design by 0.3 percentage points. The controlled diffusion stator demonstrated a lower minimum loss over the multiple-circular-arc stator from the root to 70 percent span. A surge diffusion factor of 0.72 was reached at both the rotor tip and the stator root. The NAS3-22008 program demonstrated its intent: high efficiency and loading levels with low aspect ratio blades and the controlled diffusion stator in the unfavorable front stage environment.

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FOREWORD

The work described herein was performed under the National Aeronautics and Space Administration Contract NAS3-22008 by the United Technologies Corporation, Pratt & Whitney Aircraft Group, Commercial Engineering, East Hartford, Connecticut 06180 under the direction of Mr. N.T. Monsarrat, Program Manager. The NASA Project Manager was Mr. T.F. Gelder, Fluid Mechanics and Acoustic Division - Fan and Compressor Branch, NASA-Lewis Research Center, Cleveland, Ohio 44135. The work was performed during the period June 1979 and June 1982.

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STUDY OF CONTROLLED DIFFUSION STATOR BLADING
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1.0 SUMMARY

Tests were conducted on a low aspect ratio, high tip speed front compressor stage using a redesigned rotor and controlled diffusion stator to demonstrate that high efficiency can be achieved at high levels of blade loading. The low aspect ratio compressor stage had a tip speed of 442 m/sec (1450 ft/sec), a hub/tip ratio of 0.597, a rotor aspect ratio of 1.3, and a stator aspect ratio of 1.45. The test stage inlet included an engine-type intermediate case and a variable inlet guide vane. The stage was similar to that tested in Contract NAS3-20809 with the only significant differences being: 1) the rotor blades were modified to increase camber, 2) the rotor-stator axial gapping was decreased to that typical of engines, and 3) the multiple-circular-arc stator was replaced by a controlled diffusion stator.

At design speed the rotor-stator stage achieved an adiabatic efficiency of 89.1 percent at design flow and pressure ratio with a surge margin of 14 percent (see table). The test stage efficiency exceeded the design goal by 0.6 percentage points. Rotor test efficiency for this point was 92.4%, exceeding design goal by 0.3 percentage points. Flow capacity and efficiency were significantly improved over the previous tests with stage efficiency showing a 2.5 percentage point increase. The recambering of the NAS3-20809 rotor resulted in 2.6 percentage point improvement in its efficiency and a 6% increase in flow. The controlled diffusion stator demonstrated a lower minimum loss than the multiple-circular-arc design from the root to 70 percent span. Surge diffusion factors of 0.72 were reached at both the rotor tip and stator root. The intent of demonstrating high efficiency and high loading levels with low aspect ratio blading and a controlled diffusion stator in the adverse front stage environment was successfully accomplished in this test.

	Design Goal	NAS3-22008 Test	NAS3-20809 Test
Corrected Inlet Flow Rotor Leading Edge, kg/sec (lbm/sec)	47.28 (104.2)	47.20 (104.0)	44.35 (97.8)
Rotor Pressure Ratio	1.845	1.842	1.835
Rotor Adiabatic Efficiency, %	92.1	92.4	89.8
Stage Pressure Ratio	1.81	1.805	1.800
Stage Adiabatic Efficiency, %	88.5	89.1	86.6
Surge Margin, %	10	14	12.5

2.0 INTRODUCTION

Future commercial aircraft powerplants, in order to reduce fuel consumption, will require compressors with higher pressure ratios and efficiencies than those currently in use. This implies the use of higher tip speeds and higher stage loadings to achieve the larger stage pressure ratio. Research on advanced compressor stages has shown that relatively low aspect ratio blading can provide high levels of loading while maintaining high efficiency and adequate stability margin. The high loading capability of low aspect ratio blading was demonstrated in Contract NAS3-20809 (ref. 1). It is the intent of this contract to correct the rotor deficiencies that had been identified in that test and to evaluate the controlled diffusion stator design technique in the three-dimensional high Mach number environment of the front stage.

The tip speeds required for a highly loaded front stage result in transonic and supersonic relative Mach numbers into the rotor, a condition similar to that encountered in fans. The design of highly loaded, high aspect ratio blading for the transonic/supersonic regime has been explored extensively and successfully under various NASA fan contracts (ref. 2, 3, 4). This fan experience in combination with an intrablade time-marching finite area procedure (ref. 5) was used to redesign the low aspect ratio blade.

High speed fan and compressor stages designed for high flow capacity and high loading tend to have very high flow Mach numbers entering the stator, especially in the hub region. This results in a tendency for strong shocks in the stator channels and excessive stator loss. An emerging theoretical design method has the potential to design stator channels that control diffusion to eliminate shocks or radically reduce shock strength, thus significantly reducing stator pressure loss. Stator airfoils designed by these methods have been tested in a two-dimensional cascade tunnel with encouraging results (ref. 6). This program evaluated the controlled diffusion stator design technique in the high Mach number environment of a front stage.

The total NAS3-22008 effort covered the design and fabrication of a controlled diffusion stator, the redesign and recambering of the rotor blades, and the simultaneous testing of rotor and stator. The test rig was essentially the same as used during the NAS3-20809 program, the only significant difference other than the recambered rotor blades and the controlled diffusion stator vanes was a smaller rotor-stator axial spacing.

3.0 APPARATUS

3.1 TEST COMPRESSOR STAGE

The tests were conducted on a low aspect ratio, single-stage research compressor designed to be representative of the first stage of an advanced multistage, high-pressure compressor. A detailed description of the aerodynamic and mechanical design of the low aspect ratio rotor and controlled diffusion stator was provided in the design report (ref. 7).

Design parameters (see Table I) were chosen to be compatible with existing rig hardware that accurately simulates engine conditions. This hardware, shown in Figure 1, includes an offset inlet transition duct that incorporates a preswirl vane to simulate fan stator root or low-pressure compressor exit flow, engine type intermediate case struts, and a variable inlet guide vane.

TABLE I

COMPARISON OF NAS3-22008 AND NAS3-20809 DESIGN PARAMETERS

	NAS3-22008	NAS3-20809
Corrected Speed, rpm	12210	12210
Rotor Tip Speed, m/sec (ft/sec)	442.0 (1450)	442.0 (1450)
Inlet Corrected Flow, kg/sec (lbm/sec)	47.28 (104.24)	47.28 (104.24)
Rotor Inlet Corrected Weight Flow Per Unit Annulus Area, kg/m^2-sec (lbm/ft^2-sec)	195.3 (40.0)	195.3 (40.0)
Rotor Pressure Ratio	1.845	1.845
Stage Pressure Ratio	1.81	1.81
Rotor Adiabatic Efficiency, %	92.1	92.1
Stage Adiabatic Efficiency, %	88.5	88.5
Tip Diameter, meters (inches)	0.6901 (27.2)	0.6901 (27.2)
Hub/Tip Ratio at Rotor Inlet	0.597	0.597
Rotor Tip Solidity	1.26	1.26
Rotor Aspect Ratio*	1.30	1.30
Stator Hub Solidity	1.429	1.426
Stator Aspect Ratio*	1.446	1.42
Stator Average Exit Flow Angle, degrees	22.0	16.0
Number of Rotor Blades	24	24
Number of Stator Vanes	27	30

* Aspect Ratio = average airfoil length/midspan chord.

The high tip speed and inlet specific flow of the rotor were chosen to provide the desired stage pressure ratio of 1.81, which is representative of front stages of advanced core compressors. Stator exit Mach number and flow angle were chosen to be realistic values to match the assumed downstream high-pressure compressor stages. The stage reaction level was set at 0.71 in order to keep stator inlet Mach number levels below 0.9 across the span. The original flowpath (Contract NAS3-20809) was retained except for rotor-to-stator spacing and the annulus area downstream of the stator. The rotor-to-stator spacing was significantly reduced to make it representative of normal first-stages. The stator-exit duct was opened up because the original duct had been choked.

The NAS3-20809 rotor was redesigned and recambered to improve flow and efficiency. Rotor losses for the redesign were estimated by extrapolating the

blade element data from the NAS3-20809 tests to minimum loss incidence. Rotor incidence, deviation, and other design parameters were set using a combination of test data from the original contract, fan experience, and a time-marching finite-area procedure (ref. 5). Approximately three degrees of camber were added to the blade trailing edge above 15 percent span. No changes could be made in the inner ten percent span of the rotor because of the reforming process used for recambering.

In the controlled diffusion design procedure (ref. 7), which was used to design the test stator vanes, the airfoil is contoured to control peak Mach numbers to low supersonic levels in order to preclude formation of strong shock waves and to yield an unseparated boundary layer at the airfoil trailing edge throughout the incidence and Mach number range of interest. For this design, the same diffusion factor (spanwise average) was used as for the NAS3-20809 stator. This resulted in six degrees more swirl at the stator exit, as seen in Table I. Two degrees of this swirl was a result of two degrees greater swirl at the stator inlet for this design. The remaining four degrees of swirl was necessary since the flowpath convergence for the NAS3-20809 stator was greater. Controlled diffusion stator losses were estimated from the previous multiple circular arc stator loss modified by Pratt & Whitney Aircraft controlled diffusion experience, which indicated that the design stage efficiency goal, see Table I, could be exceeded by 0.7 percentage points. The stator blade element data is compared in Section 5 with this lower loss level used during the stator aerodynamic design.

3.2 TEST FACILITY

The test program was conducted in the facility shown in Figure 2. The facility is equipped with a synchronous motor with a multi-ratio gearbox to provide speed range capability. The inlet air flows first through a filter and then through a flatplate orifice and into an inlet plenum, which provides a uniform total pressure and temperature profile to the test rig. The airflow is exhausted from the rig into a toroidal collector through a set of various size valves, providing coarse and fine adjustment of backpressure, or throttling, for the test compressor and then through exhausters. The low pressure provided by the exhausters is also used to vent the rotor front cavity. Strain-gage signals from the rotor are transmitted to recording equipment by means of telemetry.

3.3 INSTRUMENTATION AND CALIBRATION

3.3.1 Overall and Blade Element Instrumentation

The airflow to the test compressor stage was measured by means of a flatplate orifice, which was designed to the specifications defined by the International Organization for Standards. All orifice related instrumentation was installed per Power Test Code 19.5, 4-1959. The flow rate measurements were accurate to within $\pm$1.0 percent.

Rotor speed was measured by means of an impulse type pickup through a

frequency-to-DC converter. The accuracy was within ±0.1 percent of the indicated speed.

All temperatures were measured by means of Chromel-Alumel Type K thermocouples with an individual wire calibration applied to each sensor. Sample elements from the temperature pole rakes were calibrated over the expected Mach number range to determine recovery factor variations with yaw and pitch angle. Variations of the recovery correction with pressure were applied per NASA Technical Note 3766 and complemented by results of Pratt & Whitney Aircraft testing. Overall root mean square temperature accuracy is estimated to be ±0.28K (±0.5°F).

Airflow angle was measured by radially traversing 15-degree included angle wedge probes. Total pressure recovery and yaw angle deviations were calibrated as functions of Mach number and pitch angle. Accuracy was ±0.5°.

Pressure measurements obtained from pole rakes and static taps were determined by means of transducers on scanivalves and were recorded by an automatic data acquisition system. The accuracy was ±0.1 percent of the full scale value for that transducer.

Typical instrumentation is shown in Figure 3, and the axial and circumferential positions of the instrumentation are shown in Figure 4. (Note that the pressure and temperature pole rakes at the stator exit (station 5) did not share the same circumferential position.)

The overall and blade element performance instrumentation is listed in Table II.

TABLE II

OVERALL PERFORMANCE AND BLADE ELEMENT INSTRUMENTATION

Instrument Plane Location	Parameter Measured	Type and Quantity
Station 0 (Inlet Flow Measuring Orifice)	P_S	4 static taps downstream and 4 static taps upstream of the inlet orifice
	P	2 ΔP transducers sensing the differential pressure between the upstream and downstream orifice pressures
	T_T	6 total temperature thermocouples located upstream of the orifice

TABLE II (Cont'd)

OVERALL PERFORMANCE AND BLADE ELEMENT INSTRUMENTATION

Instrument Plane Location	Parameter Measured	Type and Quantity
Station 1 (Plenum Chamber)	T_T	10 bare wire thermocouples located in a plane in the plenum chamber and distributed equally in the radial and circumferential direction
	P_S	6 static pressure taps circumferentially equally spaced on the plenum wall
Station 2 (Rig Inlet Duct)	P_S	3 outer and 3 inner wall static pressure taps 4 outer and 4 inner wall static pressure taps at leading edge of inlet guide vane
Station 3 (Rotor Inlet)	P_T	3 nine-element sensor rakes* to provide readings at nine radial positions (5, 10, 15, 30, 50, 70, 85, 90, and 95 percent span)
	P_S	4 outer* and 4 inner wall static pressure taps located in the same plane as the P_T rakes
	P_S	8 outer and 4 inner wall static pressure taps at the trailing edge of the inlet guide vane
	P_S	4 outer wall static pressure taps at the leading edge of the rotor
	P_T, Air Angle, Radius	2 wedge-type traverse probes* positioned to measure at 9 radial locations (5, 10, 15, 30, 50, 70, 80, 90, and 95 percent span)
	P_S	10 outer wall static pressure taps at the trailing edge of the rotor
Station 4 (Stator Inlet)	P_S	8 interstage outer wall static pressure taps between the rotor and stator rows

TABLE II (Cont'd)

OVERALL PERFORMANCE AND BLADE ELEMENT INSTRUMENTATION

Instrument Plane Location	Parameter Measured	Type and Quantity
	P_S	5 outer and 5 inner wall static pressure taps at the leading edge of the stator
Station 5 (Stator Exit)	P_T	3 nine-element sensor rakes* to provide readings at nine radial positions (5, 10, 15, 30, 50, 70, 85, 90, and 95 percent span)
	T_T	3 nine-element sensor rakes* to provide readings at nine radial positions (5, 10, 15, 30, 50, 70, 85, 90, and 95 percent span)
	P_S	4 outer* and 4 inner wall static pressure taps located in the same plane as the P_T and T_T rakes
	P_S	9 outer and 4 inner wall static pressure taps at the trailing edge of the stator
	P_T, Air Angle, Radius	2 wedge-type traverse probes* positioned to measure at 9 radial locations (5, 10, 15, 30, 50, 70, 85, 90, and 95 percent span)

* Located in a circumferential traverse ring.

3.3.2 Special Instrumentation

Special instrumentation for indicating stall was provided at the leading and trailing edge of the rotor blade row. This instrumentation consisted of a high response thermocouple at the outer wall of the flowpath at the leading edge and static pressure taps with close mounted pressure transducers at the trailing edge. Both sensors were connected to the stand safety monitoring system, which automatically sequenced the compressor to stall recovery. This system along with the automatic data recording system was used to identify the point of instability.

Strain gages were installed on selected blades and vanes to detect excessive vibratory or flutter stresses.

Special instrumentation for measuring both aerodynamic and mechanical characteristics is listed in Table III.

TABLE III

SPECIAL INSTRUMENTATION

Instrument Plane Location	Parameter Measured	Type and Quantity
Rotor Leading Edge	T_T	2 high response bare wire thermocouples near the outer wall
Rotor Trailing Edge	P_S	2 static pressure taps on the outer wall and connected to high frequency response transducers
Inlet Guide Vane	Stress	2 strain gages on each of 3 vanes
Rotor	Stress	16 strain gages distributed on each of 8 blades and 2 strain gages on the disk
Stator	Stress	14 strain gages distributed on each of 4 vanes

4.0 PROCEDURES

4.1 TEST PROCEDURES

4.1.1 Shakedown Tests

Shakedown tests were conducted to establish the mechanical integrity of the test rig, to locate stress boundaries that might limit the test operating range, and to verify the performance of the instrumentation and data reduction system. The shakedown tests were performed with the inlet guide vane and stator at the design stagger positions.

A stress survey from 50 to 105 percent of design speed did not indicate any significant integral order blade stresses in any mode. Other tests indicated that stresses were essentially unaffected by inlet guide vane or stator angle position, probe configuration (fixed or traversing), stage pressure ratio, or airflow rate. Flutter (nonintegral vibration) did not occur at any condition, and all other mechanical monitoring instrumentation indicated that the rig was

operating within established limits.

4.1.2 Pole Rake Blockage Test

All pole rake instrumentation was removed from station 3 (rotor inlet) after the pole rake blockage test. Steady state and circumferential traverse data were acquired with a wide open throttle at 100 and 105 percent speed. In addition, steady state data, circumferential traverse data and radial traverse data were obtained at the design operating point and at an above-design operating point for 100 percent speed.

The data showed that the station 3 pole rakes caused an unacceptable blockage and interfered with downstream instrumentation. The pole rakes were therefore removed from station 3 for the remainder of the test. The rotor inlet pressure for post test data reduction was calculated using a loss curve generated from data obtained during the shakedown test.

4.1.3 Inlet Guide Vane and Stator Exit Vane Optimization Test

Both the inlet guide vane and the stator were tested over a range of stagger angle settings, as shown in Table IV. All data were acquired at 100 percent of design speed on or above the operating line. The design stagger was chosen for the inlet guide vane since that angle resulted in the stage meeting its design flow and pressure ratio. The design stagger was also selected for the stator vane for all performance documentation testing, no overall stage performance difference being discerned at either the open or closed settings.

TABLE IV

SETTINGS FOR STAGGER ANGLE OPTIMIZATION TEST

Stagger Angle			
IGV	Stator	Purpose	Type of Data Taken
0°	0°	Calibration of Vane Position	Circumferential and Radial Traverse Data
0°	0°	Baseline for IGV Optimization	Steady State Data
-4°	0°	IGV Optimization	Steady State Data
+4°	0°	IGV Optimization	Steady State Data
0°	-2°	Stator Stagger Optimization	Circumferential Traverse Data
0°	+2°	Stator Stagger Optimization	Circumferential Traverse Data
0°	0°	Assess Interaction, Confirm Combined Performance of Best Stagger Settings	Circumferential and Radial Traverse Data

4.1.4 Overall and Blade Element Performance Tests

Overall and blade element performance data points were recorded for documentation on speedlines of 70, 95, 100, and 105 percent of design speed. Each data point consisted of fixed steady state, circumferential, and radial traverse data. Surge points were acquired at each speed to document surge margin.

After each surge point, a design operating line point was acquired at 100 percent of design speed. These "health points" showed that surge did not deteriorate performance.

4.2 DATA REDUCTION

4.2.1 Data Reduction Procedure

An automated data reduction and analysis program conditioned, organized, and processed the raw data into engineering units and performed circumferential mass averaging for subsequent use in flowfield synthesis computer programs.

All steady state performance data were automatically recorded in millivolts and converted to engineering units. Thermocouple signals were converted to temperature measurements, wire calibrations being used for individual sensors. These temperature measurements were converted into total temperature using calibrations of total temperature recovery versus Mach number for individual sensors and a pressure level correction. Total and static pressure signals were converted to pressure measurements by means of scanivalve transducer calibrations. Wedge probes were used to measure airflow angle, which was corrected for yaw deviation by means of a Mach number calibration for individual probes.

Circumferentially mass-flow averaged total temperatures and total pressures for each selected radial position were calculated by means of measured circumferential distributions of total pressure and temperature. A constant circumferential static pressure was utilized in determining the dynamic head at each radial position. This constant circumferential static pressure was obtained by linearly interpolating between static pressure measurements from inner and outer wall static pressure taps.

4.2.2 Traverse Data Considerations

The test compressor rig was fitted with an engine type inlet duct which had large struts and inlet guide vanes that distorted the rotor inlet pressure field and with stator vanes and stator exit probes that backpressured the rotor. As a consequence the instrumentation for the traverse stage and rotor data reduction procedures had to be chosen with special care to ensure adequate isolation of stage and rotor performance. A discussion follows.

Rotor Inlet Traverse

Rotor inlet conditions were defined by circumferentially traversed total pressure pole rakes and radially traversed air angle probes at station 3 (rotor inlet) and by the plenum chamber total temperature probes.

A total pressure traverse of the rotor inlet plane (station 3) was used to isolate rotor and stage pressures from the losses generated by the representative engine transition duct. Traverse probes were positioned to assess the wakes of the inlet guide vanes and struts at nine radial positions that ranged from 5 to 95 percent span. Figure 5 shows a typical sample of wake measurements for each of the three pole rakes at midspan as a function of inlet guide vane gap and intermediate case strut gap. These three pole rakes in combination measured three inlet guide vane gaps and one strut gap, or one-ninth of the entire circumference, providing a mass-flow average inlet loss. Loss was defined at each of the nine spans from data obtained during the shakedown test covering the range of test flows, and these losses were used to isolate rotor and stage pressure ratio for all points presented. The measured loss of the inlet guide vane, intermediate case, and struts from the previous test (ref. 1) duplicated the losses measured during this test (ref. 7, Fig. 7).

The airflow angle at the rotor leading edge was measured by two radially traversed wedge probes positioned circumferentially midway between inlet guide vane wakes. The flow angle input into the stream line analysis program was the arithmetical average of the two probes at each of the nine radial positions.

Stator Exit Traverse

To measure rotor and stator exit temperature and pressure, three temperature and three pressure pole rakes, each with nine radial elements, were traversed across two stator vane gaps at the stator exit. These three probes were positioned so their total circumferential traverse would measure six stator vane gaps, two full strut gaps, and six inlet guide vane gaps. Figures 6 and 7 show typical circumferential profiles of the pressure and temperature distributions at the stator trailing edge station. At this station the wakes from the inlet case struts and from the inlet guide vanes have undergone considerable mixing and are no longer visible. The pressure traverse profiles are dominated by vane wakes and pressure fluctuations caused by the rotor being backpressured by the stator leading edge flowfield. The temperature profiles are typical of rotor temperature wakes measured at the stator trailing edge.

From this and a subsequent Pratt & Whitney Aircraft funded test where extensive probe interchanging had been performed, it was concluded that an exit flow distortion problem was present. The distortion was traced to the backpressure effect of the stator exit probes.

The data from the Pratt & Whitney Aircraft funded test showed that only a relatively small circumferential efficiency variation resulted when the pressure and temperature probes sampled the same segment of the backpressure

distortion (either high or low). Based on this, two matched pairs of pressure and temperature probes were used to obtain the data presented in this report. The probes included the 46-degree pressure probe and the 193-degree temperature probe, which were in high backpressure areas, and the 20-degree temperature probe and 140-degree pressure probe, which were in low backpressure areas. The total pressures and total temperatures were circumferentially mass-flow averaged for each of the four probes. These pressure and temperature mass-flow averaged values were then, respectively, arithmetically averaged to obtain a single radial distribution of pressure and temperature to represent stator exit conditions for use in the streamline analysis program. These probes provided a balanced, accurate measurement of rotor and stage performance, with rotor efficiency agreeing closely with the results of the Pratt & Whitney Aircraft test of the same rotor measured by four sets of coincident pressure and temperature probes.

The probe measurements eliminated from this report were the 287-degree temperature probe, which sampled a low backpressure region, and the 313-degree pressure probe, which sampled a high backpressure region. Inclusion of these two measurements would have biased the results in the direction of an unrealistically higher efficiency by approximately 0.8 percentage points.

A second flowfield distortion present in this test rig produced a requirement to modify the method of extracting rotor pressure from the stator exit traverse results relative to that used in the initial NAS3-20809 program. Because of the close spacing between rotor and stator--typical of engine designs--the stator leading edge flowfield locally backpressured the rotor. Evidence of this stator-induced distortion field is indicated in Figure 8a by the static pressure measurements obtained at the stator leading edge outer wall 2.3 cm from the rotor exit (1.7 cm from the stator inlet). Because of this stator induced rotor backpressuring, the peak midgap value method of determining rotor pressure employed during the NAS3-20809 tests (Figure 8b) could not be used.* Rotor exit pressure for the present test was determined by analyzing each wake traverse to isolate stator core from stator wake pressures for the nine measured spans for each data point, as seen in Figure 8c.

Stator exit airflow angles were measured by two radially traversed wedge probes positioned circumferentally between stator wakes. The flow angle input to the streamline analysis program was the arithmetic average of the probes at each of the nine radial positons.

4.2.3 Flowfield Analysis

Overall and blade element performance parameters were determined by an analysis of the stage flowfield. An axisymmetrically averaged model of the flowfield was produced from measured traverse results as input to a streamline computer program, with boundary conditions based on test data. The computer program solved the equations of continuity, energy, and radial equilibrium using the streamline curvature technique, including enthalpy and entropy gradient terms and assuming axisymmetric flow. The input to the computer program, as listed in Table V, included measured temperatures, pressures, and

* Because of the large spacing employed during the NAS3-20809 program, rotor back pressuring was insignificant.

airflow angles and a flow blockage factor derived from static pressures measured by means of wall taps.

TABLE V

FLOWFIELD PROGRAM PARAMETER INPUT

Location	Parameters
Compressor Inlet (Station 1)	1) Corrected mass flow 2) Corrected rotor speed
Rotor Inlet (Station 3)	1) Total pressure ratio versus radius 2) Absolute air angle versus radius 3) Constant radial blockage factor determined by wall static pressure measurements
Rotor Exit (Station 4)	1) Constant radial blockage factor determined by wall static pressure measurements
Stator Exit (Station 5)	1) Total pressure ratio versus radius 2) Total temperature ratio versus radius 3) Absolute air angle versus radius 4) Stator free stream total pressure ratio versus radius 5) Constant radial blockage factor determined by wall static pressure measurements

Analysis of the test results showed that a single blockage factor could be selected at specific axial stations to closely represent both inner and outer wall static pressure measurements over the entire testing flow range. These blockage factors were generated from a sampling of data points that represented each tested speed and operating line conditions.

The blockage factors for this test (solid line) are compared in Figure 9 with those used in the design (dashed line) and those in the NAS3-20809 test (dotted line). The design blockage factors for this test program were based on the NAS3-20809 results and other front stage experience. The blockage factors for this test were lower than those used for design and for the NAS3-20809 tests. The reduced blockage at the rotor inlet can be attributed to the removal of the four inlet traverse probes at the rotor leading edge, which had not been removed during the NAS3-20809 tests. This probe removal may also account for the reduced blockage at the rotor exit and part of the reduction in stator exit blockage. Part of the reduced blockage at the stator exit may also be attributed to the smaller axial spacing between the rotor and stator, allowing less distance for boundary layer growth and blade wake dispersion.

All static pressure distributions and air angles behind the rotor were calculated by the streamline flowfield computer program. Aerodynamic conditions at the blade leading and trailing edges were calculated by translating the measured data from the instrument plane along streamlines to the blade edges, based on conservation of momentum. Blade element parameters were calculated for airfoil sections lying on conical surfaces defined by the intersection of design streamlines and the blade edges. Calculations were made on design streamlines passing through the rotor trailing edge at 5, 10, 15, 30, 50, 70, 85, 90, and 95 percent of the passage height. In addition to the blade element parameters calculated using the Appendix B definitions, the output of the flowfield analysis program included overall performance of the rotor and stator. All these performance data are tabulated in Appendix C. Symbols are defined in Appendix A.

5.0 RESULTS AND DISCUSSION

5.1 OVERALL PERFORMANCE

Stage and rotor overall performance are compared in Figures 10 and 11 with design goals and with the performance from the NAS3-20809 test (ref. 1). The operating line data point for this test is compared with design and the peak stage efficiency point of the NAS3-20809 test in Table VI. The inlet guide vane for this test was set at nominal. For the NAS3-20809 test, it was set at nominal and also unintentionally closed two degrees from nominal during part of the program (ref. 1).

TABLE VI

SUMMARY OF TEST RESULTS AT DESIGN SPEED

	Program Design Goal	(40-10-06) NAS3-22008 Operating Line	(104-10-02) NAS3-20809 Peak Stage Efficiency	(104-10-01) NAS3-20809 Peak Rotor Efficiency
Corrected Inlet Flow Rotor Leading Edge, kg/sec (lbm/sec)	47.28 (104.2)	47.20 (104.0)	44.35 (97.8)	45.14 (99.5)
Rotor Pressure Ratio	1.845	1.842	1.836	1.814
Rotor Adiabatic Efficiency	92.1%	92.4%	89.8%	90.1%
Stage Pressure Ratio	1.81	1.805	1.800	1.769
Stage Adiabatic Efficiency	88.5%	89.1%	86.6%	86.0%
Surge Margin	10%	14%	12.5%	16.6%

At design speed the stage achieved an adiabatic efficiency of 89.1% at design flow and pressure ratio, exceeding design goal by 0.6 percentage points. The rotor efficiency for this point was 92.4%, exceeding design goal by 0.3 percentage points. Peak rotor and stage efficiency at design speed occurred below the operating line and exceeded design goals by 0.4 and 1.0 percentage points, respectively. Although the gain in rotor efficiency from the operating line to below operating line was small, the significant gain in stage efficiency indicates that the stator on a span average was operating on the stall side of minimum loss at the near-design operating point.

A peak off-design rotor and stage efficiency of 94.5% and 92.0% occurred at 70 percent of design speed: a gain in rotor efficiency of 2.0 percentage points and a gain in stage efficiency of 2.5 percentage points over the peak design speed efficiency. The increase in efficiency at low speed is attributed to very low or nonexistent shock losses in the rotor, which had an inlet relative Mach number below 0.9 at 70 percent of design speed. At 105 percent of design speed, rotor and stage efficiency fell 1.2 and 1.4 percentage points, respectively, from the design speed peak. This decrease in efficiency can be attributed to increased shock losses and to the rotor approaching maximum flow capacity.

Design speed surge margin relative to the operating line was 14%, exceeding the design goal of 10%. Overspeed surge margin remained at 14% while surge margin at 95 percent speed increased to 18% relative to the representative high-pressure compressor operating line.

Recambering the rotor corrected the efficiency and flow deficiencies of the NAS3-20809 program. Design point test rotor and stage efficiencies were, respectively, 2.3 and 2.5 percentage points higher than the NAS3-20809 peak rotor and stage efficiencies, almost all improvement in performance occurring in the rotor. A 0.2 percentage point improvement in stage efficiency can be attributed to the controlled diffusion stator. The minimum span average efficiency loss for the controlled diffusion stator occurred below the operating line and was 2.8 percentage points. This was a 0.4 percentage point improvement over the NAS3-20809 stator minimum efficiency loss. Surge margin from the design operating line at design speed and 105 percent of design speed was five percentage points less than had been achieved in the earlier program (ref.1), but surge margin at 95 and 70 percent speeds was higher.

5.2 BLADE ELEMENT PERFORMANCE

5.2.1 Comparison of Spanwise Performance

The following section compares rotor and stator spanwise performance parameters with design and with the NAS3-20809 parameters. The design operating line data point and the peak stage efficiency point from the previous program, which was close to design pressure ratio, are compared with the design intent of this program. The overall performance parameters for these data points are compared in Table VI.

The spanwise variation of rotor performance parameters are presented in Figures 12 through 20. These figures show that rotor spanwise performance was very close to design across the entire span, thus, recambering corrected the NAS3-20809 rotor performance deficiencies.

Figures 12 and 13 show that the rotor temperature and pressure ratios closely match design. Recambering corrected the higher than design temperature ratios above 50 percent span and the falloff in pressure ratio at the tip. Near the hub where the blade could not be recambered, the pressure and temperature ratios are similar to those of the earlier program. The spanwise rotor efficiency profiles (Figure 14) show the improvements in efficiency: efficiency at the tip increased by eight percentage points, closely matching design; below 50 percent span, efficiency exceeded design and the NAS3-20809 test efficiency. Rotor loss coefficient in Figure 15 also shows this dramatic improvement.

Rematching incidence closer to minimum loss reduced rotor losses. The increased camber produced more pressure ratio, pulling more flow and reducing incidence (Figure 16) to within one degree of design. The one degree difference is attributable to the higher than design inlet air angle produced by the inlet guide vane (Figure 17) and the slightly lower rotor inlet flowpath blockage (see Figure 9). Although the small differences in rotor incidence between the current test and design can be explained in this manner, it should be noted that the differences in inlet air angle are within the accuracy of air angle measurements and the stagger settings of the inlet guide vane.

Rotor turning (Figure 18) and rotor deviation (Figure 19) also agreed closely with design. This close agreement between design and test results shown in Figure 19 confirm the higher design deviation of the modified rotor relative to the NAS3-20809. Rotor diffusion factor (Figure 20) also met design intent over the span. The diffusion factors shown for this test are less than in the previous test because the NAS3-20809 data point in the figure is on a higher operating line.

Spanwise performance parameters for the stage and stator are presented in Figures 21 through 29. The controlled diffusion stator met design loss goals and exhibited lower minimum efficiency loss than the original multiple-circular-arc stator on a span average. The stator demonstrated less than design loss below 50 percent span for the near-design test point and met design loss over 70 percent of the span when matched at each section's demonstrated minimum loss. This is discussed further in the following blade element section, Section 5.2.2.

Stage pressure ratio and efficiency were close to design (Figures 21 and 22), the small differences being caused by the stator not attaining its design loss profile (Figure 23). Stator loss at the root was less than design and also less than the NAS3-20809 results and contributed to the high stage pressure ratio and efficiency at the root. Although stator loss near the tip was higher than that of the NAS3-20809 stator, stage efficiency in this region was greater, because of the better rotor efficiency.

The match of stator inlet Mach number with design (Figure 24) was also much better from 10 percent span to the tip, reflecting the improved rotor performance. Stator Mach numbers were lower than those of NAS3-20809 because of the larger flowpath annulus at the stator leading edge, resulting from the reduction in rotor-to-stator spacing.

Stator deviation and turning angles (Figures 25 and 26) were near design from the hub to 15 percent span and at the tip. Deviation was significantly greater than design and turning significantly less from 30 to 90 percent span. The stator spans that had higher than design deviation and lower turning generally had greater than design loss.

A small portion of this radial redistribution of loss and deviation relative to design can be attributed to the variation of stator incidence relative to design (Figure 27). Stator incidence ranged from one degree below design in the hub region where the losses were lower than design to one degree above design near the tip where loss and deviation exceeded design. Evaluation of this indicates that although this variation in incidence can explain up to one-third of this difference in loss, it cannot explain all of it. The major influence is more likely that the design radial distribution of loss and deviation were not precisely duplicated by the test, producing a radial redistribution of streamtube convergence that limits the potential performance of each section.

The exceptionally low loss and deviation of the rotor and stator hub sections drew more flow toward the stator hub than had been expected, as shown in the stator Mach number plot (Figure 24), resulting in greater than design velocity density ratios (streamtube convergence). This had the opposite effect above 20 percent span, resulting in lower than design velocity density ratios. The low streamtube convergence increases loading, loss, and deviation in that region. The test stator velocity-density ratio is compared with design in Figure 28, illustrating the two distinct regimes.

Stator diffusion factor (Figure 29) was below design level in the hub region where low levels of loss and deviation increased flow and streamtube convergence relative to design. Tip region loading was necessarily opposite to the hub and above design levels, following the spanwise trend of loss and turning.

The following section on the variation of blade element performance with incidence provides further evidence of the connection between the radial distribution of streamtube convergence and the radial spanwise performance.

5.2.2 Variations of Blade Element Parameters With Incidence Angle

Blade element plots are presented in Figures 30 through 47 for loss coefficient, diffusion factor, and deviation angle versus suction surface incidence angle at nine radial locations. The rotor plots are in Figures 30 through 38 and the stator plots in Figures 39 through 47. The stator loss scale is expanded 2.5 time that of the rotor loss scale, for clarity. Blade

element data from the current program are compared with design and with data from the previous program.*

The rotor minimum loss was lower in the current program than in the NAS3-20809 program from midspan through the tip, demonstrating as much as a 50 percent reduction in loss in the tip region. This was also apparent in Figure 15. The NAS3-20809 rotor operated on the stall side of minimum loss from midspan through the tip at all speeds. Adding camber to the outer spans of the rotor pulled more flow and permitted minimum loss incidence to be achieved.

Below midspan, where the loss versus incidence curves were fairly flat as a result of the decreased shock losses, minimum loss of the two tests is similar. Rotor blade element characteristics are also similar in the lower spans since the blades were not recambered in the hub area.

The design speed operating line point (third circle from right) was near minimum loss at all spans, ideally located between the sharp deviation increase at negative incidence and the loss increase shown in these curves at stalled incidence. A slight improvement in loss could be achieved at the tip with about one-half degree more negative incidence for the operating line point. Because the rotor relative Mach numbers were subsonic at 70 percent speed, the loss near the tip region shown in this data was significantly lower than the design speed test loss.

Peak rotor diffusion factors for the subject test occurred at or near the rotor tip for all speeds, indicating that the rotor tip was probably responsible for stage surge. Peak rotor diffusion factor was 0.65 at 95 percent span at 95 percent speed. Extrapolating to the surge line indicates a surge diffusion factor of 0.72 at 95 percent span, which is quite close to the peak diffusion factor of 0.73 obtained when extrapolating NAS3-20809 to surge and which also occurred at 95 percent span but at 100 percent speed. This similarity suggests that the rotor tip set surge and demonstrates the high loading capability of the low aspect ratio rotor. In addition it is doubtful that the stator could cause surge except by backpressuring the rotor. Diffusion factors at equivalent incidences were higher for the current test because of the additional blade camber.

Rotor deviation at minimum loss incidence was within one degree of design at all spans: deviation was slightly lower than design at the hub and higher at the tip. The test results confirm the design deviation levels, which were based on the previous test and other Pratt & Whitney Aircraft experience. The significant increase in deviation at choke incidence in the outer spans was caused by high choke shock losses. The previous test did not exhibit this strong increased deviation since that rotor was always operating on the stall side of minimum loss.

The low loss potential of the controlled diffusion stator design was demonstrated in this test in the high Mach number stator root-to-midspan region (Figures 39 to 43). The minimum loss levels in this region were lower

* The stator deviation angles for the previous test are not shown since the stator exit air angles, from which they were derived, were considered suspect due to interference of the angle measurement by adjacent probes (ref. 1).

than design and the loss levels obtained with multiple-circular-arc airfoils during the previous test. Minimum loss levels in the stator tip region (Figures 45, 46, and 47) were higher than either design or the previous test. Although design-speed deviation angles were near design levels in the stator root and tip, deviation angles in the midspan exceeded design.

These results suggest that the superior performance at the root of this stator caused a radial redistribution of flow towards the root, as evidenced by the increased velocity-density ratio (streamtube convergence). This in turn caused an opposite streamtube expansion in the tip region which is responsible for its poor performance. This radial redistribution changed rapidly with operating point (Figure 48) because of the sharp rise in loss in the stator root as incidence was increased from the minimum loss operating line point. Loss, deviation, and loading below midspan responded as a stalled characteristic in Figures 39 through 43. Deviation in the tip region also had a stalled shape with incidence, but stator tip loss dropped as incidence was increased, suggesting a choked characteristic in Figures 45 to 47.

This apparent contradiction of the tip-region loss and deviation characteristics is a further response to the changing radial distribution of streamtube convergence. As shown in Figure 48, the stalled root characteristic reduced streamtube convergence as the stage was throttled up a speedline. This impressed an opposing swing at the tip toward more convergence. Cascade testing has shown that streamtube contraction changes cause the loss and turning buckets to shift with incidence. In this case, the increasing streamtube contraction with throttling in the tip region shifted the loss bucket in the positive incidence direction faster than the operating point incidence increased with throttling, causing the section to have a choked loss characteristic. Lower than design streamtube contraction can also result in higher loss and may be responsible for the high tip loss at low stator incidence angles.

The resultant characteristic shapes depended on the change of incidence and streamtube contraction from point to point and their relative effects on the section in question. The broader deviation and loading characteristics were not changed as dramatically as the loss curve, but were influenced by this complex interaction.

In summary, the controlled diffusion stator demonstrated excellent low loss capability below midspan, but was probably operating too close to stall in that region for good overall performance. Overall stator performance could be improved by a radial redesign, recognizing the results of this test. The lack of a measurable performance improvement in the stator restagger tests early in this program is further evidence that a radial redesign was needed.

Stator diffusion factors at design incidence were slightly lower than design from the root through 71 percent span and near design above 71 percent span. A peak stator diffusion factor of 0.69 was achieved at the stator root. Extrapolating the diffusion factors to the surge line results in a surge diffusion factor of 0.72, exceeding the extrapolated diffusion factor of 0.69 of the previous test and nearly matching the rotor diffusion factor of 0.72 for this test.

6.0 CONCLUSIONS

1. The NAS3-22008 tests demonstrated that high efficiency can be achieved at high loading levels with low aspect ratio blading in an adverse front stage environment.

2. The rotor exceeded design efficiency goals at design flow and pressure ratio, demonstrating a significant increase in efficiency over the original tests. The shortfall in flow and efficiency of the original program, identified as caused by incorrect design flowpath blockages, was corrected in the redesign, permitting the rotor to operate at minimum loss incidence and to meet or exceed all design goals.

3. The low loss potential of the controlled diffusion stator at near design turning was demonstrated in the high Mach number stator root, with loss levels significantly lower than the multiple-circular-arc stator of the original program. Although the full potential of the controlled diffusion stator was not realized, a significant improvement in span averaged loss and turning could result by redesigning the stator to the minimum loss incidence and spanwise velocity-density ratios detemined by the test.

4. To measure the most consistent sampling of pressure and temperature, probes downstream of a rotor should be placed with pressures and temperatures at the same circumferential location or probes should be small enough not to significantly backpressure the rotor.

7.0 REFERENCES

1. Behlke, R.F.; Brooky, J.D.; and Canal, E. Jr: "Study of Blade Aspect Ratio on a Compressor Front Stage--Final Report," NASA CR-159556, PWA-5583-58, 1980.

2. Sulam, D.H.; Keenan, M.J.; and Flynn, J.T.: "Single Stage Evaluation of Highly Loaded High Mach Number Compressor Stages - II. Data and Performance, Multiple-Circular-Arc Rotor," NASA CR-72694, PWA-3772, 1970.

3. Harley, K.G. and Burdsall, E.A.: "High Loading Low Speed Fan Study--Data and Performance--Unslotted Blades and Vanes," NASA CR-72667, PWA-3663, 1970.

4. Messenger, H.E. and Kennan, M.J.: "Two-Stage Fan - II. Data and Performance with Redesigned Second Stage Rotor, Uniform and Distorted Inlet Flows," NASA CR-134710, PWA-5087, 1974.

5. McDonald, P.W.: "The Computation of Transonic Flow Through Two-Dimensional Gas Turbine Cascades," ASME Paper No. 71-GT-89, 1971.

6. Stephens, H.E. and Hobbs, D.E.: "Design and Performance Evaluation of Supercritical Airfoils for Axial Flow Compressors, Final Report," Naval Air Systems Command, Contract N00019-77-0546, 1979

7. Canal, E.; Chisholm, B.C.; Lee, D.; and Spear, D.A.: "Study of Controlled Diffusion Stator Blading--Aerodynamic and Mechanical Design Report," NASA CR-165500, PWA-5698-28, 1981.

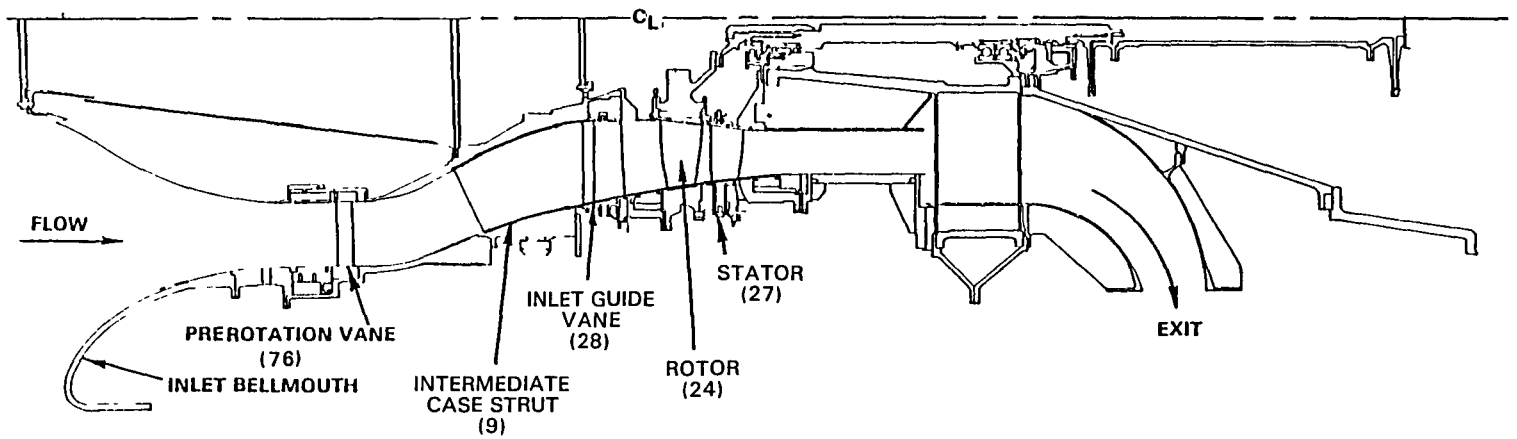


Figure 1 Controlled-Diffusion, Low-Aspect-Ratio Front Stage Test Rig

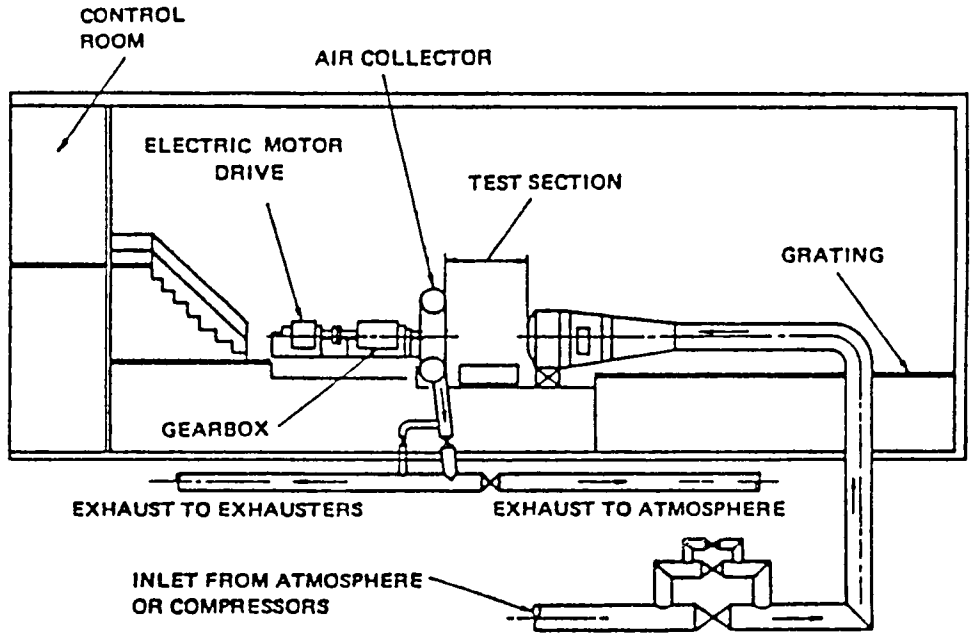
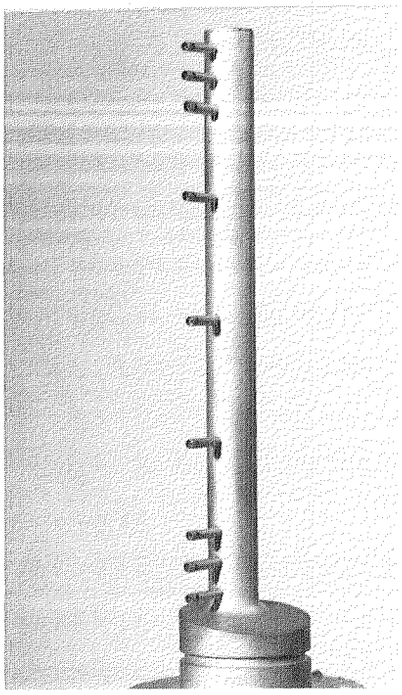
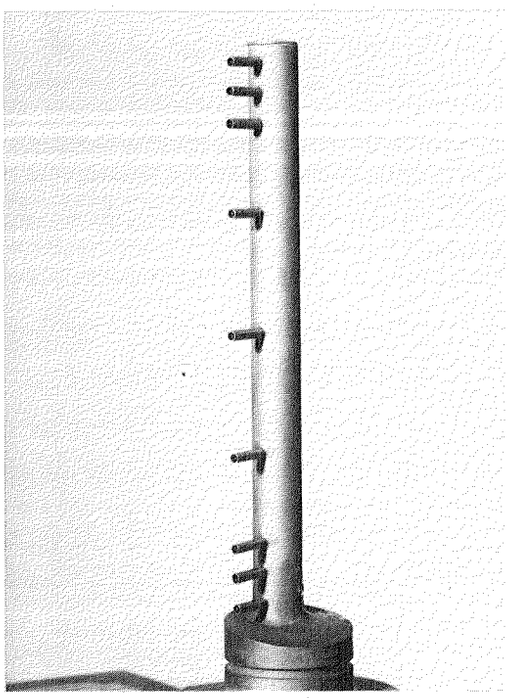


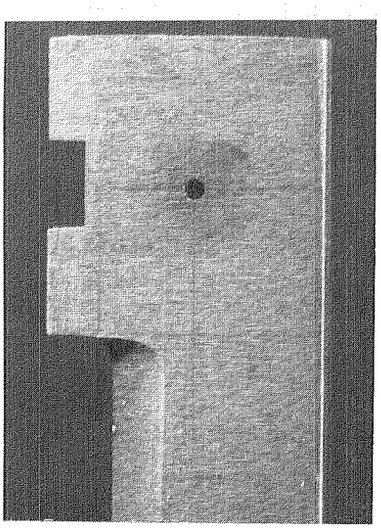
Figure 2 Schematic of Test Stand

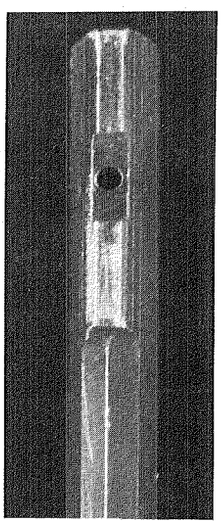


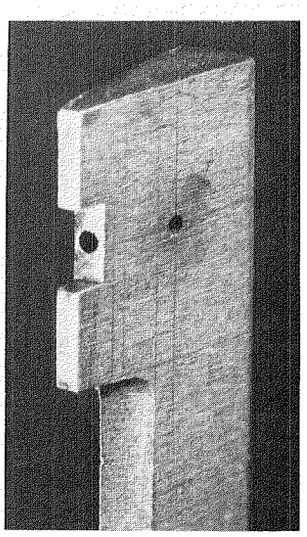
Total Pressure Rake



Total Temperature Rake

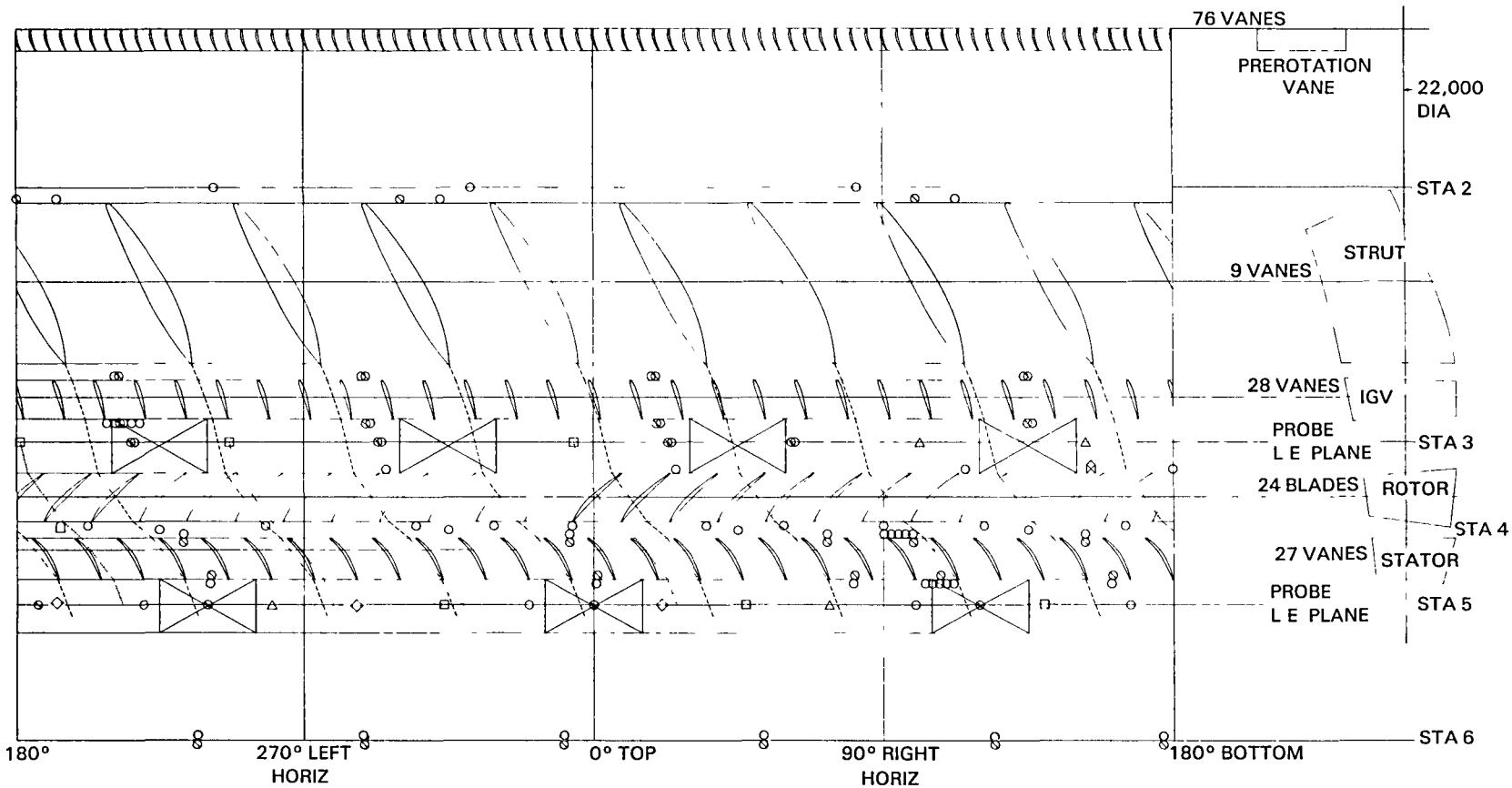






Traverse Wedge Probe

Figure 3 Typical Instrumentation



- P_T — Nine element total pressure rake
- T_T — Nine element total temperature rake
- Wedge — Total Pressure, air angle
- P_SOD — Static Pressure
- P_SID — Static Pressure
- Surge P_S — Static Pressure
- Surge T/C — Thermocouple
- -----Wake Path from inlet struts
- — — Wake Path from P_T rakes

Note
All rake instrumentation in Stations 3 & 5 is shown in the start position of a circumferential traverse mode

Figure 4 Axial and Circumferential Location of Instrumentaion

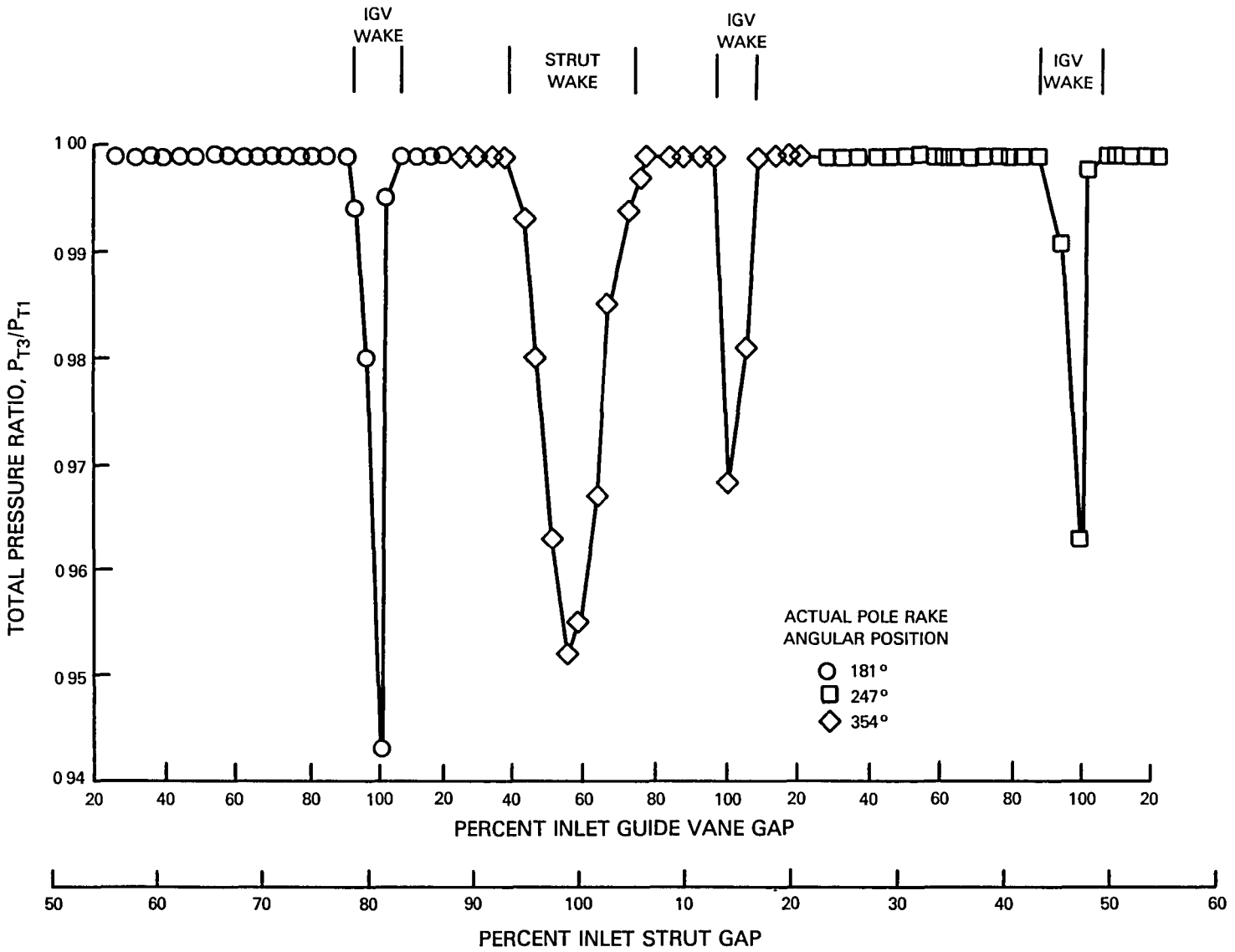


Figure 5 Sample of Wake Total Pressure Ratio for Each of Three Pole Rakes at Midspan as a Function of Inlet-Guide-Vane Gap and Inlet Strut Gap - Station 3 Rotor Leading Edge Pole Rake Traverse at Fifty Percent Span, Design Speed

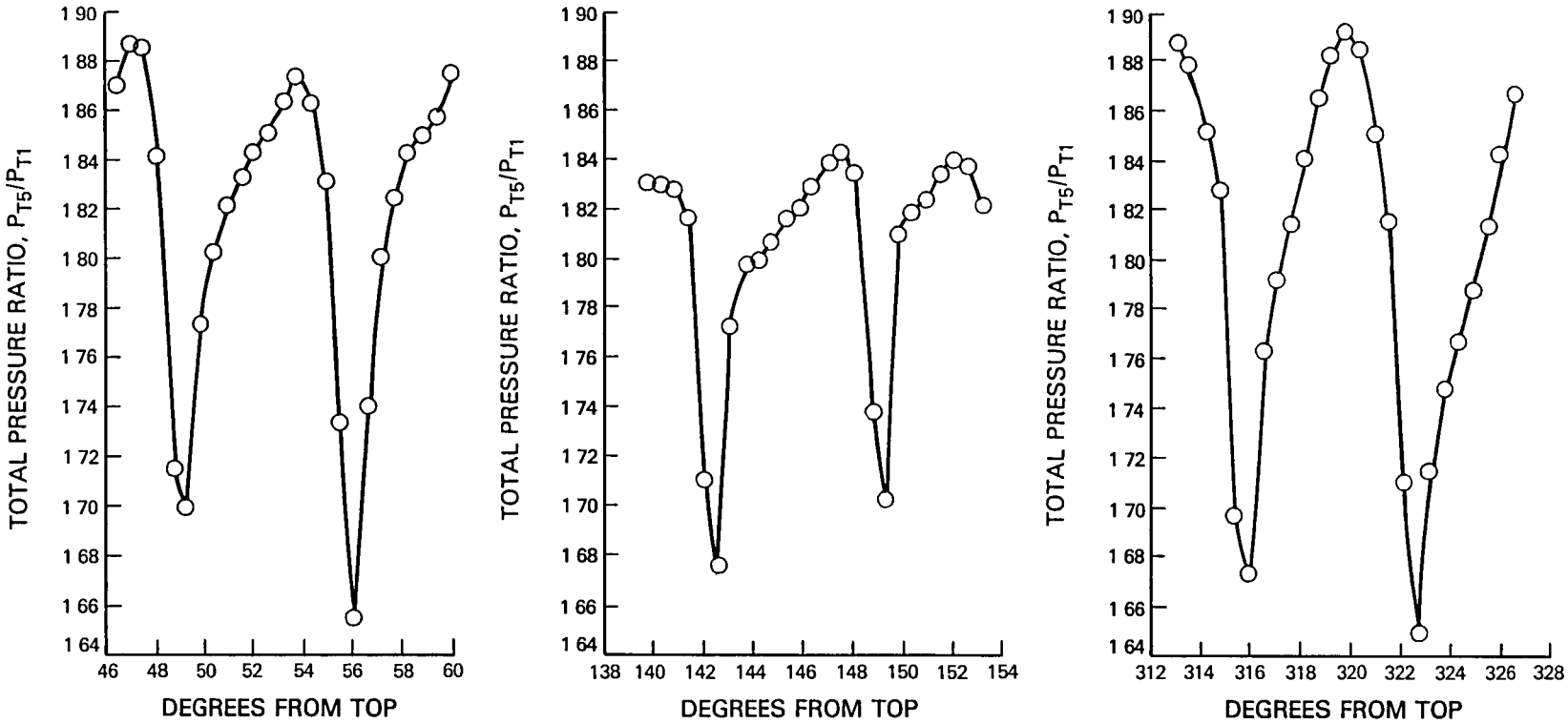


Figure 6 Typical Circumferential Profiles of Total Pressure Ratio Distribution - Station 5 Stator Trailing Edge Pole Rake Traverse at Fifty Percent Span, Design Speed Operating Line

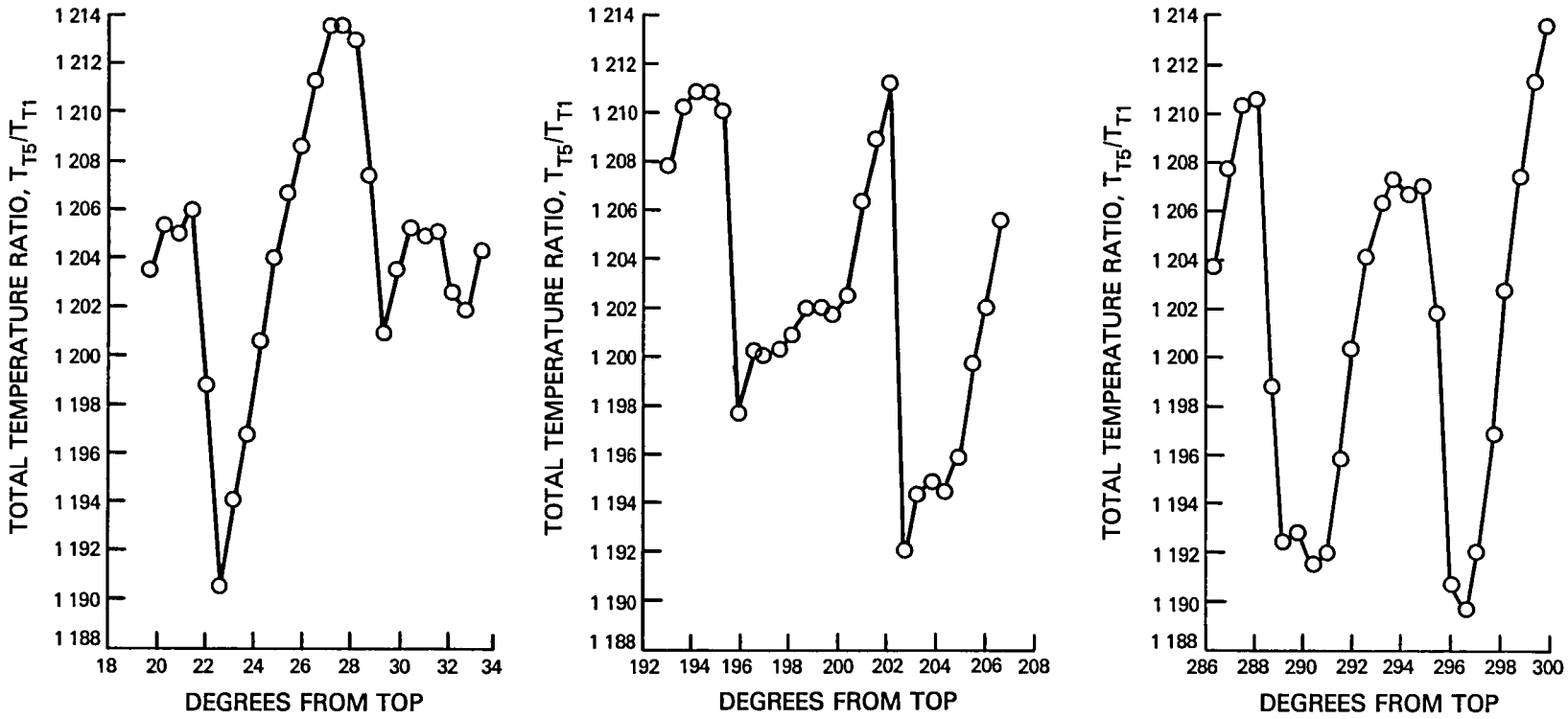
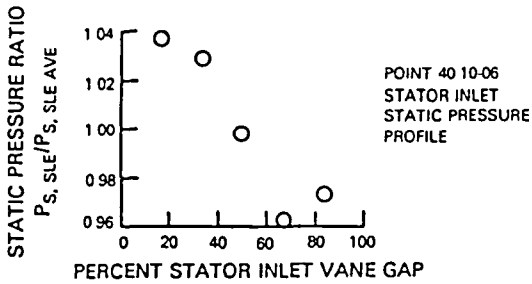
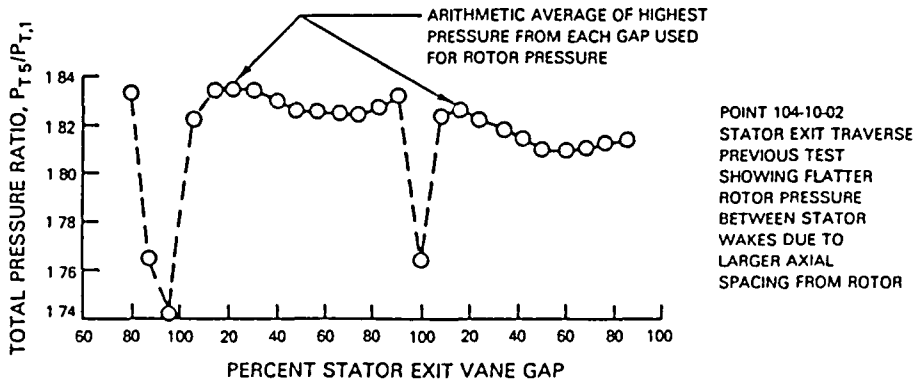


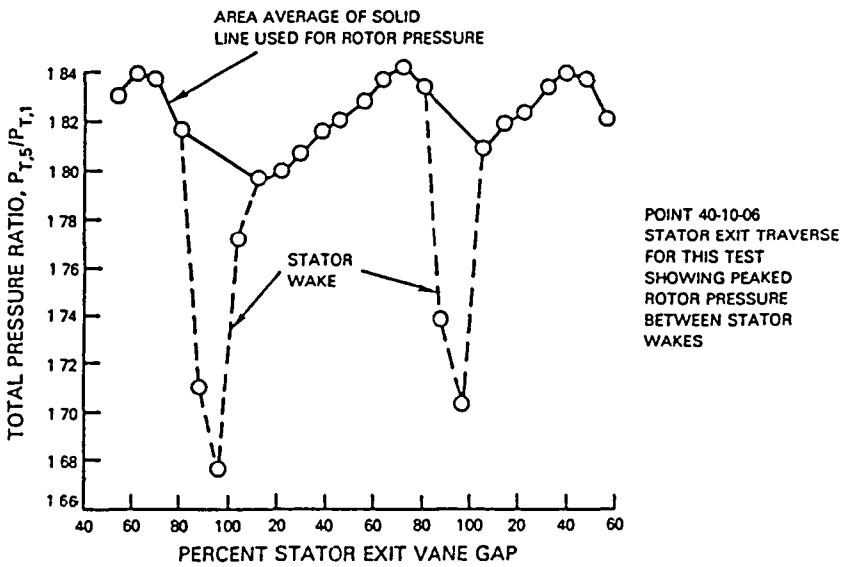
Figure 7 Typical Circumferential Profiles of Total Temperature Ratio Distribution - Station 5 Stator Trailing Edge Pole Rake Traverse at Fifty Percent Span, Design Speed Operating Line



(a) Stator Inlet Static Pressure Profile (NAS3-22008)



(b) Stator Exit Traverse From Previous Test Showing Flat Rotor Pressure Between Stator Wakes as a Result of the Large Spacing Between Rotor and Stator (NAS3-20809)



(c) Stator Exit Traverse Showing Peaked rotor Pressure Between Stator Wakes (NAS3-22008)

Figure 8 Stator Trailing Edge Total Pressure - Station 5, Pole Rake Traverse at Fifty Percent Span, Design Speed Operating Line - Methods to Determine Rotor Exit Total Pressure Shown

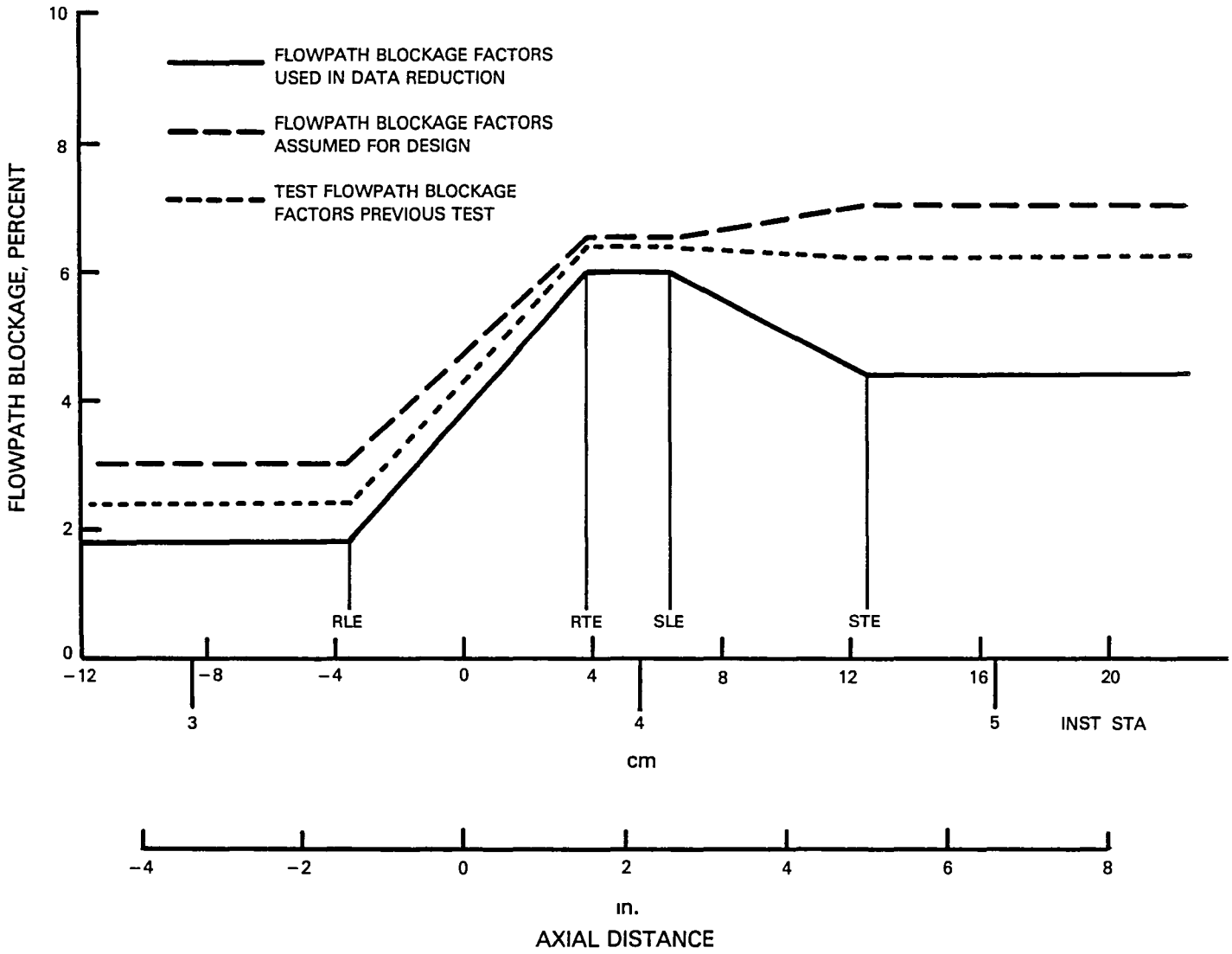


Figure 9 Comparison of Flowpath Blockage Factors Used in Data Reduction With Those Assumed for Design and Values From NAS3-20809 Tests

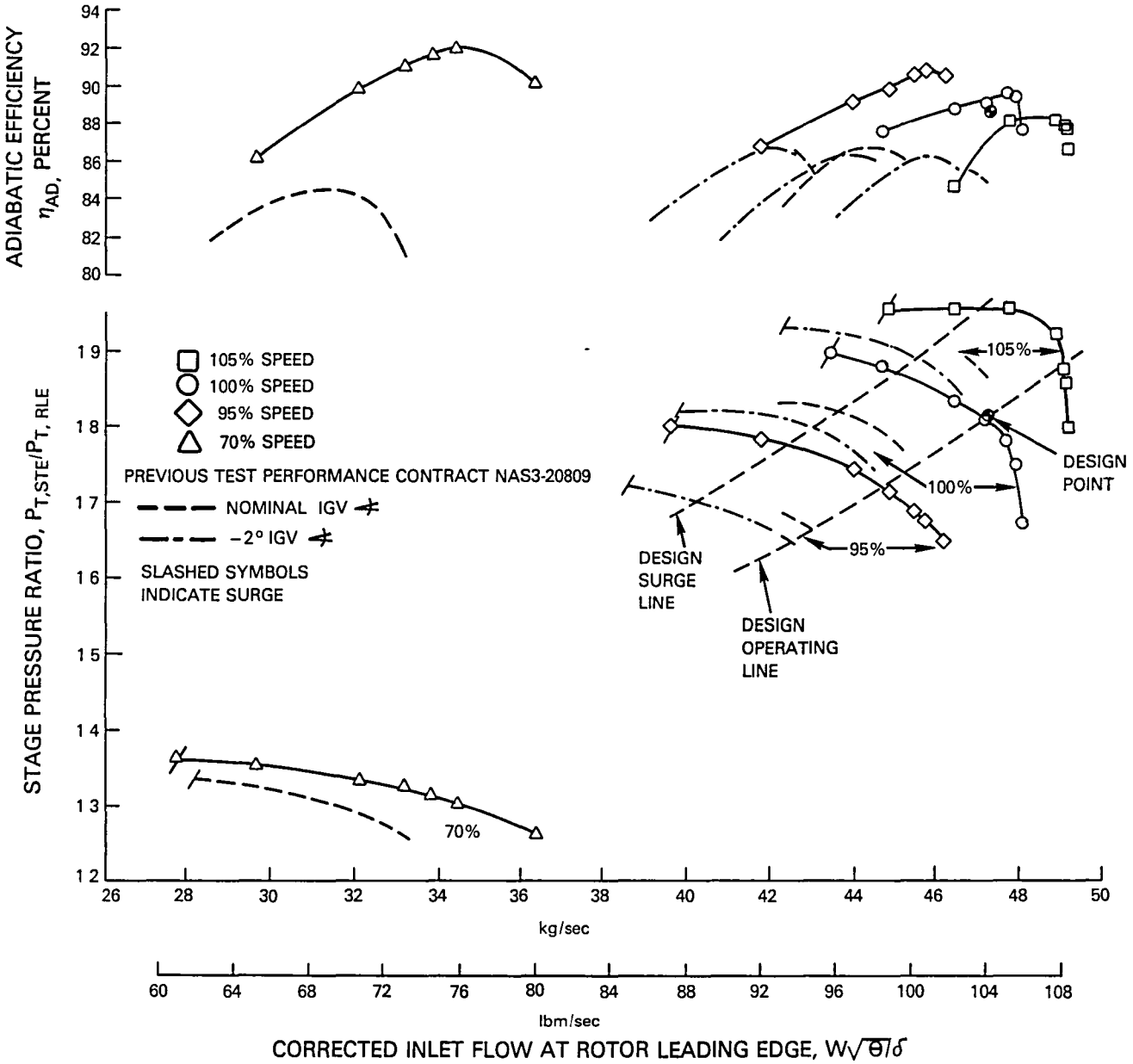


Figure 10 Stage Pressure Ratio and Adiabatic Efficiency as Functions of Corrected Inlet Flow

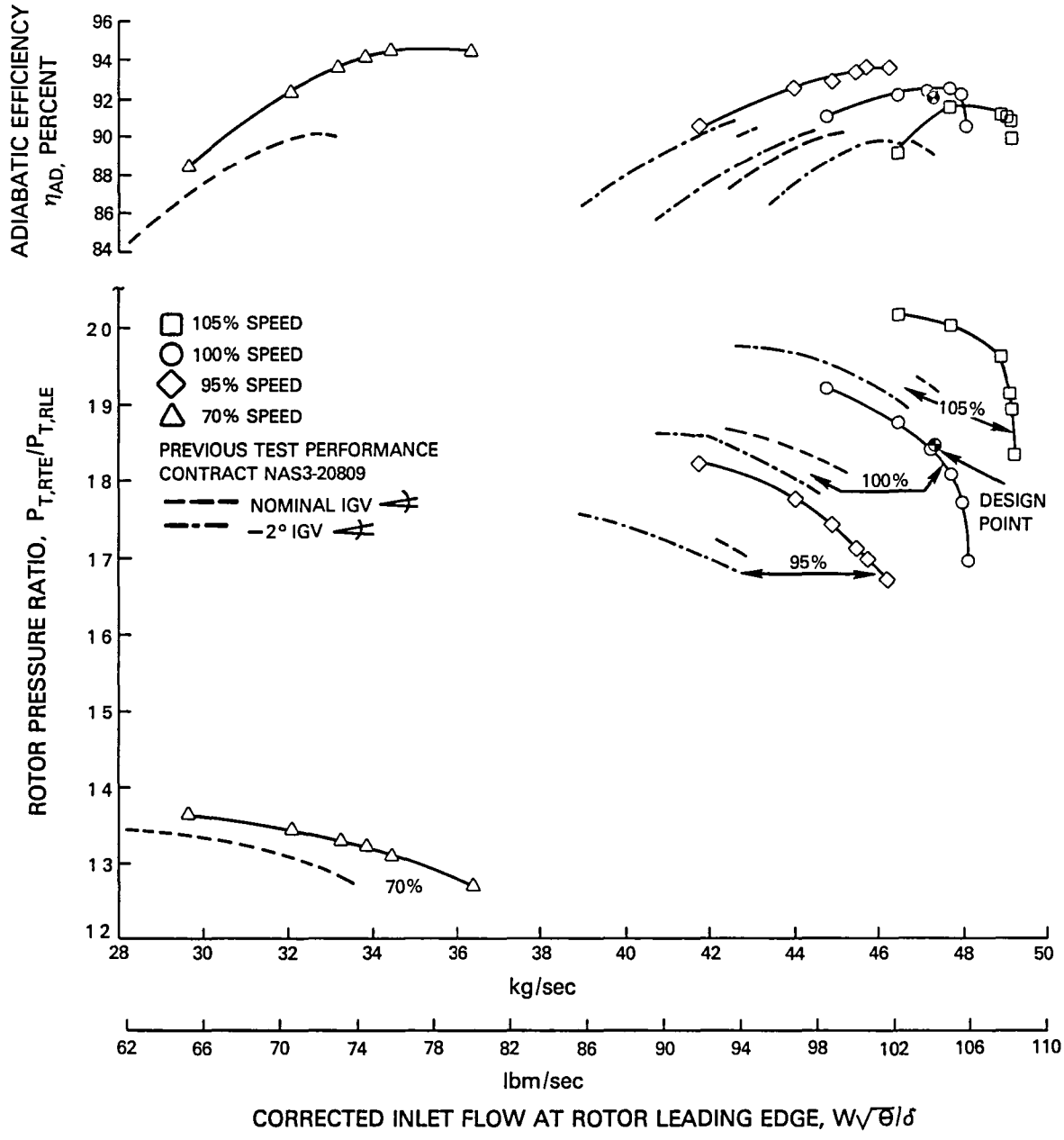


Figure 11 Rotor Pressure Ratio and Adiabatic Efficiency as Functions of Corrected Inlet Flow

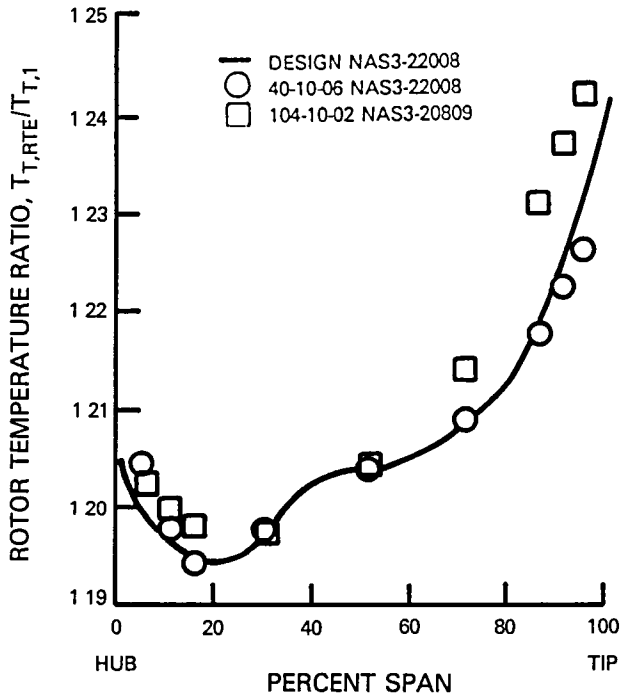


Figure 12 Rotor Temperature Ratio as a Function of Percent Span at the Rotor Trailing Edge

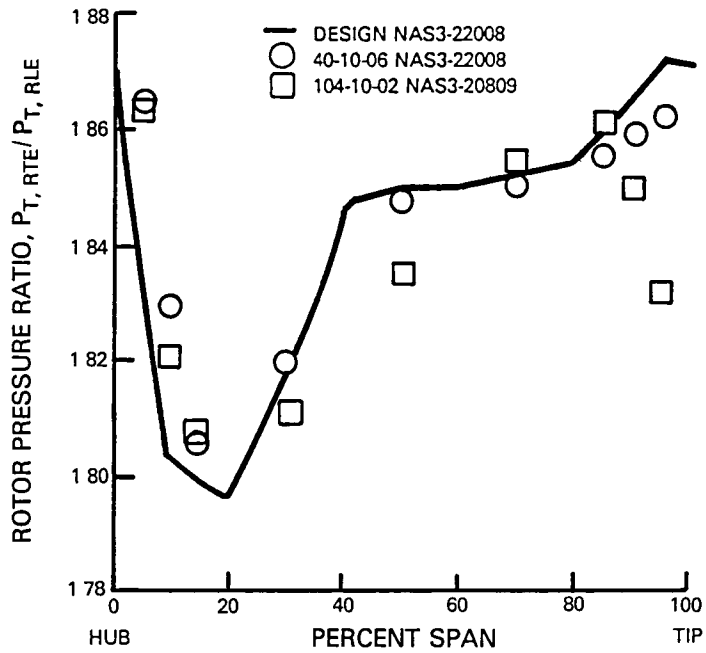


Figure 13 Rotor Pressure Ratio as a Function of Percent Span at the Rotor Trailing Edge

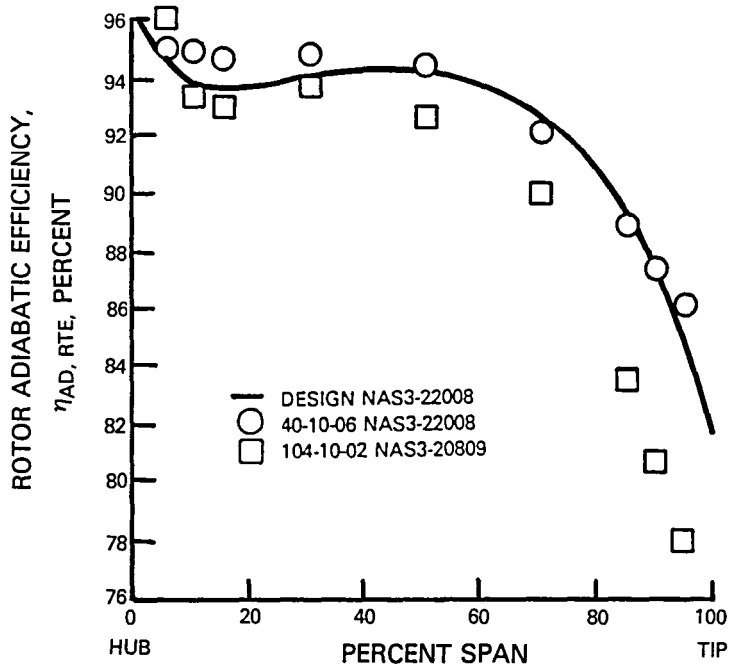


Figure 14 Rotor Adiabatic Efficiency as a Function of Percent Span at the Rotor Trailing Edge

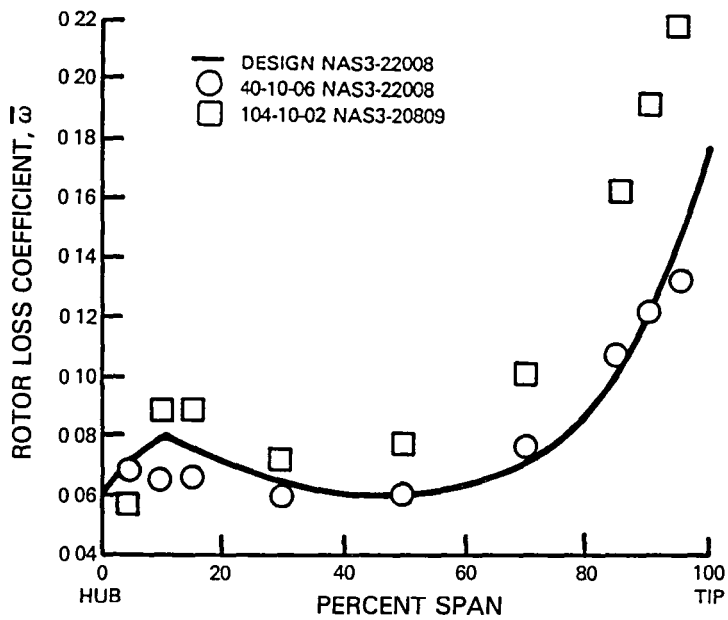


Figure 15 Rotor Loss Coefficient as a Function of Percent Span at the Rotor Trailing Edge

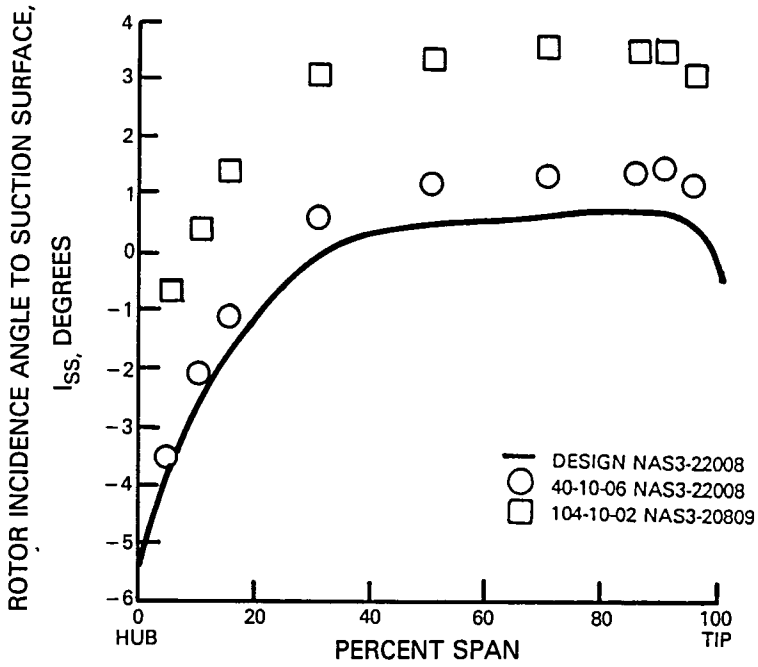


Figure 16 Rotor Incidence angle to Suction Surface as a Function of Percent Span at the Rotor Trailing Edge

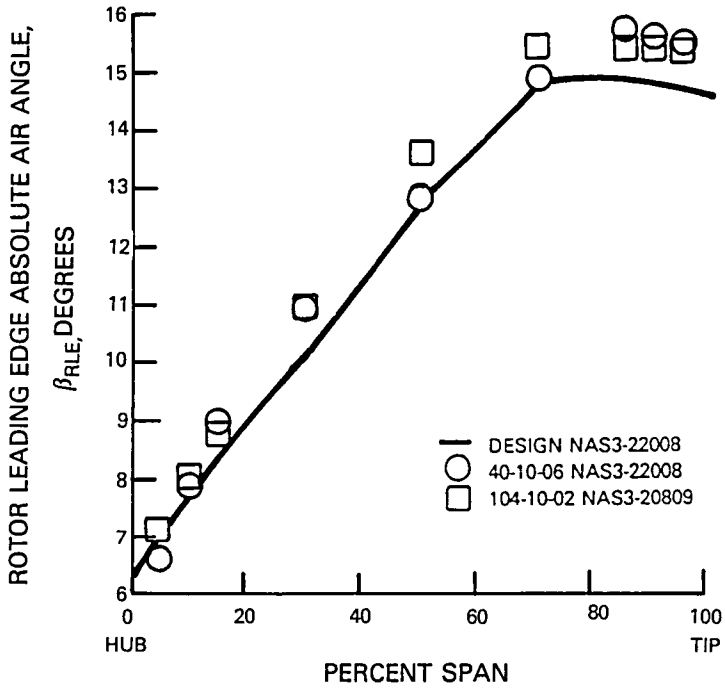


Figure 17 Rotor Leading Edge Absolute Air Angle as a Function of Percent Span at the Rotor Trailing Edge

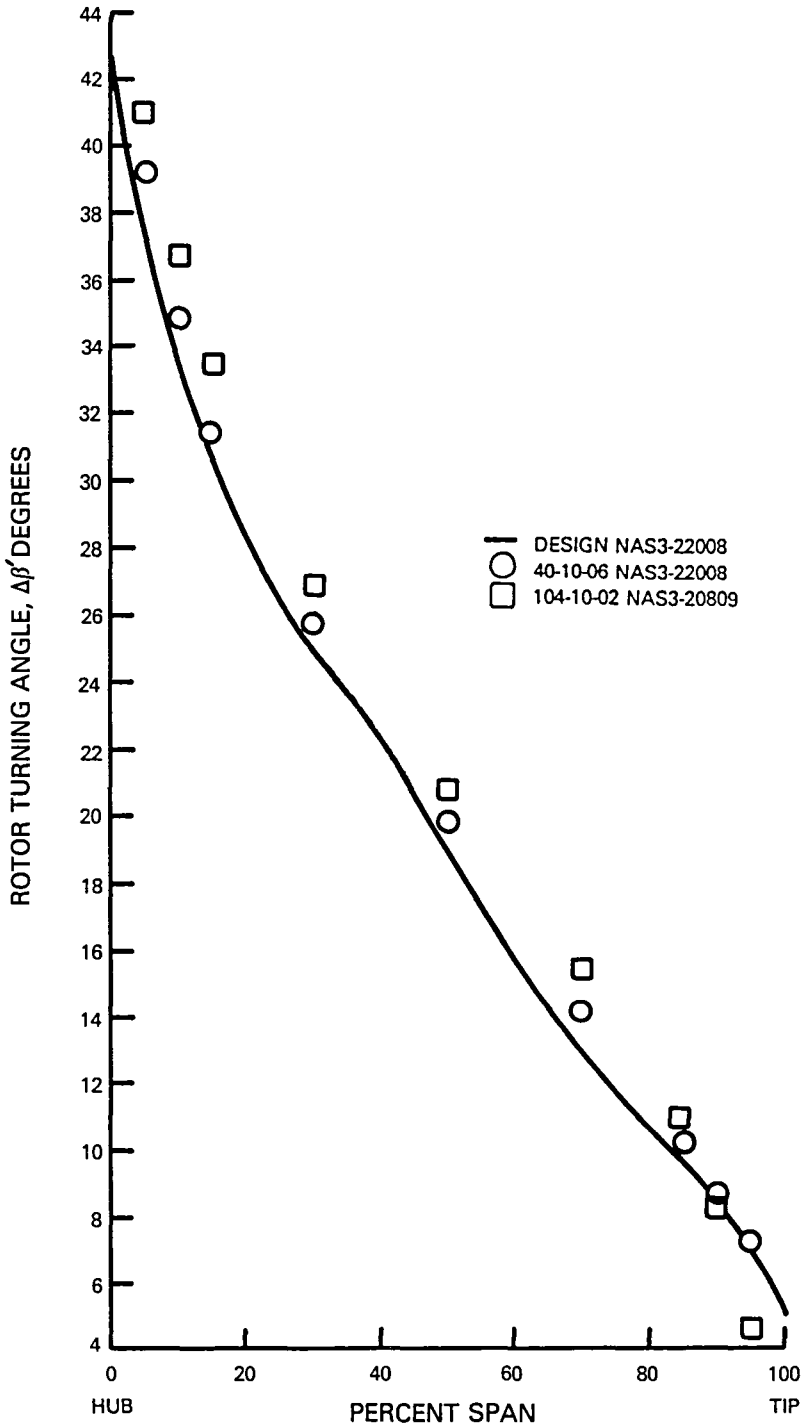


Figure 18 Rotor Turning Angle as a Function of Percent Span at the Rotor Trailing Edge

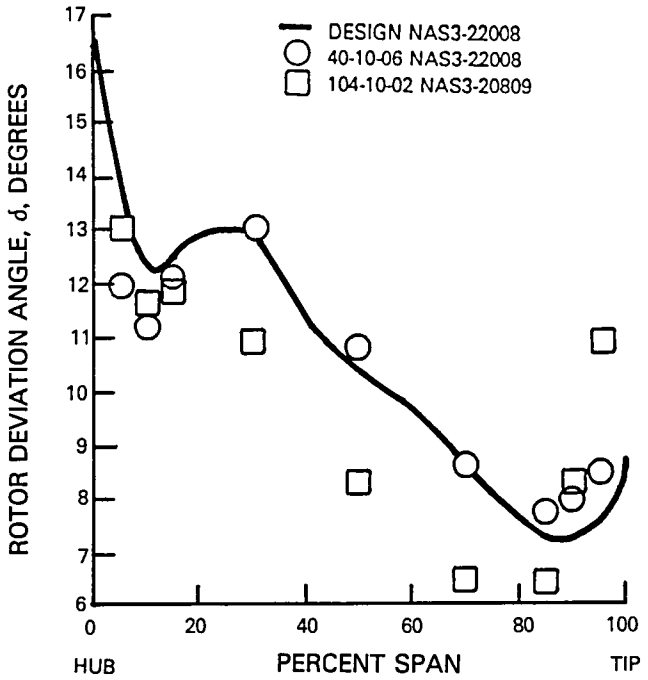


Figure 19 Rotor Deviation Angle as a Function of Percent Span at the Rotor Trailing Edge

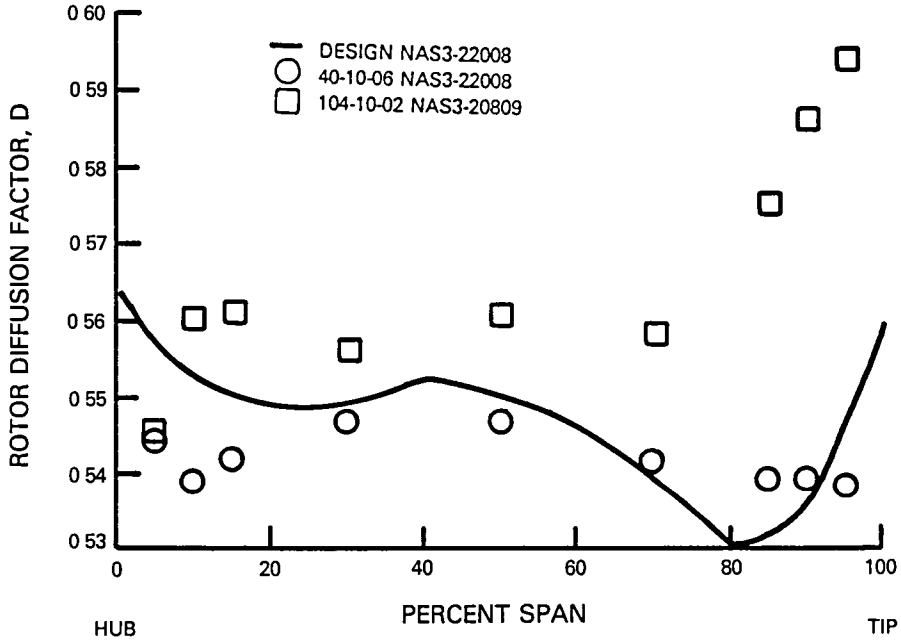


Figure 20 Rotor Diffusion Factor as a Function of Percent Span at the Rotor Trailing Edge

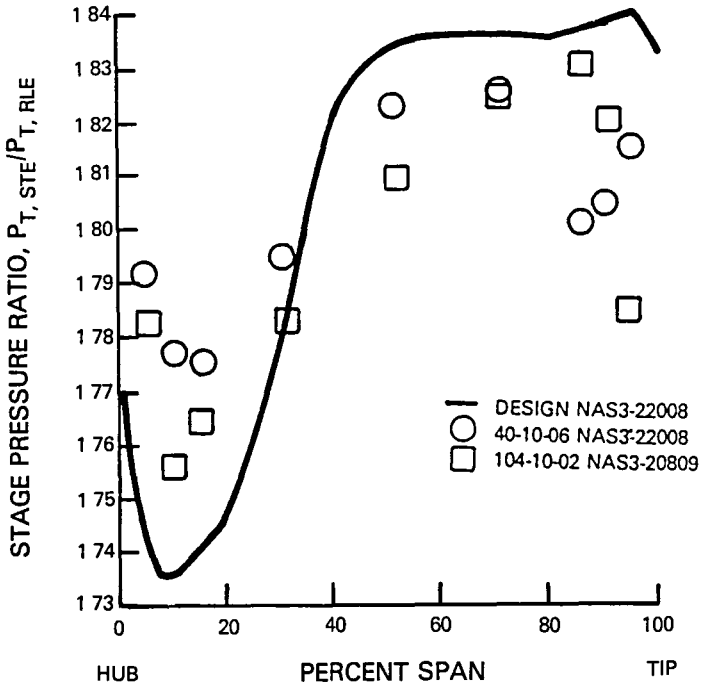


Figure 21 Stage Pressure Ratio as a Function of Percent Span at the Stator Trailing Edge

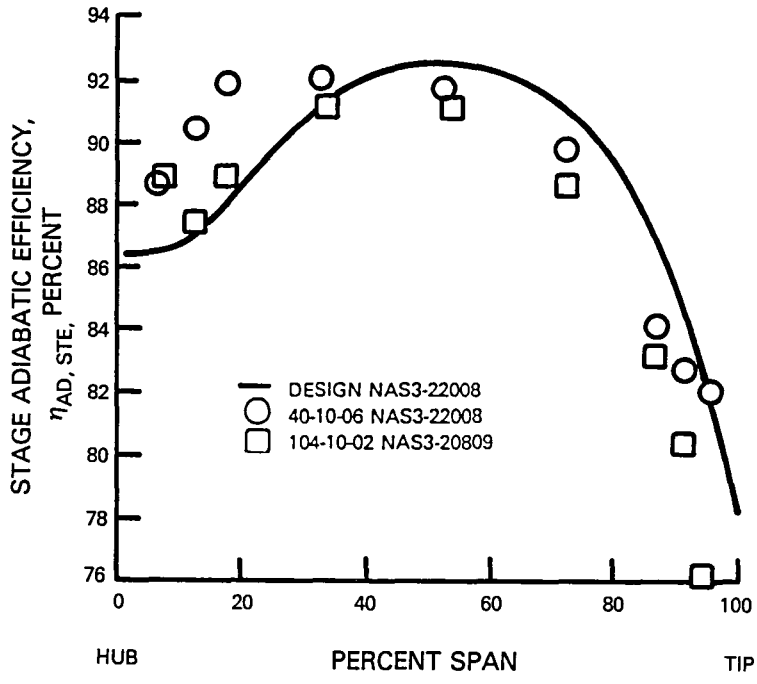


Figure 22 Stage Adiabatic Efficiency as a Function of Percent Span at the Stator Trailing Edge

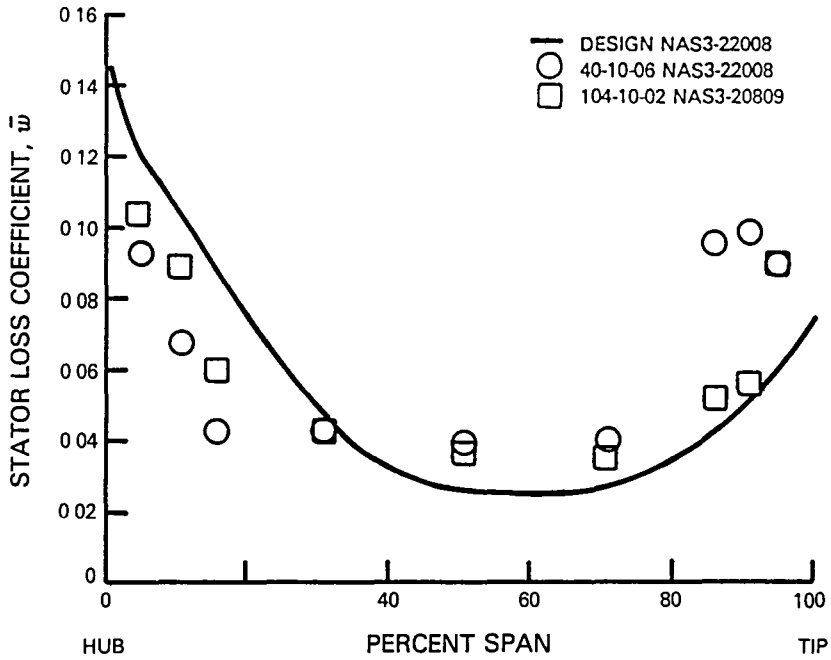


Figure 23 Stator Loss Coefficient as a Function of Percent Span at the Stator Trailing Edge

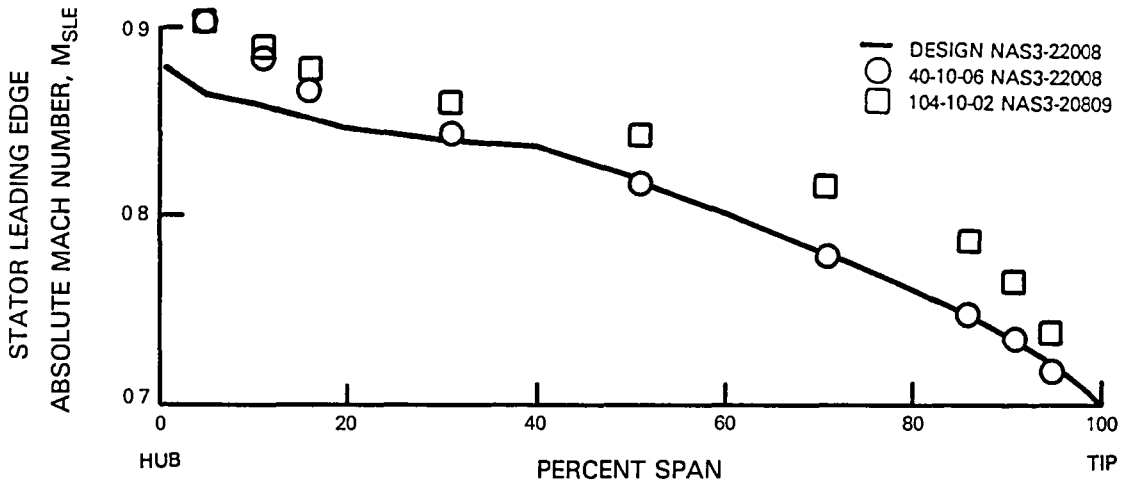


Figure 24 Stator Inlet Absolute Mach Number as a Function of Percent Span at the Stator Trailing Edge

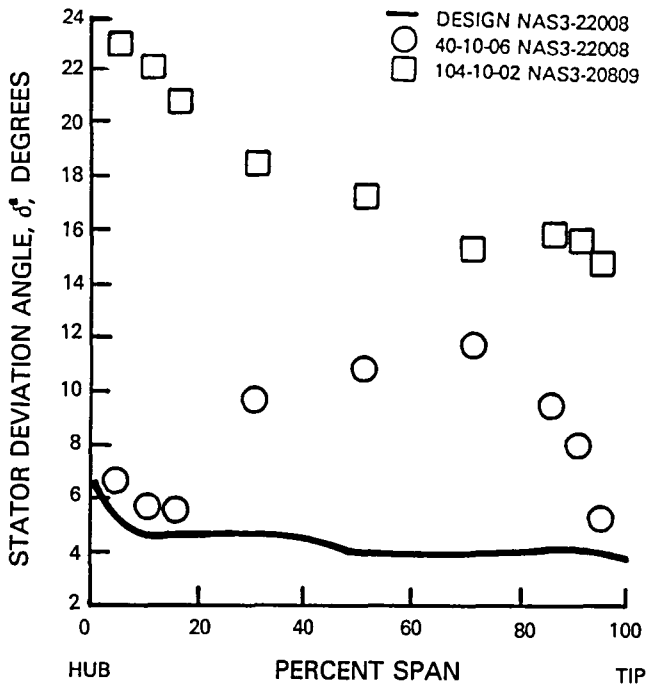


Figure 25 Stator Deviation Angle as a Function of Percent Span at the Stator Trailing Edge

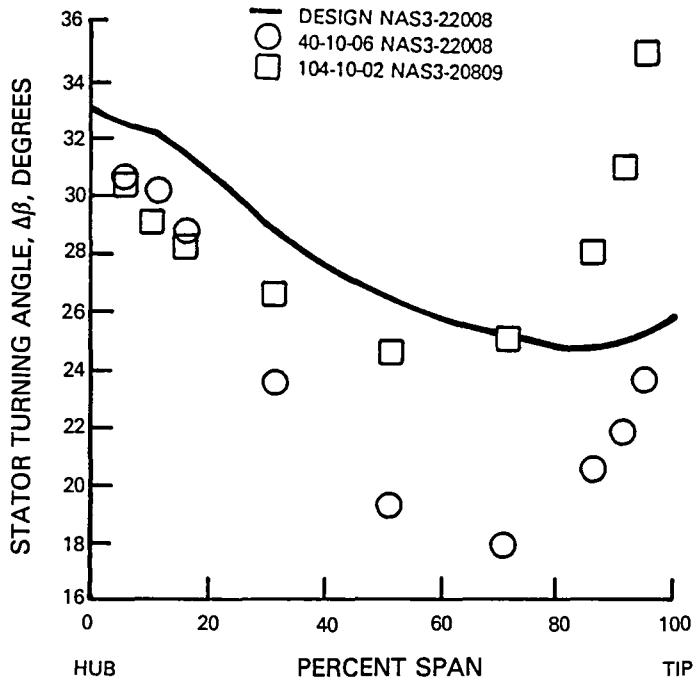


Figure 26 Stator Turning Angle as a Function of Percent Span at the Stator Trailing Edge

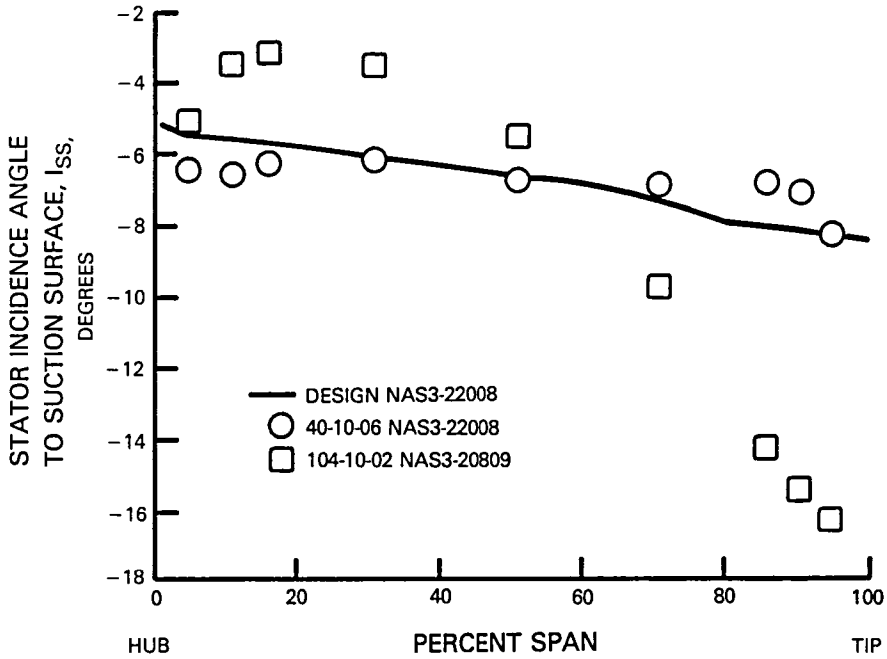


Figure 27 Stator Incidence Angle as a Function of Percent Span at the Stator Trailing Edge

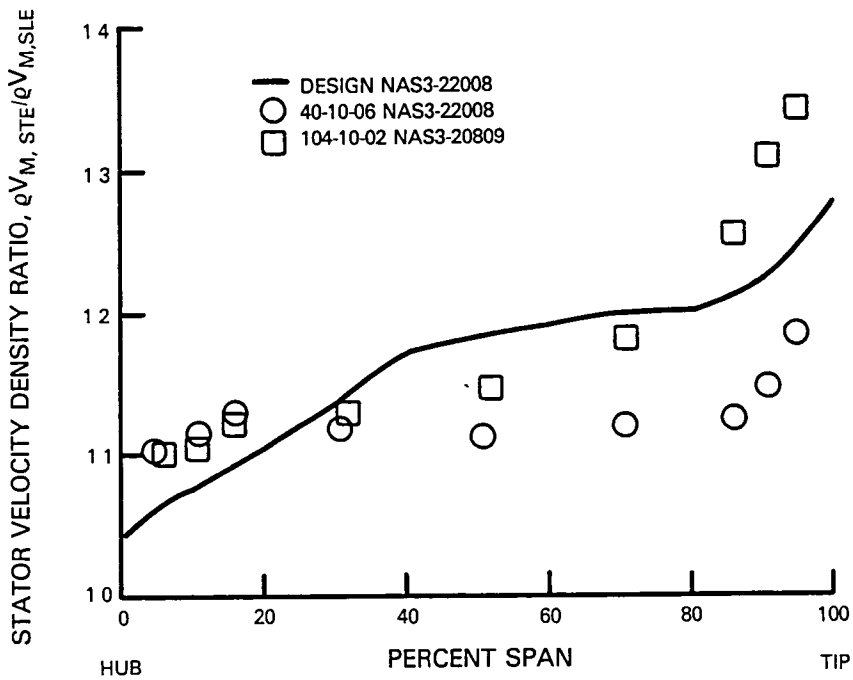


Figure 28 Stator Velocity Density Ratio as a Function of Percent Span at the Stator Trailing Edge

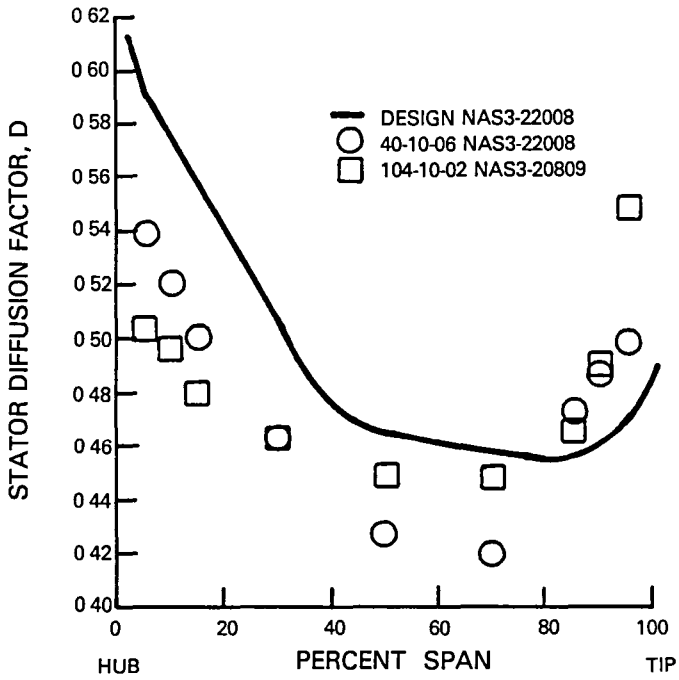


Figure 29 Stator Diffusion Factor as a Function of Percent Span at the Stator Trailing Edge

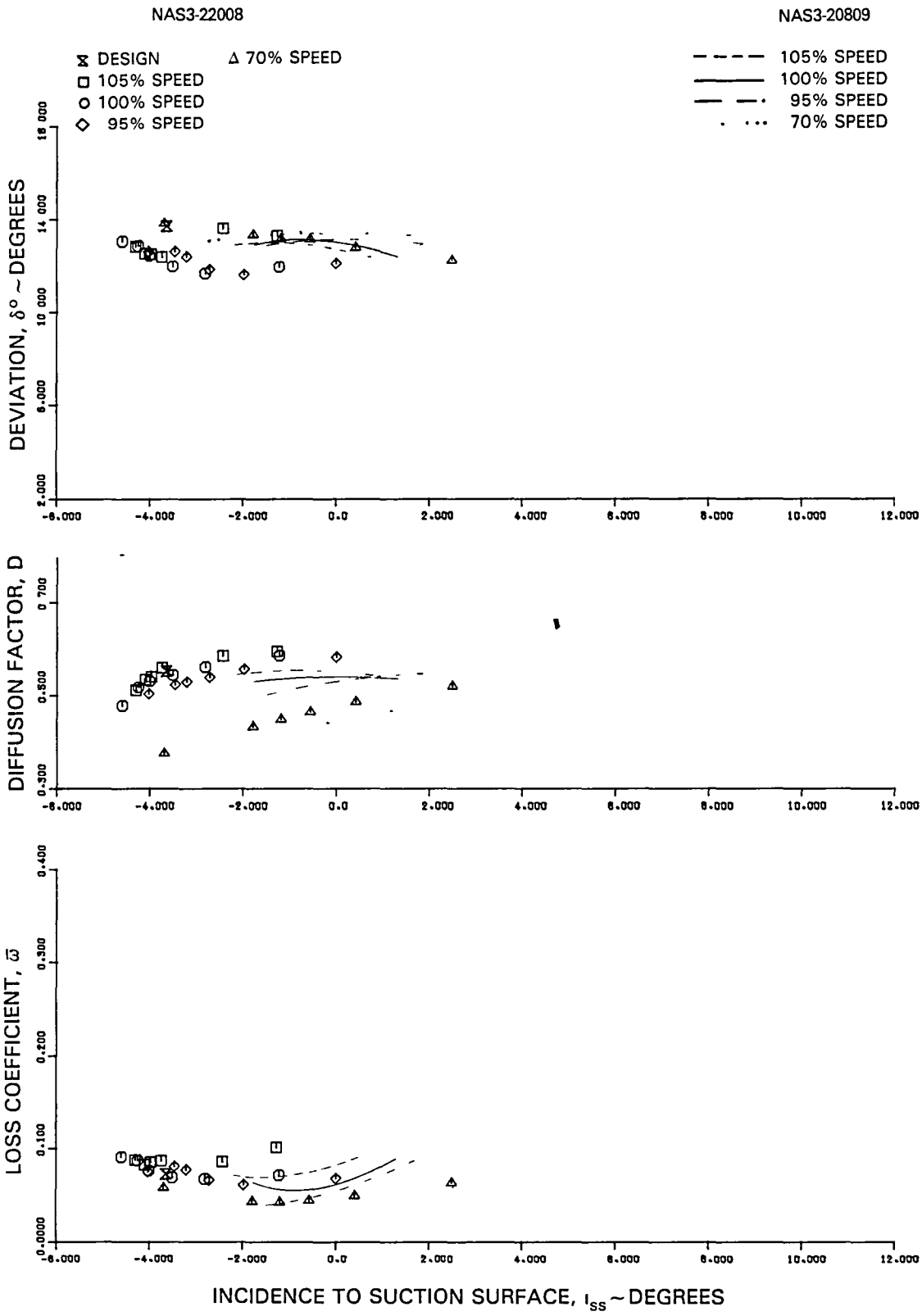


Figure 30 Rotor Blade Element Plots Showing Deviation Angle, Diffusion Factor, and Loss Coefficient as Functions of Suction Surface Incidence Angle at Five Percent Span From the Hub at Design Stagger Angles

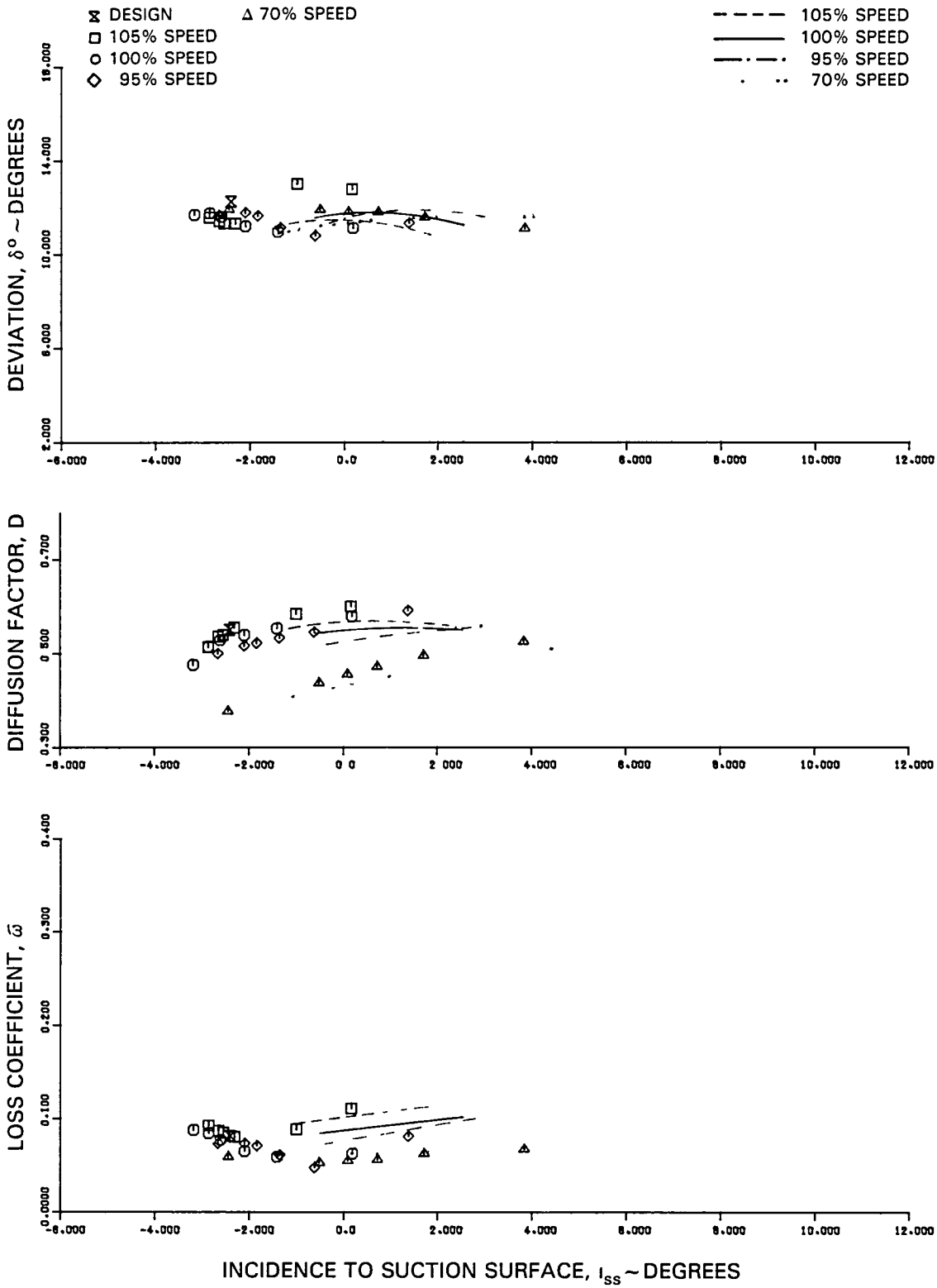


Figure 31 Rotor Blade Element Plots Showing Deviation Angle, Diffusion Factor, and Loss Coefficient as Functions of Suction Surface Incidence Angle at Ten Percent Span From the Hub at Design Stagger Angles

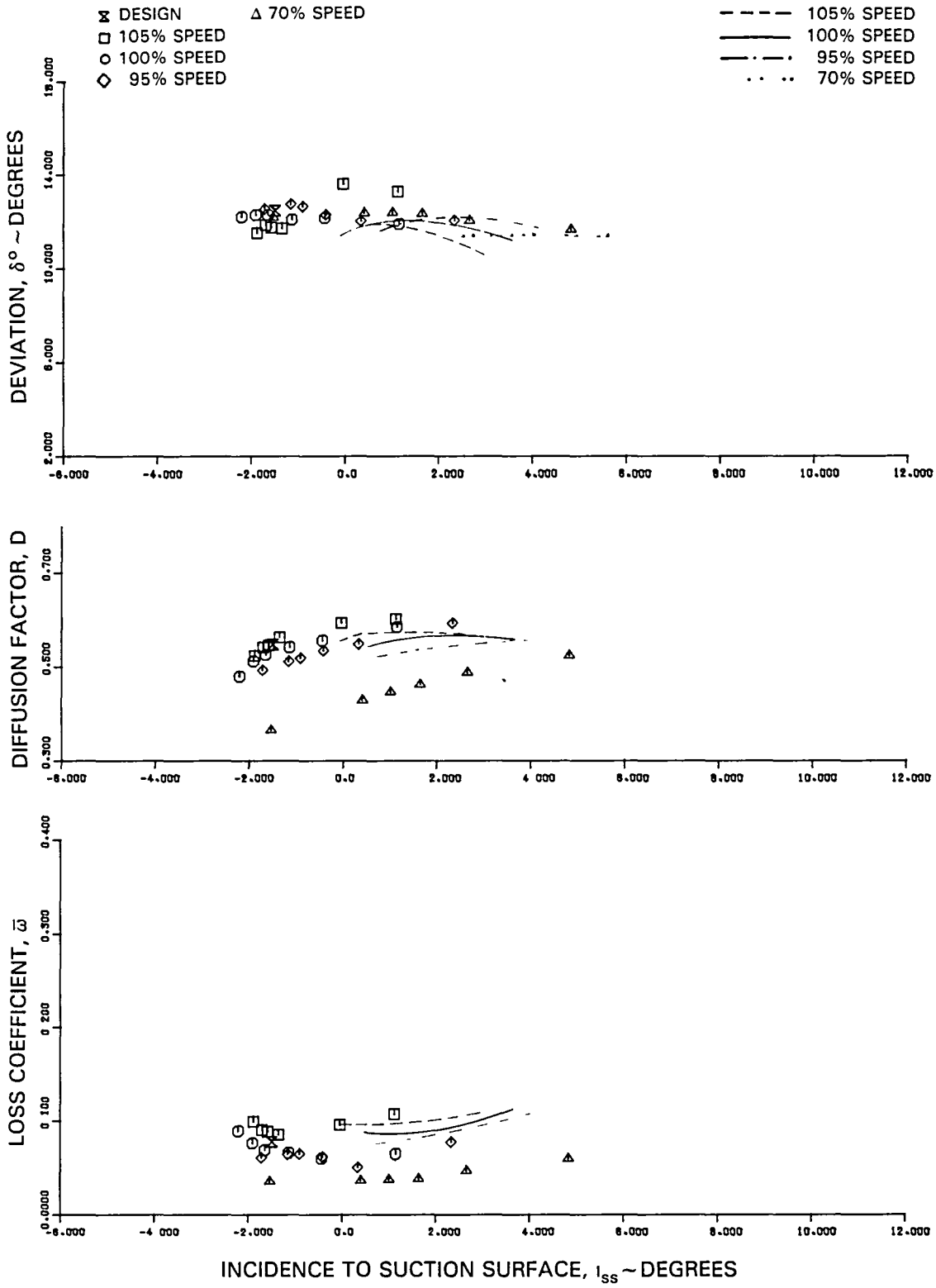


Figure 32 Rotor Blade Element Plots Showing Deviation Angle, Diffusion Factor, and Loss Coefficient as Functions of Suction Surface Incidence Angle at 15 Percent Span From the Hub at Design Stagger Angles

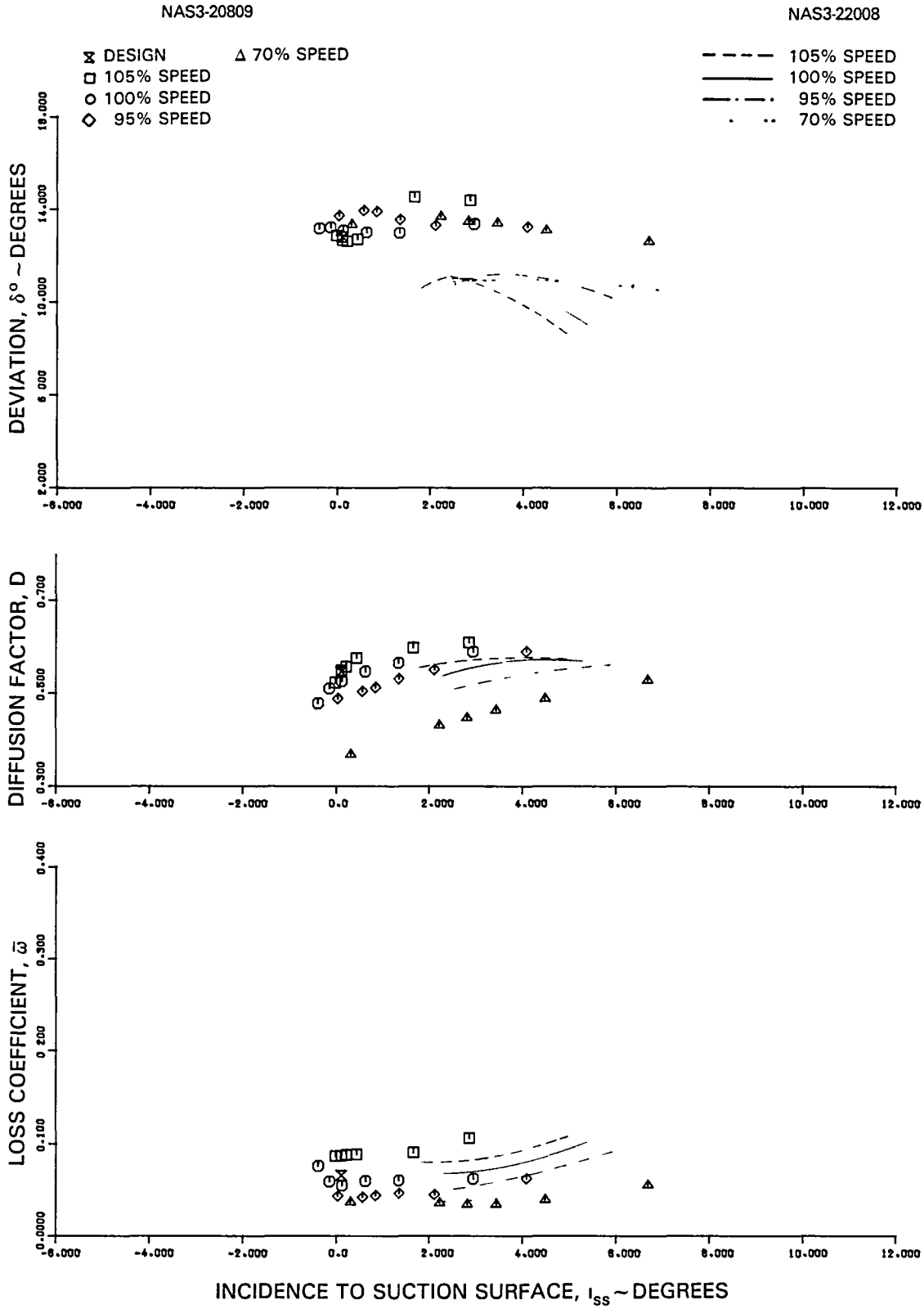


Figure 33 Rotor Blade Element Plots Showing Deviation Angle, Diffusion Factor, and Loss Coefficient as Functions of Suction Surface Incidence Angle at 30 Percent Span From the Hub at Design Stagger Angles

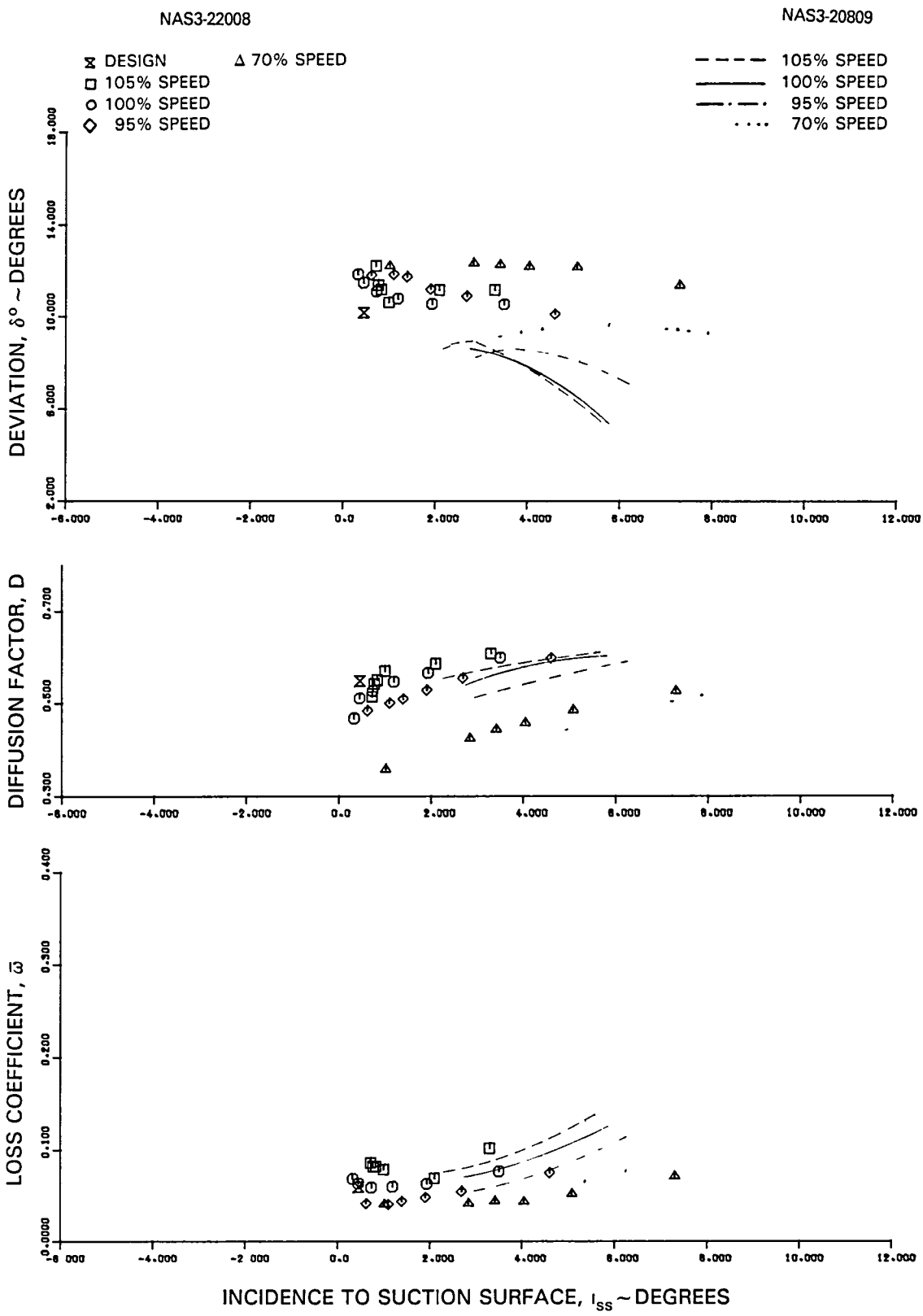


Figure 34 Rotor Blade Element Plots Showing Deviation Angle, Diffusion Factor, and Loss Coefficient as Functions of Suction Surface Incidence Angle at 50 Percent Span From the Hub at Design Stagger Angles

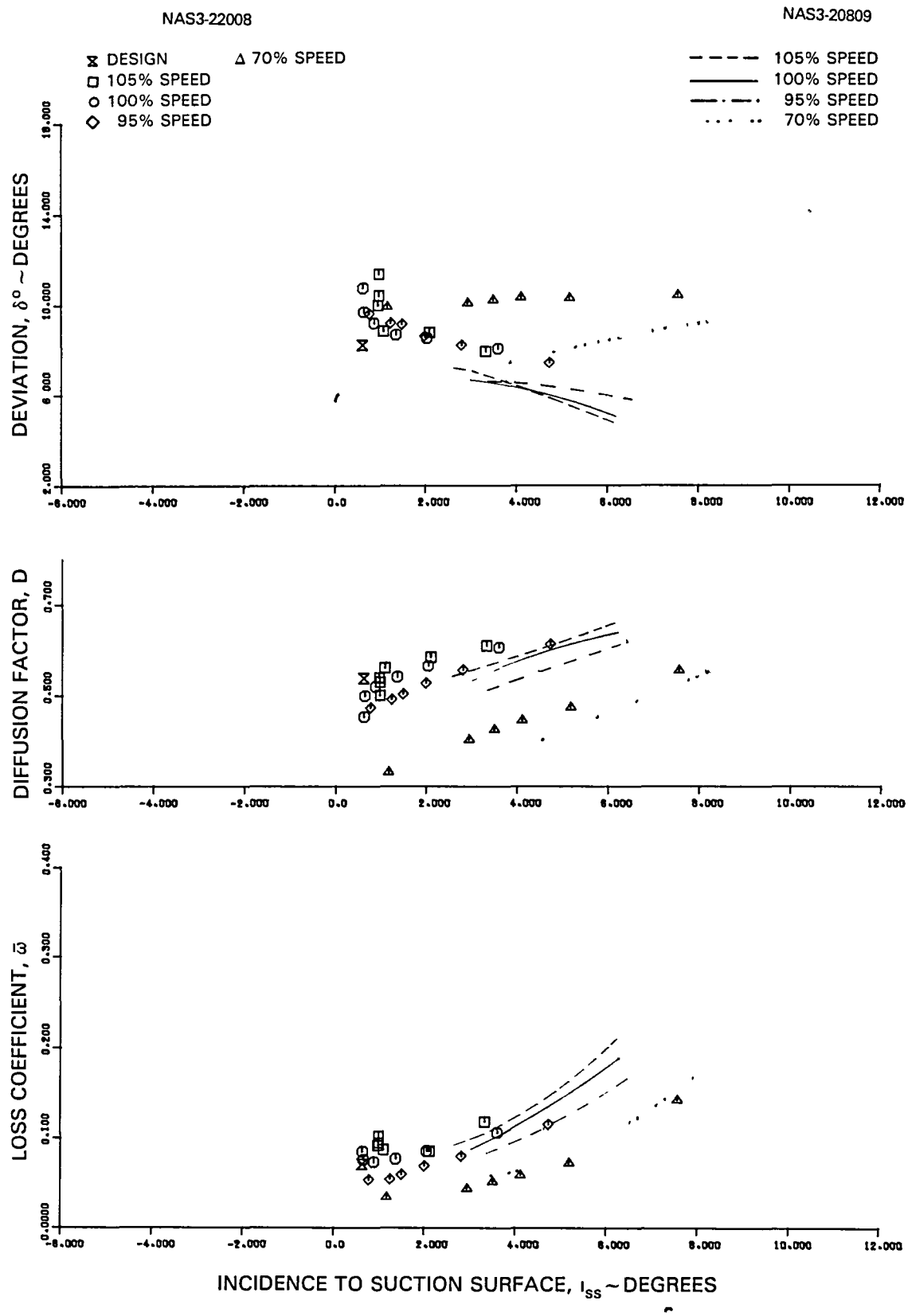


Figure 35 Rotor Blade Element Plots Showing Deviation Angle, Diffusion Factor, and Loss Coefficient as Functions of Suction Surface Incidence Angle at 70 Percent Span From the Hub at Design Stagger Angles

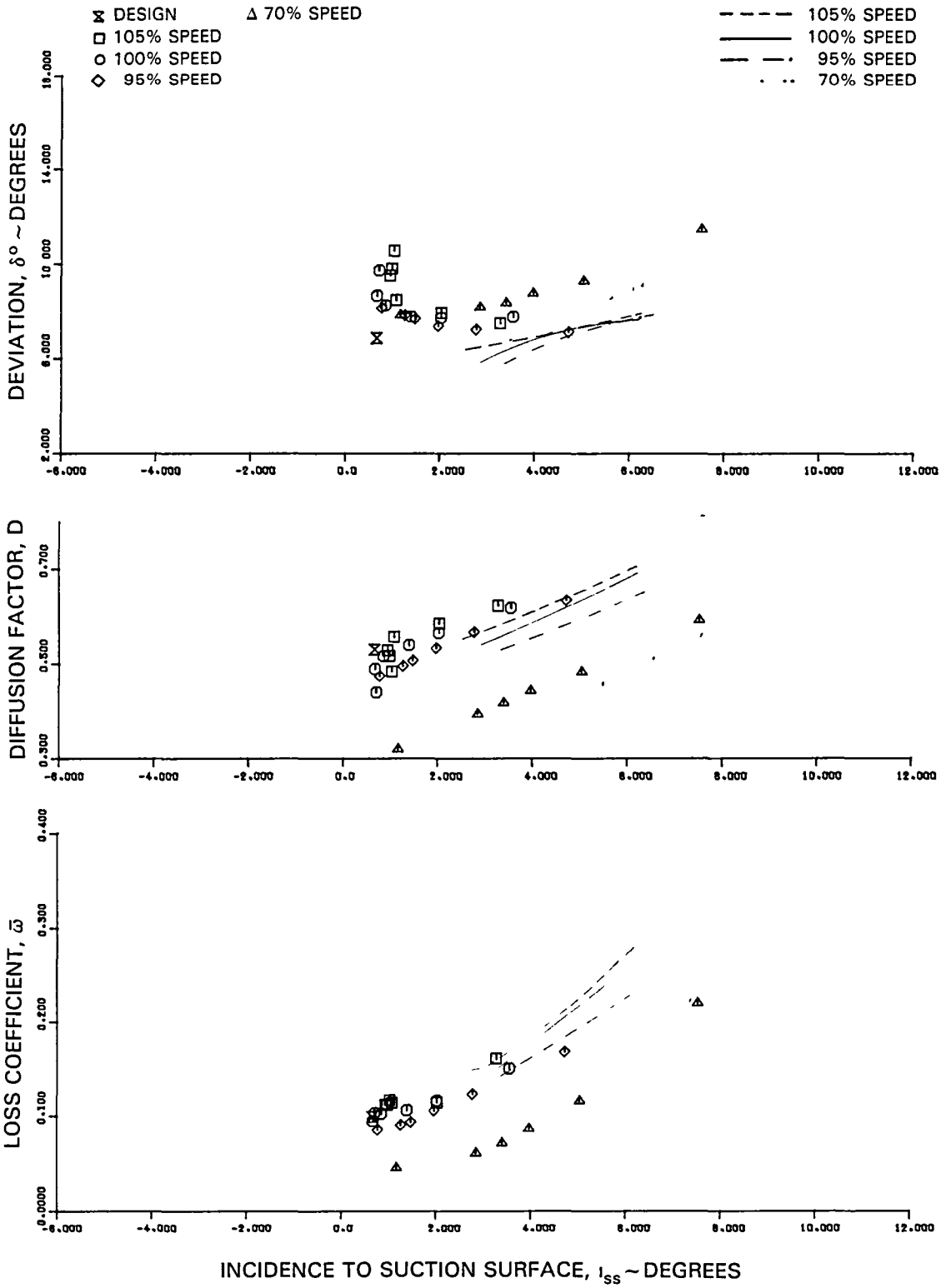


Figure 36 Rotor Blade Element Plots Showing Deviation Angle, Diffusion Factor, and Loss Coefficient as Functions of Suction Surface Incidence Angle at 85 Percent Span From the Hub at Design Stagger Angles

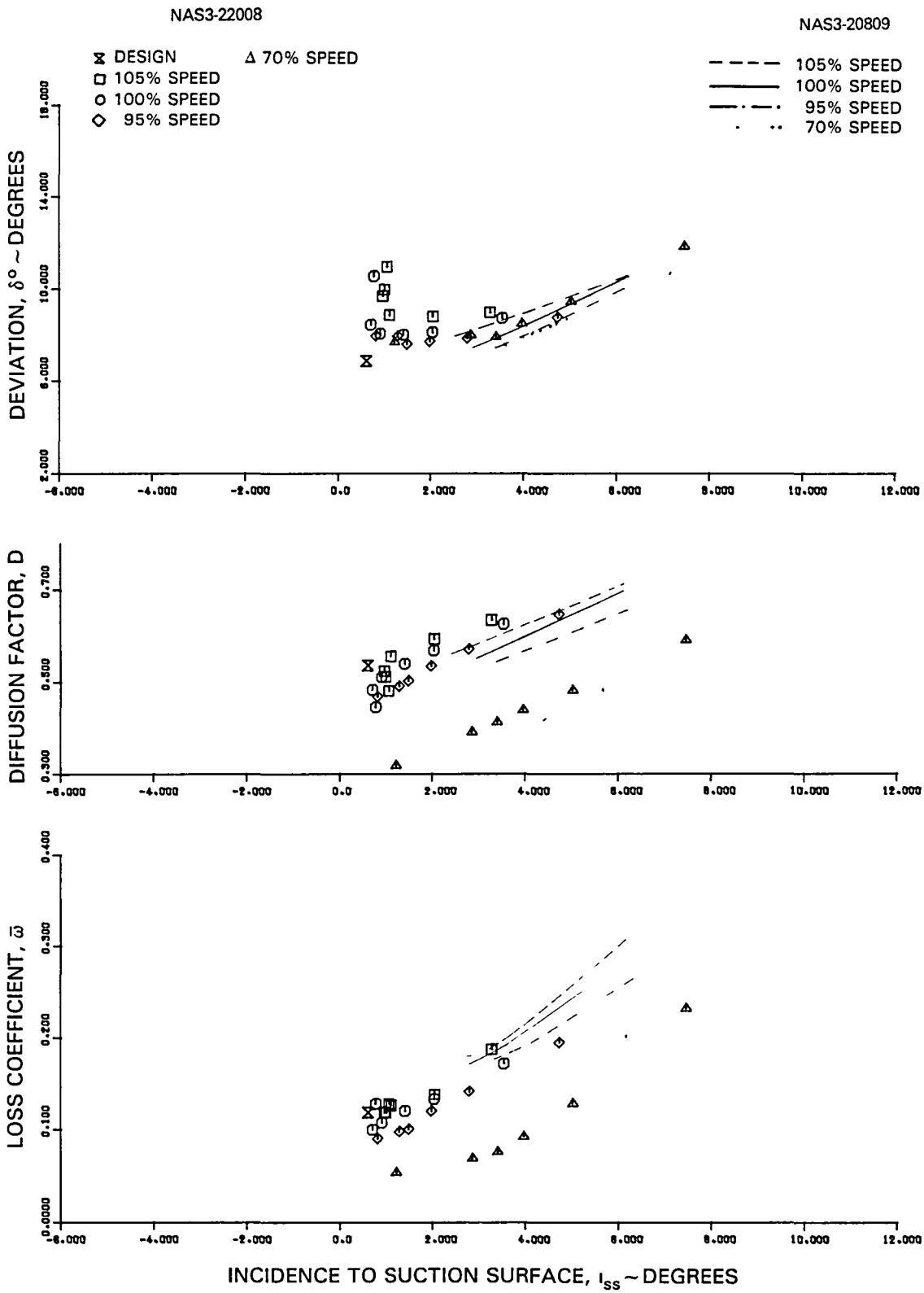


Figure 37 Rotor Blade Element Plots Showing Deviation Angle, Diffusion Factor, and Loss Coefficient as Functions of Suction Surface Incidence Angle at 90 Percent Span From the Hub at Design Stagger Angles

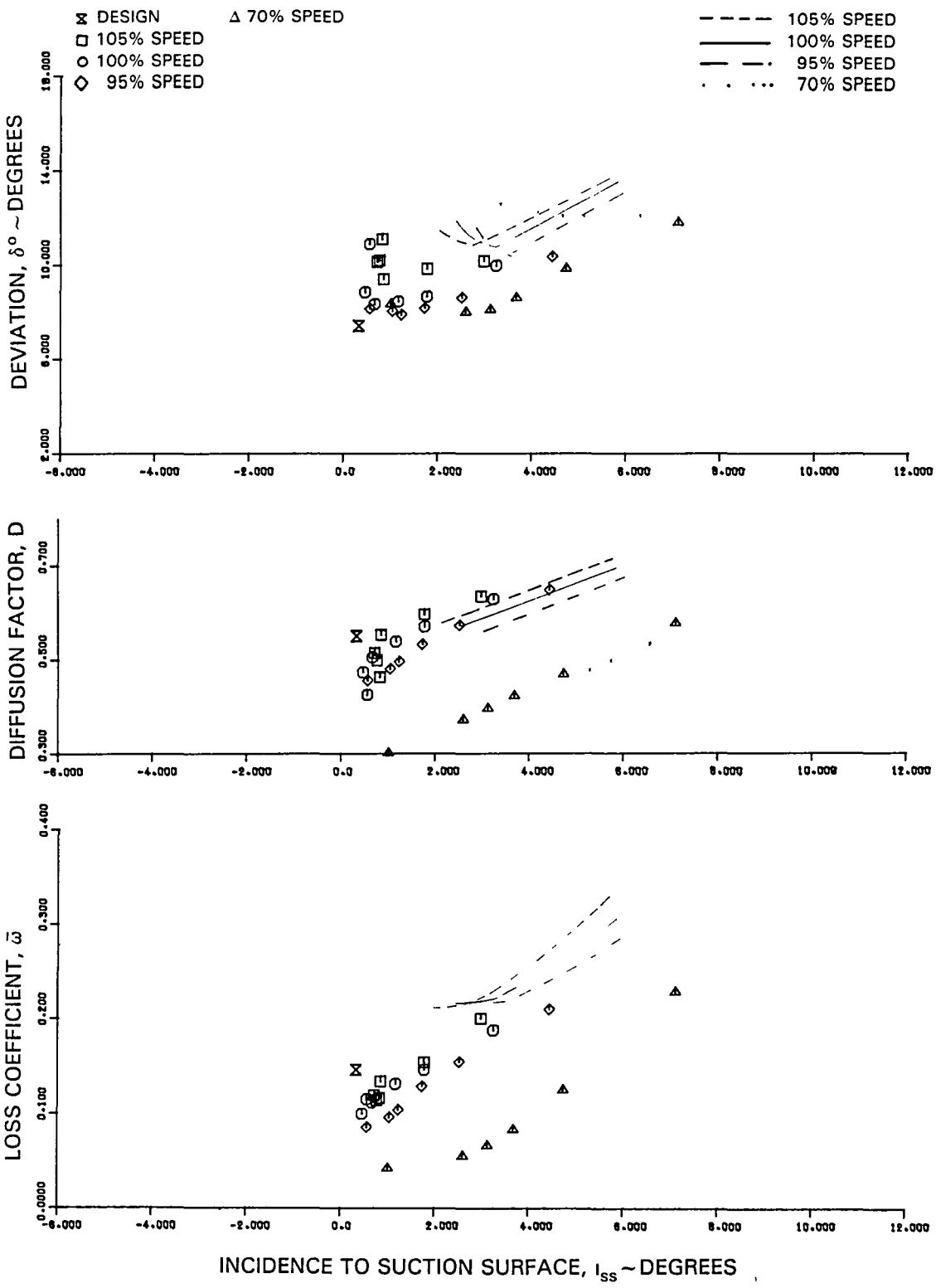


Figure 38 Rotor Blade Element Plots Showing Deviation Angle, Diffusion Factor, and Loss Coefficient as Functions of Suction Surface Incidence Angle at 95 Percent Span From the Hub at Design Stagger Angles

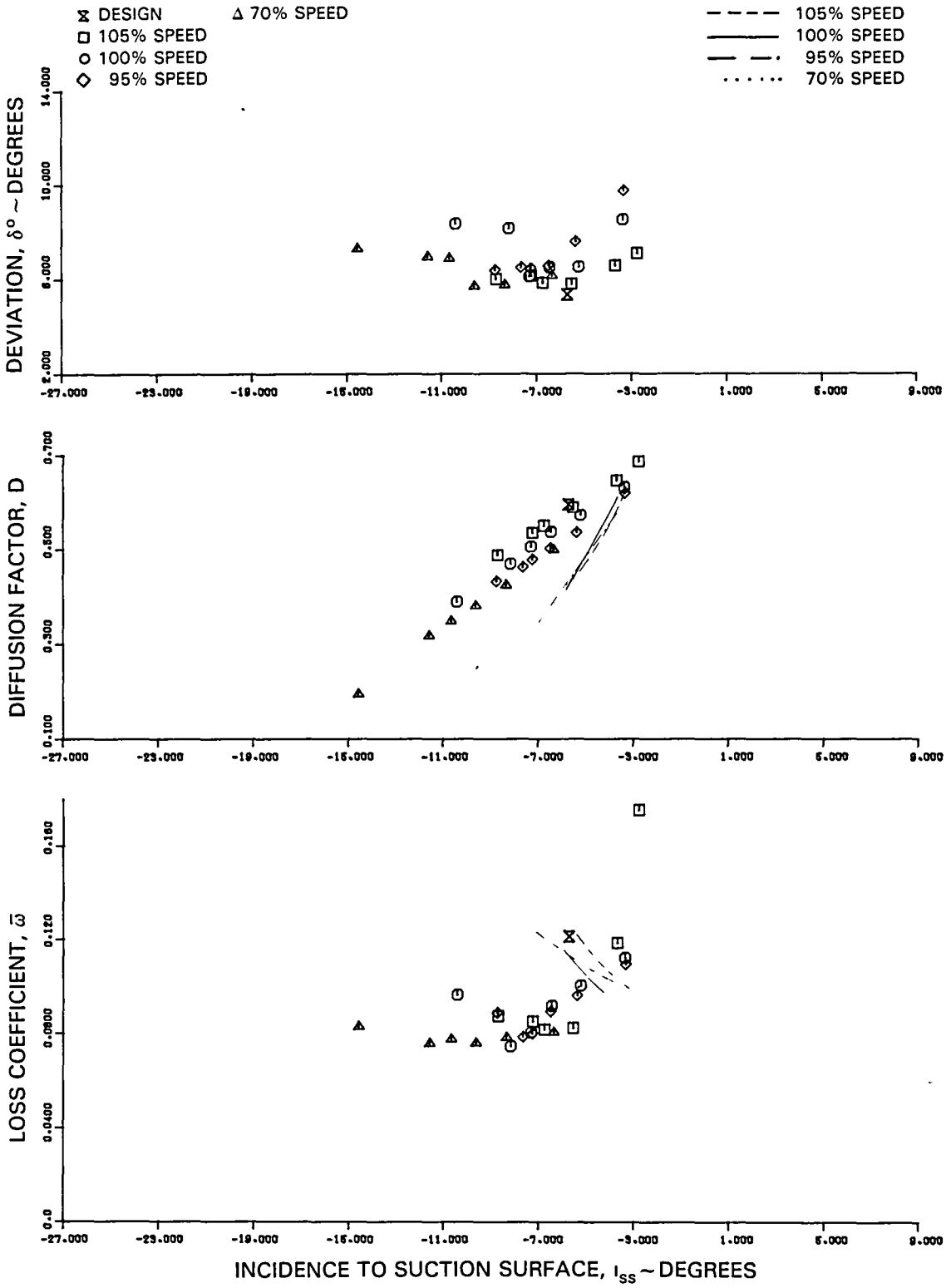


Figure 39 Stator Blade Element Plots Showing Deviation Angle, Diffusion Factor, and Loss Coefficient as Functions of Suction Surface Incidence Angle at Five Percent Span From the Hub at Design Stagger Angles

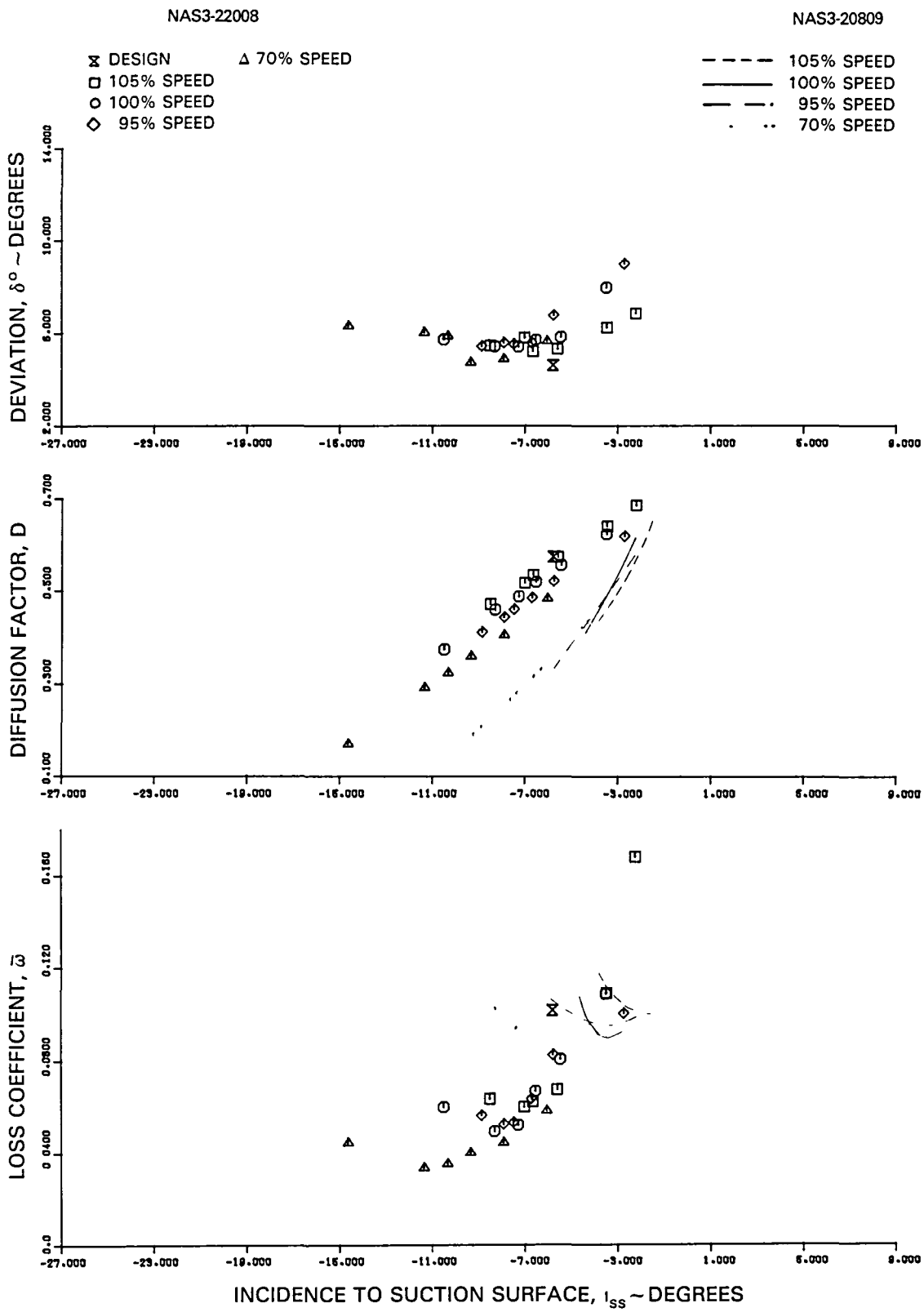


Figure 40 Stator Blade Element Plots Showing Deviation Angle, Diffusion Factor, and Loss Coefficient as Functions of Suction Surface Incidence Angle at 11 Percent Span From the Hub at Design Stagger Angles

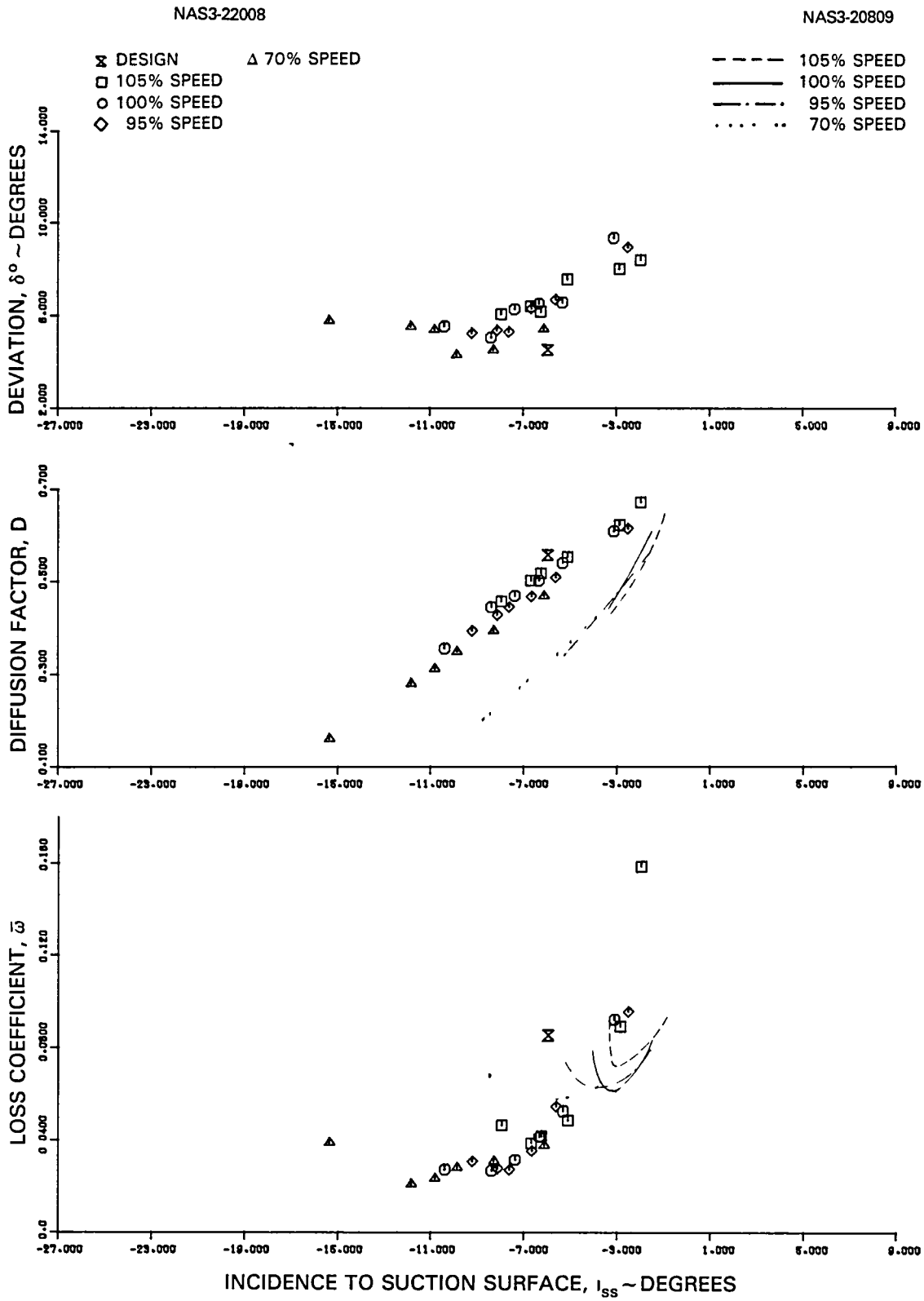


Figure 41 Stator Blade Element Plots Showing Deviation Angle, Diffusion Factor, and Loss Coefficient as Functions of Suction Surface Incidence Angle at 16 Percent Span From the Hub at Design Stagger Angles

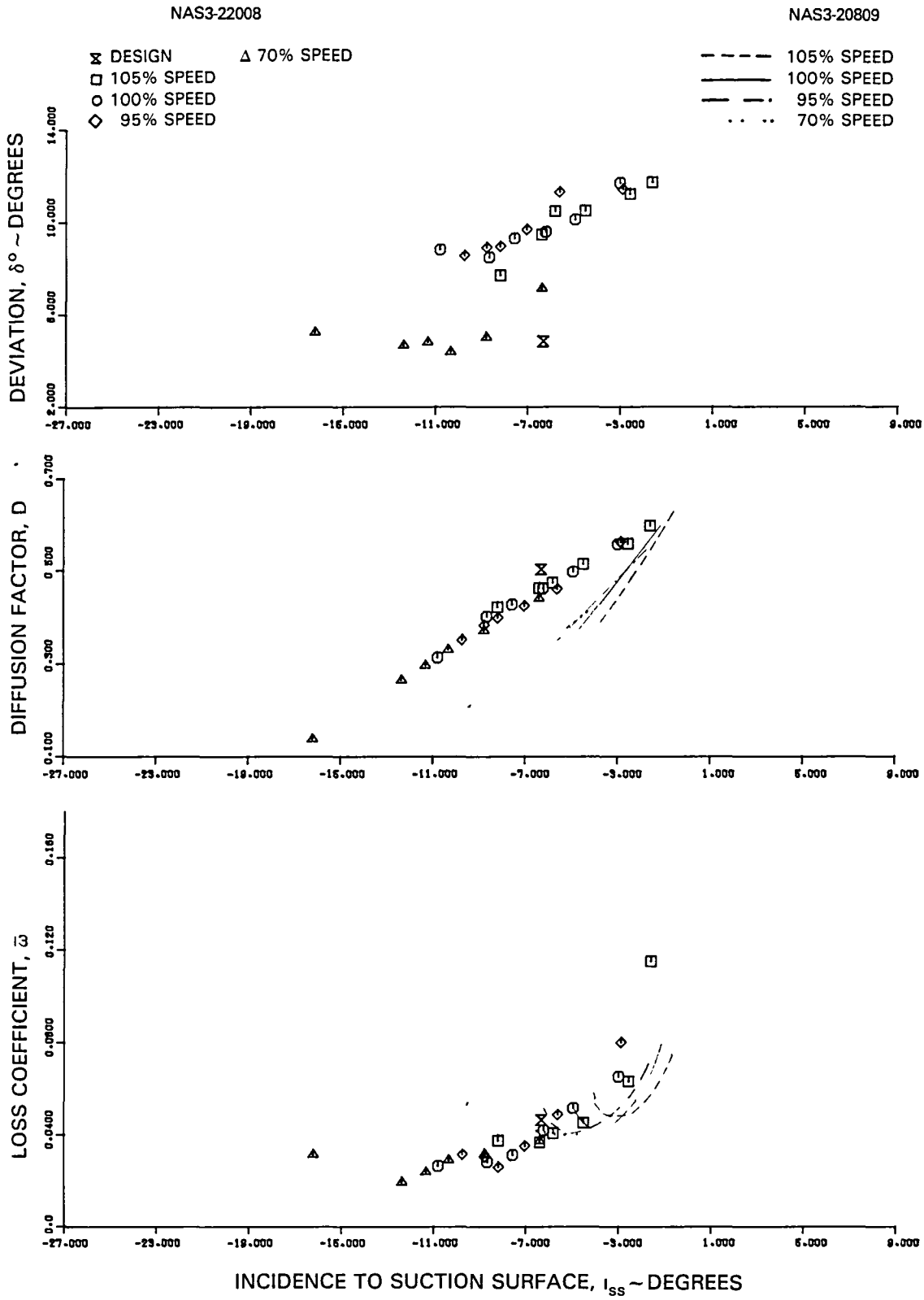


Figure 42 Stator Blade Element Plots Showing Deviation Angle, Diffusion Factor, and Loss Coefficient as Functions of Suction Surface Incidence Angle at 31 Percent Span From the Hub at Design Stagger Angles

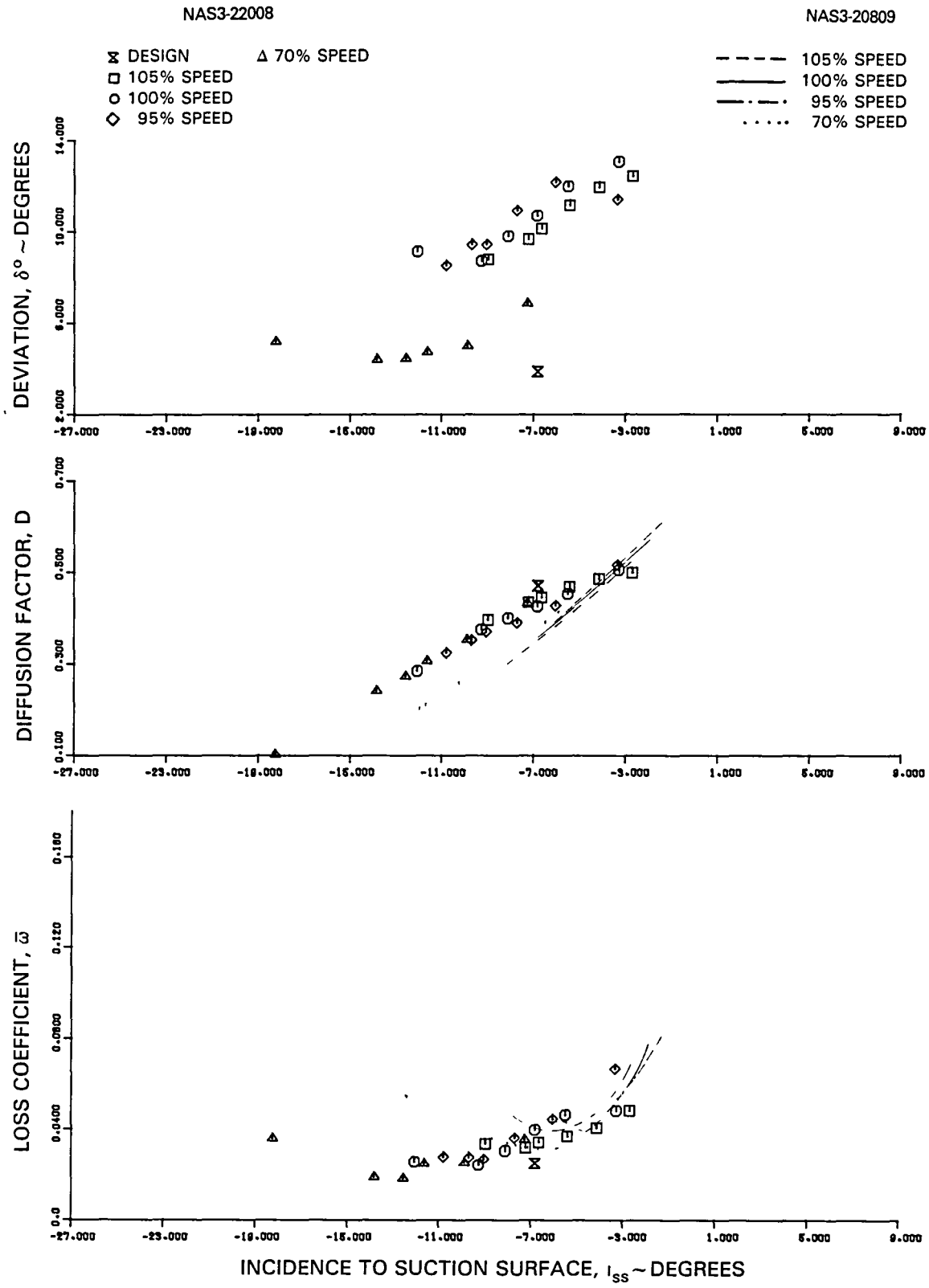


Figure 43 Stator Blade Element Plots Showing Deviation Angle, Diffusion Factor, and Loss Coefficient as Functions of Suction Surface Incidence Angle at 51 Percent Span From the Hub at Design Stagger Angles

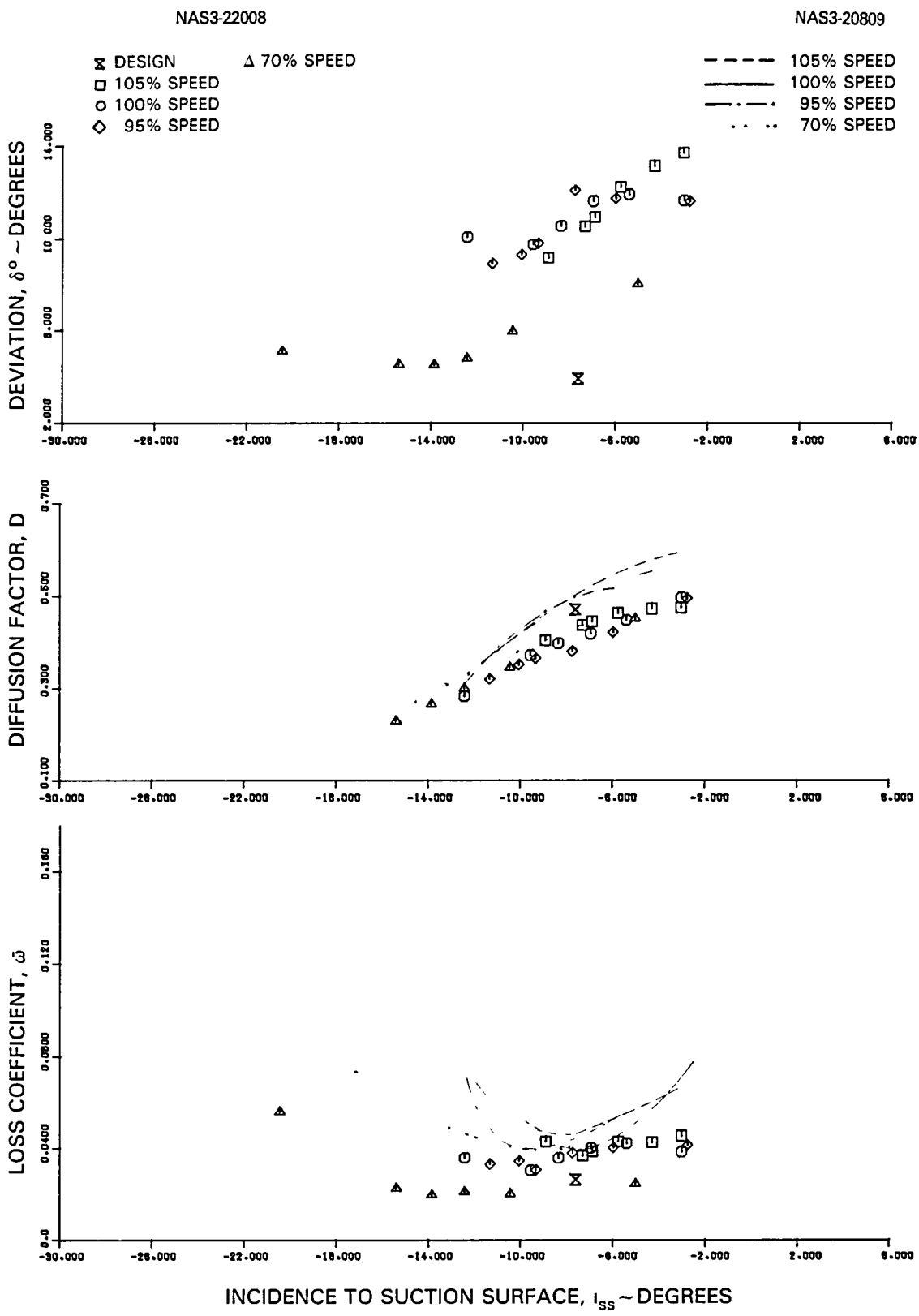


Figure 44 Stator Blade Element Plots Showing Deviation Angle, Diffusion Factor, and Loss Coefficient as Functions of Suction Surface Incidence Angle at 71 Percent Span From the Hub at Design Stagger Angles

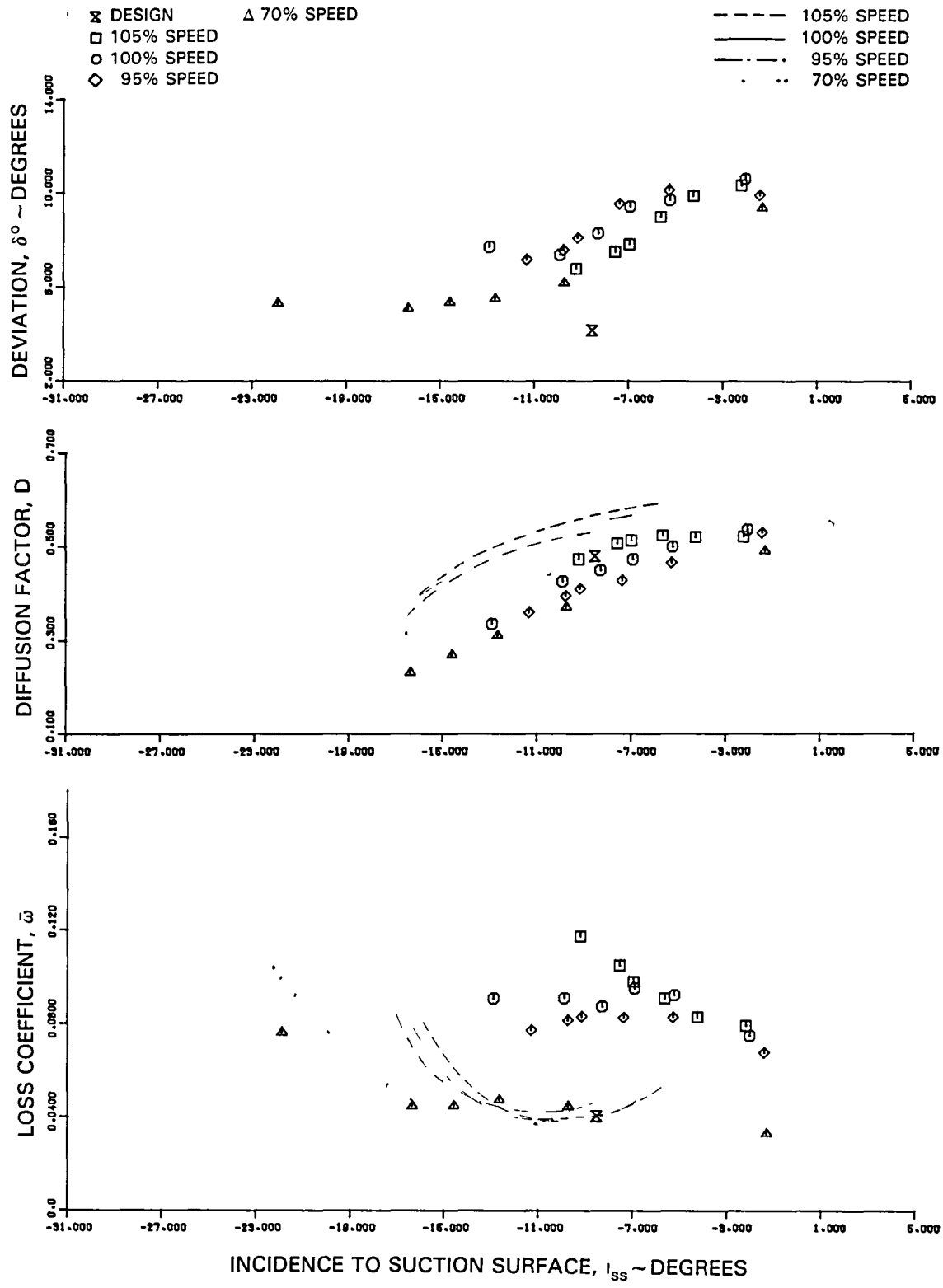


Figure 45 Stator Blade Element Plots Showing Deviation Angle, Diffusion Factor, and Loss Coefficient as Functions of Suction Surface Incidence Angle at 86 Percent Span From the Hub at Design Stagger Angles

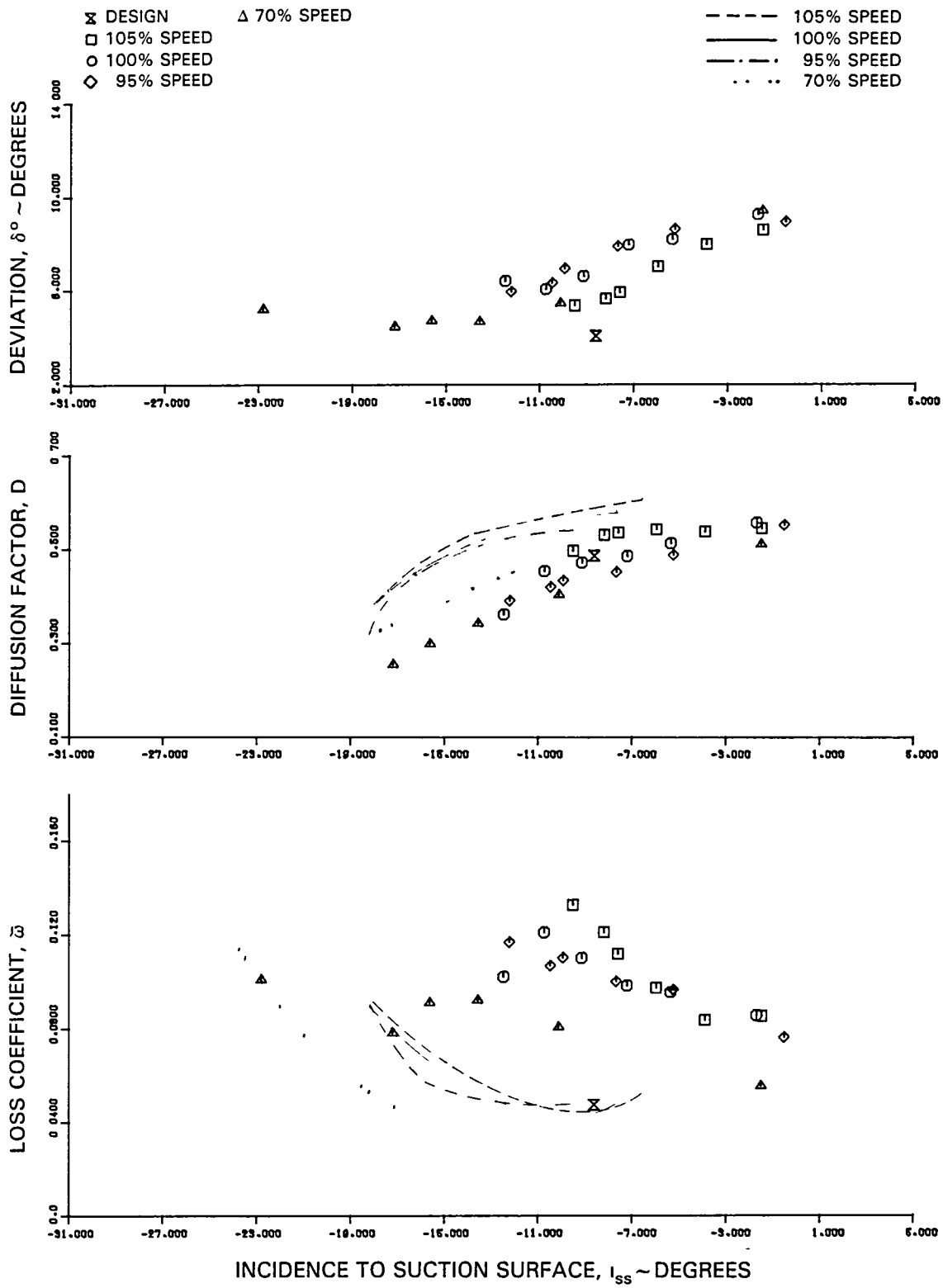


Figure 46 Stator Blade Element Plots Showing Deviation Angle, Diffusion Factor, and Loss Coefficient as Functions of Suction Surface Incidence Angle at 90 Percent Span From the Hub at Design Stagger Angles

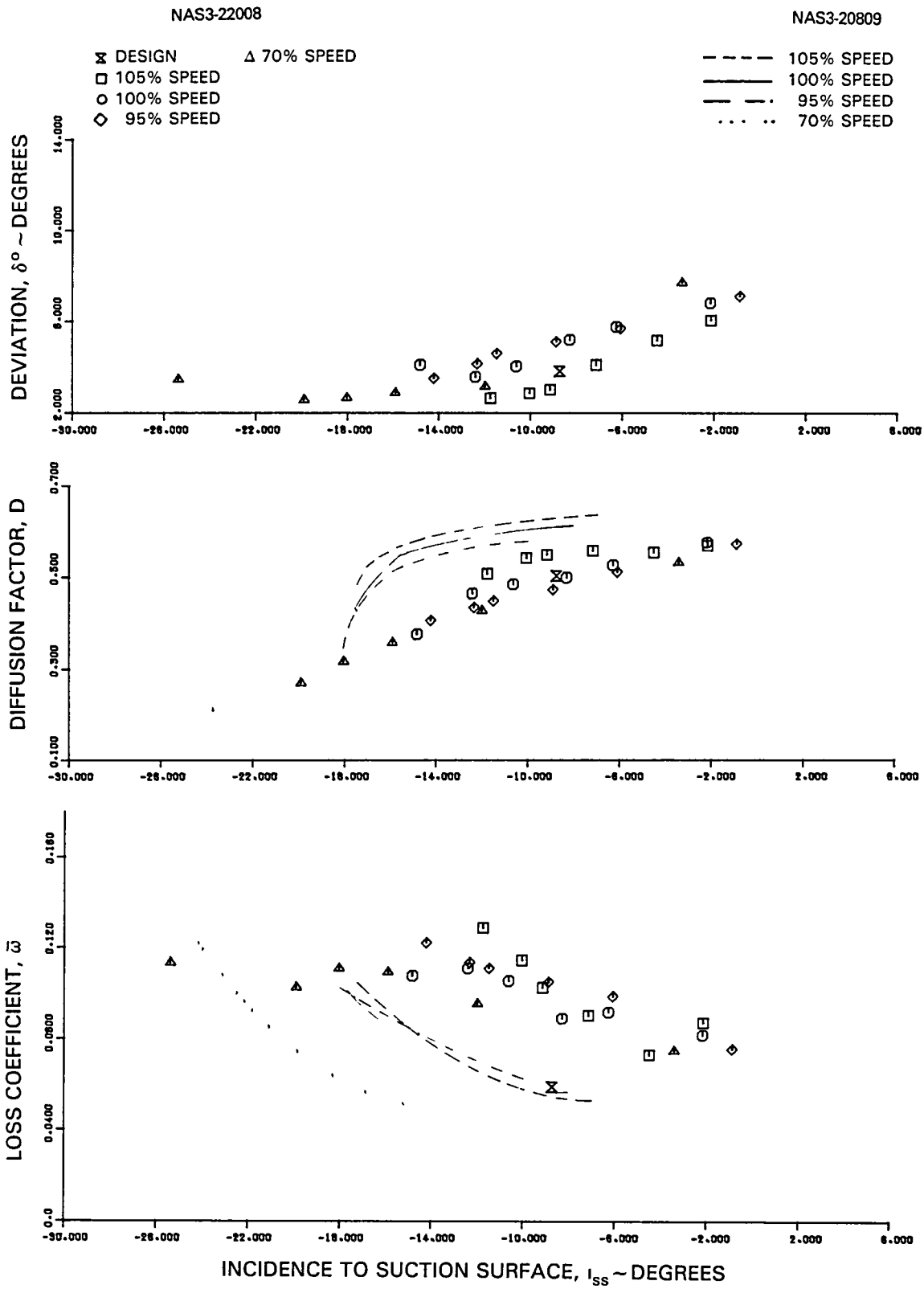


Figure 47 Stator Blade Element Plots Showing Deviation Angle, Diffusion Factor, and Loss Coefficient as Functions of Suction Surface Incidence Angle at 95 Percent Span From the Hub at Design Stagger Angles

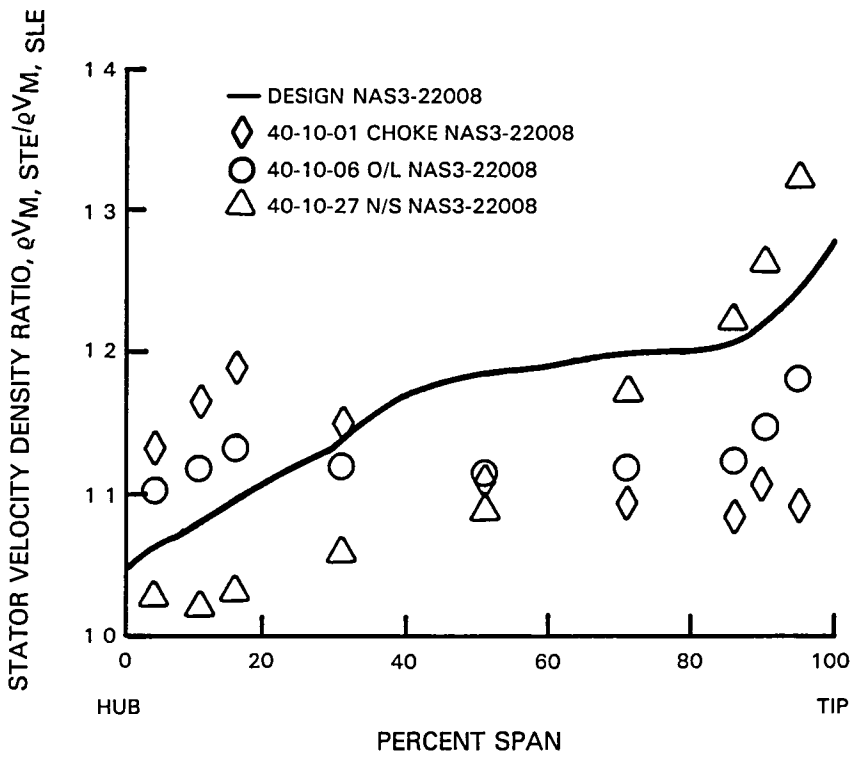


Figure 48 Stator Velocity Density Ratio as a Function of Percent Span at the Stator Trailing Edge at Design, Choke, Operating Line, and Near Stall

APPENDIX A

SYMBOLS

A	area, meters^2 (inches^2)
C_p	specific heat at constant pressure, joule/kg-K (Btu/lbm-^oR)
D	diffusion factor
g_c	conversion factor, 32.17 lbm-ft/lbf-sec^2
i_m	incidence angle, angle between inlet air direction and line tangent to blade mean camber line at leading edge, degrees
i_{ss}	incidence angle, angle between inlet air direction and line tangent to blade suction surface at leading edge, degrees
IGV	inlet guide vane
J	conversion factor, 1.00m-kg/joule (778 ft-lbf/Btu)
N	rotor speed, rpm
P_T	total pressure, N/m^2 or lbf/ft^2
P_S	static pressure, N/m^2 or lbf/ft^2
R	gas constant for air
r	radius measured from rig centerline, meters (inches)
SL	streamline number
T_T	total temperature, K (^oR)
T_S	static temperature, K (^oR)
U	rotor speed, m/sec (ft/sec)
V	air velocity, m/sec (ft/sec)
V_m	meridional velocity $(V_r^2+V_z^2)^{1/2}$, m/sec (ft/sec)
V_θ	tangential velocity, m/sec (ft/sec)
W	mass flow rate, kg/sec (lbm/sec)

SYMBOLS (Con't)

z	axial distance - meters (inches)
β	absolute air angle, $\cot^{-1}$ (V_m/V_θ), degrees
β'	relative air angle, $\cot^{-1}$ (V_m/V_θ'), degrees
$\Delta\beta$	air turning angle, degrees
γ	ratio of specific heats for air
δ	ratio of total pressure to standard pressure of 1.01325 x 10^5 N/m^2 (2.116 x 10^3 lbf/ft^2)
δ^0	deviation angle, exit air angle minus tangent to blade mean camber line at trailing edge, degrees
ϵ	angle between tangent to streamline projected on meridional plane and axial direction, degrees
η	efficiency
θ	ratio of total temperature to standard temperature of 288.16K (518.7°R)
ρ	mass density - kg/m^3 (lbm/ft^3)
σ	solidity, ratio of aerodynamic chord to gap between blades
ω	angular velocity of rotor, radians/sec
$\bar{\omega}$	total pressure loss coefficient

SUPERSCRIPTS

'	relative to rotor
*	blade metal angle

SUBSCRIPTS

ad	adiabatic
des.	design
in	inlet
m	meridional direction

SUBSCRIPTS (Cont'd)

p	polytropic or profile
r	radial direction; radius
r	ratio (e.g., $P_{T,r}$ = total pressure ratio)
RLE	rotor leading edge
RTE	rotor trailing edge
SLE	stator leading edge
STE	stator trailing edge
ss	suction surface
z	axial component
θ	tangential component
0	inlet flow measuring orifice
1	plenum chamber
2	instrument plane upstream of intermediate case strut
3	instrument plane upstream of rotor
4	instrument plane downstream of rotor
5	instrument plane downstream of stator

APPENDIX B

PERFORMANCE PARAMETERS

a) Relative total temperature

$$T'_{T,RLE} = T_{S,RLE}\left[1 + \frac{\gamma - 1}{2}(M'_{RLE})^2\right] \qquad \text{(rotor) IN}$$

$$T'_{T,RTE} = T'_{T,RLE} + \left[\frac{(\omega r)^2_{RTE} - (\omega r)^2_{RLE}}{\frac{2\gamma}{\gamma - 1} Rg_c}\right] \qquad \text{(rotor) OUT}$$

b) Incidence angle based on mean camber line

$$i_m = \beta'_{RLE} - \beta^*_{RLE} \qquad \text{(rotor)}$$

$$i_m = \beta_{SLE} - \beta^*_{SLE} \qquad \text{(stator)}$$

Incidence angle based on suction surface metal angle

$$i_{ss} = \beta'_{RLE} - \beta^*_{ss,RLE} \qquad \text{(rotor)}$$

$$i_{ss} = \beta_{SLE} - \beta^*_{ss,SLE} \qquad \text{(stator)}$$

c) Deviation angle

$$\delta^\circ = \beta'_{RTE} - \beta^*_{RTE} \qquad \text{(rotor)}$$

$$\delta^\circ = \beta_{STE} - \beta^*_{STE} \qquad \text{(stator)}$$

d) Diffusion factor

$$D = 1 - \frac{V'_{RTE}}{V'_{RLE}} + \frac{r_{RTE} V_{\theta\,RTE} - r_{RLE} V_{\theta\,RLE}}{(r_{RTE} + r_{RLE})\,\sigma\, V'_{RLE}} \qquad \text{(rotor)}$$

$$D = 1 - \frac{V_{STE}}{V_{SLE}} + \frac{r_{SLE} V_{\theta\,SLE} - r_{STE} V_{\theta\,STE}}{(r_{SLE} + r_{STE})\,\sigma\, V_{SLE}} \qquad \text{(stator)}$$

e) Loss coefficient

$$\bar{\omega} = \frac{P'_{T,RLE}\left[\frac{T'_{T,RTE}}{T'_{T,RLE}}\right]^{\frac{\gamma}{\gamma-1}} - P'_{T,RTE}}{P'_{T,RLE} - P_{S,RLE}} \qquad \text{(rotor)}$$

$$\bar{\omega} = \frac{P_{T,SLE} - P_{T,STE}}{P_{T,SLE} - P_{S,SLE}} \qquad \text{(stator)}$$

f) Loss parameter

$$\frac{\bar{\omega} \cos \beta'_{RTE}}{2\sigma} \qquad \text{(rotor)}$$

$$\frac{\bar{\omega} \cos \beta_{STE}}{2\sigma} \qquad \text{(stator)}$$

g) Polytropic efficiency

$$\eta_p = \frac{\frac{\gamma-1}{\gamma} \ln \frac{P_{T,RTE}}{P_{T,RLE}}}{\ln \frac{T_{T,RTE}}{T_{T,RLE}}} \qquad \text{(rotor)}$$

$$\eta_p = \frac{\frac{\gamma-1}{\gamma} \ln \frac{P_{T,STE}}{P_{T,RLE}}}{\ln \frac{T_{T,STE}}{T_{T,RLE}}} \qquad \text{(stage)}$$

h) Adiabatic efficiency

$$\eta_{ad} = \frac{\left[\frac{P_{T,RTE}}{P_{T,RLE}}\right]^{\frac{\gamma-1}{\gamma}} - 1}{\left[\frac{T_{T,RTE}}{T_{T,RLE}}\right] - 1} \qquad \text{(rotor)}$$

$$\eta_{ad} = \frac{\left[\frac{P_{T,STE}}{P_{T,RLE}}\right]^{\frac{\gamma-1}{\gamma}} - 1}{\left[\frac{T_{T,STE}}{T_{T,RLE}}\right] - 1} \qquad \text{(stage)}$$

i) Surge margin

$$SM = \left[\left(\frac{P_{T,STE}/P_{T,RLE}}{W\sqrt{\theta} \,/\, \delta} \right)_{Stall} \Bigg/ \left(\frac{W\sqrt{\theta} \,/\, \delta}{P_{T,STE}/P_{T,RLE}} \right)_{\substack{\text{Reference} \\ \text{Point or} \\ \text{Operating Point}}} - 1 \right] 100$$

APPENDIX C

Overall and Blade Element Performance

Airfoil Aerodynamic Summary

COMPUTER TABLE SYMBOL TRANSLATION

AIRFOIL AERODYNAMIC SUMMARY PRINT

xx PERCENT DESIGN SPEED (ROTOR PERFORMANCE) RUN NO xxx SPEED CODE xx POINT NO x

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1																
2																
3	V_{RLE}		$V_{m,RLE}$		$V_{\theta,RLE}$		U_{RLE}		V'_{RLE}		$V'_{\theta,RLE}$		$\rho V_{m,RLE}$		ϵ_{RLE}	
4		V_{RTE}		$V_{m,RTE}$		$V_{\theta,RTE}$		U_{RTE}		V'_{RTE}		$V'_{\theta,RTE}$		$\rho V_{m,RTE}$		ϵ_{RTE}
5																
6																
7																
8																
9																

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF-P TOTAL
1																		
2																		
3	β_{RLE}		β'_{RLE}		M_{RLE}		M'_{RLE}		i_{ss}		δ^o		D	$\frac{\bar{\omega}\cos\beta'_{RTE}}{2\sigma}$			η_{ad}	
4		β_{RTE}		β'_{RTE}		M_{RTE}		M'_{RTE}		i_m		$\Delta\beta'$		$\bar{\omega}$				η_p
5																$\frac{P_{T,RTE}}{P_{T,RLE}}$	$\frac{RTE}{RLE}$	
6																		
7																		$\frac{RTE}{RLE}$
8																		
9																		

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1																	
2																	
3	V_{RLE}		$V_{m,RLE}$		$V_{\theta,RLE}$		U_{RLE}		V'_{RLE}		$V'_{\theta,RLE}$		$\rho V_{m,RLE}$		ϵ_{RLE}		% span
4		V_{RTE}		$V_{m,RTE}$		$V_{\theta,RTE}$		U_{RTE}		V'_{RTE}		$V'_{\theta,RTE}$		$\rho V_{m,RTE}$		ϵ_{RTE}	
5																	RTE
6																	
7																	
8																	
9																	

WC1/A1 LBM/SEC SQFT $\frac{W\sqrt{\theta}}{\delta A}$	WC1/A1 KG/SEC SQM $\frac{W\sqrt{\theta}}{\delta A}$	T02/T01 $\frac{T_{T,RTE}}{T_{T,RLE}}$	P02/P01 $\frac{P_{T,RTE}}{P_{T,RLE}}$	EFF-AD ROTOR % η_{ad} $\frac{RTE}{RLE}$	EFF-P ROTOR % η_p $\frac{RTE}{RLE}$

COMPUTER TABLE SYMBOL TRANSLATION

AIRFOIL AERODYNAMIC SUMMARY PRINT

xx PERCENT DESIGN SPEED (STATOR PERFORMANCE) RUN NO xxx SPEED CODE xx POINT NO x

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1										
2										
3	V_{SLE}		$V_{m,SLE}$		$V_{\theta,SLE}$		$\rho V_{m,SLE}$		ϵ_{SLE}	
4		V_{STE}		$V_{m,STE}$		$V_{\theta,STE}$		$\rho V_{m,STE}$		ϵ_{STE}
5										
6										
7										
8										
9										

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	P0/P0 STAGE	T0/T0 STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1																
2																
3	β_{SLE}		M_{SLE}		i_{ss}		δ^0	$\Delta\beta$	D	$\frac{\bar{\omega}\cos\beta}{2\sigma}$ STE			$\frac{P_{T,STE}}{P_{T,RLE}}$		η_{ad}	η_p
4		β_{STE}		M_{STE}		i_m										
5										$\bar{\omega}$		$\frac{P_{T,STE}}{P_{T,SLE}}$		$\frac{T_{T,STE}}{T_{T,RLE}}$	$\frac{STE}{RLE}$	$\frac{STE}{RLE}$
6																
7																
8																
9																

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1											
2											
3	V_{SLE}		$V_{m,SLE}$		$V_{\theta,SLE}$		$\rho V_{m,SLE}$		% span		ϵ_{STE}
4		V_{STE}		$V_{m,STE}$		$V_{\theta,STE}$		$\rho V_{m,STE}$	STE	ϵ_{SLE}	
5											
6											
7											
8											
9											

	NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	T0/T0 STAGE	P02/P01	P0/P0 STAGE	EFF-AD STAGE %	EFF-P STAGE %
	$\frac{N}{\sqrt{\theta}}$		$\frac{W\sqrt{\theta}}{\delta}$	$\frac{T_{T,STE}}{T_{T,RLE}}$		$\frac{P_{T,STE}}{P_{T,PLE}}$	η_{ad}	η_p
		$\frac{W\sqrt{\theta}}{\delta}$			$\frac{P_{T,STE}}{P_{T,SLE}}$		$\frac{STE}{RLE}$	$\frac{STE}{RLE}$
	RLE	RLE	RLE					

AIRFOIL AERODYNAMIC SUMMARY PRINT

105 PERCENT SPEED (ROTOR PERFORMANCE) RUN NO 40 SPEED CODE 5 POINT NO 8

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	200.9	322.7	199.6	219.6	22.8	236.4	287.9	296.8	331.8	227.7	-265.1	-60.4	197.18	274.82	0.0366	0.0860
2	208.2	316.2	206.3	216.0	28.4	230.9	298.4	305.0	339.8	228.4	-270.0	-74.1	204.24	274.57	0.0187	0.0736
3	211.7	311.8	209.1	211.2	32.7	229.4	308.6	313.2	346.1	227.2	-275.8	-83.8	207.10	271.30	0.0033	0.0607
4	215.4	302.0	211.6	204.5	40.2	222.3	338.5	337.7	365.7	234.8	-298.3	-115.5	208.91	270.21	-0.0381	0.0171
5	216.0	285.9	210.7	191.0	47.6	212.7	377.3	370.4	391.3	247.8	-329.7	-157.8	207.81	259.61	-0.0879	-0.0388
6	213.8	266.8	206.6	171.1	54.7	204.7	414.1	403.2	414.5	262.1	-359.4	-198.5	204.54	237.02	-0.1273	-0.0865
7	209.6	253.8	201.8	157.3	56.6	199.2	440.2	427.7	433.4	277.4	-383.6	-228.5	200.18	220.14	-0.1464	-0.1157
8	206.1	247.4	198.5	150.2	55.3	196.6	448.5	435.9	440.5	282.5	-393.2	-239.2	196.59	210.25	-0.1505	-0.1238
9	202.0	240.2	194.7	146.2	53.7	190.6	456.3	444.1	447.2	292.6	-402.6	-253.5	192.34	205.67	-0.1539	-0.1353

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF-P TOTAL
1	6.5	47.1	52.95	15.38	0.6119	0.9299	1.0108	0.6563	-4.30	1.98	12.84	37.57	0.5118	0.0878	0.0255	1.9217	93.41	93.99
2	7.8	46.9	52.58	18.95	0.6360	0.9109	1.0378	0.6579	-2.86	3.25	11.57	33.63	0.5141	0.0925	0.0269	1.8804	92.57	93.20
3	8.9	47.4	52.80	21.66	0.6475	0.8965	1.0588	0.6534	-1.88	4.08	11.48	31.14	0.5238	0.0992	0.0289	1.8659	91.72	92.41
4	10.8	47.4	54.67	29.45	0.6598	0.8646	1.1202	0.6722	-0.02	5.63	12.85	25.22	0.5231	0.0869	0.0251	1.8646	92.04	92.71
5	12.7	48.0	57.46	39.51	0.6619	0.8130	1.1990	0.7047	0.72	5.59	12.22	17.95	0.5140	0.0861	0.0234	1.8420	91.16	91.88
6	14.8	50.0	60.13	49.14	0.6544	0.7534	1.2690	0.7401	0.99	5.22	11.38	10.99	0.5000	0.1016	0.0247	1.7986	88.55	89.45
7	15.7	51.6	62.24	55.34	0.6406	0.7124	1.3247	0.7785	1.03	4.53	10.56	6.90	0.4839	0.1170	0.0257	1.7826	86.25	87.32
8	15.5	52.5	63.20	57.77	0.6290	0.6920	1.3443	0.7899	1.06	4.29	10.94	5.42	0.4806	0.1275	0.0265	1.7782	84.92	86.08
9	15.4	52.4	64.18	59.95	0.6156	0.6708	1.3629	0.8171	0.83	3.81	11.08	4.23	0.4633	0.1166	0.0230	1.7771	85.95	87.03

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1	659.1	1058.6	654.9	720.4	74.8	775.7	944.5	973.8	1088.7	747.1	-869.7	-198.1	40.38	56.29	2.094	4.925	0.0499
2	683.1	1037.5	676.7	708.8	93.1	757.6	979.0	1000.7	1114.8	749.4	-885.9	-243.1	41.83	56.23	1.074	4.219	0.1000
3	694.5	1023.1	686.2	693.0	107.4	752.6	1012.4	1027.6	1135.7	745.6	-905.0	-275.0	42.42	55.56	0.189	3.477	0.1501
4	706.6	991.0	694.2	671.0	131.9	729.3	1110.5	1108.1	1199.8	770.5	-978.6	-378.8	42.79	55.34	-2.182	0.982	0.3000
5	708.8	937.9	691.4	626.8	156.2	697.7	1238.0	1215.4	1283.9	813.0	-1081.9	-517.7	42.56	53.17	-5.038	-2.221	0.5000
6	701.4	875.4	678.0	561.5	179.5	671.5	1358.6	1322.8	1360.1	859.9	-1179.1	-651.2	41.89	48.54	-7.294	-4.957	0.7000
7	687.7	832.8	662.2	516.1	185.7	653.6	1444.2	1403.3	1422.0	910.1	-1258.5	-749.7	41.00	45.09	-8.386	-6.628	0.8499
8	676.1	811.8	651.4	492.7	181.3	645.2	1471.4	1430.1	1445.2	926.7	-1290.0	-784.9	40.26	43.06	-8.625	-7.094	0.9000
9	662.8	788.1	639.0	479.6	176.2	625.4	1497.2	1457.0	1467.4	960.0	-1321.0	-831.6	39.39	42.12	-8.817	-7.751	0.9500

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM	T02/T01	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
41.80	203.98	1.2101	1.8336	89.99	90.80

AIRFOIL AERODYNAMIC SUMMARY PRINT

105 PERCENT SPEED (STATOR PERFORMANCE) RUN NO 40 SPEED CODE 5 POINT NO 8

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	332.5	228.6	235.8	219.9	234.5	62.7	287.29	325.02	0.1031	0.0850
2	326.8	230.6	232.9	221.6	229.3	63.6	287.67	330.15	0.0838	0.0709
3	322.8	232.7	228.5	222.2	228.0	69.2	285.11	332.30	0.0654	0.0576
4	313.1	232.9	221.1	216.4	221.8	86.1	284.05	325.87	0.0239	0.0219
5	295.8	224.9	205.2	200.4	213.1	102.2	272.23	303.18	-0.0211	-0.0181
6	274.7	210.1	181.9	181.7	205.9	105.6	247.50	275.07	-0.0582	-0.0570
7	260.7	190.1	165.9	165.2	201.1	94.1	228.93	248.07	-0.0874	-0.0872
8	254.3	182.4	158.7	159.2	198.7	89.2	219.09	238.09	-0.0979	-0.0974
9	247.7	177.5	155.5	156.0	192.8	84.6	215.55	233.85	-0.1083	-0.1075

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	P0/P0 STAGE	TO/TO STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	44.8	15.9	0.9635	0.6327	-8.70	-6.09	6.00	28.92	0.4882	0.0876	0.0297	0.9607	1.8415	1.2188	87.06	88.12
2	44.5	16.0	0.9467	0.6400	-8.51	-5.81	5.47	28.53	0.4724	0.0634	0.0220	0.9723	1.8251	1.2132	87.90	88.87
3	44.9	17.3	0.9336	0.6467	-7.95	-5.18	6.06	27.61	0.4560	0.0466	0.0165	0.9800	1.8281	1.2124	88.50	89.43
4	45 0	21.7	0.9014	0.6476	-8.19	-5.21	7.72	23.37	0.4219	0.0376	0.0138	0.9847	1.8338	1.2112	89.49	90.35
5	46.1	27.0	0.8452	0.6244	-8.96	-5.73	8.78	19.07	0.3965	0.0336	0.0128	0.9876	1.8134	1.2087	88.78	89.67
6	48.6	30.2	0.7785	0.5811	-8.90	-5.43	9.17	18.38	0.4038	0.0430	0.0172	0.9860	1.7713	1.2063	85.95	87.03
7	50.5	29.7	0.7337	0.5220	-9.22	-5.58	6.80	20.82	0.4724	0.1174	0.0497	0.9651	1.7191	1.2086	80.21	81.65
8	51.4	29.3	0.7132	0.4995	-9.51	-5.80	5.35	22.14	0.4979	0.1325	0.0573	0.9622	1.7104	1.2103	78.77	80.30
9	51.1	28.5	0.6937	0.4859	-11.75	-8.00	2.64	22.66	0.5071	0.1289	0.0570	0.9647	1.7142	1.2073	80.27	81.70

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	1091.0	750.2	773.6	721.4	769.2	205.8	58.84	66.57	0.0543	5.907	4.868
2	1072.2	756.5	764.0	727.1	752.3	208.7	58.92	67.62	0.1078	4.799	4.062
3	1059.2	763.5	749.7	729.0	748.2	227.1	58.39	68.06	0.1601	3.750	3.299
4	1027.4	764.2	725.4	710.1	727.6	282.5	58.18	66.74	0.3140	1.371	1.254
5	970.5	738.0	673.2	657.5	699.1	335.3	55.76	62.09	0.5124	-1.207	-1.037
6	901.4	689.5	596.7	596.0	675.6	346.6	50.69	56.34	0.7091	-3.337	-3.265
7	855.3	623.7	544.4	542.0	659.7	308.6	46.89	50.81	0.8564	-5.009	-4.995
8	834.5	598.6	520.7	522.2	652.1	292.6	44.87	48.76	0.9050	-5.609	-5.582
9	812.7	582.2	510.0	511.8	632.7	277.5	44.15	47.89	0.9531	-6.203	-6.162

NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	TO/TO STAGE	P02/P01	P0/P0 STAGE	EFF-AD STAGE %	EFF-P STAGE %
12820.00	108.41	49.17	1.2101	0.9788	1.7947	86.54	87.59

AIRFOIL AERODYNAMIC SUMMARY PRINT

105 PERCENT SPEED (ROTOR PERFORMANCE) RUN NO 40 SPEED CODE 5 POINT NO 12

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	199.5	320.6	198.2	213.3	22.7	239.3	287.9	296.8	331.1	220.9	-265.2	-57.5	196.32	271.14	0.0370	0.0862
2	206.7	314.0	204.8	209.8	28.2	233.7	298.4	305.0	339.0	221.6	-270.1	-71.3	203.25	270.80	0.0196	0.0740
3	210.4	308.5	207.9	205.1	32.6	230.4	308.6	313.2	345.5	221.2	-275.9	-82.8	206.35	267.86	0.0045	0.0611
4	214.4	301.1	210.6	197.6	40.1	227.1	338.5	337.7	365.2	226.5	-298.4	-110.6	208.37	265.50	-0.0356	0.0188
5	215.6	289.1	210.3	186.8	47.5	220.7	377.3	370.4	391.2	239.4	-329.8	-149.7	207.63	259.07	-0.0843	-0.0357
6	213.8	272.5	206.7	168.5	54.6	214.2	414.1	403.2	414.6	253.2	-359.5	-189.0	204.54	239.18	-0.1242	-0.0825
7	209.9	260.3	202.2	154.5	56.6	209.6	440.2	427.7	433.6	267.3	-383.6	-218.1	200.41	221.90	-0.1445	-0.1136
8	206.5	255.2	199.0	149.2	55.2	207.1	448.5	435.9	440.7	273.1	-393.2	-228.8	196.89	214.71	-0.1492	-0.1230
9	202.5	248.7	195.2	144.4	53.7	202.5	456.3	444.1	447.5	281.4	-402.7	-241.6	192.68	208.71	-0.1533	-0.1351

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF-P TOTAL
1	6.5	48.3	53.14	15.08	0.6075	0.9216	1.0080	0.6351	-4.10	2.18	12.54	38.06	0.5339	0.0828	0.0241	1.9441	93.89	94.43
2	7.8	48.1	52.79	18.79	0.6311	0.9022	1.0349	0.6366	-2.65	3.47	11.42	33.99	0.5357	0.0870	0.0253	1.9034	93.14	93.73
3	8.9	48.3	52.98	22.01	0.6434	0.8848	1.0563	0.6345	-1.70	4.26	11.82	30.97	0.5413	0.0902	0.0263	1.8827	92.56	93.19
4	10.8	49.0	54.80	29.24	0.6565	0.8589	1.1183	0.6461	0.11	5.77	12.64	25.56	0.5495	0.0874	0.0253	1.8972	92.22	92.89
5	12.7	49.7	57.51	38.67	0.6606	0.8194	1.1984	0.6784	0.77	5.64	11.38	18.84	0.5422	0.0822	0.0226	1.9056	91.95	92.65
6	14.8	51.7	60.12	48.17	0.6544	0.7668	1.2693	0.7124	0.99	5.21	10.41	11.95	0.5296	0.0940	0.0233	1.8810	89.99	90.84
7	15.6	53.5	62.20	54.58	0.6417	0.7275	1.3254	0.7469	0.98	4.48	9.80	7.62	0.5163	0.1117	0.0250	1.8712	87.66	88.69
8	15.5	54.1	63.15	56.79	0.6303	0.7108	1.3453	0.7608	1.00	4.24	9.95	6.36	0.5110	0.1182	0.0253	1.8738	86.87	87.97
9	15.4	54.4	64.12	59.05	0.6171	0.6911	1.3639	0.7820	0.77	3.75	10.18	5.07	0.4988	0.1144	0.0232	1.8763	87.14	88.22

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1	654.7	1052.0	650.4	700.0	74.5	785.3	944.5	973.8	1086.3	724.9	-870.0	-188.5	40.21	55.53	2.121	4.940	0.0499
2	678.3	1030.3	671.9	688.3	92.7	766.7	979.0	1000.7	1112.2	727.0	-886.3	-234.0	41.63	55.46	1.123	4.238	0.1000
3	690.5	1012.0	682.1	672.9	107.0	755.9	1012.4	1027.6	1133.6	725.7	-905.4	-271.7	42.26	54.86	0.260	3.500	0.1501
4	703.4	987.8	691.0	648.3	131.5	745.2	1110.5	1108.1	1198.3	743.0	-978.9	-362.9	42.68	54.38	-2.037	1.078	0.3000
5	707.4	948.7	690.0	612.8	155.9	724.2	1238.0	1215.4	1283.4	785.4	-1082.1	-491.2	42.52	53.06	-4.827	-2.045	0.5000
6	701.4	894.2	678.1	553.0	179.2	702.8	1358.6	1322.8	1360.4	830.8	-1179.4	-620.0	41.89	48.99	-7.114	-4.726	0.7000
7	688.8	854.2	663.3	506.8	185.6	687.6	1444.2	1403.3	1422.7	876.9	-1258.6	-715.7	41.05	45.45	-8.277	-6.511	0.8499
8	677.5	837.3	652.8	489.4	181.2	679.4	1471.4	1430.1	1445.9	896.2	-1290.2	-750.7	40.33	43.97	-8.549	-7.048	0.9000
9	664.3	816.0	640.6	473.8	176.1	664.4	1497.2	1457.0	1468.2	923.4	-1321.1	-792.6	39.46	42.74	-8.782	-7.740	0.9500

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM	T02/T01	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
41.75	203.75	1.2200	1.8925	90.82	91.60

AIRFOIL AERODYNAMIC SUMMARY PRINT

105 PERCENT SPEED (STATOR PERFORMANCE) RUN NO 40 SPEED CODE 5 POINT NO 12

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	328.2	213.1	226.7	204.8	237.3	59.0	282.32	314.21	0.1041	0.0852
2	322.3	215.1	223.8	206.4	232.0	60.6	282.61	319.29	0.0853	0.0713
3	317.2	217.3	219.5	207.0	229.0	65.8	280.24	321.85	0.0676	0.0582
4	310.4	220.6	212.2	202.3	226.6	87.8	278.49	316.20	0.0243	0.0232
5	298.4	218.9	200.3	193.4	221.1	102.4	271.88	304.45	-0.0186	-0.0164
6	280.7	207.7	179.9	177.1	215.4	108.6	250.71	279.52	-0.0563	-0.0550
7	267.9	189.5	164.5	163.5	211.5	95.8	232.55	256.23	-0.0849	-0.0855
8	263.0	183.1	159.3	159.3	209.3	90.3	225.68	248.71	-0.0952	-0.0961
9	257.2	179.0	155.4	157.0	204.9	85.9	220.81	245.36	-0.1064	-0.1067

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	P0/P0 STAGE	T0/T0 STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	46.3	16.0	0.9474	0.5858	-7.23	-4.61	6.15	30.25	0.5362	0.0854	0.0289	0.9626	1.8676	1.2221	87.93	88.94
2	46.0	16.3	0.9300	0.5933	-7.03	-4.33	5.81	29.67	0.5188	0.0599	0.0208	0.9744	1.8509	1.2161	88.94	89.85
3	46.1	17.6	0.9140	0.6001	-6.68	-3.90	6.40	28.56	0.5010	0.0388	0.0137	0.9838	1.8524	1.2141	89.90	90.74
4	46.8	23.4	0.8897	0.6089	-6.39	-3.41	9.48	23.41	0.4627	0.0368	0.0134	0.9853	1.8708	1.2179	89.88	90.73
5	47.8	27.9	0.8493	0.6034	-7.22	-3.99	9.66	19.92	0.4351	0.0319	0.0121	0.9881	1.8809	1.2199	89.91	90.77
6	50.2	31.6	0.7924	0.5706	-7.31	-3.84	10.53	18.61	0.4368	0.0368	0.0145	0.9876	1.8567	1.2199	87.88	88.88
7	52.2	30.4	0.7511	0.5169	-7.57	-3.92	7.51	21.76	0.5062	0.1050	0.0441	0.9674	1.8101	1.2239	82.47	83.86
8	52.7	29.6	0.7348	0.4980	-8.19	-4.48	5.64	23.16	0.5314	0.1209	0.0521	0.9637	1.8062	1.2264	81.22	82.70
9	52.8	28.7	0.7170	0.4864	-10.05	-6.30	2.86	24.14	0.5411	0.1147	0.0507	0.9668	1.8142	1.2258	82.10	83.53

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	1077.0	699.2	743.9	671.9	778.7	193.6	57.82	64.35	0.0543	5.965	4.879
2	1057.5	705.8	734.2	677.3	761.1	198.8	57.88	65.39	0.1078	4.886	4.085
3	1040.7	712.8	720.2	679.3	751.3	216.0	57.40	65.92	0.1601	3.876	3.336
4	1018.5	723.7	696.1	663.9	743.5	288.1	57.04	64.76	0.3140	1.395	1.327
5	979.0	718.2	657.3	634.7	725.6	336.1	55.68	62.35	0.5124	-1.068	-0.940
6	920.8	681.6	590.1	580.9	706.9	356.4	51.35	57.25	0.7091	-3.226	-3.152
7	879.1	621.8	539.6	536.4	694.0	314.4	47.63	52.48	0.8564	-4.865	-4.901
8	862 9	600.8	522.7	522.6	686.6	296.4	46.22	50.94	0.9050	-5.454	-5.505
9	843.8	587.3	509.8	515.2	672.4	281.9	45.22	50.25	0.9531	-6.095	-6.113

NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	T0/T0 STAGE	P02/P01	P0/P0 STAGE	EFF-AD STAGE %	EFF-P STAGE %
12820.00	108.29	49.12	1.2200	0.9802	1.8551	87.72	88.73

AIRFOIL AERODYNAMIC SUMMARY PRINT

105 PERCENT SPEED (ROTOR PERFORMANCE) RUN NO 40 SPEED CODE 5 POINT NO 13

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	198.7	319.7	197.4	211.2	22.6	240.0	287.9	296.8	330.6	218.8	-265.3	-56.8	195.80	269.37	0.0381	0.0856
2	206.0	313.9	204.1	208.7	28.1	234.4	298.4	305.0	338.7	220.3	-270.2	-70.6	202.95	270.58	0.0214	0.0727
3	209.6	308.4	207.1	203.9	32.5	231.3	308.6	313.2	345.1	219.7	-276.1	-81.9	205.91	267.45	0.0067	0.0594
4	213.6	300.7	209.9	195.5	40.0	228.5	338.5	337.7	364.9	223.9	-298.5	-109.2	207.95	263.96	-0.0325	0.0189
5	215.0	289.8	209.8	185.2	47.4	222.9	377.3	370.4	391.0	236.8	-330.0	-147.5	207.30	258.56	-0.0796	-0.0322
6	213.8	274.9	206.7	168.3	54.6	217.4	414.1	403.2	414.7	250.7	-359.5	-185.8	204.63	240.79	-0.1196	-0.0767
7	210.2	262.7	202.5	153.3	56.5	213.3	440.2	427.7	433.8	263.5	-383.7	-214.3	200.60	222.04	-0.1424	-0.1056
8	206.8	257.7	199.3	148.1	55.2	210.9	448.5	435.9	440.9	269.3	-393.3	-224.9	197.11	214.88	-0.1482	-0.1165
9	202.9	251.0	195.7	142.0	53.6	207.0	456.3	444.1	447.7	276.4	-402.7	-237.1	193.00	206.72	-0.1530	-0.1311

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF-P TOTAL
1	6.5	48.7	53.28	15.06	0.6046	0.9183	1.0063	0.6283	-3.97	2.31	12.52	38.22	0.5404	0.0853	0.0249	1.9467	93.74	94.30
2	7.8	48.3	52.89	18.70	0.6288	0.9012	1.0336	0.6327	-2.55	3.57	11.32	34.19	0.5395	0.0850	0.0248	1.9115	93.35	93.92
3	8.9	48.6	53.10	21.89	0.6407	0.8839	1.0548	0.6298	-1.58	4.38	11.71	31.21	0.5460	0.0884	0.0258	1.8921	92.78	93.39
4	10.8	49.5	54.90	29.20	0.6539	0.8570	1.1169	0.6382	0.21	5.87	12.60	25.70	0.5571	0.0884	0.0256	1.9069	92.22	92.39
5	12.7	50.2	57.58	38.49	0.6587	0.8203	1.1975	0.6702	0.83	5.71	11.20	19.09	0.5503	0.0821	0.0227	1.9247	92.10	92.79
6	14.8	52.1	60.10	47.72	0.6546	0.7724	1.2696	0.7044	0.97	5.19	9.97	12.38	0.5383	0.0912	0.0228	1.9111	90.51	91.33
7	15.6	54.1	62.16	54.28	0.6426	0.7330	1.3262	0.7353	0.94	4.45	9.50	7.88	0.5282	0.1121	0.0253	1.9016	87.88	88.92
8	15.5	54.8	63.11	56.51	0.6314	0.7167	1.3461	0.7489	0.96	4.20	9.67	6.60	0.5232	0.1187	0.0256	1.9048	87.08	88.19
9	15.3	55.4	64.07	58.99	0.6185	0.6960	1.3648	0.7663	0.72	3.70	10.12	5.09	0.5142	0.1196	0.0243	1.9058	86.85	87.99

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1	651.8	1049.0	647.6	693.1	74.2	787.4	944.5	973.8	1084.8	717.7	-870.3	-186.4	40.10	55.17	2.182	4.904	0.0499
2	676.0	1029.8	669.7	684.8	92.3	769.1	979.0	1000.7	1111.1	722.9	-886.6	-231.6	41.57	55.42	1.226	4.163	0.1000
3	687.8	1011.7	679.5	668.9	106.6	759.0	1012.4	1027.6	1132.3	720.8	-905.8	-268.6	42.17	54.78	0.385	3.404	0.1501
4	700.9	986.5	688.5	641.3	131.1	749.6	1110.5	1108.1	1197.2	734.7	-979.4	-358.4	42.59	54.06	-1.861	1.084	0.3000
5	705.6	950.9	688.2	607.7	155.4	731.4	1238.0	1215.4	1282.8	776.9	-1082.6	-484.0	42.46	52.95	-4.558	-1.844	0.5000
6	701.6	901.9	678.3	552.0	179.1	713.2	1358.6	1322.8	1360.7	822.4	-1179.5	-609.6	41.91	49.32	-6.850	-4.395	0.7000
7	689.7	862.0	664.3	503.1	185.4	700.0	1444.2	1403.3	1423.3	864.7	-1258.8	-703.3	41.09	45.47	-8.162	-6.052	0.8499
8	678.5	845.6	653.9	485.9	181.0	692.1	1471.4	1430.1	1446.6	883.6	-1290.4	-738.0	40.37	44.01	-8.492	-6.677	0.9000
9	665.7	823.5	642.0	466.0	175.9	679.0	1497.2	1457.0	1469.0	906.8	-1321.2	-777.9	39.53	42.34	-8.765	-7.511	0.9500

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM	T02/T01	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
41.72	203.59	1.2236	1.9121	90.94	91.73

AIRFOIL AERODYNAMIC SUMMARY PRINT

105 PERCENT SPEED (STATOR PERFORMANCE) RUN NO 40 SPEED CODE 5 POINT NO 13

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	326.5	208.6	223.5	200.8	238.0	56.7	279.89	311.17	0.1018	0.0854
2	321.3	210.8	221.6	202.9	232.7	57.3	281.67	316.94	0.0850	0.0718
3	316.3	212.9	217.2	203.2	230.0	63.7	279.13	318.88	0.0702	0.0589
4	309.3	216.4	209.1	197.0	227.9	89.6	276.40	310.81	0.0306	0.0233
5	298.6	216.9	198.3	190 8	223 3	103.0	271.08	303.68	-0.0158	-0.0163
6	283.0	207.7	179.8	176.3	218.6	109.9	252.63	281.82	-0.0568	-0.0550
7	270.6	190.4	163.9	163.8	215.3	97.2	233.39	260.01	-0.0866	-0.0851
8	265.8	184.4	158.8	160.0	213.2	91.7	226.66	253.16	-0.0963	-0.0956
9	259.8	180.3	153.7	157.9	209.5	87.0	219.84	249.83	-0.1072	-0.1063

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	PO/PO STAGE	TO/TO STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	46.8	15.7	0.9411	0.5724	-6.74	-4.13	5.84	31.04	0.5509	0.0820	0.0278	0.9644	1.8744	1.2230	88.12	89.12
2	46.3	15.7	0.9263	0.5803	-6.66	-3.96	5.22	30.63	0.5356	0.0622	0.0216	0.9736	1.8573	1.2172	89.04	89.95
3	46.6	17.4	0.9105	0.5869	-6.25	-3.47	6.17	29.21	0.5168	0.0418	0.0147	0.9827	1.8588	1.2154	89.92	90.76
4	47.4	24.4	0.8853	0.5961	-5.80	-2.82	10.48	23.00	0.4741	0.0407	0.0146	0.9838	1.8783	1.2199	89.67	90.54
5	48.4	28.4	0.8488	0.5965	-6.65	-3.42	10.12	20.04	0.4455	0.0342	0.0129	0.9872	1.9001	1.2234	90.05	90.90
6	50.6	32.0	0.7982	0.5694	-6.88	-3.41	10.93	18.64	0.4450	0.0387	0.0152	0.9868	1.8854	1.2246	88.38	89.37
7	52.8	30.7	0.7573	0.5183	-6.97	-3.32	7.83	22.04	0.5125	0.0982	0.0412	0.9690	1.8424	1.2295	83.06	84.44
8	53.3	29.8	0.7416	0.5004	-7.59	-3.89	5.91	23.49	0.5366	0.1119	0.0481	0.9659	1.8403	1.2322	81.90	83.38
9	53.7	28.9	0.7228	0.4885	-9.15	-5.40	3.01	24.89	0.5480	0.1027	0.0453	0.9699	1.8484	1.2328	82.36	83.81

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	1071.2	684.5	733.3	658.7	780.9	185.9	57.32	63.73	0.0543	5.833	4.895
2	1054.3	691.6	727.0	665.6	763.5	187.9	57.69	64.91	0.1078	4.873	4.113
3	1037.9	698.6	712.6	666.6	754.5	209.0	57.17	65.31	0.1601	4.024	3.373
4	1014.9	710.1	686.1	646.3	747.8	294.0	56.61	63.66	0.3140	1.754	1.366
5	979.8	711.5	650.5	626.1	732.7	338.0	55.52	62.20	0.5124	-0.903	-0.936
6	928.7	681.5	589.8	578.4	717.3	360.6	51.74	57.72	0.7091	-3.253	-3.151
7	887.8	624.8	537.6	537.3	706.5	318.9	47.80	53.25	0.8564	-4.961	-4.876
8	872.2	605.0	521.1	524.9	699.4	300.9	46.42	51.85	0.9050	-5.519	-5.476
9	852.4	591.4	504.3	518.0	687.2	285.3	45.03	51.17	0.9531	-6.145	-6.088

NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	TO/TO STAGE	P02/P01	PO/PO STAGE	EFF-AD STAGE %	EFF-P STAGE %
12820.00	108.20	49.08	1.2236	0.9799	1.8737	87.84	88.86

AIRFOIL AERODYNAMIC SUMMARY PRINT

105 PERCENT SPEED (ROTOR PERFORMANCE) RUN NO 40 SPEED CODE 5 POINT NO 15

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	197.1	317.4	195.8	205.3	22.5	242.1	287.9	296.8	329.8	212.5	-265.4	-54.7	194.91	264.76	0.0383	0.0866
2	204.4	312.0	202.5	203.9	28.0	236.1	298.4	305.0	337.8	215.2	-270.4	-68.9	202.02	267.55	0.0217	0.0748
3	208.0	306.7	205.5	198.9	32.3	233.5	308.6	313.2	344.3	214.3	-276.2	-79.7	204.97	264.15	0.0072	0.0622
4	212.1	299.2	208.4	189.8	39.7	231.3	338.5	337.7	364.2	217.6	-298.7	-106.5	207.09	259.51	-0.0314	0.0216
5	213.9	292.0	208.6	182.0	47.1	228.4	377.3	370.4	390.6	230.8	-330.2	-142.1	206.64	257.74	-0.0783	-0.0296
6	212.8	280.7	205.8	167.4	54.3	225.4	414.1	403.2	414.5	244.2	-359.8	-177.8	204.09	243.62	-0.1196	-0.0746
7	209.1	270.0	201.4	152.0	56.2	223.1	440.2	427.7	433.6	254.8	-383.9	-204.6	200.02	223.81	-0.1436	-0.1062
8	205.7	265.2	198.3	145.5	54.9	221.6	448.5	435.9	440.7	259.0	-393.5	-214.2	196.53	214.66	-0.1494	-0.1178
9	201.8	259.4	194.6	138.6	53.4	219.3	456.3	444.1	447.5	264.1	-402.9	-224.8	192.41	204.78	-0.1537	-0.1315

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF-P TOTAL
1	6.5	49.7	53.51	14.94	0.5995	0.9095	1.0032	0.6088	-3.74	2.54	12.40	38.57	0.5603	0.0869	0.0253	1.9581	93.70	94.27
2	7.9	49.2	53.13	18.69	0.6235	0.8940	1.0304	0.6167	-2.31	3.80	11.31	34.44	0.5552	0.0805	0.0235	1.9275	93.78	94.33
3	8.9	49.6	53.33	21.85	0.6353	0.8775	1.0516	0.6130	-1.35	4.61	11.67	31.48	0.5627	0.0852	0.0248	1.9101	93.15	93.74
4	10.8	50.6	55.12	29.29	0.6489	0.8507	1.1142	0.6188	0.43	6.08	12.69	25.83	0.5761	0.0886	0.0256	1.9274	92.35	93.02
5	12.7	51.4	57.74	37.93	0.6547	0.8245	1.1957	0.6518	1.00	5.87	10.64	19.81	0.5700	0.0788	0.0219	1.9708	92.66	93.32
6	14.8	53.3	60.23	46.60	0.6513	0.7868	1.2684	0.6844	1.10	5.33	8.85	13.64	0.5610	0.0867	0.0222	1.9813	91.35	92.14
7	15.6	55.6	62.30	53.25	0.6391	0.7505	1.3249	0.7084	1.08	4.59	8.47	9.06	0.5570	0.1141	0.0263	1.9802	88.26	89.33
8	15.5	56.6	63.25	55.68	0.6278	0.7342	1.3448	0.7171	1.11	4.34	8.84	7.57	0.5561	0.1261	0.0277	1.9847	86.99	88.18
9	15.3	57.6	64.21	58.26	0.6149	0.7154	1.3635	0.7284	0.86	3.84	9.39	5.95	0.5525	0.1342	0.0278	1.9896	86.12	87.38

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1	646.6	1041.4	642.4	673.5	73.8	794.2	944.5	973.8	1082.0	697.1	-870.7	-179.6	39.92	54.23	2.192	4.964	0.0499
2	670.7	1023.6	664.4	668.9	91.8	774.7	979.0	1000.7	1108.3	706.1	-887.1	-226.0	41.37	54.80	1.243	4.286	0.1000
3	682.5	1006.4	674.2	652.7	106.0	766.1	1012.4	1027.6	1129.6	703.1	-906.4	-261.5	41.98	54.10	0.410	3.564	0.1501
4	695.9	981.7	683.6	622.8	130.4	758.8	1110.5	1108.1	1195.0	714.1	-980.1	-349.3	42.41	53.15	-1.800	1.239	0.3000
5	701.7	958.1	684.4	597.0	154.6	749.3	1238.0	1215.4	1281.5	757.4	-1083.4	-466.1	42.32	52.79	-4.489	-1.697	0.5000
6	698.3	921.1	675.2	549.3	178.2	739.4	1358.6	1322.8	1359.9	801.2	-1180.5	-583.3	41.80	49.89	-6.855	-4.277	0.7000
7	686.2	885.8	661.0	498.6	184.5	732.1	1444.2	1403.3	1422.6	836.1	-1259.7	-671.2	40.97	45.84	-8.230	-6.082	0.8499
8	675.0	870.0	650.5	477.5	180.2	727.2	1471.4	1430.1	1445.8	849.8	-1291.2	-702.9	40.25	43.96	-8.558	-6.749	0.9000
9	662.1	851.0	638.5	454.6	175.1	719.4	1497.2	1457.0	1468.2	866.4	-1322.0	-737.6	39.41	41.94	-8.806	-7.536	0.9500

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM
41.57	202.86

T02/T01	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
1.2322	1.9601	91.24	92.03

AIRFOIL AERODYNAMIC SUMMARY PRINT
RUN NO 40 SPEED CODE 5 POINT NO 15

105 PERCENT SPEED (STATOR PERFORMANCE)

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	323.0	196.3	216.1	189.0	240.1	53.1	274.60	299.97	0.1029	0.0856
2	318.2	198.7	215.1	191.1	234.4	54.3	277.82	305.89	0.0865	0.0723
3	313.4	200.8	210.7	190.1	232.1	64.7	275.01	305.56	0.0713	0.0599
4	306.7	205.7	202.2	187.2	230.7	85.2	271.35	302.46	0.0339	0.0262
5	300.2	212.5	194.5	185.1	228.8	104.2	270.14	302.13	-0.0115	-0.0128
6	288.9	207.9	179.1	173.9	226.6	113.9	255.88	285.47	-0.0516	-0.0505
7	278.1	193.6	163.1	164.4	225.2	102.2	236.14	268.37	-0.0808	-0.0810
8	273.6	189.0	157.1	162.1	224.0	97.2	227.70	263.60	-0.0918	-0.0922
9	268.5	185.5	151.2	160.7	221.9	92.5	219.34	260.91	-0.1045	-0.1043

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	P0/P0 STAGE	T0/T0 STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	48.0	15.7	0.9282	0.5361	-5.53	-2.91	5.79	32.31	0.5905	0.0826	0.0280	0.9648	1.8873	1.2254	88.23	89.23
2	47.4	15.8	0.9147	0.5445	-5.60	-2.91	5.32	31.58	0.5745	0.0673	0.0234	0.9719	1.8704	1.2193	89.28	90.18
3	47.7	18.8	0.8997	0.5509	-5.11	-2.34	7.56	28.96	0.5521	0.0487	0.0170	0.9802	1.8712	1.2179	89.91	90.75
4	48.7	24.4	0.8753	0.5637	-4.50	-1.52	10.49	24.29	0.5143	0.0452	0.0163	0.9823	1.8957	1.2236	89.60	90.48
5	49.6	29.4	0.8511	0.5816	-5.41	-2.19	11.14	20.25	0.4700	0.0370	0.0138	0.9861	1.9449	1.2310	90.54	91.38
6	51.7	33.3	0.8125	0.5670	-5.77	-2.30	12.22	18.46	0.4629	0.0430	0.0166	0.9849	1.9516	1.2361	89.08	90.05
7	54.1	31.9	0.7756	0.5242	-5.64	-1.99	8.99	22.21	0.5231	0.0910	0.0377	0.9702	1.9211	1.2440	83.95	85.35
8	55.0	31.0	0.7602	0.5100	-5.96	-2.26	7.02	24.01	0.5434	0.0974	0.0414	0.9690	1.9233	1.2485	82.61	84.12
9	55.7	29.9	0.7434	0.4993	-7.15	-3.40	4.10	25.80	0.5570	0.0905	0.0395	0.9722	1.9343	1.2520	82.23	83.79

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	1059.6	644.1	708.9	620.0	787.6	174.3	56.24	61.44	0.0543	5.897	4.905
2	1043.9	651.9	705.9	627.1	769.1	178.2	56.90	62.65	0.1078	4.954	4.143
3	1028.4	658.9	691.2	623.7	761.5	212.4	56.32	62.58	0.1601	4.087	3.432
4	1006.4	674.8	663.4	614.2	756.8	279.5	55.58	61.95	0.3140	1.942	1.500
5	985.1	697.0	638.0	607.4	750.6	342.0	55.33	61.88	0.5124	-0.657	-0.735
6	947.7	682.0	587.5	570.4	743.6	373.8	52.41	58.47	0.7091	-2.955	-2.894
7	912.3	635.2	535.3	539.5	738.8	335.3	48.36	54.97	0.8564	-4.627	-4.638
8	897.7	620.1	515.5	531.8	734.9	318.8	46.64	53.99	0.9050	-5.262	-5.284
9	881.0	608.5	496.0	527.3	728.1	303.6	44.92	53.44	0.9531	-5.989	-5.978

NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	T0/T0 STAGE	P02/P01	P0/P0 STAGE	EFF-AD STAGE %	EFF-P STAGE %
12820.00	107.82	48.91	1.2322	0.9792	1.9193	88.12	89.15

AIRFOIL AERODYNAMIC SUMMARY PRINT

105 PERCENT SPEED (ROTOR PERFORMANCE) RUN NO 4 SPEED CODE 5 POINT NO 21

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	181.0	308.9	179.8	191.1	20.9	242.7	287.9	296.8	321.9	198.6	-267.0	-54.1	184.91	253.11	0.0383	0.0883
2	188.1	301.1	186.3	185.8	26.0	236.9	298.4	305.0	330.0	197.9	-272.4	-68.1	191.91	249.55	0.0220	0.0797
3	191.5	297.0	189.1	182.6	30.0	234.2	308.6	313.2	336.7	198.9	-278.6	-79.0	194.84	248.35	0.0078	0.0694
4	195.4	291.2	191.9	175.1	36.9	232.7	338.5	337.7	357.4	204.2	-301.6	-105.1	197.04	245.11	-0.0302	0.0326
5	197.3	290.1	192.4	170.1	43 8	235.0	377 3	370.4	385.0	217.5	-333.5	-135.5	196.91	246.36	-0.0777	-0.0168
6	196.3	287.3	189.7	159.4	50.4	239.0	414.1	403.2	410.1	228.8	-363.6	-164.1	194.33	236.75	-0. 219	-0.0643
7	192.3	281.1	185.1	142.8	52.2	242.2	440.2	427.7	429.9	234.1	-388 0	-185.5	189.99	214.22	-0.1494	-0.1019
8	188.9	275.6	181.9	130.8	51.0	242.6	448.5	435.9	437.1	233.J	-397.5	-193.2	186.43	196.14	-0.1551	-0.1195
9	185.0	270.1	178.2	121.6	49.6	241.1	456.3	444.1	444.1	236.6	-406.8	-202.9	182.39	182.89	-0.1572	-0.1453

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF-P TOTAL
1	6.6	51.8	55.97	15.82	0.5476	0 8805	0.9738	0.5662	-1.27	5.00	13.28	40.15	0.5946	0.1012	0.0294	1.9608	92.99	93.62
2	7.9	51.9	55.59	20.14	0.5702	0.8570	1.0006	0.5631	0.16	6.27	12.77	35.45	0.5999	0.1110	0.0321	1.9183	91.79	92 51
3	9.0	52.1	55.80	23.43	0.5813	0.8441	1.0222	0.5655	1.12	7.08	13.24	32.38	0.6012	0.1070	0.0308	1.9106	91.78	92.49
4	10.9	53.0	57.54	30.98	0.5940	0.8228	1.0866	0.5770	2.85	8.51	14.37	26.57	0.6095	0.1062	0.0302	1.9397	91.26	92.03
5	12.8	54.0	60.04	38.46	0.6002	0.8137	1.1713	0.6100	3.30	8.17	11.18	21.58	0.6075	0.1017	0.0281	2.0176	91.11	91 94
6	14.9	56.2	62.46	45.70	0.5968	0.7987	1.2472	0.6360	3.33	7.56	7.95	16.76	0.6099	0.1181	0.0307	2.0781	89.20	90 25
7	15.8	59.3	64.50	52.26	0.5841	0.7734	1.3054	0.6440	3.28	6.78	7.48	12.24	0.6226	0.1612	0.0381	2.1027	84.99	86.47
8	15.7	61.6	65.42	55.78	0.5728	0.7540	1.3258	0.6383	3.28	6.51	8.95	9.64	0.6340	0.1874	0.0411	2.1026	82.57	84.28
9	15.5	63.2	66.34	59.02	0.5603	0.7354	1.3451	0.6443	2.99	5.97	10.15	7.32	0.6339	0.2007	0.0408	2.1073	81.33	83 17

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1	594.0	1013.5	590.0	627.1	68.4	796.3	944.5	973.8	1056.3	651.7	-876.1	-177.6	37.87	51.84	2.192	5.059	0.0499
2	617.0	987.9	611.1	609.5	85.2	777.4	979.0	1000.7	1082.7	649.1	-893.8	-223.3	39.30	51.11	1.258	4.566	0.1000
3	628.3	974.3	620.5	599.0	98.4	768.4	1012.4	1027.6	1104.7	652.7	-914.0	-259.2	39.91	50.86	0.447	3.976	0.1501
4	641.1	955.4	629.6	574.5	121.0	763.4	1110.5	1108.1	1172.7	670.0	-989.4	-344.7	40.36	50.20	-1.730	1.865	0.3000
5	647.3	951.8	631.1	558.2	143.7	771.0	1238.0	1215.4	1263.3	713.6	-1094.4	-444.5	40.33	50.46	-4.453	-0.964	0.5000
6	644 0	942.6	622.3	522.9	165.5	784.2	1358.6	1322.8	1345.7	750.6	-1193.1	-538.5	39.80	48.49	-6.985	-3.686	0.7000
7	631.1	922.4	607.4	468.4	171.3	794.6	1444.2	1403.3	1410.4	768.1	-1272.9	-608.7	38.91	43.87	-8.559	-5.837	0.8499
8	619.7	904.4	596.7	429.1	167.2	796.1	1471.4	1430.1	1434.2	765.6	-1304.2	-634.0	38.18	40.17	-8.886	-6.849	0.9000
9	607.0	886.1	584.8	399.1	162.6	791.1	1497.2	1457.0	1457.1	776.3	-1334.6	-665.9	37.36	37.46	-9.007	-8.326	0.9500

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM	T02/T01	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
39.47	192.60	1.2489	2.0181	89.16	90.17

AIRFOIL AERODYNAMIC SUMMARY PRINT

105 PERCENT SPEED (STATOR PERFORMANCE) RUN NO 4 SPEED CODE 5 POINT NO 21

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	310 7	163.3	196.5	156.1	240.7	47.6	259.09	250.55	0.1086	0.0891
2	303.5	161.3	191.8	153.9	235.2	48.2	256.16	248 12	0.0944	0.0790
3	299.8	163.1	189.1	153.6	232.7	54.8	255.43	248.80	0.0837	0.0696
4	295.5	178.1	183.4	160.5	231.7	77.2	254.07	262.96	0.0559	0.0432
5	296.7	203.4	181.2	175.0	234.9	103.7	258.29	292.15	0.0143	0.0071
6	294.9	210.1	171.4	172.6	239.9	119.7	250.35	291.33	-0.0290	-0.0323
7	289.2	204.0	155.2	170.6	244.0	121.8	228.97	286.64	-0.0619	-0.0671
8	284 3	198 8	144.4	167.6	244.9	107.0	212.77	280.00	-0.0726	-0.0814
9	279.5	193.7	136.4	164.4	244.0	102.4	201.20	273.47	-0.0862	-0.0981

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	P0/P0 STAGE	TO/TO STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	50.7	16.9	0.8863	0.4415	-2.76	-0.14	7.06	33.82	0.6882	0.1757	0 0592	0.9296	1.8232	1.2280	82.05	83.49
2	50 8	17.4	0.8649	0.4368	-2.23	0.46	6 86	33.41	0.6866	0.1673	0.0576	0.9352	1.7981	1.2232	81.69	83.13
3	50.9	19.6	0.8534	0.4423	-1.96	0.82	8.39	31.28	0.6704	0.1588	0.0553	0.9397	1.7962	1.2214	82.21	83.60
4	51 6	25.7	0.8369	0.4837	-1.60	1.38	11.72	25.96	0.5980	0.1151	0.0410	0.9576	1.8510	1.2268	84.72	85.97
5	52.4	30.7	0.8347	0.5528	-2.68	0.54	12 41	21.71	0.4995	0.0483	0.0178	0.9823	1.9742	1.2416	88.69	89.71
6	54.4	34.7	0.8228	0.5683	-3 03	0.43	13.70	19.71	0.4747	0.0454	0.0173	0.9836	2.0380	1.2574	87.54	88.71
7	57 5	33.2	0.7987	0.5468	-2.21	1.43	10.34	24.29	0.5202	0.0793	0.0323	0.9726	2.0451	1.2752	82.31	83.99
8	59.4	32.5	0.7807	0.5304	-1.48	2.22	8.59	26.92	0.5457	0.0854	0.0357	0.9714	2.0426	1.2836	79.72	81.64
9	60.8	31.9	0.7641	0.5144	-2.14	1.61	6.06	28.85	0.5678	0.0874	0.0373	0.9719	2.0473	1.2906	78.07	80.15

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PLT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	1019.4	535.6	644.8	512.3	789.6	156.3	53.06	51.32	0.0543	6.220	5.104
2	995.8	529.2	629.3	504.9	771.7	158.3	52.46	50.82	0.1078	5.411	4.525
3	983.7	535.2	620.4	504.1	763.4	179.7	52.31	50.96	0.1601	4.795	3.988
4	969.7	584.3	601.8	526.6	760.3	253.3	52.04	53.86	0.3140	3.202	2.473
5	973.4	667 4	594.4	574.1	770.8	340.3	52.90	59.84	0.5124	0.817	0.408
6	967.5	689.3	562 5	566.4	787.2	392.7	51.27	59.67	0.7091	-1.663	-1.848
7	949.0	669.4	509.4	559.9	800.7	366.9	46.90	58.71	0.8564	-3.545	-3.844
8	932.9	652.4	473.9	550.0	803.6	350.9	43.58	57.35	0.9050	-4.159	-4.661
9	917.1	635.5	447.6	539.4	800 5	335.9	41.21	56.01	0.9531	-4.938	-5.623

NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	TO/TO STAGE	P02/P01	P0/P0 STAGE	EFF-AD STAGE %	EFF-P STAGE %
12820.00	102.36	46 43	1.2489	0.9679	1.9533	84.60	85.98

AIRFOIL AERODYNAMIC SUMMARY PRINT

05 PERCENT SPEED (ROTOR PERFORMANCE) RUN NO 4 SPEED CODE 5 POINT NO 23

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	188.4	309.2	187.2	194.1	21.7	240.6	287.9	296.8	325.4	202.1	-266.2	-56.2	189.64	256.23	0.0388	0.0870
2	195.6	302.0	193.7	190.5	27.0	234.3	298.4	305.0	333.5	203.1	-271.4	-70.7	196.71	255.28	0.0229	0.0783
3	199.2	296.6	196.7	184.9	31.1	231.9	308.6	313.2	340.1	202.0	-277.4	-81.3	199.70	250.61	0.0091	0.0676
4	203.5	291.1	199.8	178.1	38 3	230.2	338.5	337.7	360.6	208.1	-300.1	-107.5	202.07	248.83	-0.0275	0.0277
5	205.8	289.9	200.7	175.9	45.5	230.4	377.3	370.4	387.8	224.9	-331.8	-140.1	202.12	255.20	-0.0743	-0.0213
6	205.3	282.4	198.4	162.1	52.5	231.3	414.1	403.2	412.5	236.3	-361.6	-171.9	199.83	241.47	-0.1173	-0.0683
7	201.8	275.1	194.3	148.5	54.4	231.6	440.2	427.7	432.0	246.0	-385.8	-196.1	195.85	224.08	-0.1441	-0.1029
8	198.4	270.3	191.1	138.9	53.1	231.9	448 5	435.9	439.2	246.8	-395.4	-204.0	192.39	209.45	-0.1506	-0.1159
9	194.5	264.6	187.6	129.3	51.6	230.8	456.3	444.1	446.1	249.4	-404.7	-213.2	188.36	195.18	-0.1548	-0.1323

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%E
1	6.6	51.1	54.82	16.15	0.5714	0.8825	0.9868	0.5769	-2.43	3.85	13.61	38.67	0.5855	0.0860	0.0249	1.9571	93.90	9
2	7.9	50.9	54.44	20.38	0.5947	0.8613	1.0139	0.5794	-1.00	5.11	13.00	34.06	0.5848	0.0886	0.0256	1.9178	93.28	9
3	9.0	51.5	54.64	23.76	0.6063	0.8443	1.0353	0.5750	-0.04	5.92	13.58	30.87	0.5929	0.0957	0.0275	1.9005	92.45	9
4	10.9	52.3	56.35	31.12	0.6204	0.8241	1.0994	0.5891	1.66	7.32	14.52	25.23	0.5983	0.0906	0.0257	1.9315	92.36	9
5	12.8	52.6	58.84	38.46	0.6281	0.8158	1.1836	0.6329	2.10	6.97	11.18	20.37	0.5853	0.0693	0.0192	2.0127	93.77	9
6	14.8	54.8	61.24	46.55	0.6262	0.7882	1.2585	0.6594	2.11	6.34	8.79	14.70	0.5848	0.0852	0.0218	2.0470	91.91	9
7	15.6	57.2	63.26	52.71	0.6148	0.7613	1.3163	0.6806	2.04	5.54	7.93	10.55	0.5852	0.1147	0.0268	2.0673	88.83	8
8	15.5	59.0	64.19	55.62	0.6037	0.7439	1.3365	0.6793	2.05	5.28	8.78	8.57	0.5932	0.1379	0.0304	2.0703	86.57	8
9	15.4	60.7	65.13	58.68	0.5912	0.7247	1.3556	0.6831	1.78	4.76	9.82	6.45	0.5958	0.1545	0.0317	2.0741	84.96	8

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PC SI
1	618.2	1014.4	614.1	636.9	71.1	789.5	944.5	973.8	1067.7	663.1	-873.4	-184.3	38.84	52.48	2.225	4.986	0
2	641.8	990.8	635.7	624.9	88.4	768.9	979.0	1000.7	1094.1	666.5	-890.5	-231.9	40.29	52.28	1.312	4.483	0.
3	653.5	973.1	645.5	606.7	102.1	760.8	1012.4	1027.6	1115.9	662.7	-910.3	-266.7	40.90	51.33	0.521	3.871	0.
4	667.6	955.0	655.7	584.4	125.7	755.3	1110.5	1108.1	1183.0	682.7	-984.7	-352.8	41.39	50.96	-1.574	1.585	0
5	675.3	951.1	658.6	577.2	149.3	755.9	1238.0	1215.4	1272.4	737.8	-1088.7	-459.5	41.40	52.27	-4.256	-1.219	0.
6	673.4	926.6	651.1	531.8	172.1	758.8	1358.6	1322.8	1353.4	775.2	-1186.5	-564.0	40.93	49.46	-6.723	-3.915	0
7	662.0	902.7	637.5	487.3	178.3	759.9	1444.2	1403.3	1417.3	807.0	-1265.9	-643.3	40.11	45.89	-8.254	-5.893	0
8	650.9	886.8	627.2	455.6	174.2	760.8	1471.4	1430.1	1440.9	809.7	-1297.2	-669.3	39.40	42.90	-8.631	-6.642	0
9	638.3	868.0	615.4	424.2	169.3	757.3	1497.2	1457.0	1463.5	818.2	-1327.8	-699.7	38.58	39.98	-8.867	-7.579	0.

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM	T02/T01	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
40.59	198.08	1.2394	2.0012	91.48	92.27

AIRFOIL AERODYNAMIC SUMMARY PRINT

105 PERCENT SPEED (STATOR PERFORMANCE) RUN NO 4 SPEED CODE 5 POINT NO 23

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	312.2	175.2	201.3	168.0	238.6	49.7	263.70	271.50	0.1070	0.0871
2	305.6	174.0	198.2	166.5	232.6	50.3	263.30	270.75	0.0896	0.0752
3	300.8	176.2	193.3	166.3	230.4	58.0	259.37	271.55	0.0758	0.0640
4	296.6	188.8	187.9	170.8	229.5	80.3	259.01	281.56	0.0448	0.0327
5	297.0	206.7	187.2	178.7	230.6	103.8	267.09	299.05	0.0006	-0.0053
6	290.3	207.3	174.0	171.5	232.4	116.4	254.66	289.31	-0.0409	-0.0433
7	283.5	198.7	160.6	167.0	233.6	107.5	238.05	280.67	-0.0724	-0.0750
8	279.1	195.0	151.9	165.6	234.2	103.1	224.88	276.92	-0.0847	-0.0872
9	274.2	191.9	143.6	164.5	233.6	98.9	212.64	274.19	-0.1002	-0.1013

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	PO/PO STAGE	TO/TO STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	49.8	16.4	0.8925	0.4758	-3.68	-1.06	6.55	33.40	0.6465	0.1187	0.0401	0.9521	1.8632	1.2250	86.40	87.53
2	49.5	16.8	0.8733	0.4735	-3.48	-0.79	6.25	32.77	0.6411	0.1084	0.0375	0.9575	1.8358	1.2190	86.50	87.60
3	50.0	19.2	0.8580	0.4801	-2.87	-0.09	8.00	30.77	0.6214	0.0892	0.0312	0.9659	1.8357	1.2177	87.01	88.07
4	50.7	25.1	0.8418	0.5148	-2.56	0.42	11.21	25.51	0.5587	0.0632	0.0226	0.9765	1.8857	1.2238	88.71	89.67
5	50.9	30.2	0.8387	0.5637	-4.13	-0.90	11.92	20.76	0.4859	0.0406	0.0151	0.9850	1.9813	1.2354	91.57	92.34
6	53.2	34.2	0.8132	0.5629	-4.29	-0.83	13.13	19.02	0.4723	0.0426	0.0163	0.9850	2.0147	1.2462	89.89	90.83
7	55.5	32.8	0.7872	0.5354	-4.24	-0.59	9.89	22.72	0.5195	0.0830	0.0340	0.9721	2.0089	1.2583	85.30	86.66
8	57.0	31.9	0.7712	0.5235	-3.89	-0.18	7.97	25.12	0.5386	0.0837	0.0352	0.9726	2.0132	1.2655	83.27	84.82
9	58.4	31.0	0.7541	0.5133	-4.48	-0.74	5.17	27.40	0.5529	0.0731	0.0315	0.9770	2.0260	1.2720	82.08	83.76

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	1024.3	574.9	660.5	551.3	782.9	163.0	54.01	55.60	0.0543	6.133	4.989
2	1002.8	570.8	650.4	546.4	763.3	165.0	53.93	55.45	0.1078	5.131	4.308
3	986.9	578.0	634.3	545.8	756.0	190.4	53.12	55.62	0.1601	4.343	3.668
4	973.0	619.4	616.3	560.5	752.9	263.6	53.05	57.67	0.3140	2.568	1.874
5	974.5	678.0	614.3	586.2	756.5	340.7	54.70	61.25	0.5124	0.033	-0.301
6	952.6	680.1	570.9	562.8	762.5	381.8	52.16	59.25	0.7091	-2.345	-2.479
7	930.1	651.8	526.9	548.1	766.5	352.8	48.75	57.48	0.8564	-4.146	-4.296
8	915.9	639.9	498.2	543.2	768.5	338.3	46.06	56.72	0.9050	-4.853	-4.996
9	899.7	629.7	471.2	539.7	766.4	324.4	43.55	56.16	0.9531	-5.741	-5.802

NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	TO/TO STAGE	P02/P01	PO/PO STAGE	EFF-AD STAGE %	EFF-P STAGE %
12820.00	105.27	47.75	1.2394	0.9764	1.9539	88.02	89.08

AIRFOIL AERODYNAMIC SUMMARY PRINT

100 PERCENT SPEED (ROTOR PERFORMANCE) RUN NO 40 SPEED CODE 10 POINT NO 1

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	193.2	311.3	192.0	218.5	22.0	221.7	274.2	282.7	316.9	226.8	-252.1	-61.0	192.76	266.83	0.0372	0.0856
2	200.3	305.6	198.4	216.4	27.4	215.8	284.2	290.5	324.5	229.0	-256.8	-74.7	199.68	268.25	0.0199	0.0727
3	203.7	299.2	201.3	211.8	31.6	211.2	293.9	298.3	330.6	229.0	-262.2	-87.1	202.52	265.23	0.0047	0.0595
4	207.5	289.7	203.8	205.7	38.9	204.0	322.4	321.7	349.2	236.9	-283.5	-117.6	204.52	263.98	-0.0362	0.0148
5	208.4	274.9	203.2	194.3	46.1	194.4	359.4	352.8	373.5	250.7	-313.3	-158.4	203.59	255.74	-0.0864	-0.0392
6	206.2	255.0	199.3	175.0	53.0	185.4	394.4	384.0	395.3	264.6	-341.4	-198.5	200.28	233.63	-0.1278	-0.0854
7	202.0	241.8	194.4	161.4	54.8	180.0	419.2	407.3	413.0	278.8	-364.4	-227.3	195.81	217.00	-0.1483	-0.1145
8	198.4	233.7	191.1	150.8	53.5	178.5	427.1	415.1	419.7	280.6	-373.6	-236.6	192.22	201.98	-0.1524	-0.1206
9	194.4	225.4	187.4	146.0	52.0	171.8	434.6	422.9	426.0	290.5	-382.6	-251.2	188.04	196.38	-0.1550	-0.1324

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF-P TOTAL
1	6.5	45.4	52.65	15.60	0.5869	0.9020	0.9626	0.6573	-4.60	1.68	13.06	37.04	0.4781	0.0908	0.0264	1.7946	92.96	93.51
2	7.9	44.9	52.26	19.07	0.6101	0.8857	0.9883	0.6636	-3.18	2.93	11.69	33.19	0.4759	0.0877	0.0255	1.7611	92.70	93.26
3	8.9	44.9	52.47	22.36	0.6212	0.8660	1.0080	0.6630	-2.21	3.75	12.17	30.11	0.4795	0.0893	0.0259	1.7358	92.17	92.75
4	10.8	44.8	54.30	29.77	0.6337	0.8357	1.0663	0.6834	-0.39	5.26	13.16	24.53	0.4784	0.0761	0.0219	1.7299	92.64	93.18
5	12.8	45.0	57.07	39.14	0.6366	0.7889	1.1408	0.7194	0.33	5.20	11.85	17.93	0.4674	0.0688	0.0188	1.7095	92.45	93.00
6	14.9	46.6	59.76	48.51	0.6293	0.7275	1.2066	0.7551	0.63	4.85	10.76	11.25	0.4532	0.0847	0.0209	1.6570	89.61	90.31
7	15.7	48.0	61.93	54.50	0.6155	0.6862	1.2587	0.7911	0.71	4.21	9.72	7.43	0.4394	0.1033	0.0231	1.6347	86.69	87.57
8	15.6	49.7	62.91	57.37	0.6039	0.6600	1.2772	0.7927	0.77	4.00	10.54	5.53	0.4446	0.1277	0.0269	1.6200	83.47	84.54
9	15.5	49.5	63.91	59.74	0.5909	0.6361	1.2947	0.8198	0.56	3.53	10.87	4.17	0.4260	0.1156	0.0230	1.6125	84.61	85.60

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1	633.9	1021.2	629.8	716.8	72.3	727.4	899.6	927.5	1039.8	744.2	-827.3	-200.1	39.48	54.65	2.133	4.904	0.0499
2	657.2	1002.7	651.0	710.1	89.9	707.9	932.4	953.1	1064.7	751.2	-842.5	-245.2	40.90	54.94	1.139	4.168	0.1000
3	668.4	981.5	660.3	695.1	103.8	693.0	964.2	978.7	1084.6	751.5	-860.4	-285.7	41.48	54.32	0.269	3.408	0.1501
4	680.9	950.5	668.8	674.8	127.6	669.5	1057.6	1055.3	1145.6	777.3	-930.1	-385.9	41.89	54.06	-2.073	0.848	0.3000
5	683.7	901.9	666.8	637.5	151.1	638.0	1179.1	1157.6	1225.3	822.4	-1028.0	-519.6	41.70	52.38	-4.950	-2.244	0.5000
6	676.5	836.5	653.8	574.1	173.8	608.4	1294.0	1259.8	1297.0	868.3	-1120.2	-651.4	41.02	47.85	-7.323	-4.895	0.7000
7	662.7	793.4	637.8	529.7	179.8	590.7	1375.5	1336.5	1355.2	914.7	-1195.7	-745.8	40.10	44.44	-8.494	-6.561	0.8499
8	651.1	766.7	627.0	494.8	175.5	585.6	1401.4	1362.1	1376.9	920.7	-1225.9	-776.4	39.37	41.37	-8.732	-6.912	0.9000
9	638.0	739.7	614.7	479.1	170.6	563.6	1425.9	1387.6	1397.8	953.2	-1255.4	-824.1	38.51	40.22	-8.880	-7.584	0.9500

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM	T02/T01	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
40.88	199.48	1.1797	1.6951	90.55	91.22

AIRFOIL AERODYNAMIC SUMMARY PRINT

100 PERCENT SPEED (STATOR PERFORMANCE) RUN NO 40 SPEED CODE 10 POINT NO 1

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	321.6	244.7	234.7	232.4	219.8	76.7	278.83	316.24	0.1016	0.0849
2	316.7	247.9	233.2	237.9	214.2	69.6	280.79	327.12	0.0825	0.0707
3	310.7	249.7	229.1	239.1	209.9	72.0	278.36	330.76	0.0649	0.0570
4	301.5	247.6	222.4	228.3	203.6	96.0	277.29	317.70	0.0214	0.0210
5	285.7	239.1	209.0	212.3	194.8	109.9	268.20	297.32	-0.0249	-0.0182
6	263.7	222.0	186.4	190.1	186.6	114.6	244.21	266.78	-0.0596	-0.0553
7	249.4	203.8	170.7	175.4	181.7	103.7	225.98	244.76	-0.0878	-0.0847
8	241.2	194.7	160.0	168.1	180.4	98.3	211.13	233.29	-0.0996	-0.0956
9	233.6	187.1	156.2	162.2	173.7	93.3	206.83	225.55	-0.1105	-0.1066

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	PO/PO STAGE	TO/TO STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	43.1	18.2	0.9370	0.6885	-10.41	-7.80	8.34	24.88	0.3894	0.0966	0.0323	0.9583	1.7158	1.1948	85.61	86.65
2	42.5	16.2	0.9231	0.7004	-10.50	-7.80	5.74	26.26	0.3748	0.0599	0.0208	0.9747	1.7104	1.1882	88.03	88.90
3	42.4	16.7	0.9049	0.7071	-10.39	-7.61	5.53	25.72	0.3549	0.0273	0.0096	0.9888	1.7145	1.1847	90.15	90.87
4	42.4	22.8	0.8748	0.7015	-10.81	-7.83	8.83	19.64	0.3133	0.0266	0.0097	0.9897	1.7098	1.1824	90.77	91.44
5	43.0	27.4	0.8242	0.6763	-12.05	-8.83	9.12	15.63	0.2849	0.0255	0.0097	0.9910	1.6871	1.1782	90.39	91.07
6	45.1	31.1	0.7552	0.6255	-12.42	-8.95	10.07	13.96	0.2835	0.0359	0.0142	0.9889	1.6359	1.1732	87.16	88.01
7	46.8	30.6	0.7096	0.5704	-12.91	-9.26	7.72	16.21	0.3360	0.0909	0.0381	0.9744	1.5898	1.1745	81.15	82.34
8	48.5	30.3	0.6832	0.5429	-12.47	-8.76	6.40	18.13	0.3625	0.1021	0.0437	0.9728	1.5742	1.1768	78.29	79.63
9	48.1	29.9	0.6611	0.5216	-14.82	-11.07	4.10	18.14	0.3758	0.1078	0.0471	0.9727	1.5679	1.1725	79.48	80.73

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	1055.0	802.9	770.0	762.5	721.3	251.6	57.11	64.77	0.0543	5.821	4.865
2	1038.9	813.3	765.2	780.7	702.8	228.2	57.51	67.00	0.1078	4.727	4.048
3	1019.5	819.2	751.6	784.4	688.8	236.3	57.01	67.74	0.1601	3.721	3.268
4	989.3	312.5	729.8	748.9	667.9	315.0	56.79	65.07	0.3140	1.228	1.203
5	937.5	784.4	685.8	696.6	639 2	360.5	54.93	60.89	0.5124	-1.424	-1.045
6	865.2	728.3	611.5	623.8	612.1	376 0	50.02	54.64	0.7091	-3.416	-3.169
7	818.1	668.6	560.2	575.6	596.3	340.2	46.28	50.13	0.8564	-5.031	-4.856
8	791.3	638.8	525.1	551.5	592.0	322.4	43.24	47.78	0.9050	-5.706	-5.475
9	766.4	613.9	512.4	532.0	570.0	306.3	42.36	46.19	0.9531	-6.332	-6.109

NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	TO/TO STAGE	P02/P01	PO/PO STAGE	EFF-AD STAGE %	EFF-P STAGE %
12210.00	106.02	48.09	1.1797	0.9835	1.6671	87.48	88.35

AIRFOIL AERODYNAMIC SUMMARY PRINT

100 PERCENT SPEED (ROTOR PERFORMANCE) RUN NO 40 SPEED CODE 10 POINT NO 2

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	190.9	306.2	189.7	207.0	21.9	225.7	274.2	282.7	315.6	214.7	-252.3	-57.0	191.25	259.12	0.0384	0.0892
2	198.1	300.3	196.3	205.0	27.2	219.5	284.2	290.5	323.3	216.9	-257.0	-71.0	198.33	260.45	0.0221	0.0769
3	201.7	295.1	199.2	202.4	31.4	214.8	293.9	298.3	329.5	218.9	-262.5	-83.5	201.29	260.27	0.0077	0.0617
4	205.8	287.0	202.2	196.7	38.7	209.0	322.4	321.7	348.4	226.7	-283.7	-112.7	203.50	260.32	-0.0316	0.0128
5	207.4	275.3	202.3	185.0	45.8	203.9	359.4	352.8	373.1	237.5	-313.5	-148.9	203.02	251.30	-0.0811	-0.0282
6	205.9	261.2	199.1	169.4	52.8	198.7	394.4	384.0	395.4	251.0	-341.6	-185.2	200.17	234.45	-0.1234	-0.0782
7	202.2	250.3	194.7	156.8	54.7	195.1	419.2	407.3	413.3	263.9	-364.6	-212.2	196.04	219.30	-0.1436	-0.1158
8	198.9	246.4	191.6	153.3	53.4	192.8	427.1	415.1	420.0	270.0	-373.7	-222.3	192.62	214.71	-0.1484	-0.1143
9	195.1	239.4	188.1	147.5	51.9	188.6	434.6	422.9	426.4	276.9	-382.7	-234.4	188.60	206.98	-0.1529	-0.1255

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF-P TOTAL
1	6.6	47.5	52.99	15.41	0.5795	0.8833	0.9580	0.6193	-4.25	2.03	12.87	37.58	0.5181	0.0873	0.0254	1.8195	93.40	93.93
2	7.9	47.0	52.58	19.14	0.6030	0.8662	0.9839	0.6258	-2.86	3.26	11.76	33.44	0.5146	0.0844	0.0245	1.7865	93.17	93.71
3	9.0	46.7	52.77	22.43	0.6146	0.8509	1.0041	0.6311	-1.91	4.05	12.25	30.34	0.5119	0.0762	0.0221	1.7700	93.52	94.02
4	10.8	46.7	54.54	29.80	0.6282	0.8244	1.0632	0.6513	-0.15	5.50	13.20	24.73	0.5106	0.0592	0.0170	1.7779	94.50	94.93
5	12.8	47.7	57.19	38.77	0.6334	0.7858	1.1394	0.6778	0.45	5.32	11.49	18.42	0.5107	0.0637	0.0175	1.7787	93.46	93.96
6	14.9	49.4	59.78	47.44	0.6285	0.7408	1.2066	0.7121	0.65	4.88	9.68	12.35	0.4996	0.0759	0.0191	1.7591	91.50	92.14
7	15.7	51.1	61.88	53.43	0.6163	0.7056	1.2596	0.7439	0.67	4.17	8.65	8.46	0.4891	0.0948	0.0218	1.7528	89.00	89.82
8	15.6	51.4	62.84	55.26	0.6054	0.6927	1.2784	0.7593	0.70	3.93	8.43	7.58	0.4829	0.0997	0.0222	1.7572	88.36	89.24
9	15.4	51.8	63.82	57.70	0.5930	0.6714	1.2962	0.7766	0.47	3.45	8.84	6.11	0.4735	0.1003	0.0211	1.7537	88.12	89.01

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1	626.4	1004.6	622.3	679.0	71.8	740.4	899.6	927.5	1035.6	704.3	-827.8	-187.1	39.17	53.07	2.199	5.111	0.0499
2	650.1	985.2	644.0	672.5	89.3	720.0	932.4	953.1	1060.9	711.7	-843.1	-233.1	40.62	53.34	1.265	4.407	0.1000
3	661.8	968.3	653.7	664.0	103.1	704.8	964.2	978.7	1081.1	718.2	-861.1	-273.8	41.23	53.31	0.443	3.536	0.1501
4	675.4	941.7	663.4	645.5	126.8	685.6	1057.6	1055.3	1143.0	743.9	-930.8	-369.7	41.68	53.32	-1.810	0.734	0.3000
5	680.5	903.4	663.7	607.0	150.4	669.0	1179.1	1157.6	1224.2	779.2	-1028.7	-488.6	41.58	51.47	-4.648	-1.616	0.5000
6	675.7	856.9	653.1	555.9	173.2	652.1	1294.0	1259.8	1297.2	823.6	-1120.8	-607.7	41.00	48.02	-7.073	-4.480	0.7000
7	663.5	821.3	638.8	514.5	179.3	640.1	1375.5	1336.5	1356.0	865.8	-1196.2	-696.3	40.15	44.91	-8.228	-6.636	0.8499
8	652.6	808.3	628.7	503.1	175.1	632.7	1401.4	1362.1	1378.0	886.0	-1226.3	-729.4	39.45	43.97	-8.502	-6.550	0.9000
9	640.1	785.4	617.1	483.9	170.2	618.7	1425.9	1387.6	1399.1	908.6	-1255.7	-769.0	38.63	42.39	-8.762	-7.193	0.9500

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM	TO2/TO1	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
40.77	198.96	1.1925	1.7713	92.15	92.75

AIRFOIL AERODYNAMIC SUMMARY PRINT

100 PERCENT SPEED (STATOR PERFORMANCE) RUN NO 40 SPEED CODE 10 POINT NO 2

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	314.4	219.5	220.8	208.7	223.8	68.1	270.68	303.97	0.1017	0.0841
2	309.3	221.5	219.6	212.9	217.9	61.0	272.67	312.89	0.0736	0.0693
3	304.6	223.6	217.3	214.7	213.5	62.7	272.89	317.43	0.0680	0.0555
4	296.9	225.0	211.4	207.9	208.5	86.0	273.14	309.36	0.0266	0.0200
5	285.1	221.8	198.8	197.7	204.3	100.5	264.03	295.76	-0.0234	-0.0189
6	269.4	211.7	180.6	181.9	199.9	108.3	245.52	273.16	-0.0516	-0.0552
7	257.9	196.5	166.5	169.8	197.0	99.0	229.24	253.43	-0.0849	-0.0856
8	253.9	189.1	162.7	163.8	194.9	94.5	224.45	243.61	-0.1038	-0.0962
9	247.5	184.1	157.6	160.4	190.8	90.4	217.68	238.54	-0.1145	-0.1067

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	PO/PO STAGE	TO/TO STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	45.3	18.0	0.9109	0.6109	-8.17	-5.55	8.14	27.33	0.4700	0.0748	0.0250	0.9690	1.7600	1.1990	88.04	88.95
2	44.7	15.9	0.8964	0.6186	-8.31	-5.62	5.43	28.75	0.4606	0.0493	0.0171	0.9800	1.7461	1.1924	89.70	90.48
3	44.4	16.2	0.8825	0.6260	-8.39	-5.61	5.05	28.19	0.4436	0.0268	0.0095	0.9894	1.7499	1.1889	91.74	92.36
4	44.5	22.4	0.8570	0.6299	-8.67	-5.69	8.49	22.12	0.4017	0.0283	0.0104	0.9893	1.7599	1.1892	92.61	93.17
5	45.8	26.9	0.8171	0.6197	-9.26	-6.03	8.71	18.84	0.3762	0.0242	0.0093	0.9915	1.7619	1.1914	91.75	92.38
6	47.9	30.8	0.7668	0.5896	-9.56	-6.09	9.75	17.14	0.3722	0.0304	0.0121	0.9903	1.7413	1.1915	89.61	90.39
7	49.8	30.3	0.7292	0.5436	-9.91	-6.27	7.39	19.55	0.4263	0.0911	0.0384	0.9730	1.7056	1.1957	84.16	85.30
8	50.2	30.0	0.7160	0.5215	-10.74	-7.04	6.05	20.19	0.4548	0.1209	0.0519	0.9651	1.6967	1.1981	82.29	83.55
9	50.5	29.4	0.6962	0.5071	-12.41	-8.66	3.58	21.06	0.4643	0.1111	0.0487	0.9694	1.6995	1.1974	82.84	84.06

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	1031.6	720.2	724.6	684.7	734.2	223.3	55.44	62.26	0.0543	5.828	4.819
2	1014.9	726.7	720.4	698.6	714.8	200.1	55.85	64.08	0.1078	4.216	3.971
3	999.5	733.8	712.9	704.3	700.6	205.8	55.89	65.01	0.1601	3.899	3.182
4	974.3	738.1	693.7	682.0	684.1	282.1	55.94	63.36	0.3140	1.522	1.145
5	935.2	727.6	652.2	648.6	670.3	329.8	54.08	60.57	0.5124	-1.339	-1.080
6	883.8	694.6	592.5	596.9	655.8	355.2	50.28	55.94	0.7091	-2.956	-3.164
7	846.2	644.7	546.3	557.0	646.2	324.8	46.95	51.90	0.8564	-4.862	-4.905
8	833.1	620.5	534.0	537.5	639.5	310.0	45.97	49.89	0.9050	-5.947	-5.513
9	812.0	604.0	517.1	526.2	626.0	296.6	44.58	48.85	0.9531	-6.560	-6.113

NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	TO/TO STAGE	P02/P01	PO/PO STAGE	EFF-AD STAGE %	EFF-P STAGE %
12210.00	105.74	47.96	1.1925	0.9842	1.7433	89.38	90.17

AIRFOIL AERODYNAMIC SUMMARY PRINT

RUN NO 40 SPEED CODE 10 POINT NO 4

100 PERCENT SPEED (ROTOR PERFORMANCE)

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	189.4	306.0	188.1	204.0	21.7	228.1	274.2	282.7	314.9	211.1	-252.5	-54.6	190.32	258.48	0.0380	0.0874
2	196.5	299.1	194.7	201.0	27.0	221.4	284.2	290.5	322.5	212.6	-257.2	-69.1	197.33	258.51	0.0214	0.0741
3	200.0	293.6	197.6	198.3	31.2	216.5	293.9	298.3	328.7	214.5	-262.7	-81.8	200.27	258.15	0.0068	0.0595
4	204.0	286.4	200.4	192.9	38.4	211.7	322.4	321.7	347.6	222.0	-284.0	-109.9	202.42	258.28	-0.0327	0.0168
5	205.5	276.7	200.4	182.3	45.5	208.1	359.4	352.8	372.4	232.7	-313.9	-144.7	201.90	250.82	-0.0810	-0.0336
6	204.3	264.1	197.4	167.1	52.4	204.4	394.4	384.0	394.9	245.3	-342.0	-179.5	199.24	234.82	-0.1217	-0.0773
7	200.8	254.2	193.3	153.3	54.3	202.8	419.2	407.3	413.0	255.6	-364.9	-204.6	195.31	217.31	-0.1428	-0.1092
8	197.4	250.7	190.1	149.9	53.0	201.0	427.1	415.1	419.7	261.4	-374.2	-214.2	191.73	212.98	-0.1480	-0.1169
9	193.6	245.1	186.6	144.3	51.5	198.2	434.6	422.9	426.2	267.1	-383.1	-224.8	187.73	205.42	-0.1528	-0.1299

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF-P TOTAL
1	6.6	48.2	53.23	15.00	0.5745	0.8815	0.9551	0.6083	-4.01	2.26	12.46	38.24	0.5307	0.0763	0.0222	1.8421	94.32	94.79
2	7.9	47.8	52.83	18.98	0.5977	0.8614	0.9809	0.6122	-2.61	3.51	11.60	33.85	0.5291	0.0772	0.0225	1.8036	93.83	94.32
3	9.0	47.5	53.03	22.43	0.6092	0.8451	1.0010	0.6174	-1.65	4.31	12.25	30.60	0.5261	0.0687	0.0200	1.7862	94.23	94.68
4	10.8	47.7	54.81	29.68	0.6222	0.8213	1.0600	0.6367	0.12	5.77	13.07	25.13	0.5261	0.0548	0.0158	1.7995	95.00	95.39
5	12.8	48.7	57.47	38.39	0.6270	0.7880	1.1363	0.6628	0.73	5.60	11.11	19.08	0.5269	0.0593	0.0164	1.8131	94.08	94.55
6	14.9	50.6	60.01	46.93	0.6230	0.7471	1.2044	0.6940	0.88	5.10	9.18	13.08	0.5189	0.0734	0.0187	1.8051	92.10	92.72
7	15.7	52.8	62.07	53.02	0.6117	0.7140	1.2580	0.7180	0.85	4.36	8.24	9.05	0.5160	0.1025	0.0238	1.8022	88.64	89.54
8	15.6	53.1	63.04	54.87	0.6004	0.7022	1.2768	0.7322	0.90	4.14	8.04	8.17	0.5108	0.1074	0.0241	1.8112	88.06	89.01
9	15.4	53.8	64.02	57.20	0.5882	0.6844	1.2947	0.7458	0.67	3.64	8.33	6.82	0.5053	0.1121	0.0240	1.8146	87.47	88.47

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1	621.4	1003.9	617.3	669.2	71.3	748.3	899.6	927.5	1033.0	692.8	-828.3	-179.2	38.98	52.94	2.176	5.005	0.0499
2	644.8	981.2	638.7	659.6	88.7	726.5	932.4	953.1	1058.2	697.4	-843.7	-226.6	40.41	52.95	1.225	4.246	0.1000
3	656.3	963.3	648.3	650.6	102.3	710.4	964.2	978.7	1078.5	703.8	-861.9	-268.3	41.02	52.87	0.392	3.408	0.1501
4	669.4	939.8	657.5	633.0	125.9	694.7	1057.6	1055.3	1140.4	728.5	-931.8	-360.7	41.46	52.90	-1.872	0.965	0.3000
5	674.2	907.7	657.5	598.0	149.3	682.9	1179.1	1157.6	1221.8	763.5	-1029.8	-474.7	41.35	51.37	-4.639	-1.924	0.5000
6	670.2	866.4	647.8	548.4	172.0	670.8	1294.0	1259.8	1295.6	804.8	-1122.0	-589.1	40.81	48.09	-6.973	-4.427	0.7000
7	658.9	834.0	634.4	502.9	178.1	665.3	1375.5	1336.5	1355.0	838.7	-1197.3	-671.2	40.00	44.51	-8.179	-6.257	0.8499
8	647.6	822.6	623.8	491.9	173.8	659.4	1401.4	1362.1	1377.0	857.8	-1227.6	-702.7	39.27	43.62	-8.478	-6.699	0.9000
9	635.2	804.3	612.3	473.5	168.9	650.1	1425.9	1387.6	1398.2	876.4	-1257.0	-737.5	38.45	42.07	-8.752	-7.443	0.9500

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM
40.56	197.94

T02/T01	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
1.1990	1.8069	92.47	93.07

AIRFOIL AERODYNAMIC SUMMARY PRINT

100 PERCENT SPEED (STATOR PERFORMANCE) RUN NO 40 SPEED CODE 10 POINT NO 4

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	313.0	211.3	216.4	203.1	226.2	58.4	269.30	302.47	0.0950	0.0848
2	306.8	212.9	214.0	204.7	219.8	58.6	269.88	307.53	0.0856	0.0706
3	301.7	214.6	211.4	204.7	215.2	64.6	269.79	309.39	0.0703	0.0574
4	295.1	217.5	206.1	199.8	211.3	86.0	270.27	303.97	0.0287	0.0227
5	285.5	216.6	194.9	191.2	208.6	101.8	262.92	292.63	-0.0177	-0.0162
6	272.1	209.0	178.1	178.1	205.6	109.4	245.96	273.66	-0.0561	-0.0536
7	261.9	195.6	163.4	167.4	204.7	101.2	227.98	255.70	-0.0853	-0.0844
8	258.6	190.2	160.1	163.8	203.1	96.6	223.84	249.33	-0.0980	-0.0952
9	253.7	186.3	155.3	161.6	200.6	92.8	217.43	245.62	-0.1094	-0.1061

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	P0/P0 STAGE	T0/T0 STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	46.2	16.0	0.9051	0.5859	-7.30	-4.68	6.13	30.20	0.5073	0.0808	0.0273	0.9668	1.7773	1.2015	88.60	89.48
2	45.7	15.9	0.8870	0.5924	-7.29	-4.59	5.42	29.79	0.4892	0.0520	0.0180	0.9792	1.7618	1.1945	90.25	90.99
3	45.4	17.5	0.8718	0.5985	-7.38	-4.60	6.27	27.98	0.4680	0.0315	0.0111	0.9878	1.7636	1.1909	92.14	92.74
4	45.7	23.3	0.8497	0.6066	-7.57	-4.59	9.32	22.39	0.4277	0.0313	0.0114	0.9883	1.7805	1.1927	92.95	93.50
5	46.9	28.0	0.8164	0.6027	-8.11	-4.88	9.80	18.89	0.4006	0.0305	0.0115	0.9893	1.7936	1.1972	92.09	92.71
6	49.1	31.6	0.7724	0.5793	-8.35	-4.89	10.55	17.54	0.3972	0.0358	0.0141	0.9884	1.7838	1.1998	89.95	90.73
7	51.4	31.2	0.7379	0.5385	-8.30	-4.65	8.29	20.26	0.4493	0.0875	0.0365	0.9735	1.7548	1.2071	84.14	85.34
8	51.8	30.5	0.7266	0.5219	-9.14	-5.44	6.61	21.24	0.4729	0.1101	0.0470	0.9675	1.7534	1.2103	82.71	84.01
9	52.3	29.9	0.7107	0.5102	-10.63	-6.88	4.04	22.38	0.4841	0.1056	0.0461	0.9699	1.7600	1.2122	82.56	83.88

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	1027.0	693.4	710.0	666.4	742.1	191.7	55.15	61.95	0.0543	5.441	4.858
2	1006.5	698.6	702.1	671.7	721.2	192.2	55.27	62.98	0.1078	4.906	4.046
3	989.8	704.3	693.7	671.6	706.1	211.9	55.25	63.37	0.1601	4.030	3.290
4	968.4	713.6	676.3	655.4	693.1	282.3	55.35	62.26	0.3140	1.645	1.298
5	936.7	710.7	639.6	627.3	684.3	334.1	53.85	59.93	0.5124	-1.017	-0.928
6	892.7	685.6	584.5	584.2	674.7	358.9	50.38	56.05	0.7091	-3.213	-3.071
7	859.3	641.9	536.1	549.4	671.6	332.0	46.69	52.37	0.8564	-4.886	-4.835
8	848.6	624.0	525.3	537.5	666.4	317.0	45.85	51.07	0.9050	-5.617	-5.455
9	832.4	611.3	509.7	530.1	658.1	304.4	44.53	50.30	0.9531	-6.267	-6.080

NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	T0/T0 STAGE	P02/P01	P0/P0 STAGE	EFF-AD STAGE %	EFF-P STAGE %
12210.00	105.20	47.72	1.1990	0.9829	1.7760	89.55	90.36

AIRFOIL AERODYNAMIC SUMMARY PRINT

100 PERCENT SPEED (ROTOR PERFORMANCE) RUN NO 40 SPEED CODE 10 POINT NO 6

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	186.2	305.7	184.9	200.5	21.4	230.8	274.2	282.7	313.2	207.1	-252.8	-51.9	188.30	257.24	0.0380	0.0884
2	193.3	299.2	191.4	198.5	26.6	223.9	284.2	290.5	320.9	209.4	-257.6	-66.6	195.29	258.65	0.0214	0.0760
3	196.7	292.6	194.3	194.0	30.7	219.1	293.9	298.3	327.1	209.5	-263.2	-79.2	198.21	255.55	0.0069	0.0627
4	200.7	285.4	197.1	187.4	37.8	215.2	322.4	321.7	346.1	215.5	-284.6	-106.4	200.37	253.63	-0.0321	0.0178
5	202.3	277.6	197.3	178.3	44.8	212.9	359.4	352.8	371.3	226.6	-314.5	-140.0	200.01	248.53	-0.0815	-0.0302
6	200.8	267.0	194.1	164.1	51.6	210.7	394.4	384.0	393.9	238.7	-342.8	-173.3	197.13	233.46	-0.1248	-0.0743
7	196.9	258.3	189.6	150.9	53.4	209.6	419.2	407.3	412.0	248.7	-365.8	-197.7	192.83	216.82	-0.1464	-0.1164
8	193.6	254.0	186.4	144.9	52.1	208.6	427.1	415.1	418.8	252.3	-375.0	-206.6	189.39	208.42	-0.1509	-0.1215
9	189.8	248.7	182.9	138.1	50.7	206.9	434.6	422.9	425.3	256.5	-383.9	-216.1	185.41	198.82	-0.1543	-0.1292

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF-P TOTAL
1	6.6	49.0	53.74	14.53	0.5641	0.8794	0.9491	0.5959	-3.51	2.77	11.99	39.21	0.5440	0.0689	0.0201	1.8645	94.98	95.40
2	7.9	48.5	53.34	18.57	0.5870	0.8607	0.9748	0.6024	-2.10	4.01	11.20	34.76	0.5392	0.0650	0.0190	1.8295	94.93	95.34
3	9.0	48.5	53.53	22.23	0.5983	0.8407	0.9949	0.6020	-1.14	4.82	12.05	31.30	0.5418	0.0660	0.0192	1.8056	94.58	95.01
4	10.9	49.0	55.31	29.60	0.6112	0 8160	1.0543	0.6161	0.62	6.28	12.99	25.71	0.5469	0.0599	0.0173	1.8196	94.67	95 10
5	12.8	50.0	57.93	38.08	0.6166	0.7887	1.1316	0.6439	1.19	6.06	10.80	19.84	0.5468	0.0603	0.0167	1.8474	94.17	94.65
6	14.9	52.0	60.50	46.44	0.6117	0.7533	1.1999	0.6733	1.37	5.59	8.69	14.06	0.5415	0.0769	0.0197	1.8499	92.02	92 68
7	15.7	54.1	62.61	52.54	0.5990	0.7231	1.2533	0.6962	1.39	4.89	7.76	10.07	0.5393	0.1062	0.0249	1.8551	88.72	89.65
8	15.6	55.1	63.55	54.83	0.5881	0.7084	1.2722	0.7038	1.41	4.65	7.99	8.73	0.5396	0.1201	0.0270	1.8592	87.24	88.29
9	15.5	56.2	64.52	57.31	0.5759	0.6911	1.2902	0.7126	1.17	4.15	8.44	7.21	0.5383	0.1316	0.0280	1.8624	85.99	87.15

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1	610.8	1003.0	606.8	657.9	70.2	757.1	899.6	927.5	1027.7	679.6	-829.4	-170.4	38.57	52.69	2.179	5.067	0.0499
2	634.1	981.7	628.0	651.4	87.3	734.5	932.4	953.1	1052.9	687.1	-845.1	-218.7	40.00	52.97	1.227	4.354	0.1000
3	645.4	960.1	637.5	636.5	100.8	718.8	964.2	978.7	1073.3	687.5	-863.4	-259.9	40.60	52.34	0.397	3.590	0.1501
4	658.4	936.3	646.6	614.7	124.0	706.2	1057.6	1055.3	1135.7	706.9	-933.7	-349.1	41.04	51.94	-1.839	1.018	0.3000
5	663.8	910.9	647.3	584.9	147.1	698.4	1179.1	1157.6	1218.2	743.6	-1032.0	-459.2	40.96	50.90	-4.669	-1.728	0.5000
6	658.9	876.2	636.8	538.4	169.3	691.2	1294.0	1259.8	1292.4	783.1	-1124.7	-568.6	40.37	47.81	-7.149	-4.259	0.7000
7	646.1	847.4	621.9	495.0	175.2	687.8	1375.5	1336.5	1351.9	816.0	-1200.3	-648.7	39.49	44.41	-8.389	-6.668	0.8499
8	635.1	833.3	611.7	475.5	171.1	684.3	1401.4	1362.1	1374.0	827.9	-1230.3	-677.7	38.79	42.69	-8.645	-6.962	0.9000
9	622.8	816.1	600.1	453.2	166.3	678.7	1425.9	1387.6	1395.3	841.4	-1259.6	-708.9	37.97	40.72	-8.841	-7.402	0.9500

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM	T02/T01	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
40.12	195.77	1.2062	1.8418	92.40	93.02

AIRFOIL AERODYNAMIC SUMMARY PRINT

100 PERCENT SPEED (STATOR PERFORMANCE) RUN NO 40 SPEED CODE 10 POINT NO 6

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	312.3	202.8	212.5	194.5	228.8	57.3	268.05	295.62	0.0935	0.0848
2	306.4	204.5	210.9	196.3	222.2	57.3	269.84	300.89	0.0880	0.0708
3	300.0	205.5	206.4	195.7	217.7	62.6	266.98	301.65	0.0769	0.0577
4	293.4	209.0	199.9	191.6	214.7	83.6	265.55	296.94	0.0294	0.0235
5	286.0	211.7	190.6	185.3	213.2	102.3	260.70	289.25	-0.0150	-0.0134
6	274.5	206.6	174.6	174.0	211.8	111.4	244.40	273.00	-0.0500	-0.0488
7	265.6	193.8	160.6	163.8	211.6	103.6	227.30	255.47	-0.0737	-0.0793
8	261.6	190.1	154.8	161.4	210.8	100.4	219.25	250.95	-0.0927	-0.0910
9	257.0	187.1	148.9	160.3	209.4	96.5	210.91	248.82	-0.1098	-0.1037

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	P0/P0 STAGE	TO/TO STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	47.1	16.4	0.9013	0.5600	-6.45	-3.83	6.49	30.69	0.5379	0.0920	0.0311	0.9624	1.7917	1.2045	88.62	89.51
2	46.4	16.2	0.8844	0.5666	-6.55	-3.86	5.72	30.22	0.5204	0.0666	0.0231	0.9736	1.7765	1.1975	90.30	91.05
3	46.5	17.7	0.8650	0.5705	-6.34	-3.56	6.51	28.79	0.5009	0.0415	0.0146	0.9841	1.7752	1.1941	91.76	92.39
4	47 0	23 5	0.8421	0.5800	-6.22	-3.24	9.59	23.47	0.4617	0.0419	0.0152	0.9845	1.7941	1.1974	92.01	92.64
5	48.2	28.9	0.8155	0.5863	-6.83	-3.61	10.67	19.30	0.4258	0.0398	0.0150	0.9859	1.8224	1.2038	91.73	92.39
6	50.5	32.7	0.7769	0.5701	-6.95	-3.49	11.62	17.87	0.4185	0.0402	0.0157	0.9868	1.8256	1.2088	89.83	90.65
7	52.8	32.3	0.7459	0.5307	-6.92	-3.28	9.44	20.48	0.4725	0.0953	0.0392	0.9706	1.8005	1.2176	84.05	85.31
8	53.7	31.9	0.7318	0.5189	-7.21	-3.50	7.95	21.83	0.4871	0.0983	0.0414	0.9705	1.8044	1.2221	82.65	84.01
9	54.6	31.0	0.7163	0.5095	-8.30	-4.55	5.20	23.56	0.4984	0.0892	0.0385	0.9742	1.8144	1.2260	82.04	83.47

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	1024.6	665.4	697.2	638.3	750.8	188.0	54.90	60.55	0.0543	5.355	4.861
2	1005.2	670.9	691.9	644.0	729.1	188.0	55.27	61.62	0.1078	5.043	4.054
3	984.3	674.3	677.1	642.2	714.4	205.5	54.68	61.78	0.1601	4.403	3.306
4	962.6	685.8	655.9	628.6	704.6	274.2	54.39	60.81	0.3140	1.682	1.347
5	938.3	694.5	625.3	607.9	699.6	335.8	53.39	59.24	0.5124	-0.860	-0.770
6	900.7	677.9	572.8	570.8	695.0	365.6	50.05	55.91	0.7091	-2.866	-2.796
7	871.6	635.9	526.9	537.4	694.3	339.9	46.55	52.32	0.8564	-4.222	-4.542
8	858.3	623.7	508.1	529.6	691.7	329.4	44.90	51.40	0.9050	-5.313	-5.213
9	843.1	613.9	488.7	526.0	687.1	316.5	43.20	50.96	0.9531	-6.291	-5.940

NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	TO/TO STAGE	P02/P01	P0/P0 STAGE	EFF-AD STAGE %	EFF-P STAGE %
12210.00	104.05	47.20	1.2062	0.9803	1.8055	89.13	89.99

AIRFOIL AERODYNAMIC SUMMARY PRINT

100 PERCENT SPEED (ROTOR PERFORMANCE) RUN NO 40 SPEED CODE 10 POINT NO 9

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	181.8	304.3	180.6	195.5	20.9	233.1	274.2	282.7	311.1	201.7	-253.3	-49.5	185.46	253.95	0.0380	0.0865
2	188.8	298.2	187.0	194.4	26.0	226.1	284.2	290.5	318.8	204.8	-258.2	-64.4	192.46	256.56	0.0211	0.0751
3	192.2	290.9	189.9	189.5	30.0	220.6	293.9	298.3	325.0	204.8	-263.8	-77.6	195.35	252.97	0.0063	0.0619
4	195.9	284.4	192.4	182.4	36.9	218.2	322.4	321.7	344.2	209.7	-285.4	-103.5	197.36	250.01	-0.0332	0.0213
5	197.2	278.4	192.3	174.2	43.8	217.2	359.4	352.8	369.5	220.8	-315.5	-135.6	196.86	245.82	-0.0813	-0.0299
6	195.9	268.9	189.3	159.3	50.5	216.6	394.4	384.0	392.6	231.1	-343.9	-167.4	194.06	229.69	-0.1223	-0.0750
7	192.2	260.9	185.0	145.9	52.2	216.2	419.2	407.3	411.0	240.4	-367.0	-191.1	189.87	212.49	-0.1454	-0.1067
8	188.9	256.8	181.9	139.2	51.0	215.8	427.1	415.1	417.8	243.1	-376.1	-199.3	186.44	202.90	-0.1508	-0.1193
9	185.2	252.2	178.4	132.0	49.6	214.9	434.6	422.9	424.4	246.4	-385.0	-208.0	182.54	192.64	-0.1545	-0.1338

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF-P TOTAL
1	6.6	50.0	54.44	14.22	0.5501	0.8735	0.9413	0.5791	-2.81	3.47	11.68	40.21	0.5612	0.0675	0.0198	1.8815	95.20	95.60
2	7.9	49.3	54.03	18.35	0.5728	0.8561	0.9669	0.5879	-1.41	4.71	10.97	35.68	0.5536	0.0590	0.0172	1.8499	95.50	95.87
3	9.0	49.4	54.24	22.30	0.5837	0.8340	0.9870	0.5873	-0.44	5.52	12.12	31.94	0.5557	0.0599	0.0174	1.8229	95.18	95.56
4	10.9	50.1	56.03	29.56	0.5956	0.8114	1.0465	0.5983	1.34	7.00	12.96	26.47	0.5648	0.0601	0.0174	1.8415	94.78	95.20
5	12.9	51.2	58.67	37.85	0.5999	0.7888	1.1241	0.6255	1.93	6.80	10.57	20.81	0.5656	0.0634	0.0177	1.8796	94.07	94.57
6	14.9	53.5	61.19	46.29	0.5956	0.7558	1.1936	0.6495	2.05	6.28	8.54	14.89	0.5656	0.0855	0.0220	1.8919	91.51	92.23
7	15.8	55.9	63.25	52.50	0.5836	0.7274	1.2480	0.6704	2.03	5.53	7.72	10.75	0.5654	0.1165	0.0274	1.9016	88.15	89.17
8	15.7	57.1	64.18	54.94	0.5729	0.7133	1.2672	0.6752	2.04	5.28	8.10	9.24	0.5684	0.1329	0.0298	1.9076	86.48	87.65
9	15.5	58.4	65.13	57.52	0.5610	0.6975	1.2855	0.6815	1.78	4.76	8.65	7.61	0.5695	0.1466	0.0311	1.9144	85.11	86.40

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1	596.5	998.4	592.6	641.5	68.6	765.0	899.6	927.5	1020.7	661.8	-831.0	-162.5	37.98	52.01	2.175	4.956	0.0499
2	619.6	978.3	613.7	637.7	85.4	741.8	932.4	953.1	1046.0	671.8	-847.0	-211.3	39.42	52.55	1.211	4.301	0.1000
3	630.7	954.3	622.9	621.8	98.6	723.9	964.2	978.7	1066.5	672.0	-865.6	-254.8	40.01	51.81	0.363	3.546	0.1501
4	642.7	933.1	631.1	598.6	121.2	715.9	1057.6	1055.3	1129.2	688.1	-936.4	-339.5	40.42	51.20	-1.904	1.220	0.3000
5	647.1	913.4	630.9	571.5	143.8	712.5	1179.1	1157.6	1212.4	724.4	-1035.3	-445.0	40.32	50.35	-4.658	-1.715	0 5000
6	642.7	882.2	621.0	522.7	165.6	710.6	1294.0	1259.8	1288.0	758.2	-1128.4	-549.2	39.74	47.04	-7.005	-4.299	0.7000
7	630.6	855.9	606.9	478.6	171.3	709.5	1375.5	1336.5	1348.4	788.8	-1204.2	-627.0	38.89	43.52	-8.332	-6.115	0.8499
8	619.7	842.6	596.7	456.7	167.3	708.1	1401.4	1362.1	1370.8	797.6	-1234.1	-653.9	38.19	41.56	-8.641	-6.835	0.9000
9	607.6	827.5	585.5	433.1	162.7	705.1	1425.9	1387.6	1392.3	808.4	-1263.2	-682.6	37.39	39.45	-8.851	-7.669	0.9500

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM	T02/T01	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
39.49	192.69	1.2133	1.8750	92.17	92.83

AIRFOIL AERODYNAMIC SUMMARY PRINT

100 PERCENT SPEED (STATOR PERFORMANCE) RUN NO 40 SPEED CODE 10 POINT NO 9

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	309.6	192.5	205.9	184.6	231.2	54.4	263.80	286.45	0.1032	0.0859
2	304.0	194.1	205.1	186.2	224.4	54.8	266.76	291.46	0.0866	0.0728
3	297.2	194.7	200.6	185.4	219.3	59.5	263.62	291.75	0.0719	0.0607
4	291.4	199.5	193.8	182.1	217.6	81.4	261.23	288.13	0.0358	0.0279
5	285.8	205.0	185.4	177.1	217.5	103.2	257.28	282.49	-0.0082	-0.0093
6	276.2	202.7	169.8	170.2	217.8	110.2	240.97	272.89	-0.0484	-0.0469
7	268.1	191.4	155.8	161.3	218.2	103.1	223.52	257.11	-0.0782	-0.0786
8	264.4	188.3	149.5	159.5	218.1	100.1	214.59	253.29	-0.0894	-0.0904
9	260 5	185.5	143 3	158.0	217.5	97.2	205.75	250.30	-0.1028	-0.1033

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	PO/PO STAGE	TO/TO STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	48.3	16.4	0.8911	0.5292	-5.22	-2.60	6.51	31.90	0.5735	0.1006	0.0340	0.9595	1.8034	1.2074	88.44	89.35
2	47.5	16.3	0.8755	0.5356	-5.47	-2.77	5.84	31.19	0.5569	0.0803	0.0278	0.9685	1.7882	1.2004	90.08	90.85
3	47.5	17.7	0.8547	0.5381	-5.32	-2.55	6.56	29.75	0.5387	0.0526	0.0185	0.9801	1.7853	1.1964	91.68	92.33
4	48.3	24.0	0.8340	0.5509	-4.94	-1.96	10.11	24.23	0.4976	0.0516	0.0186	0.9812	1.8089	1.2014	91.56	92.23
5	49.6	30.2	0.8125	0.5650	-5.49	-2.26	11.98	19.34	0.4540	0.0465	0.0173	0.9836	1.8497	1.2102	91.35	92.06
6	52.1	32.9	0.7787	0.5564	-5.40	-1.93	11.90	19.15	0.4481	0.0422	0.0164	0.9861	1.8655	1.2182	89.32	90.21
7	54.5	32.6	0.7499	0.5214	-5.24	-1.59	9.71	21.89	0.4992	0.0924	0.0379	0.9712	1.8468	1.2283	83.84	85.16
8	55.6	32.1	0.7366	0.5111	-5.35	-1.65	8.19	23.45	0.5137	0.0955	0.0401	0.9711	1.8522	1.2339	82.25	83.71
9	56.6	31.6	0.7228	0.5022	-6.27	-2.52	5.77	25.02	0.5256	0.0920	0.0395	0.9729	1.8625	1.2393	81.20	82.76

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	1015.7	631.5	675.4	605.7	758.6	178.6	54.03	58.67	0.0543	5.915	4.920
2	997.5	636.9	672.8	611.1	736.4	179.7	54.63	59.69	0.1078	4.964	4.173
3	975.0	638.7	658.0	608.2	719.5	195.2	53.99	59.75	0.1601	4.122	3.476
4	956.0	654.5	635.7	597.5	714.0	267.1	53.50	59.01	0.3140	2.049	1.596
5	937.8	672.6	608.3	581.2	713.7	338.5	52.69	57.86	0.5124	-0.467	-0.534
6	906.1	665.2	557.1	558.4	714.7	361.4	49.35	55.89	0.7091	-2.771	-2.689
7	879.7	628.1	511.1	529.2	716.0	338.2	45.78	52.66	0.8564	-4.480	-4.501
8	867.6	617.7	490.5	523.2	715.6	328.4	43.95	51.88	0.9050	-5.120	-5.177
9	854.7	608.7	470.2	518.5	713.7	319.0	42.14	51.26	0.9531	-5.890	-5.918

NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	TO/TO STAGE	P02/P01	PO/PO STAGE	EFF-AD STAGE %	EFF-P STAGE %
12210.00	102.41	46.45	1.2133	0.9784	1.8344	88.68	89.60

AIRFOIL AERODYNAMIC SUMMARY PRINT

100 PERCENT SPEED (ROTOR PERFORMANCE) RUN NO 40 SPEED CODE 10 POINT NO 27

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	172.4	300.4	171.2	187.7	19.9	234.5	274.2	282.7	306.6	193.8	-254.3	-48.2	178.98	247.86	0.0370	0.0871
2	179.2	295.1	177.5	186.8	24.8	228.5	284.2	290.5	314.3	196.8	-259.4	-62.0	185.90	250.66	0.0194	0.0753
3	182.5	289.7	180.2	182.3	28.6	225.1	293.9	298.3	320.7	196.4	-265.2	-73.1	188.75	247.26	0.0040	0.0631
4	185.7	282.8	182.4	175.7	35.2	221.5	322.4	321.7	340.2	202.2	-287.2	-100.1	190.59	244.82	-0.0370	0.0226
5	186.7	279.4	182.0	166.9	41.7	224.1	359.4	352.8	366.1	210.7	-317.7	-128.7	189.92	239.18	-0.0866	-0.0328
6	185.0	273.4	178.6	152.1	47.9	227.2	394.4	384.0	389.8	218.5	-346.4	-156.8	186.81	222.91	-0.1286	-0.0828
7	180.9	266.4	174.0	135.3	49.6	229.5	419.2	407.3	408.6	223.4	-369.7	-177.9	182.31	200.06	-0.1512	-0.1138
8	177.6	262.0	170.9	126.3	48.4	229.5	427.1	415.1	415.5	224.5	-378.8	-185.6	178.83	186.86	-0.1557	-0.1232
9	173.8	256.6	167.3	116.9	47.0	228.4	434.6	422.9	422.2	227.0	-387.6	-194.6	174.84	173.17	-0.1574	-0.1361

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF-P TOTAL
1	6.6	51.3	55.98	14.40	0.5200	0.8598	0.9248	0.5546	-1.27	5.01	11.86	41.58	0.5832	0.0716	0.0209	1.8919	95.07	95.49
2	7.9	50.8	55.57	18.38	0.5418	0.8448	0.9502	0.5633	0.13	6.25	11.00	37.19	0.5763	0.0624	0.0182	1.8668	95.40	95.79
3	9.0	51.0	55.78	21.89	0.5522	0.8278	0.9705	0.5612	1.11	7.07	11.71	33.89	0.5819	0.0649	0.0189	1.8512	95.00	95.41
4	10.9	51.6	57.60	29.68	0.5628	0.8040	1.0307	0.5750	2.91	8.57	13.08	27.92	0.5871	0.0623	0.0180	1.8701	94.79	95.23
5	12.9	53.3	60.23	37.59	0.5659	0.7882	1.1096	0.5944	3.49	8.36	10.30	22.64	0.5980	0.0775	0.0217	1.9241	93.10	93.70
6	15.0	56.1	62.75	45.76	0.5602	0.7641	1.1807	0.6105	3.62	7.85	8.01	16.99	0.6076	0.1073	0.0279	1.9599	90 00	90 89
7	15.9	59.4	64.80	52.63	0.5473	0.7371	1.2359	0.6183	3.59	7.09	7.85	12.18	0.6198	0.1516	0.0355	1.9774	85.65	86.95
8	15.8	61.1	65.72	55.65	0.5366	0.7216	1.2555	0.6183	3.58	6.82	8.81	10.07	0.6266	0.1727	0.0380	1.9816	83.66	85.15
9	15.7	62.8	66.65	58.93	0.5246	0.7035	1.2741	0.6224	3.30	6.28	10.06	7.73	0.6284	0.1887	0.0384	1.9837	82.15	83.77

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1	565.6	985.5	561.8	615.8	65.2	769.5	899.6	927.5	1005.9	635.8	-834.4	-158.0	36.66	50.76	2.120	4.992	0.0499
2	588.0	968.3	582.4	612.8	81.3	749.7	932.4	953.1	1031.2	645.7	-851.0	-203.4	38.07	51.34	1.111	4.314	0.1000
3	598.7	950.4	591.3	598.0	93.9	738.7	964.2	978.7	1052.1	644.3	-870.3	-240.0	38.66	50.64	0.228	3.618	0.1501
4	609.4	927.7	598.4	576.5	115.4	726.9	1057.6	1055.3	1116.2	663.5	-942.3	-328.4	39.03	50.14	-2.122	1.298	0.3000
5	612.6	916.8	597.1	547.6	136.8	735.4	1179.1	1157.6	1201.2	691.4	-1042.3	-422.2	38.90	48.99	-4.961	-1.881	0.5000
6	606.9	897.1	586.1	499.2	157.3	745.4	1294.0	1259.8	1278.9	716.8	-1136.7	-514.4	38.26	45.65	-7.370	-4.742	0.7000
7	593.7	874.0	571.0	443.8	162.6	752.9	1375.5	1336.5	1340.6	733.1	-1212.9	-583.6	37.34	40.97	-8.665	-6.520	0.8499
8	582.7	859.6	560.6	414.4	158.7	753.1	1401.4	1362.1	1363.3	736.6	-1242.7	-608.9	36.63	38.27	-8.920	-7.060	0.9000
9	570.3	841.8	549.0	383.5	154.3	749.3	1425.9	1387.6	1385.1	744.7	-1271.7	-638.3	35.81	35.47	-9.017	-7.800	0.9500

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM	T02/T01	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
38.01	185.47	1.2253	1.9221	91.03	91.82

AIRFOIL AERODYNAMIC SUMMARY PRINT

100 PERCENT SPEED (STATOR PERFORMANCE) RUN NO 40 SPEED CODE 10 POINT NO 27

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	300.1	172.4	189.7	163.5	232.6	54.5	250.72	261.63	0.0978	0.0881
2	295.7	172.7	189.7	163.7	226.8	55.0	254.20	263.71	0.0791	0.0774
3	291.0	173.7	186.0	162.5	223.7	61.1	251.63	262.92	0.0632	0.0676
4	286.1	182.0	182.0	163.9	220.8	79.0	251.57	267.64	0.0321	0.0406
5	285.4	193.1	176.5	164.9	224.3	100.5	249.61	271.62	-0.0016	0.0070
6	281.1	197.1	164.1	165.8	228.3	106.5	236.44	274.96	-0.0388	-0.0317
7	274.9	189.4	148.2	157.9	231.5	104.5	215.39	260.07	-0.0709	-0.0685
8	270.9	184.8	140.0	154.6	231.9	101.1	203.48	253.47	-0.0834	-0.0828
9	266.1	181.0	131.9	152.4	231.1	97.6	191.75	248.89	-0.0988	-0.0991

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	P0/P0 STAGE	TO/TO STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	50.7	18.4	0.8590	0.4707	-2.77	-0.15	8.51	32.36	0.6292	0.1139	0.0381	0.9565	1.8094	1.2100	87.86	88.82
2	50.0	18.5	0.8466	0.4728	-2.98	-0.28	8.01	31.52	0.6207	0.1094	0.0374	0.9591	1.7906	1.2046	88.47	89.37
3	50.2	20.6	0.8321	0.4760	-2.64	0.13	9.38	29.61	0.6051	0.0931	0.0322	0.9660	1.7889	1.2025	89.22	90.07
4	50.5	25.7	0.8149	0.4991	-2.75	0.23	11.76	24.77	0.5559	0.0655	0.0233	0.9768	1.8253	1.2062	90.95	91.68
5	51.8	31.4	0.8072	0.5281	-3.26	-0.03	13.12	20.43	0.5063	0.0480	0.0176	0.9832	1.8883	1.2196	90.65	91.45
6	54.3	32.7	0.7884	0.5364	-3.19	0.28	11.66	21.60	0.4992	0.0385	0.0150	0.9870	1.9317	1.2336	88.55	89.55
7	57.4	33.5	0.7633	0.5109	-2.36	1.29	10.61	23.87	0.5391	0.0749	0.0305	0.9759	1.9285	1.2493	82.70	84.21
8	58.9	33.2	0.7488	0.4965	-2.06	1.64	9.23	25.69	0.5615	0.0852	0.0354	0.9734	1.9281	1.2563	80.42	82.13
9	60.3	32.6	0.7325	0.4846	-2.62	1.13	6.80	27.64	0.5781	0.0810	0.0344	0.9756	1.9351	1.2623	79.04	80.88

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	984.8	565.5	622.6	536.5	763.0	178.8	51.35	53.58	0.0543	5.602	5.047
2	970.2	566.7	622.4	537.2	744.2	180.3	52.06	54.01	0.1078	4.533	4.433
3	954.7	569.8	610.4	533.3	734.1	200.6	51.54	53.85	0.1601	3.623	3.873
4	938.8	597.0	597.0	537.8	724.6	259.2	51.52	54.82	0.3140	1.842	2.323
5	936.5	633.5	579.2	541.0	735.9	329.7	51.12	55.63	0.5124	-0.094	0.402
6	922.5	646.5	538.4	544.1	749.0	349.3	48.43	56.31	0.7091	-2.224	-1.819
7	901.8	621.3	486.2	518.0	759.5	343.0	44.11	53.26	0.8564	-4.062	-3.923
8	888.8	606.2	459.5	507.4	760.9	331.8	41.68	51.91	0.9050	-4.779	-4.744
9	873.2	593.7	432.8	499.9	758.4	320.3	39.27	50.98	0.9531	-5.661	-5.678

NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	TO/TO STAGE	P02/P01	P0/P0 STAGE	EFF-AD STAGE %	EFF-P STAGE %
12210.00	98.57	44.71	1.2253	0.9771	1.8781	87.51	88.56

AIRFOIL AERODYNAMIC SUMMARY PRINT

95 PERCENT SPEED (ROTOR PERFORMANCE) RUN NO 40 SPEED CODE 95 POINT NO 1

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	180.0	293.5	178.8	200.6	20.7	214.2	260.5	268.6	299.0	207.8	-239.7	-54.3	184.21	250.02	0.0384	0.0907
2	187.0	287.1	185.2	198.5	25.8	207.5	270.0	276.0	306.4	209.9	-244.2	-68.5	191.18	250.66	0.0222	0.0776
3	190.4	281.3	188.1	196.4	29.8	201.4	279.2	283.4	312.3	212.8	-249.4	-82.0	194.13	250.83	0.0079	0.0620
4	194.3	272.2	190.8	190.7	36.7	194.1	306.2	305.6	330.3	220.9	-269.6	-111.5	196.33	249.82	-0.0311	0.0129
5	195.9	260.8	191.0	180.7	43.5	188.1	341.4	335.2	353.8	232.9	-297.9	-147.1	196.00	242.50	-0.0796	-0.0345
6	194.7	247.7	188.1	166.4	50.2	183.4	374.7	364.8	375.1	246.1	-324.5	-181.3	193.31	227.02	-0.1212	-0.0766
7	191.3	238.8	184.1	153.7	51.9	182.7	398.3	387.0	392.2	255.6	-346.4	-204.3	189.31	211.01	-0.1427	-0.1133
8	188.1	234.9	181.2	150.2	50.7	180.6	405.8	394.4	398.6	261.3	-355.1	-213.8	186.00	206.60	-0.1476	-0.1191
9	184.5	228.8	177.8	146.0	49.3	176.1	412.9	401.8	404.7	268.8	-363.6	-225.7	182.18	201.34	-0.1524	-0.1292

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF-P TOTAL
1	6.6	46.9	53.22	15.17	0.5442	0.8493	0.9043	0.6014	-4.03	2.25	12.63	38.05	0.5036	0.0752	0.0219	1.7314	94.28	94.71
2	7.9	46.3	52.78	19.06	0.5667	0.8309	0.9288	0.6075	-2.66	3.46	11.68	33.72	0.4999	0.0732	0.0213	1.6982	94.01	94.44
3	9.0	45.8	52.96	22.68	0.5778	0.8138	0.9479	0.6156	-1.72	4.24	12.50	30.28	0.4927	0.0607	0.0176	1.6788	94.74	95.11
4	10.9	45.5	54.72	30.30	0.5904	0.7850	1.0036	0.6372	0.03	5.69	13.70	24.42	0.4885	0.0434	0.0124	1.6768	95.83	96.13
5	12.9	46.1	57.36	39.09	0.5955	0.7485	1.0758	0.6685	0.62	5.49	11.81	18.26	0.4835	0.0414	0.0114	1.6760	95.56	95.87
6	14.9	47.7	59.91	47.35	0.5918	0.7069	1.1400	0.7025	0.77	5.00	9.59	12.56	0.4732	0.0538	0.0136	1.6591	93.70	94.13
7	15.7	49.8	61.99	52.92	0.5806	0.6770	1.1907	0.7248	0.77	4.28	8.14	9.07	0.4734	0.0856	0.0199	1.6564	89.71	90 42
8	15.6	50.1	62.95	54.78	0.5704	0.6644	1.2087	0.7392	0.81	4.04	7.95	8.16	0.4677	0.0900	0.0202	1.6601	89.11	89.85
9	15.5	50.2	63.92	57.00	0.5589	0.6459	1.2258	0.7588	0.57	3.55	8.14	6.92	0.4560	0.0860	0.0185	1.6592	89.40	90.13

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1	590.5	962.9	586.6	658.2	68.1	702.8	854.6	881.1	981.2	681.9	-786.6	-178.3	37.73	51.21	2.203	5.195	0.0499
2	613.4	942.1	607.6	651.2	84.7	680.8	885.8	905.5	1005.4	688.8	-801.1	-224.7	39.16	51.34	1.273	4.446	0.1000
3	624.7	922.9	617.0	644.3	97.8	660.8	916.0	929.8	1024.8	698.2	-818.2	-269.0	39.76	51.37	0.455	3.550	0.1501
4	637.5	892.9	626.0	625.8	120.4	636.9	1004.8	1002.6	1083.6	724.8	-884.4	-365.7	40.21	51.16	-1.784	0.737	0.3000
5	642.6	855.8	626.6	592.8	142.9	617.3	1120.2	1099.8	1160.9	764.3	-977.3	-482.5	40.14	49.67	-4.563	-1.977	0.5000
6	638.8	812.6	617.3	545.9	164.6	601.9	1229.3	1196.9	1230.7	807.5	-1064.7	-595.0	39.59	46.50	-6.942	-4.389	0.7000
7	627.6	783.4	604.0	504.2	170.4	599.6	1306.8	1269.7	1286.9	838.7	-1136.4	-670.2	38.77	43.22	-8.174	-6.492	0.8499
8	617.2	770.6	594.4	492.9	166.4	592.4	1331.4	1294.0	1307.9	857.4	-1165.0	-701.6	38.09	42.31	-8.459	-6.822	0.9000
9	605.5	750.5	583.5	478.9	161.8	577.9	1354.7	1318.3	1328.0	881.8	-1192.9	-740.4	37.31	41.24	-8.730	-7.405	0.9500

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM	T02/T01	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
39.31	191.81	1.1692	1.6734	93.64	94.08

AIRFOIL AERODYNAMIC SUMMARY PRINT

95 PERCENT SPEED (STATOR PERFORMANCE) RUN NO 40 SPEED CODE 95 POINT NO 1

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	301.2	221.8	213.6	212.9	212.4	62.2	261.06	297.47	0.0866	0.0838
2	295.5	223.6	211.9	214.9	206.0	61.6	262.16	303.09	0.0843	0.0689
3	289.9	224.7	209.6	215.5	200.2	63.7	262.34	305.97	0.0688	0.0552
4	281.2	223.8	203.9	206.7	193.7	85.8	261.53	295.36	0.0236	0.0198
5	270.2	220.3	193.5	196.7	188.5	99.2	254.48	282.97	-0.0228	-0.0191
6	256.0	211.0	177.5	182.8	184.5	105.3	238.03	264.05	-0.0590	-0.0555
7	246.7	199.9	163.9	173.1	184.5	100.0	221.49	248.56	-0.0842	-0.0860
8	243.0	191.8	160.5	166.3	182.5	95.5	217.22	237.93	-0.0984	-0.0968
9	237.4	185.9	156.9	162.0	178.2	91.1	212.88	231.85	-0.1113	-0.1072

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	PO/PO STAGE	TO/TO STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	44.8	16 2	0.8750	0.6231	-8.74	-6.12	6.37	28.52	0.4327	0.0889	0.0301	0.9652	1.6675	1.1794	87.68	88.53
2	44.1	15.9	0.8586	0.6306	-8.87	-6.17	5.45	28.19	0.4119	0.0562	0.0195	0.9786	1.6562	1.1723	89.99	90.68
3	43.6	16.4	0.8421	0.6355	-9.21	-6.44	5.23	27.19	0.3922	0.0308	0.0109	0.9886	1.6573	1.1676	92.66	93.16
4	43.5	22.5	0.8145	0.6332	-9 75	-6.77	8.56	20.97	0.3512	0.0315	0.0115	0.9890	1.6586	1.1659	93.72	94.15
5	44 3	26.7	0.7785	0.6224	-10.79	-7.56	8.51	17.51	0.3243	0.0278	0.0106	0.9909	1.6595	1.1663	93.61	94.05
6	46.1	30.0	0.7333	0.5941	-11.33	-7.87	8.92	16.19	0.3204	0.0331	0.0133	0.9901	1.6422	1.1664	91.49	92 07
7	48.4	30.1	0.7018	0.5591	-11.32	-7.67	7.17	18.35	0.3600	0.0773	0.0326	0.9784	1.6208	1.1733	85.34	86.30
8	48.7	29.9	0.6895	0.5347	-12.22	-8.52	5.94	18.82	0.3915	0.1168	0.0502	0.9683	1.6082	1.1752	82.99	84 08
9	48.7	29.3	0.6726	0.5176	-14.22	-10.47	3.51	19.32	0.4056	0.1222	0.0536	0.9681	1.6061	1.1739	83.33	84.40

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	988.3	727.6	700.7	698.4	697.0	204.1	53.47	60.92	0.0543	4.960	4.804
2	969.5	733.6	695.1	705.2	675.9	202.2	53.69	62.08	0.1078	4.827	3.947
3	951.0	737.4	687.9	707.1	656.7	209.0	53.73	62.66	0.1601	3.941	3.161
4	922.7	734.4	669.0	678.3	635.5	281.5	53.56	60.49	0.3140	1.352	1.132
5	886.4	722.9	634.9	645.5	618.6	325.3	52.12	57.96	0.5124	-1.308	-1.092
6	840.1	692.2	582.4	599.9	605.4	345.3	48.75	54.08	0.7091	-3.378	-3.182
7	809.6	655.9	537.7	567.8	605.3	328.2	45.36	50.91	0.8564	-4.826	-4.930
8	797.2	629.3	526.4	545.7	598.7	313.3	44.49	48.73	0.9050	-5.638	-5.548
9	779.0	609.8	514.7	531.6	584.8	298.8	43.60	47.49	0.9531	-6.377	-6.140

NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	TO/TO STAGE	P02/P01	PO/PO STAGE	EFF-AD STAGE %	EFF-P STAGE %
11600.00	101.94	46.24	1.1692	0.9841	1.6468	90.51	91.15

AIRFOIL AERODYNAMIC SUMMARY PRINT

95 PERCENT SPEED (ROTOR PERFORMANCE) RUN NO 40 SPEED CODE 95 POINT NO 2

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	172.1	291.1	171.0	191.2	19.9	219.5	260.5	268.6	295.2	197.4	-240.6	-49.0	178.72	244.51	0.0384	0.0872
2	179.1	284.8	177.3	189.6	24.8	212.6	270.0	276.0	302.6	199.9	-245.2	-63.4	185.72	245.84	0.0221	0.0758
3	182.4	277.7	180.2	185.0	28.6	207.1	279.2	283.4	308.6	200.2	-250.6	-76.3	188.67	242.41	0.0077	0.0621
4	186.0	269.9	182.6	180.1	35.2	201.1	306.2	305.6	326.8	208.3	-271.0	-104.5	190.74	242.02	-0.0314	0.0201
5	187.5	262.4	182.7	171.9	41.8	198.2	341.4	335.2	350.9	219.7	-299.6	-136.9	190.44	236.85	-0.0793	-0.0309
6	186.3	253.4	180.0	158.7	48.2	197.6	374.7	364.8	372.8	230.5	-326.5	-167.2	187.79	222.65	-0.1205	-0.0750
7	183.0	246.3	176.0	145.7	49.9	198.6	398.3	387.0	390.4	238.1	-348.4	-188.4	183.78	205.86	-0.1441	-0.1084
8	179.8	241.9	173.1	139.6	48.7	197.5	405.8	394.4	396.8	241.4	-357.1	-196.9	180.48	197.48	-0.1496	-0.1222
9	176.3	236.7	169.8	133.4	47.3	195.5	412.9	401.8	403.1	245.7	-365.6	-206.3	176.71	189.02	-0.1537	-0.1363

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF-P TOTAL
1	6.6	49.0	54.53	14.38	0.5192	0.8392	0.8903	0.5690	-2.72	3.56	11.84	40.15	0.5389	0.0660	0.0193	1.7687	95.23	95.59
2	7.9	48.3	54.08	18.51	0.5413	0.8211	0.9148	0.5762	-1.36	4.76	11.13	35.57	0.5332	0.0608	0.0177	1.7377	95.26	95.62
3	9.0	48.2	54.26	22.43	0.5520	0.7996	0.9339	0.5763	-0.42	5.54	12.25	31.83	0.5345	0.0615	0.0179	1.7125	94.93	95.30
4	10.9	48.1	56.04	30.13	0.5636	0.7746	0.9902	0.5976	1.35	7.01	13.53	25.91	0.5304	0.0460	0.0132	1.7201	95.84	96.15
5	12.9	49.0	58.64	38.50	0.5683	0.7485	1.0639	0.6269	1.90	6.77	11.21	20.14	0.5286	0.0482	0.0133	1.7405	95.24	95.59
6	15.0	51.1	61.14	46.38	0.5647	0.7182	1.1298	0.6533	2.00	6.23	8.63	14.76	0.5275	0.0691	0.0177	1.7477	92.72	93.27
7	15.8	53.6	63.19	52.15	0.5538	0.6928	1.1816	0.6698	1.97	5.47	7.37	11.04	0.5333	0.1063	0.0252	1.7556	88.58	89.45
8	15.7	54.6	64.13	54.54	0.5437	0.6780	1.1999	0.6765	1.98	5.22	7.70	9.59	0.5344	0.1200	0.0272	1.7579	87.06	88.04
9	15.6	55.6	65.08	57.03	0.5324	0.6613	1.2174	0.6863	1.73	4.70	8.16	8.05	0.5320	0.1291	0.0277	1.7605	86.02	87.08

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1	564.8	955.2	561.0	627.4	65.2	720.3	854.6	881.1	968.4	647.7	-789.4	-160.8	36.60	50.08	2.202	4.997	0.0499
2	587.5	934.5	581.8	621.9	81.3	697.5	885.8	905.5	992.9	655.8	-804.5	-208.0	38.04	50.35	1.264	4.340	0.1000
3	598.5	911.2	591.1	607.1	93.9	679.4	916.0	929.8	1012.5	656.7	-822.1	-250.3	38.64	49.65	0.439	3.557	0.1501
4	610.2	885.7	599.2	591.0	115.6	659.7	1004.8	1002.6	1072.3	683.3	-889.2	-343.0	39.07	49.57	-1.797	1.153	0.3000
5	615.0	860.8	599.5	563.9	137.2	650.4	1120.2	1099.8	1151.4	721.0	-983.0	-449.3	39.00	48.51	-4.546	-1.769	0.5000
6	611.4	831.4	590.6	520.7	158.1	648.2	1229.3	1196.9	1223.3	756.4	-1071.3	-548.7	38.46	45.60	-6.906	-4.299	0.7000
7	600.3	808.2	577.6	478.0	163.6	651.7	1306.8	1269.7	1280.8	781.3	-1143.2	-618.1	37.64	42.16	-8.254	-6.212	0.8499
8	590.0	793.6	567.9	458.1	159.7	648.1	1331.4	1294.0	1302.0	791.9	-1171.7	-645.9	36.96	40.45	-8.571	-7.001	0.9000
9	578.4	776.7	557.1	437.7	155.3	641.6	1354.7	1318.3	1322.5	806.0	-1199.4	-676.8	36.19	38.71	-8.806	-7.810	0.9500

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM	T02/T01	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
38.15	186.16	1.1847	1.7412	92.95	93.47

AIRFOIL AERODYNAMIC SUMMARY PRINT

95 PERCENT SPEED (STATOR PERFORMANCE) RUN NO 40 SPEED CODE 95 POINT NO 2

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	297.4	202.2	202.7	193.9	217.7	57.4	255.17	285.48	0.1023	0.0848
2	291.7	203.4	201.4	195.4	211.0	56.6	256.89	290.11	0.0834	0.0707
3	285.0	203.7	197.2	194.3	205.8	61.4	253.90	289.98	0.0679	0.0575
4	277.7	205.5	192.1	188.2	200.6	82.5	253.62	282.87	0.0308	0.0226
5	270.1	206.5	183.1	180.4	198.6	100.6	248.10	272.77	-0.0140	-0.0156
6	260.5	202.7	168.5	169.8	198.7	110.7	232.95	257.98	-0.0526	-0.0519
7	253.2	193.1	154.7	163.0	200.4	103.5	215.66	246.20	-0.0794	-0.0819
8	249.1	187.4	149.1	159.2	199.6	98.8	207.87	239.50	-0.0899	-0.0931
9	244.6	182.7	143.8	156.7	197.9	93.9	200.67	235.29	-0.1032	-0.1049

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	P0/P0 STAGE	T0/T0 STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	47.0	16.4	0.8600	0.5630	-6.49	-3.87	6.56	30.58	0.5038	0.0896	0.0303	0.9657	1.7053	1.1852	88.93	89.73
2	46.3	16.1	0.8437	0.5683	-6.72	-4.03	5.60	30.18	0.4866	0.0634	0.0220	0.9765	1.6916	1.1785	90.78	91.43
3	46.2	17.5	0.8235	0.5703	-6.66	-3.89	6.30	28.67	0.4667	0.0354	0.0125	0.9874	1.6887	1.1745	92.52	93.05
4	46.2	23.6	0.7996	0.5755	-7.04	-4.05	9.69	22.55	0.4247	0.0352	0.0127	0.9880	1.7014	1.1751	93.60	94.06
5	47.3	29.1	0.7732	0.5770	-7.71	-4.49	10.91	18.18	0.3907	0.0361	0.0135	0.9883	1.7211	1.1805	92.95	93.47
6	49.7	33.1	0.7405	0.5641	-7.75	-4.29	12.08	16.62	0.3804	0.0380	0.0147	0.9884	1.7278	1.1867	90.55	91.24
7	52.3	32.4	0.7141	0.5334	-7.38	-3.73	9.55	19.91	0.4279	0.0828	0.0340	0.9762	1.7138	1.1970	84.43	85.56
8	53.3	31.8	0.7002	0.5158	-7.67	-3.96	7.89	21.43	0.4530	0.1001	0.0421	0.9721	1.7089	1.2009	82.31	83.58
9	54.0	30.9	0.6855	0.5018	-8.89	-5.14	5.11	23.06	0.4722	0.1051	0.0454	0.9717	1.7107	1.2039	81.29	82.64

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	975.9	663.4	664.9	636.1	714.3	188.2	52.26	58.47	0.0543	5.861	4.860
2	957.1	667.5	660.7	641.1	692.4	185.6	52.61	59.42	0.1078	4.776	4.051
3	935.1	668.5	646.9	637.4	675.3	201.4	52.00	59.39	0.1601	3.891	3.293
4	911.2	674.4	630.3	617.6	658.0	270.8	51.94	57.93	0.3140	1.765	1.296
5	886.2	677.6	600.6	591.8	651.7	330.1	50.81	55.87	0.5124	-0.803	-0.892
6	854.8	665.1	552.8	557.2	652.0	363.1	47.71	52.84	0.7091	-3.015	-2.973
7	830.8	633.6	507.7	534.9	657.7	339.7	44.17	50.42	0.8564	-4.552	-4.695
8	817.4	614.7	489.0	522.3	654.9	324.1	42.57	49.05	0.9050	-5.149	-5.335
9	802.7	599.5	471.8	514.2	649.4	308.2	41.10	48.19	0.9531	-5.913	-6.010

NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	T0/T0 STAGE	P02/P01	P0/P0 STAGE	EFF-AD STAGE %	EFF-P STAGE %
11600.00	98.94	44.88	1.1847	0.9829	1.7114	89.83	90.56

AIRFOIL AERODYNAMIC SUMMARY PRINT

95 PERCENT SPEED (ROTOR PERFORMANCE) RUN NO 40 SPEED CODE 95 POINT NO 3

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	167.9	289.6	166.7	186.4	19.4	221.6	260.5	268.6	293.1	192.2	-241.1	-47.0	175.65	241.42	0.0381	0.0396
2	174.7	284.5	173.0	186.4	24.2	214.9	270.0	276.0	300.6	196.2	-245.8	-61.1	182.60	245.18	0.0213	0.0758
3	177.9	277.2	175.7	181.6	27.9	209.5	279.2	283.4	306.6	196.0	-251.2	-73.9	185.50	241.18	0.0064	0.0617
4	181.3	269.6	178.0	175.4	34.4	204.7	306.2	305.6	325.0	202.3	-271.9	-100.8	187.43	238.74	-0.0336	0.0207
5	182.4	263.3	177.8	166.8	40.8	203.7	341.4	335.2	349.3	212.4	-300.7	-131.5	186.92	232.67	-0.0822	-0.0302
6	181.0	256.2	174.8	154.1	46.9	204.6	374.7	364.8	371.5	222.3	-327.7	-160.2	184.06	218.87	-0.1240	-0.0745
7	177.4	249.8	170.6	140.1	48.6	206.8	398.3	387.0	389.1	228.3	-349.7	-180.2	179.89	200.28	-0.1476	-0.1085
8	174.2	245.3	167.6	132.7	47.4	206.3	405.8	394.4	395.6	230.2	-358.4	-188.1	176.52	189.81	-0.1526	-0.1231
9	170.6	240.1	164.3	125.2	46.1	204.9	412.9	401.8	401.9	233.3	-366.8	-196.9	172.68	179.23	-0.1555	-0.1390

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF-P TOTAL
1	6.6	50.0	55.26	14.15	0.5056	0.8331	0.8830	0.5530	-1.98	4.30	11.61	41.11	0.5562	0.0611	0.0179	1.7850	95.68	96.02
2	7.9	49.1	54.82	18.16	0.5273	0.8189	0.9073	0.5647	-0.62	5.49	10.79	36.65	0.5454	0.0474	0.0139	1.7617	96.40	96.67
3	9.0	49.1	55.01	22.16	0.5377	0.7969	0.9265	0.5635	0.33	6.29	11.98	32.84	0.5483	0.0502	0.0146	1.7362	95.96	96.26
4	10.9	49.4	56.80	29.89	0.5484	0.7718	0.9831	0.5793	2.11	7.77	13.29	26.91	0.5508	0.0448	0.0129	1.7454	96.07	96.3o
5	12.9	50.6	59.43	38.20	0.5520	0.7488	1.0571	0.6041	2.69	7.56	10.91	21.23	0.5542	0.0549	0.0152	1.7727	94.78	95.18
6	15.0	52.9	61.94	45.98	0.5475	0.7234	1.1236	0.6277	2.81	7.04	8.23	15.96	0.5565	0.0800	0.0207	1.7901	91.95	92.58
7	15.9	55.7	63.99	52.00	0.5360	0.6994	1.1757	0.6393	2.77	6.28	7.22	11.99	0.5669	0.1234	0.0293	1.8015	87.40	88 39
8	15.8	57.1	64.93	54.68	0.5258	0.6841	1.1942	0.6422	2.79	6.02	7.84	10.25	0.5713	0.1415	0.0319	1.8037	85.52	86.67
9	15.7	58.5	65.87	57.48	0.5143	0.6673	1.2117	0.6483	2.53	5.50	8.61	8.39	0.5719	0.1551	0.0329	1.8059	84.11	85.36

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1	550.7	950.0	547.0	611.5	63.6	727.1	854.6	881.1	961.8	630.6	-791.0	-154.1	35.97	49.44	2.182	5.135	0.0499
2	573.1	933.4	567.6	611.6	79.3	705.0	885.8	905.5	986.2	643.7	-806.5	-200.5	37.40	50.21	1.220	4.346	0.1000
3	583.8	909.6	576.6	595.7	91.7	687.3	916.0	929.8	1006.0	643.2	-824.3	-242.4	37.99	49.40	0.369	3.537	0.1501
4	594.8	884.6	584.0	575.6	112.7	671.8	1004.8	1002.6	1066.2	663.9	-892.1	-330.9	38.39	48.90	-1.922	1.188	0.3000
5	598.5	863.8	583.3	547.3	133.8	668.3	1120.2	1099.8	1146.0	696.9	-986.4	-431.4	38.28	47.65	-4.710	-1.731	0.5000
6	593.9	840.5	573.6	505.7	154.0	671.3	1229.3	1196.9	1218.7	729.3	-1075.3	-525.5	37.70	44.83	-7.104	-4.269	0.7000
7	582.1	819.5	559.9	459.7	159.3	678.4	1306.8	1269.7	1276.7	749.0	-1147.4	-591.3	36.84	41.02	-8.456	-6.215	0.8499
8	571.5	804.8	550.0	435.5	155.5	676.7	1331.4	1294.0	1298.1	755.4	-1175.9	-617.3	36.15	38.88	-8.744	-7.054	0.9000
9	559.8	787.9	539.0	410.7	151.2	672.3	1354.7	1318.3	1318.7	765.5	-1203.5	-646.0	35.37	36.71	-8.907	-7.964	0.9500

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM	T02/T01	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
37.41	182.53	1.1924	1.7749	92.54	93.11

AIRFOIL AERODYNAMIC SUMMARY PRINT

95 PERCENT SPEED (STATOR PERFORMANCE) RUN NO 40 SPEED CODE 95 POINT NO 3

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	294.9	191.8	196.6	182.9	219.7	57.7	251.41	275.54	0.1002	0.0855
2	290.3	193.0	196.9	184.2	213.3	57.5	255.42	279.63	0.0840	0.0722
3	283.5	193.0	192.4	183.6	208.2	59.4	251.82	280.25	0.0713	0.0598
4	276.3	195.9	186.1	177.1	204.2	83.6	249.54	272.00	0.0353	0.0272
5	270.3	199.0	177.3	171.6	204.0	100.7	243.59	265.38	-0.0080	-0.0089
6	263.0	198.2	163.8	166.7	205.8	107.2	229.31	259.08	-0.0470	-0.0454
7	256 4	189.5	149.1	158.9	208.6	103.2	210.35	245.44	-0.0747	-0.0771
8	252.3	184.2	142.2	155.2	208.4	99.1	200.59	238.78	-0.0851	-0.0893
9	247.8	179.8	135.6	153.3	207.4	94.0	191.35	235.05	-0.0994	-0.1027

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	P0/P0 STAGE	T0/T0 STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	48.1	17.4	0.8505	0.5318	-5.37	-2.75	7.57	30.69	0.5371	0.0964	0.0324	0.9637	1.7185	1.1877	89.13	89.92
2	47.2	17.3	0.8380	0.5366	-5.78	-3.08	6.78	29.94	0.5226	0.0822	0.0283	0.9698	1.7048	1.1814	90.73	91.39
3	47.2	17.9	0.8172	0.5377	-5.62	-2.84	6.69	29.33	0.5077	0.0546	0.0192	0.9807	1.7012	1.1776	92.27	92.83
4	47.6	25.2	0.7933	0.5456	-5.61	-2.63	11.30	22.37	0.4607	0.0487	0.0174	0.9835	1.7181	1.1798	92.96	93.47
5	49.0	30.4	0.7711	0.5528	-6.04	-2.81	12.15	18.62	0.4275	0.0446	0.0165	0.9855	1.7476	1.1876	92.12	92.71
6	51.5	32.8	0.7446	0.5483	-5.98	-2.52	11.73	18.74	0.4215	0.0403	0.0157	0.9876	1.7675	1.1966	89.87	90.65
7	54.4	33.0	0.7200	0.5201	-5.28	-1.64	10.13	21.43	0.4653	0.0829	0.0339	0.9758	1.7577	1.2091	83.59	84.83
8	55.7	32.6	0.7056	0.5037	-5.24	-1.53	8.62	23.13	0.4895	0.0965	0.0403	0.9727	1.7542	1.2142	81.29	82.70
9	56 8	31.5	0.6906	0.4902	-6.08	-2.33	5.69	25.29	0.5103	0.0989	0.0424	0.9730	1.7570	1.2185	79.92	81.44

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	967.4	629.3	645.0	600.2	721.0	189.2	51.49	56.43	0.0543	5.742	4.898
2	952.5	633.1	646.1	604.3	699.9	188.6	52.31	57.27	0.1078	4.812	4.136
3	930.0	633.3	631.1	602.6	683.1	194.9	51.57	57.40	0.1601	4.083	3.429
4	906.6	642.6	610.7	581.1	670.0	274.4	51.11	55.71	0.3140	2.024	1.559
5	886.8	652.8	581.7	563.1	669.4	330.2	49.89	54.35	0.5124	-0.458	-0.510
6	862.8	650.2	537.3	546.8	675.1	351.7	46.96	53.06	0.7091	-2.696	-2.601
7	841.4	621.7	489.3	521.3	684.5	338.7	43.08	50.27	0.8564	-4.279	-4.420
8	827.8	604.3	466.6	509.3	683.8	325.2	41.08	48.90	0.9050	-4.874	-5.116
9	813.1	589.9	444.9	502.8	680.5	308.5	39.19	48.14	0.9531	-5.697	-5.882

NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	T0/T0 STAGE	P02/P01	P0/P0 STAGE	EFF-AD STAGE %	EFF-P STAGE %
11600.00	97.01	44.00	1.1924	0.9804	1.7401	89.09	89.90

AIRFOIL AERODYNAMIC SUMMARY PRINT

95 PERCENT SPEED (ROTOR PERFORMANCE) RUN NO 40 SPEED CODE 95 POINT NO 6

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	156.6	284.2	155.5	177.0	18.1	222.3	260.5	268.6	288.0	183.0	-242.4	-46.2	167.05	233.46	0.0374	0.0900
2	163.1	277.5	161.5	172.1	22.6	217.8	270.0	276.0	295.4	181.6	-247.3	-58.2	173.79	229.56	0.0204	0.0775
3	166.2	273.2	164.1	169.1	26.2	214.5	279.2	283.4	301.6	182.6	-253.0	-68.9	176.62	228.06	0.0055	0.0655
4	169.4	268.0	166.3	165.7	32.2	210.7	306.2	305.6	320.6	190.9	-274.1	-94.9	178.61	229.23	-0.0351	0.0265
5	170.3	266.1	166.0	159.0	38.2	213.4	341.4	335.2	345.7	200.2	-303.2	-121.8	178.03	225.52	-0.0865	-0.0238
6	168.4	261.9	162.6	145.1	43.9	218.1	374.7	364.8	368.6	206.3	-330.8	-146.7	174.76	209.13	-0.1315	-0.0697
7	164.2	256.8	157.8	128.6	45.3	222.3	398.3	387.0	386.6	208.9	-352.9	-164.7	170.03	186.33	-0.1569	-0.1086
8	160.8	251.7	154.6	117.2	44.2	222.8	405.8	394.4	393.3	207.9	-361.6	-171.6	166.49	169.83	-0.1612	-0.1300
9	157.1	246.2	151.2	107.6	43.0	221.5	412.9	401.8	399.6	210.0	-369.9	-180.3	162.54	156.13	-0.1606	-0.1637

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF-P TOTAL
1	6.6	51.5	57.24	14.64	0.4701	0.8150	0.8645	0.5247	-0.00	6.28	12.10	42.60	0.5826	0.0680	0.0198	1.7908	95.36	95.73
2	8.0	51.7	56.81	18.71	0.4905	0.7948	0.8885	0.5202	1.38	7.49	11.33	38.11	0.5913	0.0813	0.0237	1.7598	94.08	94.53
3	9.1	51.8	57.01	22.18	0.5003	0.7814	0.9080	0.5224	2.33	8.29	12.00	34.83	0.5924	0.0772	0.0224	1.7515	94.13	94.57
4	11.0	51.8	58.77	29.82	0.5105	0.7636	0.9661	0.5440	4.08	9.73	13.22	28.94	0.5887	0.0623	0.0179	1.7763	94 84	95 24
5	13.0	53.3	61.34	37.39	0.5134	0.7529	1.0421	0.5665	4.60	9.47	10.11	23.95	0.5975	0.0754	0.0211	1.8282	93.32	93.86
6	15.1	56.2	63.86	45.19	0.5073	0.7345	1.1105	0.5786	4.73	8.96	7.43	18.68	0.6133	0.1154	0.0303	1.8607	89.30	90.18
7	16.0	59.8	65.94	51.88	0.4941	0.7131	1.1634	0.5801	4.72	8.22	7.10	14.06	0.6336	0.1684	0.0401	1.8806	84.22	85.55
8	16.0	62.2	66.87	55.57	0.4835	0.6955	1.1821	0.5743	4.73	7.96	8.74	11.29	0.6457	0.1948	0.0430	1.8796	81.75	83.29
9	15.9	64.1	67.79	59.21	0.4719	0.6775	1.2000	0.5777	4.44	7.42	10.34	8.58	0.6477	0.2108	0.0426	1.8798	80.26	81.92

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1	513.7	932.5	510.2	580.8	59.5	729.5	854.6	881.1	944.8	600.3	-795.2	-151.7	34.21	47.82	2.142	5.158	0.0499
2	535.1	910.6	529.9	564.5	74.3	714.5	885.8	905.5	969.2	595.9	-811.5	-191.0	35.59	47.02	1.167	4.442	0.1000
3	545.2	896.2	538.4	554.9	85.9	703.8	916.0	929.8	989.5	599.1	-830.1	-226.0	36.17	46.71	0.318	3.751	0.1501
4	555.7	879.3	545.6	543.5	105.6	691.2	1004.8	1002.6	1051.8	626.4	-899.2	-311.4	36.58	46.95	-2.012	1.519	0.3000
5	558.8	873.2	544.5	521.5	125.2	700.3	1120.2	1099.8	1134.2	656.9	-995.0	-399.5	36.46	46.19	-4.957	-1.363	0.5000
6	552.5	859.4	533.4	476.1	144.0	715.5	1229.3	1196.9	1209.3	677.0	-1085.4	-481.4	35.79	42.83	-7.537	-3.994	0.7000
7	538.8	842.7	517.9	421.9	148.7	729.5	1306.8	1269.7	1268.5	685.5	-1158.0	-540.3	34.82	38.16	-8.991	-6.223	0.8499
8	527.7	825.9	507.4	384.7	145.1	730.9	1331.4	1294.0	1290.3	682.0	-1186.3	-563.2	34.10	34.78	-9.236	-7.447	0.9000
9	515.6	807.9	495.9	352.9	140.9	726.7	1354.7	1318.3	1311.2	688.9	-1213.8	-591.6	33.29	31.98	-9.204	-9.381	0.9500

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM	T02/T01	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
35.49	173.18	1.2069	1.8241	90.51	91.27

AIRFOIL AERODYNAMIC SUMMARY PRINT

95 PERCENT SPEED (STATOR PERFORMANCE) RUN NO 40 SPEED CODE 95 POINT NO 6

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	287.0	165.4	183.8	155.7	220.5	55.6	240.75	243.54	0.1056	0.0881
2	280.9	163.7	179.3	154.3	216.2	54.8	237.47	242.18	0.0882	0.0770
3	276.9	163.6	176.7	153.6	213.2	56.4	236.32	241.95	0.0795	0.0667
4	272.6	171.9	173.9	155.3	210.0	73.7	238.14	246.82	0.0484	0.0398
5	272.0	183.2	168.6	159.2	213.5	90.5	236.10	255.17	0.0107	0.0080
6	268.2	189.0	154.9	159.2	218.9	101.9	220.38	256.79	-0.0298	-0.0281
7	263.3	185.0	138.3	155.5	224.1	100.3	197.91	249.54	-0.0586	-0.0635
8	258.6	179.9	127.6	151.1	224.9	97.7	182.39	241.04	-0.0652	-0.0784
9	253.7	175.1	118.8	146.9	224.2	95.3	169.99	233.48	-0.0706	-0.0964

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	PO/PO STAGE	TO/TO STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	50.2	19.6	0.8241	0.4548	-3.34	-0.73	9.73	30.56	0.6206	0.1095	0.0363	0.9606	1.7202	1.1899	88.26	89.12
2	50.3	19.5	0.8056	0.4507	-2.73	-0.03	9.00	30.77	0.6195	0.0998	0.0340	0.9653	1.6991	1.1863	87.76	88.63
3	50.3	20 1	0.7934	0.4509	-2.52	0.25	8.93	30.17	0.6136	0.0956	0.0332	0.9675	1.6949	1.1845	88.15	88.99
4	50.3	25.4	0.7783	0.4741	-2.88	0.11	11.42	24.99	0.5626	0.0801	0.0286	0.9736	1.7275	1.1876	90.06	90.79
5	51.7	29.6	0.7716	0.5038	-3.34	-0.11	11.38	22.08	0.5168	0.0668	0.0249	0.9782	1.7848	1.2000	89.94	90.73
6	54.7	32.6	0.7541	0.5176	-2.77	0.70	11.60	22.08	0.4946	0.0413	0.0161	0.9870	1.8313	1.2144	87.98	88.95
7	58.3	32.8	0.7331	0.5024	-1.43	2.21	9.92	25.49	0.5287	0.0678	0.0278	0.9794	1.8414	1.2317	82.20	83.65
8	60.4	32.9	0.7164	0.4862	-0.52	3.18	8.93	27.53	0.5530	0.0763	0.0317	0.9777	1.8379	1.2393	79.33	81.00
9	62.0	33.0	0.7000	0.4714	-0.88	2.87	7.12	29.06	0.5716	0.0757	0.0320	0.9787	1.8398	1.2453	77.51	79.34

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	941.7	542.6	602.9	511.0	723.4	182.5	49.31	49.88	0.0543	6.053	5.045
2	921.6	537.1	588.4	506.1	709.3	179.7	48.64	49.60	0.1078	5.056	4.410
3	908.5	536.9	579.8	504.0	699.4	185.1	48.40	49.55	0.1601	4.555	3.824
4	894.4	564.1	570.4	509.6	688.9	241.9	48.77	50.55	0.3140	2.775	2.278
5	892.5	601.0	553.1	522.4	700.5	297.1	48.36	52.26	0.5124	0.611	0.457
6	880.0	620.2	508.3	522.2	718.3	334.5	45.14	52.59	0.7091	-1.705	-1.610
7	863.9	607.1	453.7	510.2	735.1	329.1	40.53	51.11	0.8564	-3.356	-3.638
8	848.5	590.2	418.5	495.6	738.1	320.5	37.35	49.37	0.9050	-3.733	-4.492
9	832.4	574.4	389.7	481.9	735.5	312.6	34.82	47.82	0.9531	-4.047	-5.522

NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	TO/TO STAGE	P02/P01	PO/PO STAGE	EFF-AD STAGE %	EFF-P STAGE %
11600.00	92.04	41.75	1.2069	0.9769	1.7820	86.70	87.73

AIRFOIL AERODYNAMIC SUMMARY PRINT

95 PERCENT SPEED (ROTOR PERFORMANCE) RUN NO 40 SPEED CODE 95 POINT NO 9

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	175.0	290.6	173.8	193.3	20.2	217.0	260.5	268.6	296.5	200.1	-240.2	-51.6	180.77	244.59	0.0386	0.0892
2	182.0	284.4	180.2	191.8	25.2	210.0	270.0	276.0	304.0	202.8	-244.8	-66.0	187.75	246.08	0.0224	0.0763
3	185.4	278.0	183.1	188.6	29.1	204.2	279.2	283.4	309.9	204.5	-250.1	-79.2	190.72	244.59	0.0082	0.0608
4	189.1	269.7	185.7	183.8	35.8	197.4	306.2	305.6	328.1	213.3	-270.4	-108.2	192.90	244.72	-0.0306	0.0161
5	190.8	260.6	186.0	174.8	42.5	193.2	341.4	335.2	352.1	225.2	-298.9	-141.9	192.67	238.62	-0.0787	-0.0315
6	189.8	250.4	183.3	161.8	49.0	191.1	374.7	364.8	373.8	237.3	-325.7	-173.6	190.08	224.70	-0.1207	-0.0749
7	186.4	243.0	179.4	149.5	50.7	191.6	398.3	387.0	391.1	246.0	-347.6	-195.4	186.12	209.12	-0.1429	-0.1119
8	183.3	239.3	176.5	145.7	49.5	189.8	405.8	394.4	397.6	251.2	-356.3	-204.6	182.84	204.21	-0.1481	-0.1190
9	179.8	233.7	173.2	140.5	48.1	186.8	412.9	401.8	403.8	256.9	-364.8	-215.0	179.07	197.25	-0.1527	-0.1298

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF-P TOTAL
1	6.6	48.3	54.04	14.95	0.5284	0.8385	0.8953	0.5773	-3.21	3.07	12.41	39.09	0.5290	0.0772	0.0225	1.7464	94.29	94.72
2	7.9	47.6	53.60	19.02	0.5506	0.8206	0.9198	0.5854	-1.84	4.27	11.64	34.58	0.5223	0.0707	0.0206	1.7155	94.37	94.78
3	9.0	47.3	53.77	22.80	0.5615	0.8016	0.9389	0.5898	-0.91	5.05	12.61	30.98	0.5190	0.0643	0.0186	1.6940	94.59	94.97
4	10.9	47.0	55.53	30.48	0.5737	0.7755	0.9951	0.6133	0.84	6.50	13.88	25.05	0.5124	0.0439	0.0125	1.6991	95.93	96.22
5	12.9	47.8	58.13	39.02	0.5790	0.7451	1.0685	0.6439	1.39	6.26	11.74	19.10	0.5090	0.0438	0.0120	1.7109	95.52	95.84
6	15.0	49 6	60.63	46.91	0.5757	0.7118	1.1339	0.6746	1.50	5.73	9.15	13.73	0.5034	0.0597	0.0152	1.7103	93.42	93.90
7	15.8	51.9	62.69	52.45	0.5649	0.6860	1.1853	0.6943	1.47	4.97	7.67	10.24	0.5064	0.0937	0.0220	1.7160	89.47	90.23
8	15.7	52.4	63.63	54.42	0.5549	0.6735	1.2036	0.7071	1.49	4.72	7.58	9.21	0.5020	0.1002	0.0227	1.7206	88.67	89.50
9	15.5	52.9	64.59	56.75	0.5435	0.6560	1.2209	0.7211	1.24	4.22	7.88	7.84	0.4957	0.1042	0.0225	1.7213	88.10	88.97

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1	574.2	953.5	570.4	634.3	66.4	711.9	854.6	881.1	973.0	656.4	-788.2	-169.2	37.02	50.09	2.209	5.113	0.0499
2	597.0	933.0	591.3	629.2	82.6	688.9	885.8	905.5	997.3	665.5	-803.2	-216.6	38.45	50.40	1.281	4.373	0.1000
3	608.2	912.0	600.6	618.7	95.4	670.0	916.0	929.8	1016.9	671.0	-820.6	-259.8	39.06	50.09	0.467	3.484	0.1501
4	620.6	885.0	609.4	603.2	117.5	647.6	1004.8	1002.6	1076.4	699.9	-887.3	-355.0	39.51	50.12	-1.752	0.923	0.3000
5	626.0	855.0	610.2	573.5	139.5	634.0	1120.2	1099.8	1155.1	738.8	-980.7	-465.7	39.46	48.87	-4.512	-1.806	0.5000
6	622.6	821.6	601.5	530.8	160.7	627.2	1229.3	1196.9	1226.3	778.6	-1068.6	-569.7	38.93	46.02	-6.918	-4.293	0.7000
7	611.6	797.4	588.5	490.4	166.3	628.7	1306.8	1269.7	1283.3	807.1	-1140.4	-641.0	38.12	42.83	-8.187	-6.411	0.8499
8	601.4	785.0	579.0	478.1	162.4	622.6	1331.4	1294.0	1304.5	824.2	-1168.9	-671.4	37.45	41.82	-8.483	-6.817	0.9000
9	589.8	766.7	568.3	460.8	157.9	612.7	1354.7	1318.3	1324.8	842.7	-1196.8	-705.6	36.68	40.40	-8.748	-7.438	0.9500

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM	T02/T01	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
38.62	188.47	1.1776	1.7112	93.39	93.87

AIRFOIL AERODYNAMIC SUMMARY PRINT

95 PERCENT SPEED (STATOR PERFORMANCE) RUN NO 40 SPEED CODE 95 POINT NO 9

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	297.4	208.1	205.3	199.6	215.2	58.7	255.49	288.95	0.0878	0.0842
2	291.8	209.4	204.2	201.2	208.4	58.0	257.41	293.69	0.0840	0.0697
3	285.7	210.1	201.1	201.4	202.9	59.8	256.08	295.83	0.0710	0.0561
4	278.0	211.4	196.3	194.7	196.9	82.5	256.43	287.91	0.0282	0.0208
5	269.2	210.4	187.0	186.3	193.7	97.7	250.50	277.27	-0.0196	-0.0176
6	258.2	204.9	172.4	176.0	192.3	104.9	235.59	262.89	-0.0541	-0.0538
7	250.5	194.3	159.2	166.6	193.4	100.0	219.40	247.29	-0.0814	-0.0843
8	246.9	187.8	155.4	161.3	191.8	96.3	214.64	238.53	-0.0940	-0.0953
9	241.9	183.1	150.9	157.9	189.0	92.7	208.65	233.38	-0.1090	-0.1062

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	P0/P0 STAGE	T0/T0 STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	46.3	16.3	0.8611	0.5811	-7.24	-4.63	6.45	29.94	0.4793	0.0803	0.0271	0.9692	1.6897	1.1825	88.59	89.40
2	45.5	16.0	0.8452	0.5869	-7.49	-4.79	5.54	29.48	0.4612	0.0531	0.0184	0.9802	1.6762	1.1754	90.64	91.29
3	45.2	16.5	0.8269	0.5902	-7.62	-4.84	5.29	28.72	0.4436	0.0272	0.0096	0.9902	1.6752	1.1711	92.79	93.30
4	45.0	22.9	0.8024	0.5943	-8.18	-5.20	8.97	22.12	0.3988	0.0261	0.0095	0.9910	1.6855	1.1706	94.29	94.69
5	46.0	27.7	0.7726	0.5903	-9.04	-5.81	9.42	18.35	0.3706	0.0267	0.0101	0.9913	1.6965	1.1739	93.74	94.18
6	48.1	30.8	0.7363	0.5728	-9.33	-5.86	9.79	17.33	0.3649	0.0305	0.0121	0.9908	1.6948	1.1777	91.55	92.16
7	50.6	31.0	0.7091	0.5393	-9.16	-5.51	8.10	19.58	0.4101	0.0832	0.0348	0.9764	1.6757	1.1868	85.05	86.09
8	51.0	30.9	0.6970	0.5198	-9.93	-6.23	6.93	20.13	0.4348	0.1102	0.0469	0.9695	1.6687	1.1894	83.17	84.33
9	51.4	30.4	0.6811	0.5059	-11.48	-7.73	4.59	20.99	0.4478	0.1111	0.0482	0.9704	1.6703	1.1905	82.82	84.01

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	975.9	682.7	673.7	655.0	706.0	192.5	52.33	59.18	0.0543	5.029	4.826
2	957.4	686.9	670.1	660.0	683.8	190.4	52.72	60.15	0.1078	4.814	3.991
3	937.3	689.4	659.7	660.9	665.9	196.1	52.45	60.59	0.1601	4.069	3.214
4	912.2	693.7	644.0	638.7	646.1	270.5	52.52	58.97	0.3140	1.613	1.190
5	883.2	690.3	613.4	611.4	635.4	320.4	51.31	56.79	0.5124	-1.121	-1.007
6	847.2	672.1	565.5	577.3	630.8	344.2	48.25	53.84	0.7091	-3.097	-3.085
7	821.9	637.5	522.2	546.7	634.7	328.0	44.94	50.65	0.8564	-4.664	-4.833
8	810.0	616.3	510.0	529.1	629.3	316.0	43.96	48.85	0.9050	-5.385	-5.460
9	793.6	600.9	495.1	518.1	620.2	304.2	42.73	47.80	0.9531	-6.244	-6.085

NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	T0/T0 STAGE	P02/P01	P0/P0 STAGE	EFF-AD STAGE %	EFF-P STAGE %
11600.00	100.17	45.44	1.1776	0.9851	1.6857	90.58	91.25

AIRFOIL AERODYNAMIC SUMMARY PRINT

95 PERCENT SPEED (ROTOR PERFORMANCE) RUN NO 40 SPEED CODE 95 POINT NO 10

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	176.5	290.6	175.4	194.7	20.4	215.8	260.5	268.6	297.3	201.7	-240.1	-52.8	181.84	245.08	0.0386	0.0877
2	183.5	284.6	181.7	193.3	25.4	208.9	270.0	276.0	304.7	204.6	-244.6	-67.1	188.82	246.76	0.0226	0.0744
3	186.9	278.4	184.6	190.5	29.3	203.1	279.2	283.4	310.7	206.7	-249.9	-80.3	191.79	245.92	0.0085	0.0603
4	190.9	270.1	187.5	185.8	36.1	196.0	306.2	305.6	328.8	215.7	-270.1	-109.6	194.09	246.31	-0.0302	0.0145
5	192.7	260.3	187.9	176.6	42.9	191.2	341.4	335.2	352.8	227.8	-298.5	-144.0	193.96	240.03	-0.0796	-0.0282
6	191.5	249.8	185.0	164.0	49.4	188.4	374.7	364.8	374.2	240.9	-325.3	-176.4	191.24	226.57	-0.1236	-0.0740
7	187.9	241.6	180.8	151.1	51.1	188.6	398.3	387.0	391.4	249.4	-347.2	-198.4	187.10	209.97	-0.1450	-0.1167
8	184.7	236.9	177.8	146.4	49.9	186.3	405.8	394.4	397.8	254.5	-355.9	-208.1	183.76	203.84	-0.1492	-0.1262
9	181.1	231.6	174.5	142.4	48.5	182.7	412.9	401.8	404.0	261.3	-364.4	-219.1	179.93	198.79	-0.1530	-0.1355

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF-P TOTAL
1	6.6	48.0	53.78	15.17	0.5332	0.8391	0.8980	0.5823	-3.46	2.81	12.63	38.61	0.5232	0.0806	0.0235	1.7372	93.98	94.43
2	7.9	47.3	53.34	19.16	0.5556	0.8218	0.9225	0.5907	-2.10	4.02	11.78	34.18	0.5164	0.0733	0.0213	1.7077	94.11	94.54
3	9.0	46.9	53.51	22.89	0.5666	0.8035	0.9416	0.5966	-1.16	4.80	12.71	30.63	0.5116	0.0643	0.0186	1.6874	94.53	94.92
4	10.9	46.5	55.25	30.53	0.5794	0.7772	0.9980	0.6208	0.56	6.22	13.93	24.72	0.5043	0.0421	0.0120	1.6918	96.05	96.33
5	12.9	47.2	57.84	39.13	0.5853	0.7452	1.0713	0.6523	1.10	5.97	11.85	18.70	0.5000	0.0402	0.0110	1.6997	95.82	96.11
6	14.9	48.8	60.38	46.96	0.5814	0.7113	1.1361	0.6858	1.25	5.48	9.20	13.43	0.4918	0.0544	0.0138	1.6944	93.86	94.30
7	15.8	51.2	62.48	52.60	0.5697	0.6831	1.1868	0.7051	1.26	4.77	7.82	9.88	0.4949	0.0906	0.0212	1.6953	89.57	90.31
8	15.7	51.7	63.43	54.77	0.5594	0.6680	1.2049	0.7174	1.29	4.53	7.93	8.66	0.4905	0.0976	0.0220	1.6966	88.68	89.49
9	15.5	52.0	64.40	56.91	0.5479	0.6515	1.2221	0.7351	1.05	4.03	8.04	7.49	0.4806	0.0964	0.0208	1.6988	88.68	89.49

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1	579.2	953.5	575.3	638.7	67.0	708.0	854.6	881.1	975.4	661.8	-787.6	-173.1	37.24	50.19	2.214	5.026	0.0499
2	602.1	933.7	596.3	634.1	83.4	685.4	885.8	905.5	999.7	671.2	-802.4	-220.1	38.67	50.54	1.294	4.265	0.1000
3	613.4	913.4	605.8	624.9	96.2	666.2	916.0	929.8	1019.3	678.2	-819.8	-263.6	39.28	50.37	0.487	3.457	0.1501
4	626.4	886.1	615.1	609.6	118.5	643.1	1004.8	1002.6	1078.8	707.8	-886.3	-359.6	39.75	50.45	-1.728	0.829	0.3000
5	632.3	854.0	616.5	579.4	140.7	627.4	1120.2	1099.8	1157.4	747.6	-979.5	-472.4	39.72	49.16	-4.562	-1.614	0.5000
6	628.3	819.6	607.1	538.2	162.0	618.2	1229.3	1196.9	1227.9	790.3	-1067.3	-578.7	39.17	46.40	-7.081	-4.240	0.7000
7	616.5	792.7	593.3	495.7	167.7	618.7	1306.8	1269.7	1284.3	818.3	-1139.1	-651.1	38.32	43.00	-8.308	-6.685	0.8499
8	606.0	777.4	583.5	480.4	163.7	611.2	1331.4	1294.0	1305.3	834.9	-1167.6	-682.8	37.64	41.75	-8.550	-7.228	0.9000
9	594.2	759.9	572.5	467.1	159.2	599.3	1354.7	1318.3	1325.5	857.4	-1195.5	-719.0	36.85	40.71	-8.766	-7.761	0.9500

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM	T02/T01	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
38.85	189.57	1.1744	1.6981	93.63	94.08

AIRFOIL AERODYNAMIC SUMMARY PRINT

95 PERCENT SPEED (STATOR PERFORMANCE) RUN NO 40 SPEED CODE 95 POINT NO 10

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	297.9	212.2	207.2	203.6	214.0	60.0	256.27	291.39	0.0959	0.0836
2	292.4	213.7	206.2	205.2	207.4	59.4	258.35	296.35	0.0840	0.0686
3	286.6	214.5	203.5	205.6	201.8	61.3	257.73	298.70	0.0698	0.0547
4	278.9	215.2	198.9	198.3	195.5	83.8	258.45	289.93	0.0259	0.0190
5	269.2	213.7	189.1	189.3	191.6	99.2	252.13	278.64	-0.0219	-0.0183
6	257.4	206.7	174.2	178.5	189.4	104.3	236.92	263.76	-0.0500	-0.0529
7	248.6	195.7	160.0	168.7	190.3	99.2	219.28	247.84	-0.0773	-0.0833
8	244.2	188.6	155.5	162.9	188.3	94.9	213.43	238.52	-0.0893	-0.0948
9	239.4	183.6	152.1	159.0	184.9	91.7	209.27	232.70	-0.1047	-0.1061

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	PO/PO STAGE	TO/TO STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	45.9	16.4	0.8632	0.5939	-7.64	-5.02	6.51	29.48	0.4630	0.0790	0.0267	0.9697	1.6814	1.1812	88.32	89.14
2	45.1	16.1	0.8477	0.6001	-7.91	-5.21	5.59	29.01	0.4443	0.0524	0.0182	0.9804	1.6685	1.1741	90.44	91.10
3	44.7	16.5	0.8305	0.6040	-8.13	-5.35	5.35	28.15	0.4263	0.0277	0.0098	0.9900	1.6680	1.1697	92.74	93.24
4	44.5	22.9	0.8060	0.6063	-8.77	-5.79	8.92	21.59	0.3829	0.0305	0.0111	0.9894	1.6755	1.1688	94.12	94.53
5	45.4	27.7	0.7738	0.6012	-9.68	-6.45	9.42	17.71	0.3521	0.0277	0.0105	0.9910	1.6843	1.1710	93.94	94.37
6	47.4	30.3	0.7351	0.5795	-10.06	-6.60	9.30	17.08	0.3514	0.0345	0.0138	0.9896	1.6769	1.1735	91.72	92.30
7	50.0	30.5	0.7048	0.5447	-9.77	-6.12	7.58	19.50	0.3951	0.0816	0.0343	0.9770	1.6564	1.1820	85.18	86.19
8	50.5	30.2	0.6902	0.5232	-10.47	-6.77	6.31	20.21	0.4207	0.1068	0.0457	0.9710	1.6475	1.1840	83.29	84.42
9	50.6	30.0	0.6754	0.5085	-12.33	-8.58	4.14	20.59	0.4337	0.1136	0.0495	0.9702	1.6483	1.1843	83.26	84.38

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	977.4	696.3	679.9	667.9	702.1	196.9	52.49	59.68	0.0543	5.497	4.792
2	959.5	701.0	676.6	673.4	680.4	194.9	52.91	60.70	0.1078	4.810	3.928
3	940.3	703.9	667.8	674.6	662.1	201.0	52.79	61.18	0.1601	3.998	3.132
4	915.2	706.2	652.7	650.5	641.6	274.8	52.93	59.38	0.3140	1.482	1.089
5	883.3	701.3	620.6	621.1	628.6	325.5	51.64	57.07	0.5124	-1.254	-1.051
6	844.4	678.3	571.6	585.5	621.6	342.4	48.52	54.02	0.7091	-2.867	-3.028
7	815.8	642.2	524.9	553.7	624.4	325.4	44.91	50.76	0.8564	-4.427	-4.775
8	801.1	618.8	510.1	534.6	617.7	311.5	43.71	48.85	0.9050	-5.119	-5.430
9	785.5	602.2	499.0	521.7	606.6	300.8	42.86	47.66	0.9531	-5.996	-6.079

NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	TO/TO STAGE	P02/P01	PO/PO STAGE	EFF-AD STAGE %	EFF-P STAGE %
11600.00	100.75	45.70	1.1744	0.9847	1.6720	90.69	91.34

AIRFOIL AERODYNAMIC SUMMARY PRINT

70 PERCENT SPEED (ROTOR PERFORMANCE) RUN NO 40 SPEED CODE 70 POINT NO 1

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	131.0	225.7	130.1	170.7	15.3	147.7	191.9	197.9	219.4	177.9	-176.6	-50.1	145.41	204.10	0.0373	0.0842
2	136.7	222.4	135.3	169.3	19.1	144.1	198.9	203.3	225.1	179.4	-179.8	-59.2	151.41	203.89	0.0200	0.0695
3	139.3	219.3	137.6	169.3	22.1	139.4	205.7	208.8	229.4	183.0	-183.6	-69.4	153.94	205.21	0.0045	0.0546
4	141.7	209.3	139.1	162.8	27.2	131.4	225.6	225.2	242.4	187.9	-198.5	-93.7	155.49	199.18	-0.0369	0.0110
5	142.3	194.7	138.6	152.5	32.2	121.1	251.6	247.0	259.4	197.7	-219.3	-125.9	154.83	188.11	-0.0839	-0.0411
6	141.3	181.0	136.3	141.9	37.1	112.3	276.1	268.8	275.1	211.2	-239.0	-156.4	152.41	176.34	-0.1205	-0.0831
7	138.8	172.6	133.4	134.3	38.4	108.5	293.5	285.1	287.8	221.9	-255.1	-176.6	149.15	167.21	-0.1418	-0.1085
8	136.3	168.6	131.1	130.5	37.5	106.7	299.0	290.6	292.5	225.5	-261.5	-183.9	146.43	162.43	-0.1477	-0.1182
9	133.5	160.9	128.5	125.3	36.4	100.9	304.2	296.1	297.0	231.9	-267.8	-195.2	143.35	156.25	-0.1527	-0.1317

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF-P TOTAL
1	6.7	40.9	53.55	16.37	0.3908	0.6624	0.6544	0.5220	-3.70	2.58	13.83	37.18	0.3752	0.0579	0.0168	1.3362	95.05	95.2
2	8.0	40.4	52.99	19.29	0.4082	0.6525	0.6722	0.5265	-2.45	3.67	11.92	33.70	0.3769	0.0586	0.0170	1.3224	94.58	94.7
3	9.1	39.5	53.14	22.31	0.4164	0.6439	0.6857	0.5374	-1.54	4.42	12.13	30.82	0.3650	0.0352	0.0102	1.3159	96.51	96.6
4	11.1	38.9	54.99	29.93	0.4238	0.6133	0.7248	0.5507	0.30	5.96	13.32	25.07	0.3681	0.0367	0.0106	1.2979	95.80	95.9
5	13.1	38.4	57.75	39.50	0.4255	0.5695	0.7759	0.5782	1.01	5.88	12.21	18.25	0.3574	0.0405	0.0110	1.2709	94.43	94.6
6	15 2	38.3	60.30	47.68	0.4224	0.5286	0.8226	0.6169	1.17	5.40	9.93	12.62	0.3313	0.0343	0.0086	1.2467	94.39	94.5
7	16.0	38.8	62.37	52.62	0.4148	0.5032	0.8602	0.6468	1.16	4.66	7.84	9.76	0.3196	0.0456	0.0107	1.2363	91.91	92.1
8	15.9	39 1	63.36	54.51	0.4071	0.4906	0.8737	0.6565	1.22	4.45	7.67	8.85	0.3177	0.0534	0.0121	1.2334	90.35	90.6
9	15.8	38.7	64.36	57.20	0.3985	0.4681	0.8865	0.6748	1.01	3.99	8.33	7.16	0.3016	0.0422	0.0090	1.2247	91.86	92.0

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1	429.9	740 6	427.0	560.0	50.1	484.8	629.7	649.2	719.9	583.6	-579.6	-164.5	29.78	41.80	2.136	4.823	0.0499
2	448.4	729.5	444.0	555.6	62.7	472.8	652.7	667.2	738.4	588.6	-590.0	-194.4	31.01	41.76	1.144	3.982	0.1000
3	457.1	719.5	451.3	555.6	72.5	457.2	674.9	685.1	752.8	600.5	-602.5	-227.8	31.53	42.03	0.260	3.131	0.1501
4	465.0	686.6	456.4	534.3	89.1	431.2	740.3	738.7	795.2	616.5	-651.2	-307.5	31.85	40.79	-2.117	0.630	0.3000
5	466.8	638.9	454.6	500.3	105.8	397.4	825.4	810.3	851.2	648.7	-719.6	-412.9	31.71	38.53	-4.808	-2.353	0.5000
6	463.5	593.9	447.2	465.6	121.8	368.6	905.8	881.9	902.6	693.0	-784.0	-513.3	31.21	36.12	-6.906	-4.763	0.7000
7	455.4	566.5	437.6	440.6	125.9	356.0	962.8	935.5	944.4	728.1	-836.9	-579.6	30.55	34.25	-8.126	-6.219	0.8499
8	447.3	553.1	430.1	428.3	122.9	350.0	981.0	953.4	959.8	740.0	-858.1	-603.5	29.99	33.27	-8.461	-6.775	0.9000
9	438.1	527.9	421.5	411.2	119.4	331.0	998.2	971.3	974.6	761.0	-878.7	-640.3	29.36	32.00	-8.747	-7.545	0.9500

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM	T02/T01	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
30.90	150.77	1.0756	1.2731	94.50	94.69

AIRFOIL AERODYNAMIC SUMMARY PRINT

70 PERCENT SPEED (STATOR PERFORMANCE) RUN NO 40 SPEED CODE 70 POINT NO 1

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	233.0	215.4	181.1	205.8	146.5	63.7	213.55	245.35	0.0994	0.0850
2	230.1	217.9	180.3	208.5	143.0	63.2	213.80	250.24	0.0809	0.0708
3	227.4	216.6	180.3	207.1	138.5	63.4	215.15	249.54	0.0647	0.0576
4	217.5	210.1	173.6	198.4	131.1	69.1	209.12	240.04	0.0223	0.0218
5	202.6	198.5	162.2	182.2	121.3	78.8	197.43	221.17	-0.0268	-0.0201
6	187.9	186.0	150.1	167.0	113.0	81.8	184.44	203.52	-0.0675	-0.0597
7	178.8	177.6	141.3	156.5	109.5	83.8	174.33	190.72	-0.0938	-0.0891
8	174.8	171.9	137.6	150.2	107.8	83.6	169.59	182.72	-0.1017	-0.0989
9	167.6	164.4	133.0	143.4	102.0	80.4	164.24	174.69	-0.1102	-0.1083

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	P0/P0 STAGE	T0/T0 STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	38.9	17.1	0.6856	0.6298	-14.58	-11.97	7.27	21.78	0.1944	0.0829	0.0279	0.9776	1.3046	1.0905	87.27	87.75
2	38.4	16.8	0.6775	0.6386	-14.64	-11.94	6.32	21.54	0.1711	0.0445	0.0154	0.9883	1.3053	1.0871	90.87	91.20
3	37.5	17.0	0.6697	0.6356	-15.37	-12.59	5.77	20.49	0.1618	0.0389	0.0137	0.9900	1.3006	1.0841	92.80	93.06
4	37.0	19.2	0.6396	0.6163	-16.22	-13.24	5.22	17.84	0.1370	0.0314	0.0117	0.9926	1.2848	1.0801	92.77	93.02
5	36.8	23.4	0.5940	0.5815	-18.26	-15.03	5.16	13.38	0.1018	0.0358	0.0141	0.9925	1.2579	1.0743	91.27	91.55
6	37.0	26.1	0.5498	0.5441	-20.47	-17.00	5.08	10.90	0.0833	0.0559	0.0232	0.9897	1.2321	1.0686	89.67	89.97
7	37.8	28.2	0.5221	0.5183	-21.92	-18.27	5.31	9.61	0.0767	0.0763	0.0328	0.9872	1.2197	1.0681	85.80	86.19
8	38.1	29.1	0.5096	0.5009	-22.81	-19.10	5.19	8.99	0.0837	0.1009	0.0437	0.9838	1.2125	1.0683	82.87	83.34
9	37.5	29.3	0.4886	0.4789	-25.39	-21.64	3.46	8.21	0.0833	0.1133	0.0498	0.9831	1.2027	1.0644	84.13	84.54

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	764.4	706.8	594.3	675.2	480.7	208.9	43.74	50.25	0.0543	5.696	4.871
2	755.1	714.8	591.5	684.0	469.3	207.5	43.79	51.25	0.1078	4.634	4.057
3	746.0	710.7	591.6	679.6	454.4	207.9	44.06	51.11	0.1601	3.708	3.301
4	713.7	689.4	569.6	651.1	430.1	226.7	42.83	49.16	0.3140	1.276	1.251
5	664.6	651.2	532.3	597.7	397.9	258.7	40.44	45.30	0.5124	-1.537	-1.154
6	616.3	610.2	492.5	548.1	370.6	268.3	37.78	41.68	0.7091	-3.867	-3.420
7	586.6	582.6	463.8	513.6	359.3	275.0	35.71	39.06	0.8564	-5.373	-5.105
8	573.4	564.1	451.3	492.9	353.6	274.4	34.73	37.42	0.9050	-5.827	-5.664
9	550.0	539.4	436.4	470.5	334.6	263.8	33.64	35.78	0.9531	-6.312	-6.203

NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	T0/T0 STAGE	P02/P01	P0/P0 STAGE	EFF-AD STAGE %	EFF-P STAGE %
8547.00	80.13	36.35	1.0756	0.9890	1.2590	90.01	90.34

AIRFOIL AERODYNAMIC SUMMARY PRINT

70 PERCENT SPEED (ROTOR PERFORMANCE) RUN NO 40 SPEED CODE 70 POINT NO 2

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	120.3	218.9	119.5	155.3	14.1	154.3	191.9	197.9	214.2	161.3	-177.8	-43.5	135.40	191.88	0.0368	0.0903
2	125.6	214.0	124.3	152.3	17.6	150.4	198.9	203.3	219.9	161.2	-181.3	-52.9	141.12	189.31	0.0194	0.0747
3	128.1	210.5	126.4	151.7	20.4	145.9	205.7	208.8	224.4	164.2	-185.4	-62.9	143.52	189.78	0.0041	0.0567
4	130.3	203.0	127.9	146.9	25.0	140.1	225.6	225.2	237.9	169.8	-200.6	-85.0	145.04	185.84	-0.0371	0.0139
5	130.9	191 4	127.5	137.5	29.7	133.2	251.6	247.0	255.9	178.4	-221.8	-113.7	144.50	175.80	-0.0856	-0.0435
6	129.8	179.8	125.3	127.2	34.2	127.0	276.1	268.8	272.4	190.5	-241.9	-141.8	142.07	163.91	-0.1242	-0.0804
7	127.4	173.0	122.4	119.6	35.3	124.9	293.5	285.1	285.7	199.9	-258.1	-160.2	138.85	154.59	-0.1426	-0.1124
8	125.1	170.5	120.2	117.6	34.5	123.4	299.0	290.6	290.6	204.4	-264.5	-167.2	136.28	152.05	-0.1473	-0.1176
9	122.4	165.3	117.8	114.7	33.5	119.1	304.2	296.1	295.2	210.9	-270.7	-177.0	133.33	148.61	-0.1522	-0.1293

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF- TOTA
1	6.7	44.8	56.04	15.68	0.3579	0.6391	0.6375	0.4707	-1.20	5.07	13.14	40.36	0.4488	0.0425	0.0123	1.3648	96.70	96.8
2	8.0	44.7	55.51	19.19	0.3741	0.6245	0.6550	0.4704	0 08	6.19	11.81	36.33	0.4558	0.0547	0.0159	1.3479	95.41	95 6
3	9.1	43.9	55.68	22.52	0.3817	0.6143	0.6688	0.4792	1 00	6.96	12.34	33.16	0.4460	0.0373	0.0108	1.3413	96.66	96.8
4	11.1	43.6	57.50	30.07	0.3887	0.5913	0.7095	0.4944	2.81	8.47	13.46	27.43	0.4473	0.0342	0.0098	1.3353	96.55	96 6
5	13.1	44.1	60.15	39.56	0.3904	0.5559	0 7631	0.5181	3.41	8.28	12.28	20.59	0.4438	0.0440	0.0120	1.3222	94.87	95.0
6	15.3	44.8	62.64	47.99	0.3872	0.5207	0.8122	0.5518	3.50	7.73	10.23	14.65	0.4249	0.0515	0.0128	1.3065	93.18	93.4
7	16.1	46.1	64.62	53.13	0.3797	0.4995	0.8513	0.5774	3.40	6.90	8.35	11.48	0.4174	0.0715	0.0166	1.3030	90.05	90.4
8	16.0	46.2	65.54	54.75	0.3726	0.4917	0.8655	0.5896	3.40	6.63	7.91	10.79	0.4120	0.0755	0.0170	1.3043	89.35	89.7
9	15.9	46.0	66.48	56.96	0.3644	0.4765	0.8789	0.6079	3.13	6.11	8.09	9.53	0.3965	0.0666	0.0143	1.3011	90.24	90.5

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1	394.6	718.3	391.9	509.4	46.2	506.4	629.7	649.2	702.9	529.1	-583.5	-142.9	27.73	39.30	2.111	5.174	0.0499
2	412.1	702.3	408.0	499.6	57.8	493.5	652.7	667.2	721.4	529.0	-594.9	-173.7	28.90	38.77	1.110	4.283	0 1000
3	420.2	690.7	414.8	497.8	66.8	478.8	674.9	685.1	736.2	538.8	-608.2	-206.2	29.39	38.87	0.235	3.248	0.1501
4	427.6	666.1	419.6	482.1	82.2	459.7	740.3	738.7	780.6	557.0	-658.2	-279.0	29.70	38.06	-2.128	0.794	0.3000
5	429.5	628.1	418.3	451.1	97.5	437.1	825.4	810.3	839.4	585.4	-727.8	-373.2	29.59	36.00	-4.902	-2.492	0.5000
6	426.0	589.8	411.0	417.4	112.2	416 7	905.8	881.9	893.7	625.0	-793.6	-465.2	29.10	33.57	-7.118	-4.607	0.7000
7	418.0	567.5	401.6	392.4	116.0	409.9	962.8	935.5	937.2	656.0	-846.9	-525.7	28.44	31.66	-8.173	-6.439	0.8499
8	410.4	559.3	394.5	385.8	113.1	404.9	981.0	953.4	953.3	670.6	-867.9	-548.5	27.91	31.14	-8.441	-6.740	0.9000
9	401.7	542.4	386.3	376.3	109.8	390.7	998.2	971.3	968.7	691.9	-888.3	-580.7	27.31	30.44	-8.719	-7.409	0.9500

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM	T02/T01	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
28.77	140.40	1.0885	1.3229	94.14	94.36

AIRFOIL AERODYNAMIC SUMMARY PRINT

70 PERCENT SPEED (STATOR PERFORMANCE) RUN NO 40 SPEED CODE 70 POINT NO 2

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	224.7	180.4	164.5	172.7	153.0	52.1	201.05	223.19	0.0765	0.0848
2	220.2	182.5	161.8	175.1	149.3	51.6	198.86	227.43	0.0944	0.0702
3	216.5	182.1	160 8	174.5	145.0	52.1	198.93	227.51	0.0760	0.0568
4	209.1	178.5	155.6	169.0	139.8	57.4	194.65	220.99	0.0211	0.0220
5	197.7	171.7	145.8	158.4	133.5	66.2	184.49	207.75	-0.0268	-0.0173
6	185.4	162.8	134.3	146.9	127.7	70.1	171.54	193.08	-0.0623	-0.0563
7	178.1	156.0	125.8	137.4	126.1	73.8	161.31	180.32	-0.0922	-0.0879
8	175.6	149.7	123.6	131.4	124.7	71.7	158.67	172.01	-0.1038	-0.0985
9	170.8	143.4	121.2	126.0	120.4	68.3	155.80	164.98	-0.1128	-0.1082

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	PO/PO STAGE	TO/TO STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	42.8	16.7	0.6573	0.5201	-10.67	-8.05	6.87	26.09	0.3485	0.0777	0.0262	0.9805	1.3364	1.0959	90.16	90.56
2	42.7	16.4	0.6439	0.5272	-10.34	-7.64	5.88	26.29	0.3239	0.0352	0.0122	0.9915	1.3350	1.0928	92.81	93.10
3	42.0	16.6	0.6333	0.5266	-10.82	-8.05	5.39	25.42	0.3115	0.0234	0.0083	0.9945	1.3331	1.0904	94.78	94.99
4	41.9	18.7	0.6104	0.5159	-11.34	-8.35	4.79	23.15	0.2962	0.0238	0.0089	0.9948	1.3269	1.0891	94.56	94.78
5	42.5	22.7	0.5752	0.4956	-12.56	-9.33	4.43	19.82	0.2739	0.0181	0.0072	0.9964	1.3157	1.0874	93.40	93.65
6	43.6	25.5	0.5378	0.4692	-13.88	-10.41	4.50	18.07	0.2659	0.0197	0.0082	0.9965	1.3013	1.0853	91.64	91.95
7	45.1	28.2	0.5152	0.4483	-14.60	-10.96	5.36	16.88	0.2700	0.0448	0.0192	0.9926	1.2935	1.0876	87.20	87.66
8	45.3	28.6	0.5073	0.4295	-15.63	-11.92	4.70	16.66	0.2991	0.0911	0.0396	0.9854	1.2854	1.0884	84.18	84.73
9	44.8	28.5	0.4932	0.4110	-18.05	-14.30	2.65	16.36	0.3163	0.1110	0.0491	0.9831	1.2785	1.0863	84.32	84.86

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	737.1	592.0	539.7	566.8	502.1	171.0	41.18	45.71	0.0543	4.380	4.858
2	722.3	598.8	530.8	574.4	489.9	169.4	40.73	46.58	0.1078	5.406	4.023
3	710.4	597.6	527.6	572.6	475.8	171.0	40.74	46.60	0.1601	4.356	3.256
4	686.2	585.7	510.4	554.5	458.6	188.4	39.87	45.26	0.3140	1.206	1.262
5	648.6	563.3	478.3	519.7	438.1	217.1	37.78	42.55	0.5124	-1.535	-0.992
6	608.2	534.1	440.7	482.0	419.1	230.0	35.13	39.54	0.7091	-3.570	-3.224
7	584.5	511.8	412.7	450.9	413.9	242.0	33.04	36.93	0.8564	-5.283	-5.036
8	576.2	491.2	405.7	431.3	409.3	235.2	32.50	35.23	0.9050	-5.948	-5.642
9	560.5	470.4	397.6	413.5	395.1	224.3	31.91	33.79	0.9531	-6.463	-6.199

NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	TO/TO STAGE	P02/P01	PO/PO STAGE	EFF-AD STAGE %	EFF-P STAGE %
8547.00	74.62	33.85	1.0885	0.9929	1.3135	91.63	91.95

AIRFOIL AERODYNAMIC SUMMARY PRINT

70 PERCENT SPEED (ROTOR PERFORMANCE) RUN NO 40 SPEED CODE 70 POINT NO 3

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	117.6	217.2	116.8	151.9	13.7	155.3	191.9	197.9	213.1	157.8	-178.2	-42.6	132.87	188.75	0.0370	0.0846
2	122.9	212.5	121.7	148.8	17.2	151.6	198.9	203.3	218.7	157.6	-181.7	-51.7	138.55	186.08	0.0196	0.0702
3	125.3	209.2	123.8	148.4	19.9	147.4	205.7	208.8	223.2	160.6	-185.8	-61.4	140.93	186.74	0.0042	0.0556
4	127.5	202.3	125.2	143.9	24.5	142.1	225.6	225.2	236.9	166.1	-201.1	-83.0	142.42	183.18	-0.0372	0.0123
5	128.0	191.4	124.6	135.3	29.1	135.3	251.6	247.0	255.0	175.4	-222.5	-111.6	141.75	174.12	-0.0851	-0.0398
6	126.9	179.8	122.4	124.0	33.5	130.1	276.1	268.8	271.7	186.0	-242.6	-138.6	139.33	160.77	-0.1226	-0.0828
7	124.5	172.6	119.6	115.0	34.6	128.7	293.5	285.1	285.2	194.2	-258.9	-156.4	136.16	149.53	-0.1427	-0.1087
8	122.2	169.8	117.5	112.5	33.7	127.2	299.0	290.6	290.1	198.3	-265.3	-163.4	133.60	146.26	-0.1478	-0.1183
9	119.6	165.1	115.0	109.8	32.7	123.2	304.2	296.1	294.8	204.8	-271.5	-172.8	130.67	143.16	-0.1525	-0.1318

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF-P TOTAL
1	6.7	45.6	56.68	15.66	0.3499	0.6335	0.6337	0.4601	-0.57	5.71	13.12	41.02	0.4640	0.0443	0.0129	1.3682	96.63	96.7
2	8.0	45.5	56.15	19.17	0.3659	0.6193	0.6511	0.4593	0.71	6.83	11.80	36.97	0.4718	0.0559	0.0163	1.3525	95.41	95 6
3	9.1	44.8	56.31	22.48	0.3734	0.6098	0.6650	0.4681	1.63	7.59	12.29	33.83	0.4622	0.0379	0.0110	1.3472	96.69	96.8
4	11.1	44.6	58.13	29.99	0.3801	0.5883	0.7061	0.4833	3.43	9.09	13.39	28.14	0.4638	0.0343	0.0099	1.3438	96.63	96.7
5	13.1	45.0	60.78	39.48	0.3814	0.5550	0.7601	0.5087	4.04	8.91	12.19	21.30	0.4576	0.0432	0.0118	1.3329	95.13	95.3
6	15.3	46.3	63.24	48.09	0.3781	0.5197	0.8098	0.5378	4.11	8.33	10.34	15.15	0.4452	0.0590	0.0147	1.3185	92.52	92.8
7	16.1	48.1	65.19	53.53	0.3708	0.4974	0.8494	0.5594	3.97	7.47	8.75	11.66	0.4429	0.0867	0.0199	1.3143	88.49	88.9
8	16.0	48.4	66.10	55.33	0.3638	0.4886	0.8636	0.5707	3.96	7.19	8.49	10.77	0.4383	0.0920	0.0204	1.3150	87.62	88.1
9	15.9	48.2	67.03	57.47	0.3557	0.4747	0.8772	0.5888	3.68	6.66	8.60	9.56	0.4230	0.0838	0.0178	1.3130	88.34	88.7

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1	386.0	712.8	383.3	498.4	45.1	509.5	629.7	649.2	699.1	517.6	-584.6	-139.7	27.21	38.66	2.121	4.847	0.0499
2	403.2	697.1	399.2	488.3	56.5	497.5	652.7	667.2	717.5	517.0	-596.2	-169.7	28.38	38.11	1.122	4.024	0.1000
3	411.3	686.4	406.0	486.9	65.3	483.7	674.9	685.1	732.4	526.9	-609.6	-201.3	28.86	38.25	0.242	3.184	0.1501
4	418.4	663.6	410.6	472.2	80.4	466.3	740.3	738.7	777.3	545.1	-659.9	-272.5	29.17	37.52	-2.132	0.705	0.3000
5	419.8	627.9	408.9	444.0	95.4	444.1	825.4	810.3	836.7	575.5	-730.0	-366.2	29.03	35.66	-4.877	-2.282	0.5000
6	416.3	589.8	401.6	406.8	109.8	427.0	905.8	881.9	891.6	610.3	-796.0	-454.9	28.54	32.93	-7.024	-4.745	0.7000
7	408.5	566.5	392.5	377.5	113.5	422.4	962.8	935.5	935.7	637.1	-849.4	-513.2	27.89	30.62	-8.174	-6.229	0.8499
8	400.9	557.2	385.4	369.0	110.6	417.5	981.0	953.4	951.8	650.7	-870.3	-536.0	27.36	29.95	-8.466	-6.780	0.9000
9	392.3	541.6	377.3	360.4	107.4	404.3	998.2	971.3	967.4	671.9	-890.7	-567.0	26.76	29.32	-8.736	-7.552	0.9500

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM	T02/T01	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
28.22	137.73	1.0913	1.3324	93.64	93.90

AIRFOIL AERODYNAMIC SUMMARY PRINT

70 PERCENT SPEED (STATOR PERFORMANCE) RUN NO 40 SPEED CODE 70 POINT NO 3

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	222.0	173.8	159 9	167.4	154.0	46.8	196.96	219.13	0.1002	0.0855
2	217.8	175.6	157.4	169.4	150.5	46.3	194.87	222.78	0.0824	0.0717
3	214.8	175.7	157.0	169.3	146.6	47.0	195.62	223.41	0.0668	0.0588
4	208.2	172.9	152.5	164.2	141.8	54.4	192.10	217.28	0.0258	0.0240
5	197.3	166.6	143.3	153.4	135.6	65.0	182.63	203.63	-0.0217	-0.0163
6	185.2	158.4	130.9	142.7	130.9	68.9	168.35	189.72	-0.0629	-0.0559
7	177.7	151.1	121.2	133.0	130.0	71.8	156.30	176.39	-0.0918	-0.0876
8	174.9	144.8	118.6	127.2	128.6	69.3	153.08	168.20	-0.1006	-0.0982
9	170.6	139.2	116.4	122.1	124.7	66.8	150.59	161.55	-0.1097	-0.1080

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	P0/P0 STAGE	T0/T0 STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	43.9	15.6	0.6486	0.4999	-9.63	-7.02	5.70	28.29	0.3809	0.0761	0.0258	0.9813	1.3411	1.0968	90.43	90.81
2	43.7	15.2	0.6360	0.5059	-9.35	-6.65	4.73	28.43	0.3601	0.0400	0.0139	0.9905	1.3387	1.0940	92.49	92.79
3	43.0	15.5	0.6274	0.5067	-9.87	-7.09	4.29	27.47	0.3481	0.0281	0.0100	0.9935	1.3380	1.0919	94.47	94.70
4	42.9	18.3	0.6069	0.4985	-10.36	-7.38	4.36	24.56	0.3301	0.0291	0.0109	0.9936	1.3343	1.0911	94.33	94.56
5	43.4	23.0	0.5733	0.4796	-11.63	-8.40	4.71	20.47	0.3064	0.0247	0.0098	0.9951	1.3249	1.0899	93.20	93.47
6	45.0	25.8	0.5363	0.4553	-12.44	-8.98	4.77	19.23	0.2999	0.0211	0.0088	0.9963	1.3129	1.0890	90.91	91.26
7	47.1	28.4	0.5127	0.4329	-12.68	-9.03	5.51	18.66	0.3116	0.0473	0.0203	0.9923	1.3040	1.0921	85.60	86.13
8	47.4	28.6	0.5041	0.4139	-13.57	-9.87	4.66	18.76	0.3431	0.0921	0.0401	0.9854	1.2960	1.0931	82.63	83.26
9	47.0	28.7	0.4913	0.3977	-15.92	-12.17	2.88	18.26	0.3574	0.1094	0.0483	0.9834	1.2909	1.0914	82.83	83.44

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	728.5	570.4	524.8	549.3	505.3	153.6	40.34	44.88	0.0543	5.742	4.901
2	714.5	576.1	516.4	555.8	493.8	151.8	39.91	45.63	0.1078	4.721	4.110
3	704.8	576.5	515.3	555.5	480.9	154.3	40.06	45.76	0.1601	3.829	3.367
4	683.2	567.4	500.3	538.6	465.2	178.4	39.34	44.50	0.3140	1.478	1.375
5	647.4	546.5	470.2	503.2	444.9	213.1	37.40	41.71	0.5124	-1.244	-0.932
6	607.5	519.8	429.6	468.0	429.6	226.1	34.48	38.86	0.7091	-3.604	-3.205
7	583.0	495.9	397.5	436.3	426.4	235.6	32.01	36.13	0.8564	-5.258	-5.019
8	573.9	475.1	389.1	417.2	421.9	227.2	31.35	34.45	0.9050	-5.761	-5.627
9	559.7	456.7	382.0	400.6	409.0	219.3	30.84	33.09	0.9531	-6.288	-6.189

NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	T0/T0 STAGE	P02/P01	P0/P0 STAGE	EFF-AD STAGE %	EFF-P STAGE %
8547.00	73.20	33.20	1.0913	0.9922	1.3220	90.99	91.34

AIRFOIL AERODYNAMIC SUMMARY PRINT

70 PERCENT SPEED (ROTOR PERFORMANCE)

RUN NO 40 SPEED CODE 70 POINT NO 4

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	122.8	220.3	121.9	158.6	14.4	152.9	191.9	197.9	215.4	164.8	-177.6	-45.0	137.75	194.72	0.0369	0.0909
2	128.1	215 6	126.9	156.0	18.0	148.8	198.9	203.3	221.0	165.3	-181.0	-54.5	143.52	192.80	0.0195	0.0755
3	130.7	212.2	129.0	155.4	20.8	144.5	205.7	208.8	225.5	168.2	-185.0	-64.3	145.96	193.18	0.0042	0.0577
4	132.9	203.5	130.5	149.6	25.5	137.8	225.6	225.2	238.9	173.2	-200.1	-87.3	147.46	187.99	-0.0370	0.0092
5	133.6	191.8	130.1	140.7	30.3	130.3	251.6	247.0	256.6	182.7	-221.2	-116.6	146.96	178.60	-0.0850	-0.0410
6	132.6	180.1	127.9	130.8	34.9	123.7	276.1	268.8	273.0	195.4	-241.2	-145.1	144.62	167.42	-0.1233	-0.0813
7	130.2	172.8	125.1	123.4	36.1	121.0	293.5	285.1	286.2	205.3	-257.4	-164.1	141.41	158.34	-0.1424	-0.1117
8	127.8	169.4	122.9	120.2	35.2	119.4	299.0	290.6	291.0	209.2	-263.8	-171.2	138.81	154.26	-0.1472	-0.1178
9	125.1	164.5	120.4	117.9	34.2	114.8	304.2	296.1	295.6	216.2	-270.0	-181.3	135.81	151.68	-0.1520	-0.1298

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF-P TOTAL
1	6.7	44.0	55.45	15.86	0.3655	0.6436	0.6413	0.4817	-1.79	4.49	13.32	39.59	0.4327	0.0433	0.0126	1.3593	96.57	96.72
2	8.0	43.7	54.92	19.28	0.3819	0.6300	0.6588	0.4829	-0.52	5.60	11.90	35.64	0.4375	0.0525	0.0152	1.3426	95.50	95.69
3	9.1	42.9	55.08	22.50	0.3897	0.6200	0.6726	0.4915	0.40	6.36	12.32	32.58	0.4285	0.0361	0.0105	1.3358	96.70	96.84
4	11.1	42.7	56.91	30.26	0.3967	0.5933	0.7128	0.5052	2.22	7.88	13.66	26.65	0.4311	0.0358	0.0102	1.3254	96.29	96.43
5	13.1	42.8	59.58	39.62	0.3986	0.5577	0.7660	0.5314	2.84	7.71	12.33	19.96	0.4239	0.0414	0.0113	1.3107	94.99	95.19
6	15.3	43.3	62.07	47.85	0.3957	0.5225	0.8146	0.5669	2.94	7.16	10.09	14.22	0.4028	0.0440	0.0110	1.2945	93.92	94.14
7	16.1	44.3	64.07	52.94	0.3882	0.5002	0.8534	0.5942	2.85	6.35	8.16	11.13	0.3935	0.0610	0.0142	1.2892	91.06	91.38
8	16.0	44.7	65.00	54.80	0.3810	0.4896	0.8674	0.6045	2.86	6.09	7.96	10.20	0.3902	0.0683	0.0154	1.2880	89.84	90.20
9	15.8	44.1	65.96	56.86	0.3727	0.4753	0.8807	0.6247	2.61	5.59	7.99	9.10	0.3726	0.0554	0.0119	1.2856	91.42	91.72

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1	402.8	722.6	400.0	520.3	47.1	501.5	629.7	649.2	706.7	540.8	-582.6	-147.7	28.21	39.88	2.117	5.208	0.0499
2	420.4	707.5	416.3	512.0	58.9	488.3	652.7	667.2	725.1	542.4	-593.8	-178.9	29.39	39.49	1.119	4.328	0.1000
3	428.7	696.2	423.3	509.9	68.1	474.0	674.9	685.1	739.9	551.9	-606.8	-211.1	29.89	39.57	0.243	3.306	0.1501
4	436.2	667.5	428.0	491.0	83.8	452.3	740.3	738.7	783.8	568.4	-656.5	-286.5	30.20	38.50	-2.121	0.526	0 3000
5	438.2	629.2	426.8	461.6	99.5	427.7	825.4	810.3	842.1	599.6	-725.9	-382.7	30.10	36.58	-4.870	-2.352	0.5000
6	435.1	590.8	419.7	429.3	114.5	405.9	905.8	881.9	895.7	641.0	-791.3	-476.0	29.62	34.29	-7.066	-4.659	0.7000
7	427.1	567.0	410.4	404.8	118.4	397.1	962.8	935.5	938.9	673.6	-844.4	-538.4	28.96	32.43	-8.160	-6.402	0.8499
8	419.4	555.9	403.2	394.3	115.5	391.8	981.0	953.4	954.8	686.3	-865.5	-561.7	28.43	31.59	-8.435	-6.751	0.9000
9	410.5	539.8	394.9	386.8	112.2	376.6	998.2	971.3	970.0	709.5	-886.0	-594.8	27.81	31.07	-8.711	-7.439	0.9500

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM	T02/T01	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
29.28	142.90	1.0854	1.3121	94.50	94.71

AIRFOIL AERODYNAMIC SUMMARY PRINT

70 PERCENT SPEED (STATOR PERFORMANCE) RUN NO 40 SPEED CODE 70 POINT NO 4

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	226.4	187.3	168.2	179.2	151.6	54.3	204.10	228.38	0.0771	0.0845
2	222.2	189.4	166.0	181.6	147.7	54.1	202.55	232.67	0.0907	0.0699
3	218.6	189.0	164.9	181.0	143.6	54.5	202.55	232.71	0.0756	0.0564
4	210.0	184.1	158.8	174.5	137.5	58.8	197.14	225.04	0.0257	0.0213
5	198.3	176.4	149.2	162.8	130.6	67.9	187.37	210.66	-0.0296	-0.0187
6	185.8	167.3	138.0	151.0	124.4	72.1	175.02	195.86	-0.0639	-0.0572
7	178.1	160.0	129.6	141.4	122.2	75.0	165.03	183.15	-0.0934	-0.0881
8	174.7	154.0	126.4	135.6	120.7	73.2	160.93	175.22	-0.1038	-0.0986
9	170.3	147.8	124.6	130.1	116.0	70.3	159.05	168.23	-0.1122	-0.1083

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	P0/P0 STAGE	TO/TO STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	41.9	16.8	0.6632	0.5413	-11.58	-8.96	6.94	25.12	0.3175	0.0759	0.0256	0.9806	1.3310	1.0946	90.03	90.42
2	41.6	16.5	0.6507	0.5487	-11.37	-8.68	6.03	25.10	0.2921	0.0335	0.0116	0.9917	1.3300	1.0914	92.95	93.24
3	41.0	16.7	0.6404	0.5480	-11.83	-9.05	5.52	24.28	0.2795	0.0208	0.0074	0.9950	1.3279	1.0889	94.96	95.15
4	40.8	18.6	0.6139	0.5336	-12.38	-9.40	4.65	22.25	0.2648	0.0192	0.0072	0.9957	1.3180	1.0868	94.62	94.83
5	41.2	22.6	0.5779	0.5107	-13.84	-10.61	4.38	18.58	0.2416	0.0187	0.0074	0.9962	1.3038	1.0843	93.47	93.72
6	42.1	25.5	0.5402	0.4838	-15.41	-11.94	4.51	16.53	0.2295	0.0226	0.0094	0.9960	1.2885	1.0815	92.17	92.45
7	43.4	28.0	0.5163	0.4615	-16.37	-12.72	5.08	15.39	0.2324	0.0446	0.0192	0.9927	1.2793	1.0829	88.00	88.41
8	43.7	28.4	0.5058	0.4434	-17.20	-13.50	4.44	15.35	0.2545	0.0782	0.0341	0.9876	1.2717	1.0836	85.11	85.61
9	43.0	28.4	0.4928	0.4253	-19.91	-16.16	2.56	14.58	0.2691	0.1026	0.0455	0.9844	1.2652	1.0811	85.77	86.24

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	742.9	614.5	551.8	588.1	497.3	178.2	41.80	46.77	0.0543	4.415	4.844
2	729.0	621.6	544.5	595.7	484.7	177.4	41.48	47.65	0.1078	5.196	4.003
3	717.4	620.1	541.0	593.8	471.0	178.8	41.48	47.66	0.1601	4.333	3.233
4	689.2	604.1	520.9	572.5	451.2	192.9	40.38	46.09	0.3140	1.471	1.223
5	650.6	578.8	489.6	534.3	428.5	222.7	38.38	43.14	0.5124	-1.695	-1.071
6	609.7	549.0	452.9	495.4	408.2	236.5	35.85	40.11	0.7091	-3.660	-3.279
7	584.5	525.0	425.3	463.9	400.9	246.0	33.80	37.51	0.8564	-5.354	-5.047
8	573.3	505.4	414.7	444.8	395.9	240.0	32.96	35.89	0.9050	-5.948	-5.649
9	558.7	485.0	408.9	426.7	380.7	230.6	32.57	34.46	0.9531	-6.431	-6.206

NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	TO/TO STAGE	P02/P01	P0/P0 STAGE	EFF-AD STAGE %	EFF-P STAGE %
8547.00	75.94	34.45	1.0854	0.9931	1.3031	92.01	92.31

AIRFOIL AERODYNAMIC SUMMARY PRINT

70 PERCENT SPEED (ROTOR PERFORMANCE)

RUN NO 40 SPEED CODE 70 POINT NO 5

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	105.3	213.7	104.6	140.7	12.2	160.7	191.9	197.9	207.9	145.6	-179.7	-37.1	120.79	177.95	0.0346	0.0857
2	110.0	209.3	108.9	138.2	15.4	157.2	198.9	203.3	213.4	145.7	-183.6	-46.2	125.91	175.89	0.0149	0.0694
3	112.0	206.0	110.6	136.7	17.8	154.1	205.7	208.8	218.1	147.2	-187.9	-54.7	127.90	174.96	-0.0023	0.0541
4	113.5	201.2	111.4	133.4	21.8	150.6	225.6	225.2	232.3	152.8	-203.9	-74.6	128.79	172.74	-0.0493	0.0087
5	113.3	192.9	110.3	126.1	25.8	146.0	251.6	247.0	251.3	161.6	-225.8	-101.0	127.51	164.96	-0.1063	-0.0474
6	110.7	182.8	106.7	108.6	29.4	147.0	276.1	268.8	268.7	163.2	-246.6	-121.7	123.64	142.18	-0.1521	-0.0927
7	107.1	175.4	102.8	89.5	30.3	150.9	293.5	285.1	282.5	161.4	-263.2	-134.3	119.21	116.72	-0.1686	-0.1181
8	104.7	172.7	100.4	85.4	29.5	150.2	299.0	290.6	287.6	164.3	-269.5	-140.4	116.49	111.44	-0.1670	-0.1382
9	102.0	169.7	97.9	83.5	28.6	147.7	304.2	296.1	292.5	170.2	-275.6	-148.3	113.52	109.30	-0.1620	-0.1606

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF-P TOTAL
1	6.6	48.8	59.73	14.78	0.3124	0.6208	0.6169	0.4230	2.49	8.76	12.24	44.95	0.5197	0.0634	0.0185	1.3830	95.56	95.76
2	8.0	48.7	59.27	18.48	0.3266	0.6079	0.6338	0.4232	3.83	9.95	11.10	40.79	0.5253	0.0671	0.0196	1.3715	94.95	95.17
3	9.1	48.4	59.50	21.80	0.3328	0.5981	0.6478	0.4274	4.82	10.78	11.62	37.69	0.5241	0.0593	0.0173	1.3674	95.29	95.49
4	11.1	48.5	61.37	29.21	0.3374	0.5826	0.6904	0.4425	6.68	12.33	12.60	32.16	0.5280	0.0554	0.0160	1.3727	95.09	95.31
5	13.2	49.1	64.04	38.66	0.3365	0.5567	0.7467	0.4663	7.30	12.17	11.38	25.38	0.5260	0.0712	0.0196	1.3692	92.81	93.12
6	15.5	53.5	66.69	48.18	0.3288	0.5243	0.7981	0.4679	7.56	11.79	10.43	18.51	0.5554	0.1427	0.0354	1.3569	84.60	85.25
7	16.5	59.2	68.74	56.22	0.3179	0.4996	0.8385	0.4596	7.52	11.02	11.44	12.52	0.5924	0.2203	0.0473	1.3518	76.26	77.25
8	16.4	60.3	69.60	58.64	0.3105	0.4911	0.8531	0.4672	7.46	10.69	11.81	10.96	0.5905	0.2314	0.0470	1.3533	75.00	76.05
9	16.3	60.5	70.46	60.63	0.3025	0.4819	0.8672	0.4834	7.11	10.08	11.77	9.82	0.5758	0.2293	0.0444	1.3547	74.91	75.96

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1	345.5	701.0	343.2	461.8	40.1	527.4	629.7	649.2	682.2	477.6	-589.6	-121.8	24.74	36.45	1.980	4.908	0.0499
2	360.9	686.7	357.4	453.5	50.4	515.7	652.7	667.2	700.3	478.1	-602.3	-151.5	25.79	36.02	0.856	3.976	0.1000
3	367.6	676.0	362.9	448.6	58.3	505.7	674.9	685.1	715.5	483.1	-616.6	-179.3	26.19	35.83	-0.132	3.097	0.1501
4	372.6	660.0	365.6	437.6	71.4	494.1	740.3	738.7	762.3	501.4	-668.9	-244.7	26.38	35.38	-2.826	0.500	0.3000
5	371.6	632.9	361.8	413.8	84.5	478.9	825.4	810.3	824.5	530.1	-740.8	-331.4	26.11	33.79	-6.093	-2.716	0.5000
6	363.2	599.8	350.2	356.4	96.6	482.4	905.8	881.9	881.7	535.3	-809.2	-399.4	25.32	29.12	-8.714	-5.312	0.7000
7	351.5	575.5	337.1	293.6	99.4	494.9	962.8	935.5	926.9	529.4	-863.5	-440.6	24.42	23.91	-9.659	-6.765	0.8499
8	343.4	566.8	329.5	280.1	96.8	492.7	981.0	953.4	943.6	539.2	-884.2	-460.7	23.86	22.82	-9.571	-7.916	0.9000
9	334.7	556.8	321.3	274.0	94.0	484.7	998.2	971.3	959.6	558.5	-904.2	-486.7	23.25	22.38	-9.284	-9.201	0.9500

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM
25.19	122.93

T02/T01	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
1.1052	1.3654	88.54	89.03

AIRFOIL AERODYNAMIC SUMMARY PRINT

70 PERCENT SPEED (STATOR PERFORMANCE) RUN NO 40 SPEED CODE 70 POINT NO 5

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	217.3	149.1	147.7	143.3	159.4	41.2	185.49	195.80	0.1007	0.0877
2	213.4	150.1	145.5	144.1	156.1	41.9	183.84	197.63	0.0850	0.0761
3	210.4	151.7	144.2	145.3	153.3	43.4	183.08	199.93	0.0713	0.0652
4	205.9	152.2	140.7	141.9	150.2	54.8	180.79	195.86	0.0326	0.0365
5	197.5	147.7	132.7	133.8	146.3	62.7	172.28	185.17	-0.0082	0.0050
6	186.8	139.7	113.8	122.1	148.0	67.8	148.10	168.66	-0.0452	-0.0284
7	178.8	131.8	93.7	111.4	152.3	70.4	121.59	152.67	-0.0738	-0.0659
8	176.2	127.6	89.6	106.6	151.7	70.1	116.39	145.59	-0.0785	-0.0824
9	173.5	123.3	88.0	102.8	149.5	68.2	114.56	140.37	-0.0858	-0.0998

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	PO/PO STAGE	TO/TO STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	47.1	16.0	0.6323	0.4250	-6.36	-3.74	6.14	31.13	0.4998	0.0807	0.0273	0.9809	1.3561	1.1015	89.60	90.04
2	46.9	16.2	0.6206	0.4283	-6.06	-3.36	5.66	30.78	0.4845	0.0582	0.0202	0.9867	1.3528	1.0994	90.77	91.16
3	46.7	16.6	0.6117	0.4333	-6.13	-3.35	5.41	30.09	0.4675	0.0377	0.0133	0.9916	1.3561	1.0982	92.60	92.91
4	46.8	21.1	0.5971	0.4344	-6.40	-3.41	7.14	25.74	0.4407	0.0372	0.0137	0.9920	1.3617	1.0997	92.53	92.85
5	47.8	25.1	0.5709	0.4211	-7.27	-4.04	6.85	22.69	0.4330	0.0354	0.0138	0.9930	1.3598	1.1012	90.72	91.12
6	52.4	29.1	0.5362	0.3964	-5.03	-1.56	8.02	23.40	0.4510	0.0245	0.0099	0.9956	1.3516	1.1068	84.26	84.92
7	58.4	32.3	0.5096	0.3715	-1.33	2.32	9.38	26.14	0.4900	0.0330	0.0136	0.9946	1.3442	1.1173	75.19	76.20
8	59.4	33.3	0.5015	0.3588	-1.51	2.20	9.40	26.08	0.5115	0.0553	0.0229	0.9912	1.3412	1.1203	72.74	73.85
9	59.5	33.5	0.4932	0.3465	-3.41	0.33	7.71	25.94	0.5308	0.0749	0.0314	0.9885	1.3392	1.1210	71.94	73.07

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	713.0	489.2	484.6	470.2	523.0	135.3	37.99	40.10	0.0543	5.772	5.022
2	700.1	492.4	477.4	472.8	512.0	137.4	37.65	40.48	0.1078	4.868	4.360
3	690.3	497.7	473.0	476.9	502.9	142.6	37.50	40.95	0.1601	4.084	3.736
4	675.4	499.2	461.7	465.7	493.0	179.8	37.03	40.11	0.3140	1.869	2.090
5	648.1	484.8	435.5	439.0	480.0	205.6	35.28	37.92	0.5124	-0.470	0.286
6	612.7	458.3	373.5	400.7	485.7	222.6	30.33	34.54	0.7091	-2.588	-1.627
7	586.5	432.4	307.3	365.6	499.6	230.9	24.90	31.27	0.8564	-4.227	-3.774
8	578.2	418.5	294.0	349.6	497.9	230.1	23.84	29.82	0.9050	-4.499	-4.721
9	569.2	404.7	288.8	337.3	490.6	223.7	23.46	28.75	0.9531	-4.915	-5.720

NCORR INLET RPM	WCORR INLET LBM/SEC	WCORR INLET KG/SEC	TO/TO STAGE	P02/P01	PO/PO STAGE	EFF-AD STAGE %	EFF-P STAGE %
8547.00	65.33	29.63	1.1052	0.9918	1.3541	86.09	86.67

AIRFOIL AERODYNAMIC SUMMARY PRINT

70 PERCENT SPEED (ROTOR PERFORMANCE)

RUN NO 40 SPEED CODE 70 POINT NO 6

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	U-1 M/SEC	U-2 M/SEC	V'-1 M/SEC	V'-2 M/SEC	VO'-1 M/SEC	VO'-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	113.6	215.8	112.8	147.6	13.3	157.5	191.9	197.9	211.3	153.0	-178.7	-40.4	128.99	184.66	0.0362	0.0871
2	118.7	210.9	117.5	144.2	16.6	153.9	198.9	203.3	216.9	152.4	-182.3	-49.4	134.48	181.47	0.0181	0.0718
3	121.0	207.9	119.5	143.6	19.2	150.3	205.7	208.8	221.5	155.1	-186.5	-58.5	136.73	181.94	0.0023	0.0550
4	123.0	201.8	120.7	139.9	23.6	145.4	225.6	225.2	235.3	161.0	-202.0	-79.7	138.00	179.37	-0.0407	0.0102
5	123.2	191.0	120.0	131.0	28.0	139.0	251.6	247.0	253.7	169.7	-223.5	-107.9	137.23	169.80	-0.0909	-0.0433
6	121.8	180.4	117.5	120.0	32.2	134.7	276.1	268.8	270.7	179.9	-243.9	-134.1	134.50	156.72	-0.1299	-0.0870
7	119.2	173.1	114.5	108.6	33.2	134.8	293.5	285.1	284.3	185.5	-260.2	-150.4	131.09	141.87	-0.1489	-0.1143
8	116.8	169.5	112.3	104.4	32.4	133.6	299.0	290.6	289.2	188.6	-266.6	-157.0	128.49	136.37	-0.1525	-0.1211
9	114.2	164.4	109.7	100.6	31.5	129.9	304.2	296.1	294.0	194.2	-272.8	-166.1	125.51	131.68	-0.1550	-0.1317

SL	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	M-1	M-2	M'-1	M'-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	%EFF-A TOTAL	%EFF-P TOTAL
1	6.7	46.9	57.65	15.31	0.3376	0.6285	0.6279	0.4455	0.41	6.69	12.77	42.34	0.4860	0.0493	0.0143	1.3746	96.36	96.52
2	8.0	46.9	57.15	18.94	0.3530	0.6137	0.6452	0.4435	1.71	7.83	11.57	38.21	0.4954	0.0623	0.0181	1.3592	95.05	95.26
3	9.1	46.3	57.33	22.19	0.3601	0.6049	0.6591	0.4513	2.65	8.61	12.00	35.14	0.4878	0.0465	0.0135	1.3551	96.08	96.25
4	11.1	46.1	59.17	29.68	0.3661	0.5860	0.7006	0.4676	4.48	10.14	13.08	29.49	0.4883	0.0391	0.0113	1.3558	96.31	96.47
5	13.2	46.7	61.82	39.45	0.3669	0.5529	0.7554	0.4912	5.08	9.95	12.16	22.37	0.4844	0.0520	0.0142	1.3459	94.38	94.61
6	15.3	48.2	64.31	48.07	0.3626	0.5205	0.8058	0.5191	5.18	9.40	10.31	16.24	0.4742	0.0723	0.0180	1.3345	91.31	91.65
7	16.2	51.0	66.26	54.05	0.3546	0.4970	0.8457	0.5326	5.04	8.55	9.27	12.21	0.4825	0.1159	0.0263	1.3294	85.61	86.18
8	16.1	51.9	67.16	56.27	0.3474	0.4859	0.8601	0.5405	5.02	8.25	9.43	10.89	0.4814	0.1277	0.0277	1.3283	83.98	84.62
9	16.0	52.1	68.08	58.70	0.3393	0.4707	0.8738	0.5562	4.73	7.71	9.83	9.38	0.4684	0.1255	0.0257	1.3248	83.82	84.45

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	EPSI-1 DEGREE	EPSI-2 DEGREE	PCT TE SPAN
1	372.8	708.1	370.2	484.2	43.5	516.7	629.7	649.2	693.3	502.0	-586.2	-132.5	26.42	37.82	2.073	4.989	0.0499
2	389.4	691.9	385.6	473.0	54.6	505.0	652.7	667.2	711.6	500.0	-598.1	-162.2	27.54	37.17	1.038	4.114	0.1000
3	397.0	682.0	391.9	471.2	63.1	493.0	674.9	685.1	726.6	508.9	-611.8	-192.1	28.00	37.26	0.131	3.152	0.1501
4	403.4	662.1	395.9	459.0	77.5	477.2	740.3	738.7	772.0	528.3	-662.8	-261.6	28.26	36.74	-2.335	0.583	0.3000
5	404.3	626.8	393.7	429.8	91.9	456.2	825.4	810.3	832.4	556.8	-733.4	-354.1	28.11	34.78	-5.209	-2.482	0.5000
6	399.7	592.0	385.5	393.8	105.6	442.0	905.8	881.9	888.2	590.4	-800.2	-439.9	27.55	32.10	-7.444	-4.983	0.7000
7	391.1	567.8	375.5	356.2	109.1	442.2	962.8	935.5	932.7	608.5	-853.8	-493.4	26.85	29.06	-8.531	-6.549	0.8499
8	383.3	556.2	368.3	342.5	106.3	438.2	981.0	953.4	949.0	618.7	-874.6	-515.2	26.32	27.93	-8.737	-6.940	0.9000
9	374.6	539.2	360.1	330.2	103.2	426.3	998.2	971.3	964.7	637.2	-895.0	-545.0	25.71	26.97	-8.883	-7.548	0.9500

WC1/A1 LBM/SEC SQFT	WC1/A1 KG/SEC SQM	T02/T01	P02/P01	EFF-AD ROTOR %	EFF-P ROTOR %
27.28	133.11	1.0958	1.3450	92.30	92.61

AIRFOIL AERODYNAMIC SUMMARY PRINT

70 PERCENT SPEED (STATOR PERFORMANCE) RUN NO 40 SPEED CODE 70 POINT NO 6

SL	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VO-1 M/SEC	VO-2 M/SEC	RHOVM-1 KG/M2 SEC	RHOVM-2 KG/M2 SEC	EPSI-1 RADIAN	EPSI-2 RADIAN
1	220.0	164.6	155.0	158.5	156.2	44.5	192.42	210.99	0.0926	0.0859
2	215.5	166.1	152.0	160.1	152.8	44.2	189.78	214.07	0.0846	0.0725
3	212.8	166.9	151.5	160.6	149.4	45.2	190.24	215.47	0.0678	0.0599
4	207.1	165.4	147.7	156.4	145.1	53.8	187.71	210.47	0.0256	0.0269
5	196.5	159.6	138.5	146.7	139.3	62.9	177.98	197.92	-0.0213	-0.0114
6	185.5	152.5	126.6	135.9	135.6	69.1	163.95	183.58	-0.0604	-0.0499
7	177.8	144.5	114.4	126.3	136.1	70.1	148.46	169.91	-0.0885	-0.0826
8	174.3	137.8	110.2	120.1	135.0	67.5	142.98	161.10	-0.0987	-0.0943
9	169.5	131.9	106.9	115.3	131.5	63.9	138.91	154.66	-0.1099	-0.1059

SL	B-1 DEGREE	B-2 DEGREE	M-1	M-2	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P02/ P01	PO/PO STAGE	TO/TO STAGE	%EFF-A TOT-STG	%EFF-P TOT-STG
1	45.2	15.6	0.6417	0.4717	-8.35	-5.73	5.75	29.53	0.4246	0.0784	0.0266	0.9811	1.3473	1.0986	90.20	90.60
2	45.1	15.4	0.6283	0.4767	-7.92	-5.22	4.88	29.70	0.4053	0.0444	0.0155	0.9896	1.3444	1.0961	91.85	92.18
3	44.5	15.7	0.6202	0.4795	-8.29	-5.52	4.50	28.84	0.3917	0.0309	0.0110	0.9930	1.3456	1.0944	93.77	94.03
4	44.4	18.9	0.6024	0.4750	-8.79	-5.81	5.00	25.48	0.3709	0.0317	0.0119	0.9931	1.3457	1.0944	93.88	94.13
5	45.2	23.2	0.5698	0.4577	-9.88	-6.65	4.96	21.97	0.3529	0.0252	0.0099	0.9950	1.3383	1.0939	92.50	92.81
6	47.0	27.0	0.5360	0.4364	-10.46	-7.00	5.95	20.03	0.3457	0.0201	0.0083	0.9964	1.3295	1.0945	89.76	90.16
7	50.0	29.1	0.5112	0.4118	-9.75	-6.10	6.18	20.91	0.3712	0.0444	0.0189	0.9928	1.3196	1.0993	83.10	83.75
8	50.8	29.4	0.5003	0.3919	-10.12	-6.41	5.43	21.44	0.4041	0.0807	0.0348	0.9874	1.3112	1.1007	79.96	80.71
9	50.9	29.0	0.4860	0.3747	-11.99	-8.24	3.15	21.92	0.4267	0.0956	0.0421	0.9858	1.3057	1.0998	79.38	80.15

SL	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	RHOVM-1 LBM/FT2SEC	RHOVM-2 LBM/FT2SEC	PCT TE SPAN	EPSI-1 DEGREE	EPSI-2 DEGREE
1	721.9	540.1	508.5	520.0	512.4	145.9	39.41	43.21	0.0543	5.307	4.919
2	707.2	545.0	498.8	525.3	501.3	145.0	38.87	43.84	0.1078	4.849	4.153
3	698.1	547.6	497.1	527.1	490.1	148.4	38.96	44.13	0.1601	3.882	3.435
4	679.4	542.7	484.7	513.2	476.1	176.5	38.44	43.11	0.3140	1.464	1.539
5	644.7	523.6	454.6	481.3	457.2	206.3	36.45	40.54	0.5124	-1.221	-0.653
6	608.7	500.2	415.3	445.8	445.0	226.8	33.58	37.60	0.7091	-3.461	-2.856
7	583.3	474.0	375.4	414.4	446.5	230.2	30.40	34.80	0.8564	-5.073	-4.730
8	571.8	452.1	361.6	394.1	443.0	221.6	29.28	33.00	0.9050	-5.653	-5.406
9	556.0	432.6	350.8	378.5	431.4	209.6	28.45	31.68	0.9531	-6.298	-6.070

NCORR INLET RPM	NCORR INLET LBM/SEC	NCORR INLET KG/SEC	TO/TO STAGE	P02/P01	PO/PO STAGE	EFF-AD STAGE %	EFF-P STAGE %
8547.00	70.74	32.09	1.0958	0.9924	1.3347	89.81	90.21

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15. General Electric Company
1000 Western Avenue
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	F. F. Ehrich	M.D. 24505	1
	L. H. King	M.D. 240G	1
	R. E. Neitzel	M.D. 24502	1

16. Curtiss-Wright Corporation
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Wood-Ridge, NJ 07075

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17. AiResearch Manufacturing Company
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	G. L. Perrone		1
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18. AiResearch Manufacturing Company
2525 West 190th Street
Torrance, CA 90509

Attn: R. Carmody		1
R. Jackson		1
L. W. Pearson		1
Library		1

19. Union Carbide Corporation
Nuclear Division
Oak Ridge Gaseous Diffusion Plant
P. O. Box P
Oak Ridge, TN 37830

Attn: J. L. Petty, K1401	MS 385	1

20. AVCO Corporation
Lycoming Division
550 South Main Street
Stratford, CT 06497

Attn: C. Kuintzle		1
Library		1

21. Teledyne, CAE
1330 Laskey Road
Toledo, OH 43612

Attn: Eli H. Benstein		1
Howard C. Walch		1

22. Solar
2200 Pacific Highway
San Diego, CA 92138

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J. Watkins	C-5	1

23. Goodyear Atomic Corporation
Box 628
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Attn: C. O. Langebrake		1

24. Hamilton Standard Division of
United Technologies Corporation
Windsor Locks, CT 06096

Attn: Mr. C. Rohrback, Chief,		
Aerodynamics & Hydrodynamics	MS 1A-3-6	1

25. Westinghouse Electric Corporation
Combustion Turbine System Division
Lester, PA 19113

Attn: S. M. DeCorso	MS A703	1

26. Williams Research Corporation
P. O. Box 95
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Attn: J. Richard Joy 1
R. A. Horn, Jr. 1

27. Eaton Research Center
P. O. Box 766
Southfield, MI 48037
Attn: Librarian 1

28. Chrysler Corporation
Research Office
Department 9510
P. O. Box 1118
Detroit, MI 48288
Attn: Ronald Pampreen CIMS 418-37-18 1

29. Elliott Company
Jeannette, PA 15644
Attn: John W. Schlirf 1
Vice President of Engineering

30. Caterpillar Tractor Company
Research Dept. Technical Center, Bldg. F
Peoria, IL 61629
Attn: J. Wiggins 1

31. BMAD
Boeing Aerospace Co.
P. O. Box 3999
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Attn: A. D. Welliver MS 41-52 1

32. Douglas Aircraft Company
3855 Lakewood Blvd.
Long Beach, CA 90801
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33. Lockheed Missile and Space Company
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34. California Institute of Technology
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35. Iowa State University of Science and Technology
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36. Massachusetts Institute of Technology
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37. University of Notre Dame
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38. Penn State University
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University Park, PA 16802
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39. University of Tennessee Space Institute
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40. University of Delaware
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