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PERFORMANCE OF A HIGHLY LOADED TWO-STAGE AXIAL-FLOW FAN

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16. Abstract

A two-stage axial-flow fan with a tip speed of 1450 ft/sec (442 m/sec) and an overall pressure ratio of 2.8 was designed, built, and tested. At design speed and pressure ratio, the measured flow matched the design value of 184.2 lbm/sec (83.55 kg/sec). The adiabatic efficiency at the design operating point was 85.7 percent. The stall margin at design speed was 10 percent. A first-bending-mode flutter of the second-stage rotor blades was encountered near stall at speeds between 77 and 93 percent of design, and also at high pressure ratios at speeds above 105 percent of design. A 5^{o} closed reset of the first-stage stator eliminated second-stage flutter for all but a narrow speed range near 90 percent of design.

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SUMMARY

A two-stage axial-flow fan was designed for a tip speed of 1450 ft/sec (442 m/sec), an overall pressure ratio of 2.8, and a corrected flow of 184.2 lbm/sec (83.55 kg/sec). At design speed and pressure ratio, the measured flow closely matched the design value. Efficiency at this design operating point was 85.7 percent, and the stall margin based on this point was 10 percent. Measured rotor losses were about equal to the design values, but stator losses were less than the design values.

A first-bending-mode subsonic stall flutter of the second-stage rotor blades was encountered near the stall limit at speeds between 77 and 93 percent of design. Supersonic stall flutter was encountered at speeds above 105 percent of design. Closing the first-stage stator 5° reduced the subsonic stall flutter region to a narrow range of speeds near 90 percent of design and eliminated the supersonic flutter at all speeds up to and including 110 percent. Closing of the first-stage stator reduced the flow and pressure ratio at speeds up to and including design speed but had no marked effect on efficiency. Failure of the leading-edge section of one first-stage stator vane root was attributed to a locally thin section, and failure of the leading-edge section of one second-stage stator vane root was attributed to a stress concentration resulting from a brazed-on leading-edge probe.

INTRODUCTION

Fans and compressors for advanced aircraft engines must have light weight, high efficiency, adequate stall margin, and tolerance to inlet flow distortions. For advanced aircraft which fly mixed supersonic-subsonic missions, turbofan engines having low bypass ratios and high fan pressure ratios are required. Inasmuch as multistage

fans are required, the use of high tip speeds and high blade loadings permits reductions in the number of fan stages.

NASA has conducted an extensive in-house and contractual research program on high-speed, highly loaded fan stages. Fan stages with tip speeds from 800 to 1800 ft/sec (244 to 549 m/sec) and design pressure ratios from 1.15 to 2.28 have been tested (refs. 1 to 8). This research program has proven that high-speed, highly-loaded stages can give good performance. Based on these results, a two-stage, highly loaded, high-speed fan has been designed, fabricated, and tested. The objectives of the two-stage-fan program are to evaluate the stage matching problems, distortion tolerance, response to stator adjustment, and effectiveness of casing treatment for such a fan. Design tip speed for the two-stage fan is 1450 ft/sec (442 m/sec), design pressure ratio is 2.8, tip diameter is 31 inches (0.787 m), design corrected flow is 184.2 lbm/sec (83.55 kg/sec), and inlet hub-tip ratio is 0.4. Details of the aerodynamic and mechanical designs are given in reference 9.

Testing for the two-stage fan consisted of mapping the overall performance and determining the stability limits of the fan with uniform inlet flow. The results of these tests are reported herein.

APPARATUS AND PROCEDURE

Aerodynamic Design

The two-stage fan is shown schematically in figure 1. A detailed description of the aerodynamic and mechanical design of the fan is given in reference 9. Performance parameters at the design point are summarized in table I. The fan was designed without inlet guide vanes (IGV) but with the provision for adding a variable camber IGV at a later date. Both stators were designed to turn the flow to the axial direction, making it prac-

TABLE I. - DESIGN PERFORMANCE

[Corrected speed, 10 720 rpm; corrected flow, 184.20 lbm/sec (83.55 kg/sec).]

	Pressure ratio		Adiabatic efficiency	
	Local (per blade row)	Cumulative	Local (per blade row)	Cumulative
Rotor 1	1.787	1.787	89.4	89.4
Stator 1	.977	1.744	----	85.4
Rotor 2	1.646	2.872	89.2	86.2
Stator 2	.975	2.80 (overall)	----	83.9 (overall)

tical to test the first stage alone if desired. The first-rotor inlet tip diameter was selected as 31 inches (0.787 m) to permit the use of existing hardware and to allow an adequate drive engine horsepower margin. With a required first-rotor tip speed of 1450 ft/sec (442 m/sec), the design speed corrected to standard inlet conditions was 10 720 rpm. The inlet inner-case diameter was 10 inches (0.254 m). The specific flow at the inlet to the first rotor was set at 42 lbm/sec-ft^2 (205 kg/sec-m^2), consistent with advanced fan technology. The hub-tip ratio was 0.4. Flow-path convergence and wall curvature between inlet and exit were used to control velocity profiles and blade aerodynamic loadings (diffusion factors) near the walls.

Blockages were included in the aerodynamic design to account for boundary layer growth on the casing walls and for the presence of the part-span shroud on the first-stage rotor. The growth of the wall boundary layer displacement thickness through the blade rows of the two-stage fan was estimated by using a correlation developed by W. T. Hanley (ref. 10).

The aerodynamic loadings, as defined by diffusion factors, are high: ranging from about 0.46 to 0.57 for the rotors and from 0.37 to 0.56 for the stators. These values are not, however, in excess of levels for which good performance has been obtained (refs. 1 and 2). The tabulations of the design values of aerodynamic parameters at the rotor and stator leading and trailing edges are presented in appendix A (tables VIII to XII). These tabulations, taken from reference 9, represent design parameters computed on the basis of 14 streamlines. Subsequent to these design computations, the design parameters were recomputed for the following reasons: (1) to determine design values for the nine streamlines along which experimental data were taken and (2) to incorporate small refinements made in the design program. These latter results are presented herein in appendix B. The design parameters presented in appendixes A and B differ slightly and later discussions of data, data comparisons, and so forth are based on values of design parameters given in appendix B.

As shown in the final flow path (fig. 2), axial spacings between the first rotor and first stator and between the second rotor and second stator were held to a minimum, which is in line with actual engine design practice. A spacing of slightly more than 1 inch (0.0254 m) was allowed between stages to provide space for radial and tangential traverse instrumentation at the first stator exit.

Airfoil Geometry

Rotor and stator blade sections for both stages of the fan are multiple-circular-arc (MCA) airfoils designed on conical surfaces which approximate stream surfaces of revolution. Blade setting angles were determined from design flow angles and from inci-

dence and deviation angle criteria. Figure 3 shows a view of the rotor blades and stator vanes.

Rotors. - A summary of important parameters of rotor blading is given in table II.

TABLE II. - ROTOR BLADING PARAMETERS

	First stage	Second stage
Number of airfoils	28	60
Aspect ratio[a]	2.48	2.69
Hub chord, in. (m)	3.62 (0.092)	2.10 (0.053)
Tip chord, in. (m)	4.55 (0.116)	2.10 (0.053)
Tip solidity	1.33	1.43

[a]Ratio of the average length to the axially projected root chord.

Rotor chords were chosen to be consistent with moderate axial lengths, acceptable rotor loadings, and structural requirements.

The ratios of rotor maximum thickness to chord t/c (all symbols defined in appendix E) were selected to provide mechanical stability while maintaining minimum airflow blockage. Rotor 1 has a hub t/c of 0.08 and a shroud at 61 percent of span from the hub. Rotor 2 has a hub t/c of 0.095 but no part-span shroud. Spanwise distributions of t/c for both rotors are linear from hub values to 0.025 at the tip.

dence angles to the suction surface for rotor 1 varied from 3.6° at the tip to -0.9° at the hub. For rotor 2, the incidence angle varied from 2.0° at the tip to -0.1° at the hub. Deviation angles for the rotor 1 blades were 11.0, 7.8, and 15.9 at the tip, mean, and hub radii, respectively. For rotor 2, deviation angles were 9.8, 7.3, and 16.2 at the tip, mean, and hub radii, respectively. Values of flow margin for both rotors varied from about 4 percent near the tip to a minimum of about 2 percent at 15 percent of span from the hub.

Rotor geometry on design conical surfaces is summarized in appendix C (tables XVI and XVIII). For each airfoil section, two values of total and front camber are tabulated. The two definitions used to calculate values of total camber are given in figure 4, which gives a polar representation of a blade mean-camber line. Front cambers were calculated in a similar manner. For manufacturing purposes, the airfoil sections were redefined on planes normal to the stacking line, a radial line through the center of gravity of the root conical section. Rotor blade coordinates for these redefined sections are presented in appendix E of reference 9.

Stators. - A summary of important parameters of stator blading is given in table III.

TABLE III. - STATOR BLADING PARAMETERS

	First stage	Second stage
Number of airfoils	46	59
Aspect ratio[a]	2.75	2.20
Hub chord, in. (m)	2.75 (0.070)	2.22 (0.056)
Tip chord, in. (m)	3.10 (0.079)	2.45 (0.062)
Hub solidity	2.52	2.25

[a]Ratio of the average length to the axially projected root chord.

Spanwise distributions of front chord, front camber, and location of maximum thickness were selected to give low-curvature entrance regions for high-Mach-number hub sections, fairing smoothly to nearly double-circular-arc (DCA) airfoils in the lower-Mach-number region near the tip. This design concept was based on past experience, where DCA stators have shown better performance than MCA stators at inlet Mach numbers below 0.7 (ref. 11). The blading parameters of table III and spanwise chord distributions were selected to achieve reasonable axial length and loadings.

The ratio of maximum thickness to chord was set to vary linearly from 0.04 at the hub to 0.075 at the tip to provide low losses while being adequate for mechanical integrity.

Incidence angles at the hub of each stator were set at approximately 0° to the suction surface based on minimum loss data from reference 11, varying almost linearly to -6.1° and -6.9° to the suction surface for the first- and second-stator tips, respectively. Stator 1 deviation angles were 13.6°, $9\ 3^{\circ}$, and 14.9° for the hub, mean, and tip radii, respectively. The corresponding deviation angles for stator 2 were 12.7°, 10.3°, and 14.0°.

Leading-edge incidence angle and front camber were used to control the throat area of the channels between blades. A 5-percent choke margin was provided near the hub of each stator, compared to approximately 4 percent predicted for minimum loss. The extra throat area was provided to give smooth radial distributions of blade geometry and to reduce high local velocities which potential-flow calculations (based on the method of ref. 12) showed existed near the leading edge of the pressure surface. The choke margin at the tip of each stator exceeded 10 percent. Stator geometry on design conical surfaces is summarized in appendix C (tables XVII and XIX). Manufacturing section data are presented in appendix E of reference 9.

TEST FACILITY

The test program was carried out in a sea-level compressor test stand shown in figure 5. The stand was equipped with a gas-turbine drive engine with a 2.1:1 gearbox to provide speed-range capability. Fan airflow was drawn through a calibrated nozzle. A 72-foot (21.9-m) straight section of 42-inch (1.07-m) diameter pipe ran from the nozzle to a 90-inch (2.29-m) diameter inlet plenum. A wire-mesh screen and an "egg crate" structure, located in the plenum, provided a uniform total-pressure profile to the two-stage fan. The airflow was exhausted from the fan into a toroidal collector and then into a 6-foot (1.83-m) diameter discharge stack. The stack contained a 6-foot (1.83-m) diameter valve to provide backpressure, or throttling, for the test compressor. Two smaller valves, a 24 inch (0.61 m) and a 12 inch (0.305 m), located in the bypass lines provided fine adjustment of backpressure.

Strain-gage and static-pressure instrumentation leads were routed through the nonrotating nose fairing. Ten struts, 14 inches (0.356 m) upstream of the rotor leading edge, supported the forward bearing and the assembly for the strain-gage slip ring. Eight struts located 11 inches (0.28 m) downstream of the stator trailing edge supported the rear bearing.

INSTRUMENTATION AND CALIBRATION

Airflow to the fan was measured by means of a calibrated nozzle (fig. 5) designed to standards of the International Organization for Standardization. Airflow measurements were within 1 percent accuracy of the values measured.

The fan speed was measured by an electromagnetic pickup device which counted the number of gear teeth that passed within an interval of time and converted the count to rpm. The measurement accuracy between 4000 and 12 000 rpm was within 0.2 percent of the measured value.

All temperatures were measured by using Chromel-Alumel, type-K thermocouples and were recorded in millivolts by means of an automatic data-acquisition system. Temperature elements were calibrated for Mach numbers over their full operating range. Effects of total-pressure level on temperature recovery were accounted for by using the corrections found in reference 13. The thermocouple leads were calibrated for each temperature element. Overall rms temperature accuracy was estimated to be $\pm 1.0^{\circ}$ F (± 0.56 K).

Wedge probes were calibrated for Mach number as a function of the indicated ratio of static to total pressure, with pitch angle as a parameter. Total-pressure recovery and yaw-angle deviation were calibrated as functions of Mach number and pitch angle.

TABLE IV. - PERFORMANCE AND BLADE-ELEMENT INSTRUMENTATION

Instrument plane		Parameter	Type and quantity
Station	Location		
0	Inlet plenum chamber	Static pressure, p Total temperature, T	Six pressure taps on plenum wall Six bare-wire Chromel-Alumel thermocouples
6	Rotor 1 inlet (2.25 in. upstream of rotor 1)	Static pressure, p Total pressure, P; static pressure, p; and air angle, β	Six taps on casing outer wall and six on inner wall One radially traversing wedge probe[a]
7	Rotor 1 exit (approx. halfway between rotor 1 trailing edge and stator 1 leading edge)	Static pressure, p	Four taps on casing outer wall, equally spaced circumferentially[b]
8	Stator 1 exit (halfway between stator 1 trailing edge and rotor 2 leading edge)	Static pressure, p Total temperature, T; total pressure, P; static pressure, p; and air angle, β	Four taps on casing outer wall and four on inner wall, equally spaced circumferentially[b] Two NASA combination probes; one with circumferential transverse of one vane gap, plus radial transverse; the second with radial transverse at midgap
9	Rotor 2 exit Stator 2 leading-edge probes	Static pressure, p Total pressure, P	Four taps on casing outer wall and four on inner wall, equally spaced circumferentially[b] Two circumferential positions and five radial positions (10, 30, 50, 70, and 90 percent of span)
10	Fan discharge (within 1.2 chord downstream of stator 2)	Static pressure, p Total pressure, P; static pressure, p; and air angle, β Total temperature, T Total pressure, P	Four taps on casing outer wall and four on inner wall, equally spaced circumferentially[b] Two radially traversing wedge probes, approximately 180° apart and located at vane midchannel[b] Six radial temperature rakes with keil heads, located at each of nine radial stations (5, 10, 15, 30, 50, 70, 85, 90, and 95 percent of span). Rakes spaced circumferentially to obtain readings across one vane gap. A seventh rake 180° from the rake at the center of a channel was used for checking purposes. Two radially traversing wake rakes approximately 180° apart
11	Test rig exit	Total pressure, P	One circumferential total-pressure rake; five stations at 50 percent of span used for setting points

[a]Nine radial locations for uniform inlet flow tests (5, 10, 15, 30, 50, 70, 85, 90, and 95 percent of blade height).

[b]Static-pressure taps ahead of and behind stators are located on approximate extensions of mean radial streamlines.

The measurement accuracy of the air-angle probes was within 1.0°. The selection of probes was made on the basis of accuracy and space availability.

All pressures from probes, fixed rakes, and static-pressure taps were measured with transducers and recorded in millivolts by an automatic data-acquisition system. The accuracy of the pressure was ±0.1 percent of the full-scale value.

Two proximity detectors, located over the tips of each rotor blade at midchord were used to monitor blade tip clearance.

Typical instrumentation is shown in figure 6, and the axial and circumferential positions of the instrumentation are shown in figures 7 and 8.

Instrumentation for measuring overall and blade-element performance data is listed in table IV. The nine radial positions of each axial station are defined by the intersection of the axial station and the design streamlines which pass through 5, 10, 15, 30, 50, 70, 85, 90, and 95 percent of the passage height at the first-stage-rotor trailing edge.

Table V lists the parameters which were recorded continually during excursions into stall or surge and used to detect and evaluate rotating stall or surge. Two hot-film probes, one located at the fan inlet and one at the exit (stations 6 and 10) with sensors at

TABLE V. - STALL TRANSIENT INSTRUMENTATION

Instrument plane		Parameter	Type and quantity
Station	Location		
---	Inlet nozzle	Total pressure, P	One tap downstream and one tap upstream of inlet nozzle
		Pressure differential, Δp	A Δp transducer sensing the differential pressure between the upstream and downstream nozzle static pressures
		Total temperature, T	One nozzle temperature
0	Inlet plenum chamber	Static pressure, p	One tap in plenum
		Total temperature, T	One plenum temperature
6	Rotor 1 inlet	Velocity, V	One hot-film probe
	Rotor blades	Stress	Selected strain gages
	Stator blades	Stress	Selected strain gages
7	Rotor 1 exit	Static pressure, p	One tap on casing outer wall
8	Stator 1 exit	Static pressure, p	One tap on casing outer wall
9	Rotor 2 exit	Static pressure, p	One tap on casing outer wall
10	Fan discharge	Static pressure, p	One tap on casing outer wall
	Fan discharge	Velocity, V	One hot-film probe
	Gearbox	Rotor speed, N	Impulse pickup

25, 50, and 85 percent of passage height from the hub, were used to continuously record velocity fluctuations on a multichannel tape recorder during operation near or within the stall region. Stationary and rotating critical parts were instrumented with strain gages to determine levels of vibratory stress over the operating range of the compressor.

TEST PROCEDURE

Shakedown Tests

Shakedown tests were conducted to establish the mechanical integrity of the fan and to locate stress boundaries that might limit the operating range over which tests could be conducted. These shakedown tests were conducted with uniform inlet flow.

During the shakedown tests the aerodynamic and mechanical stability limits of the fan were determined for a range of speeds from 50 to 110 percent of design. At speeds of 77 to 93 percent of design, the minimum flow was limited by first-bending-mode flutter of the second-stage rotor blades as detected from strain-gage signals. At speeds of 105 percent of design, first-bending-mode flutter of the second-stage rotor was again encountered at the high-pressure-ratio conditions. For speeds of 50, 70, 95, and 100 percent of design, no flutter was observed, and transient rotating stall or surge studies were conducted.

Readings from the hot-film probes and selected rotor and stator strain gages were recorded along with a speed signal and stator-exit outer wall static pressure. These readings were recorded simultaneously by a multichannel tape recorder. Continual readings of the other transient parameters, shown in table V, were recorded by the automatic recording system every 1.5 seconds as the fan stage was throttled toward stall. Approximately 100 sets of these data were obtained between the wide-open-throttle and minimum-flow conditions.

Overall and Blade-Element Performance Mapping

Fan overall performance was evaluated for speeds from 50 to 112 percent of design. Complete blade-element data were obtained for speeds of 50 to 100 percent of design. At each speed covered, data points were taken between the maximum flow attainable and the stability limit as represented by blade flutter, rotating stall, or surge.

Test With Reset First-Stage Stator

In an effort to minimize the operational limits imposed by first-bending-mode flutter of the second-stage rotor, the first-stage stator vane angle was reset closed by 5° to reduce the incidence angle on the second-stage rotor. With this stator reset, the aerodynamic and mechanical stability limits of the stage were reevaluated.

DATA REDUCTION TECHNIQUES

All performance data were automatically recorded on computer cards. These data were then converted to engineering units, corrected, and averaged as described in the following sections.

Pressure Data From Fixed-Element Probes

The circumferential total-pressure distributions obtained at the first- and second-stator exits were each mass-flow averaged at each radial position by using a constant circumferential static pressure determined by linearly interpolating the wall static-pressure data. Peak values from the circumferential total-pressure distribution measured across the passage between adjacent stator vanes at each stator exit were chosen to represent the preceding rotor exit pressures. Both the peak values and the circumferentially mass-flow-averaged pressures from the two wake rakes at the second-stator exit were arithmetically averaged for each radial location.

Data From Wedge Probes

Wedge probes were used to measure total pressure, air angle, and static pressure at the inlet to the first rotor. Mach number was determined from a calibration of measured total and static pressures. The resulting calibrated Mach number and corrected total pressure were then used in conjunction with standard air-property tables to calculate static pressure. The measured total pressure and flow angle from these probes were corrected by using Mach number calibration curves for individual probes.

Temperature Data

Thermocouple signals were converted to temperature measurements by using wire

calibrations for individual sensors. These temperature measurements were converted into total temperature by using Mach number calibrations for individual sensors and the pressure-level correction given in reference 13. A circumferential mass-flow-averaged total temperature was calculated at each radial position by using the total temperatures and pressures given by the measured circumferential distributions and the static pressures linearly interpolated between inner and outer wall static-pressure tap measurements.

Flow-Field-Analysis Computer Program

Overall and blade-element performance was calculated by means of a flow-field-analysis computer program. All parameters were corrected to standard-day conditions. The following inputs were used (for station locations, see fig. 7):

(1) Compressor inlet (station 0)
  (a) Corrected weight flow
  (b) Corrected rotor speed

(2) Rotor 1 inlet instrumentation plane (station 6)
  (a) Total-pressure ratio as function of radius
  (b) Constant radial blockage factor (to account for estimated wall boundary layer)

(3) Stator 1 inlet (station 7)
  (a) Total-pressure ratio as function of radius
  (b) Constant radial blockage factor

(4) Stator 1 exit instrument plane (station 8)
  (a) Total-temperature ratio as function of radius
  (b) Total-pressure ratio as function of radius
  (c) Constant radial blockage factor
  (d) Absolute air angle as function of radius

(5) Stator 2 inlet (station 9)
  (a) Total-pressure ratio as function of radius
  (b) Constant radial blockage factor

(6) Stator 2 exit instrument plane (station 10)
  (a) Total-temperature ratio as function of radius
  (b) Total-pressure ratio as function of radius
  (c) Constant radial blockage factor
  (d) Absolute air angle as function of radius

Total pressures and temperatures were ratioed to compressor inlet values. Compressor inlet total pressure was assumed equal to the inlet plenum pressure. Temperatures were always ratioed to the inlet plenum temperature.

A flow blockage factor was used at each radial location to improve the accuracy of the static-pressure and velocity calculations at blade-row stations. Blockages were applied equally to all stream tubes at each of the axial locations. Axial distributions of flow blockage factors were selected so that the hub and tip static pressures obtained from the flow-field calculations closely approximated the wall average static pressure for a representative midthrottle operating condition at design speed. Blockage factors selected in this manner agreed with the measured wall static pressures within 20 lbf/ft^2 abs (957 N/m^2). The flow blockage factors used in the data-reduction flow-field calculation are compared in table VI with those blockages used in the design.

TABLE VI. - ANNULUS BLOCKAGES

Station	Data reduction	Design
	Flow blockage factor, percent	
Upstream to rotor 1 leading edge	2.4	2.4
Rotor 1 trailing edge	4.1	4.1
Stator 1 leading edge	4.1	4.1
Stator 1 trailing edge	2.8	2.8
Rotor 2 leading edge	2.8	2.8
Rotor 2 trailing edge	3.8	3.8
Stator 2 leading edge	3.8	3.8
Stator 2 trailing edge and downstream	4.1	3.5

All static-pressure distributions and air angles behind the rotor were calculated by assuming axisymmetric flow and by considerations of mass-flow continuity, radial equilibrium, and energy equations. Curvature, enthalpy, and entropy gradient terms were used in the equilibrium calculations. Blade-element performance parameters at the blade edges were calculated by translating the measured data from the instrument plane along streamlines passing through the rotor 1 trailing edge at 5, 10, 15, 30, 50, 70, 85, 90, and 95 percent of the passage height. Actual percents of span where these streamlines crossed each blade and vane leading and trailing edge are tabulated in appendix B. Blade-element parameters were calculated at airfoil sections lying on conical surfaces defined by the intersections of these streamlines and the blade edges. The blade-edge stations that were used as input to the flow-field calculation were slanted straight lines closely approximating the meridional profiles of the manufactured blade edges. In addition to the blade-element parameters, the output of the flow-field-analysis program also includes overall performance of the first-rotor blade row, the first stage, the first stage plus rotor 2, and the complete two-stage fan. Blade-element performance

is tabulated in appendix B. Accumulated overall performance to the exit of each blade row is tabulated at the bottom of the blade-element data sheet for that blade row. (Tables marked "Run 0; speed code 0; point 0" represent design values.)

RESULTS AND DISCUSSION

Fan Performance With Design Stator Settings

Overall performance of two-stage fan. - The overall performance data for the two-stage fan are tabulated in table VII and plotted in figure 9(a). These data cover a range of corrected speeds from 50 to 112 percent of design. At design corrected speed and pressure ratio, the flow was almost exactly equal to the design value. Adiabatic efficiency at design speed and pressure ratio was 85.7 percent, which was 1.8 percentage points above the design value of 83.9 percent. Peak efficiency at design speed was 86.4 percent and occurred at a pressure ratio of 2.86. Peak efficiency increased from 82.5 percent at 50 percent corrected speed to the 86.4 percent at design speed. At 105 percent corrected speed, the maximum efficiency obtained was about 81 percent. The peak efficiencies were probably not achieved at corrected speeds above design because the flow range was limited by second-stage rotor blade stresses caused by blade flutter.

Minimum flows at 50 and 70 percent corrected speeds were limited by rotating stall. Between corrected speeds of 77 and 93 percent, the minimum flow was limited by first-bending-mode flutter of the second-stage rotor blades. At corrected speeds of 95 and 100 percent, minimum flow was limited by a cyclic surge with a period of 0.26 second, as determined from strain-gage and hot-film traces. Momentary rotating stall was detected at the fan exit during both the decreasing flow and the recovery portion of the surge cycle. The minimum flow limit at corrected speeds of 105 percent and above was again limited by first-bending-mode flutter of the second-stage rotor blades. This flutter phenomenon is discussed in more detail in a later section of this report, Second-Stage Rotor Blade Flutter. The design-speed stall margin for this two-stage fan was about 10 percent, based on design-point operation and the following definition of stall margin:

$$SM = \left[\frac{\left(\frac{W\sqrt{\theta_1}}{\delta_1} \right)_{des}}{\left(\frac{W\sqrt{\theta_1}}{\delta_1} \right)_{stall}} \frac{\left(\frac{P_2}{P_1} \right)_{stall}}{\left(\frac{P_2}{P_1} \right)_{des}} - 1 \right] 100$$

TABLE VII. - OVERALL PERFORMANCE DATA SUMMARY

Run	Speed code	Point	Rotor speed, percent of design	Overall pressure ratio	Equivalent weight flow		Overall adiabatic efficiency, percent	Type of data
					lbm/sec	kg/sec		
0	0	0	100 (design)	2.800	184.20	83.552	83.83	-----
223	10	1	99.76	2.276	184.89	83.866	72.81	(a, b)
	10	2	99.93	2.951	182.81	82.927	86.33	(a, b)
	10	3	100.05	2.990	181.02	82.110	85.66	(a, b)
225	10	3	99.98	2.587	184.95	83.893	82.87	(a, b)
	10	4	99.99	2.790	184.80	83.823	85.68	
	10	5	100.00	2.862	184.25	83.574	86.38	
	95	1	94.92	2.097	175.78	79.732	71.83	
	95	2	94.92	2.282	175.81	79.747	80.31	
	95	5	95.03	2.717	163.92	74.354	84.54	
	85	3	85.12	2.137	148.17	67.209	85.02	
	↓	5	85.01	2.217	139.42	63.240	83.50	
		11	85.09	1.765	151.78	68.847	68.18	
	↓	12	84.77	1.937	151.33	68.642	80.02	
	70	1	70.06	1.481	121.69	55.198	71.87	
	↓	2	69.93	1.623	117.09	53.111	82.74	
		3	70.03	1.668	113.21	51.351	83.03	
		4	70.02	1.700	107.40	48.716	81.66	
	↓	5	69.98	1.710	103.31	46.860	80.02	
	50	1	50.07	1.226	87.76	39.800	75.63	
	↓	2	50.18	1.264	83.49	37.871	81.10	
		3	49.95	1.299	76.60	34.745	82.54	
	↓	4	50.00	1.317	71.21	32.300	80.69	↓
[c]226	80	5	79.97	1.980	116.43	52.812	80.27	(a, b)
	85	5	85.04	2.163	124.41	56.432	78.84	(a, b)
	80	1	79.97	1.629	136.37	61.857	71.20	(a)
	80	3	80.02	1.943	126.91	57.566	84.40	↓
	80	5	79.97	1.981	116.43	52.812	80.60	
	90	1	90.18	1.952	158.53	71.908	76.20	
	90	3	90.11	2.368	147.28	66.805	84.70	↓
222	15	1	104.61	2.361	190.34	86.337	70.50	(a)
	11	1	109.96	2.439	194.44	88.197	66.70	↓
	15	2	104.87	2.783	189.35	85.888	81.00	
	11	2	109.89	2.863	192.51	87.321	76.90	
	15	13	104.88	2.713	190.67	86.487	80.30	
	112	13	111.85	2.825	195.52	88.687	74.40	↓

[a]Overall performance - fixed instrumentation only.

[b]Blade-element data - survey instrumentation.

[c]Stator 1 closed 5°.

Overall performance of first rotor. - Overall performance of the first-rotor blade row is presented in figure 9(b). At design corrected speed and pressure ratio, the measured corrected flow was very nearly equal to the design value. At this operating point, the measured efficiency of 90.8 percent was about 1.4 percentage points greater than the design value. Peak efficiency at design speed was 92.0 percent. At low speeds, flow limitations of the second stage restricted the maximum flow attainable by the first rotor, and peak-efficiency flow was probably not attained at 50 and 70 percent corrected speeds.

Overall performance of first stage. - Overall performance of the first stage is presented in figure 9(c). The measured flow at design corrected speed and pressure ratio is nearly equal to the design value. Efficiency at the design operating condition was about 87 percent, which was 1.5 percentage points above the design value. As for the first rotor, flow limitations of the second stage precluded attainment of peak efficiency at low speeds.

Overall performance of first stage plus second rotor. - Figure 9(d) presents the overall performance of the first stage plus the second rotor. The design speed curve for this combination of blade rows passes through the design point. At design corrected speed and pressure ratio, the measured efficiency is about 87.6 percent, or 1.4 percentage points above the design value. Peak efficiency decreased from 87.9 percent at design speed to 86.0 percent at 50 percent of design speed. Unlike the performance measured for the first rotor and first stage, values of peak efficiency were achieved at low speeds. This result indicates that the second stage operated at flows greater than that corresponding to the peak-efficiency points because the first stage operated on the low-flow side of peak efficiency (figs. 9(b) and (c)).

Nondimensional performance data. - Nondimensional plots of the performance of the first rotor, the first stage, the second rotor, and the second stage are presented in terms of pressure coefficient and adiabatic efficiency as functions of flow coefficient in figure 10. The spread in the data for both the first rotor and the first stage (figs. 10(a) and (b)) can be attributed to a marked compressibility effect and/or a change in axial velocity V_z. This result is not unexpected for such a highly loaded stage with a high percentage of the static-pressure rise across the rotor. The design-speed pressure coefficient curves for the first rotor and the first stage very nearly pass through the design points at design speed and flow coefficient. The efficiencies of the first rotor and the first stage are both above the design values.

The compressibility effects for rotor 2 and stage 2 (figs. 10(c) and (d)) are not as pronounced as for stage 1. There is, however, a marked increase in peak pressure coefficient with increased corrected speed, and design corrected speed curves do not pass through the design points. These effects can be attributed to a combination of compressibility and the added influence of variations in radial distributions of flow due to

off-design operation of the first stage. Another factor is that the flow coefficient is based on the calculated value of inlet axial velocity at the mean radius. The efficiencies at the design pressure coefficient for both the second rotor and the second stage are somewhat above the design values.

Based on these data, it is obvious that performance of multistage fans and compressors with highly loaded, high-Mach-number stages cannot be accurately predicted from curves of pressure coefficient and efficiency as functions of flow coefficient unless effective compressibility corrections are used.

Radial Distribution of Flow and Performance Parameters

The agreement between overall performance and design prediction was extremely good. The following discussion compares radial distributions of design and measured values of several pertinent design parameters. The corresponding data are presented in figure 11. Comparisons are made for conditions of maximum flow attainable (minimum pressure ratio), for the operating point nearest the design value of pressure ratio, and for the near-stall point at design corrected speed.

Meridional velocity. - The spanwise variations of meridional velocity at the leading edges of each rotor and stator blade row are presented in figure 11(a). For rotor 1, for the maximum-flow and near-design points, the distribution and level of meridional velocity are in excellent agreement with the design curve. The data for the near-stall point are slightly below the design values.

For stator 1, the inlet meridional velocity for the near-design point is slightly above the design curve except at 50 and 95 percents of span, where meridional velocities are somewhat less than design values. The low value at 50 percent of span probably reflects the wake from the first-rotor part-span shroud, which is located at 61 percent of span. The low value at 95 percent of span is probably caused by the casing boundary layer. Similar to results for rotor 1, the maximum-flow point and near-design point values of meridional velocity are nearly equal, and the near-stall point values are somewhat lower.

The rotor 2 inlet meridional velocities for the maximum-flow and near-design points are nearly equal. Those values are somewhat above design for the inner 30 percent span, nearly equal to design from 50 to 90 percents of span, and slightly below design at 95 percent of span. At the near-stall point the meridional velocity is appreciably below design over the inner 70 percent of span and equal to or slightly below design in the tip region.

The meridional velocity at the inlet to the second-stage stator shows an appreciable spread between values for the maximum-flow and near-design points. The agreement

between measured values for the near-design point and the design values is reasonably good. Some measured values fall above and some below the design curve. As expected, the maximum spread of meridional velocity between the maximum-flow and near-stall points occurs for the second stator.

The close agreement between values of inlet meridional velocity for the maximum-flow and near-design points for the first three blade rows indicates that for this range of flows, the second-stage rotor is operating on the vertical portion of its performance characteristic. Therefore, the only blade row to show a significant variation of meridional velocity is the second stator. Throttling from the design point toward stall results in appreciable changes in second-stage inlet flow with only limited changes in first-stage inlet flow.

Total-temperature ratio. - The spanwise variations of total-temperature ratio for stages 1 and 2 are plotted in figure 11(b). For stage 1, the near-design-point and maximum-flow-point values are nearly equal for all spanwise positions. The near-stall-point temperature ratio is close to the design flow value near the hub and appreciably higher than the design flow value from midspan to the blade tip. The rotor of stage 1 is designed to provide a relative flow angle of about 20° past the axial direction at the hub. As a result, the temperature rise in the hub region at the lower flows should be slightly less than that for higher flows. Therefore, the lack of variation of temperature ratio with flow in the hub region is expected for this type of design. For the near-design point, the temperature ratio near the hub is somewhat greater than the design value; at 50 percent of span, it is equal to the design value; from 70 and 90 percents of span, it is less than design; and at 95 percent of span, it is again equal to the design value. The mass-averaged temperature ratio for stage 1 for the near-design point is 1.1994, which compares well with the design value of 1.2016.

Stage 2 shows a normal variation of temperature ratio with flow. The temperature ratio at the near-design point is lower than the design value over the inner 50 percent of span, equal to or above the design value from 70 to 90 percents of span, and slightly below the design value at 95 percent of span. The mass-averaged temperature ratio for stage 2 for the near-design point is 1.165, which is slightly lower than the design value of 1.170. Two factors are involved in this discrepancy: (1) the pressure ratio for the near-design point is slightly below the design value and (2) the efficiency for this point is slightly higher than the design value.

Total-pressure ratio. - Spanwise variations of total-pressure ratio for rotor 1, stage 1, rotor 2, and stage 2 are shown in figure 11(c) for design speed. For rotor 1, the pressure ratios for the maximum-flow and near-design points are nearly equal. The near-design-point pressure ratio is equal to or above the design value for all locations except 50 and 95 percents of span. The value at 50 percent of span is probably affected by the part-span shroud, and the value at 95 percent of span by the casing boundary

layer. The mass-averaged pressure ratio for rotor 1 is 1.779 for the near-design point, as compared to the design value of 1.787.

The trends of spanwise variations of total-pressure ratio for the first stage are very similar to those for the first rotor. The mass-averaged stage pressure ratio at the near-design point was 1.738, compared to the design value of 1.744.

The rotor 2 total-pressure ratio shows a normal spread over the range of flows covered. At the near-design point, the rotor 2 pressure ratio is somewhat below design values of all locations except 50 and 70 percents of span, where the pressure ratios are approximately equal to design. At the near-design point, the mass-averaged total-pressure ratio is 1.631, compared to the design value of 1.646

The stage 2 total-pressure ratios follow the same trend as those for rotor 2. The near-design-point value of mass-averaged total-pressure ratio for stage 2 is 1.605, compared to a design-point value of 1.607. Stator losses for stage 2 are obviously lower than design because the pressure ratio for rotor 2 is less than the design value, whereas the pressure ratio for the stage is very nearly equal to the design value.

Incidence angle. - Spanwise variations of incidence angle to the suction surface for rotor 1, stator 1, rotor 2, and stator 2 are plotted in figure 11(d) for three values of flow at design speed. Rotor 1 incidence angles for the maximum-flow and near-design points are very nearly equal to the design values. Near-stall-point incidence angles for rotor 1 are about $1\frac{1}{2}^{\circ}$ above design in the hub region and about $\frac{1}{2}^{\circ}$ above design at the tip.

The maximum-flow and near-design-point values of suction-surface incidence angle for stator 1 are very nearly equal to the design values for the inner 50 percent of span, 1° to 3° less than design for 70 to 90 percent of span, and slightly above design at 95 percent of span. The total range of incidence covered by this stator varies from about 3° near the hub to about 4° to 5° for the outer portions of the stator vane (70 to 95 percents of span).

Rotor 2 suction-surface incidence angles for the maximum-flow and near-design points are within about 1° of design over the entire span. The incidence angle range for the hub region is approximately 5°, whereas the tip incidence angle range is essentially zero.

Incidence angles for stator 2 show the greatest range of all blade rows, varying from about 12° near the hub to 4° near the tip. At the near-design point, the second-stator incidence angle is below design at 5, 30, 50, 70, and 95 percents of span and approximately equal to design at the remaining spanwise locations.

Deviation angle. - The spanwise variations of deviation angle for three flows at design speed are presented in figure 11(e). For all flow conditions, the deviation angles for rotor 1 are slightly lower than design for the inner 30 percent of span and equal to or slightly higher than design for the remainder of the blade span. Variations of deviation angle with flow are small.

Stator 1 deviation angles are about equal to the design values at 10 and 15 percents of span and are 2° to 3° lower than design at all other spanwise locations.

Rotor 2 deviation angles are from 2° to 8° greater than the design values over the entire span, with the major differences occurring in the hub region.

Stator 2 deviation angles are very close to the design values over the entire span for all flows.

Diffusion factors. - Plots of spanwise variations of diffusion factor are presented in figure 11(f) for three values of flow at design speed for all four blade rows. For rotor 1 at the near-design point, the diffusion factors are relatively close to the design values except at 70 to 85 percent of span, where the diffusion factors are somewhat lower than design. The maximum tip diffusion factor for rotor 1 was about 0.525 at the near-stall point, and the maximum value at any of the three flow conditions was 0.6 at 30 percent of span. Based on these values of loading, it is doubtful that stall at design speed was initiated by the first rotor.

For the near-design point, the diffusion factors for the first stator were all very nearly equal to the design values. A maximum diffusion factor of slightly over 0.6 occurred at the stator hub for the near-stall-point condition.

Rotor 2 diffusion factors for the near-design point were also very close to the design values. The variation in rotor 2 tip diffusion factor is relatively small. The maximum hub diffusion factor of 0 67 for the near-stall point is relatively high, and this region of the blade may trigger stall of the complete fan.

Diffusion factors for the near-design point for stator 2 are close to design values in the blade end regions and lower than design values at midspan. Variations of diffusion factor with flow are relatively small near the tip and relatively large near the hub. The maximum diffusion factor of 0.68 near the hub for the near-stall point indicates that stall might be initiated in this region.

Loss coefficient. - Spanwise variations of loss coefficient for three values of flow at design speed for all four blade rows are presented in figure 11(g). The loss coefficients for the near-design point for rotor 1 are, in general, slightly above design values for the inner 50 percent of span and somewhat below design in the outer span regions.

Loss coefficients for stator 1 at the near-design point are equal to or less than the design values at all locations except 70 percent of span.

Rotor 2 loss coefficients for the near-design point are relatively close to the design values except for 30 and 50 percents of span, where the values are appreciably less than design values, and for 85 percent of span, where the measured value is somewhat above design. The very high value of hub loss coefficient at the near-stall point indicates that this section may trigger stall of the complete fan.

Loss coefficients for the second stator for the near-design point are nearly equal to or less than the design values for all spanwise locations.

Blade-Element Performance

All blade-element data are tabulated in appendix B.

First-rotor blade row. - First-rotor blade-element performance data, in terms of deviation angle (DEV), diffusion factor (D-FAC), and loss coefficient (OMEGA-B) against suction-surface incidence angle (INCS) are presented in figure 12 for 5, 10, 15, 30, 50, 70, 85, 90, and 95 percents of span from the hub. At design speed and design incidence angles, the loss coefficients are about equal to design values for all locations except 70 and 85 percents of span. For 70 and 85 percents of span, the loss coefficients are less than design. As would be expected for a multistage fan, the range of incidence angle for design speed is very small. At lower speeds, the range of incidence angle increases as does the minimum value attained. At design speed, the diffusion factors and incidence angles are very close to the design values for all spanwise positions. For design incidence angles and design speed, the deviation angles near the hub, 5 to 30 percent of span, were 1° to 2° below the design values and the magnitudes decreased with increasing incidence angle. For the outer span region, 50 to 90 percent of span, the deviation angles were close to design values and did not vary appreciably with incidence angle or rotative speed.

First-stator blade row. - Blade-element data for the first-stator blade row are presented in figure 13. At design incidence angles and design speed, the loss coefficients are nearly equal to the design values for all spanwise positions. The range of incidence angle covered by the hub sections is approximately $3\frac{1}{2}^{\circ}$ at design speed at 5 percent of span, and at the tip the range is about 5° at design speed. At design speed and design incidence angles, the diffusion factors are equal to or slightly greater than the design values at all spans. At design speed and design incidence angle, the deviation angle at 5 percent of span station is about 2° less than design; at 10 and 15 percents of span, deviation angles are slightly greater than design; and for the remaining stations, deviation angles are from 1° to 3° less than design.

Second-rotor blade row. - Blade-element data for the second-rotor blade row are presented in figure 14. For design speed and design incidence angle, the loss coefficients were very close to the design values at 5, 10, 15, and 30 percents of span from the hub. At the remaining radial locations, the minimum losses at design speed were equal to or somewhat less than the design values, but the minimum incidence angles achieved at design speed were higher than the design values. Near the hub, the incidence angle range at design speed was about 6.5°; in the tip region, the corresponding incidence angle range was only about 1° The design-speed curves of diffusion factor against incidence angle are in good agreement with the design values for the inner radial positions. Extrapolations of the design-speed diffusion factor curves for the outer radial positions are also close to the design point except at 95 percent of span. At 95 percent

of span, the extrapolated diffusion factor curve for design speed is below the design point. Deviation angles for the inner radial locations (5 to 30 percent of span) are as much as 8° greater than the design values, but for the remainder of the radial locations the extrapolated deviation angle curves for design speed agree well with the design values.

Second-stator blade row. - Figure 15 presents the blade-element data for the second-stator blade row. For design speed and design incidence angles, the losses for all radial stations are equal to or less than the design values. The range of incidence angle at design speed varies from about 16° at the hub to 13° at the tip. The diffusion factors and deviation angles for design speed and design incidence angles are very close to the design values.

Fan Performance With Reset First-Stage Stator

To study the effect of inlet flow angle on the second-stage rotor flutter boundaries, the first-stage stator was reset 5° closed. This stator reset gave a 2° decrease in calculated incidence angle for the second-stage rotor for design speed and flow. With the first stator reset, the stability limits of the compressor were determined for speeds from 50 to 110 percent of design, and the overall performance data were taken to define speed lines at 80 and 90 percents of design. Complete blade-element data were taken only for near-stall points at 80 and 85 percents of design speed. The overall performance data are presented in figure 16, and the detailed blade-element data for the two points taken are tabulated in appendix B. Performance with design stator settings is shown by the dashed lines in figure 16 for comparison purposes. These data show that resetting the first stator reduced flow and pressure ratio at speeds up to and including 100 percent of design but did not appreciably alter these parameters at speeds greater than design. Overall efficiencies were not changed appreciably.

The region of intermediate-speed flutter was reduced to a very narrow speed range near 90 percent of design, and the overspeed flutter region was eliminated for speeds up to 110 percent of design. Minimum flow was limited at low speeds by rotating stall and at high speeds by surge.

The stall limit with the stator reset was improved at the lower speeds, but at design speed the stall limit was reduced somewhat compared to that for the design stator setting.

Second-Stage Rotor Blade Flutter

Flutter boundaries. - With design stator settings, the second-stage rotor blade encountered bending flutter limitations near stall at corrected speeds between 77 and 93

percent of design. Blade flutter in this speed regime is generally referred to as a subsonic stall flutter. First-bending-mode flutter was also encountered at moderate pressure ratios at corrected speeds of 105 to 110 percent of design. This high-speed flutter is generally termed supersonic stall flutter. No flutter was encountered on any other blade rows. The measured rotor blade frequencies ranged from about 400 hertz at 90 percent corrected speed to 440 hertz at 105 percent corrected speed and were detected on the root leading-edge and root trailing-edge strain gages. Measured blade first-bending frequency agreed fairly closely with the predicted frequency (fig. 43 of ref. 9). Measured stresses in the flutter regions were as high as ±14 000 psi ($\pm 9.7 \times 10^7$ N/m^2). These stresses did not necessarily represent peak values, but further throttling was limited at this point to avoid higher levels of vibratory stress. First-bending-mode flutter is not commonly encountered, and the flutter limits are not well defined. In general, blades are designed based on predicted torsional flutter limits. For the second-stage rotor blade in the torsional mode, the calculated reduced velocity parameter $2V'/c\omega_t$ of 2.35 for 110 percent of design speed was considered to be a potential problem. The calculated reduced velocity parameter for first bending was 5.48 for 110 percent of design speed. These values of reduced velocity were based on conditions at 75 percent of span from the hub.

To further evaluate the flutter boundaries for the second-stage rotor blade row, the first-stage stator was reset 5° closed. With this reset, as shown in figure 16, the low-speed, near-stall flutter region was reduced to a very narrow speed range near 90 percent corrected speed, and the overspeed flutter region was eliminated for speeds up to 110 percent of design. The flutter encountered was also a first-bending-mode flutter.

Flutter boundary correlation. - In order to better understand the first-bending-mode flutter problems encountered with the rotor 2 blades, an attempt was made to arrive at some meaningful flutter boundary correlation by using measured blade flutter frequencies and detailed blade-element data. The correlation used involved the determination of the first-bending flutter parameter $2V'/c\omega_b$ as a function of blade mean-camber-line incidence angle i_m for the various fan speeds. The relative velocity in the reduced-velocity parameter and the incidence angle on the mean camber line were evaluated at 75 percent of span from the hub. The results are presented in figure 17 for corrected speeds up to 100 percent of design. No blade-element data were taken for the overspeed conditions. Therefore, reduced velocities and incidence angles could not be determined for the supersonic flutter region. The incidence angle and relative velocity at 75 percent of span were determined by interpolation of the detailed blade-element data of appendix B. Directly measured values of blade first-bending frequency ω_b were limited to the 90 to 105 percent corrected speed range. The measured values were less than the calculated values and ranged from 400 hertz at 90 percent corrected speed to about 440 hertz at 105 percent corrected speed compared to the calculated values of

440 and 480 hertz. Therefore, values of frequency at the lower speeds were determined by extrapolation along a curve parallel to the calculated curve. The curves of figure 17 for corrected speeds of 75, 80, and 90 percent of design, the incidence angle at stall or surge, and the incidence angle at onset of flutter were estimated simply by interpolation and extrapolation of appropriate data curves.

First-bending-mode flutter of rotor 2 blades was encountered at corrected speeds from 77 to 93 percent of design, and the flutter boundary for this intermediate speed range is shown in figure 17. As stated previously, the stability limit at speeds less than 77 percent of design was established by rotating stall, and the stability limit for speeds greater than 93 percent resulted from surge. It is evident from figure 17 that at speeds greater than 90 percent of design, the flutter boundary must break upward very sharply because the incidence angle at surge for design speed must fall to the left of an extension of the flutter boundary curve (operation is flutter free at design speed).

The two data points for which detailed blade-element data were taken at 80 and 85 percents of design speed with the first stator reset 5° closed are also plotted in figure 17. The intent of this stator reset was to reduce the incidence angle on the second-stage rotor blade at high speed. At low speed, the reduction in flow (as shown in fig. 16) more than offset the increase in the inlet absolute flow angle for the second rotor. As a result, the incidence angle on rotor 2 increased appreciably. The flutter parameter, however, decreased because of reduced V_1. This decrease in flutter parameter more than offset the increase in incidence angle so that the near stall points at 80 and 85 percents of design speed fell on the stable side of the flutter boundary (fig. 17). At 90 percent corrected speed, the reduction in the flutter parameter value was not sufficient to compensate for the increased incidence angle caused by reduced flow, and flutter was still encountered.

The data taken at the overspeed conditions were insufficient to evaluate the supersonic flutter boundaries. However, the data of figure 16 indicate that the flows attained at overspeed with the reset first-stage stators were approximately the same as those for the design stator settings. Therefore, at these speeds, reductions in second-rotor incidence angle of the order of the calculated 2° were probably attained. The prewhirl at the inlet to the second rotor as a result of stator 1 reset also decreased the relative inlet velocity and thus decreased the value of the flutter parameter. Both the decrease in incidence angle and the decrease in inlet relative velocity (or flutter parameter) would contribute to the elimination of supersonic flutter of the second-stage rotor blades at overspeed conditions.

Insufficient data were obtained in this investigation to determine whether supersonic and subsonic flutter were separate phenomena with separate boundaries or if supersonic flutter is merely an extension of the subsonic flutter phenomenon and thus the subsonic flutter boundary.

Mechanical Characteristics

Blade vibrations. - Aside from the flutter problem of the second-stage rotor blades, no severe vibratory stresses were encountered for any blade row. A second-rotor blade tip resonance with first-stator vanes (46 vanes) was observed in the 100 to 110 percent speed range. This resonance was a second-mode bending at 90 percent of span. A maximum stress of ±8000 psi ($\pm 5.5 \times 10^7$ N/m^2) was observed. This stress was well below the allowable of ±16 000 psi ($\pm 1.1 \times 10^8$ N/m^2) indicated from a Goodman diagram (ref. 9). Although stresses were well below the fatigue limit, operation in this range was held to a minimum. Holographic tests on a shake table showed a series of natural frequencies in the range of 8200 to 9000 hertz which gave second-mode tip patterns such as indicated in the 100 to 110 percent speed range.

Test rig vibration. - During initial testing, a front-bearing housing vibration was observed in the design speed range. Trim balance weights were added to the rear flexible coupling flange to eliminate this vibration. These weights were added to the rear flex coupling because access holes for field balance were available at this location. At overspeed the trim balance weight caused a rear-bearing housing vibration. Overall performance mapping for speeds of 50, 75, 85, and 100 percent of design were run with these trim balance weights in place.

The 95 percent speed line could not be completed because the front-bearing housing vibration was again encountered. Therefore, the rear-coupling trim balance weights were removed, and the low-speed testing was completed. To futher evaluate the fan flutter boundaries, it was necessary to improve the shaft balance. Therefore, the rig was partially disassembled and trim balance weights were added to the first-stage rotor. This reduced the vibrations to an acceptable level for the remainder of the tests. When tests were completed and the rig disassembled, all balance weights were removed, and the balance was checked. This check showed that the balance of the rotating mass had changed during testing, particularly in the front-rotor region. The source of this balance change was not determined.

Stator vane failures. - During a routine inspection, a damaged first-stage vane was discovered. Because of this failure, the rig was disassembled and a damaged second-stage vane was also uncovered. The damage to both vanes consisted of a fractured leading-edge hub corner. The two failures appeared to be similar, except that the second-stage vane had been fitted with pressure sensors and the failure occurred in the area where one of the sensors had been brazed to the vane.

The two damaged vanes are shown in their respective assemblies in figures 18 and 19. Both the first- and second-stage failures consisted of a fracture at the hub corner running angularly from the leading edge to the inboard edge of the airfoils. The first-stage failure resulted in the loss of a 1/2- by 1/4-inch (1.27- by 0.635-cm) segment, and the second-stage failure resulted in the loss of a 3/4- by 1/2-inch (1.90- by

1.27-cm) segment. The two failures appear to be similar except for the probable involvement of the sensors in the second-stage failure.

Magnaflux inspection of the remaining first- and second-stage vanes indicated no cracks or damage. Three small nicks were found in the leading edge of the second-stage blades, but no damage could be found on the first-stage rotor assembly. Visual and Zyglo inspection of all remaining rotating and nonrotating parts revealed no further damage. A dimensional check of the thickness of both sets of vanes in the area of the damage revealed that the failed first-stage vane was thin compared to the average of the remainder of the first-stage vanes (0.009 in. (0.023 cm) compared to the average of 0.023 in. (0.058 cm)). The second-stage vanes were within blueprint tolerances. Microscopic examination of the first-stage vane fracture revealed fatigue which had progressed from the vicinity of the concave airfoil surface; the fracture surface was severely rubbed and the exact origin could not be determined. Examination of the second-stage vane fracture surface revealed fatigue which had progressed from an origin at the pressure sensor braze joint on the concave airfoil surface. Qualitative spectrographic analysis identified the vane material as being the required AMS 5613 stainless steel. Hardnesses of both the first-stage and second-stage vanes conformed to the design requirements. Metallographic examination of the traverse sections through fatigue origins revealed no material abnormalities.

The excitation on stator 1 is predominantly rotor 1 blade passing frequency. Due to the passing frequency of the rotor 1 blades, the first-stator vanes are subject to a range of frequencies from 2500 to 5500 hertz for the speeds covered in this test program. Four first-stage vanes were vibrated on a bench, and the mode shapes were determined holographically for modes between 500 and 15 000 hertz. Several vane mode shapes occur in this frequency range, and most of them involve significant motion of the hub and tip leading-edge corners. These bench tests also showed that the blades with thin hub leading edges were very susceptible to vibration in the region of 5000 hertz, which corresponds to rotor 1 blade passing frequency at design speed. Although the aerodynamic damping is significantly different in the rig than on the bench, these results suggest that in the rig the vanes of average and less-than-average thickness also respond easily to excitation around 5000 hertz and that the thicker vanes are subjected to substantially less stress at the corner for a given excitation level.

The second stator is predominantly excited by the rotor 2 blade passing frequency. Due to the passing frequency of the rotor 2 blades, the second-stator vanes are subject to a range of frequencies from 5360 to 11 800 hertz over the range of test speeds. Two second-stage vanes were vibrated on the bench, and their mode shapes were determined holographically over a range of frequencies from 1500 to 15 000 hertz. No regions of extreme sensitivity of the root leading-edge corner were noted in these bench tests.

However, at the braze, the origin of failure for the vane, a relatively low vibratory amplitude could lead to a high concentrated stress and thus result in a short fatigue life. In addition, since there were so many responding modes within the leading-edge corner, the vibration even at low levels was probably present over the entire range of speeds.

SUMMARY OF RESULTS

The following results were obtained from tests of a high-tip-speed, highly loaded two-stage fan:

1. The fan achieved the design pressure ratio of 2.8 at the design corrected flow of 184.2 lbm/sec (83.55 kg/sec) and design corrected tip speed or 1450 ft/sec (442 m/sec). The efficiency at design speed and pressure ratio was 85.7 percent, compared to a design value of 83.9.

2. Design control in regard to flow distributions and performance was extremely good. Rotor losses were approximately equal to the predicted values, and stator losses were somewhat lower than predicted values.

3. The stall margin, from design pressure ratio to surge at design speed, was 10 percent. A study of blade-element data indicates stall originated in the hub region of either the second-stage rotor or stator blade row.

4. Closing the first-stage stator by 5° reduced flow and pressure ratio at speeds up to design speed. At overspeed, the flow was not altered appreciably. The stall limit was improved at the lower speeds but was reduced slightly at design speed. There was no marked change in fan overall efficiency.

5. First-bending-mode flutter of the second-stage rotor was encountered in two separate operating regimes. The first occurred at near stall between corrected speeds of 77 and 93 percents of design, and the second was encountered at moderate pressure ratios at 105 to 110 percent corrected speeds.

6. A first-stage stator reset of 5° closed eliminated the high-speed flutter region and reduced the intermediate-speed flutter region to a narrow speed range near 90 percent of design. The reduction in the extent of the intermediate-speed flutter region resulted from a reduction in the value of the flutter parameter rather than a reduction in incidence angle.

7. A failure of one first-stage stator hub leading edge was determined to be caused by vibrational sensitivity of vanes which were locally appreciably thinner than specified.

8. Failure of one second-stage stator hub leading edge was attributed to stress concentrations caused by a leading-edge probe which was brazed to the vane at the point of crack initiation.

Lewis Research Center,
National Aeronautics and Space Administration,
Cleveland, Ohio, March 7, 1974,
501-24.

APPENDIX A

AERODYNAMIC DESIGN SUMMARY

The design values for the aerodynamic parameters at the rotor and stator leading and trailing edges are presented in this appendix in tables VIII to XII.

TABLE VIII. - IDENTIFICATION OF COLUMN HEADINGS USED IN AIRFOIL AERODYNAMIC SUMMARY TABLES

% FLOW	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
0.00																		
3.15																		
6.70																		
10.40																		
22.70																		
31.65																		
41.45	r_1	r_2	V_1	V_2	V_{m_1}	V_{m_2}	V_{θ_1}	V_{θ_2}	β_1	β_2	β'_1	β'_2	V'_1	V'_2	V'_{θ_1}	V'_{θ_2}	U_1	U_2
51.85																		
62.90																		
74.60																		
80.70																		
87.00																		
93.40																		
100.00																		

% FLOW	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOCM1/ RHOCM2	OMEGA-B SHOCK	EFF-P INLET %	D-FAC	AREA SQ FT	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
0.00																				
3.15																				
6.70																				
10.40																				
22.70																				
31.65	i_{u_1}	i_{m_1}	δ^*	$\Delta\beta$	$\frac{(\rho V_m)_1}{(\rho V_m)_2}$	$\bar{\omega}_{sh}$	η_p	D	A	$\frac{N}{\sqrt{\theta_2}}$	$\frac{\bar{\omega}\cos\beta'_2}{2\sigma}$	$\frac{(\bar{\omega}-\bar{\omega}_{sh})\cos\beta'_2}{2\sigma}$	$\frac{P_2}{P_1}$	η_p	η_{ad}	η_p	M_1	M_2	M'_1	M'_2
41.45																				
51.85																				
62.90																				
74.60																				
80.70																				
87.00																				
93.40																				
100.00																				

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	AREA SQ FT	NCORR LOCAL RPM	WCORR LOCAL LBM/SEC	TO/TO LOCAL	PO/PO LOCAL	EFF-AD LOCAL	EFF-P LOCAL	STA-1 - - LOCAL - -	STA-2 - -
$\frac{N}{\sqrt{\theta_{in}}}$	$\frac{W\sqrt{\theta_{in}}}{\delta_{in}}$	$\frac{T_2}{T_{in}}$	$\frac{P_2}{P_{in}}$	η_{ad}	η_p	A	$\frac{N}{\sqrt{\theta_2}}$	$\frac{W\sqrt{\theta_2}}{\delta_2}$	$\frac{T_2}{T_1}$	$\frac{P_2}{P_1}$	η_{ad}	η_p	1	2

TABLE IX. - AERODYNAMIC SUMMARY - ROTOR 1 - U. S. CUSTOMARY UNITS

%FLOW	DIA-1	DIA-2	V-1	V-2	VM-1	VM-2	VU-1	VU-2	B-1	B-2	B*-1	B*-2	V*-1	V*-2	VU*-1	VU*-2	U-1	U-2
	IN	IN	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	DEGREE	DEGREE	DEGREE	DEGREE	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC
0.00	12.400	14.840	607.9	1093.0	607.9	603.3	.0	911.5	.00	56.50	43.66	-19.81	840.2	641.2	-580.0	217.4	580.0	694.1
3.15	13.450	15.600	617.4	1048.2	617.4	617.0	.0	847.3	.00	53.94	45.54	-10.79	881.4	628.1	-629.1	117.6	629.1	729.7
6.70	14.490	16.350	629.6	1006.6	629.6	627.3	.0	789.8	.00	51.54	47.11	-2.29	925.1	627.8	-677.8	25.0	677.8	764.8
10.40	15.490	17.100	641.8	977.8	641.8	628.4	.0	749.1	.00	50.01	48.46	4.62	968.0	630.5	-724.5	-50.8	724.5	799.8
22.70	18.420	19.370	674.6	900.2	674.6	620.7	.0	651.9	.00	46.41	51.88	22.26	1095.2	670.7	-861.6	-254.1	861.6	906.0
31.65	20.290	20.840	694.5	862.9	694.5	610.1	.0	610.2	.00	45.00	53.80	30.93	1176.0	711.3	-949.1	-365.6	949.1	975.7
41.45	22.140	22.390	708.5	831.1	708.5	599.4	.0	575.7	.00	43.85	55.62	38.19	1254.8	762.7	-1035.6	-471.6	1035.6	1047.3
51.85	23.960	23.900	717.0	806.0	717.0	590.9	.0	548.1	.00	42.85	57.39	43.96	1330.4	820.9	-1120.7	-569.8	1120.7	1117.9
62.90	25.740	25.410	719.4	787.1	719.4	586.2	.0	525.2	.00	41.86	59.14	48.53	1402.5	885.3	-1204.0	-663.4	1204.0	1188.5
74.60	27.510	26.910	715.4	773.4	715.4	584.1	.0	506.9	.00	40.95	60.93	52.16	1472.3	952.0	-1286.8	-751.8	1286.8	1258.7
80.70	28.380	27.670	710.9	773.5	710.9	583.4	.0	507.8	.00	41.04	61.83	53.43	1505.9	979.2	-1327.5	-786.4	1327.5	1294.3
87.00	29.260	28.420	704.6	774.4	704.6	583.3	.0	509.4	.00	41.13	62.75	54.57	1539.4	1006.2	-1368.6	-819.9	1368.6	1329.3
93.40	30.130	29.180	697.0	781.1	697.0	580.6	.0	522.6	.00	41.99	63.68	55.42	1572.3	1023.1	-1409.3	-842.3	1409.3	1364.9
100.0	31.000	29.930	687.6	792.1	687.6	576.4	.0	543.3	.00	43.31	64.63	56.07	1604.8	1032.5	-1450.0	-856.7	1450.0	1400.0

%FLOW	INCS	INCM	DEV	TURN	RHOCM1/OMEGA-R	RHOCM2	SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M*-1	M*-2
	DEGREE	DEGREE	DEGREE	DEGREE															
0.00	-0.9	3.9	15.9	63.47	.8577	.0000	.4815	.0617	.0120	.0120	1.8720	.9687	.9660	.9235	.5612	.9734	.7756	.5711
3.15	-0.9	3.7	17.1	56.33	.8236	.0000	.5121	.0507	.0108	.0106	1.8508	.9715	.9690	.9418	.5706	.9286	.8148	.5569
6.70	-0.7	3.6	17.4	49.39	.8024	.0000	.5277	.0410	.0093	.0093	1.8300	.9743	.9720	.9543	.5826	.8899	.8559	.5539
10.40	-0.4	3.7	16.1	43.85	.7969	.0000	.5415	.0440	.0104	.0104	1.8174	.9703	.9677	.9524	.5947	.8592	.8970	.5540
22.70	0.5	4.0	12.6	29.62	.8012	.0000	.5500	.0564	.0139	.0139	1.7855	.9540	.9500	.9410	.6289	.7833	1.0189	.5836
31.65	0.9	3.9	10.1	22.88	.8134	.0361	.5442	.0697	.0169	.0082	1.7751	.9375	.9322	.9274	.6474	.7466	1.0960	.6155
41.45	1.2	3.8	7.8	17.43	.8252	.0419	.5307	.0814	.0192	.0093	1.7685	.9207	.9139	.9142	.6616	.7155	1.1720	.6566
51.85	1.5	3.8	6.5	13.43	.8327	.0495	.5131	.0911	.0207	.0095	1.7660	.9049	.8969	.9022	.6702	.6908	1.2436	.7036
62.90	1.9	3.8	5.6	10.61	.8330	.0593	.4923	.0987	.0217	.0087	1.7675	.8910	.8819	.8911	.6726	.6720	1.3117	.7558
74.60	2.5	4.1	6.4	8.77	.8278	.0672	.4714	.1070	.0228	.0085	1.7710	.8763	.8660	.8780	.6686	.6579	1.3757	.8099
80.70	2.8	4.2	6.6	8.40	.8255	.0709	.4675	.1210	.0255	.0106	1.7790	.8596	.8479	.8610	.6640	.6562	1.4068	.8308
87.00	3.1	4.4	7.6	8.18	.8218	.0736	.4639	.1345	.0281	.0127	1.7870	.8431	.8300	.8437	.6578	.6552	1.4367	.8514
93.40	3.3	4.5	9.1	8.26	.8235	.0744	.4696	.1611	.0336	.0161	1.8001	.8146	.7988	.8129	.6498	.6581	1.4663	.8619
100.0	3.6	4.7	11.0	8.56	.8282	.0805	.4812	.1944	.0407	.0238	1.8170	.7810	.7620	.7753	.6404	.6637	1.4947	.8651

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	AREA SQFT	NCORR LOCAL RPM	WCORR LOCAL LBM/SEC	TO/TO LOCAL	PO/PO LOCAL	EFF-AD LOCAL %	EFF-P LOCAL %	STA-1 STA-2 ---LOCAL---
10720.	184.70	1.2016	1.7866	89.39	90.21	4.359	9779.	113.02	1.2016	1.7866	89.39	90.21	7.0 8.0

TABLE X. - AERODYNAMIC SUMMARY - STATOR 1 - U. S. CUSTOMARY UNITS

%FLOW	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	BI-1 DEGREE	BI-2 DEGREE	VI-1 FT/SEC	VI-2 FT/SEC	VOI-1 FT/SEC	VOI-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
0.00	15.220	16.850	1069.5	616.6	630.1	616.6	868.7	.0	54.66	.00	-15.67	51.87	654.5	1001.9	176.8	-788.2	711.9	788.2
3.15	15.930	17.410	1048.7	627.1	641.1	627.1	829.9	.0	52.32	.00	-7.53	52.40	646.6	1027.8	84.8	-814.3	745.1	814.3
6.70	16.640	17.970	1012.1	632.9	649.6	632.9	776.1	.0	50.07	.00	.20	53.02	649.6	1052.2	-2.2	-840.5	778.3	840.5
10.40	17.350	18.530	993.7	642.4	650.1	642.4	738.3	.0	48.64	.00	6.43	53.45	654.2	1078.9	-73.2	-866.7	811.5	866.7
22.70	19.510	20.290	917.1	649.8	642.7	649.8	647.2	.0	45.20	.00	22.43	55.60	695.3	1150.2	-265.3	-949.1	912.6	949.1
31.65	20.940	21.480	878.1	653.4	633.8	653.4	607.8	.0	43.80	.00	30.39	56.96	734.7	1198.5	-371.6	-1004.7	979.5	1004.7
41.45	22.400	22.700	849.9	657.1	625.5	657.1	575.4	.0	42.61	.00	37.06	58.25	783.8	1248.7	-472.3	-1061.8	1047.8	1061.8
51.85	23.860	23.940	828.2	664.0	620.0	664.0	549.1	.0	41.53	.00	42.44	59.33	840.2	1301.8	-567.0	-1119.8	1116.0	1119.8
62.90	25.310	25.180	813.1	669.0	619.0	669.0	527.2	-.0	40.42	-.00	46.69	60.40	902.4	1354.5	-656.6	-1177.8	1183.9	1177.8
74.60	26.760	26.430	802.9	670.2	621.6	670.2	509.8	.0	39.36	.00	50.04	61.54	967.9	1406.2	-741.9	-1236.3	1251.7	1236.3
80.70	27.490	27.040	806.5	673.9	623.8	673.9	511.2	.0	39.33	.00	51.16	61.97	994.6	1433.9	-774.7	-1265.7	1285.8	1265.7
87.00	28.220	27.690	810.3	674.0	627.1	674.0	513.2	.0	39.29	.00	52.14	62.51	1021.9	1460.1	-806.8	-1295.2	1320.0	1295.2
93.40	28.940	28.320	820.1	677.2	628.6	677.2	526.6	.0	39.95	.00	52.76	62.92	1038.9	1487.7	-827.1	-1324.7	1353.7	1324.7
100.0	29.670	28.960	834.6	682.1	629.4	682.1	548.1	.0	41.05	.00	53.15	63.27	1049.4	1516.6	-839.8	-1354.6	1387.8	1354.6

%FLOW	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOCM1/RHOCM2	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD CUM	EFF-P STATIC	M-1	M-2	MI-1	MI-2
0.00	0.0	1.9	13.6	54.66	.8306	.0000	.5847	.2013	.0397	.0397	.9088	.0000	.8070	.7704	.9697	.5187	.5825	.8401
3.15	-0.2	1.8	12.2	52.32	.8487	.0000	.5562	.1729	.0352	.0352	.9261	.0000	.8386	.7899	.9288	.5273	.5729	.8642
6.70	-0.8	1.7	11.2	50.07	.8646	.0000	.5306	.1448	.0306	.0306	.9414	.0000	.8671	.8125	.8932	.5335	.5734	.8869
10.40	-1.0	1.8	10.4	48.64	.8633	.0000	.5065	.1189	.0261	.0261	.9541	.0000	.8852	.8350	.8653	.5424	.5754	.9108
22.70	-1.8	1.9	9.3	45.20	.8731	.0000	.4574	.0758	.0185	.0185	.9742	.0000	.9035	.8744	.7950	.5496	.6060	.9729
31.65	-2.4	2.0	9.3	43.80	.8730	.0000	.4327	.0642	.0166	.0166	.9795	.0000	.8958	.8812	.7613	.5525	.6371	1.0139
41.45	-2.9	2.1	9.3	42.61	.8713	.0000	.4106	.0573	.0157	.0157	.9828	.0000	.8838	.8814	.7335	.5552	.6763	1.0551
51.85	-3.5	2.1	9.3	41.53	.8662	.0000	.3877	.0473	.0136	.0135	.9864	.0000	.8736	.8888	.7117	.5606	.7220	1.0992
62.90	-4.2	1.9	9.4	40.42	.8669	.0000	.3702	.0429	.0127	.0127	.9881	.0000	.8619	.8880	.6963	.5642	.7728	1.1423
74.60	-5.1	1.6	9.9	39.36	.8743	.0000	.3621	.0430	.0132	.0132	.9884	.0000	.8468	.8806	.6863	.5641	.8263	1.1837
80.70	-5.3	1.6	10.6	39.33	.8739	.0000	.3633	.0461	.0144	.0144	.9875	.0000	.8279	.8708	.6868	.5660	.8470	1.2043
87.00	-5.6	1.4	11.8	39.29	.8788	.0000	.3701	.0546	.0173	.0173	.9852	.0000	.8068	.8511	.6884	.5645	.8679	1.2228
93.40	-5.6	1.5	13.2	39.95	.8764	.0000	.3813	.0643	.0205	.0205	.9823	.0000	.7729	.8288	.6939	.5645	.8790	1.2403
100.0	-6.1	1.4	14.9	41.05	.8696	.0000	.3962	.0752	.0242	.0242	.9789	.0000	.7324	.8080	.7027	.5652	.8836	1.2567

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
10720.	184.20	1.2018	1.7444	85.40	86.50

AREA SQFT	NCORR LOCAL RPM	WCORR LOCAL LBM/SEC	TO/TO LOCAL	PO/PO LOCAL
3.501	9779.	115.75	1.0000	.9766

STA-1	STA-2
---LOCAL---	
9.0	10.0

TABLE XI. - AERODYNAMIC SUMMARY - ROTOR 2 - U. S. CUSTOMARY UNITS

%FLOW	DIA-1	DIA-2	V-1	V-2	VM-1	VM-2	VU-1	VU-2	B-1	B-2	B'-1	B'-2	V'-1	V'-2	VU'-1	VU'-2	U-1	U-2
	IN	IN	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	DEGREE	DEGREE	DEGREE	DEGREE	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC
0.00	17.390	18.350	673.4	1095.0	673.4	677.0	.0	860.6	.00	51.81	50.38	-.20	1056.0	677.0	-813.4	2.3	813.4	858.3
3.15	17.900	18.770	685.6	1059.2	685.6	680.8	.0	811.4	.00	50.00	50.69	5.58	1082.2	684.0	-837.3	-66.6	837.3	878.0
6.70	18.400	19.200	694.8	1026.4	694.8	679.1	.0	768.3	.00	48.53	51.09	10.82	1106.1	691.4	-860.7	-129.8	860.7	898.1
10.40	18.910	19.620	707.2	996.2	707.2	678.0	.0	729.9	.00	47.11	51.36	15.48	1132.5	703.6	-884.5	-187.8	884.5	917.7
22.70	20.520	20.990	723.7	923.8	723.7	654.3	.0	652.1	.00	44.90	52.98	24.74	1202.1	732.7	-959.8	-329.7	959.8	981.8
31.65	21.610	21.930	732.6	888.0	732.6	639.7	.0	616.0	.00	43.92	54.07	32.65	1248.4	759.7	-1010.8	-409.8	1010.8	1025.8
41.45	22.740	22.920	740.9	854.6	740.9	626.2	.0	581.8	.00	42.89	55.14	38.06	1296.2	795.4	-1063.7	-490.3	1063.7	1072.1
51.85	23.880	23.920	750.9	825.1	750.9	614.5	.0	550.7	.00	41.87	56.09	42.76	1345.9	836.9	-1117.0	-568.1	1117.0	1118.9
62.90	25.040	24.940	758.4	800.7	758.4	603.2	-.0	526.5	-.00	41.11	57.08	46.70	1395.4	879.5	-1171.2	-640.1	1171.2	1166.6
74.60	26.210	25.980	761.2	783.1	761.2	599.6	.0	503.7	.00	40.09	58.16	49.88	1443.0	930.4	-1226.0	-711.5	1226.0	1215.2
80.70	26.800	26.510	764.9	779.4	764.9	597.0	.0	501.1	.00	40.01	58.61	51.06	1468.5	950.0	-1253.6	-738.9	1253.6	1240.0
87.00	27.390	27.040	765.0	779.2	765.0	591.9	.0	506.8	.00	40.57	59.16	52.01	1492.2	961.7	-1281.2	-758.0	1281.2	1264.8
93.40	27.980	27.580	767.7	785.9	767.7	584.0	.0	525.9	.00	42.00	59.61	52.61	1517.3	961.7	-1308.8	-764.1	1308.8	1290.0
100.0	28.580	28.120	771.7	794.5	771.7	567.6	.0	555.8	.00	44.40	60.00	53.23	1543.6	948.1	-1336.8	-759.5	1336.8	1315.3

%FLOW	INCS	INCM	DEV	TURN	RHOCM1/RHOCM2	OMEGA-B SHOCK	D-FAC	OMEGA-R	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
	DEGREE	DEGREE	DEGREE	DEGREE														
0.00	-0.1	5.4	16.2	50.57	.8213	.0000	.5430	.1346	.0296	.0296	1.7751	.9109	.9034	.8404	.5675	.8789	.8899	.5434
3.15	0.1	5.4	14.9	45.10	.8197	.0000	.5413	.1314	.0295	.0295	1.7418	.9068	.8997	.8470	.5795	.8504	.9145	.5492
6.70	0.3	5.4	13.8	40.27	.8211	.0000	.5394	.1253	.0285	.0285	1.7153	.9054	.8979	.8559	.5893	.8235	.9382	.5553
10.40	0.5	5.4	13.1	35.87	.8263	.0000	.5348	.1201	.0275	.0275	1.6897	.9035	.8958	.8627	.6007	.7996	.9619	.5647
22.70	1.4	5.6	10.1	26.24	.8436	.0485	.5312	.1033	.0237	.0126	1.6574	.9052	.8982	.8838	.6166	.7385	1.0242	.5857
31.65	1.7	5.4	8.6	21.42	.8537	.0519	.5254	.0912	.0207	.0089	1.6507	.9100	.9035	.8974	.6243	.7073	1.0639	.6051
41.45	1.3	4.5	7.3	17.08	.8635	.0450	.5137	.0788	.0175	.0075	1.6451	.9164	.9103	.9103	.6313	.6784	1.1047	.6313
51.85	1.1	3.9	6.1	13.33	.8771	.0397	.4994	.0719	.0156	.0070	1.6354	.9180	.9121	.9168	.6397	.6527	1.1467	.6620
62.90	1.2	3.5	5.3	10.38	.8916	.0392	.4861	.0713	.0151	.0066	1.6269	.9138	.9076	.9161	.6455	.6311	1.1875	.6933
74.60	1.5	3.4	5.6	8.29	.8929	.0391	.4674	.0666	.0139	.0057	1.6224	.9149	.9087	.9191	.6467	.6153	1.2259	.7311
80.70	1.6	3.2	6.1	7.55	.9012	.0393	.4649	.0763	.0156	.0077	1.6181	.9017	.8945	.9072	.6483	.6102	1.2446	.7437
87.00	1.9	3.3	7.0	7.14	.9121	.0410	.4690	.0945	.0196	.0111	1.6177	.8795	.8713	.8863	.6466	.6071	1.2612	.7493
93.40	2.0	3.2	8.1	7.00	.9348	.0422	.4642	.1289	.0268	.0181	1.6175	.8411	.8301	.8493	.6456	.6075	1.2766	.7434
100.0	2.0	3.1	9.8	6.78	.9788	.0440	.5164	.1763	.0369	.0277	1.6136	.7903	.7756	.8008	.6452	.6075	1.2905	.7250

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
10720.	184.20	1.4065	2.6717	84.23	88.16

AREA SQFT	NCORR LOCAL RPM	WCORR LOCAL LBM/SEC	TO/TO LOCAL	PO/PO LOCAL	EFF-AD LOCAL %	EFF-P LOCAL %	STA-1 ---LOCAL---	STA-2 ---LOCAL---
2.787	9039.	76.07	1.1705	1.6465	89.19	89.95	11.0	12.0

TABLE XII. - AERODYNAMIC SUMMARY - STATOR 2 - U. S. CUSTOMARY UNITS

%FLOW	DIA-1	DIA-2	V-1	V-2	VM-1	VM-2	VD-1	VD-2	B-1	B-2	B'-1	B'-2	V'-1	V'-2	VD'-1	VD'-2	U-1	U-2
	IN	IN	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	DEGREE	DEGREE	DEGREE	DEGREE	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC
0.00	18.580	18.900	1118.1	658.7	726.4	658.7	850.0	.0	49.48	.00	1.51	53.31	726.6	1102.4	-19.1	-884.0	869.1	884.0
3.15	18.980	19.270	1061.1	651.3	724.8	651.3	802.2	.0	47.90	.00	6.73	54.15	729.8	1112.0	-85.6	-901.4	887.8	901.4
6.70	19.380	19.640	1047.2	644.6	719.0	644.8	781.4	.0	46.64	.00	11.41	54.93	733.5	1122.4	-145.1	-918.7	906.5	918.7
10.40	19.790	20.020	1016.4	639.8	714.2	639.8	723.2	.0	45.36	.00	15.83	55.66	742.4	1134.1	-202.5	-936.4	925.7	936.4
22.70	21.080	21.220	944.0	630.8	685.1	630.8	649.4	.0	43.46	.00	26.17	57.56	763.4	1176.1	-336.6	-992.6	986.0	992.6
31.65	21.980	22.050	900.4	625.0	669.3	629.0	614.6	.0	42.56	.00	31.71	58.62	786.8	1208.1	-413.6	-1031.4	1028.1	1031.4
41.45	22.920	22.930	877.3	629.3	656.6	629.3	581.8	.0	41.54	.00	36.75	59.60	819.5	1243.6	-490.3	-1072.5	1072.1	1072.5
51.85	23.880	23.830	850.4	631.7	647.2	631.7	551.6	.0	40.44	.00	41.14	60.48	859.3	1281.2	-565.3	-1114.6	1117.0	1114.6
62.90	24.860	24.740	829.6	636.3	640.0	636.3	528.2	.0	39.53	.00	44.76	61.20	901.3	1320.6	-634.7	-1157.2	1162.8	1157.2
74.60	25.850	25.680	817.6	642.5	641.9	642.5	506.3	.0	38.26	.00	47.59	61.86	951.9	1362.2	-702.9	-1201.2	1209.1	1201.2
80.70	26.360	26.150	817.2	647.8	643.3	647.8	504.0	.0	38.08	.00	48.58	62.09	972.3	1384.1	-729.0	-1223.2	1233.0	1223.2
87.00	26.870	26.630	820.7	654.3	642.9	654.3	510.1	.0	38.43	.00	49.27	62.29	985.3	1407.0	-746.7	-1245.6	1256.8	1245.6
93.40	27.380	27.110	831.5	663.4	641.1	663.4	529.6	-.0	39.56	-.00	49.52	62.38	987.5	1431.1	-751.1	-1268.1	1280.7	1268.1
100.0	27.900	27.600	845.1	674.9	632.7	674.9	560.2	.0	41.53	.00	49.65	62.40	977.2	1456.8	-744.8	-1291.0	1305.0	1291.0

%FLOW	INCS	INCR	DEV	TURN	RHOCM1/OMEGA-B	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD CUM	EFF-P STATIC	M-1	M-2	M'-1	M'-2
	DEGREE	DEGREE	DEGREE	DEGREE	RHOCM2	SHOCK											
0.00	-0.3	0.8	12.7	49.48	.9250	.0000	.5783	.1783	.0396	.0396	.9772	.0000	.7767	.7819	.9004	.5049	.5852	.8451
3.15	-0.4	1.2	11.6	47.90	.9425	.0000	.5446	.1597	.0362	.0362	.9378	.0000	.8005	.7974	.8708	.5013	.5878	.8559
6.70	-0.6	1.5	11.0	46.64	.9525	.0000	.5514	.1414	.0327	.0327	.9474	.0000	.8231	.8144	.8433	.4982	.5907	.8672
10.40	-1.1	1.5	10.7	45.36	.9617	.0000	.5376	.1242	.0293	.0293	.9559	.0000	.8397	.8309	.8179	.4956	.5974	.8785
22.70	-2.0	2.0	10.3	43.46	.9591	.0000	.5038	.0911	.0229	.0229	.9713	.0000	.8654	.8616	.7563	.4905	.6117	.9144
31.65	-2.5	2.3	10.3	42.56	.9545	.0000	.4839	.0826	.0216	.0216	.9756	.0000	.8680	.8646	.7256	.4892	.6280	.9396
41.45	-3.2	2.3	10.3	41.54	.9492	.0000	.4618	.0744	.0202	.0202	.9793	.0000	.8684	.8675	.6981	.4895	.6519	.9673
51.85	-4.0	1.9	10.2	40.44	.9433	.0000	.4379	.0653	.0182	.0182	.9829	.0000	.8668	.8730	.6745	.4913	.6815	.9965
62.90	-4.5	1.8	10.0	39.53	.9356	.0000	.4153	.0560	.0166	.0166	.9855	.0000	.8602	.8764	.6561	.4945	.7122	1.0263
74.60	-5.4	1.2	10.0	38.26	.9372	.0000	.3951	.0579	.0169	.0169	.9859	.0000	.8520	.8657	.6445	.4989	.7506	1.0577
80.70	-5.7	1.0	10.2	38.08	.9349	.0000	.3894	.0621	.0183	.0183	.9850	.0000	.8333	.8547	.6421	.5015	.7638	1.0716
87.00	-6.1	0.8	10.9	38.43	.9282	.0000	.3879	.0700	.0208	.0208	.9831	.0000	.8081	.8339	.6419	.5044	.7707	1.0848
93.40	-6.2	0.9	12.0	39.56	.9161	.0000	.3933	.0858	.0256	.0256	.9791	.0000	.7660	.7976	.6455	.5076	.7667	1.0950
100.0	-6.9	0.5	14.0	41.53	.8913	.0000	.4017	.0991	.0298	.0298	.9756	.0000	.7141	.7631	.6493	.5110	.7508	1.1030

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
10720.	184.20	1.4065	2.8000	83.85	85.99

AREA SQFT	NCORR LOCAL RPM	WCORR LOCAL LBM/SEC	TO/TO LOCAL	PO/PO LOCAL	STA-1 ---LOCAL---	STA-2
2.352	9039.	78.02	1.0000	.9752	13.0	14.0

APPENDIX B

OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

This appendix presents overall performance and blade-element data in tabular form. The streamline locations to be used with these data are given in table XIII. The column headings in the data tables are identified in table XIV. Finally, the overall performance and blade-element data are presented in table XV. Twenty-five sets of data are presented, each set containing data for rotor 1, stator 1, rotor 2, and stator 2.

TABLE XIII. - STREAMLINE LOCATIONS

Streamline	Nominal percent of span	Rotor 1		Stator 1		Rotor 2		Stator 2	
		LE	TE	LE	TE	LE	TE	LE	TE
		Actual percent of span							
1(Hub)	5	5.72	5.00	4.91	4.38	4.33	3.96	3.88	3.74
2	10	11.34	9.97	9.81	8.94	8.83	8.12	7.99	7.74
3	15	16.89	14.96	14.78	13.62	13.48	12.46	12.30	12.00
4	30	32.91	30.00	29.82	28.22	28.03	26.39	26.24	25.88
5	50	52.88	50.01	49.93	48.31	48.10	46.25	46.23	45.93
6	70	71.94	70.01	70.05	68.77	68.62	67.11	67.25	67.07
7	85	86.02	85.00	85.08	84.36	84.25	83.26	83.42	83.41
8	90	90.70	89.99	90.06	89.59	89.51	88.73	88.88	88.92
9(Tip)	95	95.36	94.99	95.04	94.81	94.76	94.30	94.40	94.46

TABLE XIV. - IDENTIFICATION OF COLUMN HEADINGS USED IN OVERALL PERFORMANCE AND BLADE-ELEMENT DATA TABLES

SL	EPSI-1	EPSI-2	V-1	V-2	VM-1	VM-2	Vθ-1	Vθ-2	B-1	B-2	M-1	M-2	U-1	U-2	M'-1	M'-2	V'-1	V'-2
Streamline number (1-9)	ϵ_1		ϵ_2	V_1	V_2	V_{m1}	V_{m2}	$V_{\theta 1}$	$V_{\theta 2}$	β_1	β_2	M_1	M_2	U_1	U_2	M'_1	M'_2	V'_1	V'_2

SL	INCS	INCM	DEV	TURN	RHOVM-1	RHOVM-2	D-FAC	EFF-P TOT-ST	%EFF-A TOT-ST	B'-1	B'-2	Vθ'-1	Vθ'-2
Streamline number (1-9)	i_{ss}	i_m	δ^o	$\Delta\beta$	$(\rho V_m)_1$	$(\rho V_m)_2$	D	η_p	η_{ad}	β'_1	β'_2	$V'_{\theta 1}$	$V'_{\theta 2}$

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC
T_2/T_{in}	P_2/P_{in}	η_{ad}	η_p	$\frac{\omega\sqrt{\theta}}{\delta A_1}$

TABLE XV. - OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(a) Run 0; speed code 0; point 0

(a-1) Rotor 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VΘ-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	15.967	18.530	625.5	1048.2	625.5	616.5	.0	947.7	.0	54.0	.5796	.9288	629.7	729.5	.8209	.5553	897.5	627.8
2	14.520	16.370	639.5	1007.1	639.5	623.2	.0	791.1	.0	51.8	.5913	.8883	678.7	764.5	.8630	.5502	931.8	623.8
3	12.342	14.322	651.5	973.8	651.5	622.1	.0	748.2	.0	50.4	.6043	.8554	727.0	739.5	.9054	.5482	976.2	624.1
4	6.679	8.750	685.3	893.4	685.3	610.6	.0	652.1	.0	46.9	.6391	.7787	866.3	905.9	1.0285	.5743	1104.6	661.2
5	.559	2.330	712.1	825.5	712.1	592.3	.0	575.9	.0	44.2	.6653	.7111	1040.1	1047.1	1.1776	.6516	1260.5	757.3
6	-4.683	-3.393	715.5	788.3	715.5	597.7	.0	525.4	.0	41.8	.6697	.6731	1205.9	1168.3	1.3105	.7565	1402.2	885.9
7	-8.522	-7.434	701.8	779.4	701.8	591.1	.0	507.9	.0	40.6	.6548	.6516	1328.4	1284.1	1.4017	.8350	1502.3	983.6
8	-9.920	-8.864	693.8	781.3	693.8	593.0	.0	509.4	.0	40.6	.6467	.6620	1369.1	1329.3	1.4307	.8568	1534.9	1011.9
9	-11.114	-10.253	684.2	789.9	684.2	592.4	.0	522.4	.0	41.3	.6370	.6560	1409.7	1354.6	1.4589	.8582	1566.9	1029.7

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	P12/ P11	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VΘ'-1 FT/SEC	VΘ'-2 FT/SEC
1	-1.39	3.22	17.07	55.86	40.68	48.91	.5186	.0539	.0117	1.9510	97.14	96.89	44.99	-10.98	-623.7	118.2
2	-1.25	3.35	17.21	48.98	41.23	50.65	.5375	.0445	.0103	1.8307	97.35	97.14	46.54	-2.44	-879.7	26.5
3	-1.04	3.07	16.24	43.30	41.77	51.53	.5532	.0466	.0111	1.8174	97.01	96.76	47.96	4.65	-727.0	-50.5
4	.07	3.54	12.92	28.96	43.09	52.74	.5627	.0985	.0144	1.7856	95.37	94.93	51.57	22.61	-856.3	-253.8
5	1.07	3.75	8.21	17.10	44.05	52.79	.5375	.0839	.0197	1.7686	92.04	91.40	55.53	38.49	-1040.1	-471.2
6	2.11	4.06	5.56	10.91	44.17	53.27	.4923	.1024	.0226	1.7675	89.03	88.19	59.34	48.42	-1205.9	-663.0
7	3.10	4.51	6.20	9.16	43.69	53.84	.4639	.1256	.0268	1.7730	85.95	84.80	62.16	53.00	-1329.4	-786.2
8	3.43	4.72	7.03	9.08	43.40	53.96	.4592	.1398	.0297	1.7870	84.30	82.99	63.12	54.13	-1369.1	-819.9
9	3.75	4.90	8.42	9.31	43.05	53.66	.4639	.1669	.0355	1.8000	81.47	79.90	64.08	54.77	-1409.7	-842.2

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.2016	1.7866	89.40	90.21	41.84

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(a) Continued. Run 0; speed code 0; point 0

(a-2) Stator 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PI2/ PI1	TI2/ TI1
1	18.345	15.124	1050.9	656.4	644.5	656.4	838.1	.0	52.4	.0	.9316	.5534	1.7118	1.1934
2	16.191	13.551	1014.0	655.9	651.2	655.9	777.2	.0	50.2	.0	.8854	.5540	1.7209	1.1640
3	14.174	12.160	984.0	659.0	656.6	659.0	738.2	.0	48.7	.0	.8696	.5573	1.7312	1.1922
4	8.777	7.835	913.2	656.1	640.4	656.1	646.7	.0	45.3	.0	.7932	.5553	1.7387	1.1895
5	2.734	2.673	848.0	654.2	623.6	654.2	574.6	.0	42.7	.0	.7316	.5526	1.7377	1.1945
6	-2.471	-2.139	812.8	652.5	613.0	662.5	526.7	.0	40.4	.0	.6960	.5583	1.7464	1.2003
7	-5.919	-5.659	806.5	670.5	624.0	670.5	510.8	.0	39.4	.0	.6967	.5629	1.7570	1.2109
8	-7.005	-6.832	810.0	673.5	626.3	673.5	513.0	.0	39.4	.0	.6881	.5640	1.7607	1.2173
9	-8.080	-8.016	819.3	680.8	627.7	680.3	526.6	.0	40.1	.0	.6932	.5577	1.7682	1.2267

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PI2/ PI1	%EFF-P STATIC-SI	%EFF-A TOT-SIG	%EFF-P TOT-SIG
1	-.17	1.94	12.32	52.38	51.02	61.80	.5238	.1753	.0359	.9248	77.73	83.04	84.81
2	-.66	1.74	11.22	50.20	52.64	62.28	.5035	.1478	.0314	.9400	80.09	86.42	87.40
3	-.81	1.97	10.38	48.72	53.49	62.94	.4901	.1227	.0271	.9526	82.41	88.27	89.12
4	-1.69	2.03	9.27	45.31	54.66	63.14	.4491	.0772	.0199	.9738	86.91	90.27	90.96
5	-2.84	2.21	9.31	42.66	54.80	62.80	.4125	.0583	.0159	.9826	87.95	88.33	89.18
6	-4.20	1.96	9.43	40.40	55.32	63.36	.3760	.0432	.0128	.9891	89.02	85.17	87.13
7	-5.26	1.62	10.54	39.35	55.96	63.80	.3678	.0458	.0143	.9876	87.30	82.80	84.08
8	-5.56	1.49	11.77	39.38	56.13	63.35	.3710	.0544	.0172	.9852	84.97	80.67	82.12
9	-5.53	1.52	13.31	40.11	55.90	64.09	.3772	.0644	.0206	.9823	82.32	77.26	78.98

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD IN.EI %	EFF-P INLET %
10723.	184.20	1.2016	1.7438	85.37	86.45

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(a) Continued. Run 0; speed code 0; point 0

(a-3) Rotor 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.670	11.039	709.0	1044.5	708.0	652.4	.0	815.7	.0	51.2	.5998	.8368	838.1	876.4	.9282	.5249	1095.6	655.2
2	10.975	9.826	714.9	1012.2	714.9	651.3	.0	774.3	.0	48.9	.6073	.8111	853.6	885.4	.9498	.5314	1118.1	683.1
3	9.957	8.554	724.6	992.8	724.6	652.0	.0	735.4	.0	48.3	.6186	.7873	884.0	915.2	.9727	.5417	1143.0	676.3
4	6.911	5.354	736.7	911.9	736.7	634.5	.0	654.9	.0	45.2	.6285	.7290	960.1	978.9	1.0325	.5588	1210.2	712.5
5	2.176	1.315	743.6	850.2	743.6	618.3	.0	593.6	.0	43.3	.6338	.6745	1066.2	1069.7	1.1072	.6239	1299.1	786.5
6	-2.535	-2.635	750.4	807.5	750.4	611.3	.0	526.9	.0	40.7	.6380	.6369	1172.6	1155.0	1.1937	.6974	1392.1	864.1
7	-6.132	-6.006	752.5	794.7	752.5	617.2	.0	500.5	.0	39.0	.6370	.6231	1254.4	1236.2	1.2383	.7545	1482.8	952.3
8	-7.249	-7.203	752.5	796.4	752.5	615.8	.0	505.5	.0	39.3	.6352	.6216	1281.9	1253.8	1.2547	.7522	1496.5	876.8
9	-8.267	-8.440	756.3	804.5	756.3	609.8	.0	524.7	.0	40.6	.6354	.6229	1309.4	1269.3	1.2704	.7572	1512.1	978.0

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHO/M-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-> TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	-.97	4.35	14.94	44.35	64.95	75.29	.5744	.1328	.0300	1.7462	90.79	90.04	43.65	5.29	-836.1	-50.8
2	-.56	4.56	14.23	39.73	65.93	76.48	.5707	.1283	.0294	1.7138	90.53	89.78	50.21	10.47	-859.6	-121.1
3	-.29	4.52	13.40	35.29	66.98	77.58	.5638	.1236	.0284	1.6944	90.35	89.61	50.65	15.36	-884.0	-179.8
4	.88	5.12	10.92	25.52	68.08	78.01	.5513	.1074	.0246	1.6586	90.48	89.78	52.52	27.00	-960.1	-324.0
5	1.27	4.49	7.69	16.92	68.25	78.08	.5216	.0839	.0186	1.6458	91.50	90.99	55.09	38.17	-1056.2	-486.1
6	1.46	3.76	4.95	11.18	68.69	78.35	.4816	.0770	.0165	1.6271	91.39	90.78	57.37	46.19	-1172.6	-638.2
7	1.98	3.54	5.05	8.95	68.70	79.00	.4543	.0826	.0175	1.6179	90.23	89.52	59.00	50.05	-1254.4	-738.3
8	2.20	3.65	5.87	8.65	68.56	78.28	.4567	.1003	.0213	1.6174	88.11	87.28	59.52	50.87	-1281.9	-758.3
9	2.26	3.51	6.85	8.57	68.54	76.59	.4715	.1345	.0290	1.6173	84.23	83.18	59.91	51.34	-1309.4	-764.5

IO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-> INLET %	WC1/A1 LBM/SEC SQFT
1.4364	2.8722	86.23	88.08	

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(a) Continued. Run 0; speed code 0; point 0

(a-4) Stator 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	8.192	.924	1068.5	654.0	700.4	654.3	806.9	.0	49.3	.0	.8598	.5032	1.6351	1.1905
2	7.194	.961	1035.0	648.1	694.9	648.1	767.1	.0	49.0	.0	.8319	.5005	1.6280	1.1855
3	6.253	.731	1004.7	643.3	690.7	643.3	729.6	.0	46.7	.0	.8069	.4981	1.6177	1.1804
4	3.674	.502	932.2	634.0	666.3	634.0	651.9	.0	44.4	.0	.7459	.4930	1.6104	1.1722
5	.756	-.026	871.8	631.3	648.1	631.3	583.1	.0	42.0	.0	.6932	.4911	1.6115	1.1671
6	-1.964	-.574	833.9	635.6	645.4	635.6	528.1	.0	39.3	.0	.6595	.4939	1.6034	1.1633
7	-4.074	-.877	829.1	644.4	659.2	644.1	502.9	.0	37.4	.0	.6523	.4988	1.5937	1.1634
8	-4.843	-.945	835.2	649.8	662.6	649.8	509.4	.0	37.6	.0	.6543	.5009	1.5904	1.1675
9	-5.711	-.999	848.8	658.2	664.4	658.2	528.2	.0	38.6	.0	.6601	.5033	1.5836	1.1756

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHO/M-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P STATIC-SI	%EFF-A TOT-STG	%EFF-P TOT-STG
1	.85	2.42	11.69	49.27	79.55	86.73	.5579	.1658	.0375	.9367	78.61	78.74	80.15
2	.64	2.68	11.13	48.01	80.30	86.74	.5444	.1477	.0341	.9461	80.22	79.98	81.29
3	.13	2.57	10.71	46.70	81.04	85.69	.5303	.1310	.0309	.9543	81.77	81.13	82.35
4	-1.11	2.84	10.30	44.42	80.94	86.46	.4948	.0944	.0236	.9708	85.22	84.16	85.18
5	-2.70	2.70	10.29	41.38	80.89	86.27	.4564	.0763	.0206	.9790	86.17	86.85	87.70
6	-4.70	1.56	10.02	39.30	81.53	86.52	.4191	.0579	.0165	.9854	87.86	87.85	88.62
7	-6.46	.28	10.26	37.39	82.93	86.74	.4018	.0602	.0177	.9850	86.58	86.54	87.39
8	-6.95	-.06	10.91	37.56	82.68	86.63	.4031	.0671	.0199	.9833	85.03	84.01	85.02
9	-7.21	-.10	12.06	38.58	81.62	86.22	.4114	.0823	.0246	.9792	81.89	79.28	80.57

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
10720.	184.20	1.4064	2.8000	83.83	85.96

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(a) Continued. Run 0; speed code 0; point 0

(a-5) Rotor 1 - SI units

SL	EPSI-1 RADIAN	EPSI-2 RADIAN	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VΘ-1 M/SEC	VΘ-2 M/SEC	B-1 RADIAN	B-2 RADIAN	M-1	M-2	U-1 M/SEC	U-2 M/SEC	M'-1	M'-2	V'-1 M/SEC	V'-2 M/SEC
1	.2944	.3234	190.7	319.5	190.7	187.9	.0	258.4	.0000	.9429	.5766	.3288	191.3	222.3	.8209	.5563	270.5	191.7
2	.2534	.2857	194.6	306.9	194.6	199.9	.0	241.1	.0000	.8044	.5913	.8883	208.9	233.0	.8630	.5502	284.0	190.1
3	.2454	.2530	198.6	296.8	198.6	189.5	.0	228.3	.0000	.8788	.6043	.8554	221.6	243.8	.9054	.5462	297.5	190.2
4	.1166	.1527	208.9	272.3	209.3	196.1	.0	198.8	.0000	.8192	.6391	.7767	264.0	275.1	1.0285	.5749	336.7	201.5
5	.0099	.0407	217.0	251.9	217.0	180.7	.0	175.5	.0000	.7712	.6653	.7111	317.0	319.2	1.1776	.6516	384.2	230.8
6	-.0917	-.0532	218.1	240.2	218.1	179.1	.0	160.1	.0000	.7291	.6687	.6731	367.5	362.2	1.3105	.7555	427.4	270.0
7	-.1487	-.1308	213.9	237.5	213.9	190.2	.0	154.8	.0000	.7087	.6598	.6616	404.9	394.9	1.4017	.8350	457.9	299.8
8	-.1714	-.1547	211.5	238.3	211.5	190.7	.0	155.3	.0000	.7082	.6467	.6520	417.3	405.1	1.4307	.8553	467.8	308.4
9	-.1940	-.1789	208.5	240.7	208.5	190.6	.0	159.2	.0000	.7207	.6370	.6660	429.6	415.9	1.4539	.8682	477.6	313.8

SL	INCS RADIAN	INCM RADIAN	DEV RADIAN	TURN RADIAN	RHOVM-1	RHO/M-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PI2/ PI1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 RADIAN	B'-2 RADIAN	VΘ'-1 M/SEC	VΘ'-2 M/SEC
1	-.0242	.0562	.2979	.9750	40.68	48.91	.5186	.0539	.0117	1.8510	97.14	96.89	.7852	-.1299	-191.9	36.0
2	-.0219	.0532	.3003	.8549	41.23	50.65	.5378	.0449	.0103	1.8307	97.36	97.14	.8123	-.0426	-208.8	8.1
3	-.0191	.0537	.2834	.7559	41.77	51.53	.5532	.0466	.0111	1.8174	97.01	96.76	.8370	.0812	-221.6	-15.4
4	.0012	.0618	.2256	.5055	43.09	52.71	.5627	.0585	.0144	1.7856	95.37	94.99	.9001	.3946	-264.0	-77.4
5	.0186	.0654	.1433	.2984	44.05	52.79	.5375	.0839	.0197	1.7686	92.04	91.40	.9703	.6718	-317.0	-143.6
6	.0368	.0708	.0970	.1905	44.17	53.27	.4923	.1024	.0226	1.7675	89.09	88.19	1.0356	.8451	-367.5	-202.1
7	.0541	.0787	.1082	.1599	43.69	53.84	.4639	.1256	.0268	1.7730	85.95	84.80	1.0843	.9250	-404.9	-239.6
8	.0598	.0823	.1228	.1585	43.40	53.96	.4532	.1398	.0297	1.7870	84.30	82.99	1.1016	.9431	-417.3	-249.9
9	.0654	.0854	.1470	.1526	43.05	53.66	.4638	.1669	.0355	1.8000	81.47	79.90	1.1185	.9559	-429.6	-255.7

TO/TO INLET	PO/PO INLET	EFF-AD IN.ET %	EFF-P INLET %	WCI/A1 KG/SEC SQM
1.2016	1.7866	89.40	90.21	204.16

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(a) Continued. Run 0; speed code 0; point 0

(a-6) Stator 1 - SI units

SL	EPSI-1 RADIAN	EPSI-2 RADIAN	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VM-1 M/SEC	VΘ-2 M/SEC	B-1 RADIAN	B-2 RADIAN	M-1	M-2	PI2/ PI1	TI2/ TI1
1	.3202	.2640	320.3	200.1	198.4	200.1	253.0	.0	.8142	.0000	.9316	.5534	1.7118	1.1984
2	.2926	.2367	309.0	199.9	199.9	199.9	236.9	.0	.8761	.0000	.8954	.5540	1.7209	1.1940
3	.2474	.2135	299.9	200.3	199.3	200.3	225.0	.0	.8503	.0000	.8656	.5573	1.7312	1.1922
4	.1532	.1367	277.4	200.0	195.2	200.0	197.1	.0	.7908	.0000	.7932	.5553	1.7387	1.1895
5	.0477	.0456	258.5	199.4	190.1	199.4	175.1	.0	.7445	.0000	.7316	.5526	1.7377	1.1935
6	-.0431	-.0373	247.7	201.9	188.7	201.9	160.5	.0	.7052	.0000	.6960	.5593	1.7464	1.2003
7	-.1033	-.0988	245.8	204.4	190.2	204.4	155.7	.0	.6870	.0000	.6867	.5629	1.7570	1.2109
8	-.1223	-.1192	246.9	205.3	191.1	205.3	156.4	.0	.6873	.0000	.6881	.5640	1.7607	1.2173
9	-.1410	-.1338	249.7	207.5	191.3	207.5	160.5	.0	.7000	.0000	.6932	.5677	1.7682	1.2287

SL	INCS RADIAN	INCM RADIAN	DEV RADIAN	TURN RADIAN	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PI2/ PI1	%EFF-P SIAIC-SI	%EFF-A TOT-STG	%EFF-P TOT-STG
1	-.0030	.0338	.2150	.8142	51.02	61.80	.5238	.1753	.0359	.9249	77.73	83.64	84.81
2	-.0115	.0304	.1958	.8761	52.64	62.28	.5095	.1478	.0314	.9400	80.09	86.42	87.40
3	-.0142	.0344	.1812	.8503	53.49	62.94	.4901	.1227	.0271	.9526	82.41	88.27	89.12
4	-.0295	.0354	.1618	.7908	54.66	63.14	.4491	.0772	.0189	.9738	86.91	90.27	90.98
5	-.0496	.0336	.1525	.7445	54.80	62.80	.4125	.0583	.0159	.9826	87.95	88.33	89.19
6	-.0732	.0341	.1646	.7052	55.32	63.36	.3780	.0432	.0128	.9891	88.02	86.17	87.19
7	-.0918	.0283	.1840	.6870	55.86	63.80	.3678	.0458	.0143	.9876	87.30	82.80	84.08
8	-.0971	.0260	.2054	.6873	56.13	63.85	.3710	.0544	.0172	.9852	84.97	80.67	82.12
9	-.0965	.0283	.2322	.7000	55.90	64.09	.3772	.0644	.0206	.9823	82.32	77.26	78.98

NCORR INLET RAD/SEC	WCORR INLET KG/SEC	TO/TO INLET	PO/PO INLET	EFF-AD IN.ET %	EFF-P INLET %
1122.50	83.537	1.2016	1.7438	85.37	86.45

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(a) Continued. Run 0; speed code 0; point 0

(a-7) Rotor 2 - SI units

SL	EPSI-1 RADIAN	EPSI-2 RADIAN	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VΘ-1 M/SEC	VΘ-2 M/SEC	B-1 RADIAN	B-2 RADIAN	M-1	M-2	U-1 M/SEC	U-2 M/SEC	M'-1	M'-2	V'-1 M/SEC	V'-2 M/SEC
1	.2037	.1927	215.9	318.3	215.8	138.8	.0	248.6	.0000	.9935	.5939	.8368	254.8	267.1	.9282	.5249	333.9	193.7
2	.1898	.1715	217.9	308.6	217.9	158.7	.0	236.0	.0000	.8686	.6073	.8111	252.[illegible]	272.9	.8488	.5314	340.8	202.1
3	.1738	.1510	220.9	299.6	220.8	178.7	.0	224.2	.0000	.8434	.6186	.7873	269.4	279.2	.8727	.5417	348.4	205.1
4	.1189	.0935	224.5	277.9	224.5	193.4	.0	199.6	.0000	.8002	.6295	.7280	292.6	293.4	1.0325	.5686	368.8	217.2
5	.0380	.0230	226.6	259.1	226.6	198.1	.0	177.8	.0000	.7565	.6338	.6745	324.7	325.0	1.1372	.6239	395.8	239.7
6	-.0453	-.0470	228.7	246.1	228.7	196.5	.0	160.6	.0000	.7107	.6380	.6369	357.4	355.1	1.1937	.6974	424.3	269.5
7	-.1070	-.1048	229.4	242.2	229.4	198.1	.0	152.6	.0000	.6804	.6370	.6231	382.3	377.6	1.2383	.7545	445.8	293.3
8	-.1265	-.1257	229.4	242.7	229.4	197.6	.0	154.1	.0000	.6864	.6352	.6216	390.7	385.2	1.2547	.7622	453.1	297.6
9	-.1443	-.1473	230.5	245.2	230.5	185.3	.0	159.9	.0000	.7091	.6354	.6229	399.1	392.9	1.2704	.7572	460.9	298.1

SL	INCS RADIAN	INCM RADIAN	DEV RADIAN	TURN RADIAN	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PIZ/ PII	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 RADIAN	B'-2 RADIAN	VΘ'-1 M/SEC	VΘ'-2 M/SEC
1	-.0169	.0759	.2608	.7742	64.95	75.29	.5744	.1328	.0300	1.7462	90.73	90.34	.8666	.0524	-254.8	-18.5
2	-.0098	.0736	.2484	.6835	65.93	76.48	.5707	.1289	.0294	1.7158	90.53	89.78	.8763	.1828	-262.0	-36.9
3	-.0051	.0606	.2338	.6160	66.98	77.58	.5638	.1236	.0284	1.6944	90.35	89.61	.8840	.2680	-269.4	-54.8
4	.0154	.0833	.1935	.4454	68.06	79.01	.5513	.1074	.0246	1.6586	90.43	89.78	.9167	.4713	-292.6	-98.7
5	.0221	.0785	.1340	.2953	68.25	78.08	.5216	.0833	.0186	1.6458	91.60	90.99	.9615	.6662	-324.7	-148.2
6	.0255	.0657	.0865	.1951	68.65	78.35	.4816	.0770	.0165	1.6271	91.39	90.78	1.0013	.8052	-357.4	-194.5
7	.0345	.0635	.0881	.1562	68.70	79.00	.4543	.0826	.0175	1.6179	90.20	89.52	1.0297	.8735	-382.3	-225.0
8	.0383	.0637	.1024	.1511	69.56	78.28	.4567	.1003	.0213	1.6174	88.11	87.28	1.0389	.8878	-390.7	-231.1
9	.0395	.0613	.1195	.1495	68.54	76.59	.4715	.1349	.0290	1.6173	84.28	83.18	1.0456	.8961	-399.1	-233.0

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 KG/SEC SQM
1.4064	2.8722	86.23	98.08	

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(a) Continued. Run 0; speed code 0; point 0

(a-8) Stator 2 - SI units

SL	EPSI-1 RADIAN	EPSI-2 RADIAN	V-1 M/SEC	V-2 M/SEC	VM-1 M/SEC	VM-2 M/SEC	VU-1 M/SEC	VU-2 M/SEC	B-1 RADIAN	B-2 RADIAN	M-1	M-2	PT2/ PT1	TT2/ TT1
1	.1430	.0151	325.7	199.3	213.5	199.3	246.9	.0	.6559	.0000	.8568	.5032	1.6361	1.1805
2	.1256	.0150	315.4	197.5	211.8	197.5	233.8	.0	.8373	.0000	.8319	.5005	1.6230	1.1805
3	.1091	.0138	306.2	196.1	210.5	196.1	222.4	.0	.8151	.0000	.8069	.4981	1.6177	1.1804
4	.0641	.0038	284.1	193.2	203.1	193.2	198.7	.0	.7753	.0000	.7459	.4930	1.5104	1.1722
5	.0132	-.0005	265.7	192.4	197.5	192.4	177.7	.0	.7327	.0000	.6932	.4911	1.0115	1.1671
6	-.0343	-.0130	254.2	193.7	196.7	193.7	161.0	.0	.6859	.0000	.6595	.4939	1.5034	1.1633
7	-.0711	-.0153	252.7	196.4	200.9	196.4	153.3	.0	.6525	.0000	.6523	.4928	1.5937	1.1634
8	-.0845	-.0155	254.5	198.0	201.8	198.0	155.0	.0	.6556	.0000	.6543	.5009	1.5804	1.1675
9	-.0997	-.0174	259.7	200.6	202.5	200.6	161.0	.0	.6734	.0000	.6601	.5033	1.5836	1.1756

SL	INCS RADIAN	INCM RADIAN	DEV RADIAN	TURN RADIAN	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-> STATIC-SI	%EFF-A TOT-STG	%EFF -P TOT-STG
1	.0149	.0423	.2041	.8599	79.53	86.73	.5579	.1658	.0375	.9367	78.61	78.74	80.15
2	.0111	.0458	.1942	.8379	80.30	85.74	.5444	.1477	.0341	.9461	80.22	79.98	81.23
3	.0022	.0466	.1869	.8151	81.04	86.69	.5303	.1310	.0309	.9543	81.77	81.13	82.35
4	-.0194	.0436	.1798	.7753	80.94	86.46	.4948	.0944	.0236	.9708	85.22	84.16	85.18
5	-.0471	.0471	.1794	.7327	80.89	86.27	.4564	.0763	.0206	.9790	86.17	86.85	87.70
6	-.0820	.0272	.1749	.6859	81.53	85.52	.4191	.0579	.0165	.9854	87.85	87.35	88.52
7	-.1127	.0049	.1790	.6525	82.93	86.74	.4018	.0602	.0177	.9850	86.58	86.54	87.39
8	-.1214	-.0011	.1905	.6556	82.68	85.63	.4031	.0671	.0199	.9933	85.03	84.01	85.02
9	-.1259	-.0018	.2106	.6734	81.62	86.22	.4114	.0923	.0246	.9792	81.89	79.26	80.57

NCORR INLET RAD/SEC	WCORR INLET KG/SEC	ID/IO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
1122.60	83.537	1.4064	2.8000	83.83	85.96

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(a) Concluded. Run 0; speed code 0; point 0

(a-9) Summary of design values for flow and pressure coefficients

	Rotor 1	Rotor 1 and stator 1	Stator 1 and rotor 2	Rotor 2	Rotor 2 and stator 2
Flow coefficient, φ	.6451	.6451	.5613	.6740	.6740
Pressure coefficient, ψ	.4565	.4359	.4455	.4661	.4407

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(b) Run 223; speed code 10; point 1

(b-1) Rotor 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	16.772	18.345	627.2	1081.4	627.2	641.6	.0	870.5	.0	53.6	.5802	.8613	628.2	727.7	.8212	.5843	887.7	857.3
2	14.435	16.027	642.5	1030.6	642.5	627.8	.0	817.3	.0	52.5	.5954	.8099	677.0	762.7	.8649	.5863	933.4	838.2
3	12.276	13.963	657.4	1006.3	657.4	641.1	.0	775.7	.0	50.4	.6101	.8856	725.2	797.8	.9095	.5845	978.8	841.5
4	8.490	8.117	693.6	926.6	693.6	831.6	.0	677.9	.0	47.0	.6465	.8087	864.2	903.8	1.0229	.5940	1108.1	870.8
5	.719	1.742	718.8	805.9	718.8	572.2	.0	567.5	.0	44.8	.6721	.6927	1037.6	1044.6	1.1802	.6404	1262.2	745.0
6	-4.574	-3.681	722.8	773.8	722.8	605.4	.0	481.9	.0	39.5	.6762	.6647	1203.0	1185.5	1.3130	.7973	1403.5	928.1
7	-9.318	-7.642	706.8	779.7	706.8	616.4	.0	477.5	.0	37.7	.6599	.6659	1325.2	1291.0	1.4022	.8716	1501.9	1020.6
8	-10.918	-9.000	697.8	770.9	697.8	593.6	.0	491.9	.0	39.6	.6508	.6544	1365.8	1326.1	1.4304	.8691	1533.8	1023.9
9	-11.988	-10.327	688.7	732.8	688.7	520.4	.0	516.0	.0	44.6	.6416	.6150	1406.3	1361.3	1.4597	.8331	1565.8	992.7

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	-1.55	3.06	15.38	57.39	48.76	50.54	.4921	.0278	.0060	1.0039	98.55	98.42	44.83	-12.56	-628.2	142.8
2	-1.52	2.78	14.67	51.26	41.41	50.50	.5392	.0616	.0141	1.0514	96.45	96.15	46.28	-4.97	-677.0	54.6
3	-1.37	2.74	13.56	45.65	42.01	52.76	.5441	.0390	.0093	1.0569	97.50	97.35	47.62	1.98	-725.2	-22.1
4	-.35	3.12	9.99	31.48	43.40	54.34	.5026	.0519	.0130	1.0281	95.97	95.63	51.15	19.67	-864.2	-225.8
5	.75	3.43	9.54	15.45	44.28	50.79	.5460	.0972	.0224	1.7373	90.57	89.83	55.28	39.83	-1037.6	-477.1
6	1.78	3.73	6.41	9.74	44.42	55.58	.4526	.0398	.0086	1.7556	95.48	95.13	59.02	49.27	-1203.0	-703.5
7	2.92	4.33	6.00	9.19	43.87	56.54	.4334	.0773	.0166	1.7764	90.93	90.19	61.98	52.79	-1325.2	-813.4
8	3.32	4.61	7.49	8.52	43.55	53.86	.4481	.1261	.0265	1.7627	85.30	84.12	63.01	54.49	-1365.8	-834.2
9	3.61	4.76	11.95	5.66	43.22	46.25	.4868	.2138	.0415	1.7088	75.26	73.37	63.95	58.29	-1406.3	-845.4

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.1966	1.7801	91.04	91.72	41.99

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(b) Continued. Run 223; speed code 10; point 1

(b-2) Stator 1 - U. S. customary units

SL	BETA-1 DEGREE	BETA-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VU-1 FT/SEC	VU-2 FT/SEC	U-1 DEGREE	U-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	18.214	14.785	1089.0	674.6	672.9	674.3	952.3	-20.9	51.9	-1.8	.9561	.5685	1.7497	1.2031
2	15.692	12.824	1039.4	679.3	680.0	679.3	803.0	3.6	50.7	.3	.9189	.5736	1.7628	1.1999
3	13.727	11.201	1018.3	690.1	693.0	690.0	764.2	7.8	48.7	.6	.8979	.5836	1.7787	1.1935
4	8.113	6.669	944.6	699.5	663.4	699.3	672.4	-18.7	45.4	-1.5	.8244	.5927	1.7907	1.1963
5	1.735	1.314	829.3	646.4	604.6	645.6	566.2	-30.8	43.1	-2.7	.7140	.5465	1.7177	1.1898
6	-2.907	-3.072	797.4	657.9	634.2	656.8	483.3	-37.8	37.3	-3.3	.6969	.5584	1.7221	1.1838
7	-5.577	-5.693	805.3	692.2	646.5	681.5	480.2	-29.7	36.6	-2.5	.6898	.5767	1.7512	1.1978
8	-6.514	-6.628	799.4	697.9	626.5	667.4	494.9	-26.7	38.4	-2.3	.6798	.5611	1.7363	1.2000
9	-7.712	-7.790	763.1	617.1	558.5	616.4	519.9	-29.9	43.0	-2.8	.6425	.5124	1.6812	1.2253

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P STATC-ST	%EFF-A TOT-STG	%EFF-P TOT-STG
1	-.66	1.45	10.56	53.65	52.81	64.12	.5360	.1682	.0344	.9242	79.17	88.25	88.35
2	-.16	2.24	11.52	50.39	52.72	65.06	.5029	.1152	.0245	.9516	84.50	87.82	88.73
3	-.85	1.93	11.02	48.09	54.88	66.42	.4797	.1029	.0227	.9582	85.22	90.05	90.90
4	-1.64	2.08	7.74	46.89	56.36	67.55	.4315	.0504	.0123	.9819	90.99	92.19	92.79
5	-2.40	2.65	6.58	45.82	52.95	61.66	.4136	.0416	.0114	.9381	90.81	88.04	88.89
6	-7.27	-1.12	6.14	40.62	57.44	62.82	.3700	.0722	.0214	.9605	80.82	91.36	91.96
7	-7.98	-1.10	8.04	39.15	58.42	64.87	.3519	.0520	.0162	.9358	84.37	87.74	88.64
8	-6.58	.47	9.47	40.66	55.98	62.90	.3728	.0576	.0182	.9647	83.66	81.77	83.10
9	-2.60	4.55	10.52	45.82	48.86	58.91	.4242	.0668	.0214	.9838	83.21	70.98	72.98

NCORR INLET RPM	WCORR INLET LBM/SEC	TC/TQ INLET	PO/PQ INLET	EFF-AD INLET %	EFF-P INLET %
10694.	184.89	1.1966	1.7401	87.17	88.10

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(b) Continued. Run 223; speed code 10; point 1

(b-3) Rotor 2 - U. S. customary units

SL	BETA-1 DEGREE	BETA-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.389	10.935	756.0	1073.4	759.8	646.0	-20.2	660.6	-1.5	37.6	.6424	.8758	934.1	874.3	.9692	.7118	1140.6	872.6
2	10.322	9.506	765.6	1040.4	769.6	797.6	3.6	668.1	.3	39.2	.6522	.8458	957.6	893.3	.9770	.6737	1148.9	828.7
3	9.211	8.328	778.4	997.1	778.3	774.8	7.5	627.7	.6	38.9	.6646	.8091	951.9	913.3	.9993	.6692	1170.6	925.6
4	5.928	5.288	788.9	863.9	788.7	728.4	-16.6	500.6	-1.3	34.4	.6749	.7135	957.8	978.5	1.0738	.7024	1155.1	870.1
5	1.127	1.263	738.4	840.6	735.8	719.3	-30.8	434.9	-2.4	31.2	.6282	.6779	1062.6	1067.1	1.1243	.7724	1317.9	957.7
6	-3.487	-2.940	729.4	770.0	729.4	657.2	-37.9	401.2	-3.0	31.4	.6234	.6167	1169.7	1162.2	1.2054	.8054	1410.3	1005.5
7	-5.583	-5.390	752.0	773.4	751.4	664.3	-30.1	396.0	-2.3	30.7	.6402	.6153	1251.4	1235.8	1.2648	.8518	1485.5	1070.8
8	-6.314	-6.294	744.7	801.5	744.2	688.7	-25.5	410.0	-2.1	30.7	.6305	.6363	1278.8	1280.9	1.2724	.8676	1502.9	1094.6
9	-7.482	-7.662	703.9	796.4	703.2	713.1	-30.2	354.7	-2.4	26.3	.5991	.6307	1306.3	1286.2	1.2638	.9291	1510.1	1173.1

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-P TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	-2.24	3.08	23.74	34.29	69.94	90.63	.3729	.1102	.0242	1.5012	90.32	89.67	48.38	14.09	-854.2	-213.7
2	-2.74	2.38	19.44	32.39	70.11	85.78	.4160	.1711	.0392	1.5467	84.47	83.50	48.03	18.68	-854.0	-225.1
3	-2.69	2.22	18.17	28.12	71.51	83.80	.4253	.1992	.0443	1.4912	80.51	79.40	48.25	20.13	-874.4	-285.4
4	-.59	3.64	17.02	17.94	72.59	79.63	.4147	.2263	.0487	1.3834	72.59	71.33	51.04	33.10	-876.4	-475.9
5	2.23	5.46	10.81	14.75	67.18	79.85	.3742	.1590	.0336	1.4202	79.53	78.51	56.06	41.31	-1093.4	-832.2
6	3.00	5.30	7.94	9.73	67.21	72.31	.3840	.2380	.0492	1.3512	66.28	64.84	58.91	49.18	-1207.6	-761.0
7	2.53	4.19	6.57	7.98	69.00	72.45	.3725	.2566	.0520	1.3338	62.10	60.56	59.55	51.57	-1281.4	-839.8
8	2.88	4.33	5.88	9.32	67.56	74.83	.3684	.2441	.0519	1.3650	64.52	63.37	60.21	50.88	-1305.7	-850.8
9	4.48	5.73	7.94	9.69	62.42	77.65	.3095	.1239	.0260	1.4136	81.01	80.07	62.12	52.43	-1336.4	-931.5

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.3628	2.4498	80.17	82.46	41.43

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(b) Concluded. Run 223; speed code 10; point 1

(b-4) Stator 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	9.934	1.500	1116.6	859.7	909.9	846.6	652.9	-149.5	36.0	-10.0	.9166	.6828	1.2305	1.1968
2	8.284	1.839	1081.3	820.6	854.7	808.3	642.4	-149.7	39.0	-9.3	.8940	.7304	1.2919	1.1591
3	7.493	1.999	1037.1	959.0	828.4	940.9	624.1	-151.9	37.2	-9.1	.9459	.7730	1.3335	1.1543
4	4.917	1.511	922.5	912.5	778.0	898.6	498.8	-158.8	32.8	-10.0	.7480	.7386	1.3003	1.1361
5	1.651	.733	878.4	888.6	763.4	877.5	434.6	-140.1	29.7	-9.1	.7114	.7204	1.3519	1.1333
6	-1.334	-.160	812.4	835.7	705.9	832.0	402.1	-78.7	29.7	-5.4	.6535	.6741	1.2987	1.1377
7	-4.424	-.794	820.8	838.3	717.9	837.9	397.9	-27.6	29.0	-1.9	.6561	.6712	1.2662	1.1409
8	-5.405	-.913	851.5	854.0	744.9	853.9	412.4	-10.8	29.0	-.7	.6784	.6805	1.2774	1.1483
9	-6.164	-.988	852.9	870.2	774.6	869.8	356.9	-27.2	24.8	-1.8	.6794	.6945	1.3332	1.1986

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-P TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P STATC-ST	%EFF -A TOT-STG	%EFF--P TOT-STG
1	-12.37	-10.80	1.70	46.04	94.05	80.10	.3940	.5434	.1211	.7705	-9.94	38.69	40.42
2	-9.36	-7.31	1.78	47.36	89.38	87.68	.3298	.4302	.0980	.8251	-20.34	47.40	49.23
3	-9.39	-6.84	1.60	46.30	87.29	93.46	.2647	.3059	.0711	.8829	-45.21	55.23	56.98
4	-12.71	-8.76	.28	42.84	82.93	91.01	.1939	.1886	.0465	.9411	-34.81	56.93	58.47
5	-15.02	-9.62	1.21	38.74	83.00	90.28	.1683	.1745	.0465	.94971074	-05	67.11	68.46
6	-24.34	-8.08	4.61	35.67	76.01	85.00	.1401	.1585	.0450	.9605	329.36	56.00	57.56
7	-14.80	-8.06	3.37	30.93	76.44	83.88	.1326	.2037	.0598	.9488	835.87	49.22	50.85
8	-15.47	-8.58	10.19	29.77	78.85	84.35	.1447	.2475	.0733	.93445234	.47	49.63	51.31
9	-20.96	-13.86	10.27	26.62	81.91	85.83	.1144	.2182	.0651	.9420	552.06	66.19	67.51

NCORR INLET RPM	WCORR INLET LBM/SEC	TC/TC INLET	PC/PC INLET	EFF-AD INLET %	EFF-P INLET %
10694.	184.89	1.3628	2.2764	72.81	75.71

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(c) Run 223; speed code 10; point 2

(c-1) Rotor 1 - U. S. customary units

SL	BETA-1 DEGREE	BETA-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	16.839	18.480	603.1	1067.7	603.1	607.4	.0	678.1	.0	55.4	.5565	.9459	629.2	720.9	.8042	.5542	871.6	636.5
2	14.509	16.296	618.0	1020.8	618.0	610.8	.0	819.0	.0	53.3	.5712	.8936	678.1	763.9	.8479	.5404	917.5	813.2
3	12.377	14.261	633.0	995.2	633.0	602.8	.0	779.3	.0	52.3	.5859	.8638	726.4	799.1	.8919	.5287	963.5	803.1
4	8.842	8.799	670.8	905.9	670.8	592.7	.0	685.1	.0	49.2	.6236	.7856	865.6	905.2	1.0181	.5483	1095.1	632.3
5	1.423	2.497	701.4	813.1	701.4	549.1	.0	599.7	.0	47.5	.6544	.6960	1039.3	1046.3	1.1698	.6059	1253.8	707.8
6	-3.709	-3.048	712.3	781.0	712.3	575.3	.0	528.1	.0	42.5	.6655	.6650	1204.9	1187.4	1.3078	.7462	1399.8	875.0
7	-8.535	-7.182	701.4	786.5	701.4	593.7	.0	515.2	.0	40.9	.6545	.6673	1327.3	1293.0	1.4007	.8298	1501.2	978.0
8	-10.250	-8.656	693.5	789.4	693.5	584.9	.0	530.2	.0	42.1	.6464	.6665	1368.0	1328.2	1.4297	.8354	1533.8	989.4
9	-11.526	-10.143	684.6	770.3	684.6	528.1	.0	560.7	.0	46.6	.6375	.6435	1408.5	1363.0	1.4592	.8023	1566.1	961.0

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-R TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	-.37	4.24	14.12	59.83	39.69	48.63	.5209	.0313	.0067	1.9041	98.44	98.31	46.01	-13.82	-629.2	149.2
2	-.35	3.95	14.58	52.51	40.38	50.15	.5495	.0313	.0072	1.8755	98.26	98.12	47.45	-5.06	-678.1	54.0
3	-.23	3.87	13.47	46.87	41.00	50.49	.5772	.0447	.0107	1.8504	97.30	97.07	48.76	1.98	-726.4	-19.8
4	.65	4.12	10.72	31.74	42.54	52.08	.5931	.0515	.0129	1.8428	96.17	95.85	52.15	20.41	-865.6	-220.1
5	1.46	4.14	8.86	16.84	43.68	50.09	.5783	.0389	.0207	1.8059	92.00	91.33	55.98	39.14	-1039.3	-446.6
6	2.17	4.12	8.00	10.54	44.06	54.45	.4981	.0502	.0110	1.8384	94.83	94.39	59.40	48.83	-1204.9	-659.2
7	3.09	4.50	5.75	9.61	43.68	56.71	.4690	.0678	.0146	1.8769	92.69	92.03	62.15	52.54	-1327.3	-777.2
8	3.45	4.74	6.66	9.48	43.40	55.55	.4787	.1049	.0225	1.8835	89.77	87.75	63.14	53.66	-1368.0	-798.0
9	3.75	4.90	10.20	7.54	43.07	49.32	.5168	.1659	.0378	1.8549	80.40	78.66	64.08	56.55	-1408.5	-802.8

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.2082	1.8473	91.99	92.63	41.52

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(c) Continued. Run 223; speed code 10; point 2

(c-2) Stator 1 - U. S. customary units

SL	BPSI-1 DEGREE	BPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VE-1 FT/SEC	VE-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	18.259	15.129	1066.1	619.4	630.5	618.2	859.7	-38.4	53.9	-3.5	.9443	.5169	1.7630	1.2053
2	16.074	13.642	1023.7	620.5	637.9	620.5	803.8	-5.1	51.9	-.5	.9025	.5210	1.7735	1.2004
3	14.049	12.228	991.5	622.9	627.3	622.9	767.8	1.6	50.9	.1	.8701	.5233	1.7825	1.1998
4	8.622	8.089	919.8	638.2	619.9	637.9	679.5	-19.9	47.6	-1.8	.7991	.5371	1.8101	1.1988
5	2.285	2.515	933.3	606.5	579.9	605.4	598.4	-36.2	45.9	-3.4	.7150	.5084	1.7727	1.2013
6	-2.665	-2.560	804.8	634.0	606.1	633.5	529.4	-26.9	41.2	-2.4	.6382	.5328	1.8013	1.2012
7	-5.575	-5.731	812.8	668.4	625.8	668.1	518.6	-19.2	39.7	-1.6	.6917	.5603	1.8429	1.2138
8	-6.543	-6.718	817.1	666.5	619.0	666.3	533.4	-16.0	40.8	-1.4	.6921	.5559	1.8403	1.2254
9	-7.769	-7.863	800.2	626.9	586.7	626.5	565.0	-23.2	45.0	-2.1	.6707	.5166	1.7931	1.2451

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P STATC-ST	%EFF -A TOT-STG	%EFF -P TOT-STG
1	1.38	3.49	8.80	57.45	50.54	60.65	.5843	.1690	.0346	.9260	80.22	85.60	86.68
2	1.02	3.42	10.75	52.34	51.94	61.43	.5550	.1325	.0281	.9457	83.61	88.68	89.53
3	1.31	4.09	10.53	50.70	52.30	61.95	.5364	.1074	.0237	.9582	85.95	89.92	90.59
4	.64	4.36	7.49	48.43	53.96	64.02	.4878	.0515	.0126	.9824	91.89	92.60	93.36
5	.39	5.44	5.89	49.31	52.26	60.23	.4762	.0629	.0172	.9819	89.59	88.19	89.08
6	-3.44	2.71	8.99	43.59	56.58	63.28	.4181	.0750	.0222	.9796	83.12	90.95	91.69
7	-4.93	1.95	9.89	41.34	59.88	66.62	.3856	.0657	.0205	.9820	82.72	89.18	90.06
8	-4.13	2.92	10.39	42.19	57.87	65.87	.3991	.0850	.0269	.9767	78.47	84.42	85.67
9	-.63	6.52	11.18	47.13	52.06	60.59	.4543	.1280	.0410	.9667	71.39	73.98	75.99

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
10712.	182.81	1.2082	1.7992	87.70	88.65

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(c) Continued. Run 223; speed code 10; point 2

(c-3) Rotor 2 - U. S. customary units

SL	BETI-1 DEGREE	BETI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.927	11.012	646.5	945.2	645.4	566.0	-37.4	757.0	-3.3	53.1	.5429	.7479	838.4	878.7	.9116	.4576	1085.6	578.3
2	11.405	9.856	654.9	932.1	654.9	547.9	-6.3	754.1	-.6	53.0	.5515	.7386	838.9	894.7	.9138	.4482	1085.2	565.7
3	10.762	8.798	665.2	919.1	665.2	556.0	1.2	726.9	.1	52.5	.5609	.7258	983.3	914.5	.9316	.4654	1104.8	586.8
4	7.871	5.789	702.7	871.5	702.5	603.8	-19.0	626.5	-1.6	46.1	.5949	.6910	959.4	978.1	1.0197	.5532	1204.4	697.7
5	2.569	1.674	691.5	824.4	690.6	593.1	-35.8	572.6	-3.0	44.0	.5842	.6484	1064.4	1065.6	1.0974	.6082	1299.0	773.4
6	-2.772	-2.555	717.5	790.8	717.0	582.0	-27.1	535.5	-2.2	42.6	.6077	.6195	1171.6	1164.1	1.1831	.6711	1396.7	856.7
7	-5.890	-5.593	748.2	782.7	748.0	579.7	-19.4	525.9	-1.5	42.1	.6323	.6083	1253.4	1237.8	1.2476	.7135	1476.3	918.0
8	-6.701	-6.569	748.6	779.4	748.5	577.2	16.0	523.7	1.2	42.1	.6295	.6028	1280.9	1262.9	1.2501	.7253	1497.4	937.7
9	-7.747	-7.857	715.4	766.0	715.0	589.8	-23.4	488.7	-1.9	39.5	.5943	.5888	1308.4	1288.3	1.2557	.7638	1511.6	993.6

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	2.84	9.15	21.44	41.67	62.56	68.80	.6262	.1949	.0432	1.6699	86.24	85.22	53.46	11.79	-872.9	-118.7
2	2.12	7.24	18.08	38.58	63.91	67.41	.6455	.1789	.0402	1.6700	87.21	86.26	52.89	14.33	-865.3	-140.6
3	2.10	7.01	16.63	34.48	64.87	69.49	.6268	.1482	.0335	1.6658	88.97	88.15	53.04	19.59	-882.1	-187.6
4	2.77	7.00	13.96	24.36	68.33	78.52	.5565	.0892	.0198	1.6561	92.22	91.65	54.41	30.04	-979.4	-349.7
5	4.07	7.30	9.43	17.98	65.09	79.08	.5363	.0636	.0138	1.6939	93.94	93.47	57.90	39.92	-1100.2	-496.3
6	3.20	5.50	5.95	11.91	68.80	78.96	.5109	.0869	.0193	1.6710	90.82	90.13	59.11	47.19	-1193.7	-628.6
7	2.49	4.15	5.77	8.74	71.65	78.39	.4989	.1262	.0263	1.6400	85.86	84.85	59.51	50.77	-1272.8	-711.9
8	2.59	4.04	6.90	8.02	71.09	77.61	.4938	.1264	.0263	1.6392	85.69	84.66	59.92	51.90	-1296.9	-739.1
9	4.02	5.27	8.97	8.19	66.41	78.67	.4678	.0597	.0122	1.6697	93.09	92.57	61.66	53.47	-1331.8	-799.6

TC/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.4180	2.9996	87.83	89.54	39.81

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(c) Concluded. Run 223; speed code 10; point 2

(c-4) Stator 2 - U. S. customary units

SL	BETA-1 DEGREE	BETA-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	8.196	1.263	961.7	509.3	603.4	509.2	748.8	8.0	51.4	.9	.7624	.3881	1.5984	1.1837
2	7.052	1.332	948.2	547.7	581.8	547.6	747.1	7.5	52.2	.8	.7527	.4193	1.6213	1.1819
3	5.879	1.212	931.1	568.6	589.4	568.5	720.9	5.8	50.8	.6	.7398	.4372	1.6312	1.1773
4	3.236	.804	888.4	589.7	630.9	589.7	625.4	-.4	44.8	-.0	.7057	.4500	1.6274	1.1982
5	.843	.353	844.5	606.6	621.2	606.5	572.0	11.3	42.6	1.1	.6685	.4683	1.6688	1.1724
6	-1.736	-.368	815.7	619.3	614.2	619.2	536.7	-5.2	41.2	-.5	.6405	.4792	1.6525	1.1741
7	-4.130	-.945	813.5	641.1	618.6	641.1	528.4	-.8	40.6	-.1	.6342	.4924	1.6245	1.1777
8	-5.090	-1.110	813.4	638.5	619.8	638.4	526.7	6.8	40.4	.6	.6311	.4880	1.6171	1.1777
9	-5.971	-1.135	805.1	615.6	637.2	615.6	492.1	3.5	37.8	.3	.6212	.4676	1.6360	1.1695

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-P TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P STATIC-ST	%EFF-A TOT-STG	%EFF -P TOT-STG
1	2.94	4.52	12.59	50.46	72.31	71.41	.6440	.1333	.0302	.9573	84.33	77.48	78.90
2	4.78	6.83	11.91	51.37	71.16	77.61	.6014	.0926	.0214	.9709	88.33	80.81	82.06
3	4.26	5.81	11.30	50.25	72.99	81.34	.5702	.0688	.0162	.9790	90.69	84.06	85.11
4	-.75	3.21	10.26	44.82	81.29	85.49	.5128	.0615	.0154	.9826	90.54	88.19	88.97
5	-2.04	3.35	11.35	41.57	81.97	87.53	.4611	.0550	.0148	.9859	90.03	90.74	91.38
6	-2.85	3.41	9.54	41.63	82.31	89.36	.4310	.0468	.0134	.9887	90.18	88.02	88.84
7	-3.30	3.45	10.18	40.63	82.42	91.20	.4040	.0391	.0115	.9907	90.69	83.07	84.18
8	-4.08	2.81	11.52	39.83	82.00	89.78	.4054	.0575	.0170	.9865	86.61	82.17	83.33
9	-8.01	-.90	12.39	37.46	83.46	85.32	.4166	.0928	.0277	.9788	80.06	88.85	89.59

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
10712.	182.81	1.4180	2.9514	86.33	88.21

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(d) Run 223; speed code 10; point 3

(d-1) Rotor 1 - U. S. customary units

SL	BETA-1 DEGREE	BETA-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	Vθ-1 FT/SEC	Vθ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	18.887	18.518	597.7	1057.1	597.7	589.1	.0	877.7	.0	56.2	.5512	.9348	630.0	729.8	.8009	.5372	608.4	607.4
2	14.585	16.372	611.2	1011.7	611.2	596.0	.0	817.5	.0	54.0	.5544	.8903	673.0	764.9	.8437	.5265	913.5	598.3
3	12.474	14.374	624.8	975.6	624.8	585.9	.0	780.1	.0	53.2	.5779	.8539	727.3	800.1	.8808	.5131	958.8	588.2
4	7.052	8.979	660.6	901.0	660.6	580.2	.0	689.3	.0	50.0	.6134	.7802	866.7	906.4	1.0119	.5364	1089.8	619.5
5	1.565	2.722	691.1	818.8	691.1	542.4	.0	613.4	.0	48.5	.6440	.6999	1040.6	1047.7	1.1640	.5939	1249.2	694.8
6	-3.501	-2.884	702.2	783.3	702.2	560.6	.0	547.1	.0	44.3	.6552	.6660	1206.5	1188.9	1.3026	.7245	1396.0	952.2
7	-8.249	-7.068	692.5	791.0	692.5	583.8	.0	533.8	.0	42.3	.6454	.6692	1329.0	1294.7	1.3937	.8113	1498.6	959.0
8	-9.995	-8.565	684.8	799.8	684.8	582.3	.0	548.2	.0	43.2	.6377	.6736	1369.8	1329.9	1.4260	.8211	1531.4	974.8
9	-11.371	-10.091	675.8	784.1	675.8	527.5	.0	580.1	.0	47.6	.6286	.6535	1410.3	1365.3	1.4547	.7983	1563.9	945.8

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-P TOTAL	LOSS-P TOTAL	P_{T2}/P_{T1}	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	Vθ'-1 FT/SEC	Vθ'-2 FT/SEC
1	-.07	4.54	13.83	60.42	39.44	47.48	.5396	.0395	.0084	1.9000	98.05	97.88	46.31	-14.12	-630.0	147.9
2	.02	4.32	14.59	52.87	40.05	49.30	.5631	.0319	.0073	1.9762	98.25	98.10	47.81	-5.05	-678.0	52.6
3	.18	4.29	13.55	47.21	40.65	49.43	.5923	.0478	.0114	1.8610	97.14	96.90	49.17	1.96	-727.3	-20.1
4	1.12	4.59	10.98	32.06	42.14	51.42	.6031	.0462	.0120	1.8541	96.48	96.18	52.62	20.56	-866.7	-217.1
5	1.89	4.57	8.42	17.71	43.31	49.94	.5901	.0869	.0204	1.8345	92.41	91.76	56.41	38.70	-1040.6	-434.3
6	2.55	4.50	5.97	10.96	43.71	52.41	.5172	.0637	.0139	1.9623	93.67	93.11	59.78	48.63	-1206.5	-641.8
7	3.41	4.92	5.62	10.05	43.36	56.29	.4844	.0754	.0163	1.9088	92.15	91.42	62.47	52.41	-1329.0	-760.9
8	3.75	5.04	6.21	10.23	43.08	55.95	.4913	.1060	.0230	1.9260	89.04	88.00	63.44	53.21	-1369.8	-761.8
9	4.05	5.20	9.64	8.40	42.73	49.87	.5301	.1856	.0383	1.9029	81.11	79.36	64.39	55.99	-1410.3	-785.1

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.2133	1.8709	91.78	92.46	41.11

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(d) Continued. Run 223; speed code 10; point 3

(d-2) Stator 1 - U. S. customary units

SL	EPSI-1	EPSI-2	V-1	V-2	VM-1	VM-2	VB-1	VB-2	B-1	B-2	M-1	M-2	PT2/ PT1	TT2/ TT1
	DEGREE	DEGREE	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	DEGREE	DEGREE				
1	18.284	15.187	1053.4	591.9	809.4	590.1	859.3	-46.2	54.9	-4.4	.9310	.4947	1.7628	1.2055
2	16.135	13.766	1012.4	595.1	818.0	595.0	803.4	-9.3	52.7	-.9	.8909	.4998	1.7743	1.2007
3	14.147	12.412	979.7	595.4	807.5	595.4	768.6	-1.1	51.8	-.1	.8580	.4989	1.7814	1.2002
4	8.814	8.422	912.6	616.6	804.6	616.4	683.6	-17.4	48.5	-1.6	.7915	.5178	1.8153	1.2004
5	2.646	2.957	837.1	591.0	771.1	589.9	612.0	-36.8	47.0	-3.6	.7170	.4938	1.7889	1.2001
6	-2.454	-2.241	805.9	622.7	790.5	622.2	548.4	-24.2	42.9	-2.2	.6870	.5211	1.8249	1.2066
7	-5.575	-5.573	816.6	660.2	815.4	660.0	536.7	-17.3	41.1	-1.5	.6929	.5512	1.8724	1.2215
8	-6.563	-6.621	825.7	665.5	815.8	665.4	551.5	-12.5	41.9	-1.1	.6985	.5531	1.8790	1.2231
9	-7.784	-7.818	813.4	628.3	785.6	628.0	584.6	-20.2	46.0	-1.8	.6801	.5159	1.8341	1.2539

SL	INCS	INCM	DEV	TURN	RHOVM-1	RHOVM-2	D-FAC	OMEGA-P TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P STATC-ST	%EFF -A TOT-STG	%EFF -P TOT-STG
	DEGREE	DEGREE	DEGREE	DEGREE									
1	2.30	4.41	7.88	59.29	49.25	58.56	.6070	.1686	.0344	.9278	80.81	85.51	86.59
2	1.81	4.21	10.33	53.55	50.94	59.59	.5763	.1342	.0285	.9459	83.85	88.71	89.56
3	2.25	5.03	10.28	51.88	51.11	59.86	.5601	.1123	.0248	.9571	85.81	89.51	90.31
4	1.54	5.26	7.65	50.16	53.16	62.57	.5085	.0617	.0151	.9791	90.73	92.60	93.18
5	1.48	5.53	5.74	50.54	52.00	59.40	.5046	.0858	.0234	.9752	85.47	87.63	88.58
6	-1.70	4.45	7.21	45.12	55.54	62.96	.4391	.0735	.0218	.9801	84.39	89.82	90.63
7	-3.48	3.40	9.04	42.64	58.48	66.76	.4046	.0693	.0213	.9812	83.17	88.53	89.48
8	-3.04	4.01	10.69	42.98	58.26	66.84	.4125	.0882	.0279	.9755	78.73	84.61	85.89
9	.40	7.56	11.46	47.89	52.62	61.71	.4682	.1358	.0435	.9638	71.02	74.42	76.47

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
10725.	181.02	1.2133	1.8184	87.25	88.26

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(d) Continued. Run 223; speed code 10; point 3

(d-3) Rotor 2 - U. S. customary units

SL	EPST-1 DEGREE	EPST-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	Vθ-1 FT/SEC	Vθ-2 FT/SEC	β-1 DEGREE	β-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.907	11.001	613.0	936.8	611.3	541.0	-44.9	764.8	-4.2	54.6	.5132	.7393	836.5	876.8	.8930	.4360	1072.7	552.5
2	11.497	9.844	622.8	926.1	622.7	520.9	-10.9	765.7	-1.0	55.6	.5229	.7319	860.0	895.9	.8989	.4243	1070.5	536.9
3	10.987	8.790	631.0	910.4	631.0	527.2	-1.5	742.2	-.1	54.5	.5303	.7201	884.4	915.7	.9141	.4390	1087.7	555.0
4	8.112	5.830	673.4	868.6	673.2	577.4	-16.6	648.9	-1.4	48.3	.5682	.6898	960.6	979.4	1.0011	.5259	1180.6	665.3
5	2.982	1.728	671.2	930.4	670.2	583.3	-36.3	591.0	-3.1	45.4	.5647	.6507	1065.7	1070.2	1.0052	.5916	1269.8	755.0
6	-2.501	-2.509	704.8	792.4	704.4	573.3	-24.3	547.0	-2.0	43.0	.5943	.6183	1173.1	1165.6	1.1714	.6581	1389.2	843.4
7	-5.701	-5.528	741.9	786.5	741.7	580.2	-17.5	531.0	-1.3	42.4	.6244	.6095	1295.0	1239.4	1.2396	.7096	1472.9	915.7
8	-6.586	-6.535	749.0	785.9	748.8	582.8	-12.7	527.3	-1.0	42.0	.6276	.6064	1282.5	1264.9	1.2538	.7250	1496.1	939.7
9	-7.692	-7.845	719.3	774.0	719.0	598.9	-20.4	490.2	-1.6	39.2	.5955	.5939	1310.0	1289.9	1.2521	.7666	1512.7	999.1

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	Pt2/ Pt1	%EFF-P TOT-ST	%EFF-A TOT-ST	β'-1 DEGREE	β'-2 DEGREE	Vθ'-1 FT/SEC	Vθ'-2 FT/SEC
1	4.58	9.80	21.29	43.58	60.13	65.89	.6592	.2157	.0479	1.8762	85.31	84.21	55.20	11.04	-881.5	-112.1
2	3.68	9.80	17.72	40.49	61.59	64.49	.6712	.2001	.0451	1.8781	86.24	85.21	54.45	13.96	-870.9	-130.2
3	3.67	8.58	16.19	36.46	62.45	66.29	.6542	.1683	.0381	1.8770	88.04	87.19	54.61	16.15	-885.9	-173.4
4	3.90	8.13	13.68	25.78	65.55	75.51	.5809	.1094	.0244	1.8658	90.91	90.23	55.53	29.76	-977.2	-330.5
5	4.89	8.12	8.91	19.31	65.16	78.27	.5510	.0793	.0173	1.7050	92.72	92.15	58.71	39.41	-1102.0	-479.3
6	3.61	5.91	5.92	12.36	69.57	78.40	.5196	.0937	.0197	1.8748	90.31	89.59	59.52	47.16	-1197.4	-618.6
7	2.69	4.35	5.61	9.10	72.06	79.37	.4998	.1234	.0258	1.8448	86.31	85.32	59.70	50.61	-1272.5	-708.4
8	2.54	3.93	6.36	8.31	72.21	79.40	.4920	.1218	.0255	1.8417	86.26	85.27	59.87	51.56	-1295.2	-737.1
9	3.86	5.10	8.55	8.45	67.78	81.04	.4540	.0545	.0113	1.8682	93.68	93.20	61.50	53.05	-1330.4	-799.6

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.4271	3.0432	87.27	89.07	39.08

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(d) Concluded. Run 223; speed code 10; point 3

(d-4) Stator 2 - U. S. customary units

SL	BETA1-1 DEGREE	BETA1-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VU-1 FT/SEC	VU-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	8.237	1.307	950.5	473.3	575.4	473.3	756.5	3.5	53.0	.4	.7512	.3584	1.6087	1.1874
2	7.114	1.417	939.5	509.9	564.3	509.9	758.6	3.0	54.0	.3	.7436	.3888	1.6257	1.1960
3	5.940	1.325	924.0	536.5	558.5	536.5	736.1	2.5	52.9	.3	.7320	.4108	1.6388	1.1820
4	3.206	.860	883.7	564.9	603.3	564.9	645.7	.1	47.0	.0	.6996	.4350	1.6354	1.1729
5	.744	.366	849.3	593.7	610.5	593.6	590.4	11.3	44.0	1.1	.6668	.4562	1.6734	1.1772
6	-1.877	-.393	818.9	613.1	605.5	613.1	548.3	-3.5	42.2	-.3	.6390	.4714	1.6559	1.1760
7	-4.299	-.989	817.1	640.0	618.9	640.0	533.5	.8	40.8	.1	.6351	.4900	1.6268	1.1778
8	-5.213	-1.139	819.8	640.8	625.2	640.8	530.3	6.9	40.4	.6	.6345	.4884	1.6160	1.1769
9	-6.037	-1.153	813.1	621.2	646.1	621.1	493.6	7.0	37.5	.6	.6261	.4708	1.6322	1.1668

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-P TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P STATC-ST	%EFF-A TOT-STG	%EFF-P TOT-STG
1	4.55	5.12	12.12	52.54	69.51	67.19	.6805	.1318	.0298	.9588	85.08	76.87	78.35
2	6.64	8.68	11.47	53.67	69.09	73.07	.6414	.1009	.0233	.9689	87.89	79.49	80.83
3	6.34	8.89	10.98	52.66	69.69	77.60	.6066	.0761	.0179	.9771	90.23	82.72	83.87
4	1.45	5.40	10.31	46.97	78.25	82.78	.5439	.0661	.0166	.9815	90.35	86.66	87.55
5	-.64	4.76	11.37	42.96	81.12	86.58	.4850	.0693	.0187	.9821	89.13	88.79	89.57
6	-1.83	4.43	9.69	42.49	81.82	89.38	.4428	.0481	.0137	.9885	90.17	87.42	88.28
7	-3.03	3.71	10.33	40.74	83.43	92.15	.4093	.0450	.0132	.9893	89.84	83.27	84.37
8	-4.13	2.76	11.53	39.77	83.60	91.28	.4086	.0657	.0195	.9844	84.99	82.40	83.55
9	-8.30	-1.20	12.71	36.85	85.83	87.30	.4145	.0983	.0293	.9773	79.00	89.29	90.01

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
10725.	181.02	1.4271	2.9898	85.66	87.66

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(e) Run 225; speed code 10; point 3

(e-1) Rotor 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VU-1 FT/SEC	VU-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	16.693	18.407	625.5	1085.7	625.5	651.1	.0	868.8	.0	53.2	.5785	.9658	629.6	729.3	.8208	.5924	887.5	665.9
2	14.283	16.135	639.9	1033.4	639.9	633.6	.0	816.5	.0	52.2	.5927	.9127	678.5	764.3	.8639	.5614	932.6	635.7
3	12.074	14.001	654.1	1005.1	654.1	645.3	.0	770.7	.0	50.1	.6069	.8848	726.8	799.6	.9072	.5686	977.8	645.9
4	6.323	8.272	690.1	910.9	690.1	621.5	.0	666.0	.0	47.0	.6430	.7925	866.1	905.7	1.0319	.5794	1107.4	666.1
5	.680	1.763	718.1	800.0	718.1	573.6	.0	557.7	.0	44.2	.6714	.6881	1039.8	1046.9	1.1815	.6484	1263.7	753.9
6	-4.247	-3.794	723.9	763.0	723.9	593.9	.0	479.0	.0	38.9	.6773	.6549	1205.6	1168.0	1.3157	.7938	1406.3	924.9
7	-8.726	-7.719	709.0	785.7	709.0	626.9	.0	473.6	.0	37.0	.6621	.6718	1328.0	1293.8	1.4059	.8827	1505.4	1032.3
8	-10.343	-9.053	699.7	785.0	699.7	616.1	.0	486.5	.0	38.2	.6527	.6679	1368.8	1329.0	1.4339	.8880	1537.2	1043.7
9	-11.583	-10.356	689.6	752.8	689.6	548.7	.0	515.3	.0	43.1	.6424	.6331	1409.3	1364.3	1.4618	.8501	1569.0	1010.8

SL	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	-1.49	3.19	15.83	57.07	40.68	51.20	.4819	.0225	.0049	1.8975	98.82	98.72	44.95	-12.11	-629.6	139.6
2	-1.34	2.95	14.94	51.15	41.29	50.84	.5328	.0637	.0146	1.8512	96.34	96.02	46.44	-4.70	-678.5	52.1
3	-1.19	2.92	14.15	45.24	41.88	52.96	.5379	.0432	.0103	1.8491	97.28	97.05	47.81	2.57	-726.8	-28.9
4	-.14	3.31	11.42	30.24	43.27	53.16	.5635	.0713	.0177	1.7949	94.39	93.92	51.35	21.10	-866.1	-239.7
5	.84	3.52	10.18	14.90	44.26	50.70	.5368	.0990	.0226	1.7208	90.26	89.51	55.36	40.47	-1039.8	-489.2
6	1.79	3.74	7.18	8.98	44.46	54.09	.4544	.0584	.0125	1.7300	93.32	92.81	59.02	50.04	-1205.6	-709.0
7	2.86	4.27	5.76	9.37	43.95	57.39	.4250	.0723	.0156	1.7776	91.52	90.83	61.92	52.56	-1328.0	-820.2
8	3.24	4.55	6.75	9.20	43.62	55.94	.4346	.1116	.0239	1.7753	87.00	85.94	62.95	53.75	-1368.8	-842.4
9	3.68	4.75	10.68	6.91	43.25	48.78	.4756	.2028	.0407	1.7272	76.70	74.88	63.94	57.03	-1409.3	-848.9

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.1954	1.7683	90.47	91.19	42.01

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(e) Continued. Run 225; speed code 10; point 3

(e-2) Stator 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	Vθ-1 FT/SEC	Vθ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/PT1	TT2/TT1
1	18.267	14.926	1090.7	690.3	682.5	690.1	850.7	-16.0	51.5	-1.3	.9710	.5826	1.7484	1.2032
2	15.986	13.168	1042.8	692.9	666.2	692.8	802.2	8.3	50.4	.7	.9223	.5857	1.7598	1.2001
3	13.844	11.504	1017.9	698.3	677.9	698.2	759.3	12.9	48.3	1.0	.8978	.5913	1.7722	1.1976
4	8.199	6.878	930.5	692.5	655.3	692.3	660.6	-18.9	45.2	-1.6	.8116	.5872	1.7694	1.1933
5	1.787	1.142	824.0	690.1	607.8	689.6	556.4	-27.1	42.5	-2.4	.7108	.5916	1.7002	1.1871
6	-3.108	-3.795	788.4	652.1	625.4	650.9	480.2	-39.9	37.5	-3.5	.6787	.5533	1.7075	1.1829
7	-5.894	-6.679	811.6	694.1	657.0	693.5	476.5	-29.4	36.0	-2.4	.6961	.5877	1.7510	1.1967
8	-6.776	-7.512	811.5	693.7	646.8	693.4	490.0	-22.6	37.2	-1.9	.6925	.5846	1.7469	1.2074
9	-7.867	-8.372	781.7	653.8	584.2	653.4	519.3	-23.2	41.7	-2.0	.6594	.5445	1.6952	1.2255

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/PT1	BEFF-P STATC-ST	BEFF-A TOT-STG	BEFF-P TOT-STG
1	-1.10	1.01	11.00	52.77	53.45	65.08	.5223	.1724	.0353	.9217	78.19	85.10	86.21
2	-.44	1.96	11.90	49.73	53.05	65.82	.4903	.1168	.0248	.9506	83.93	87.53	88.46
3	-1.22	1.56	11.43	47.26	55.09	66.73	.4689	.1006	.0222	.9591	85.24	89.84	90.61
4	-1.79	1.93	7.71	46.77	55.30	66.44	.4279	.0354	.0086	.9876	93.53	91.55	92.18
5	-3.06	2.01	6.88	44.88	52.96	60.75	.4139	.0425	.0116	.9879	90.78	87.49	88.36
6	-7.04	-.90	5.92	41.06	56.14	61.93	.3701	.0521	.0154	.9862	85.96	90.25	90.93
7	-8.61	-1.73	8.11	38.45	59.23	65.67	.3407	.0541	.0169	.9850	82.97	88.19	89.06
8	-7.73	-.68	9.90	39.09	57.82	65.02	.3472	.0587	.0186	.9839	81.62	83.34	84.57
9	-3.90	3.25	11.27	43.77	51.12	59.85	.3881	.0733	.0235	.9814	79.00	72.12	74.07

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
10718.	184.95	1.1954	1.7312	86.84	87.80

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(e) Continued. Run 225; speed code 10; point 3

(e-3) Rotor 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	V^{θ}-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.588	11.007	752.7	1015.6	752.5	739.0	-15.6	696.7	-1.2	43.2	.6393	.8185	835.9	876.2	.9652	.6129	1136.4	760.5
2	10.712	9.785	762.2	997.4	762.2	718.0	8.1	692.2	.6	43.8	.6490	.8040	859.4	895.2	.9729	.6015	1142.7	746.1
3	9.749	8.642	773.6	972.1	773.5	710.0	12.6	664.0	.9	43.0	.6603	.7836	883.8	915.0	.9943	.6070	1165.0	753.1
4	6.411	5.443	783.0	893.7	782.8	707.5	-18.7	546.0	-1.4	37.6	.6703	.7189	959.9	978.7	1.0728	.6671	1253.1	829.3
5	1.117	1.207	741.4	821.0	740.9	658.2	-27.2	490.7	-2.1	36.7	.6336	.6567	1064.9	1069.4	1.1278	.7011	1319.7	876.5
6	-4.227	-3.163	744.0	777.6	742.9	644.0	-39.9	435.8	-3.1	34.1	.6370	.6200	1172.3	1164.7	1.2174	.7755	1421.7	972.7
7	-7.402	-6.444	766.0	769.2	765.5	640.0	-29.4	426.7	-2.2	33.7	.6534	.6085	1254.1	1238.5	1.2747	.8178	1494.4	1033.8
8	-8.183	-7.523	758.4	755.6	758.1	626.7	-22.8	422.2	-1.7	33.9	.6433	.5945	1281.6	1263.5	1.2796	.8254	1508.7	1049.1
9	-8.866	-8.644	717.3	704.4	716.9	577.1	-23.4	404.0	-1.9	34.9	.6010	.5492	1309.1	1288.9	1.2679	.8237	1513.1	1056.5

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	$RHOV_{M-1}$	$RHOV_{M-2}$	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/PT1	EFF-P TOT-ST	EFF-A TOT-ST	d'-1 DEGREE	B'-2 DEGREE	VB'_{-1} FT/SEC	VB'_{-2} FT/SEC
1	-2.19	3.13	23.23	34.85	68.71	82.81	.4760	.1403	.0309	1.6093	88.26	87.45	48.43	13.58	-851.5	-179.5
2	-2.67	2.45	19.47	32.39	69.62	81.59	.4889	.1390	.0311	1.5973	88.05	87.24	48.10	15.71	-851.3	-203.0
3	-2.57	2.34	17.44	28.97	71.03	81.74	.4890	.1383	.0311	1.5754	87.45	86.62	48.37	19.39	-871.1	-251.0
4	-.30	3.93	15.32	19.94	71.58	83.95	.4548	.1076	.0236	1.5362	88.45	87.74	51.34	31.40	-978.6	-432.6
5	2.09	5.25	10.83	14.52	66.91	79.50	.4480	.0813	.0173	1.5585	90.68	90.08	55.84	41.32	-1092.1	-578.8
6	2.69	4.92	7.30	9.99	67.50	78.17	.4210	.1146	.0235	1.5193	85.31	84.43	58.53	48.54	-1212.2	-728.9
7	2.19	3.85	6.72	7.49	69.77	76.45	.4091	.1595	.0326	1.4704	78.21	77.00	59.21	51.72	-1283.5	-811.8
8	2.50	3.95	8.27	6.56	68.67	73.99	.4034	.1584	.0319	1.4633	78.07	76.87	59.83	53.27	-1304.4	-841.3
9	4.04	5.28	12.34	4.85	63.69	66.87	.3984	.1490	.0280	1.4524	78.93	77.81	61.68	56.83	-1332.5	-885.0

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
1.3753	2.6432	85.02	86.89	41.63

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(e) Concluded. Run 225; speed code 10; point 3

(e-4) Stator 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	Vθ-1 FT/SEC	Vθ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	8.328	1.064	1051.3	742.9	794.1	742.9	689.0	6.2	41.2	.5	.8514	.5810	1.4873	1.1655
2	7.377	1.043	1030.9	777.0	769.7	777.0	685.8	5.7	41.9	.4	.8347	.6110	1.5170	1.1633
3	6.386	.896	1004.3	781.0	757.8	781.0	659.0	.6	41.1	.0	.8128	.6163	1.5161	1.1593
4	3.783	.404	922.8	757.4	745.7	757.4	543.6	-10.7	36.1	-.8	.7448	.6007	1.5070	1.1479
5	1.110	-.236	848.3	720.9	692.2	720.9	490.3	-6.9	35.3	-.6	.6805	.5711	1.5357	1.1492
6	-1.405	-.910	805.4	699.3	676.6	699.1	436.8	-17.6	32.8	-1.4	.6439	.5535	1.5024	1.1494
7	-3.447	-1.217	801.6	685.3	677.5	685.2	428.5	-9.6	32.3	-.8	.6362	.5380	1.4483	1.1503
8	-4.270	-1.254	793.1	663.3	669.6	663.3	425.0	-1.4	32.4	-.1	.6263	.5176	1.4383	1.1482
9	-5.260	-1.217	748.9	603.5	629.0	603.5	406.5	1.9	32.9	.2	.5862	.4668	1.4255	1.1438

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P STATC-ST	%EFF-A TOT-STG	%EFF -P TOT-STG
1	-7.23	-5.66	12.17	40.70	86.86	89.43	.4396	.2017	.0456	.9238	67.64	72.08	73.59
2	-5.48	-3.44	11.55	41.47	85.55	94.83	.3989	.1396	.0322	.9487	74.29	76.92	78.22
3	-5.43	-2.89	10.75	41.10	85.46	96.24	.3768	.1083	.0255	.9618	78.07	78.77	79.97
4	-9.39	-5.43	9.49	36.95	86.98	94.72	.3287	.0618	.0155	.9810	84.29	83.59	84.50
5	-9.37	-3.97	9.73	35.87	82.41	90.10	.3076	.0547	.0147	.9855	83.12	86.88	87.65
6	-11.16	-4.89	8.58	34.29	81.00	87.06	.2928	.0430	.0123	.9896	84.76	82.06	83.05
7	-11.51	-4.77	9.46	33.13	79.67	83.70	.3065	.0619	.0182	.9853	79.97	73.82	75.14
8	-12.07	-5.18	10.80	32.56	77.74	79.95	.3205	.0737	.0218	.9831	78.03	73.38	74.70
9	-12.86	-5.74	12.24	32.76	71.54	71.38	.3540	.0857	.0256	.9824	77.71	73.64	74.92

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
10718.	184.95	1.3753	2.5869	82.87	84.97

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(f) Run 225; speed code 10; point 4

(f-1) Rotor 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	Vθ-1 FT/SEC	Vθ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	16.715	18.425	624.4	1084.4	624.4	652.1	.0	866.3	.0	53.1	.5774	.9646	629.7	729.4	.8201	.5928	886.8	666.3
2	14.319	16.178	639.9	1035.6	639.9	640.2	.0	814.0	.0	51.8	.5927	.9152	678.6	764.5	.8640	.5674	932.7	642.1
3	12.140	14.070	654.7	1005.2	654.7	642.1	.0	773.3	.0	50.3	.6075	.8845	726.9	799.7	.9078	.5655	978.3	642.7
4	6.388	8.391	691.3	930.8	691.3	636.1	.0	679.5	.0	46.9	.6442	.8105	866.2	905.8	1.0328	.5879	1108.3	675.2
5	.581	1.976	717.0	808.6	717.0	569.8	.0	574.1	.0	45.2	.6703	.6947	1040.0	1047.0	1.1809	.6360	1263.2	740.5
6	-3.927	-3.633	722.6	783.2	722.6	609.3	.0	492.1	.0	38.9	.6759	.6723	1205.8	1188.2	1.3150	.7941	1405.7	925.1
7	-8.796	-7.631	707.6	790.8	707.6	626.7	.0	482.3	.0	37.5	.6607	.6755	1328.2	1294.0	1.4052	.8760	1505.0	1025.5
8	-10.468	-9.006	698.5	788.3	698.5	610.8	.0	498.4	.0	39.1	.6515	.6695	1369.0	1329.2	1.4334	.8757	1536.9	1031.1
9	-11.692	-10.339	689.0	756.4	689.0	544.3	.0	525.2	.0	43.9	.6419	.6352	1409.5	1364.5	1.4616	.8400	1568.9	1000.3

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B /TOTAL	LOSS-P TOTAL	PT2/ PT1	EFF-P TOT-ST	EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	-1.36	3.25	16.07	56.89	40.64	51.00	.4804	.0300	.0082	1.8847	98.01	97.84	45.01	-11.88	-629.7	137.0
2	-1.35	2.95	15.21	50.88	41.30	51.14	.5256	.0669	.0153	1.8458	96.13	95.80	46.45	-4.43	-678.6	49.6
3	-1.20	2.91	13.94	45.44	41.91	52.37	.5423	.0629	.0150	1.8383	96.04	95.70	47.79	2.35	-726.9	-26.4
4	-.20	3.27	9.92	31.70	43.32	54.31	.5592	.0661	.0166	1.8203	94.88	94.45	51.30	19.60	-866.2	-226.3
5	.88	3.56	9.42	15.71	44.22	50.13	.5516	.1186	.0274	1.7278	88.54	87.64	55.41	39.70	-1040.0	-473.0
6	1.83	3.78	5.93	10.27	44.41	55.65	.4567	.0546	.0119	1.7607	93.95	93.47	59.06	48.79	-1205.8	-696.1
7	2.92	4.33	5.48	9.70	43.90	57.46	.4315	.0771	.0167	1.7897	91.08	90.34	61.98	52.27	-1328.2	-811.7
8	3.31	4.60	6.60	9.40	43.58	55.44	.4456	.1234	.0265	1.7842	85.85	84.68	63.00	53.60	-1369.0	-830.8
9	3.63	4.78	10.59	7.03	43.23	48.42	.4847	.2104	.0423	1.7366	76.14	74.25	63.97	56.94	-1409.5	-839.3

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.1994	1.7788	89.65	90.44	41.97

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(f) Continued. Run 225; speed code 10; point 4

(f-2) Stator 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VΘ-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/PT1	TT2/TT1
1	18.283	14.997	1088.1	677.9	681.5	677.4	848.3	-25.4	51.4	-2.1	.9686	.5716	1.7417	1.2027
2	16.039	13.339	1043.6	680.4	670.5	680.4	799.8	1.9	50.2	.2	.9235	.5746	1.7534	1.1996
3	13.916	11.768	1016.6	687.0	673.1	687.0	761.9	8.2	48.6	.7	.8962	.5809	1.7673	1.1984
4	8.336	7.401	949.1	697.7	668.3	697.5	673.9	-17.0	45.2	-1.4	.8286	.5909	1.7860	1.1973
5	1.937	1.815	832.1	646.9	603.5	646.1	572.9	-31.7	43.5	-2.8	.7166	.5463	1.7163	1.1927
6	-3.068	-3.520	808.2	665.0	640.3	664.0	493.2	-36.9	37.6	-3.2	.6958	.5638	1.7282	1.1876
7	-5.721	-6.453	817.1	698.9	657.6	698.3	485.1	-27.8	36.5	-2.3	.7001	.5912	1.7637	1.2002
8	-6.629	-7.319	815.5	692.9	642.9	692.5	501.7	-24.3	38.0	-2.0	.6948	.5827	1.7531	1.2122
9	-7.780	-8.236	786.0	653.3	581.1	652.7	529.2	-26.9	42.4	-2.4	.6621	.5431	1.7030	1.2298

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/PT1	ΣEFF-P STATC-ST	ΣEFF-A TOT-STG	ΣEFF-P TOT-STG
1	-1.13	.98	10.19	53.55	53.14	64.05	.5341	.1672	.0342	.9244	79.26	84.71	85.63
2	-.70	1.70	11.38	49.99	53.22	64.82	.5036	.1180	.0250	.9501	84.23	87.13	88.09
3	-.91	1.87	11.06	47.94	54.41	65.81	.4815	.0950	.0210	.9615	86.43	89.01	89.83
4	-1.76	1.96	7.88	46.63	56.32	67.22	.4367	.0474	.0116	.9829	91.70	91.27	91.94
5	-2.01	3.04	6.50	46.30	52.35	61.49	.4171	.0201	.0055	.9945	95.69	86.53	87.49
6	-6.97	-.81	6.24	40.82	57.64	63.34	.3726	.0700	.0207	.9807	81.69	90.12	90.83
7	-8.15	-1.27	8.26	38.75	59.35	66.29	.3419	.0521	.0162	.9855	83.62	87.89	88.79
8	-6.91	.14	9.75	40.05	57.45	64.99	.3568	.0649	.0206	.9821	80.35	82.01	83.35
9	-3.21	3.94	10.93	44.79	50.86	59.90	.3977	.0764	.0245	.9805	78.74	71.42	73.44

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
10719.	184.80	1.1994	1.7383	85.78	86.82

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(f) Continued. Run 225; speed code 10; point 4

(f-3) Rotor 2 - U. S. customary units

SE	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.727	11.004	732.9	981.1	732.5	657.7	-25.0	728.0	-1.9	47.7	.6214	.7838	836.0	876.3	.9584	.5387	1130.4	674.2
2	11.037	9.817	742.3	949.7	742.3	619.9	1.7	719.5	.1	49.1	.6308	.7583	859.5	895.3	.9640	.5145	1134.4	644.4
3	10.256	8.740	755.6	930.5	755.5	626.7	8.2	687.8	.6	47.5	.6434	.7437	883.9	915.2	.9849	.5320	1156.6	666.7
4	7.214	5.690	785.5	887.1	785.4	670.2	-16.6	581.2	-1.2	40.9	.6715	.7091	960.1	978.8	1.0713	.6229	1253.3	779.3
5	2.078	1.667	749.0	819.0	748.3	620.8	-31.4	534.2	-2.4	40.7	.6390	.6494	1065.1	1069.6	1.1325	.6500	1327.5	819.7
6	-4.017	-3.106	755.3	782.5	754.9	605.6	-37.0	495.6	-2.8	39.3	.6462	.6180	1172.4	1164.9	1.2196	.7129	1425.4	902.6
7	-7.053	-6.235	771.1	773.1	770.6	600.5	-27.9	486.9	-2.1	39.0	.6571	.6057	1254.3	1238.7	1.2748	.7538	1496.0	962.1
8	-7.812	-7.201	760.7	758.6	760.3	588.6	-24.7	478.5	-1.9	39.0	.6441	.5909	1281.8	1263.7	1.2798	.7645	1511.6	981.4
9	-8.543	-8.441	721.6	721.5	721.1	559.1	-27.3	456.0	-2.2	39.1	.6038	.5576	1309.3	1289.1	1.2707	.7755	1518.7	1003.4

SE	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	-1.10	4.22	22.30	36.88	67.35	77.42	.5579	.1254	.0277	1.6690	90.18	89.45	49.53	12.65	-861.0	-148.4
2	-1.67	3.45	19.52	33.34	68.50	73.88	.5815	.1366	.0305	1.6405	88.96	88.17	49.10	15.76	-857.8	-175.8
3	-1.71	3.20	17.91	29.36	69.63	75.85	.5646	.1147	.0257	1.6274	90.22	89.52	49.23	19.86	-875.7	-227.3
4	-.40	3.83	14.56	20.60	72.22	84.28	.5005	.0570	.0126	1.6172	94.29	93.89	51.24	30.64	-976.7	-397.6
5	1.87	5.10	10.28	14.92	67.68	79.72	.5029	.0399	.0085	1.6590	95.83	95.53	55.69	40.78	-1096.5	-535.9
6	2.16	4.46	6.62	10.21	68.71	78.49	.4835	.0850	.0176	1.6320	90.24	89.55	58.07	47.86	-1209.4	-669.3
7	1.98	3.64	6.34	7.66	70.38	76.90	.4703	.1283	.0265	1.5935	84.52	83.47	59.00	51.34	-1282.2	-751.7
8	2.44	3.90	8.08	6.69	68.85	74.62	.4623	.1225	.0248	1.5897	85.03	84.02	59.77	53.08	-1306.4	-785.2
9	3.95	5.20	11.57	5.53	64.04	69.86	.4480	.0938	.0180	1.5952	88.35	87.56	61.59	56.06	-1336.5	-833.2

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
1.3961	2.8349	87.23	88.94	41.50

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(f) Concluded. Run 225; speed code 10; point 4

(f-4) Stator 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VΘ-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	6.273	1.150	1006.6	621.3	703.5	621.2	720.1	7.9	45.9	.7	.8068	.4792	1.5677	1.1751
2	7.202	1.165	974.4	655.8	664.3	655.8	712.8	7.4	47.2	.6	.7803	.5086	1.5921	1.1715
3	6.066	1.023	954.4	661.1	667.4	661.1	682.3	4.1	46.8	.4	.7650	.5146	1.5884	1.1659
4	3.467	.623	909.5	678.4	701.8	678.3	578.5	-8.4	39.5	-.7	.7288	.5314	1.5903	1.1558
5	.921	.036	842.3	662.7	651.4	662.7	534.0	2.4	39.3	.2	.6695	.5181	1.6404	1.1618
6	-1.310	-.673	808.7	654.0	637.6	653.9	496.6	-9.0	37.9	-.8	.6400	.5108	1.6176	1.1667
7	-3.544	-1.126	803.6	648.6	637.5	648.5	489.2	-6.2	37.5	-.5	.6315	.5027	1.5761	1.1694
8	-4.442	-1.214	793.1	628.3	630.1	628.3	481.6	-3.6	37.4	-.3	.6199	.4842	1.5700	1.1670
9	-5.454	-1.204	761.6	580.1	607.7	580.1	459.0	-2.8	37.1	-.3	.5908	.4436	1.5694	1.1618

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P STATC-ST	%EFF-A TOT-STG	%EFF-P TOT-STG
1	-2.51	-.94	12.42	46.18	81.47	82.00	.5424	.1754	.0397	.9388	76.63	77.75	79.11
2	-.18	1.87	11.77	44.55	77.98	87.68	.4942	.0925	.0214	.9692	86.15	82.29	83.40
3	-.82	1.72	11.06	45.40	79.62	89.17	.4745	.0758	.0179	.9756	87.89	84.62	85.58
4	-5.99	-2.04	9.59	40.25	87.13	92.93	.4153	.0557	.0139	.9834	89.40	90.39	91.00
5	-5.33	.07	10.49	39.14	82.64	90.45	.3836	.0419	.0113	.9891	90.40	93.26	93.71
6	-6.09	.17	9.23	38.70	81.60	88.93	.3697	.0365	.0104	.9912	90.58	87.82	88.61
7	-6.32	.42	9.71	38.07	80.49	86.64	.3745	.0458	.0135	.9893	88.27	81.40	82.54
8	-7.08	-.19	10.59	37.77	78.65	82.85	.3875	.0565	.0167	.9873	86.35	81.80	82.91
9	-8.65	-1.54	11.79	37.42	74.64	75.23	.4186	.0753	.0225	.9843	83.66	84.28	85.24

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
10719.	184.80	1.3961	2.7895	85.68	87.56

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(g) Run 225; speed code 10; point 5

(g-1) Rotor 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	16.805	18.525	622.1	1074.9	622.1	636.4	.0	866.2	.0	53.8	.5751	.9546	629.7	729.5	.8184	.5781	885.2	650.9
2	14.445	16.367	635.0	1027.6	635.0	626.9	.0	814.1	.0	52.5	.5880	.9069	678.7	764.5	.8605	.5550	929.4	628.9
3	12.277	14.325	648.1	997.0	648.1	627.9	.0	774.5	.0	51.0	.6009	.8761	727.0	799.8	.9030	.5522	973.9	628.4
4	6.641	8.761	682.4	914.2	682.4	612.2	.0	679.0	.0	48.0	.6352	.7943	866.3	905.9	1.0266	.5673	1102.8	653.0
5	.797	2.417	711.9	813.8	711.9	565.9	.0	584.9	.0	46.0	.6650	.6982	1040.1	1047.1	1.1775	.6269	1260.4	730.7
6	-4.935	-3.348	719.7	781.5	719.7	594.7	.0	507.0	.0	40.4	.6730	.6689	1205.9	1188.3	1.3133	.7740	1404.3	904.3
7	-8.767	-7.533	705.7	789.9	705.7	613.0	.0	498.1	.0	39.0	.6588	.6726	1328.4	1294.1	1.4042	.8555	1504.2	1004.7
8	-10.244	-8.939	696.9	788.2	696.9	600.2	.0	510.9	.0	40.3	.6498	.6677	1369.1	1329.3	1.4326	.8597	1536.3	1014.8
9	-11.464	-10.293	686.9	761.8	686.9	535.9	.0	541.4	.0	45.2	.6398	.6381	1409.7	1364.6	1.4605	.8228	1568.1	982.3

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	EFFF-P TOT-ST	EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	-1.24	3.37	15.79	57.29	40.53	50.19	.4964	.0371	.0080	1.8853	98.07	97.90	45.14	-12.16	-629.7	136.8
2	-1.11	3.19	15.11	51.22	41.09	50.56	.5374	.0594	.0136	1.8516	96.60	96.30	46.69	-4.53	-678.7	49.6
3	-.89	3.22	13.89	45.79	41.63	51.72	.5544	.0564	.0135	1.8452	96.49	96.19	48.10	2.31	-727.0	-25.3
4	.18	3.65	10.69	31.31	42.98	52.80	.5760	.0694	.0173	1.8174	94.70	94.25	51.69	20.38	-866.3	-227.0
5	1.08	3.76	8.98	16.34	44.05	50.58	.5602	.1025	.0238	1.7647	90.39	89.61	55.60	39.26	-1040.1	-462.3
6	1.96	3.90	6.00	10.32	44.31	55.00	.4752	.0566	.0124	1.7880	93.87	93.37	59.18	48.86	-1205.9	-681.3
7	2.98	4.39	5.54	9.70	43.83	57.04	.4486	.0781	.0169	1.8232	91.23	90.48	62.04	52.34	-1328.4	-796.0
8	3.35	4.64	6.66	9.38	43.52	55.46	.4586	.1171	.0251	1.8222	86.95	85.83	63.04	53.66	-1369.1	-818.4
9	3.68	4.83	10.49	7.19	43.15	48.60	.4993	.2037	.0411	1.7836	77.66	75.80	64.02	56.83	-1409.7	-823.3

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
1.2030	1.8053	90.51	91.24	41.85

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(g) Continued. Run 225; speed code 10; point 5

(g-2) Stator 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VΘ-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	18.353	15.143	1076.5	653.5	662.8	652.9	848.2	-29.4	52.2	-2.6	.9563	.5498	1.7479	1.2027
2	16.177	13.584	1033.4	652.6	654.3	652.6	799.9	-1.4	50.9	-.1	.9129	.5497	1.7565	1.1997
3	14.118	12.086	1006.4	657.4	656.1	657.4	763.0	5.0	49.4	.4	.8856	.5542	1.7689	1.1987
4	8.562	7.831	931.2	665.4	643.1	665.1	673.4	-18.2	46.3	-1.6	.8109	.5617	1.7885	1.1973
5	2.324	2.439	836.2	625.9	598.8	625.1	583.6	-31.1	44.3	-2.8	.7193	.5266	1.7397	1.1964
6	-2.752	-2.391	805.8	649.8	625.2	649.0	508.4	-32.7	39.1	-2.9	.6917	.5487	1.7598	1.1936
7	-5.872	-5.701	816.1	684.0	644.3	683.5	501.0	-25.7	37.9	-2.2	.6971	.5760	1.7961	1.2070
8	-6.870	-6.802	815.7	679.0	632.9	678.7	514.5	-22.4	39.2	-1.9	.6932	.5687	1.7880	1.2181
9	-7.962	-7.966	792.0	639.9	574.3	639.5	545.5	-23.9	43.6	-2.2	.6656	.5297	1.7394	1.2369

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P STATC-ST	%EFF-A TOT-STG	%EFF-P TOT-STG
1	-.34	1.76	9.76	54.76	52.22	62.66	.5527	.1639	.0335	.9271	80.16	85.28	86.37
2	.01	2.41	11.09	50.99	52.53	63.11	.5266	.1231	.0261	.9487	84.14	87.40	88.34
3	-.12	2.66	10.82	48.98	53.66	63.92	.5069	.1033	.0228	.9588	85.90	89.02	89.85
4	-.67	3.05	7.71	47.89	54.82	65.21	.4620	.0432	.0105	.9849	92.80	91.52	92.17
5	-1.25	3.80	6.47	47.09	52.80	60.74	.4503	.0502	.0137	.9854	90.26	87.23	88.17
6	-5.47	.69	6.54	42.02	57.01	63.23	.3939	.0594	.0176	.9837	85.56	90.45	91.16
7	-6.69	.19	8.39	40.08	59.04	66.24	.3649	.0538	.0168	.9851	84.66	87.93	88.86
8	-5.76	1.29	9.87	41.08	57.56	65.13	.3779	.0676	.0214	.9815	81.32	82.80	84.12
9	-2.00	5.15	11.16	45.79	51.22	60.00	.4246	.0963	.0308	.9753	76.10	72.25	74.29

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
10720.	184.25	1.2030	1.7642	86.69	87.69

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(g) Continued. Run 225; speed code 10; point 5

(g-3) Rotor 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VΘ-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.740	11.077	702.4	956.0	701.8	608.1	-29.1	737.7	-2.4	50.4	.5934	.7603	836.1	876.4	.9415	.4960	1114.0	623.7
2	11.058	9.930	709.3	932.8	709.3	580.9	-1.7	729.8	-.1	51.4	.6007	.7421	859.6	895.4	.9449	.4806	1115.7	604.1
3	10.264	8.858	721.4	911.2	721.3	588.8	5.1	695.4	.4	49.6	.6119	.7256	884.0	915.2	.9645	.5005	1137.0	628.5
4	7.249	5.700	749.1	873.4	748.9	639.5	-17.7	594.8	-1.4	42.9	.6378	.6958	960.1	978.9	1.0486	.5943	1231.7	746.0
5	2.363	1.522	722.7	821.7	722.1	610.2	-30.9	550.3	-2.4	42.0	.6138	.6495	1065.2	1069.7	1.1147	.6334	1312.5	801.3
6	-2.764	-2.706	734.0	784.1	733.3	595.1	-32.9	510.5	-2.6	40.6	.6249	.6172	1172.6	1165.0	1.2013	.6964	1410.9	884.7
7	-6.173	-5.945	754.2	777.1	753.7	596.6	-25.9	497.9	-2.0	39.8	.6397	.6070	1254.4	1238.8	1.2602	.7431	1485.7	951.3
8	-7.150	-7.056	747.0	769.0	746.6	589.4	-27.7	493.9	-1.7	39.9	.6300	.5975	1281.9	1263.8	1.2677	.7534	1503.1	969.6
9	-8.141	-8.300	708.7	736.1	708.3	570.1	-24.2	465.8	-1.9	39.2	.5904	.5677	1309.4	1289.3	1.2580	.7724	1510.0	1001.6

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VΘ'-1 FT/SEC	VΘ'-2 FT/SEC
1	.25	5.57	22.43	38.09	65.78	72.80	.5997	.1504	.0332	1.6692	88.66	87.81	50.87	12.78	-865.2	-138.7
2	-.27	4.85	19.60	34.66	66.71	70.56	.6135	.1420	.0317	1.6559	89.04	88.23	50.50	15.84	-861.3	-165.6
3	-.30	4.61	18.45	30.23	67.95	72.60	.5929	.1169	.0261	1.6413	90.46	89.78	50.64	20.41	-878.9	-219.8
4	.96	5.19	14.87	21.64	70.39	81.91	.5216	.0580	.0128	1.6366	94.48	94.08	52.60	30.95	-977.8	-384.1
5	2.81	6.04	9.91	16.24	66.96	79.84	.5143	.0399	.0086	1.6799	95.99	95.69	56.64	40.40	-1096.1	-519.4
6	2.77	5.07	6.47	10.97	68.50	78.98	.4920	.0791	.0165	1.6538	91.29	90.65	58.68	47.71	-1205.4	-654.5
7	2.46	4.12	6.10	8.37	70.48	78.75	.4754	.1134	.0235	1.6232	86.76	85.83	59.47	51.10	-1280.4	-740.9
8	2.82	4.27	7.49	7.66	69.29	77.19	.4700	.1118	.0229	1.6217	86.82	85.90	60.15	52.49	-1304.6	-769.9
9	4.30	5.55	10.73	6.72	64.38	73.72	.4474	.0643	.0126	1.6341	92.24	91.69	61.94	55.22	-1333.6	-823.5

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.4041	2.9076	87.89	89.54	40.83

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(g) Concluded. Run 225; speed code 10; point 5

(g-4) Stator 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/PT1	TT2/TT1
1	8.274	1.092	978.5	566.6	651.9	566.6	729.7	5.7	48.5	.6	.7803	.4348	1.5806	1.1783
2	7.231	1.078	954.3	609.7	623.0	609.7	722.9	5.2	49.4	.5	.7612	.4705	1.6115	1.1748
3	6.159	.953	932.1	618.8	626.6	618.8	689.9	3.2	47.9	.3	.7441	.4795	1.6118	1.1687
4	3.498	.608	892.7	634.6	668.1	634.6	592.1	-.5	41.6	-.0	.7127	.4945	1.6104	1.1597
5	.884	.094	842.6	635.9	638.5	635.8	549.8	7.1	40.7	.6	.6674	.4945	1.6586	1.1657
6	-1.741	-.580	809.1	635.1	626.9	635.1	511.6	-2.8	39.2	-.3	.6385	.4937	1.6367	1.1694
7	-3.952	-1.005	808.8	650.3	635.6	650.3	500.2	.3	38.2	.0	.6337	.5026	1.6076	1.1717
8	-4.790	-1.112	804.9	640.4	633.1	640.3	497.0	6.3	38.2	.6	.6276	.4923	1.6019	1.1709
9	-5.688	-1.141	778.3	595.8	621.3	595.8	468.9	2.7	37.1	.3	.6025	.4546	1.6051	1.1631

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/PT1	EFF-P STATC-ST	EFF-A TOT-STG	EFF-P TOT-STG
1	.04	1.61	12.26	47.88	76.98	76.95	.5876	.1604	.0363	.9468	79.79	77.83	79.20
2	2.05	4.10	11.61	48.93	74.70	83.88	.5345	.0859	.0198	.9725	87.97	82.99	84.08
3	1.29	3.84	11.00	47.58	76.35	85.94	.5097	.0604	.0142	.9814	90.90	86.03	86.93
4	-3.94	.01	10.26	41.63	84.65	89.40	.4555	.0559	.0140	.9839	90.35	90.71	91.31
5	-3.95	1.45	10.92	40.09	82.63	89.26	.4194	.0495	.0133	.9872	89.96	93.23	93.70
6	-4.78	1.48	9.77	39.48	82.17	88.96	.3969	.0444	.0127	.9894	89.73	88.64	89.40
7	-5.60	1.14	10.28	38.22	82.62	89.76	.3784	.0405	.0119	.9904	89.73	84.01	85.04
8	-6.32	.57	11.48	37.63	81.54	87.34	.3847	.0538	.0159	.9875	86.88	83.70	84.74
9	-8.66	-1.55	12.32	36.88	78.83	79.91	.4135	.0808	.0241	.9825	82.40	88.07	88.84

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
10720.	184.25	1.4041	2.8619	86.38	88.21

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(h) Run 225; speed code 95; point 1

(h-1) Rotor 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	16.775	18.361	580.0	1027.8	580.0	604.0	.0	831.6	.0	54.0	.5339	.9138	597.7	692.4	.7667	.5511	832.8	619.9
2	14.407	16.056	593.9	984.2	593.9	605.3	.0	776.1	.0	52.1	.5475	.6707	644.2	725.7	.8077	.5373	876.2	607.4
3	12.224	13.905	607.2	951.8	607.2	605.7	.0	734.3	.0	50.5	.5605	.8387	690.0	759.1	.8485	.5342	919.1	606.2
4	6.670	8.160	638.2	867.4	638.2	592.2	.0	633.8	.0	46.9	.5911	.7568	822.3	859.9	.9641	.5531	1040.9	633.9
5	1.263	1.701	659.1	771.5	659.1	545.0	.0	546.0	.0	45.1	.6119	.6654	987.2	993.9	1.1020	.6085	1187.0	705.5
6	-3.528	-3.741	662.8	738.4	662.8	565.6	.0	474.6	.0	40.0	.6156	.6352	1144.6	1127.9	1.2284	.7433	1322.7	864.1
7	-7.985	-7.567	652.3	749.6	652.3	588.2	.0	464.7	.0	38.2	.6051	.6423	1260.8	1228.3	1.3169	.8259	1419.6	963.9
8	-9.648	-8.892	645.7	759.3	645.7	594.3	.0	472.7	.0	38.4	.5985	.6489	1299.5	1261.7	1.3451	.8441	1451.1	987.6
9	-11.117	-10.250	637.8	745.0	637.8	554.1	.0	498.0	.0	41.8	.5907	.6312	1338.0	1295.2	1.3728	.8225	1482.2	970.9

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	EFF-P TOT-ST	EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	-.73	3.88	14.95	58.64	38.61	47.46	.4924	.0360	.0077	1.7909	98.15	98.01	45.64	-12.99	-597.7	139.2
2	-.69	3.61	14.89	51.86	39.27	48.61	.5237	.0412	.0094	1.7647	97.64	97.46	47.10	-4.76	-644.2	50.4
3	-.53	3.58	13.93	46.11	39.87	49.55	.5417	.0419	.0100	1.7525	97.37	97.17	48.46	2.35	-690.0	-24.8
4	.60	4.07	11.22	31.20	41.22	50.41	.5578	.0563	.0140	1.7149	95.57	95.24	52.10	20.90	-822.3	-226.1
5	1.74	4.42	9.13	16.86	42.08	47.75	.5438	.0985	.0229	1.6631	90.48	89.80	56.27	39.42	-987.2	-447.9
6	2.68	4.63	6.24	10.81	42.23	51.09	.4638	.0584	.0127	1.6802	93.47	93.00	59.91	49.10	-1144.6	-653.3
7	3.56	4.97	5.54	10.29	41.81	53.59	.4350	.0694	.0150	1.7184	91.93	91.31	62.62	52.33	-1260.8	-763.6
8	3.87	5.16	5.93	10.63	41.54	54.05	.4353	.0882	.0192	1.7341	89.77	88.97	63.56	52.93	-1299.5	-789.1
9	4.15	5.30	8.75	9.39	41.21	49.70	.4670	.1595	.0337	1.7144	81.82	80.42	64.49	55.09	-1338.0	-797.2

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
1.1803	1.7072	91.66	92.14	39.92

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(h) Continued. Run 225; speed code 95; point 1

(h-2) Stator 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VΘ-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	18.194	14.869	1031.2	645.8	632.8	645.6	814.2	-16.9	52.3	-1.5	.9173	.5472	1.6740	1.1846
2	15.903	13.098	991.7	648.5	634.1	648.4	762.4	7.8	50.4	.7	.8783	.5506	1.6841	1.1806
3	13.769	11.436	962.4	656.2	634.8	656.1	723.4	9.9	48.8	.9	.8494	.5580	1.6971	1.1787
4	8.106	6.844	884.2	651.1	621.9	650.8	628.6	-20.5	45.3	-1.8	.7732	.5545	1.6959	1.1748
5	1.671	1.040	792.9	612.4	576.1	611.7	544.8	-28.3	43.4	-2.7	.6856	.5198	1.6477	1.1740
6	-3.316	-3.947	762.0	628.4	595.3	627.4	475.8	-34.9	38.7	-3.2	.6573	.5347	1.6567	1.1717
7	-6.209	-6.703	775.0	669.9	618.2	669.5	467.4	-23.3	37.2	-2.0	.6659	.5693	1.6987	1.1833
8	-7.095	-7.518	785.5	678.9	624.8	678.8	476.0	-12.9	37.4	-1.1	.6732	.5752	1.7075	1.1918
9	-8.092	-8.356	773.1	646.4	588.2	646.2	501.8	-18.1	40.6	-1.6	.6570	.5424	1.6678	1.2069

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	SEFF-P STATC-ST	SEFF-A TOT-STG	SEFF-P TOT-STG
1	-.22	1.89	10.83	53.82	49.59	60.32	.5312	.1550	.0317	.9350	80.18	85.85	86.81
2	-.49	1.91	11.90	49.68	50.64	61.06	.5006	.1152	.0245	.9546	84.19	88.87	89.63
3	-.74	2.04	11.24	47.94	51.53	62.12	.4752	.0830	.0183	.9689	87.69	91.23	91.84
4	-1.72	2.00	7.47	47.08	52.35	61.89	.4375	.0302	.0074	.9902	94.50	93.14	93.61
5	-2.12	2.93	6.66	46.03	49.85	57.56	.4226	.0344	.0094	.9908	92.58	88.09	88.87
6	-5.93	.22	6.24	41.86	53.07	59.04	.3746	.0575	.0170	.9855	84.50	90.33	90.97
7	-7.45	-.57	6.54	39.17	55.53	62.82	.3349	.0461	.0144	.9881	84.39	89.12	89.88
8	-7.55	-.50	10.67	38.49	55.99	63.36	.3347	.0579	.0183	.9849	80.51	86.08	87.06
9	-5.05	2.10	11.69	42.20	51.95	59.19	.3814	.1081	.0346	.9728	69.05	76.00	77.63

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
10175.	175.78	1.1803	1.6753	88.09	88.90

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(h) Continued. Run 225; speed code 95; point 1

(h-3) Rotor 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VΘ-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.561	10.894	710.1	985.2	709.9	777.3	-16.5	605.3	-1.3	37.7	.6056	.8081	793.6	831.9	.9184	.6641	1077.1	809.6
2	10.637	9.614	718.4	987.6	718.4	759.9	7.6	630.9	.6	39.5	.6142	.8102	815.9	849.9	.9245	.6487	1081.4	790.6
3	9.645	8.471	730.2	948.5	730.1	727.1	9.7	609.0	.8	39.8	.6256	.7756	839.1	868.7	.9467	.6314	1105.0	772.1
4	6.339	5.347	737.1	880.4	736.8	732.3	-20.3	488.6	-1.6	33.7	.6331	.7197	911.3	929.1	1.0202	.6987	1187.8	854.6
5	.818	.922	707.0	831.1	706.4	723.0	-28.4	409.9	-2.3	29.5	.6056	.6784	1011.0	1015.3	1.0764	.7697	1256.7	943.0
6	-4.508	-3.489	705.5	765.2	704.6	669.4	-34.9	370.9	-2.8	29.0	.6047	.6204	1112.9	1105.8	1.1545	.8058	1346.8	999.0
7	-7.003	-6.247	731.9	764.7	731.5	675.1	-23.1	359.1	-1.8	28.0	.6258	.6169	1190.6	1175.8	1.2116	.8548	1417.1	1059.6
8	-7.711	-7.223	736.8	794.9	736.7	709.2	-13.2	359.0	-1.0	26.8	.6279	.6412	1216.7	1199.6	1.2217	.8871	1433.7	1099.8
9	-8.510	-8.407	705.6	746.9	705.4	673.0	-18.4	324.1	-1.5	25.7	.5954	.5984	1242.8	1223.7	1.2193	.9000	1445.1	1123.4

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VΘ'-1 FT/SEC	VΘ'-2 FT/SEC
1	-1.95	3.36	25.81	32.51	64.28	78.79	.3819	.2003	.0436	1.4520	81.33	80.34	48.67	16.16	-810.1	-226.5
2	-2.47	2.66	19.75	32.31	65.33	77.89	.4059	.2111	.0471	1.4619	80.51	79.46	48.30	15.99	-808.3	-219.0
3	-2.33	2.58	17.61	29.03	66.59	74.85	.4334	.2555	.0574	1.4175	74.99	73.75	48.61	19.57	-829.4	-259.7
4	.01	4.25	14.90	20.67	67.08	77.46	.3916	.2004	.0441	1.3840	76.40	75.31	51.65	30.98	-931.6	-440.6
5	1.97	5.20	9.44	15.86	63.53	77.83	.3502	.1210	.0262	1.4015	83.83	83.06	55.79	39.93	-1039.4	-605.4
6	2.59	4.89	6.44	10.82	63.89	71.09	.3574	.2043	.0426	1.3248	69.34	68.13	58.50	47.68	-1147.8	-734.9
7	1.91	3.57	5.38	8.55	66.51	70.82	.3413	.2306	.0485	1.2871	62.75	61.42	58.92	50.36	-1213.7	-816.7
8	1.72	3.17	4.77	9.27	66.70	74.37	.3200	.1984	.0432	1.3090	67.66	66.43	59.04	49.77	-1230.0	-840.5
9	3.07	4.32	8.62	7.60	62.81	69.61	.3036	.1762	.0363	1.2933	69.38	68.26	60.72	53.12	-1261.2	-899.6

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
1.3273	2.2786	80.86	82.90	40.63

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(h) Concluded. Run 225; speed code 95; point 1

(h-4) Stator 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VΘ-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/PT1	TT2/TT1
1	8.650	1.508	1027.7	836.0	835.6	822.6	598.3	-149.3	35.8	-10.3	.8478	.6735	1.1413	1.1387
2	7.900	1.746	1027.5	949.3	815.5	936.1	625.0	-157.7	37.7	-9.5	.8474	.7748	1.2560	1.1428
3	6.958	1.668	987.7	981.2	781.0	969.1	604.6	-153.4	37.9	-9.0	.8117	.8051	1.2891	1.1423
4	4.193	1.000	917.6	963.0	778.0	950.1	486.6	-157.0	32.1	-9.4	.7535	.7951	1.2925	1.1291
5	1.504	.212	867.7	931.1	764.9	923.7	409.6	-117.1	28.2	-7.2	.7111	.7689	1.3093	1.1213
6	-1.332	-.722	805.7	894.5	719.8	891.6	371.8	-72.2	27.5	-4.6	.6558	.7354	1.2608	1.1222
7	-4.168	-1.414	808.7	893.0	723.7	892.7	360.8	-22.8	26.5	-1.5	.6553	.7301	1.2166	1.1210
8	-5.053	-1.504	841.0	876.4	759.4	876.3	361.3	-12.8	25.5	-.8	.6817	.7130	1.1970	1.1181
9	-5.845	-1.413	801.3	781.2	731.9	781.0	326.3	-15.4	24.1	-1.1	.6454	.6279	1.1301	1.1111

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/PT1	STATC-ST	%EFF-P TOT-STG	%EFF-A TOT-STG	%EFF-P TOT-STG
1	-12.57	-10.99	1.42	46.12	82.27	71.67	.3506	.5669	.1262	.7870	-43.39		27.60	28.91
2	-9.69	-7.64	1.58	47.23	81.39	84.18	.2532	.3805	.0866	.8566	-123.15		46.64	48.25
3	-8.66	-6.12	1.72	46.90	78.38	88.64	.1949	.2689	.0625	.9039	-970.16		52.62	54.25
4	-13.45	-9.49	.92	41.46	80.46	89.23	.1285	.2085	.0515	.9344	274.66		58.64	60.08
5	-16.50	-11.10	3.05	35.40	80.68	87.55	.0919	.2330	.0623	.9332	230.11		65.68	66.94
6	-16.52	-10.26	5.39	32.10	74.35	83.91	.0471	.1917	.0545	.9520	169.01		55.75	57.14
7	-17.31	-10.57	8.79	28.00	74.20	82.54	.0443	.2268	.0666	.9421	203.73		47.37	48.78
8	-19.01	-12.12	10.08	26.34	77.72	79.91	.0806	.3221	.0954	.91621026.73			44.20	45.55
9	-21.68	-14.57	10.93	25.24	73.70	69.26	.1468	.5148	.1537	.87672086.53			31.79	32.90

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
10175.	175.78	1.3273	2.0973	71.83	74.65

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(i) Run 225; speed code 95; point 2

(i-1) Rotor 1 - U.S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	16.752	18.504	577.0	1031.9	577.0	609.5	.0	832.7	.0	53.9	.5310	.9179	597.7	692.3	.7646	.5563	830.7	625.4
2	14.353	16.297	589.6	985.9	589.6	607.7	.0	776.4	.0	52.0	.5433	.8725	644.1	725.6	.8047	.5397	873.2	609.9
3	12.151	14.192	602.3	953.1	602.3	608.3	.0	733.7	.0	50.4	.5557	.8400	690.0	759.1	.8451	.5366	915.9	608.8
4	6.443	8.471	634.6	867.9	634.6	594.8	.0	632.1	.0	46.8	.5876	.7575	822.2	859.8	.9616	.5559	1038.6	636.9
5	.709	1.919	659.4	766.9	659.4	547.1	.0	537.3	.0	44.5	.6122	.6619	987.1	993.9	1.1022	.6151	1187.1	712.6
6	-4.167	-3.755	663.7	739.4	663.7	566.4	.0	475.3	.0	40.0	.6165	.6360	1144.5	1127.8	1.2289	.7433	1323.0	869.1
7	-8.245	-7.647	651.8	755.8	651.8	584.3	.0	479.4	.0	39.3	.6046	.6463	1260.8	1228.2	1.3165	.8122	1419.3	949.8
8	-9.736	-8.952	644.7	766.9	644.7	596.3	.0	482.2	.0	38.9	.5975	.6547	1299.4	1261.6	1.3445	.8379	1450.5	981.4
9	-11.126	-10.285	636.2	751.0	636.2	561.7	.0	498.5	.0	41.5	.5891	.6366	1337.9	1295.2	1.3718	.8263	1481.4	974.7

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	-.59	4.02	14.95	58.78	38.47	47.76	.4846	.0359	.0077	1.7923	98.16	98.02	45.79	-12.99	-597.7	140.4
2	-.49	3.81	14.87	52.08	39.07	48.70	.5191	.0445	.0102	1.7632	97.46	97.27	47.30	-4.78	-644.1	50.7
3	-.31	3.80	13.97	46.29	39.65	49.71	.5368	.0417	.0100	1.7520	97.39	97.20	48.68	2.39	-690.0	-25.3
4	.74	4.21	11.29	31.27	41.07	50.70	.5535	.0497	.0124	1.7176	96.08	95.79	52.24	20.97	-822.2	-227.8
5	1.72	4.40	9.56	16.40	42.10	48.03	.5366	.0879	.0203	1.6568	91.37	90.76	56.25	39.85	-987.1	-456.5
6	2.66	4.61	6.17	10.86	42.26	50.98	.4650	.0635	.0138	1.6755	92.87	92.35	59.89	49.03	-1144.5	-652.6
7	3.59	5.00	5.19	10.67	41.79	52.75	.4489	.0959	.0209	1.7154	89.03	88.19	62.65	51.98	-1260.8	-748.8
8	3.91	5.20	5.50	11.09	41.49	53.86	.4420	.1038	.0229	1.7337	88.12	87.18	63.60	52.50	-1299.4	-779.5
9	4.21	5.36	8.37	9.83	41.14	50.17	.4642	.1611	.0343	1.7133	81.65	80.24	64.54	54.71	-1337.9	-796.7

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.1807	1.7055	91.16	91.78	39.93

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(i) Continued. Run 225; speed code 95; point 2

(i-2) Stator 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VΘ-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/PT1	TT2/TT1
1	18.220	14.987	1036.4	689.2	639.8	689.1	815.4	-11.0	52.1	-.9	.9226	.5064	1.7270	1.1847
2	15.936	13.273	994.9	665.8	638.7	665.8	762.8	4.8	50.2	.4	.8816	.5663	1.7078	1.1805
3	13.823	11.622	965.4	658.8	639.8	658.8	722.9	7.4	48.6	.6	.8524	.5605	1.7047	1.1785
4	8.244	7.005	886.6	650.4	626.9	650.1	626.9	-19.4	45.0	-1.7	.7757	.5540	1.6991	1.1742
5	1.992	1.241	789.5	602.6	579.4	601.8	536.2	-31.3	42.8	-3.0	.6832	.5117	1.6911	1.1714
6	-3.038	-3.716	763.0	622.9	595.9	622.1	476.5	-32.1	38.7	-3.0	.6581	.6297	1.6653	1.1723
7	-6.196	-6.702	780.0	674.8	613.0	674.8	482.3	2.7	38.3	.2	.6688	.5722	1.7044	1.1892
8	-7.153	-7.592	791.0	672.3	624.4	672.3	485.6	2.1	38.0	.2	.6772	.5682	1.6981	1.1957
9	-8.134	-8.442	776.7	644.6	592.5	644.4	502.3	-18.7	40.4	-1.7	.6603	.5408	1.6630	1.2071

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/PT1	%EFF-P STATC-ST	%EFF-A TOT-STG	%EFF-P TOT-STG
1	-.48	1.63	11.41	52.98	49.96	65.05	.4898	.0842	.0172	.9645	88.44	91.41	92.03
2	-.68	1.72	11.63	49.77	50.83	63.06	.4845	.0779	.0165	.9692	88.94	91.48	92.07
3	-.98	1.81	11.02	47.92	51.81	62.58	.4734	.0698	.0154	.9737	89.62	92.19	92.73
4	-2.01	1.71	7.57	46.69	52.78	61.99	.4380	.0277	.0068	.9910	94.99	93.81	94.23
5	-2.74	2.31	6.33	45.74	50.20	56.76	.4310	.0414	.0113	.9889	91.38	88.68	89.42
6	-5.93	.22	6.47	41.63	52.94	58.61	.3825	.0500	.0148	.9874	87.08	89.86	90.54
7	-6.35	.53	10.78	38.04	54.60	63.12	.3288	.0266	.0083	.9931	90.87	86.91	87.84
8	-6.98	.07	11.95	37.79	55.62	62.44	.3455	.0763	.0242	.9799	76.56	83.42	84.59
9	-5.22	1.93	11.63	42.09	52.18	58.90	.3870	.1157	.0371	.9706	67.98	75.47	77.13

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
10175.	175.81	1.1807	1.6780	88.18	88.99

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(i) Continued. Run 225; speed code 95; point 2

(i-3) Rotor 2 - U. S. customary units

SL	EPS1-1 DEGREE	EPS1-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.652	11.130	747.1	948.7	747.0	709.1	-10.9	630.2	-.8	41.5	.6394	.7725	793.5	831.8	.9397	.6003	1097.8	737.2
2	10.867	9.979	732.6	950.4	732.6	707.8	4.6	634.3	.4	41.7	.6273	.7753	815.9	849.8	.9360	.6035	1093.1	739.9
3	9.949	8.838	732.3	937.9	732.3	709.6	7.3	613.2	.6	40.7	.6276	.7655	839.0	868.7	.9497	.6155	1108.1	754.2
4	6.547	5.529	738.3	881.1	738.0	721.6	-19.1	505.6	-1.5	35.0	.6344	.7193	911.3	929.1	1.0204	.6830	1187.6	836.7
5	1.121	1.119	698.9	792.5	698.2	666.4	-31.3	429.0	-2.6	32.8	.5988	.6431	1011.0	1015.3	1.0749	.7201	1254.5	887.5
6	-4.382	-3.390	705.1	752.9	704.3	652.7	-31.5	375.4	-2.6	29.9	.6041	.6094	1112.9	1105.7	1.1514	.7928	1343.8	974.5
7	-7.575	-6.645	731.2	743.0	731.2	643.9	2.8	370.7	.2	29.9	.6234	.5979	1190.6	1175.7	1.1893	.8296	1394.8	1030.9
8	-8.362	-7.712	719.9	732.6	719.9	636.5	1.5	362.8	.1	29.6	.6113	.5870	1216.7	1199.5	1.1993	.8424	1412.4	1051.3
9	-9.028	-8.782	686.9	669.1	686.7	578.6	-19.1	336.1	-1.6	30.1	.5785	.5312	1242.8	1223.6	1.2098	.8411	1436.6	1059.5

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	-3.60	1.72	25.44	31.23	68.42	75.30	.4642	.2375	.0518	1.4439	77.65	76.48	47.03	15.79	-804.4	-201.6
2	-2.90	2.22	20.63	31.01	67.07	76.36	.4593	.1883	.0418	1.4829	82.72	81.74	47.87	16.87	-811.3	-215.5
3	-2.32	2.59	17.77	28.89	67.02	77.60	.4505	.1578	.0354	1.4906	85.08	84.23	48.62	19.73	-831.7	-255.4
4	-.06	4.18	14.28	21.22	67.30	81.46	.4093	.0976	.0216	1.4775	89.14	88.54	51.58	30.36	-930.4	-423.5
5	2.35	5.58	10.84	14.84	62.91	76.06	.3976	.0761	.0162	1.4653	90.47	89.96	56.17	41.33	-1042.3	-586.2
6	2.52	4.82	6.98	10.20	63.80	74.37	.3659	.0988	.0204	1.4142	85.65	84.95	58.43	48.22	-1144.4	-730.3
7	1.40	3.06	6.33	7.09	66.44	72.11	.3488	.1306	.0269	1.3577	79.13	78.23	58.42	51.33	-1187.8	-805.1
8	2.03	3.49	7.70	6.66	65.23	70.50	.3432	.1375	.0281	1.3525	77.80	76.86	59.36	52.70	-1215.1	-836.7
9	3.77	5.02	12.35	4.57	61.53	62.79	.3477	.1676	.0315	1.3193	72.13	71.04	61.41	56.85	-1261.8	-887.6

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.3302	2.3926	85.51	87.15	40.58

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(i) Concluded. Run 225; speed code 95; point 2

(i-4) Stator 2 - U. S. customary units

SL	EPSI-1	EPSI-2	V-1	V-2	VM-1	VM-2	VB-1	VB-2	B-1	B-2	M-1	M-2	PT2/ PT1	TT2/ TT1
	DEGREE	DEGREE	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	DEGREE	DEGREE				
1	8.324	1.184	984.6	738.1	762.2	737.7	623.3	-24.3	39.5	-1.9	.8054	.5874	1.2671	1.1438
2	7.419	1.319	983.5	765.4	756.5	765.0	628.4	-26.9	39.9	-2.0	.8056	.6115	1.3093	1.1451
3	6.532	1.353	969.1	793.7	754.2	792.9	608.6	-34.0	39.0	-2.5	.7941	.6370	1.3450	1.1432
4	4.153	1.079	909.6	831.8	757.5	831.0	503.5	-37.6	33.7	-2.6	.7450	.6750	1.4013	1.1330
5	1.540	.323	821.8	790.3	701.0	790.0	428.9	-24.7	31.5	-1.8	.6688	.6411	1.4206	1.1278
6	-1.027	-.541	784.8	762.8	688.8	762.4	376.2	-25.7	28.6	-1.9	.6373	.6180	1.3812	1.1221
7	-3.248	-1.029	780.7	743.5	686.2	743.4	372.3	-9.8	28.5	-.8	.6307	.5984	1.3221	1.1161
8	-4.133	-1.142	776.0	727.8	684.6	727.8	365.5	-.7	28.1	-.1	.6245	.5829	1.3148	1.1166
9	-5.168	-1.181	721.3	642.9	637.0	642.9	338.3	3.6	28.0	.3	.5753	.5093	1.2675	1.1154

SL	INCS	INCM	DEV	TURN	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P STATC-ST	%EFF-A TOT-STG	%EFF-P TOT-STG
	DEGREE	DEGREE	DEGREE	DEGREE									
1	-8.91	-7.33	9.81	41.39	79.08	77.18	.3984	.3484	.0788	.8788	33.34	48.40	50.07
2	-7.47	-5.42	9.12	41.91	79.89	80.87	.3751	.3296	.0761	.8853	30.48	54.88	56.53
3	-7.54	-4.99	8.26	41.50	80.65	84.87	.3391	.2859	.0672	.9023	29.07	61.40	62.95
4	-11.86	-7.91	7.71	36.26	84.08	91.61	.2382	.1677	.0419	.9479	19.60	75.71	76.82
5	-13.21	-7.81	8.49	33.26	78.79	87.51	.1886	.1211	.0326	.9685	-31.35	82.19	83.03
6	-15.36	-9.10	8.09	30.57	77.25	84.39	.1746	.1013	.0289	.9758	-57.56	78.77	79.70
7	-15.35	-8.61	9.50	29.25	75.44	81.05	.1923	.1114	.0327	.9738	-2.55	71.17	72.27
8	-16.39	-9.49	10.86	28.19	74.34	78.49	.2004	.1218	.0361	.9724	8.41	69.37	70.50
9	-17.76	-10.65	12.38	27.71	67.65	67.73	.2456	.1948	.0582	.9615	12.82	60.39	61.66

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
10175.	175.81	1.3302	2.2822	80.31	82.43

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(j) Run 225; speed code 95; point 5

(j-1) Rotor 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VU-1 FT/SEC	VU-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	17.271	18.502	523.7	967.2	523.7	487.5	.0	835.3	.0	59.8	.4796	.8514	598.4	693.2	.7282	.4470	795.2	507.8
2	15.357	16.294	533.8	938.7	533.8	498.7	.0	795.2	.0	57.9	.4893	.8230	644.9	726.5	.7673	.4414	837.1	503.5
3	13.520	14.206	544.6	915.1	544.6	511.2	.0	759.0	.0	56.1	.4997	.7998	690.8	760.0	.8071	.4467	879.7	511.2
4	7.895	8.680	575.0	865.4	575.0	563.4	.0	656.8	.0	49.4	.5291	.7526	823.2	860.9	.9240	.5211	1004.2	599.2
5	1.466	2.416	597.3	793.5	597.3	525.3	.0	594.8	.0	48.6	.5508	.6812	988.4	995.1	1.0650	.5669	1154.8	660.4
6	-3.874	-3.219	599.3	772.5	599.3	525.6	.0	566.1	.0	47.1	.5528	.6570	1145.9	1129.2	1.1929	.6551	1293.2	770.3
7	-7.867	-7.280	589.3	780.4	589.3	524.0	.0	578.3	.0	47.7	.5430	.6575	1262.3	1229.7	1.2837	.7044	1393.1	836.0
8	-9.438	-8.687	583.5	784.4	583.5	553.0	.0	556.3	.0	45.1	.5373	.6620	1301.0	1263.2	1.3132	.7575	1425.9	897.5
9	-11.003	-10.150	576.2	777.1	576.2	518.5	.0	578.8	.0	48.0	.5302	.6509	1339.6	1296.8	1.3420	.7417	1458.2	885.5

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	EFF-P TOT-ST	EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VU'-1 FT/SEC	VU'-2 FT/SEC
1	2.20	6.90	11.66	64.95	35.79	37.97	.6075	.2439	.0516	1.6941	88.33	87.45	48.67	-16.28	-598.4	142.1
2	2.50	6.80	11.79	58.15	36.32	39.88	.6259	.2057	.0469	1.7029	89.37	88.57	50.30	-7.85	-644.9	68.7
3	2.72	6.83	11.70	51.60	36.87	41.85	.6304	.1677	.0401	1.7147	90.67	89.95	51.71	.11	-690.8	-1.0
4	3.54	7.03	10.28	35.12	38.37	49.00	.5776	.0503	.0126	1.7573	96.56	96.29	55.06	19.94	-823.2	-204.1
5	4.33	7.01	7.04	21.53	39.42	47.17	.5816	.1013	.0242	1.7446	91.40	90.72	58.86	37.32	-988.4	-400.3
6	5.16	7.10	4.08	15.44	39.52	48.06	.5478	.1320	.0300	1.7723	87.58	86.56	62.38	46.95	-1145.9	-563.1
7	5.88	7.29	4.31	13.83	39.05	48.07	.5444	.1808	.0403	1.8126	82.61	81.13	64.94	51.11	-1262.3	-651.4
8	6.19	7.41	4.86	13.95	38.78	51.22	.5091	.1516	.0339	1.8310	84.94	83.63	65.81	51.86	-1301.0	-706.9
9	6.34	7.51	7.70	12.65	38.43	47.57	.5366	.2071	.0448	1.8243	79.54	77.78	66.69	54.05	-1339.6	-717.9

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
1.2028	1.7683	87.13	88.10	37.23

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(j) Continued. Run 225; speed code 95; point 5

(j-2) Stator 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VM-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	18.061	14.745	962.6	489.0	507.7	483.9	817.8	-70.2	58.3	-8.2	.8468	.4090	1.6608	1.1858
2	15.661	12.921	938.4	497.4	519.9	493.5	781.2	-61.9	56.4	-7.1	.8228	.4164	1.6709	1.1853
3	13.466	11.262	918.2	508.4	532.9	505.4	747.8	-54.7	54.5	-6.1	.8020	.4259	1.6821	1.1851
4	8.308	7.247	875.1	560.8	584.3	560.8	651.4	-.1	48.1	-.0	.7420	.4725	1.7333	1.1814
5	2.914	2.428	808.8	541.3	549.5	541.0	593.5	-15.8	47.2	-1.7	.6958	.4537	1.7178	1.1895
6	-2.011	-2.393	791.9	575.6	552.2	575.3	567.5	17.6	45.8	1.7	.6750	.4807	1.7573	1.2039
7	-5.701	-5.856	802.9	612.9	553.5	611.5	581.7	41.8	46.5	3.9	.6782	.5083	1.8015	1.2273
8	-6.814	-6.963	807.6	625.9	582.1	625.4	559.9	27.1	44.0	2.5	.6834	.5201	1.8196	1.2256
9	-7.927	-8.066	802.2	617.8	550.6	617.6	583.3	17.2	46.8	1.6	.6738	.5098	1.8097	1.2400

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	EFFF-P STATC-ST	EFF-A TOT-STG	EFF-P TOT-STG
1	5.74	7.87	4.16	66.48	39.68	47.74	.6737	.0528	.0107	.9803	94.26	83.91	85.00
2	5.57	7.97	4.13	63.51	41.58	48.86	.6543	.0530	.0112	.9810	93.98	85.19	86.20
3	5.01	7.79	4.26	60.67	43.54	50.19	.6335	.0559	.0123	.9807	93.37	86.52	87.45
4	1.10	4.82	9.26	48.11	50.49	56.40	.5376	.0423	.0103	.9864	94.04	93.74	94.19
5	1.71	6.76	7.64	48.88	48.91	54.02	.5364	.0563	.0154	.9844	91.25	88.15	89.00
6	1.19	7.34	11.18	44.04	49.95	57.36	.4793	.0281	.0083	.9926	94.72	85.64	86.71
7	1.86	8.73	14.46	42.55	50.14	60.52	.4475	.0198	.0062	.9948	95.69	80.48	82.00
8	-.98	6.07	14.25	41.47	53.21	62.24	.4361	.0203	.0064	.9946	95.40	82.59	83.97
9	1.19	8.27	14.91	45.16	49.83	60.72	.4581	.0313	.0100	.9918	93.17	76.87	78.68

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
10187.	163.92	1.2028	1.7483	85.25	86.34

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(j) Continued. Run 225; speed code 95; point 5

(j-3) Rotor 2 - U. S. customary units

SL	PSI-1 DEGREE	PSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.714	10.773	533.5	868.5	529.1	520.6	-68.2	695.3	-7.3	53.0	.4476	.6917	794.5	832.8	.8492	.4268	1012.1	538.4
2	10.834	9.332	545.6	867.6	542.3	550.8	-60.4	670.3	-6.3	50.4	.4581	.6922	816.9	850.9	.8664	.4625	1031.4	579.7
3	9.739	7.957	559.1	853.9	556.5	565.5	-53.5	639.8	-5.5	48.4	.4702	.6820	840.0	869.7	.8853	.4876	1052.7	610.5
4	6.393	4.753	610.8	811.6	610.8	508.3	-.3	632.7	-.0	51.1	.5168	.6474	912.4	930.2	.9291	.4698	1098.3	588.9
5	1.704	.917	602.8	793.0	602.5	557.0	-15.7	564.4	-1.5	45.4	.5077	.6290	1012.2	1016.5	1.0037	.5690	1191.5	717.4
6	-3.416	-3.160	639.7	763.4	639.5	539.9	17.8	539.8	1.6	45.0	.5372	.6014	1114.3	1107.1	1.0659	.6169	1269.3	783.1
7	-6.633	-6.212	677.7	775.2	676.4	578.2	42.3	516.4	3.6	41.7	.5652	.6074	1192.0	1177.2	1.1126	.6880	1333.9	878.0
8	-7.659	-7.303	688.3	776.5	687.8	576.6	27.2	520.1	2.3	42.0	.5752	.6064	1218.2	1201.0	1.1492	.6968	1375.3	892.2
9	-8.423	-8.447	679.7	751.9	679.5	573.6	17.4	486.1	1.5	40.2	.5440	.5839	1244.3	1225.2	1.1637	.7266	1402.5	935.6

SL	IMCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	7.78	13.10	24.37	43.69	51.37	61.73	.6425	.1765	.0387	1.6286	87.95	87.10	58.40	14.71	-862.8	-137.6
2	7.47	12.59	21.80	40.19	52.74	66.26	.6058	.1313	.0290	1.6361	90.62	89.95	58.24	18.04	-877.3	-180.6
3	7.13	12.03	20.05	36.05	54.22	68.84	.5805	.1054	.0233	1.6259	91.99	91.43	58.06	22.01	-893.5	-229.9
4	4.57	8.80	14.19	25.93	60.16	63.39	.6132	.1490	.0331	1.6733	87.42	86.60	56.21	30.27	-912.7	-297.5
5	5.80	9.03	8.56	20.57	58.69	70.87	.5369	.0793	.0174	1.6153	92.62	92.11	59.62	39.06	-1027.9	-452.1
6	3.86	6.15	5.18	13.33	62.04	69.11	.5104	.0895	.0191	1.6739	90.55	89.93	59.76	46.42	-1096.5	-567.3
7	2.50	4.16	3.77	10.74	65.03	73.99	.4585	.0581	.0126	1.6591	93.22	92.78	59.52	48.77	-1149.7	-660.8
8	2.62	4.07	4.67	10.28	66.54	73.52	.4717	.1168	.0255	1.6471	86.38	85.52	59.95	49.67	-1191.0	-680.8
9	3.31	4.56	7.61	8.85	65.00	72.51	.4470	.0975	.0206	1.6334	88.06	87.32	60.95	52.10	-1226.9	-739.1

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.3896	2.7649	86.24	88.04	36.65

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(j) Concluded. Run 225; speed code 95; point 5

(j-4) Stator 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	Vθ-1 FT/SEC	Vθ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/PT1	TT2/TT1
1	8.298	1.329	884.1	480.1	555.5	480.1	687.7	8.5	51.3	1.0	.7053	.3705	1.5607	1.1706
2	7.457	1.526	882.1	520.1	580.6	520.0	664.0	8.3	49.0	.9	.7049	.4029	1.5813	1.1676
3	6.724	1.608	867.9	539.9	591.8	539.8	634.8	6.9	47.2	.7	.6941	.4196	1.5872	1.1630
4	4.206	1.329	826.1	545.0	534.8	545.0	629.6	2.3	49.7	.2	.6599	.4252	1.5519	1.1589
5	1.084	.508	810.2	571.1	581.7	571.0	564.0	8.9	44.1	.9	.6438	.4448	1.5858	1.1584
6	-1.715	-.376	785.4	587.5	569.6	587.5	541.1	-2.9	43.5	-.3	.6209	.4563	1.5590	1.1529
7	-4.043	-.995	802.8	619.6	612.7	619.6	518.8	7.8	40.3	.7	.6307	.4793	1.5377	1.1447
8	-4.851	-1.140	807.4	622.5	615.1	622.4	523.0	15.1	40.4	1.4	.6326	.4799	1.5207	1.1551
9	-5.737	-1.173	788.2	587.4	617.8	587.3	489.5	10.7	38.5	1.0	.6147	.4503	1.5012	1.1473

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/PT1	%EFF-P STATIC-ST	%EFF-A TOT-STG	%EFF-P TOT-STG
1	2.80	4.46	12.71	50.28	65.30	64.07	.6300	.1467	.0332	.9585	82.00	79.01	80.28
2	1.66	3.70	12.04	48.10	69.29	70.04	.5814	.1159	.0248	.9673	84.72	82.98	84.03
3	.50	3.13	11.44	46.44	71.49	73.30	.5499	.0915	.0215	.9747	87.19	86.03	86.90
4	-.15	8.14	10.54	49.48	66.20	74.87	.5303	.0613	.0153	.9844	90.53	83.73	84.69
5	-.54	4.84	11.17	43.23	73.37	78.36	.4801	.0725	.0195	.9824	87.30	88.35	89.07
6	-.47	5.79	9.74	43.81	72.15	80.10	.4502	.0420	.0120	.9904	91.40	87.90	88.62
7	-3.54	3.20	10.98	39.58	77.36	83.53	.4165	.0577	.0170	.9864	87.32	89.75	90.35
8	-4.08	2.81	12.30	39.05	77.27	83.25	.4168	.0697	.0206	.9836	84.78	81.46	82.52
9	-7.31	-.20	13.11	37.44	76.79	77.56	.4355	.0907	.0271	.9797	81.67	82.91	83.86

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
10187.	163.97	1.3896	2.7171	84.54	86.53

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(k) Run 225; speed code 85; point 3

(k-1) Rotor 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	16.698	18.389	457.7	896.3	457.7	506.5	.0	739.5	.0	55.6	.4169	.7956	536.0	620.9	.6420	.4617	704.8	520.2
2	14.266	16.104	467.8	859.6	467.8	510.9	.0	691.4	.0	53.6	.4265	.7603	577.7	650.8	.6776	.4532	743.4	512.5
3	12.051	13.964	477.7	827.7	477.7	507.2	.0	654.0	.0	52.2	.4358	.7294	618.8	680.8	.7132	.4476	781.7	507.9
4	6.498	8.211	501.9	761.6	501.9	501.0	.0	573.6	.0	48.9	.4588	.6661	737.4	771.1	.8154	.4710	892.0	538.5
5	.748	1.759	519.9	685.0	519.9	481.9	.0	486.9	.0	45.3	.4760	.5949	885.3	891.3	.9400	.5463	1026.7	629.2
6	-4.336	-3.750	522.3	664.8	522.3	488.6	.0	450.8	.0	42.7	.4783	.5742	1026.5	1011.5	1.0547	.6423	1151.7	743.7
7	-8.454	-7.644	513.8	671.3	513.8	499.4	.0	448.6	.0	41.9	.4702	.5769	1130.7	1101.5	1.1365	.7065	1242.0	822.1
8	-9.934	-8.969	508.8	680.7	508.8	500.6	.0	461.3	.0	42.6	.4654	.5832	1165.4	1131.5	1.1631	.7167	1271.6	836.6
9	-11.248	-10.298	503.0	672.4	503.0	469.6	.0	481.3	.0	45.6	.4698	.5725	1199.9	1161.6	1.1894	.7038	1301.1	826.6

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	EFF-P TOT-ST	EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	2.91	7.52	14.75	62.47	32.13	40.17	.5106	.0412	.0088	1.4027	98.01	97.90	49.28	-13.19	-536.0	118.6
2	2.97	7.27	15.10	55.31	32.72	41.25	.5382	.0371	.0085	1.4884	97.99	97.88	50.77	-4.54	-577.7	40.6
3	3.19	7.25	14.60	49.11	33.28	41.55	.5608	.0449	.0107	1.4763	97.31	97.16	52.13	3.02	-618.8	-26.7
4	4.17	7.63	11.84	34.14	34.63	42.42	.5723	.0504	.0125	1.4637	96.20	95.98	55.67	21.53	-737.4	-197.6
5	5.04	7.72	9.73	19.56	35.59	41.89	.5304	.0620	.0143	1.4362	94.04	93.69	59.57	40.01	-885.3	-404.5
6	5.81	7.76	6.06	14.12	35.72	43.06	.4833	.0766	.0147	1.4498	91.63	91.12	63.04	48.92	-1026.5	-560.7
7	6.50	7.91	5.74	13.03	35.27	44.12	.4647	.1069	.0231	1.4721	87.79	87.01	65.56	52.54	-1130.7	-653.0
8	6.72	8.01	6.14	13.25	35.00	44.08	.4717	.1334	.0289	1.4845	84.90	83.92	66.41	53.16	-1165.4	-670.2
9	6.91	8.06	8.94	11.96	34.68	40.96	.4991	.1898	.0399	1.4767	78.80	77.43	67.24	55.28	-1199.9	-680.3

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/A LBM/SEC SQFT
1.1499	1.5625	90.71	91.25	33.65

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(k) Continued. Run 225; speed code 85; point 3

(k-2) Stator 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	Vθ-1 FT/SEC	Vθ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/PT1	TT2/TT1
1	18.216	14.935	896.6	563.9	528.8	563.8	724.1	-11.6	54.0	-1.2	.7958	.4825	1.5297	1.1473
2	15.938	13.231	863.4	565.6	533.0	565.5	679.2	13.0	52.0	1.3	.7439	.4846	1.5365	1.1443
3	13.818	11.615	834.0	562.3	529.5	562.1	644.4	12.9	50.7	1.3	.7358	.4820	1.5371	1.1429
4	8.225	7.148	773.2	558.3	523.7	558.2	568.9	-6.7	47.4	-.7	.6772	.4786	1.5373	1.1419
5	2.154	1.678	700.8	531.9	505.0	531.0	485.9	-30.6	43.9	-3.3	.6095	.4555	1.5141	1.1394
6	-2.759	-3.178	683.0	555.8	511.8	555.1	452.2	-28.4	41.5	-2.9	.5909	.4754	1.5345	1.1463
7	-5.931	-6.328	691.1	575.2	523.3	574.8	451.4	-22.2	40.8	-2.2	.5951	.4901	1.5521	1.1584
8	-6.928	-7.303	700.8	583.6	529.6	583.5	464.6	-9.4	41.6	-.9	.6015	.4956	1.5586	1.1674
9	-8.017	-8.268	693.6	580.0	496.0	559.8	484.9	-14.1	44.5	-1.5	.5918	.4721	1.5356	1.1794

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/PT1	ηEFF-P STATIC-ST	ηEFF-A TOT-STG	ηEFF-P TOT-STG
1	1.49	3.60	11.15	55.21	41.93	51.31	.5313	.1331	.0272	.9546	81.93	87.66	88.36
2	1.14	3.54	12.53	50.69	42.93	51.77	.5015	.1011	.0215	.9677	85.31	90.46	91.00
3	1.17	3.90	11.69	49.35	43.20	51.61	.4865	.0820	.0181	.9753	87.38	91.47	91.95
4	.34	4.08	8.58	48.05	44.04	51.38	.4552	.0625	.0153	.9835	88.75	92.12	92.56
5	-1.69	3.44	6.07	47.17	43.53	48.75	.4413	.0653	.0178	.9855	86.41	90.28	90.81
6	-3.19	3.03	6.50	44.41	44.70	50.88	.3956	.0468	.0139	.9901	87.69	88.93	89.56
7	-3.78	3.10	8.32	43.07	45.77	52.38	.3825	.0591	.0184	.9874	82.95	84.46	85.37
8	-3.33	3.72	10.84	42.54	45.72	52.85	.3832	.0756	.0239	.9836	78.32	80.77	81.90
9	-1.17	5.98	11.85	45.92	42.81	49.99	.4256	.1233	.0395	.9740	68.57	72.67	74.24

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
9125.	148.17	1.1499	1.5344	86.79	87.54

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(k) Continued. Run 225; speed code 85; point 3

(k-3) Rotor 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VθA-1 FT/SEC	VθA-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.674	10.947	601.6	881.3	601.5	623.3	-11.5	623.1	-1.1	44.8	.5161	.7289	711.7	746.0	.8073	.5255	940.6	635.3
2	10.894	9.699	608.7	853.5	608.6	588.9	12.7	617.8	1.2	46.2	.5235	.7055	731.7	762.2	.8101	.5013	942.0	606.4
3	9.985	8.529	610.5	837.5	610.4	600.7	12.7	583.5	1.2	44.0	.5256	.6930	752.5	779.1	.8255	.5228	959.1	631.7
4	6.584	5.207	617.8	770.7	617.8	593.8	-6.6	491.3	-.6	39.5	.5323	.6359	817.3	833.2	.8873	.5654	1029.7	685.2
5	1.284	.979	599.6	720.8	598.8	575.1	-30.5	434.5	-2.9	37.1	.5164	.5917	906.7	910.5	.9578	.6128	1112.2	746.5
6	-3.824	-3.149	619.8	682.9	619.2	564.6	-28.5	384.2	-2.6	34.2	.5331	.5579	998.1	991.7	1.0310	.6775	1198.8	829.3
7	-6.982	-6.292	632.0	684.7	631.6	572.0	-22.1	376.4	-2.0	33.3	.5411	.5559	1067.8	1054.5	1.0784	.7202	1259.6	887.1
8	-7.871	-7.400	635.8	681.5	635.7	570.3	-9.6	373.0	-.9	33.1	.5424	.5516	1091.2	1075.8	1.0843	.7325	1271.2	905.0
9	-8.648	-8.560	611.1	638.8	610.9	536.1	-14.3	347.4	-1.3	32.9	.5173	.5139	1114.6	1097.4	1.0867	.7417	1283.6	922.0

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VθA'-1 FT/SEC	VθA'-2 FT/SEC
1	-.48	4.86	20.75	39.06	53.86	64.80	.4808	.1137	.0253	1.4854	90.92	90.41	50.16	11.10	-723.2	-123.0
2	-1.04	4.06	17.47	36.00	54.69	61.84	.5085	.1296	.0292	1.4638	89.34	88.77	49.71	13.71	-719.0	-144.4
3	-.48	4.43	16.00	32.51	54.89	63.89	.4654	.0901	.0204	1.4626	92.16	91.74	50.46	17.95	-739.7	-195.5
4	1.50	5.74	13.80	23.24	55.42	64.57	.4601	.0675	.0150	1.4324	92.99	92.64	53.14	29.88	-823.8	-341.9
5	3.60	6.82	9.12	17.81	53.45	63.45	.4483	.0686	.0149	1.4384	92.11	91.71	57.42	39.61	-937.2	-476.0
6	3.01	5.32	5.84	11.82	55.21	62.38	.4159	.0878	.0185	1.3983	88.27	87.72	58.92	47.10	-1026.6	-607.5
7	2.80	4.55	4.81	10.10	56.13	62.54	.3997	.1106	.0236	1.3835	84.41	83.69	59.91	49.81	-1089.8	-678.1
8	2.64	4.09	5.88	9.09	56.24	62.00	.3892	.1033	.0220	1.3765	85.01	84.34	59.97	50.88	-1100.8	-702.7
9	3.88	5.13	9.88	7.15	53.40	57.57	.3782	.0968	.0194	1.3591	85.28	84.64	61.52	54.37	-1128.9	-750.0

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.2845	2.1734	87.12	88.43	36.91

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(k) Concluded. Run 225; speed code 85; point 3

(k-4) Stator 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/PT1	TT2/TT1
1	8.290	1.073	907.9	638.9	666.7	638.7	616.3	18.5	43.0	1.7	.7533	.5156	1.3975	1.1320
2	7.269	1.026	878.8	666.1	630.7	665.9	612.0	19.3	44.3	1.7	.7286	.5402	1.4181	1.1293
3	6.219	.859	861.7	644.5	638.3	664.4	578.9	9.4	42.3	.8	.7151	.5404	1.4204	1.1247
4	3.578	.363	793.4	649.3	624.7	649.2	489.1	-3.1	38.1	-.3	.6561	.5296	1.4146	1.1163
5	-.813	-.299	743.2	629.5	603.2	629.5	434.2	-1.5	35.7	-.1	.6114	.5125	1.4192	1.1188
6	-1.754	-.903	707.1	616.2	593.1	616.2	385.1	-7.6	33.0	-.7	.5790	.5005	1.3853	1.1142
7	-3.820	-1.205	713.4	621.6	605.0	621.6	378.1	-1.3	32.0	-.1	.5808	.5019	1.3664	1.1154
8	-4.608	-1.249	714.1	610.9	607.4	610.9	375.5	4.9	31.8	.5	.5798	.4915	1.3544	1.1124
9	-5.519	-1.210	677.7	563.8	580.5	563.8	349.7	6.0	31.1	.6	.5470	.4509	1.3356	1.1079

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/PT1	EFF-P STATC-ST	EFF-A TOT-STG	EFF-P TOT-STG
1	-5.43	-3.86	13.35	41.32	68.20	70.60	.4449	.1911	.0432	.9399	88.32	75.72	76.82
2	-3.05	-1.00	12.78	42.66	65.23	74.50	.3977	.1047	.0242	.9688	79.45	80.83	81.74
3	-4.24	-1.69	11.52	41.53	66.93	74.89	.3840	.1004	.0236	.9710	79.20	84.26	85.01
4	-7.43	-3.48	10.03	38.37	67.13	73.89	.3358	.0498	.0125	.9875	86.95	89.07	89.76
5	-8.93	-3.53	10.14	35.89	65.82	71.42	.3102	.0579	.0156	.9871	81.90	88.20	88.75
6	-11.00	-4.74	9.31	33.70	64.80	69.42	.2875	.0442	.0126	.9910	83.64	85.17	85.82
7	-11.81	-5.07	10.14	32.15	65.29	68.97	.2863	.0585	.0172	.9880	78.54	80.50	81.32
8	-12.74	-5.85	11.37	31.32	65.08	67.21	.2950	.0760	.0222	.9849	74.47	80.21	81.02
9	-14.66	-7.54	12.68	30.53	61.34	61.22	.3178	.0891	.0266	.9838	73.40	79.55	80.35

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
9125.	148.17	1.2845	2.1371	85.02	86.51

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(*l*) Run 225; speed code 85; point 5

(*l*-1) Rotor 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VΘ-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	16.722	18.469	433.2	893.5	433.2	472.3	.0	758.5	.0	58.1	.3939	.7914	535.3	620.1	.6261	.4359	688.6	492.1
2	14.291	16.258	441.2	857.0	441.2	478.5	.0	711.0	.0	56.1	.4014	.7562	576.9	649.9	.6607	.4256	726.3	482.3
3	12.058	14.187	449.0	825.4	449.0	477.5	.0	673.2	.0	54.7	.4087	.7259	618.0	679.8	.6953	.4200	763.9	477.6
4	6.392	8.583	468.3	763.0	468.3	469.1	.0	601.8	.0	52.1	.4270	.6653	736.4	770.1	.7956	.4346	872.7	490.4
5	.568	2.187	482.5	687.3	482.5	451.8	.0	518.0	.0	48.9	.4403	.5946	884.1	890.1	.9192	.5069	1007.2	585.3
6	-4.881	-3.488	482.5	685.5	482.5	476.3	.0	492.9	.0	46.0	.4403	.5896	1025.1	1010.1	1.0340	.6048	1133.0	703.1
7	-9.154	-7.584	471.8	689.6	471.8	469.9	.0	504.8	.0	47.0	.4303	.5885	1129.2	1100.0	1.1160	.6471	1223.8	756.3
8	-10.505	-8.949	466.4	692.5	466.4	456.8	.0	520.6	.0	48.7	.4251	.5883	1163.8	1130.0	1.1428	.6470	1253.8	761.6
9	-11.572	-10.294	460.6	686.7	460.6	422.3	.0	541.5	.0	51.9	.4196	.5797	1198.3	1160.0	1.1696	.6322	1283.7	748.9

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	ΣEFF-P TOT-ST	ΣEFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VΘ'-1 FT/SEC	VΘ'-2 FT/SEC
1	4.42	9.03	11.58	67.16	30.69	37.39	.5462	.0975	.0206	1.6006	95.57	95.28	50.80	-16.36	-535.3	138.4
2	4.57	8.87	12.36	59.65	31.17	38.62	.5752	.0851	.0194	1.5891	95.67	95.40	52.37	-7.28	-576.9	61.1
3	4.81	8.92	12.38	53.01	31.63	39.15	.5964	.0843	.0202	1.5795	95.26	94.97	53.80	.79	-618.0	-6.6
4	5.95	9.42	10.08	37.69	32.75	39.79	.6176	.0913	.0229	1.5753	93.60	93.20	57.45	19.76	-736.4	-168.3
5	6.85	9.53	9.21	21.88	33.55	39.39	.5743	.1010	.0234	1.5523	91.02	90.47	61.37	39.49	-884.1	-372.2
6	7.59	9.54	4.47	17.40	33.55	42.16	.5237	.1096	.0247	1.5878	89.09	88.38	64.82	47.34	-1025.1	-517.2
7	8.30	9.71	4.86	15.71	32.95	41.47	.5258	.1686	.0371	1.6074	82.68	81.51	67.36	51.65	-1129.2	-595.2
8	8.51	9.80	6.07	15.13	32.64	40.11	.5415	.2052	.0446	1.6137	79.07	77.64	68.20	53.07	-1163.8	-609.4
9	8.65	9.80	9.23	13.41	32.30	36.78	.5703	.2570	.0536	1.6102	74.08	72.32	68.98	55.57	-1198.3	-618.5

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.1616	1.5846	86.98	87.77	31.67

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(l) Continued. Run 225; speed code 85; point 5

(l-2) Stator 1 - U. S. customary units

SL	EPSI-1	EPSI-2	V-1	V-2	VM-1	VM-2	Vθ-1	Vθ-2	B-1	B-2	M-1	M-2	PT2/ PT1	TT2/ TT1
	DEGREE	DEGREE	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	DEGREE	DEGREE				
1	18.338	15.072	891.3	505.8	492.7	505.5	742.7	-17.3	56.6	-1.9	.7691	.4301	1.5233	1.1510
2	16.177	13.494	858.1	511.4	498.4	511.3	698.6	9.3	54.6	1.0	.7573	.4355	1.5324	1.1483
3	14.177	12.002	829.0	507.4	497.3	507.3	663.2	8.1	53.2	.9	.7293	.4323	1.5328	1.1469
4	8.821	7.887	771.7	512.9	489.2	512.9	596.9	-1.0	50.7	-.1	.6736	.4369	1.5422	1.1487
5	2.825	2.779	700.1	484.3	472.2	483.3	516.8	-31.4	47.6	-3.7	.6064	.4117	1.5230	1.1478
6	-2.031	-1.928	700.9	527.6	497.1	527.3	494.2	-20.3	44.8	-2.2	.6039	.4478	1.5608	1.1591
7	-5.303	-5.405	707.2	540.9	492.5	540.3	507.6	-24.2	45.9	-2.6	.6046	.4558	1.5761	1.1769
8	-6.444	-6.603	710.9	543.9	480.5	543.8	523.9	-11.9	47.5	-1.3	.6051	.4564	1.5792	1.1873
9	-7.741	-7.877	706.0	525.9	448.1	525.6	545.6	-17.7	50.7	-1.9	.5972	.4380	1.5638	1.2015

SL	INCS	INCM	DEV	TURN	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P STATC-ST	%EFF-A TOT-STG	%EFF-P TOT-STG
	DEGREE	DEGREE	DEGREE	DEGREE									
1	4.08	6.19	10.38	58.58	39.08	46.73	.5996	.1434	.0293	.9516	82.49	84.64	85.50
2	3.78	6.18	12.25	53.61	40.21	47.54	.5680	.1128	.0239	.9643	85.39	87.46	88.16
3	3.71	6.49	11.30	52.33	40.68	47.31	.5566	.0992	.0219	.9704	86.61	88.36	89.01
4	3.69	7.41	9.16	50.80	41.29	47.95	.5213	.0803	.0196	.9789	87.60	88.68	89.23
5	2.08	7.13	5.59	51.30	40.90	45.12	.5212	.0846	.0231	.9814	85.61	86.39	87.15
6	.24	6.39	7.23	47.04	43.65	49.21	.4649	.0750	.0223	.9836	84.64	85.23	86.10
7	1.27	8.15	7.97	48.47	43.08	49.98	.4697	.0865	.0270	.9811	81.48	78.43	79.74
8	2.58	9.63	10.51	48.78	41.81	49.95	.4745	.0984	.0311	.9784	79.03	74.41	75.97
9	5.06	12.22	11.37	52.63	38.66	47.62	.5136	.1345	.0431	.9712	73.09	67.59	69.53

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
9113.	139.42	1.1614	1.5486	82.36	83.39

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(l) Continued. Run 225; speed code 85; point 5

(l-3) Rotor 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.748	10.936	529.7	845.1	529.4	548.7	-17.3	642.7	-1.9	49.3	.4512	.6933	710.7	745.0	.7668	.4579	900.2	558.2
2	11.026	9.679	540.3	825.8	540.2	520.4	9.1	641.2	1.0	50.8	.4612	.6776	730.7	761.2	.7694	.4382	901.5	534.0
3	10.180	8.513	541.0	804.1	540.9	525.5	8.1	608.6	.9	49.1	.4621	.6598	751.4	778.0	.7852	.4531	919.3	552.1
4	7.078	5.284	556.5	740.3	556.5	515.0	-.6	531.8	-.1	45.9	.4755	.6050	816.2	832.1	.8445	.4872	988.3	596.1
5	2.344	1.299	538.7	698.0	537.9	509.9	-30.9	476.6	-3.3	43.1	.4599	.5670	905.5	909.3	.9218	.5432	1079.9	668.7
6	-2.555	-2.659	584.5	675.8	584.1	522.4	-20.4	428.7	-2.0	39.4	.4983	.5466	996.7	990.3	.9999	.6204	1173.0	767.1
7	-6.015	-5.831	601.6	676.5	601.1	546.1	-24.4	399.4	-2.3	36.1	.5095	.5432	1066.3	1053.0	1.0548	.6838	1245.4	851.7
8	-7.134	-7.015	609.8	670.1	609.7	541.4	-12.0	394.8	-1.1	36.0	.5100	.5361	1089.7	1074.3	1.0598	.6952	1256.8	868.9
9	-8.198	-8.310	588.0	636.2	587.8	526.5	-17.8	397.0	-1.7	34.1	.4921	.5064	1113.1	1095.9	1.0665	.7222	1274.5	907.3

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	3.28	8.59	20.15	43.40	48.49	58.59	.5496	.1204	.0268	1.5081	91.40	90.90	53.90	10.50	-728.0	-102.3
2	2.38	7.50	16.67	40.24	49.68	56.18	.5738	.1253	.0284	1.4945	90.83	90.31	53.15	12.91	-721.7	-119.9
3	3.03	7.94	15.84	36.17	49.80	57.34	.5575	.1016	.0231	1.4871	92.14	91.70	53.96	17.79	-743.3	-169.4
4	4.13	8.36	14.11	25.57	51.16	57.30	.5361	.0948	.0210	1.4525	91.32	90.87	55.77	30.20	-816.8	-300.3
5	6.31	9.54	9.82	19.83	49.22	57.69	.5135	.0923	.0199	1.4702	90.68	90.17	60.14	40.31	-936.4	-432.7
6	4.21	6.51	5.82	13.06	53.29	59.75	.4641	.0852	.0180	1.4419	89.88	89.35	60.12	47.06	-1017.2	-561.6
7	4.08	5.74	5.06	11.03	54.24	62.11	.4276	.0769	.0163	1.4373	90.06	89.55	61.10	50.06	-1090.7	-653.6
8	3.85	5.30	6.37	9.80	54.20	61.29	.4169	.0651	.0137	1.4301	91.30	90.86	61.17	51.37	-1101.7	-679.5
9	4.81	6.06	9.95	8.02	51.98	59.08	.3884	.0320	.0064	1.4168	95.42	95.19	62.46	54.44	-1130.9	-738.9

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.3052	2.2502	85.26	86.82	34.58

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(l) Concluded. Run 225; speed code 85; point 5

(l-4) Stator 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	8.331	1.108	863.0	530.1	583.7	529.9	635.7	16.5	47.7	1.8	.7094	.4228	1.4308	1.1365
2	7.338	1.095	842.8	564.2	563.9	563.9	635.3	17.1	49.1	1.7	.6928	.4520	1.4494	1.1344
3	6.291	.935	820.6	571.8	555.8	571.7	603.8	8.5	47.5	.6	.6746	.4595	1.4573	1.1306
4	3.531	.394	756.6	553.3	540.6	553.3	529.4	-6.0	44.4	-.6	.6194	.4452	1.4393	1.1233
5	.427	-.376	715.6	553.9	534.1	553.9	476.2	-1.5	41.7	-.2	.5822	.4447	1.4573	1.1287
6	-2.359	-1.031	696.5	566.9	548.1	566.9	429.7	-3.9	38.1	-.4	.5643	.4545	1.4252	1.1226
7	-4.330	-1.270	702.7	582.6	576.8	582.5	401.3	6.0	34.9	.6	.5655	.4641	1.4143	1.1211
8	-5.016	-1.286	699.9	578.3	576.4	578.2	397.0	11.1	34.6	1.1	.5615	.4593	1.4064	1.1171
9	-5.785	-1.222	672.1	544.8	567.8	544.7	359.6	10.4	32.4	1.1	.5366	.4308	1.3934	1.1094

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P STATC-ST	%EFF-A TOT-STG	%EFF-P TOT-STG
1	-.74	.83	13.47	45.90	61.68	61.82	.5474	.1805	.0408	.9484	75.09	78.62	79.65
2	1.73	3.78	12.86	47.37	59.22	66.49	.4999	.1120	.0259	.9691	82.69	82.88	83.74
3	.93	3.47	11.56	46.66	60.10	67.91	.4742	.0773	.0182	.9796	87.10	86.62	87.30
4	-1.09	2.87	9.68	46.06	59.66	66.06	.4450	.0393	.0098	.9910	92.47	88.55	89.11
5	-2.96	2.44	10.13	41.87	59.93	65.86	.4052	.0440	.0119	.9910	90.07	87.91	88.52
6	-5.89	.37	9.63	38.50	62.11	66.99	.3637	.0569	.0162	.9890	84.77	86.52	87.16
7	-8.97	-2.22	10.85	34.29	64.85	67.70	.3370	.0800	.0235	.9844	77.02	85.53	86.21
8	-9.89	-3.00	12.01	33.54	64.40	66.68	.3349	.0827	.0245	.9842	76.21	86.93	87.54
9	-13.36	-6.25	13.15	31.35	62.78	62.17	.3432	.0879	.0262	.9845	76.37	90.43	90.86

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
9113.	139.42	1.3052	2.2167	83.50	85.21

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(m) Run 225; speed code 85; point 11

(m-1) Rotor 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	16.777	18.439	476.1	912.5	476.1	516.9	.0	752.0	.0	55.5	.4342	.8108	535.8	620.7	.6538	.4739	716.7	533.3
2	14.381	16.186	485.6	874.9	485.6	528.3	.0	697.4	.0	52.9	.4433	.7749	577.4	650.5	.6888	.4698	754.5	530.4
3	12.171	14.059	495.1	843.8	495.1	526.2	.0	659.6	.0	51.4	.4523	.7448	618.6	680.5	.7239	.4648	792.3	526.6
4	6.460	8.319	518.9	772.9	518.9	523.8	.0	568.4	.0	47.4	.4750	.6774	737.1	770.8	.8252	.4921	901.5	561.5
5	.594	1.812	535.8	686.8	535.8	491.8	.0	479.4	.0	44.3	.4912	.5971	885.0	891.0	.9485	.5576	1034.5	641.3
6	-4.347	-3.753	537.2	665.1	537.2	502.3	.0	436.0	.0	40.9	.4926	.5758	1026.1	1011.1	1.0620	.6610	1158.2	763.6
7	-8.418	-7.639	528.0	676.4	528.0	523.3	.0	428.6	.0	39.3	.4837	.5835	1130.3	1101.1	1.1429	.7351	1247.5	852.1
8	-9.906	-8.963	522.6	687.6	522.6	527.9	.0	440.7	.0	39.8	.4785	.5916	1164.9	1131.0	1.1692	.7476	1276.8	869.0
9	-11.234	-10.292	516.2	671.3	516.2	489.6	.0	469.2	.0	43.1	.4725	.5736	1199.4	1161.1	1.1951	.7312	1305.8	855.7

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	1.79	6.40	13.67	62.44	33.19	40.43	.5043	.0733	.0157	1.6018	96.40	96.16	48.16	-14.28	-535.8	131.3
2	1.92	6.22	14.57	54.79	33.73	42.15	.5231	.0530	.0121	1.5872	97.07	96.90	49.72	-5.07	-577.4	46.8
3	2.14	6.25	13.86	48.85	34.25	42.62	.5447	.0558	.0133	1.5764	96.60	96.40	51.13	2.28	-618.6	-20.9
4	3.26	6.73	11.46	33.62	35.54	43.92	.5499	.0485	.0120	1.5578	96.23	96.02	54.76	21.14	-737.1	-202.4
5	4.27	6.95	9.65	18.87	36.42	42.22	.5204	.0749	.0173	1.5163	92.56	92.14	58.80	39.93	-885.0	-411.6
6	5.14	7.09	8.89	13.52	36.49	43.79	.4649	.0750	.0164	1.5277	91.47	90.97	62.37	48.85	-1026.1	-575.1
7	5.90	7.31	8.26	12.90	36.02	45.83	.4374	.0890	.0194	1.5549	89.39	88.74	64.96	52.06	-1130.3	-672.5
8	6.15	7.44	8.52	13.32	35.73	46.10	.4427	.1128	.0248	1.5688	86.68	85.84	65.84	52.52	-1164.9	-690.3
9	6.36	7.51	8.65	11.70	35.40	42.30	.4725	.1762	.0373	1.5516	79.42	78.13	66.70	55.00	-1199.4	-701.9

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.1465	1.5477	90.74	91.27	34.47

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(m) Continued. Run 225; speed code 85; point 11

(m-2) Stator 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	18.215	14.972	915.1	593.9	543.2	593.9	736.4	-4.7	53.8	-.5	.8134	.5089	1.5264	1.1497
2	15.944	13.264	881.2	593.5	554.1	593.4	685.2	13.6	51.2	1.3	.7811	.5095	1.5324	1.1455
3	13.831	11.633	852.9	594.1	562.3	593.9	649.9	11.2	49.7	1.1	.7537	.5103	1.5369	1.1440
4	8.283	7.069	787.4	583.4	549.8	583.2	563.8	-15.3	45.7	-1.5	.6912	.5015	1.5313	1.1405
5	2.177	1.422	704.8	552.0	517.6	551.0	478.4	-34.1	42.7	-3.5	.6139	.4740	1.5010	1.1372
6	-2.923	-3.408	684.0	576.1	526.1	575.4	437.2	-29.9	39.8	-3.0	.5933	.4947	1.5172	1.1417
7	-6.091	-6.372	696.2	595.3	546.5	595.0	431.4	-19.8	38.4	-1.9	.6018	.5096	1.5324	1.1518
8	-7.042	-7.301	707.6	603.6	551.0	603.5	443.9	-8.1	38.9	-.8	.6099	.5151	1.5391	1.1603
9	-8.067	-8.256	693.0	576.3	515.8	576.1	462.8	-12.2	42.0	-1.2	.5934	.4882	1.5124	1.1711

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P STATC-ST	%EFF-A TOT-STG	%EFF-P TOT-STG
1	1.22	3.33	11.87	54.22	42.42	53.15	.5087	.1329	.0272	.9532	81.32	85.81	86.60
2	.30	2.70	12.52	49.85	44.02	53.49	.4807	.1030	.0219	.9659	84.50	89.14	89.75
3	.17	2.96	11.46	48.63	44.47	53.75	.4618	.0793	.0175	.9752	87.20	90.76	91.2
4	-1.29	2.43	7.77	47.21	45.70	52.97	.4333	.0593	.0145	.9838	88.74	92.13	92.57
5	-2.77	2.29	5.77	46.27	44.01	49.83	.4141	.0458	.0125	.9897	89.54	89.69	90.24
6	-4.84	1.31	6.46	42.74	45.42	51.89	.3614	.0342	.0101	.9927	89.55	89.27	89.86
7	-6.27	.61	8.63	40.26	47.39	53.34	.3492	.0680	.0212	.9852	77.86	85.47	86.29
8	-6.00	1.05	10.99	39.72	47.62	53.80	.3512	.0842	.0267	.9813	72.93	81.83	82.67
9	-3.62	3.53	12.09	43.23	44.09	50.65	.3902	.1190	.0381	.9748	65.85	73.32	74.80

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
9122.	151.78	1.1465	1.5212	86.95	87.67

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(m) Continued. Run 225; speed code 85; point 11

(m-3) Rotor 2 - U. S. customary units

SL	EPSI-1	EPSI-2	V-1	V-2	VM-1	VM-2	Vθ-1	Vθ-2	B-1	B-2	M-1	M-2	U-1	U-2	M'-1	M'-2	V'-1	V'-2
	DEGREE	DEGREE	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	DEGREE	DEGREE			FT/SEC	FT/SEC			FT/SEC	FT/SEC
1	11.678	11.004	644.2	882.8	644.2	698.2	-4.8	540.3	-.4	37.6	.5545	.7360	711.4	745.7	.8291	.6067	963.3	727.7
2	10.824	9.768	650.1	937.2	649.9	754.0	13.3	556.6	1.2	36.3	.5609	.7874	731.4	761.9	.8357	.6566	968.6	781.5
3	9.825	8.602	655.7	883.0	655.6	707.7	11.1	528.0	1.0	36.6	.5665	.7384	752.2	778.7	.8548	.6279	989.4	750.8
4	6.434	5.346	655.9	822.7	655.7	705.3	-15.1	423.6	-1.3	30.9	.5676	.6877	817.0	832.9	.9167	.6817	1059.4	815.5
5	1.053	.886	629.7	774.9	628.8	692.7	-34.0	347.3	-3.1	26.6	.5444	.6468	906.3	910.2	.9779	.7450	1131.2	892.5
6	-4.092	-3.346	637.1	702.5	636.4	632.0	-29.9	306.6	-2.7	25.9	.5499	.5819	997.7	991.3	1.0434	.7718	1208.7	931.8
7	-6.752	-6.156	644.6	707.9	644.3	642.9	-19.6	296.3	-1.7	24.7	.5542	.5843	1067.3	1054.0	1.0864	.8201	1263.6	993.7
8	-7.604	-7.227	649.3	738.8	649.3	677.9	-8.3	293.7	-.7	23.4	.5564	.6101	1090.7	1075.3	1.0938	.8545	1276.5	1034.7
9	-8.492	-8.445	621.7	680.3	621.6	629.1	-12.4	259.0	-1.1	22.3	.5288	.5583	1114.1	1097.0	1.0943	.8599	1286.6	1047.8

SL	INCS	INCM	DEV	TURN	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B	LOSS-P	PT2/	%EFF-P	%EFF-A	B'-1	B'-2	VB'-1	VB'-2
	DEGREE	DEGREE	DEGREE	DEGREE				TOTAL	TOTAL	PT1	TOT-ST	TOT-ST	DEGREE	DEGREE	FT/SEC	FT/SEC
1	-2.68	2.63	25.96	31.63	56.34	63.99	.3758	.3048	.0663	1.3001	69.63	68.51	47.94	16.31	-716.2	-205.4
2	-2.97	2.16	18.91	32.65	57.08	70.90	.3257	.1801	.0403	1.3742	82.56	81.78	47.80	15.15	-718.1	-205.2
3	-2.46	2.45	17.47	29.05	57.66	66.59	.3675	.2494	.0560	1.3201	74.03	73.02	48.48	19.43	-741.0	-250.7
4	.12	4.35	14.00	21.68	57.60	67.90	.3376	.1933	.0430	1.2960	75.66	74.78	51.76	30.08	-832.1	-409.3
5	2.40	5.63	8.59	17.14	54.97	67.57	.3081	.1416	.0311	1.2969	79.38	78.64	56.22	39.09	-940.4	-562.8
6	2.35	4.65	6.06	10.94	55.84	60.61	.3169	.2218	.0466	1.2153	62.16	61.13	58.26	47.29	-1027.6	-684.6
7	2.31	3.97	4.64	9.69	56.48	61.00	.2959	.2239	.0478	1.2018	59.25	58.22	59.33	49.64	-1087.0	-757.7
8	2.06	3.51	3.99	10.39	56.66	64.38	.2687	.1793	.0396	1.2222	66.52	65.58	59.38	48.99	-1099.0	-781.6
9	3.40	4.65	8.53	8.02	53.58	58.96	.2577	.1735	.0359	1.1940	64.44	63.57	61.04	53.03	-1126.5	-838.0

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.2581	1.9162	79.00	80.80	38.08

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(m) Concluded. Run 225; speed code 85; point 11

(m-4) Stator 2 - U. S. customary units

SL	EPS1-1 DEGREE	EPS1-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	Vθ-1 FT/SEC	Vθ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	8.475	1.429	923.9	777.3	753.8	763.5	534.3	-145.6	35.6	-10.8	.7743	.6402	1.0186	1.1131
2	7.693	1.632	973.5	917.8	802.2	904.6	551.6	-165.3	34.7	-9.7	.8219	.7691	1.1494	1.1155
3	6.842	1.601	918.8	968.2	754.5	954.3	524.3	-163.1	34.9	-9.7	.7718	.8181	1.2049	1.1137
4	4.293	1.079	856.1	946.4	744.9	933.8	421.9	-153.8	29.6	-9.4	.7184	.8032	1.2075	1.1029
5	1.568	.318	808.7	919.4	730.3	909.2	347.2	-136.9	25.4	-8.6	.6775	.7808	1.2198	1.0979
6	-1.288	-.642	741.7	875.6	675.0	872.6	307.3	-73.1	24.5	-4.8	.6167	.7392	1.1635	1.0934
7	-4.107	-1.336	750.8	868.6	689.3	868.3	297.7	-23.1	23.4	-1.5	.6223	.7292	1.1330	1.0921
8	-4.978	-1.435	784.2	851.3	726.3	851.2	295.6	-14.8	22.2	-1.0	.6506	.7117	1.1137	1.0884
9	-5.782	-1.383	735.0	736.9	687.1	736.6	260.8	-20.8	20.9	-1.4	.6063	.6080	1.0318	1.0813

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P STATC-ST	%EFF.-A TOT-STG	%EFF.-P TOT-STG
1	-12.85	-11.28	.91	46.34	67.29	58.22	.3241	.6553	.1457	.7857	-101.62	4.67	4.88
2	-12.66	-10.62	1.40	44.44	73.64	71.74	.2200	.4502	.1025	.8415	-382.78	34.63	35.75
3	-11.63	-9.08	1.02	44.64	69.41	77.42	.1332	.2803	.0651	.9063	180.85	47.99	49.30
4	-15.95	-11.99	.95	38.94	70.32	77.57	.0663	.2331	.0576	.9318	188.80	53.61	54.80
5	-19.24	-13.84	1.72	34.00	69.95	76.48	.0274	.2314	.0617	.9384	167.46	59.46	60.55
6	-19.52	-13.26	5.23	29.27	63.48	72.81	-.0341	.1888	.0537	.9573	140.66	47.18	48.27
7	-20.45	-13.71	8.73	24.92	64.00	71.22	-.0229	.2527	.0742	.9409	170.79	39.55	40.58
8	-22.32	-15.43	9.92	23.19	67.38	68.97	.0217	.3586	.1062	.9140	326.99	34.73	35.64
9	-24.94	-17.83	10.45	22.46	62.76	57.94	.1046	.6178	.1844	.8674	368.04	10.88	11.18

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
9122.	151.78	1.2581	1.7647	68.18	70.57

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(n) Run 225; speed code 85; point 12

(n-1) Rotor 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VΘ-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	16.760	18.367	473.9	915.4	473.9	516.6	.0	755.7	.0	55.7	.4322	.8137	533.7	618.3	.6510	.4752	713.8	534.6
2	14.361	16.052	483.8	878.7	483.8	526.0	.0	703.8	.0	53.2	.4414	.7783	575.2	648.0	.6861	.4686	751.6	529.0
3	12.159	13.874	493.7	847.2	493.7	524.9	.0	665.0	.0	51.7	.4510	.7479	616.2	677.9	.7212	.4635	789.5	525.0
4	6.448	8.041	518.0	774.2	518.0	522.2	.0	571.5	.0	47.6	.4749	.6785	734.3	767.8	.8226	.4889	898.6	557.9
5	.643	1.494	534.8	687.0	534.8	491.3	.0	480.3	.0	44.4	.4903	.5974	881.5	887.5	.9453	.5549	1031.1	638.1
6	-4.214	-4.003	535.5	663.3	535.5	499.0	.0	437.0	.0	41.2	.4910	.5742	1022.1	1007.2	1.0579	.6559	1153.9	757.7
7	-8.348	-7.799	525.6	678.4	525.6	521.8	.0	433.6	.0	39.7	.4814	.5851	1125.9	1096.8	1.1381	.7278	1242.5	843.9
8	-9.877	-9.086	519.9	688.2	519.9	524.0	.0	446.0	.0	40.3	.4760	.5917	1160.4	1126.7	1.1641	.7386	1271.6	859.0
9	-11.224	-10.362	513.4	672.2	513.4	486.8	.0	463.5	.0	43.5	.4497	.5742	1194.8	1156.6	1.1899	.7235	1300.4	846.9

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	EFF-P TOT-ST	EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	1.80	6.41	13.03	63.09	33.07	40.40	.5018	.0678	.0144	1.6048	96.70	96.50	48.18	-14.91	-533.7	137.4
2	1.91	6.21	13.59	56.76	33.43	41.97	.5252	.0515	.0118	1.6917	97.19	97.02	49.71	-6.05	-575.2	55.8
3	2.11	6.22	12.99	49.70	34.17	42.53	.5467	.0527	.0126	1.6810	96.83	96.64	51.10	1.41	-616.2	-12.9
4	3.20	6.67	10.92	34.10	35.49	43.84	.5534	.0452	.0113	1.6609	96.52	96.32	54.70	20.60	-734.3	-196.3
5	4.23	6.90	9.38	19.09	36.37	42.26	.5219	.0691	.0160	1.6193	93.17	92.79	58.75	39.66	-881.5	-407.3
6	5.12	7.07	5.94	13.55	36.41	43.56	.4679	.0734	.0161	1.6283	91.69	91.20	62.35	48.80	-1022.1	-570.2
7	5.91	7.32	4.97	13.21	35.89	45.72	.4429	.0917	.0201	1.6583	89.20	88.53	64.97	51.76	-1125.9	-663.3
8	6.17	7.46	5.34	13.53	35.59	45.75	.4497	.1184	.0262	1.6701	86.18	85.30	65.86	52.34	-1160.4	-680.6
9	6.30	7.54	8.47	11.91	35.24	42.05	.4783	.1799	.0382	1.6530	79.19	77.89	66.73	54.82	-1194.8	-693.1

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.1468	1.5501	90.89	91.41	34.37

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(n) Continued. Run 225; speed code 85; point 12

(n-2) Stator 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VΘ-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/PT1	TT2/TT1
1	18.120	14.904	916.4	596.1	540.9	596.0	739.9	-6.4	54.0	-.6	.8148	.5108	1.5289	1.1498
2	15.784	13.153	883.4	594.9	550.2	594.7	691.4	14.4	51.6	1.4	.7833	.5105	1.5338	1.1462
3	13.610	11.491	855.1	595.3	549.5	595.2	655.1	12.1	50.1	1.2	.7556	.5113	1.5382	1.1445
4	7.984	6.824	787.9	586.0	547.2	585.8	566.8	-14.0	46.0	-1.4	.6914	.5038	1.5347	1.1407
5	1.870	.979	705.0	549.0	517.0	548.2	479.3	-30.3	42.8	-3.2	.6142	.4714	1.5017	1.1369
6	-3.071	-4.116	683.0	565.1	523.9	564.4	438.3	-28.5	39.9	-2.9	.5924	.4849	1.5150	1.1414
7	-6.111	-7.051	698.7	592.3	545.6	592.0	436.5	-18.4	38.7	-1.8	.6037	.5067	1.5370	1.1527
8	-7.034	-7.861	708.1	603.5	547.2	603.4	449.4	-8.4	39.5	-.8	.6100	.5148	1.5447	1.1614
9	-8.061	-8.601	693.4	575.2	512.4	575.0	467.1	-13.2	42.5	-1.3	.5936	.4871	1.5152	1.1720

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/PT1	ΔEFF-P STATIC-ST	ΔEFF-A TOT-STG	ΔEFF-P TOT-STG
1	1.46	3.56	11.71	54.61	42.27	53.37	.5082	.1333	.0273	.9529	81.22	86.08	86.86
2	.73	3.13	12.60	50.21	43.74	53.60	.4816	.1080	.0229	.9641	83.75	88.89	89.52
3	.53	3.30	11.54	48.90	44.29	53.86	.4626	.0850	.0188	.9733	86.28	90.58	91.11
4	-1.02	2.70	7.91	47.34	45.56	53.26	.4307	.0579	.0141	.9842	88.89	92.52	92.94
5	-2.69	2.37	6.15	45.97	44.06	49.67	.4173	.0522	.0142	.9883	88.30	89.97	90.50
6	-4.64	1.49	6.53	42.84	45.29	51.08	.3762	.0421	.0125	.9911	88.18	89.15	89.74
7	-5.80	.99	8.76	40.52	47.31	53.26	.3568	.0631	.0197	.9862	80.28	85.55	86.37
8	-5.46	1.59	10.96	40.29	47.27	53.95	.3544	.0725	.0229	.9839	76.86	81.98	83.02
9	-3.17	3.98	11.98	43.78	43.80	50.63	.3946	.1148	.0368	.9757	67.45	73.27	74.76

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
9086.	151.33	1.1468	1.5229	87.00	87.72

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(n) Continued. Run 225; speed code 85; point 12

(n-3) Rotor 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VΘ-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.651	11.027	635.7	847.9	635.7	649.4	-6.4	545.1	-.6	39.9	.5464	.7036	708.7	742.8	.8227	.5634	956.7	678.9
2	10.810	9.809	641.1	859.2	641.0	653.4	14.1	557.8	1.3	40.3	.5525	.7147	728.6	758.9	.8272	.5688	959.9	683.7
3	9.830	8.643	647.6	847.8	647.5	658.5	11.9	534.0	1.1	38.9	.5580	.7056	749.3	775.7	.8469	.5839	981.3	701.5
4	6.211	5.327	653.1	796.5	652.9	666.4	-13.9	436.2	-1.2	33.2	.5449	.6631	813.8	829.7	.9119	.6443	1054.2	773.9
5	.515	.934	627.3	725.7	626.6	631.3	-30.2	357.9	-2.8	29.5	.5423	.6024	902.8	906.6	.9715	.6943	1123.9	836.4
6	-4.977	-3.520	636.6	687.9	635.9	614.8	-28.3	308.6	-2.6	26.7	.5495	.5691	993.8	987.4	1.0392	.7576	1203.9	915.8
7	-8.080	-6.808	646.1	679.1	645.8	611.8	-17.8	294.7	-1.6	25.7	.5552	.5588	1063.2	1050.0	1.0822	.7998	1259.2	971.9
8	-8.844	-7.890	647.0	663.0	647.0	597.6	-8.8	287.1	-.8	25.6	.5539	.5434	1086.5	1071.2	1.0891	.8081	1272.1	985.9
9	-9.377	-8.914	614.2	697.8	614.0	532.6	-13.4	271.6	-1.3	27.0	.5218	.4861	1109.8	1092.7	1.0876	.7958	1280.1	978.7

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VΘ'-1 FT/SEC	VΘ'-2 FT/SEC
1	-2.36	2.97	26.50	31.42	55.91	64.37	.4241	.1684	.0365	1.3751	83.96	83.25	48.27	16.85	-715.0	-197.8
2	-2.71	2.41	20.79	31.03	56.56	65.73	.4217	.1329	.0295	1.3984	87.45	86.86	48.06	17.03	-714.5	-201.1
3	-2.26	2.66	18.12	28.61	57.20	66.97	.4135	.1144	.0256	1.3967	88.64	88.11	48.69	20.08	-737.4	-241.8
4	.00	4.31	14.43	21.21	57.55	69.47	.3767	.0628	.0139	1.3824	92.53	92.20	51.72	30.51	-827.7	-393.5
5	2.28	5.51	10.49	15.12	54.87	66.45	.3558	.0455	.0097	1.3646	93.66	93.40	56.11	40.99	-933.1	-548.7
6	2.24	4.56	6.61	10.33	55.76	64.09	.3285	.0788	.0164	1.3125	86.99	86.51	58.17	47.85	-1022.2	-678.8
7	2.16	3.85	5.98	8.23	56.70	62.49	.3107	.1160	.0241	1.2715	79.07	78.38	59.21	50.98	-1081.0	-755.2
8	2.14	3.59	7.66	6.81	56.62	60.34	.3035	.1223	.0250	1.2549	77.03	76.31	59.47	52.66	-1095.3	-784.1
9	3.60	4.93	12.50	4.34	53.16	52.76	.3121	.1549	.0290	1.2225	69.91	69.08	61.33	56.99	-1123.2	-821.1

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.2595	2.0281	86.15	87.44	37.93

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(n) Concluded. Run 225; speed code 85; point 12

(n-4) Stator 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	8.321	1.217	882.9	707.4	699.2	707.2	539.0	-14.5	37.9	-1.2	.7357	.5784	1.2189	1.1139
2	7.425	1.381	891.1	732.9	699.1	732.8	552.6	-16.9	38.5	-1.3	.7442	.6013	1.2407	1.1154
3	6.552	1.434	878.2	762.0	700.3	761.7	530.0	-21.9	37.3	-1.6	.7336	.6280	1.2672	1.1138
4	4.217	1.140	824.6	795.7	700.8	795.3	434.5	-25.0	31.9	-1.8	.6884	.6622	1.3153	1.1051
5	1.623	.277	753.4	765.5	662.9	765.2	357.9	-22.5	28.4	-1.7	.6370	.6379	1.3253	1.0993
6	-.886	-.596	716.1	726.3	645.8	725.9	309.4	-21.6	25.6	-1.7	.5940	.6030	1.2767	1.0931
7	-3.049	-1.071	711.2	708.6	646.7	708.6	296.1	-8.6	24.6	-.7	.5871	.5847	1.2386	1.0903
8	-3.900	-1.173	700.9	683.2	638.5	683.1	289.2	-3.3	24.4	-.3	.5764	.5609	1.2189	1.0874
9	-4.980	-1.195	643.8	598.0	583.0	598.0	273.3	-1.8	25.2	-.2	.5256	.4863	1.1741	1.0853

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P STATIC-ST	%EFF-A TOT-STG	%EFF-P TOT-STG
1	-10.54	-8.98	10.52	39.03	67.86	66.90	.3395	.3733	.0845	.8872	10.14	50.89	52.22
2	-8.84	-6.81	9.81	39.83	68.96	69.98	.3239	.3627	.0837	.8885	3.97	54.91	56.23
3	-9.32	-6.77	9.07	38.90	69.93	73.63	.2827	.3084	.0726	.9068	-4.07	61.33	62.57
4	-13.68	-9.72	8.50	33.66	71.93	78.98	.1779	.1793	.0449	.9510	-107.30	77.24	78.08
5	-16.30	-10.90	8.60	30.06	68.81	76.63	.1214	.1270	.0342	.9709	446.01	84.11	84.70
6	-18.41	-12.15	8.31	27.30	66.44	72.25	.1179	.1293	.0369	.9726	563.84	77.39	78.13
7	-19.24	-12.49	9.56	25.31	65.08	69.54	.1303	.1232	.0362	.9744	******	69.63	70.50
8	-20.12	-13.23	10.64	24.67	63.46	66.32	.1458	.1436	.0425	.9718	-370.90	66.24	67.14
9	-20.62	-13.52	11.89	25.34	56.75	56.87	.1956	.2312	.0691	.9613	-69.30	54.84	55.80

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
9086.	151.33	1.2595	1.9370	80.02	81.76

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(o) Run 225; speed code 70; point 1

(o-1) Rotor 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VΘ-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	16.606	18.333	366.3	769.8	366.3	442.6	.0	629.9	.0	54.9	.3316	.6867	441.2	511.0	.5191	.4088	573.4	458.3
2	14.124	15.975	373.8	736.8	373.8	439.1	.0	591.7	.0	53.4	.3385	.6552	475.4	535.6	.5477	.3936	604.8	442.6
3	11.872	13.758	381.1	708.0	381.1	443.2	.0	562.1	.0	51.2	.3453	.6282	509.3	560.3	.5764	.3933	636.1	443.3
4	5.959	7.828	399.1	649.8	399.1	446.4	.0	472.1	.0	46.6	.3620	.5739	606.9	634.7	.6589	.4196	726.4	475.1
5	.242	1.211	410.4	564.5	410.4	405.6	.0	392.7	.0	44.1	.3726	.4955	728.7	733.6	.7592	.4650	836.3	529.9
6	-4.536	-4.265	410.4	548.9	410.4	428.4	.0	343.1	.0	38.7	.3725	.4813	844.8	832.5	.8526	.5703	939.2	650.4
7	-8.574	-8.001	402.1	553.9	402.1	432.3	.0	346.3	.0	38.7	.3649	.4838	930.6	906.6	.9198	.6181	1013.8	707.7
8	-10.008	-9.236	397.8	558.9	397.8	436.2	.0	349.5	.0	38.6	.3608	.4875	959.1	931.3	.9419	.6343	1038.4	727.2
9	-11.285	-10.452	393.0	542.6	393.0	405.5	.0	360.5	.0	41.5	.3563	.4713	987.6	956.0	.9638	.6258	1062.9	720.5

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	EFF-P TOT-ST	EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	3.68	8.29	12.90	65.10	26.53	34.06	.4617	.0868	.0185	1.3908	95.85	95.68	50.06	-15.04	-441.2	118.8
2	3.78	8.08	12.36	58.84	27.01	34.20	.5081	.0974	.0222	1.3790	94.77	94.56	51.58	-7.28	-475.4	56.1
3	3.98	8.09	12.64	51.91	27.48	34.92	.5225	.0840	.0201	1.3697	94.94	94.74	52.97	1.06	-509.3	-8.2
4	5.05	8.52	10.31	36.54	28.61	36.06	.5252	.0603	.0151	1.3580	95.20	95.02	56.55	19.99	-606.9	-162.5
5	6.07	8.75	9.76	20.56	29.31	33.22	.5096	.1008	.0232	1.3190	89.47	89.08	60.60	40.05	-728.7	-340.9
6	6.87	8.82	5.98	15.30	29.31	35.55	.4284	.0631	.0138	1.3265	92.03	91.74	64.10	48.80	-844.8	-489.4
7	7.58	8.99	5.52	14.39	28.80	35.79	.4219	.1051	.0228	1.3358	86.18	85.64	66.64	52.32	-930.6	-560.3
8	7.79	9.08	6.08	14.39	28.53	36.05	.4202	.1188	.0258	1.3404	84.27	83.64	67.48	53.08	-959.1	-581.8
9	7.95	9.10	9.31	12.61	28.23	33.26	.4456	.1733	.0361	1.3277	77.18	76.29	68.29	55.66	-987.6	-595.5

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
1.0978	1.3405	89.38	89.77	27.64

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(o) Continued. Run 225; speed code 70; point 1

(o-2) Stator 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	18.161	14.933	770.5	541.8	461.9	541.8	616.7	7.4	53.3	.8	.6873	.4722	1.3456	1.1033
2	15.774	13.187	740.6	539.4	458.8	539.2	581.4	15.6	51.8	1.6	.6588	.4704	1.3481	1.1015
3	13.546	11.514	714.1	534.4	462.7	534.3	543.9	7.9	49.6	.8	.6341	.4664	1.3474	1.0991
4	7.899	6.854	660.3	517.7	465.6	517.6	468.2	-10.5	45.1	-1.2	.5838	.4519	1.3382	1.0960
5	1.628	.887	578.7	473.3	425.9	472.4	391.8	-28.1	42.6	-3.4	.5085	.4124	1.3068	1.0924
6	-3.101	-4.319	564.3	481.7	447.0	480.7	344.4	-31.1	37.6	-3.7	.4954	.4201	1.3125	1.0919
7	-6.125	-7.285	569.6	499.4	450.5	499.0	348.5	-21.6	37.8	-2.5	.4981	.4343	1.3234	1.1008
8	-7.059	-8.073	574.0	502.4	453.3	501.9	352.1	-20.7	37.9	-2.4	.5013	.4362	1.3241	1.1045
9	-8.068	-8.761	558.5	482.5	424.2	482.1	363.2	-20.1	40.7	-2.4	.4857	.4172	1.3083	1.1106

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	BEFF-P STATC-ST	BEFF-A TOT-STG	BEFF-P TOT-STG
1	.79	2.90	13.09	52.57	35.53	45.31	.4504	.1187	.0243	.9679	79.89	85.75	86.30
2	.96	3.36	12.86	50.17	35.66	45.29	.4251	.0862	.0183	.9783	84.09	87.82	88.29
3	.11	2.89	11.22	48.80	36.34	45.04	.4095	.0677	.0149	.9840	86.51	89.77	90.16
4	-1.88	1.84	8.12	46.28	37.40	43.73	.3861	.0642	.0157	.9868	85.01	90.42	90.77
5	-2.91	2.14	5.91	45.99	34.66	39.75	.3786	.0589	.0161	.9905	83.64	86.02	86.50
6	-6.96	-.81	5.78	41.36	36.85	40.52	.3448	.0695	.0206	.9893	76.62	87.97	88.39
7	-6.83	.05	8.05	40.28	37.05	41.82	.3272	.0601	.0187	.9906	76.26	82.72	83.35
8	-7.02	.04	9.39	40.30	37.21	41.91	.3323	.0767	.0243	.9879	70.22	79.96	80.70
9	-4.95	2.20	10.91	43.09	34.56	39.87	.3579	.0982	.0314	.9854	64.46	72.17	73.17

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
7510.	121.69	1.0977	1.3227	85.13	85.67

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(o) Continued. Run 225; speed code 70; point 1

(o-3) Rotor 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VΘ-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.722	11.097	570.6	737.5	570.5	590.1	7.1	431.4	.7	35.7	.4705	.6299	585.7	614.0	.7099	.5342	812.6	625.3
2	10.938	9.950	574.6	751.1	574.4	611.9	15.3	435.5	1.5	35.3	.5026	.6427	602.2	627.3	.7183	.5468	821.3	641.3
3	9.955	8.828	575.6	757.5	575.5	632.9	7.8	416.2	.8	33.2	.5041	.6496	619.3	641.2	.7354	.5760	839.7	671.7
4	6.254	5.558	571.9	709.0	571.8	627.0	-10.4	330.9	-1.0	27.8	.5014	.6082	672.6	685.8	.7810	.6181	890.8	720.5
5	.403	1.172	536.9	644.2	536.2	590.7	-28.2	287.2	-3.0	23.5	.4701	.5516	746.2	749.4	.8248	.6584	941.9	768.9
6	-5.301	-3.383	539.1	604.7	538.2	569.2	-31.0	204.1	-3.3	19.7	.4722	.5175	821.5	816.2	.8830	.7152	1008.2	835.8
7	-8.554	-6.878	541.5	595.8	541.1	568.1	-21.7	179.6	-2.3	17.5	.4724	.5086	878.8	867.9	.9165	.7618	1050.6	892.5
8	-9.395	-8.059	535.0	570.1	534.6	542.2	-20.9	175.9	-2.2	18.0	.4656	.4847	898.1	885.4	.9253	.7592	1063.2	892.9
9	-9.938	-9.089	508.7	490.7	508.3	459.1	-20.3	173.2	-2.3	20.6	.4407	.4139	917.3	903.2	.9239	.7275	1066.6	862.4

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VΘ'-1 FT/SEC	VΘ'-2 FT/SEC
1	-5.30	.02	26.54	28.44	47.14	52.02	.3516	.2144	.0465	1.2145	75.81	75.17	45.32	16.89	-578.7	-182.6
2	-5.19	-.07	21.09	28.26	47.53	53.84	.3394	.1662	.0368	1.2345	81.26	80.74	45.58	17.33	-586.9	-191.8
3	-4.22	.69	17.54	27.29	47.67	56.36	.3163	.1096	.0246	1.2519	87.19	86.81	46.72	19.50	-611.5	-224.9
4	-1.58	2.65	13.39	20.56	47.22	56.91	.2901	.0469	.0105	1.2418	93.34	93.17	50.06	29.47	-683.0	-354.9
5	1.47	4.70	9.31	15.46	44.02	53.85	.2718	.0225	.0049	1.2280	96.11	96.04	55.29	39.80	-774.8	-492.2
6	1.90	4.20	5.84	10.73	44.37	51.33	.2462	.0629	.0133	1.1804	86.51	86.25	57.80	47.08	-852.5	-612.0
7	2.08	3.74	5.46	8.64	44.59	50.22	.2165	.0847	.0178	1.1469	78.80	78.45	59.10	50.46	-900.5	-680.3
8	2.56	4.01	7.59	7.29	44.02	47.29	.2221	.1190	.0244	1.1279	69.46	69.02	59.89	52.59	-919.0	-709.4
9	3.93	5.18	13.31	3.74	41.62	39.24	.2536	.1991	.0365	1.0865	48.04	47.52	61.57	57.80	-937.6	-730.0

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.1654	1.5821	84.68	85.61	34.36

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(o) Concluded. Run 225; speed code 70; point 1

(o-4) Stator 2 - U.S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	Vθ-1 FT/SEC	Vθ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	8.304	1.238	772.0	701.6	643.4	700.9	426.7	-29.4	33.8	-2.4	.6620	.5970	1.0570	1.0758
2	7.412	1.432	782.3	724.9	652.6	724.4	431.5	-26.4	33.6	-2.1	.6718	.6184	1.0762	1.0767
3	6.598	1.527	786.5	765.4	669.2	764.5	413.3	-36.6	31.8	-2.7	.6767	.6567	1.1141	1.0766
4	4.517	1.462	735.3	774.1	657.2	773.1	329.8	-39.2	26.7	-2.9	.6326	.6685	1.1417	1.0689
5	2.139	.790	669.7	757.5	618.2	756.8	257.4	-31.1	22.6	-2.4	.5748	.6561	1.1680	1.0632
6	-.270	-.193	629.8	715.8	595.4	714.9	205.1	-35.5	19.0	-2.8	.5401	.6192	1.1320	1.0566
7	-2.375	-.831	623.5	696.5	596.9	696.2	180.4	-21.5	16.8	-1.8	.5336	.6003	1.1070	1.0509
8	-3.231	-1.015	605.2	668.2	578.7	668.1	177.1	-10.6	17.0	-.9	.5161	.5732	1.0889	1.0506
9	-4.399	-1.131	535.8	564.5	506.8	564.4	174.0	-3.2	19.0	-.3	.4535	.4788	1.0291	1.0505

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P STATC-ST	%EFF-A TOT-STG	%EFF-P TOT-STG
1	-14.65	-13.08	9.29	36.17	54.90	54.06	.2239	.5061	.1144	.8711	-160.39	21.07	21.64
2	-13.72	-11.68	9.04	35.73	56.40	56.33	.2062	.4834	.1116	.8743	-212.20	27.64	28.34
3	-14.75	-12.20	7.97	34.57	58.62	60.31	.1643	.4130	.0971	.8905	-557.43	40.87	41.72
4	-18.82	-14.86	7.40	29.61	58.84	62.32	.0794	.3403	.0851	.9188	417.65	55.94	56.71
5	-22.06	-16.66	7.93	24.97	55.70	61.87	-.0101	.2517	.0678	.9491	182.02	71.67	72.24
6	-25.00	-18.74	7.58	21.84	53.11	58.54	-.0263	.2357	.0672	.9575	172.27	63.63	64.20
7	-27.03	-20.29	8.49	18.58	52.14	56.63	-.0216	.2007	.0590	.9646	172.08	57.92	58.46
8	-27.50	-20.61	10.01	17.93	49.86	53.83	-.0108	.2259	.0669	.9637	211.70	48.41	48.92
9	-26.82	-19.71	11.74	19.36	42.73	44.43	.0456	.4297	.1283	.9453	574.88	16.41	16.63

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
7510.	121.69	1.1654	1.4814	71.87	73.35

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(p) Run 225; speed code 70; point 2

(p-1) Rotor 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VΘ-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	16.551	18.324	351.8	769.5	351.8	432.2	.0	636.6	.0	55.8	.3182	.6860	440.4	510.1	.5098	.4015	563.7	950.4
2	14.029	15.962	359.0	736.5	359.0	424.4	.0	601.9	.0	54.8	.3248	.6544	474.6	534.6	.5384	.3818	595.0	929.7
3	11.775	13.745	365.8	707.0	365.8	424.7	.0	565.3	.0	53.1	.3312	.6267	508.4	559.3	.5670	.3765	626.3	924.8
4	5.871	7.827	382.5	653.3	382.5	431.7	.0	490.4	.0	48.6	.3466	.5762	605.8	633.5	.6492	.4012	716.5	954.8
5	.017	1.279	392.8	573.7	392.8	393.0	.0	418.0	.0	46.8	.3562	.5026	727.3	732.3	.7496	.4408	826.6	903.2
6	-4.915	-4.162	392.4	561.3	392.4	419.6	.0	372.9	.0	41.6	.3558	.4909	843.3	831.0	.8434	.5433	930.1	821.2
7	-9.067	-7.966	384.1	559.1	384.1	416.2	.0	373.3	.0	41.9	.3481	.4867	928.9	904.9	.9110	.5878	1005.2	675.2
8	-10.447	-9.225	379.9	560.0	379.9	410.4	.0	381.0	.0	42.8	.3442	.4864	957.4	929.6	.9332	.5950	1030.0	685.1
9	-11.560	-10.450	375.3	544.7	375.3	375.0	.0	395.0	.0	46.4	.3400	.4709	985.8	954.3	.9554	.5821	1054.8	673.3

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	EFF-P TOT-ST	EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VΘ'-1 FT/SEC	VΘ'-2 FT/SEC
1	4.75	9.36	11.62	67.48	25.59	33.22	.4695	.1125	.0238	1.3896	94.81	94.59	51.13	-16.33	-440.4	126.5
2	4.84	9.14	10.64	61.65	26.06	33.01	.5261	.1313	.0298	1.3781	93.22	92.94	52.64	-9.01	-474.6	67.3
3	5.04	9.15	10.78	54.84	26.50	33.40	.5499	.1258	.0301	1.3685	92.74	92.45	54.03	-.81	-508.4	6.0
4	6.11	9.58	8.65	39.28	27.57	34.82	.5538	.0934	.0236	1.3625	92.97	92.69	57.61	18.34	-605.8	-143.2
5	7.09	9.77	8.36	22.99	28.22	32.16	.5455	.1360	.0319	1.3292	86.75	86.24	61.62	38.64	-727.3	-319.3
6	7.84	9.79	4.65	17.56	28.19	34.78	.4655	.1007	.0226	1.3404	88.30	87.84	65.07	47.51	-843.3	-458.1
7	8.51	9.92	5.12	16.64	27.67	34.40	.4596	.1447	.0317	1.3450	82.27	81.54	67.57	51.91	-928.9	-531.6
8	8.70	9.99	6.14	15.26	27.40	33.81	.4678	.1714	.0372	1.3466	79.01	78.15	68.39	53.14	-957.4	-548.5
9	8.83	9.98	9.72	13.10	27.11	30.65	.4983	.2281	.0470	1.3353	72.33	71.21	69.16	56.07	-985.8	-559.2

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.1037	1.3481	85.98	86.53	26.60

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(p) Continued. Run 225; speed code 70; point 2

(p-2) Stator 1 - U.S. customary units

SL	EPSI-1	EPSI-2	V-1	V-2	VM-1	VM-2	VΘ-1	VΘ-2	B-1	B-2	M-1	M-2	PT2/	TT2/
	DEGREE	DEGREE	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	DEGREE	DEGREE			PT1	TT1
1	18.228	14.956	769.0	511.2	450.4	511.2	623.3	1.8	54.3	.2	.6855	.4443	1.3446	1.1042
2	15.894	13.228	739.0	509.3	443.1	509.1	591.4	14.6	53.3	1.6	.6567	.4427	1.3470	1.1032
3	13.688	11.572	711.8	504.1	443.2	504.0	556.9	7.4	51.5	.8	.6312	.4384	1.3460	1.1014
4	8.101	7.026	662.3	492.7	449.5	492.6	486.3	-9.5	47.2	-1.1	.5846	.4285	1.3412	1.0997
5	1.929	1.331	586.1	453.6	411.8	452.7	417.1	-29.0	45.3	-3.7	.5140	.3937	1.3158	1.0983
6	-2.840	-3.553	575.1	468.8	436.9	468.0	374.1	-29.0	40.6	-3.6	.5036	.4071	1.3266	1.0995
7	-5.793	-6.533	573.8	472.6	433.8	472.1	375.6	-23.1	40.9	-2.8	.5002	.4088	1.3301	1.1083
8	-6.776	-7.441	574.8	472.5	427.8	472.0	383.8	-20.7	42.0	-2.5	.4998	.4077	1.3299	1.1134
9	-7.903	-8.350	560.3	454.0	394.3	453.5	398.1	-20.2	45.4	-2.6	.4850	.3898	1.3173	1.1210

SL	INCS	INCM	DEV	TURN	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B	LOSS-P	PT2/	BEFF-P	BEFF-A	BEFF-P
	DEGREE	DEGREE	DEGREE	DEGREE				TOTAL	TOTAL	PT1	STATC-ST	TOT-STG	TOT-STG
1	1.78	3.89	12.51	54.14	34.63	43.22	.4928	.1195	.0244	.9678	81.64	84.74	85.33
2	2.41	4.81	12.85	51.64	34.41	43.18	.4686	.0881	.0187	.9779	85.45	86.14	86.67
3	2.00	4.78	11.22	50.78	34.77	42.87	.4552	.0698	.0154	.9836	87.72	87.42	87.91
4	.23	3.95	8.17	48.31	36.10	41.98	.4336	.0719	.0176	.9852	85.60	87.81	88.27
5	-.15	4.90	5.65	49.01	33.51	38.43	.4328	.0626	.0171	.9897	85.71	83.04	83.65
6	-4.01	2.14	5.88	44.14	35.99	39.80	.3935	.0651	.0193	.9897	82.28	84.57	85.14
7	-3.68	3.20	7.73	43.75	35.63	39.91	.3940	.0699	.0218	.9890	80.08	78.48	79.30
8	-2.98	4.07	9.25	44.40	35.02	39.73	.4029	.0813	.0257	.9872	77.21	74.91	75.86
9	-.26	6.89	10.74	47.94	32.02	37.82	.4314	.0910	.0291	.9865	75.63	67.73	68.93

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
7497.	117.09	1.1037	1.3295	81.82	82.50

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(p) Continued. Run 225; speed code 70; point 2

(p-3) Rotor 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VΘ-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.602	11.008	535.4	746.0	535.4	577.0	1.6	472.9	.2	39.2	.4662	.6360	684.7	612.9	.6892	.5054	791.6	593.8
2	10.857	9.787	539.3	744.1	539.1	577.3	14.3	469.5	1.5	39.0	.4699	.6339	601.1	626.2	.6943	.5096	796.8	598.2
3	9.867	8.623	539.1	727.7	539.0	575.6	7.4	445.3	.8	37.6	.4701	.6198	618.2	640.0	.7104	.5175	814.6	607.6
4	6.279	5.332	538.1	666.0	538.0	564.5	-9.4	353.3	-1.0	32.0	.4696	.5668	671.4	684.5	.7573	.5571	867.7	654.6
5	.750	1.021	507.9	597.7	507.1	532.1	-29.0	272.2	-3.3	27.1	.4425	.5075	744.9	748.0	.8061	.6061	925.2	713.8
6	-4.431	-3.217	518.8	564.1	518.0	510.2	-29.0	240.6	-3.2	25.2	.4520	.4776	820.0	814.7	.8666	.6503	994.5	768.1
7	-7.416	-6.393	517.2	562.6	516.7	512.7	-23.2	231.6	-2.6	24.3	.4488	.4743	877.2	866.3	.9008	.6879	1038.1	815.9
8	-8.296	-7.556	513.4	555.3	513.0	505.8	-20.9	229.2	-2.3	24.3	.4443	.4667	896.4	883.8	.9095	.6953	1051.0	827.2
9	-9.008	-8.715	493.1	509.6	492.7	458.7	-20.4	222.0	-2.4	25.8	.4246	.4258	915.7	901.6	.9109	.6851	1057.8	819.8

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	EFF-P TOT-ST	EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VΘ'-1 FT/SEC	VΘ'-2 FT/SEC
1	-3.27	2.05	23.22	33.78	44.83	52.67	.3880	.1032	.0227	1.2898	90.08	89.75	47.35	13.57	-583.1	-140.0
2	-3.39	1.73	18.87	32.27	45.18	53.20	.3845	.0717	.0161	1.2965	92.97	92.74	47.38	15.11	-586.8	-156.7
3	-2.39	2.52	16.66	29.91	45.21	53.43	.3840	.0642	.0145	1.2928	93.37	93.16	48.55	18.62	-610.8	-194.7
4	.04	4.27	14.27	21.39	45.05	53.35	.3540	.0191	.0042	1.2701	97.61	97.57	51.67	30.35	-680.8	-331.3
5	2.93	6.16	11.30	14.96	42.21	50.72	.3226	-.0156	-.0033	1.2571	102.39	102.51	56.76	41.80	-773.9	-475.8
6	2.74	5.04	7.14	10.28	43.23	48.36	.3134	.0420	.0086	1.2224	92.36	92.19	58.65	48.38	-849.0	-574.1
7	3.16	4.82	6.03	9.14	42.96	47.98	.2959	.0593	.0123	1.2116	88.52	88.24	60.18	51.03	-900.4	-634.7
8	3.46	4.91	7.26	8.51	42.51	46.97	.2929	.0680	.0140	1.2061	86.57	86.26	60.79	52.26	-917.3	-654.6
9	4.57	5.82	11.43	6.20	40.52	42.03	.3036	.1002	.0193	1.1850	79.75	79.30	62.21	55.92	-936.1	-679.5

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
1.1791	1.6534	86.13	87.05	32.98

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(p) Concluded. Run 225; speed code 70; point 2

(p-4) Stator 2 - U. S. customary units

SL	EPSI-1	EPSI-2	V-1	V-2	VM-1	VM-2	Vθ-1	Vθ-2	B-1	B-2	M-1	M-2	PT2/ PT1	TT2/ TT1
	DEGREE	DEGREE	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	DEGREE	DEGREE				
1	8.261	1.079	775.9	631.5	619.1	631.2	467.7	18.8	37.3	1.7	.6627	.5315	1.2163	1.0839
2	7.283	1.063	771.8	670.8	615.9	670.5	465.1	19.8	37.2	1.7	.6595	.5671	1.2483	1.0830
3	6.319	.914	754.1	679.5	611.0	679.4	441.9	14.0	36.0	1.2	.6441	.5759	1.2601	1.0817
4	3.793	.393	689.7	648.5	593.2	648.5	351.9	.7	30.7	.1	.5884	.5510	1.2470	1.0723
5	1.170	-.223	619.5	604.0	556.6	603.9	272.1	-9.4	26.1	-.9	.5270	.5131	1.2388	1.0658
6	-1.312	-.786	585.3	577.1	533.3	576.9	241.2	-16.2	24.3	-1.6	.4964	.4891	1.2079	1.0640
7	-3.456	-1.120	586.6	573.5	538.5	573.5	232.6	-6.5	23.4	-.6	.4955	.4839	1.1982	1.0638
8	-4.257	-1.192	583.5	560.7	535.9	560.7	230.6	.3	23.3	.0	.4916	.4714	1.1906	1.0636
9	-5.236	-1.195	543.8	502.8	495.8	502.8	223.4	3.0	24.3	.3	.4556	.4200	1.1624	1.0627

SL	INCS	INCH	DEV	TURN	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B	LOSS-P	PT2/	%EFF-P	%EFF-A	%EFF-P
	DEGREE	DEGREE	DEGREE	DEGREE				TOTAL	TOTAL	PT1	STATIC-ST	TOT-STG	TOT-STG
1	-11.12	-9.55	13.40	35.59	55.58	57.48	.3159	.2219	.0502	.9434	42.99	68.45	69.27
2	-10.13	-8.09	12.82	35.55	55.89	61.75	.2644	.1469	.0339	.9627	49.02	78.73	79.35
3	-10.57	-8.03	11.89	34.89	55.92	63.00	.2328	.1047	.0246	.9745	52.70	83.44	83.94
4	-14.81	-10.85	10.36	30.64	55.42	60.68	.1860	.0867	.0217	.9819	32.65	89.93	90.20
5	-18.62	-13.22	9.39	26.94	52.55	56.58	.1466	.0832	.0224	.9857	-62.58	95.79	95.88
6	-19.67	-13.41	8.41	25.94	50.12	53.74	.1396	.0760	.0217	.9882	-150.99	86.58	86.89
7	-20.47	-13.73	9.61	24.04	49.91	52.83	.1433	.0715	.0210	.9889	-43.21	82.96	83.35
8	-21.20	-14.31	10.95	23.28	49.25	51.24	.1528	.0822	.0244	.9878	-13.69	80.20	80.64
9	-21.49	-14.38	12.40	23.97	44.90	45.30	.1936	.1392	.0416	.9819	5.35	70.11	70.69

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
7497.	117.09	1.1794	1.6230	82.74	83.85

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(q) Run 225; speed code 70; point 3

(q-1) Rotor 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VΘ-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	16.551	18.311	339.1	755.9	339.1	414.6	.0	632.0	.0	56.8	.3065	.6731	441.0	510.8	.5028	.3846	556.3	432.0
2	14.005	15.944	346.0	723.5	346.0	411.3	.0	595.2	.0	55.3	.3129	.6422	475.2	535.4	.5316	.3689	587.9	415.6
3	11.717	13.726	352.7	693.8	352.7	409.8	.0	559.8	.0	53.8	.3191	.6142	509.1	560.0	.5602	.3628	619.3	409.8
4	5.761	7.820	368.9	639.0	368.9	415.0	.0	485.9	.0	49.5	.3340	.5630	606.7	634.4	.6428	.3884	710.0	440.8
5	-.154	1.308	379.0	566.5	379.0	381.1	.0	419.2	.0	47.7	.3433	.4959	728.3	733.3	.7438	.4322	821.0	493.8
6	-5.520	-4.186	378.1	562.6	378.1	413.8	.0	361.1	.0	42.7	.3426	.4915	844.5	832.1	.8382	.5347	925.3	612.1
7	-9.881	-8.060	368.9	555.0	368.9	394.2	.0	390.7	.0	44.7	.3340	.4819	930.2	906.2	.9060	.5634	1000.7	649.0
8	-11.122	-9.304	364.5	548.8	364.5	371.4	.0	404.1	.0	47.4	.3299	.4747	958.7	930.9	.9284	.5575	1025.7	644.6
9	-11.936	-10.496	360.1	539.3	360.1	341.4	.0	417.5	.0	50.6	.3259	.4645	987.1	955.6	.9509	.5408	1050.8	637.2

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	EFF-P TOT-ST	EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VΘ'-1 FT/SEC	VΘ'-2 FT/SEC
1	5.82	10.43	11.63	68.51	24.76	32.22	.4934	.0871	.0184	1.3932	94.07	95.91	52.20	-16.31	-441.0	121.2
2	5.88	10.18	11.37	61.96	25.21	32.36	.5416	.0972	.0221	1.3827	93.05	94.85	53.68	-8.28	-475.2	59.9
3	6.06	10.17	11.62	55.02	25.65	32.58	.5669	.0985	.0236	1.3727	94.40	94.17	55.05	.03	-509.1	-.2
4	7.07	10.54	9.99	38.90	26.70	33.81	.5680	.0763	.0192	1.3654	94.30	94.08	58.57	19.68	-606.7	-148.5
5	7.98	10.66	9.21	23.01	27.34	31.48	.5549	.1207	.0280	1.3381	88.44	87.99	62.50	39.49	-728.3	-314.1
6	8.69	10.64	4.61	10.46	27.29	34.57	.4766	.0929	.0209	1.3545	89.47	89.04	65.92	47.47	-844.5	-451.0
7	9.39	10.80	5.77	15.08	26.70	32.70	.4905	.1676	.0361	1.3529	80.27	79.45	68.45	52.57	-930.2	-515.5
8	9.57	10.86	7.76	14.49	26.41	30.62	.5137	.2138	.0446	1.3487	75.06	74.02	69.26	54.76	-958.7	-526.8
9	9.65	10.80	11.18	12.47	26.13	27.96	.5390	.2609	.0517	1.3427	69.86	68.62	69.99	57.62	-987.1	-538.0

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.1054	1.3558	86.23	84.78	25.71

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(q) Continued. Run 225; speed code 70; point 3

(q-2) Stator 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	Vθ-1 FT/SEC	Vθ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/PT1	TT2/TT1
1	18.217	14.974	754.6	491.3	431.9	491.3	618.8	1.2	55.3	.1	.6718	.4264	1.3487	1.1036
2	15.900	13.280	725.1	489.5	428.7	489.3	594.8	14.7	53.9	1.7	.6437	.4251	1.3511	1.1022
3	13.723	11.666	697.5	483.4	427.0	483.3	551.5	8.8	52.3	1.0	.6178	.4199	1.3494	1.1006
4	8.194	7.250	646.9	472.6	431.6	472.5	481.9	-7.0	48.1	-.8	.5704	.4105	1.3454	1.0990
5	2.109	1.766	577.9	437.7	398.7	436.9	418.4	-26.3	46.4	-3.4	.5063	.3794	1.3243	1.0987
6	-2.492	-2.916	575.3	457.8	429.9	457.3	382.3	-20.5	41.7	-2.6	.5031	.3967	1.3386	1.1017
7	-5.360	-5.970	568.7	446.3	411.1	445.8	393.0	-19.9	43.7	-2.6	.4943	.3845	1.3334	1.1130
8	-6.446	-7.003	562.9	438.9	389.0	438.6	406.8	-17.1	46.3	-2.2	.4874	.3767	1.3292	1.1200
9	-7.735	-8.098	553.8	419.6	360.1	419.2	420.7	-18.6	49.5	-2.5	.4776	.3584	1.3177	1.1281

SL	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	RHOVH-1	RHOVH-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/PT1	%EFF-P STATC-ST	%EFF-A TOT-STG	%EFF-P TOT-STG
1	2.72	4.83	12.46	56.13	33.59	41.99	.5086	.1216	.0249	.9682	81.76	86.16	86.70
2	3.01	5.41	12.93	52.16	33.70	41.97	.4841	.0924	.0196	.9775	85.19	87.68	88.35
3	2.77	5.55	11.42	51.27	33.89	41.56	.4718	.0747	.0165	.9831	87.33	88.92	89.35
4	1.14	4.86	8.43	48.98	35.02	40.72	.4494	.0712	.0174	.9859	86.29	89.46	89.85
5	.86	5.91	5.87	49.81	32.77	37.52	.4519	.0659	.0180	.9894	85.82	84.69	85.25
6	-2.94	3.21	6.81	44.29	35.72	39.32	.4130	.0740	.0219	.9882	81.56	85.53	86.08
7	-.88	6.01	7.98	46.31	33.89	37.98	.4427	.0948	.0296	.9854	77.38	75.88	76.80
8	1.39	8.44	9.53	48.57	31.88	37.12	.4604	.0991	.0313	.9851	76.87	70.66	71.78
9	3.90	11.05	10.76	52.08	29.32	35.15	.4992	.1291	.0413	.9813	71.95	64.08	65.41

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
7507.	113.21	1.1054	1.3354	81.76	82.45

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(q) Continued. Run 225; speed code 70; point 3

(q-3) Rotor 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.668	10.983	511.7	746.2	511.7	561.7	1.0	491.2	.1	41.0	.4448	.6343	585.5	613.7	.6753	.4887	776.8	574.9
2	10.848	9.756	515.1	730.7	514.9	545.3	14.4	486.4	1.6	41.6	.4482	.6209	602.0	627.0	.6798	.4785	781.3	563.1
3	9.886	8.601	513.5	711.6	513.4	542.0	8.8	461.1	1.0	40.3	.4471	.6044	619.0	640.9	.6944	.4850	797.5	571.0
4	6.422	5.363	512.0	654.9	511.9	528.8	-6.8	386.4	-.8	36.1	.4460	.5553	672.4	685.5	.7410	.5150	850.5	607.5
5	1.127	1.169	485.8	595.4	485.0	505.8	-26.2	314.0	-3.1	31.8	.4224	.5032	745.9	749.1	.7930	.5639	911.9	667.2
6	-3.817	-2.905	503.0	564.0	502.6	485.8	-21.0	286.5	-2.4	30.5	.4374	.4750	821.1	815.8	.8527	.6051	980.7	718.5
7	-6.768	-5.985	492.0	558.0	491.6	485.7	-20.1	274.7	-2.3	29.4	.4251	.4671	878.4	867.5	.8851	.6414	1024.2	766.3
8	-7.743	-7.190	484.2	550.7	483.9	480.4	-17.3	269.1	-2.0	29.2	.4168	.4594	897.7	885.0	.8911	.6516	1035.0	781.1
9	-8.628	-8.471	464.9	512.2	464.6	443.9	-18.8	255.6	-2.3	29.9	.3983	.4251	916.9	902.8	.8949	.6513	1044.7	784.8

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	-1.92	3.40	21.89	36.47	43.40	52.19	.4063	.0849	.0188	1.3119	92.43	92.16	48.71	12.24	-504.5	-122.5
2	-2.05	3.07	18.15	34.33	43.75	51.03	.4225	.0873	.0196	1.3057	92.02	91.74	48.72	14.39	-587.5	-140.7
3	-1.03	3.88	16.32	31.62	43.65	51.08	.4213	.0798	.0181	1.3002	92.30	92.05	49.91	18.28	-610.3	-179.8
4	1.35	5.59	13.36	23.55	43.48	50.63	.4055	.0575	.0129	1.2813	93.41	93.21	52.99	29.44	-679.2	-299.0
5	4.04	7.26	10.20	17.17	40.96	48.91	.3752	.0251	.0054	1.2749	96.56	96.48	57.86	40.69	-772.2	-435.0
6	3.28	5.58	6.21	11.74	42.51	46.86	.3654	.0733	.0153	1.2445	88.52	88.20	59.19	47.45	-842.1	-529.3
7	4.29	5.95	5.61	10.69	41.20	46.28	.3467	.0768	.0161	1.2433	87.39	87.03	61.31	50.61	-898.5	-592.7
8	4.77	6.22	6.97	10.12	40.31	45.47	.3382	.0712	.0148	1.2416	88.02	87.68	62.10	51.97	-915.0	-615.9
9	5.90	7.15	10.99	8.06	38.38	41.55	.3387	.0836	.0163	1.2263	85.38	84.99	63.54	55.48	-935.7	-647.2

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.1894	1.6890	85.23	86.26	31.77

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(q) Concluded. Run 225; speed code 70; point 3

(q-4) Stator 2 - U. S. customary units

SL	EPSI-1	EPSI-2	V-1	V-2	VM-1	VM-2	VB-1	VB-2	B-1	B-2	M-1	M-2	PT2/	TT2/
	DEGREE	DEGREE	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	DEGREE	DEGREE			PTI	TTI
1	8.319	1.088	771.9	590.5	599.8	590.2	485.8	18.4	39.2	1.8	.6580	.4945	1.2493	1.0874
2	7.354	1.071	754.8	619.7	581.0	619.5	481.9	16.6	39.9	1.5	.6431	.5209	1.2717	1.0863
3	6.371	.917	734.7	623.6	574.8	623.6	457.6	8.9	38.7	.8	.6256	.5253	1.2794	1.0846
4	3.764	.379	675.9	595.2	555.6	595.2	384.8	-1.9	34.8	-.2	.5742	.5020	1.2676	1.0786
5	1.037	-.240	614.9	558.1	528.7	558.0	313.8	-8.7	30.7	-.9	.5206	.4703	1.2620	1.0743
6	-1.512	-.790	583.4	542.0	507.9	541.8	287.2	-13.5	29.5	-1.4	.4921	.4556	1.2361	1.0730
7	-3.702	-1.141	580.5	538.3	510.7	538.3	276.0	-3.1	28.4	-.3	.4868	.4498	1.2335	1.0736
8	-4.490	-1.206	576.9	525.8	509.3	525.8	270.9	4.6	28.1	.5	.4823	.4378	1.2284	1.0724
9	-5.412	-1.195	543.8	480.2	479.1	480.2	257.3	7.5	28.3	.9	.4523	.3977	1.2091	1.0705

SL	INCS	INCM	DEV	TURN	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B	LOSS-P	PT2/	%EFF-P	%EFF-A	%EFF-P
	DEGREE	DEGREE	DEGREE	DEGREE				TOTAL	TOTAL	PTI	STATC-ST	TOT-STG	TOT-STG
1	-9.18	-7.60	13.48	37.45	54.96	56.22	.3716	.1900	.0430	.9520	60.38	74.97	75.71
2	-7.51	-5.47	12.66	38.32	53.67	59.57	.3219	.1082	.0250	.9736	71.66	82.24	82.80
3	-7.92	-5.37	11.53	37.84	53.52	60.31	.2953	.0697	.0164	.9838	78.54	86.08	86.53
4	-10.78	-6.82	10.12	34.94	52.68	57.92	.2614	.0533	.0133	.9893	78.83	89.07	89.40
5	-13.98	-8.58	9.39	31.59	50.70	54.24	.2329	.0582	.0157	.9902	69.85	92.37	92.58
6	-14.51	-8.25	8.59	30.92	48.60	52.35	.2182	.0437	.0125	.9933	70.90	85.43	85.82
7	-15.43	-8.69	9.93	28.75	48.24	51.26	.2149	.0527	.0155	.9921	65.88	83.84	84.27
8	-16.46	-9.57	11.41	27.56	47.74	49.65	.2223	.0690	.0204	.9900	61.34	83.39	83.83
9	-17.49	-10.38	12.95	27.42	44.36	44.80	.2520	.1025	.0306	.9868	55.63	78.90	79.42

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
7507.	113.21	1.1894	1.6678	83.03	84.18

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(r) Run 225; speed code 70; point 4

(r-1) Rotor 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	V_θ-1 FT/SEC	V_θ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	16.554	14.381	325.3	746.5	325.3	394.6	.0	633.7	.0	58.1	.2938	.6639	440.9	510.7	.4949	.3675	547.9	413.3
2	13.977	16.079	331.5	717.5	331.5	396.0	.0	598.3	.0	56.5	.2996	.6362	475.2	535.3	.5234	.3556	579.3	401.0
3	11.615	13.912	337.3	687.9	337.3	397.7	.0	561.3	.0	54.7	.3049	.6086	509.0	559.9	.5519	.3519	610.6	397.7
4	5.44A	8.094	350.7	633.7	350.7	397.7	.0	493.4	.0	51.1	.3172	.5577	606.5	634.3	.6337	.3713	700.6	421.9
5	-.64A	1.663	357.4	585.6	357.4	359.3	.0	436.8	.0	50.6	.3234	.4940	728.2	733.1	.7340	.4068	811.2	465.7
6	-6.314	-4.031	354.4	572.6	354.4	409.6	.0	400.2	.0	44.3	.3206	.4995	849.3	832.0	.8284	.5191	915.7	595.1
7	-10.62A	-7.937	343.7	558.2	343.7	349.8	.0	435.1	.0	51.2	.3108	.4819	930.0	906.0	.8964	.5064	991.5	586.7
8	-11.543	-9.169	339.6	553.2	339.6	332.9	.0	441.9	.0	52.9	.3069	.4762	958.6	930.7	.9192	.5090	1016.9	591.4
9	-12.079	-10.413	335.6	553.1	335.6	317.1	.0	453.1	.0	54.9	.3033	.4745	987.0	955.4	.9421	.5097	1042.5	594.0

SL	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	EFF-P TOT-ST	EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	V_θ'-1 FT/SEC	V_θ'-2 FT/SEC
1	6.96	11.57	10.61	70.68	23.84	30.77	.5204	.1081	.0227	1.3904	95.27	95.08	53.34	-17.34	-440.9	123.0
2	7.05	11.35	10.60	63.89	24.25	31.28	.5612	.1026	.0233	1.3842	94.94	94.73	54.84	-9.04	-475.2	63.0
3	7.24	11.35	11.39	56.42	24.64	31.76	.5814	.0976	.0233	1.3747	94.59	94.37	56.23	-.20	-509.0	1.4
4	8.33	11.80	9.82	40.32	25.52	32.47	.5924	.0942	.0237	1.3664	93.17	92.90	59.83	19.51	-606.5	-140.9
5	9.32	12.00	9.24	24.33	25.96	29.67	.5917	.1551	.0359	1.3419	85.87	85.30	63.85	39.52	-728.2	-296.4
6	10.07	12.02	3.65	20.79	25.76	34.22	.4974	.1120	.0256	1.3661	87.96	87.45	67.30	46.51	-844.3	-431.8
7	10.7A	12.19	6.57	16.47	25.06	28.79	.5649	.2472	.0523	1.3584	73.47	72.34	69.84	53.37	-930.0	-471.0
8	10.90	12.19	8.69	14.90	24.78	27.32	.5754	.2751	.0561	1.3571	70.40	69.13	70.59	55.68	-958.6	-488.8
9	10.92	12.07	11.30	13.61	24.53	25.94	.5891	.3041	.0600	1.3601	67.52	66.12	71.26	57.64	-987.0	-502.3

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
1.1105	1.3619	83.52	84.19	24.39

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(r) Continued. Run 225; speed code 70; point 4

(r-2) Stator 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	Vθ-1 FT/SEC	Vθ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/PT1	TT2/TT1
1	18.32A	15.084	746.4	448.4	414.8	448.3	620.5	-2.5	56.4	-.3	.6637	.3879	1.3472	1.1039
2	16.133	13.486	720.2	448.3	416.0	448.1	587.9	12.7	54.9	1.6	.6388	.3881	1.3503	1.1028
3	14.096	11.964	692.6	442.9	416.9	442.7	553.0	10.5	53.1	1.4	.6130	.3836	1.3491	1.1009
4	8.860	7.754	641.8	436.7	415.3	436.7	489.3	-1.6	49.7	-.2	.5659	.3781	1.3479	1.1005
5	2.821	2.528	575.7	418.6	376.1	418.2	435.9	-17.2	49.2	-2.3	.5033	.3617	1.3366	1.1028
6	-1.792	-1.951	582.8	434.5	422.8	434.4	401.1	-8.5	43.5	-1.1	.5089	.3752	1.3462	1.1061
7	-4.881	-5.217	569.2	429.2	364.3	429.2	437.3	-5.2	50.2	-.7	.4918	.3672	1.3444	1.1259
8	-6.203	-6.460	564.3	406.5	347.5	406.2	444.6	-15.9	52.0	-2.2	.4861	.3465	1.3320	1.1313
9	-7.659	-7.802	564.3	387.7	331.6	386.5	456.5	-30.6	54.1	-4.5	.4844	.3289	1.3220	1.1389

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/PT1	%EFF-P STATC-ST	%EFF-A TOT-STG	%EFF-P TOT-STG
1	3.88	5.99	12.01	56.74	32.35	38.85	.5626	.1214	.0248	.9689	83.50	85.58	86.14
2	4.00	6.40	12.83	53.25	32.82	38.96	.5401	.1016	.0216	.9756	85.48	87.21	87.71
3	3.56	6.34	11.73	51.74	33.21	38.59	.5274	.0828	.0183	.9815	87.61	88.59	89.03
4	2.71	6.43	9.06	49.92	33.77	38.12	.5031	.0694	.0169	.9864	88.44	88.67	89.11
5	3.71	8.76	6.96	51.56	30.92	36.34	.4871	.0242	.0066	.9961	95.18	84.12	84.73
6	-1.10	5.05	8.30	44.62	35.17	37.72	.4632	.0910	.0270	.9852	81.31	83.72	84.35
7	5.60	12.48	9.85	50.92	29.85	36.67	.4903	.0695	.0217	.9894	85.31	70.14	71.33
8	7.08	14.13	9.53	54.27	28.39	34.47	.5388	.1220	.0386	.9818	76.66	65.12	66.46
9	8.45	15.60	8.77	58.62	27.00	32.52	.5921	.1882	.0601	.9720	66.84	59.79	61.30

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
7506.	107.40	1.1105	1.3418	79.32	80.13

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(r) Continued. Run 225; speed code 70; point 4

(r-3) Rotor 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.740	10.957	477.3	730.0	477.3	528.3	-2.7	503.8	-.3	43.5	.4138	.6186	585.4	613.6	.6567	.4573	757.4	539.6
2	10.994	9.694	481.6	717.9	481.4	512.0	12.4	496.1	1.5	43.9	.4178	.6039	601.9	626.9	.6603	.4476	761.1	528.4
3	10.111	8.498	479.5	694.4	479.3	506.3	10.5	475.2	1.3	43.1	.4161	.5881	618.9	640.8	.6726	.4511	774.5	532.7
4	6.918	5.181	478.1	637.7	478.1	486.1	-1.3	412.8	-.2	40.3	.4152	.5384	672.2	685.4	.7174	.4705	826.0	557.3
5	2.057	1.140	460.3	583.1	460.0	465.4	-17.1	351.4	-2.1	37.0	.3988	.4900	745.8	748.9	.7718	.5144	890.9	612.1
6	-2.634	-2.646	470.2	557.7	470.1	448.1	-8.6	332.0	-1.1	36.5	.4070	.4669	820.9	815.7	.8255	.5520	953.5	659.3
7	-5.745	-5.585	467.7	551.6	467.7	457.5	-4.9	308.1	-.6	33.9	.4012	.4581	878.3	867.3	.8571	.6001	999.4	722.5
8	-6.868	-6.786	446.8	543.3	446.5	454.7	-15.5	297.4	-2.0	33.1	.3818	.4497	897.5	884.8	.8684	.6149	1016.4	742.9
9	-8.071	-8.197	428.3	507.0	427.2	433.0	-30.8	263.7	-4.1	31.3	.3642	.4176	916.8	902.7	.8839	.6358	1039.4	771.8

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	EFF-P TOT-ST	EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	.23	5.55	21.33	39.17	40.95	49.93	.4425	.0780	.0173	1.3275	93.56	93.33	50.86	11.68	-588.1	-109.9
2	-.04	5.08	18.02	36.47	41.37	48.73	.4564	.0773	.0174	1.3192	93.41	93.18	50.73	14.26	-589.5	-130.8
3	.83	5.74	16.07	33.74	41.26	48.52	.4578	.0729	.0165	1.3138	93.50	93.27	51.77	18.03	-608.4	-165.6
4	3.07	7.25	13.15	25.43	41.15	47.18	.4553	.0778	.0174	1.2917	91.87	91.61	54.66	29.23	-673.6	-272.6
5	5.10	8.33	10.01	18.42	39.42	45.54	.4304	.0668	.0144	1.2821	91.86	91.61	58.92	40.50	-762.9	-397.6
6	4.54	6.84	5.94	13.28	40.34	43.95	.4190	.0953	.0201	1.2669	87.10	86.69	60.45	47.18	-829.6	-483.7
7	5.09	6.68	5.64	11.40	39.47	44.38	.3792	.0628	.0131	1.2668	90.65	90.36	62.04	50.64	-883.2	-559.2
8	6.54	7.99	7.16	11.70	37.44	43.86	.3711	.0568	.0117	1.2739	91.50	91.24	63.86	52.16	-913.0	-587.5
9	8.01	9.26	11.29	9.87	35.52	41.41	.3538	.0517	.0100	1.2615	91.69	91.44	65.65	55.78	-947.6	-638.9

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
1.2003	1.7204	83.66	84.84	30.06

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(r) Concluded. Run 225; speed code 70; point 4

(r-4) Stator 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	V^{θ}-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	8.349	1.074	748.8	541.4	558.9	541.1	498.3	17.3	42.0	1.8	.6357	.4511	1.2722	1.0903
2	7.423	1.065	730.3	566.4	540.1	566.2	491.5	15.6	42.5	1.6	.6197	.4734	1.2888	1.0883
3	6.476	.945	710.9	566.6	532.0	566.6	471.6	7.2	41.7	.7	.6031	.4744	1.2928	1.0869
4	3.860	.453	653.1	541.7	507.6	541.7	411.0	-4.5	39.0	-.5	.5522	.4537	1.2818	1.0827
5	.905	-.218	599.2	509.1	485.6	509.0	351.0	-10.5	35.9	-1.2	.5042	.4254	1.2726	1.0802
6	-1.901	-.819	576.0	498.3	470.1	498.2	332.9	-11.2	35.3	-1.3	.4829	.4153	1.2544	1.0804
7	-4.159	-1.137	574.3	504.2	483.6	504.2	309.6	-.0	32.7	-.0	.4778	.4173	1.2536	1.0773
8	-4.912	-1.192	569.5	496.2	484.4	496.2	299.4	4.3	31.8	.5	.4723	.4093	1.2582	1.0780
9	-5.708	-1.178	538.6	461.2	468.6	461.2	265.5	4.6	29.6	.6	.4447	.3788	1.2459	1.0749

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	BEFF-P STATIC-ST	BEFF-A TOT-STG	BEFF-P TOT-STG
1	-6.46	-4.89	13.52	40.13	52.30	53.33	.4218	.1762	.0398	.9579	67.71	78.72	79.40
2	-4.88	-2.83	12.70	40.92	50.95	56.26	.3755	.1019	.0235	.9766	77.78	84.95	85.45
3	-4.88	-2.33	11.44	40.97	50.57	56.58	.3574	.0747	.0176	.9837	82.12	87.43	87.85
4	-6.49	-2.53	9.82	39.52	48.93	54.31	.3296	.0415	.0104	.9922	88.08	88.72	89.07
5	-8.82	-3.42	9.10	37.05	47.20	50.85	.3129	.0465	.0125	.9926	84.65	88.75	89.09
6	-8.69	-2.43	8.73	36.60	45.77	49.45	.3055	.0665	.0190	.9902	75.65	83.06	83.56
7	-11.17	-4.43	10.25	32.68	46.51	49.19	.2808	.0756	.0222	.9891	69.55	86.10	86.51
8	-12.73	-5.84	11.41	31.29	46.27	48.03	.2786	.0833	.0247	.9883	67.22	86.70	87.09
9	-16.17	-9.06	12.64	29.05	44.33	44.21	.2865	.0919	.0274	.9884	67.23	86.36	86.74

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
7506.	107.40	1.2003	1.6998	81.66	82.95

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(s) Run 225; speed code 70; point 5

(s-1) Rotor 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	V^{θ}-1 FT/SEC	Vθ-2 FT/SEC	R-1 DEGREE	R-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	16.509	18.389	311.6	746.3	311.6	387.7	.0	637.6	.0	58.7	.2812	.6634	440.7	510.5	.4871	.3628	539.7	408.1
2	13.913	16.097	317.5	715.9	317.5	381.1	.0	606.0	.0	57.8	.2864	.6343	474.9	535.0	.5157	.3935	571.3	387.6
3	11.550	13.938	323.1	686.0	323.1	384.3	.0	568.2	.0	55.9	.2918	.6064	508.7	559.7	.5443	.3398	602.7	384.4
4	5.319	8.107	336.2	629.7	336.2	385.2	.0	498.2	.0	52.3	.3038	.5537	606.3	634.0	.6265	.3591	693.2	408.4
5	-.917	1.630	342.8	560.0	342.8	347.7	.0	439.0	.0	51.6	.3099	.4888	727.9	732.8	.7273	.3973	804.5	455.2
6	-6.553	-4.034	339.4	567.5	339.4	387.9	.0	414.2	.0	46.9	.3068	.4939	843.9	831.6	.8222	.4960	909.6	569.8
7	-10.791	-7.971	329.1	562.4	329.1	333.6	.0	452.8	.0	53.6	.2973	.4845	929.6	905.6	.8909	.4846	986.1	562.4
8	-11.697	-9.216	325.0	566.0	325.0	314.5	.0	470.6	.0	56.2	.2936	.4858	958.1	930.3	.9138	.4780	1011.7	557.0
9	-12.168	-10.446	321.2	570.6	321.2	298.7	.0	486.2	.0	58.3	.2900	.4880	986.5	955.0	.9368	.4754	1037.5	555.9

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	Vθ'-1 FT/SEC	Vθ'-2 FT/SEC
1	8.12	12.73	9.77	72.67	22.91	30.27	.5249	.1142	.0239	1.3923	95.15	94.95	54.49	-18.18	-440.7	127.1
2	8.18	12.48	9.09	66.54	23.31	30.12	.5817	.1258	.0284	1.3851	94.00	93.75	55.98	-10.56	-474.9	71.0
3	8.35	12.46	10.31	58.62	23.69	30.72	.6010	.1149	.0275	1.3761	93.83	93.58	57.34	-1.28	-508.7	8.6
4	9.36	12.82	9.74	41.43	24.56	31.53	.6095	.1022	.0257	1.3682	92.77	92.47	60.85	19.43	-606.3	-135.8
5	10.25	12.93	9.91	24.58	25.00	28.83	.6029	.1554	.0356	1.3444	86.03	85.47	64.78	40.20	-727.9	-293.8
6	10.94	12.89	4.24	21.07	24.77	32.47	.5273	.1363	.0308	1.3696	86.86	85.26	68.17	47.10	-843.9	-417.4
7	11.57	12.98	6.80	17.03	24.09	27.57	.5933	.2617	.0551	1.3715	73.06	71.87	70.63	53.59	-929.6	-452.9
8	11.67	12.96	8.56	15.80	23.82	25.88	.6172	.2998	.0614	1.3774	69.62	68.25	71.36	55.56	-958.1	-459.7
9	11.67	12.82	11.06	14.60	23.56	24.51	.6355	.3309	.0657	1.3850	66.97	65.48	72.01	57.41	-986.5	-468.8

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.1134	1.3683	82.69	83.41	23.47

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(s) Continued. Run 225; speed code 70; point 5

(s-2) Stator 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VΘ-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	18.361	15.088	745.1	440.0	406.8	439.9	624.3	-2.6	57.1	-.3	.6623	.3804	1.3486	1.1045
2	16.147	13.490	717.6	448.7	400.4	448.5	595.5	15.2	56.2	1.9	.6360	.3882	1.3571	1.1040
3	14.058	11.964	689.7	439.5	402.7	439.4	559.9	12.5	54.4	1.6	.6099	.3804	1.3535	1.1021
4	8.779	7.794	636.9	424.6	401.9	424.6	494.0	-1.6	50.9	-.2	.5604	.3672	1.3460	1.1014
5	2.842	2.709	569.0	398.2	363.2	397.9	438.1	-15.5	50.3	-2.2	.4971	.3435	1.3293	1.1033
6	-1.736	-1.623	576.6	418.6	400.2	418.5	416.1	1.2	46.1	.2	.5023	.3605	1.3404	1.1099
7	-4.759	-4.938	572.2	395.2	347.1	394.2	455.0	-28.7	52.7	-4.2	.4934	.3368	1.3294	1.1302
8	-6.044	-6.261	576.1	388.1	328.3	385.4	473.4	-46.1	55.3	-6.8	.4946	.3292	1.3263	1.1391
9	-7.543	-7.702	580.9	390.3	312.3	385.6	489.9	-60.7	57.6	-9.0	.4973	.3297	1.3278	1.1490

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	EFF-P STATC-ST	EFF-A TOT-STG	EFF-P TOT-STG
1	4.56	6.67	11.98	57.45	31.78	38.25	.5741	.1228	.0251	.9686	83.62	85.41	85.98
2	5.37	7.77	13.14	54.30	31.62	39.14	.5389	.0839	.0178	.9800	87.93	87.67	88.16
3	4.83	7.61	12.00	52.75	32.14	38.43	.5312	.0738	.0163	.9837	88.98	88.56	89.00
4	3.90	7.62	9.06	51.11	32.79	37.12	.5193	.0834	.0204	.9840	86.45	87.42	87.91
5	4.84	9.89	7.08	52.57	30.00	34.68	.5172	.0723	.0198	.9888	86.90	82.08	82.75
6	1.46	7.60	9.60	45.88	33.37	36.26	.4871	.1348	.0400	.9786	73.82	79.66	80.45
7	8.04	14.93	6.38	56.83	28.57	33.52	.5721	.1970	.0613	.9698	65.03	65.17	66.51
8	10.36	17.40	4.94	62.12	26.90	32.52	.6110	.2354	.0740	.9630	59.80	60.47	61.98
9	11.92	19.07	4.33	66.54	25.51	32.29	.6346	.2646	.0837	.9583	55.11	56.65	58.31

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
7502.	103.31	1.1134	1.3378	76.49	77.40

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(s) Continued. Run 225; speed code 70; point 5

(s-3) Rotor 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	V^{θ}-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.766	10.964	468.0	718.8	468.0	512.2	-3.0	504.3	-.4	44.4	.4054	.6082	585.1	613.3	.6510	.4431	751.6	523.7
2	11.045	9.739	480.7	699.3	480.5	492.8	14.8	496.2	1.8	45.0	.4168	.5914	601.6	626.6	.6576	.4311	758.4	509.8
3	10.197	8.588	475.1	683.7	474.9	490.4	12.6	476.3	1.5	44.0	.4122	.5782	618.6	640.5	.6680	.4374	770.0	517.2
4	7.095	5.313	463.8	627.3	463.8	468.4	-1.3	417.2	-.2	41.6	.4022	.5287	671.9	685.1	.7089	.4548	817.5	539.6
5	2.297	1.235	435.4	571.6	435.1	440.8	-15.7	363.9	-2.1	39.5	.3765	.4793	745.4	748.6	.7581	.4905	876.7	585.1
6	-2.155	-2.364	449.6	546.6	449.6	405.0	1.7	367.0	.2	42.2	.3881	.4554	820.6	815.3	.8063	.5033	939.2	604.2
7	-5.240	-5.223	434.6	545.2	433.7	441.2	-28.1	320.4	-3.7	35.9	.3712	.4503	877.9	866.9	.8580	.5801	1004.4	702.4
8	-6.594	-6.581	429.6	531.9	427.1	447.1	-46.0	288.0	-6.1	32.7	.3654	.4375	897.1	884.4	.8805	.6131	1035.3	745.4
9	-7.966	-8.115	432.1	501.2	427.8	438.0	-61.3	243.7	-8.1	29.0	.3650	.4105	916.3	902.2	.9036	.6477	1067.2	790.9

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVH-1	RHOVH-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	ηEFF-P TOT-ST	ηEFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	.79	6.10	21.60	39.46	40.30	48.78	.4596	.0748	.0166	1.3291	93.92	93.70	51.41	11.95	-588.1	-109.0
2	-.11	5.01	18.51	35.91	41.47	47.24	.4783	.0886	.0199	1.3133	92.46	92.20	50.66	14.75	-586.8	-130.4
3	.98	5.89	16.47	33.49	41.04	47.35	.4740	.0723	.0163	1.3129	93.61	93.39	51.92	18.43	-606.0	-164.2
4	3.84	8.07	13.63	25.76	40.03	45.78	.4721	.0712	.0159	1.2978	92.78	92.55	55.47	29.71	-673.2	-267.9
5	6.43	9.66	10.61	19.15	37.38	43.40	.4552	.0632	.0135	1.2941	92.72	92.49	60.25	41.11	-761.1	-384.7
6	5.30	7.60	6.65	13.33	38.57	39.84	.4733	.1212	.0251	1.2791	85.11	84.61	61.21	47.88	-818.9	-448.3
7	7.33	8.99	6.00	13.35	36.46	42.98	.4114	.0722	.0150	1.2957	90.25	89.92	64.35	51.00	-905.9	-546.6
8	8.22	9.68	8.03	12.52	35.62	43.30	.3857	.0576	.0117	1.2923	91.71	91.43	65.55	53.03	-943.1	-596.4
9	8.64	9.89	11.78	10.01	35.39	42.10	.3561	.0459	.0088	1.2724	92.61	92.39	66.28	56.27	-977.7	-658.5

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
1.2067	1.7304	81.98	83.29	29.04

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(s) Concluded. Run 225; speed code 70; point 5

(s-4) Stator 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	Vθ-1 FT/SEC	Vθ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	8.364	1.092	735.9	514.9	541.0	514.7	498.8	16.1	42.9	1.8	.6238	.4280	1.2782	1.0904
2	7.434	1.103	715.2	536.0	519.5	535.8	491.6	14.2	43.6	1.5	.6058	.4468	1.2851	1.0878
3	6.480	1.007	698.8	538.0	514.7	538.0	472.7	6.8	42.7	.7	.5919	.4493	1.2917	1.0866
4	3.908	.588	641.6	512.8	489.0	512.8	415.3	-3.1	40.4	-.4	.5416	.4283	1.2872	1.0835
5	.981	-.063	587.1	480.4	461.0	480.3	363.5	-9.1	38.3	-1.1	.4928	.4001	1.2851	1.0825
6	-2.099	-.826	564.5	471.6	428.1	471.6	368.0	-3.6	40.7	-.4	.4710	.3908	1.2662	1.0859
7	-4.593	-1.264	567.1	487.4	466.8	487.4	322.0	-5.5	34.7	-.6	.4691	.4008	1.2791	1.0849
8	-5.247	-1.300	557.2	480.0	475.9	480.0	289.9	-3.4	31.4	-.4	.4592	.3933	1.2754	1.0822
9	-5.904	-1.234	532.1	451.9	472.2	451.9	245.4	-4.5	27.5	-.6	.4367	.3689	1.2564	1.0770

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	EFF-P STATIC-ST	EFF-A TOT-STG	EFF-P TOT-STG
1	-5.50	-3.93	13.48	41.12	51.07	51.45	.4485	.1700	.0385	.9606	70.72	80.20	80.84
2	-3.76	-1.72	12.64	42.09	49.40	53.95	.4051	.0975	.0225	.9785	80.52	84.48	84.98
3	-3.87	-1.32	11.43	41.99	49.33	54.44	.3881	.0762	.0179	.9838	83.56	87.49	87.90
4	-5.14	-1.18	9.95	40.74	47.49	52.06	.3644	.0456	.0114	.9917	88.63	89.47	89.81
5	-6.42	-1.02	9.19	39.35	45.10	48.56	.3530	.0459	.0124	.9930	87.18	89.71	90.23
6	-3.31	2.95	9.58	41.13	41.82	47.13	.3528	.0733	.0209	.9897	77.51	81.04	81.63
7	-9.18	-2.44	9.61	35.31	45.10	47.78	.3075	.0900	.0264	.9875	67.74	85.57	86.03
8	-13.10	-6.21	10.51	31.83	45.66	46.68	.2889	.0853	.0253	.9887	68.35	87.30	87.71
9	-18.25	-11.14	11.49	28.12	44.90	43.56	.2889	.0943	.0282	.9885	67.69	87.29	87.66

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
7502.	103.31	1.2067	1.7095	80.02	81.44

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(t) Run 225; speed code 50; point 1

(t-1) Rotor 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	16.666	18.224	258.1	560.7	258.1	317.0	.0	462.6	.0	55.6	.2324	.5013	315.3	365.2	.3668	.2964	407.5	31.6
2	14.178	15.786	263.2	535.8	263.2	329.3	.0	422.7	.0	52.0	.2370	.4785	339.8	382.8	.3870	.2962	429.8	31.7
3	11.858	13.512	268.2	514.9	268.2	330.5	.0	394.9	.0	50.0	.2415	.4593	364.0	400.4	.4072	.2948	452.1	30.5
4	5.907	7.473	279.7	468.8	279.7	331.8	.0	331.1	.0	44.9	.2520	.4171	433.7	453.6	.4651	.3147	516.1	33.7
5	.210	.932	285.9	409.5	285.9	306.6	.0	271.4	.0	41.5	.2577	.3633	520.7	524.3	.5355	.3526	594.1	97.4
6	-4.560	-4.329	285.2	398.4	285.2	321.5	.0	235.2	.0	36.2	.2571	.3533	603.7	594.9	.6019	.4279	667.7	82.4
7	-8.908	-8.061	279.4	403.1	279.4	332.8	.0	227.5	.0	34.3	.2518	.3573	665.0	647.9	.6500	.4752	721.4	36.2
8	-10.472	-9.337	276.2	400.1	276.2	323.8	.0	235.1	.0	35.9	.2489	.3540	685.4	665.5	.6659	.4765	739.0	38.6
9	-11.645	-10.537	272.7	377.9	272.7	287.7	.0	245.0	.0	40.3	.2457	.3333	705.7	683.2	.6816	.4624	756.6	24.2

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	4.09	8.70	10.86	67.54	19.22	24.19	.4556	.1279	.0269	1.1895	93.90	93.81	50.46	-17.08	-315.3	97.4
2	4.20	8.50	12.74	58.90	19.57	25.33	.4700	.0884	.0202	1.1835	95.11	95.05	52.00	-6.91	-339.8	39.9
3	4.40	8.51	12.54	52.44	19.92	25.57	.4901	.0801	.0192	1.1789	95.00	94.94	53.40	.96	-364.0	-5.5
4	5.57	9.04	10.55	36.84	20.72	26.00	.4924	.0547	.0137	1.1701	95.34	95.31	57.07	20.23	-433.7	-122.5
5	6.69	9.37	9.22	21.71	21.16	24.20	.4707	.0834	.0193	1.1518	90.43	90.30	61.22	39.51	-520.7	-252.9
6	7.49	9.44	5.36	16.51	21.11	25.54	.3943	.0462	.0102	1.1544	93.39	93.32	64.73	48.22	-603.7	-359.7
7	8.18	9.59	4.81	15.63	20.71	26.44	.3683	.0570	.0125	1.1587	91.09	90.97	67.24	51.61	-665.0	-420.4
8	8.39	9.68	6.00	15.09	20.48	25.63	.3858	.0966	.0210	1.1568	85.05	84.81	68.08	53.00	-685.4	-430.4
9	8.55	9.70	10.29	12.25	20.24	22.64	.4257	.1697	.0344	1.1454	74.11	73.67	68.88	56.63	-705.7	-438.2

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
1.0482	1.1609	90.52	90.66	19.93

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(t) Continued. Run 225; speed code 50; point 1

(t-2) Stator 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	Vθ-1 FT/SEC	Vθ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	17.959	14.770	562.9	414.5	339.3	414.5	452.9	8.1	53.7	1.1	.5033	.3664	1.1716	1.0541
2	15.476	12.920	540.3	411.7	345.7	411.6	415.2	7.3	50.3	1.0	.4827	.3643	1.1721	1.0518
3	13.228	11.178	521.1	407.1	346.8	407.1	389.0	1.5	48.3	.2	.4651	.3603	1.1707	1.0506
4	7.527	6.364	477.7	388.5	347.0	388.2	328.3	-15.4	43.3	-2.3	.4254	.3439	1.1608	1.0481
5	1.325	.400	420.3	366.0	321.4	365.2	270.8	-23.4	40.1	-3.7	.3732	.3239	1.1472	1.0456
6	-3.428	-4.573	409.2	374.5	334.3	373.7	236.0	-23.3	35.3	-3.6	.3632	.3316	1.1490	1.0451
7	-6.046	-7.289	413.5	376.8	344.3	375.9	229.0	-26.3	33.7	-4.0	.3667	.3334	1.1491	1.0474
8	-6.865	-8.009	410.1	373.9	334.8	373.1	236.9	-23.8	35.4	-3.7	.3631	.3303	1.1472	1.0502
9	-7.914	-8.682	388.6	356.6	300.1	356.1	246.9	-17.5	39.5	-2.8	.3430	.3141	1.1386	1.0538

SL	INCS DEGREE	INCM. DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	SEFF-P STATC-ST	SEFF-A TOT-STG	SEFF-P TOT-STG
1	1.16	3.27	13.43	52.60	25.49	32.97	.4154	.0921	.0188	.9654	81.50	85.79	86.05
2	-.58	1.82	12.23	49.26	26.54	32.86	.3882	.0617	.0131	.9910	86.32	89.78	89.95
3	-1.26	1.53	10.59	48.07	26.77	32.54	.3736	.0478	.0106	.9935	88.45	91.15	91.28
4	-3.65	.07	7.01	45.61	27.10	31.02	.3541	.0592	.0144	.9931	83.18	90.48	90.81
5	-5.42	-.36	5.65	43.74	25.28	29.10	.3181	.0446	.0122	.9959	82.07	87.84	88.00
6	-9.35	-3.20	5.85	38.84	26.47	29.76	.2740	.0562	.0167	.9951	67.25	90.00	90.13
7	-10.92	-4.04	6.51	37.73	27.26	29.85	.2826	.0936	.0292	.9917	47.56	85.55	85.77
8	-9.59	-2.54	8.10	39.02	26.42	29.53	.2920	.0956	.0302	.9916	47.05	79.85	80.17
9	-6.09	1.06	10.47	42.38	23.54	28.03	.3026	.0762	.0244	.9940	54.18	70.38	70.86

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
5367.	87.76	1.0482	1.1532	86.38	86.59

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(t) Continued. Run 225; speed code 50; point 1

(t-3) Rotor 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	Vθ-1 FT/SEC	Vθ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.848	11.012	445.1	599.5	445.0	486.1	7.9	350.8	1.0	35.7	.3942	.5252	418.6	438.8	.5364	.4329	605.5	494.0
2	11.100	9.783	446.6	622.2	446.5	519.5	7.2	342.4	.9	33.3	.3960	.5470	430.4	448.3	.5456	.4661	615.2	530.2
3	10.082	8.576	445.8	616.5	445.8	532.1	1.5	311.4	.2	30.2	.3955	.5427	442.6	458.2	.5564	.4859	627.1	552.0
4	6.177	5.049	432.8	553.5	432.5	507.1	-15.3	221.9	-2.0	23.6	.3841	.4871	480.7	490.1	.5841	.5048	658.1	573.7
5	.291	.596	408.8	489.1	408.1	464.8	-23.4	152.1	-3.3	18.1	.3627	.4301	533.3	535.5	.6124	.5299	690.2	602.6
6	-4.986	-3.541	407.6	457.3	407.0	444.7	-23.6	106.8	-3.3	13.5	.3617	.4024	587.0	583.3	.6512	.5734	733.9	651.7
7	-8.134	-6.771	400.3	449.3	399.4	440.6	-26.5	88.0	-3.8	11.3	.3546	.3948	628.0	620.2	.6793	.6071	766.7	690.9
8	-9.010	-7.933	392.0	427.8	391.3	418.5	-23.7	88.6	-3.5	11.9	.3467	.3749	641.8	632.7	.6826	.6016	772.0	686.4
9	-9.576	-8.990	371.3	375.4	370.9	362.7	-17.7	96.6	-2.7	14.9	.3274	.3273	655.6	645.5	.6777	.5737	768.7	657.9

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	ηEFF-P TOT-ST	ηEFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	Vθ'-1 FT/SEC	Vθ'-2 FT/SEC
1	-7.99	-2.67	19.86	32.42	35.04	38.35	.3150	.2902	.0647	1.1103	66.62	66.19	42.63	10.21	-410.7	-88.0
2	-7.33	-2.21	15.22	31.98	35.23	41.50	.2660	.1717	.0391	1.1336	79.92	79.63	43.44	11.46	-423.1	-105.9
3	-6.24	-1.33	13.40	29.33	35.17	42.87	.2383	.1010	.0232	1.1381	87.15	86.99	44.70	15.36	-441.1	-146.8
4	-2.74	1.49	11.73	21.08	34.06	41.36	.2219	.0433	.0099	1.1203	92.83	92.80	48.89	27.81	-496.0	-268.2
5	-.08	3.15	9.02	14.23	32.09	38.07	.2020	.0197	.0043	1.0999	95.52	95.57	53.74	39.51	-556.7	-383.4
6	.47	2.77	5.75	9.40	32.08	36.27	.1708	.0338	.0071	1.0755	89.48	89.50	56.38	46.99	-610.7	-476.4
7	1.66	3.32	5.37	8.31	31.48	35.57	.1500	.0533	.0112	1.0628	80.80	80.78	58.68	50.37	-654.5	-532.2
8	2.26	3.71	7.41	7.18	30.78	33.51	.1577	.0851	.0175	1.0528	69.08	69.01	59.59	52.41	-665.5	-544.1
9	3.51	4.76	12.01	4.65	29.06	28.68	.1946	.1658	.0314	1.0329	42.03	41.93	61.15	56.50	-673.2	-548.9

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.0795	1.2586	85.56	85.98	27.77

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(t) Concluded. Run 225; speed code 50; point 1

(t-4) Stator 2 - U. S. customary units

SL	EPSI-1	EPSI-2	V-1	V-2	VM-1	VM-2	Vθ-1	Vθ-2	β-1	β-2	M-1	M-2	PT2/ PT1	TT2/ TT1
	DEGREE	DEGREE	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	DEGREE	DEGREE				
1	8.030	1.090	627.0	575.3	522.2	574.6	347.0	29.7	33.8	2.9	.5508	.5030	1.0541	1.0458
2	6.935	1.042	646.6	636.1	550.6	635.2	339.1	34.5	31.8	3.1	.5698	.5600	1.0987	1.0459
3	5.998	.845	639.2	652.1	559.6	651.5	308.8	28.1	29.0	2.5	.5639	.5760	1.1152	1.0433
4	3.697	.361	574.1	594.5	529.9	594.4	221.0	7.2	22.7	.7	.5061	.5250	1.0881	1.0355
5	1.206	-.179	508.3	548.6	484.9	548.6	152.2	.2	17.4	.0	.4476	.4847	1.0728	1.0288
6	-1.174	-.722	475.8	511.5	463.6	511.3	107.4	-12.4	13.0	-1.4	.4192	.4518	1.0485	1.0234
7	-3.031	-1.061	470.2	506.9	461.8	506.9	88.6	-1.1	10.9	-.1	.4139	.4473	1.0446	1.0217
8	-3.816	-1.181	453.4	482.0	444.7	482.0	88.8	3.6	11.3	.4	.3981	.4240	1.0344	1.0215
9	-4.912	-1.218	407.2	410.3	395.5	410.3	96.9	4.1	13.8	.6	.3558	.3586	1.0046	1.0225

SL	INCS	INCM	DEV	TURN	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P STATC-ST	%EFF -A TOT-STG	%EFF -P TOT-STG
	DEGREE	DEGREE	DEGREE	DEGREE									
1	-14.62	-13.09	14.64	30.85	40.67	43.50	.1951	.2690	.0608	.9500	-60.82	33.14	33.56
2	-15.60	-13.55	14.23	28.67	43.46	48.84	.1245	.1551	.0357	.9693	-167.39	59.50	59.96
3	-17.58	-15.09	13.17	26.53	44.59	50.54	.0820	.1037	.0244	.9799	323.62	73.15	73.48
4	-22.85	-18.90	10.99	21.99	42.83	46.24	.0549	.1783	.0446	.9715	320.86	68.96	69.24
5	-27.25	-21.85	10.30	17.41	39.43	42.79	-.0009	.1895	.0511	.9758	203.52	70.51	70.69
6	-30.96	-24.70	8.64	14.42	37.56	39.85	-.0038	.2176	.0621	.9752	229.88	58.31	58.45
7	-32.98	-26.24	10.14	10.98	37.02	39.37	-.0223	.1521	.0447	.9831	189.86	57.94	58.06
8	-33.21	-26.32	11.34	10.88	35.33	37.18	-.0120	.1711	.0507	.9831	243.71	45.34	45.42
9	-32.01	-24.90	12.64	13.21	31.02	31.21	.0544	.3331	.0995	.9734	-255.58	6.54	6.42

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
6367.	87.76	1.0795	1.2264	75.63	76.28

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(u) Run 225; speed code 50; point 2

(u-1) Rotor 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	V0-1 FT/SEC	V0-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	16.677	18.203	245.2	552.1	245.2	299.2	.0	464.0	.0	57.2	.2207	.4931	316.0	366.0	.3599	.2812	400.0	314.8
2	14.209	15.745	250.0	528.1	250.0	310.2	.0	427.4	.0	54.0	.2250	.4711	340.5	383.6	.3802	.2795	422.5	313.3
3	11.885	13.466	254.8	506.4	254.8	315.4	.0	396.2	.0	51.4	.2293	.4513	364.8	401.3	.4005	.2811	444.9	315.5
4	5.817	7.462	265.6	459.7	265.6	316.1	.0	333.8	.0	46.5	.2392	.4087	434.7	454.6	.4588	.3008	509.5	338.4
5	.100	.979	271.4	402.9	271.4	289.8	.0	279.9	.0	44.0	.2445	.3571	521.9	525.4	.5299	.3366	588.2	379.8
6	-4.869	-4.307	270.5	397.8	270.5	310.6	.0	248.6	.0	38.7	.2436	.3524	605.1	596.3	.5970	.4130	662.8	466.2
7	-9.296	-8.103	264.4	398.0	264.4	311.3	.0	248.0	.0	38.5	.2381	.3519	666.6	649.4	.6458	.4490	717.1	507.9
8	-10.726	-9.362	261.3	391.6	261.3	295.4	.0	257.1	.0	41.0	.2353	.3455	687.0	667.0	.6618	.4458	735.0	505.3
9	-11.733	-10.543	258.1	377.9	258.1	268.5	.0	265.9	.0	44.6	.2324	.3326	707.3	684.7	.6779	.4378	753.0	497.5

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	EFF-P TOT-ST	EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	V0'-1 FT/SEC	V0'-2 FT/SEC
1	5.59	10.20	9.82	70.09	18.30	22.94	.4880	.1358	.0284	1.1903	93.79	93.69	51.96	-18.13	-316.0	97.9
2	5.68	9.98	11.63	61.49	18.65	23.97	.5066	.0986	.0225	1.1855	94.80	94.74	53.48	-8.01	-340.5	43.7
3	5.86	9.97	12.51	53.93	18.98	24.52	.5163	.0768	.0184	1.1808	95.39	95.34	54.86	.92	-364.8	-5.1
4	6.95	10.42	11.20	37.56	19.75	24.88	.5173	.0556	.0139	1.1721	95.41	95.38	58.45	20.89	-434.7	-120.8
5	7.99	10.67	9.99	22.25	20.15	22.97	.4999	.0939	.0215	1.1559	89.73	89.59	62.52	40.27	-521.9	-245.5
6	8.71	10.66	5.37	17.70	20.08	24.77	.4215	.0584	.0129	1.1617	92.17	92.07	65.94	48.24	-605.1	-347.7
7	9.35	10.76	5.38	16.23	19.66	24.78	.4146	.0978	.0213	1.1637	86.00	85.76	68.41	52.18	-666.6	-401.3
8	9.53	10.82	7.17	15.05	19.44	23.43	.4387	.1453	.0308	1.1605	79.44	79.07	69.22	54.17	-687.0	-409.9
9	9.64	10.79	10.91	12.72	19.21	21.20	.4685	.2001	.0399	1.1539	71.5[illegible]	71.48	69.97	57.25	-707.3	-418.8

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
1.0504	1.1654	88.90	89.08	18.96

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(u) Continued. Run 225; speed code 50; point 2

(u-2) Stator 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VΘ-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/PT1	TT2/TT1
1	17.935	14.739	553.2	390.0	315.7	389.9	454.2	7.6	55.3	1.1	.4941	.3441	1.1730	1.0544
2	15.425	12.878	531.5	388.4	325.9	388.2	419.8	7.6	52.2	1.4	.4743	.3430	1.1738	1.0524
3	13.185	11.154	511.5	384.1	330.6	384.1	390.3	4.9	49.7	.7	.4560	.3394	1.1725	1.0509
4	7.621	4.466	467.5	366.3	330.1	366.2	331.0	-9.3	45.0	-1.4	.4158	.3237	1.1637	1.0486
5	1.501	.677	412.5	342.9	303.6	342.3	279.3	-21.4	42.6	-3.6	.3658	.3029	1.1511	1.0472
6	-3.130	-4.095	407.5	357.1	322.3	356.6	249.4	-19.2	37.8	-3.1	.3612	.3156	1.1559	1.0477
7	-5.797	-6.822	407.5	355.2	322.1	354.5	249.7	-22.1	37.8	-3.6	.3605	.3132	1.1547	1.0517
8	-6.726	-7.637	401.1	349.2	306.3	348.8	259.0	-17.9	40.3	-2.9	.3541	.3074	1.1519	1.0549
9	-7.874	-8.456	387.8	334.7	280.3	334.6	268.0	-11.0	43.8	-1.9	.3415	.2939	1.1455	1.0585

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-P TOTAL	LOSS-P TOTAL	PT2/PT1	BEFF-P STATC-ST	BEFF -A TOT-STG	BEFF -P TOT-STG
1	2.78	4.89	13.42	54.23	24.19	31.29	.4506	.0928	.0190	.9858	82.97	85.89	86.15
2	1.36	3.76	12.62	50.81	25.15	31.24	.4227	.0652	.0138	.9907	86.95	89.52	89.69
3	.19	2.97	11.11	49.00	25.65	30.96	.4059	.0500	.0110	.9934	89.18	91.56	91.69
4	-1.98	1.74	7.82	46.47	25.91	29.51	.3867	.0568	.0139	.9937	85.91	91.13	91.26
5	-2.91	2.14	5.74	46.16	23.99	27.49	.3665	.0495	.0135	.9956	84.58	86.99	87.18
6	-6.84	-.68	6.34	40.85	25.63	28.64	.3202	.0588	.0174	.9949	75.87	88.75	88.91
7	-6.79	.10	6.97	41.41	25.56	28.36	.3376	.0898	.0280	.9923	64.48	81.38	81.70
8	-4.66	2.39	8.82	43.23	24.22	27.79	.3505	.0906	.0286	.9924	64.76	75.25	75.68
9	-1.82	5.33	11.41	45.71	22.06	26.53	.3698	.0940	.0301	.9927	64.77	67.77	68.31

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
5379.	83.49	1.0504	1.1577	84.94	85.19

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(u) Continued. Run 225; speed code 50; point 2

(u-3) Rotor 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	Vθ-1 FT/SEC	Vθ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.740	10.951	419.0	584.7	419.0	475.6	7.4	340.0	1.0	35.4	.3704	.5119	419.5	439.8	.5196	.4255	587.7	496.0
2	10.932	9.683	420.7	589.1	420.6	483.8	9.4	336.2	1.3	34.7	.3723	.5164	431.4	449.3	.5272	.4355	595.7	496.8
3	9.921	8.468	419.1	578.3	419.1	485.1	4.8	314.7	.7	32.9	.3712	.5072	443.6	459.3	.5373	.4439	606.7	506.2
4	6.160	4.997	405.3	524.0	405.2	463.4	-9.2	244.6	-1.3	27.8	.3590	.4592	481.8	491.2	.5639	.4600	636.6	524.9
5	.489	.592	381.0	465.8	380.4	428.0	-21.4	183.9	-3.2	23.2	.3372	.4076	534.5	536.8	.5962	.4853	673.6	554.7
6	-4.566	-3.436	386.8	435.6	386.3	411.8	-19.4	141.8	-2.9	19.0	.3423	.3811	588.4	584.6	.6374	.5291	720.2	604.7
7	-7.575	-6.507	378.6	424.3	378.0	407.3	-22.1	118.8	-3.4	16.2	.3343	.3706	629.4	621.6	.6651	.5662	753.3	647.1
8	-8.478	-7.665	369.9	410.0	369.4	393.0	-17.8	116.9	-2.8	16.5	.3259	.3574	643.2	634.2	.6672	.5662	757.3	649.6
9	-9.160	-8.798	353.3	371.8	353.1	352.0	-11.1	120.0	-1.6	18.8	.3105	.3230	657.0	646.9	.6642	.5504	755.8	633.7

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	Vθ'-1 FT/SEC	Vθ'-2 FT/SEC
1	-6.17	-.85	21.43	32.67	33.31	38.70	.3044	.1538	.0341	1.1351	83.00	82.76	44.45	11.78	-412.2	-99.8
2	-5.72	-.59	16.85	31.96	33.50	39.66	.2960	.1121	.0253	1.1436	87.40	87.23	45.05	13.09	-421.9	-113.1
3	-4.64	.27	14.56	29.78	33.41	40.01	.2894	.0848	.0194	1.1434	89.89	89.77	46.30	16.52	-438.7	-144.5
4	-1.18	3.05	11.88	22.50	32.26	38.59	.2794	.0455	.0103	1.1303	93.33	93.30	50.46	27.96	-491.0	-246.6
5	1.78	5.01	9.00	16.11	30.23	35.76	.2656	.0337	.0073	1.1152	93.69	93.69	55.60	39.50	-555.9	-352.9
6	1.70	4.00	5.84	10.52	30.76	34.35	.2327	.0451	.0095	1.0931	89.06	89.03	57.61	47.08	-607.8	-442.8
7	2.90	4.56	5.96	8.95	30.03	33.71	.2032	.0449	.0093	1.0838	87.33	87.30	59.91	50.96	-651.5	-502.8
8	3.48	4.94	7.73	8.08	29.26	32.33	.2007	.0532	.0109	1.0783	84.38	84.34	60.81	52.73	-661.0	-517.2
9	4.48	5.73	11.71	5.91	27.86	28.70	.2209	.0997	.0191	1.0647	70.66	70.53	62.12	56.21	-668.2	-526.9

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.0854	1.2827	86.36	86.79	26.34

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(u) Concluded. Run 225; speed code 50; point 2

(u-4) Stator 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	8.189	1.100	608.3	535.0	506.8	534.7	336.3	19.2	33.8	2.1	.5337	.4664	1.0934	1.0446
2	7.169	1.072	610.6	574.2	511.7	573.8	333.1	21.3	33.2	2.1	.5363	.5027	1.1204	1.0449
3	6.200	.895	608.5	582.2	510.5	582.0	312.3	16.5	31.6	1.6	.5258	.5108	1.1295	1.0435
4	3.707	.337	542.3	538.6	484.5	538.6	243.6	-1.8	26.7	-.2	.4759	.4726	1.1139	1.0381
5	.997	-.347	483.0	496.0	446.6	495.8	183.9	-11.1	22.4	-1.3	.4231	.4349	1.1008	1.0337
6	-1.519	-.918	452.4	463.8	429.5	463.5	142.4	-16.1	18.3	-2.0	.3963	.4066	1.0777	1.0288
7	-3.428	-1.165	443.7	454.0	427.3	454.0	119.5	-8.3	15.6	-1.1	.3881	.3973	1.0721	1.0266
8	-4.184	-1.225	433.0	437.5	416.8	437.5	117.5	-3.8	15.8	-.5	.3780	.3820	1.0666	1.0258
9	-5.184	-1.219	399.8	388.2	381.1	388.2	120.6	-2.2	17.6	-.3	.3478	.3374	1.0477	1.0258

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	DFAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	EFF-P STATC-ST	EFF -A TOT-STG	EFF -P TOT-STG
1	-14.64	-13.07	13.75	31.72	40.80	42.80	.2371	.2066	.0467	.9636	16.89	58.02	58.48
2	-14.15	-12.11	13.25	31.09	41.54	46.39	.1773	.1136	.0262	.9797	11.38	73.62	73.97
3	-15.01	-12.46	12.33	29.95	41.72	47.33	.1434	.0707	.0166	.9878	-20.17	81.42	81.66
4	-18.80	-14.84	10.11	26.93	40.05	43.95	.1173	.0998	.0250	.9857	3.17	82.25	82.43
5	-22.30	-16.90	9.00	23.66	37.09	40.46	.0790	.1069	.0288	.9877	266.34	92.72	82.86
6	-25.66	-19.40	8.04	20.32	35.62	37.75	.0733	.1333	.0380	.9863	338.94	75.12	75.28
7	-28.22	-21.47	9.21	16.68	35.14	36.78	.0610	.1074	.0315	.9894	325.05	75.74	75.86
8	-28.76	-21.87	10.42	16.25	34.06	35.27	.0679	.1118	.0331	.9899	-298.50	72.09	72.22
9	-28.19	-21.08	11.74	17.93	30.85	31.00	.1160	.1950	.0582	.9848	-822.56	52.31	52.49

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
5379.	83.49	1.0854	1.2640	81.10	81.68

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(v) Run 225; speed code 50; point 3

(v-1) Rotor 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	Vθ-1 FT/SEC	Vθ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	16.602	18.184	225.1	540.6	225.1	279.3	.0	462.8	.0	58.9	.2024	.4824	314.5	364.4	.3478	.2643	386.8	296.2
2	14.029	15.727	229.5	521.0	229.5	293.1	.0	430.7	.0	55.7	.2064	.4645	339.0	381.9	.3682	.2649	409.4	297.2
3	11.588	13.453	233.8	500.0	233.8	296.6	.0	402.5	.0	53.6	.2103	.4453	363.1	399.5	.3885	.2642	431.9	296.7
4	5.395	7.496	243.2	452.9	243.2	288.1	.0	349.4	.0	50.5	.2188	.4021	432.7	452.5	.4466	.2716	496.4	306.0
5	-.247	1.053	248.0	400.3	248.0	266.2	.0	299.0	.0	48.3	.2232	.3542	519.5	523.0	.5181	.3079	575.7	348.0
6	-5.672	-4.365	246.7	399.8	246.7	294.2	.0	270.7	.0	42.6	.2220	.3535	602.3	593.5	.5857	.3862	650.9	436.8
7	-9.996	-8.208	240.3	388.9	240.3	267.0	.0	282.8	.0	46.6	.2162	.3424	663.5	646.4	.6349	.3972	705.7	451.1
8	-11.048	-9.408	237.5	386.3	237.5	253.0	.0	291.9	.0	49.0	.2137	.3395	683.8	664.0	.6512	.3954	723.9	449.9
9	-11.771	-10.550	234.8	386.0	234.8	242.5	.0	300.3	.0	51.0	.2112	.3387	704.1	681.6	.6676	.3965	742.2	451.9

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	Vθ'-1 FT/SEC	Vθ'-2 FT/SEC
1	7.81	12.42	8.53	73.60	16.86	21.51	.5182	.1364	.0283	1.1896	94.11	94.02	54.18	-19.41	-314.5	98.4
2	7.85	12.15	10.20	65.10	17.19	22.76	.5325	.0872	.0198	1.1880	95.67	95.62	55.65	-9.45	-339.0	48.9
3	7.99	12.10	10.99	57.58	17.49	23.17	.5496	.0748	.0179	1.1837	95.77	95.73	56.98	-.59	-363.1	3.1
4	9.03	12.50	9.97	40.87	18.16	22.76	.5785	.0903	.0227	1.1751	93.15	93.05	60.53	19.66	-432.7	-103.1
5	9.94	12.62	9.80	24.39	18.91	21.19	.5550	.1206	.0277	1.1628	88.01	87.81	64.47	40.08	-519.5	-224.1
6	10.54	12.49	4.80	20.11	18.41	23.57	.4687	.0821	.0184	1.1715	90.03	89.87	67.78	47.66	-602.3	-322.8
7	11.11	12.52	6.90	16.48	17.95	21.27	.5036	.1752	.0368	1.1685	78.13	77.69	70.17	53.69	-663.5	-363.6
8	11.22	12.51	8.74	15.17	17.76	20.09	.5241	.2135	.0435	1.1681	73.60	73.07	70.91	55.74	-683.8	-372.0
9	11.24	12.39	11.12	14.12	17.56	19.23	.5390	.2435	.0483	1.1691	70.16	69.55	71.58	57.46	-704.1	-381.3

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
1.0540	1.1721	86.14	86.39	17.40

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(v) Continued. Run 225; speed code 50; point 3

(v-2) Stator 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VΘ-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	18.008	14.799	540.3	351.6	294.3	351.6	453.1	3.5	57.1	.6	.4821	.3096	1.1722	1.0541
2	15.613	13.017	522.8	353.4	307.1	353.3	423.1	10.7	54.1	1.7	.4662	.3115	1.1744	1.0527
3	13.487	11.377	503.4	351.1	310.0	351.0	396.6	8.4	52.0	1.4	.4484	.3096	1.1742	1.0516
4	7.993	6.864	458.8	336.9	300.7	336.9	346.6	-3.6	49.0	-.6	.4075	.2970	1.1684	1.0508
5	1.785	1.268	408.1	310.5	278.4	310.0	298.4	-17.8	47.0	-3.3	.3613	.2734	1.1563	1.0502
6	-2.622	-3.216	407.8	331.9	304.1	331.6	271.6	-13.3	41.8	-2.3	.3607	.2923	1.1642	1.0516
7	-5.544	-6.066	397.1	315.8	277.0	315.6	284.5	-12.3	45.8	-2.2	.3498	.2770	1.1581	1.0585
8	-6.688	-7.082	394.6	306.8	263.1	306.6	294.0	-10.7	48.2	-2.0	.3469	.2686	1.1548	1.0621
9	-7.936	-8.149	394.3	297.4	252.8	297.2	302.6	-11.2	50.2	-2.2	.3461	.2597	1.1513	1.0657

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	ΣEFF-P STATC-ST	ΣEFF-A TOT-STG	ΣEFF-P TOT-STG
1	4.59	6.70	12.89	56.57	22.67	28.51	.5109	.0993	.0203	.9854	84.05	85.99	86.24
2	3.24	5.64	12.94	52.38	23.83	28.73	.4826	.0804	.0171	.9889	86.21	89.30	89.48
3	2.48	5.26	11.75	50.65	24.18	28.58	.4648	.0610	.0135	.9922	88.85	91.13	91.27
4	2.03	5.75	8.67	49.63	23.70	27.42	.4464	.0497	.0121	.9947	89.73	89.68	89.84
5	1.46	6.51	6.03	50.24	22.11	25.15	.4429	.0680	.0186	.9941	84.48	84.45	84.71
6	-2.81	3.34	7.13	44.09	24.30	26.91	.3944	.0726	.0215	.9938	79.52	86.26	86.49
7	1.19	8.08	8.31	48.05	22.01	25.42	.4392	.1101	.0344	.9911	71.42	73.39	73.88
8	3.30	10.35	9.76	50.26	20.85	24.60	.4683	.1419	.0449	.9887	65.69	67.77	68.37
9	4.60	11.75	11.14	52.40	19.99	23.74	.5033	.1918	.0614	.9847	57.24	62.57	63.26

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TT INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
5355.	76.60	1.0546	1.1625	81.67	81.90

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(v) Continued. Run 225; speed code 50; point 3

(v-3) Rotor 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	Vθ-1 FT/SEC	Vθ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.674	10.867	376.0	563.4	376.0	444.6	3.4	346.0	.5	37.7	.3316	.4922	417.6	437.8	.4934	.3966	559.5	454.0
2	10.838	9.563	380.4	551.8	380.2	430.6	10.4	345.1	1.6	36.5	.3357	.4819	429.4	447.2	.4994	.3865	565.8	442.6
3	9.863	8.363	380.1	538.0	380.0	425.5	8.3	329.2	1.3	37.6	.3356	.4697	441.5	457.2	.5089	.3880	576.2	444.4
4	6.363	5.051	369.2	488.5	369.2	407.4	-3.5	269.5	-.5	33.4	.3260	.4260	479.6	488.9	.5368	.4035	608.0	462.6
5	.984	.765	342.8	438.0	342.3	382.7	-17.7	213.1	-3.0	29.1	.3023	.3812	532.1	534.3	.5712	.4348	647.7	499.6
6	-3.786	-3.110	356.5	412.4	356.3	366.4	-13.5	189.4	-2.1	27.2	.3144	.3584	585.7	581.9	.6147	.4665	697.0	536.9
7	-6.633	-5.954	339.7	401.0	339.5	361.9	-12.4	172.8	-2.1	25.5	.2983	.3473	626.6	618.8	.6354	.4974	723.5	574.4
8	-7.666	-7.160	330.4	393.4	330.2	356.2	-10.9	167.0	-1.9	25.1	.2895	.3401	640.3	631.3	.6397	.5059	730.1	585.2
9	-8.609	-8.463	320.0	367.1	319.8	331.4	-11.3	157.8	-2.0	25.4	.2798	.3165	654.0	644.0	.6454	.5073	738.2	588.3

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	Vθ'-1 FT/SEC	Vθ'-2 FT/SEC
1	-2.94	2.37	21.25	36.08	30.29	37.25	.3306	.0557	.0124	1.1592	94.55	94.50	47.68	11.60	-414.2	-91.8
2	-3.04	2.08	17.03	34.45	30.68	36.21	.3586	.0818	.0185	1.1544	91.80	91.70	47.72	13.27	-418.9	-102.2
3	-2.21	2.70	14.70	32.06	30.69	35.92	.3646	.0817	.0187	1.1507	91.37	91.27	48.73	16.66	-433.2	-128.0
4	.97	5.20	12.16	24.36	29.79	34.65	.3557	.0586	.0133	1.1384	92.58	92.52	52.61	28.24	-483.1	-219.4
5	4.26	7.49	9.51	18.08	27.55	32.68	.3316	.0337	.0073	1.1306	94.72	94.72	58.08	40.00	-549.8	-321.2
6	3.37	5.67	5.73	12.30	28.72	31.23	.3209	.0775	.0164	1.1121	85.75	85.62	59.28	46.97	-599.0	-392.5
7	4.98	6.65	5.89	11.12	27.18	30.63	.2905	.0584	.0121	1.1113	88.25	88.16	62.00	50.89	-639.0	-446.0
8	5.75	7.20	7.43	10.65	26.34	30.03	.2802	.0497	.0102	1.1105	89.59	89.53	63.08	52.43	-651.2	-464.3
9	6.63	7.88	11.15	8.63	25.41	27.78	.2815	.0663	.0129	1.1015	85.44	85.34	64.28	55.64	-665.4	-486.1

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
1.0942	1.3093	85.07	85.59	24.11

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(v) Concluded. Run 225; speed code 50; point 3

(v-4) Stator 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	8.353	1.143	581.4	474.6	470.1	474.3	342.2	15.7	36.3	1.9	.5087	.4117	1.1249	1.0456
2	7.405	1.145	568.6	498.5	454.3	498.3	341.9	14.6	37.1	1.7	.4972	.4335	1.1384	1.0467
3	6.419	.988	553.9	499.2	447.3	499.2	326.7	7.6	36.3	.9	.4843	.4345	1.1408	1.0449
4	3.762	.420	503.2	466.6	425.7	466.6	268.4	-4.2	32.3	-.5	.4393	.4062	1.1313	1.0408
5	.943	-.267	452.2	430.8	399.0	430.7	213.0	-11.0	28.1	-1.5	.3940	.3748	1.1243	1.0376
6	-1.693	-.847	427.2	409.9	382.6	409.7	190.0	-12.1	26.9	-1.7	.3715	.3561	1.1059	1.0359
7	-3.826	-1.178	418.4	403.1	380.7	403.0	173.6	-5.6	24.5	-.8	.3628	.3491	1.1061	1.0347
8	-4.581	-1.245	413.5	392.8	377.8	392.8	168.1	-2.2	24.0	-.3	.3579	.3395	1.1037	1.0338
9	-5.477	-1.227	391.1	358.7	357.4	358.7	158.9	-1.5	24.0	-.2	.3377	.3091	1.0911	1.0329

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	DIFAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	SEFF-P STATIC-ST	SEFF-A TOT-STG	SEFF-P TOT-STG
1	-12.14	-10.57	13.59	34.38	39.07	39.92	.3105	.1839	.0916	.9701	50.14	75.01	75.35
2	-10.23	-8.18	12.81	35.46	37.93	40.20	.2567	.0906	.0209	.9858	65.01	82.53	82.78
3	-10.31	-7.76	11.58	35.40	37.51	40.42	.2351	.0591	.0139	.9912	71.68	85.40	85.60
4	-13.26	-9.30	9.79	32.79	36.01	39.75	.2068	.0496	.0124	.9939	66.51	88.10	88.23
5	-16.58	-11.18	8.82	29.55	33.91	36.67	.1792	.0516	.0139	.9948	45.48	90.48	90.56
6	-17.60	-11.34	8.33	28.10	32.47	34.75	.1747	.0599	.0171	.9946	27.30	81.27	81.45
7	-19.30	-12.56	9.47	25.34	32.05	33.91	.1629	.0549	.0161	.9952	27.73	84.36	84.49
8	-20.49	-13.60	10.59	24.35	31.67	32.90	.1681	.0663	.0196	.9945	29.71	84.50	84.62
9	-21.76	-14.65	11.82	24.27	29.77	29.85	.2022	.1183	.0353	.9912	25.00	76.80	76.99

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
5355.	76.60	1.0942	1.2993	82.54	83.14

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(w) Run 225; speed code 50; point 4

(w-1) Rotor 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	16.466	18.177	213.5	535.6	213.5	268.6	.0	463.3	.0	59.9	.1919	.4777	314.8	364.7	.3419	.2552	360.4	286.1
2	13.767	15.721	217.3	517.3	217.3	280.2	.0	434.8	.0	57.2	.1953	.4609	339.3	382.2	.3622	.2540	402.9	285.1
3	11.214	13.443	220.8	498.8	220.8	282.2	.0	411.3	.0	55.5	.1986	.4439	363.5	399.8	.3823	.2519	425.3	282.5
4	4.851	7.525	227.7	448.1	227.7	267.9	.0	369.2	.0	53.3	.2047	.3973	433.1	452.9	.4400	.2517	489.3	283.8
5	-.898	1.097	229.9	401.8	229.9	250.0	.0	314.5	.0	51.5	.2068	.3561	520.0	523.5	.5113	.2880	568.6	325.8
6	-6.372	-4.400	226.5	403.7	226.5	272.7	.0	297.6	.0	47.5	.2037	.3561	602.9	594.1	.5791	.3554	644.0	402.8
7	-10.367	-8.253	219.3	400.6	219.3	238.5	.0	321.9	.0	53.4	.1972	.3516	664.1	647.0	.6287	.3539	699.4	403.3
8	-11.192	-9.440	216.6	404.0	216.6	230.7	.0	331.7	.0	55.1	.1947	.3540	684.5	664.6	.6453	.3549	717.9	405.0
9	-11.798	-10.569	213.9	406.8	213.9	224.2	.0	339.4	.0	56.5	.1923	.3569	704.8	682.2	.6620	.3584	736.5	409.6

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	9.24	13.85	7.78	75.7	16.03	20.73	.5373	.1449	.0300	1.1896	93.93	93.84	55.61	-20.17	-314.8	98.6
2	9.29	13.59	9.03	67.7	16.30	21.79	.5583	.1020	.0231	1.1889	95.11	95.04	57.09	-10.62	-339.3	52.6
3	9.47	13.58	9.27	60.7	16.56	22.08	.5819	.0938	.0224	1.1863	94.90	94.83	58.46	-2.31	-363.5	11.4
4	10.62	14.09	9.58	42.8	17.05	21.18	.6236	.1251	.0315	1.1759	90.95	90.80	62.12	19.26	-433.1	-93.7
5	11.61	14.29	9.61	26.2	17.22	19.92	.5975	.1519	.0350	1.1673	86.82	86.57	66.14	39.89	-520.0	-209.0
6	12.25	14.20	4.54	22.0	16.97	21.83	.5300	.1393	.0313	1.1775	84.74	84.44	69.48	47.40	-602.9	-296.5
7	12.76	14.17	6.92	18.1	16.45	18.98	.5870	.2453	.0515	1.1800	73.15	72.56	71.82	53.72	-664.1	-325.1
8	12.82	14.11	8.25	17.2	16.25	18.33	.6022	.2722	.0562	1.1835	70.47	69.80	72.51	55.25	-684.5	-332.9
9	12.80	13.95	10.40	16.3	16.06	17.80	.6120	.2930	.0593	1.1871	68.37	67.64	73.13	56.74	-704.8	-342.8

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
1.0588	1.1783	82.89	83.22	16.17

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(w) Continued. Run 225; speed code 50; point 4

(w-2) Stator 1 - U. S. customary units

SL	EPSI-1	EPSI-2	V-1	V-2	VM-1	VM-2	Vθ-1	Vθ-2	β-1	β-2	M-1	M-2	PT2/ PT1	TT2/ TT1
	DEGREE	DEGREE	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	DEGREE	DEGREE				
1	18.122	14.921	534.3	329.6	282.4	329.6	453.6	-.3	58.3	-.0	.4766	.2899	1.1716	1.0542
2	15.834	13.252	518.0	331.8	293.0	331.7	427.2	9.8	55.6	1.7	.4616	.2920	1.1739	1.0534
3	13.784	11.717	500.9	330.5	294.5	330.3	405.2	9.9	54.0	1.7	.4458	.2909	1.1743	1.0528
4	8.383	7.430	452.7	313.6	279.3	313.6	356.2	-1.3	51.9	-.2	.4015	.2759	1.1685	1.0523
5	2.306	2.077	408.0	285.7	260.6	285.4	313.9	-13.2	50.3	-2.7	.3607	.2509	1.1578	1.0529
6	-2.083	-2.302	410.3	305.9	281.4	305.9	298.6	-2.3	46.7	-.4	.3621	.2685	1.1656	1.0564
7	-5.293	-5.406	407.8	288.0	247.9	287.7	323.8	-14.4	52.6	-2.9	.3581	.2514	1.1603	1.0663
8	-6.565	-6.617	411.2	282.9	239.9	282.1	334.0	-22.2	54.4	-4.5	.3605	.2464	1.1589	1.0704
9	-7.889	-7.903	414.1	281.8	233.5	280.0	342.0	-31.7	55.8	-6.5	.3625	.2449	1.1587	1.0744

SL	INCS	INCM	DEV	TURN	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	SEFF-P STATC-ST	SEFF-A TOT-STG	SEFF-P TOT-STG
	DEGREE	DEGREE	DEGREE	DEGREE									
1	5.71	7.82	12.27	58.30	21.80	26.87	.5490	.1048	.0214	.9849	84.30	85.47	85.74
2	4.79	7.19	12.89	53.97	22.79	27.10	.5230	.0918	.0195	.9875	85.50	88.00	88.21
3	4.51	7.29	12.09	52.33	23.02	27.02	.5075	.0780	.0172	.9901	87.06	89.11	89.29
4	4.90	8.62	9.03	52.14	22.04	25.65	.4960	.0585	.0143	.9939	89.31	87.20	87.42
5	4.79	9.85	6.66	52.96	20.72	23.26	.5180	.0960	.0262	.9917	81.93	80.91	81.24
6	2.10	8.25	9.00	47.13	22.48	24.91	.4718	.1160	.0344	.9899	75.11	79.63	80.01
7	7.97	14.85	7.68	55.44	19.68	23.20	.5516	.1927	.0601	.9837	63.02	65.55	66.22
8	9.42	16.47	7.25	58.88	19.02	22.66	.5865	.2390	.0754	.9795	56.28	61.25	62.00
9	10.14	17.29	6.83	62.24	18.49	22.42	.6114	.2754	.0877	.9761	50.65	57.89	58.71

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
5360.	71.21	1.0580	1.1642	76.67	77.11

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(w) Continued. Run 225; speed code 50, point 4

(w-3) Rotor 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.710	10.863	347.1	540.6	347.1	408.5	-.4	354.2	-.1	40.8	.3055	.4710	416.0	438.2	.4706	.3633	543.6	417.0
2	10.914	9.572	351.9	525.8	351.8	391.7	9.5	350.8	1.5	41.7	.3100	.4579	429.8	447.7	.4828	.3514	548.1	403.5
3	9.993	8.403	352.7	511.0	352.6	385.9	9.9	334.9	1.6	40.8	.3108	.4448	442.0	457.6	.4915	.3525	557.7	404.9
4	6.663	5.195	340.0	466.9	340.0	369.5	-1.2	295.4	-.2	37.6	.2995	.4058	480.0	489.4	.5190	.3668	589.2	422.0
5	1.444	.961	313.0	418.6	312.7	346.8	-13.2	239.4	-2.4	34.1	.2752	.3629	532.6	534.8	.5532	.3977	629.0	458.7
6	-3.118	-2.823	328.7	398.9	328.7	329.1	-2.3	225.4	-.4	34.4	.2888	.3448	586.2	502.5	.5923	.4198	674.1	485.6
7	-6.014	-5.607	314.4	390.2	314.1	337.4	-14.3	196.1	-2.6	30.1	.2748	.3368	627.2	619.3	.6242	.4657	714.3	541.2
8	-7.211	-6.889	309.9	382.0	309.1	337.7	-22.3	178.6	-4.1	27.8	.2702	.3281	640.9	631.9	.6301	.4855	731.7	565.3
9	-8.341	-8.304	308.2	358.6	306.5	324.0	-32.0	153.7	-5.9	25.3	.2682	.3073	654.7	644.6	.6544	.5041	752.0	588.2

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	EFF-P TOT-ST	EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	-.38	4.94	21.20	38.69	28.16	34.71	.3841	.0491	.0109	1.1670	95.60	95.57	50.24	11.55	-418.4	-84.0
2	-.74	4.38	17.58	36.21	28.59	33.40	.4118	.0737	.0166	1.1601	93.18	93.10	50.03	13.82	-420.3	-96.9
3	-.16	4.75	15.60	33.29	28.67	33.01	.4157	.0733	.0166	1.1553	92.82	92.75	50.78	17.56	-432.1	-122.7
4	3.13	7.36	12.77	25.92	27.62	31.83	.4097	.0565	.0127	1.1472	93.57	93.52	54.77	28.86	-481.2	-204.0
5	6.36	9.59	10.40	19.30	25.33	29.99	.3833	.0311	.0067	1.1417	95.72	95.72	60.19	40.89	-545.8	-300.4
6	4.91	7.21	6.08	13.49	26.62	28.40	.3851	.0820	.0172	1.1286	87.37	87.23	60.81	47.32	-588.5	-357.0
7	6.85	8.51	6.37	12.50	25.18	28.90	.3386	.0501	.0103	1.1310	91.35	91.28	63.87	51.37	-641.5	-423.2
8	7.63	9.08	8.22	11.73	24.68	28.84	.3191	.0397	.0080	1.1290	92.65	92.61	64.96	53.22	-663.2	-453.3
9	8.24	9.48	11.99	9.39	24.40	27.55	.3023	.0431	.0082	1.1190	91.14	91.09	65.88	56.49	-686.7	-490.9

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.1014	1.3260	82.90	83.53	22.42

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(w) Concluded. Run 225; speed code 50; point 4

(w-4) Stator 2 - U. S. customary units

SL	EPSI-1	EPSI-2	V-1	V-2	VM-1	VM-2	Vθ-1	Vθ-2	θ-1	θ-2	M-1	M-2	PT2/ PT1	TT2/ TT1
	DEGREE	DEGREE	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	FT/SEC	DEGREE	DEGREE				
1	8.384	1.196	555.6	429.0	431.3	428.8	350.3	14.5	39.3	1.9	.4847	.3707	1.1373	1.0473
2	7.456	1.155	539.8	446.7	413.0	446.5	347.5	12.0	40.3	1.5	.4706	.3867	1.1457	1.0467
3	6.475	1.011	524.3	445.1	405.6	445.1	332.3	5.0	39.5	.6	.4569	.3856	1.1459	1.0455
4	3.807	.466	479.4	418.0	386.0	418.0	284.2	-3.5	36.4	-.5	.4170	.3621	1.1403	1.0428
5	.948	-.234	430.9	387.2	361.7	387.1	234.3	-8.5	32.9	-1.3	.3739	.3351	1.1364	1.0403
6	-1.900	-.911	412.0	374.1	344.5	374.0	226.1	-7.1	33.3	-1.1	.3564	.3229	1.1219	1.0403
7	-4.183	-1.308	405.9	374.9	354.7	374.9	197.3	-5.3	29.1	-.8	.3496	.3223	1.1245	1.0391
8	-4.083	-1.349	400.1	367.3	357.4	367.2	180.0	-5.6	26.8	-.9	.3440	.3152	1.1215	1.0378
9	-5.669	-1.276	380.4	342.1	347.5	342.1	154.7	-7.1	24.1	-1.2	.3264	.2930	1.1105	1.0359

SL	INCS	INCM	DEV	TURN	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	EFF-P STATC-ST	EFF-A TOT-STG	EFF-P TOT-STG
	DEGREE	DEGREE	DEGREE	DEGREE									
1	-9.10	-7.52	13.62	37.39	36.43	36.98	.3645	.1737	.0393	.9741	60.65	79.20	79.59
2	-7.10	-5.06	12.66	38.73	35.02	38.70	.3170	.0909	.0210	.9871	73.84	84.91	85.13
3	-7.11	-4.56	11.35	38.83	34.52	38.67	.2988	.0624	.0147	.9916	79.55	87.26	87.43
4	-9.12	-5.16	9.82	36.89	33.10	36.38	.2771	.0529	.0132	.9940	79.21	89.38	89.51
5	-11.74	-6.35	9.03	34.19	31.16	33.64	.2524	.0484	.0131	.9956	75.85	92.38	92.44
6	-10.72	-4.46	8.93	34.37	29.61	32.30	.2530	.0709	.0202	.9940	61.30	83.03	83.22
7	-14.72	-7.98	9.45	29.93	30.25	32.05	.2211	.0697	.0205	.9944	54.07	87.23	87.37
8	-17.73	-10.84	10.04	27.64	30.36	31.27	.2127	.0722	.0214	.9944	53.23	88.12	88.23
9	-21.72	-14.61	10.89	25.24	29.37	28.99	.2241	.0976	.0292	.9931	48.84	84.77	84.91

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
5360.	71.21	1.1014	1.3165	80.69	81.39

TABLE XV. - *Continued.* OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(x) Run 226; speed code 80; point 5

(x-1) *Rotor 1 - U. S. customary units*

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	16.582	18.449	353.7	832.2	353.7	420.7	.0	718.0	.0	59.7	.3200	.7369	503.6	583.3	.5567	.3912	615.4	441.0
2	13.981	16.199	361.0	798.3	361.0	435.0	.0	669.3	.0	57.0	.3267	.7049	542.7	611.4	.5099	.3876	651.8	438.9
3	11.540	14.049	368.2	766.1	368.2	444.9	.0	623.7	.0	54.5	.3333	.6749	581.3	639.6	.4630	.3922	688.1	445.2
4	5.065	8.254	384.6	710.9	384.6	435.7	.0	561.8	.0	52.2	.3486	.6216	692.8	724.5	.7181	.4067	792.4	465.1
5	-1.565	1.779	392.4	634.4	392.4	383.4	.0	505.5	.0	52.8	.3556	.5491	831.7	837.4	.8339	.4386	919.6	507.1
6	-6.825	-3.906	387.5	632.4	387.5	403.5	.0	487.0	.0	50.4	.3513	.5440	964.3	950.3	.9421	.5264	1039.3	514.3
7	-10.585	-7.830	376.6	636.6	376.6	366.8	.0	520.3	.0	54.8	.3411	.5418	1062.3	1034.8	1.0209	.5378	1127.0	631.9
8	-11.541	-9.082	372.1	639.3	372.1	346.3	.0	537.4	.0	57.1	.3370	.5416	1094.8	1063.0	1.0472	.5333	1156.4	629.4
9	-12.133	-10.346	367.8	639.4	367.8	326.7	.0	549.7	.0	59.2	.3330	.5396	1127.3	1091.3	1.0735	.5337	1185.8	632.5

SL	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	8.31	12.92	10.17	72.46	25.71	33.50	.5586	.0936	.0196	1.5285	96.10	95.89	54.68	-17.77	-503.6	134.7
2	8.32	12.62	12.05	63.71	26.19	35.27	.5780	.0639	.0146	1.5204	96.98	96.82	56.12	-7.60	-542.7	50.0
3	8.42	12.53	13.62	55.38	26.65	36.59	.5828	.0455	.0109	1.5089	97.55	97.43	57.42	2.04	-581.3	-15.8
4	9.32	12.79	10.00	40.33	27.70	36.76	.6092	.0747	.0186	1.5027	94.77	94.49	60.82	20.49	-692.8	-162.7
5	10.22	12.90	10.60	23.86	28.19	32.72	.6189	.1612	.0366	1.4675	86.01	85.26	64.74	40.89	-831.7	-331.9
6	10.96	12.91	6.08	19.26	27.89	34.66	.5670	.1814	.0396	1.4897	82.32	81.33	68.20	48.94	-964.3	-463.2
7	11.53	12.94	7.68	16.12	27.19	31.20	.6034	.2734	.0563	1.5042	73.20	71.65	70.59	54.47	-1062.3	-514.6
8	11.63	12.92	9.56	14.76	26.90	29.32	.6231	.3083	.0615	1.5110	70.07	68.31	71.32	56.56	-1094.8	-525.6
9	11.63	12.78	12.46	13.17	26.63	27.59	.6359	.3354	.0641	1.5168	67.58	65.67	71.97	58.80	-1127.3	-541.6

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	*C1/A1 LBM/SEC SQFT
1.1481	1.4969	82.47	83.41	26.44

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(x) Continued. Run 226; speed code 80; point 5

(x-2) Stator 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VΘ-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	18.370	15.275	829.4	477.5	440.1	474.9	703.1	49.8	58.2	5.9	.7342	.4083	1.4632	1.1345
2	16.239	13.858	798.8	481.1	453.1	476.3	657.9	67.9	55.6	8.1	.7054	.4120	1.4707	1.1314
3	14.269	12.513	768.7	478.5	461.8	473.4	614.5	69.6	53.2	8.3	.6774	.4103	1.4730	1.1281
4	9.232	8.691	717.8	465.3	452.7	461.8	557.0	57.6	51.0	7.1	.6281	.3982	1.4709	1.1305
5	3.630	3.695	644.0	419.8	400.6	418.4	504.2	33.5	51.6	4.6	.5578	.3574	1.4458	1.1354
6	-1.260	-1.125	643.1	439.1	418.9	437.3	487.9	39.5	49.3	5.2	.5538	.3724	1.4626	1.1467
7	-4.597	-4.847	648.4	427.3	383.6	426.8	522.7	21.3	53.7	2.9	.5525	.3584	1.4598	1.1703
8	-5.882	-6.223	651.5	426.8	363.7	426.5	540.5	15.9	56.1	2.1	.5526	.3562	1.4607	1.1812
9	-7.405	-7.686	652.1	429.8	344.3	429.6	553.9	12.1	58.2	1.6	.5509	.3571	1.4634	1.1924

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	BEFF-P STATIC-ST	BEFF-A TOT-STG	BEFF-P TOT-STG
1	5.50	2.71	13.25	52.22	35.10	43.16	.5774	.1419	.0289	.9572	82.04	85.46	86.19
2	4.74	2.14	14.28	47.53	36.73	43.56	.5475	.1157	.0243	.9672	84.53	88.68	89.26
3	3.66	1.44	13.72	44.06	37.93	43.52	.5279	.0900	.0196	.9762	87.36	91.40	91.83
4	3.96	2.68	11.38	43.85	38.06	42.50	.5190	.0927	.0225	.9782	86.01	89.33	89.87
5	6.06	6.11	8.89	46.98	34.03	38.26	.5464	.0740	.0202	.9859	88.34	82.06	82.94
6	4.74	5.90	9.60	44.18	35.81	39.84	.5224	.0932	.0275	.9825	84.17	78.29	79.40
7	9.11	10.99	8.40	50.87	32.45	38.21	.5807	.1523	.0475	.9715	75.42	67.02	68.70
8	11.14	12.71	8.91	53.95	30.63	37.89	.5997	.1731	.0548	.9675	72.32	63.09	64.97
9	12.56	14.71	9.93	56.58	28.90	37.86	.6107	.1882	.0603	.9648	69.65	59.70	61.76

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
8573.	116.43	1.1481	1.4613	77.27	78.43

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(x) Continued. Run 226; speed code 80; point 5

(x-3) Rotor 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.779	11.039	487.8	787.6	485.4	509.4	47.8	600.7	5.6	49.5	.4173	.6554	668.6	700.9	.6742	.4320	798.0	519.2
2	11.103	9.845	496.8	779.1	492.4	493.8	65.9	602.5	7.6	50.5	.4258	.6487	687.4	716.0	.6797	.4219	792.9	506.7
3	10.305	8.719	499.0	764.7	494.3	487.2	60.3	589.4	7.9	50.3	.4285	.6371	706.9	731.9	.6935	.4229	807.5	507.6
4	7.361	5.501	497.9	711.6	494.6	493.4	57.3	512.7	6.6	46.1	.4271	.5912	767.8	782.8	.7426	.4673	865.7	562.5
5	2.581	1.274	461.6	653.9	460.4	467.1	33.2	457.6	4.1	44.4	.3941	.5388	851.8	855.4	.8018	.5056	939.2	613.6
6	-2.382	-2.671	481.1	630.8	479.5	480.5	40.0	461.1	4.8	47.0	.4093	.5144	937.7	931.6	.8657	.5200	1017.7	637.6
7	-5.608	-5.654	477.8	620.0	477.3	480.4	21.7	415.2	2.6	42.0	.4021	.5005	1003.1	990.6	.9184	.5950	1091.4	737.0
8	-6.804	-6.874	479.9	614.0	479.6	482.4	16.2	392.3	1.9	39.6	.4019	.4939	1025.1	1010.6	.9357	.6259	1117.1	778.1
9	-8.004	-8.227	483.9	597.3	483.8	484.7	12.3	382.5	1.5	37.3	.4034	.4787	1047.1	1031.0	.9522	.6571	1142.3	814.9

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	1.28	6.60	20.72	40.83	43.94	51.25	.5046	.1359	.0302	1.3916	90.29	89.84	51.90	11.07	-620.8	-100.2
2	.82	5.94	16.64	38.71	44.76	50.25	.5217	.1308	.0296	1.3903	90.48	90.04	51.59	12.88	-621.5	-113.5
3	1.34	6.25	14.29	36.03	45.10	50.11	.5274	.1255	.0287	1.3882	90.53	90.10	52.28	16.25	-638.6	-142.5
4	3.57	7.80	12.57	26.56	45.02	51.84	.4857	.0639	.0144	1.3756	94.25	94.01	55.21	28.65	-710.6	-270.1
5	6.84	10.07	9.92	20.25	41.54	49.56	.4743	.0520	.0112	1.3831	94.72	94.50	60.66	40.41	-818.6	-397.4
6	5.97	8.27	6.30	14.34	43.09	45.53	.5007	.1300	.0272	1.3678	85.82	85.20	61.88	47.54	-897.7	-470.6
7	6.99	8.65	6.27	12.74	42.07	48.25	.4417	.0908	.0187	1.3722	88.98	88.49	64.00	51.27	-981.5	-575.5
8	7.17	8.62	7.53	11.97	41.90	49.28	.4150	.0677	.0139	1.3694	91.31	90.93	64.50	52.53	-1009.0	-618.3
9	7.21	8.46	10.03	10.33	41.91	49.27	.3862	.0442	.0088	1.3564	93.86	93.60	64.86	54.53	-1034.8	-668.5

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P %	WCI/AI LBM/SEC SQFT
1.2680	2.0092	82.20	83.83	30.43

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(x) Concluded. Run 226; speed code 80; point 5

(x-4) Stator 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VΘ-1 FT/SEC	VΘ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	8.314	1.050	801.4	487.3	537.8	487.2	594.1	10.8	48.1	1.3	.6678	.3952	1.3422	1.1099
2	7.349	1.054	791.8	515.2	520.3	515.1	596.9	11.2	49.1	1.2	.6602	.4192	1.3547	1.1093
3	6.349	.949	776.9	523.8	511.4	523.7	584.8	8.9	49.0	1.0	.6481	.4273	1.3598	1.1090
4	3.679	.553	723.3	513.6	512.5	513.6	510.4	4.8	44.9	.5	.6016	.4198	1.3581	1.1012
5	.862	.056	667.6	485.7	486.5	485.7	457.1	4.1	43.2	.5	.5507	.3952	1.3661	1.1024
6	-2.005	-.582	648.4	490.3	464.7	490.3	462.2	2.4	45.5	.3	.5295	.3958	1.3491	1.1095
7	-4.529	-1.049	642.7	512.0	488.9	511.9	417.2	2.6	40.5	.3	.5198	.4101	1.3586	1.1063
8	-5.282	-1.139	639.9	511.7	503.8	511.7	394.5	2.8	38.1	.3	.5158	.4086	1.3549	1.1025
9	-5.996	-1.136	627.9	489.0	511.0	489.0	364.8	3.1	35.6	.4	.5044	.3890	1.3365	1.0966

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P STATC-ST	%EFF -A TOT-STG	%EFF -P TOT-STG
1	-.34	1.24	12.96	46.81	53.70	53.77	.5554	.1373	.0311	.9645	81.02	79.59	80.40
2	1.73	3.78	12.37	47.86	52.57	57.30	.5196	.1012	.0234	.9743	84.77	82.63	83.33
3	2.39	4.93	11.68	47.99	52.27	58.63	.5007	.0838	.0197	.9793	86.65	83.98	84.64
4	-.60	3.36	10.83	44.40	53.54	57.86	.4650	.0585	.0146	.9873	89.53	90.04	90.44
5	-1.46	3.94	10.77	42.73	51.30	54.28	.4555	.0668	.0180	.9876	87.12	90.80	91.17
6	1.48	7.73	10.30	45.20	47.74	53.88	.4468	.0783	.0223	.9864	83.28	81.30	82.05
7	-3.31	3.43	10.55	40.25	50.75	55.24	.3931	.0588	.0173	.9901	85.14	85.74	86.33
8	-6.37	.52	11.22	37.84	52.01	54.80	.3810	.0609	.0180	.9899	84.34	88.07	88.55
9	-10.16	-3.06	12.42	35.27	52.40	51.91	.3933	.0891	.0266	.9858	79.00	88.98	89.41

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
8573.	116.43	1.2680	1.9795	80.27	82.04

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(y) Run 226; speed code 85; point 5

(y-1) Rotor 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	Vθ-1 FT/SEC	Vθ-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M*-1	M*-2	V*-1 FT/SEC	V*-2 FT/SEC
1	16.548	18.392	388.6	804.6	388.6	445.0	.0	764.6	.0	59.8	.3523	.7821	535.5	620.3	.5998	.4136	861.6	467.3
2	13.929	16.119	395.7	851.6	395.7	452.2	.0	721.6	.0	57.9	.3589	.7501	577.1	650.1	.6346	.4033	899.7	457.8
3	11.505	13.939	402.4	818.8	402.4	452.2	.0	682.6	.0	56.5	.3651	.7138	618.2	690.3	.6692	.3970	737.6	452.2
4	5.048	8.298	417.4	759.2	417.4	459.8	.0	604.1	.0	52.7	.3791	.6615	736.6	770.3	.7850	.4261	846.7	489.0
5	-1.365	1.843	422.4	687.7	422.4	395.5	.0	562.6	.0	54.9	.3837	.5915	884.4	890.4	.8905	.4418	980.1	513.7
6	-6.259	-3.853	415.6	682.4	415.6	420.7	.0	537.4	.0	51.9	.3774	.5830	1025.4	1010.4	1.0048	.5408	1106.4	633.0
7	-10.015	-7.931	403.1	688.0	403.1	397.9	.0	561.3	.0	54.6	.3658	.5818	1129.5	1100.4	1.0892	.5666	1199.3	670.0
8	-11.046	-9.121	398.0	691.0	398.0	384.9	.0	573.9	.0	56.1	.3611	.5819	1164.2	1130.3	1.1160	.5698	1230.3	676.6
9	-11.807	-10.388	393.0	693.3	393.0	366.9	.0	588.3	.0	58.0	.3564	.5812	1198.6	1160.3	1.1438	.5697	1261.4	679.6

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B*-1 DEGREE	B*-2 DEGREE	Vθ*-1 FT/SEC	Vθ*-2 FT/SEC
1	7.41	12.02	9.96	71.78	27.95	35.50	.5671	.1123	.0235	1.6040	95.26	94.96	53.79	-17.99	-535.5	144.3
2	7.50	11.90	10.66	64.29	28.40	36.78	.5985	.0956	.0217	1.5980	95.46	95.17	55.30	-8.99	-577.1	71.5
3	7.70	11.91	11.26	57.02	29.81	37.35	.6210	.0950	.0227	1.5870	94.99	94.67	56.69	-.33	-618.2	2.6
4	9.91	12.28	10.21	40.43	29.74	39.21	.6200	.0873	.0219	1.5909	94.01	93.64	60.32	19.89	-736.6	-166.3
5	9.94	12.62	9.37	24.82	30.04	34.10	.6527	.1957	.0452	1.5496	83.92	82.92	64.47	39.66	-884.4	-327.9
6	10.78	12.73	5.49	19.66	29.63	36.68	.5907	.2046	.0452	1.5779	81.15	79.93	68.01	48.35	-1025.4	-473.1
7	11.38	12.79	6.73	16.91	28.86	34.49	.6071	.2742	.0578	1.5996	74.21	72.48	70.44	53.53	-1129.5	-539.1
8	11.50	12.79	8.26	15.92	28.54	33.27	.6177	.3004	.0619	1.6084	71.79	69.88	71.19	55.26	-1164.2	-556.4
9	11.53	12.68	10.89	14.63	28.23	31.61	.6313	.3286	.0656	1.6173	69.30	67.20	71.87	57.24	-1198.6	-572.1

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.1717	1.5829	81.64	82.76	28.26

TABLE XV. - *Continued.* OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(y) Continued. Run 226; speed code 85; point 5

(y-2) Stator 1 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VU-1 FT/SEC	VU-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	18.395	15.247	881.5	465.5	465.5	464.1	748.6	36.5	58.3	4.5	.7790	.3945	1.5241	1.1522
2	16.280	13.248	851.7	478.4	472.0	474.4	709.0	61.8	56.5	7.4	.7503	.4061	1.5380	1.1506
3	14.332	12.528	821.3	479.0	471.3	474.3	672.6	66.6	55.1	8.0	.7211	.4069	1.5422	1.1490
4	9.498	8.876	765.8	472.8	477.3	468.1	598.8	66.9	51.5	8.1	.6678	.4015	1.5454	1.1489
5	3.885	3.922	697.0	426.6	413.4	426.0	561.2	23.4	53.7	3.1	.6000	.3595	1.5192	1.1600
6	-1.217	-1.114	693.7	455.0	437.4	453.8	538.5	33.2	50.9	4.2	.5933	.3820	1.5436	1.1717
7	-4.732	-4.888	701.1	465.2	416.2	464.6	564.2	24.6	53.6	3.0	.5936	.3868	1.5563	1.1956
8	-6.069	-6.246	704.7	470.0	403.8	469.5	577.5	22.3	55.1	2.7	.5942	.3893	1.5614	1.2055
9	-7.568	-7.693	707.6	473.0	385.3	472.6	592.8	19.4	57.0	2.4	.5940	.3896	1.5643	1.2189

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHO VM-1	RHO VM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P STATIC-ST	%EFF-A TOT-STG	%EFF-P TOT-STG
1	5.77	2.89	11.78	53.87	37.21	43.48	.6296	.1508	.0308	.9501	82.56	84.04	84.93
2	5.65	3.05	13.59	49.13	39.39	44.71	.5932	.1212	.0255	.9621	85.15	86.87	87.62
3	5.57	3.35	13.36	47.13	38.87	44.88	.5739	.0963	.0210	.9717	87.64	88.42	89.08
4	4.53	3.25	12.41	43.39	40.55	44.48	.5496	.0897	.0217	.9766	87.49	88.95	89.58
5	8.15	8.21	7.46	50.51	35.47	40.03	.5971	.0953	.0233	.9815	87.80	79.32	80.47
6	6.31	7.46	8.61	46.72	37.92	42.54	.5579	.0960	.0284	.9797	84.87	76.89	78.23
7	8.97	10.85	9.57	50.56	35.85	42.96	.5752	.1210	.0377	.9743	80.59	68.85	70.69
8	10.12	11.69	9.49	52.34	34.67	43.16	.5816	.1315	.0416	.9721	78.68	66.04	68.07
9	11.34	13.56	10.67	54.62	33.06	43.04	.5948	.1534	.0491	.9674	75.11	62.24	64.50

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
9116.	124.41	1.1717	1.5423	76.73	78.08

TABLE XV. - Continued. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(y) Continued. Run 226; speed code 85; point 5

(y-3) Rotor 2 - U. S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	U-1 FT/SEC	U-2 FT/SEC	M'-1	M'-2	V'-1 FT/SEC	V'-2 FT/SEC
1	11.885	10.958	476.2	814.3	474.9	504.2	34.7	639.4	4.2	51.6	.4038	.6689	710.9	745.2	.7008	.4231	826.4	515.1
2	11.292	9.739	493.9	800.1	490.3	475.1	59.8	643.7	7.0	53.4	.4197	.6571	731.0	761.4	.7062	.4019	831.1	489.4
3	10.567	8.627	498.9	791.5	494.7	484.5	65.1	625.9	7.5	52.1	.4244	.6506	751.7	778.2	.7199	.4174	846.2	507.3
4	7.770	5.562	504.6	741.4	500.2	472.5	67.0	571.4	7.6	50.4	.4295	.6090	816.4	832.4	.7670	.4426	901.0	539.8
5	2.874	1.460	472.1	688.3	471.5	482.0	23.1	491.4	2.8	45.6	.3989	.5586	905.8	909.6	.8457	.5178	1000.7	638.1
6	-2.442	-2.724	501.0	676.5	499.9	456.9	33.3	498.9	3.8	47.5	.4220	.5433	997.0	990.6	.9146	.5391	1085.7	671.3
7	-5.822	-5.779	517.3	667.5	516.7	484.6	24.9	459.1	2.8	43.4	.4318	.5310	1066.6	1053.4	.9705	.6100	1162.9	766.8
8	-6.946	-6.936	524.0	658.6	523.5	488.7	22.5	441.5	2.5	42.0	.4356	.5220	1090.0	1074.6	.9895	.6338	1188.9	799.7
9	-8.057	-8.228	528.1	645.5	527.7	499.5	19.7	408.9	2.1	39.2	.4369	.5099	1113.4	1096.3	1.0041	.6712	1214.4	849.7

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P TOT-ST	%EFF-A TOT-ST	B'-1 DEGREE	B'-2 DEGREE	VB'-1 FT/SEC	VB'-2 FT/SEC
1	4.24	9.55	21.44	43.07	44.32	52.81	.5468	.1705	.0378	1.4443	88.51	87.92	54.86	11.78	-676.3	-105.8
2	3.08	8.20	17.60	40.01	45.95	50.26	.5781	.1845	.0416	1.4316	87.25	86.61	53.85	13.84	-671.1	-117.6
3	3.33	8.24	15.42	36.89	46.47	51.89	.5605	.1497	.0340	1.4347	89.21	88.66	54.27	17.38	-696.6	-152.3
4	4.72	8.95	12.80	27.48	47.03	51.87	.5448	.1127	.0254	1.4229	90.67	90.21	56.36	28.88	-749.5	-261.0
5	8.08	11.31	10.45	20.97	43.67	53.43	.4945	.0707	.0151	1.4391	93.19	92.84	61.91	40.94	-882.6	-418.2
6	6.66	8.95	5.85	15.48	46.15	50.60	.5141	.1394	.0294	1.4282	95.51	94.78	62.57	47.09	-963.8	-491.7
7	6.55	8.21	5.74	12.83	46.95	53.25	.4625	.1164	.0243	1.4204	86.51	85.83	63.57	50.74	-1041.8	-594.3
8	6.48	7.93	7.25	11.56	47.25	53.47	.4446	.1082	.0223	1.4114	86.86	86.21	63.81	52.25	-1067.5	-633.1
9	6.51	7.76	9.41	10.26	47.17	54.44	.4091	.0737	.0149	1.4006	90.35	89.88	64.16	53.90	-1093.7	-687.4

TC/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
1.3122	2.1992	80.72	82.70	31.12

TABLE XV. - Concluded. OVERALL PERFORMANCE AND BLADE-ELEMENT DATA

(y) Concluded. Run 226; speed code 85; point 5

(y-4) Stator 2 - U.S. customary units

SL	EPSI-1 DEGREE	EPSI-2 DEGREE	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VB-1 FT/SEC	VB-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	M-1	M-2	PT2/ PT1	TT2/ TT1
1	8.377	1.137	827.6	465.2	532.2	465.1	632.4	11.7	50.2	1.4	.6799	.3712	1.3942	1.1255
2	7.402	1.153	811.6	497.0	502.1	496.9	637.7	12.9	52.0	1.5	.6674	.3978	1.4032	1.1243
3	6.350	1.023	802.8	509.3	508.9	509.2	621.0	8.7	50.8	1.0	.6607	.4087	1.4082	1.1223
4	3.596	.527	753.1	499.6	493.6	499.6	568.8	2.0	49.1	.2	.6183	.4017	1.4012	1.1171
5	.862	-.023	702.3	491.5	502.3	491.5	490.8	2.1	44.3	.2	.5707	.3930	1.4211	1.1175
6	-1.844	-.644	694.4	507.7	482.0	507.7	499.9	-.6	46.1	-.1	.5586	.4027	1.4039	1.1258
7	-4.335	-1.107	690.7	530.2	514.0	530.1	461.4	6.1	42.0	.7	.5505	.4174	1.3997	1.1221
8	-5.153	-1.194	684.8	532.2	521.3	532.2	444.1	5.9	40.5	.6	.5440	.4179	1.3937	1.1189
9	-5.945	-1.181	676.2	512.9	536.4	512.9	411.6	4.9	37.6	.6	.5354	.4013	1.3767	1.1114

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	RHOVM-1	RHOVM-2	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	PT2/ PT1	%EFF-P STATC-ST	%EFF-A TOT-STG	%EFF-P TOT-STG
1	1.74	3.31	13.13	48.72	55.37	54.41	.6062	.1315	.0298	.9649	83.29	79.04	79.98
2	4.60	6.65	12.61	50.48	52.78	58.56	.5645	.0787	.0182	.9796	89.11	81.42	82.26
3	4.22	6.77	11.68	49.83	54.17	60.39	.5448	.0724	.0170	.9816	89.46	83.72	84.47
4	3.56	7.52	10.53	48.87	53.87	59.63	.5246	.0671	.0168	.9847	89.39	86.08	86.71
5	-.34	5.06	10.53	44.09	55.33	58.01	.4878	.0635	.0171	.9874	88.73	89.49	89.98
6	2.05	8.31	9.35	46.12	57.95	58.90	.4751	.0893	.0255	.9830	82.59	80.49	81.39
7	-1.88	4.86	10.91	41.31	55.92	60.43	.4266	.0775	.0228	.9656	82.78	82.13	82.94
8	-4.01	2.88	11.55	39.87	56.42	60.25	.4121	.0654	.0194	.9881	84.79	83.19	83.94
9	-8.19	-1.08	12.62	37.05	57.72	57.60	.4210	.0940	.0281	.9834	79.64	85.32	85.96

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
9116.	124.41	1.3122	2.1633	78.84	80.97

APPENDIX C

AIRFOIL GEOMETRY ON CONICAL SURFACES

The airfoil geometry on conical surfaces for rotor 1, stator 1, rotor 2, and stator 2 is presented in tables XVI to XIX.

TABLE XVI. - AIRFOIL GEOMETRY ON CONICAL SURFACES - ROTOR 1

Inlet Root Diameter = 12.40 Inches (.315 Meters)   Inlet Tip Diameter = 31.00 Inches (.787 Meters)
Exit Root Diameter = 14.91 Inches (.378 Meters)   Exit Tip Diameter = 29.94 Inches (.761 Meters)
Axial Tilt = 0 Degrees (0 Radians)   Tangential Tilt = 0 Inches (0 Meters)

Multiple - Circular - Arc Airfoils, 28 Blades

	Hub													Tip
Percent Flow	0	3.15	6.70	10.40	22.70	31.65	41.45	51.85	62.90	74.60	80.70	87.00	93.40	100.0
% Span at Leading Edge	0.0	5.7	11.2	16.6	32.4	42.4	52.4	62.1	71.7	81.2	85.9	90.7	95.3	100.0
Average % Span	0.0	5.35	10.6	15.8	31.2	41.2	51.2	61.05	70.85	80.6	85.45	90.35	95.15	100.0
% Span at Trailing Edge	0.0	5.0	10.0	15.0	30.0	40.0	50.0	60.0	70.0	80.0	85.0	90.0	95.0	100.0

U.S. customary units, inches and degrees

c	3.62	3.70	3.76	3.83	4.00	4.08	4.17	4.25	4.32	4.40	4.45	4.48	4.51	4.55
σ_f	0.85	0.92	1.00	1.08	1.29	1.49	1.65	1.83	1.98	2.14	2.21	2.30	2.40	2.50
t/c	0.0798	0.0770	0.0740	0.0710	0.0630	0.0570	0.0520	0.0460	0.0410	0.0353	0.0330	0.0300	0.0275	0.0250
% c to max t	52.8	53.0	53.5	54.0	55.5	56.5	57.6	59.0	60.5	62.0	62.6	63.5	64.3	64.8
a/c	0.518	0.520	0.522	0.525	0.535	0.540	0.544	0.550	0.570	0.600	0.615	0.634	0.649	0.665
RLE	0.0140	0.0139	0.0138	0.0135	0.0129	0.0120	0.0112	0.0106	0.0100	0.0092	0.0088	0.0083	0.0078	0.0073
RTE	0.0140	0.0139	0.0138	0.0135	0.0129	0.0120	0.0112	0.0106	0.0100	0.0092	0.0088	0.0083	0.0078	0.0073
β'_{ss1}	44.6	46.4	47.8	48.9	51.4	52.9	54.4	55.9	57.2	58.4	59.0	59.7	60.4	61.0
β''_1	39.8	41.8	43.5	44.8	47.9	49.9	51.8	53.6	55.3	56.8	57.6	58.4	59.2	59.9
ϕ	75.5	69.7	63.2	56.3	38.2	29.1	21.4	16.1	12.4	11.0	10.8	11.4	12.9	14.8
ϕ_E	74.0	66.9	59.0	52.5	35.5	27.3	21.0	16.5	13.5	13.0	13.3	14.0	16.0	18.5
ϕ_f	8.5	8.4	8.2	8.0	6.9	6.0	4.8	3.6	2.5	0.9	-0.4	-1.5	-2.8	-4.0
ϕ_{Lf}	6.9	6.88	6.7	6.6	6.0	5.5	4.7	3.9	2.8	1.6	0.9	-0.2	-1.2	-2.3
i	20.3	18.3	16.2	14.3	8.9	5.5	2.3	-0.8	-3.9	-6.9	-8.4	-9.9	-11.4	-12.9
δ	2.38	2.27	2.17	2.09	1.88	1.77	1.67	1.58	1.51	1.44	1.41	1.38	1.36	1.33

TABLE XVII. - AIRFOIL GEOMETRY ON CONICAL SURFACES - STATOR 1

Inlet Root Diameter = 1[illegible].22 Inches (.[illegible]87 Meters) Inlet Tip Diameter = 29.67 (.754 Meters)
Exit Root Diameter = 16.85 Inches (.428 Meters) Exit Tip Diameter = 28.9[illegible] .7 Meters)

Multiple - Circular - Arc Airfoils, 46 Vanes

	Hub												Tip
Percent Flow	0	3.15	6.70	10.40	22.70	31.65	41.45	51.85	62.90	74.60	80.70	87.00	93.40	100.0
% Span at Leading Edge	0.0	4.9	9.8	14.7	29.7	39.6	49.7	59.8	69.8	79.9	84.9	90.0	95.0	100.0
Average % Span	0.0	4.75	9.5	14.3	29.05	38.9	49.0	59.15	69.3	79.5	84.6	89.75	94.85	100.0
% Span at Trailing Edge	0.0	4.6	9.2	13.9	28.4	38.2	48.3	58.5	68.8	79.1	84.3	89.5	94.7	100.0

U. S. customary units, inches and degrees

c	2.75	2.78	2.78	2.77	2.78	2.79	2.82	2.86	2.90	2.95	2.98	3.01	3.05	3.11
c_f	0.89	0.89	0.90	0.91	0.96	1.03	1.09	1.18	1.35	1.35	1.40	1.46	1.54	1.60
t/c	0.0400	0.0410	0.0430	0.0500	0.0500	0.0539	0.0579	0.0610	0.0645	0.0689	0.0700	0.0715	0.0730	0.0750
% c to max. t	56.0	55.6	55.2	54.9	53.7	53.0	52.3	51.6	51.1	50.6	50.4	50.2	50.1	50.0
a/c	0.538	0.537	0.536	0.536	0.536	0.535	0.534	0.531	0.522	0.509	0.508	0.513	0.520	0.532
RLE	0.0050	0.0050	0.0052	0.0054	0.0058	0.0060	0.0065	0.0066	0.0070	0.0072	0.0074	0.0075	0.0078	0.0080
RTE	0.0050	0.0050	0.0052	0.0054	0.0058	0.0060	0.0065	0.0066	0.0070	0.0072	0.0074	0.0075	0.0078	0.0080
β_{33}	54.7	52.5	50.9	49.6	47.0	46.2	45.5	45.0	44.6	44.5	44.6	44.9	45.6	47.1
β_{12}	52.8	50.5	48.4	46.8	43.[illegible]	41.8	40.5	39.4	38.5	37.3	37.7	37.9	38.5	39.6
β	66.4	62.7	59.6	57.1	52.6	51.1	49.8	48.7	47.9	47.7	48.[illegible]	49.7	51.7	54.6
β_2	63.5	59.8	57.[illegible]	55.[illegible]	51.5	50.5	49.[illegible]	48.5	47.8	48.0	48.3	50.0	52.0	55.0
β_1	8.8	8.5	8.4	8.5	9.3	10.6	12.[illegible]	14.5	17.3	20.0	21.3	22.2	22.9	23.3
β_{1f}	7.5	6.[illegible]	6.4	7.0	9.3	10.6	12.5	14.3	17.8	20.8	22.0	22.5	23.0	23.5
ζ	19.1	17.3	15.4	13.7	8.8	5.9	3.2	0.8	-1.3	-3.6	-4.4	-5.3	-6.2	-7.1
σ	2.51	2.39	2.35	2.2[illegible]	2.04	1.93	1.83	1.75	1.69	1.63	1.60	1.58	1.56	1.55

TABLE XVIII. - AIRFOIL GEOMETRY ON CONICAL SURFACES - ROTOR 2

Inlet Root Diameter = 17.39 Inches (.442 Meters) Inlet Tip Diameter = 28.58 Inches (.726 Meters)
Exit Root Diameter = 18.34 Inches (.466 Meters) Exit Tip Diameter = 28.13 Inches (.714 Meters)
Axial Tilt = 0 Degrees (0 Radians) Tangential Tilt = 0 Inches (0 Meters)

Multiple - Circular - Arc Airfoils, 60 Blades

	Hub													Tip
Percent Flow	0	3.15	6.70	10.40	22.70	31.65	41.45	51.85	62.90	74.60	80.70	87.60	93.40	100.0
% Span at Leading Edge	0.0	4.5	9.0	13.6	28.0	37.7	47.8	58.0	68.4	78.8	84.1	89.4	94.7	100.0
Average % Span	0.0	4.4	8.85	13.3	27.5	37.15	47.25	57.5	67.95	78.45	83.8	89.2	94.6	100.0
% Span at Trailing Edge	0.0	4.3	8.7	13.0	27.0	36.6	46.7	57.0	67.5	78.1	83.5	89.0	94.5	100.0
U. S. customary units, inches and degrees														
c	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
c_f	0.60	0.60	0.63	0.65	0.70	0.75	0.79	0.84	0.90	0.94	0.95	0.98	1.00	1.05
t/c	0.0950	0.0920	0.0890	0.0860	0.0760	0.0690	0.0620	0.0545	0.0475	0.0400	0.0369	0.0330	0.0290	0.0250
% c to max. t	53.8	54.0	54.0	54.5	55.3	55.8	56.6	57.6	58.5	59.3	60.3	61.0	61.4	62.0
a/c	0.518	0.519	0.518	0.520	0.520	0.525	0.526	0.530	0.543	0.565	0.580	0.595	0.613	0.625
RLE	0.0100	0.0099	0.0095	0.0093	0.0085	0.0079	0.0074	0.0070	0.0065	0.0060	0.0058	0.0055	0.0052	0.0050
RTE	0.0100	0.0099	0.0095	0.0093	0.0085	0.0079	0.0074	0.0070	0.0065	0.0060	0.0058	0.0055	0.0052	0.0050
β'_{ss_1}	50.5	50.6	50.8	50.9	51.6	52.4	53.8	55.0	55.9	56.7	57.0	57.3	57.6	58.0
β'_1	45.0	45.3	45.7	46.0	47.4	48.7	50.6	52.2	53.6	54.8	55.1	55.9	56.4	56.9
β_1	61.4	54.6	48.7	43.6	30.8	24.7	19.8	15.5	12.2	10.5	10.4	10.9	11.9	13.5
β_2	60.0	54.0	48.0	42.5	29.5	24.0	19.8	15.5	12.5	11.0	11.0	11.5	13.0	14.9
β_f	9.5	9.0	8.8	8.3	7.2	6.4	5.4	4.2	3.3	2.0	1.3	0.5	-0.5	-1.3
β_{ss_2}	8.9	8.6	8.3	7.9	6.8	6.0	5.3	4.4	3.4	2.4	1.7	1.0	0.2	-0.7
σ	13.7	12.7	11.7	10.6	7.3	5.1	2.7	0.2	-2.3	-4.9	-6.3	-7.6	-9.0	-10.4
	2.26	2.20	2.15	2.10	1.94	1.85	1.77	1.69	1.62	1.55	1.52	1.48	1.46	1.43

TABLE XIX. - AIRFOIL GEOMETRY ON CONICAL SURFACES - STATOR 2

Inlet Root Diameter = 18.50 Inches (.472 Meters) Inlet Tip Diameter = 27.90 Inches (.709 Meters)
Exit Root Diameter = 18.50 Inches .480 Meters Exit Tip Diameter = 27.60 Inches (.701 Meters)

Multiple - Circular - Arc Airfoils, 59 Vanes

	Hub													Tip
Percent Flow	0	3.15	6.70	10.40	22.70	31.65	41.45	51.35	62.90	74.60	80.70	87.00	93.40	100.0
% Span at Leading Edge	0.0	4.3	8.6	12.9	26.8	36.4	46.5	56.8	67.3	78.0	83.5	89.0	94.4	100.0
Average % Span	0.0	4.3	8.55	12.85	26.7	36.3	46.4	56.7	67.25	77.95	83.45	88.95	94.4	100.0
% Span at Trailing Edge	0.0	4.3	8.5	12.8	26.6	36.2	46.3	56.6	67.2	77.9	83.4	88.9	94.4	100.0

U.S. customary units, inches and degrees

c	2.25	2.24	2.24	2.24	2.24	2.25	2.26	2.28	2.31	2.35	2.38	2.40	2.43	2.46
c_f	0.75	0.76	0.76	0.77	0.79	0.85	0.93	1.03	1.13	1.20	1.20	1.23	1.25	1.25
t/c	0.0400	0.0420	0.0432	0.0449	0.0498	0.0530	0.0560	0.0600	0.0640	0.0675	0.0695	0.0710	0.0730	0.0750
% c to max. t	58.1	57.1	56.2	55.3	52.9	51.6	50.7	50.1	50.0	50.0	50.0	50.0	50.0	50.0
a/c	0.538	0.539	0.540	0.540	0.542	0.545	0.549	0.550	0.542	0.520	0.512	0.505	0.510	0.523
RLE	0.0050	0.0050	0.0052	0.0054	0.0058	0.0060	0.0065	0.0066	0.0070	0.0072	0.0074	0.0075	0.0078	0.0080
RTE	0.0050	0.0050	0.0052	0.0054	0.0058	0.0060	0.0065	0.0066	0.0070	0.0072	0.0074	0.0075	0.0078	0.0080
$\beta^*_{SS_1}$	49.8	48.3	47.2	46.5	45.5	45.1	44.7	44.4	44.0	43.7	43.8	44.5	45.8	48.4
β^*_2	48.7	46.7	45.1	43.9	41.5	40.3	39.2	38.5	37.7	37.1	37.1	37.6	38.7	41.0
β_1	61.4	58.3	56.2	54.5	51.8	50.6	49.5	48.7	47.8	47.1	47.4	48.5	50.7	55.0
β_E	61.0	58.5	56.0	54.3	51.6	50.8	49.6	48.8	47.8	47.3	47.5	48.5	51.3	55.5
β_f	8.6	8.0	7.5	7.4	8.3	9.5	11.2	14.0	17.5	21.3	22.9	23.9	24.5	24.7
β_{Ef}	8.3	7.6	7.3	7.0	8.3	9.5	11.3	14.0	18.0	21.4	22.5	24.0	24.6	25.0
i*	4.5	4.0	3.6	3.1	1.9	1.0	0.2	-0.2	-1.4	-2.2	-2.6	-2.9	-3.3	-3.7
σ	2.25	2.21	2.16	2.12	1.99	1.91	1.85	1.80	1.75	1.70	1.69	1.68	1.67	1.66

APPENDIX D

PERFORMANCE PARAMETERS

Relative total temperature:

$$T'_1 = t_1\left[1 + \frac{\gamma - 1}{2}(M'_1)^2\right] \quad \text{rotor inlet}$$

$$T'_2 = T'_1 + \left[\frac{(\omega r_2)^2 - (\omega r_1)^2}{\frac{2\gamma}{\gamma - 1} Rg_c}\right] \quad \text{rotor exit}$$

Incidence angle based on mean camber line:

$$i_m = \beta'_1 - \beta'^*_1 \quad \text{for rotors}$$

$$i_m = \beta_1 - \beta^*_1 \quad \text{for stators}$$

Deviation angle:

$$\delta^o = \beta'_2 - \beta'^*_2 \quad \text{for rotors}$$

$$\delta^o = \beta_2 - \beta^*_2 \quad \text{for stators}$$

Diffusion factor:

$$D = 1 - \frac{V'_2}{V'_1} + \frac{r_2 V_{\theta 2} - r_1 V_{\theta 1}}{(r_2 + r_1)\sigma V'_1} \quad \text{for rotors}$$

$$D = 1 - \frac{V_2}{V_1} + \frac{r_1 V_{\theta 1} - r_2 V_{\theta 2}}{(r_1 + r_2)\sigma V_1} \quad \text{for stators}$$

Loss coefficient:

$$\bar{\omega} = \frac{P'_1 \left(\frac{T'_2}{T'_1}\right)^{\gamma/(\gamma-1)} - P'_2}{P'_1 - p_1} \quad \text{for rotors}$$

$$\bar{\omega} = \frac{P_1 - P_2}{P_1 - p_1} \quad \text{for stators}$$

Loss parameter:

$$\frac{\bar{\omega} \cos \beta'_2}{2\sigma} \quad \text{for rotors}$$

$$\frac{\bar{\omega} \cos \beta_2}{2\sigma} \quad \text{for stators}$$

Polytropic efficiency:

$$\eta_p = \frac{\frac{\gamma - 1}{\gamma} \ln\left(\frac{P_2}{P_1}\right)}{\ln\left(\frac{T_2}{T_0}\right)} \quad \text{for rotors}$$

$$\eta_p = \frac{\frac{\gamma - 1}{\gamma} \ln\left(\frac{p_2}{p_1}\right)}{\ln\left(\frac{t_2}{t_1}\right)} \quad \text{for stators}$$

Adiabatic efficiency:

$$\eta_{ad} = \frac{\left(\frac{P_2}{P_1}\right)^{(\gamma-1)/\gamma} - 1}{\left(\frac{T_2}{T_0}\right) - 1} \quad \text{for rotors}$$

$$\eta_{ad} = \frac{\left(\frac{P_3}{P_0}\right)^{(\gamma-1)/\gamma} - 1}{\left(\frac{T_3}{T_0}\right) - 1} \quad \text{fan overall}$$

APPENDIX E

SYMBOLS

A	area, ft^2 (m^2)
a	distance along chord from leading edge of airfoil to point of maximum elevation of airfoil above chord line, in. (m)
a'	a point on the suction surface of a blade halfway between the leading edge and the point from which a Mach wave emanates that meets the leading edge of the following blade
c	chord (aerodynamic on flow surface), in. (m)
D or D-FAC	diffusion factor
E	epse, the angle between rays drawn to a conical design surface, one ray to the leading edge of an airfoil section, the second to some other point on the airfoil (fig. 4), deg (rad)
g_c	conversion factor, 32.174 ft/sec^2 (9.807 m/sec^2)
H	enthalpy, Btu/lbm-^oR (J/kg-K)
ID	inner diameter of casing, in. (m)
INCS	suction-surface incidence angle, inlet air angle minus blade suction-surface metal angle, deg (rad)
i	incidence angle, inlet air angle minus blade metal angle, deg (rad)
J	conversion constant, 778 ft-lbf/Btu (1.0)
M	Mach number
N	rotor speed, rpm
OD	outer diameter of casing, in. (m)
P	total or stagnation pressure, lb/ft^2 abs (N/m^2)
p	static pressure, lb/ft^2 abs (N/m^2)
Δp	pressure differential
R	distance from apex of design conical surface to point on blade, in. (m); or gas constant for air
RLE	leading-edge airfoil radius, in. (m)
RTE	trailing-edge airfoil radius, in. (m)

r	radius measured from rig centerline, in. (m)
SM	stall margin
T	total temperature, ^{o}R (K)
t	blade maximum thickness, in. (m); or static temperature, ^{o}R (K)
U	rotor speed, ft/sec (m/sec)
V	air velocity, ft/sec (m/sec)
W	weight flow, lbm/sec (kg/sec)
z	axial distance, in. (m)
β	absolute air angle, $\cot^{-1}(V_m/V_\theta)$, deg (rad)
β^*	metal angle, on conical surface, between tangent to mean-camber line and meridional direction at leading and trailing edge, deg (rad)
$\Delta\beta$	air turning angle, deg (rad)
γ	ratio of specific heats for air
δ	ratio of total pressure to standard pressure of 2116 lb/ft^2 abs
δ^{o} or DEV	deviation angle, exit air angle minus tangent to blade mean-camber line at trailing edge, deg (rad)
ϵ	angle between tangent to streamline projected on meridional plane and axial direction, deg (rad)
η	efficiency, percent
θ	ratio of total temperature to standard temperature of 518.7^{o} R (288 K)
ρ	mass density, lbm/ft^3 (kg/m^3)
σ	solidity, ratio of aerodynamic chord to spacing between blades
φ	blade camber angle, difference between blade angles at leading and trailing edges on conical surface, $\beta_1'^* - \beta_2'^*$ for rotors and $\beta_1^* - \beta_2^*$ for stators, deg (rad); flow coefficient, $(V_z/U)_{\text{mean radius}}$
φ_E	blade camber angle on plane of "unwrapped" conical surface, $\beta_1'^* - \beta_2'^* - E_{TE}$ for rotors and $\beta_1^* - \beta_2^* - E_{TE}$ for stators, deg (rad)
ψ	pressure coefficient, $\Delta H_{id} J g_c / U_m^2$
ω	angular rotor velocity, rad/sec
$\overline{\omega}$ or OMEGA-B	total-pressure-loss coefficient

ω_b	bending vibrational frequency, Hz or rad/sec
ω_t	torsional vibrational frequency, rad/sec

Subscripts:

ad	adiabatic
des	design
E	denotes camber definitions which include epse angle E (fig. 4)
Ef	denotes front camber definitions which include epse angle E (fig. 4)
f	front
id	ideal
in	inlet
LE	leading edge
m	meridional (velocity); mean camber line (angle); mean radius
p	profile (loss); polytropic (efficiency)
R	point at a specific polar radius
ss	suction surface
sh	shock
stall	stall point
TE	trailing edge
z	axial component
θ	tangential component
0	plenum
1	leading edge of rotor or stator
2	trailing edge of rotor or stator
3	instrumentation plane at fan discharge

Superscripts:

'	relative to rotor
*	blade metal angle

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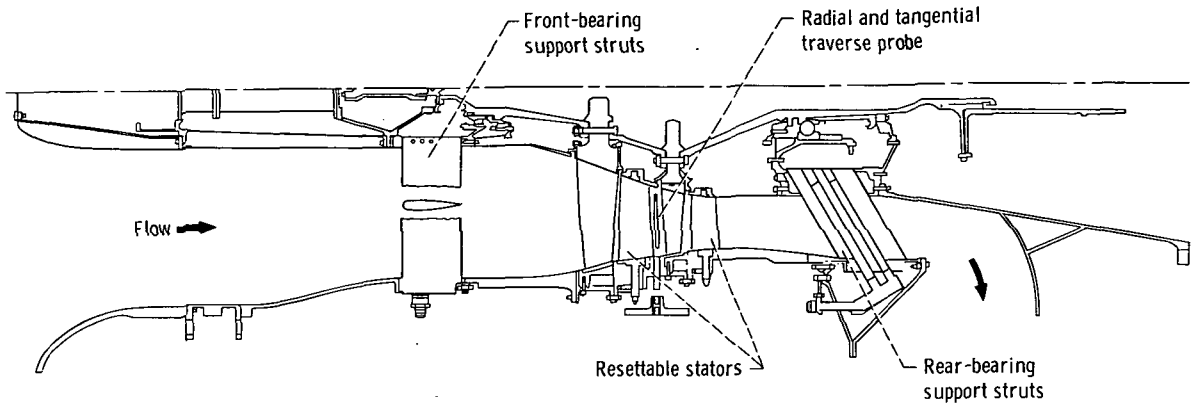


Figure 1. - Schematic of two-stage fan test arrangement.

Station	Inside diameter		Outside diameter		Inside diameter		Outside diameter	
	in.	m	in.	m	Axial distance, z			
					in.	m	in.	m
1	10.00	0.254	32.48	0.825	-5.20	-0.132	-5.20	-0.132
2	10.26	.261	32.33	.821	-3.70	-.094	-3.70	-.094
3	10.94	.278	31.96	.811	-2.245	-.057	-2.245	-.057
4	12.40	.315	31.00	.787	.0	.0	.42	.011
5	14.84	.377	29.93	.760	3.30	.084	2.75	.070
6	15.22	.387	29.67	.754	3.80	.097	3.45	.088
7	16.85	.428	28.96	.736	6.15	.156	6.33	.161
8	17.39	.442	28.58	.726	7.23	.184	7.57	.192
9	18.35	.467	28.12	.714	9.20	.234	8.82	.224
10	18.58	.472	27.90	.709	9.80	.249	9.59	.244
11	18.90	.480	27.60	.701	11.85	.301	11.93	.303
12	18.90	.480	27.60	.701	13.50	.343	13.50	.343
13	18.90	.480	27.68	.703	15.00	.381	15.00	.381
14	18.90	.480	27.94	.709	16.50	.419	16.50	.419
15	18.90	.480	28.54	.724	18.55	.471	18.55	.471

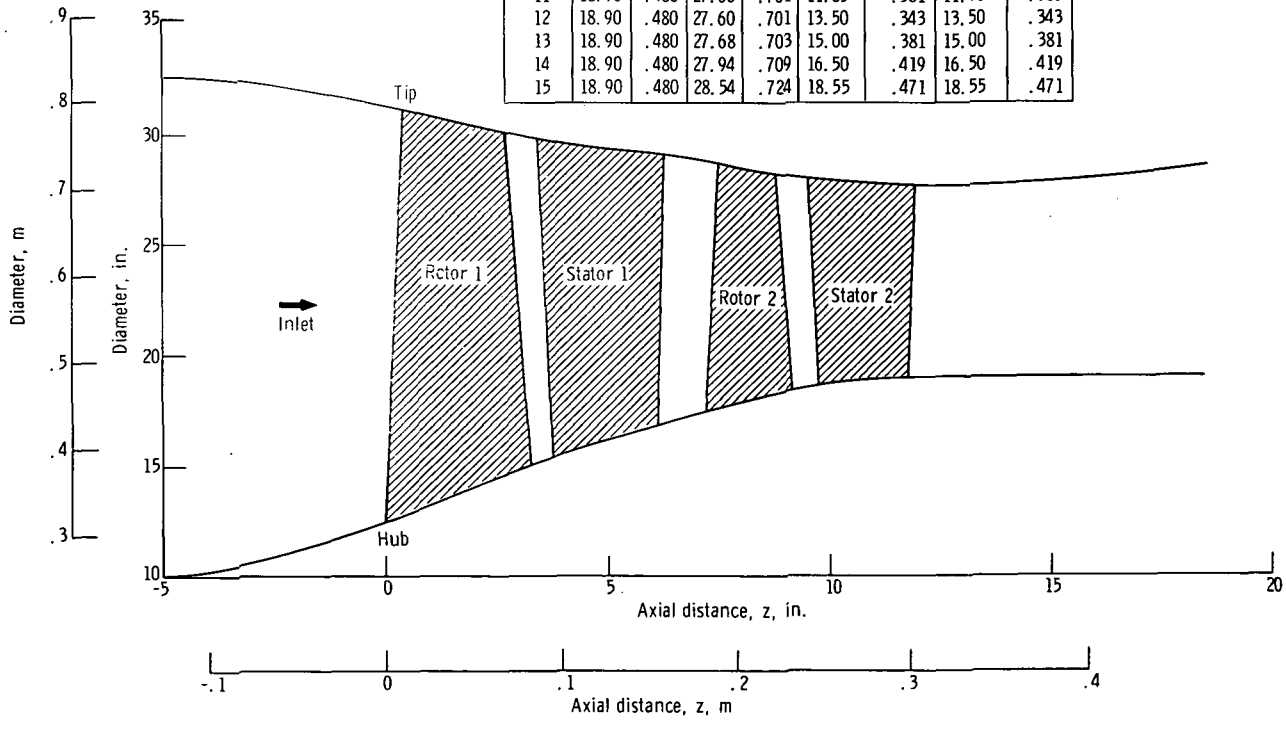
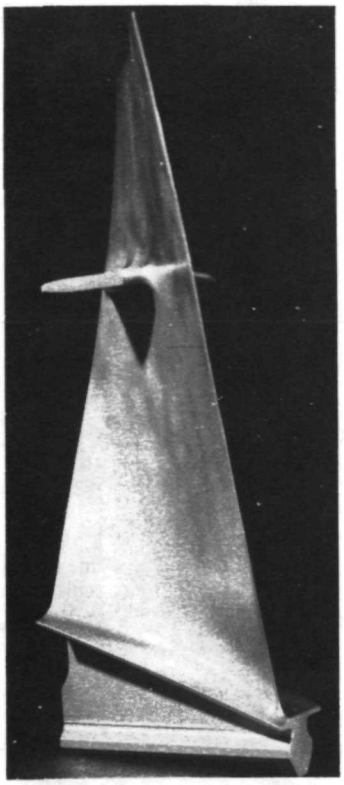
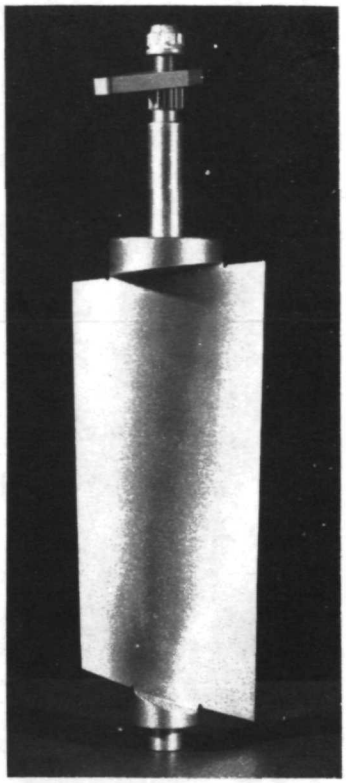


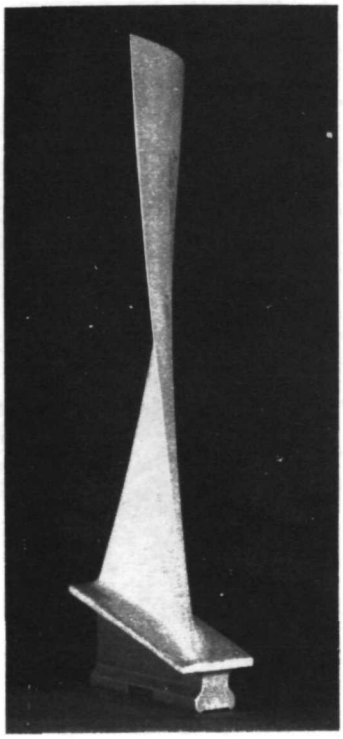
Figure 2. - Flow path.



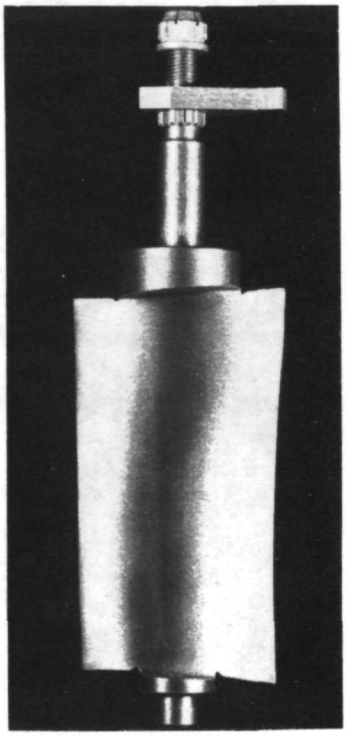
First-stage blade



First-stage vane



Second-stage blade



Second-stage vane

Figure 3. - Fan blades and vanes.

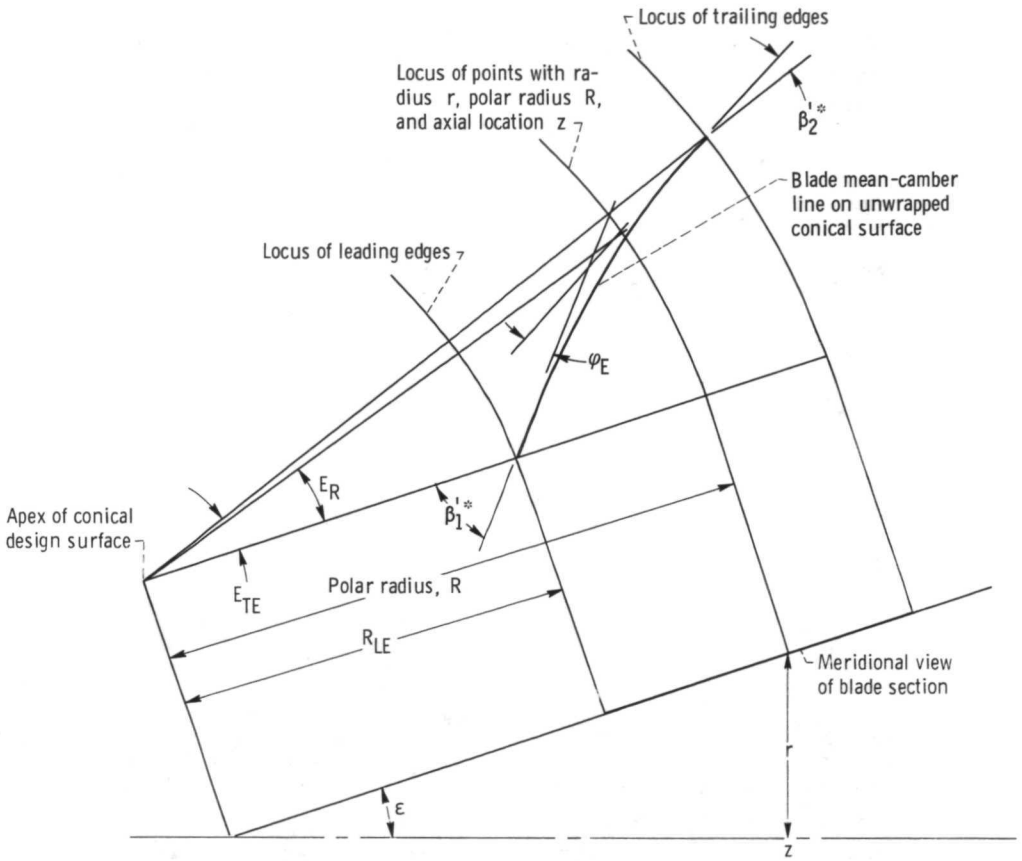


Figure 4. - Meridional view and polar representation of blade mean-camber line. Camber equations: $\varphi = \beta_1'^* - \beta_2'^*$ and $\varphi_E = \beta_1'^*(\beta_2'^* + E_{TE})$.

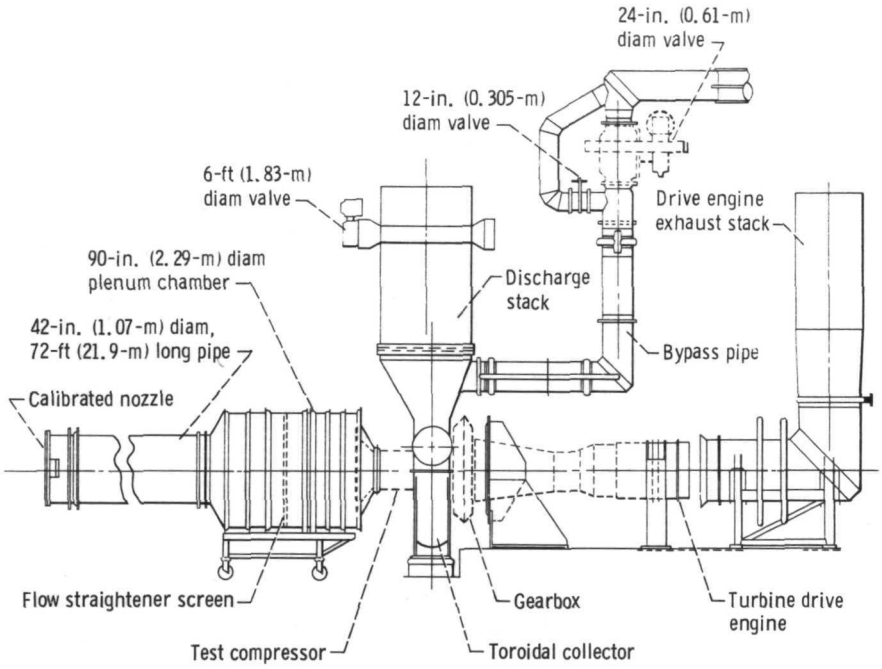
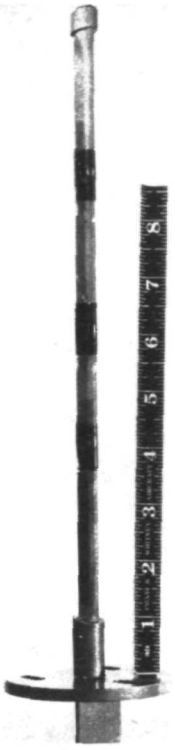


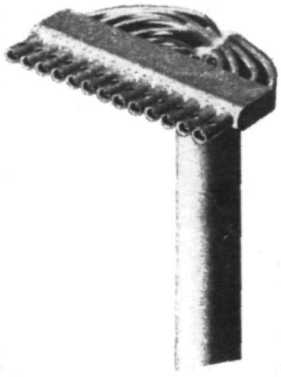
Figure 5. - Schematic of compressor test facility.

Fan inlet and discharge traverse wedge probe

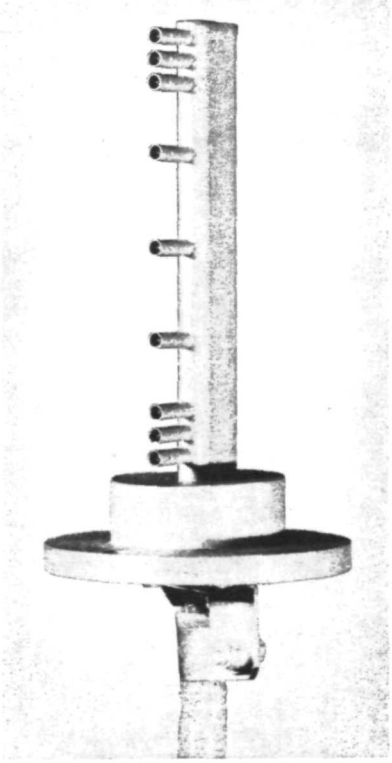


Inlet hot-film probe

NASA combination probe, stator 1 exit



Fan discharge total-pressure wake rake



Fan discharge total-temperature rake

Figure 6. - Typical instrumentation.

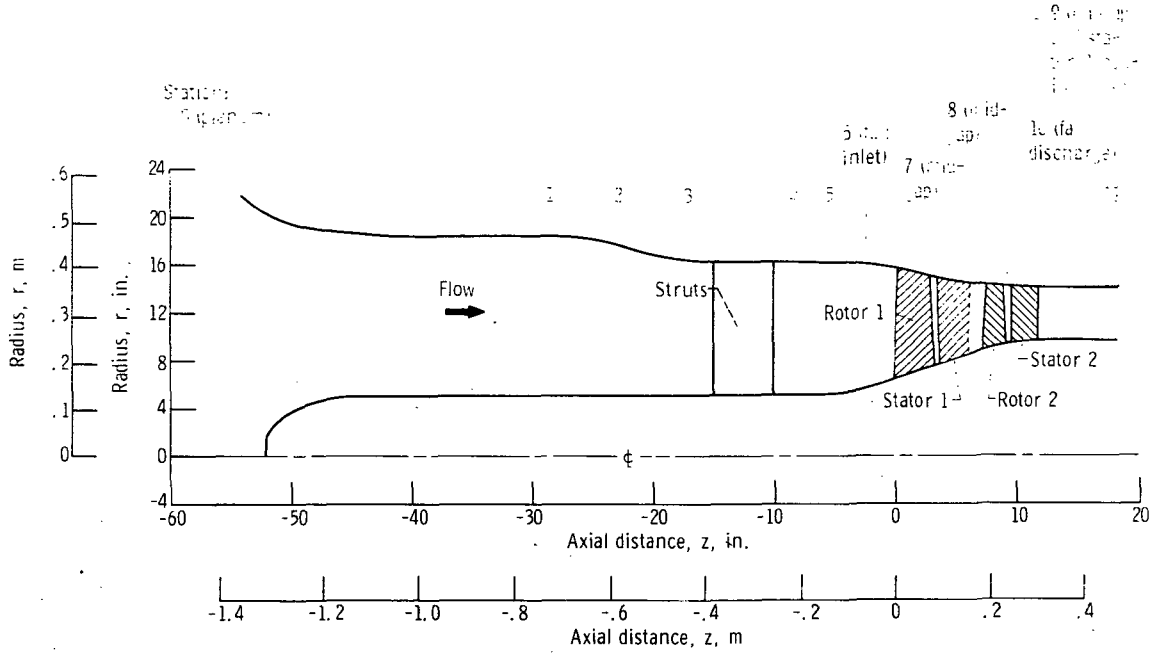


Figure 7. - Axial location of instrumentation planes.

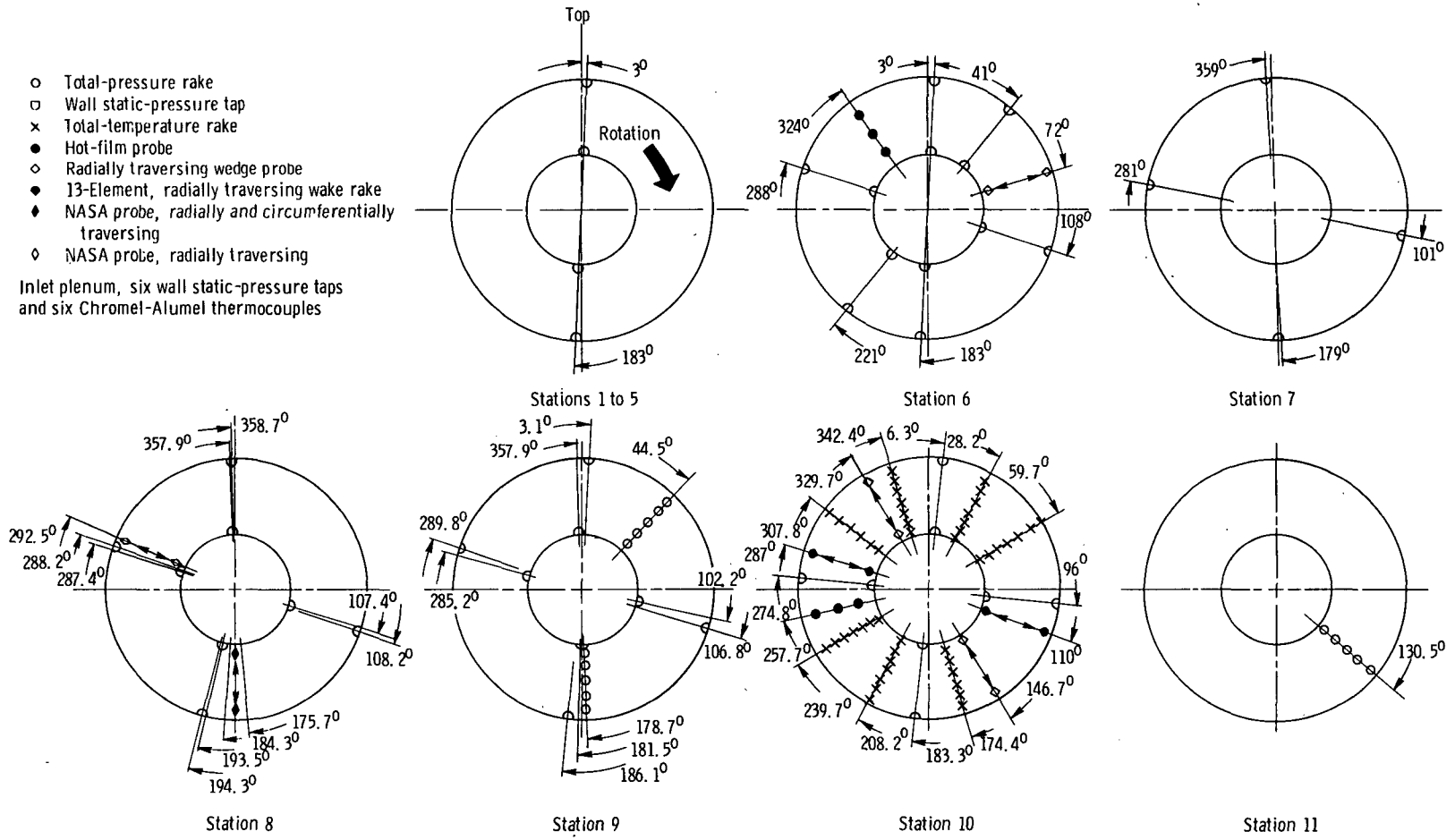
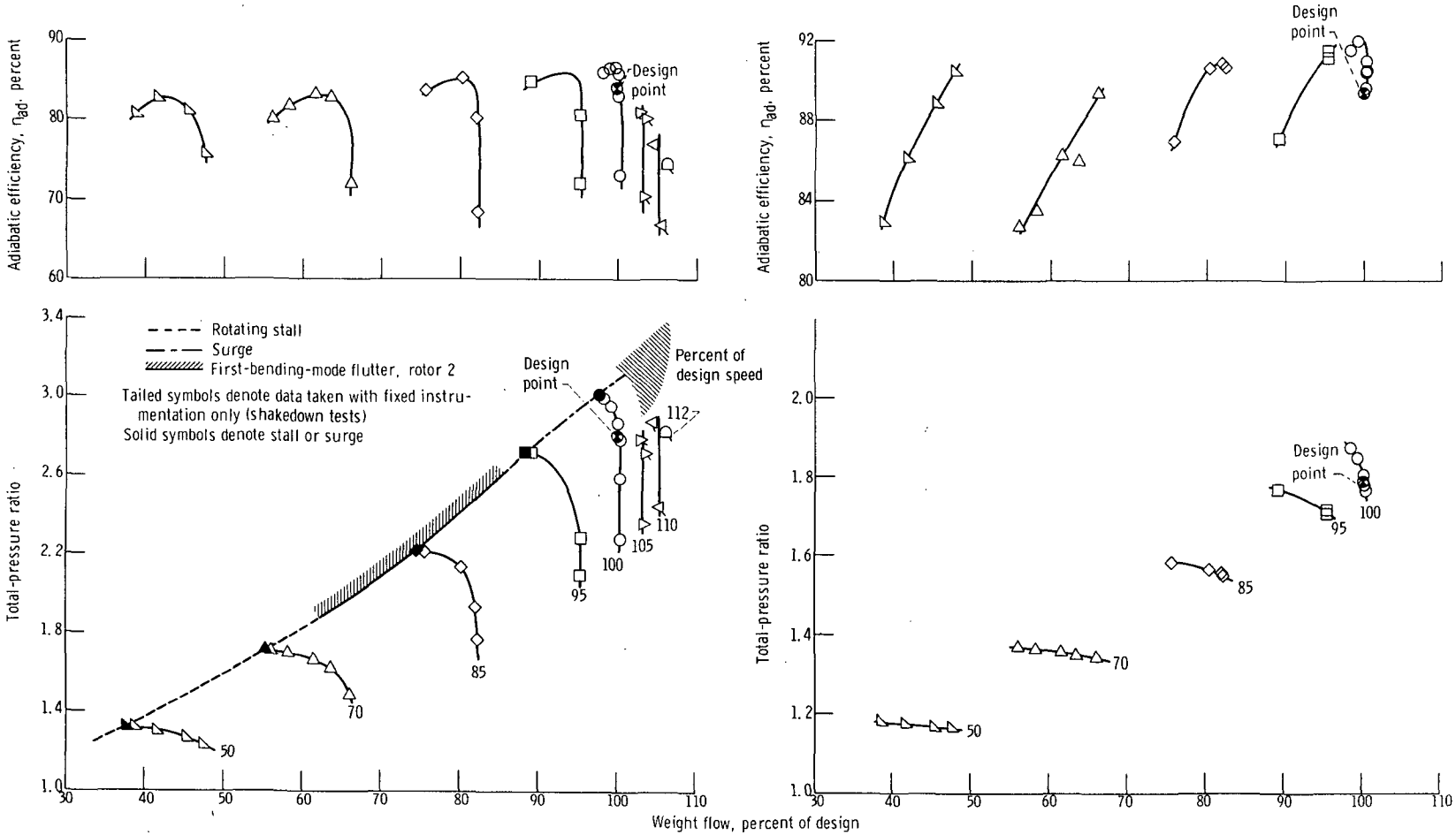


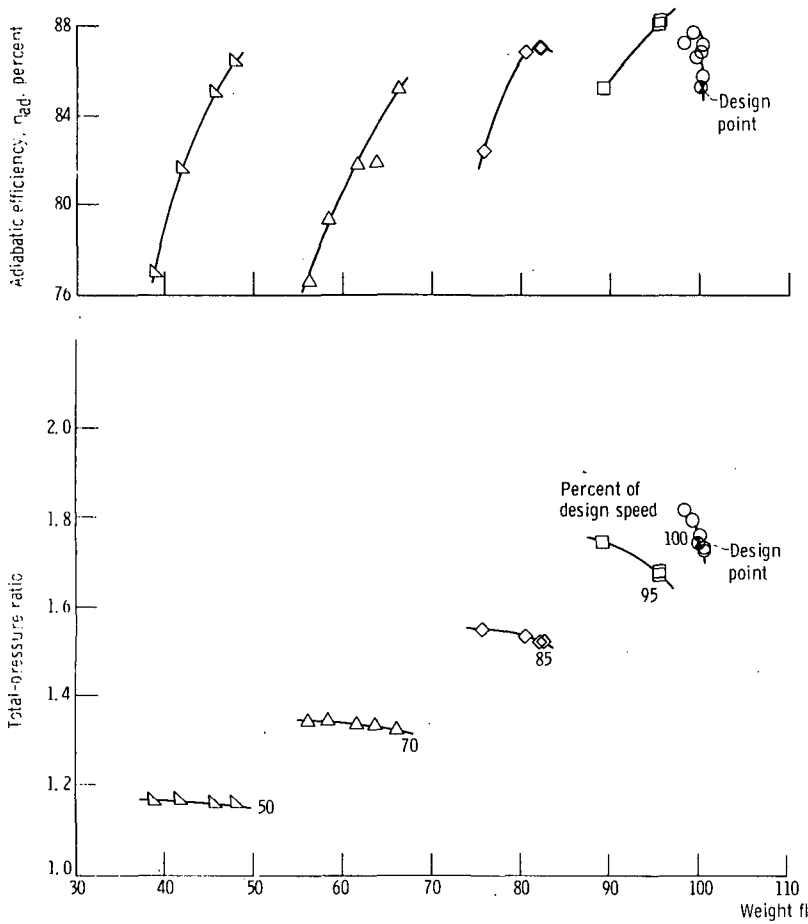
Figure 8. - Circumferential locations of instrumentation - looking upstream.



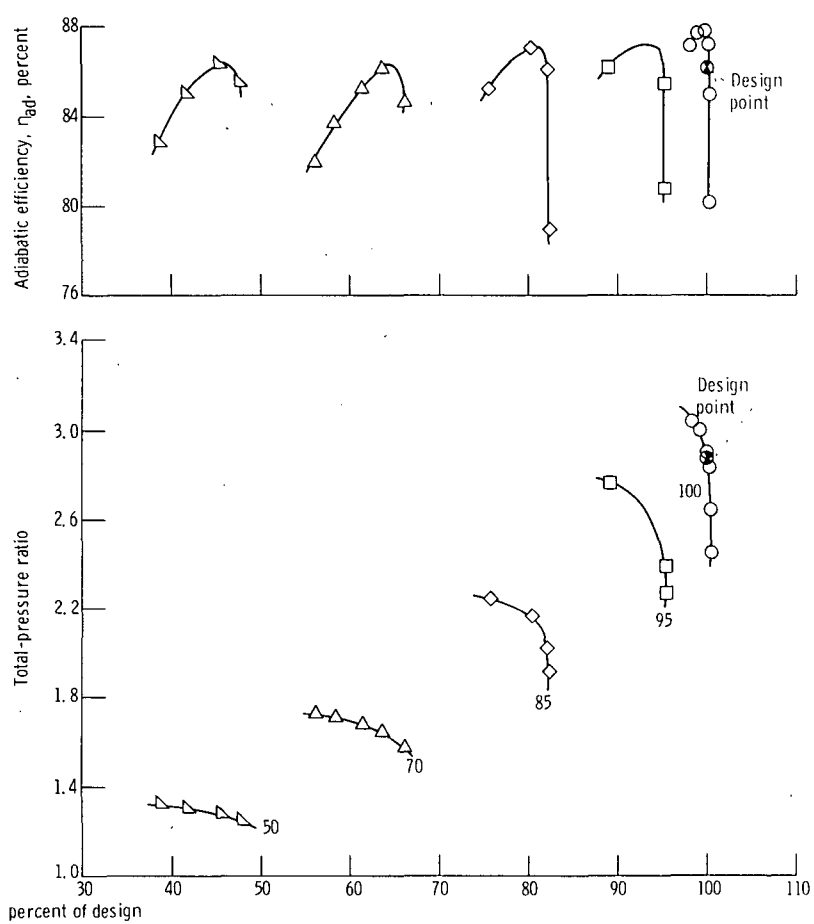
(a) Two-stage-fan overall performance.

(b) First-rotor performance.

Figure 9. - Performance maps.



(c) First-stage performance.



(d) Performance of first stage plus second rotor.

Figure 9. - Concluded.

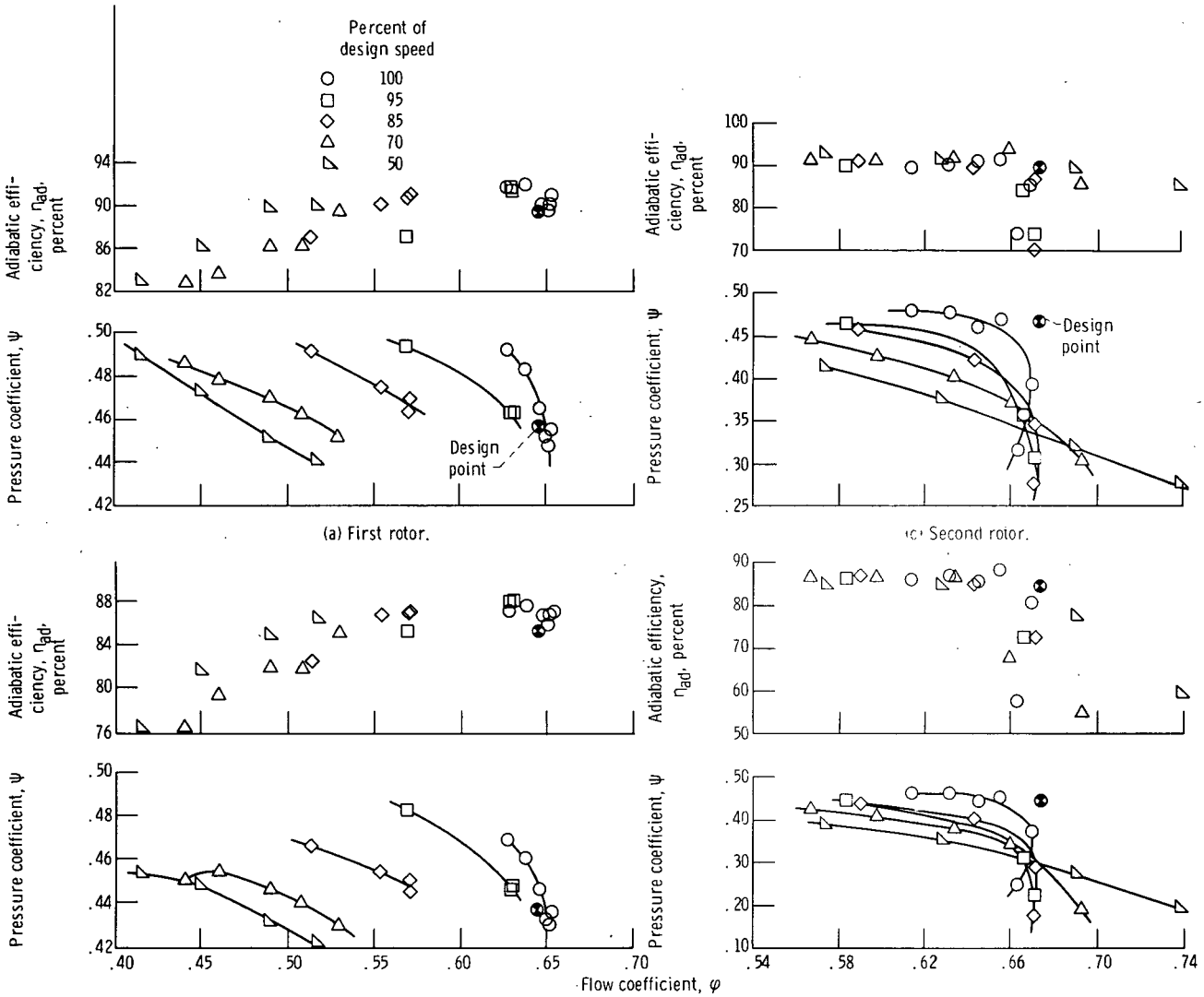
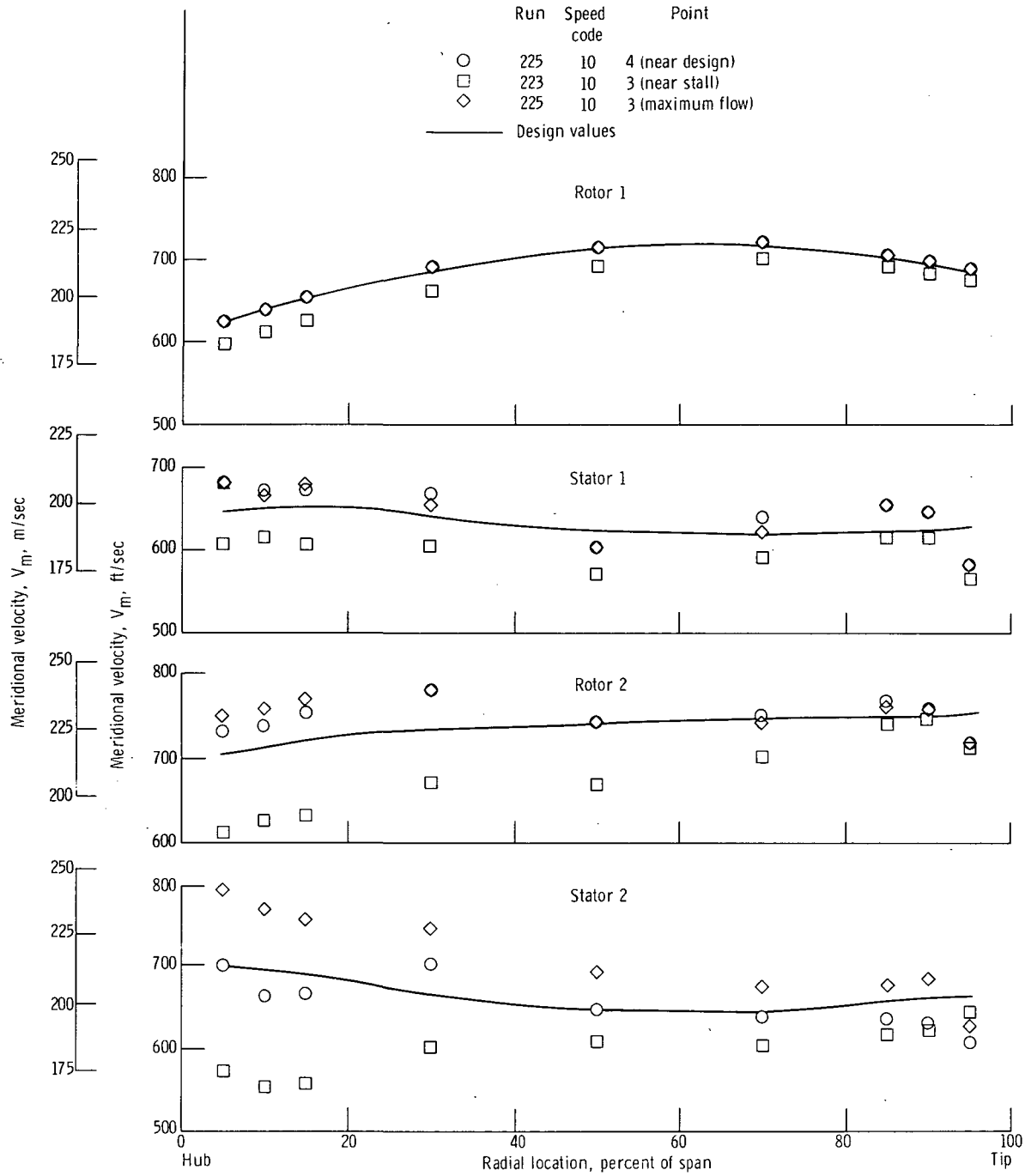
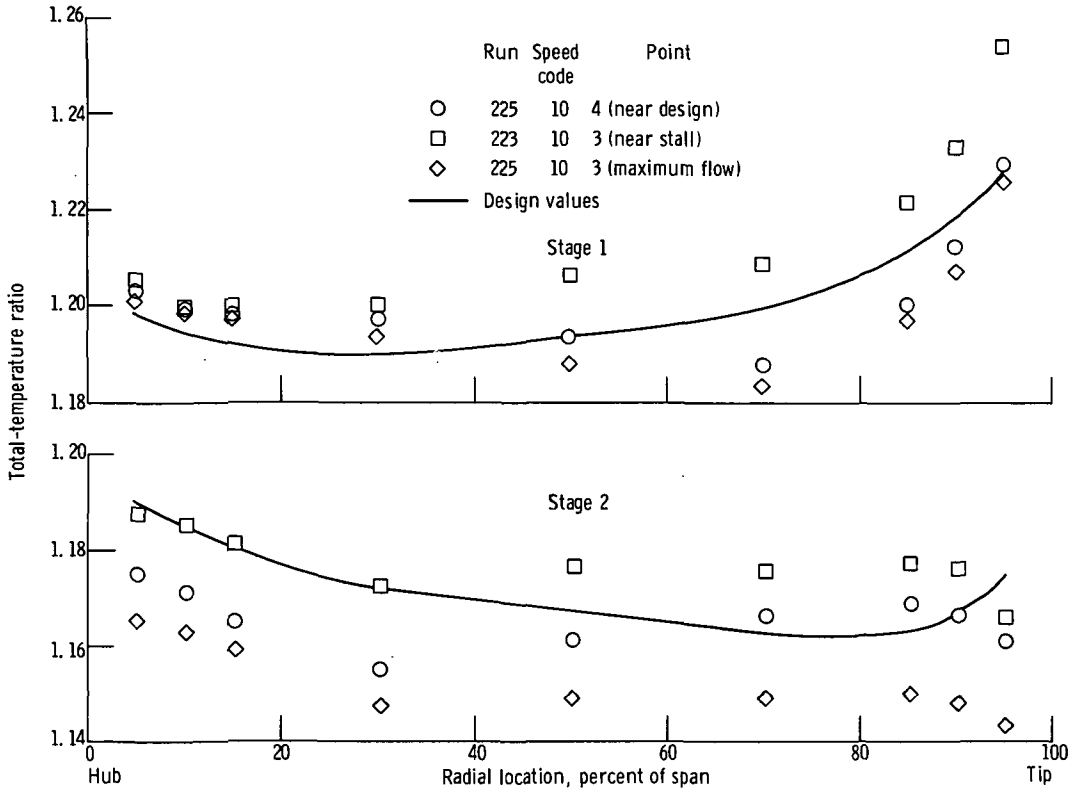


Figure 10. - Pressure coefficient and adiabatic efficiency as function of flow coefficient.



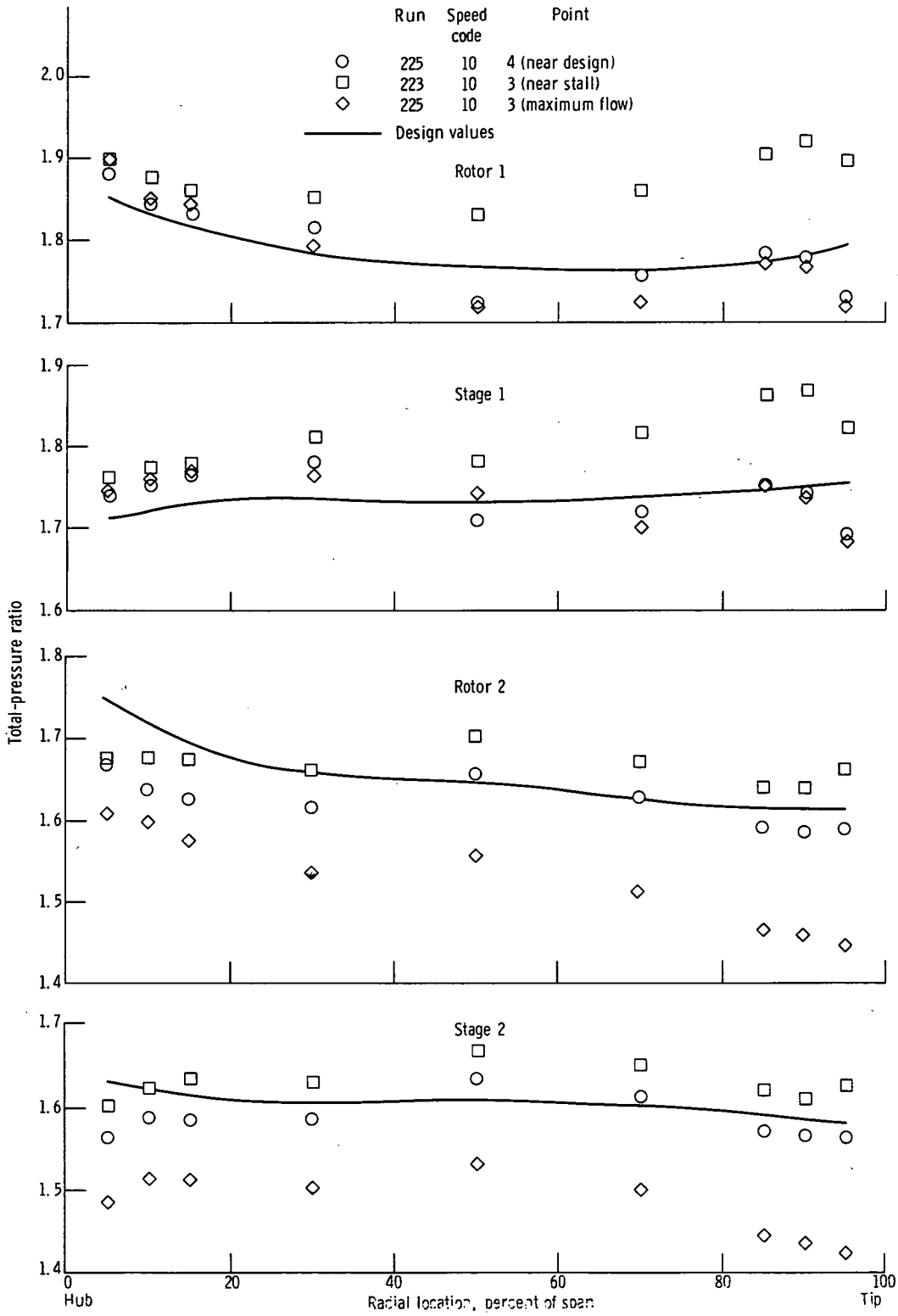
(a) Blade leading-edge meridional velocity.

Figure 11. - Measured spanwise variations of pertinent parameters compared with design values.



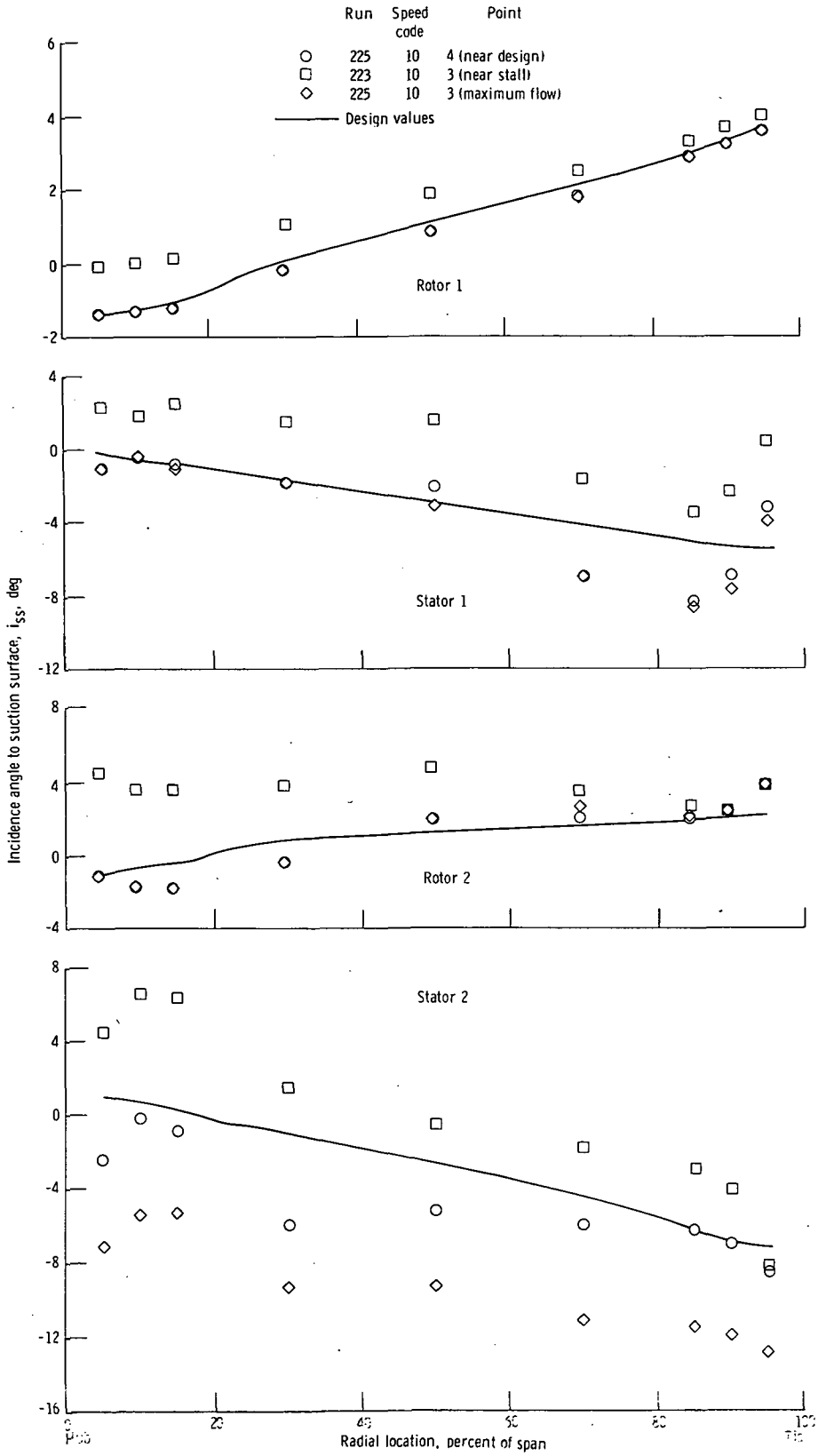
(b) Total temperature ratio.

Figure 11. - Continued.



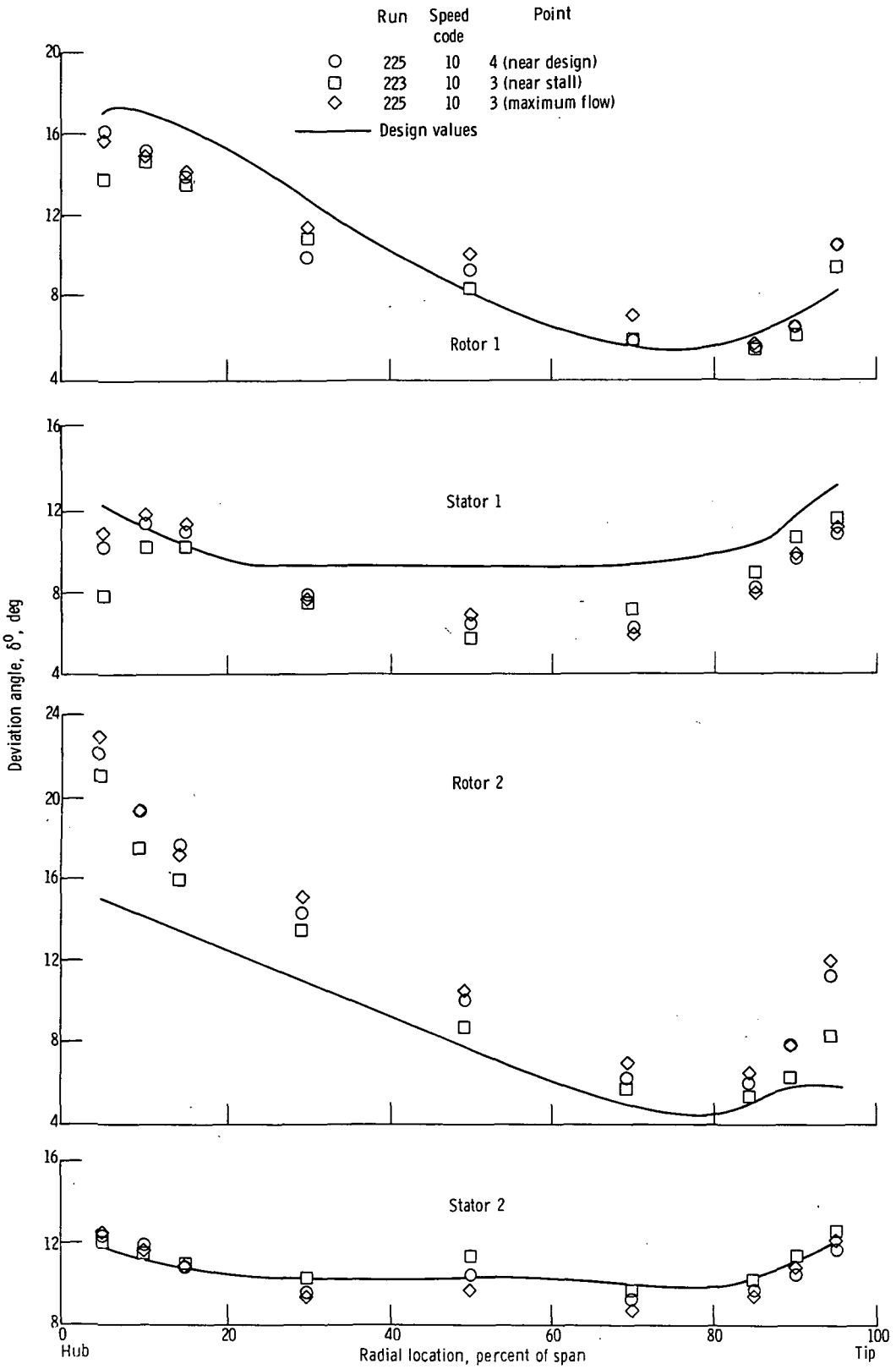
(c) Total-pressure ratio.

Figure 11. - Continued.



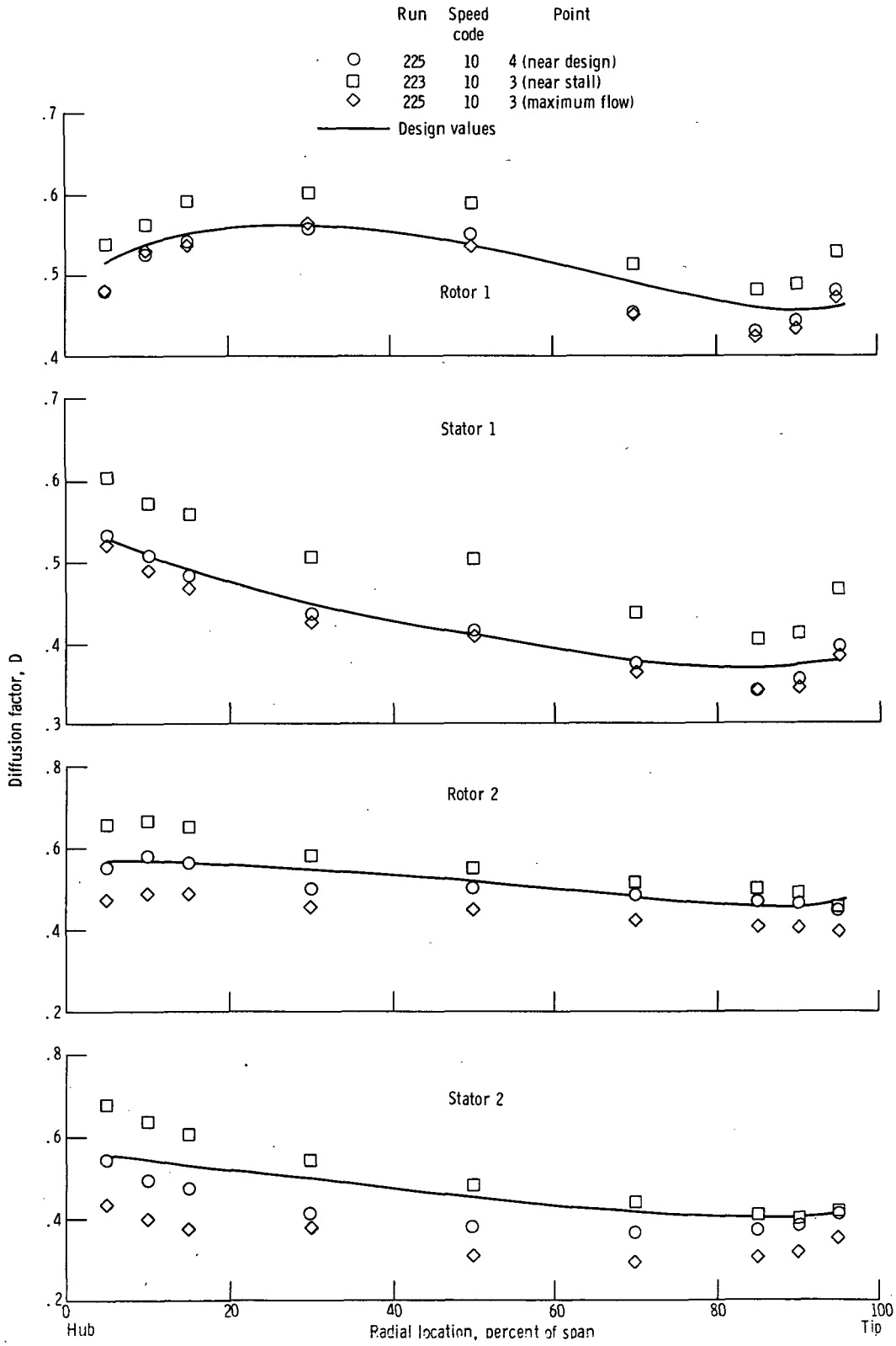
(d) Suction-surface incidence angle.

Figure 11. - Continued.



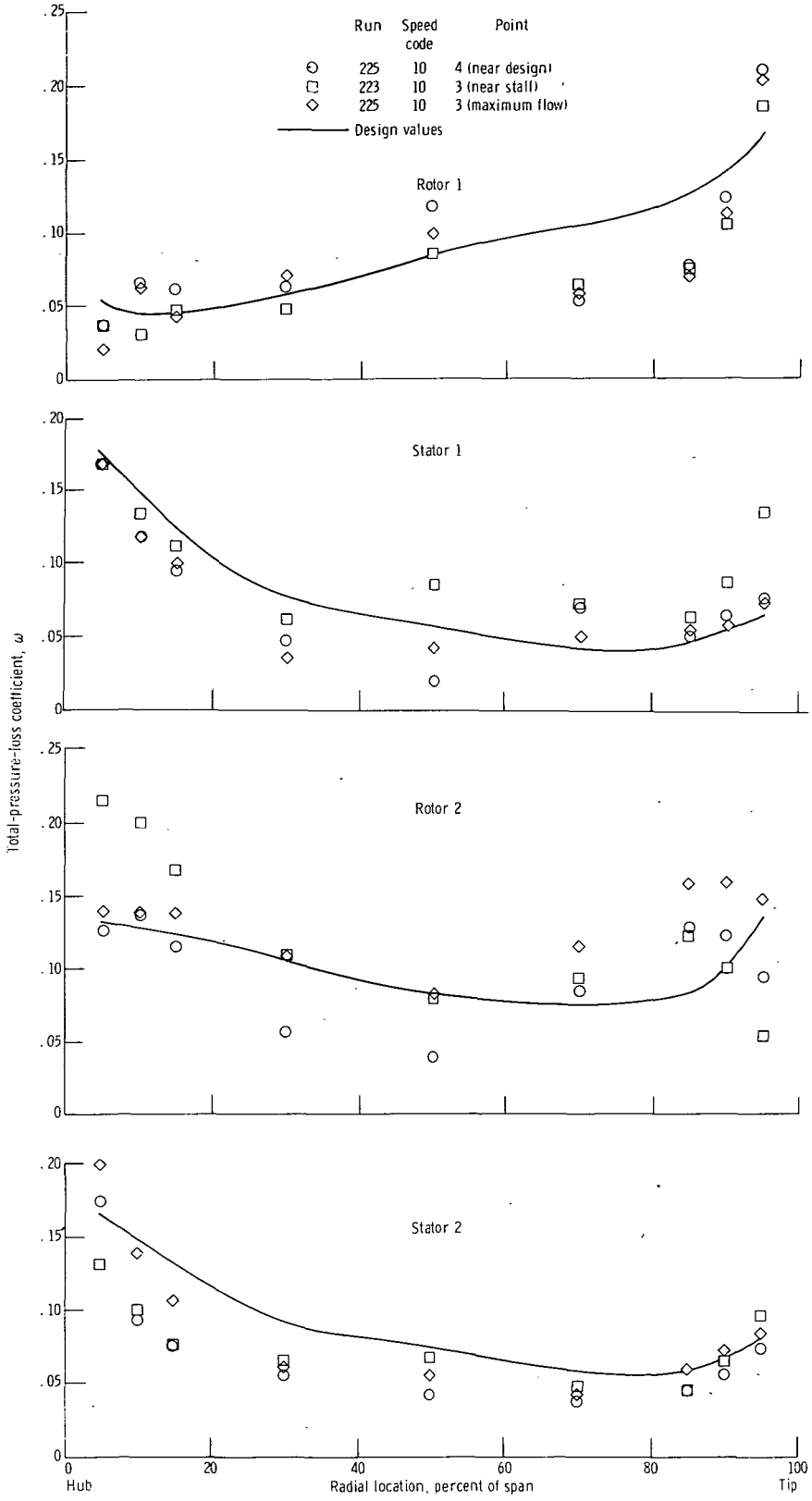
(e) Deviation angle.

Figure 11. - Continued.



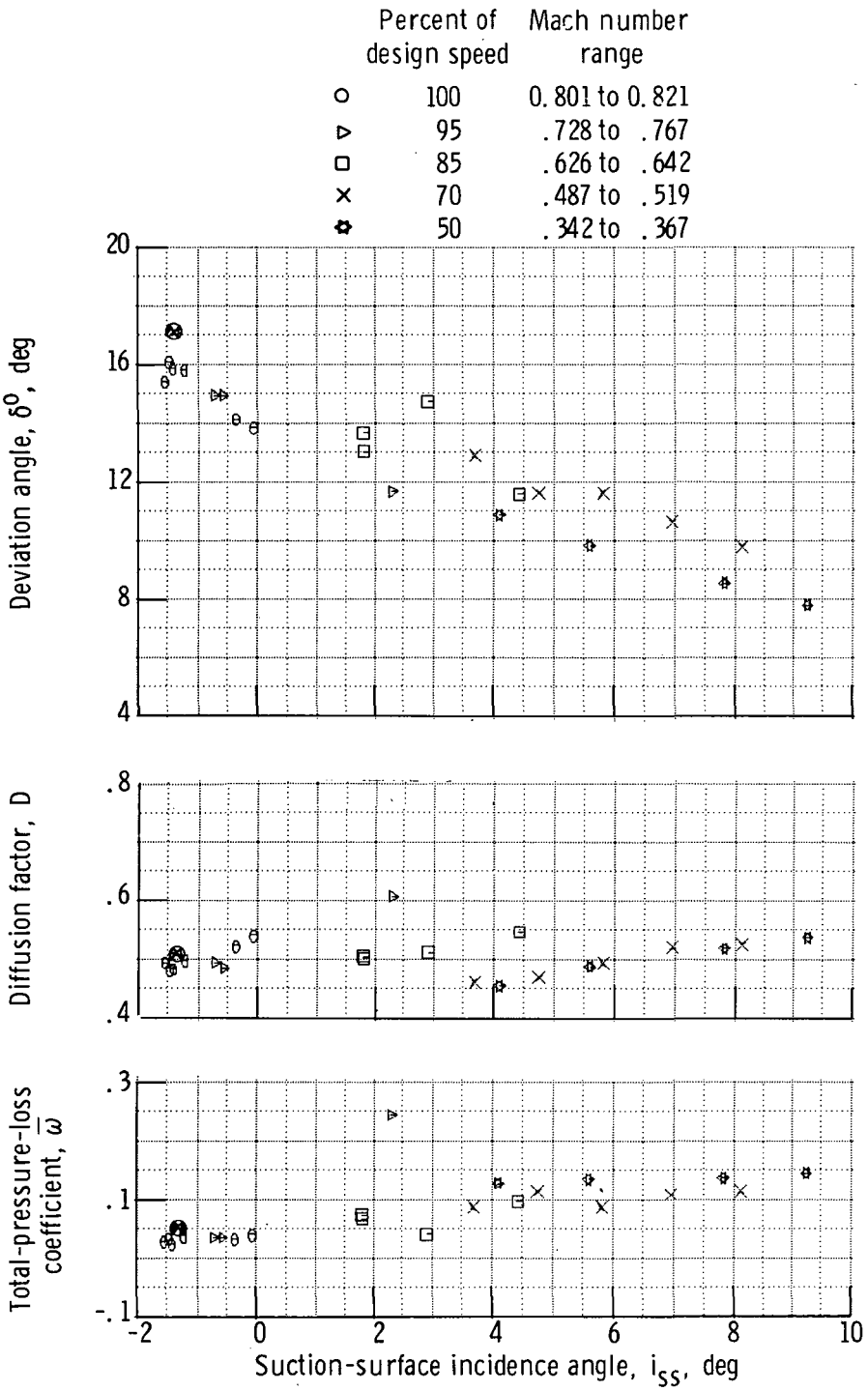
(f) Diffusion factor.

Figure 11. - Continued.



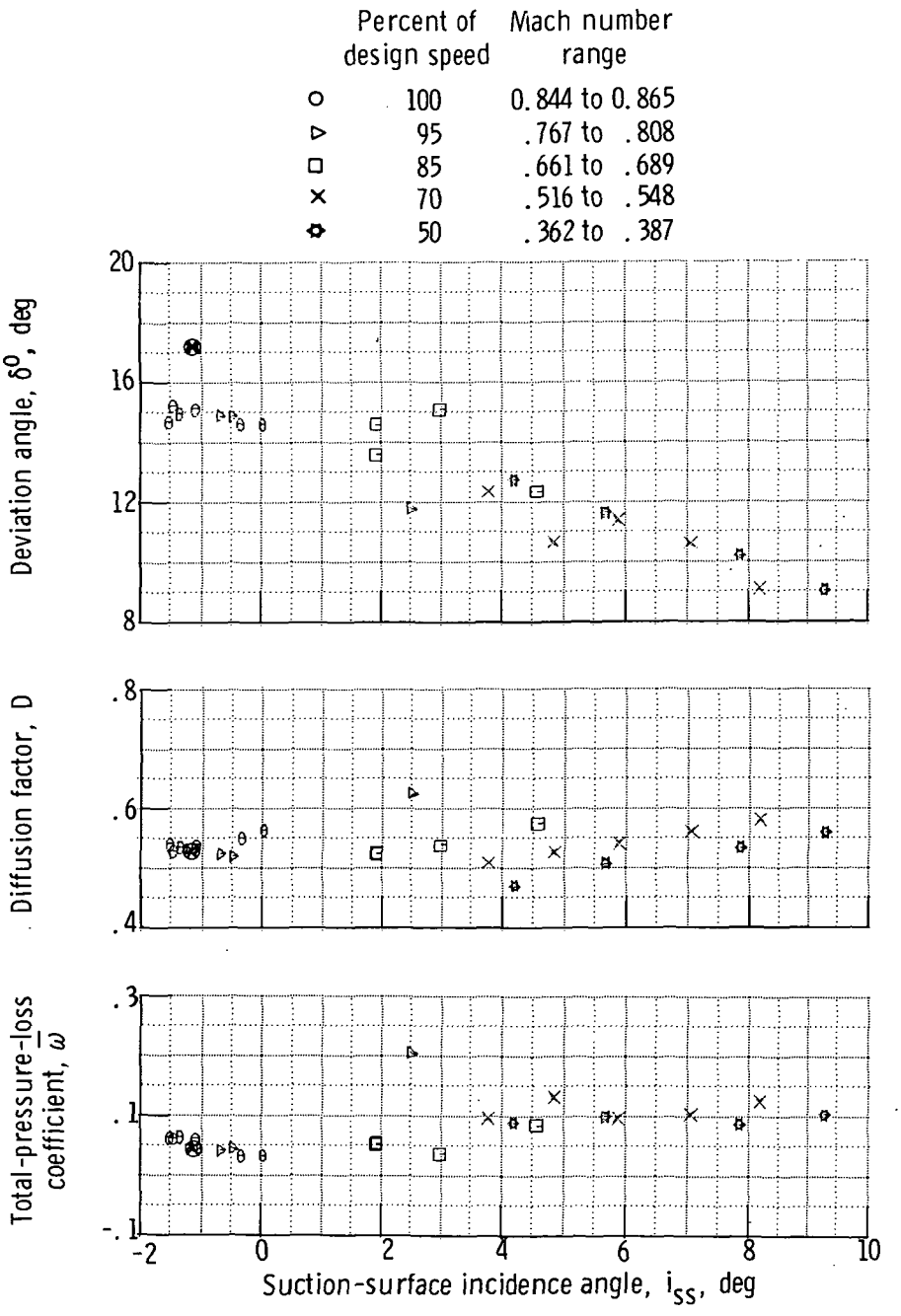
(g) Total-pressure-loss coefficient.

Figure 11. - Concluded.



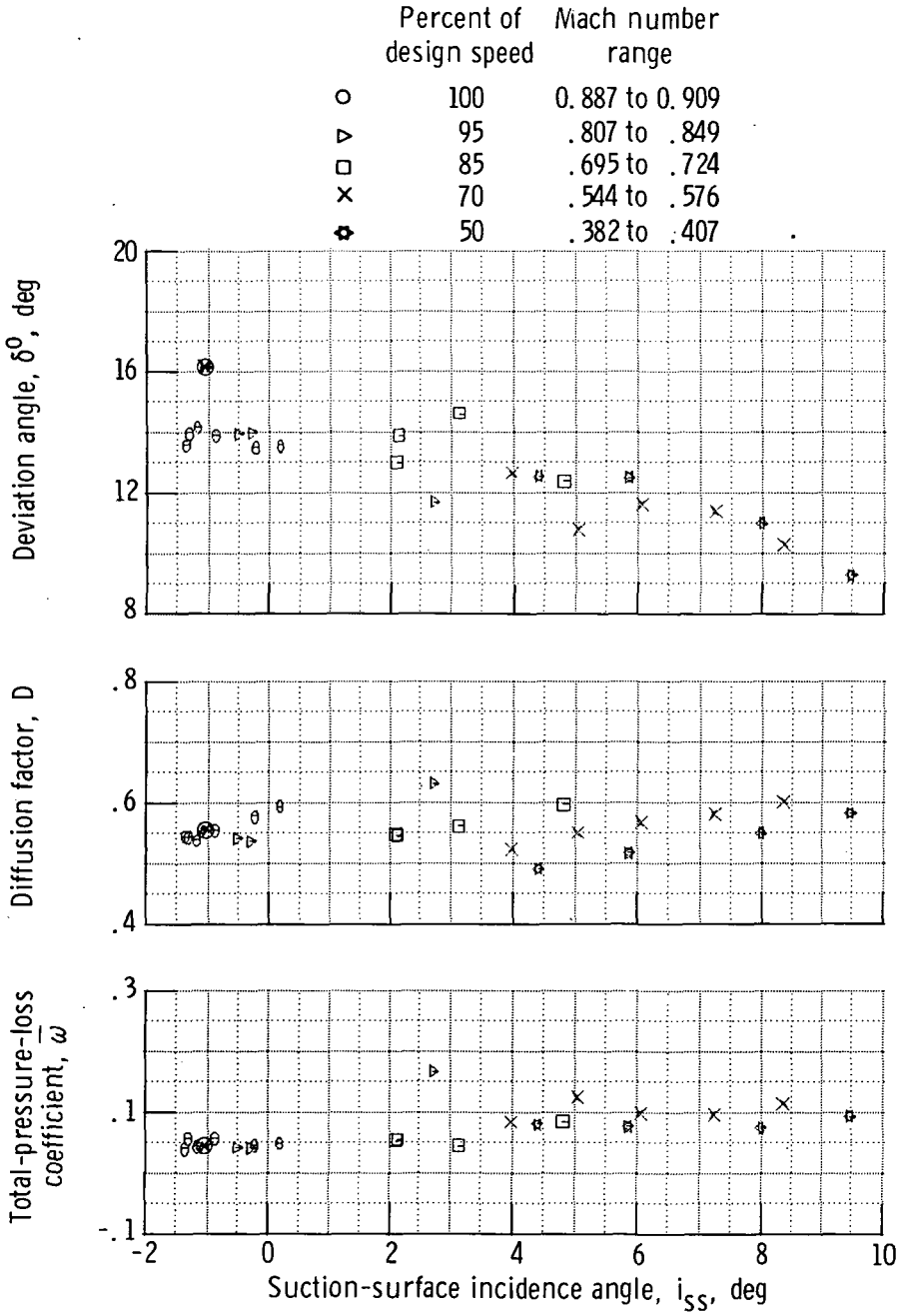
(a) 5 Percent of span (from hub).

Figure 12. - Blade-element performance data - rotor 1.



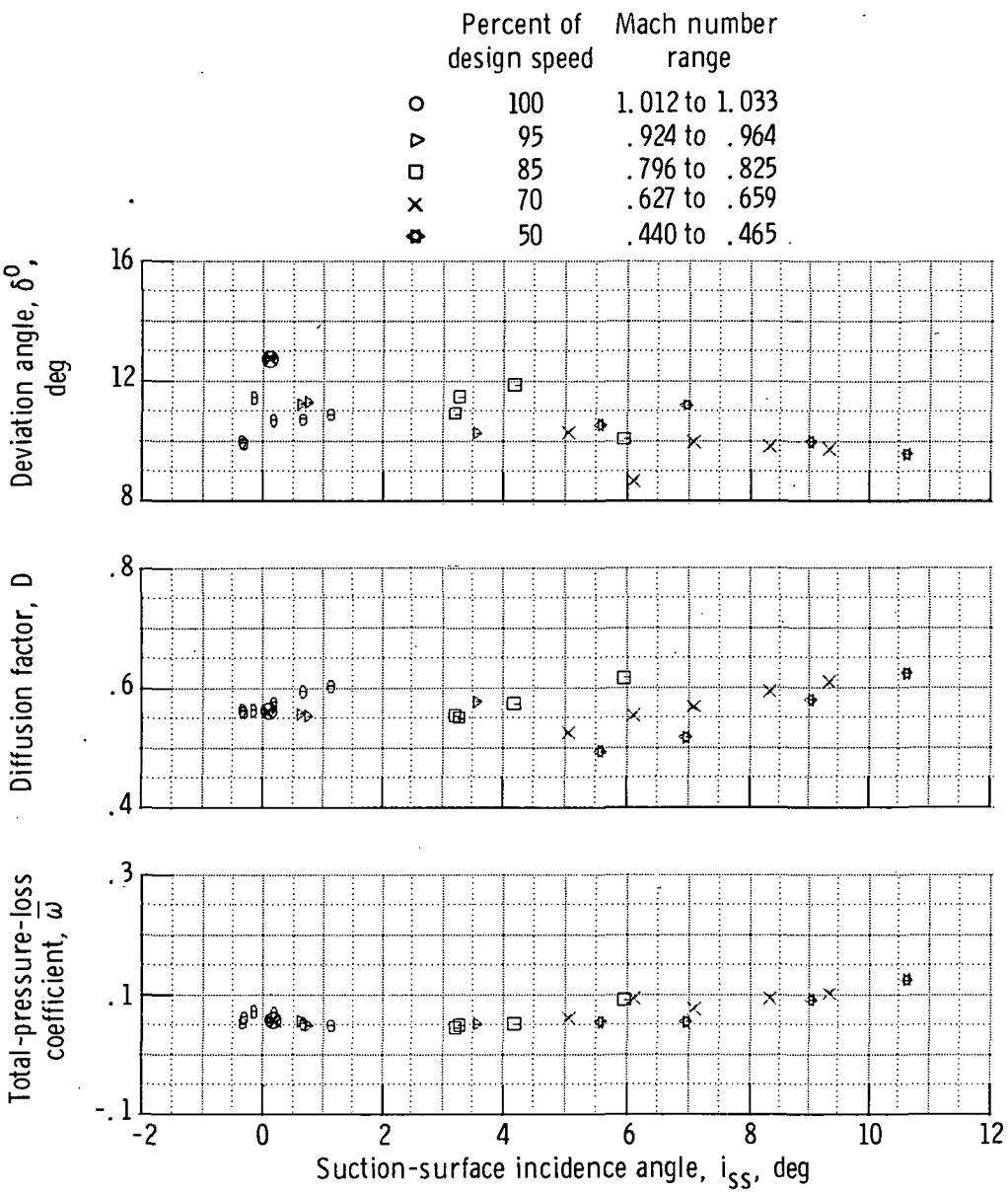
(b) 10 Percent of span.

Figure 12. - Continued.



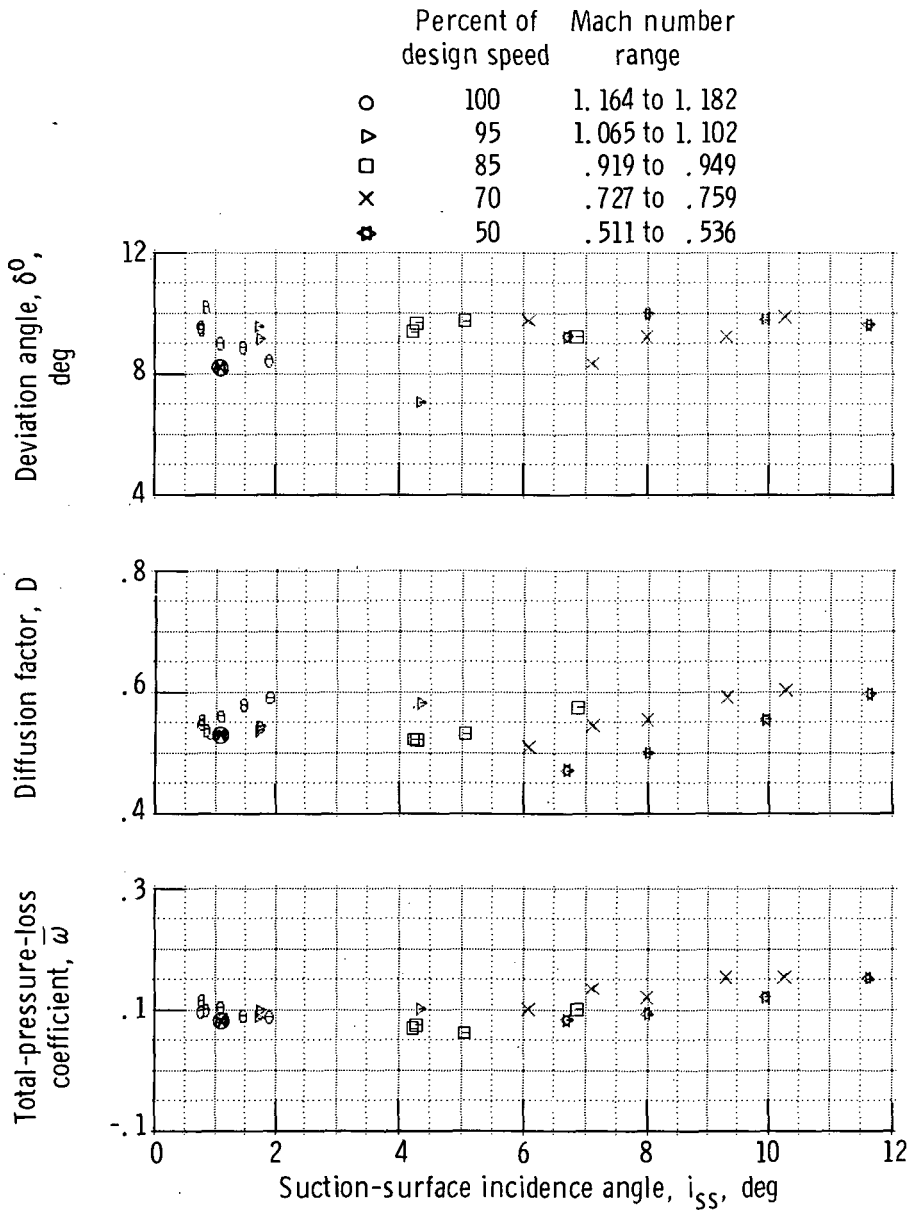
(c) 15 Percent of span.

Figure 12. - Continued.



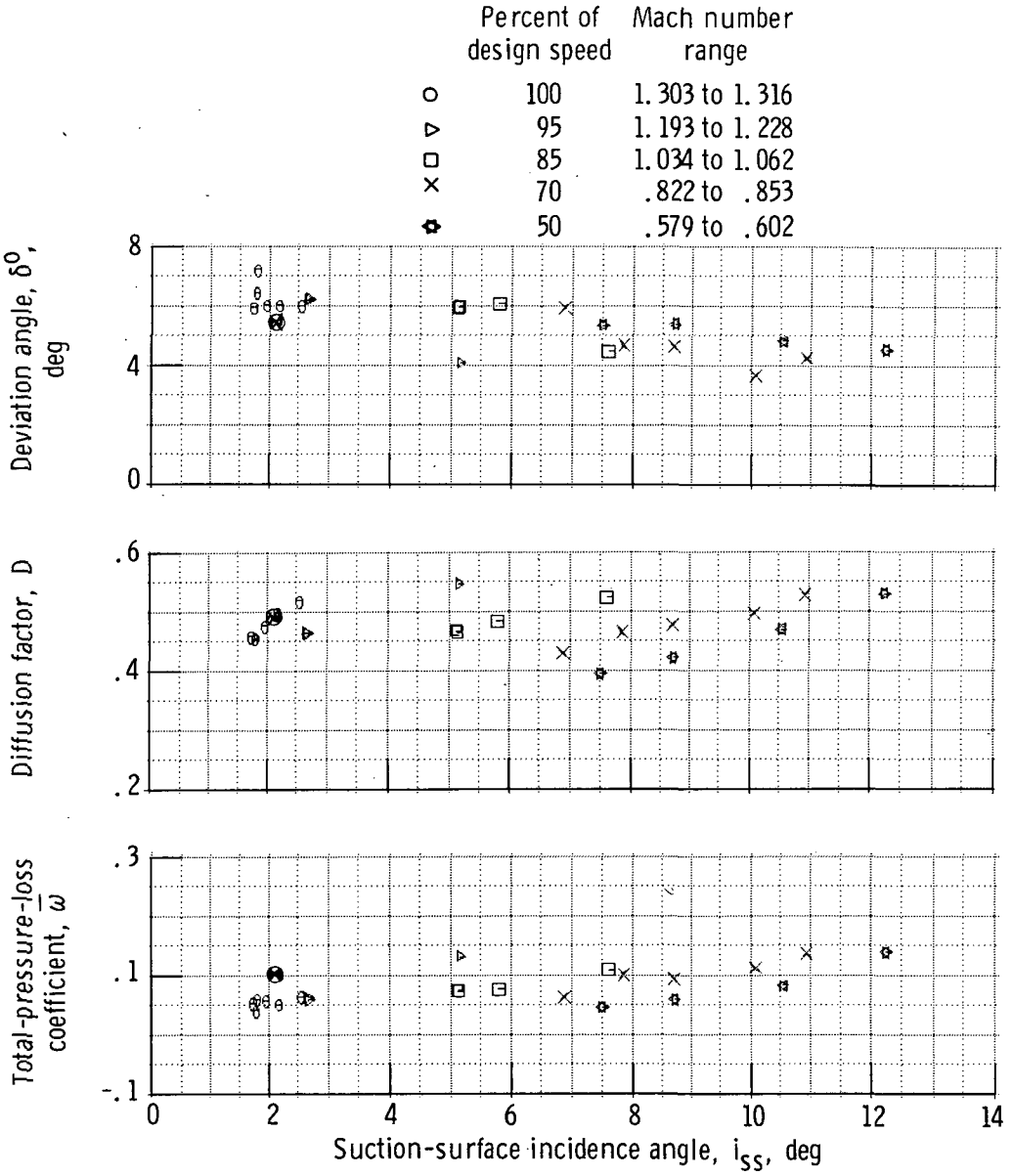
(d) 30 Percent of span.

Figure 12. - Continued.



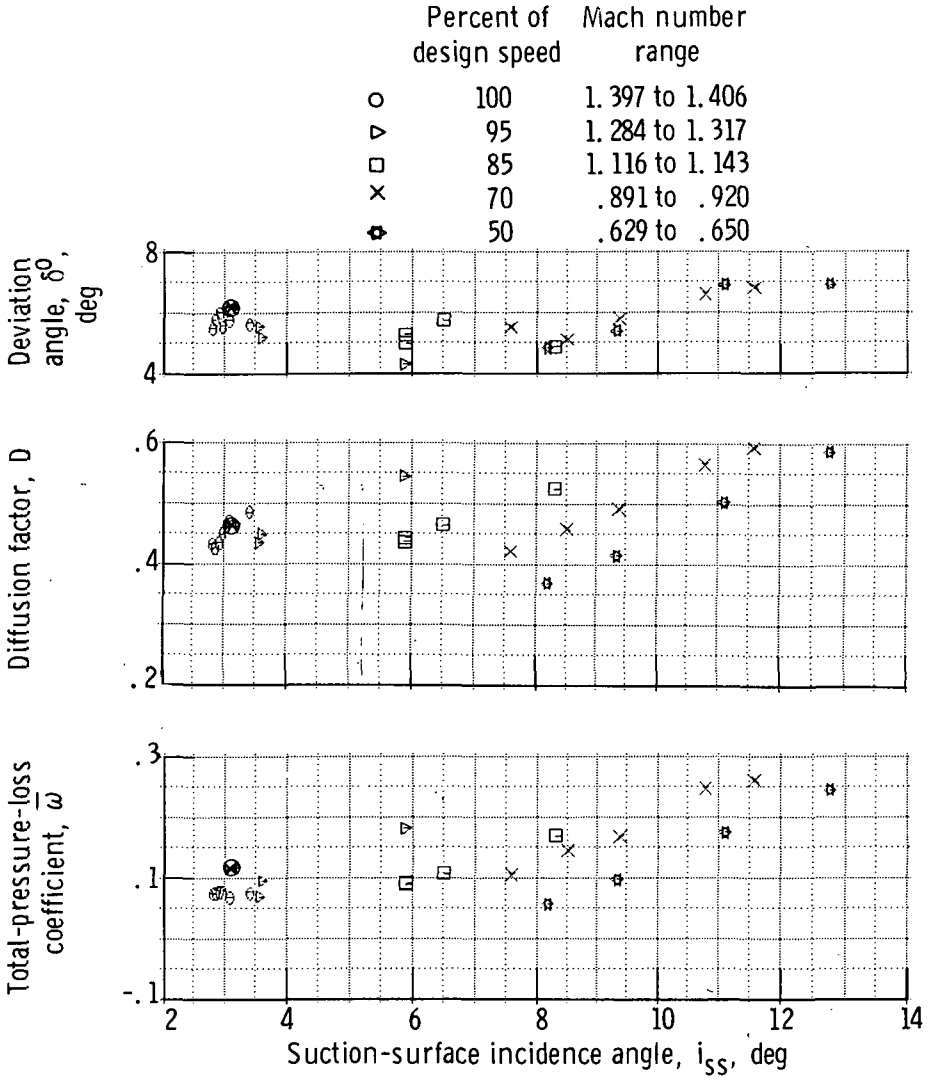
(e) 50 Percent of span.

Figure 12. - Continued.



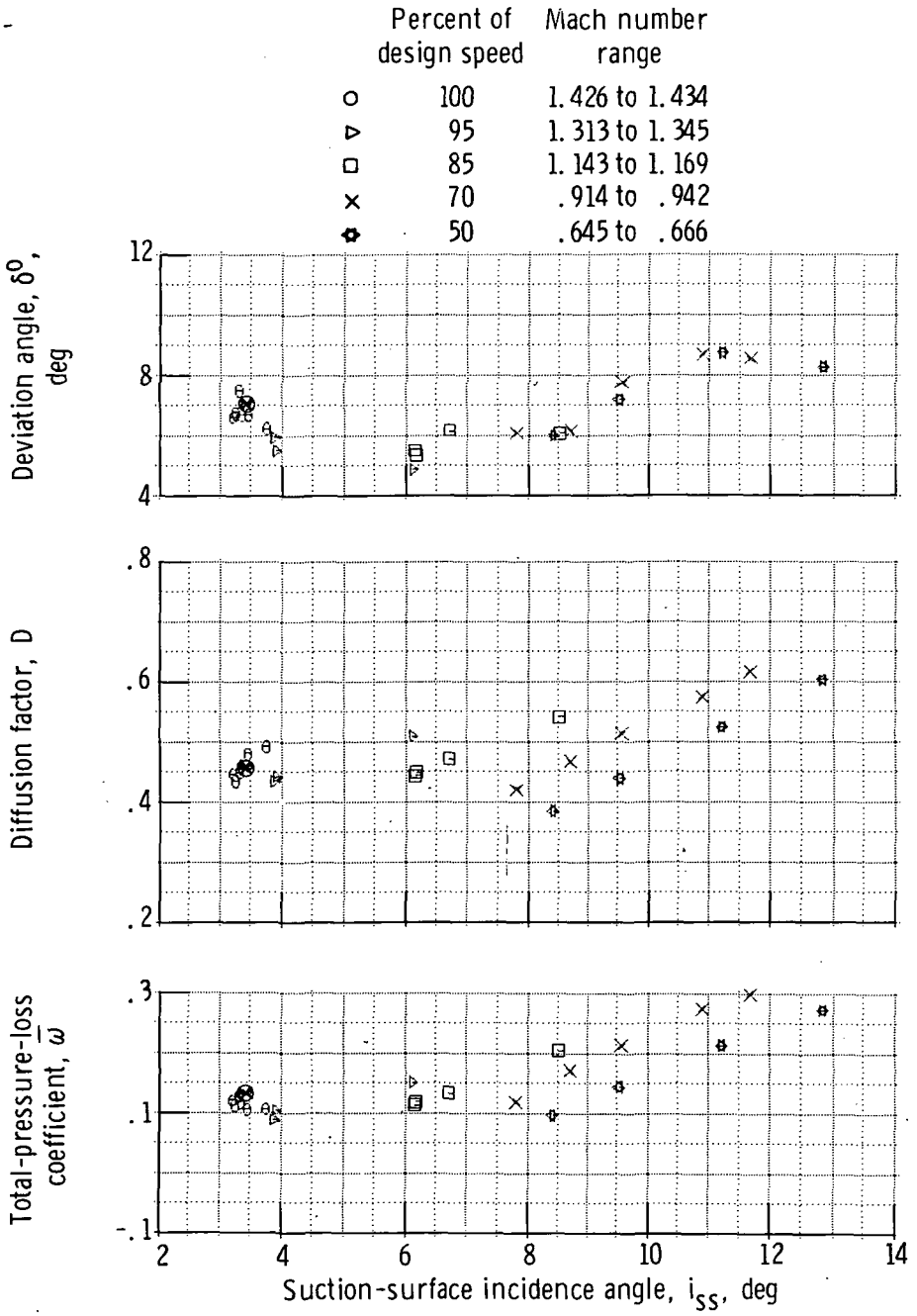
(f) 70 Percent of span.

Figure 12. - Continued.



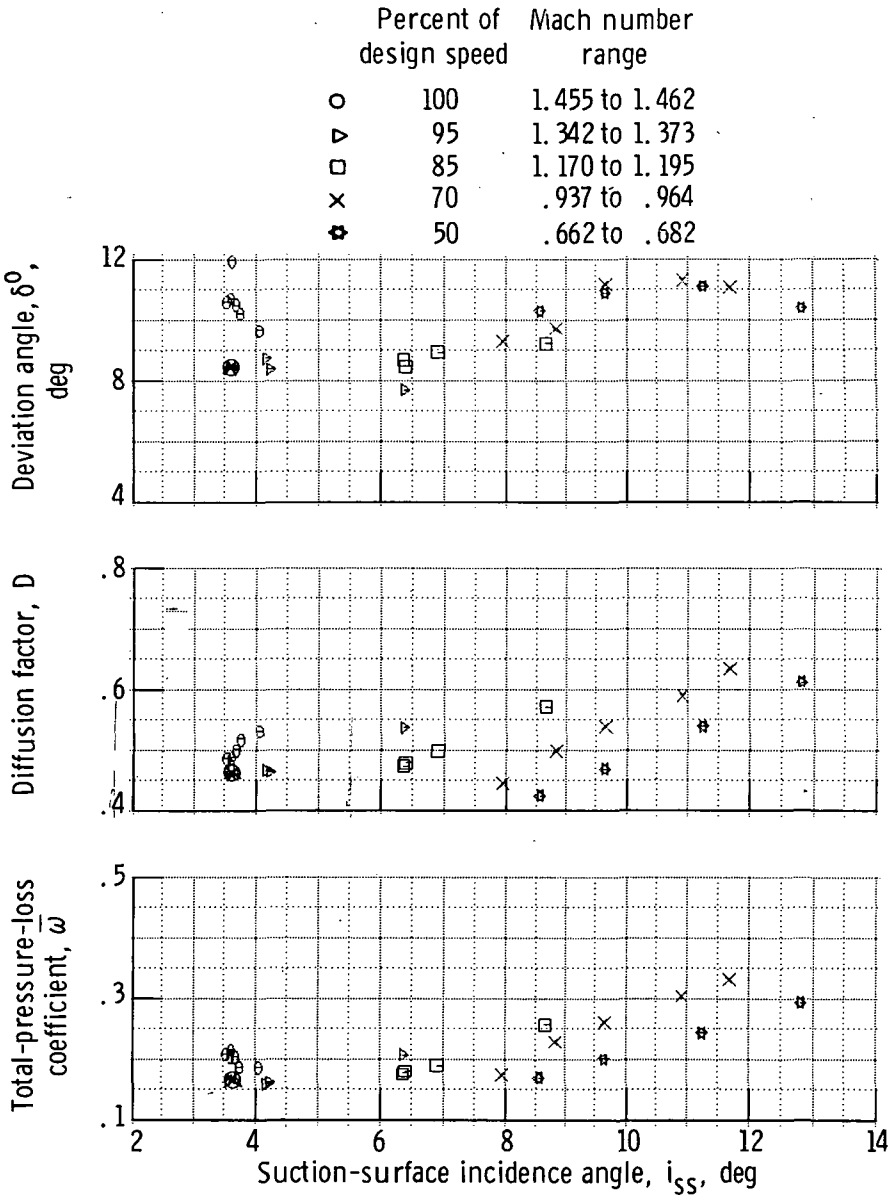
(g) 85 Percent of span.

Figure 12. - Continued.



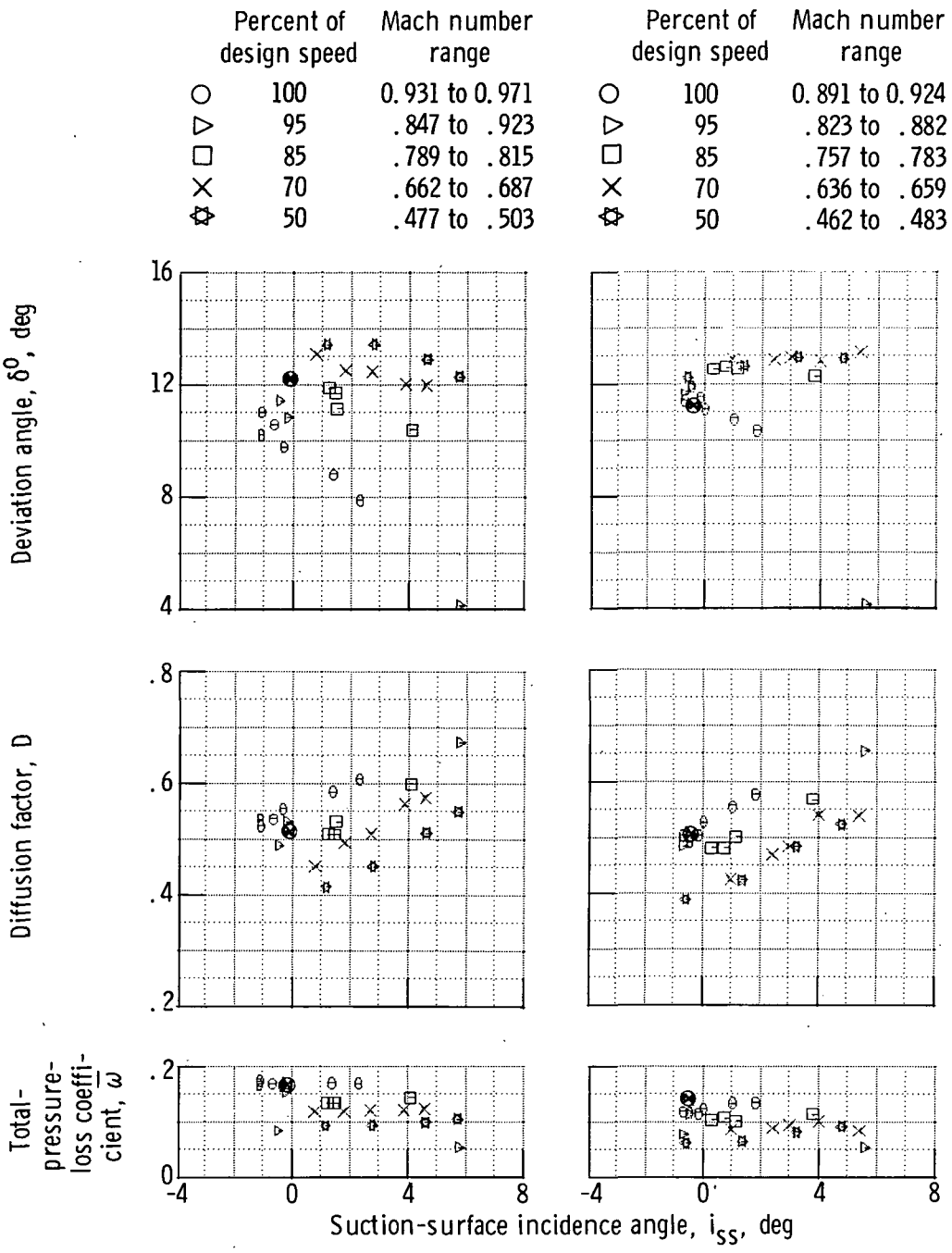
(h) 90 Percent of span.

Figure 12. - Continued.



(i) 95 Percent of span.

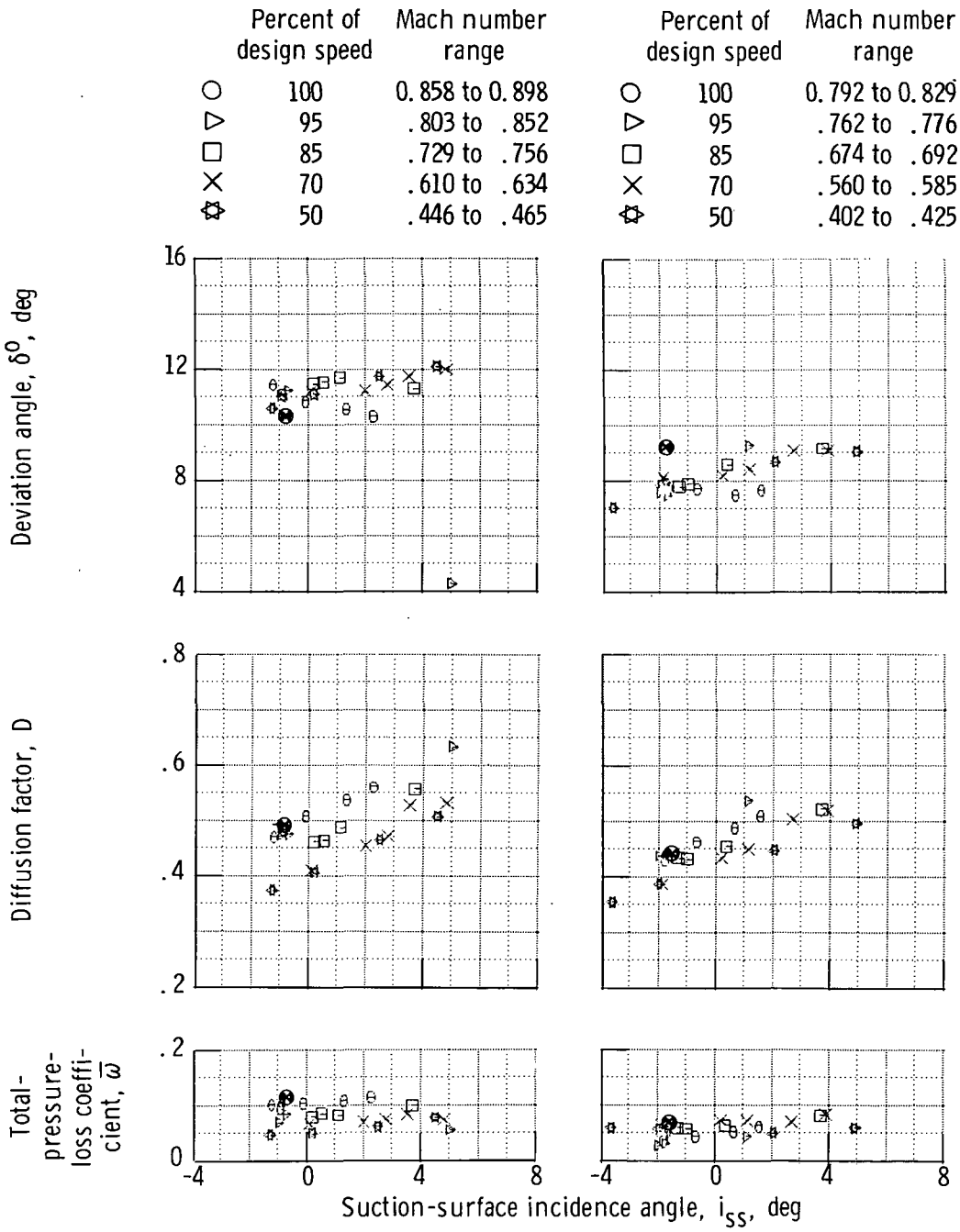
Figure 12. - Concluded.



(a) 5 Percent of span (from hub).

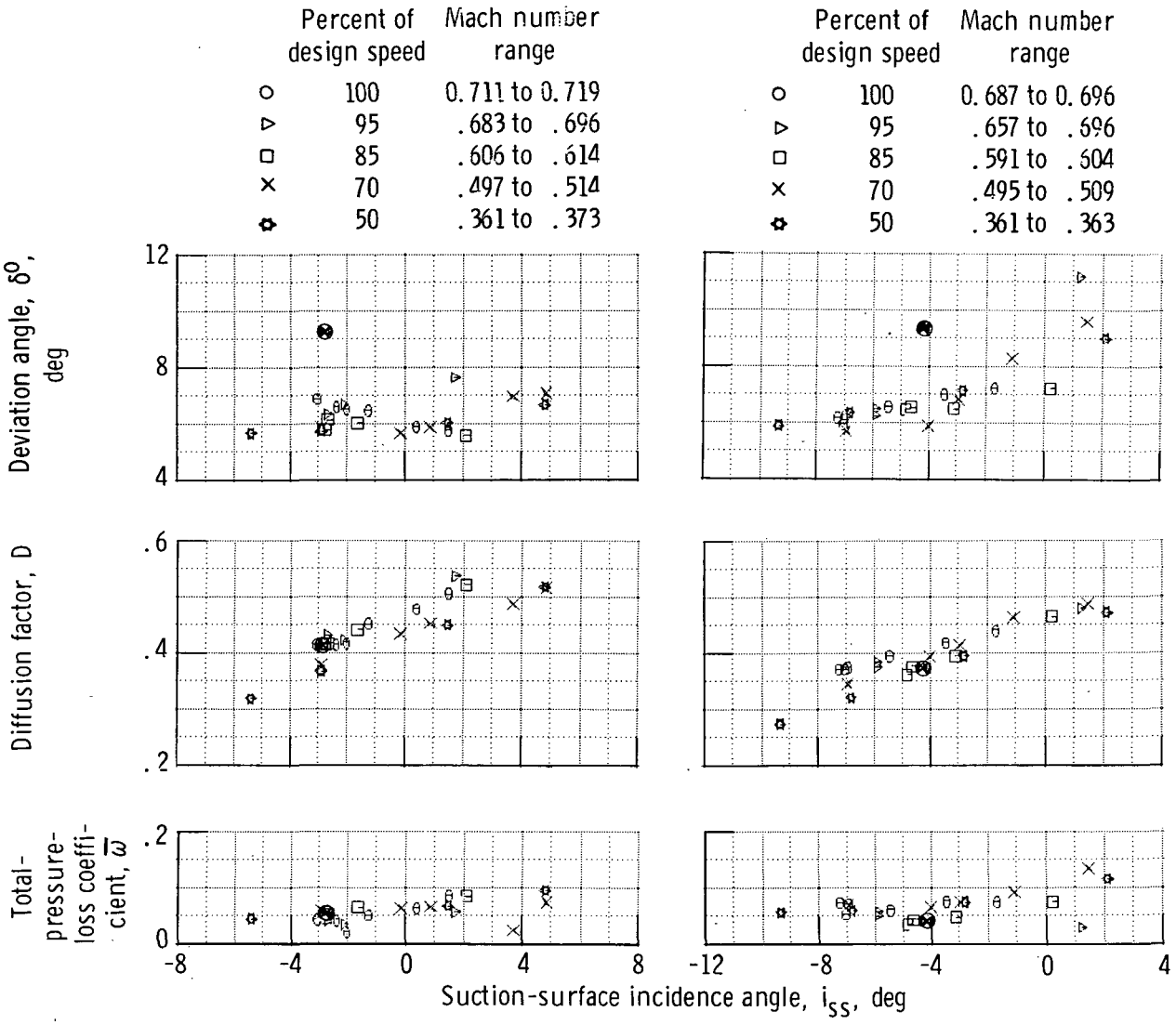
(b) 10 Percent of span.

Figure 13. - Blade-element performance data - stator 1.



(c) 15 Percent of span. (d) 30 Percent of span.

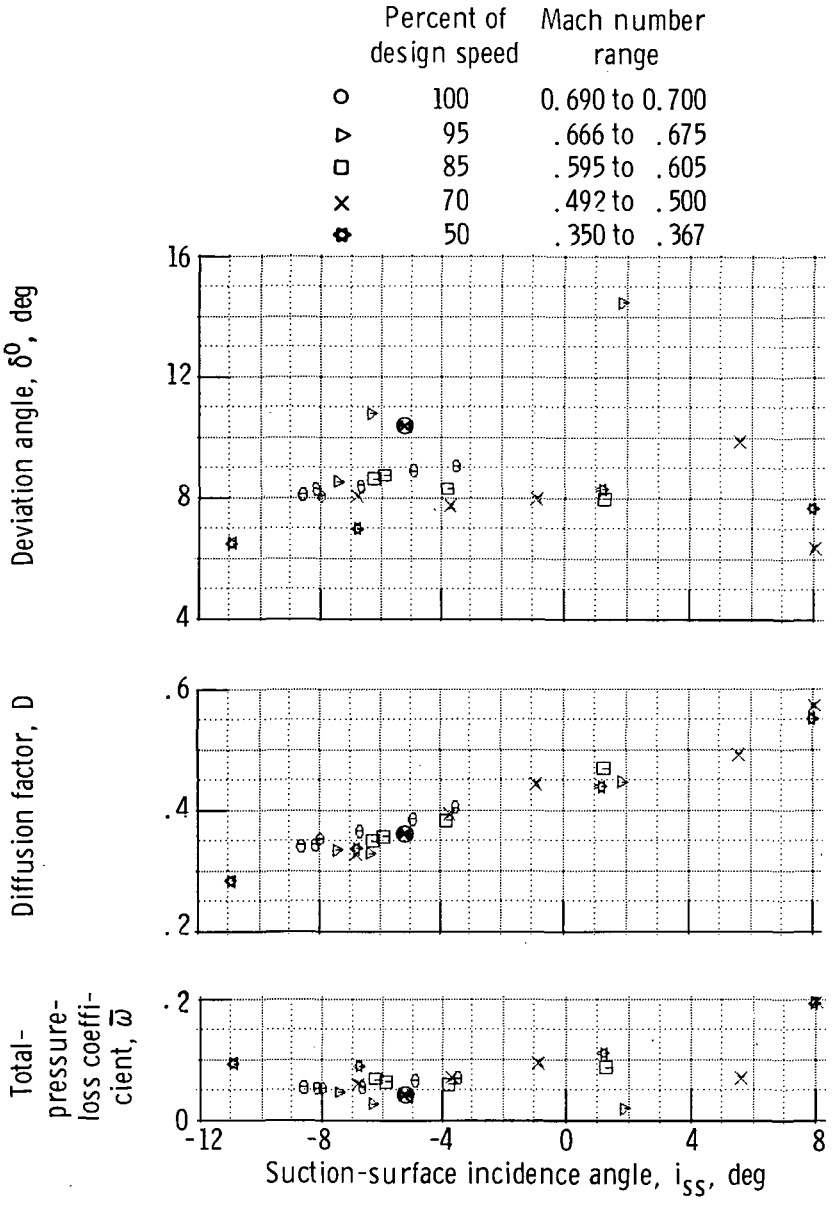
Figure 13. - Continued.



(e) 50 Percent of span.

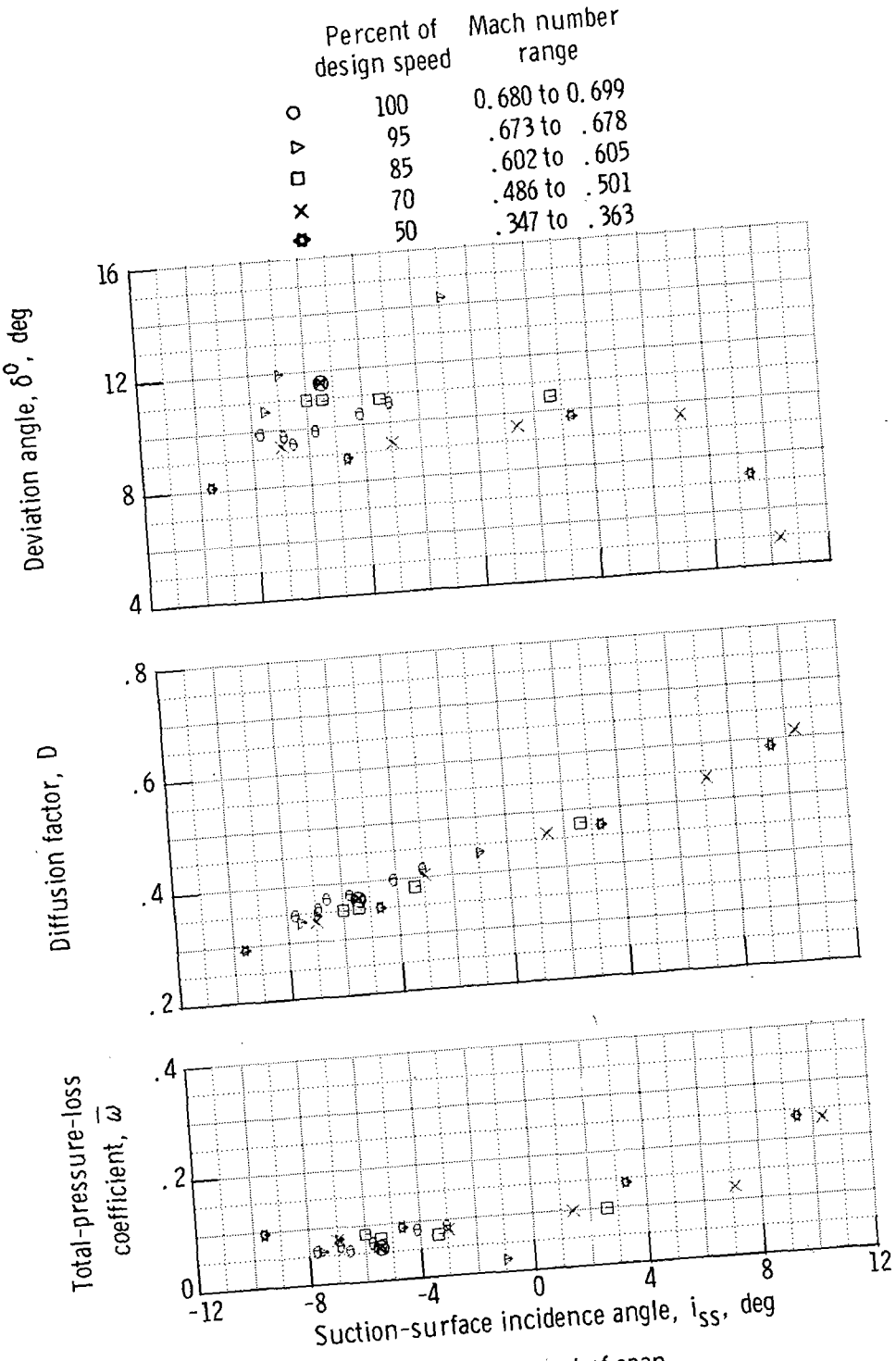
(f) 70 percent of span.

Figure 13. - Continued.



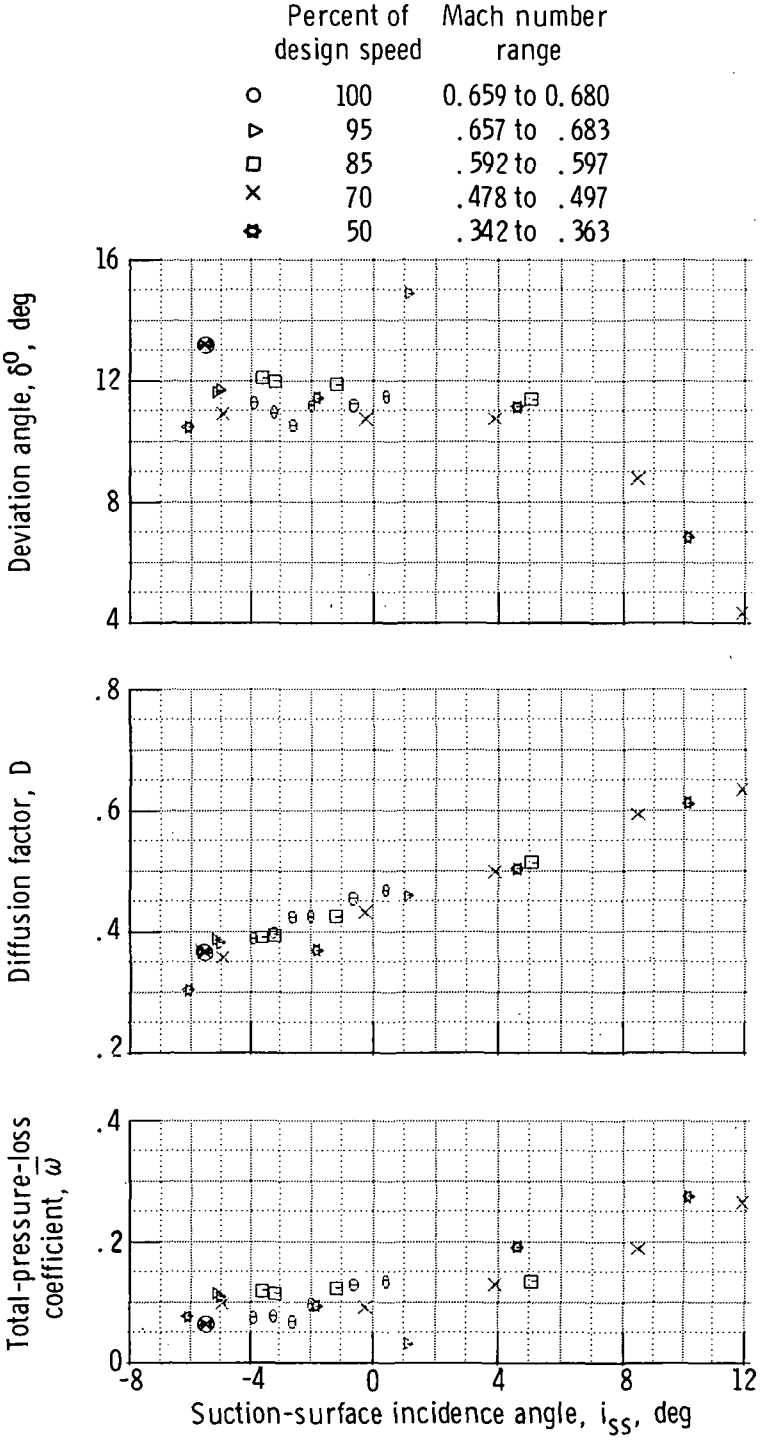
(g) 85 Percent of span.

Figure 13. - Continued.



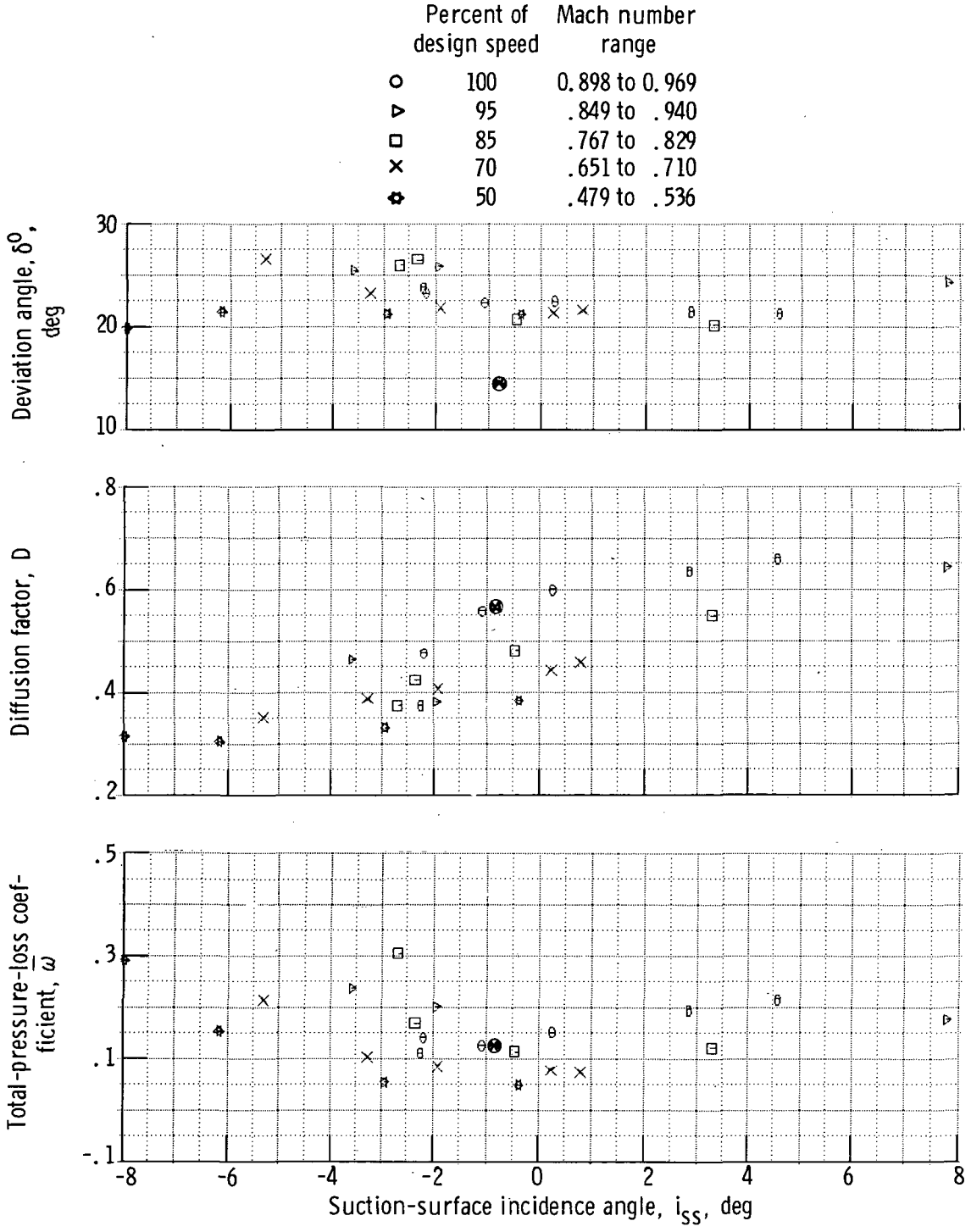
(h) 90 Percent of span.

Figure 13. - Continued.



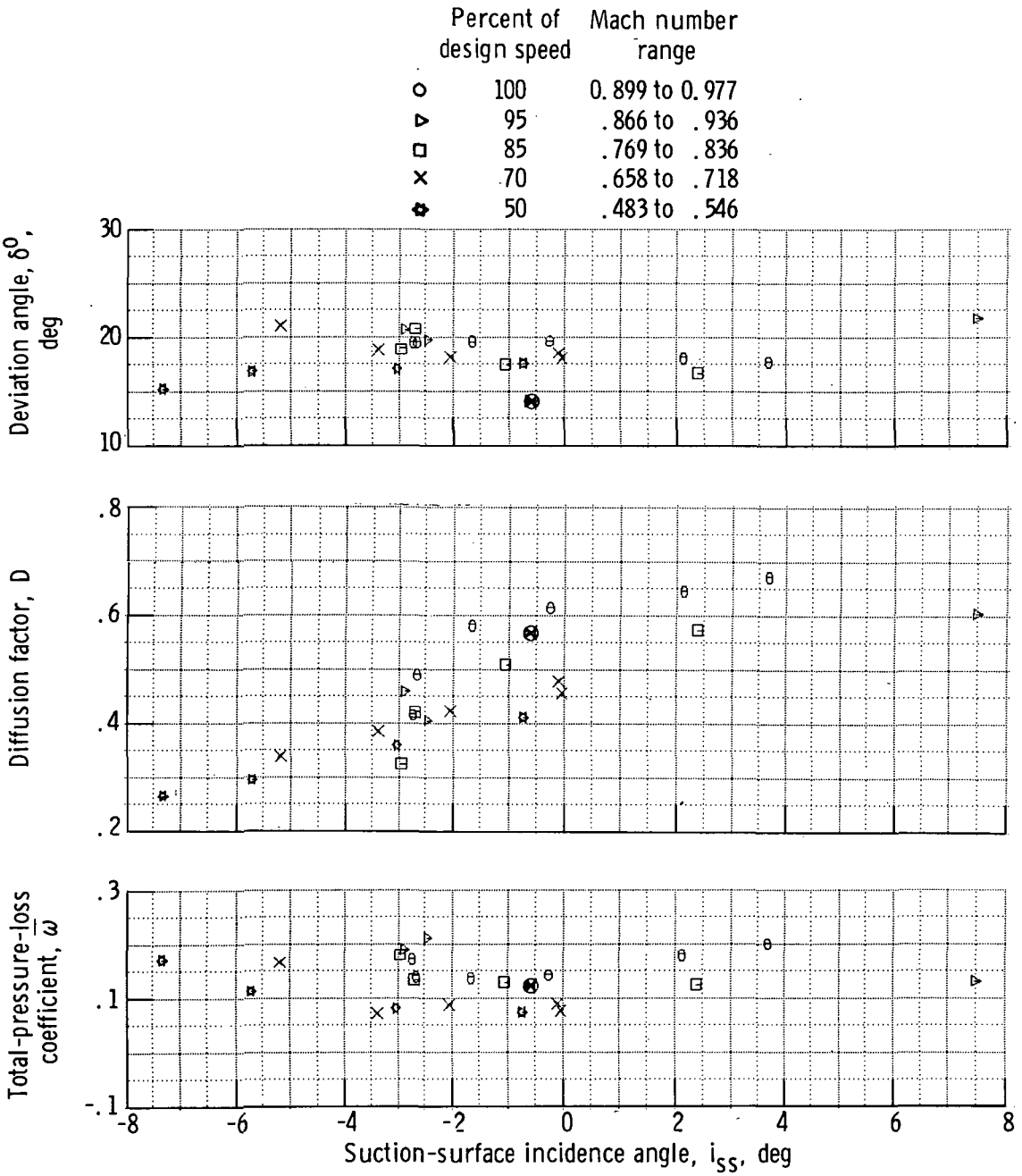
(i) 95 Percent of span.

Figure 13. - Concluded.



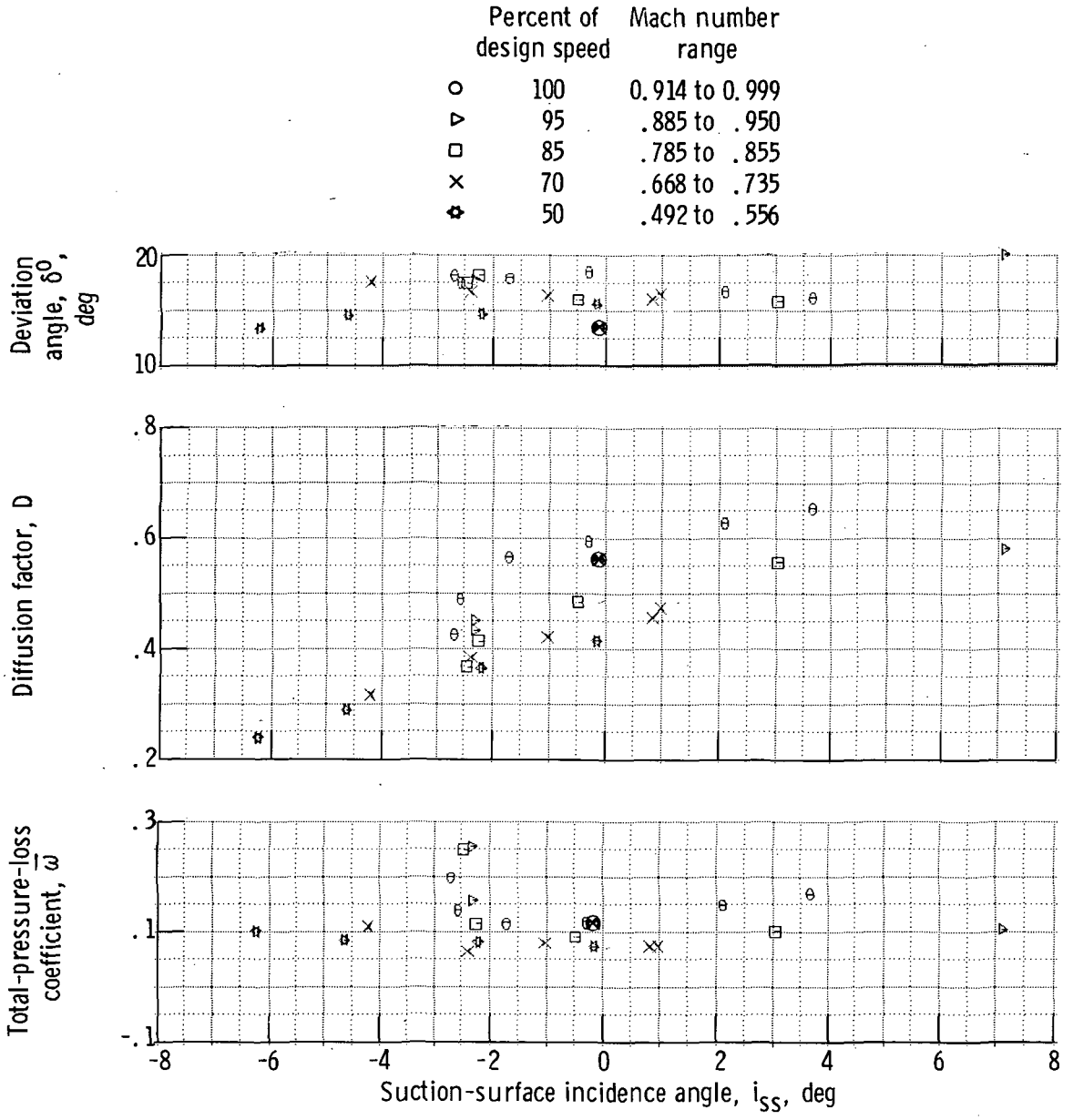
(a) 5 Percent of span (from hub).

Figure 14. - Blade-element performance data - rotor 2.



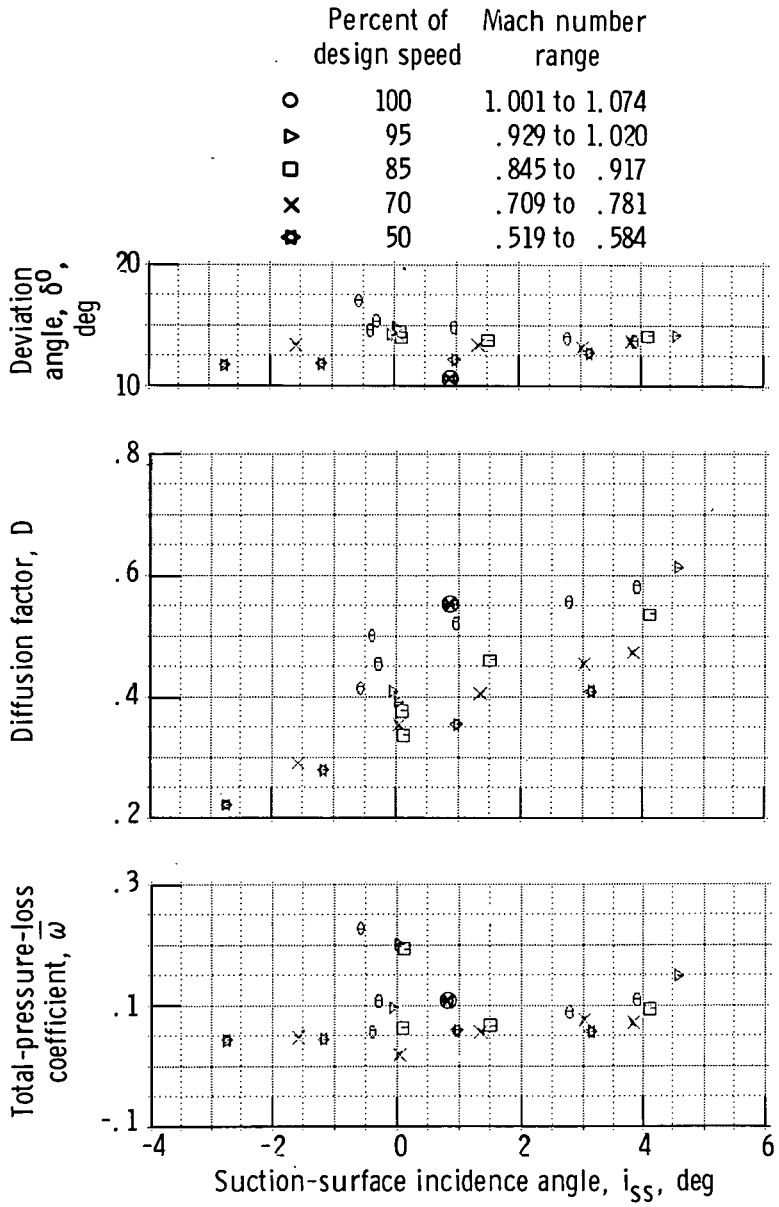
(b) 10 Percent of span.

Figure 14. - Continued.



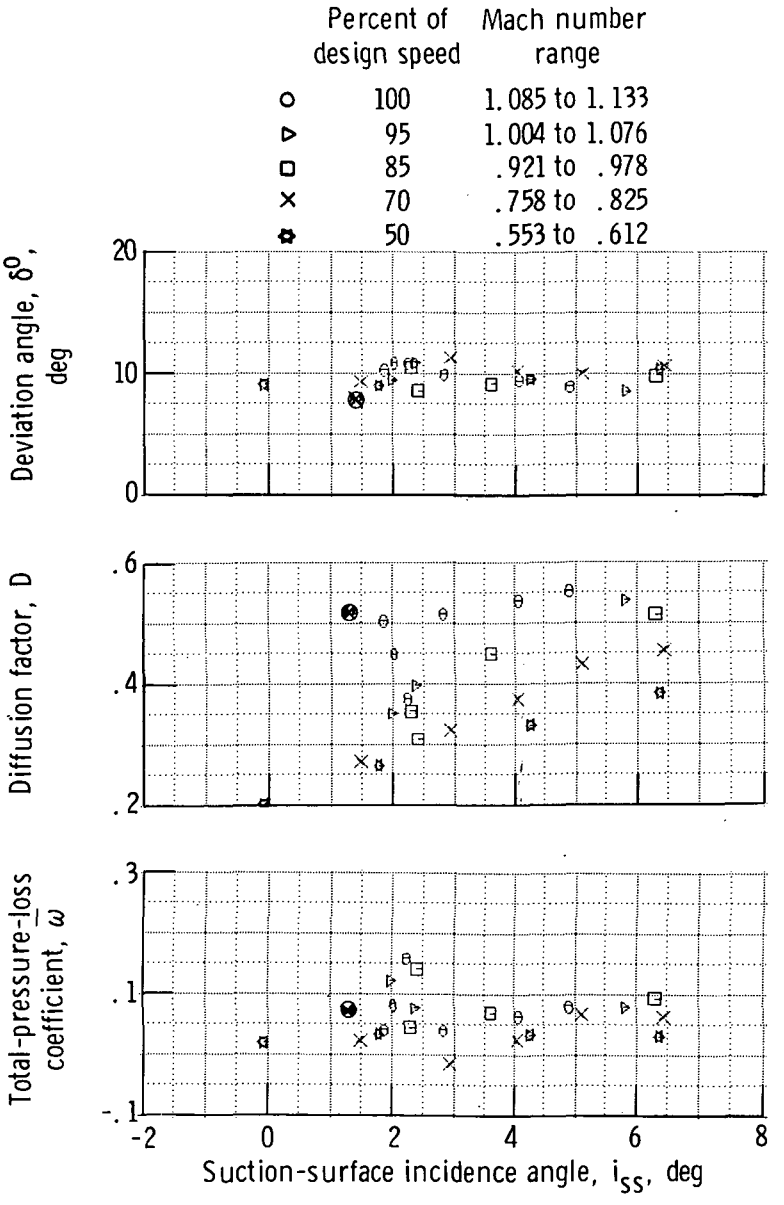
(c) 15 Percent of span.

Figure 14. - Continued.



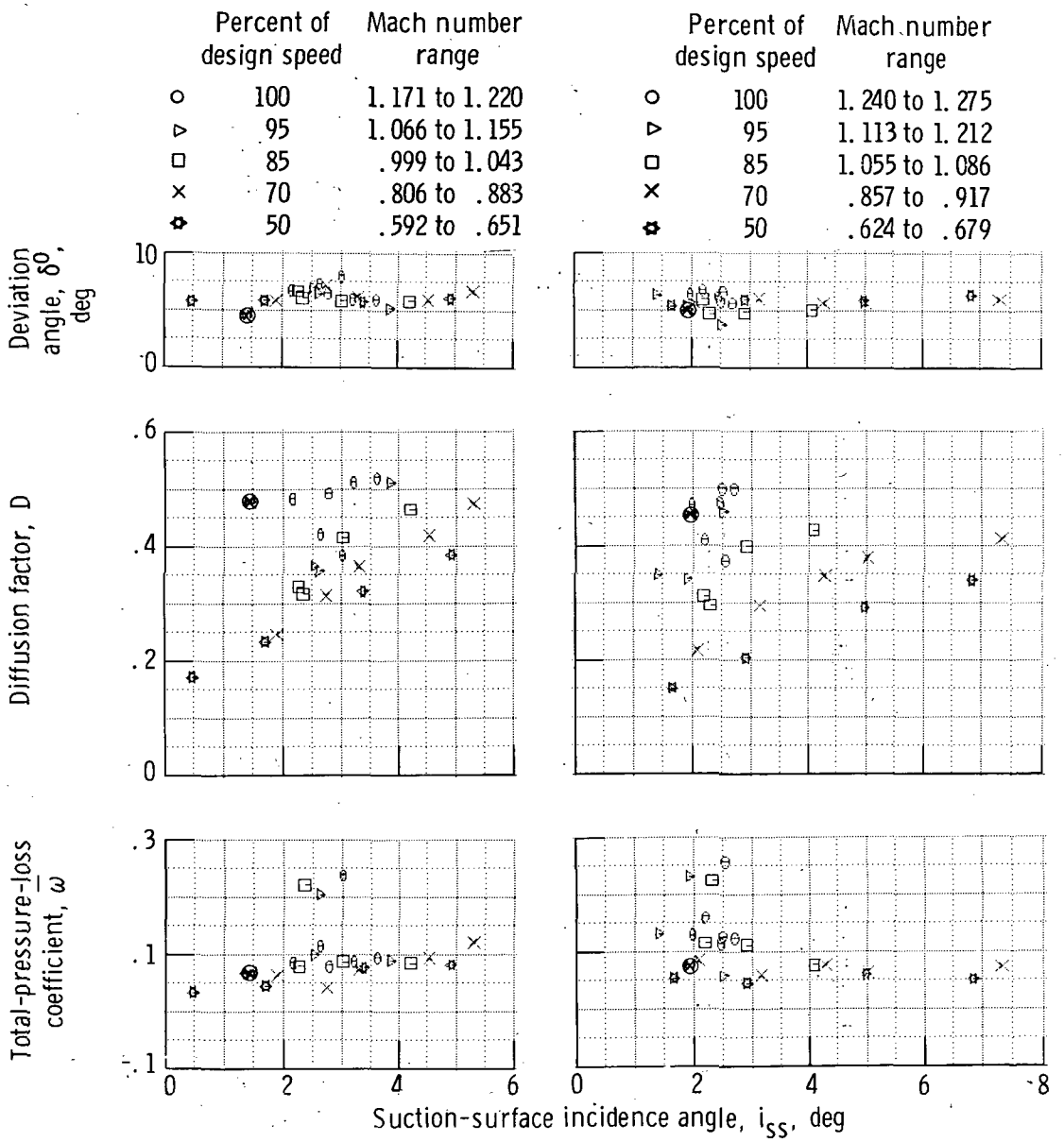
(d) 30 Percent of span.

Figure 14. - Continued.



(e) 50 Percent of span.

Figure 14. - Continued.



(f) 70 Percent of span.

(g) 85 Percent of span.

Figure 14. - Continued.

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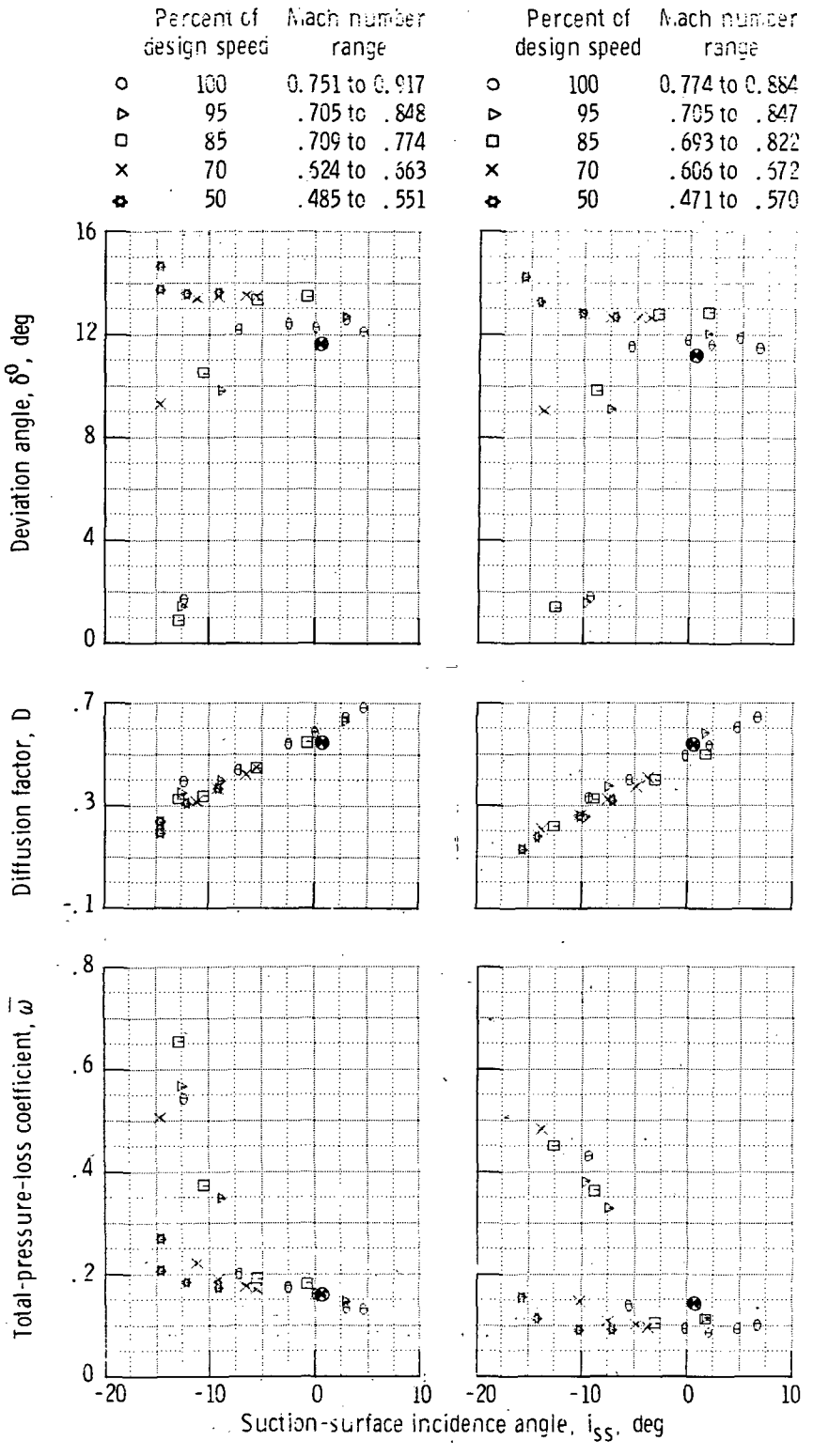
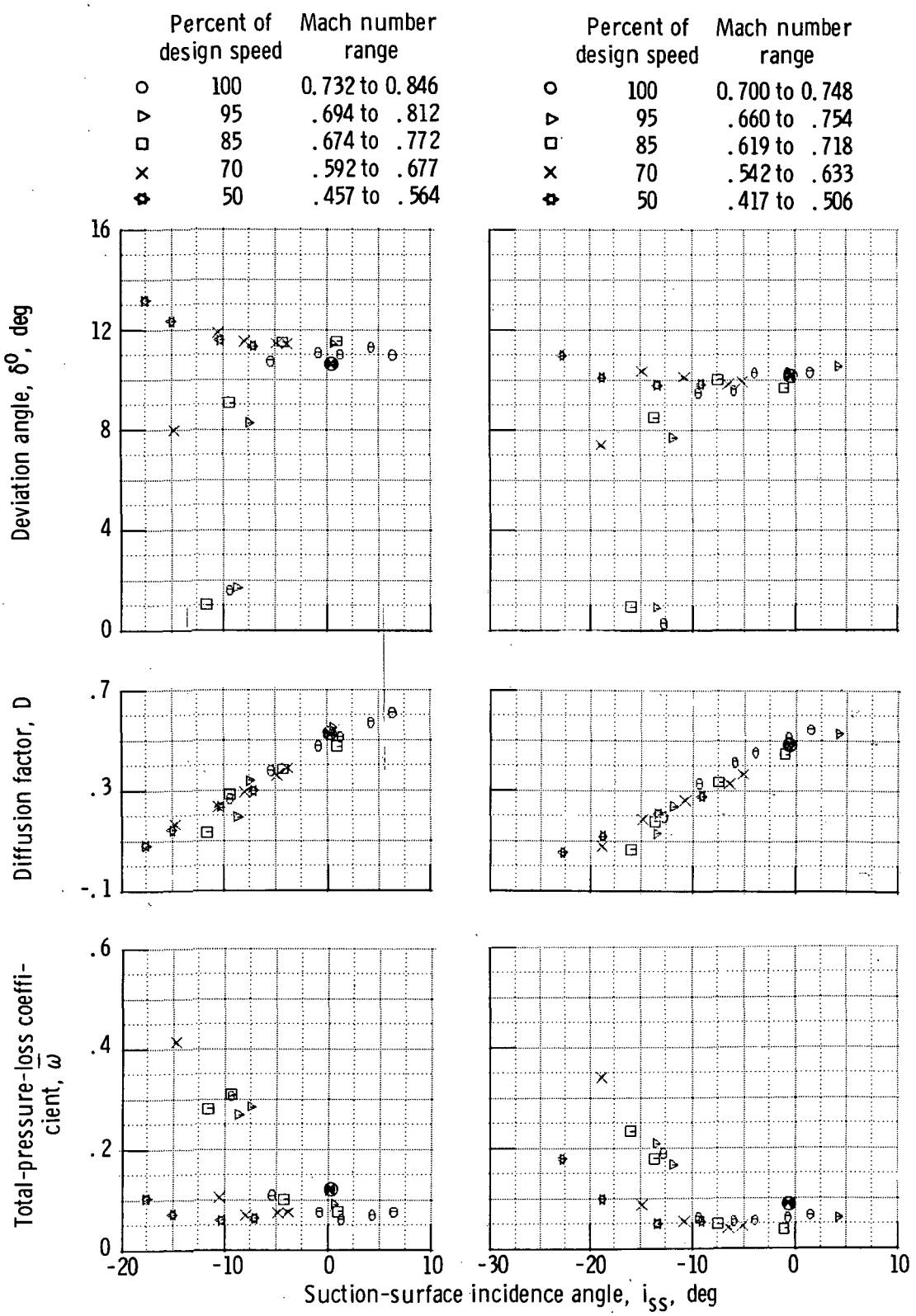


(a) 5 Percent of span (from hub).

(b) 10 Percent of span.

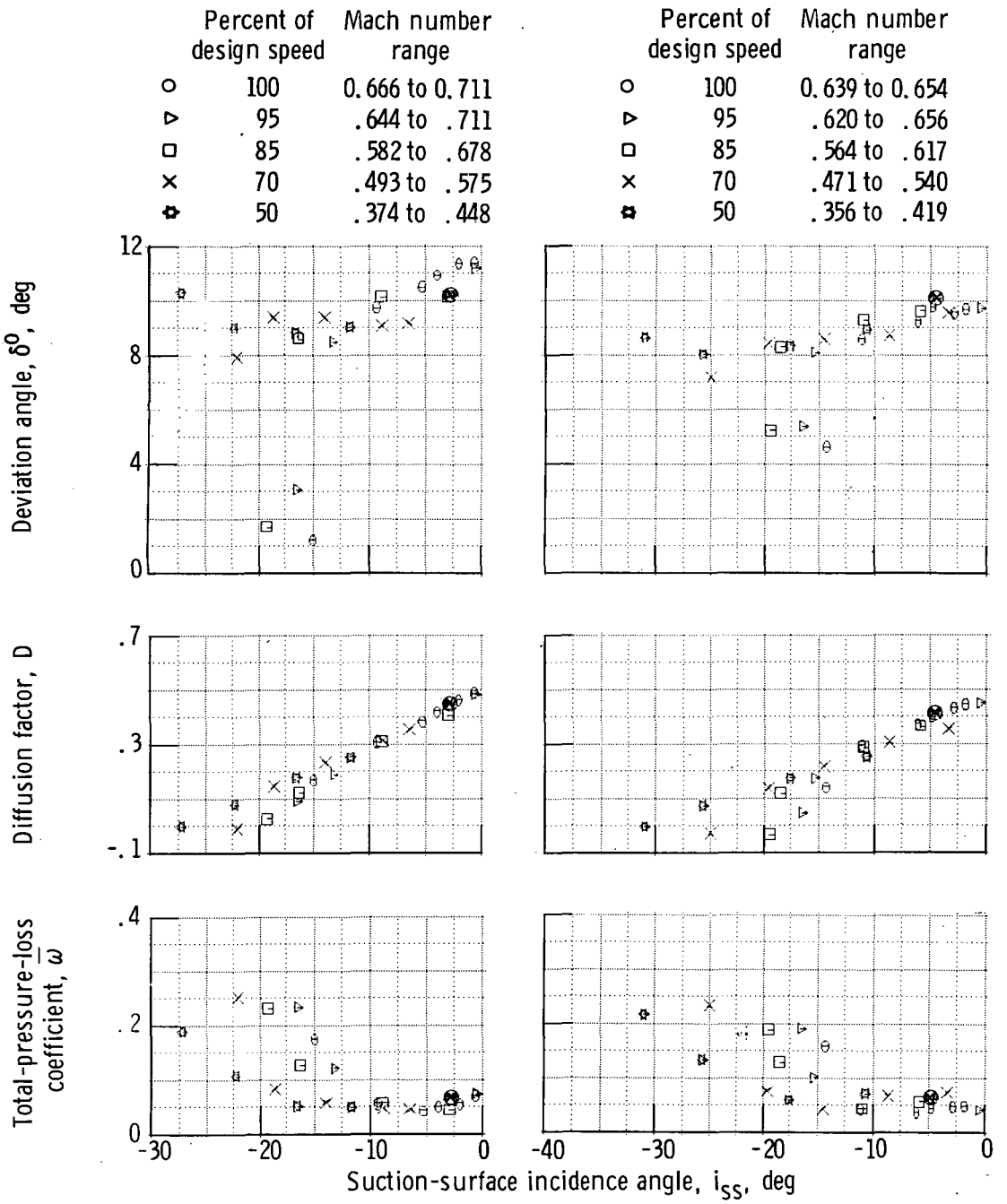
Figure 15. - Blade-element performance data - stator 2.



(c) 15 Percent of span.

(d) 30 Percent of span.

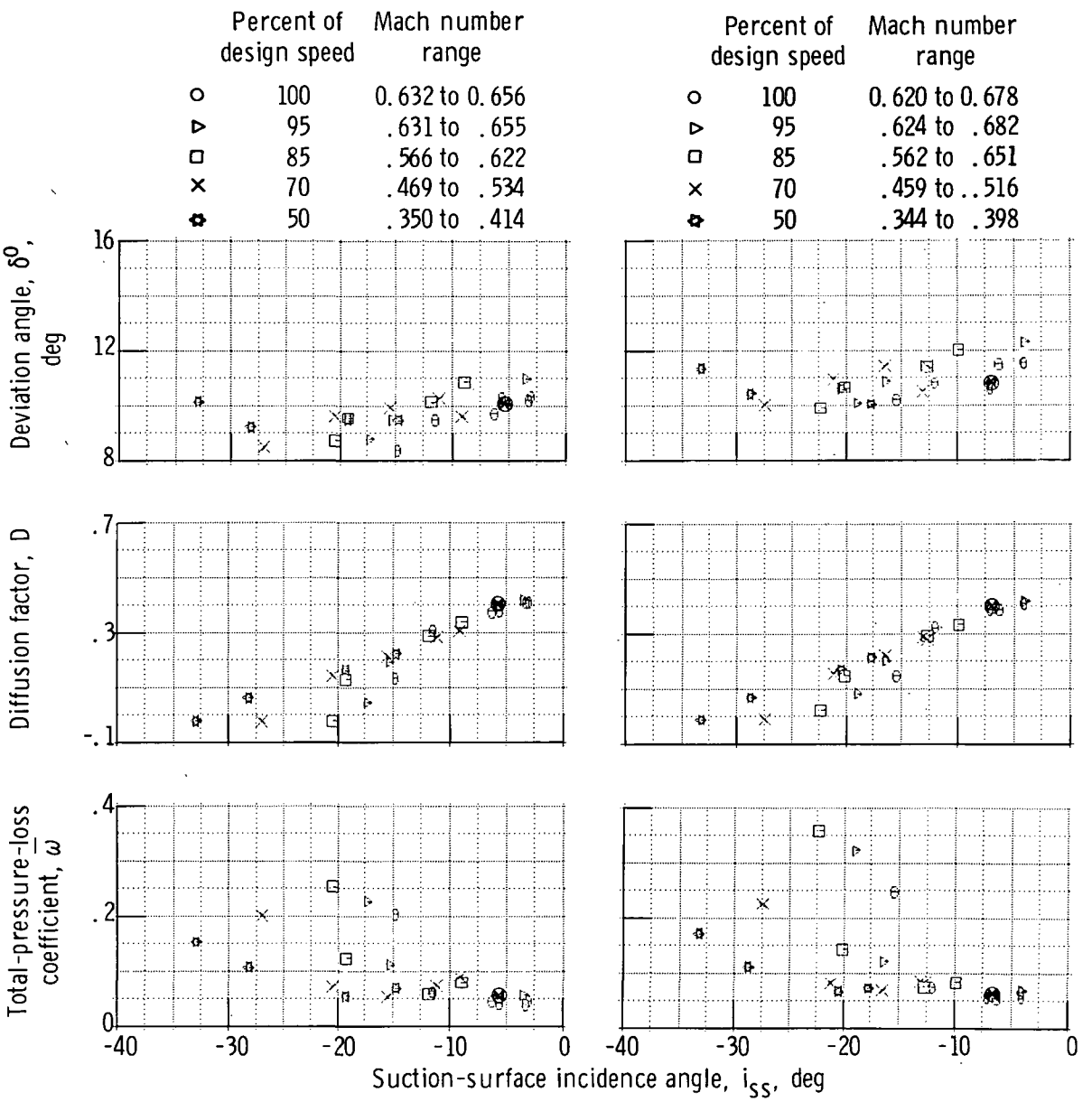
Figure 15. - Continued.



(e) 50 Percent of span.

(f) 70 Percent of span.

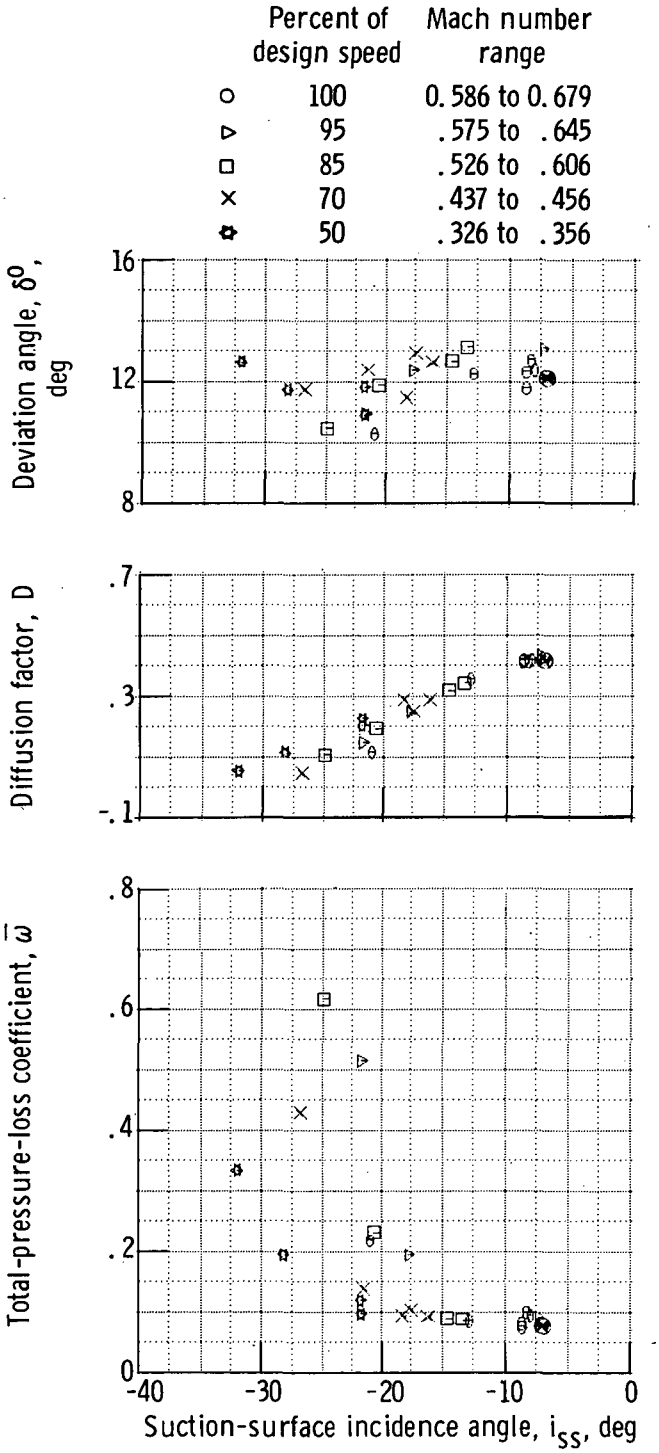
Figure 15. - Continued.



(g) 85 Percent of span.

(h) 90 Percent of span.

Figure 15. - Continued.



(i) 95 Percent of span.

Figure 15. - Concluded.

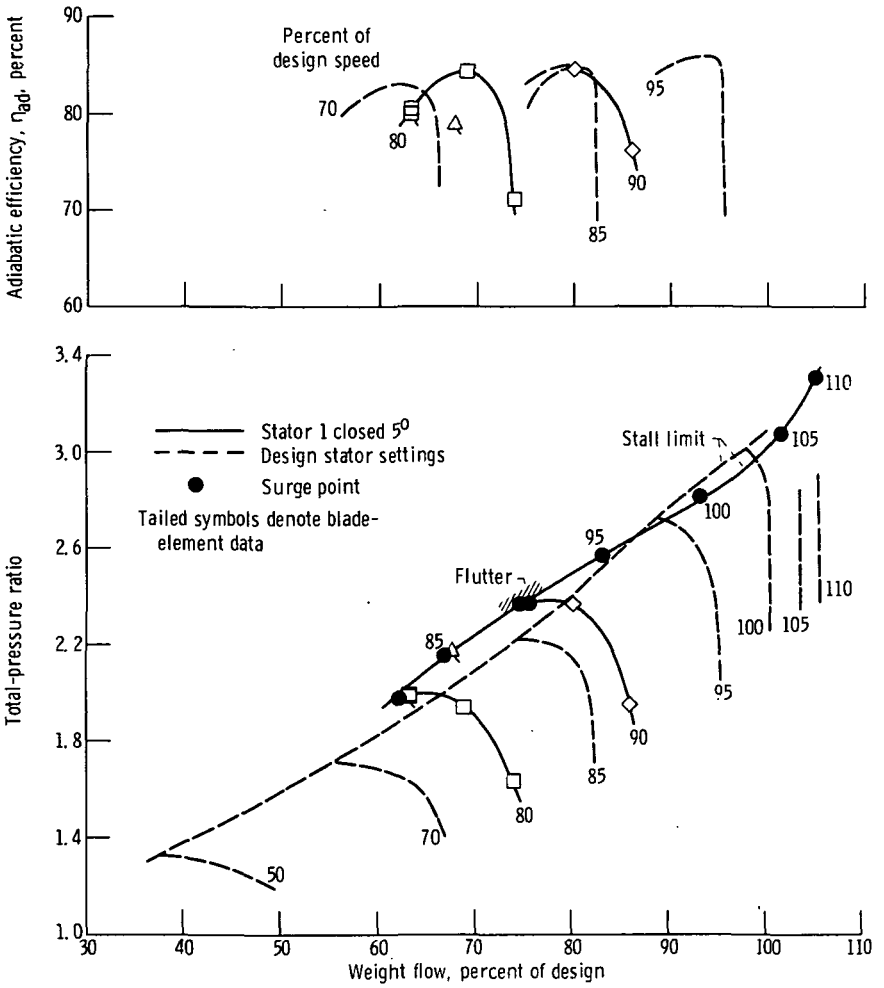


Figure 16. - Fan overall performance with first stator closed 5° from design.

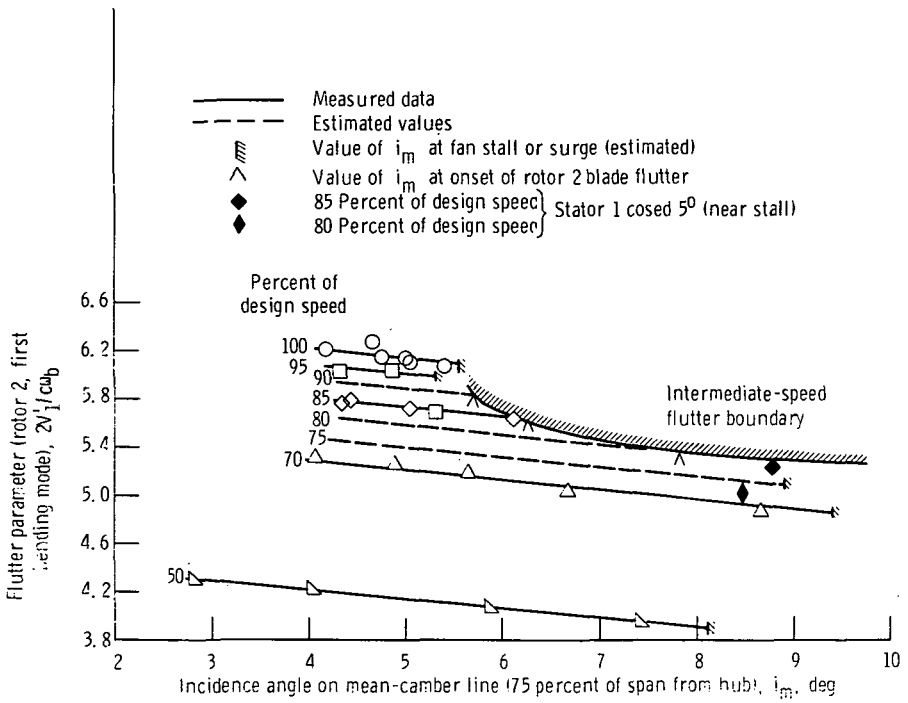


Figure 17. - Rotor 2 blade flutter boundaries.

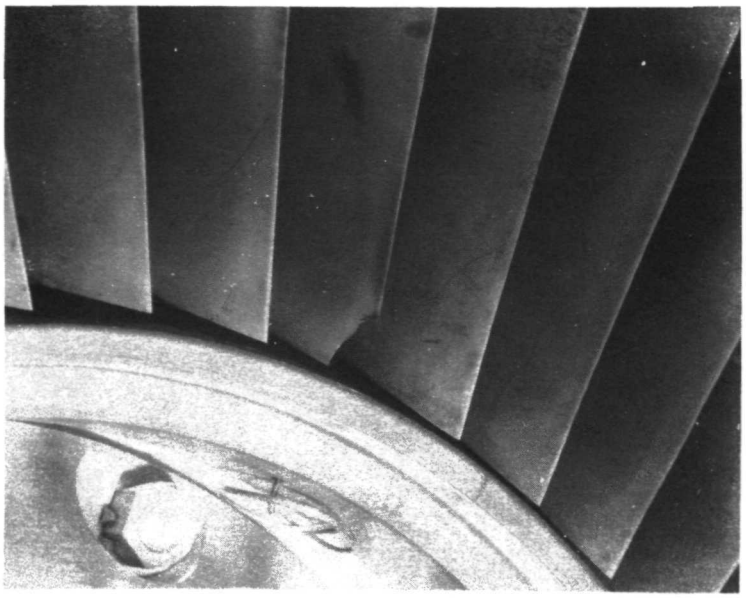


Figure 19. - Portion of second-stator assembly showing damaged vane.

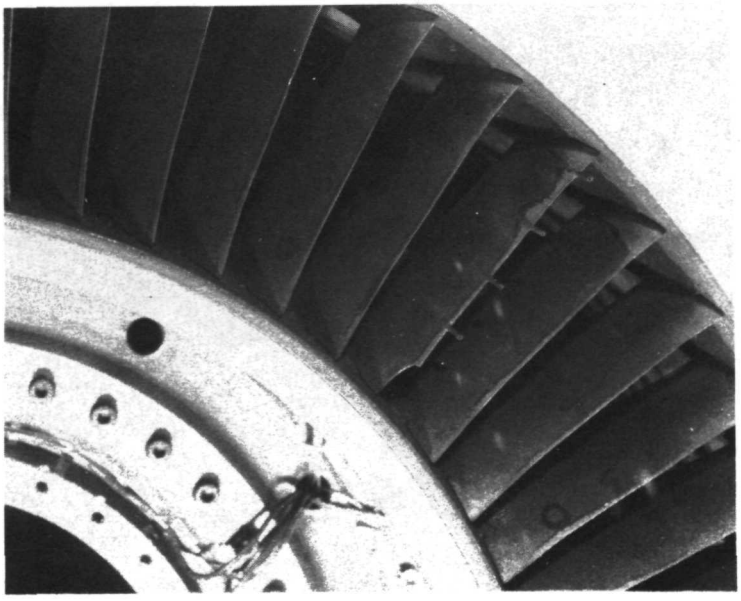


Figure 18. - Portion of first stator assembly showing damaged vane.

"The aeronautical and space activities of the United States shall be conducted so as to contribute . . . to the expansion of human knowledge of phenomena in the atmosphere and space. The Administration shall provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof."

—NATIONAL AERONAUTICS AND SPACE ACT OF 1958

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