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PERFORMANCE OF LOW-PRESSURE-RATIO LOW-TIP-SPEED FAN STAGE WITH BLADE TIP SOLIDITY OF 0.65

George Kovich and Ronald J. Steinke

Lewis Research Center
Cleveland, Ohio 44135

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16. Abstract

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PERFORMANCE OF LOW-PRESSURE-RATIO LOW-TIP-SPEED FAN STAGE WITH BLADE TIP SOLIDITY OF 0.65

by George Kovich and Ronald J. Steinke

Lewis Research Center

SUMMARY

The overall and blade-element performance of a low-pressure-ratio, low-blade-tip-speed fan compressor stage is presented. Detailed radial and circumferential (behind stator) surveys of the flow conditions were made over the stable operating range at rotative speeds from 90 to 120 percent of design speed. Stage peak efficiency of 0.927 was obtained at a pressure ratio of 1.134 and a weight flow of 32.4 kilograms per second (190.31 kg/sec/m^2 of annulus area). Design weight flow is 29.94 kilograms per second with a pressure ratio of 1.151 and an efficiency of 0.865. Stall margin at design speed and peak efficiency was 15.3 percent.

Rotor blade losses were higher than design in the middle portion of the blade span and less than design at the tip and hub. Stator losses were higher than design at the tip and hub but were much lower than design in the middle portion of the blade span. The diffusion factor of both rotor and stator were less than design values over most of the blade spans.

Rotor suction surface incidence angles corresponding to minimum losses varied from 0° to 5° more negative than design values. Stator suction surface incidence angles were 0° to 8° less than the design values. At design incidence, rotor deviation angles were within $\pm 3^\circ$ of design values. Stator deviation angles were as much as 5° higher than design in the tip and hub regions of the blade span.

The dip in total pressure ratio and efficiency at design weight flow may be associated with the forward movement of the flow separation point on the rotor blade suction surface. A rapid movement of the flow separation point over a small portion of the incidence range could result from the combination of high negative incidence angles, relatively thick blade sections in the midspan region and high camber on the suction surface.

INTRODUCTION

The Lewis Research Center of the National Aeronautics and Space Administration is engaged in a research program on axial-flow fans and compressors for advanced air-breathing engines. The program is directed primarily towards providing the technology to permit reducing the size and weight of the fans and compressors while maintaining a high level of performance.

NASA is currently engaged in investigating short-haul-type aircraft for commercial application. The aircraft must have an efficient and reliable propulsion system which satisfies the low noise requirement for urban communities. These aircraft engines must also be capable of operating over a wide range of conditions from takeoff, cruise, and approach to thrust reversal after landing.

In support of the program, the Lewis Research Center is investigating a number of fan stages suitable for short haul aircraft propulsion systems.

These low pressure ratio stages operate at low tip speeds to meet the required low noise level. Adjustable rotor blades may be required to provide the varied flight demands and reverse thrust after landing.

The performance for one of the fans (stage 51A) in the series is presented in reference 1. The 12-bladed, 50.8-centimeter-diameter fan was designed for a stage pressure ratio of 1.151 at a weight flow of 29.94 kilograms per second. The design tip speed is 243.8 meters per second. The experimental pressure ratio obtained by stage 51A was considerably less than design. The performance was particularly deficient in the tip region of the rotor blade, probably because of the low blade solidity. Stage 51A was subsequently redesigned to improve the performance with higher solidity (longer blade chords) in the tip region of the rotor blade and increased camber over the entire blade span. Both designs incorporated provisions for manually adjusting the rotor blade setting angle.

This report presents the design and aerodynamic performance for the redesigned fan stage, designated stage 51B. Design pressure ratio, weight flow, and tip speed are the same as those for stage 51A. Overall performance for both the rotor and stage along with blade-element performance for both rotor and stator are presented for the design setting angle. The data are presented over the stable operating range of the stage from 90 to 120 percent of design speed. Blade-element survey data were obtained at nine radial positions. The tests were conducted in the single-stage compressor test facility at Lewis Research Center.

FAN STAGE DESIGN

Fan stage 51B is a revised design of fan stage 51A based on the experimental results obtained with stage 51A. Fan stage 51A included acoustic considerations in its design procedure (ref. 1) which resulted in a compromising of the aerodynamic parameters. Fan stage 51B was designed primarily for aerodynamic and mechanical parameters but did retain some of the acoustic design features from stage 51A. The main differences in the design of the two fan rotors were: (1) increased blade chords for stage 51B to obtain better flow guidance, (2) increased blade camber for stage 51B to obtain greater energy input, (3) the experimental distribution of deviation angle for stage 51A was used in the design of stage 51B, and (4) lower blade loading (diffusion factor) from the blade midspan to the blade tip for stage 51B. The changes in these parameters from those of stage 51A were such that the acoustic performance of stage 51B was not expected to be much different from that of stage 51A.

The overall design parameters for fan stage 51B are listed in table I and are nearly identical to those for fan stage 51A. Both stages used the same flow path, which is shown in figure 1, and the same stators. Fan stage 51B was designed for an overall pressure ratio of 1.151 at a weight flow of 29.9 kilograms per second (175.8 kg/sec/m^2 of annulus area). The tip speed was 243.8 meters per second. There are 12 rotatable rotor blades with a tip solidity of 0.65. The hub solidity of 0.96 allows the blade to pass each other through "flat pitch" for reverse thrust applications. The aspect ratio of the rotor blade is 2.9 at the hub. There are 32 stator blades with a hub solidity of 2.35 and an aspect ratio of 3.1.

AERODYNAMIC DESIGN

Three computer programs were used in the design of fan stage 51B. These programs are the streamline analysis program, the blade geometry program, and the blade coordinate program. These three computer programs are presented in detail in references 2 and 3; and only a brief description of each is presented in this report.

The streamline analysis program was used to calculate the flow-field parameters at several axial locations, including planes approximating the blade leading and trailing edges for both the rotor and the stator. The weight flow, rotative speed, flow-path geometry, and radial distributions of total pressure and temperature are inputs in this program. The program accounts for both streamline curvature and entropy gradients; boundary-layer blockage factors are also included.

The distributions of velocity vector, total pressure, and total temperature calculated in the streamline analysis program are utilized in the blade geometry program to compute blade geometry parameters. The blade-element total loss is calculated

within the program. It is based on a calculated shock loss (as related to the selected blade shape) and a profile loss.

The blade geometry parameters are utilized in the blade coordinates program (ref. 3) to compute blade elements on conical surfaces approximating the stream surfaces passing through the blade. The blade elements are then stacked on a line passing through their centers of gravity. The computed cartesian blade coordinates are used directly in fabrication.

The blade-element design parameters for rotor 51B are presented in table II. The rotor was designed for a pressure ratio of 1.184 at the tip varying quadratically to 1.083 at the hub. The higher tip solidity, 0.65, of rotor 51B was obtained by increasing the aerodynamic chord at the tip 30 percent over that of rotor 51A. The rotor hub thickness to chord ratio is 15 percent less than that of rotor 51A. Blade camber of rotor 51B is increased 4.6° at the tip, 5.8° at the mean blade span, and 4.8° at the hub as compared to rotor 51A.

The stator blade-element design parameters are given in table III. The blade geometry is presented in table IV for rotor 51B and in table V for stator 51. Both the rotor and the stator utilized double-circular-arc blade shapes.

The symbols used in this report are defined in appendix A. The equations used for calculating the overall and blade-element performance parameters are presented in appendix B. All definitions along with units presented in the tables are listed in appendix C.

APPARATUS AND PROCEDURE

Compressor Test Facility

The compressor stage was tested in the Lewis single-stage compressor facility, which is described in detail in reference 2. A schematic diagram of the facility is shown in figure 2. Atmospheric air enters the test facility at an inlet located on the roof of the building and flows through the flow-measuring orifice and into the plenum chamber upstream of the test stage. The air then passes through the experimental compressor stage into the collector and is exhausted to the atmosphere.

Test Stage

The rotor 51B and stator 51 are shown in figures 3 and 4, respectively. The rotor blades are mounted in a split rotor disk with the blades prevented from turning by friction pins in each half of the disk. The compression of the friction pins against the blade

bases is adjustable from the front side of the rotor disk allowing the blade angle to be reset without disassembling the rotor. The ambient nonrotating radial tip clearance of the rotor was a nominal 0.05 centimeter at the stacking line. However, the radial tip clearances at the leading and trailing edges were approximately three times greater due to the convex contour of the blade tip. The blade tips were machined with the rotor blades in the "flat" pitch position to permit rotation of the blades in either direction. The compressor housing has provisions for spacing the stator blade row at 1, 2, and 4 rotor hub mean chord lengths behind the rotor. Figure 1 shows the stator blade row in the two chord-length position for this investigation.

Instrumentation

The compressor weight flow was determined from measurements on a calibrated thin-plate orifice. The temperature at the orifice was measured with two Chromel-constantan thermocouples. Pressures at the orifice were measured by calibrated transducers.

Radial surveys of the flow were made upstream of the rotor, between the rotor and stator, and downstream of the stator (fig. 5). The survey probes are shown in figure 6. Total pressure, total temperature, and flow angle were measured with the combination probe (fig. 6(a)), and static pressure was measured with an 8° C-shaped wedge probe (fig. 6(b)). Each probe was positioned with a null-balancing, stream-directional sensitive control system that automatically alined the probe to the direction of the flow. The probes were angularly prealined in an air tunnel. Two combination probes and two wedge static probes were used at each of the measuring stations. The probe thermocouple material was Chromel-constantan. The temperatures at stations 2 and 3 were measured as differences above temperatures at station 1.

Inner and outer wall static pressure taps were located at the same axial stations as the survey probes. The circumferential locations of both types of survey probes, along with inner and outer wall static pressure taps, are shown in figure 5. The combination probes downstream of the stator (station 3) were circumferentially traversed one stator blade passage (11.2°) counterclockwise from the nominal values shown. All pressures were obtained with calibrated strain-gage transducers.

An electronic speed counter, in conjunction with a magnetic pickup, was used to measure rotative speed (rpm).

The estimated errors of the data based on inherent accuracies of the instrumentation and recording system are as follows:

Weight flow, kg/sec	±0.3
Rotative speed, rpm	±30
Flow angle, deg	±1
Temperature, K	±0.6
Rotor-inlet total pressure, N/cm^2	±0.01
Rotor-outlet total pressure, N/cm^2	±0.10
Stator-outlet total pressure, N/cm^2	±0.10
Rotor-inlet static pressure, N/cm^2	±0.04
Rotor-outlet static pressure, N/cm^2	±0.07
Stator-outlet static pressure, N/cm^2	±0.07

An indication of the consistency of the data can be observed by comparing the integrated weight flow at each measuring station to the orifice weight flow.

Test Procedure

The stage survey data were taken over a range of weight flows from maximum flow to the near-stall conditions. At 90, 100, 110, and 120 percent of design speed, radial surveys were taken at a minimum of three weight flows. Data were recorded at nine radial positions for each speed and weight flow.

At each radial position the combination probes behind the stator were circumferentially traversed to nine different locations across the stator gap. The wedge probes were set at midgap because previous studies showed that the static pressure across the stator gap was constant. Values of pressure, temperature, and flow angle were recorded at each circumferential position. At the last circumferential position, values of pressure, temperature, and flow angle were also recorded at stations 1 and 2. All probes were then traversed to the next radial position and the circumferential traverse procedure repeated.

At each of the four rotative speeds the backpressure on the stage was increased by closing the sleeve valve in the collector until a drop in discharge total pressure at the blade tip occurred. The drop in pressure was determined by comparing the radial distribution of discharge total pressures between succeeding data recordings with an on-line computer located at the site. This point represented the limit of stable operation at the low end of the weight flow range and usually occurred before any definite indications of stall were observed such as change in noise level or increase in blade stresses.

Calculation Procedure

Measured total temperatures and total pressures were corrected for Mach number and streamline slope. These corrections were based on instrument probe calibrations given in reference 4. The stream static pressure was corrected for Mach number and streamline slope based on an average calibration for the type of probe used.

Because of the physical construction of the C-shaped static pressure wedges, it was not possible to obtain static pressure measurements at 5, 10, and 95 percent of span. The static pressure at 95 percent of span was obtained by assuming a linear variation in static pressure between the values at the inner wall and the probe measurement at 90 percent of span. A linear variation was also assumed between the static pressure measurements at the outer wall and the 15 percent span to obtain the static pressure at 5 and 10 percent of span.

At each radial position, averaged values of the nine circumferential measurements of pressure, temperature, and flow angle downstream of the stator (station 3) were obtained. The nine values of total temperature were mass averaged to obtain the stator-outlet total temperature presented. The nine values of total pressure were energy averaged. The measured values of pressure, temperature, and flow angle were used to calculate axial and tangential velocities at each circumferential position. The flow angles presented for each radial position were calculated based on these mass-averaged axial and tangential velocities. To obtain the overall performance, the radial values of total temperature were mass averaged and the values of total pressure were energy averaged. At each measuring station, the integrated weight flow was computed based on the radial survey data.

The data, measured at the three measuring stations, have been translated to the blade leading and trailing edges by the method presented in reference 2.

Orifice weight flows, total pressures, static pressures, and temperatures were all corrected to standard-day conditions based on the rotor-inlet conditions.

RESULTS AND DISCUSSION

The overall performance for the rotor and the stage are presented first. Radial distributions of several performance parameters are then presented for both the rotor and the stator, followed by blade-element data for both rotor and stator. The data presented are computer plotted, and occasionally a data point is omitted when it falls outside the range of the parameters shown in the figure.

All the plotted data together with some additional performance parameters for the stage configuration are presented in tabular form. The overall performance data are presented in table VI. The blade-element data are presented first for the rotor in

table VII and then for the stator in table VIII. The definitions and units used for the tabular data are presented in appendix C.

Overall Performance

The overall performance for rotor 51B is presented in figure 7 and for the stage 51B in figure 8. For both of these figures, data are presented for speeds from 90 to 120 percent of design speed at several weight flows from choke to the near-stall conditions. Stall conditions occurred gradually with only a moderate dropoff in pressure rise and thus it was difficult to establish a specific stall point with this stage, particularly at the lower speeds. The stall condition was arbitrarily taken as the point where a drop in total pressure at the blade tip was first detected. Successive calculations of the radial distribution of the stage discharge total pressure, as obtained with an on-line computer, were compared. Data for the minimum flow points were taken at flow rates just slightly greater than the point of drop off in total pressure in the tip region. Design point values are shown as solid symbols in both figures.

The peak temperature rise efficiency for rotor 51B at design speed is 0.918 occurring at a weight flow of 32.4 kilograms per second. The measured total pressure ratio is 1.145 and the temperature ratio 1.043. At the near design weight flow of 30.4 kilograms per second, the rotor efficiency of 0.902 compares favorably with the design efficiency of 0.911; however, the rotor total pressure ratio at this weight flow is decreased to 1.137 and then increased again as the flow rate is further reduced. This step seen in the rotor overall performance curve is also evident in the stage performance results.

The peak temperature rise efficiency for the stage of 0.927 occurs at the same flow rate as that for the rotor of 32.4 kilograms per second. The stage total pressure ratio was 1.134 with a temperature ratio of 1.039. The apparent gain in efficiency across the stator is due to experimental error; it results from low stator losses and the significant effect of a small inaccuracy in temperature measurement on the calculation of efficiency at these low pressure ratios. The difference between rotor and stage peak efficiency is equivalent to a temperature difference of 0.15 K which is within the estimated accuracy of temperature measurement.

The measured stall margin at design speed and peak efficiency is 15.3 percent.

Radial Distributions

The radial distributions of several parameters for 100 percent of design speed are presented in figure 9 for rotor 51B and in figure 10 for stator 51. In each figure data are presented for those weight flows: near choke, near design, and near stall. The design values are shown by solid symbols.

Rotor. - The temperature rise efficiency at near design weight flow is greater than or close to design at the tip and hub, but is less than design over the middle portion of the blade from about 20 percent to 80 percent of blade span. The total pressure ratio is less than design except near the hub. Deviation angles are slightly greater than design in the region from 20 to 80 percent of blade span. Losses are also higher than design in the same region of the blade while the diffusion factor is less than design over almost the total blade span.

There is a significant increase in the total loss parameter and deviation angle over the 20 to 80 percent portion of the blade span as the weight flow is reduced from the maximum efficiency point to the design point. The changes in these parameters are greater than would be expected for the relatively small change in weight flow (approximately 2 kg/sec). The overall efficiency and pressure ratio dip at the design weight flow and then recover somewhat at lower weight flows. The cause for the higher losses and resulting lower pressure ratio at design weight flow is not obvious from the radial flow distributions and will be discussed more in the following section dealing with the variation of blade-element parameters with incidence angles.

Stator. - The stator suction surface incidence angles at near design weight flow were 2° to 5° less than the design value of zero except at the hub. Experimental deviation angles were 1° to 5° larger than design with the greatest differences occurring at the tip and hub. The losses as indicated by the total loss parameter were much higher than design at the tip and hub but were lower than design in the 50 to 70 percent portion of the blade span. The loading or diffusion factor was equal to or slightly less than design over the blade span.

Variations with Incidence Angles

The variations of selected blade-element parameters with incidence angle are shown in figure 11 for the rotor and in figure 12 for the stator. The data are presented for 90, 100, and 120 percent of speed at blade elements on streamlines located at 5, 10, 30, 50, 70, 90, and 95 percent of blade span as measured from the rotor outlet blade tip. Design values are indicated by solid symbols. The variation in incidence-angle curves are presented primarily for future correlations in comparing the performance of these blades with other blade designs. Only a few brief observations are made herein.

The rotor blade suction-surface incidence angles corresponding to minimum losses were equal to design incidence at the tip and the hub but were 2° to 5° more negative than design over the 10 to 70 percent portion of blade span. At design speed, the measured losses were higher than design at the 50 and 70 percent blade span locations and the extreme hub. Rotor total pressure ratio changed little over the range of incidence angle at

the 50 and 70 percent blade elements. Rotor blade deviation angles at the design incidence were within $\pm 3^{\circ}$ of design values.

The stator blade suction-surface incidence angles corresponding to minimum losses were equal to design values at the 30 and 50 percent blade elements but were more negative than design by 4° to 8° at the tip and hub elements. Stator deviation angles at design incidence were 1° to 2° higher than design at the 30, 50, and 70 percent blade elements and 3° and 5° higher for elements in the hub and tip region of the blade.

The manner in which the element performance characteristics contributed to the dip in the overall efficiency and pressure ratio at design weight flow can now be considered. It was observed previously that the losses and deviation angles increased significantly in the 20 to 80 percent span as the weight flow was reduced to the design point. The performance of the 50 percent span element shown in figure 11(d), for example, indicates that, at suction surface incidence angles higher than -13°, the losses rise fairly rapidly considering the levels of relative flow Mach number. On the other hand, the loading or diffusion factor stays almost constant to the -10° incidence, apparently because the deviation angle increases very rapidly in the same range of incidence. This may indicate a very rapid forward movement of a flow separation from the blade trailing edge. The change in performance was not a discontinuity; steady measurements were observed over the whole stable operating range. When the flow is further reduced and the incidence angle increases above -10°, a more normal variation of loss and loading parameters results in an apparent recovery of overall pressure ratio and efficiency. Such a rapid forward movement of flow separation on the blade suction surface may be due to the rather thick rotor blade sections (radial distribution of maximum thickness, table IV). The combination of design parameters utilized for this blade results in blade sections over the midspan region having relatively high suction surface camber as compared to that for the pressure surface. A more detailed calculation and analysis of the rotor blade row internal flow conditions is considered beyond the scope of this report.

SUMMARY OF RESULTS

This report presents both the aerodynamic design and the overall and blade-element performance of a low pressure ratio, low blade tip speed fan stage. Radial surveys of the flow conditions at both the rotor inlet and outlet and the stator outlet were made over the compressor-stage operating flow range at equivalent rotative speeds from 90 to 120 percent of design speed. Flow and performance parameters were calculated over a selected number of blade elements. The following principal results were obtained:

1. Peak efficiency for the stage at design speed was 0.927 and occurred at an equivalent weight flow of 32.4 kilograms per second.

2. Total pressure ratio and total temperature ratio at the peak efficiency equivalent weight flow was 1.134 and 1.039, respectively.

3. Stall margin of the stage at design speed and peak efficiency was 15.3 percent.

4. Peak efficiency of the rotor was 0.918. The rotor total pressure ratio and total temperature ratio were 1.145 and 1.043, respectively. The higher efficiency of the stage over that of the rotor is attributed to the significant effect of small inaccuracies in temperature measurement on the calculation of efficiency at low pressure ratios.

5. The measured total-loss-parameter distribution for the rotor showed the losses higher than design over the middle portion of the blade from 20 to 80 percent blade span. The stator losses were higher than design values at the tip and hub but were lower than design over the middle portion of the stator blade. The diffusion factors for both rotor and stator were less than design values over most of the blade spans.

6. At design speed the rotor-blade suction-surface incidence angles corresponding to minimum losses were equal to design values at the tip and hub but were 2° to 5° more negative than design over the 10 to 70 percent portion of blade span. The minimum-loss stator suction-surface incidence angles were equal to design values at the 30 and 50 percent blade elements but were 4° to 8° more negative than design at the tip and hub.

7. At design incidence, rotor deviation angles were within $\pm 3^{\circ}$ of design values. Stator deviation angles were 3° to 5° higher in the tip and hub regions and were 1° to 2° higher than design in the middle portion of the blade.

8. A dip in rotor total pressure ratio and efficiency at the design weight flow with apparent recovery as the equivalent weight flow rate was reduced is probably associated with a rapid forward movement of the flow separation point on the blade suction surface over a portion of the incidence range. The rotor blade design parameters selected resulting in very thick blade sections in the midspan region may have contributed to this condition.

Lewis Research Center,
National Aeronautics and Space Administration,
Cleveland, Ohio,
505-04.

APPENDIX A

SYMBOLS

A_{an}	annulus area at rotor leading edge, 0.170 m^2
A_f	frontal area at rotor leading edge, 0.203 m^2
C_p	specific heat at constant pressure, 1004 J/kg/K
c	aerodynamic chord, cm
D	diffusion factor
g	acceleration of gravity, 9.8 m/sec^2
i_{mc}	mean incidence angle, angle between inlet air direction and line tangent to blade mean camber line at leading edge, deg
i_{ss}	suction-surface incidence angle, angle between inlet air direction and line tangent to blade suction surface at leading edge, deg
J	mechanical equivalent of heat
N	rotative speed, rpm
P	total pressure, N/cm^2
p	static pressure, N/cm^2
r	radius, cm
SM	stall margin
T	total temperature, K
U	wheel speed, m/sec
V	air velocity, m/sec
W	weight flow, kg/sec
Z	axial distance referenced from rotor-blade-hub leading edge, cm
α_c	cone angle, deg
α_s	slope of streamline, deg
β	air angle, angle between air velocity and axial direction, deg
β'_c	relative meridional air angle based on cone angle, $\arctan(\tan \beta'_m \cos \alpha_c / \cos \alpha_s)$, deg
γ	ratio of specific heats, 1.40

γ_b blade setting angle

δ ratio of rotor-inlet total pressure to standard pressure of 10.13 N/cm^2

δ^o deviation angle, angle between exit air direction and tangent to blade mean camber line at trailing edge, deg

θ ratio of rotor-inlet total temperature to standard temperature of 288.2 K

η efficiency

κ_{mc} angle between blade mean camber line and meridional plane, deg

κ_{ss} angle between blade suction-surface camber line at leading edge and meridional plane, deg

σ solidity, ratio of chord to spacing

$\bar{\omega}$ total loss coefficient

$\bar{\omega}_p$ profile loss coefficient

$\bar{\omega}_s$ shock loss coefficient

Subscripts:

ad adiabatic (temperature rise)

id ideal

LE blade leading edge

m meridional direction

mom momentum-rise

p polytropic

r radial direction

ref reference

stall stall

TE blade trailing edge

tip tip

z axial direction

θ tangential direction

1 instrumentation plane upstream of rotor

2 instrumentation plane between rotor and stator

3 instrumentation plane downstream of stator

Superscript:

' relative to blade

APPENDIX B

EQUATIONS

Suction-surface incidence angle:

$$i_{ss} = \left(\beta_c'\right)_{LE} - \kappa_{ss} \tag{B1}$$

Mean incidence angle:

$$i_{mc} = \left(\beta_c'\right)_{LE} - \left(\kappa_{mc}\right)_{LE} \tag{B2}$$

Deviation angle:

$$\delta^o = \left(\beta_c'\right)_{TE} - \left(\kappa_{mc}\right)_{TE} \tag{B3}$$

Diffusion factor:

$$D = 1 - \frac{V'_{TE}}{V'_{LE}} + \left|\frac{\left(rV_\theta\right)_{TE} - \left(rV_\theta\right)_{LE}}{(r_{TE} + r_{LE})\sigma\,(V'_{LE})}\right| \tag{B4}$$

Total loss coefficient:

$$\bar{\omega} = \frac{\left(P'_{id}\right)_{TE} - P'_{TE}}{P'_{LE} - p_{LE}} \tag{B5}$$

Profile loss coefficient:

$$\bar{\omega}_p = \bar{\omega} - \bar{\omega}_s \tag{B6}$$

Total loss parameter:

$$\frac{\bar{\omega}\cos\left(\beta'_m\right)_{TE}}{2\sigma} \tag{B7}$$

Profile loss parameter:

$$\frac{\bar{\omega}_p \cos\left(\beta'_m\right)_{TE}}{2\sigma} \tag{B8}$$

Adiabatic (temperature rise) efficiency:

$$\eta_{ad} = \frac{\left(\frac{P_{TE}}{P_{LE}}\right)^{(\gamma-1)/\gamma} - 1}{\frac{T_{TE}}{T_{LE}} - 1} \tag{B9}$$

Momentum-rise efficiency:

$$\eta_{mom} = \frac{\left(\frac{P_{TE}}{P_{LE}}\right)^{(\gamma-1)/\gamma} - 1}{\frac{\left(UV_\theta\right)_{TE} - \left(UV_\theta\right)_{LE}}{T_{LE} g J C_p}} \tag{B10}$$

Equivalent weight flow:

$$\frac{W\sqrt{\theta}}{\delta} \tag{B11}$$

Equivalent rotative speed:

$$\frac{N}{\sqrt{\theta}} \tag{B12}$$

Weight flow per unit annulus area:

$$\frac{\frac{W\sqrt{\theta}}{\delta}}{A_{an}} \tag{B13}$$

Weight flow per unit frontal area:

$$\frac{W\sqrt{\theta}}{\frac{\delta}{A_f}} \tag{B14}$$

Head-rise coefficient:

$$\frac{gJC_pT_{LE}}{U_{tip}^2}\left[\left(\frac{P_{TE}}{P_{LE}}\right)^{(\gamma-1)/\gamma} - 1\right] \tag{B15}$$

Flow coefficient:

$$\left(\frac{V_z}{U_{tip}}\right)_{LE} \tag{B16}$$

Stall margin:

$$SM = \left[\frac{\left(\frac{P_{TE}}{P_{LE}}\right)_{stall}}{\left(\frac{P_{TE}}{P_{LE}}\right)_{ref}} \times \frac{\left(\frac{W\sqrt{\theta}}{\delta}\right)_{ref}}{\left(\frac{W\sqrt{\theta}}{\delta}\right)_{stall}} - 1\right] \times 100 \tag{B17}$$

Polytropic efficiency:

$$\eta_P = \frac{\ln\left(\frac{P_{TE}}{P_{LE}}\right)^{(\gamma-1)/\gamma}}{\ln\frac{T_{TE}}{T_{LE}}} \tag{B18}$$

APPENDIX C

DEFINITIONS AND UNITS USED IN TABLES

ABS	absolute
AERO CHORD	aerodynamic chord, cm
AREA RATIO	ratio of actual minimum flow area to critical area (where local Mach number is 1)
BETAM	meridional air angle, deg
CONE ANGLE	angle between axial direction and conical surface representing blade element, deg
DELTA INC	difference between mean camber blade angle and suction-surface blade angle at leading edge, deg
DEV	deviation angle (defined by eq. (B3)), deg
D-FACT	diffusion factor (defined by eq. (B4))
EFF	adiabatic efficiency (defined by eq. (B9))
IN	inlet (leading edge of blade)
INCIDENCE	incidence angle (suction surface defined by eq. (B1) and mean defined by eq. (B2)), deg
KIC	angle between blade mean camber line at leading edge and meridional plane, deg
KOC	angle between blade mean camber line at trailing edge and meridional plane, deg
KTC	angle between blade mean camber line at transition point and meridional plane, deg
LOSS COEFF	loss coefficient (total defined by eq. (B5) and profile defined by eq. (B6))
LOSS PARAM	loss parameter (total defined by eq. (B7) and profile defined by eq. (B8))
MERID	meridional
MERID VEL R	meridional velocity ratio
OUT	outlet (trailing edge of blade)
PERCENT SPAN	percent of blade span from tip at rotor outlet

PHISS	suction-surface camber ahead of assumed shock location, deg
PRESS	pressure, N/cm^2
PROF	profile
RADII	radius, cm
REL	relative to blade
RI	inlet radius (leading edge of blade), cm
RO	outlet radius (trailing edge of blade), cm
RP	radial position
RPM	equivalent rotative speed, rpm
SETTING ANGLE	angle between aerodynamic chord and meridional plane, deg
SOLIDITY	ratio of aerodynamic chord to blade spacing
SPEED	speed, m/sec
SS	suction surface
STREAMLINE SLOPE	slope of streamline, deg
TANG	tangential
TEMP	temperature, K
TI	thickness of blade at leading edge, cm
TM	thickness of blade at maximum thickness, cm
TO	thickness of blade at trailing edge, cm
TOT	total
TOTAL CAMBER	difference between inlet and outlet blade mean camber lines, deg
VEL	velocity, m/sec
WT FLOW	equilvalent weight flow, kg/sec
X FACTOR	ratio of suction-surface camber ahead of assumed shock location of multiple-circular-arc blade section to that of double-circular-arc blade section
ZIC	axial distance to blade leading edge from inlet, cm
ZMC	axial distance to blade maximum thickness point from inlet, cm
ZOC	axial distance to blade trailing edge from inlet, cm
ZTC	axial distance to transition point from inlet, cm

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TABLE I. -DESIGN OVERALL PARAMETERS

FOR FAN STAGE 51B

ROTOR TOTAL PRESSURE RATIO.....	1.159
STAGE TOTAL PRESSURE RATIO	1.151
ROTOR TOTAL TEMPERATURE RATIO.....	1.047
STAGE TOTAL TEMPERATURE RATIO	1.047
ROTOR ADIABATIC EFFICIENCY.....	0.911
STAGE ADIABATIC EFFICIENCY	0.865
ROTOR POLYTROPIC EFFICIENCY.....	0.913
STAGE POLYTROPIC EFFICIENCY	0.868
ROTOR HEAD RISE COEFFICIENT.....	0.210
STAGE HEAD RISE COEFFICIENT	0.199
FLOW COEFFICIENT.....	0.681
WT FLOW PER UNIT FRONTAL AREA	147.704
WT FLOW PER UNIT ANNULUS AREA.....	175.838
WT FLOW	29.937
RPM.....	9167.300
TIP SPEED	243.839

TABLE II. - DESIGN BLADE-ELEMENT PARAMETERS FOR ROTOR 51B

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
TIP	25.400	25.400	0.	24.4	55.3	48.9	288.2	1.058	10.14	1.184
1	24.647	24.638	-0.	24.5	54.5	47.5	288.2	1.057	10.14	1.183
2	23.868	23.876	0.	24.6	53.6	46.0	288.2	1.056	10.14	1.183
3	23.085	23.114	0.	24.8	52.7	44.5	288.2	1.055	10.14	1.182
4	20.732	20.828	0.	25.6	49.8	39.5	288.2	1.051	10.14	1.175
5	17.607	17.780	0.	27.1	45.5	31.6	288.2	1.046	10.14	1.159
6	14.533	14.732	0.	28.9	40.6	22.2	288.2	1.040	10.14	1.134
7	12.294	12.446	0.	30.0	36.2	14.2	288.2	1.034	10.14	1.111
8	11.565	11.684	0.	30.2	34.7	11.6	288.2	1.032	10.14	1.102
9	10.844	10.922	0.	30.3	33.0	9.0	288.2	1.030	10.14	1.092
HUB	10.160	10.160	-0.	30.4	31.4	6.3	288.2	1.028	10.14	1.083

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
TIP	169.0	167.5	296.7	231.8	169.0	152.5	0.	69.2	243.8	243.8
1	169.0	168.2	290.8	226.3	169.0	153.0	-0.	69.8	236.6	236.5
2	168.9	168.8	284.7	220.8	168.9	153.4	0.	70.4	229.1	229.2
3	168.8	169.3	278.6	215.3	168.8	153.7	0.	71.1	221.6	221.9
4	168.0	170.1	260.5	198.8	168.0	153.4	0.	73.5	199.0	199.9
5	165.9	169.9	236.8	177.6	165.9	151.2	0.	77.5	169.0	170.7
6	163.0	168.3	214.6	159.1	163.0	147.3	0.	81.4	139.5	141.4
7	161.0	166.0	199.6	148.2	161.0	143.7	0.	83.0	118.0	119.5
8	160.5	164.8	195.2	145.4	160.5	142.4	0.	82.9	111.0	112.2
9	160.2	163.5	191.0	142.9	160.2	141.1	0.	82.5	104.1	104.9
HUB	159.8	162.1	187.2	140.7	159.8	139.9	-0.	82.0	97.5	97.5

	ABS MACH NO		REL MACH NO		MERID MACH NO		STREAMLINE SLOPE		MERID PEAK SS
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	VEL R MACH NO
TIP	0.509	0.490	0.894	0.678	0.509	0.446	-0.22	-0.28	0.903 1.233
1	0.509	0.492	0.876	0.662	0.509	0.448	-0.07	-0.13	0.906 1.199
2	0.509	0.494	0.858	0.647	0.509	0.449	0.09	0.03	0.908 1.166
3	0.509	0.496	0.840	0.631	0.509	0.450	0.27	0.21	0.910 1.136
4	0.506	0.500	0.785	0.584	0.506	0.451	0.83	0.78	0.913 1.015
5	0.499	0.500	0.713	0.523	0.499	0.445	1.46	1.46	0.912 0.764
6	0.490	0.497	0.645	0.470	0.490	0.435	1.67	1.76	0.904 0.645
7	0.484	0.491	0.600	0.438	0.484	0.425	1.31	1.48	0.892 0.600
8	0.483	0.488	0.587	0.430	0.483	0.422	1.04	1.20	0.887 0.587
9	0.481	0.484	0.574	0.423	0.481	0.418	0.70	0.84	0.881 0.574
HUB	0.480	0.481	0.563	0.417	0.480	0.415	0.37	0.47	0.875 0.563

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
TIP	0.	-1.0	-5.6	5.5	0.398	0.846	0.072	0.072	0.037	0.036
1	5.00	-1.0	-5.6	5.3	0.405	0.865	0.064	0.064	0.033	0.033
2	10.00	-0.8	-5.7	5.2	0.411	0.882	0.057	0.057	0.030	0.030
3	15.00	-0.7	-5.9	5.5	0.417	0.896	0.050	0.050	0.027	0.027
4	30.00	-0.1	-7.2	7.2	0.439	0.929	0.036	0.036	0.020	0.020
5	50.00	1.0	-9.3	10.4	0.470	0.941	0.031	0.031	0.018	0.018
6	70.00	2.2	-11.2	14.0	0.494	0.922	0.043	0.043	0.024	0.024
7	85.00	3.1	-11.8	13.8	0.494	0.887	0.060	0.060	0.033	0.033
8	90.00	3.5	-11.7	12.6	0.489	0.872	0.067	0.067	0.036	0.036
9	95.00	3.8	-11.6	10.9	0.481	0.854	0.074	0.074	0.039	0.039
HUB	100.00	4.1	-11.5	9.0	0.471	0.832	0.081	0.081	0.041	0.041

TABLE III. - DESIGN BLADE-ELEMENT PARAMETERS FOR STATOR 51B

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
TIP	25.400	25.400	23.4	-0.	23.4	-0.	305.0	1.000	12.00	0.993
1	24.595	24.608	23.5	0.	23.5	0.	304.6	1.000	11.99	0.994
2	23.861	23.887	23.6	-0.	23.6	-0.	304.2	1.000	11.99	0.994
3	23.128	23.166	23.8	-0.	23.8	-0.	303.9	1.000	11.98	0.994
4	20.917	20.995	24.7	-0.	24.7	-0.	302.8	1.000	11.91	0.994
5	17.955	18.080	26.6	-0.	26.6	-0.	301.3	1.000	11.74	0.993
6	14.946	15.110	29.0	-0.	29.0	-0.	299.6	1.000	11.50	0.992
7	12.647	12.787	30.7	-0.	30.7	-0.	298.1	1.000	11.26	0.990
8	11.870	11.967	31.1	-0.	31.1	-0.	297.4	1.000	11.17	0.989
9	11.087	11.125	31.3	-0.	31.3	-0.	296.8	1.000	11.07	0.987
HUB	10.160	10.160	31.6	0.	31.6	0.	296.0	1.000	10.96	0.986

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
TIP	174.6	161.8	174.6	161.8	160.2	161.8	69.4	-0.	0.	0.
1	175.2	161.7	175.2	161.7	160.6	161.7	69.9	0.	0.	0.
2	175.6	161.4	175.6	161.4	160.8	161.4	70.4	-0.	0.	0.
3	175.7	161.0	175.7	161.0	160.8	161.0	71.0	-0.	0.	0.
4	175.1	158.4	175.1	158.4	159.0	158.4	73.1	-0.	0.	0.
5	171.6	151.7	171.6	151.7	153.5	151.7	76.7	-0.	0.	0.
6	165.6	140.7	165.6	140.7	144.9	140.7	80.2	-0.	0.	0.
7	160.0	128.1	160.0	128.1	137.6	128.1	81.7	-0.	0.	0.
8	158.2	122.2	158.2	122.2	135.5	122.2	81.6	-0.	0.	0.
9	156.3	115.5	156.3	115.5	133.5	115.5	81.3	-0.	0.	0.
HUB	154.1	107.8	154.1	107.8	131.2	107.8	80.8	0.	0.	0.

	ABS MACH NO		REL MACH NO		MERID MACH NO		STREAMLINE SLOPE		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
TIP	0.512	0.472	0.512	0.472	0.469	0.472	-0.07	-0.04	1.010	0.512
1	0.514	0.472	0.514	0.472	0.471	0.472	0.10	0.13	1.007	0.514
2	0.515	0.472	0.515	0.472	0.472	0.472	0.24	0.27	1.004	0.515
3	0.516	0.471	0.516	0.471	0.472	0.471	0.38	0.41	1.001	0.516
4	0.515	0.464	0.515	0.464	0.468	0.464	0.79	0.81	0.996	0.515
5	0.506	0.444	0.506	0.444	0.452	0.444	1.30	1.30	0.988	0.506
6	0.489	0.412	0.489	0.412	0.427	0.412	1.68	1.61	0.971	0.489
7	0.473	0.375	0.473	0.375	0.406	0.375	1.44	1.31	0.931	0.473
8	0.467	0.358	0.467	0.358	0.400	0.358	1.02	0.91	0.902	0.467
9	0.462	0.338	0.462	0.338	0.395	0.338	0.44	0.34	0.865	0.462
HUB	0.456	0.315	0.456	0.315	0.388	0.315	-0.26	-0.31	0.821	0.456

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
TIP	0.	9.2	-0.0	4.1	0.274	0.	0.041	0.041	0.020	0.020
1	5.00	9.2	-0.0	4.1	0.272	0.	0.039	0.039	0.019	0.019
2	10.00	9.2	-0.0	4.0	0.270	0.	0.037	0.037	0.018	0.018
3	15.00	9.2	-0.0	4.0	0.270	0.	0.037	0.037	0.017	0.017
4	30.00	9.2	-0.0	4.0	0.269	0.	0.038	0.038	0.016	0.016
5	50.00	9.2	-0.0	4.1	0.276	0.	0.045	0.045	0.016	0.016
6	70.00	9.1	-0.0	4.2	0.294	0.	0.056	0.056	0.017	0.017
7	85.00	9.1	0.0	4.2	0.328	0.	0.072	0.072	0.018	0.018
8	90.00	9.1	0.0	4.1	0.349	0.	0.081	0.081	0.019	0.019
9	95.00	9.1	0.0	4.0	0.375	0.	0.092	0.092	0.020	0.020
HUB	100.00	9.1	0.0	3.9	0.406	0.	0.106	0.106	0.021	0.021

TABLE IV. - BLADE GEOMETRY FOR ROTOR 51B

	PERCENT	RADII		BLADE ANGLES			DELTA	CONE
RP	SPAN	RI	RO	KIC	KTC	KOC	INC	ANGLE
TIP	0.	25.400	25.400	56.30	49.79	43.33	4.58	0.057
1	5.	24.647	24.638	55.42	48.81	42.20	4.66	-0.093
2	10.	23.868	23.876	54.45	47.61	40.77	4.88	0.082
3	15.	23.085	23.114	53.40	46.18	38.96	5.25	0.290
4	30.	20.732	20.828	49.93	41.12	32.31	7.07	0.959
5	50.	17.607	17.780	44.49	32.84	21.19	10.36	1.698
6	70.	14.533	14.732	38.37	23.30	8.20	13.41	1.993
7	85.	12.294	12.446	33.12	16.79	0.44	14.90	1.590
8	90.	11.565	11.684	31.20	15.12	-0.99	15.19	1.273
9	95.	10.844	10.922	29.21	13.68	-1.88	15.39	0.853
HUB	100.	10.160	10.160	27.30	12.33	-2.70	15.56	0.057

	BLADE THICKNESSES			AXIAL DIMENSIONS			
RP	TI	TM	TO	ZI	ZMC	ZTC	ZO
TIP	0.086	0.429	0.086	-0.155	2.460	2.460	5.445
1	0.083	0.430	0.083	-0.157	2.461	2.461	5.443
2	0.086	0.441	0.086	-0.165	2.461	2.461	5.450
3	0.098	0.464	0.098	-0.181	2.460	2.460	5.467
4	0.121	0.584	0.121	-0.232	2.455	2.455	5.521
5	0.159	0.779	0.157	-0.271	2.455	2.455	5.556
6	0.189	0.923	0.177	-0.241	2.466	2.466	5.490
7	0.186	0.944	0.187	-0.148	2.479	2.479	5.339
8	0.184	0.933	0.186	-0.103	2.483	2.483	5.271
9	0.182	0.914	0.183	-0.051	2.486	2.486	5.194
HUB	0.179	0.896	0.179	0.	2.490	2.490	5.116

	AERO	SETTING	TOTAL		X		AREA
RP	CHORD	ANGLE	CAMBER	SOLIDITY	FACTOR	PHISS	RATIO
TIP	8.629	49.80	12.97	0.649	1.000	13.99	0.
1	8.460	48.81	13.22	0.656	1.000	13.71	-0.015
2	8.287	47.61	13.68	0.663	1.000	13.56	0.028
3	8.115	46.18	14.44	0.671	1.000	13.58	0.138
4	7.599	41.13	17.62	0.698	1.000	13.18	0.154
5	6.910	32.85	23.30	0.746	1.000	10.14	0.175
6	6.229	23.26	30.16	0.813	1.000	4.28	0.194
7	5.726	16.82	32.67	0.884	1.000	-1.52	0.206
8	5.561	15.14	32.19	0.914	1.000	-3.60	0.203
9	5.393	13.69	31.08	0.946	1.000	-5.76	0.196
HUB	5.232	12.33	30.00	0.984	1.000	-7.81	0.190

TABLE V. - BLADE GEOMETRY FOR STATOR 51B

RP	PERCENT SPAN	RADII RI	RADII RO	BLADE ANGLES KIC	BLADE ANGLES KTC	BLADE ANGLES KOC	DELTA INC	CONE ANGLE
TIP	0.	25.400	25.400	14.20	5.04	-4.13	9.22	0.057
1	5.	24.595	24.608	14.30	5.12	-4.07	9.21	0.144
2	10.	23.861	23.887	14.44	5.20	-4.03	9.21	0.306
3	15.	23.128	23.166	14.63	5.31	-4.01	9.21	0.448
4	30.	20.917	20.995	15.51	5.75	-4.00	9.19	0.915
5	50.	17.955	18.080	17.40	6.64	-4.11	9.17	1.461
6	70.	14.946	15.110	19.85	7.81	-4.23	9.13	1.913
7	85.	12.647	12.787	21.60	8.70	-4.20	9.11	1.642
8	90.	11.870	11.967	21.95	8.92	-4.11	9.11	1.140
9	95.	11.087	11.125	22.20	9.10	-3.99	9.12	0.439
HUB	100.	10.160	10.160	22.49	9.32	-3.85	9.13	0.057

RP	BLADE THICKNESSES TI	BLADE THICKNESSES TM	BLADE THICKNESSES TO	AXIAL DIMENSIONS ZI	AXIAL DIMENSIONS ZMC	AXIAL DIMENSIONS ZTC	AXIAL DIMENSIONS ZO
TIP	0.099	0.495	0.099	25.452	27.898	27.898	30.379
1	0.099	0.495	0.099	25.455	27.900	27.900	30.381
2	0.099	0.495	0.099	25.456	27.900	27.900	30.381
3	0.099	0.495	0.099	25.455	27.899	27.899	30.380
4	0.099	0.495	0.099	25.458	27.897	27.897	30.378
5	0.099	0.495	0.099	25.467	27.896	27.896	30.378
6	0.099	0.495	0.099	25.479	27.894	27.894	30.379
7	0.099	0.495	0.099	25.488	27.891	27.891	30.377
8	0.099	0.495	0.099	25.491	27.891	27.891	30.377
9	0.099	0.495	0.099	25.494	27.892	27.892	30.378
HUB	0.099	0.494	0.099	25.498	27.894	27.894	30.380

RP	AERO CHORD	SETTING ANGLE	TOTAL CAMBER	SOLIDITY	X FACTOR	PHISS	AREA RATIO
TIP	4.945	5.04	18.33	0.992	1.000	-2.24	0.273
1	4.945	5.12	18.38	1.024	1.000	-2.36	0.266
2	4.945	5.20	18.47	1.055	1.000	-2.43	0.261
3	4.945	5.31	18.64	1.088	1.000	-2.48	0.257
4	4.945	5.76	19.51	1.202	1.000	-2.50	0.252
5	4.946	6.65	21.51	1.398	1.000	-2.26	0.259
6	4.948	7.83	24.08	1.677	1.000	-2.03	0.281
7	4.947	8.72	25.79	1.981	1.000	-2.19	0.305
8	4.946	8.94	26.07	2.114	1.000	-2.41	0.300
9	4.946	9.11	26.19	2.268	1.000	-2.72	0.288
HUB	4.946	9.32	26.34	2.479	1.000	-3.09	0.275

TABLE VI. - OVERALL PERFORMANCE FOR STAGE 51B

(a) 90 Percent design speed

Parameter	Reading number				
	1758	1762	1763	1764	1765
ROTOR TOTAL PRESSURE RATIO	1.124	1.113	1.107	1.109	1.086
STAGE TOTAL PRESSURE RATIO	1.112	1.103	1.100	1.100	1.073
ROTOR TOTAL TEMPERATURE RATIO	1.038	1.034	1.032	1.032	1.027
STAGE TOTAL TEMPERATURE RATIO	1.036	1.032	1.029	1.029	1.023
ROTOR TEMP. RISE EFFICIENCY	0.888	0.911	0.929	0.936	0.893
STAGE TEMP. RISE EFFICIENCY	0.853	0.894	0.941	0.957	0.890
ROTOR MOMENTUM RISE EFFICIENCY	0.872	0.912	0.915	0.922	0.882
ROTOR HEAD RISE COEFFICIENT	0.204	0.188	0.179	0.179	0.142
STAGE HEAD RISE COEFFICIENT	0.185	0.171	0.167	0.165	0.122
FLOW COEFFICIENT	0.596	0.662	0.733	0.788	0.867
WT FLOW PER UNIT FRONTAL AREA	121.90	132.80	143.86	152.18	162.63
WT FLOW PER UNIT ANNULUS AREA	145.12	158.09	171.27	181.17	193.60
WT FLOW AT ORIFICE	24.71	26.92	29.16	30.84	32.96
WT FLOW AT ROTOR INLET	24.70	26.90	29.16	30.88	33.01
WT FLOW AT ROTOR OUTLET	24.99	27.18	29.26	30.91	33.14
WT FLOW AT STATOR OUTLET	24.53	26.60	28.95	30.62	32.56
ROTATIVE SPEED	8249.8	8230.4	8225.4	8264.7	8263.7
PERCENT OF DESIGN SPEED	90.0	89.8	89.7	90.2	90.1

(b) 100 Percent design speed

Parameter	Reading number				
	1766	1767	1768	1769	1771
ROTOR TOTAL PRESSURE RATIO	1.127	1.145	1.137	1.152	1.155
STAGE TOTAL PRESSURE RATIO	1.117	1.134	1.126	1.139	1.141
ROTOR TOTAL TEMPERATURE RATIO	1.039	1.043	1.042	1.046	1.048
STAGE TOTAL TEMPERATURE RATIO	1.035	1.039	1.039	1.044	1.046
ROTOR TEMP. RISE EFFICIENCY	0.898	0.918	0.902	0.889	0.881
STAGE TEMP. RISE EFFICIENCY	0.908	0.927	0.894	0.860	0.836
ROTOR MOMENTUM RISE EFFICIENCY	0.880	0.917	0.897	0.885	0.872
ROTOR HEAD RISE COEFFICIENT	0.170	0.192	0.182	0.202	0.206
STAGE HEAD RISE COEFFICIENT	0.156	0.178	0.168	0.185	0.188
FLOW COEFFICIENT	0.799	0.762	0.695	0.618	0.592
WT FLOW PER UNIT FRONTAL AREA	164.92	159.91	149.87	136.51	131.78
WT FLOW PER UNIT ANNULUS AREA	196.34	190.37	178.42	162.52	156.88
WT FLOW AT ORIFICE	33.43	32.41	30.38	27.67	26.71
WT FLOW AT ROTOR INLET	33.45	32.45	30.39	27.76	26.76
WT FLOW AT ROTOR OUTLET	33.58	32.64	30.54	28.01	27.03
WT FLOW AT STATOR OUTLET	33.22	32.35	30.06	27.51	26.56
ROTATIVE SPEED	9152.1	9161.2	9168.0	9158.4	9141.9
PERCENT OF DESIGN SPEED	99.8	99.9	100.0	99.9	99.7

TABLE VI. - Concluded.

(c) 110 Percent design speed

Parameter	Reading number				
	1772	1773	1774	1781	1782
ROTOR TOTAL PRESSURE RATIO	1.200	1.189	1.175	1.172	1.139
STAGE TOTAL PRESSURE RATIO	1.178	1.170	1.159	1.156	1.123
ROTOR TOTAL TEMPERATURE RATIO	1.062	1.057	1.053	1.053	1.046
STAGE TOTAL TEMPERATURE RATIO	1.059	1.053	1.049	1.049	1.041
ROTOR TEMP. RISE EFFICIENCY	0.864	0.889	0.890	0.872	0.828
STAGE TEMP. RISE EFFICIENCY	0.815	0.861	0.874	0.869	0.825
ROTOR MOMENTUM RISE EFFICIENCY	0.866	0.889	0.888	0.870	0.816
ROTOR HEAD RISE COEFFICIENT	0.218	0.206	0.191	0.188	0.153
STAGE HEAD RISE COEFFICIENT	0.195	0.187	0.175	0.171	0.137
FLOW COEFFICIENT	0.584	0.637	0.677	0.728	0.756
WT FLOW PER UNIT FRONTAL AREA	139.66	149.39	156.72	164.86	168.89
WT FLOW PER UNIT ANNULUS AREA	166.26	177.85	186.57	196.26	201.06
WT FLOW AT ORIFICE	28.31	30.28	31.76	33.41	34.23
WT FLOW AT ROTOR INLET	28.50	30.43	31.83	33.47	34.26
WT FLOW AT ROTOR OUTLET	29.01	30.86	32.29	33.95	34.92
WT FLOW AT STATOR OUTLET	28.37	30.15	31.57	33.26	34.08
ROTATIVE SPEED	10019.2	10026.6	10030.5	10049.6	10041.9
PERCENT OF DESIGN SPEED	109.3	109.4	109.4	109.6	109.5

(d) 120 Percent design speed

Parameter	Reading number		
	1862	1863	1864
ROTOR TOTAL PRESSURE RATIO	1.190	1.227	1.253
STAGE TOTAL PRESSURE RATIO	1.169	1.203	1.217
ROTOR TOTAL TEMPERATURE RATIO	1.063	1.071	1.078
STAGE TOTAL TEMPERATURE RATIO	1.057	1.067	1.074
ROTOR TEMP. RISE EFFICIENCY	0.810	0.850	0.852
STAGE TEMP. RISE EFFICIENCY	0.792	0.811	0.784
ROTOR MOMENTUM RISE EFFICIENCY	0.759	0.814	0.840
ROTOR HEAD RISE COEFFICIENT	0.173	0.205	0.226
STAGE HEAD RISE COEFFICIENT	0.155	0.184	0.196
FLOW COEFFICIENT	0.689	0.637	0.586
WT FLOW PER UNIT FRONTAL AREA	168.36	159.29	149.96
WT FLOW PER UNIT ANNULUS AREA	200.43	189.63	178.53
WT FLOW AT ORIFICE	34.12	32.29	30.39
WT FLOW AT ROTOR INLET	34.18	32.44	30.59
WT FLOW AT ROTOR OUTLET	35.13	33.02	30.96
WT FLOW AT STATOR OUTLET	33.70	32.19	30.54
ROTATIVE SPEED	10975.6	10956.8	10976.0
PERCENT OF DESIGN SPEED	119.7	119.5	119.7

TABLE VII. - BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 51B

(a) 90 Percent design speed; reading number 1758

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.648	24.638	-0.0	28.5	58.3	50.2	288.6	1.048	10.10	1.143
2	23.868	23.876	-0.0	25.2	57.2	47.4	288.5	1.045	10.14	1.149
3	23.086	23.114	-0.0	25.5	56.5	45.8	288.3	1.045	10.13	1.148
4	20.731	20.828	-0.0	27.9	53.4	40.6	288.0	1.042	10.14	1.136
5	17.607	17.780	-0.0	29.9	49.3	34.6	288.0	1.035	10.14	1.114
6	14.531	14.732	-0.0	31.9	44.4	24.9	288.0	1.031	10.13	1.101
7	12.294	12.446	-0.0	33.0	39.9	14.6	288.0	1.027	10.14	1.094
8	11.565	11.684	-0.0	33.3	38.1	11.1	288.0	1.026	10.13	1.089
9	10.843	10.922	-0.0	36.4	36.5	6.5	288.0	1.026	10.12	1.080

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	131.5	139.0	250.4	190.8	131.5	122.1	-0.1	66.4	213.0	212.9
2	132.5	145.9	244.6	195.0	132.5	132.0	-0.1	62.1	205.5	205.6
3	132.2	147.2	239.5	190.5	132.2	132.9	-0.0	63.3	199.6	199.8
4	133.1	147.1	223.4	171.3	133.1	130.1	-0.1	68.8	179.4	180.2
5	131.0	140.2	200.9	147.7	131.0	121.5	-0.1	69.8	152.3	153.8
6	128.1	137.9	179.3	129.1	128.1	117.1	-0.0	72.9	125.5	127.2
7	126.9	141.0	165.5	122.2	126.9	118.2	-0.1	76.7	106.2	107.5
8	127.6	141.5	162.1	120.5	127.6	118.3	-0.1	77.7	99.9	101.0
9	126.8	137.5	157.7	111.3	126.8	110.6	-0.0	81.7	93.7	94.3

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.392	0.405	0.746	0.556	0.392	0.356	0.928	1.121
2	0.395	0.427	0.730	0.570	0.395	0.386	0.996	1.083
3	0.394	0.431	0.714	0.558	0.394	0.389	1.005	1.060
4	0.397	0.431	0.667	0.502	0.397	0.381	0.977	0.948
5	0.391	0.412	0.600	0.434	0.391	0.357	0.928	0.744
6	0.382	0.406	0.535	0.380	0.382	0.345	0.914	0.535
7	0.378	0.416	0.493	0.360	0.378	0.349	0.932	0.493
8	0.380	0.418	0.483	0.356	0.380	0.349	0.927	0.483
9	0.378	0.406	0.470	0.328	0.378	0.326	0.872	0.470

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	2.9	-1.8	8.0	0.440	0.804	0.101	0.101	0.049	0.049
2	10.00	2.7	-2.1	6.6	0.395	0.893	0.054	0.054	0.028	0.028
3	15.00	3.1	-2.2	6.8	0.402	0.899	0.052	0.052	0.027	0.027
4	30.00	3.5	-3.6	8.3	0.454	0.888	0.061	0.061	0.033	0.033
5	50.00	4.8	-5.5	13.5	0.499	0.886	0.063	0.063	0.035	0.035
6	70.00	6.0	-7.4	16.7	0.532	0.918	0.048	0.048	0.027	0.027
7	85.00	6.8	-8.1	14.1	0.526	0.961	0.024	0.024	0.013	0.013
8	90.00	6.9	-8.3	12.1	0.520	0.950	0.030	0.030	0.016	0.016
9	95.00	7.2	-8.1	8.4	0.569	0.865	0.084	0.084	0.044	0.044

TABLE VII. - Continued.

(b) 90 Percent design speed; reading number 1762

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.648	24.638	0.0	21.7	55.7	48.9	288.8	1.043	10.10	1.131
2	23.868	23.876	0.0	20.2	54.6	46.6	288.7	1.040	10.13	1.136
3	23.086	23.114	0.0	20.4	53.7	45.1	288.5	1.039	10.14	1.133
4	20.731	20.828	0.0	22.6	50.5	40.3	288.1	1.036	10.13	1.123
5	17.607	17.780	0.0	25.1	46.2	33.7	287.9	1.032	10.14	1.105
6	14.531	14.732	0.0	27.4	41.2	24.2	287.8	1.028	10.14	1.093
7	12.294	12.446	0.0	29.0	36.8	14.4	287.8	1.026	10.14	1.089
8	11.565	11.684	0.0	29.3	35.2	11.4	287.8	1.025	10.14	1.084
9	10.843	10.922	0.0	31.8	33.8	7.5	287.9	1.024	10.11	1.077

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	144.6	147.9	256.9	209.0	144.6	137.3	0.1	54.8	212.4	212.3
2	146.4	153.7	252.4	210.2	146.4	144.3	0.1	53.0	205.7	205.8
3	146.1	154.4	246.8	205.3	146.1	144.8	0.1	53.7	199.0	199.2
4	147.2	153.7	231.3	186.1	147.2	142.0	0.1	59.0	178.5	179.3
5	145.4	148.7	210.0	161.9	145.4	134.6	0.1	63.2	151.6	153.1
6	143.0	147.6	190.0	143.7	143.0	131.1	0.1	67.8	125.1	126.8
7	141.5	151.6	176.8	136.9	141.5	132.7	0.1	73.5	106.1	107.4
8	141.2	151.4	172.9	134.7	141.2	132.0	0.1	74.1	99.8	100.8
9	139.7	147.5	168.0	126.5	139.7	125.4	0.1	77.6	93.5	94.2

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.432	0.433	0.768	0.612	0.432	0.402	0.950	1.086
2	0.438	0.451	0.755	0.617	0.438	0.424	0.986	1.052
3	0.437	0.454	0.739	0.604	0.437	0.426	0.991	1.025
4	0.441	0.453	0.693	0.548	0.441	0.418	0.965	0.913
5	0.435	0.439	0.629	0.477	0.435	0.397	0.926	0.696
6	0.428	0.436	0.569	0.425	0.428	0.387	0.916	0.569
7	0.423	0.449	0.529	0.405	0.423	0.393	0.938	0.529
8	0.423	0.449	0.517	0.399	0.423	0.391	0.935	0.517
9	0.418	0.437	0.503	0.374	0.418	0.371	0.898	0.503

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	0.3	-4.3	6.7	0.348	0.830	0.075	0.075	0.038	0.038
2	10.00	0.1	-4.8	5.9	0.325	0.914	0.037	0.037	0.019	0.019
3	15.00	0.3	-5.0	6.2	0.330	0.927	0.032	0.032	0.017	0.017
4	30.00	0.5	-6.5	8.0	0.378	0.929	0.032	0.032	0.017	0.017
5	50.00	1.7	-8.7	12.5	0.432	0.915	0.039	0.039	0.022	0.022
6	70.00	2.8	-10.6	16.0	0.464	0.914	0.042	0.042	0.024	0.024
7	85.00	3.7	-11.2	13.9	0.462	0.949	0.026	0.026	0.014	0.014
8	90.00	4.0	-11.2	12.4	0.456	0.933	0.035	0.035	0.019	0.019
9	95.00	4.6	-10.8	9.4	0.492	0.874	0.066	0.066	0.035	0.035

TABLE VII. - Continued.

(c) 90 Percent design speed; reading number 1763

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.648	24.638	0.0	18.1	53.0	47.8	289.0	1.037	10.09	1.117
2	23.868	23.876	0.0	17.8	51.9	45.5	288.9	1.036	10.13	1.123
3	23.086	23.114	0.0	17.8	51.0	44.1	288.5	1.035	10.14	1.121
4	20.731	20.828	0.0	19.5	47.7	39.2	287.9	1.034	10.13	1.115
5	17.607	17.780	0.0	22.6	43.2	31.1	287.9	1.031	10.14	1.107
6	14.531	14.732	0.0	25.1	38.2	20.9	287.8	1.029	10.13	1.100
7	12.294	12.446	0.0	25.9	33.9	14.0	287.9	1.024	10.14	1.080
8	11.565	11.684	0.0	26.0	32.3	11.3	287.9	1.023	10.14	1.076
9	10.843	10.922	0.0	28.1	31.0	7.9	287.9	1.023	10.11	1.069

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	160.0	156.2	265.7	221.0	160.0	148.5	0.1	48.5	212.2	212.2
2	161.6	161.4	261.6	219.5	161.6	153.7	0.1	49.2	205.8	205.9
3	160.9	161.7	255.7	214.6	160.9	154.0	0.1	49.5	198.7	199.0
4	162.6	162.7	241.5	198.0	162.6	153.4	0.1	54.3	178.7	179.5
5	161.3	162.9	221.4	175.6	161.3	150.4	0.1	62.6	151.8	153.3
6	159.1	165.5	202.6	160.4	159.1	149.9	0.1	70.1	125.5	127.3
7	157.3	162.0	189.5	150.2	157.3	145.7	0.1	70.8	105.7	107.0
8	156.8	162.1	185.4	148.5	156.8	145.6	0.1	71.1	99.2	100.2
9	155.2	158.8	181.2	141.4	155.2	140.0	0.1	74.8	93.6	94.2

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.480	0.460	0.798	0.650	0.480	0.437	0.928	1.049
2	0.485	0.476	0.786	0.647	0.485	0.453	0.951	1.019
3	0.484	0.478	0.768	0.633	0.484	0.455	0.957	0.992
4	0.489	0.481	0.727	0.586	0.489	0.454	0.943	0.881
5	0.485	0.482	0.666	0.520	0.485	0.445	0.932	0.666
6	0.479	0.491	0.609	0.476	0.479	0.445	0.942	0.609
7	0.473	0.481	0.569	0.446	0.473	0.433	0.926	0.569
8	0.471	0.482	0.557	0.442	0.471	0.433	0.929	0.557
9	0.466	0.472	0.544	0.420	0.466	0.416	0.902	0.544

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	-2.4	-7.1	5.6	0.307	0.864	0.050	0.050	0.025	0.025
2	10.00	-2.6	-7.5	4.8	0.303	0.942	0.021	0.021	0.011	0.011
3	15.00	-2.4	-7.7	5.2	0.305	0.949	0.019	0.019	0.010	0.010
4	30.00	-2.2	-9.3	6.9	0.342	0.939	0.023	0.023	0.013	0.013
5	50.00	-1.3	-11.6	9.9	0.397	0.934	0.027	0.027	0.016	0.016
6	70.00	-0.1	-13.5	12.7	0.422	0.952	0.021	0.021	0.012	0.012
7	85.00	0.8	-14.1	13.5	0.420	0.915	0.036	0.036	0.020	0.020
8	90.00	1.1	-14.1	12.3	0.410	0.919	0.033	0.033	0.018	0.018
9	95.00	1.8	-13.6	9.8	0.438	0.823	0.077	0.077	0.040	0.040

TABLE VII. - Continued.

(d) 90 Percent design speed; reading number 1764

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.648	24.638	0.0	16.9	51.1	47.1	288.9	1.035	10.08	1.108
2	23.868	23.876	0.0	15.4	50.0	44.8	288.8	1.034	10.13	1.119
3	23.086	23.114	0.0	16.1	49.0	43.2	288.7	1.033	10.14	1.115
4	20.731	20.828	0.0	18.5	45.6	37.3	288.0	1.034	10.14	1.119
5	17.607	17.780	0.0	22.0	41.1	28.3	287.8	1.033	10.14	1.115
6	14.531	14.732	0.0	24.1	36.1	18.4	287.8	1.031	10.14	1.107
7	12.294	12.446	0.0	24.5	32.0	12.8	287.7	1.025	10.14	1.082
8	11.565	11.684	0.0	24.0	30.5	11.7	287.8	1.022	10.13	1.069
9	10.843	10.922	0.0	25.9	29.1	8.3	287.8	1.022	10.11	1.060

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	171.9	161.5	273.9	227.0	171.9	154.5	0.1	46.9	213.2	213.2
2	173.7	169.1	269.9	229.8	173.7	163.0	0.1	44.8	206.7	206.8
3	173.3	169.0	264.1	222.9	173.3	162.4	0.1	46.8	199.3	199.5
4	175.5	173.2	250.9	206.6	175.5	164.3	0.1	54.9	179.4	180.3
5	174.7	175.9	231.7	185.4	174.7	163.2	0.1	65.8	152.4	153.9
6	172.2	178.7	213.1	171.9	172.2	163.1	0.1	73.1	125.7	127.5
7	170.3	173.6	200.8	162.0	170.3	158.0	0.1	72.1	106.6	108.0
8	169.7	170.0	197.0	158.6	169.7	155.3	0.1	69.2	100.2	101.2
9	168.2	166.1	192.5	151.0	168.2	149.4	0.1	72.7	93.7	94.4

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.518	0.476	0.825	0.669	0.518	0.456	0.899	1.028
2	0.524	0.500	0.814	0.680	0.524	0.482	0.939	0.997
3	0.523	0.500	0.796	0.660	0.523	0.481	0.937	0.966
4	0.530	0.514	0.758	0.613	0.530	0.487	0.936	0.851
5	0.528	0.523	0.700	0.551	0.528	0.485	0.934	0.700
6	0.520	0.532	0.643	0.512	0.520	0.485	0.947	0.643
7	0.514	0.518	0.606	0.483	0.514	0.471	0.928	0.606
8	0.512	0.507	0.594	0.473	0.512	0.463	0.915	0.594
9	0.507	0.495	0.581	0.450	0.507	0.445	0.888	0.581

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	-4.3	-9.0	4.9	0.301	0.844	0.051	0.051	0.027	0.027
2	10.00	-4.5	-9.4	4.0	0.273	0.953	0.015	0.015	0.008	0.008
3	15.00	-4.4	-9.7	4.3	0.288	0.948	0.017	0.017	0.009	0.009
4	30.00	-4.3	-11.4	5.0	0.333	0.956	0.016	0.016	0.009	0.009
5	50.00	-3.4	-13.8	7.2	0.391	0.963	0.015	0.015	0.009	0.009
6	70.00	-2.3	-15.7	10.2	0.406	0.960	0.017	0.017	0.010	0.010
7	85.00	-1.1	-16.0	12.4	0.397	0.892	0.043	0.043	0.023	0.023
8	90.00	-0.7	-15.9	12.7	0.388	0.860	0.050	0.050	0.027	0.027
9	95.00	-0.1	-15.5	10.2	0.416	0.762	0.088	0.088	0.046	0.046

TABLE VII. - Continued.

(e) 90 Percent design speed; reading number 1765

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.648	24.638	0.0	11.8	48.5	46.2	289.2	1.026	10.07	1.073
2	23.868	23.876	0.0	10.3	47.3	44.3	288.9	1.026	10.13	1.084
3	23.086	23.114	0.0	11.1	46.5	42.8	288.6	1.025	10.13	1.085
4	20.731	20.828	0.0	13.6	42.9	36.9	288.0	1.027	10.14	1.089
5	17.607	17.780	0.0	17.0	38.4	28.1	287.8	1.028	10.14	1.095
6	14.531	14.732	0.0	20.1	33.4	18.1	287.8	1.029	10.14	1.094
7	12.294	12.446	0.0	20.7	29.4	11.9	287.7	1.024	10.14	1.078
8	11.565	11.684	0.0	20.4	28.0	11.0	287.7	1.022	10.14	1.062
9	10.843	10.922	0.0	20.9	26.7	9.5	287.7	1.020	10.11	1.047

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	188.6	174.0	284.5	246.0	188.6	170.4	0.1	35.5	213.1	213.0
2	190.4	181.2	280.9	249.3	190.4	178.3	0.1	32.4	206.6	206.7
3	189.6	182.0	275.4	243.3	189.6	178.6	0.1	34.9	199.8	200.1
4	192.6	186.5	263.0	226.7	192.6	181.3	0.1	43.9	179.2	180.1
5	192.3	191.5	245.3	207.6	192.3	183.1	0.1	56.1	152.4	153.9
6	190.5	196.2	228.2	193.8	190.5	184.3	0.1	67.4	125.8	127.5
7	188.8	195.6	216.6	187.0	188.8	183.0	0.1	69.1	106.3	107.6
8	188.4	190.8	213.3	182.2	188.4	178.9	0.1	66.5	100.2	101.3
9	186.6	184.1	208.8	174.4	186.6	172.0	0.1	65.6	93.9	94.5

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.571	0.517	0.861	0.731	0.571	0.506	0.903	0.980
2	0.577	0.540	0.851	0.743	0.577	0.531	0.936	0.946
3	0.575	0.543	0.835	0.726	0.575	0.533	0.942	0.922
4	0.585	0.557	0.799	0.678	0.585	0.542	0.941	0.799
5	0.584	0.573	0.745	0.621	0.584	0.548	0.952	0.745
6	0.579	0.588	0.693	0.581	0.579	0.552	0.967	0.693
7	0.573	0.588	0.658	0.562	0.573	0.550	0.970	0.658
8	0.572	0.573	0.648	0.547	0.572	0.537	0.950	0.648
9	0.566	0.552	0.634	0.523	0.566	0.516	0.922	0.634

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	-6.9	-11.6	4.0	0.230	0.783	0.050	0.050	0.026	0.026
2	10.00	-7.1	-12.0	3.6	0.199	0.891	0.026	0.026	0.014	0.014
3	15.00	-6.9	-12.2	3.8	0.211	0.929	0.017	0.017	0.009	0.009
4	30.00	-7.0	-14.1	4.6	0.257	0.896	0.028	0.028	0.016	0.016
5	50.00	-6.1	-16.5	6.9	0.308	0.926	0.023	0.023	0.014	0.014
6	70.00	-5.0	-18.4	9.9	0.333	0.910	0.032	0.032	0.019	0.019
7	85.00	-3.8	-18.7	11.4	0.318	0.901	0.032	0.032	0.018	0.018
8	90.00	-3.2	-18.4	12.0	0.317	0.808	0.058	0.058	0.031	0.031
9	95.00	-2.5	-17.9	11.4	0.331	0.659	0.099	0.099	0.052	0.052

TABLE VII. - Continued.

(f) 100 Percent design speed; reading number 1766

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.648	24.638	0.0	18.0	50.7	47.1	289.1	1.044	10.08	1.122
2	23.868	23.876	0.0	15.7	49.6	44.8	288.9	1.041	10.13	1.140
3	23.086	23.114	0.0	16.2	48.7	43.1	288.6	1.041	10.14	1.139
4	20.731	20.828	0.0	18.2	45.2	37.7	287.9	1.042	10.14	1.137
5	17.607	17.780	0.0	21.3	40.7	28.9	287.9	1.039	10.14	1.134
6	14.531	14.732	0.0	23.8	35.7	18.7	287.8	1.037	10.14	1.127
7	12.294	12.446	0.0	24.2	31.6	12.8	287.7	1.030	10.14	1.096
8	11.565	11.684	0.0	24.1	30.1	11.4	287.8	1.027	10.14	1.080
9	10.843	10.922	0.0	25.5	28.7	8.9	287.7	1.027	10.11	1.069

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	193.0	176.9	304.7	247.3	193.0	168.3	0.1	54.6	235.9	235.8
2	194.6	186.8	300.2	253.2	194.6	179.8	0.1	50.6	228.7	228.8
3	194.3	187.9	294.3	247.4	194.3	180.5	0.1	52.3	221.2	221.5
4	197.0	190.7	279.7	228.9	197.0	181.1	0.1	59.7	198.8	199.7
5	196.1	193.9	258.6	206.4	196.1	180.6	0.1	70.5	168.8	170.4
6	193.6	198.2	238.5	191.4	193.6	181.3	0.1	80.0	139.4	141.3
7	191.7	193.4	225.0	180.9	191.7	176.4	0.1	79.3	117.8	119.3
8	191.2	188.7	220.9	175.8	191.2	172.3	0.1	77.0	110.8	111.9
9	189.4	183.4	216.0	167.6	189.4	165.6	0.1	78.9	104.0	104.8

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.585	0.522	0.924	0.729	0.585	0.496	0.872	1.138
2	0.591	0.553	0.911	0.750	0.591	0.533	0.924	1.104
3	0.590	0.558	0.894	0.734	0.590	0.535	0.929	1.075
4	0.600	0.567	0.852	0.680	0.600	0.538	0.919	0.941
5	0.597	0.578	0.787	0.615	0.597	0.538	0.921	0.787
6	0.589	0.592	0.725	0.572	0.589	0.542	0.936	0.725
7	0.583	0.579	0.684	0.542	0.583	0.528	0.920	0.684
8	0.581	0.565	0.671	0.526	0.581	0.516	0.901	0.671
9	0.575	0.548	0.656	0.501	0.575	0.495	0.874	0.656

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	-4.7	-9.4	4.9	0.324	0.766	0.080	0.080	0.041	0.041
2	10.00	-4.9	-9.7	4.0	0.283	0.921	0.026	0.026	0.014	0.014
3	15.00	-4.7	-10.0	4.2	0.292	0.924	0.026	0.026	0.014	0.014
4	30.00	-4.7	-11.8	5.4	0.335	0.902	0.036	0.036	0.020	0.020
5	50.00	-3.8	-14.2	7.8	0.385	0.929	0.028	0.028	0.017	0.017
6	70.00	-2.7	-16.1	10.5	0.405	0.942	0.025	0.025	0.014	0.014
7	85.00	-1.6	-16.5	12.3	0.396	0.882	0.044	0.044	0.025	0.025
8	90.00	-1.1	-16.3	12.4	0.396	0.824	0.062	0.062	0.033	0.033
9	95.00	-0.5	-15.9	10.8	0.418	0.716	0.103	0.103	0.054	0.054

TABLE VII. - Continued.

(g) 100 Percent design speed; reading number 1767

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.648	24.638	0.0	20.6	51.8	47.5	289.1	1.051	10.09	1.148
2	23.868	23.876	0.0	18.4	50.8	44.8	288.9	1.048	10.13	1.167
3	23.086	23.114	0.0	18.6	49.9	43.2	288.6	1.047	10.14	1.166
4	20.731	20.828	0.0	20.9	46.4	37.4	288.0	1.046	10.14	1.161
5	17.607	17.780	0.0	23.8	42.1	29.0	287.8	1.043	10.14	1.149
6	14.531	14.732	0.0	25.8	37.1	19.2	287.8	1.038	10.14	1.132
7	12.294	12.446	0.0	25.9	32.9	14.0	287.7	1.031	10.14	1.095
8	11.565	11.684	0.0	25.5	31.4	12.3	287.8	1.028	10.14	1.086
9	10.843	10.922	0.0	28.1	30.1	8.5	287.8	1.029	10.11	1.076

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	185.8	172.0	300.6	238.3	185.8	161.0	0.1	60.6	236.4	236.3
2	186.7	182.0	295.3	243.4	186.7	172.7	0.1	57.5	229.0	229.0
3	186.5	183.4	289.4	238.4	186.5	173.8	0.1	58.6	221.5	221.7
4	188.5	186.3	273.6	219.0	188.5	174.0	0.1	66.5	198.4	199.4
5	186.9	187.5	251.9	196.1	186.9	171.6	0.1	75.7	169.0	170.6
6	184.3	188.6	231.0	179.8	184.3	169.7	0.1	82.1	139.5	141.4
7	181.9	180.6	216.8	167.4	181.9	162.4	0.1	78.9	118.0	119.4
8	181.4	178.6	212.6	165.0	181.4	161.2	0.1	77.0	111.0	112.1
9	179.4	174.2	207.4	155.4	179.4	153.7	0.1	81.9	104.2	104.9

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.562	0.505	0.909	0.699	0.562	0.472	0.866	1.158
2	0.565	0.537	0.894	0.718	0.565	0.509	0.925	1.124
3	0.565	0.541	0.877	0.704	0.565	0.513	0.932	1.096
4	0.572	0.551	0.830	0.648	0.572	0.515	0.923	0.964
5	0.567	0.556	0.764	0.582	0.567	0.509	0.918	0.764
6	0.559	0.561	0.700	0.535	0.559	0.505	0.921	0.700
7	0.551	0.538	0.657	0.499	0.551	0.484	0.893	0.657
8	0.549	0.533	0.644	0.492	0.549	0.481	0.888	0.644
9	0.543	0.518	0.628	0.463	0.543	0.457	0.857	0.628

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	-3.6	-8.3	5.3	0.361	0.785	0.087	0.087	0.045	0.045
2	10.00	-3.7	-8.5	4.0	0.322	0.942	0.023	0.023	0.012	0.012
3	15.00	-3.5	-8.8	4.2	0.327	0.948	0.021	0.021	0.011	0.011
4	30.00	-3.5	-10.6	5.1	0.374	0.947	0.022	0.022	0.013	0.013
5	50.00	-2.4	-12.8	7.8	0.423	0.949	0.023	0.023	0.013	0.013
6	70.00	-1.3	-14.7	11.0	0.442	0.938	0.029	0.029	0.017	0.017
7	85.00	-0.2	-15.1	13.6	0.434	0.856	0.059	0.059	0.033	0.033
8	90.00	0.2	-15.0	13.3	0.423	0.845	0.061	0.061	0.033	0.033
9	95.00	0.9	-14.5	10.4	0.460	0.732	0.113	0.113	0.059	0.059

TABLE VII. - Continued.

(h) 100 Percent design speed; reading number 1768

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.648	24.638	0.0	21.6	54.4	48.2	289.1	1.050	10.10	1.158
2	23.868	23.876	0.0	19.7	53.3	46.1	288.8	1.048	10.13	1.167
3	23.086	23.114	0.0	19.7	52.4	44.8	288.4	1.047	10.13	1.163
4	20.731	20.828	0.0	21.5	49.1	40.3	288.0	1.044	10.14	1.147
5	17.607	17.780	0.0	24.5	44.8	33.5	287.9	1.039	10.14	1.127
6	14.531	14.732	0.0	26.8	39.8	23.3	287.8	1.036	10.14	1.116
7	12.294	12.446	0.0	28.1	35.5	14.3	287.8	1.032	10.13	1.107
8	11.565	11.684	0.0	28.4	34.0	11.3	287.8	1.031	10.14	1.103
9	10.843	10.922	0.0	30.9	32.5	7.6	287.8	1.031	10.11	1.091

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	169.5	168.1	290.9	234.3	169.5	156.3	0.1	62.0	236.6	236.5
2	171.1	174.5	286.1	236.8	171.1	164.3	0.1	58.8	229.4	229.5
3	170.7	174.2	279.5	231.3	170.7	164.0	0.1	58.6	221.5	221.7
4	172.2	172.6	262.8	210.6	172.2	160.6	0.1	63.3	198.6	199.5
5	170.2	168.1	239.9	183.5	170.2	153.0	0.1	69.6	169.2	170.9
6	167.3	169.0	217.6	164.4	167.3	150.9	0.1	76.2	139.4	141.3
7	165.4	171.7	203.2	156.3	165.4	151.5	0.1	80.9	118.2	119.6
8	164.9	172.3	198.8	154.5	164.9	151.5	0.1	82.0	111.2	112.3
9	163.4	167.1	193.7	144.6	163.4	143.3	0.1	85.8	104.1	104.9

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.510	0.493	0.876	0.687	0.510	0.458	0.922	1.196
2	0.516	0.513	0.862	0.697	0.516	0.483	0.960	1.161
3	0.515	0.513	0.843	0.681	0.515	0.483	0.961	1.130
4	0.520	0.509	0.793	0.621	0.520	0.474	0.933	1.003
5	0.514	0.497	0.724	0.542	0.514	0.452	0.899	0.736
6	0.504	0.500	0.656	0.487	0.504	0.447	0.902	0.656
7	0.498	0.510	0.612	0.464	0.498	0.450	0.916	0.612
8	0.497	0.512	0.599	0.459	0.497	0.450	0.919	0.599
9	0.492	0.496	0.583	0.429	0.492	0.425	0.877	0.583

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	-1.0	-5.7	6.0	0.357	0.847	0.065	0.065	0.033	0.033
2	10.00	-1.2	-6.1	5.3	0.327	0.931	0.029	0.029	0.015	0.015
3	15.00	-1.0	-6.3	5.9	0.328	0.939	0.026	0.026	0.014	0.014
4	30.00	-0.9	-7.9	8.0	0.371	0.910	0.039	0.039	0.021	0.021
5	50.00	0.3	-10.0	12.3	0.430	0.899	0.045	0.045	0.025	0.025
6	70.00	1.4	-12.0	15.1	0.461	0.881	0.058	0.058	0.033	0.033
7	85.00	2.4	-12.5	13.9	0.457	0.915	0.042	0.042	0.023	0.023
8	90.00	2.8	-12.4	12.3	0.449	0.918	0.040	0.040	0.022	0.022
9	95.00	3.3	-12.1	9.5	0.488	0.824	0.088	0.088	0.046	0.046

TABLE VII. - Continued.

(i) 100 Percent design speed; reading number 1769

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.648	24.638	0.0	26.9	57.2	49.4	288.8	1.059	10.10	1.180
2	23.868	23.876	0.0	24.4	56.3	47.1	288.7	1.056	10.13	1.188
3	23.086	23.114	0.0	25.0	55.5	45.7	288.4	1.054	10.14	1.183
4	20.731	20.828	0.0	26.7	52.4	41.5	288.0	1.049	10.13	1.164
5	17.607	17.780	0.0	29.2	48.1	35.0	287.9	1.042	10.14	1.137
6	14.531	14.732	0.0	30.9	43.2	24.4	287.9	1.038	10.14	1.127
7	12.294	12.446	0.0	31.9	38.9	15.3	287.9	1.034	10.14	1.114
8	11.565	11.684	0.0	32.6	37.4	11.6	287.9	1.033	10.13	1.110
9	10.843	10.922	0.0	35.5	36.0	7.6	287.9	1.032	10.12	1.098

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	152.3	158.2	281.1	217.0	152.3	141.2	0.1	71.5	236.3	236.2
2	152.6	164.3	274.8	219.7	152.6	149.6	0.1	67.8	228.6	228.7
3	152.5	164.1	268.9	213.1	152.5	148.8	0.1	69.3	221.6	221.9
4	153.4	161.4	251.2	192.4	153.4	144.1	0.1	72.6	199.0	199.9
5	151.2	155.0	226.4	165.3	151.2	135.4	0.1	75.5	168.7	170.3
6	148.3	156.5	203.4	147.5	148.3	134.3	0.1	80.4	139.3	141.3
7	145.8	157.0	187.4	138.2	145.8	133.3	0.1	83.0	117.9	119.4
8	144.8	157.5	182.3	135.5	144.8	132.7	0.1	84.8	110.9	112.0
9	143.2	152.0	177.0	124.8	143.2	123.7	0.1	88.3	104.1	104.9

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.456	0.461	0.842	0.632	0.456	0.411	0.927	1.232
2	0.457	0.480	0.824	0.642	0.457	0.437	0.981	1.196
3	0.457	0.480	0.806	0.624	0.457	0.435	0.976	1.168
4	0.460	0.473	0.754	0.564	0.460	0.423	0.940	1.044
5	0.453	0.456	0.679	0.486	0.453	0.398	0.896	0.811
6	0.445	0.461	0.610	0.435	0.445	0.396	0.906	0.610
7	0.437	0.464	0.561	0.408	0.437	0.394	0.914	0.561
8	0.434	0.465	0.546	0.400	0.434	0.392	0.917	0.546
9	0.429	0.449	0.530	0.368	0.429	0.365	0.864	0.530

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	1.8	-2.9	7.2	0.422	0.817	0.095	0.095	0.047	0.047
2	10.00	1.8	-3.1	6.3	0.386	0.903	0.050	0.050	0.026	0.026
3	15.00	2.1	-3.2	6.8	0.399	0.909	0.047	0.047	0.024	0.024
4	30.00	2.4	-4.6	9.2	0.441	0.897	0.054	0.054	0.029	0.029
5	50.00	3.6	-6.7	13.8	0.494	0.880	0.064	0.064	0.035	0.035
6	70.00	4.8	-8.6	16.2	0.519	0.910	0.052	0.052	0.029	0.029
7	85.00	5.8	-9.1	14.8	0.514	0.928	0.043	0.043	0.023	0.023
8	90.00	6.2	-9.0	12.6	0.512	0.931	0.041	0.041	0.022	0.022
9	95.00	6.8	-8.6	9.5	0.559	0.845	0.096	0.096	0.050	0.050

TABLE VII. - Continued.

(j) 100 Percent design speed; reading number 1771

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.648	24.638	0.0	29.6	58.4	50.3	288.8	1.062	10.11	1.182
2	23.868	23.876	0.0	26.0	57.3	47.5	288.6	1.058	10.14	1.192
3	23.086	23.114	0.0	26.0	56.5	46.1	288.3	1.056	10.14	1.186
4	20.731	20.828	0.0	28.7	53.5	41.9	288.0	1.051	10.13	1.165
5	17.607	17.780	0.0	31.4	49.5	35.2	287.9	1.044	10.13	1.142
6	14.531	14.732	0.0	32.8	44.6	24.4	287.9	1.039	10.14	1.131
7	12.294	12.446	0.0	33.1	40.1	15.6	287.9	1.034	10.13	1.116
8	11.565	11.684	0.0	33.8	38.4	11.8	287.8	1.033	10.13	1.110
9	10.843	10.922	0.0	36.7	36.8	7.4	288.0	1.032	10.10	1.100

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	145.4	153.4	277.5	208.7	145.4	133.4	0.1	75.9	236.5	236.4
2	147.1	161.5	272.1	214.9	147.1	145.2	0.1	70.7	229.1	229.1
3	145.8	160.8	264.3	208.4	145.8	144.5	0.1	70.6	220.5	220.8
4	146.3	156.8	246.1	184.8	146.3	137.5	0.1	75.4	198.0	198.9
5	143.6	151.5	221.3	158.4	143.6	129.4	0.1	78.9	168.5	170.1
6	141.3	153.1	198.3	141.2	141.3	128.7	0.1	82.9	139.2	141.1
7	140.0	152.8	182.9	132.9	140.0	128.0	0.1	83.5	117.8	119.3
8	139.7	153.3	178.3	130.2	139.7	127.5	0.1	85.2	110.8	111.9
9	138.2	148.8	172.7	120.2	138.2	119.2	0.1	89.0	103.6	104.4

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.435	0.446	0.830	0.606	0.435	0.387	0.917	1.249
2	0.440	0.471	0.814	0.627	0.440	0.424	0.987	1.211
3	0.436	0.470	0.791	0.609	0.436	0.422	0.991	1.174
4	0.438	0.459	0.737	0.541	0.438	0.402	0.939	1.050
5	0.430	0.445	0.663	0.465	0.430	0.380	0.901	0.828
6	0.423	0.450	0.593	0.416	0.423	0.379	0.910	0.593
7	0.419	0.451	0.547	0.392	0.419	0.378	0.914	0.547
8	0.418	0.453	0.533	0.385	0.418	0.376	0.912	0.533
9	0.413	0.439	0.516	0.355	0.413	0.352	0.863	0.516

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	3.0	-1.7	8.1	0.456	0.789	0.116	0.116	0.057	0.057
2	10.00	2.8	-2.0	6.7	0.406	0.883	0.063	0.063	0.032	0.032
3	15.00	3.1	-2.1	7.1	0.410	0.886	0.063	0.063	0.032	0.032
4	30.00	3.6	-3.5	9.6	0.469	0.882	0.066	0.066	0.035	0.035
5	50.00	5.0	-5.3	14.0	0.524	0.888	0.064	0.064	0.035	0.035
6	70.00	6.2	-7.2	16.2	0.546	0.927	0.045	0.045	0.025	0.025
7	85.00	6.9	-8.0	15.2	0.533	0.937	0.039	0.039	0.021	0.021
8	90.00	7.2	-8.0	12.8	0.532	0.931	0.043	0.043	0.023	0.023
9	95.00	7.6	-7.8	9.3	0.577	0.860	0.091	0.091	0.048	0.048

TABLE VII. - Continued.

(k) 110 Percent design speed; reading number 1772

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.648	24.638	0.0	33.0	59.1	50.1	288.8	1.083	10.11	1.235
2	23.868	23.876	0.0	28.7	57.7	47.4	288.7	1.075	10.14	1.241
3	23.086	23.114	0.0	28.3	56.7	45.7	288.4	1.072	10.15	1.239
4	20.731	20.828	0.0	30.5	53.7	41.2	288.0	1.067	10.13	1.217
5	17.607	17.780	0.0	33.3	49.7	34.4	287.9	1.056	10.13	1.184
6	14.531	14.732	0.0	34.8	45.1	23.5	287.9	1.050	10.13	1.171
7	12.294	12.446	0.0	34.9	40.7	15.2	287.9	1.043	10.13	1.145
8	11.565	11.684	0.0	35.7	39.1	12.0	287.8	1.040	10.13	1.133
9	10.843	10.922	0.0	38.8	37.7	7.0	288.0	1.040	10.10	1.124

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	154.9	167.1	301.6	218.5	154.9	140.1	0.1	91.0	258.9	258.7
2	157.6	174.1	295.3	225.6	157.6	152.7	0.1	83.7	249.8	249.8
3	159.1	175.9	289.6	221.9	159.1	154.9	0.1	83.5	242.1	242.4
4	160.2	173.3	270.3	198.5	160.2	149.3	0.1	88.0	217.8	218.8
5	155.9	165.7	241.2	167.9	155.9	138.5	0.1	91.1	184.2	186.0
6	152.1	166.9	215.5	149.3	152.1	137.0	0.1	95.3	152.7	154.8
7	149.9	164.1	197.6	139.5	149.9	134.6	0.1	93.9	128.9	130.5
8	149.4	162.0	192.4	134.5	149.4	131.6	0.1	94.5	121.3	122.6
9	147.5	159.1	186.5	124.9	147.5	124.0	0.1	99.7	114.1	115.0

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.464	0.482	0.904	0.631	0.464	0.404	0.905	1.381
2	0.473	0.506	0.886	0.655	0.473	0.443	0.969	1.331
3	0.478	0.512	0.870	0.646	0.478	0.451	0.974	1.296
4	0.482	0.506	0.813	0.579	0.482	0.436	0.932	1.161
5	0.468	0.485	0.725	0.491	0.468	0.405	0.888	0.911
6	0.457	0.490	0.647	0.439	0.457	0.402	0.900	0.647
7	0.450	0.483	0.593	0.411	0.450	0.396	0.898	0.593
8	0.448	0.478	0.577	0.397	0.448	0.388	0.881	0.577
9	0.442	0.469	0.559	0.368	0.442	0.365	0.840	0.559

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	3.7	-1.0	7.9	0.505	0.751	0.158	0.151	0.077	0.074
2	10.00	3.3	-1.6	6.6	0.449	0.849	0.091	0.087	0.046	0.045
3	15.00	3.3	-2.0	6.8	0.449	0.881	0.071	0.069	0.037	0.036
4	30.00	3.7	-3.4	8.9	0.499	0.869	0.081	0.081	0.044	0.044
5	50.00	5.2	-5.1	13.2	0.558	0.875	0.079	0.079	0.044	0.044
6	70.00	6.7	-6.7	15.3	0.581	0.915	0.058	0.058	0.033	0.033
7	85.00	7.6	-7.3	14.8	0.564	0.920	0.054	0.054	0.030	0.030
8	90.00	7.9	-7.3	13.0	0.571	0.917	0.055	0.055	0.029	0.029
9	95.00	8.5	-6.9	8.9	0.613	0.852	0.104	0.104	0.054	0.054

TABLE VII. - Continued.

(*l*) 110 Percent design speed; reading number 1773

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.648	24.638	0.0	28.3	56.8	49.3	288.9	1.075	10.11	1.219
2	23.868	23.876	0.0	24.4	55.5	46.8	288.8	1.069	10.14	1.232
3	23.086	23.114	0.0	24.5	54.5	45.4	288.5	1.065	10.14	1.225
4	20.731	20.828	0.0	26.9	51.4	40.7	288.0	1.061	10.13	1.206
5	17.607	17.780	0.0	29.2	47.4	34.2	287.8	1.052	10.13	1.174
6	14.531	14.732	0.0	31.4	42.5	23.7	287.9	1.046	10.13	1.156
7	12.294	12.446	0.0	31.9	38.2	14.7	288.0	1.041	10.13	1.140
8	11.565	11.684	0.0	32.7	36.7	11.3	287.9	1.039	10.13	1.133
9	10.843	10.922	0.0	35.7	35.2	7.3	287.9	1.039	10.10	1.117

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	169.7	172.9	309.7	233.5	169.7	152.2	0.1	81.9	259.2	259.1
2	172.1	181.4	303.9	241.3	172.1	165.2	0.1	74.8	250.6	250.7
3	172.9	181.3	297.6	235.0	172.9	164.9	0.1	75.3	242.3	242.6
4	173.7	179.5	278.5	211.2	173.7	160.2	0.1	81.2	217.8	218.8
5	170.2	172.6	251.2	182.2	170.2	150.6	0.1	84.2	184.9	186.7
6	166.4	172.4	225.6	160.8	166.4	147.2	0.1	89.8	152.5	154.6
7	163.9	173.7	208.5	152.5	163.9	147.5	0.1	91.8	129.0	130.6
8	163.2	173.2	203.4	148.7	163.2	145.8	0.1	93.5	121.5	122.8
9	161.4	166.7	197.4	136.4	161.4	135.3	0.1	97.4	113.8	114.6

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.511	0.502	0.932	0.678	0.511	0.442	0.897	1.351
2	0.519	0.529	0.916	0.704	0.519	0.482	0.960	1.306
3	0.521	0.530	0.898	0.687	0.521	0.482	0.954	1.270
4	0.524	0.526	0.841	0.619	0.524	0.470	0.922	1.136
5	0.513	0.507	0.758	0.535	0.513	0.443	0.885	0.880
6	0.501	0.508	0.680	0.474	0.501	0.434	0.885	0.680
7	0.493	0.514	0.628	0.451	0.493	0.436	0.900	0.628
8	0.491	0.513	0.612	0.440	0.491	0.431	0.894	0.612
9	0.485	0.492	0.594	0.403	0.485	0.400	0.839	0.594

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	1.3	-3.3	7.1	0.447	0.781	0.122	0.115	0.060	0.057
2	10.00	1.1	-3.8	6.0	0.392	0.892	0.057	0.054	0.030	0.028
3	15.00	1.1	-4.2	6.5	0.399	0.914	0.045	0.044	0.024	0.023
4	30.00	1.5	-5.6	8.4	0.451	0.901	0.054	0.054	0.029	0.029
5	50.00	2.9	-7.5	13.0	0.500	0.895	0.058	0.058	0.032	0.032
6	70.00	4.1	-9.3	15.5	0.533	0.919	0.047	0.047	0.026	0.026
7	85.00	5.1	-9.8	14.3	0.519	0.939	0.036	0.036	0.019	0.019
8	90.00	5.5	-9.7	12.3	0.521	0.923	0.046	0.046	0.024	0.024
9	95.00	6.0	-9.4	9.1	0.570	0.827	0.106	0.106	0.056	0.056

TABLE VII. - Continued.

(m) 110 Percent design speed; reading number 1774

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.648	24.638	0.0	24.5	55.1	48.7	288.9	1.067	10.09	1.199
2	23.868	23.876	0.0	21.9	54.0	46.4	288.8	1.063	10.13	1.211
3	23.086	23.114	0.0	21.6	53.0	45.0	288.5	1.060	10.14	1.208
4	20.731	20.828	0.0	23.7	49.8	40.4	288.0	1.056	10.13	1.189
5	17.607	17.780	0.0	26.1	45.5	33.7	287.9	1.049	10.14	1.162
6	14.531	14.732	0.0	28.5	40.5	23.4	287.8	1.043	10.14	1.147
7	12.294	12.446	0.0	29.4	36.2	14.2	287.7	1.039	10.14	1.136
8	11.565	11.684	0.0	29.9	34.7	11.2	287.8	1.039	10.14	1.129
9	10.843	10.922	0.0	32.7	33.2	7.6	287.8	1.038	10.11	1.110

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	180.4	178.3	315.4	245.8	180.4	162.2	0.1	74.0	258.8	258.6
2	182.3	186.2	309.8	250.4	182.3	172.7	0.1	69.4	250.7	250.7
3	182.3	186.9	303.0	245.5	182.3	173.7	0.1	68.9	242.2	242.5
4	184.1	185.1	285.1	222.5	184.1	169.5	0.1	74.5	217.8	218.8
5	181.6	179.8	259.1	194.1	181.6	161.5	0.1	79.1	185.0	186.8
6	178.5	180.4	234.9	172.7	178.5	158.5	0.1	86.2	152.8	154.9
7	175.9	183.3	218.1	164.7	175.9	159.7	0.1	90.1	129.0	130.6
8	175.6	183.6	213.7	162.2	175.6	159.1	0.1	91.5	121.8	123.0
9	173.8	175.7	207.7	149.2	173.8	147.9	0.1	94.9	113.8	114.6

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.545	0.520	0.953	0.717	0.545	0.473	0.899	1.325
2	0.551	0.546	0.937	0.734	0.551	0.506	0.948	1.286
3	0.551	0.549	0.917	0.721	0.551	0.510	0.953	1.250
4	0.558	0.545	0.864	0.655	0.558	0.499	0.920	1.116
5	0.550	0.530	0.785	0.573	0.550	0.476	0.889	0.840
6	0.540	0.534	0.711	0.511	0.540	0.469	0.888	0.711
7	0.532	0.544	0.659	0.489	0.532	0.474	0.908	0.659
8	0.531	0.545	0.646	0.482	0.531	0.473	0.906	0.646
9	0.525	0.521	0.627	0.442	0.525	0.438	0.851	0.627

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	-0.3	-5.0	6.5	0.399	0.797	0.099	0.093	0.050	0.047
2	10.00	-0.5	-5.4	5.6	0.361	0.887	0.054	0.051	0.028	0.026
3	15.00	-0.4	-5.6	6.0	0.359	0.917	0.039	0.038	0.021	0.020
4	30.00	-0.2	-7.2	8.1	0.407	0.900	0.048	0.048	0.026	0.026
5	50.00	1.0	-9.3	12.5	0.456	0.888	0.055	0.055	0.031	0.031
6	70.00	2.2	-11.2	15.2	0.492	0.921	0.040	0.040	0.023	0.023
7	85.00	3.1	-11.8	13.8	0.479	0.941	0.031	0.031	0.017	0.017
8	90.00	3.5	-11.7	12.2	0.476	0.912	0.047	0.047	0.025	0.025
9	95.00	4.0	-11.4	9.5	0.524	0.805	0.105	0.105	0.055	0.055

TABLE VII. - Continued.

(n) 110 Percent design speed; reading number 1781

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.648	24.638	-0.0	23.1	53.2	49.0	289.0	1.065	10.09	1.171
2	23.868	23.876	-0.0	20.4	52.2	45.8	288.9	1.062	10.13	1.195
3	23.086	23.114	-0.0	20.0	51.3	43.9	288.5	1.060	10.13	1.197
4	20.731	20.828	-0.0	22.5	47.8	38.2	288.0	1.057	10.14	1.191
5	17.607	17.780	-0.0	25.4	43.4	30.0	287.9	1.053	10.14	1.177
6	14.531	14.732	-0.0	27.0	38.3	20.2	287.8	1.046	10.14	1.156
7	12.294	12.446	-0.0	27.2	34.1	14.5	287.8	1.037	10.14	1.117
8	11.565	11.684	-0.0	27.2	32.5	12.2	287.7	1.035	10.14	1.108
9	10.843	10.922	-0.0	29.7	31.2	8.6	287.8	1.034	10.10	1.094

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	194.0	178.7	324.1	250.8	194.0	164.4	-0.0	70.1	259.5	259.4
2	194.9	191.5	318.1	257.6	194.9	179.5	-0.0	66.6	251.4	251.4
3	194.7	195.1	311.4	254.6	194.7	183.3	-0.0	66.7	243.1	243.4
4	197.5	197.3	294.2	232.0	197.5	182.2	-0.0	75.5	218.0	219.1
5	195.9	197.0	269.7	205.4	195.9	178.0	-0.0	84.6	185.3	187.2
6	193.4	198.3	246.5	188.3	193.4	176.7	-0.0	90.0	152.8	154.9
7	191.3	190.5	231.0	175.0	191.3	169.4	-0.0	87.1	129.4	131.0
8	191.0	189.6	226.4	172.5	191.0	168.7	-0.0	86.5	121.6	122.8
9	188.5	183.6	220.3	161.4	188.5	159.6	-0.0	90.9	114.1	115.0

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.589	0.522	0.983	0.732	0.589	0.480	0.847	1.303
2	0.592	0.562	0.966	0.757	0.592	0.527	0.921	1.265
3	0.591	0.574	0.946	0.750	0.591	0.540	0.942	1.233
4	0.601	0.583	0.896	0.686	0.601	0.539	0.923	1.091
5	0.596	0.584	0.821	0.608	0.596	0.527	0.908	0.821
6	0.588	0.590	0.750	0.560	0.588	0.526	0.914	0.750
7	0.581	0.568	0.702	0.522	0.581	0.505	0.885	0.702
8	0.580	0.565	0.688	0.515	0.580	0.503	0.883	0.688
9	0.572	0.547	0.669	0.480	0.572	0.475	0.847	0.669

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	-2.2	-6.9	6.8	0.391	0.709	0.132	0.126	0.066	0.063
2	10.00	-2.2	-7.1	5.1	0.348	0.846	0.069	0.065	0.036	0.034
3	15.00	-2.1	-7.3	5.0	0.342	0.873	0.057	0.055	0.031	0.030
4	30.00	-2.1	-9.2	5.9	0.396	0.905	0.044	0.044	0.025	0.025
5	50.00	-1.1	-11.4	8.8	0.450	0.909	0.044	0.044	0.026	0.026
6	70.00	-0.1	-13.5	12.0	0.462	0.921	0.039	0.039	0.022	0.022
7	85.00	1.0	-13.9	14.1	0.457	0.878	0.053	0.053	0.029	0.029
8	90.00	1.3	-13.9	13.1	0.448	0.855	0.063	0.063	0.034	0.034
9	95.00	2.0	-13.4	10.5	0.486	0.762	0.106	0.106	0.055	0.055

TABLE VII. - Continued.

(o) 110 Percent design speed; reading number 1782

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.648	24.638	-0.0	18.0	52.2	48.0	289.0	1.054	10.09	1.138
2	23.868	23.876	-0.0	16.2	51.2	45.7	288.8	1.052	10.13	1.157
3	23.086	23.114	-0.0	16.2	50.3	43.9	288.5	1.050	10.13	1.156
4	20.731	20.828	-0.0	18.3	46.9	39.3	288.0	1.047	10.14	1.141
5	17.607	17.780	-0.0	21.1	42.3	31.6	287.9	1.044	10.14	1.135
6	14.531	14.732	-0.0	24.2	37.2	19.9	287.9	1.044	10.14	1.147
7	12.294	12.446	-0.0	25.1	33.0	13.3	287.7	1.037	10.14	1.116
8	11.565	11.684	-0.0	24.6	31.4	11.9	287.8	1.033	10.14	1.100
9	10.843	10.922	-0.0	26.6	30.1	9.1	287.8	1.031	10.11	1.080

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	201.0	189.4	327.9	269.5	201.0	180.1	-0.0	58.6	259.1	259.0
2	202.0	198.8	322.3	273.4	202.0	190.9	-0.0	55.6	251.2	251.2
3	201.4	202.0	315.6	269.3	201.4	194.0	-0.0	56.4	243.0	243.3
4	204.5	200.6	299.0	246.3	204.5	190.5	-0.0	63.0	218.1	219.1
5	203.5	200.4	275.2	219.4	203.5	186.9	-0.0	72.2	185.3	187.1
6	201.2	209.3	252.6	203.0	201.2	190.9	-0.0	85.8	152.8	154.9
7	199.3	205.4	237.6	191.2	199.3	186.1	-0.1	87.0	129.3	130.9
8	199.2	202.0	233.3	187.6	199.2	183.6	-0.0	84.2	121.5	122.8
9	196.7	194.0	227.3	175.6	196.7	173.4	-0.1	86.9	113.9	114.7

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.611	0.558	0.998	0.794	0.611	0.531	0.896	1.285
2	0.615	0.588	0.981	0.809	0.615	0.565	0.945	1.249
3	0.613	0.600	0.961	0.799	0.613	0.576	0.963	1.218
4	0.624	0.597	0.913	0.732	0.624	0.566	0.932	1.075
5	0.621	0.597	0.840	0.653	0.621	0.557	0.919	0.840
6	0.614	0.626	0.770	0.607	0.614	0.571	0.949	0.770
7	0.607	0.615	0.724	0.573	0.607	0.557	0.934	0.724
8	0.607	0.606	0.711	0.562	0.607	0.550	0.922	0.711
9	0.599	0.580	0.692	0.526	0.599	0.519	0.882	0.692

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	-3.2	-7.9	5.8	0.314	0.692	0.116	0.110	0.059	0.056
2	10.00	-3.2	-8.1	4.9	0.282	0.819	0.067	0.064	0.035	0.034
3	15.00	-3.1	-8.3	5.0	0.280	0.853	0.054	0.052	0.029	0.028
4	30.00	-3.1	-10.1	7.0	0.328	0.822	0.066	0.066	0.037	0.037
5	50.00	-2.2	-12.5	10.4	0.380	0.827	0.069	0.069	0.040	0.040
6	70.00	-1.2	-14.6	11.7	0.407	0.916	0.038	0.038	0.022	0.022
7	85.00	-0.1	-15.0	12.8	0.404	0.870	0.054	0.054	0.030	0.030
8	90.00	0.2	-15.0	12.9	0.394	0.839	0.062	0.062	0.033	0.033
9	95.00	0.9	-14.5	11.0	0.430	0.713	0.109	0.109	0.057	0.057

TABLE VII. - Continued.

(p) 120 Percent design speed; reading number 1862

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.648	24.638	-2.1	29.2	55.4	50.5	289.0	1.081	10.09	1.161
2	23.868	23.876	-1.7	20.7	54.3	46.9	288.8	1.073	10.12	1.209
3	23.086	23.114	-1.6	21.3	53.4	45.1	288.6	1.069	10.13	1.211
4	20.731	20.828	-1.1	23.1	49.9	39.2	288.1	1.067	10.14	1.212
5	17.607	17.780	-0.2	26.2	45.1	30.9	287.8	1.061	10.14	1.194
6	14.531	14.732	0.1	27.9	39.8	20.6	287.8	1.055	10.14	1.184
7	12.294	12.446	0.1	28.0	35.4	14.7	287.7	1.046	10.14	1.147
8	11.565	11.684	0.2	28.2	33.8	12.0	287.8	1.044	10.14	1.142
9	10.843	10.922	-0.0	30.7	32.5	8.7	287.7	1.042	10.10	1.122

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	200.4	183.2	352.8	251.2	200.2	160.0	-7.3	89.4	283.2	283.1
2	201.3	202.5	344.8	277.2	201.2	189.4	-6.1	71.6	274.0	274.1
3	200.9	204.5	337.0	269.7	200.8	190.4	-5.7	74.4	265.0	265.4
4	204.1	209.5	316.9	248.8	204.1	192.7	-4.0	82.2	238.4	239.5
5	202.8	209.1	287.2	218.6	202.8	187.6	-0.8	92.3	202.5	204.5
6	200.1	211.9	260.5	200.1	200.1	187.4	0.4	99.1	167.2	169.5
7	198.1	204.1	243.0	186.3	198.1	180.2	0.4	95.8	141.2	142.9
8	197.5	203.6	237.7	183.6	197.5	179.5	0.6	96.1	133.0	134.4
9	195.5	195.4	231.9	169.9	195.5	168.0	-0.0	99.8	124.7	125.6

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.609	0.532	1.073	0.729	0.609	0.464	0.799	1.432
2	0.613	0.594	1.050	0.813	0.612	0.555	0.941	1.401
3	0.612	0.601	1.026	0.793	0.611	0.560	0.949	1.385
4	0.623	0.618	0.967	0.734	0.623	0.569	0.944	1.254
5	0.619	0.619	0.876	0.647	0.619	0.556	0.925	0.912
6	0.610	0.631	0.794	0.595	0.610	0.557	0.936	0.794
7	0.603	0.608	0.740	0.555	0.603	0.537	0.910	0.740
8	0.601	0.607	0.724	0.547	0.601	0.535	0.909	0.724
9	0.595	0.582	0.706	0.506	0.595	0.500	0.859	0.706

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	0.0	-4.7	8.3	0.497	0.538	0.225	0.199	0.109	0.097
2	10.00	-0.1	-5.0	6.1	0.366	0.766	0.109	0.089	0.056	0.046
3	15.00	0.0	-5.2	6.1	0.377	0.812	0.086	0.070	0.045	0.037
4	30.00	-0.0	-7.1	6.9	0.410	0.839	0.078	0.075	0.043	0.042
5	50.00	0.6	-9.8	9.7	0.457	0.847	0.078	0.078	0.045	0.045
6	70.00	1.4	-12.0	12.4	0.466	0.902	0.053	0.053	0.030	0.030
7	85.00	2.3	-12.6	14.2	0.457	0.876	0.062	0.062	0.034	0.034
8	90.00	2.6	-12.6	13.0	0.449	0.878	0.061	0.061	0.032	0.032
9	95.00	3.3	-12.1	10.6	0.496	0.791	0.104	0.104	0.054	0.054

TABLE VII. - Continued.

(q) 120 Percent design speed; reading number 1863

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.648	24.638	-2.1	37.2	57.7	50.9	288.9	1.100	10.11	1.233
2	23.868	23.876	-1.9	26.9	56.4	46.9	288.7	1.086	10.13	1.270
3	23.086	23.114	-1.8	25.6	55.2	45.3	288.6	1.081	10.14	1.271
4	20.731	20.828	-1.1	27.6	51.8	40.0	288.2	1.075	10.14	1.255
5	17.607	17.780	-0.3	30.0	47.3	32.7	287.8	1.066	10.13	1.220
6	14.531	14.732	0.1	31.4	42.2	23.3	287.7	1.056	10.13	1.187
7	12.294	12.446	0.0	32.5	38.1	14.8	287.7	1.048	10.13	1.166
8	11.565	11.684	-0.0	33.2	36.6	11.8	287.7	1.046	10.13	1.156
9	10.843	10.922	-0.2	36.0	35.2	7.8	287.6	1.046	10.10	1.139

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	183.5	178.7	343.2	225.9	183.3	142.3	-6.6	108.0	283.6	283.5
2	186.2	194.6	336.0	254.1	186.1	173.6	-6.2	88.0	273.5	273.6
3	188.5	197.6	329.9	253.3	188.4	178.3	-6.0	85.3	264.9	265.2
4	190.1	197.7	306.9	228.5	190.0	175.1	-3.7	91.7	237.4	238.5
5	187.3	193.2	276.4	198.8	187.3	167.2	-1.0	96.7	202.2	204.2
6	183.6	190.4	247.8	177.0	183.6	162.6	0.2	99.1	166.7	169.0
7	179.6	187.7	228.3	163.7	179.6	158.2	0.1	100.9	141.0	142.7
8	179.3	185.7	223.1	158.7	179.3	155.3	-0.1	101.8	132.8	134.2
9	177.5	179.1	217.1	146.1	177.5	144.8	-0.6	105.4	124.4	125.3

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.555	0.513	1.038	0.649	0.554	0.409	0.776	1.492
2	0.564	0.565	1.017	0.738	0.564	0.504	0.932	1.458
3	0.571	0.576	1.000	0.739	0.571	0.520	0.947	1.439
4	0.577	0.579	0.932	0.669	0.577	0.513	0.922	1.270
5	0.568	0.568	0.839	0.584	0.568	0.491	0.893	0.973
6	0.556	0.562	0.751	0.522	0.556	0.480	0.886	0.751
7	0.544	0.555	0.691	0.485	0.544	0.468	0.881	0.691
8	0.543	0.550	0.675	0.470	0.543	0.460	0.866	0.675
9	0.537	0.529	0.657	0.432	0.537	0.428	0.815	0.657

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	2.3	-2.4	8.7	0.596	0.616	0.237	0.207	0.114	0.099
2	10.00	1.9	-3.0	6.2	0.455	0.818	0.103	0.080	0.053	0.041
3	15.00	1.8	-3.5	6.3	0.438	0.872	0.071	0.051	0.037	0.027
4	30.00	1.8	-5.2	7.7	0.478	0.889	0.063	0.061	0.035	0.033
5	50.00	2.8	-7.5	11.5	0.519	0.881	0.070	0.070	0.039	0.039
6	70.00	3.8	-9.6	15.1	0.533	0.904	0.057	0.057	0.032	0.032
7	85.00	5.0	-9.9	14.4	0.534	0.932	0.040	0.040	0.022	0.022
8	90.00	5.3	-9.8	12.8	0.540	0.911	0.052	0.052	0.028	0.028
9	95.00	5.9	-9.4	9.7	0.586	0.823	0.107	0.107	0.056	0.056

TABLE VII. - Concluded.

(r) 120 Percent design speed; reading number 1864

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.648	24.638	-1.8	42.3	59.9	50.6	288.8	1.114	10.12	1.288
2	23.868	23.876	-1.7	32.3	58.5	47.7	288.8	1.100	10.15	1.306
3	23.086	23.114	-1.6	30.3	57.3	45.8	288.6	1.093	10.14	1.313
4	20.731	20.828	-0.9	31.9	53.9	41.6	288.1	1.083	10.14	1.282
5	17.607	17.780	-0.3	33.5	49.7	34.8	287.8	1.069	10.13	1.237
6	14.531	14.732	0.2	34.9	44.7	24.6	287.8	1.060	10.12	1.201
7	12.294	12.446	0.2	35.7	40.4	15.0	287.8	1.051	10.13	1.178
8	11.565	11.684	0.4	36.7	38.7	12.4	287.6	1.047	10.13	1.160
9	10.843	10.922	0.0	39.6	37.4	7.5	287.8	1.048	10.10	1.148

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	167.3	179.5	332.9	209.2	167.2	132.8	-5.2	120.9	282.7	282.6
2	171.1	187.8	327.7	235.8	171.0	158.8	-5.0	100.3	274.5	274.6
3	174.0	191.2	322.1	237.0	174.0	165.1	-5.0	96.4	266.1	266.4
4	175.9	186.8	298.3	212.0	175.9	158.6	-2.7	98.7	238.3	239.4
5	172.6	180.5	266.5	183.3	172.6	150.6	-1.0	99.6	202.1	204.1
6	168.2	178.6	236.5	161.1	168.2	146.5	0.7	102.1	166.9	169.2
7	165.4	178.4	217.2	150.1	165.4	144.9	0.5	104.1	141.2	143.0
8	164.7	173.4	211.0	142.3	164.7	139.0	1.1	103.7	132.9	134.3
9	163.3	170.1	205.5	132.2	163.3	131.1	0.1	108.3	124.8	125.7

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.503	0.512	1.002	0.597	0.503	0.379	0.794	1.553
2	0.515	0.541	0.987	0.679	0.515	0.457	0.929	1.510
3	0.525	0.553	0.972	0.686	0.525	0.478	0.949	1.468
4	0.531	0.543	0.901	0.616	0.531	0.461	0.902	1.295
5	0.521	0.527	0.805	0.535	0.521	0.440	0.873	1.009
6	0.507	0.524	0.713	0.473	0.507	0.430	0.871	0.713
7	0.498	0.526	0.654	0.442	0.498	0.427	0.876	0.654
8	0.496	0.511	0.636	0.420	0.496	0.410	0.844	0.636
9	0.492	0.501	0.619	0.389	0.492	0.386	0.803	0.619

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	4.4	-0.2	8.4	0.660	0.659	0.246	0.211	0.119	0.102
2	10.00	4.1	-0.8	6.9	0.523	0.793	0.139	0.111	0.070	0.056
3	15.00	3.9	-1.3	6.9	0.499	0.865	0.088	0.067	0.046	0.035
4	30.00	3.9	-3.1	9.3	0.534	0.884	0.075	0.073	0.040	0.039
5	50.00	5.2	-5.2	13.6	0.566	0.901	0.064	0.064	0.036	0.036
6	70.00	6.3	-7.1	16.4	0.584	0.897	0.070	0.070	0.039	0.039
7	85.00	7.3	-7.6	14.6	0.580	0.934	0.045	0.045	0.024	0.024
8	90.00	7.5	-7.7	13.4	0.593	0.915	0.056	0.056	0.030	0.030
9	95.00	8.2	-7.2	9.4	0.636	0.846	0.107	0.107	0.056	0.056

TABLE VIII. - BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 51

(a) 90 Percent design speed; reading number 1758

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.595	24.608	27.5	2.5	27.5	2.5	302.6	0.999	11.55	0.979
2	23.861	23.886	24.3	2.3	24.3	2.3	301.5	1.000	11.65	0.980
3	23.127	23.167	24.5	2.0	24.5	2.0	301.2	0.999	11.63	0.985
4	20.917	20.996	27.0	1.5	27.0	1.5	300.1	0.996	11.52	0.992
5	17.955	18.080	29.3	1.4	29.3	1.4	298.2	0.997	11.30	0.996
6	14.945	15.110	31.9	1.7	31.9	1.7	296.8	0.999	11.16	0.997
7	12.647	12.786	33.6	2.3	33.6	2.3	295.8	0.999	11.10	0.988
8	11.869	11.966	34.1	3.2	34.1	3.2	295.5	1.000	11.03	0.982
9	11.087	11.125	37.4	3.8	37.4	3.8	295.3	1.001	10.92	0.982

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	143.9	125.6	143.9	125.6	127.6	125.4	66.5	5.5	0.	0.
2	151.3	130.8	151.3	130.8	137.9	130.7	62.2	5.2	0.	0.
3	152.4	132.4	152.4	132.4	138.6	132.3	63.3	4.5	0.	0.
4	150.9	130.8	150.9	130.8	134.5	130.7	68.5	3.3	0.	0.
5	141.3	122.8	141.3	122.8	123.2	122.8	69.2	3.0	0.	0.
6	135.8	115.6	135.8	115.6	115.3	115.5	71.8	3.5	0.	0.
7	136.4	105.2	136.4	105.2	113.6	105.2	75.5	4.2	0.	0.
8	136.3	98.0	136.3	98.0	112.8	97.9	76.5	5.5	0.	0.
9	132.3	90.1	132.3	90.1	105.0	89.9	80.4	5.9	0.	0.

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.420	0.365	0.420	0.365	0.372	0.365	0.983	0.469
2	0.443	0.381	0.443	0.381	0.404	0.381	0.948	0.443
3	0.447	0.386	0.447	0.386	0.406	0.386	0.954	0.447
4	0.443	0.383	0.443	0.383	0.395	0.383	0.972	0.443
5	0.415	0.360	0.415	0.360	0.362	0.360	0.997	0.435
6	0.400	0.339	0.400	0.339	0.339	0.338	1.002	0.430
7	0.402	0.308	0.402	0.308	0.335	0.308	0.926	0.428
8	0.402	0.287	0.402	0.287	0.333	0.286	0.867	0.427
9	0.390	0.263	0.390	0.263	0.310	0.263	0.856	0.465

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	13.2	4.0	6.6	0.334	0.	0.186	0.186	0.091	0.091
2	10.00	9.8	0.6	6.3	0.314	0.	0.160	0.160	0.076	0.076
3	15.00	9.9	0.7	6.0	0.308	0.	0.117	0.117	0.054	0.054
4	30.00	11.5	2.3	5.5	0.313	0.	0.067	0.067	0.028	0.028
5	50.00	11.9	2.7	5.5	0.298	0.	0.032	0.032	0.011	0.011
6	70.00	12.1	2.9	5.9	0.298	0.	0.027	0.027	0.008	0.008
7	85.00	12.0	2.9	6.5	0.359	0.	0.118	0.118	0.030	0.030
8	90.00	12.2	3.1	7.3	0.404	0.	0.171	0.171	0.040	0.040
9	95.00	15.2	6.1	7.8	0.443	0.	0.185	0.185	0.041	0.041

TABLE VIII. - Continued.

(b) 90 Percent design speed; reading number 1762

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.595	24.608	20.9	2.1	20.9	2.1	301.2	0.997	11.42	0.979
2	23.861	23.886	19.3	2.5	19.3	2.5	300.4	0.998	11.51	0.983
3	23.127	23.167	19.5	1.7	19.5	1.7	299.8	0.998	11.49	0.989
4	20.917	20.996	21.8	0.6	21.8	0.6	298.5	0.997	11.38	0.993
5	17.955	18.080	24.6	1.0	24.6	1.0	297.0	0.998	11.20	0.997
6	14.945	15.110	27.4	1.4	27.4	1.4	296.0	0.999	11.08	1.000
7	12.647	12.786	29.6	2.4	29.6	2.4	295.3	0.999	11.04	0.992
8	11.869	11.966	30.1	3.8	30.1	3.8	295.0	0.999	10.99	0.984
9	11.087	11.125	32.7	5.3	32.7	5.3	294.9	1.001	10.89	0.979

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	153.9	134.8	153.9	134.8	143.8	134.7	54.8	4.9	0.	0.
2	160.1	141.1	160.1	141.1	151.0	140.9	53.0	6.1	0.	0.
3	160.5	142.4	160.5	142.4	151.3	142.3	53.7	4.2	0.	0.
4	158.3	140.5	158.3	140.5	147.0	140.5	58.8	1.5	0.	0.
5	150.2	135.0	150.2	135.0	136.6	135.0	62.6	2.3	0.	0.
6	145.3	131.4	145.3	131.4	129.0	131.3	66.8	3.2	0.	0.
7	146.3	125.3	146.3	125.3	127.2	125.2	72.3	5.2	0.	0.
8	145.4	117.0	145.4	117.0	125.8	116.8	73.0	7.7	0.	0.
9	141.4	106.7	141.4	106.7	118.9	106.2	76.5	9.9	0.	0.

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.451	0.394	0.451	0.394	0.422	0.394	0.937	0.451
2	0.471	0.413	0.471	0.413	0.444	0.413	0.933	0.471
3	0.473	0.418	0.473	0.418	0.446	0.418	0.941	0.473
4	0.467	0.413	0.467	0.413	0.434	0.413	0.956	0.467
5	0.443	0.397	0.443	0.397	0.403	0.397	0.988	0.443
6	0.429	0.387	0.429	0.387	0.381	0.387	1.018	0.429
7	0.433	0.369	0.433	0.369	0.376	0.369	0.984	0.433
8	0.430	0.344	0.430	0.344	0.372	0.343	0.928	0.430
9	0.418	0.313	0.418	0.313	0.351	0.311	0.893	0.418

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	6.6	-2.6	6.2	0.282	0.	0.162	0.162	0.079	0.079
2	10.00	4.9	-4.3	6.5	0.258	0.	0.118	0.118	0.056	0.056
3	15.00	4.9	-4.3	5.7	0.254	0.	0.079	0.079	0.036	0.036
4	30.00	6.3	-2.9	4.6	0.263	0.	0.053	0.053	0.022	0.022
5	50.00	7.2	-2.0	5.1	0.244	0.	0.024	0.024	0.009	0.009
6	70.00	7.5	-1.6	5.6	0.226	0.	0.003	0.003	0.001	0.001
7	85.00	8.0	-1.1	6.6	0.259	0.	0.067	0.067	0.017	0.017
8	90.00	8.2	-0.9	7.9	0.301	0.	0.133	0.133	0.031	0.031
9	95.00	10.5	1.4	9.3	0.349	0.	0.182	0.182	0.040	0.040

TABLE VIII. - Continued.

(c) 90 Percent design speed; reading number 1763

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.595	24.608	17.3	1.4	17.3	1.4	299.8	0.997	11.28	0.979
2	23.861	23.886	17.0	1.7	17.0	1.7	299.2	0.998	11.37	0.987
3	23.127	23.167	17.1	1.1	17.1	1.1	298.5	0.998	11.36	0.993
4	20.917	20.996	18.8	0.3	18.8	0.3	297.6	0.997	11.30	0.995
5	17.955	18.080	22.1	0.7	22.1	0.7	296.9	0.997	11.22	0.998
6	14.945	15.110	25.1	1.7	25.1	1.7	296.1	0.999	11.15	1.000
7	12.647	12.786	26.5	1.8	26.5	1.8	294.8	1.000	10.95	0.999
8	11.869	11.966	26.8	2.7	26.8	2.7	294.5	1.000	10.91	0.988
9	11.087	11.125	29.1	4.3	29.1	4.3	294.6	1.001	10.81	0.980

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	163.2	144.0	163.2	144.0	155.8	144.0	48.5	3.5	0.	0.
2	168.5	152.0	168.5	152.0	161.1	151.9	49.3	4.5	0.	0.
3	168.6	152.9	168.6	152.9	161.1	152.9	49.5	3.0	0.	0.
4	168.0	153.1	168.0	153.1	159.0	153.1	54.1	0.7	0.	0.
5	164.8	151.9	164.8	151.9	152.7	151.9	61.9	2.0	0.	0.
6	162.8	151.0	162.8	151.0	147.5	151.0	69.1	4.4	0.	0.
7	155.9	141.7	155.9	141.7	139.5	141.7	69.6	4.5	0.	0.
8	155.2	134.3	155.2	134.3	138.5	134.1	70.0	6.4	0.	0.
9	151.6	123.3	151.6	123.3	132.5	122.9	73.7	9.2	0.	0.

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.481	0.423	0.481	0.423	0.459	0.423	0.924	0.481
2	0.498	0.447	0.498	0.447	0.476	0.447	0.943	0.498
3	0.499	0.451	0.499	0.451	0.477	0.451	0.949	0.499
4	0.498	0.452	0.498	0.452	0.471	0.452	0.963	0.498
5	0.488	0.449	0.488	0.449	0.452	0.449	0.995	0.488
6	0.483	0.447	0.483	0.447	0.437	0.447	1.024	0.483
7	0.463	0.419	0.463	0.419	0.414	0.419	1.015	0.463
8	0.460	0.396	0.460	0.396	0.411	0.396	0.969	0.460
9	0.450	0.363	0.450	0.363	0.393	0.362	0.928	0.450

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	3.0	-6.2	5.5	0.252	0.	0.144	0.144	0.070	0.070
2	10.00	2.6	-6.7	5.7	0.224	0.	0.083	0.083	0.039	0.039
3	15.00	2.5	-6.8	5.1	0.219	0.	0.047	0.047	0.022	0.022
4	30.00	3.3	-5.9	4.3	0.220	0.	0.030	0.030	0.012	0.012
5	50.00	4.7	-4.5	4.9	0.208	0.	0.017	0.017	0.006	0.006
6	70.00	5.3	-3.9	5.9	0.190	0.	0.001	0.001	0.000	0.000
7	85.00	4.9	-4.2	6.0	0.196	0.	0.010	0.010	0.002	0.002
8	90.00	4.9	-4.3	6.9	0.231	0.	0.086	0.086	0.020	0.020
9	95.00	6.9	-2.2	8.3	0.280	0.	0.157	0.157	0.035	0.035

TABLE VIII. - Continued.

(d) 90 Percent design speed; reading number 1764

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.595	24.608	16.2	1.2	16.2	1.2	299.2	0.996	11.18	0.978
2	23.861	23.886	14.7	0.9	14.7	0.9	298.7	0.997	11.34	0.983
3	23.127	23.167	15.4	0.4	15.4	0.4	298.3	0.997	11.31	0.993
4	20.917	20.996	17.8	0.2	17.8	0.2	297.8	0.996	11.34	0.992
5	17.955	18.080	21.5	1.1	21.5	1.1	297.2	0.996	11.31	0.995
6	14.945	15.110	24.2	1.4	24.2	1.4	296.6	0.997	11.22	0.997
7	12.647	12.786	25.2	2.1	25.2	2.1	295.0	0.999	10.96	0.997
8	11.869	11.966	24.8	2.6	24.8	2.6	294.2	1.001	10.83	0.994
9	11.087	11.125	26.9	4.4	26.9	4.4	294.1	1.002	10.72	0.982

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	168.9	149.7	168.9	149.7	162.2	149.7	47.0	3.3	0.	0.
2	177.0	158.9	177.0	158.9	171.2	158.8	44.9	2.5	0.	0.
3	176.5	161.2	176.5	161.2	170.2	161.2	46.8	1.0	0.	0.
4	179.1	163.8	179.1	163.8	170.6	163.8	54.7	0.7	0.	0.
5	178.1	165.4	178.1	165.4	165.8	165.4	65.2	3.1	0.	0.
6	175.7	164.7	175.7	164.7	160.2	164.6	72.0	4.1	0.	0.
7	166.8	153.7	166.8	153.7	151.0	153.6	70.9	5.7	0.	0.
8	162.4	146.8	162.4	146.8	147.5	146.6	68.1	6.8	0.	0.
9	158.2	134.5	158.2	134.5	141.1	134.1	71.6	10.3	0.	0.

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.499	0.441	0.499	0.441	0.479	0.441	0.923	0.499
2	0.525	0.469	0.525	0.469	0.508	0.469	0.928	0.525
3	0.524	0.477	0.524	0.477	0.505	0.477	0.947	0.524
4	0.532	0.486	0.532	0.486	0.507	0.486	0.960	0.532
5	0.530	0.491	0.530	0.491	0.493	0.491	0.998	0.530
6	0.523	0.489	0.523	0.489	0.477	0.489	1.027	0.523
7	0.496	0.456	0.496	0.456	0.449	0.456	1.017	0.496
8	0.483	0.435	0.483	0.435	0.439	0.434	0.994	0.483
9	0.470	0.397	0.470	0.397	0.420	0.396	0.950	0.470

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	1.9	-7.4	5.3	0.240	0.	0.138	0.138	0.067	0.067
2	10.00	0.2	-9.0	4.9	0.216	0.	0.097	0.097	0.046	0.046
3	15.00	0.7	-8.5	4.4	0.206	0.	0.040	0.040	0.018	0.018
4	30.00	2.3	-6.9	4.2	0.210	0.	0.044	0.044	0.018	0.018
5	50.00	4.1	-5.1	5.2	0.195	0.	0.028	0.028	0.010	0.010
6	70.00	4.4	-4.8	5.6	0.177	0.	0.016	0.016	0.005	0.005
7	85.00	3.6	-5.6	6.3	0.176	0.	0.021	0.021	0.005	0.005
8	90.00	2.8	-6.3	6.8	0.185	0.	0.042	0.042	0.010	0.010
9	95.00	4.7	-4.4	8.4	0.235	0.	0.130	0.130	0.029	0.029

TABLE VIII. - Continued.

(e) 90 Percent design speed; reading number 1765

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.595	24.608	11.2	0.3	11.2	0.3	296.7	0.996	10.81	0.971
2	23.861	23.886	9.8	-0.1	9.8	-0.1	296.5	0.996	10.98	0.978
3	23.127	23.167	10.5	-0.4	10.5	-0.4	295.9	0.997	10.99	0.987
4	20.917	20.996	13.0	-0.6	13.0	-0.6	295.9	0.996	11.04	0.992
5	17.955	18.080	16.6	0.3	16.6	0.3	296.0	0.996	11.10	0.992
6	14.945	15.110	20.2	0.8	20.2	0.8	296.0	0.996	11.09	0.995
7	12.647	12.786	21.3	1.9	21.3	1.9	294.5	0.999	10.93	0.993
8	11.869	11.966	21.2	2.5	21.2	2.5	294.0	1.000	10.77	0.988
9	11.087	11.125	21.8	4.3	21.8	4.3	293.5	1.001	10.59	0.973

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	183.0	160.6	183.0	160.6	179.5	160.6	35.6	0.9	0.	0.
2	190.7	170.5	190.7	170.5	187.9	170.5	32.5	-0.2	0.	0.
3	191.1	174.1	191.1	174.1	187.9	174.1	34.9	-1.1	0.	0.
4	193.9	179.9	193.9	179.9	188.9	179.8	43.7	-1.9	0.	0.
5	194.5	184.4	194.5	184.4	186.3	184.4	55.6	1.0	0.	0.
6	192.6	187.6	192.6	187.6	180.8	187.5	66.4	2.8	0.	0.
7	186.9	182.2	186.9	182.2	174.1	182.1	68.0	6.0	0.	0.
8	181.3	174.1	181.3	174.1	169.0	174.0	65.4	7.7	0.	0.
9	174.2	158.8	174.2	158.8	161.8	158.4	64.6	11.8	0.	0.

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.546	0.476	0.546	0.476	0.535	0.476	0.895	0.546
2	0.570	0.508	0.570	0.508	0.562	0.508	0.907	0.570
3	0.572	0.519	0.572	0.519	0.562	0.519	0.926	0.572
4	0.581	0.538	0.581	0.538	0.566	0.538	0.952	0.581
5	0.583	0.552	0.583	0.552	0.558	0.552	0.990	0.583
6	0.577	0.562	0.577	0.562	0.541	0.562	1.037	0.577
7	0.560	0.545	0.560	0.545	0.522	0.545	1.046	0.560
8	0.543	0.520	0.543	0.520	0.506	0.520	1.029	0.543
9	0.521	0.473	0.521	0.473	0.484	0.471	0.979	0.521

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	-3.1	-12.3	4.4	0.215	0.	0.159	0.159	0.078	0.078
2	10.00	-4.6	-13.8	4.0	0.187	0.	0.110	0.110	0.052	0.052
3	15.00	-4.1	-13.3	3.7	0.176	0.	0.065	0.065	0.030	0.030
4	30.00	-2.5	-11.7	3.4	0.170	0.	0.040	0.040	0.017	0.017
5	50.00	-0.8	-10.0	4.4	0.152	0.	0.039	0.039	0.014	0.014
6	70.00	0.3	-8.8	5.1	0.124	0.	0.025	0.025	0.008	0.008
7	85.00	-0.3	-9.4	6.1	0.108	0.	0.039	0.039	0.010	0.010
8	90.00	-0.8	-9.9	6.7	0.114	0.	0.068	0.068	0.016	0.016
9	95.00	-0.4	-9.5	8.2	0.155	0.	0.159	0.159	0.035	0.035

TABLE VIII. - Continued.

(f) 100 Percent design speed; reading number 1766

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.595	24.608	17.1	1.3	17.1	1.3	301.7	0.997	11.31	0.979
2	23.861	23.886	14.9	1.1	14.9	1.1	300.9	0.998	11.55	0.978
3	23.127	23.167	15.4	0.7	15.4	0.7	300.4	0.997	11.55	0.988
4	20.917	20.996	17.5	0.2	17.5	0.2	299.8	0.995	11.53	0.993
5	17.955	18.080	20.8	0.8	20.8	0.8	299.2	0.996	11.50	0.996
6	14.945	15.110	23.9	1.7	23.9	1.7	298.5	0.997	11.43	0.997
7	12.647	12.786	24.9	2.5	24.9	2.5	296.4	0.999	11.11	0.996
8	11.869	11.966	24.9	3.1	24.9	3.1	295.6	1.001	10.95	0.989
9	11.087	11.125	26.5	4.2	26.5	4.2	295.4	1.001	10.80	0.974

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	185.4	165.9	185.4	165.9	177.2	165.8	54.7	3.6	0.	0.
2	196.2	174.1	196.2	174.1	189.6	174.0	50.6	3.4	0.	0.
3	197.0	176.8	197.0	176.8	189.9	176.8	52.3	2.1	0.	0.
4	197.8	180.0	197.8	180.0	188.6	180.0	59.4	0.7	0.	0.
5	196.5	181.8	196.5	181.8	183.7	181.8	69.8	2.7	0.	0.
6	194.6	182.0	194.6	182.0	177.9	181.9	78.9	5.6	0.	0.
7	185.2	170.7	185.2	170.7	168.0	170.5	78.0	7.4	0.	0.
8	179.8	161.0	179.8	161.0	163.0	160.8	75.8	8.6	0.	0.
9	174.2	145.7	174.2	145.7	155.9	145.3	77.7	10.8	0.	0.

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.548	0.488	0.548	0.488	0.524	0.488	0.936	0.548
2	0.583	0.514	0.583	0.514	0.563	0.514	0.918	0.583
3	0.586	0.523	0.586	0.523	0.565	0.523	0.931	0.586
4	0.589	0.534	0.589	0.534	0.562	0.534	0.954	0.589
5	0.586	0.541	0.586	0.541	0.548	0.541	0.989	0.586
6	0.581	0.542	0.581	0.542	0.531	0.541	1.022	0.581
7	0.553	0.507	0.553	0.507	0.502	0.507	1.015	0.553
8	0.536	0.478	0.536	0.478	0.486	0.477	0.986	0.536
9	0.519	0.430	0.519	0.430	0.464	0.429	0.932	0.519

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	2.8	-6.4	5.3	0.240	0.	0.112	0.112	0.055	0.055
2	10.00	0.5	-8.7	5.1	0.227	0.	0.105	0.105	0.050	0.050
3	15.00	0.8	-8.4	4.7	0.220	0.	0.060	0.060	0.028	0.028
4	30.00	2.0	-7.2	4.2	0.213	0.	0.034	0.034	0.014	0.014
5	50.00	3.4	-5.8	5.0	0.197	0.	0.021	0.021	0.008	0.008
6	70.00	4.1	-5.1	6.0	0.177	0.	0.016	0.016	0.005	0.005
7	85.00	3.3	-5.8	6.7	0.174	0.	0.021	0.021	0.005	0.005
8	90.00	3.0	-6.1	7.2	0.193	0.	0.061	0.061	0.014	0.014
9	95.00	4.3	-4.8	8.2	0.248	0.	0.155	0.155	0.034	0.034

TABLE VIII. - Continued.

(g) 100 Percent design speed; reading number 1767

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.595	24.608	19.7	1.6	19.7	1.6	303.9	0.995	11.58	0.982
2	23.861	23.886	17.6	1.5	17.6	1.5	302.8	0.997	11.82	0.977
3	23.127	23.167	17.8	1.1	17.8	1.1	302.2	0.997	11.82	0.986
4	20.917	20.996	20.1	0.8	20.1	0.8	301.2	0.996	11.78	0.991
5	17.955	18.080	23.2	1.1	23.2	1.1	300.1	0.996	11.65	0.996
6	14.945	15.110	25.9	1.9	25.9	1.9	298.9	0.997	11.47	0.998
7	12.647	12.786	26.6	2.2	26.6	2.2	296.5	1.000	11.10	0.999
8	11.869	11.966	26.4	3.0	26.4	3.0	295.9	1.001	11.01	0.989
9	11.087	11.125	29.1	4.5	29.1	4.5	296.1	1.000	10.88	0.976

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	179.8	161.7	179.8	161.7	169.2	161.6	60.7	4.6	0.	0.
2	190.6	168.4	190.6	168.4	181.7	168.4	57.5	4.4	0.	0.
3	191.7	171.2	191.7	171.2	182.5	171.2	58.5	3.2	0.	0.
4	192.7	173.8	192.7	173.8	181.0	173.8	66.2	2.3	0.	0.
5	189.8	173.2	189.8	173.2	174.4	173.2	74.9	3.4	0.	0.
6	185.3	169.2	185.3	169.2	166.7	169.1	81.0	5.7	0.	0.
7	173.4	155.3	173.4	155.3	155.1	155.2	77.6	6.0	0.	0.
8	170.6	145.8	170.6	145.8	152.9	145.6	75.8	7.7	0.	0.
9	166.0	131.1	166.0	131.1	145.1	130.7	80.7	10.2	0.	0.

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.529	0.474	0.529	0.474	0.498	0.474	0.955	0.529
2	0.563	0.495	0.563	0.495	0.537	0.495	0.927	0.563
3	0.568	0.504	0.568	0.504	0.540	0.504	0.938	0.568
4	0.572	0.514	0.572	0.514	0.537	0.514	0.960	0.572
5	0.564	0.513	0.564	0.513	0.518	0.513	0.993	0.564
6	0.551	0.501	0.551	0.501	0.495	0.501	1.015	0.551
7	0.516	0.459	0.516	0.459	0.461	0.459	1.001	0.516
8	0.507	0.430	0.507	0.430	0.455	0.430	0.952	0.507
9	0.493	0.386	0.493	0.386	0.431	0.385	0.901	0.493

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	5.4	-3.8	5.7	0.253	0.	0.106	0.106	0.052	0.052
2	10.00	3.1	-6.1	5.5	0.248	0.	0.117	0.117	0.055	0.055
3	15.00	3.2	-6.1	5.1	0.239	0.	0.072	0.072	0.033	0.033
4	30.00	4.6	-4.6	4.8	0.236	0.	0.043	0.043	0.018	0.018
5	50.00	5.8	-3.3	5.2	0.222	0.	0.020	0.020	0.007	0.007
6	70.00	6.1	-3.1	6.2	0.207	0.	0.010	0.010	0.003	0.003
7	85.00	5.0	-4.1	6.4	0.208	0.	0.003	0.003	0.001	0.001
8	90.00	4.4	-4.7	7.1	0.240	0.	0.067	0.067	0.016	0.016
9	95.00	6.9	-2.2	8.5	0.304	0.	0.157	0.157	0.034	0.034

TABLE VIII. - Continued.

(h) 100 Percent design speed; reading number 1768

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.595	24.608	20.7	2.0	20.7	2.0	303.6	0.997	11.69	0.977
2	23.861	23.886	18.8	2.1	18.8	2.1	302.8	0.998	11.83	0.979
3	23.127	23.167	18.8	1.6	18.8	1.6	301.9	0.998	11.78	0.986
4	20.917	20.996	20.7	0.6	20.7	0.6	300.7	0.996	11.63	0.993
5	17.955	18.080	23.9	0.9	23.9	0.9	299.0	0.998	11.42	0.999
6	14.945	15.110	26.8	1.6	26.8	1.6	298.2	0.998	11.31	1.002
7	12.647	12.786	28.8	2.3	28.8	2.3	297.1	0.998	11.22	0.992
8	11.869	11.966	29.3	3.7	29.3	3.7	296.7	0.999	11.18	0.978
9	11.087	11.125	31.9	5.3	31.9	5.3	296.6	1.000	11.03	0.973

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	175.5	153.7	175.5	153.7	164.1	153.6	62.1	5.3	0.	0.
2	182.3	159.7	182.3	159.7	172.5	159.6	58.9	5.7	0.	0.
3	181.6	160.6	181.6	160.6	171.9	160.5	58.6	4.5	0.	0.
4	178.2	159.0	178.2	159.0	166.7	159.0	63.0	1.7	0.	0.
5	169.9	154.6	169.9	154.6	155.3	154.5	68.9	2.6	0.	0.
6	166.3	151.9	166.3	151.9	148.4	151.9	75.1	4.4	0.	0.
7	165.3	143.3	165.3	143.3	144.9	143.1	79.6	5.8	0.	0.
8	165.0	133.6	165.0	133.6	143.9	133.3	80.7	8.7	0.	0.
9	159.7	121.2	159.7	121.2	135.5	120.7	84.5	11.2	0.	0.

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.516	0.449	0.516	0.449	0.482	0.449	0.936	0.516
2	0.538	0.468	0.538	0.468	0.509	0.468	0.925	0.538
3	0.536	0.472	0.536	0.472	0.508	0.471	0.934	0.536
4	0.527	0.468	0.527	0.468	0.493	0.468	0.954	0.527
5	0.502	0.456	0.502	0.456	0.459	0.455	0.995	0.502
6	0.492	0.448	0.492	0.448	0.439	0.448	1.023	0.492
7	0.490	0.422	0.490	0.422	0.429	0.422	0.988	0.490
8	0.489	0.393	0.489	0.393	0.427	0.392	0.926	0.489
9	0.473	0.355	0.473	0.355	0.401	0.354	0.890	0.473

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	6.4	-2.8	6.1	0.282	0.	0.137	0.137	0.067	0.067
2	10.00	4.4	-4.8	6.1	0.262	0.	0.116	0.116	0.055	0.055
3	15.00	4.2	-5.0	5.6	0.253	0.	0.077	0.077	0.035	0.035
4	30.00	5.2	-4.0	4.6	0.250	0.	0.039	0.039	0.016	0.016
5	50.00	6.5	-2.7	5.1	0.230	0.	0.003	0.003	0.001	0.001
6	70.00	7.0	-2.2	5.9	0.213	0.	-0.012	-0.012	-0.004	-0.004
7	85.00	7.2	-1.9	6.5	0.246	0.	0.055	0.055	0.014	0.014
8	90.00	7.3	-1.8	7.8	0.293	0.	0.143	0.143	0.034	0.034
9	95.00	9.7	0.6	9.3	0.342	0.	0.190	0.190	0.042	0.042

TABLE VIII. - Continued.

(i) 100 Percent design speed; reading number 1769

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.595	24.608	25.8	3.5	25.8	3.5	305.9	0.998	11.92	0.975
2	23.861	23.886	23.4	3.4	23.4	3.4	304.8	0.999	12.04	0.975
3	23.127	23.167	24.0	2.7	24.0	2.7	304.0	0.999	11.99	0.982
4	20.917	20.996	25.8	1.4	25.8	1.4	302.3	0.996	11.80	0.994
5	17.955	18.080	28.6	1.4	28.6	1.4	300.2	0.998	11.52	1.000
6	14.945	15.110	30.9	2.0	30.9	2.0	298.9	0.998	11.43	0.995
7	12.647	12.786	32.6	3.2	32.6	3.2	297.6	0.998	11.29	0.987
8	11.869	11.966	33.4	4.6	33.4	4.6	297.2	0.999	11.25	0.976
9	11.087	11.125	36.6	5.8	36.6	5.8	297.2	1.000	11.11	0.977

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	164.3	142.3	164.3	142.3	147.9	142.0	71.6	8.7	0.	0.
2	170.8	146.6	170.8	146.6	156.7	146.4	67.8	8.7	0.	0.
3	170.3	147.4	170.3	147.4	155.5	147.3	69.3	7.0	0.	0.
4	165.8	145.9	165.8	145.9	149.3	145.9	72.3	3.5	0.	0.
5	156.4	137.9	156.4	137.9	137.3	137.9	74.8	3.3	0.	0.
6	154.1	131.4	154.1	131.4	132.2	131.3	79.2	4.6	0.	0.
7	151.6	119.2	151.6	119.2	127.8	119.0	81.6	6.7	0.	0.
8	151.4	107.9	151.4	107.9	126.4	107.5	83.4	8.7	0.	0.
9	146.1	97.3	146.1	97.3	117.3	96.8	87.0	9.8	0.	0.

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.479	0.413	0.479	0.413	0.431	0.412	0.980	0.479
2	0.500	0.427	0.500	0.427	0.459	0.426	0.934	0.500
3	0.499	0.430	0.499	0.430	0.456	0.429	0.947	0.499
4	0.487	0.427	0.487	0.427	0.438	0.427	0.977	0.487
5	0.460	0.404	0.460	0.404	0.404	0.404	1.004	0.460
6	0.454	0.385	0.454	0.385	0.389	0.385	0.993	0.454
7	0.447	0.349	0.447	0.349	0.377	0.349	0.931	0.447
8	0.447	0.316	0.447	0.316	0.373	0.314	0.851	0.447
9	0.430	0.284	0.430	0.284	0.346	0.282	0.825	0.498

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	11.5	2.3	7.6	0.321	0.	0.174	0.174	0.085	0.085
2	10.00	9.0	-0.2	7.4	0.305	0.	0.161	0.161	0.076	0.076
3	15.00	9.4	0.2	6.7	0.302	0.	0.112	0.112	0.051	0.051
4	30.00	10.3	1.1	5.4	0.292	0.	0.040	0.040	0.017	0.017
5	50.00	11.2	2.0	5.5	0.281	0.	-0.003	-0.003	-0.001	-0.001
6	70.00	11.1	2.0	6.2	0.291	0.	0.035	0.035	0.010	0.010
7	85.00	11.0	1.9	7.4	0.338	0.	0.102	0.102	0.026	0.026
8	90.00	11.5	2.4	8.7	0.404	0.	0.184	0.184	0.043	0.043
9	95.00	14.4	5.2	9.8	0.450	0.	0.197	0.197	0.043	0.043

TABLE VIII. - Continued.

(j) 100 Percent design speed; reading number 1771

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.595	24.608	28.6	4.5	28.6	4.5	306.7	1.000	11.94	0.976
2	23.861	23.886	25.0	4.0	25.0	4.0	305.4	1.001	12.08	0.973
3	23.127	23.167	25.1	3.1	25.1	3.1	304.6	0.999	12.03	0.979
4	20.917	20.996	27.8	1.6	27.8	1.6	302.6	0.997	11.81	0.995
5	17.955	18.080	30.8	1.5	30.8	1.5	300.5	0.998	11.58	0.998
6	14.945	15.110	32.8	2.3	32.8	2.3	299.1	0.998	11.47	0.993
7	12.647	12.786	33.8	3.5	33.8	3.5	297.7	0.998	11.31	0.985
8	11.869	11.966	34.6	4.7	34.6	4.7	297.2	0.999	11.25	0.977
9	11.087	11.125	37.8	5.8	37.8	5.8	297.2	1.000	11.11	0.977

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	158.9	138.5	158.9	138.5	139.5	138.1	76.0	10.8	0.	0.
2	167.6	142.2	167.6	142.2	152.0	141.9	70.7	10.0	0.	0.
3	166.6	142.7	166.6	142.7	151.0	142.4	70.6	7.7	0.	0.
4	160.8	141.4	160.8	141.4	142.2	141.4	75.1	3.9	0.	0.
5	152.7	132.5	152.7	132.5	131.2	132.4	78.1	3.6	0.	0.
6	150.7	124.3	150.7	124.3	126.7	124.2	81.7	4.9	0.	0.
7	147.8	110.8	147.8	110.8	122.8	110.6	82.2	6.7	0.	0.
8	147.6	101.9	147.6	101.9	121.5	101.5	83.9	8.4	0.	0.
9	143.1	92.3	143.1	92.3	113.1	91.8	87.6	9.3	0.	0.

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.462	0.401	0.462	0.401	0.406	0.400	0.989	0.538
2	0.490	0.413	0.490	0.413	0.444	0.412	0.934	0.490
3	0.488	0.415	0.488	0.415	0.442	0.414	0.944	0.488
4	0.471	0.413	0.471	0.413	0.417	0.413	0.994	0.499
5	0.448	0.387	0.448	0.387	0.385	0.387	1.009	0.506
6	0.443	0.364	0.443	0.364	0.372	0.363	0.980	0.498
7	0.435	0.324	0.435	0.324	0.362	0.323	0.901	0.469
8	0.435	0.298	0.435	0.298	0.358	0.297	0.836	0.475
9	0.421	0.269	0.421	0.269	0.333	0.268	0.812	0.508

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	14.3	5.1	8.5	0.329	0.	0.173	0.173	0.084	0.084
2	10.00	10.5	1.3	8.1	0.323	0.	0.179	0.179	0.085	0.085
3	15.00	10.4	1.2	7.1	0.317	0.	0.137	0.137	0.063	0.063
4	30.00	12.3	3.1	5.6	0.304	0.	0.034	0.034	0.014	0.014
5	50.00	13.4	4.2	5.7	0.306	0.	0.017	0.017	0.006	0.006
6	70.00	13.0	3.8	6.5	0.326	0.	0.059	0.059	0.017	0.017
7	85.00	12.2	3.1	7.7	0.378	0.	0.121	0.121	0.031	0.031
8	90.00	12.7	3.6	8.8	0.430	0.	0.186	0.186	0.044	0.044
9	95.00	15.6	6.4	9.8	0.475	0.	0.196	0.196	0.043	0.043

TABLE VIII. - Continued.

(k) 110 Percent design speed; reading number 1772

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.595	24.608	31.9	4.9	31.9	4.9	312.6	0.999	12.48	0.974
2	23.861	23.886	27.6	4.6	27.6	4.6	310.4	1.002	12.59	0.970
3	23.127	23.167	27.3	3.6	27.3	3.6	309.0	0.999	12.57	0.971
4	20.917	20.996	29.5	2.0	29.5	2.0	307.2	0.994	12.34	0.985
5	17.955	18.080	32.7	1.6	32.7	1.6	304.1	0.996	11.99	0.993
6	14.945	15.110	34.9	2.6	34.9	2.6	302.4	0.994	11.86	0.981
7	12.647	12.786	35.6	3.9	35.6	3.9	300.2	0.996	11.59	0.977
8	11.869	11.966	36.6	5.1	36.6	5.1	299.2	0.999	11.47	0.973
9	11.087	11.125	39.9	6.1	39.9	6.1	299.5	0.999	11.35	0.972

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	172.8	152.8	172.8	152.8	146.7	152.2	91.2	13.0	0.	0.
2	180.6	154.8	180.6	154.8	160.0	154.3	83.8	12.3	0.	0.
3	182.3	153.8	182.3	153.8	162.0	153.5	83.5	9.6	0.	0.
4	177.8	151.3	177.8	151.3	154.7	151.2	87.6	5.4	0.	0.
5	166.9	141.2	166.9	141.2	140.4	141.2	90.2	4.0	0.	0.
6	164.3	127.4	164.3	127.4	134.7	127.2	94.0	5.7	0.	0.
7	158.7	110.2	158.7	110.2	129.0	110.0	92.4	7.5	0.	0.
8	156.1	99.6	156.1	99.6	125.3	99.2	93.0	8.8	0.	0.
9	153.2	89.8	153.2	89.8	117.5	89.3	98.2	9.6	0.	0.

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.499	0.439	0.499	0.439	0.424	0.438	1.037	0.646
2	0.525	0.447	0.525	0.447	0.465	0.445	0.964	0.584
3	0.532	0.445	0.532	0.445	0.473	0.444	0.947	0.573
4	0.519	0.440	0.519	0.440	0.452	0.440	0.978	0.596
5	0.489	0.412	0.489	0.412	0.411	0.412	1.005	0.593
6	0.482	0.371	0.482	0.371	0.395	0.371	0.944	0.585
7	0.467	0.321	0.467	0.321	0.379	0.320	0.853	0.543
8	0.459	0.290	0.459	0.290	0.369	0.289	0.792	0.543
9	0.450	0.261	0.450	0.261	0.346	0.259	0.760	0.580

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	17.6	8.4	9.0	0.337	0.	0.169	0.169	0.082	0.082
2	10.00	13.2	4.0	8.6	0.330	0.	0.173	0.173	0.082	0.082
3	15.00	12.6	3.4	7.6	0.342	0.	0.164	0.164	0.075	0.075
4	30.00	14.0	4.8	6.0	0.341	0.	0.091	0.091	0.038	0.038
5	50.00	15.3	6.1	5.7	0.338	0.	0.044	0.044	0.016	0.016
6	70.00	15.0	5.9	6.8	0.384	0.	0.130	0.130	0.039	0.039
7	85.00	14.0	4.9	8.1	0.439	0.	0.166	0.166	0.042	0.042
8	90.00	14.6	5.5	9.2	0.489	0.	0.200	0.200	0.047	0.047
9	95.00	17.7	8.6	10.1	0.541	0.	0.215	0.215	0.047	0.047

TABLE VIII. - Continued.

(*l*) 110 Percent design speed; reading number 1773

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.595	24.608	27.2	3.3	27.2	3.3	310.5	0.998	12.32	0.973
2	23.861	23.886	23.3	3.2	23.3	3.2	308.6	0.999	12.49	0.971
3	23.127	23.167	23.5	2.6	23.5	2.6	307.3	0.998	12.42	0.980
4	20.917	20.996	25.9	1.3	25.9	1.3	305.5	0.994	12.22	0.988
5	17.955	18.080	28.6	1.5	28.6	1.5	302.9	0.996	11.89	0.994
6	14.945	15.110	31.5	2.0	31.5	2.0	301.1	0.997	11.71	0.992
7	12.647	12.786	32.6	3.2	32.6	3.2	299.7	0.997	11.55	0.980
8	11.869	11.966	33.6	4.6	33.6	4.6	299.2	0.997	11.47	0.970
9	11.087	11.125	36.8	5.7	36.8	5.7	299.1	0.998	11.29	0.971

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	179.6	157.1	179.6	157.1	159.7	156.8	82.1	9.1	0.	0.
2	189.0	162.3	189.0	162.3	173.5	162.0	74.9	9.1	0.	0.
3	188.5	162.9	188.5	162.9	172.9	162.7	75.2	7.5	0.	0.
4	184.8	160.1	184.8	160.1	166.2	160.1	80.8	3.6	0.	0.
5	174.2	150.7	174.2	150.7	152.9	150.6	83.4	3.9	0.	0.
6	169.7	142.3	169.7	142.3	144.7	142.2	88.5	4.9	0.	0.
7	167.6	127.6	167.6	127.6	141.1	127.4	90.4	7.2	0.	0.
8	166.4	116.4	166.4	116.4	138.6	116.0	92.1	9.4	0.	0.
9	160.0	104.6	160.0	104.6	128.1	104.1	95.9	10.5	0.	0.

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.522	0.454	0.522	0.454	0.464	0.454	0.982	0.574
2	0.553	0.471	0.553	0.471	0.507	0.470	0.934	0.553
3	0.553	0.474	0.553	0.474	0.507	0.474	0.941	0.553
4	0.543	0.468	0.543	0.468	0.488	0.468	0.964	0.543
5	0.512	0.441	0.512	0.441	0.450	0.441	0.985	0.512
6	0.500	0.417	0.500	0.417	0.426	0.416	0.983	0.523
7	0.495	0.373	0.495	0.373	0.416	0.373	0.903	0.495
8	0.491	0.340	0.491	0.340	0.409	0.339	0.837	0.501
9	0.472	0.305	0.472	0.305	0.378	0.303	0.813	0.551

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	12.9	3.7	7.4	0.324	0.	0.159	0.159	0.077	0.077
2	10.00	8.9	-0.3	7.2	0.306	0.	0.154	0.154	0.073	0.073
3	15.00	8.9	-0.3	6.6	0.301	0.	0.108	0.108	0.050	0.050
4	30.00	10.4	1.2	5.3	0.307	0.	0.065	0.065	0.027	0.027
5	50.00	11.2	2.0	5.6	0.298	0.	0.034	0.034	0.012	0.012
6	70.00	11.6	2.5	6.2	0.307	0.	0.051	0.051	0.015	0.015
7	85.00	11.0	1.9	7.4	0.363	0.	0.128	0.128	0.032	0.032
8	90.00	11.7	2.5	8.7	0.417	0.	0.195	0.195	0.046	0.046
9	95.00	14.6	5.5	9.7	0.464	0.	0.203	0.203	0.045	0.045

TABLE VIII. - Continued.

(m) 110 Percent design speed; reading number 1774

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.595	24.608	23.5	2.4	23.5	2.4	308.2	0.997	12.10	0.969
2	23.861	23.886	20.9	2.6	20.9	2.6	307.1	0.997	12.27	0.972
3	23.127	23.167	20.7	1.8	20.7	1.8	305.9	0.998	12.24	0.982
4	20.917	20.996	22.9	1.0	22.9	1.0	304.2	0.995	12.05	0.992
5	17.955	18.080	25.5	1.0	25.5	1.0	302.1	0.997	11.78	0.999
6	14.945	15.110	28.6	1.6	28.6	1.6	300.3	0.998	11.63	0.998
7	12.647	12.786	30.2	2.8	30.2	2.8	299.1	0.998	11.52	0.984
8	11.869	11.966	30.8	4.2	30.8	4.2	299.0	0.997	11.45	0.971
9	11.087	11.125	33.8	5.4	33.8	5.4	298.7	0.998	11.22	0.970

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	185.9	158.4	185.9	158.4	170.5	158.2	74.1	6.7	0.	0.
2	194.5	165.9	194.5	165.9	181.7	165.8	69.5	7.5	0.	0.
3	195.0	169.0	195.0	169.0	182.4	168.9	68.9	5.4	0.	0.
4	191.1	167.8	191.1	167.8	176.1	167.8	74.2	2.8	0.	0.
5	181.8	162.0	181.8	162.0	164.0	162.0	78.3	2.8	0.	0.
6	177.4	156.2	177.4	156.2	155.7	156.2	85.0	4.4	0.	0.
7	176.4	144.8	176.4	144.8	152.5	144.6	88.6	7.0	0.	0.
8	175.8	133.7	175.8	133.7	150.9	133.4	90.1	9.9	0.	0.
9	168.1	120.2	168.1	120.2	139.7	119.6	93.5	11.4	0.	0.

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.544	0.460	0.544	0.460	0.499	0.460	0.928	0.544
2	0.572	0.484	0.572	0.484	0.534	0.484	0.912	0.572
3	0.574	0.494	0.574	0.494	0.537	0.494	0.926	0.574
4	0.564	0.493	0.564	0.493	0.519	0.493	0.953	0.564
5	0.537	0.476	0.537	0.476	0.484	0.476	0.988	0.537
6	0.525	0.460	0.525	0.460	0.460	0.459	1.003	0.525
7	0.523	0.426	0.523	0.426	0.452	0.425	0.948	0.523
8	0.521	0.392	0.521	0.392	0.447	0.391	0.884	0.521
9	0.497	0.352	0.497	0.352	0.413	0.350	0.856	0.497

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	9.2	-0.0	6.5	0.325	0.	0.171	0.171	0.084	0.084
2	10.00	6.5	-2.7	6.6	0.298	0.	0.142	0.142	0.067	0.067
3	15.00	6.1	-3.1	5.8	0.283	0.	0.092	0.092	0.042	0.042
4	30.00	7.3	-1.8	5.0	0.277	0.	0.042	0.042	0.018	0.018
5	50.00	8.1	-1.0	5.1	0.257	0.	0.007	0.007	0.003	0.003
6	70.00	8.8	-0.4	5.8	0.254	0.	0.013	0.013	0.004	0.004
7	85.00	8.6	-0.5	7.0	0.295	0.	0.094	0.094	0.024	0.024
8	90.00	8.9	-0.2	8.4	0.346	0.	0.169	0.169	0.040	0.040
9	95.00	11.6	2.5	9.4	0.393	0.	0.191	0.191	0.042	0.042

TABLE VIII. - Continued.

(n) 110 Percent design speed; reading number 1781

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.595	24.608	22.1	2.5	22.1	2.5	307.8	0.995	11.82	0.974
2	23.861	23.886	19.4	3.1	19.4	3.1	306.7	0.996	12.11	0.970
3	23.127	23.167	19.1	2.5	19.1	2.5	305.9	0.995	12.13	0.979
4	20.917	20.996	21.6	2.4	21.6	2.4	304.3	0.995	12.08	0.986
5	17.955	18.080	24.9	2.8	24.9	2.8	303.0	0.995	11.94	0.996
6	14.945	15.110	27.1	3.6	27.1	3.6	301.0	0.997	11.72	0.997
7	12.647	12.786	28.0	3.6	28.0	3.6	298.3	1.000	11.33	0.995
8	11.869	11.966	28.1	4.9	28.1	4.9	297.7	0.999	11.23	0.982
9	11.087	11.125	30.8	6.3	30.8	6.3	297.6	0.999	11.06	0.972

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	186.6	162.2	186.6	162.2	172.9	162.0	70.2	7.0	0.	0.
2	200.6	171.2	200.6	171.2	189.2	170.9	66.7	9.3	0.	0.
3	204.1	176.1	204.1	176.1	193.0	176.0	66.7	7.8	0.	0.
4	204.2	179.1	204.2	179.1	189.8	178.9	75.2	7.6	0.	0.
5	199.4	179.6	199.4	179.6	180.9	179.4	83.8	8.9	0.	0.
6	194.8	173.2	194.8	173.2	173.4	172.9	88.7	10.8	0.	0.
7	182.9	157.2	182.9	157.2	161.5	156.9	85.7	9.9	0.	0.
8	181.0	145.9	181.0	145.9	159.7	145.4	85.2	12.5	0.	0.
9	175.0	130.3	175.0	130.3	150.4	129.5	89.5	14.4	0.	0.

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.546	0.473	0.546	0.473	0.506	0.472	0.937	0.546
2	0.591	0.501	0.591	0.501	0.557	0.500	0.904	0.591
3	0.603	0.517	0.603	0.517	0.570	0.516	0.912	0.603
4	0.605	0.527	0.605	0.527	0.562	0.527	0.943	0.605
5	0.591	0.530	0.591	0.530	0.536	0.530	0.992	0.591
6	0.579	0.512	0.579	0.512	0.515	0.511	0.997	0.579
7	0.544	0.464	0.544	0.464	0.480	0.463	0.971	0.544
8	0.538	0.430	0.538	0.430	0.475	0.428	0.910	0.538
9	0.520	0.382	0.520	0.382	0.446	0.380	0.861	0.520

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	7.8	-1.4	6.6	0.296	0.	0.140	0.140	0.068	0.068
2	10.00	5.0	-4.2	7.1	0.282	0.	0.143	0.143	0.068	0.068
3	15.00	4.4	-4.8	6.5	0.270	0.	0.095	0.095	0.044	0.044
4	30.00	6.1	-3.1	6.4	0.260	0.	0.063	0.063	0.026	0.026
5	50.00	7.4	-1.7	7.0	0.233	0.	0.019	0.019	0.007	0.007
6	70.00	7.2	-1.9	7.8	0.229	0.	0.016	0.016	0.005	0.005
7	85.00	6.4	-2.8	7.8	0.244	0.	0.025	0.025	0.006	0.006
8	90.00	6.1	-3.0	9.0	0.288	0.	0.100	0.100	0.024	0.024
9	95.00	8.6	-0.6	10.3	0.350	0.	0.169	0.169	0.037	0.037

TABLE VIII. - Continued.

(o) 110 Percent design speed; reading number 1782

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.595	24.608	17.1	2.4	17.1	2.4	304.7	0.995	11.48	0.970
2	23.861	23.886	15.4	2.3	15.4	2.3	303.8	0.996	11.72	0.972
3	23.127	23.167	15.4	2.0	15.4	2.0	302.9	0.996	11.71	0.978
4	20.917	20.996	17.5	1.8	17.5	1.8	301.5	0.994	11.57	0.986
5	17.955	18.080	20.6	2.1	20.6	2.1	300.6	0.997	11.50	1.003
6	14.945	15.110	24.3	3.0	24.3	3.0	300.4	0.995	11.63	0.989
7	12.647	12.786	25.9	3.7	25.9	3.7	298.3	0.998	11.32	0.992
8	11.869	11.966	25.6	4.8	25.6	4.8	297.3	1.000	11.15	0.987
9	11.087	11.125	27.7	6.4	27.7	6.4	296.7	1.001	10.91	0.975

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	199.1	170.5	199.1	170.5	190.2	170.4	58.7	7.0	0.	0.
2	209.4	179.9	209.4	179.9	201.9	179.8	55.6	7.1	0.	0.
3	212.5	182.4	212.5	182.4	204.9	182.3	56.4	6.5	0.	0.
4	208.5	183.2	208.5	183.2	198.8	183.1	62.7	5.6	0.	0.
5	203.2	189.4	203.2	189.4	190.2	189.2	71.5	6.9	0.	0.
6	205.4	188.8	205.4	188.8	187.1	188.6	84.6	10.0	0.	0.
7	196.5	179.1	196.5	179.1	176.8	178.8	85.7	11.4	0.	0.
8	192.0	171.3	192.0	171.3	173.2	170.7	82.9	14.4	0.	0.
9	184.1	154.6	184.1	154.6	163.0	153.6	85.6	17.2	0.	0.

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.588	0.501	0.588	0.501	0.562	0.500	0.896	0.588
2	0.622	0.530	0.622	0.530	0.600	0.530	0.891	0.622
3	0.633	0.539	0.633	0.539	0.610	0.538	0.890	0.633
4	0.622	0.543	0.622	0.543	0.593	0.543	0.921	0.622
5	0.606	0.563	0.606	0.563	0.567	0.562	0.995	0.606
6	0.613	0.562	0.613	0.562	0.558	0.561	1.008	0.613
7	0.587	0.533	0.587	0.533	0.528	0.531	1.011	0.587
8	0.574	0.508	0.574	0.508	0.517	0.506	0.985	0.574
9	0.549	0.457	0.549	0.457	0.486	0.454	0.943	0.549

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	2.8	-6.4	6.4	0.270	0.	0.141	0.141	0.069	0.069
2	10.00	1.0	-8.2	6.3	0.251	0.	0.123	0.123	0.058	0.058
3	15.00	0.8	-8.5	6.0	0.250	0.	0.091	0.091	0.042	0.042
4	30.00	2.0	-7.2	5.8	0.235	0.	0.060	0.060	0.025	0.025
5	50.00	3.2	-6.0	6.2	0.181	0.	-0.012	-0.012	-0.004	-0.004
6	70.00	4.5	-4.7	7.3	0.188	0.	0.049	0.049	0.015	0.015
7	85.00	4.2	-4.9	7.9	0.183	0.	0.039	0.039	0.010	0.010
8	90.00	3.6	-5.5	8.9	0.192	0.	0.064	0.064	0.015	0.015
9	95.00	5.5	-3.6	10.4	0.242	0.	0.134	0.134	0.029	0.029

TABLE VIII. - Continued.

(p) 120 Percent design speed; reading number 1862

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.595	24.608	28.0	1.6	28.0	1.6	312.5	0.990	11.72	0.983
2	23.861	23.886	19.7	1.9	19.7	1.9	309.9	0.997	12.24	0.959
3	23.127	23.167	20.3	1.4	20.3	1.4	308.5	0.998	12.26	0.974
4	20.917	20.996	22.1	1.1	22.1	1.1	307.5	0.994	12.29	0.984
5	17.955	18.080	25.6	1.0	25.6	1.0	305.5	0.995	12.11	0.992
6	14.945	15.110	28.0	1.6	28.0	1.6	303.6	0.995	12.01	0.985
7	12.647	12.786	28.8	2.4	28.8	2.4	300.8	0.997	11.63	0.991
8	11.869	11.966	29.2	3.5	29.2	3.5	300.4	0.997	11.58	0.973
9	11.087	11.125	31.9	5.0	31.9	5.0	299.8	0.997	11.33	0.965

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	190.4	160.1	190.4	160.1	168.1	160.0	89.5	4.5	0.	0.
2	212.6	168.7	212.6	168.7	200.1	168.6	71.7	5.7	0.	0.
3	214.2	175.7	214.2	175.7	200.8	175.6	74.4	4.2	0.	0.
4	217.2	182.7	217.2	182.7	201.2	182.7	81.8	3.4	0.	0.
5	211.6	181.2	211.6	181.2	190.8	181.2	91.4	3.1	0.	0.
6	208.0	175.4	208.0	175.4	183.6	175.3	97.7	4.9	0.	0.
7	195.7	163.8	195.7	163.8	171.5	163.6	94.3	6.9	0.	0.
8	194.1	152.2	194.1	152.2	169.5	151.9	94.6	9.4	0.	0.
9	186.1	135.2	186.1	135.2	158.0	134.7	98.3	11.8	0.	0.

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.554	0.464	0.554	0.464	0.489	0.463	0.952	0.632
2	0.626	0.490	0.626	0.490	0.589	0.490	0.842	0.626
3	0.632	0.512	0.632	0.512	0.593	0.512	0.874	0.632
4	0.643	0.536	0.643	0.536	0.595	0.536	0.908	0.643
5	0.627	0.533	0.627	0.533	0.566	0.533	0.950	0.627
6	0.618	0.517	0.618	0.517	0.546	0.517	0.955	0.618
7	0.582	0.483	0.582	0.483	0.510	0.482	0.954	0.582
8	0.577	0.448	0.577	0.448	0.504	0.447	0.896	0.577
9	0.552	0.396	0.552	0.396	0.469	0.395	0.853	0.552

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	13.7	4.5	5.7	0.377	0.	0.090	0.090	0.044	0.044
2	10.00	5.3	-3.9	6.0	0.353	0.	0.176	0.176	0.083	0.083
3	15.00	5.7	-3.5	5.4	0.330	0.	0.110	0.110	0.051	0.051
4	30.00	6.6	-2.6	5.1	0.309	0.	0.067	0.067	0.028	0.028
5	50.00	8.2	-1.0	5.1	0.292	0.	0.034	0.034	0.012	0.012
6	70.00	8.2	-1.0	5.8	0.289	0.	0.064	0.064	0.019	0.019
7	85.00	7.2	-1.9	6.6	0.275	0.	0.042	0.042	0.011	0.011
8	90.00	7.2	-1.9	7.7	0.319	0.	0.132	0.132	0.031	0.031
9	95.00	9.7	0.6	9.0	0.376	0.	0.185	0.185	0.041	0.041

TABLE VIII. - Continued.

(q) 120 Percent design speed; reading number 1863

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.595	24.608	36.0	3.8	36.0	3.8	317.9	0.991	12.47	0.976
2	23.861	23.886	25.8	3.7	25.8	3.7	313.6	1.000	12.86	0.959
3	23.127	23.167	24.5	2.8	24.5	2.8	312.1	1.000	12.89	0.966
4	20.917	20.996	26.6	1.9	26.6	1.9	309.9	0.996	12.72	0.986
5	17.955	18.080	29.4	1.0	29.4	1.0	306.9	0.994	12.36	0.989
6	14.945	15.110	31.5	1.5	31.5	1.5	303.7	0.997	12.03	0.992
7	12.647	12.786	33.3	3.3	33.3	3.3	301.5	0.997	11.81	0.979
8	11.869	11.966	34.2	4.6	34.2	4.6	301.1	0.998	11.71	0.967
9	11.087	11.125	37.2	5.3	37.2	5.3	300.9	0.998	11.50	0.967

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	184.2	159.2	184.2	159.2	149.1	158.9	108.2	10.4	0.	0.
2	202.7	165.5	202.7	165.5	182.6	165.1	88.1	10.7	0.	0.
3	205.8	170.4	205.8	170.4	187.4	170.2	85.2	8.5	0.	0.
4	203.7	175.1	203.7	175.1	182.1	175.0	91.3	5.9	0.	0.
5	195.0	164.3	195.0	164.3	169.8	164.2	95.8	3.0	0.	0.
6	187.2	152.7	187.2	152.7	159.7	152.7	97.7	3.9	0.	0.
7	180.8	135.7	180.8	135.7	151.1	135.4	99.3	7.8	0.	0.
8	178.2	121.2	178.2	121.2	147.4	120.8	100.2	9.8	0.	0.
9	171.7	106.8	171.7	106.8	136.8	106.3	103.8	9.9	0.	0.

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.530	0.457	0.530	0.457	0.429	0.456	1.066	0.762
2	0.591	0.477	0.591	0.477	0.532	0.476	0.904	0.591
3	0.602	0.493	0.602	0.493	0.548	0.492	0.908	0.602
4	0.597	0.510	0.597	0.510	0.534	0.510	0.961	0.597
5	0.573	0.480	0.573	0.480	0.499	0.480	0.967	0.606
6	0.552	0.447	0.552	0.447	0.471	0.446	0.956	0.578
7	0.534	0.396	0.534	0.396	0.446	0.396	0.896	0.557
8	0.526	0.353	0.526	0.353	0.435	0.352	0.820	0.562
9	0.506	0.310	0.506	0.310	0.403	0.309	0.777	0.599

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	21.7	12.5	7.8	0.395	0.	0.136	0.136	0.066	0.066
2	10.00	11.3	2.1	7.7	0.364	0.	0.197	0.197	0.093	0.093
3	15.00	9.8	0.6	6.9	0.343	0.	0.156	0.156	0.072	0.072
4	30.00	11.1	1.9	5.9	0.314	0.	0.066	0.066	0.027	0.027
5	50.00	12.0	2.9	5.1	0.327	0.	0.054	0.054	0.019	0.019
6	70.00	11.6	2.5	5.7	0.332	0.	0.045	0.045	0.013	0.013
7	85.00	11.7	2.6	7.5	0.377	0.	0.122	0.122	0.031	0.031
8	90.00	12.3	3.2	8.7	0.439	0.	0.192	0.192	0.045	0.045
9	95.00	15.0	5.9	9.3	0.499	0.	0.207	0.207	0.046	0.046

TABLE VIII. - Concluded.

(r) 120 Percent design speed; reading number 1864

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.595	24.608	41.1	4.6	41.1	4.6	321.7	0.990	13.04	0.961
2	23.861	23.886	31.1	4.8	31.1	4.8	317.6	0.998	13.25	0.955
3	23.127	23.167	29.1	4.6	29.1	4.6	315.6	0.999	13.31	0.956
4	20.917	20.996	30.9	2.8	30.9	2.8	312.0	0.995	12.99	0.972
5	17.955	18.080	32.8	1.1	32.8	1.1	307.8	0.994	12.53	0.983
6	14.945	15.110	35.0	2.3	35.0	2.3	305.0	0.994	12.16	0.981
7	12.647	12.786	36.5	4.0	36.5	4.0	302.5	0.996	11.93	0.968
8	11.869	11.966	37.7	5.2	37.7	5.2	301.2	0.998	11.74	0.969
9	11.087	11.125	40.7	6.1	40.7	6.1	301.4	0.999	11.60	0.967

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	184.3	161.4	184.3	161.4	138.9	160.9	121.1	13.0	0.	0.
2	194.4	165.8	194.4	165.8	166.5	165.2	100.4	13.9	0.	0.
3	198.0	167.6	198.0	167.6	173.0	167.0	96.3	13.5	0.	0.
4	191.6	164.3	191.6	164.3	164.4	164.1	98.3	7.9	0.	0.
5	181.9	151.6	181.9	151.6	152.8	151.6	98.6	3.0	0.	0.
6	175.7	134.1	175.7	134.1	144.0	134.0	100.7	5.4	0.	0.
7	172.4	114.3	172.4	114.3	138.7	114.0	102.4	8.0	0.	0.
8	167.0	102.8	167.0	102.8	132.2	102.4	102.0	9.4	0.	0.
9	163.7	90.4	163.7	90.4	124.1	89.9	106.7	9.6	0.	0.

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.527	0.461	0.527	0.461	0.397	0.459	1.158	0.849
2	0.561	0.475	0.561	0.475	0.480	0.473	0.992	0.705
3	0.574	0.482	0.574	0.482	0.501	0.480	0.965	0.670
4	0.558	0.476	0.558	0.476	0.479	0.475	0.998	0.672
5	0.531	0.441	0.531	0.441	0.447	0.441	0.992	0.647
6	0.515	0.390	0.515	0.390	0.422	0.390	0.930	0.626
7	0.507	0.332	0.507	0.332	0.408	0.331	0.822	0.608
8	0.492	0.298	0.492	0.298	0.389	0.297	0.774	0.602
9	0.481	0.262	0.481	0.262	0.365	0.260	0.725	0.634

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	26.8	17.6	8.7	0.410	0.	0.226	0.226	0.110	0.110
2	10.00	16.7	7.4	8.8	0.358	0.	0.232	0.232	0.110	0.110
3	15.00	14.5	5.3	8.6	0.346	0.	0.219	0.219	0.100	0.100
4	30.00	15.4	6.2	6.8	0.338	0.	0.147	0.147	0.061	0.061
5	50.00	15.4	6.3	5.3	0.353	0.	0.099	0.099	0.035	0.035
6	70.00	15.1	6.0	6.5	0.398	0.	0.117	0.117	0.035	0.035
7	85.00	14.9	5.7	8.2	0.474	0.	0.197	0.197	0.050	0.050
8	90.00	15.7	6.6	9.3	0.515	0.	0.204	0.204	0.048	0.048
9	95.00	18.5	9.4	10.1	0.578	0.	0.224	0.224	0.049	0.049

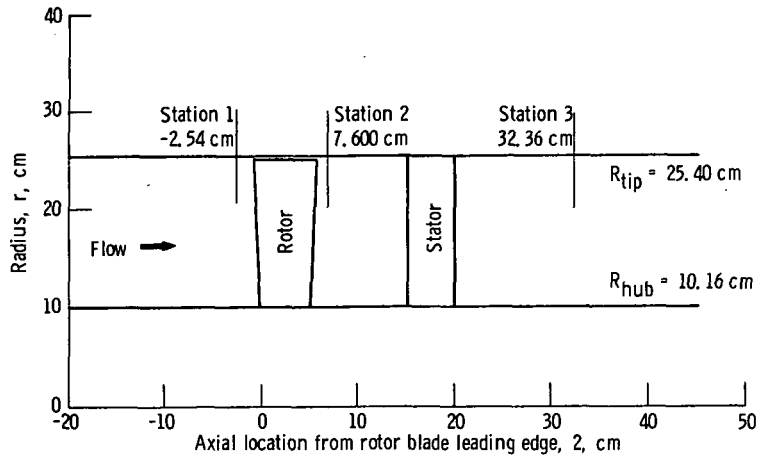


Figure 1. - Compressor flow path.

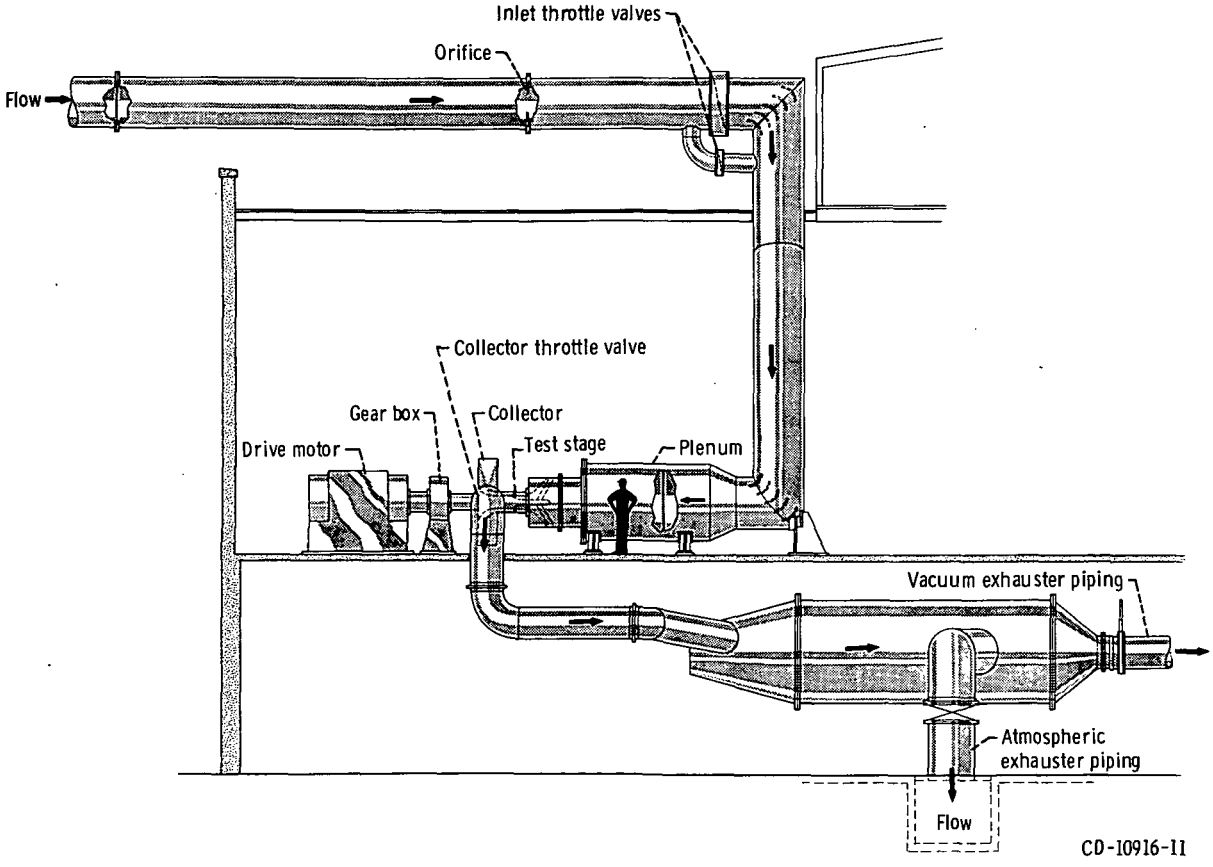


Figure 2. - Single-stage compressor facility.

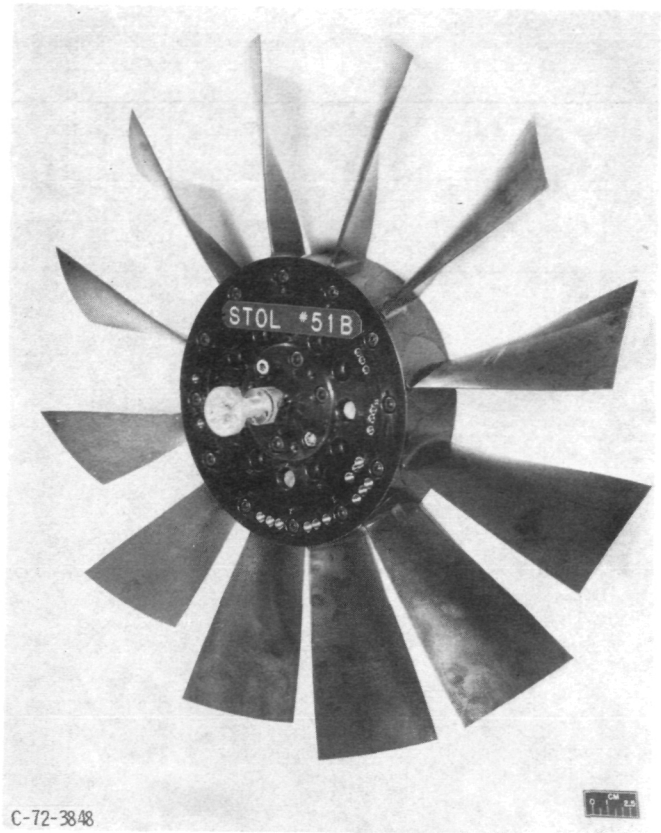


Figure 3. - Rotor 51B, stage 51B.

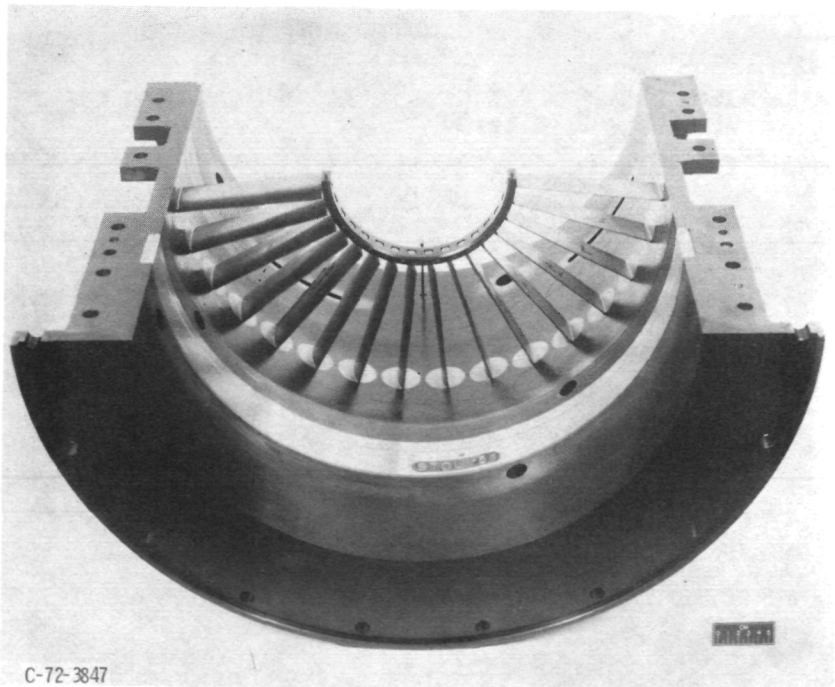
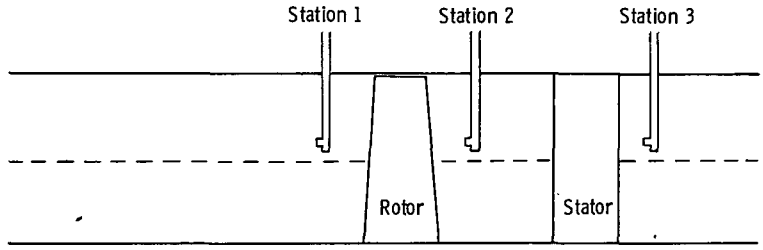
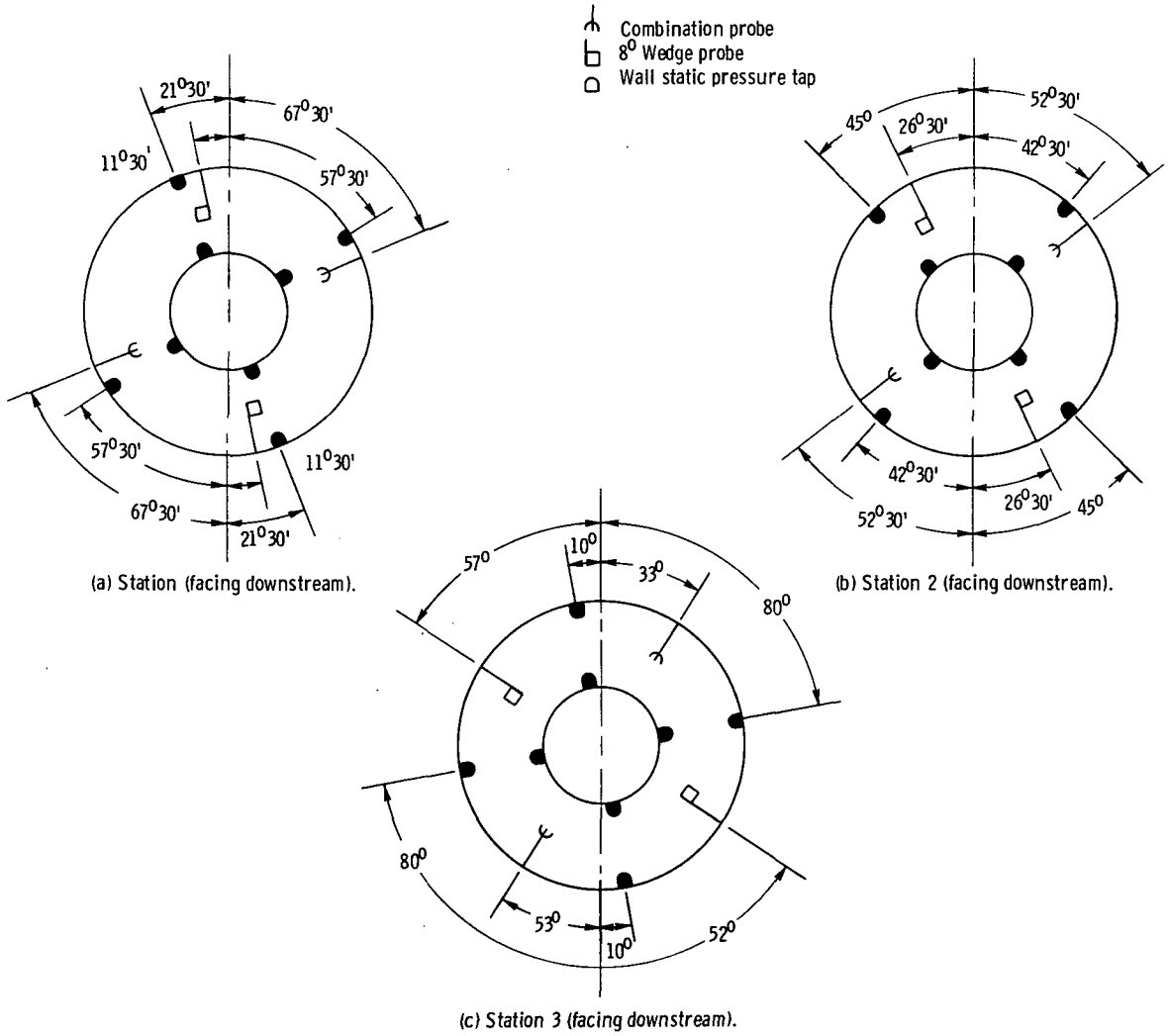


Figure 4. - Stator 51, stage 51B.



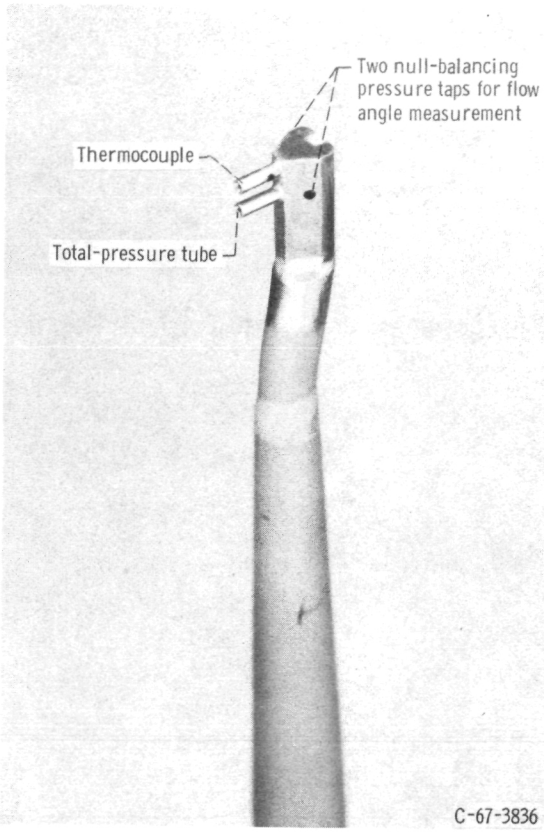


(a) Station (facing downstream).

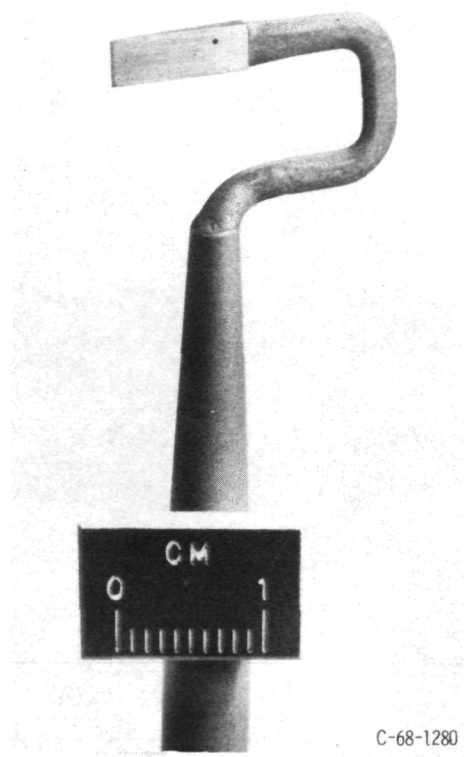
(b) Station 2 (facing downstream).

(c) Station 3 (facing downstream).

Figure 5. - Circumferential location of measurements.



(a) Combination total pressure, total temperature, and flow angle probe (double barrel).



(b) Static pressure probe.

Figure 6. - Survey probe.

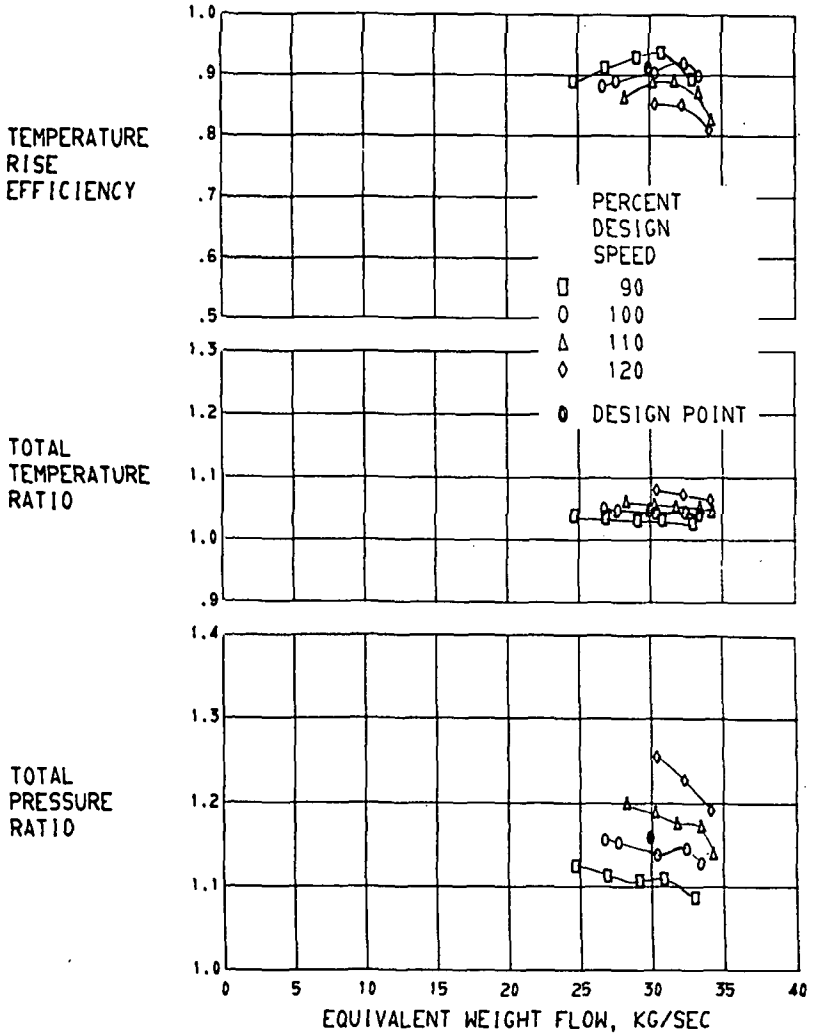


FIGURE 7. - OVERALL PERFORMANCE FOR ROTOR 51B.

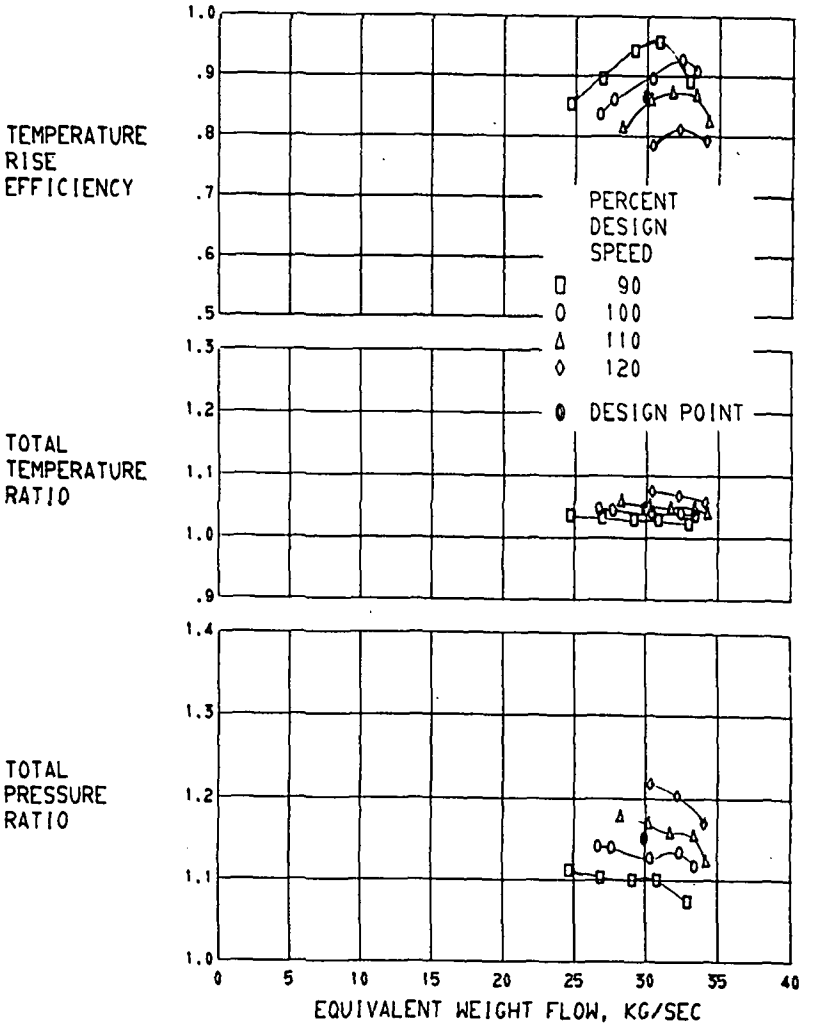
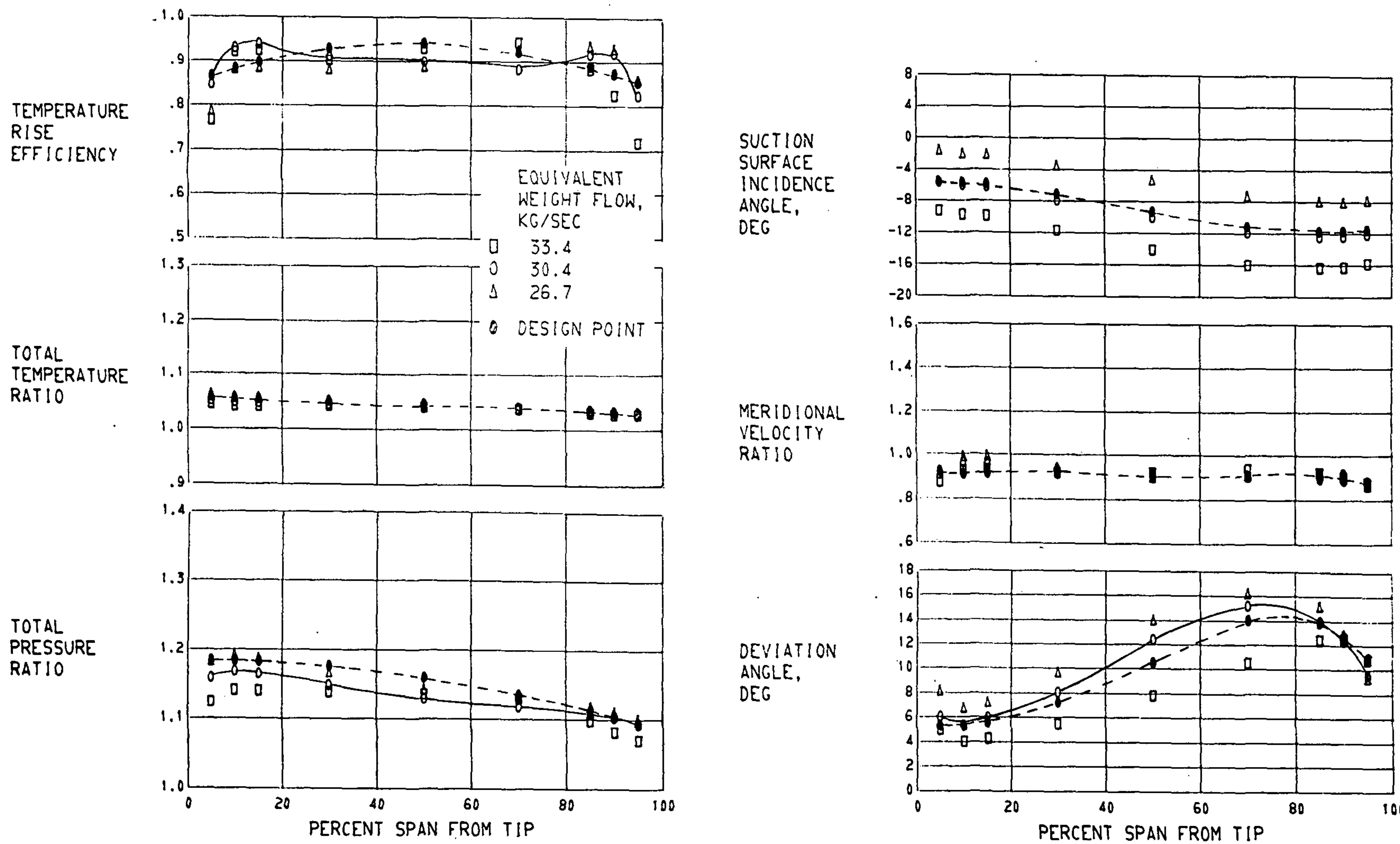


FIGURE 8. - OVERALL PERFORMANCE FOR STAGE 51B.


TEMPERATURE RISE EFFICIENCY
TOTAL TEMPERATURE RATIO
TOTAL PRESSURE RATIO
EQUIVALENT WEIGHT FLOW, KG/SEC
33.4
30.4
26.7
DESIGN POINT
SUCTION SURFACE INCIDENCE ANGLE, DEG
MERIDIONAL VELOCITY RATIO
DEVIATION ANGLE, DEG
PERCENT SPAN FROM TIP
PERCENT SPAN FROM TIP

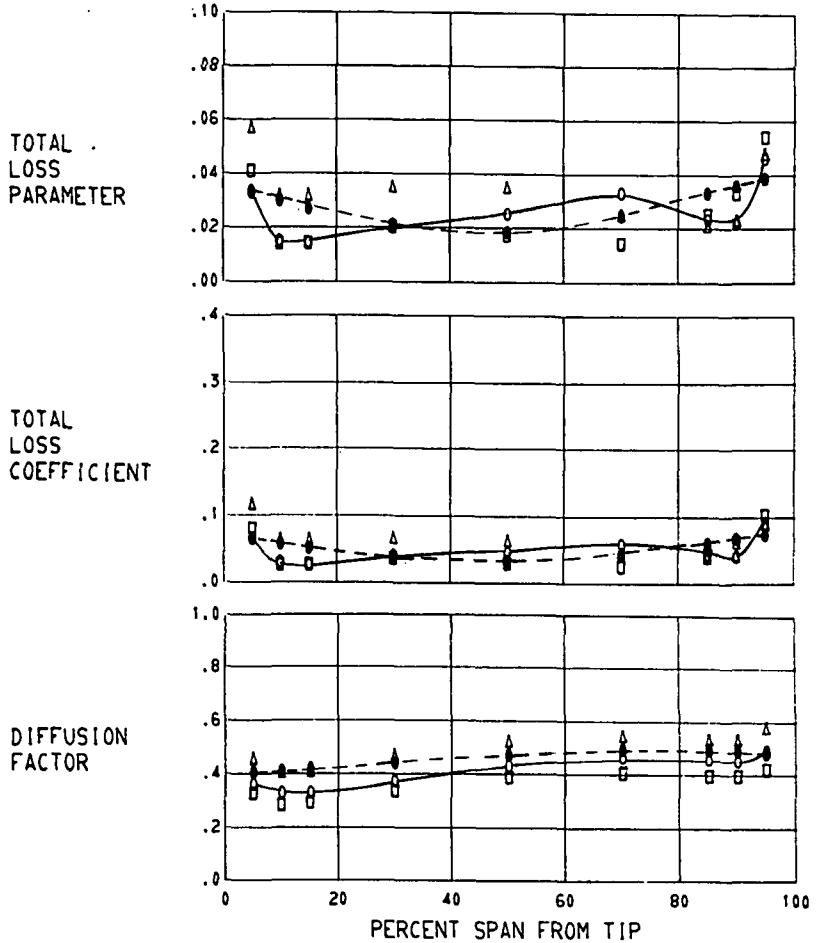


FIGURE 9. - RADIAL DISTRIBUTION OF PERFORMANCE FOR ROTOR 51B. 100 PERCENT DESIGN SPEED.

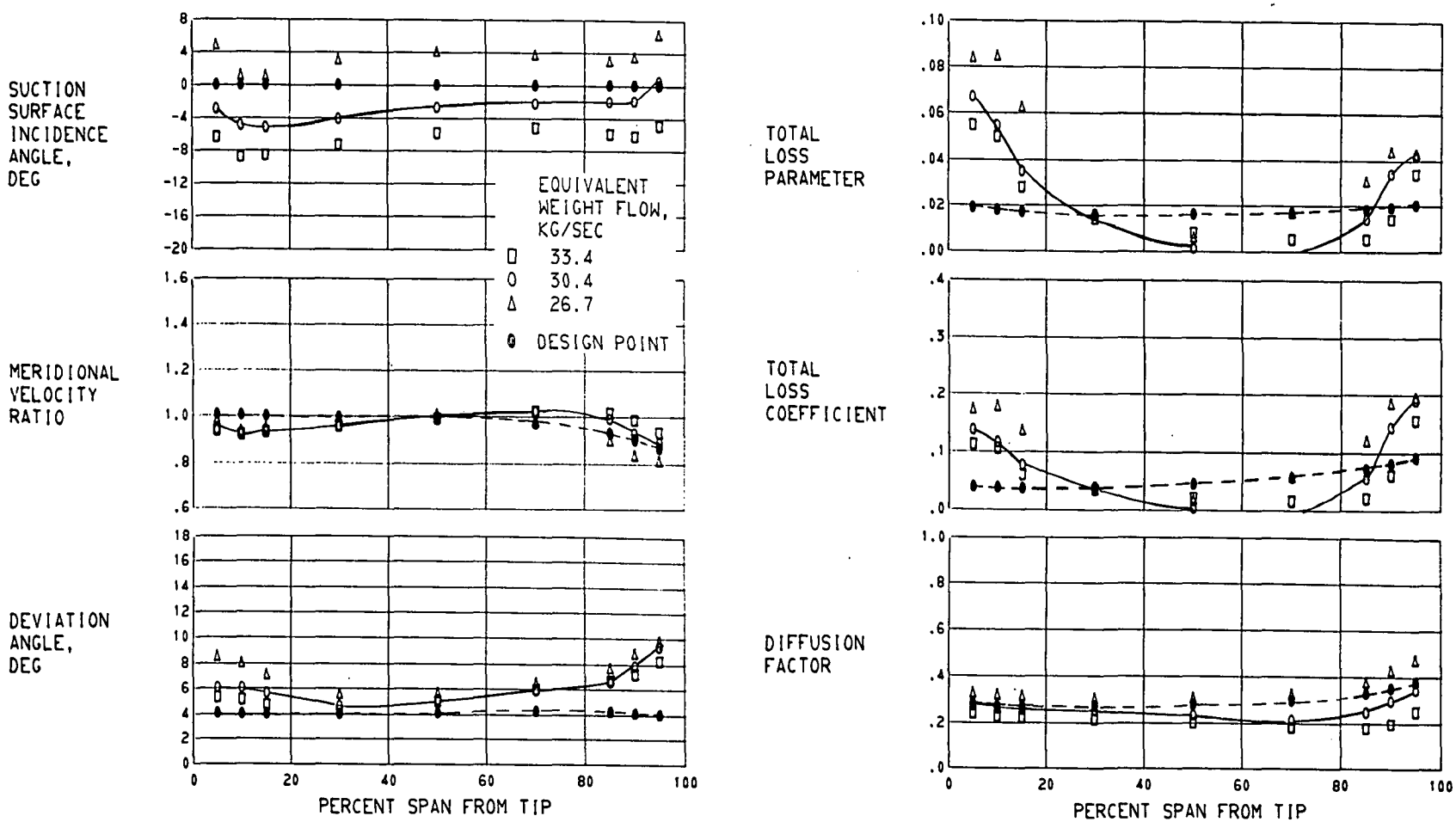
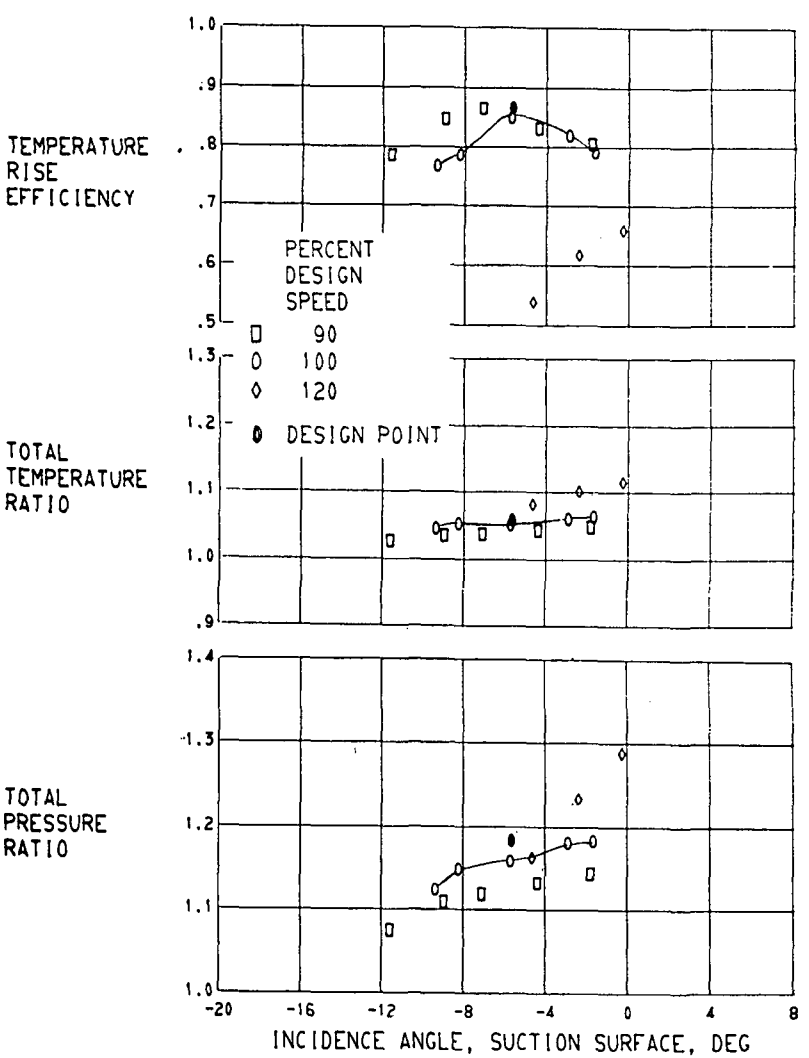
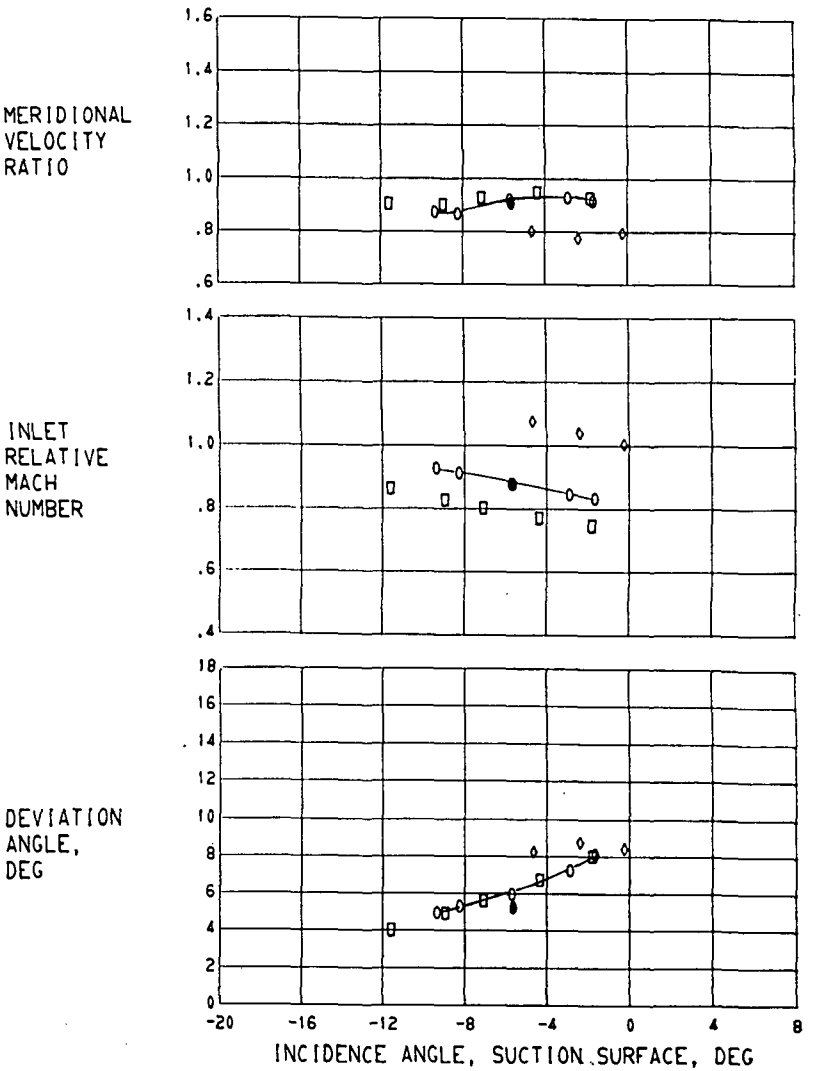
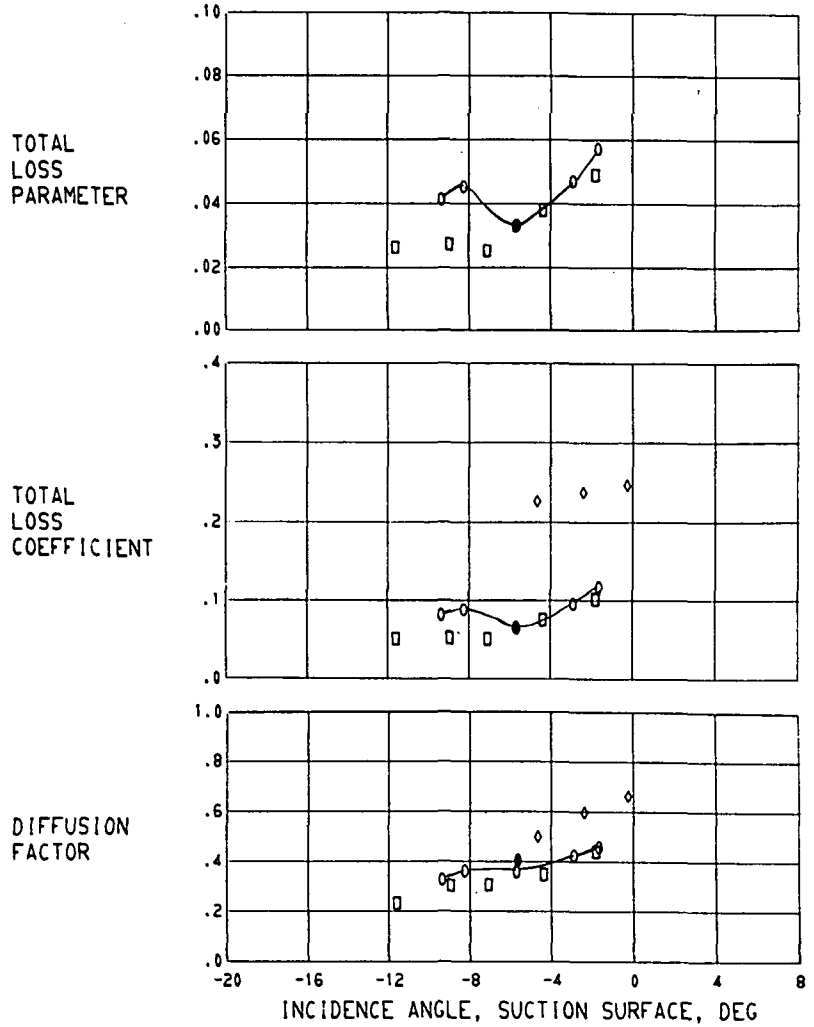


FIGURE 10. - RADIAL DISTRIBUTION OF PERFORMANCE FOR STATOR 51. 100 PERCENT DESIGN SPEED.

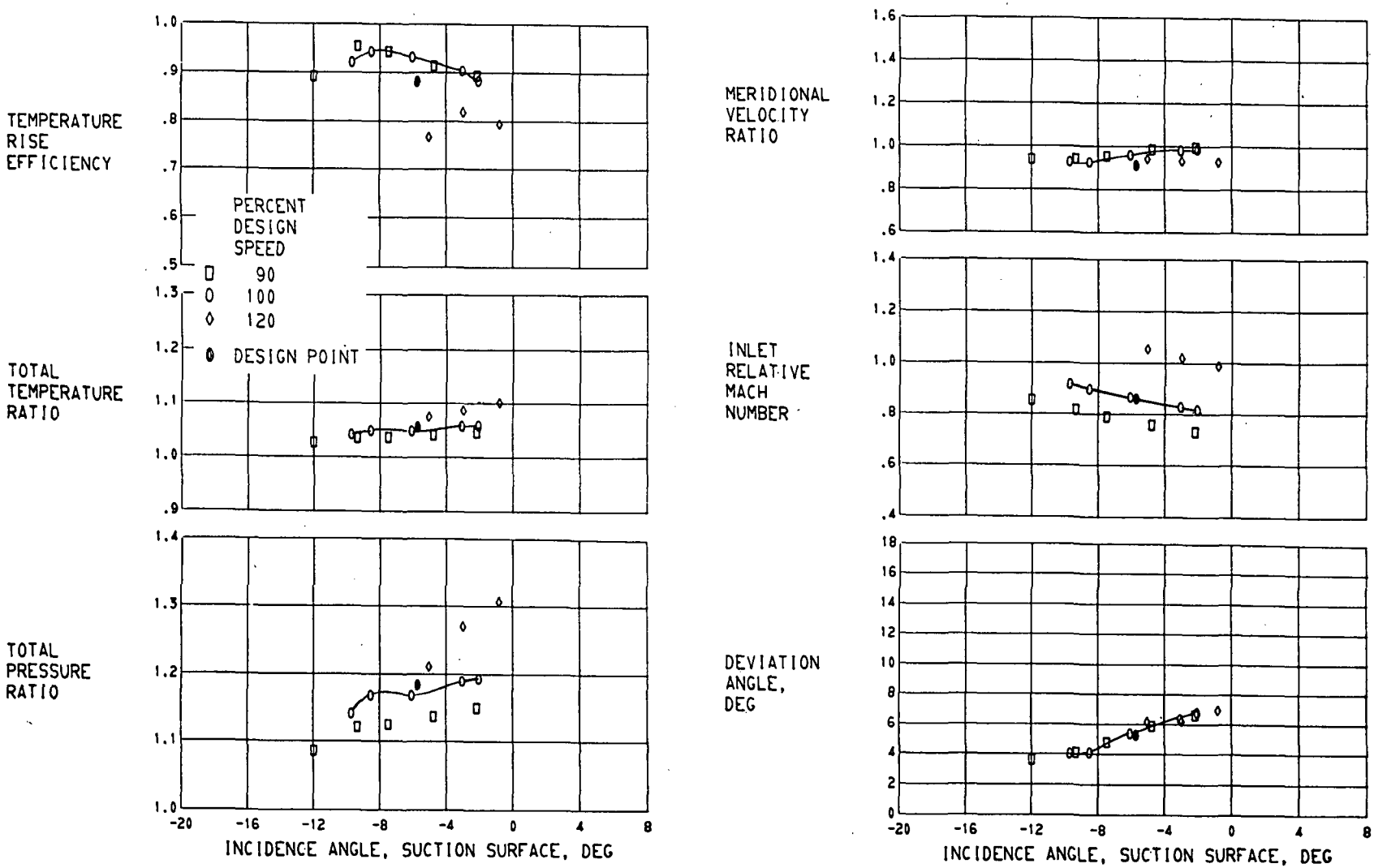

TEMPERATURE RISE EFFICIENCY
TOTAL TEMPERATURE RATIO
TOTAL PRESSURE RATIO
PERCENT DESIGN SPEED
90
100
120
DESIGN POINT
INCIDENCE ANGLE, SUCTION SURFACE, DEG

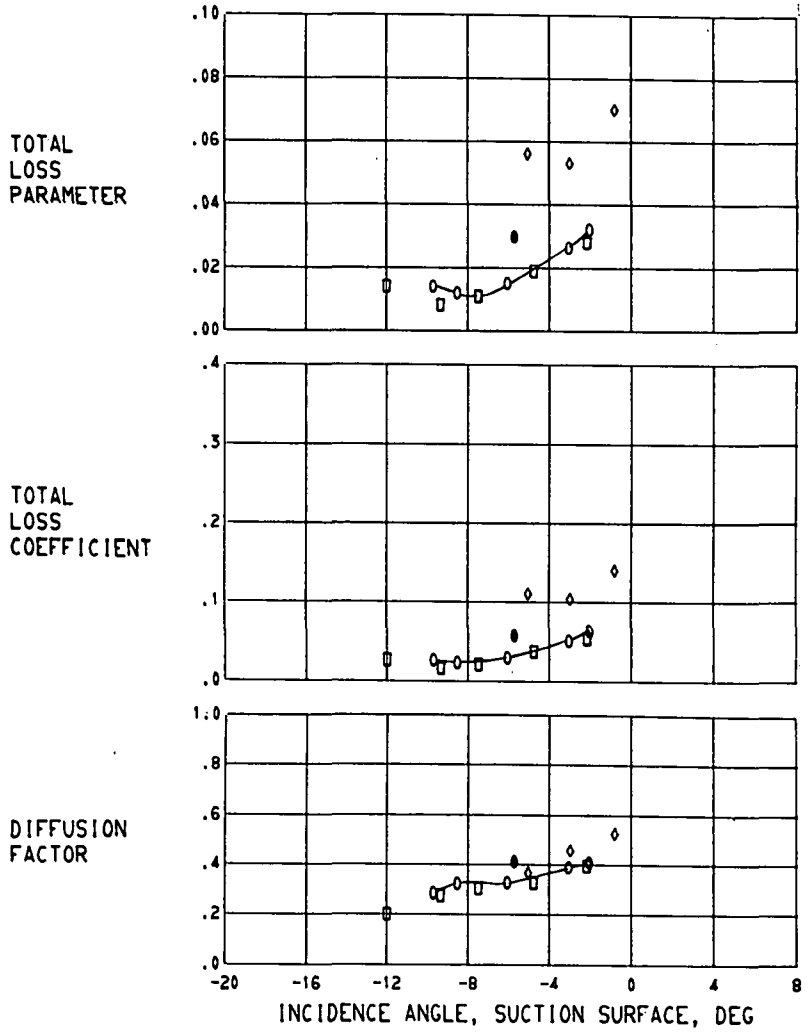

MERIDIONAL VELOCITY RATIO
INLET RELATIVE MACH NUMBER
DEVIATION ANGLE, DEG
INCIDENCE ANGLE, SUCTION SURFACE, DEG



(A) 5.0 PERCENT SPAN.

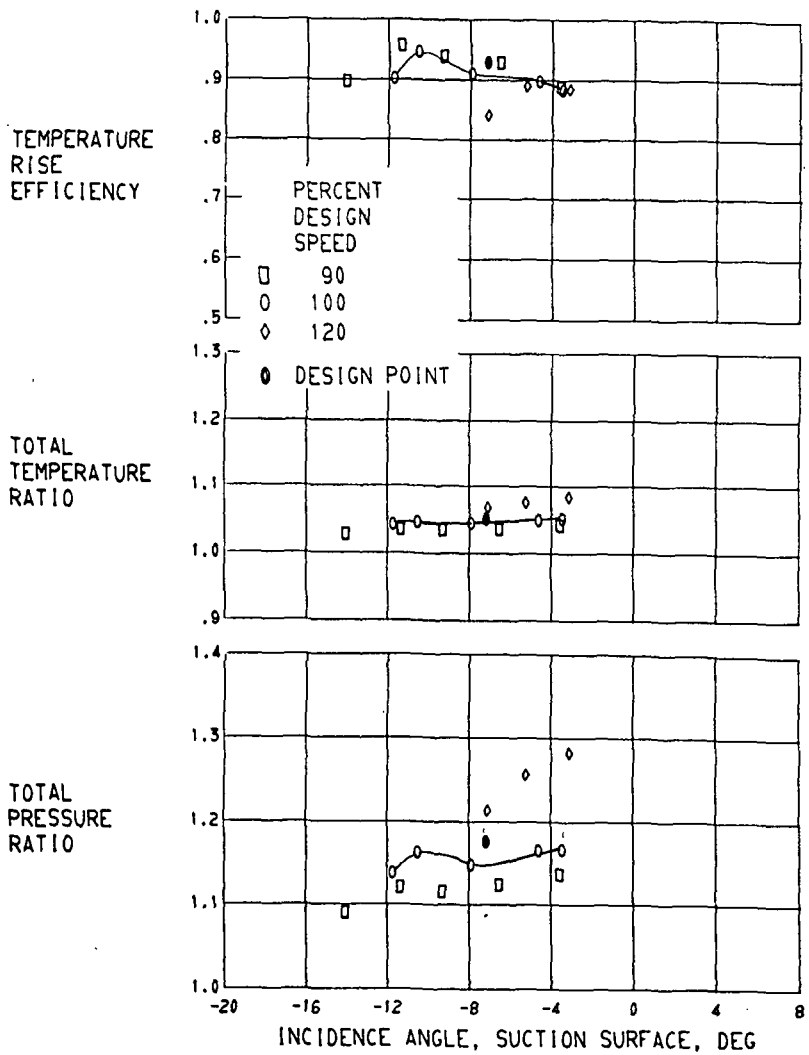
FIGURE 11. - BLADE-ELEMENT PERFORMANCE FOR ROTOR 51B.

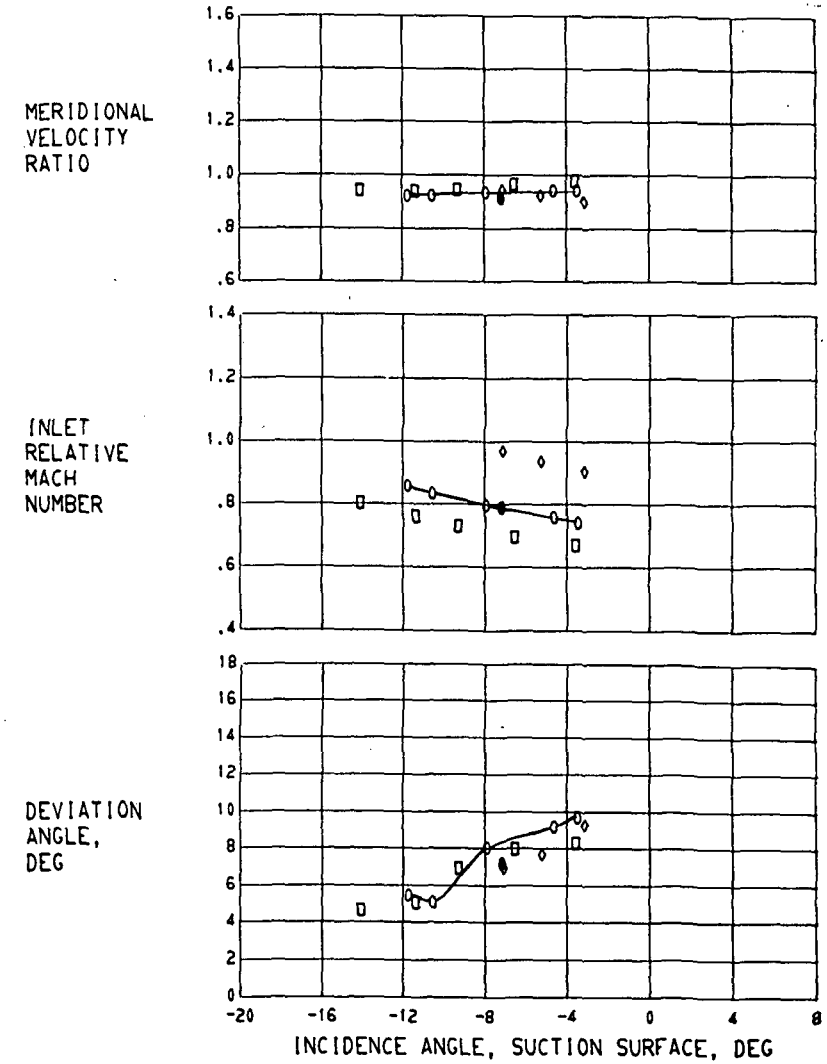

TEMPERATURE RISE EFFICIENCY
TOTAL TEMPERATURE RATIO
TOTAL PRESSURE RATIO
PERCENT DESIGN SPEED
90
100
120
DESIGN POINT
INCIDENCE ANGLE, SUCTION SURFACE, DEG
MERIDIONAL VELOCITY RATIO
INLET RELATIVE MACH NUMBER
DEVIATION ANGLE, DEG
INCIDENCE ANGLE, SUCTION SURFACE, DEG

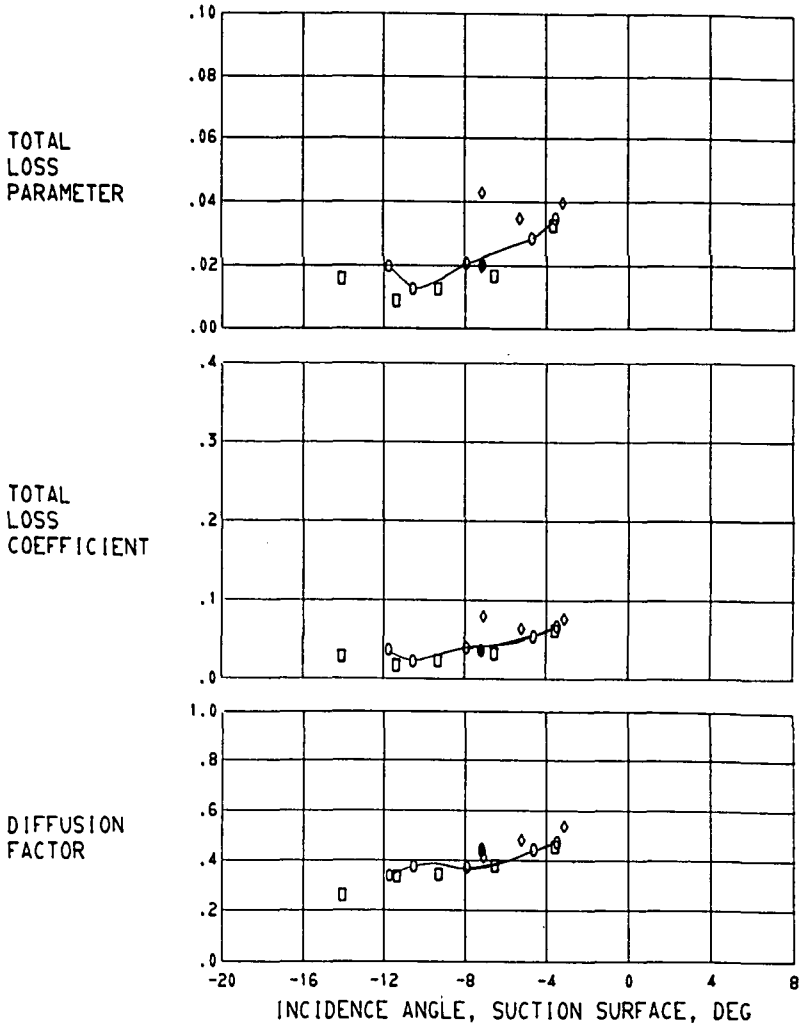


(B) 10.0 PERCENT SPAN.

FIGURE 11. - CONTINUED. BLADE-ELEMENT PERFORMANCE FOR ROTOR 51B.

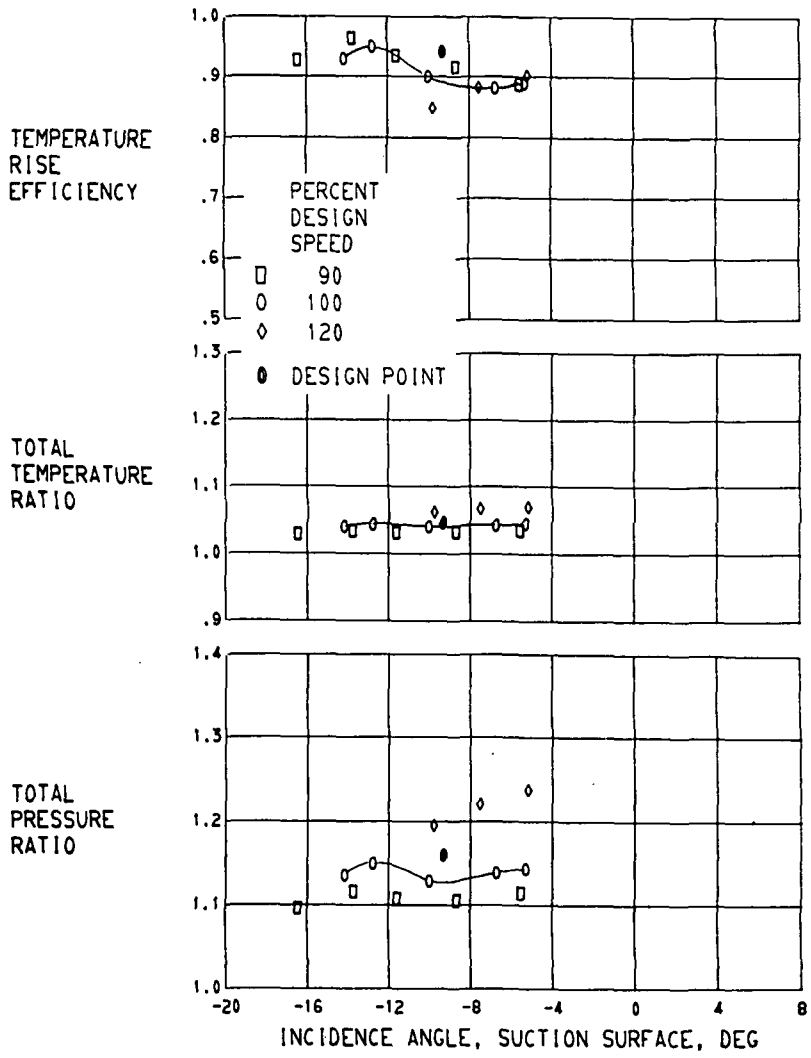

TEMPERATURE RISE EFFICIENCY
TOTAL TEMPERATURE RATIO
TOTAL PRESSURE RATIO
PERCENT DESIGN SPEED
90
100
120
DESIGN POINT
1.0
.9
.8
.7
.6
.5
1.3
1.2
1.1
1.0
.9
1.4
1.3
1.2
1.1
1.0
-20
-16
-12
-8
-4
0
4
8
INCIDENCE ANGLE, SUCTION SURFACE, DEG

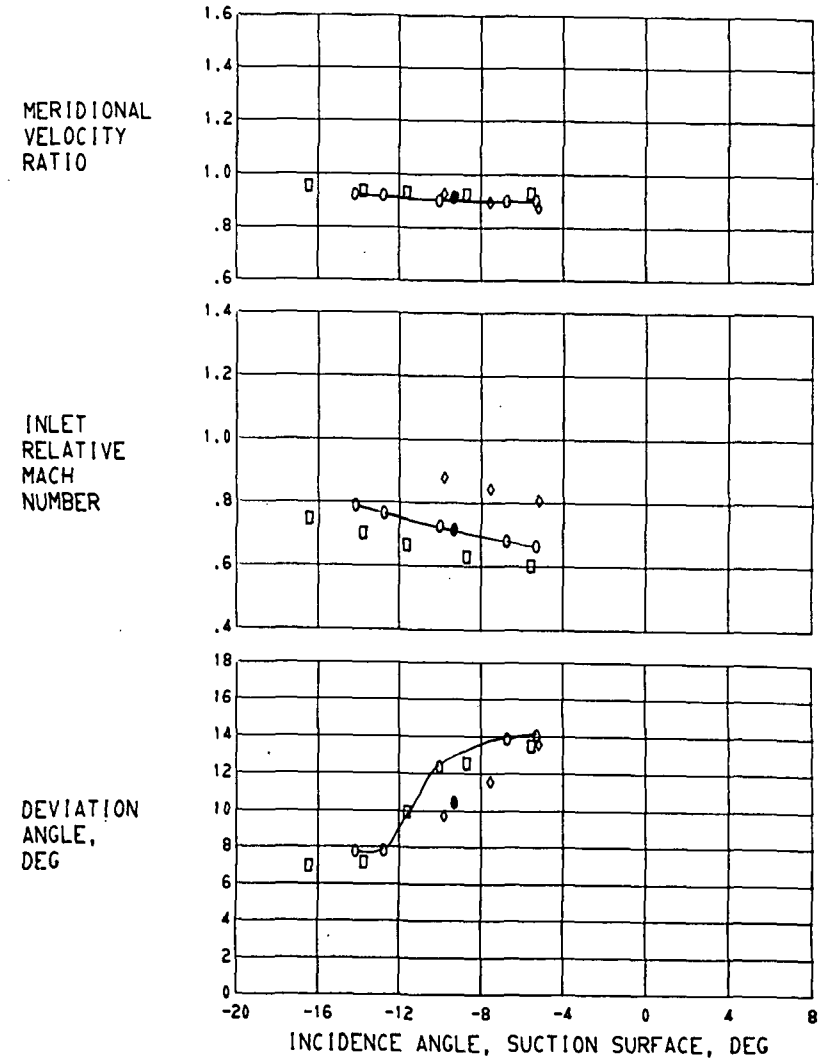

MERIDIONAL VELOCITY RATIO
INLET RELATIVE MACH NUMBER
DEVIATION ANGLE, DEG
1.6
1.4
1.2
1.0
.8
.6
1.4
1.2
1.0
.8
.6
.4
18
16
14
12
10
8
6
4
2
0
-20
-16
-12
-8
-4
0
4
8
INCIDENCE ANGLE, SUCTION SURFACE, DEG

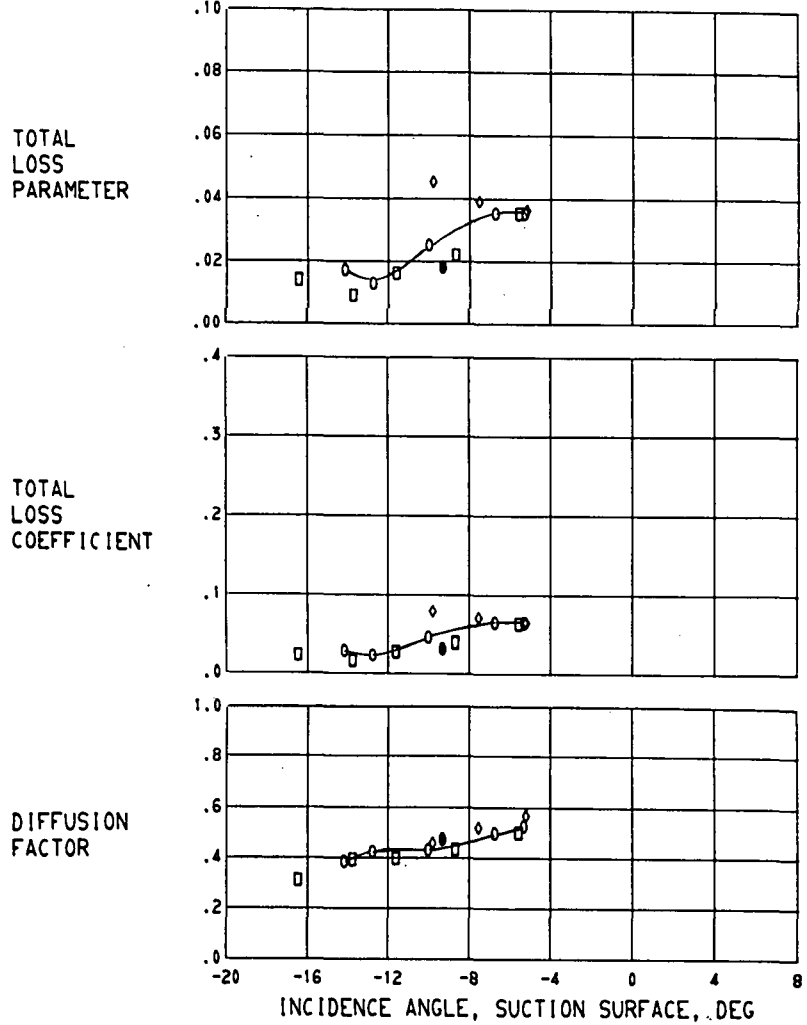


(C) 30.0 PERCENT SPAN.

FIGURE 11. - CONTINUED. BLADE-ELEMENT PERFORMANCE FOR ROTOR 51B.

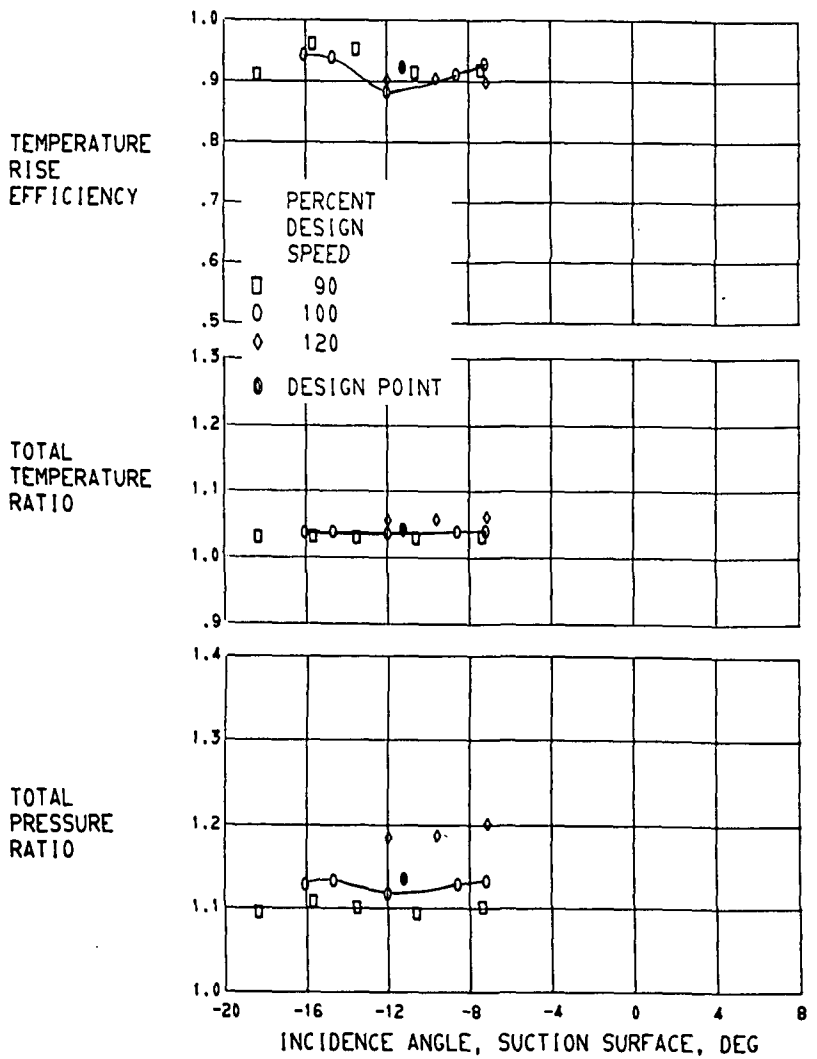

TEMPERATURE RISE EFFICIENCY
TOTAL TEMPERATURE RATIO
TOTAL PRESSURE RATIO
PERCENT DESIGN SPEED
90
100
120
DESIGN POINT
1.0
.9
.8
.7
.6
.5
1.3
1.2
1.1
1.0
.9
1.4
1.3
1.2
1.1
1.0
-20
-16
-12
-8
-4
0
4
8
INCIDENCE ANGLE, SUCTION SURFACE, DEG

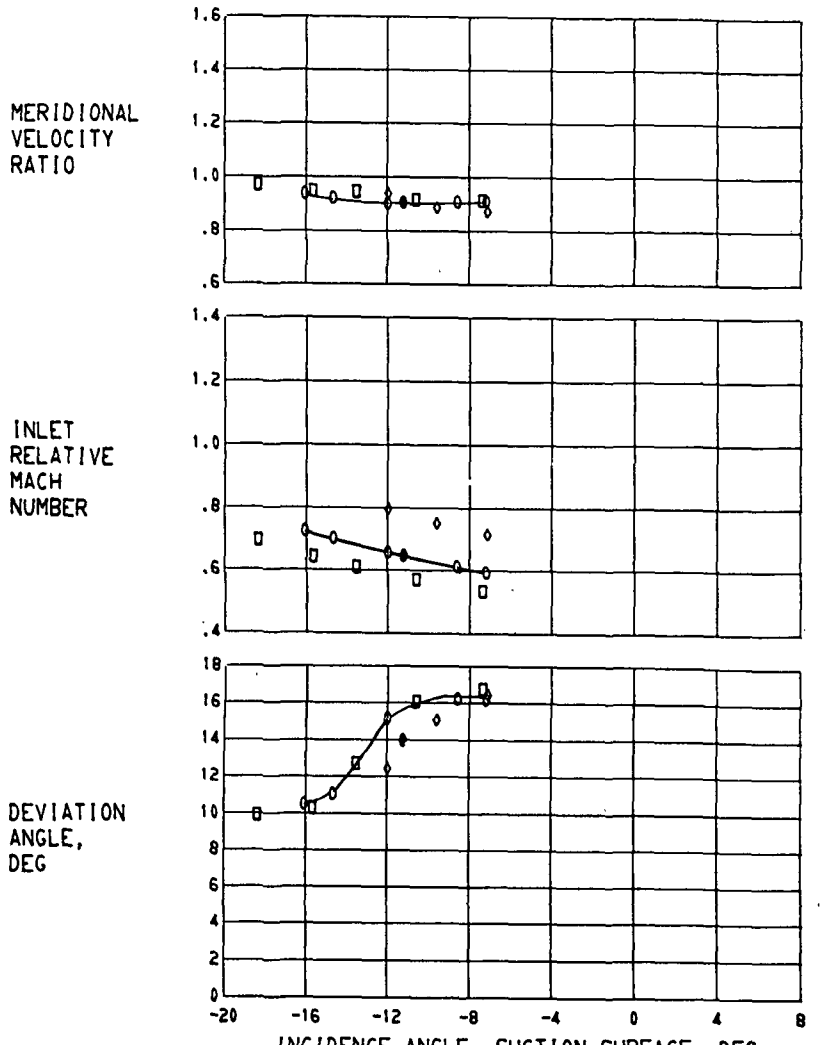

MERIDIONAL VELOCITY RATIO
INLET RELATIVE MACH NUMBER
DEVIATION ANGLE, DEG
1.6
1.4
1.2
1.0
.8
.6
1.4
1.2
1.0
.8
.6
.4
18
16
14
12
10
8
6
4
2
0
-20
-16
-12
-8
-4
0
4
8
INCIDENCE ANGLE, SUCTION SURFACE, DEG

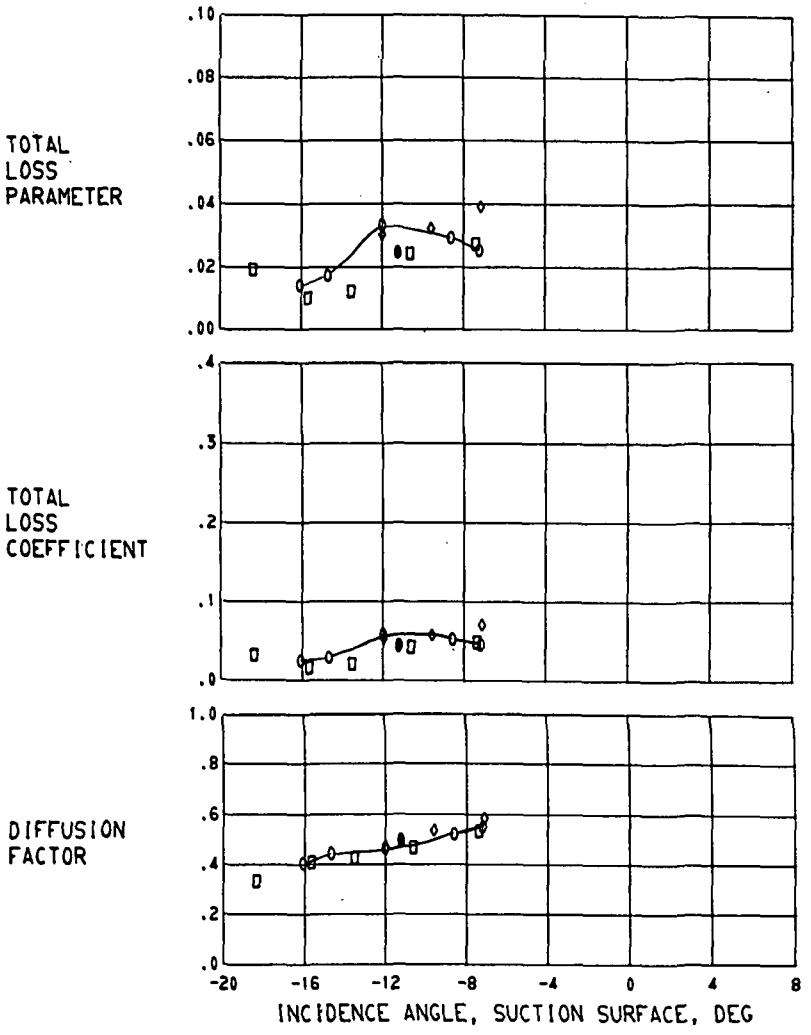


(D) 50.0 PERCENT SPAN.

FIGURE 11. - CONTINUED. BLADE-ELEMENT PERFORMANCE FOR ROTOR 51B.

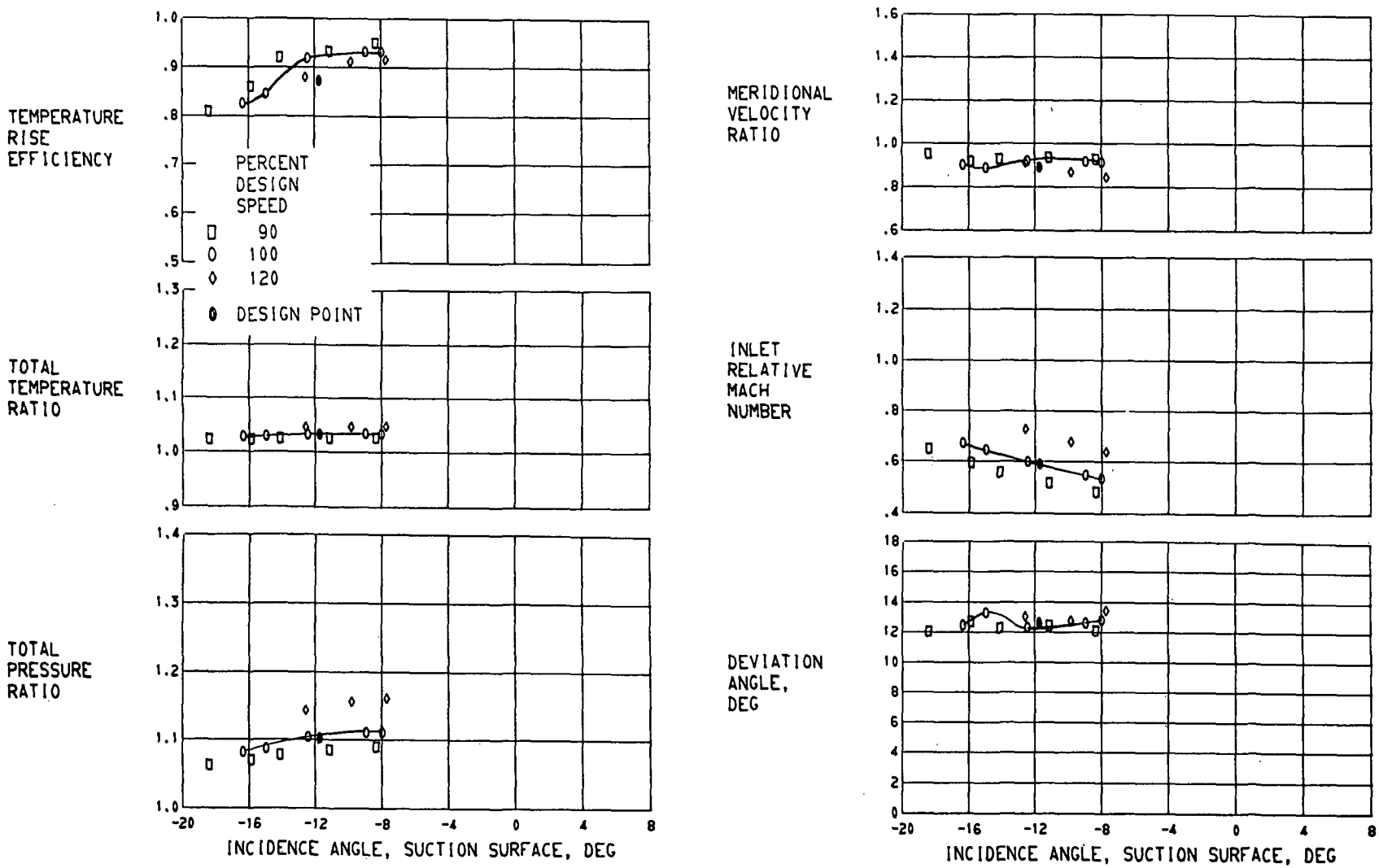

TEMPERATURE RISE EFFICIENCY
TOTAL TEMPERATURE RATIO
TOTAL PRESSURE RATIO
PERCENT DESIGN SPEED
90
100
120
DESIGN POINT
1.0
.9
.8
.7
.6
.5
1.3
1.2
1.1
1.0
.9
1.4
1.3
1.2
1.1
1.0
-20
-16
-12
-8
-4
0
4
8
INCIDENCE ANGLE, SUCTION SURFACE, DEG

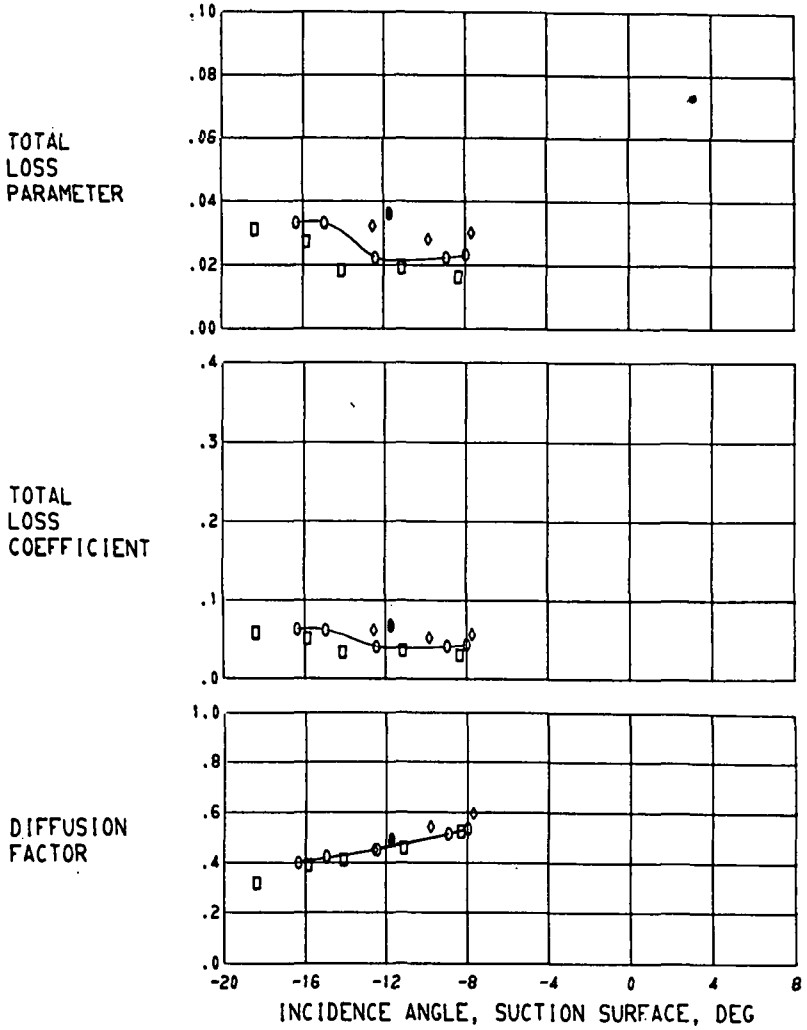

MERIDIONAL VELOCITY RATIO
INLET RELATIVE MACH NUMBER
DEVIATION ANGLE, DEG
1.6
1.4
1.2
1.0
.8
.6
1.4
1.2
1.0
.8
.6
.4
18
16
14
12
10
8
6
4
2
0
-20
-16
-12
-8
-4
0
4
8
INCIDENCE ANGLE, SUCTION SURFACE, DEG



(E) 70.0 PERCENT SPAN.

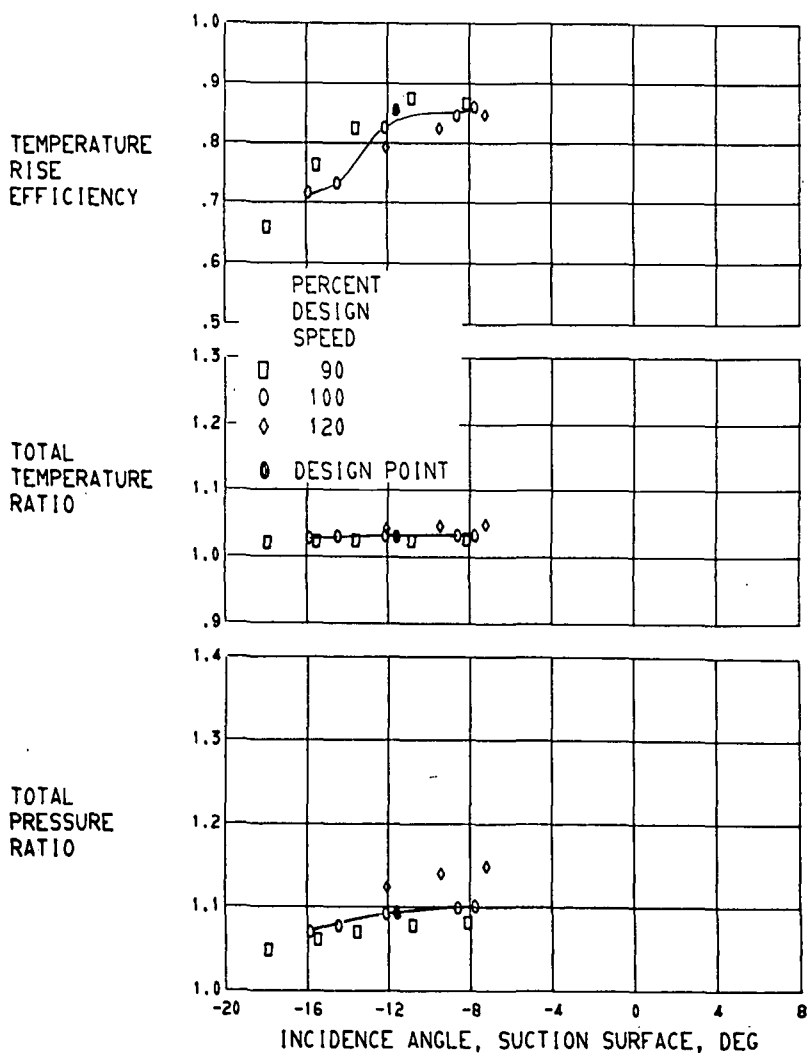
FIGURE 11. - CONTINUED. BLADE-ELEMENT PERFORMANCE FOR ROTOR 51B.

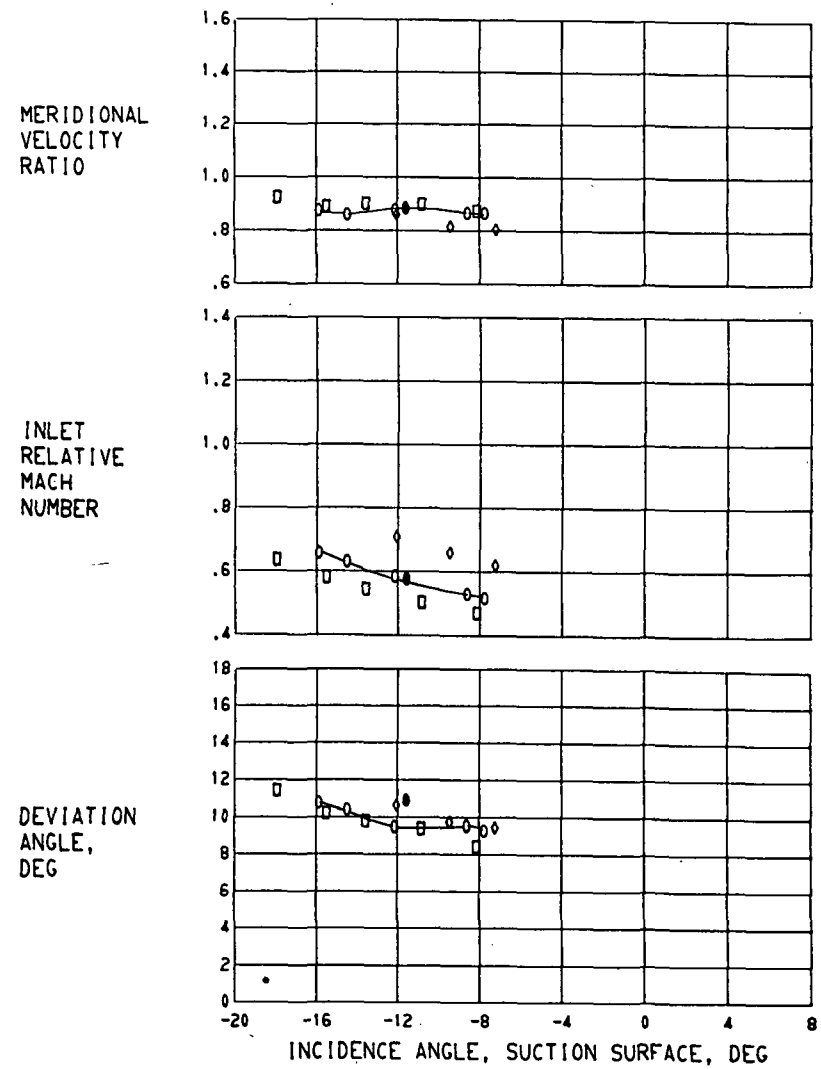

TEMPERATURE RISE EFFICIENCY
TOTAL TEMPERATURE RATIO
TOTAL PRESSURE RATIO
PERCENT DESIGN SPEED
90
100
120
DESIGN POINT
INCIDENCE ANGLE, SUCTION SURFACE, DEG
MERIDIONAL VELOCITY RATIO
INLET RELATIVE MACH NUMBER
DEVIATION ANGLE, DEG
INCIDENCE ANGLE, SUCTION SURFACE, DEG

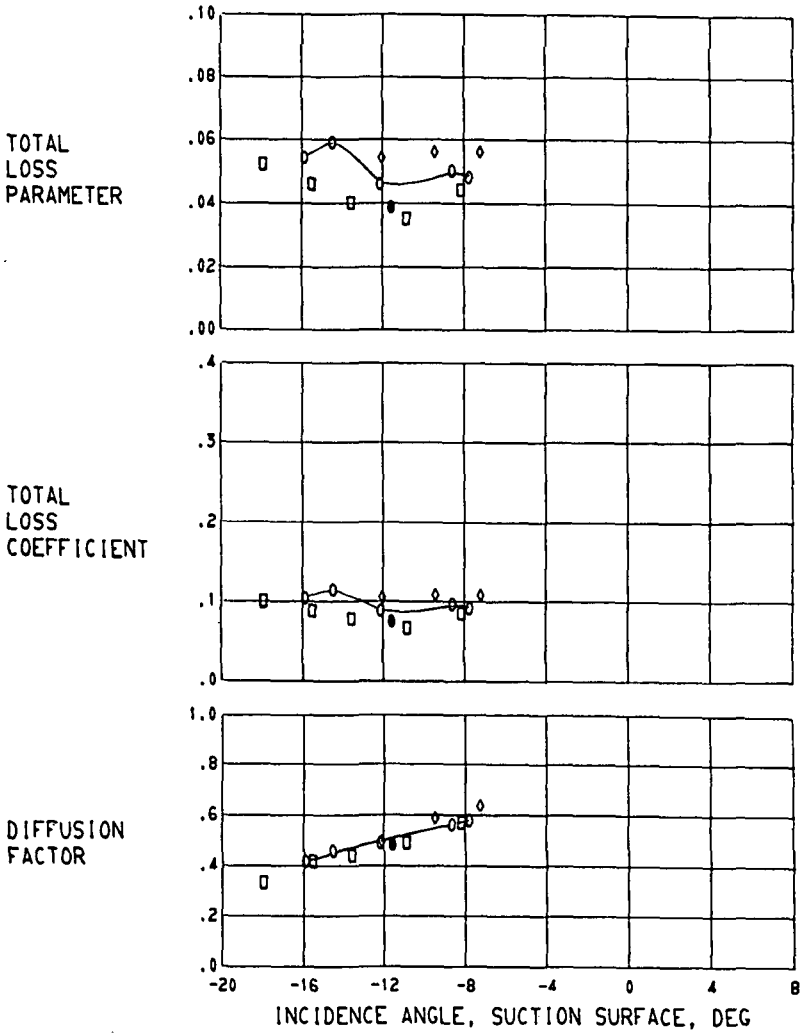


(F) 90.0 PERCENT SPAN.

FIGURE 11. - CONTINUED. BLADE-ELEMENT PERFORMANCE FOR ROTOR 51B.

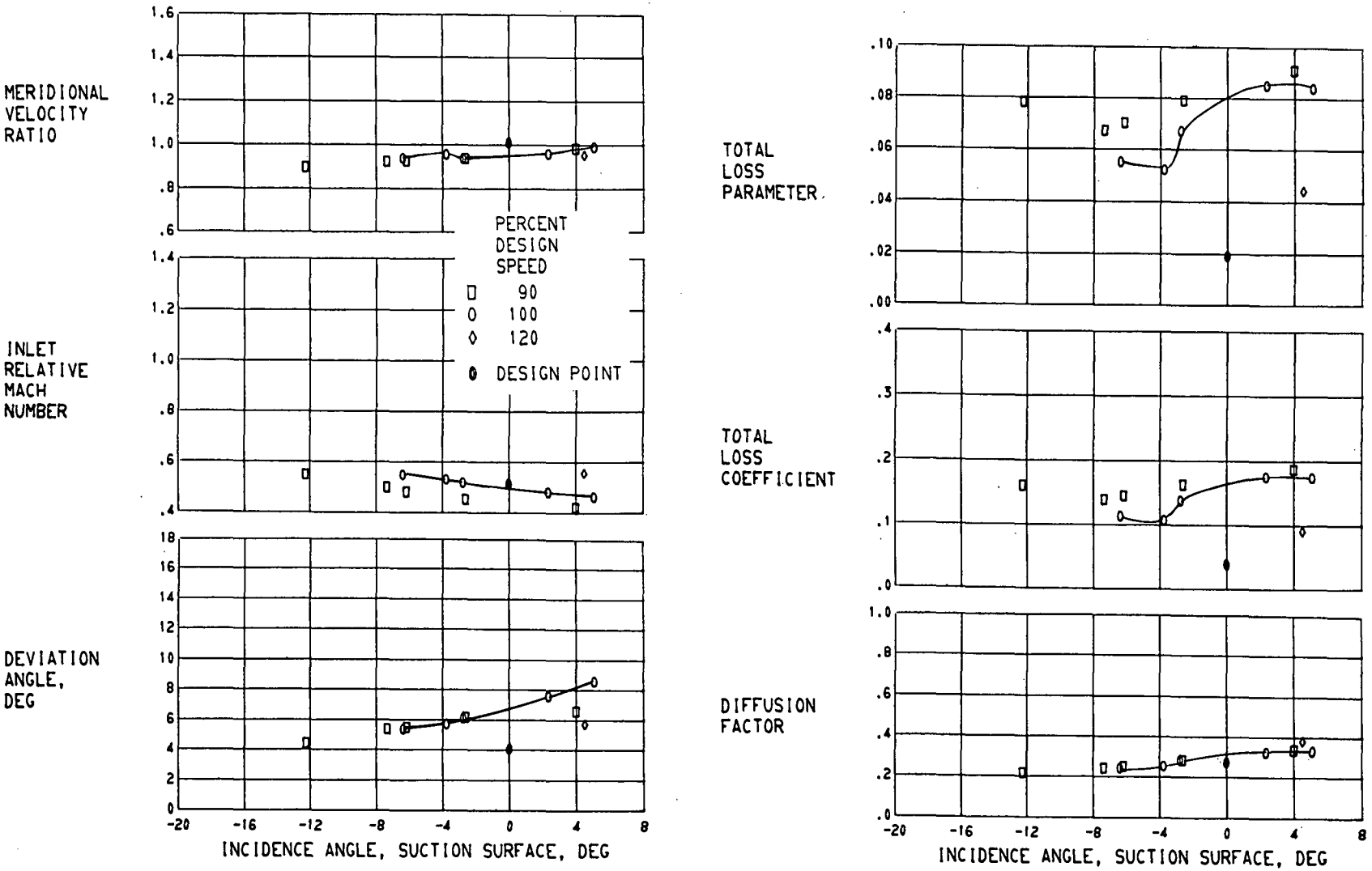

TEMPERATURE RISE EFFICIENCY
TOTAL TEMPERATURE RATIO
TOTAL PRESSURE RATIO
PERCENT DESIGN SPEED
90
100
120
DESIGN POINT
1.0
.9
.8
.7
.6
.5
1.3
1.2
1.1
1.0
.9
1.4
1.3
1.2
1.1
1.0
-20
-16
-12
-8
-4
0
4
8
INCIDENCE ANGLE, SUCTION SURFACE, DEG


MERIDIONAL VELOCITY RATIO
INLET RELATIVE MACH NUMBER
DEVIATION ANGLE, DEG
1.6
1.4
1.2
1.0
.8
.6
1.4
1.2
1.0
.8
.6
.4
18
16
14
12
10
8
6
4
2
0
-20
-16
-12
-8
-4
0
4
8
INCIDENCE ANGLE, SUCTION SURFACE, DEG



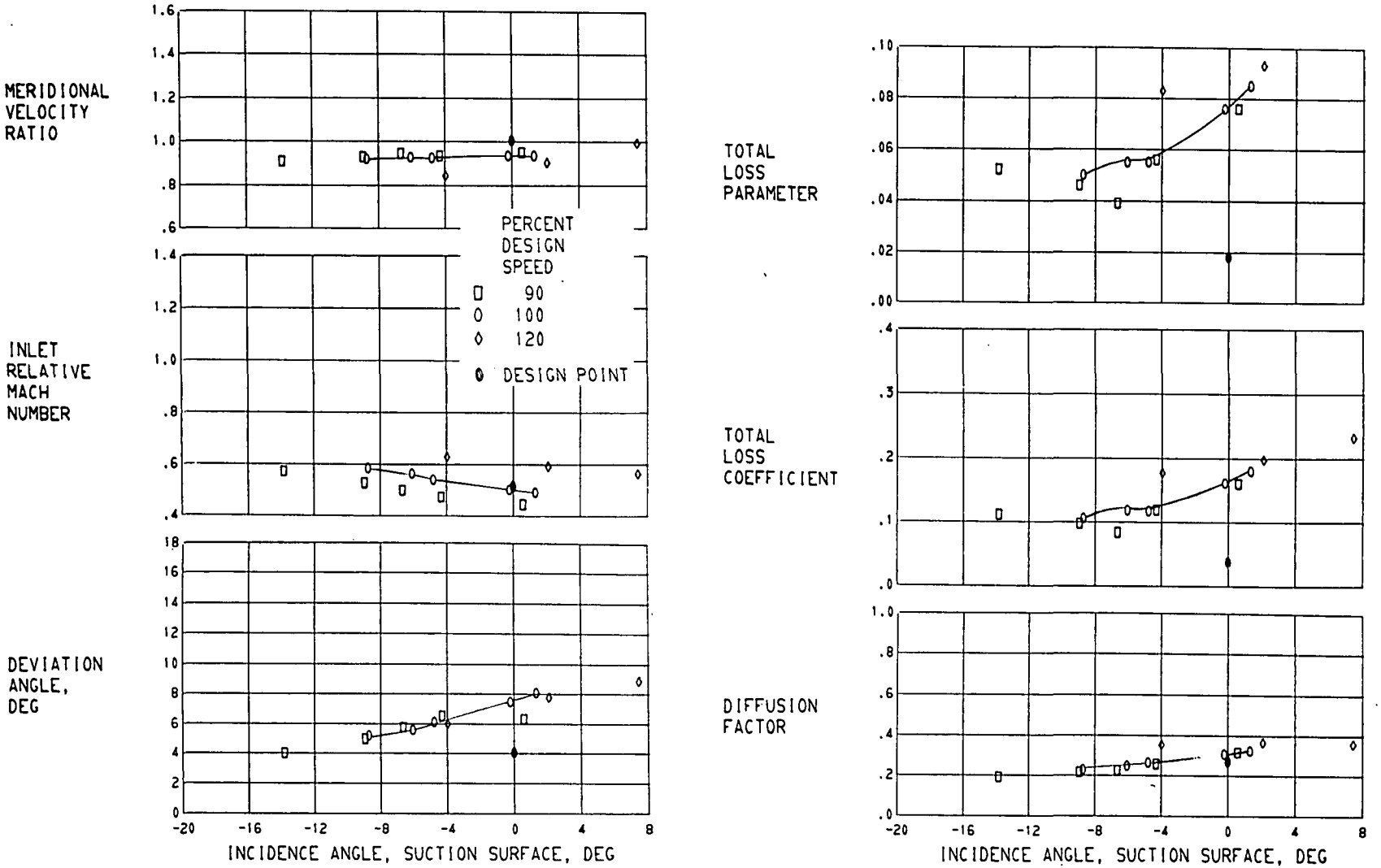
(G) 95.0 PERCENT SPAN.

FIGURE 11. - CONCLUDED. BLADE-ELEMENT PERFORMANCE FOR ROTOR 51B.



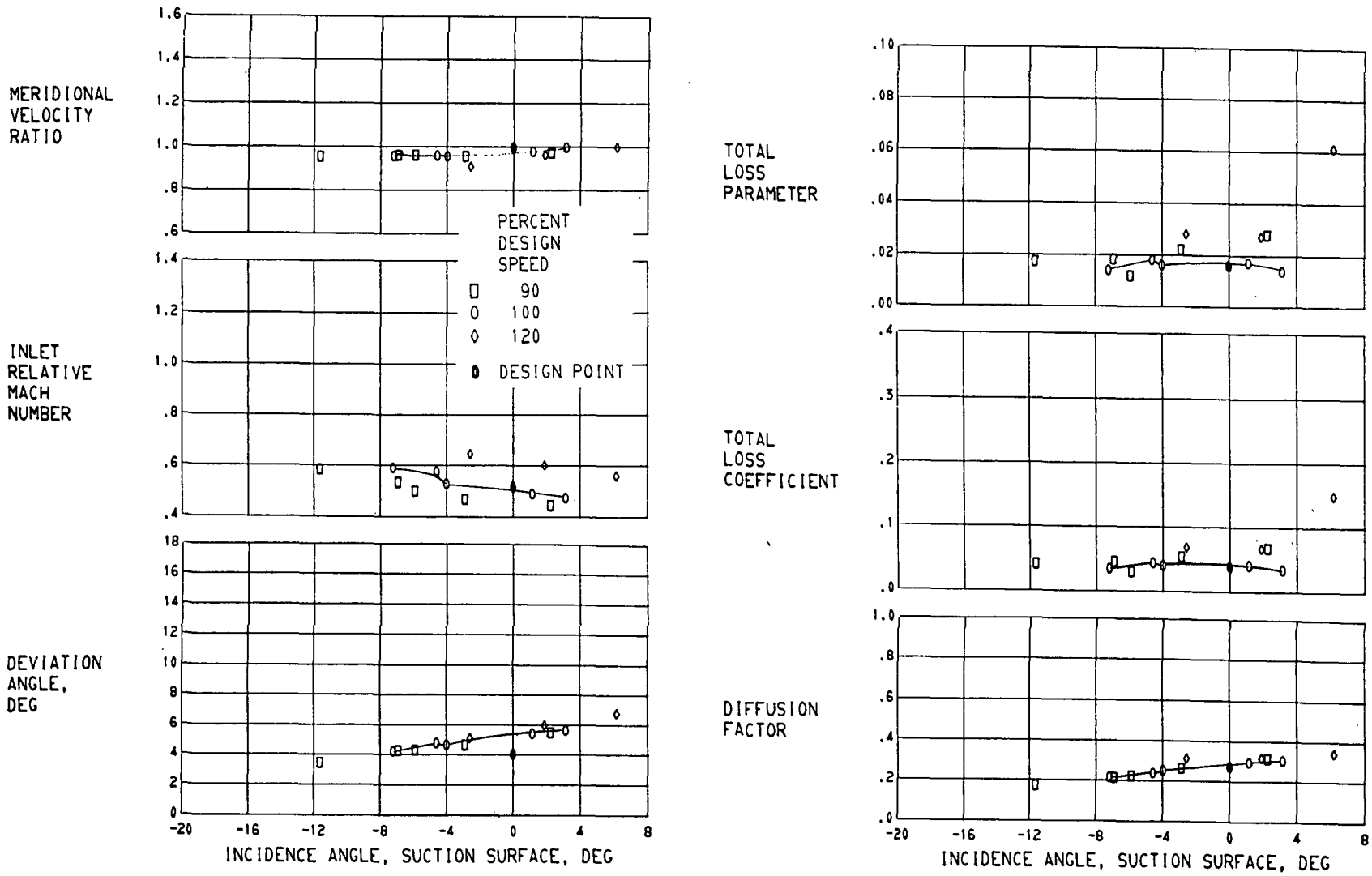
(A) 5.0 PERCENT SPAN.

FIGURE 12. - BLADE-ELEMENT PERFORMANCE FOR STATOR 51.



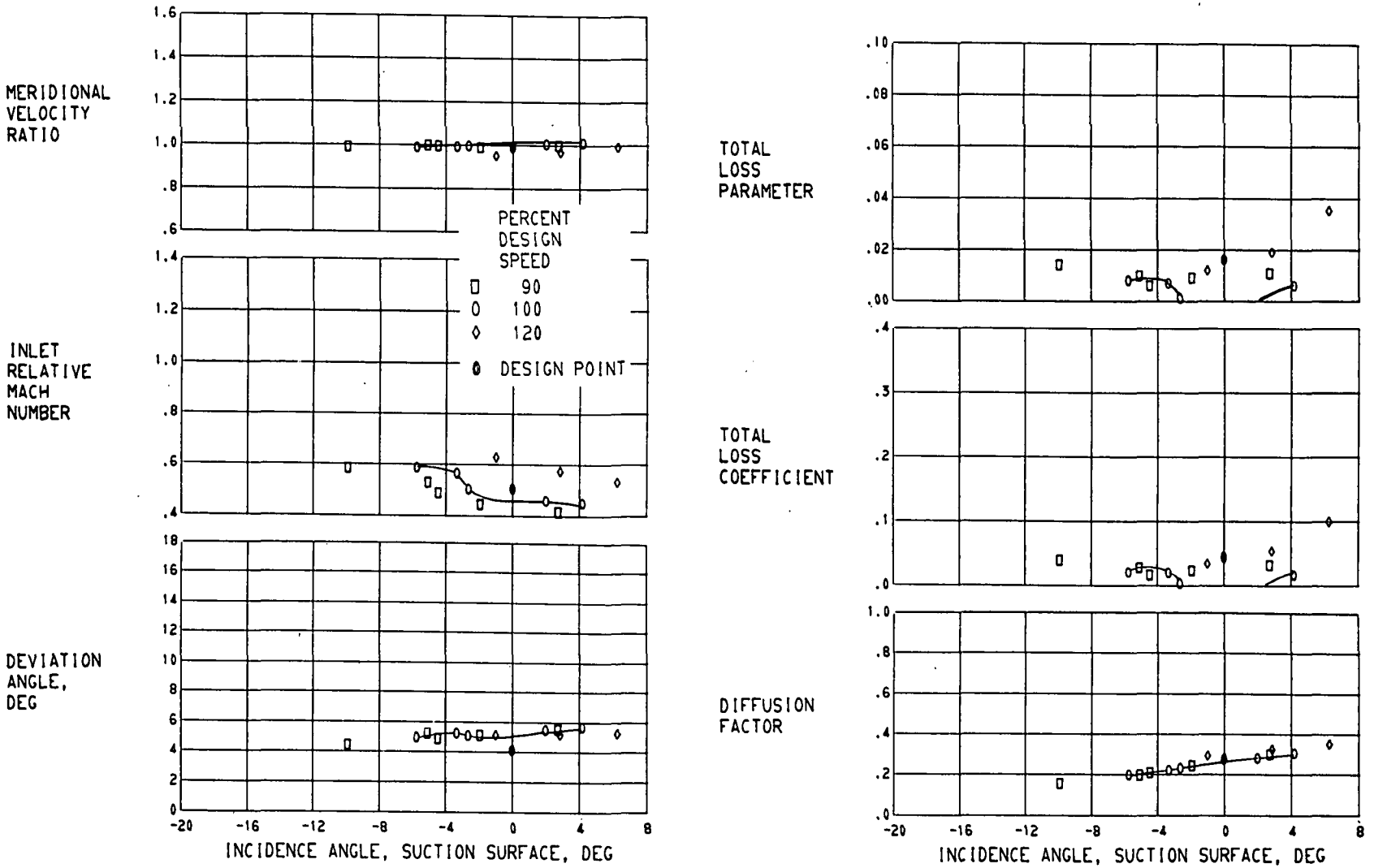
(B) 10.0 PERCENT SPAN.

FIGURE 12. - CONTINUED. BLADE-ELEMENT PERFORMANCE FOR STATOR 51.



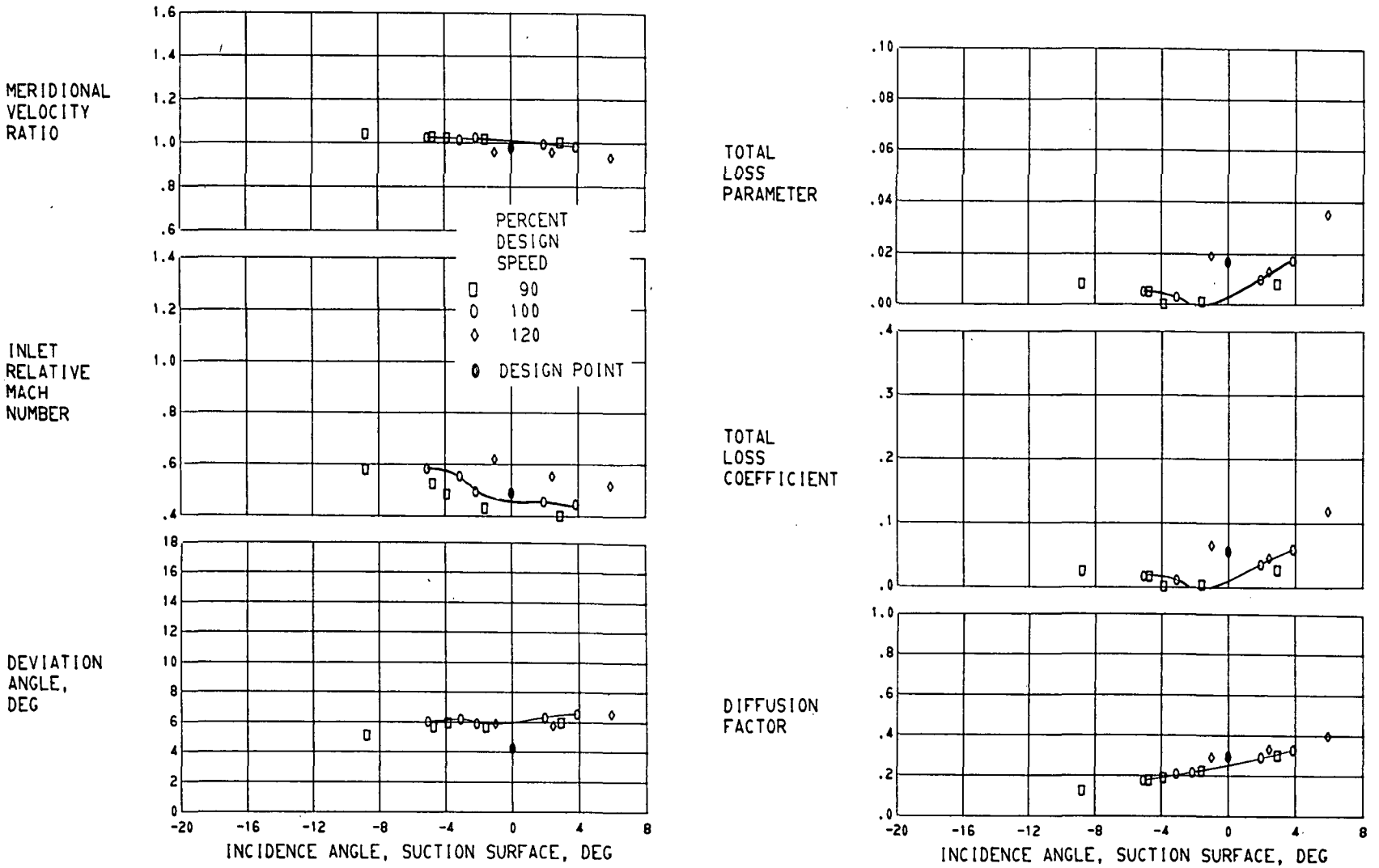
(C) 30.0 PERCENT SPAN.

FIGURE 12. - CONTINUED. BLADE-ELEMENT PERFORMANCE FOR STATOR 51.



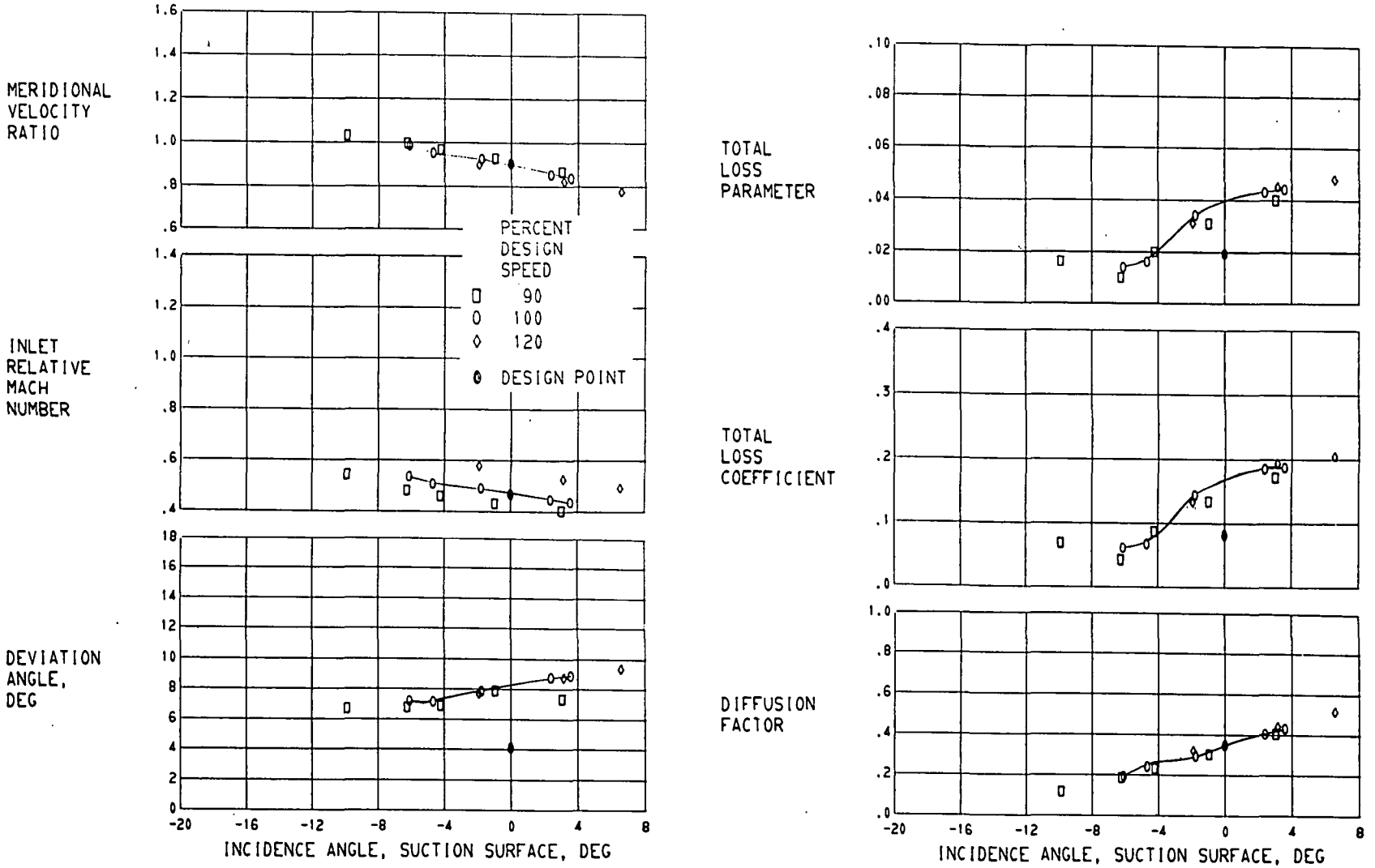
(D) 50.0 PERCENT SPAN.

FIGURE 12. - CONTINUED. BLADE-ELEMENT PERFORMANCE FOR STATOR 51.



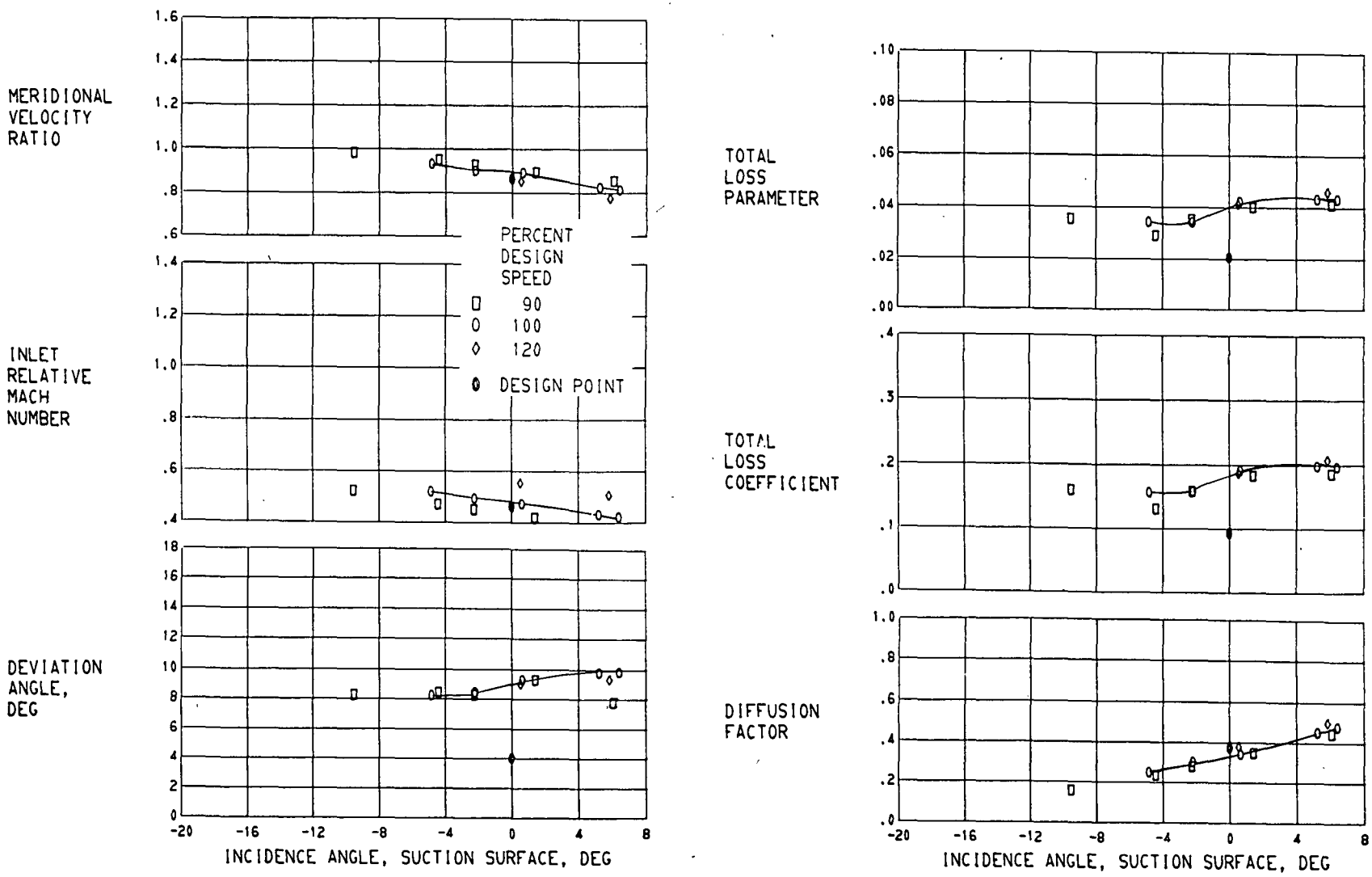
(E) 70.0 PERCENT SPAN.

FIGURE 12. - CONTINUED. BLADE-ELEMENT PERFORMANCE FOR STATOR 51.



(F) 90.0 PERCENT SPAN.

FIGURE 12. - CONTINUED. BLADE-ELEMENT PERFORMANCE FOR STATOR 51.



(G) 95.0 PERCENT SPAN.

FIGURE 12. - CONCLUDED. BLADE-ELEMENT PERFORMANCE FOR STATOR 51.

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