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DESIGN AND PERFORMANCE OF A HIGH-PRESSURE-RATIO, HIGHLY LOADED AXIAL-FLOW TRANSONIC COMPRESSOR STAGE

by George W. Lewis, Jr., Lonnie Reid, and Edward R. Tysl

Lewis Research Center
Cleveland, Ohio 44135

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16. Abstract

A 50-cm-diam. axial-flow transonic compressor stage with multiple-circular-arc blades was designed and tested. At design speed, a rotor peak efficiency of 0.85 occurred at an equivalent weight flow of 29.3 kg/sec. Stage peak efficiency was 0.79 at 28.6 kg/sec. Stage total pressure ratio at peak efficiency was 1.84. The stall margin at design speed was 5 percent. Rotor and stator losses were higher than predicted. The stator choked at design flow.

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SUMMARY

A 50-centimeter-diameter single-stage axial-flow transonic compressor having high blade loading, a high pressure ratio, and a design rotor blade-tip speed of 422 meters per second was tested. Radial surveys of flow conditions at the rotor inlet and outlet and stator outlet were made. The flow and performance parameters were calculated at the leading and trailing edge of both rotor and stator blades for 11 radial positions. The radial surveys were made over the stable operating flow range of the stage at equivalent rotative speeds which varied from 50 to 100 percent design speed.

Peak efficiency for the rotor occurred at an equivalent weight flow of 29.3 kilograms per second and for the stage, 28.6 kilograms per second. Peak efficiency for rotor and stage were 0.85 and 0.79, respectively. The total pressure ratios for rotor and stage, at equivalent weight flows corresponding to peak efficiency, were 1.92 and 1.84, respectively. Stall margin for the stage at design speed was 5 percent based on weight flows and total pressure ratio at peak efficiency and stall.

Rotor and stator losses were higher than the predicted design values. At near design flow the stator blade row was choking.

INTRODUCTION

A research program on axial flow fans and compressors for advanced airbreathing engines is currently being conducted at the NASA Lewis Research Center. This program is primarily directed toward providing technology to permit reducing the size and weight of fans and compressors while maintaining high levels of performance. One way to reduce compressor weight is to obtain a high pressure ratio per stage thereby reducing the number of stages. In support of this program, several single-stage fans have been designed to produce stage pressure ratios ranging from 1.9 to 2.2. A single-stage

fan designed for a rotor tip speed of 485 meters per second and a stage pressure ratio of 1.936 has been tested and is reported in reference 1. Another single-stage fan designed for a rotor tip speed of 549 meters per second and a stage pressure ratio of 2.2 has been tested and is reported in reference 2.

This report presents the aerodynamic design and the performance of a single-stage fan designed for a pressure ratio of 1.925 at a design tip speed of 422 meters per second. The overall performance for both rotor and stage along with blade-element performance for both rotor and stator are presented. The data are presented over the stable operating flow range at rotative speeds which varied from 50 to 100 percent of design speed. Blade-element survey data were obtained at 11 radial positions. The stage presented in this report has been designated stage 18-13 (rotor 18, stator 13). The data presented in this report are in tabular form as well as in machine-plotted form. The symbols and equations are defined in appendixes A and B. The abbreviations and units used for the tabular data are defined in appendix C.

AERODYNAMIC DESIGN

Three computer programs were used in the design of this compressor stage. 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 3 and 4 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 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 used in the blade geometry program to compute blade geometry parameters. 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 profile losses used for this stage are based on loss-diffusion factor correlations, which include the data presented in reference 4 for the rotor and in reference 5 for the stator.

The blade geometry parameters are used in the blade coordinate program (ref. 6) to compute blade elements on conical surfaces passing through the blade. In this program the blade elements are then stacked on a line passing through their centers of gravity, and Cartesian blade coordinates are computed and used directly in fabrication.

The overall design parameters for stage 18-13 are listed in table I and the flow path is shown in figure 1. This stage was designed for an overall pressure ratio of 1.925 at a weight flow of 29.5 kilograms per second (202 kg/sec/m^2 of annulus area). The design tip speed was 422 meters per second. The stage was designed for a tip solidity of 1.7 for both rotor and stator. This resulted in 56 rotor blades with an aspect ratio of 2.6 and 62 stator blades with an aspect ratio of 2.0. Both the rotor and stator used multiple-circular-arc blade shapes.

The blade-element design parameters for rotor 18 are presented in table II. This rotor was designed for a radially constant total pressure ratio of 2.0. The stator blade element design parameters are given in table III. The blade geometry is presented in table IV for rotor 18 and in table V for stator 13.

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 3. 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 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

Photographs of the rotor and stator are shown in figures 3 and 4, respectively. Each rotor blade has a vibration damper located at about a 52 percent span from the outlet rotor tip. The maximum thickness of the damper was 0.214 centimeter. The nonrotating radial tip clearance of the rotor was a nominal 0.05 centimeter at ambient conditions. The axial spacing between the rotor hub trailing edge and the stator hub leading edge was 3.1 centimeters. The hubs of the stator blades were seated on a rubber O-ring which was circumferentially recessed in the inner casing. This arrangement was quite effective in dampening blade vibrations, thereby reducing blade stresses.

Instrumentation

The compressor weight flow was determined from measurements on a calibrated

thin-plate orifice. The orifice temperature was determined from an average of two Chromel-Alumel thermocouples. Orifice pressures 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. Photographs of the survey probes are shown in figure 5. Total pressure, total temperature, and flow angle were measured with the combination probe (fig. 5(a)), and the static pressure was measured with an 8° C-shaped wedge probe (fig. 5(b)). Each probe was positioned with a null-balancing, stream-directional sensitive control system that automatically alined the probe to the direction of flow. The thermocouple material was iron constantan. The probes were calibrated in an air tunnel. Two combination probes and two wedge static probes were used at each of the three measuring stations.

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 6. The combination probes downstream of the stator (station 3) were circumferentially traversed one stator blade passage (5.8°) counterclockwise from the nominal values shown.

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

Test Procedure

The stage survey data were taken over a range of weight flows from maximum flow to the near-stall conditions. At 70, 90, and 100 percent design speed, radial surveys were taken at five weight flows. At 50, 60, and 80 percent design speed, radial surveys were taken for the near-stall weight flow only. Data were recorded at 11 radial posi-

tions for each speed and weight flow.

At each radial position the two combination probes behind the stator were circumferentially traversed to nine different locations across the stator gap. The wedge probes were set at midgap because preliminary 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 six rotative speeds the back pressure on the stage was increased by closing the sleeve valve in the collector until a stalled condition was detected by a sudden drop in stage outlet total pressure. This pressure was measured by a probe located at midpassage and was recorded on an X-Y plotter. Stall was corroborated by large increases in the measured blade stresses on both rotor and stator along with a sudden increase in noise level.

Calculation Procedure

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 span. The static pressure at 95 percent 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 span. A similar variation was assumed between the static pressure measurements at the outer wall and the 30 percent span to obtain the static pressure at 5 and 10 percent 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 are 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 3.

An onsite digital computer was used to compute the orifice weight flow at stall with all survey probes removed from the flow passage. The weight flow at stall was obtained in the following manner. During operation of the near-stall condition, the collector valve was slowly closed in small increments. At each increment the weight flow was obtained. The weight flow obtained just before stall occurred is called the stall weight flow.

Orifice weight flow, total pressures, static pressures, and temperatures were all corrected to sea-level conditions based on the rotor inlet conditions.

RESULTS AND DISCUSSION

The results from this investigation are presented in three main sections. The overall performances for the rotor and the stage are presented first. Radial distributions of several performance parameters are then presented for the rotor and stator. Finally, the blade-element data are presented for both the rotor and stator. The data presented are computer plotted, and occasionally a data point is omitted because it falls outside the range of the parameters shown in the figure.

All of the plotted data together with some additional performance parameters 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 18 and for stage 18-13 is presented in figures 7 and 8, respectively. For both of these computer plotted figures, data are presented for speeds from 50 to 100 percent design speed. For 50, 60, and 80 percent design speeds, the overall performance is presented for the near-stall condition only. For 70, 90, and 100 percent design speeds, data are presented at several weight flows from choke to the near-stall conditions. Design point values are shown as solid symbols on both figures. The stall points for each speed line were established by extrapolating the overall performance curve to the stall weight flow value recorded with the onsite computer. The stall lines (dashed lines) shown in the figures were then established by fairing a curve through the stall points associated with each speed line.

Peak efficiency for the rotor at the design tip speed of 422 meters per second occurred at the near design equivalent weight flow of 29.3 kilograms per second (200.7 kg/sec/m^2 of annulus area). The experimental peak efficiency was 0.85. Corresponding

experimental values of total pressure ratio and total temperature ratio were 1.92 and 1.24, respectively, as compared to the design values of 2.00 and 1.24. Rotor efficiency increases with flow at each speed, and maximum efficiency occurs at the choke weight flow. Apparently the stator limits the flow for the stage. Higher peak efficiencies were measured at the lower speeds, and the peak efficiency at 70 percent speed is 0.89.

Peak efficiency at design speed for the stage was 0.79 and occurred at a weight flow of 28.6 kilograms per second; the corresponding stage pressure ratio was 1.86. At higher weight flows stage efficiency dropped rapidly so that, at the near design weight flow of 29.3 kilograms per second, the overall temperature rise efficiency was only 0.74. The stage total temperature ratio of 1.24 agreed with design; however, the experimental stage pressure ratio of 1.75 was appreciably lower than the design value of 1.92.

While rotor efficiency continued to increase with higher flow rates, the stage efficiency peaks and then falls off rapidly. The separate performance of rotor and stator will be covered in greater detail in the blade-element performance sections.

Stall margin for the stage was 5 percent based on equivalent weight flow and total pressure ratio at which peak efficiency occurred as compared with the values at stall.

Radial Distributions

The radial distributions of selected flow and performance parameters for both rotor and stator are shown in figures 9 and 10. The results are presented for three flow rates at design speed. The data shown represent the flow conditions at near stall, peak efficiency, and near choke. The design values are shown by solid symbols.

Rotor. - The total temperature ratio (energy input) matched design values at the maximum flow rate; at the lower flows greater than design ratios were measured over the outer 30 percent of span. Even at peak stage efficiency, however, the total pressure ratio was lower than design except in the hub and tip regions. The temperature rise efficiency is also lower than design across the passage except at the 95 percent span. The experimental deviation angles were within about 2° of design values except at the hub for the maximum flow (peak rotor efficiency). At maximum flow, the total loss parameter distribution shows that except in the blade damper region, the losses across the blade span are only moderately higher than design values. Losses increase in the blade damper region. The losses associated with the damper were not included in the aerodynamic design of the rotor. The blade loading levels, as indicated by the diffusion factor, closely agree with design values except in the blade damper region where loading was somewhat higher than design.

Stator. - The stator flow and performance parameters depart considerably from

design values, particularly for the high flow data points. At the two lower flows the stator is loaded to near-design D-factors, and losses are only moderately higher than design values except in the hub region. At these lower flows, positive incidence angles were measured over the outer 70 percent of blade span with the highest values in the damper region. At the high flow point (29.3 kg/sec) greatly reduced loading and high meridional velocity ratios over most of the blade height are evident. Comparison of design meridional velocities (table VIII) indicate that the high velocity ratio is caused by higher-than-design exit velocities. The stator is choked at this high flow condition and apparently has poor pressure recovery in the diffusion portion of the blade passage.

Variations of Blade-Element Performance With Incidence Angle

The variations of selected blade-element performance parameters with incidence angle are shown in figure 11 for the rotor and in figure 12 for the stator. The data are presented for 70, 90, and 100 percent of speed at blade elements on streamlines located at 5, 10, 30, 47.5, 70, 90, and 95 percent of blade span as measured from the rotor-outlet blade tip. Design values are indicated by solid symbols. The various curves as a function of incidence angle 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.

Rotor. - The rotor blades were designed for minimum loss to occur at zero incidence angle on the blade suction surface. The range of incidence angle between maximum flow and stall at design speed was only 1.5° to 2.0°. Losses across the entire blade span continued to decrease as the incidence angle decreased except at the 47.5 and 95 percent span locations; a minimum loss value was defined only at 95 percent span. At design speed and maximum flow (near-design incidence angle) most of the blade-element performance parameters approached design values. Losses were somewhat higher than design causing reduced total pressure ratio; however, except in the blade midspan damper region, the performance was remarkably good. The only other large discrepancy between measured and design values occurred for the deviation angle in the hub region. The measured diffusion factor closely matched design values over the whole rotor span for this highly loaded blade.

Stator. - The blade-element data indicate the performance of this highly loaded stator, having a design D-factor at the hub greater than 0.60, did not approach design conditions as closely as did the rotor. Deviation angles were appreciably greater than design over the range of incidence angles and at all radial locations. Except at the blade extremities (5 and 95 percent span) minimum loss values were defined across the blade span. The minimum loss generally occurred near the design incidence angle of 0° except in the region downstream of the rotor midspan dampers (47.5 and 70 percent span)

where the minimum stator incidence angle is greater than design. The measured losses were greater than the design values except at the midspan elements (30, 47.5, and 70 percent span) where minimum loss matched design loss. At 90 and 100 percent speeds both the meridional velocity ratio and the losses increase sharply at low incidence angles. Apparently this is caused by increased shock losses and resultant poor diffusion as the blade passage becomes choked. The large deviation angles and measured losses indicate the desirability of a new stator design. A stator having somewhat lower solidity and, therefore, a higher critical area ratio would probably give closer to design turning with the required high flow.

SUMMARY OF RESULTS

This report presents the aerodynamic design and both the overall and blade-element performance of a 50-centimeter-diameter single-stage transonic compressor. This stage is one in a series designed to investigate high pressure ratio, high loading stages. The stage had a design equivalent weight flow of 29.5 kilograms per second (202 kg/sec/m^2 of annulus area) at a rotor blade tip speed of 422 meters per second. Radial surveys of the flow conditions at the rotor inlet, rotor outlet, and stator outlet were made over the stable operating flow range of the stage at equivalent rotative speeds from 50 to 100 percent design speed. Flow and performance parameters were calculated across a number of selected blade elements. The following principal results were obtained:

1. Peak efficiency for the stage was 0.79 and occurred at a weight flow 28.6 kilograms per second. The corresponding stage pressure ratio was 1.86. At the near-design weight flow of 29.3 kilograms per second, the stage efficiency was 0.74. Corresponding values of total pressure ratio and total temperature ratio were 1.75 and 1.24, respectively, as compared to design values of 1.92 and 1.24.

2. Peak efficiency for the rotor was 0.85 and occurred at the near design weight flow of 29.3 kilograms per second. Corresponding values of total pressure ratio and total temperature ratio were 1.92 and 1.24, respectively, as compared to the design values of 2.00 and 1.24.

3. Stall margin for the stage was 5 percent based on equivalent weight flow and total pressure ratios at peak efficiency and stall.

4. Radial flow surveys of the rotor indicate that, at design speed and maximum flow (near-design incidence angle), most of the measured performance parameters approach design values. Losses were appreciably greater than design only in the blade midspan damper region. The diffusion factor closely matched the design value of about 0.60 over the whole blade span.

5. Radial flow surveys of the stator indicated losses somewhat greater than design and an inability of the blade row to turn the flow through the desired angle. Deviation angles were appreciably greater than design. Losses increased rapidly as the stator approached the choked flow condition.

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501-24.

APPENDIX A

SYMBOLS

A_{an} annulus area at rotor leading edge, m^2

A_f frontal area at rotor leading edge, m^2

C_p specific heat at constant pressure, 1004 J/(kg)(K)

D diffusion factor

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 at leading edge, deg

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 β'_m cos α_c/cos α_s), deg

γ ratio of specific heats (1.40)

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 the blade mean camber line and meridional plane, deg

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

σ solidity, ratio of chord to spacing

$\overline{\omega}$ total loss coefficient

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

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

Subscripts:

ad adiabatic (temperature rise)

id ideal

LE blade leading edge

m meridional direction

mom momentum-rise

p polytropic

TE blade trailing edge

z axial direction

θ tangential direction

Superscript:

' relative to blade

APPENDIX B

EQUATIONS

Suction-surface incidence angle

$$i_{ss} = (\beta'_c)_{LE} - \kappa_{ss} \tag{B1}$$

Mean incidence angle

$$i_{mc} = (\beta'_c)_{LE} - (\kappa_{mc})_{LE} \tag{B2}$$

Deviation angle

$$\delta^o = (\beta'_c)_{TE} - (\kappa_{mc})_{TE} \tag{B3}$$

Diffusion factor

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

Total loss coefficient

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

Profile loss coefficient

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

Total loss parameter

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

Profile loss parameter

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

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

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

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

$$\frac{\left(\frac{W\sqrt{\theta}}{\delta}\right)}{A_{an}} \tag{B13}$$

Weight flow per unit frontal area

$$\frac{\left(\frac{W\sqrt{\theta}}{\delta}\right)}{A_f} \tag{B14}$$

Head-rise coefficient

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

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
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 the blade mean camber line at leading edge and meridional plane, deg
KOC	angle between the 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	equivalent 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 a 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 STAGE 18-13

ROTOR TOTAL PRESSURE RATIO	2.000
STAGE TOTAL PRESSURE RATIO	1.925
ROTOR TOTAL TEMPERATURE RATIO	1.241
STAGE TOTAL TEMPERATURE RATIO	1.241
ROTOR ADIABATIC EFFICIENCY	0.907
STAGE ADIABATIC EFFICIENCY	0.852
ROTOR POLYTROPIC EFFICIENCY	0.915
STAGE POLYTROPIC EFFICIENCY	0.865
ROTOR HEAD RISE COEFFICIENT	0.356
STAGE HEAD RISE COEFFICIENT	0.335
FLOW COEFFICIENT	0.477
WT FLOW PER UNIT FRONTAL AREA	149.930
WT FLOW PER UNIT ANNULUS AREA	201.973
WT FLOW	29.484
RPM	16100.000
TIP SPEED	421.817

TABLE II. - DESIGN BLADE-ELEMENT PARAMETERS FOR ROTOR 18

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
TIP	25.019	24.359	0.	54.9	66.4	55.4	288.2	1.289	10.13	2.000
1	24.442	23.871	-0.	52.7	65.0	54.3	288.2	1.272	10.13	2.000
2	23.906	23.383	0.	50.5	63.8	52.4	288.2	1.259	10.13	2.000
3	21.655	21.433	0.	49.3	59.8	45.4	288.2	1.241	10.13	2.000
4	19.590	19.726	0.	50.2	57.1	37.1	288.2	1.234	10.13	2.000
5	19.288	19.482	0.	50.5	56.7	35.7	288.2	1.234	10.13	2.000
6	18.983	19.238	0.	50.7	56.4	34.2	288.2	1.233	10.13	2.000
7	18.676	18.994	0.	50.9	56.1	32.7	288.2	1.233	10.13	2.000
8	18.367	18.750	0.	51.2	55.8	31.1	288.2	1.233	10.13	2.000
9	16.777	17.531	0.	52.5	54.2	22.0	288.2	1.230	10.13	2.000
10	14.079	15.580	0.	56.4	51.6	2.3	288.2	1.232	10.13	2.000
11	13.384	15.093	0.	58.0	50.8	-4.3	288.2	1.235	10.13	2.000
HUB	12.700	14.605	-0.	59.7	49.9	-11.5	288.2	1.238	10.13	2.000

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
TIP	184.1	248.9	460.2	251.5	184.1	143.0	0.	203.8	421.8	410.7
1	192.0	245.7	454.6	255.0	192.0	148.9	-0.	195.4	412.1	402.5
2	198.3	246.8	449.2	257.2	198.3	156.9	0.	190.5	403.0	394.2
3	212.9	254.6	422.6	236.4	212.9	166.0	0.	193.0	365.1	361.3
4	213.8	265.5	393.4	212.9	213.8	169.8	0.	204.1	330.3	332.6
5	213.3	257.4	388.9	209.6	213.3	170.2	0.	206.2	325.2	328.5
6	212.6	269.3	384.2	206.3	212.6	170.6	0.	208.4	320.1	324.3
7	211.8	271.3	379.5	203.1	211.8	171.0	0.	210.7	314.9	320.2
8	210.8	273.3	374.6	200.0	210.8	171.3	0.	212.9	309.7	316.1
9	204.2	284.3	348.8	186.5	204.2	172.9	0.	225.6	282.9	295.6
10	188.3	307.2	303.0	170.0	188.3	169.9	0.	256.0	237.4	262.7
11	184.1	314.9	291.2	167.5	184.1	167.0	0.	267.0	225.7	254.5
HUB	180.0	323.6	279.7	166.7	180.0	163.3	-0.	279.4	214.1	246.2

	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	0.558	0.673	1.394	0.680	0.558	0.387	-8.64	10.94	0.777	1.596
1	0.583	0.668	1.381	0.694	0.583	0.405	-7.80	-2.37	0.775	1.591
2	0.604	0.675	1.368	0.704	0.604	0.429	-6.88	-8.89	0.791	1.584
3	0.652	0.704	1.294	0.654	0.652	0.459	-1.83	-1.92	0.780	1.569
4	0.655	0.740	1.205	0.593	0.655	0.473	3.36	3.22	0.794	1.564
5	0.653	0.746	1.191	0.585	0.653	0.475	4.15	3.97	0.798	1.559
6	0.651	0.752	1.176	0.576	0.651	0.476	4.94	4.73	0.803	1.552
7	0.648	0.758	1.161	0.568	0.648	0.478	5.75	5.50	0.807	1.546
8	0.645	0.765	1.146	0.560	0.645	0.479	6.56	6.29	0.813	1.540
9	0.623	0.800	1.064	0.525	0.623	0.487	10.87	10.42	0.847	1.515
10	0.571	0.873	0.919	0.483	0.571	0.483	18.67	18.05	0.903	1.377
11	0.558	0.898	0.882	0.477	0.558	0.476	20.81	20.18	0.907	1.313
HUB	0.545	0.925	0.846	0.476	0.545	0.467	22.97	22.39	0.907	1.249

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
TIP	0.	2.4	-0.1	6.3	0.581	0.757	0.250	0.150	0.042	0.025
1	5.00	2.7	-0.0	5.9	0.562	0.805	0.197	0.100	0.033	0.017
2	10.00	3.0	0.0	5.6	0.546	0.843	0.156	0.063	0.027	0.011
3	30.00	4.1	-0.0	5.5	0.558	0.908	0.095	0.016	0.017	0.003
4	47.50	5.0	-0.0	6.0	0.582	0.933	0.075	0.010	0.014	0.002
5	50.00	5.2	-0.0	6.1	0.585	0.935	0.073	0.012	0.014	0.002
6	52.50	5.3	-0.0	6.3	0.588	0.937	0.073	0.015	0.014	0.003
7	55.00	5.4	-0.0	6.4	0.591	0.939	0.072	0.017	0.014	0.003
8	57.50	5.6	-0.0	6.6	0.594	0.941	0.070	0.019	0.013	0.004
9	70.00	6.2	-0.0	7.6	0.600	0.950	0.066	0.029	0.013	0.006
10	90.00	6.9	-0.0	10.0	0.589	0.942	0.096	0.088	0.016	0.015
11	95.00	7.0	-0.0	10.5	0.581	0.933	0.120	0.117	0.019	0.019
HUB	100.00	7.1	0.0	11.1	0.567	0.920	0.152	0.152	0.023	0.023

TABLE III. - DESIGN BLADE-ELEMENT PARAMETERS FOR STATOR 13

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
TIP	23.876	23.876	47.8	0.	47.8	0.	372.0	1.000	20.26	0.964
1	23.443	23.463	45.3	-0.	45.3	-0.	366.5	1.000	20.26	0.963
2	23.050	23.092	43.8	0.	43.8	0.	362.9	1.000	20.26	0.964
3	21.431	21.579	43.1	0.	43.1	0.	357.6	1.000	20.26	0.974
4	19.979	20.262	44.2	0.	44.2	0.	355.7	1.000	20.26	0.972
5	19.770	20.076	44.4	0.	44.4	0.	355.6	1.000	20.26	0.971
6	19.562	19.890	44.6	0.	44.6	0.	355.5	1.000	20.26	0.971
7	19.353	19.705	44.8	0.	44.8	0.	355.3	1.000	20.26	0.970
8	19.145	19.522	45.0	0.	45.0	0.	355.2	1.000	20.26	0.970
9	18.107	18.622	46.1	0.	46.1	0.	354.6	1.000	20.26	0.966
10	16.497	17.242	48.7	0.	48.7	0.	355.1	1.000	20.26	0.930
11	16.123	16.900	49.7	0.	49.7	0.	355.8	1.000	20.26	0.905
HUB	15.748	16.510	50.8	-0.	50.8	-0.	356.7	1.000	20.26	0.871

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
TIP	282.3	190.9	282.3	190.9	189.5	190.9	209.2	0.	0.	0.
1	279.8	189.8	279.8	189.8	196.7	189.8	199.1	-0.	0.	0.
2	279.1	189.6	279.1	189.6	201.4	189.6	193.2	0.	0.	0.
3	282.4	195.2	282.4	195.2	206.1	195.2	193.0	0.	0.	0.
4	289.0	197.6	289.0	197.6	207.2	197.6	201.5	0.	0.	0.
5	290.4	197.8	290.4	197.8	207.5	197.8	203.2	0.	0.	0.
6	291.8	198.0	291.8	198.0	207.7	198.0	204.9	0.	0.	0.
7	293.3	198.3	293.3	198.3	208.0	198.3	206.7	0.	0.	0.
8	294.8	198.7	294.8	198.7	208.3	198.7	208.5	0.	0.	0.
9	303.2	199.9	303.2	199.9	210.3	199.9	218.5	0.	0.	0.
10	321.7	185.6	321.7	185.6	212.2	185.6	241.9	0.	0.	0.
11	328.0	176.1	328.0	176.1	212.1	176.1	250.2	0.	0.	0.
HUB	335.2	163.0	335.2	163.0	211.9	163.0	259.7	-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	0.773	0.506	0.773	0.506	0.519	0.506	-1.12	0.01	1.007	1.161
1	0.771	0.507	0.771	0.507	0.542	0.507	-0.25	0.32	0.965	1.128
2	0.773	0.509	0.773	0.509	0.558	0.509	0.43	0.55	0.942	1.110
3	0.790	0.529	0.790	0.529	0.577	0.529	2.63	1.43	0.947	1.110
4	0.814	0.538	0.814	0.538	0.583	0.538	5.12	2.52	0.953	1.139
5	0.818	0.538	0.818	0.538	0.585	0.538	5.53	2.69	0.953	1.145
6	0.823	0.539	0.823	0.539	0.586	0.539	5.96	2.86	0.953	1.151
7	0.828	0.540	0.828	0.540	0.587	0.540	6.40	3.04	0.953	1.160
8	0.833	0.541	0.833	0.541	0.589	0.541	6.86	3.22	0.954	1.172
9	0.861	0.545	0.861	0.545	0.597	0.545	9.47	4.19	0.951	1.249
10	0.921	0.504	0.921	0.504	0.608	0.504	14.72	5.46	0.875	1.399
11	0.941	0.476	0.941	0.476	0.609	0.476	16.21	5.44	0.830	1.454
HUB	0.964	0.439	0.964	0.439	0.610	0.439	17.81	5.28	0.769	1.520

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
TIP	0.	6.2	-0.0	11.6	0.542	0.	0.111	0.111	0.033	0.033
1	5.00	6.2	0.0	10.5	0.528	0.	0.113	0.113	0.033	0.033
2	10.00	6.2	-0.0	9.8	0.518	0.	0.111	0.111	0.032	0.032
3	30.00	6.3	0.0	9.0	0.490	0.	0.076	0.076	0.020	0.020
4	47.50	6.2	0.0	8.8	0.486	0.	0.079	0.079	0.020	0.020
5	50.00	6.2	0.0	8.8	0.489	0.	0.080	0.080	0.020	0.020
6	52.50	6.2	0.0	8.8	0.490	0.	0.081	0.081	0.020	0.020
7	55.00	6.2	0.0	8.7	0.492	0.	0.082	0.082	0.020	0.020
8	57.50	6.2	0.0	8.7	0.493	0.	0.083	0.083	0.020	0.020
9	70.00	6.1	0.0	8.4	0.501	0.	0.089	0.088	0.020	0.020
10	90.00	6.0	0.0	8.4	0.574	0.	0.166	0.157	0.034	0.032
11	95.00	6.0	0.0	8.4	0.612	0.	0.218	0.202	0.044	0.040
HUB	100.00	6.0	0.1	8.5	0.662	0.	0.289	0.262	0.057	0.051

TABLE IV. - BLADE GEOMETRY FOR ROTOR 18

RP	PERCENT SPAN	RADII RI	RO	BLADE ANGLES KIC	KTC	KOC	DELTA INC	CONE ANGLE
TIP	0.	25.019	24.359	63.50	60.06	48.60	2.49	-15.536
1	5.	24.442	23.871	61.91	58.53	47.71	2.75	-12.940
2	10.	23.906	23.383	60.51	57.10	46.55	3.00	-11.383
3	30.	21.655	21.433	55.62	51.09	39.82	4.08	-4.201
4	48.	19.590	19.726	52.08	45.52	31.18	5.03	2.263
5	50.	19.288	19.482	51.61	44.86	29.62	5.17	3.196
6	53.	18.983	19.238	51.14	44.24	27.97	5.30	4.131
7	55.	18.676	18.994	50.68	43.63	26.26	5.43	5.076
8	58.	18.367	18.750	50.22	42.97	24.48	5.56	6.033
9	70.	16.777	17.531	48.02	39.76	14.38	6.16	10.944
10	90.	14.079	15.580	44.63	35.58	-7.70	6.86	19.179
11	95.	13.384	15.093	43.76	34.81	-14.81	6.97	21.167
HUB	100.	12.700	14.605	42.89	34.15	-22.54	7.04	22.937

RP	BLADE THICKNESSES TI	TM	TO	AXIAL DIMENSIONS ZIC	ZMC	ZTC	ZOC
TIP	0.051	0.152	0.051	1.148	2.212	2.267	3.523
1	0.051	0.163	0.051	1.087	2.213	2.225	3.573
2	0.051	0.173	0.051	1.031	2.213	2.183	3.626
3	0.051	0.216	0.051	0.812	2.205	1.966	3.847
4	0.051	0.256	0.051	0.627	2.193	1.719	4.048
5	0.051	0.262	0.051	0.602	2.191	1.681	4.076
6	0.051	0.267	0.051	0.578	2.188	1.643	4.105
7	0.051	0.273	0.051	0.554	2.185	1.604	4.133
8	0.051	0.279	0.051	0.529	2.182	1.563	4.160
9	0.051	0.309	0.051	0.396	2.164	1.341	4.296
10	0.051	0.360	0.051	0.149	2.126	0.924	4.466
11	0.051	0.373	0.051	0.076	2.117	0.807	4.488
HUB	0.051	0.386	0.051	0.000	2.107	0.687	4.502

RP	AERO CHORD	SETTING ANGLE	TOTAL CAMBER	SOLIDITY	X FACTOR	PHISS	AREA RATIO
TIP	4.734	58.23	14.90	1.709	0.627	6.04	1.048
1	4.698	56.71	14.20	1.733	0.657	6.15	1.047
2	4.692	55.23	13.96	1.769	0.686	6.33	1.046
3	4.668	48.77	15.80	1.931	0.815	7.93	1.040
4	4.665	42.09	20.90	2.115	0.929	10.13	1.046
5	4.667	41.08	21.98	2.146	0.929	10.32	1.045
6	4.670	40.06	23.17	2.178	0.924	10.47	1.043
7	4.674	39.01	24.42	2.212	0.920	10.62	1.042
8	4.679	37.90	25.74	2.247	0.920	10.80	1.041
9	4.724	31.81	33.64	2.454	0.920	11.65	1.038
10	4.900	19.54	52.34	2.945	0.874	11.86	1.039
11	4.967	15.78	58.57	3.109	0.849	11.57	1.040
HUB	5.043	11.73	65.43	3.292	0.820	11.16	1.040

TABLE V. - BLADE GEOMETRY FOR STATOR 13

	PERCENT	RADII		BLADE ANGLES			DELTA	CONE
RP	SPAN	RI	RO	KIC	KTC	KOC	INC	ANGLE
TIP	0.	23.876	23.876	41.63	33.98	-11.65	6.20	0.057
1	5.	23.463	23.463	39.10	32.44	-10.50	6.23	0.302
2	10.	23.050	23.092	37.57	31.54	-9.78	6.25	0.629
3	30.	21.431	21.579	36.87	31.42	-8.95	6.25	2.192
4	48.	19.979	20.262	38.00	32.55	-8.78	6.23	4.214
5	50.	19.770	20.076	38.22	32.75	-8.77	6.22	4.545
6	53.	19.562	19.890	38.44	32.96	-8.76	6.22	4.886
7	55.	19.353	19.705	38.67	33.10	-8.74	6.21	5.240
8	58.	19.145	19.522	38.89	33.10	-8.70	6.20	5.608
9	70.	18.107	18.622	40.08	32.83	-8.44	6.15	7.635
10	90.	16.497	17.242	43.12	33.57	-8.36	6.02	11.023
11	95.	16.123	16.900	44.26	33.89	-8.41	5.99	11.508
HUB	100.	15.748	16.510	45.57	34.25	-8.49	5.94	11.338

	BLADE THICKNESSES			AXIAL DIMENSIONS			
RP	TI	TM	TO	ZIC	ZMC	ZTC	ZOC
TIP	0.051	0.279	0.051	7.621	9.332	8.792	11.414
1	0.051	0.279	0.051	7.589	9.339	8.715	11.414
2	0.051	0.279	0.051	7.570	9.344	8.662	11.414
3	0.051	0.279	0.051	7.559	9.346	8.571	11.413
4	0.051	0.279	0.051	7.569	9.344	8.528	11.411
5	0.051	0.279	0.051	7.571	9.343	8.523	11.411
6	0.051	0.279	0.051	7.573	9.342	8.517	11.411
7	0.051	0.279	0.051	7.575	9.342	8.511	11.410
8	0.051	0.279	0.051	7.575	9.342	8.502	11.410
9	0.051	0.279	0.051	7.572	9.341	8.453	11.410
10	0.051	0.279	0.051	7.583	9.338	8.399	11.407
11	0.051	0.279	0.051	7.589	9.337	8.393	11.407
HUB	0.051	0.279	0.051	7.596	9.335	8.383	11.407

	AERO	SETTING	TOTAL		X		AREA
RP	CHORD	ANGLE	CAMBER	SOLIDITY	FACTOR	PHISS	RATIO
TIP	4.103	20.61	53.28	1.696	0.600	12.00	1.108
1	4.102	19.23	49.61	1.726	0.600	10.78	1.090
2	4.104	18.43	47.35	1.755	0.600	10.00	1.078
3	4.106	17.98	45.82	1.884	0.600	9.12	1.057
4	4.113	18.49	46.79	2.017	0.600	8.97	1.040
5	4.115	18.59	46.99	2.038	0.600	8.96	1.038
6	4.117	18.70	47.21	2.059	0.600	8.95	1.036
7	4.119	18.76	47.42	2.081	0.605	9.01	1.035
8	4.121	18.76	47.59	2.103	0.618	9.19	1.035
9	4.136	18.58	48.53	2.222	0.707	10.44	1.040
10	4.172	19.02	51.47	2.440	0.827	12.43	1.061
11	4.178	19.24	52.67	2.497	0.863	13.19	1.069
HUB	4.174	19.50	54.06	2.553	0.902	14.05	1.079

TABLE VI. - OVERALL PERFORMANCE FOR STAGE 18-13

(a) 100 Percent design speed

Parameter	Reading				
	927	926	925	924	923
ROTOR TOTAL PRESSURE RATIO	1.921	1.922	1.935	1.955	1.960
STAGE TOTAL PRESSURE RATIO	1.750	1.804	1.837	1.856	1.864
ROTOR TOTAL TEMPERATURE RATIO	1.241	1.242	1.245	1.251	1.254
STAGE TOTAL TEMPERATURE RATIO	1.235	1.237	1.240	1.244	1.248
ROTOR TEMP. RISE EFFICIENCY	0.849	0.849	0.848	0.840	0.833
STAGE TEMP. RISE EFFICIENCY	0.738	0.776	0.792	0.793	0.786
ROTOR MOMENTUM RISE EFFICIENCY	0.846	0.850	0.856	0.863	0.861
ROTOR HEAD RISE COEFFICIENT	0.336	0.337	0.341	0.346	0.348
STAGE HEAD RISE COEFFICIENT	0.284	0.301	0.311	0.317	0.319
FLOW COEFFICIENT	0.416	0.416	0.413	0.403	0.392
WT FLOW PER UNIT FRONTAL AREA	149.10	148.77	147.93	145.38	142.69
WT FLOW PER UNIT ANNULUS AREA	200.85	200.41	199.28	195.85	192.22
WT FLOW AT ORIFICE	29.32	29.25	29.09	28.59	28.06
WT FLOW AT ROTOR INLET	29.67	29.59	29.44	28.93	28.36
WT FLOW AT ROTOR OUTLET	28.24	28.17	28.00	27.66	27.00
WT FLOW AT STATOR OUTLET	30.50	29.95	29.72	28.98	28.28
ROTATIVE SPEED	16048.0	16024.8	16029.4	16025.4	16033.0
PERCENT OF DESIGN SPEED	99.7	99.5	99.6	99.5	99.6

(b) 90 Percent design speed

Parameter	Reading				
	918	919	920	921	922
ROTOR TOTAL PRESSURE RATIO	1.714	1.723	1.733	1.741	1.738
STAGE TOTAL PRESSURE RATIO	1.548	1.667	1.656	1.664	1.664
ROTOR TOTAL TEMPERATURE RATIO	1.192	1.194	1.198	1.202	1.203
STAGE TOTAL TEMPERATURE RATIO	1.185	1.188	1.192	1.195	1.197
ROTOR TEMP. RISE EFFICIENCY	0.867	0.867	0.858	0.850	0.844
STAGE TEMP. RISE EFFICIENCY	0.721	0.836	0.808	0.802	0.796
ROTOR MOMENTUM RISE EFFICIENCY	0.863	0.870	0.870	0.868	0.863
ROTOR HEAD RISE COEFFICIENT	0.335	0.338	0.342	0.346	0.345
STAGE HEAD RISE COEFFICIENT	0.268	0.316	0.312	0.315	0.316
FLOW COEFFICIENT	0.411	0.407	0.394	0.382	0.374
WT FLOW PER UNIT FRONTAL AREA	136.62	135.49	132.15	128.85	126.47
WT FLOW PER UNIT ANNULUS AREA	184.04	182.52	178.02	173.58	170.36
WT FLOW AT ORIFICE	26.87	26.64	25.99	25.34	24.87
WT FLOW AT ROTOR INLET	27.21	26.99	26.32	25.65	25.19
WT FLOW AT ROTOR OUTLET	26.05	26.01	25.32	24.69	24.12
WT FLOW AT STATOR OUTLET	28.00	28.04	26.15	25.29	24.71
ROTATIVE SPEED	14469.3	14478.4	14469.9	14469.5	14466.7
PERCENT OF DESIGN SPEED	89.9	89.9	89.9	89.9	89.9

(c) 80 Percent design speed

Parameter	Reading
	915
ROTOR TOTAL PRESSURE RATIO	1.554
STAGE TOTAL PRESSURE RATIO	1.496
ROTOR TOTAL TEMPERATURE RATIO	1.164
STAGE TOTAL TEMPERATURE RATIO	1.158
ROTOR TEMP. RISE EFFICIENCY	0.818
STAGE TEMP. RISE EFFICIENCY	0.771
ROTOR MOMENTUM RISE EFFICIENCY	0.832
ROTOR HEAD RISE COEFFICIENT	0.332
STAGE HEAD RISE COEFFICIENT	0.302
FLOW COEFFICIENT	0.336
WT FLOW PER UNIT FRONTAL AREA	105.79
WT FLOW PER UNIT ANNULUS AREA	142.51
WT FLOW AT ORIFICE	20.80
WT FLOW AT ROTOR INLET	21.08
WT FLOW AT ROTOR OUTLET	20.35
WT FLOW AT STATOR OUTLET	20.59
ROTATIVE SPEED	13053.9
PERCENT OF DESIGN SPEED	81.1

TABLE VI. - Concluded. OVERALL PERFORMANCE FOR STAGE 18-13

(d) 70 Percent design speed

Parameter	Reading				
	905	906	907	947	904
ROTOR TOTAL PRESSURE RATIO	1.357	1.372	1.386	1.395	1.392
STAGE TOTAL PRESSURE RATIO	1.264	1.329	1.352	1.361	1.357
ROTOR TOTAL TEMPERATURE RATIO	1.103	1.107	1.113	1.119	1.123
STAGE TOTAL TEMPERATURE RATIO	1.103	1.107	1.113	1.115	1.122
ROTOR TEMP. RISE EFFICIENCY	0.886	0.882	0.862	0.838	0.809
STAGE TEMP. RISE EFFICIENCY	0.675	0.790	0.796	0.800	0.747
ROTOR MOMENTUM RISE EFFICIENCY	0.887	0.881	0.878	0.868	0.832
ROTOR HEAD RISE COEFFICIENT	0.302	0.313	0.325	0.330	0.329
STAGE HEAD RISE COEFFICIENT	0.230	0.281	0.299	0.304	0.302
FLOW COEFFICIENT	0.417	0.402	0.375	0.348	0.322
WT FLOW PER UNIT FRONTAL AREA	112.65	108.86	102.36	96.12	89.41
WT FLOW PER UNIT ANNULUS AREA	151.75	146.64	137.89	129.48	120.44
WT FLOW AT ORIFICE	22.15	21.41	20.13	18.90	17.58
WT FLOW AT ROTOR INLET	22.43	21.69	20.41	19.16	17.80
WT FLOW AT ROTOR OUTLET	21.65	20.91	19.76	18.75	17.07
WT FLOW AT STATOR OUTLET	22.56	21.62	20.23	18.88	17.50
ROTATIVE SPEED	11279.1	11276.6	11269.0	11299.6	11280.1
PERCENT OF DESIGN SPEED	70.1	70.0	70.0	70.2	70.1

(e) 60 Percent design speed

Parameter	Reading
	934
ROTOR TOTAL PRESSURE RATIO	1.280
STAGE TOTAL PRESSURE RATIO	1.255
ROTOR TOTAL TEMPERATURE RATIO	1.089
STAGE TOTAL TEMPERATURE RATIO	1.087
ROTOR TEMP. RISE EFFICIENCY	0.820
STAGE TEMP. RISE EFFICIENCY	0.774
ROTOR MOMENTUM RISE EFFICIENCY	0.854
ROTOR HEAD RISE COEFFICIENT	0.331
STAGE HEAD RISE COEFFICIENT	0.304
FLOW COEFFICIENT	0.320
WT FLOW PER UNIT FRONTAL AREA	76.74
WT FLOW PER UNIT ANNULUS AREA	103.38
WT FLOW AT ORIFICE	15.09
WT FLOW AT ROTOR INLET	15.28
WT FLOW AT ROTOR OUTLET	14.97
WT FLOW AT STATOR OUTLET	14.98
ROTATIVE SPEED	9644.3
PERCENT OF DESIGN SPEED	59.9

(f) 50 Percent design speed

Parameter	Reading
	942
ROTOR TOTAL PRESSURE RATIO	1.190
STAGE TOTAL PRESSURE RATIO	1.175
ROTOR TOTAL TEMPERATURE RATIO	1.062
STAGE TOTAL TEMPERATURE RATIO	1.060
ROTOR TEMP. RISE EFFICIENCY	0.821
STAGE TEMP. RISE EFFICIENCY	0.786
ROTOR MOMENTUM RISE EFFICIENCY	0.861
ROTOR HEAD RISE COEFFICIENT	0.331
STAGE HEAD RISE COEFFICIENT	0.305
FLOW COEFFICIENT	0.316
WT FLOW PER UNIT FRONTAL AREA	63.76
WT FLOW PER UNIT ANNULUS AREA	85.90
WT FLOW AT ORIFICE	12.54
WT FLOW AT ROTOR INLET	12.76
WT FLOW AT ROTOR OUTLET	12.53
WT FLOW AT STATOR OUTLET	12.46
ROTATIVE SPEED	8062.7
PERCENT OF DESIGN SPEED	50.1

TABLE VII. - BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 18

(a) 100 Percent design speed; reading 927

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.442	23.871	-0.0	52.1	65.4	53.3	288.9	1.273	10.02	1.950
2	23.906	23.383	-0.0	48.2	63.7	51.3	288.5	1.255	10.13	1.932
3	21.656	21.433	-0.0	49.0	59.8	44.4	288.0	1.241	10.14	1.931
4	19.591	19.726	-0.0	52.3	56.8	34.8	287.9	1.239	10.14	1.901
5	19.289	19.482	-0.0	53.8	56.4	35.4	287.9	1.238	10.14	1.857
6	18.984	19.238	-0.0	55.1	56.1	34.8	288.0	1.237	10.14	1.836
7	18.677	18.994	-0.0	55.3	55.6	33.8	287.9	1.235	10.14	1.824
8	18.367	18.750	-0.0	54.1	55.2	31.8	287.9	1.232	10.15	1.843
9	16.777	17.531	-0.0	52.7	53.6	23.1	288.0	1.222	10.14	1.892
10	14.079	15.580	-0.0	55.2	50.3	4.9	288.0	1.230	10.14	1.955
11	13.383	15.093	-0.0	58.5	49.3	-8.8	288.1	1.251	10.14	2.072

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	188.3	248.8	451.9	255.4	188.3	152.7	-0.0	196.4	410.8	401.2
2	199.2	249.6	449.2	266.0	199.2	166.3	-0.1	186.1	402.6	393.8
3	212.2	258.0	421.6	237.0	212.2	169.3	-0.1	194.7	364.2	360.5
4	215.3	272.6	393.5	202.9	215.3	166.6	-0.1	215.7	329.4	331.6
5	215.3	267.2	389.4	193.3	215.3	157.6	-0.0	215.7	324.4	327.7
6	215.0	265.7	385.0	185.1	215.0	152.0	-0.0	217.9	319.4	323.6
7	214.5	264.5	379.4	181.4	214.5	150.8	-0.0	217.4	312.9	318.2
8	214.0	268.1	375.2	184.9	214.0	157.2	-0.0	217.2	308.1	314.5
9	207.9	279.7	350.4	184.3	207.9	169.6	-0.0	222.4	282.0	294.7
10	196.5	300.9	307.6	172.4	196.5	171.7	-0.0	247.1	236.6	261.9
11	193.0	328.2	296.2	173.3	193.0	171.3	-0.0	280.0	224.7	253.4

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.570	0.676	1.369	0.694	0.570	0.415	0.811	1.597
2	0.606	0.684	1.367	0.729	0.606	0.456	0.835	1.579
3	0.650	0.715	1.290	0.656	0.650	0.469	0.798	1.566
4	0.660	0.760	1.206	0.566	0.660	0.465	0.774	1.557
5	0.660	0.744	1.194	0.538	0.660	0.439	0.732	1.551
6	0.659	0.740	1.180	0.515	0.659	0.423	0.707	1.543
7	0.657	0.737	1.163	0.505	0.657	0.420	0.703	1.530
8	0.656	0.749	1.149	0.517	0.656	0.439	0.735	1.525
9	0.635	0.789	1.071	0.520	0.635	0.478	0.816	1.499
10	0.598	0.854	0.936	0.489	0.598	0.487	0.874	1.362
11	0.586	0.935	0.900	0.494	0.586	0.488	0.887	1.295

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	3.1	0.4	4.9	0.559	0.771	0.231	0.136	0.040	0.023
2	10.00	2.9	-0.1	4.5	0.524	0.812	0.183	0.091	0.032	0.016
3	30.00	4.1	0.0	4.5	0.557	0.858	0.145	0.068	0.027	0.013
4	47.50	4.8	-0.2	3.7	0.614	0.843	0.173	0.110	0.034	0.021
5	50.00	4.9	-0.3	5.8	0.633	0.813	0.208	0.147	0.039	0.028
6	52.50	4.9	-0.4	6.9	0.650	0.801	0.224	0.167	0.042	0.032
7	55.00	4.9	-0.5	7.5	0.652	0.797	0.230	0.179	0.043	0.034
8	57.50	5.0	-0.5	7.3	0.637	0.823	0.204	0.155	0.039	0.029
9	70.00	5.6	-0.6	8.7	0.606	0.900	0.125	0.090	0.024	0.017
10	90.00	5.6	-1.3	12.6	0.583	0.917	0.132	0.124	0.022	0.021
11	95.00	5.5	-1.5	6.0	0.576	0.920	0.145	0.142	0.023	0.023

TABLE VII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR ROTOR 18

(b) 100 Percent design speed; reading 926

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	24.442	23.871	-0.0	52.4	65.5	53.1	289.0	1.273	9.99	1.960
2	23.906	23.383	-0.0	48.6	63.7	51.3	288.5	1.256	10.14	1.932
3	21.656	21.433	-0.0	49.1	59.8	44.3	288.0	1.241	10.14	1.936
4	19.591	19.726	-0.0	52.4	56.9	35.4	287.9	1.239	10.15	1.898
5	19.289	19.482	-0.0	53.8	56.5	35.5	288.0	1.239	10.14	1.860
6	18.984	19.238	-0.0	55.1	56.1	35.2	287.9	1.237	10.15	1.836
7	18.677	18.994	-0.0	55.2	55.7	34.3	287.9	1.235	10.14	1.828
8	18.367	18.750	-0.0	54.0	55.3	32.1	287.9	1.232	10.14	1.846
9	16.777	17.531	-0.0	52.7	53.7	23.5	288.0	1.222	10.15	1.897
10	14.079	15.580	-0.0	55.2	50.5	5.3	287.9	1.231	10.15	1.957
11	13.383	15.093	-0.0	57.6	49.6	-5.1	288.0	1.247	10.14	2.015

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	186.4	248.9	449.7	253.0	186.4	151.7	-0.0	197.3	409.3	399.7
2	198.6	249.3	447.8	263.7	198.6	165.0	-0.0	186.9	401.4	392.6
3	211.9	258.4	421.2	236.4	211.9	169.2	-0.0	195.2	364.0	360.2
4	214.8	270.5	393.2	202.3	214.8	164.9	-0.0	214.4	329.3	331.6
5	214.5	266.3	388.3	192.9	214.5	157.1	-0.0	215.0	323.7	326.9
6	214.1	264.0	384.1	184.9	214.1	151.1	-0.1	216.5	318.9	323.2
7	213.6	263.2	379.4	182.0	213.6	150.3	-0.1	216.2	313.5	318.8
8	213.1	266.5	374.0	184.8	213.1	156.6	-0.0	215.6	307.4	313.8
9	207.3	278.1	350.0	183.6	207.3	168.4	-0.1	221.4	282.0	294.7
10	194.4	298.6	305.8	171.0	194.4	170.2	-0.0	245.3	236.1	261.2
11	191.3	317.7	294.9	170.7	191.3	170.0	-0.0	268.4	224.4	253.1

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	0.564	0.676	1.361	0.687	0.564	0.412	0.814	1.589
2	0.604	0.683	1.362	0.723	0.604	0.452	0.831	1.575
3	0.649	0.716	1.289	0.655	0.649	0.469	0.799	1.566
4	0.658	0.754	1.205	0.564	0.658	0.460	0.768	1.558
5	0.657	0.741	1.190	0.537	0.657	0.437	0.732	1.549
6	0.656	0.735	1.177	0.515	0.656	0.420	0.706	1.544
7	0.654	0.733	1.162	0.507	0.654	0.418	0.703	1.535
8	0.653	0.744	1.145	0.516	0.653	0.437	0.735	1.523
9	0.633	0.784	1.069	0.517	0.633	0.474	0.812	1.501
10	0.591	0.846	0.930	0.484	0.591	0.482	0.876	1.361
11	0.581	0.902	0.896	0.485	0.581	0.483	0.889	1.295

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	3.3	0.5	4.7	0.563	0.778	0.227	0.133	0.039	0.023
2	10.00	2.9	-0.1	4.5	0.528	0.810	0.187	0.096	0.033	0.017
3	30.00	4.1	0.0	4.4	0.558	0.861	0.143	0.065	0.026	0.012
4	47.50	4.8	-0.2	4.2	0.615	0.839	0.179	0.115	0.034	0.022
5	50.00	4.9	-0.3	5.9	0.633	0.813	0.209	0.150	0.040	0.028
6	52.50	5.0	-0.3	7.3	0.649	0.800	0.225	0.168	0.042	0.032
7	55.00	5.1	-0.3	8.1	0.650	0.802	0.226	0.173	0.042	0.032
8	57.50	5.1	-0.5	7.6	0.636	0.826	0.201	0.153	0.038	0.029
9	70.00	5.7	-0.5	9.1	0.607	0.904	0.121	0.086	0.023	0.016
10	90.00	5.8	-1.0	13.0	0.584	0.916	0.136	0.129	0.023	0.022
11	95.00	5.7	-1.2	9.7	0.576	0.896	0.186	0.184	0.030	0.029

TABLE VII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR ROTOR 18

(c) 100 Percent design speed; reading 925

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.442	23.871	-0.0	53.4	65.6	52.8	289.0	1.286	10.01	1.981
2	23.906	23.383	-0.0	49.9	63.9	50.9	288.6	1.262	10.14	1.959
3	21.656	21.433	-0.0	49.5	60.0	44.6	288.0	1.243	10.14	1.943
4	19.591	19.726	-0.0	52.5	57.1	36.1	288.0	1.240	10.14	1.905
5	19.289	19.482	-0.0	53.8	56.7	36.5	287.9	1.239	10.14	1.870
6	18.984	19.238	-0.0	55.0	56.3	35.9	287.9	1.239	10.14	1.850
7	18.677	18.994	-0.0	55.2	55.9	35.1	288.0	1.237	10.14	1.836
8	18.367	18.750	-0.0	54.1	55.5	33.1	288.0	1.234	10.14	1.852
9	16.777	17.531	-0.0	52.9	53.9	24.5	288.0	1.223	10.14	1.898
10	14.079	15.580	-0.0	55.3	50.9	6.7	288.0	1.232	10.14	1.955
11	13.383	15.093	-0.0	58.6	49.8	-8.8	288.0	1.253	10.14	2.096

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	185.5	252.0	449.8	248.6	185.5	150.4	-0.0	202.3	409.8	403.2
2	197.3	252.5	448.2	258.2	197.3	162.7	-0.0	193.1	402.5	393.7
3	210.4	257.1	420.4	234.7	210.4	167.2	-0.0	195.4	363.9	360.1
4	213.2	267.8	392.2	202.1	213.2	163.2	-0.0	212.3	329.2	331.5
5	212.9	263.5	388.1	193.5	212.9	155.6	-0.0	212.7	324.5	327.8
6	212.5	261.9	383.5	185.5	212.5	150.2	-0.0	214.6	319.1	323.4
7	211.9	260.4	378.1	181.6	211.9	148.5	-0.1	213.8	313.1	318.4
8	211.0	263.2	373.0	184.4	211.0	154.4	-0.0	213.1	307.5	313.9
9	205.0	273.9	347.9	181.5	205.0	165.2	-0.0	218.5	281.0	293.7
10	192.5	294.4	305.0	168.6	192.5	167.4	-0.0	242.2	236.6	261.8
11	189.3	327.2	293.4	172.6	189.3	170.5	-0.0	279.2	224.0	252.7

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS
RP	IN	OUT	IN	OUT	IN	OUT	VEL R MACH NO
1	0.561	0.682	1.361	0.673	0.561	0.407	0.811 1.593
2	0.600	0.691	1.363	0.707	0.600	0.445	0.825 1.583
3	0.644	0.711	1.286	0.649	0.644	0.462	0.795 1.569
4	0.653	0.745	1.201	0.562	0.653	0.454	0.765 1.561
5	0.652	0.732	1.189	0.538	0.652	0.432	0.731 1.557
6	0.651	0.728	1.174	0.515	0.651	0.417	0.707 1.549
7	0.648	0.723	1.157	0.505	0.648	0.413	0.701 1.537
8	0.646	0.733	1.141	0.514	0.646	0.430	0.732 1.530
9	0.626	0.770	1.062	0.510	0.626	0.464	0.806 1.504
10	0.585	0.832	0.927	0.476	0.585	0.473	0.870 1.367
11	0.575	0.930	0.890	0.491	0.575	0.485	0.901 1.295

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	3.4	0.6	4.4	0.576	0.756	0.256	0.162	0.045	0.028
2	10.00	3.1	0.1	4.2	0.544	0.809	0.191	0.099	0.034	0.018
3	30.00	4.3	0.2	4.7	0.561	0.859	0.145	0.068	0.027	0.013
4	47.50	5.0	-0.0	5.0	0.613	0.843	0.175	0.111	0.033	0.021
5	50.00	5.2	-0.0	6.9	0.630	0.819	0.203	0.143	0.038	0.027
6	52.50	5.2	-0.1	8.0	0.646	0.806	0.221	0.164	0.041	0.031
7	55.00	5.3	-0.2	8.9	0.649	0.801	0.230	0.177	0.042	0.033
8	57.50	5.4	-0.2	8.7	0.634	0.824	0.206	0.157	0.038	0.029
9	70.00	5.9	-0.3	10.0	0.609	0.901	0.126	0.091	0.023	0.017
10	90.00	6.2	-0.7	14.3	0.589	0.909	0.148	0.141	0.025	0.024
11	95.00	6.0	-1.0	6.0	0.574	0.929	0.132	0.130	0.021	0.021

TABLE VII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR ROTOR 18

(d) 100 Percent design speed; reading 924

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.442	23.871	-0.0	54.5	66.3	53.2	289.0	1.296	10.01	1.999
2	23.906	23.383	-0.0	51.3	64.6	50.4	288.6	1.278	10.14	1.994
3	21.656	21.433	-0.0	50.5	60.7	45.0	288.0	1.249	10.14	1.954
4	19.591	19.726	-0.0	52.8	57.7	35.8	287.9	1.243	10.14	1.935
5	19.289	19.482	-0.0	54.2	57.3	35.7	287.9	1.243	10.14	1.909
6	18.984	19.238	-0.0	55.5	57.0	35.8	287.9	1.243	10.14	1.880
7	18.677	18.994	-0.0	55.6	56.7	35.6	287.8	1.240	10.15	1.866
8	18.367	18.750	-0.0	54.6	56.3	33.5	288.0	1.236	10.14	1.880
9	16.777	17.531	-0.0	53.5	54.6	25.3	287.9	1.226	10.14	1.909
10	14.079	15.580	-0.0	56.1	51.5	6.9	288.1	1.236	10.15	1.965
11	13.383	15.093	-0.0	58.7	50.5	-8.0	288.0	1.254	10.14	2.103

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	180.1	251.9	448.3	244.6	180.1	146.5	-0.0	205.0	410.5	400.9
2	190.9	255.7	444.7	250.7	190.9	159.9	-0.1	199.6	401.6	392.8
3	204.0	255.7	416.8	229.8	204.0	162.6	-0.0	197.3	363.5	359.7
4	207.2	267.8	388.0	199.9	207.2	162.1	-0.0	213.2	328.0	330.3
5	207.5	265.3	384.3	191.2	207.5	155.3	-0.0	215.1	323.4	326.6
6	206.9	261.9	380.1	183.1	206.9	148.5	-0.0	215.8	318.8	323.0
7	206.4	260.2	376.2	180.9	206.4	147.1	-0.1	214.6	314.5	319.9
8	205.6	262.7	370.9	182.4	205.6	152.1	-0.0	214.3	308.6	315.1
9	200.1	271.0	345.2	178.4	200.1	161.3	-0.0	217.7	281.3	293.9
10	187.6	291.2	301.6	163.7	187.6	162.5	-0.0	241.6	236.1	261.3
11	184.7	323.3	290.5	169.5	184.7	167.8	-0.0	276.3	224.1	252.8

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.544	0.679	1.354	0.659	0.544	0.395	0.813	1.609
2	0.579	0.696	1.349	0.682	0.579	0.435	0.837	1.593
3	0.622	0.705	1.272	0.634	0.622	0.449	0.797	1.581
4	0.633	0.744	1.186	0.556	0.633	0.450	0.782	1.571
5	0.634	0.737	1.174	0.531	0.634	0.431	0.748	1.565
6	0.632	0.726	1.161	0.508	0.632	0.412	0.717	1.561
7	0.630	0.722	1.149	0.502	0.630	0.408	0.713	1.559
8	0.628	0.731	1.132	0.507	0.628	0.423	0.740	1.553
9	0.610	0.760	1.052	0.500	0.610	0.452	0.806	1.522
10	0.569	0.820	0.915	0.461	0.569	0.458	0.866	1.369
11	0.560	0.917	0.880	0.481	0.560	0.476	0.909	1.302

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	4.0	1.3	4.8	0.585	0.739	0.281	0.184	0.048	0.032
2	10.00	3.8	0.8	3.6	0.562	0.786	0.225	0.132	0.040	0.024
3	30.00	5.0	0.9	5.1	0.571	0.847	0.163	0.085	0.030	0.016
4	47.50	5.7	0.6	4.7	0.615	0.852	0.170	0.107	0.032	0.020
5	50.00	5.7	0.6	6.1	0.634	0.835	0.191	0.131	0.036	0.025
6	52.50	5.9	0.6	7.9	0.649	0.814	0.217	0.160	0.040	0.030
7	55.00	6.1	0.7	9.3	0.649	0.814	0.219	0.164	0.040	0.030
8	57.50	6.1	0.6	9.1	0.638	0.837	0.194	0.142	0.036	0.026
9	70.00	6.5	0.4	10.9	0.615	0.897	0.134	0.098	0.025	0.018
10	90.00	6.8	-0.0	14.6	0.600	0.903	0.162	0.155	0.027	0.026
11	95.00	6.7	-0.3	6.9	0.579	0.932	0.129	0.127	0.021	0.020

TABLE VII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR ROTOR 18

(e) 100 Percent design speed; reading 923

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.442	23.871	-0.0	55.8	67.0	54.8	289.0	1.297	10.02	1.973
2	23.906	23.383	-0.0	53.1	65.3	50.7	288.6	1.285	10.13	1.997
3	21.656	21.433	-0.0	51.7	61.5	45.0	288.0	1.254	10.14	1.968
4	19.591	19.726	-0.0	53.4	58.6	36.7	288.0	1.246	10.14	1.948
5	19.289	19.482	-0.0	54.7	58.2	37.0	288.0	1.245	10.15	1.914
6	18.984	19.238	-0.0	55.9	57.8	36.4	288.0	1.245	10.14	1.896
7	18.677	18.994	-0.0	56.1	57.4	35.2	287.9	1.243	10.15	1.889
8	18.367	18.750	-0.0	55.2	57.1	33.9	287.8	1.239	10.14	1.892
9	16.777	17.531	-0.0	54.2	55.4	25.9	288.0	1.229	10.15	1.916
10	14.079	15.580	-0.0	56.6	52.3	7.0	288.0	1.239	10.14	1.973
11	13.383	15.093	-0.0	58.9	51.4	-6.2	288.1	1.253	10.14	2.086

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	174.6	246.8	446.2	240.7	174.6	138.6	-0.0	204.3	410.6	401.0
2	184.7	255.4	441.2	242.4	184.7	153.4	-0.0	204.2	400.7	391.9
3	197.7	256.1	413.7	224.5	197.7	158.8	-0.0	200.9	363.4	359.7
4	201.1	265.9	386.0	197.9	201.1	158.7	-0.0	213.3	329.4	331.7
5	201.0	261.7	381.7	189.3	201.0	151.1	-0.0	213.6	324.4	327.7
6	201.0	260.4	377.2	181.6	201.0	146.1	-0.0	215.5	319.1	323.4
7	200.4	260.2	371.9	177.7	200.4	145.2	-0.0	216.0	313.2	318.5
8	199.4	260.7	366.7	179.3	199.4	148.8	-0.0	214.1	307.7	314.1
9	194.2	268.4	341.9	174.6	194.2	157.0	-0.0	217.7	281.4	294.1
10	182.5	289.1	298.3	160.1	182.5	158.9	-0.0	241.5	235.9	261.1
11	180.1	317.8	288.7	165.3	180.1	164.3	-0.1	272.0	225.5	254.3

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS
RP	IN	OUT	IN	OUT	IN	OUT	VEL R MACH NO
1	0.526	0.663	1.345	0.647	0.526	0.372	0.794 1.623
2	0.559	0.693	1.336	0.657	0.559	0.416	0.831 1.603
3	0.602	0.705	1.259	0.618	0.602	0.437	0.803 1.595
4	0.613	0.737	1.177	0.549	0.613	0.440	0.789 1.592
5	0.613	0.725	1.163	0.524	0.613	0.418	0.752 1.587
6	0.613	0.721	1.150	0.503	0.613	0.404	0.727 1.579
7	0.611	0.721	1.133	0.492	0.611	0.402	0.724 1.569
8	0.608	0.724	1.117	0.498	0.608	0.413	0.746 1.564
9	0.590	0.751	1.040	0.488	0.590	0.439	0.809 1.544
10	0.553	0.812	0.903	0.450	0.553	0.447	0.871 1.375
11	0.545	0.899	0.873	0.468	0.545	0.465	0.912 1.318

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	4.7	2.0	6.5	0.591	0.721	0.302	0.203	0.050	0.034
2	10.00	4.5	1.5	4.0	0.580	0.766	0.251	0.158	0.045	0.028
3	30.00	5.8	1.7	5.1	0.582	0.840	0.174	0.095	0.032	0.017
4	47.50	6.5	1.5	5.6	0.618	0.854	0.171	0.105	0.032	0.020
5	50.00	6.6	1.5	7.4	0.635	0.831	0.199	0.136	0.037	0.025
6	52.50	6.7	1.4	8.5	0.651	0.818	0.217	0.158	0.040	0.029
7	55.00	6.7	1.3	9.0	0.654	0.819	0.219	0.164	0.041	0.030
8	57.50	6.9	1.3	9.4	0.642	0.837	0.199	0.147	0.037	0.027
9	70.00	7.4	1.2	11.5	0.622	0.891	0.145	0.106	0.027	0.019
10	90.00	7.6	0.7	14.7	0.608	0.898	0.175	0.168	0.029	0.028
11	95.00	7.6	0.6	8.7	0.588	0.923	0.148	0.146	0.024	0.023

TABLE VII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR ROTOR 18

(f) 90 Percent design speed; reading 918

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.442	23.871	-0.0	48.8	65.7	52.7	288.7	1.210	10.06	1.718
2	23.906	23.383	-0.0	46.4	64.3	50.3	288.6	1.199	10.12	1.714
3	21.656	21.433	-0.0	46.6	60.5	44.7	288.0	1.189	10.14	1.701
4	19.591	19.726	-0.0	49.0	57.6	35.0	288.0	1.188	10.14	1.700
5	19.289	19.482	-0.0	50.3	57.3	34.2	287.9	1.188	10.14	1.682
6	18.984	19.238	-0.0	51.8	56.9	33.3	287.9	1.189	10.14	1.666
7	18.677	18.994	-0.0	52.1	56.5	32.1	288.0	1.189	10.14	1.663
8	18.367	18.750	-0.0	51.2	56.1	30.8	287.9	1.185	10.14	1.670
9	16.777	17.531	-0.0	50.9	54.4	22.5	288.0	1.181	10.14	1.697
10	14.079	15.580	-0.0	54.6	51.2	1.6	288.0	1.192	10.14	1.777
11	13.383	15.093	-0.0	57.4	50.3	-8.6	288.0	1.205	10.13	1.839

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	166.6	223.3	405.5	242.7	166.6	147.1	-0.0	168.0	369.6	361.0
2	174.3	227.7	401.8	245.9	174.3	157.1	-0.0	164.8	362.0	354.0
3	186.3	231.3	378.0	223.9	186.3	159.0	-0.0	167.9	328.9	325.5
4	188.1	246.2	351.4	196.9	188.1	161.4	-0.0	186.0	296.8	298.8
5	187.8	245.0	347.1	189.1	187.8	156.4	-0.0	188.6	291.9	294.8
6	187.7	244.3	343.4	180.7	187.7	151.0	-0.0	192.1	287.5	291.3
7	187.4	245.1	339.5	177.8	187.4	150.6	-0.0	193.3	283.1	287.9
8	187.0	246.5	335.2	179.6	187.0	154.3	-0.0	192.2	278.2	284.0
9	181.8	256.1	312.6	174.8	181.8	161.5	-0.0	198.8	254.2	265.6
10	172.0	284.5	274.3	164.9	172.0	164.8	-0.0	231.9	213.6	236.3
11	168.8	300.8	264.1	163.9	168.8	162.1	-0.0	253.4	203.0	229.3

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS
RP	IN	OUT	IN	OUT	IN	OUT	VEL R MACH NO
1	0.501	0.618	1.220	0.672	0.501	0.407	0.883 1.457
2	0.526	0.635	1.212	0.686	0.526	0.438	0.901 1.458
3	0.565	0.649	1.146	0.628	0.565	0.446	0.854 1.467
4	0.571	0.695	1.066	0.556	0.571	0.456	0.858 1.483
5	0.570	0.692	1.053	0.534	0.570	0.442	0.833 1.481
6	0.570	0.689	1.042	0.510	0.570	0.426	0.804 1.479
7	0.568	0.691	1.030	0.502	0.568	0.425	0.804 1.479
8	0.567	0.697	1.017	0.508	0.567	0.437	0.825 1.478
9	0.550	0.729	0.946	0.497	0.550	0.460	0.888 1.419
10	0.519	0.815	0.828	0.473	0.519	0.472	0.958 1.228
11	0.509	0.864	0.796	0.471	0.509	0.465	0.960 1.171

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	3.5	0.7	4.3	0.520	0.795	0.194	0.145	0.034	0.025
2	10.00	3.5	0.5	3.5	0.503	0.836	0.150	0.105	0.027	0.019
3	30.00	4.8	0.7	4.9	0.522	0.867	0.127	0.088	0.023	0.016
4	47.50	5.6	0.6	3.8	0.565	0.869	0.139	0.107	0.027	0.021
5	50.00	5.7	0.5	4.6	0.583	0.850	0.162	0.131	0.031	0.025
6	52.50	5.7	0.4	5.4	0.603	0.830	0.186	0.157	0.036	0.030
7	55.00	5.9	0.4	5.9	0.606	0.826	0.193	0.166	0.037	0.032
8	57.50	5.9	0.4	6.3	0.593	0.854	0.164	0.138	0.031	0.026
9	70.00	6.4	0.2	8.1	0.573	0.903	0.120	0.107	0.023	0.020
10	90.00	6.4	-0.4	9.2	0.550	0.930	0.114	0.114	0.019	0.019
11	95.00	6.4	-0.5	6.3	0.543	0.928	0.131	0.131	0.021	0.021

TABLE VII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR ROTOR 18

(g) 90 Percent design speed; reading 919

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	24.442	23.871	-0.0	49.2	66.2	52.7	288.8	1.214	10.03	1.735
2	23.906	23.383	-0.0	46.8	64.5	50.3	288.8	1.203	10.13	1.724
3	21.656	21.433	-0.0	47.0	60.7	44.4	287.9	1.191	10.14	1.710
4	19.591	19.726	-0.0	49.3	57.9	35.1	288.0	1.189	10.14	1.710
5	19.289	19.482	-0.0	50.5	57.5	34.6	288.0	1.189	10.14	1.692
6	18.984	19.238	-0.0	52.0	57.1	33.9	287.9	1.191	10.14	1.673
7	18.677	18.994	-0.0	52.3	56.8	32.5	288.0	1.191	10.14	1.673
8	18.367	18.750	-0.0	51.3	56.5	31.4	288.0	1.187	10.14	1.677
9	16.777	17.531	-0.0	50.9	54.7	23.0	287.9	1.183	10.15	1.707
10	14.079	15.580	-0.0	54.6	51.6	3.1	288.0	1.192	10.14	1.771
11	13.383	15.093	-0.0	57.2	50.7	-8.0	288.0	1.205	10.13	1.845

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	163.4	224.3	405.2	241.8	163.4	146.6	-0.0	169.8	370.8	362.1
2	172.9	228.2	401.6	244.5	172.9	156.1	-0.0	166.5	362.5	354.6
3	184.5	232.3	376.7	221.9	184.5	158.5	-0.0	169.8	328.4	325.0
4	186.6	245.9	350.9	195.9	186.6	160.2	-0.0	186.5	297.1	299.1
5	186.4	244.1	346.9	188.5	186.4	155.2	-0.0	188.5	292.5	295.4
6	186.2	242.7	342.8	180.2	186.2	149.6	-0.0	191.2	287.9	291.7
7	185.7	244.0	338.7	177.0	185.7	149.3	-0.0	193.0	283.3	288.1
8	184.7	244.6	334.3	179.2	184.7	152.9	-0.0	191.0	278.6	284.4
9	179.8	254.4	311.4	174.1	179.8	160.3	-0.0	197.6	254.2	265.7
10	169.1	278.9	272.2	161.8	169.1	161.5	-0.0	227.4	213.3	236.0
11	166.1	299.1	262.1	163.5	166.1	161.9	-0.0	251.5	202.8	228.7

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	0.491	0.620	1.218	0.669	0.491	0.405	0.897	1.481
2	0.521	0.635	1.211	0.680	0.521	0.434	0.903	1.465
3	0.559	0.652	1.142	0.623	0.559	0.445	0.859	1.471
4	0.566	0.694	1.064	0.553	0.566	0.452	0.859	1.493
5	0.565	0.689	1.052	0.531	0.565	0.438	0.832	1.489
6	0.564	0.684	1.040	0.508	0.564	0.421	0.803	1.487
7	0.563	0.688	1.027	0.499	0.563	0.421	0.804	1.486
8	0.560	0.691	1.013	0.506	0.560	0.432	0.828	1.489
9	0.544	0.723	0.942	0.495	0.544	0.455	0.891	1.423
10	0.510	0.797	0.821	0.462	0.510	0.462	0.955	1.230
11	0.500	0.858	0.790	0.469	0.500	0.464	0.975	1.172

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	4.0	1.2	4.3	0.523	0.796	0.195	0.145	0.034	0.025
2	10.00	3.7	0.7	3.5	0.507	0.830	0.159	0.112	0.029	0.020
3	30.00	5.0	0.9	4.5	0.527	0.869	0.127	0.088	0.024	0.016
4	47.50	5.8	0.8	3.9	0.568	0.877	0.132	0.099	0.026	0.019
5	50.00	5.9	0.7	5.0	0.584	0.857	0.155	0.123	0.030	0.024
6	52.50	6.0	0.7	6.0	0.603	0.830	0.189	0.159	0.036	0.030
7	55.00	6.1	0.7	6.2	0.607	0.829	0.193	0.164	0.037	0.031
8	57.50	6.3	0.7	7.0	0.592	0.852	0.168	0.141	0.032	0.027
9	70.00	6.7	0.5	8.6	0.573	0.902	0.123	0.110	0.023	0.021
10	90.00	6.9	0.0	10.7	0.555	0.925	0.124	0.124	0.021	0.021
11	95.00	6.9	-0.1	6.8	0.540	0.933	0.124	0.124	0.020	0.020

TABLE VII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR ROTOR 18

(h) 90 Percent design speed; reading 920

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.442	23.871	-0.0	51.6	66.9	53.2	288.8	1.225	10.06	1.742
2	23.906	23.383	-0.0	48.9	65.4	50.2	288.7	1.214	10.12	1.747
3	21.656	21.433	0.0	48.6	61.6	44.6	288.0	1.195	10.14	1.724
4	19.591	19.726	-0.0	49.9	58.7	35.5	288.0	1.192	10.14	1.724
5	19.289	19.482	-0.0	51.3	58.3	35.3	287.9	1.191	10.14	1.702
6	18.984	19.238	-0.0	52.6	58.0	34.5	288.0	1.193	10.14	1.688
7	18.677	18.994	-0.0	53.1	57.6	33.0	287.9	1.193	10.14	1.689
8	18.367	18.750	-0.0	52.2	57.2	32.1	287.9	1.189	10.14	1.688
9	16.777	17.531	-0.0	52.0	55.6	24.5	288.0	1.183	10.14	1.705
10	14.079	15.580	-0.0	55.2	52.6	4.1	287.9	1.193	10.14	1.769
11	13.383	15.093	-0.0	57.7	51.6	-7.7	288.0	1.206	10.14	1.847

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	158.3	224.1	402.8	232.3	158.3	139.2	-0.0	175.7	370.3	361.7
2	165.9	229.5	397.8	235.3	165.9	150.8	-0.0	173.0	361.6	353.7
3	177.8	231.8	373.5	215.4	177.8	153.4	0.0	173.8	328.4	325.0
4	180.4	243.8	347.0	192.7	180.4	156.9	-0.0	186.6	296.4	298.5
5	180.3	241.3	343.4	184.8	180.3	150.9	-0.0	188.4	292.2	295.1
6	180.0	240.7	339.5	177.5	180.0	146.3	-0.0	191.2	287.8	291.7
7	180.0	242.3	335.8	173.6	180.0	145.6	-0.1	193.7	283.4	288.2
8	179.2	241.9	330.9	175.0	179.2	148.3	-0.0	191.1	278.1	283.9
9	174.4	249.0	308.7	168.5	174.4	153.3	-0.0	196.3	254.7	266.2
10	163.2	273.7	268.4	156.7	163.2	156.3	-0.0	224.7	213.0	235.8
11	160.7	295.9	258.9	159.6	160.7	158.1	-0.0	250.1	202.9	228.9

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS
RP	IN	OUT	IN	OUT	IN	OUT	VEL R MACH NO
1	0.475	0.616	1.209	0.639	0.475	0.383	0.879 1.496
2	0.499	0.636	1.197	0.652	0.499	0.418	0.909 1.482
3	0.538	0.649	1.129	0.603	0.538	0.429	0.863 1.492
4	0.546	0.687	1.050	0.543	0.546	0.442	0.870 1.511
5	0.546	0.679	1.039	0.520	0.546	0.425	0.837 1.511
6	0.545	0.677	1.027	0.499	0.545	0.411	0.813 1.511
7	0.545	0.682	1.016	0.488	0.545	0.410	0.809 1.511
8	0.542	0.682	1.001	0.493	0.542	0.418	0.828 1.512
9	0.527	0.706	0.932	0.477	0.527	0.434	0.879 1.435
10	0.491	0.780	0.808	0.447	0.491	0.446	0.958 1.237
11	0.483	0.847	0.779	0.457	0.483	0.453	0.984 1.181

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	4.6	1.9	4.8	0.548	0.762	0.237	0.186	0.041	0.032
2	10.00	4.6	1.6	3.4	0.530	0.808	0.189	0.141	0.034	0.026
3	30.00	5.9	1.8	4.7	0.543	0.863	0.137	0.096	0.025	0.018
4	47.50	6.6	1.6	4.3	0.572	0.879	0.133	0.099	0.026	0.019
5	50.00	6.7	1.6	5.7	0.590	0.857	0.159	0.125	0.030	0.024
6	52.50	6.9	1.6	6.5	0.607	0.835	0.187	0.155	0.035	0.029
7	55.00	6.9	1.5	6.8	0.615	0.836	0.189	0.158	0.036	0.030
8	57.50	7.0	1.5	7.6	0.601	0.855	0.168	0.139	0.032	0.026
9	70.00	7.6	1.4	10.1	0.587	0.899	0.129	0.116	0.024	0.021
10	90.00	7.8	1.0	11.7	0.565	0.920	0.135	0.135	0.023	0.023
11	95.00	7.8	0.8	7.2	0.548	0.931	0.130	0.130	0.021	0.021

TABLE VII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR ROTOR 18

(i) 90 Percent design speed; reading 921

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	24.442	23.871	-0.0	53.5	67.7	54.2	288.9	1.232	10.05	1.746
2	23.906	23.383	-0.0	50.8	66.2	50.0	288.8	1.224	10.12	1.769
3	21.656	21.433	-0.0	49.8	62.4	45.1	288.0	1.200	10.14	1.731
4	19.591	19.726	-0.0	51.1	59.6	36.1	288.0	1.193	10.14	1.730
5	19.289	19.482	-0.0	52.1	59.2	35.9	287.9	1.193	10.14	1.711
6	18.984	19.238	-0.0	53.3	58.8	34.9	287.9	1.194	10.14	1.697
7	18.677	18.994	-0.0	53.7	58.4	33.2	287.9	1.194	10.14	1.696
8	18.367	18.750	-0.0	53.0	58.1	32.6	287.9	1.190	10.14	1.698
9	16.777	17.531	-0.0	52.8	56.3	24.7	287.9	1.185	10.14	1.707
10	14.079	15.580	-0.0	55.7	53.5	4.6	287.9	1.194	10.14	1.774
11	13.383	15.093	-0.0	58.3	52.5	-7.8	288.0	1.207	10.14	1.850

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	152.2	222.5	400.9	226.1	152.2	132.3	-0.0	178.9	370.9	362.2
2	160.1	231.9	396.3	228.3	160.1	146.6	-0.0	179.6	362.5	354.6
3	171.4	230.2	370.3	210.5	171.4	148.6	-0.0	175.8	328.2	324.9
4	174.3	242.1	344.6	188.2	174.3	152.0	-0.0	188.4	297.2	299.3
5	174.4	239.6	340.6	181.8	174.4	147.3	-0.0	189.0	292.6	295.5
6	174.0	239.1	336.2	174.2	174.0	142.9	-0.0	191.7	287.6	291.5
7	173.5	240.6	331.4	170.1	173.5	142.3	-0.0	194.0	282.3	287.1
8	173.4	240.4	328.4	171.8	173.4	144.7	-0.0	192.0	278.8	284.6
9	168.7	246.2	304.3	163.8	168.7	148.8	-0.0	196.2	253.2	264.6
10	157.8	270.8	265.2	153.3	157.8	152.8	-0.0	223.6	213.1	235.8
11	155.7	294.1	255.8	156.2	155.7	154.7	-0.0	250.1	202.9	228.8

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	0.456	0.610	1.201	0.619	0.456	0.362	0.869	1.518
2	0.481	0.640	1.190	0.630	0.481	0.405	0.916	1.515
3	0.517	0.643	1.117	0.588	0.517	0.415	0.867	1.513
4	0.527	0.681	1.041	0.529	0.527	0.428	0.872	1.538
5	0.527	0.674	1.029	0.511	0.527	0.414	0.845	1.537
6	0.526	0.672	1.015	0.490	0.526	0.401	0.821	1.536
7	0.524	0.676	1.001	0.478	0.524	0.400	0.820	1.536
8	0.524	0.677	0.992	0.484	0.524	0.408	0.835	1.530
9	0.509	0.696	0.917	0.463	0.509	0.421	0.882	1.435
10	0.474	0.771	0.797	0.436	0.474	0.435	0.968	1.246
11	0.467	0.841	0.768	0.447	0.467	0.442	0.994	1.188

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	5.5	2.7	5.8	0.563	0.742	0.264	0.209	0.045	0.035
2	10.00	5.4	2.4	3.3	0.551	0.791	0.213	0.162	0.039	0.029
3	30.00	6.8	2.7	5.2	0.554	0.849	0.156	0.113	0.029	0.021
4	47.50	7.6	2.5	5.0	0.584	0.878	0.137	0.099	0.026	0.019
5	50.00	7.6	2.5	6.3	0.596	0.861	0.158	0.122	0.030	0.023
6	52.50	7.7	2.4	7.0	0.614	0.841	0.184	0.149	0.035	0.028
7	55.00	7.8	2.4	7.0	0.620	0.841	0.188	0.155	0.036	0.029
8	57.50	7.9	2.4	8.2	0.608	0.859	0.167	0.136	0.031	0.025
9	70.00	8.3	2.2	10.3	0.596	0.893	0.141	0.129	0.026	0.024
10	90.00	8.8	1.9	12.2	0.572	0.917	0.144	0.144	0.024	0.024
11	95.00	8.7	1.7	7.0	0.556	0.929	0.138	0.138	0.022	0.022

TABLE VII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR ROTOR 18

(j) 90 Percent design speed; reading 922

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	24.442	23.871	-0.0	54.9	68.1	54.9	289.0	1.232	10.05	1.738
2	23.906	23.383	-0.0	52.3	66.7	50.5	288.9	1.227	10.12	1.772
3	21.656	21.433	-0.0	50.6	63.0	45.6	288.0	1.200	10.14	1.726
4	19.591	19.726	-0.0	51.5	60.2	36.6	287.9	1.194	10.14	1.731
5	19.289	19.482	-0.0	52.5	59.7	36.3	287.9	1.194	10.14	1.711
6	18.984	19.238	-0.0	53.8	59.5	35.8	287.9	1.194	10.14	1.696
7	18.677	18.994	-0.0	54.4	59.1	34.0	287.9	1.195	10.14	1.695
8	18.367	18.750	-0.0	53.7	58.7	33.1	287.7	1.191	10.14	1.696
9	16.777	17.531	-0.0	53.6	57.1	25.4	287.9	1.188	10.14	1.707
10	14.079	15.580	-0.0	56.0	54.1	4.6	287.9	1.194	10.14	1.777
11	13.383	15.093	-0.0	57.9	53.1	-5.1	287.9	1.203	10.13	1.812

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	148.7	221.0	399.3	221.2	148.7	127.1	-0.0	180.8	370.5	361.8
2	156.3	231.6	395.0	222.4	156.3	141.6	-0.0	183.3	362.8	354.8
3	167.2	228.5	367.9	207.1	167.2	145.0	-0.0	176.5	327.8	324.4
4	170.1	240.1	342.2	186.1	170.1	149.4	-0.0	188.0	296.9	298.9
5	170.2	237.6	337.8	179.4	170.2	144.7	-0.0	188.5	291.7	294.6
6	169.7	236.7	334.1	172.2	169.7	139.7	-0.0	191.0	287.8	291.7
7	169.2	238.6	329.6	167.3	169.2	138.8	-0.0	194.1	282.8	287.6
8	169.0	238.3	325.7	168.6	169.0	141.2	-0.0	191.9	278.3	284.1
9	164.6	244.5	302.9	160.8	164.6	145.2	-0.0	196.8	254.3	265.8
10	154.3	269.8	263.2	151.3	154.3	150.8	-0.0	223.7	213.2	236.3
11	152.2	285.6	253.5	152.2	152.2	151.6	-0.0	242.0	202.7	228.6

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	0.445	0.605	1.195	0.606	0.445	0.348	0.855	1.527
2	0.469	0.638	1.185	0.613	0.469	0.390	0.906	1.518
3	0.504	0.637	1.109	0.578	0.504	0.405	0.867	1.526
4	0.513	0.675	1.032	0.523	0.513	0.420	0.878	1.554
5	0.513	0.667	1.019	0.504	0.513	0.406	0.859	1.551
6	0.512	0.664	1.008	0.483	0.512	0.392	0.823	1.556
7	0.510	0.670	0.994	0.470	0.510	0.390	0.820	1.549
8	0.510	0.670	0.982	0.474	0.510	0.397	0.835	1.536
9	0.496	0.691	0.912	0.454	0.496	0.410	0.882	1.450
10	0.463	0.768	0.790	0.430	0.463	0.429	0.977	1.252
11	0.457	0.815	0.761	0.434	0.457	0.433	0.996	1.191

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	5.9	3.1	6.5	0.575	0.736	0.271	0.215	0.045	0.036
2	10.00	5.9	2.9	3.7	0.567	0.781	0.226	0.174	0.041	0.031
3	30.00	7.3	3.2	5.7	0.561	0.843	0.163	0.119	0.030	0.022
4	47.50	8.1	3.1	5.4	0.586	0.874	0.143	0.103	0.027	0.020
5	50.00	8.2	3.0	6.7	0.600	0.856	0.166	0.128	0.031	0.024
6	52.50	8.4	3.1	7.8	0.617	0.838	0.189	0.152	0.035	0.028
7	55.00	8.5	3.0	7.7	0.627	0.836	0.196	0.161	0.037	0.030
8	57.50	8.5	3.0	8.7	0.615	0.855	0.175	0.144	0.033	0.027
9	70.00	9.1	2.9	11.0	0.605	0.880	0.161	0.147	0.030	0.027
10	90.00	9.4	2.5	12.3	0.577	0.922	0.137	0.137	0.023	0.023
11	95.00	9.3	2.3	9.8	0.562	0.914	0.166	0.166	0.027	0.027

TABLE VII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR ROTOR 18

(k) 80 Percent design speed; reading 915

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	24.442	23.871	-0.0	56.1	70.5	55.7	289.8	1.182	10.07	1.547
2	23.906	23.383	-0.0	53.2	69.0	52.1	289.0	1.181	10.13	1.550
3	21.656	21.433	-0.0	52.2	65.8	47.1	287.9	1.164	10.14	1.529
4	19.591	19.726	-0.0	53.7	63.4	37.8	287.8	1.160	10.14	1.542
5	19.289	19.482	-0.0	53.9	63.0	37.9	287.8	1.159	10.14	1.529
6	18.984	19.238	-0.0	54.5	62.6	37.3	287.8	1.156	10.14	1.520
7	18.677	18.994	-0.0	55.3	62.3	36.0	287.8	1.157	10.14	1.517
8	18.367	18.750	-0.0	55.5	61.8	34.0	287.8	1.157	10.14	1.522
9	16.777	17.531	-0.0	53.2	60.0	23.8	287.8	1.153	10.14	1.563
10	14.079	15.580	-0.0	55.0	56.4	4.9	287.8	1.156	10.14	1.606
11	13.383	15.093	-0.0	57.1	55.3	-4.6	287.8	1.165	10.13	1.635

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	118.2	198.4	354.9	196.4	118.2	110.8	-0.0	164.6	334.6	326.8
2	125.6	203.4	350.0	198.4	125.6	121.8	-0.0	162.9	326.7	319.6
3	133.2	201.9	324.6	182.0	133.2	123.8	-0.0	159.5	296.0	292.9
4	134.2	213.0	299.5	159.6	134.2	126.1	-0.0	171.7	267.7	269.6
5	134.4	210.3	296.1	157.2	134.4	124.1	-0.0	169.8	263.8	266.4
6	134.3	209.3	292.1	152.9	134.3	121.7	-0.0	170.3	259.4	262.9
7	134.2	210.1	288.4	147.9	134.2	119.7	-0.0	172.7	255.2	259.5
8	134.4	212.6	284.8	145.2	134.4	120.5	-0.0	175.2	251.0	256.3
9	132.2	225.1	264.7	147.5	132.2	135.0	-0.0	180.2	229.3	239.6
10	127.9	245.4	231.2	141.1	127.9	140.6	-0.0	201.1	192.6	213.1
11	126.7	259.0	222.4	141.2	126.7	140.7	-0.0	217.5	182.8	236.1

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	0.351	0.551	1.053	0.545	0.351	0.308	0.937	1.512
2	0.374	0.567	1.041	0.553	0.374	0.339	0.969	1.500
3	0.398	0.568	0.969	0.511	0.398	0.348	0.929	1.521
4	0.401	0.602	0.895	0.451	0.401	0.357	0.940	1.479
5	0.402	0.595	0.885	0.445	0.402	0.351	0.923	1.467
6	0.401	0.592	0.873	0.433	0.401	0.344	0.906	1.451
7	0.401	0.594	0.862	0.418	0.401	0.339	0.892	1.435
8	0.401	0.602	0.851	0.411	0.401	0.341	0.896	1.420
9	0.395	0.641	0.791	0.420	0.395	0.385	1.021	1.336
10	0.382	0.703	0.690	0.404	0.382	0.403	1.099	1.147
11	0.378	0.744	0.663	0.405	0.378	0.404	1.110	1.088

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	8.3	5.6	7.3	0.579	0.729	0.268	0.233	0.044	0.038
2	10.00	8.2	5.2	5.4	0.563	0.736	0.265	0.232	0.046	0.040
3	30.00	10.1	6.0	7.3	0.566	0.785	0.224	0.197	0.040	0.035
4	47.50	11.3	6.3	6.7	0.603	0.822	0.207	0.192	0.039	0.036
5	50.00	11.4	6.2	8.3	0.603	0.813	0.219	0.207	0.040	0.038
6	52.50	11.5	6.2	9.3	0.611	0.813	0.221	0.211	0.040	0.039
7	55.00	11.6	6.2	9.7	0.624	0.807	0.234	0.225	0.043	0.041
8	57.50	11.6	6.1	9.5	0.628	0.811	0.234	0.227	0.043	0.042
9	70.00	12.0	5.8	9.3	0.585	0.888	0.156	0.155	0.029	0.029
10	90.00	11.7	4.8	12.6	0.545	0.929	0.128	0.128	0.022	0.022
11	95.00	11.4	4.5	10.2	0.532	0.916	0.169	0.169	0.027	0.027

TABLE VII. - Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 18

(*l*) 70 Percent design speed; reading 905

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.442	23.871	-0.0	38.2	65.8	52.7	288.7	1.103	10.08	1.333
2	23.906	23.383	-0.0	36.7	64.1	50.6	288.4	1.098	10.13	1.329
3	21.656	21.433	-0.0	38.0	60.6	45.2	288.1	1.096	10.14	1.335
4	19.591	19.726	-0.0	41.0	57.9	37.3	288.0	1.100	10.14	1.345
5	19.289	19.482	-0.0	42.1	57.5	35.9	288.0	1.101	10.14	1.345
6	18.984	19.238	-0.0	44.1	57.1	34.8	288.1	1.103	10.14	1.334
7	18.677	18.994	-0.0	45.0	56.7	33.7	288.1	1.104	10.14	1.331
8	18.367	18.750	-0.0	44.0	56.3	32.8	287.9	1.102	10.14	1.335
9	16.777	17.531	-0.0	44.8	54.5	23.6	288.0	1.103	10.14	1.371
10	14.079	15.580	-0.0	49.9	51.0	2.4	288.0	1.116	10.14	1.431
11	13.383	15.093	-0.0	52.0	50.0	-3.8	288.0	1.120	10.13	1.447

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	130.0	170.7	316.8	221.6	130.0	134.1	-0.0	105.7	288.8	282.0
2	136.7	175.4	313.4	221.2	136.7	140.6	-0.0	104.9	282.0	275.8
3	144.2	179.4	293.5	200.6	144.2	141.3	-0.0	110.6	255.7	253.0
4	145.4	189.6	273.7	179.9	145.4	143.1	-0.0	124.4	231.8	233.4
5	145.3	190.7	270.2	174.5	145.3	141.4	-0.0	127.9	227.8	230.1
6	145.1	190.0	266.8	166.0	145.1	136.4	-0.0	132.2	223.9	226.9
7	144.9	190.3	264.0	161.8	144.9	134.6	-0.0	134.6	220.7	224.5
8	144.6	191.1	260.6	163.4	144.6	137.4	-0.0	132.9	216.8	221.3
9	141.4	204.2	243.6	158.2	141.4	144.9	-0.0	143.9	198.3	207.2
10	134.6	232.4	214.0	149.8	134.6	149.7	-0.0	177.8	166.4	184.2
11	132.7	238.6	206.4	147.2	132.7	146.9	-0.0	188.1	158.1	178.3

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS
RP	IN	OUT	IN	OUT	IN	OUT	VEL R MACH NO
1	0.388	0.489	0.944	0.634	0.388	0.384	1.331 1.252
2	0.408	0.504	0.936	0.636	0.408	0.404	1.328 1.233
3	0.432	0.517	0.879	0.578	0.432	0.407	0.980 1.223
4	0.435	0.547	0.820	0.519	0.435	0.413	0.985 1.203
5	0.435	0.550	0.809	0.503	0.435	0.408	0.973 1.190
6	0.434	0.547	0.799	0.478	0.434	0.393	0.940 1.177
7	0.434	0.548	0.791	0.466	0.434	0.388	0.929 1.168
8	0.433	0.551	0.780	0.471	0.433	0.396	0.950 1.155
9	0.423	0.591	0.729	0.458	0.423	0.419	1.025 1.095
10	0.402	0.676	0.639	0.435	0.402	0.435	1.112 0.946
11	0.396	0.694	0.616	0.428	0.396	0.427	1.107 0.900

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	3.5	0.7	4.4	0.396	0.828	0.124	0.122	0.022	0.021
2	10.00	3.3	0.3	3.8	0.388	0.859	0.099	0.098	0.018	0.018
3	30.00	4.9	0.8	5.4	0.414	0.901	0.075	0.075	0.014	0.014
4	47.50	5.9	0.8	6.1	0.450	0.887	0.100	0.100	0.019	0.019
5	50.00	5.9	0.7	6.3	0.465	0.877	0.112	0.112	0.021	0.021
6	52.50	5.9	0.6	6.8	0.492	0.832	0.159	0.159	0.030	0.030
7	55.00	6.1	0.6	7.5	0.503	0.817	0.177	0.177	0.033	0.033
8	57.50	6.1	0.5	8.3	0.488	0.847	0.149	0.149	0.028	0.028
9	70.00	6.5	0.3	9.2	0.474	0.912	0.098	0.098	0.018	0.018
10	90.00	6.3	-0.5	10.1	0.448	0.932	0.105	0.105	0.018	0.018
11	95.00	6.2	-0.8	11.0	0.442	0.925	0.129	0.129	0.021	0.021

TABLE VII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR ROTOR 18

(m) 70 Percent design speed; reading 906

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.442	23.871	-0.0	41.4	66.7	52.8	288.5	1.111	10.08	1.354
2	23.906	23.383	-0.0	40.8	65.1	50.4	288.3	1.106	10.14	1.352
3	21.656	21.433	-0.0	40.8	61.5	45.2	288.2	1.100	10.14	1.353
4	19.591	19.726	-0.0	43.4	58.8	36.6	288.1	1.105	10.14	1.364
5	19.289	19.482	-0.0	44.6	58.5	35.4	288.1	1.105	10.14	1.362
6	18.984	19.238	-0.0	46.1	58.1	34.9	288.0	1.106	10.14	1.351
7	18.677	18.994	-0.0	47.1	57.7	33.7	288.0	1.107	10.14	1.345
8	18.367	18.750	-0.0	46.2	57.4	33.0	288.1	1.105	10.14	1.347
9	16.777	17.531	-0.0	46.8	55.6	23.2	288.0	1.107	10.14	1.381
10	14.079	15.580	-0.0	51.0	52.2	2.8	287.9	1.116	10.14	1.432
11	13.383	15.093	-0.0	53.5	51.3	-5.0	287.9	1.123	10.13	1.453

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	124.4	170.8	314.1	211.7	124.4	128.1	-0.0	113.1	288.4	281.7
2	131.4	176.4	311.9	209.4	131.4	133.5	-0.0	115.3	282.8	276.6
3	138.8	178.7	291.0	192.2	138.8	135.4	-0.0	116.7	255.8	253.1
4	140.0	189.7	270.2	171.7	140.0	137.9	-0.0	130.3	231.0	232.6
5	139.7	190.4	267.2	166.5	139.7	135.6	-0.0	133.5	227.7	230.0
6	139.7	188.8	264.3	159.5	139.7	130.8	-0.0	136.1	224.3	227.3
7	139.2	188.8	260.6	154.4	139.2	128.5	-0.0	138.4	220.3	224.3
8	139.0	189.3	257.8	156.3	139.0	131.1	-0.0	136.5	217.1	221.6
9	135.7	202.7	240.3	150.9	135.7	138.7	-0.0	147.8	198.3	210.2
10	128.8	227.7	210.3	143.3	128.8	143.2	-0.0	177.1	166.3	184.3
11	126.7	236.8	202.4	141.4	126.7	140.9	-0.0	190.4	157.9	178.1

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.370	0.487	0.935	0.604	0.370	0.365	1.030	1.271
2	0.392	0.505	0.930	0.600	0.392	0.382	1.016	1.258
3	0.415	0.514	0.870	0.553	0.415	0.389	0.975	1.239
4	0.419	0.546	0.808	0.494	0.419	0.397	0.985	1.210
5	0.418	0.548	0.799	0.479	0.418	0.390	0.971	1.202
6	0.418	0.543	0.790	0.459	0.418	0.376	0.936	1.192
7	0.416	0.543	0.779	0.444	0.416	0.369	0.923	1.178
8	0.415	0.545	0.771	0.450	0.415	0.377	0.944	1.169
9	0.405	0.585	0.718	0.436	0.405	0.401	1.023	1.106
10	0.384	0.661	0.627	0.416	0.384	0.415	1.112	0.954
11	0.378	0.687	0.604	0.410	0.378	0.409	1.112	0.908

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	4.4	1.7	4.4	0.429	0.819	0.140	0.137	0.024	0.024
2	10.00	4.3	1.3	3.6	0.432	0.849	0.114	0.112	0.020	0.020
3	30.00	5.8	1.8	5.3	0.443	0.902	0.079	0.078	0.014	0.014
4	47.50	6.7	1.7	5.4	0.479	0.888	0.106	0.106	0.020	0.020
5	50.00	6.9	1.7	5.8	0.494	0.876	0.120	0.120	0.023	0.023
6	52.50	7.0	1.7	6.9	0.516	0.846	0.152	0.152	0.029	0.029
7	55.00	7.1	1.6	7.4	0.529	0.825	0.177	0.177	0.033	0.033
8	57.50	7.2	1.6	8.5	0.513	0.843	0.160	0.160	0.030	0.030
9	70.00	7.6	1.4	8.8	0.500	0.906	0.110	0.110	0.021	0.021
10	90.00	7.5	0.7	10.4	0.469	0.928	0.116	0.116	0.020	0.020
11	95.00	7.4	0.5	9.9	0.462	0.915	0.153	0.153	0.025	0.025

TABLE VII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR ROTOR 18

(n) 70 Percent design speed; reading 907

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.442	23.871	-0.0	45.4	68.2	53.4	288.6	1.122	10.08	1.378
2	23.906	23.383	-0.0	44.4	66.6	50.0	288.4	1.118	10.13	1.386
3	21.656	21.433	-0.0	44.5	63.2	46.3	288.1	1.109	10.13	1.367
4	19.591	19.726	0.0	46.7	60.7	36.4	288.0	1.111	10.14	1.386
5	19.289	19.482	-0.0	47.4	60.3	35.6	288.0	1.111	10.13	1.381
6	18.984	19.238	-0.0	48.5	59.9	35.4	288.0	1.111	10.14	1.366
7	18.677	18.994	-0.0	49.9	59.5	34.7	288.1	1.111	10.14	1.358
8	18.367	18.750	-0.0	49.3	59.2	33.6	288.0	1.109	10.14	1.359
9	16.777	17.531	-0.0	49.2	57.5	23.8	288.0	1.109	10.14	1.385
10	14.079	15.580	-0.0	52.4	54.1	3.5	288.0	1.115	10.14	1.429
11	13.383	15.093	-0.0	55.0	53.1	-5.5	287.9	1.123	10.13	1.454

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	115.8	170.4	311.3	200.4	115.8	119.6	-0.0	121.4	289.0	282.2
2	122.3	178.0	307.8	198.0	122.3	127.1	-0.0	124.5	282.4	276.3
3	129.4	175.2	287.0	180.7	129.4	124.9	-0.0	122.9	256.1	253.5
4	130.0	189.1	265.5	161.2	130.0	129.8	0.0	137.5	231.5	233.1
5	129.9	188.5	262.4	157.0	129.9	127.6	-0.0	138.8	227.9	230.2
6	129.7	186.0	258.8	151.1	129.7	123.1	-0.0	139.4	223.9	226.9
7	129.7	185.2	255.9	145.1	129.7	119.3	-0.0	141.7	220.5	224.3
8	129.2	185.8	252.5	145.5	129.2	121.2	-0.0	140.9	216.8	221.4
9	126.2	197.5	234.6	141.0	126.2	129.0	-0.0	149.6	197.7	206.6
10	119.8	220.9	204.3	135.0	119.8	134.7	-0.0	175.0	165.5	183.2
11	118.2	232.4	196.9	133.9	118.2	133.3	-0.0	190.3	157.4	177.6

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS
RP	IN	OUT	IN	OUT	IN	OUT	VEL R MACH NO
1	0.344	0.483	0.925	0.568	0.344	0.339	1.033 1.308
2	0.364	0.507	0.916	0.564	0.364	0.362	1.040 1.288
3	0.386	0.501	0.856	0.517	0.386	0.357	0.965 1.268
4	0.388	0.542	0.792	0.462	0.388	0.372	0.999 1.237
5	0.388	0.541	0.783	0.450	0.388	0.366	0.982 1.227
6	0.387	0.533	0.772	0.433	0.387	0.353	0.950 1.212
7	0.387	0.531	0.763	0.416	0.387	0.342	0.920 1.201
8	0.386	0.533	0.753	0.418	0.386	0.348	0.938 1.189
9	0.376	0.569	0.699	0.406	0.376	0.371	1.022 1.120
10	0.357	0.639	0.608	0.391	0.357	0.390	1.125 0.964
11	0.352	0.673	0.586	0.388	0.352	0.386	1.128 0.918

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	5.9	3.2	5.0	0.468	0.786	0.183	0.179	0.032	0.031
2	10.00	5.8	2.8	3.3	0.470	0.828	0.146	0.143	0.026	0.026
3	30.00	7.5	3.4	6.4	0.481	0.856	0.127	0.127	0.023	0.023
4	47.50	8.6	3.6	5.2	0.516	0.879	0.124	0.124	0.024	0.024
5	50.00	8.7	3.6	6.0	0.525	0.868	0.137	0.137	0.026	0.026
6	52.50	8.8	3.5	7.5	0.541	0.839	0.171	0.171	0.032	0.032
7	55.00	8.9	3.5	8.5	0.559	0.821	0.193	0.193	0.036	0.036
8	57.50	9.0	3.5	9.1	0.549	0.838	0.177	0.177	0.033	0.033
9	70.00	9.4	3.3	9.4	0.532	0.892	0.134	0.134	0.025	0.025
10	90.00	9.4	2.5	11.1	0.492	0.930	0.118	0.118	0.020	0.020
11	95.00	9.3	2.3	9.4	0.485	0.921	0.150	0.150	0.024	0.024

TABLE VII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR ROTOR 18

(o) 70 Percent design speed; reading 947

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.442	23.871	-0.0	50.4	69.7	54.4	288.6	1.133	10.09	1.387
2	23.906	23.383	-0.0	47.9	68.2	50.8	288.4	1.128	10.13	1.395
3	21.656	21.433	0.0	47.2	64.9	47.2	288.1	1.115	10.13	1.374
4	19.591	19.726	-0.0	49.1	62.5	37.5	288.0	1.115	10.14	1.389
5	19.289	19.482	-0.0	49.6	62.1	37.2	288.0	1.115	10.14	1.381
6	18.984	19.238	0.0	50.5	61.8	36.5	288.1	1.114	10.14	1.374
7	18.677	18.994	0.0	51.9	61.4	35.6	287.9	1.114	10.14	1.367
8	18.367	18.750	-0.0	51.8	61.1	34.5	288.0	1.113	10.14	1.365
9	16.777	17.531	-0.0	50.8	59.3	23.9	288.0	1.114	10.14	1.398
10	14.079	15.580	0.	53.2	55.9	4.3	288.0	1.117	10.14	1.436
11	13.383	15.093	-0.0	55.6	54.9	-5.2	288.0	1.125	10.13	1.466

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	107.5	170.6	309.1	186.5	107.5	108.7	-0.0	131.5	289.8	283.1
2	113.0	176.9	304.8	187.7	113.0	118.5	-0.0	131.3	283.0	276.8
3	119.7	172.9	282.7	172.7	119.7	117.4	0.0	126.9	256.1	253.5
4	120.7	185.5	261.4	153.3	120.7	121.6	-0.0	140.2	231.9	233.5
5	120.7	183.9	258.0	149.6	120.7	119.2	-0.0	140.0	228.1	230.4
6	120.5	183.2	255.0	145.0	120.5	116.5	0.0	141.4	224.7	227.7
7	120.3	183.0	251.7	138.9	120.3	113.0	0.0	144.0	221.0	224.8
8	120.0	183.2	248.2	137.6	120.0	113.4	-0.0	143.9	217.2	221.7
9	117.8	196.7	230.9	135.9	117.8	124.2	-0.0	152.5	198.6	207.5
10	112.7	217.3	200.8	130.4	112.7	130.0	0.	174.1	166.2	185.9
11	111.3	230.8	193.6	130.9	111.3	130.3	-0.0	190.5	158.4	178.7

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.319	0.481	0.917	0.526	0.319	0.307	1.011	1.342
2	0.336	0.501	0.905	0.532	0.336	0.336	1.048	1.324
3	0.356	0.493	0.841	0.492	0.356	0.335	0.981	1.297
4	0.359	0.531	0.778	0.438	0.359	0.348	1.007	1.264
5	0.359	0.526	0.768	0.428	0.359	0.341	0.988	1.251
6	0.359	0.524	0.759	0.415	0.359	0.333	0.967	1.240
7	0.358	0.524	0.749	0.397	0.358	0.323	0.939	1.227
8	0.357	0.524	0.739	0.394	0.357	0.325	0.945	1.213
9	0.351	0.565	0.687	0.390	0.351	0.357	1.054	1.144
10	0.335	0.628	0.597	0.377	0.335	0.376	1.154	0.981
11	0.331	0.668	0.575	0.379	0.331	0.377	1.171	0.937

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	7.4	4.7	6.0	0.518	0.735	0.245	0.240	0.041	0.040
2	10.00	7.5	4.5	4.1	0.505	0.778	0.204	0.200	0.036	0.036
3	30.00	9.3	5.2	7.3	0.505	0.825	0.165	0.164	0.029	0.029
4	47.50	10.5	5.4	6.4	0.541	0.853	0.159	0.159	0.030	0.030
5	50.00	10.5	5.4	7.6	0.547	0.843	0.173	0.173	0.032	0.032
6	52.50	10.7	5.4	8.6	0.559	0.836	0.182	0.182	0.034	0.034
7	55.00	10.8	5.3	9.3	0.578	0.818	0.207	0.207	0.038	0.038
8	57.50	10.9	5.3	10.0	0.576	0.820	0.208	0.208	0.038	0.038
9	70.00	11.3	5.1	9.5	0.549	0.884	0.154	0.154	0.029	0.029
10	90.00	11.1	4.3	12.0	0.505	0.929	0.124	0.124	0.021	0.021
11	95.00	11.1	4.1	9.7	0.492	0.926	0.146	0.146	0.023	0.023

TABLE VII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR ROTOR 18

(p) 70 Percent design speed; reading 904

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.442	23.871	-0.0	61.0	71.7	56.9	288.7	1.149	10.09	1.383
2	23.906	23.383	-0.0	56.3	70.2	53.9	288.4	1.142	10.13	1.376
3	21.656	21.433	-0.0	50.9	66.9	47.1	288.1	1.121	10.13	1.378
4	19.591	19.726	-0.0	50.2	64.3	37.8	288.0	1.117	10.14	1.393
5	19.289	19.482	-0.0	51.3	63.9	38.1	288.0	1.116	10.14	1.382
6	18.984	19.238	-0.0	52.4	63.5	37.9	288.0	1.114	10.14	1.371
7	18.677	18.994	-0.0	53.5	63.1	36.7	287.7	1.114	10.13	1.364
8	18.367	18.750	-0.0	54.1	62.8	35.8	288.0	1.114	10.14	1.363
9	16.777	17.531	-0.0	52.6	60.9	24.6	288.0	1.113	10.13	1.394
10	14.079	15.580	-0.0	54.4	57.5	4.1	288.0	1.117	10.14	1.436
11	13.383	15.093	-0.0	56.5	56.3	-5.0	288.0	1.124	10.13	1.456

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	95.8	174.5	304.4	154.7	95.8	84.6	-0.0	152.6	288.9	282.2
2	101.9	173.3	300.1	163.4	101.9	96.3	-0.0	144.1	282.3	276.1
3	109.2	174.2	278.5	161.3	109.2	109.8	-0.0	135.3	256.1	253.5
4	111.4	184.2	256.7	147.3	111.4	116.5	-0.0	142.7	231.3	232.9
5	111.8	181.4	254.0	144.1	111.8	113.5	-0.0	141.6	228.1	230.4
6	111.8	179.4	250.6	138.7	111.8	109.5	-0.0	142.1	224.3	227.3
7	111.8	179.5	246.9	133.1	111.8	106.7	-0.0	144.3	220.1	223.8
8	111.8	180.0	244.4	130.2	111.8	105.6	-0.0	145.7	217.3	221.8
9	110.2	193.0	226.7	129.0	110.2	117.3	-0.0	153.3	198.1	207.0
10	105.9	215.1	197.1	125.6	105.9	125.3	-0.0	174.9	166.2	183.9
11	105.4	227.0	189.9	125.9	105.4	125.4	-0.0	189.2	158.0	178.2

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS
RP	IN	OUT	IN	OUT	IN	OUT	VEL R MACH NO
1	0.283	0.489	0.901	0.434	0.283	0.237	0.883 1.381
2	0.302	0.488	0.890	0.460	0.302	0.271	0.945 1.360
3	0.324	0.495	0.827	0.459	0.324	0.312	1.005 1.330
4	0.331	0.526	0.763	0.421	0.331	0.333	1.046 1.284
5	0.332	0.518	0.755	0.412	0.332	0.324	1.015 1.275
6	0.332	0.512	0.745	0.396	0.332	0.313	0.979 1.260
7	0.332	0.513	0.734	0.380	0.332	0.305	0.955 1.243
8	0.332	0.514	0.726	0.372	0.332	0.302	0.945 1.235
9	0.327	0.554	0.673	0.370	0.327	0.337	1.064 1.158
10	0.314	0.621	0.585	0.362	0.314	0.362	1.182 0.994
11	0.313	0.656	0.564	0.364	0.313	0.362	1.190 0.944

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	9.5	6.7	8.5	0.635	0.651	0.358	0.351	0.056	0.055
2	10.00	9.4	6.4	7.1	0.590	0.674	0.329	0.324	0.055	0.054
3	30.00	11.2	7.2	7.2	0.546	0.795	0.207	0.206	0.036	0.036
4	47.50	12.2	7.2	6.6	0.558	0.851	0.167	0.167	0.031	0.031
5	50.00	12.3	7.1	8.5	0.563	0.838	0.184	0.184	0.034	0.034
6	52.50	12.4	7.1	10.0	0.578	0.826	0.200	0.200	0.036	0.036
7	55.00	12.4	7.0	10.4	0.594	0.813	0.220	0.220	0.040	0.040
8	57.50	12.6	7.0	11.3	0.601	0.813	0.223	0.223	0.040	0.040
9	70.00	12.9	6.7	10.2	0.572	0.883	0.160	0.160	0.030	0.030
10	90.00	12.8	5.9	11.8	0.521	0.932	0.124	0.124	0.021	0.021
11	95.00	12.5	5.5	9.8	0.507	0.912	0.181	0.181	0.029	0.029

TABLE VII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR ROTOR 18

(q) 60 Percent design speed; reading 934

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	24.442	23.871	-0.0	57.6	71.8	55.7	288.8	1.104	10.10	1.276
2	23.906	23.383	-0.0	53.0	70.2	53.1	288.4	1.100	10.13	1.279
3	21.656	21.433	-0.0	48.8	67.1	46.7	288.1	1.087	10.14	1.271
4	19.591	19.726	-0.0	49.5	64.5	37.7	288.1	1.085	10.13	1.278
5	19.289	19.482	-0.0	49.9	64.2	37.6	288.0	1.084	10.14	1.272
6	18.984	19.238	-0.0	51.1	63.8	37.4	288.0	1.083	10.13	1.264
7	18.677	18.994	-0.0	52.4	63.5	36.4	288.1	1.083	10.13	1.259
8	18.367	18.750	-0.0	52.7	63.0	35.3	288.0	1.083	10.13	1.257
9	16.777	17.531	-0.0	51.7	61.3	24.8	287.9	1.083	10.14	1.277
10	14.079	15.580	-0.0	53.3	57.8	3.9	287.8	1.087	10.14	1.314
11	13.383	15.093	-0.0	55.6	56.6	-4.5	287.9	1.091	10.13	1.326

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	81.1	147.9	259.9	140.7	81.1	79.2	-0.0	124.8	246.9	241.1
2	87.0	147.8	256.9	148.1	87.0	89.0	-0.0	118.0	241.7	236.4
3	92.5	149.4	237.7	143.3	92.5	98.3	-0.0	112.4	218.9	216.7
4	94.2	157.8	219.2	129.6	94.2	102.5	-0.0	119.9	197.9	199.2
5	94.3	156.1	216.4	126.7	94.3	100.5	-0.0	119.5	194.8	196.7
6	94.3	154.4	213.8	122.2	94.3	97.0	-0.0	120.2	191.9	194.5
7	94.1	154.3	210.6	117.0	94.1	94.2	-0.0	122.2	188.4	191.6
8	94.4	154.4	207.9	114.7	94.4	93.6	-0.0	122.8	185.3	189.2
9	92.9	165.2	193.2	112.8	92.9	102.4	-0.0	129.7	169.4	177.0
10	89.6	186.8	168.2	111.9	89.6	111.6	-0.0	149.8	142.3	157.4
11	89.2	195.0	161.8	110.6	89.2	110.3	-0.0	160.9	135.0	152.2

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	0.239	0.420	0.767	0.400	0.239	0.225	0.977	1.180
2	0.257	0.421	0.760	0.422	0.257	0.254	1.023	1.162
3	0.274	0.429	0.704	0.411	0.274	0.282	1.063	1.136
4	0.279	0.454	0.649	0.373	0.279	0.295	1.089	1.099
5	0.279	0.449	0.641	0.365	0.279	0.289	1.066	1.088
6	0.279	0.445	0.633	0.352	0.279	0.279	1.029	1.079
7	0.279	0.444	0.624	0.337	0.279	0.271	1.001	1.064
8	0.280	0.445	0.616	0.330	0.280	0.270	0.992	1.052
9	0.275	0.477	0.572	0.326	0.275	0.296	1.102	0.991
10	0.265	0.542	0.498	0.325	0.265	0.324	1.245	0.851
11	0.264	0.566	0.479	0.321	0.264	0.320	1.236	0.807

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	9.6	6.9	7.4	0.595	0.692	0.300	0.300	0.049	0.049
2	10.00	9.5	6.5	6.3	0.552	0.706	0.281	0.281	0.048	0.048
3	30.00	11.4	7.4	6.8	0.519	0.813	0.182	0.182	0.032	0.032
4	47.50	12.5	7.5	6.6	0.538	0.855	0.159	0.159	0.030	0.030
5	50.00	12.6	7.4	8.0	0.544	0.843	0.175	0.175	0.032	0.032
6	52.50	12.7	7.4	9.5	0.558	0.832	0.189	0.189	0.034	0.034
7	55.00	12.8	7.4	10.1	0.577	0.817	0.212	0.212	0.039	0.039
8	57.50	12.8	7.3	10.9	0.581	0.815	0.218	0.218	0.040	0.040
9	70.00	13.3	7.1	10.4	0.556	0.865	0.183	0.183	0.034	0.034
10	90.00	13.1	6.2	11.6	0.494	0.935	0.119	0.119	0.020	0.020
11	95.00	12.7	5.8	10.4	0.486	0.918	0.169	0.169	0.027	0.027

TABLE VII. - Concluded. BLADE-ELEMENT DATA AT BLADE

EDGES FOR ROTOR 18

(r) 50 Percent design speed; reading 942

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.444	23.465	49.3	8.4	49.3	8.4	309.5	0.997	11.98	0.987
2	23.050	23.091	46.4	7.3	46.4	7.3	308.6	0.997	12.01	0.987
3	21.430	21.580	43.2	2.2	43.2	2.2	305.7	0.998	11.98	0.995
4	19.980	20.262	43.8	3.4	43.8	3.4	305.1	0.997	12.04	0.990
5	19.771	20.076	44.4	2.9	44.4	2.9	304.9	0.998	12.00	0.992
6	19.563	19.891	45.7	2.5	45.7	2.5	304.6	0.998	11.97	0.994
7	19.352	19.705	47.2	2.2	47.2	2.2	305.2	0.997	11.94	0.997
8	19.144	19.522	47.3	2.2	47.3	2.2	304.7	0.998	11.91	1.000
9	18.108	18.621	45.7	2.3	45.7	2.3	304.6	0.998	12.05	0.996
10	16.497	17.242	45.8	3.7	45.8	3.7	305.3	1.000	12.28	0.969
11	16.124	16.901	47.6	5.4	47.6	5.4	306.4	0.997	12.41	0.944

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	135.2	96.8	135.2	96.8	88.2	95.7	102.5	14.2	0.	0.
2	136.4	99.2	136.4	99.2	94.1	98.4	98.7	12.7	0.	0.
3	134.8	103.2	134.8	103.2	98.2	103.1	92.4	4.0	0.	0.
4	141.2	105.2	141.2	105.2	101.8	105.0	97.8	6.2	0.	0.
5	139.1	104.4	139.1	104.4	99.4	104.3	97.4	5.3	0.	0.
6	137.5	104.0	137.5	104.0	96.0	103.9	98.5	4.6	0.	0.
7	137.0	104.4	137.0	104.4	93.0	104.3	100.6	4.1	0.	0.
8	136.4	105.4	136.4	105.4	92.5	105.3	100.3	4.0	0.	0.
9	146.5	113.8	146.5	113.8	102.3	113.7	104.8	4.6	0.	0.
10	164.6	112.9	164.6	112.9	114.7	112.7	118.0	7.2	0.	0.
11	173.0	103.6	173.0	103.6	116.6	103.1	127.8	9.7	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	0.389	0.277	0.389	0.277	0.254	0.274	1.086	0.627
2	0.393	0.284	0.393	0.284	0.271	0.282	1.045	0.599
3	0.390	0.297	0.390	0.297	0.284	0.297	1.050	0.550
4	0.410	0.304	0.410	0.304	0.296	0.303	1.031	0.569
5	0.404	0.301	0.404	0.301	0.288	0.301	1.049	0.565
6	0.399	0.300	0.399	0.300	0.279	0.300	1.083	0.574
7	0.397	0.301	0.397	0.301	0.270	0.301	1.121	0.590
8	0.396	0.304	0.396	0.304	0.268	0.304	1.139	0.588
9	0.426	0.329	0.426	0.329	0.298	0.329	1.111	0.612
10	0.481	0.326	0.481	0.326	0.335	0.325	0.982	0.681
11	0.505	0.298	0.505	0.298	0.341	0.297	0.885	0.745

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	10.2	4.0	18.9	0.473	0.	0.127	0.127	0.036	0.036
2	10.00	8.8	2.5	17.1	0.452	0.	0.125	0.125	0.035	0.035
3	30.00	6.4	0.1	11.2	0.408	0.	0.054	0.054	0.014	0.014
4	47.50	5.9	-0.4	12.2	0.415	0.	0.095	0.095	0.023	0.023
5	50.00	6.2	0.0	11.7	0.410	0.	0.076	0.076	0.019	0.019
6	52.50	7.3	1.1	11.3	0.408	0.	0.055	0.055	0.013	0.013
7	55.00	8.6	2.4	11.0	0.406	0.	0.028	0.028	0.007	0.007
8	57.50	8.5	2.3	10.9	0.394	0.	0.001	0.001	0.000	0.000
9	70.00	5.8	-0.4	10.7	0.375	0.	0.034	0.034	0.008	0.008
10	90.00	3.1	-2.9	12.0	0.448	0.	0.213	0.213	0.044	0.044
11	95.00	4.0	-2.0	13.7	0.534	0.	0.350	0.350	0.070	0.070

TABLE VIII. - BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 13

(a) 100 Percent design speed; reading 927

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.444	23.465	44.1	8.9	44.1	8.9	367.6	0.996	19.53	0.906
2	23.050	23.091	41.2	5.9	41.2	5.9	362.1	1.003	19.57	0.921
3	21.430	21.580	42.7	4.2	42.7	4.2	357.5	0.995	19.58	0.930
4	19.980	20.262	46.4	3.3	46.4	3.3	356.7	0.990	19.28	0.925
5	19.771	20.076	48.2	3.0	48.2	3.0	356.3	0.990	18.83	0.947
6	19.563	19.891	49.7	2.7	49.7	2.7	356.2	0.990	18.62	0.960
7	19.352	19.705	49.8	2.5	49.8	2.5	355.5	0.990	18.50	0.972
8	19.144	19.522	48.4	2.3	48.4	2.3	354.7	0.991	18.70	0.969
9	18.108	18.621	46.3	1.7	46.3	1.7	351.9	0.994	19.19	0.962
10	16.497	17.242	47.3	8.2	47.3	8.2	354.3	1.004	19.83	0.784
11	16.124	16.901	50.4	10.3	50.4	10.3	360.5	0.989	21.00	0.672

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	287.5	229.8	287.5	229.8	206.5	227.0	200.0	35.4	0.	0.
2	286.8	236.8	286.8	236.8	215.8	235.5	188.8	24.4	0.	0.
3	287.2	243.0	287.2	243.0	211.0	242.3	194.7	17.8	0.	0.
4	293.9	242.8	293.9	242.8	202.5	242.4	213.0	13.9	0.	0.
5	285.0	243.9	285.0	243.9	189.8	243.6	212.6	12.8	0.	0.
6	281.2	246.6	281.2	246.6	182.0	246.4	214.3	11.6	0.	0.
7	279.3	250.5	279.3	250.5	180.3	250.3	213.3	10.8	0.	0.
8	284.3	254.9	284.3	254.9	188.7	254.7	212.7	10.1	0.	0.
9	297.9	271.2	297.9	271.2	205.8	271.1	215.4	8.2	0.	0.
10	317.6	213.7	317.6	213.7	215.4	211.6	233.4	30.4	0.	0.
11	340.3	168.2	340.3	168.2	217.1	165.5	262.1	30.0	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	0.794	0.622	0.794	0.622	0.570	0.615	1.100 1.126
2	0.798	0.645	0.798	0.645	0.601	0.642	1.091 1.072
3	0.805	0.671	0.805	0.671	0.592	0.669	1.148 1.119
4	0.828	0.673	0.828	0.673	0.570	0.672	1.197 1.222
5	0.800	0.677	0.800	0.677	0.533	0.676	1.283 1.224
6	0.788	0.685	0.788	0.685	0.510	0.685	1.353 1.238
7	0.783	0.698	0.783	0.698	0.505	0.697	1.389 1.230
8	0.800	0.712	0.800	0.712	0.531	0.711	1.350 1.219
9	0.847	0.764	0.847	0.764	0.585	0.764	1.317 1.234
10	0.909	0.585	0.909	0.585	0.616	0.579	0.982 1.335
11	0.975	0.453	0.975	0.453	0.622	0.446	0.762 1.528

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	5.0	-1.2	19.4	0.366	0.	0.278	0.278	0.079	0.079
2	10.00	3.6	-2.6	15.7	0.337	0.	0.230	0.230	0.065	0.065
3	30.00	5.8	-0.4	13.2	0.317	0.	0.200	0.200	0.053	0.053
4	47.50	8.5	2.3	12.0	0.340	0.	0.207	0.207	0.051	0.051
5	50.00	10.1	3.8	11.8	0.315	0.	0.155	0.155	0.038	0.038
6	52.50	11.3	5.0	11.5	0.296	0.	0.119	0.119	0.029	0.029
7	55.00	11.2	5.0	11.2	0.275	0.	0.083	0.083	0.020	0.020
8	57.50	9.6	3.4	11.0	0.271	0.	0.089	0.089	0.021	0.021
9	70.00	6.4	0.2	10.2	0.244	0.	0.101	0.101	0.023	0.023
10	90.00	4.6	-1.4	16.4	0.454	0.	0.521	0.516	0.106	0.105
11	95.00	6.7	0.7	18.5	0.638	0.	0.717	0.689	0.141	0.136

TABLE VIII. - Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 13

(b) 100 Percent design speed; reading 926

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	23.444	23.465	44.4	8.9	44.4	8.9	367.8	0.999	19.59	0.926
2	23.050	23.091	41.6	6.6	41.6	6.6	362.3	1.005	19.59	0.942
3	21.430	21.580	42.8	3.9	42.8	3.9	357.5	0.996	19.63	0.962
4	19.980	20.262	46.6	3.2	46.6	3.2	356.9	0.991	19.25	0.958
5	19.771	20.076	48.3	2.9	48.3	2.9	356.7	0.991	18.87	0.972
6	19.563	19.891	49.7	2.8	49.7	2.8	356.1	0.990	18.63	0.985
7	19.352	19.705	49.8	2.7	49.8	2.7	355.4	0.991	18.54	0.992
8	19.144	19.522	48.3	2.5	48.3	2.5	354.7	0.992	18.73	0.986
9	18.108	18.621	46.4	1.7	46.4	1.7	352.0	0.995	19.25	0.974
10	16.497	17.242	47.4	7.7	47.4	7.7	354.4	1.005	19.86	0.836
11	16.124	16.901	49.3	9.4	49.3	9.4	359.2	0.995	20.44	0.753

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	287.0	208.9	287.0	208.9	204.9	206.4	200.9	32.3	0.	0.
2	285.7	216.0	285.7	216.0	213.7	214.5	189.6	24.9	0.	0.
3	287.4	227.2	287.4	227.2	211.0	226.7	195.2	15.5	0.	0.
4	291.4	225.6	291.4	225.6	200.2	225.3	211.7	12.5	0.	0.
5	284.0	224.6	284.0	224.6	189.1	224.3	211.9	11.5	0.	0.
6	279.3	225.7	279.3	225.7	180.8	225.5	212.9	11.0	0.	0.
7	278.0	228.0	278.0	228.0	179.6	227.7	212.2	10.6	0.	0.
8	282.7	231.0	282.7	231.0	187.9	230.8	211.2	10.0	0.	0.
9	296.0	243.3	296.0	243.3	204.1	243.2	214.3	7.3	0.	0.
10	314.9	199.3	314.9	199.3	213.2	197.5	231.7	26.6	0.	0.
11	331.4	160.7	331.4	160.7	216.1	158.6	251.2	26.3	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	0.792	0.561	0.792	0.561	0.565	0.554	1.007	1.133
2	0.795	0.584	0.795	0.584	0.594	0.580	1.004	1.079
3	0.806	0.624	0.806	0.624	0.592	0.622	1.075	1.123
4	0.819	0.621	0.819	0.621	0.563	0.620	1.126	1.215
5	0.796	0.619	0.796	0.619	0.530	0.618	1.186	1.219
6	0.782	0.622	0.782	0.622	0.506	0.622	1.247	1.229
7	0.779	0.630	0.779	0.630	0.503	0.629	1.268	1.222
8	0.795	0.639	0.795	0.639	0.528	0.639	1.228	1.208
9	0.841	0.678	0.841	0.678	0.580	0.677	1.192	1.228
10	0.899	0.542	0.899	0.542	0.609	0.537	0.926	1.324
11	0.947	0.432	0.947	0.432	0.618	0.426	0.734	1.450

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	5.3	-0.9	19.4	0.442	0.	0.218	0.218	0.062	0.062
2	10.00	4.0	-2.2	16.4	0.408	0.	0.169	0.169	0.048	0.048
3	30.00	5.9	-0.3	12.9	0.375	0.	0.109	0.109	0.029	0.029
4	47.50	8.6	2.4	12.0	0.394	0.	0.118	0.118	0.029	0.029
5	50.00	10.1	3.9	11.7	0.381	0.	0.081	0.081	0.020	0.020
6	52.50	11.3	5.0	11.6	0.366	0.	0.045	0.045	0.011	0.011
7	55.00	11.1	4.9	11.4	0.352	0.	0.025	0.025	0.006	0.006
8	57.50	9.5	3.3	11.2	0.350	0.	0.041	0.041	0.010	0.010
9	70.00	6.5	0.3	10.2	0.333	0.	0.070	0.070	0.016	0.016
10	90.00	4.7	-1.3	15.9	0.497	0.	0.403	0.399	0.082	0.081
11	95.00	5.6	-0.4	17.7	0.647	0.	0.563	0.547	0.111	0.108

TABLE VIII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR STATOR 13

(c) 100 Percent design speed; reading 925

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.444	23.465	45.5	8.7	45.5	8.7	371.5	0.991	19.84	0.932
2	23.050	23.091	43.0	7.0	43.0	7.0	364.1	1.003	19.86	0.944
3	21.430	21.580	43.2	4.3	43.2	4.3	358.0	0.997	19.70	0.980
4	19.980	20.262	46.7	4.1	46.7	4.1	357.0	0.992	19.32	0.971
5	19.771	20.076	48.2	3.8	48.2	3.8	356.7	0.991	18.97	0.983
6	19.563	19.891	49.6	3.7	49.6	3.7	356.6	0.992	18.76	0.991
7	19.352	19.705	49.8	3.6	49.8	3.6	356.2	0.991	18.62	0.999
8	19.144	19.522	48.5	3.4	48.5	3.4	355.3	0.992	18.79	0.992
9	18.108	18.621	46.7	2.3	46.7	2.3	352.2	0.995	19.26	0.979
10	16.497	17.242	47.6	7.1	47.6	7.1	354.8	1.006	19.83	0.875
11	16.124	16.981	50.4	8.2	50.4	8.2	361.0	0.992	21.25	0.764

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	288.9	199.7	288.9	199.7	202.6	197.4	206.0	30.3	0.	0.
2	287.3	205.7	287.3	205.7	210.1	204.2	195.9	25.2	0.	0.
3	285.3	220.1	285.3	220.1	207.8	219.4	195.4	16.6	0.	0.
4	288.2	215.3	288.2	215.3	197.8	214.8	209.6	15.4	0.	0.
5	280.9	213.5	280.9	213.5	187.0	213.0	209.5	14.2	0.	0.
6	277.2	213.4	277.2	213.4	179.7	213.0	211.0	13.6	0.	0.
7	274.8	214.6	274.8	214.6	177.3	214.1	209.9	13.5	0.	0.
8	278.9	216.9	278.9	216.9	184.9	216.5	208.8	13.0	0.	0.
9	290.9	226.8	290.9	226.8	199.7	226.6	211.6	9.2	0.	0.
10	309.9	200.6	309.9	200.6	209.1	199.1	228.7	24.9	0.	0.
11	339.0	168.7	339.0	168.7	216.0	166.9	261.3	24.2	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	0.793	0.534	0.793	0.534	0.556	0.527		0.974 1.163
2	0.797	0.553	0.797	0.553	0.583	0.549		0.972 1.122
3	0.799	0.602	0.799	0.602	0.582	0.600		1.056 1.125
4	0.809	0.590	0.809	0.590	0.555	0.589		1.086 1.201
5	0.786	0.585	0.786	0.585	0.524	0.584		1.139 1.204
6	0.775	0.585	0.775	0.585	0.503	0.584		1.185 1.215
7	0.768	0.589	0.768	0.589	0.496	0.588		1.208 1.226
8	0.782	0.597	0.782	0.597	0.519	0.596		1.171 1.192
9	0.824	0.628	0.824	0.628	0.566	0.627		1.135 1.211
10	0.882	0.545	0.882	0.545	0.595	0.541		0.952 1.304
11	0.970	0.454	0.970	0.454	0.618	0.449		0.773 1.522

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	6.4	0.1	19.2	0.485	0.	0.199	0.199	0.057	0.057
2	10.00	5.4	-0.8	16.8	0.453	0.	0.163	0.163	0.046	0.046
3	30.00	6.4	0.1	13.3	0.394	0.	0.059	0.059	0.015	0.015
4	47.50	8.7	2.5	12.9	0.418	0.	0.082	0.082	0.020	0.020
5	50.00	10.1	3.9	12.6	0.409	0.	0.051	0.051	0.012	0.012
6	52.50	11.2	5.0	12.4	0.401	0.	0.027	0.027	0.006	0.006
7	55.00	11.2	5.0	12.3	0.389	0.	0.002	0.002	0.001	0.001
8	57.50	9.6	3.4	12.1	0.387	0.	0.023	0.023	0.005	0.005
9	70.00	6.7	0.6	10.8	0.375	0.	0.057	0.057	0.013	0.013
10	90.00	4.9	-1.2	15.4	0.484	0.	0.314	0.312	0.064	0.063
11	95.00	6.7	0.7	16.5	0.639	0.	0.520	0.492	0.103	0.098

TABLE VIII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR STATOR 13

(d) 100 Percent design speed; reading 924

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	23.444	23.465	48.5	7.7	48.5	7.7	374.9	0.992	19.77	0.957
2	23.050	23.091	46.6	7.4	46.6	7.4	370.9	0.998	20.24	0.946
3	21.430	21.580	45.8	4.8	45.8	4.8	361.2	0.997	19.96	0.976
4	19.980	20.262	47.7	4.1	47.7	4.1	358.8	0.992	19.76	0.959
5	19.771	20.076	49.3	3.8	49.3	3.8	358.6	0.991	19.42	0.971
6	19.563	19.891	50.6	3.7	50.6	3.7	358.6	0.990	19.22	0.979
7	19.352	19.705	50.8	3.5	50.8	3.5	358.0	0.989	19.16	0.981
8	19.144	19.522	49.7	3.7	49.7	3.7	356.5	0.992	19.18	0.980
9	18.108	18.621	48.2	3.2	48.2	3.2	353.9	0.993	19.43	0.973
10	16.497	17.242	49.2	7.2	49.2	7.2	356.8	1.002	20.02	0.897
11	16.124	16.901	50.9	7.3	50.9	7.3	361.1	0.995	21.14	0.806

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	277.6	187.2	277.6	187.2	183.9	185.5	208.0	25.2	0.	0.
2	285.1	193.0	285.1	193.0	195.8	191.4	207.2	24.8	0.	0.
3	280.4	201.8	280.4	201.8	195.6	201.1	200.9	16.8	0.	0.
4	284.6	193.9	284.6	193.9	191.5	193.4	210.6	13.9	0.	0.
5	277.6	192.6	277.6	192.6	181.0	192.2	210.5	12.9	0.	0.
6	274.4	192.7	274.4	192.7	174.2	192.3	211.9	12.5	0.	0.
7	273.5	192.9	273.5	192.9	172.9	192.5	212.0	11.8	0.	0.
8	274.7	193.7	274.7	193.7	177.6	193.3	209.7	12.7	0.	0.
9	282.8	202.3	282.8	202.3	188.5	202.0	210.8	11.1	0.	0.
10	301.2	188.5	301.2	188.5	196.7	187.0	228.1	23.5	0.	0.
11	328.2	164.3	328.2	164.3	207.0	163.0	254.6	20.8	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	0.755	0.496	0.755	0.496	0.500	0.491	1.008	1.185
2	0.782	0.514	0.782	0.514	0.537	0.509	0.977	1.197
3	0.780	0.546	0.780	0.546	0.544	0.544	1.028	1.166
4	0.796	0.527	0.796	0.527	0.535	0.525	1.010	1.210
5	0.774	0.524	0.774	0.524	0.505	0.522	1.062	1.212
6	0.764	0.524	0.764	0.524	0.485	0.523	1.104	1.223
7	0.762	0.525	0.762	0.525	0.481	0.524	1.114	1.222
8	0.768	0.528	0.768	0.528	0.496	0.527	1.089	1.203
9	0.796	0.555	0.796	0.555	0.530	0.554	1.072	1.211
10	0.851	0.510	0.851	0.510	0.556	0.506	0.951	1.306
11	0.934	0.441	0.934	0.441	0.589	0.437	0.788	1.479

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	9.4	3.2	18.2	0.516	0.	0.135	0.135	0.039	0.039
2	10.00	9.0	2.8	17.2	0.505	0.	0.162	0.162	0.046	0.046
3	30.00	8.9	2.7	13.7	0.454	0.	0.073	0.073	0.019	0.019
4	47.50	9.8	3.5	12.9	0.489	0.	0.120	0.120	0.030	0.030
5	50.00	11.1	4.9	12.6	0.479	0.	0.088	0.088	0.021	0.021
6	52.50	12.2	6.0	12.5	0.472	0.	0.065	0.065	0.016	0.016
7	55.00	12.2	6.0	12.2	0.469	0.	0.059	0.059	0.014	0.014
8	57.50	10.9	4.7	12.4	0.464	0.	0.063	0.063	0.015	0.015
9	70.00	8.3	2.1	11.6	0.441	0.	0.078	0.078	0.017	0.017
10	90.00	6.5	0.5	15.4	0.509	0.	0.274	0.273	0.056	0.055
11	95.00	7.2	1.2	15.6	0.638	0.	0.450	0.432	0.089	0.086

TABLE VIII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR STATOR 13

(e) 100 Percent design speed; reading 923

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	23.444	23.465	46.8	8.5	46.8	8.5	374.6	0.988	20.01	0.939
2	23.050	23.091	44.6	7.5	44.6	7.5	368.7	0.997	20.21	0.941
3	21.430	21.580	44.5	4.9	44.5	4.9	359.7	0.997	19.82	0.980
4	19.980	20.262	47.0	4.6	47.0	4.6	358.0	0.992	19.62	0.964
5	19.771	20.076	48.6	4.3	48.6	4.3	357.9	0.991	19.36	0.972
6	19.563	19.891	50.1	4.1	50.1	4.1	357.8	0.991	19.06	0.985
7	19.352	19.705	50.2	3.9	50.2	3.9	356.8	0.992	18.93	0.990
8	19.144	19.522	49.1	3.8	49.1	3.8	356.0	0.992	19.07	0.984
9	18.108	18.621	47.3	3:0	47.3	3.0	353.0	0.994	19.36	0.977
10	16.497	17.242	48.5	7.1	48.5	7.1	356.0	1.003	19.94	0.892
11	16.124	16.901	50.7	7.8	50.7	7.8	361.1	0.994	21.33	0.786

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	286.5	192.9	286.5	192.9	196.2	190.8	208.7	28.4	0.	0.
2	288.5	198.7	288.5	198.7	205.6	197.0	202.5	25.9	0.	0.
3	281.8	209.2	281.8	209.2	201.2	208.4	197.4	18.0	0.	0.
4	287.7	203.1	287.7	203.1	196.1	202.4	210.5	16.4	0.	0.
5	282.4	201.9	282.4	201.9	186.6	201.3	212.0	15.3	0.	0.
6	276.5	201.5	276.5	201.5	177.3	200.9	212.2	14.4	0.	0.
7	274.1	201.9	274.1	201.9	175.4	201.4	210.6	13.8	0.	0.
8	277.7	203.2	277.7	203.2	181.8	202.8	209.8	13.3	0.	0.
9	286.7	212.5	286.7	212.5	194.3	212.2	210.8	11.0	0.	0.
10	304.6	194.3	304.6	194.3	201.9	192.8	228.2	24.1	0.	0.
11	334.4	165.9	334.4	165.9	212.0	164.3	258.6	22.5	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	0.782	0.513	0.782	0.513	0.536	0.508	0.972	1.182
2	0.796	0.531	0.796	0.531	0.567	0.527	0.958	1.162
3	0.786	0.569	0.786	0.569	0.561	0.566	1.036	1.140
4	0.806	0.554	0.806	0.554	0.550	0.552	1.032	1.207
5	0.790	0.551	0.790	0.551	0.522	0.549	1.079	1.219
6	0.772	0.550	0.772	0.550	0.495	0.548	1.133	1.224
7	0.765	0.552	0.765	0.552	0.490	0.550	1.148	1.212
8	0.777	0.556	0.777	0.556	0.509	0.555	1.115	1.201
9	0.809	0.585	0.809	0.585	0.549	0.584	1.092	1.208
10	0.863	0.527	0.863	0.527	0.572	0.523	0.955	1.304
11	0.954	0.445	0.954	0.445	0.605	0.441	0.775	1.505

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	7.7	1.4	19.0	0.509	0.	0.183	0.183	0.052	0.052
2	10.00	7.0	0.8	17.3	0.486	0.	0.172	0.172	0.049	0.049
3	30.00	7.6	1.3	13.9	0.426	0.	0.059	0.059	0.015	0.015
4	47.50	9.1	2.8	13.4	0.460	0.	0.104	0.104	0.026	0.026
5	50.00	10.5	4.2	13.1	0.454	0.	0.084	0.084	0.020	0.020
6	52.50	11.7	5.5	12.8	0.444	0.	0.047	0.047	0.011	0.011
7	55.00	11.6	5.4	12.6	0.434	0.	0.032	0.032	0.008	0.008
8	57.50	10.3	4.1	12.4	0.435	0.	0.049	0.049	0.012	0.012
9	70.00	7.4	1.2	11.4	0.413	0.	0.065	0.065	0.015	0.015
10	90.00	5.8	-0.2	15.4	0.496	0.	0.281	0.279	0.057	0.057
11	95.00	7.0	1.0	16.1	0.641	0.	0.482	0.459	0.096	0.091

TABLE VIII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR STATOR 13

(f) 90 Percent design speed; reading 918

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.444	23.465	40.8	7.8	40.8	7.8	349.4	0.997	17.28	0.906
2	23.050	23.091	39.6	5.7	39.6	5.7	346.1	1.001	17.36	0.921
3	21.430	21.580	40.5	3.0	40.5	3.0	342.5	0.996	17.25	0.929
4	19.980	20.262	43.1	2.7	43.1	2.7	342.3	0.991	17.24	0.925
5	19.771	20.076	44.5	2.6	44.5	2.6	342.1	0.991	17.06	0.937
6	19.563	19.891	46.2	2.3	46.2	2.3	342.4	0.990	16.90	0.948
7	19.352	19.705	46.4	1.8	46.4	1.8	342.5	0.989	16.87	0.953
8	19.144	19.522	45.4	1.5	45.4	1.5	341.1	0.990	16.94	0.954
9	18.108	18.621	44.6	0.6	44.6	0.6	340.0	0.990	17.20	0.949
10	16.497	17.242	46.7	6.5	46.7	6.5	343.3	0.997	18.03	0.752
11	16.124	16.901	49.1	9.4	49.1	9.4	347.0	0.989	18.63	0.654

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	261.5	231.6	261.5	231.6	197.8	229.4	171.0	31.6	0.	0.
2	262.1	238.9	262.1	238.9	201.9	237.7	167.2	23.7	0.	0.
3	258.5	243.0	258.5	243.0	196.6	242.7	167.9	12.8	0.	0.
4	268.5	249.2	268.5	249.2	195.9	248.9	183.6	11.6	0.	0.
5	264.9	251.3	264.9	251.3	188.8	251.1	185.8	11.2	0.	0.
6	261.8	254.0	261.8	254.0	181.2	253.8	188.9	10.1	0.	0.
7	261.9	256.9	261.9	256.9	180.6	256.8	189.8	8.2	0.	0.
8	264.3	260.5	264.3	260.5	185.5	260.4	188.2	6.6	0.	0.
9	274.3	274.5	274.3	274.5	195.4	274.4	192.5	2.6	0.	0.
10	300.9	212.0	300.9	212.0	206.3	210.7	219.0	24.2	0.	0.
11	313.8	165.2	313.8	165.2	205.5	163.0	237.2	26.9	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	0.735	0.644	0.735	0.644	0.556	0.638	1.160	0.958
2	0.741	0.668	0.741	0.668	0.570	0.665	1.177	0.953
3	0.733	0.687	0.733	0.687	0.558	0.686	1.235	0.963
4	0.765	0.708	0.765	0.708	0.558	0.707	1.270	1.043
5	0.754	0.715	0.754	0.715	0.537	0.714	1.330	1.059
6	0.744	0.724	0.744	0.724	0.515	0.723	1.401	1.081
7	0.744	0.733	0.744	0.733	0.513	0.733	1.422	1.084
8	0.753	0.745	0.753	0.745	0.529	0.745	1.404	1.070
9	0.787	0.792	0.787	0.792	0.561	0.792	1.404	1.099
10	0.869	0.591	0.869	0.591	0.596	0.588	1.021	1.260
11	0.907	0.454	0.907	0.454	0.594	0.448	0.793	1.382

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	1.7	-4.5	18.3	0.269	0.	0.312	0.312	0.090	0.090
2	10.00	2.1	-4.2	15.5	0.244	0.	0.259	0.259	0.073	0.073
3	30.00	3.6	-2.6	12.0	0.219	0.	0.236	0.236	0.063	0.063
4	47.50	5.2	-1.1	11.5	0.229	0.	0.232	0.232	0.058	0.058
5	50.00	6.4	0.2	11.3	0.212	0.	0.202	0.202	0.049	0.049
6	52.50	7.8	1.6	11.0	0.194	0.	0.170	0.170	0.041	0.041
7	55.00	7.8	1.6	10.6	0.184	0.	0.153	0.153	0.037	0.037
8	57.50	6.6	0.4	10.2	0.176	0.	0.147	0.147	0.035	0.035
9	70.00	4.6	-1.5	9.0	0.153	0.	0.153	0.153	0.034	0.034
10	90.00	4.0	-2.0	14.8	0.424	0.	0.639	0.638	0.130	0.130
11	95.00	5.4	-0.6	17.6	0.604	0.	0.837	0.830	0.165	0.164

TABLE VIII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR STATOR 13

(g) 90 Percent design speed; reading 919

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	23.444	23.465	41.3	8.4	41.3	8.4	350.6	0.998	17.41	0.945
2	23.050	23.091	40.1	6.8	40.1	6.8	347.3	1.001	17.47	0.965
3	21.430	21.580	40.9	4.5	40.9	4.5	342.9	0.998	17.35	1.056
4	19.980	20.262	43.5	3.2	43.5	3.2	342.5	0.993	17.34	0.968
5	19.771	20.076	44.8	3.4	44.8	3.4	342.5	0.993	17.16	0.975
6	19.563	19.891	46.4	3.3	46.4	3.3	342.9	0.991	16.97	0.983
7	19.352	19.705	46.6	3.2	46.6	3.2	343.0	0.989	16.97	0.981
8	19.144	19.522	45.5	2.8	45.5	2.8	341.8	0.991	17.01	0.977
9	18.108	18.621	44.6	1.3	44.6	1.3	340.5	0.990	17.32	0.963
10	16.497	17.242	46.8	6.1	46.8	6.1	343.2	0.999	17.96	0.879
11	16.124	16.901	48.9	7.6	48.9	7.6	347.0	0.992	18.69	0.790

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	262.1	195.8	262.1	195.8	197.0	193.6	172.9	28.7	0.	0.
2	262.0	206.0	262.0	206.0	200.4	204.5	168.9	24.5	0.	0.
3	259.2	230.0	259.2	230.0	195.8	229.3	169.8	17.9	0.	0.
4	267.7	212.7	267.7	212.7	194.3	212.4	184.1	11.9	0.	0.
5	263.6	212.2	263.6	212.2	187.1	211.8	185.7	12.5	0.	0.
6	259.8	212.5	259.8	212.5	179.3	212.2	188.0	12.2	0.	0.
7	260.6	212.1	260.6	212.1	178.9	211.7	189.4	11.8	0.	0.
8	262.1	212.5	262.1	212.5	183.6	212.3	187.0	10.5	0.	0.
9	272.3	219.0	272.3	219.0	193.7	219.0	191.3	5.0	0.	0.
10	294.6	206.1	294.6	206.1	201.6	205.0	214.7	21.9	0.	0.
11	312.4	178.0	312.4	178.0	205.4	176.4	235.4	23.6	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	0.735	0.537	0.735	0.537	0.552	0.531	0.983	0.970
2	0.739	0.569	0.739	0.569	0.565	0.565	1.021	0.964
3	0.735	0.646	0.735	0.646	0.555	0.644	1.171	0.976
4	0.762	0.595	0.762	0.595	0.554	0.595	1.093	1.047
5	0.749	0.594	0.749	0.594	0.532	0.593	1.132	1.059
6	0.737	0.595	0.737	0.595	0.509	0.594	1.183	1.075
7	0.739	0.594	0.739	0.594	0.508	0.593	1.183	1.082
8	0.745	0.596	0.745	0.596	0.522	0.595	1.156	1.062
9	0.779	0.617	0.779	0.617	0.555	0.617	1.130	1.091
10	0.848	0.573	0.848	0.573	0.581	0.570	1.017	1.232
11	0.902	0.490	0.902	0.490	0.593	0.486	0.859	1.369

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	2.2	-4.1	18.9	0.412	0.	0.184	0.184	0.053	0.053
2	10.00	2.5	-3.7	16.6	0.371	0.	0.115	0.115	0.033	0.033
3	30.00	4.1	-2.2	13.4	0.267	0.	-0.186	-0.186	-0.049	-0.049
4	47.50	5.5	-0.7	12.0	0.364	0.	0.100	0.100	0.025	0.025
5	50.00	6.6	0.4	12.1	0.355	0.	0.082	0.082	0.020	0.020
6	52.50	8.0	1.7	12.0	0.345	0.	0.054	0.054	0.013	0.013
7	55.00	8.0	1.8	11.9	0.348	0.	0.063	0.063	0.015	0.015
8	57.50	6.7	0.5	11.5	0.348	0.	0.076	0.076	0.018	0.018
9	70.00	4.7	-1.5	9.7	0.347	0.	0.112	0.112	0.025	0.025
10	90.00	4.1	-1.9	14.4	0.431	0.	0.323	0.323	0.066	0.066
11	95.00	5.2	-0.8	15.9	0.562	0.	0.511	0.505	0.101	0.100

TABLE VIII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR STATOR 13

(h) 90 Percent design speed; reading 920

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.444	23.465	44.0	8.8	44.0	8.8	353.9	0.994	17.52	0.956
2	23.050	23.091	42.4	7.6	42.4	7.6	350.5	0.998	17.68	0.961
3	21.430	21.580	42.7	4.3	42.7	4.3	344.2	0.998	17.48	0.986
4	19.980	20.262	44.2	4.4	44.2	4.4	343.2	0.994	17.48	0.969
5	19.771	20.076	45.7	4.5	45.7	4.5	343.0	0.994	17.26	0.978
6	19.563	19.891	47.0	4.4	47.0	4.4	343.6	0.991	17.11	0.984
7	19.352	19.705	47.5	4.0	47.5	4.0	343.5	0.990	17.13	0.979
8	19.144	19.522	46.5	3.6	46.5	3.6	342.2	0.992	17.11	0.978
9	18.108	18.621	45.9	2.0	45.9	2.0	340.7	0.991	17.30	0.969
10	16.497	17.242	47.5	6.7	47.5	6.7	343.4	0.999	17.94	0.895
11	16.124	16.901	49.5	7.9	49.5	7.9	347.2	0.991	18.72	0.813

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	257.4	185.1	257.4	185.1	185.2	182.9	178.9	28.3	0.	0.
2	260.3	192.1	260.3	192.1	192.2	190.4	175.5	25.5	0.	0.
3	256.4	199.3	256.4	199.3	188.5	198.8	173.8	14.9	0.	0.
4	264.4	197.1	264.4	197.1	189.6	196.5	184.2	15.2	0.	0.
5	259.4	196.4	259.4	196.4	181.3	195.8	185.6	15.3	0.	0.
6	256.8	196.3	256.8	196.3	175.0	195.7	188.0	15.0	0.	0.
7	257.7	195.6	257.7	195.6	173.9	195.1	190.1	13.6	0.	0.
8	257.9	195.5	257.9	195.5	177.5	195.1	187.1	12.2	0.	0.
9	264.7	200.1	264.7	200.1	184.2	200.0	190.3	6.9	0.	0.
10	287.6	192.0	287.6	192.0	194.1	190.6	212.2	22.5	0.	0.
11	307.7	167.2	307.7	167.2	199.7	165.6	234.1	23.0	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	0.717	0.505	0.717	0.505	0.516	0.499	0.988 1.015
2	0.730	0.526	0.730	0.526	0.539	0.522	0.991 1.011
3	0.725	0.553	0.725	0.553	0.533	0.551	1.054 1.007
4	0.751	0.548	0.751	0.548	0.539	0.547	1.036 1.059
5	0.736	0.546	0.736	0.546	0.514	0.545	1.080 1.062
6	0.727	0.546	0.727	0.546	0.495	0.545	1.119 1.078
7	0.730	0.545	0.730	0.545	0.492	0.543	1.122 1.090
8	0.732	0.545	0.732	0.545	0.504	0.544	1.100 1.067
9	0.755	0.560	0.755	0.560	0.526	0.560	1.085 1.089
10	0.825	0.531	0.825	0.531	0.557	0.528	0.982 1.220
11	0.886	0.459	0.886	0.459	0.575	0.455	0.829 1.364

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	4.9	-1.3	19.3	0.450	0.	0.152	0.152	0.044	0.044
2	10.00	4.8	-1.4	17.4	0.426	0.	0.131	0.131	0.037	0.037
3	30.00	5.8	-0.4	13.2	0.386	0.	0.049	0.049	0.013	0.013
4	47.50	6.2	-0.0	13.2	0.412	0.	0.100	0.100	0.025	0.025
5	50.00	7.5	1.3	13.2	0.403	0.	0.073	0.073	0.018	0.018
6	52.50	8.7	2.4	13.1	0.398	0.	0.055	0.055	0.013	0.013
7	55.00	8.9	2.7	12.7	0.404	0.	0.070	0.070	0.017	0.017
8	57.50	7.7	1.5	12.3	0.401	0.	0.072	0.072	0.017	0.017
9	70.00	5.9	-0.2	10.4	0.397	0.	0.100	0.100	0.022	0.022
10	90.00	4.8	-1.2	15.0	0.464	0.	0.291	0.290	0.059	0.059
11	95.00	5.9	-0.1	16.2	0.590	0.	0.468	0.463	0.093	0.092

TABLE VIII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR STATOR 13

(i) 90 Percent design speed; reading 921

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	23.444	23.465	46.2	8.6	46.2	8.6	356.1	0.993	17.54	0.966
2	23.050	23.091	44.4	7.8	44.4	7.8	353.5	0.996	17.91	0.958
3	21.430	21.580	44.0	4.6	44.0	4.6	345.6	0.998	17.55	0.986
4	19.980	20.262	45.5	4.7	45.5	4.7	343.6	0.994	17.55	0.968
5	19.771	20.076	46.5	4.7	46.5	4.7	343.3	0.994	17.35	0.976
6	19.563	19.891	47.9	4.5	47.9	4.5	343.7	0.992	17.21	0.980
7	19.352	19.705	48.3	4.2	48.3	4.2	343.7	0.990	17.20	0.976
8	19.144	19.522	47.4	3.7	47.4	3.7	342.6	0.991	17.22	0.973
9	18.108	18.621	46.8	2.1	46.8	2.1	341.2	0.991	17.31	0.967
10	16.497	17.242	48.2	7.3	48.2	7.3	343.8	0.998	17.99	0.896
11	16.124	16.901	50.3	8.2	50.3	8.2	347.6	0.990	18.76	0.818

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	252.4	180.3	252.4	180.3	174.6	178.3	182.2	27.0	0.	0.
2	260.5	186.5	260.5	186.5	186.2	184.8	182.2	25.2	0.	0.
3	252.9	191.2	252.9	191.2	181.9	190.6	175.8	15.4	0.	0.
4	260.9	187.4	260.9	187.4	183.0	186.8	186.0	15.3	0.	0.
5	256.6	186.5	256.6	186.5	176.5	185.8	186.2	15.4	0.	0.
6	254.2	185.4	254.2	185.4	170.5	184.8	188.6	14.5	0.	0.
7	255.0	184.3	255.0	184.3	169.6	183.8	190.4	13.3	0.	0.
8	255.3	184.1	255.3	184.1	172.7	183.7	188.1	11.8	0.	0.
9	260.4	188.0	260.4	188.0	178.2	187.9	189.9	6.9	0.	0.
10	283.5	179.5	283.5	179.5	189.1	178.0	211.2	22.9	0.	0.
11	304.4	155.4	304.4	155.4	194.6	153.8	234.1	22.2	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	0.699	0.490	0.699	0.490	0.484	0.484	1.021	1.043
2	0.727	0.508	0.727	0.508	0.519	0.504	0.993	1.057
3	0.712	0.528	0.712	0.528	0.512	0.526	1.048	1.023
4	0.740	0.519	0.740	0.519	0.519	0.518	1.020	1.067
5	0.726	0.517	0.726	0.517	0.500	0.515	1.053	1.069
6	0.718	0.514	0.718	0.514	0.482	0.512	1.084	1.085
7	0.721	0.511	0.721	0.511	0.480	0.510	1.083	1.096
8	0.723	0.511	0.723	0.511	0.489	0.510	1.064	1.078
9	0.741	0.524	0.741	0.524	0.507	0.524	1.055	1.093
10	0.811	0.495	0.811	0.495	0.541	0.491	0.941	1.216
11	0.875	0.426	0.875	0.426	0.559	0.421	0.790	1.367

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	7.1	0.9	19.1	0.463	0.	0.120	0.120	0.034	0.034
2	10.00	6.8	0.6	17.5	0.456	0.	0.142	0.142	0.040	0.040
3	30.00	7.2	0.9	13.6	0.412	0.	0.048	0.048	0.013	0.013
4	47.50	7.5	1.3	13.5	0.443	0.	0.106	0.106	0.026	0.026
5	50.00	8.4	2.1	13.5	0.435	0.	0.083	0.083	0.020	0.020
6	52.50	9.5	3.3	13.2	0.435	0.	0.070	0.070	0.017	0.017
7	55.00	9.7	3.5	12.9	0.442	0.	0.083	0.083	0.020	0.020
8	57.50	8.6	2.4	12.4	0.441	0.	0.091	0.091	0.022	0.022
9	70.00	6.9	0.7	10.5	0.434	0.	0.108	0.108	0.024	0.024
10	90.00	5.5	-0.6	15.6	0.499	0.	0.296	0.296	0.060	0.060
11	95.00	6.6	0.6	16.5	0.625	0.	0.463	0.459	0.092	0.091

TABLE VIII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR STATOR 13

(j) 90 Percent design speed; reading 922

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.444	23.465	47.8	8.3	47.8	8.3	356.2	0.995	17.48	0.973
2	23.050	23.091	46.1	7.8	46.1	7.8	354.6	0.996	17.94	0.958
3	21.430	21.580	44.9	4.8	44.9	4.8	345.6	0.999	17.51	0.989
4	19.980	20.262	45.9	4.8	45.9	4.8	343.8	0.994	17.56	0.967
5	19.771	20.076	47.0	4.8	47.0	4.8	343.7	0.993	17.35	0.974
6	19.563	19.891	48.5	4.5	48.5	4.5	343.9	0.991	17.20	0.978
7	19.352	19.705	49.1	4.1	49.1	4.1	343.9	0.989	17.19	0.973
8	19.144	19.522	48.2	3.9	48.2	3.9	342.6	0.992	17.20	0.971
9	18.108	18.621	47.7	2.6	47.7	2.6	341.9	0.990	17.31	0.967
10	16.497	17.242	48.6	7.4	48.6	7.4	343.7	0.997	18.02	0.894
11	16.124	16.901	49.9	8.3	49.9	8.3	346.3	0.993	18.37	0.840

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	248.6	176.9	248.6	176.9	167.0	175.0	184.1	25.5	0.	0.
2	258.0	182.4	258.0	182.4	178.9	180.7	185.9	24.7	0.	0.
3	250.0	186.3	250.0	186.3	176.9	185.6	176.6	15.7	0.	0.
4	258.2	181.5	258.2	181.5	179.6	180.9	185.6	15.3	0.	0.
5	253.9	179.9	253.9	179.9	173.0	179.3	185.8	14.9	0.	0.
6	251.0	178.6	251.0	178.6	166.4	178.1	187.9	14.1	0.	0.
7	252.0	177.0	252.0	177.0	165.1	176.6	190.5	12.5	0.	0.
8	252.2	176.6	252.2	176.6	168.1	176.1	188.0	12.1	0.	0.
9	257.6	182.3	257.6	182.3	173.5	182.1	190.5	8.2	0.	0.
10	281.7	172.5	281.7	172.5	186.3	171.1	211.3	22.1	0.	0.
11	296.1	150.6	296.1	150.6	190.6	149.0	226.6	21.6	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	0.687	0.479	0.687	0.479	0.462	0.474	1.048 1.362
2	0.718	0.496	0.718	0.496	0.498	0.491	1.010 1.386
3	0.703	0.513	0.703	0.513	0.498	0.511	1.049 1.332
4	0.731	0.502	0.731	0.502	0.508	0.500	1.007 1.367
5	0.717	0.498	0.717	0.498	0.489	0.496	1.036 1.369
6	0.708	0.494	0.708	0.494	0.470	0.493	1.070 1.384
7	0.711	0.490	0.711	0.490	0.466	0.489	1.070 1.100
8	0.713	0.489	0.713	0.489	0.476	0.488	1.048 1.381
9	0.731	0.507	0.731	0.507	0.492	0.506	1.050 1.100
10	0.806	0.475	0.806	0.475	0.533	0.471	0.918 1.219
11	0.849	0.412	0.849	0.412	0.547	0.408	0.782 1.318

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	8.7	2.5	18.8	0.473	0.	0.100	0.100	0.029	0.029
2	10.00	8.5	2.3	17.6	0.471	0.	0.143	0.143	0.040	0.040
3	30.00	8.1	1.8	13.8	0.425	0.	0.040	0.040	0.011	0.011
4	47.50	8.0	1.8	13.6	0.459	0.	0.111	0.111	0.027	0.027
5	50.00	8.9	2.6	13.5	0.455	0.	0.090	0.090	0.022	0.022
6	52.50	10.1	3.9	13.3	0.455	0.	0.078	0.078	0.019	0.019
7	55.00	10.5	4.3	12.8	0.466	0.	0.093	0.093	0.022	0.022
8	57.50	9.4	3.2	12.6	0.464	0.	0.100	0.100	0.024	0.024
9	70.00	7.7	1.6	11.0	0.449	0.	0.110	0.110	0.025	0.025
10	90.00	5.9	-0.1	15.6	0.521	0.	0.304	0.304	0.062	0.062
11	95.00	6.2	0.2	16.5	0.626	0.	0.425	0.424	0.084	0.084

TABLE VIII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR STATOR 13

(k) 90 Percent design speed; reading 915

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	23.444	23.465	49.4	8.7	49.4	8.7	342.5	0.995	15.58	0.971
2	23.050	23.091	47.5	8.3	47.5	8.3	341.3	0.996	15.71	0.968
3	21.430	21.580	46.9	4.6	46.9	4.6	335.3	0.997	15.50	0.985
4	19.980	20.262	48.6	4.5	48.6	4.5	333.8	0.994	15.63	0.972
5	19.771	20.076	48.7	4.2	48.7	4.2	333.4	0.994	15.50	0.978
6	19.563	19.891	49.4	3.9	49.4	3.9	332.8	0.995	15.41	0.983
7	19.352	19.705	50.2	3.7	50.2	3.7	332.8	0.994	15.37	0.987
8	19.144	19.522	50.4	3.6	50.4	3.6	333.0	0.992	15.43	0.985
9	18.108	18.621	47.4	3.3	47.4	3.3	331.9	0.993	15.84	0.973
10	16.497	17.242	47.6	6.8	47.6	6.8	332.7	0.996	16.28	0.911
11	16.124	16.901	49.1	8.5	49.1	8.5	335.1	0.991	16.56	0.864

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	220.8	150.3	220.8	150.3	143.8	148.5	167.6	22.6	0.	0.
2	224.3	153.8	224.3	153.8	151.6	152.2	165.3	22.1	0.	0.
3	218.4	156.4	218.4	156.4	149.1	155.9	159.5	12.4	0.	0.
4	226.1	156.5	226.1	156.5	149.6	156.0	169.5	12.2	0.	0.
5	222.7	156.0	222.7	156.0	146.9	155.6	167.4	11.3	0.	0.
6	220.7	156.1	220.7	156.1	143.8	155.7	167.4	10.5	0.	0.
7	220.6	157.2	220.6	157.2	141.2	156.9	169.5	10.1	0.	0.
8	222.8	158.7	222.8	158.7	142.1	158.4	171.6	9.9	0.	0.
9	237.1	169.8	237.1	169.8	160.6	169.5	174.5	9.7	0.	0.
10	257.1	157.2	257.1	157.2	173.2	156.1	189.9	18.5	0.	0.
11	269.4	137.7	269.4	137.7	176.5	136.2	203.6	20.3	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 MACH NO
1	0.617	0.413	0.617	0.413	0.402	0.408	1.033 0.98
2	0.629	0.424	0.629	0.424	0.425	0.419	1.034 0.98
3	0.617	0.435	0.617	0.435	0.421	0.433	1.046 0.948
4	0.642	0.437	0.642	0.437	0.425	0.435	1.043 0.995
5	0.632	0.435	0.632	0.435	0.417	0.434	1.059 0.978
6	0.627	0.436	0.627	0.436	0.408	0.435	1.083 0.978
7	0.627	0.439	0.627	0.439	0.401	0.439	1.111 0.992
8	0.633	0.444	0.633	0.444	0.404	0.443	1.115 1.006
9	0.679	0.477	0.679	0.477	0.460	0.476	1.055 1.013
10	0.741	0.439	0.741	0.439	0.499	0.436	0.901 1.097
11	0.777	0.382	0.777	0.382	0.509	0.378	0.771 1.184

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	10.3	4.0	19.2	0.510	0.	0.129	0.129	0.037	0.037
2	10.00	9.9	3.6	18.1	0.496	0.	0.135	0.135	0.038	0.038
3	30.00	10.1	3.8	13.5	0.462	0.	0.066	0.066	0.018	0.018
4	47.50	10.6	4.4	13.3	0.479	0.	0.117	0.117	0.029	0.029
5	50.00	10.5	4.3	12.9	0.470	0.	0.091	0.091	0.022	0.022
6	52.50	11.0	4.7	12.6	0.464	0.	0.074	0.074	0.018	0.018
7	55.00	11.6	5.4	12.4	0.459	0.	0.056	0.056	0.014	0.014
8	57.50	11.5	5.3	12.3	0.458	0.	0.064	0.064	0.015	0.015
9	70.00	7.4	1.3	11.7	0.438	0.	0.104	0.104	0.023	0.023
10	90.00	4.9	-1.1	15.0	0.521	0.	0.291	0.291	0.059	0.059
11	95.00	5.4	-0.6	16.8	0.621	0.	0.414	0.414	0.082	0.082

TABLE VIII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR STATOR 13

(*l*) 70 Percent design speed; reading 905

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.444	23.465	31.2	4.2	31.2	4.2	318.5	1.000	13.43	0.912
2	23.050	23.091	30.9	2.9	30.9	2.9	316.8	1.003	13.46	0.933
3	21.430	21.580	32.7	1.8	32.7	1.8	315.6	1.002	13.54	0.959
4	19.980	20.262	35.5	1.1	35.5	1.1	316.7	0.999	13.64	0.961
5	19.771	20.076	36.6	1.2	36.6	1.2	317.1	0.999	13.63	0.963
6	19.563	19.891	38.6	1.1	38.6	1.1	317.8	0.998	13.52	0.970
7	19.352	19.705	39.4	0.9	39.4	0.9	318.1	0.997	13.50	0.969
8	19.144	19.522	38.4	0.6	38.4	0.6	317.2	0.999	13.54	0.969
9	18.108	18.621	38.6	-0.5	38.6	-0.5	317.8	1.000	13.89	0.972
10	16.497	17.242	41.9	5.6	41.9	5.6	321.3	1.000	14.50	0.826
11	16.124	16.901	43.2	8.7	43.2	8.7	322.7	0.996	14.66	0.751

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	207.9	186.4	207.9	186.4	177.9	185.9	107.6	13.6	0.	0.
2	207.3	196.5	207.3	196.5	177.8	196.2	106.4	10.0	0.	0.
3	204.9	211.2	204.9	211.2	172.5	211.1	110.6	6.6	0.	0.
4	211.5	220.8	211.5	220.8	172.2	220.7	122.8	4.1	0.	0.
5	211.4	222.7	211.4	222.7	169.7	222.6	126.0	4.5	0.	0.
6	208.5	223.7	208.5	223.7	163.0	223.6	130.0	4.3	0.	0.
7	207.9	223.8	207.9	223.8	160.6	223.8	132.1	3.3	0.	0.
8	209.5	226.1	209.5	226.1	164.2	226.1	130.1	2.2	0.	0.
9	223.3	243.5	223.3	243.5	174.5	243.5	139.3	-2.1	0.	0.
10	251.5	205.4	251.5	205.4	187.3	204.4	167.9	20.1	0.	0.
11	257.0	170.2	257.0	170.2	187.2	168.3	176.1	25.8	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	0.602	0.536	0.602	0.536	0.515	0.534	1.045	0.602
2	0.602	0.567	0.602	0.567	0.516	0.567	1.103	0.602
3	0.595	0.614	0.595	0.614	0.501	0.614	1.223	0.595
4	0.615	0.644	0.615	0.644	0.501	0.644	1.282	0.636
5	0.614	0.650	0.614	0.650	0.493	0.650	1.312	0.670
6	0.604	0.653	0.604	0.653	0.472	0.653	1.372	0.709
7	0.602	0.653	0.602	0.653	0.465	0.653	1.394	0.725
8	0.608	0.661	0.608	0.661	0.477	0.661	1.377	0.704
9	0.651	0.716	0.651	0.716	0.509	0.716	1.395	0.764
10	0.737	0.591	0.737	0.591	0.549	0.588	1.092	0.942
11	0.753	0.485	0.753	0.485	0.549	0.479	0.899	0.995

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	-7.9	-14.2	14.7	0.234	0.	0.405	0.405	0.117	0.117
2	10.00	-6.7	-12.9	12.7	0.184	0.	0.311	0.311	0.088	0.088
3	30.00	-4.2	-10.5	10.7	0.104	0.	0.192	0.192	0.051	0.051
4	47.50	-2.5	-8.7	9.8	0.094	0.	0.172	0.172	0.043	0.043
5	50.00	-1.6	-7.8	9.9	0.086	0.	0.164	0.164	0.040	0.040
6	52.50	0.2	-6.0	9.9	0.072	0.	0.136	0.136	0.033	0.033
7	55.00	0.8	-5.4	9.6	0.071	0.	0.141	0.141	0.034	0.034
8	57.50	-0.4	-6.6	9.3	0.065	0.	0.139	0.139	0.033	0.033
9	70.00	-1.4	-7.5	8.0	0.050	0.	0.112	0.112	0.025	0.025
10	90.00	-0.8	-6.8	13.9	0.300	0.	0.575	0.575	0.117	0.117
11	95.00	-0.4	-6.4	17.0	0.451	0.	0.796	0.796	0.158	0.158

TABLE VIII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR STATOR 13

(m) 70 Percent design speed; reading 906

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.444	23.465	34.3	4.3	34.3	4.3	320.4	1.002	13.65	0.960
2	23.050	23.091	34.9	3.5	34.9	3.5	318.9	1.004	13.70	0.980
3	21.430	21.580	35.3	0.2	35.3	0.2	317.0	1.002	13.72	0.990
4	19.980	20.262	37.9	0.3	37.9	0.3	318.2	0.998	13.83	0.981
5	19.771	20.076	39.1	0.5	39.1	0.5	318.5	0.998	13.81	0.982
6	19.563	19.891	40.7	0.8	40.7	0.8	318.6	0.998	13.70	0.990
7	19.352	19.705	41.7	0.9	41.7	0.9	318.8	0.997	13.64	0.992
8	19.144	19.522	40.6	0.8	40.6	0.8	318.4	0.999	13.66	0.990
9	18.108	18.621	40.7	-0.1	40.7	-0.1	318.7	0.998	14.00	0.981
10	16.497	17.242	43.2	3.7	43.2	3.7	321.5	1.001	14.52	0.920
11	16.124	16.901	45.0	5.9	45.0	5.9	323.4	0.997	14.72	0.860

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	204.2	164.3	204.2	164.3	168.7	163.9	115.1	12.2	0.	0.
2	204.6	175.7	204.6	175.7	167.9	175.3	117.0	10.7	0.	0.
3	201.7	181.6	201.7	181.6	164.6	181.6	116.7	0.6	0.	0.
4	209.3	185.5	209.3	185.5	165.1	185.5	128.6	0.9	0.	0.
5	208.8	186.1	208.8	186.1	162.1	186.1	131.6	1.8	0.	0.
6	205.4	186.4	205.4	186.4	155.8	186.4	133.9	2.6	0.	0.
7	204.3	186.6	204.3	186.6	152.7	186.6	135.8	2.8	0.	0.
8	205.5	187.2	205.5	187.2	156.0	187.2	133.7	2.6	0.	0.
9	219.3	198.1	219.3	198.1	166.2	198.1	143.1	-0.5	0.	0.
10	244.2	196.7	244.2	196.7	178.0	196.3	167.2	12.6	0.	0.
11	252.1	174.3	252.1	174.3	178.3	173.4	178.2	18.0	0.	0.

	ABS MACH NO		REL MACH NO		MERID MACH NO			
RP	IN	OUT	IN	OUT	IN	OUT		
1	0.589	0.467	0.589	0.467	0.486	0.466		
2	0.591	0.502	0.591	0.502	0.485	0.501		
3	0.584	0.522	0.584	0.522	0.477	0.522		
4	0.607	0.534	0.607	0.534	0.478	0.534		
5	0.605	0.535	0.605	0.535	0.469	0.535		
6	0.594	0.536	0.594	0.536	0.450	0.536		
7	0.590	0.537	0.590	0.537	0.441	0.537		
8	0.594	0.539	0.594	0.539	0.451	0.539		
9	0.637	0.572	0.637	0.572	0.483	0.572		
10	0.713	0.564	0.713	0.564	0.520	0.563		
11	0.736	0.496	0.736	0.496	0.521	0.494		

											MERID PEAK SS
	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM		VEL R MACH NO
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF	
1	5.00	-4.8	-11.0	14.8	0.341	0.	0.191	0.191	0.055	0.055	0.972 0.589
2	10.00	-2.7	-8.9	13.3	0.289	0.	0.097	0.097	0.028	0.028	1.045 0.641
3	30.00	-1.5	-7.8	9.2	0.252	0.	0.050	0.050	0.013	0.013	1.103 0.643
4	47.50	-0.0	-6.3	9.1	0.264	0.	0.085	0.085	0.021	0.021	1.123 0.736
5	50.00	0.9	-5.3	9.3	0.260	0.	0.082	0.082	0.020	0.020	1.148 0.727
6	52.50	2.3	-3.9	9.6	0.246	0.	0.049	0.049	0.012	0.012	1.197 0.747
7	55.00	3.0	-3.2	9.6	0.242	0.	0.037	0.037	0.009	0.009	1.222 0.761
8	57.50	1.8	-4.4	9.5	0.239	0.	0.045	0.045	0.011	0.011	1.200 0.742
9	70.00	0.8	-5.4	8.3	0.242	0.	0.078	0.078	0.018	0.018	1.192 0.802
10	90.00	0.5	-5.5	12.0	0.321	0.	0.277	0.277	0.057	0.057	1.103 0.947
11	95.00	1.3	-4.7	14.2	0.432	0.	0.462	0.462	0.092	0.092	0.972 1.018

TABLE VIII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR STATOR 13

(n) 70 Percent design speed; reading 907

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	23.444	23.465	38.4	5.2	38.4	5.2	323.8	1.001	13.89	0.974
2	23.050	23.091	38.5	4.7	38.5	4.7	322.5	1.002	14.04	0.978
3	21.430	21.580	39.2	0.6	39.2	0.6	319.6	1.000	13.85	0.991
4	19.980	20.262	41.3	1.6	41.3	1.6	320.1	0.998	14.05	0.981
5	19.771	20.076	42.0	1.7	42.0	1.7	320.0	0.998	14.00	0.983
6	19.563	19.891	43.2	1.5	43.2	1.5	320.1	0.998	13.85	0.992
7	19.352	19.705	44.6	1.4	44.6	1.4	320.1	0.997	13.76	0.997
8	19.144	19.522	43.9	1.2	43.9	1.2	319.4	0.999	13.77	0.997
9	18.108	18.621	43.3	0.6	43.3	0.6	319.5	0.999	14.03	0.989
10	16.497	17.242	44.8	3.6	44.8	3.6	321.2	1.002	14.48	0.939
11	16.124	16.901	46.7	5.8	46.7	5.8	323.2	0.997	14.74	0.883

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	199.2	152.9	199.2	152.9	156.2	152.3	123.6	13.9	0.	0.
2	203.0	161.0	203.0	161.0	159.0	160.5	126.3	13.3	0.	0.
3	194.5	161.5	194.5	161.5	150.7	161.5	122.9	1.7	0.	0.
4	205.7	167.2	205.7	167.2	154.6	167.2	135.7	4.8	0.	0.
5	204.3	166.5	204.3	166.5	151.7	166.4	136.7	4.9	0.	0.
6	200.2	166.5	200.2	166.5	146.0	166.5	137.1	4.2	0.	0.
7	198.1	166.4	198.1	166.4	141.1	166.4	139.1	3.9	0.	0.
8	199.0	167.6	199.0	167.6	143.4	167.5	138.0	3.5	0.	0.
9	211.1	177.0	211.1	177.0	153.6	177.0	144.9	1.7	0.	0.
10	234.5	176.5	234.5	176.5	166.4	176.2	165.3	11.1	0.	0.
11	244.6	155.9	244.6	155.9	167.6	155.1	178.1	15.8	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	0.570	0.431	0.570	0.431	0.447	0.430	0.975	0.690
2	0.583	0.456	0.583	0.456	0.456	0.455	1.010	0.725
3	0.559	0.460	0.559	0.460	0.434	0.460	1.072	0.737
4	0.594	0.477	0.594	0.477	0.446	0.477	1.081	0.769
5	0.589	0.475	0.589	0.475	0.438	0.475	1.097	0.775
6	0.577	0.475	0.577	0.475	0.420	0.475	1.141	0.778
7	0.570	0.475	0.570	0.475	0.406	0.475	1.180	0.794
8	0.573	0.479	0.573	0.479	0.413	0.478	1.168	0.784
9	0.611	0.507	0.611	0.507	0.444	0.507	1.153	0.827
10	0.683	0.503	0.683	0.503	0.484	0.502	1.059	0.945
11	0.712	0.442	0.712	0.442	0.488	0.439	0.926	1.029

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	-0.7	-7.0	15.7	0.392	0.	0.133	0.133	0.038	0.038
2	10.00	0.9	-5.4	14.5	0.365	0.	0.107	0.107	0.030	0.030
3	30.00	2.3	-3.9	9.5	0.334	0.	0.045	0.045	0.012	0.012
4	47.50	3.3	-2.9	10.4	0.344	0.	0.088	0.088	0.022	0.022
5	50.00	3.8	-2.4	10.4	0.342	0.	0.083	0.083	0.020	0.020
6	52.50	4.8	-1.4	10.2	0.328	0.	0.040	0.040	0.010	0.010
7	55.00	6.0	-0.2	10.1	0.322	0.	0.018	0.018	0.004	0.004
8	57.50	5.1	-1.1	9.9	0.317	0.	0.016	0.016	0.004	0.004
9	70.00	3.4	-2.8	9.0	0.312	0.	0.048	0.048	0.011	0.011
10	90.00	2.1	-3.9	11.9	0.379	0.	0.229	0.229	0.047	0.047
11	95.00	3.1	-2.9	14.1	0.491	0.	0.409	0.409	0.081	0.081

TABLE VIII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR STATOR 13

(o) 70 Percent design speed; reading 947

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.444	23.465	43.6	8.2	43.6	8.2	327.1	0.995	14.00	0.976
2	23.050	23.091	42.1	7.4	42.1	7.4	325.4	0.998	14.13	0.974
3	21.430	21.580	42.0	3.0	42.0	3.0	321.3	0.998	13.93	0.993
4	19.980	20.262	43.8	3.8	43.8	3.8	321.3	0.996	14.08	0.984
5	19.771	20.076	44.4	3.5	44.4	3.5	321.1	0.997	14.00	0.988
6	19.563	19.891	45.3	3.0	45.3	3.0	320.8	0.996	13.93	0.992
7	19.352	19.705	46.7	2.9	46.7	2.9	320.8	0.995	13.86	0.997
8	19.144	19.522	46.5	2.8	46.5	2.8	320.7	0.996	13.84	0.999
9	18.108	18.621	45.0	2.1	45.0	2.1	320.7	0.996	14.17	0.988
10	16.497	17.242	45.8	5.1	45.8	5.1	321.7	0.999	14.56	0.938
11	16.124	16.901	47.5	7.0	47.5	7.0	323.9	0.993	14.86	0.886

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	194.2	141.3	194.2	141.3	140.7	139.9	133.9	20.3	0.	0.
2	198.6	146.1	198.6	146.1	147.3	144.9	133.2	18.7	0.	0.
3	189.8	148.8	189.8	148.8	141.1	148.6	126.9	7.8	0.	0.
4	199.8	152.8	199.8	152.8	144.2	152.4	138.4	10.1	0.	0.
5	197.3	152.0	197.3	152.0	141.1	151.7	138.0	9.3	0.	0.
6	195.6	151.9	195.6	151.9	137.6	151.7	139.0	8.0	0.	0.
7	194.2	152.3	194.2	152.3	133.2	152.1	141.3	7.7	0.	0.
8	194.3	153.6	194.3	153.6	133.7	153.4	140.9	7.6	0.	0.
9	208.7	163.6	208.7	163.6	147.5	163.5	147.6	6.0	0.	0.
10	229.4	158.3	229.4	158.3	160.0	157.6	164.4	14.1	0.	0.
11	241.8	139.6	241.8	139.6	163.3	138.5	178.3	17.0	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	0.552	0.397	0.552	0.397	0.400	0.393	0.994	0.773
2	0.567	0.411	0.567	0.411	0.420	0.408	0.984	0.780
3	0.543	0.422	0.543	0.422	0.404	0.421	1.053	0.742
4	0.574	0.434	0.574	0.434	0.414	0.433	1.057	0.796
5	0.567	0.432	0.567	0.432	0.405	0.431	1.075	0.792
6	0.562	0.432	0.562	0.432	0.395	0.431	1.102	0.799
7	0.557	0.433	0.557	0.433	0.382	0.433	1.142	0.817
8	0.558	0.437	0.558	0.437	0.384	0.436	1.148	0.813
9	0.602	0.466	0.602	0.466	0.425	0.466	1.108	0.851
10	0.666	0.449	0.666	0.449	0.464	0.447	0.985	0.944
11	0.703	0.394	0.703	0.394	0.475	0.391	0.848	1.033

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	4.5	-1.8	18.7	0.442	0.	0.130	0.130	0.037	0.037
2	10.00	4.6	-1.7	17.1	0.428	0.	0.131	0.131	0.037	0.037
3	30.00	5.1	-1.1	11.9	0.382	0.	0.036	0.036	0.009	0.009
4	47.50	5.9	-0.4	12.6	0.393	0.	0.079	0.079	0.020	0.020
5	50.00	6.2	-0.0	12.3	0.388	0.	0.062	0.062	0.015	0.015
6	52.50	5.9	0.7	11.8	0.385	0.	0.044	0.044	0.011	0.011
7	55.00	8.1	1.9	11.6	0.379	0.	0.016	0.016	0.004	0.004
8	57.50	7.7	1.5	11.5	0.371	0.	0.004	0.004	0.001	0.001
9	70.00	5.1	-1.1	10.5	0.366	0.	0.054	0.054	0.012	0.012
10	90.00	3.1	-2.9	13.4	0.441	0.	0.242	0.242	0.049	0.049
11	95.00	3.8	-2.2	15.3	0.553	0.	0.406	0.406	0.081	0.081

TABLE VIII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR STATOR 13

(p) 70 Percent design speed; reading 904

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	23.444	23.465	55.2	6.8	55.2	6.8	331.7	0.993	13.96	0.970
2	23.050	23.091	51.0	6.2	51.0	6.2	329.3	0.997	13.94	0.978
3	21.430	21.580	45.8	2.8	45.8	2.8	322.9	1.002	13.97	0.991
4	19.980	20.262	45.6	2.9	45.6	2.9	321.7	0.999	14.12	0.979
5	19.771	20.076	46.2	2.5	46.2	2.5	321.3	0.999	14.01	0.987
6	19.563	19.891	47.3	2.2	47.3	2.2	320.8	1.000	13.89	0.994
7	19.352	19.705	48.5	2.0	48.5	2.0	320.6	1.000	13.83	0.998
8	19.144	19.522	49.0	2.1	49.0	2.1	320.7	1.000	13.81	1.001
9	18.108	18.621	46.9	2.0	46.9	2.0	320.5	1.000	14.13	0.991
10	16.497	17.242	47.1	4.6	47.1	4.6	321.7	1.001	14.56	0.935
11	16.124	16.901	48.5	6.6	48.5	6.6	323.8	0.995	14.75	0.894

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	189.3	124.9	189.3	124.9	108.1	124.0	155.4	14.7	0.	0.
2	188.0	129.5	188.0	129.5	118.3	128.7	146.2	14.0	0.	0.
3	188.6	139.6	188.6	139.6	131.5	139.5	135.3	6.8	0.	0.
4	197.0	141.5	197.0	141.5	137.7	141.3	140.9	7.2	0.	0.
5	193.4	141.3	193.4	141.3	133.9	141.1	139.5	6.3	0.	0.
6	190.1	141.3	190.1	141.3	128.9	141.2	139.7	5.4	0.	0.
7	189.2	141.5	189.2	141.5	125.5	141.4	141.6	5.0	0.	0.
8	189.1	143.3	189.1	143.3	124.1	143.2	142.7	5.2	0.	0.
9	203.2	154.2	203.2	154.2	138.7	154.1	148.4	5.5	0.	0.
10	225.6	144.7	225.6	144.7	153.6	144.2	165.2	11.7	0.	0.
11	236.4	126.8	236.4	126.8	156.6	125.9	177.1	14.6	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	0.533	0.347	0.533	0.347	0.304	0.345	1.147	0.957
2	0.531	0.361	0.531	0.361	0.334	0.359	1.088	0.892
3	0.539	0.393	0.539	0.393	0.375	0.393	1.061	0.867
4	0.565	0.400	0.565	0.400	0.395	0.399	1.026	0.819
5	0.555	0.400	0.555	0.400	0.384	0.399	1.054	0.810
6	0.545	0.400	0.545	0.400	0.369	0.399	1.095	0.813
7	0.543	0.401	0.543	0.401	0.360	0.400	1.127	0.828
8	0.542	0.406	0.542	0.406	0.356	0.406	1.154	0.836
9	0.585	0.438	0.585	0.438	0.400	0.438	1.111	0.865
10	0.654	0.409	0.654	0.409	0.445	0.407	0.939	0.956
11	0.685	0.357	0.685	0.357	0.454	0.354	0.804	1.031

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	16.1	9.8	17.3	0.555	0.	0.171	0.171	0.049	0.049
2	10.00	13.5	7.2	16.0	0.512	0.	0.127	0.127	0.036	0.036
3	30.00	9.0	2.7	11.7	0.440	0.	0.053	0.053	0.014	0.014
4	47.50	7.7	1.4	11.7	0.449	0.	0.107	0.107	0.026	0.026
5	50.00	8.0	1.8	11.3	0.437	0.	0.071	0.071	0.018	0.018
6	52.50	8.9	2.7	11.0	0.427	0.	0.032	0.032	0.008	0.008
7	55.00	9.8	3.6	10.8	0.424	0.	0.013	0.013	0.003	0.003
8	57.50	10.2	4.0	10.8	0.413	0.	-0.003	-0.003	-0.001	-0.001
9	70.00	7.0	0.8	10.5	0.397	0.	0.043	0.043	0.010	0.010
10	90.00	4.4	-1.6	12.9	0.495	0.	0.260	0.260	0.053	0.053
11	95.00	4.8	-1.2	14.9	0.597	0.	0.392	0.392	0.078	0.078

TABLE VIII. - Continued. BLADE-ELEMENT DATA AT BLADE

EDGES FOR STATOR 13

(q) 60 Percent design speed; reading 934

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.444	23.465	51.5	8.2	51.5	8.2	318.9	0.995	12.88	0.979
2	23.050	23.091	47.7	7.2	47.7	7.2	317.3	0.998	12.87	0.984
3	21.430	21.580	43.8	3.3	43.8	3.3	313.3	0.999	12.89	0.991
4	19.980	20.262	44.4	3.8	44.4	3.8	312.6	0.997	12.95	0.984
5	19.771	20.076	44.9	3.4	44.9	3.4	312.3	0.997	12.89	0.987
6	19.563	19.891	46.1	3.0	46.1	3.0	312.0	0.998	12.81	0.993
7	19.352	19.705	47.4	2.7	47.4	2.7	312.1	0.997	12.76	0.996
8	19.144	19.522	47.6	2.6	47.6	2.6	311.9	0.997	12.74	0.999
9	18.108	18.621	46.2	2.9	46.2	2.9	312.0	0.998	12.94	0.995
10	16.497	17.242	46.1	5.5	46.1	5.5	312.8	1.000	13.32	0.952
11	16.124	16.901	47.7	6.8	47.7	6.8	314.3	0.997	13.43	0.920

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	162.3	113.3	162.3	113.3	101.0	112.2	127.1	16.2	0.	0.
2	161.9	116.5	161.9	116.5	108.9	115.6	119.7	14.7	0.	0.
3	162.4	122.2	162.4	122.2	117.2	122.0	112.4	6.9	0.	0.
4	169.1	123.3	169.1	123.3	120.7	123.0	118.4	8.1	0.	0.
5	166.8	122.7	166.8	122.7	118.1	122.5	117.7	7.2	0.	0.
6	164.1	122.5	164.1	122.5	113.9	122.3	118.2	6.3	0.	0.
7	163.1	122.8	163.1	122.8	110.4	122.7	120.0	5.8	0.	0.
8	162.8	124.1	162.8	124.1	109.6	124.0	120.3	5.6	0.	0.
9	174.1	134.7	174.1	134.7	120.6	134.5	125.6	6.8	0.	0.
10	196.5	131.3	196.5	131.3	136.4	130.7	141.5	12.6	0.	0.
11	203.7	115.0	203.7	115.0	137.2	114.2	150.6	13.7	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	0.463	0.321	0.463	0.321	0.288	0.317	1.111 0.774
2	0.463	0.330	0.463	0.330	0.312	0.328	1.061 0.725
3	0.468	0.349	0.468	0.349	0.337	0.348	1.041 0.668
4	0.488	0.353	0.488	0.353	0.349	0.352	1.019 0.688
5	0.482	0.351	0.482	0.351	0.341	0.350	1.037 0.682
6	0.474	0.351	0.474	0.351	0.329	0.350	1.074 0.686
7	0.471	0.352	0.471	0.352	0.319	0.351	1.111 0.700
8	0.470	0.355	0.470	0.355	0.316	0.355	1.131 0.723
9	0.504	0.386	0.504	0.386	0.349	0.386	1.115 0.732
10	0.572	0.375	0.572	0.375	0.397	0.374	0.958 0.816
11	0.593	0.328	0.593	0.328	0.400	0.325	0.832 0.875

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	12.4	6.2	18.7	0.500	0.	0.154	0.154	0.044	0.044
2	10.00	10.1	3.9	17.0	0.465	0.	0.115	0.115	0.032	0.032
3	30.00	6.9	0.7	12.2	0.419	0.	0.067	0.067	0.018	0.018
4	47.50	6.5	0.3	12.5	0.431	0.	0.105	0.105	0.026	0.026
5	50.00	6.7	0.5	12.1	0.425	0.	0.087	0.087	0.021	0.021
6	52.50	7.7	-1.5	11.7	0.418	0.	0.052	0.052	0.013	0.013
7	55.00	8.8	2.5	11.4	0.413	0.	0.027	0.027	0.006	0.006
8	57.50	8.8	2.6	11.3	0.403	0.	0.005	0.005	0.001	0.001
9	70.00	6.2	.0.1	11.3	0.378	0.	0.029	0.029	0.007	0.007
10	90.00	3.4	-2.7	13.8	0.463	0.	0.240	0.240	0.049	0.049
11	95.00	4.0	-2.0	15.1	0.566	0.	0.377	0.377	0.075	0.075

TABLE VIII. - Concluded. BLADE-ELEMENT DATA AT BLADE

EDGES FOR STATOR 13

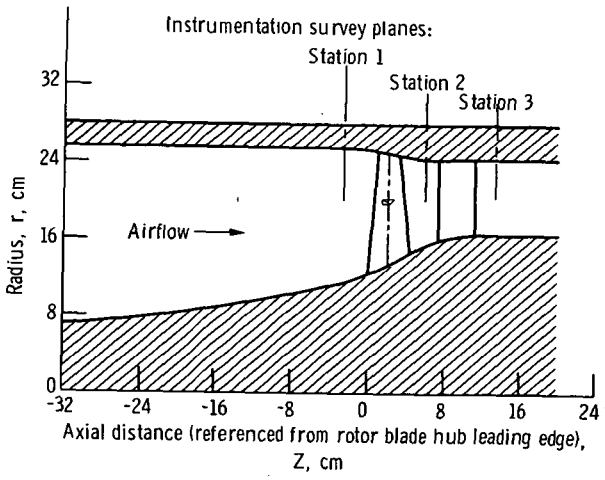
(r) 50 Percent design speed; reading 942

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	23.444	23.465	49.3	8.4	49.3	8.4	309.5	0.997	11.98	0.987
2	23.050	23.091	46.4	7.3	46.4	7.3	308.6	0.997	12.01	0.987
3	21.430	21.580	43.2	2.2	43.2	2.2	305.7	0.998	11.98	0.995
4	19.980	20.262	43.8	3.4	43.8	3.4	305.1	0.997	12.04	0.990
5	19.771	20.076	44.4	2.9	44.4	2.9	304.9	0.998	12.00	0.992
6	19.563	19.891	45.7	2.5	45.7	2.5	304.6	0.998	11.97	0.994
7	19.352	19.705	47.2	2.2	47.2	2.2	305.2	0.997	11.94	0.997
8	19.144	19.522	47.3	2.2	47.3	2.2	304.7	0.998	11.91	1.000
9	18.108	18.621	45.7	2.3	45.7	2.3	304.6	0.998	12.05	0.996
10	16.497	17.242	45.8	3.7	45.8	3.7	305.3	1.000	12.28	0.969
11	16.124	16.901	47.6	5.4	47.6	5.4	306.4	0.997	12.41	0.944

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	135.2	96.8	135.2	96.8	88.2	95.7	102.5	14.2	0.	0.
2	136.4	99.2	136.4	99.2	94.1	98.4	98.7	12.7	0.	0.
3	134.8	103.2	134.8	103.2	98.2	103.1	92.4	4.0	0.	0.
4	141.2	105.2	141.2	105.2	101.8	105.0	97.8	6.2	0.	0.
5	139.1	104.4	139.1	104.4	99.4	104.3	97.4	5.3	0.	0.
6	137.5	104.0	137.5	104.0	96.0	103.9	98.5	4.6	0.	0.
7	137.0	104.4	137.0	104.4	93.0	104.3	100.6	4.1	0.	0.
8	136.4	105.4	136.4	105.4	92.5	105.3	100.3	4.0	0.	0.
9	146.5	113.8	146.5	113.8	102.3	113.7	104.8	4.6	0.	0.
10	164.6	112.9	164.6	112.9	114.7	112.7	118.0	7.2	0.	0.
11	173.0	103.6	173.0	103.6	116.6	103.1	127.8	9.7	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 VEL R	MERID PEAK MACH NO
1	0.389	0.277	0.389	0.277	0.254	0.274	1.086	0.621
2	0.393	0.284	0.393	0.284	0.271	0.282	1.045	0.599
3	0.390	0.297	0.390	0.297	0.284	0.297	1.050	0.550
4	0.410	0.304	0.410	0.304	0.296	0.303	1.031	0.569
5	0.404	0.301	0.404	0.301	0.288	0.301	1.049	0.565
6	0.399	0.300	0.399	0.300	0.279	0.300	1.083	0.574
7	0.397	0.301	0.397	0.301	0.270	0.301	1.121	0.590
8	0.396	0.304	0.396	0.304	0.268	0.304	1.139	0.588
9	0.426	0.329	0.426	0.329	0.298	0.329	1.111	0.612
10	0.481	0.326	0.481	0.326	0.335	0.325	0.982	0.681
11	0.505	0.298	0.505	0.298	0.341	0.297	0.885	0.745

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	10.2	4.0	18.9	0.473	0.	0.127	0.127	0.036	0.036
2	10.00	8.8	2.5	17.1	0.452	0.	0.125	0.125	0.035	0.035
3	30.00	6.4	0.1	11.2	0.408	0.	0.054	0.054	0.014	0.014
4	47.50	5.9	-0.4	12.2	0.415	0.	0.095	0.095	0.023	0.023
5	50.00	6.2	0.0	11.7	0.410	0.	0.076	0.076	0.019	0.019
6	52.50	7.3	1.1	11.3	0.408	0.	0.055	0.055	0.013	0.013
7	55.00	8.6	2.4	11.0	0.406	0.	0.028	0.028	0.007	0.007
8	57.50	8.5	2.3	10.9	0.394	0.	0.001	0.001	0.000	0.000
9	70.00	5.8	-0.4	10.7	0.375	0.	0.034	0.034	0.008	0.008
10	90.00	3.1	-2.9	12.0	0.448	0.	0.213	0.213	0.044	0.044
11	95.00	4.0	-2.0	13.7	0.534	0.	0.350	0.350	0.070	0.070



Flow path coordinates		
Axial distance, Z, cm	Radius, r, cm	
	Inner	Outer
-30.480	7.303	25.400
-25.400	7.493	
-22.860	7.874	
-20.320	8.255	
-15.240	9.144	
-10.160	10.097	
-5.080	10.922	
[a]-2.540	11.659	
0	12.668	25.273
4.572	14.605	24.511
[a]6.096	15.240	24.397
7.620	15.748	24.384
11.176	16.510	
[a]13.462		
15.240		
20.320		

[a]Instrumentation survey plane.

Figure 1. - Flow path for stage 18-13, showing axial location of instrumentation.

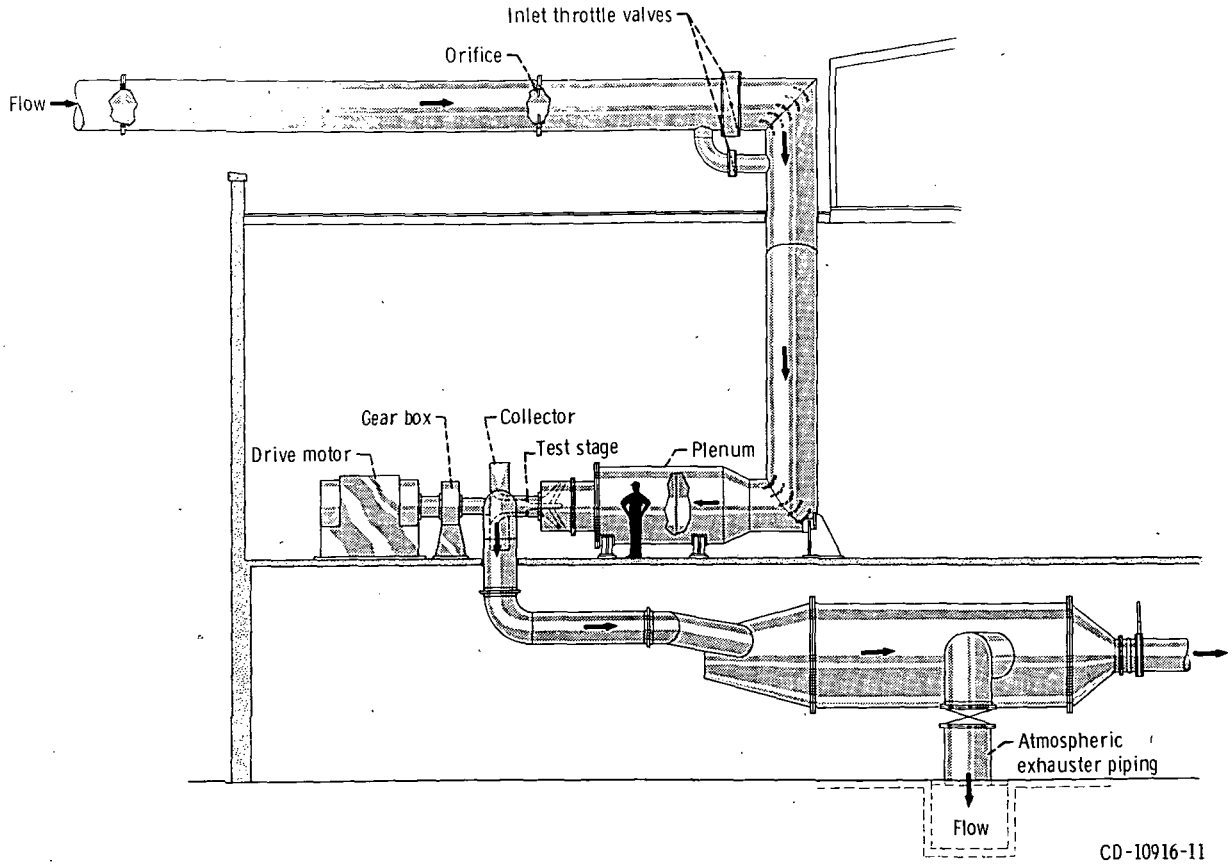


Figure 2. - Test facility schematic.

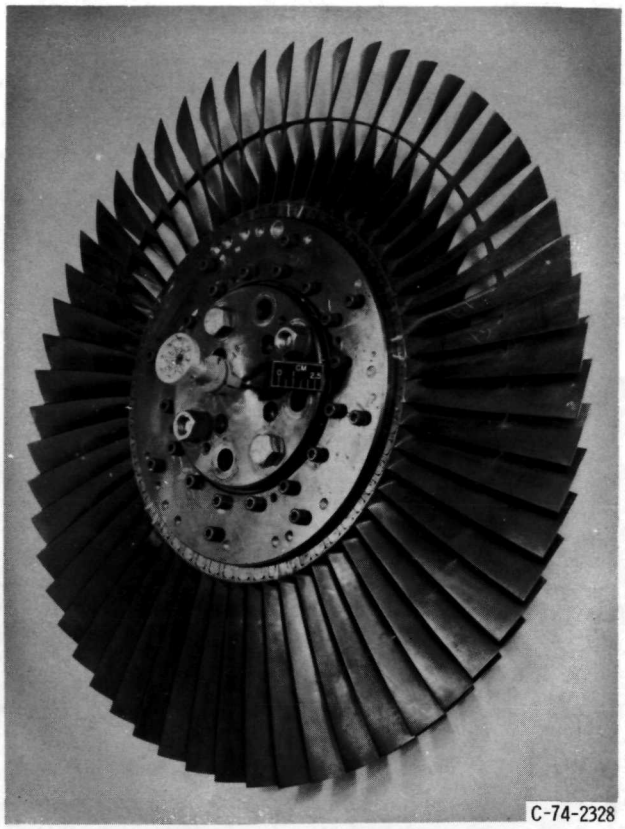


Figure 3. - Test rotor (rotor 18).

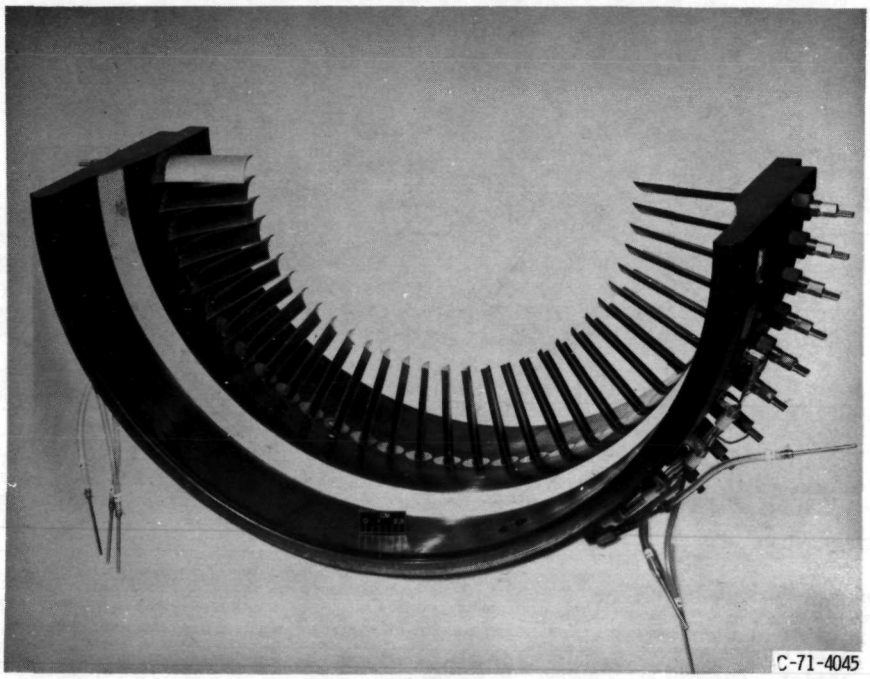
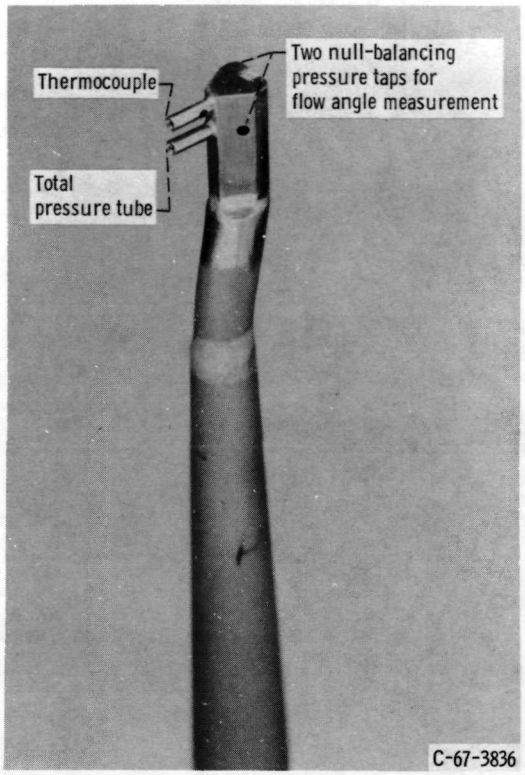
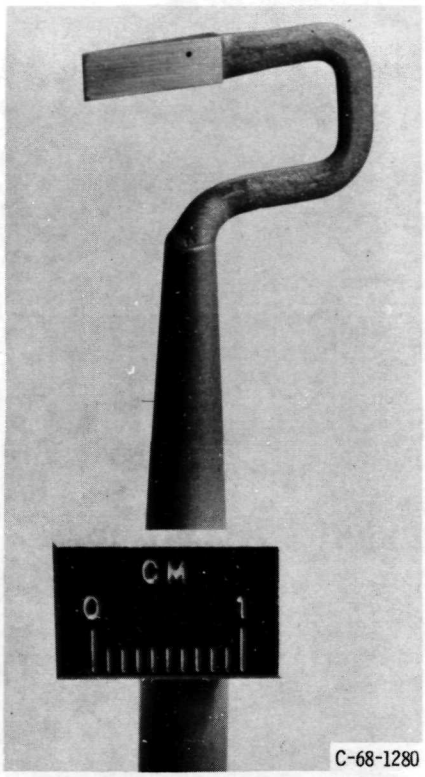


Figure 4. - Test stator (stator 13).



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



(b) Static pressure probe; 8^{0} C-shaped wedge.

Figure 5. - Survey probes.

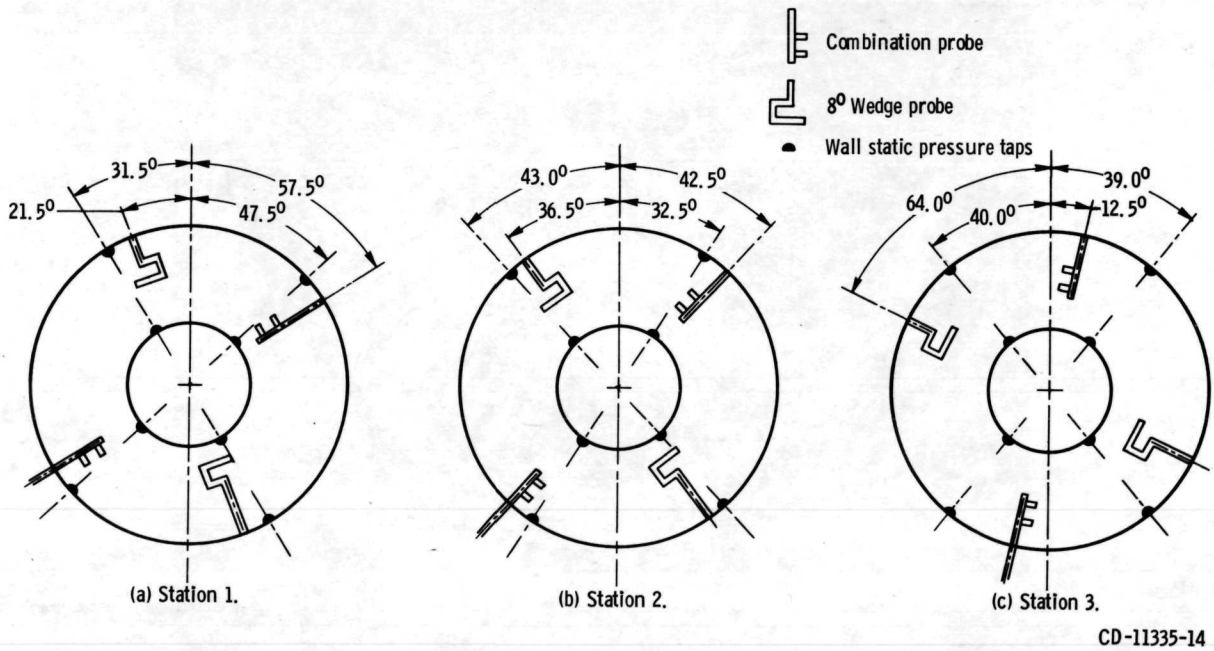


Figure 6. - Circumferential location of instrumentation at measuring stations (facing downstream).

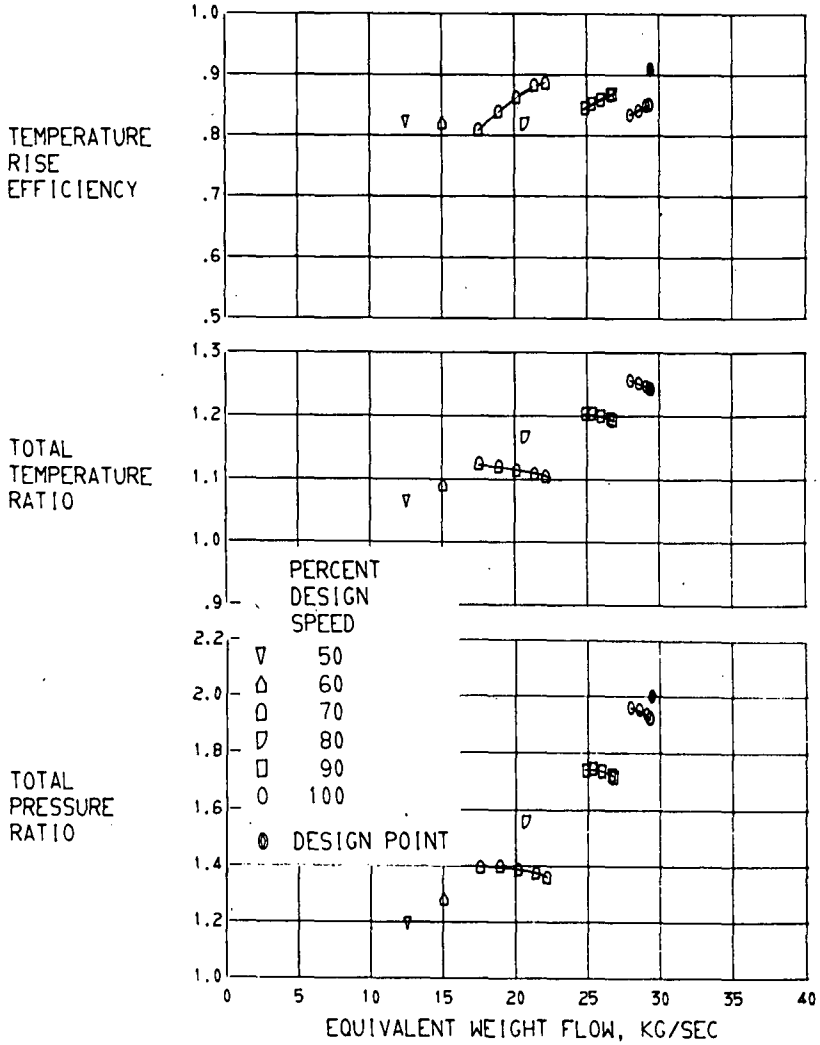


FIGURE 7. - OVERALL PERFORMANCE FOR ROTOR 18.

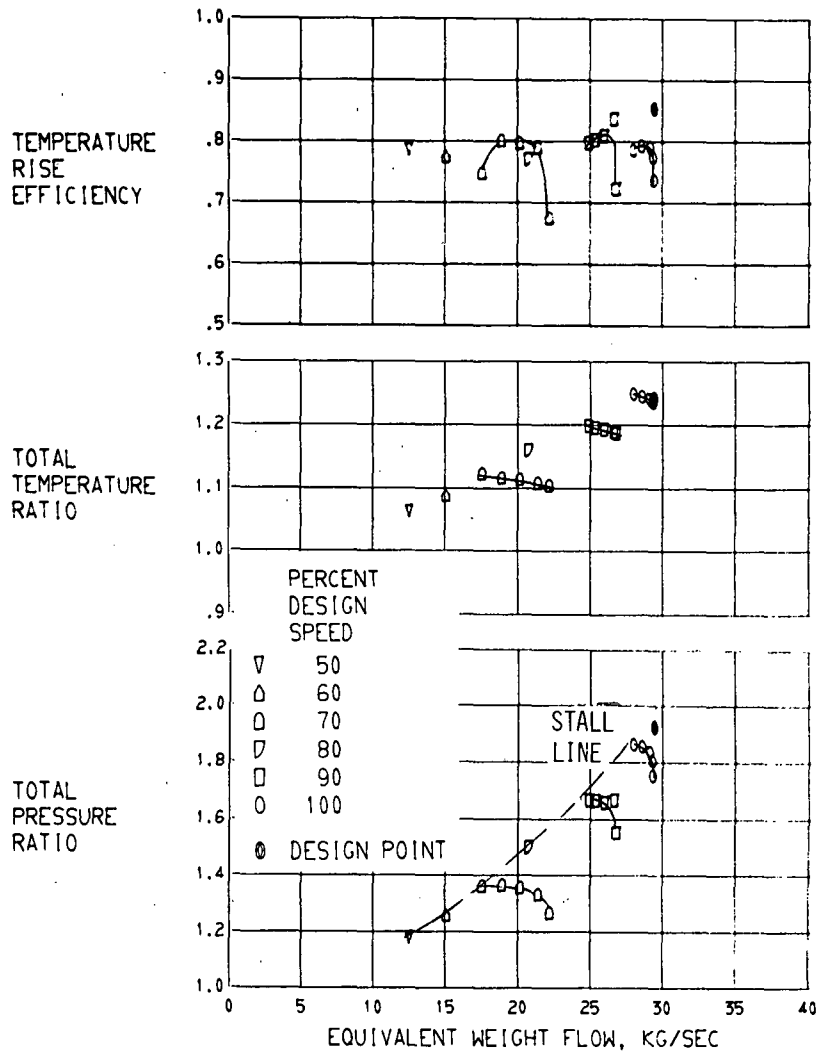
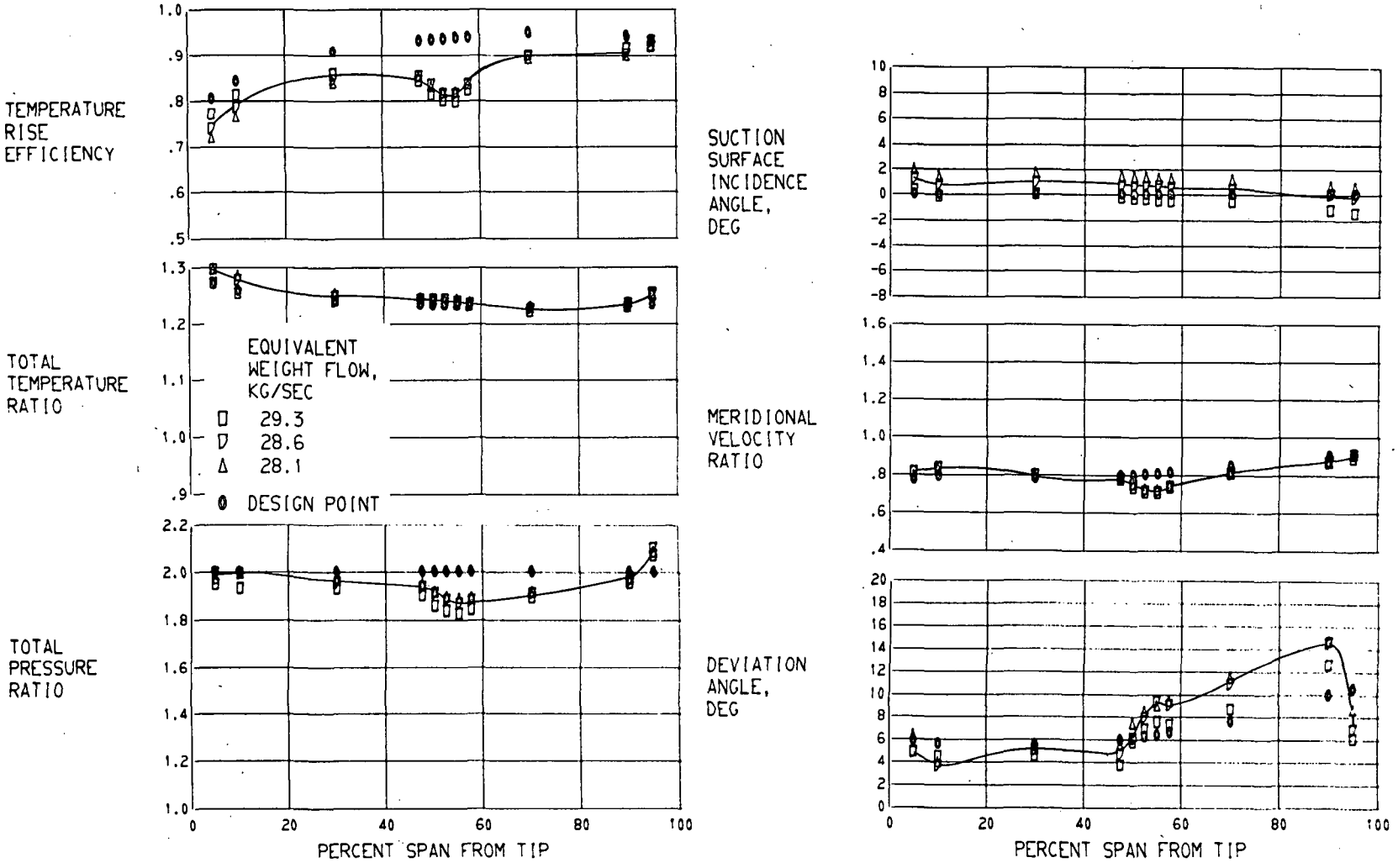


FIGURE 8. - OVERALL PERFORMANCE FOR STAGE 18-13.


TEMPERATURE RISE EFFICIENCY
TOTAL TEMPERATURE RATIO
TOTAL PRESSURE RATIO
EQUIVALENT WEIGHT FLOW, KG/SEC
29.3
28.6
28.1
DESIGN POINT
SUCTION SURFACE INCIDENCE ANGLE, DEG
MERIDIONAL VELOCITY RATIO
DEVIATION ANGLE, DEG
PERCENT SPAN FROM TIP
PERCENT SPAN FROM TIP

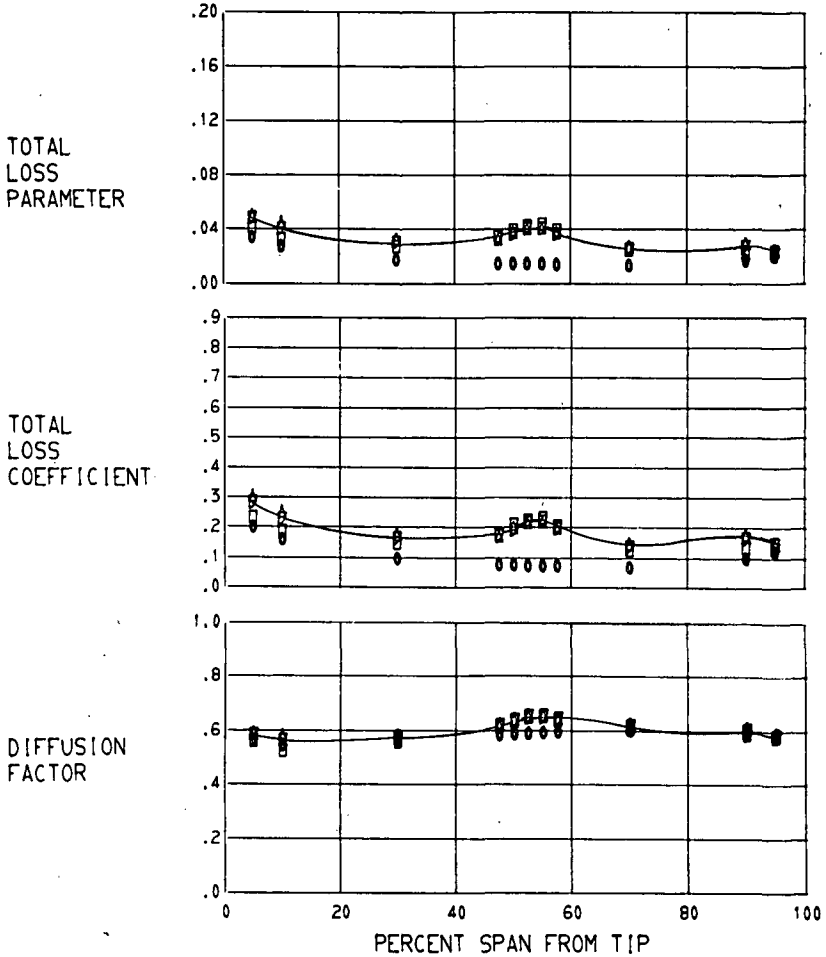


FIGURE 9. - RADIAL DISTRIBUTION OF PERFORMANCE FOR ROTOR 18. 100 PERCENT DESIGN SPEED.

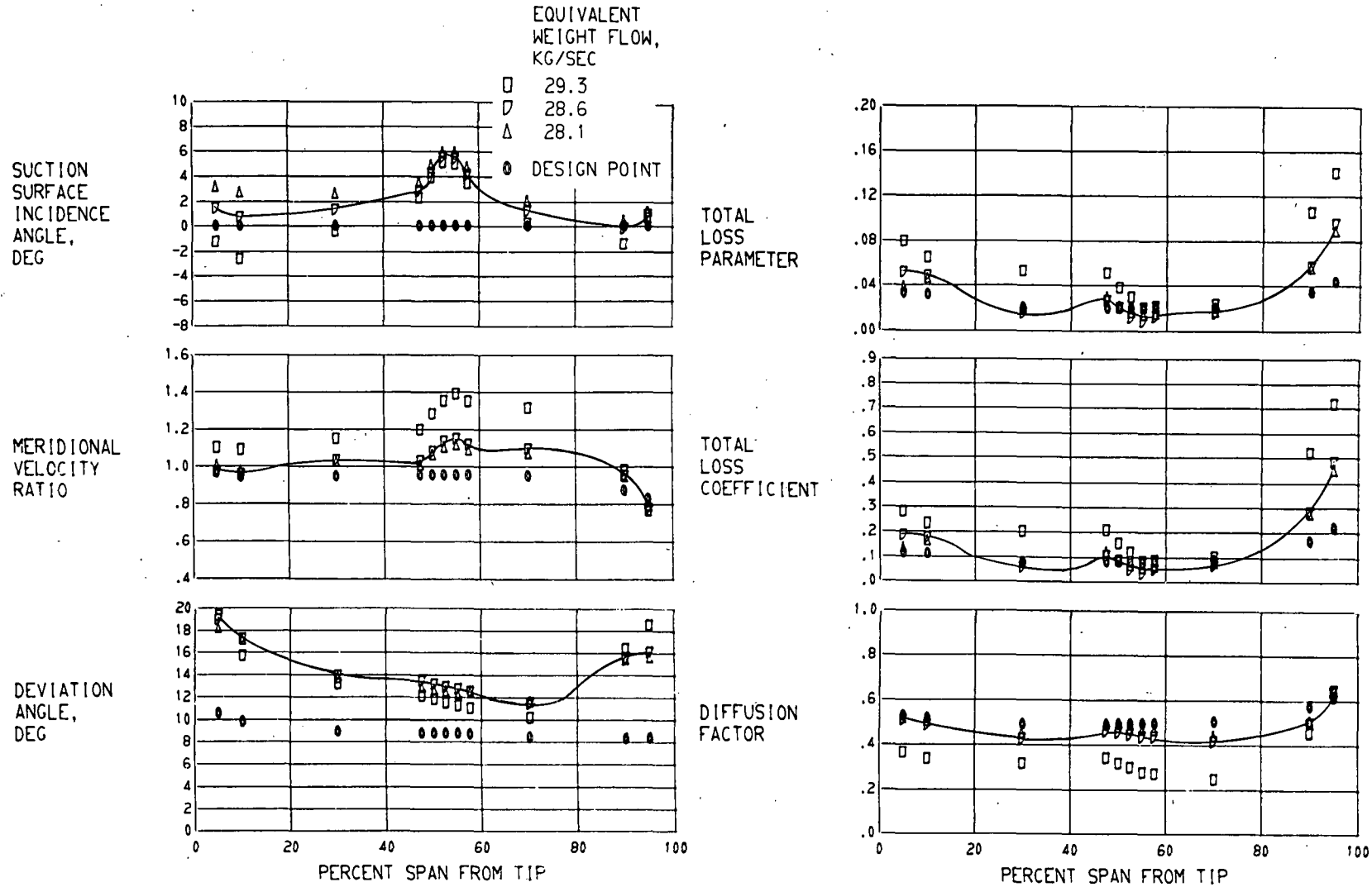
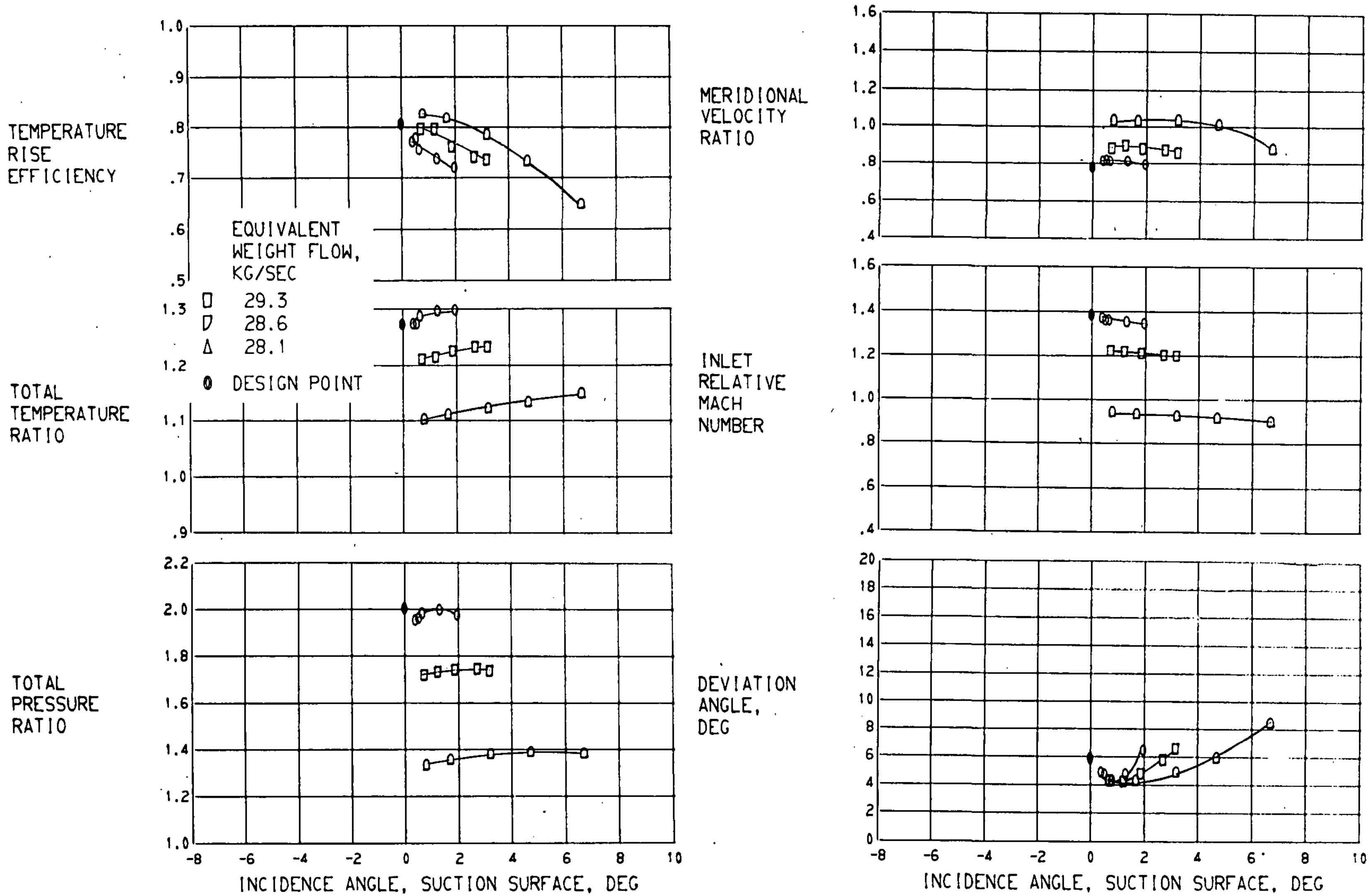
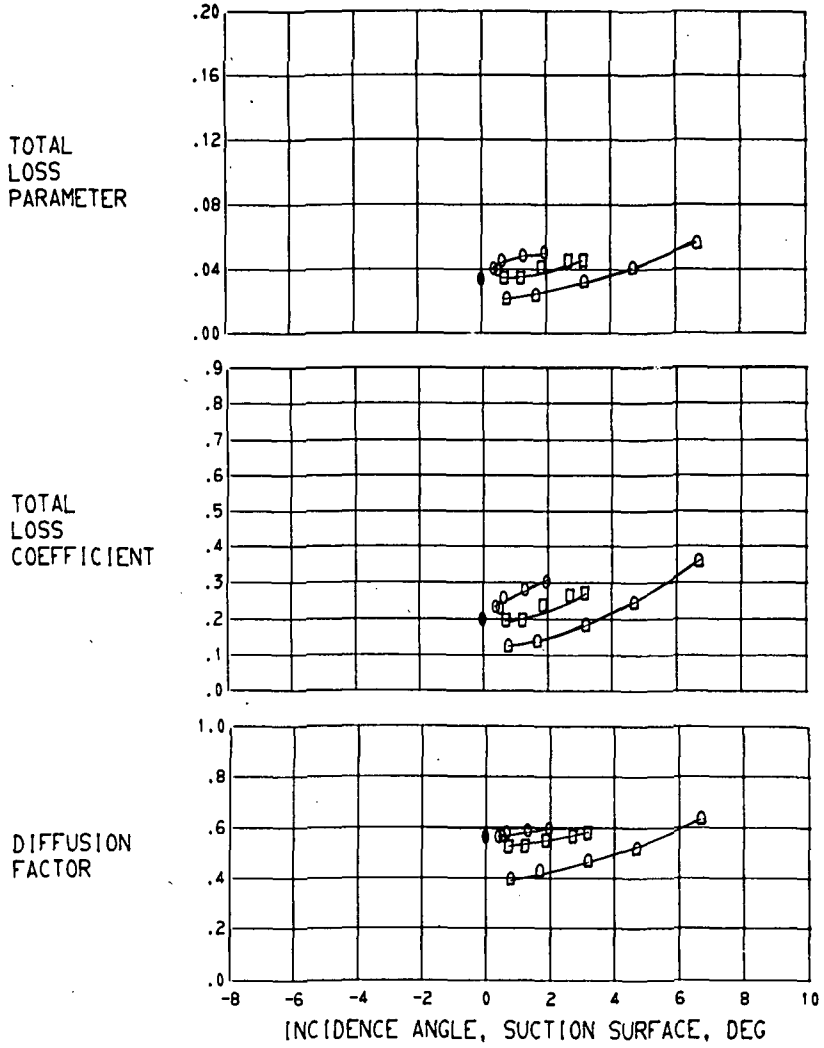


FIGURE 10. - RADIAL DISTRIBUTION OF PERFORMANCE FOR STATOR 13. 100 PERCENT DESIGN SPEED.

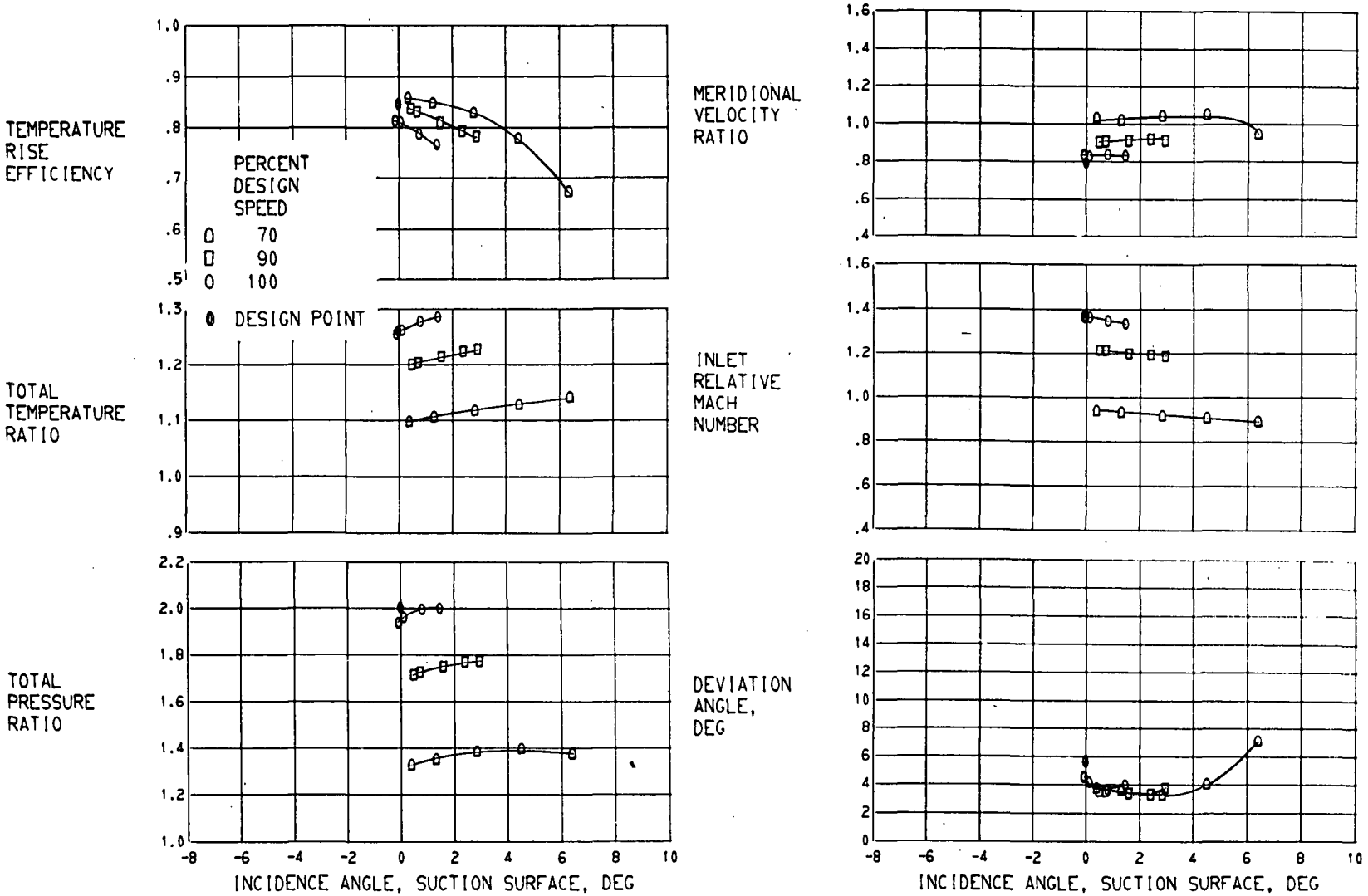


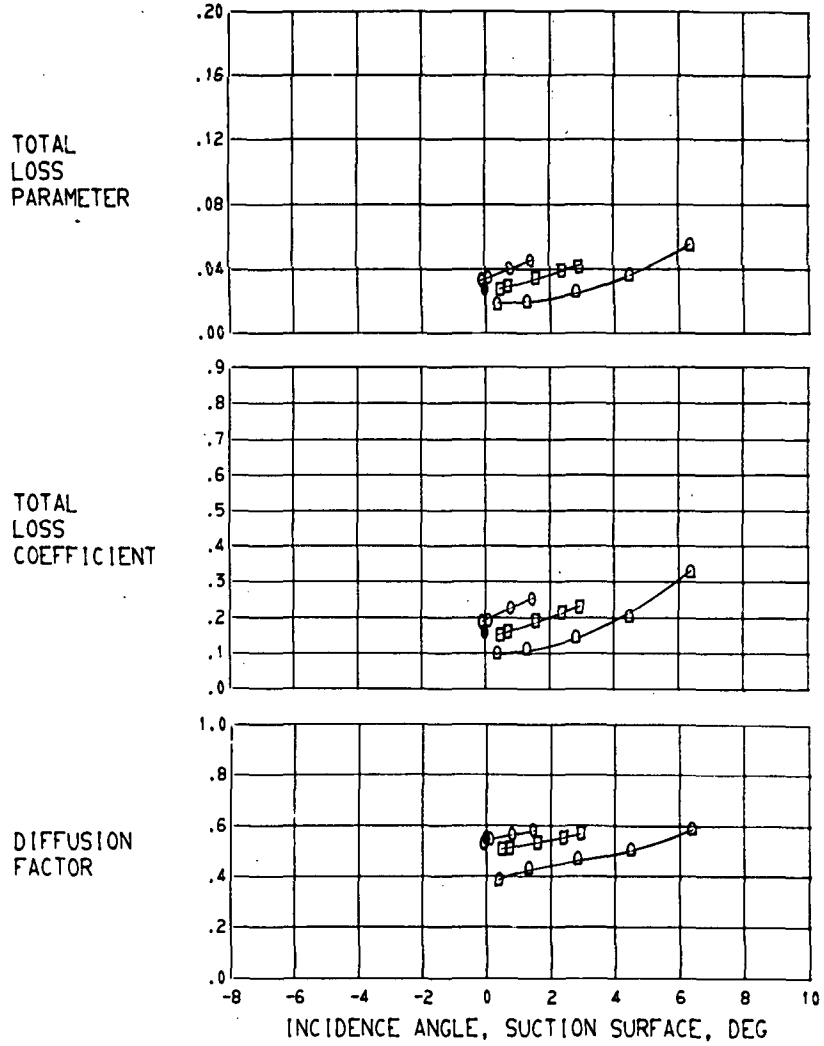
TEMPERATURE RISE EFFICIENCY
TOTAL TEMPERATURE RATIO
TOTAL PRESSURE RATIO
MERIDIONAL VELOCITY RATIO
INLET RELATIVE MACH NUMBER
DEVIATION ANGLE, DEG
EQUIVALENT WEIGHT FLOW, KG/SEC
29.3
28.6
28.1
DESIGN POINT
INCIDENCE ANGLE, SUCTION SURFACE, DEG
INCIDENCE ANGLE, SUCTION SURFACE, DEG



(A) 5.0 PERCENT SPAN.

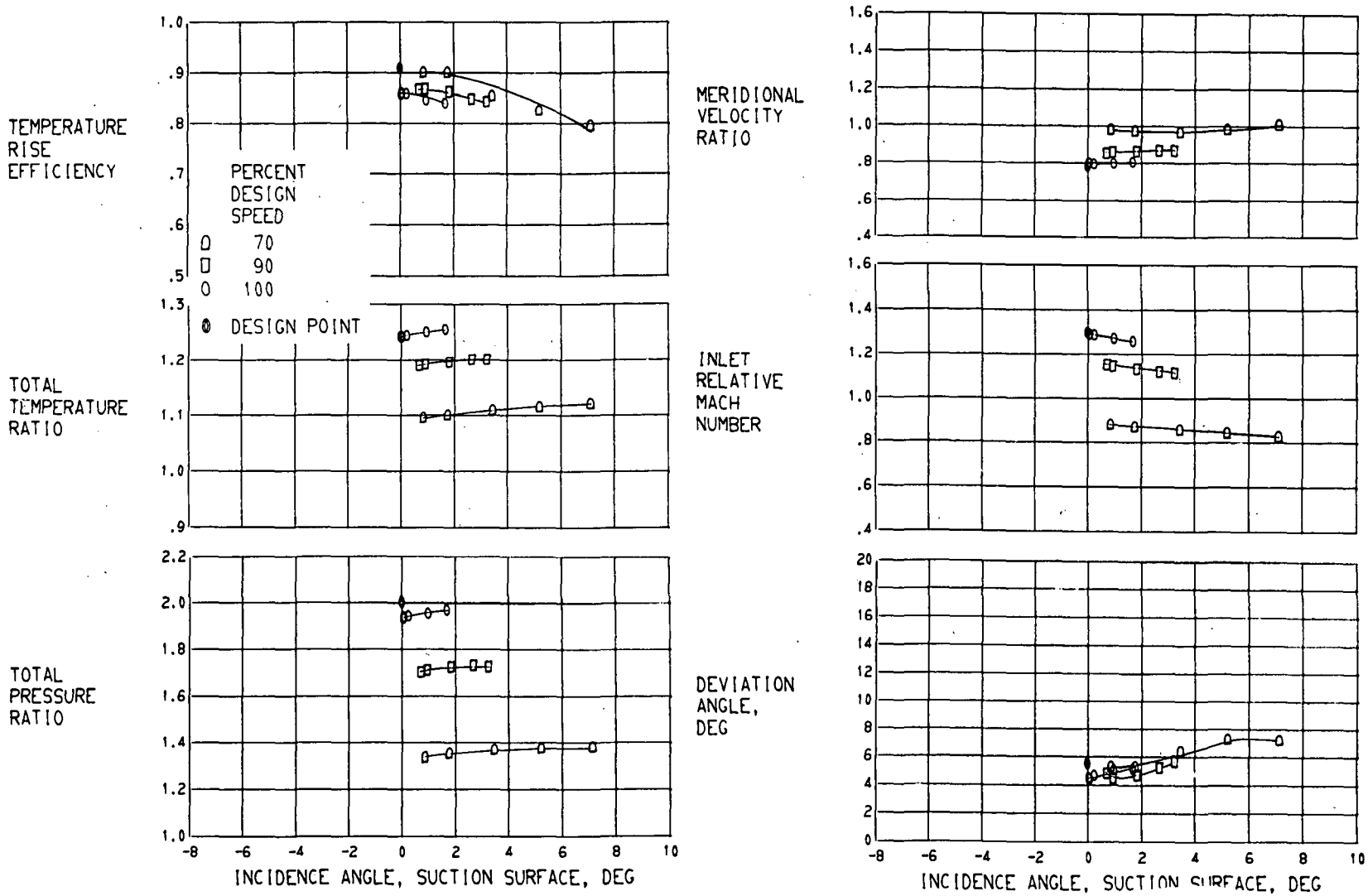
FIGURE 11. - BLADE-ELEMENT PERFORMANCE FOR ROTOR 18.

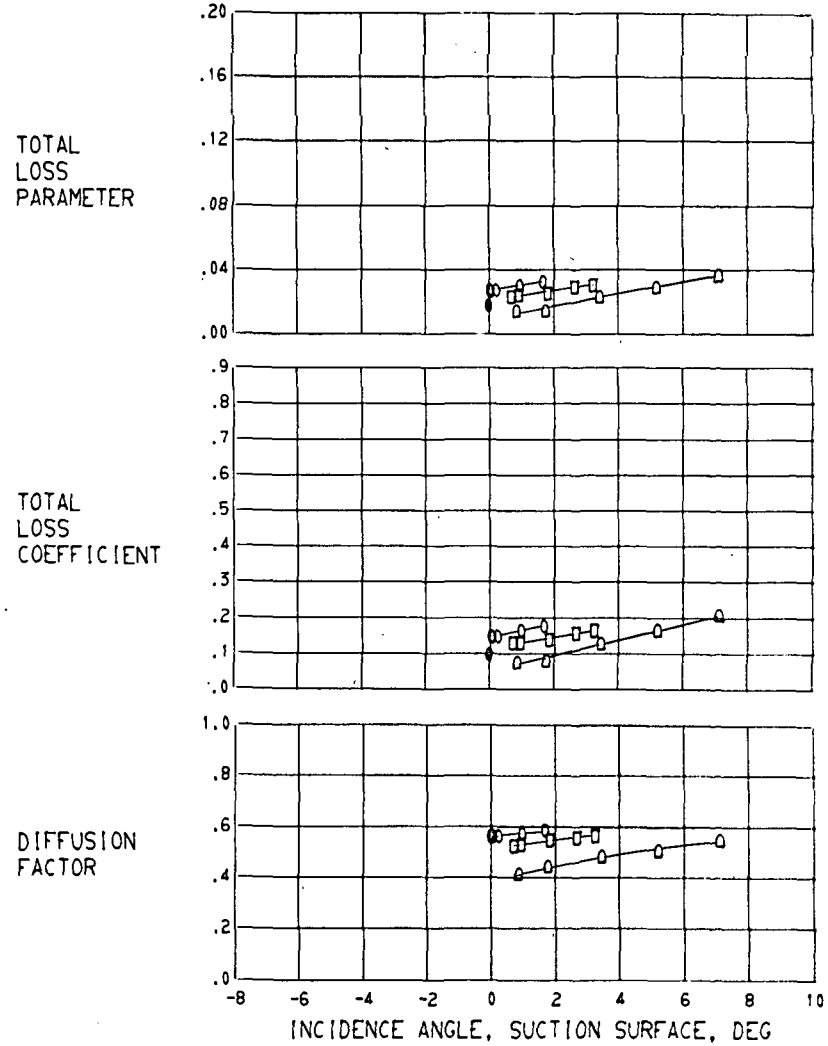

TEMPERATURE RISE EFFICIENCY
TOTAL TEMPERATURE RATIO
TOTAL PRESSURE RATIO
PERCENT DESIGN SPEED
70
90
100
DESIGN POINT
MERIDIONAL VELOCITY RATIO
INLET RELATIVE MACH NUMBER
DEVIATION ANGLE, DEG
INCIDENCE ANGLE, SUCTION SURFACE, DEG
INCIDENCE ANGLE, SUCTION SURFACE, DEG



(B) 10.0 PERCENT SPAN.

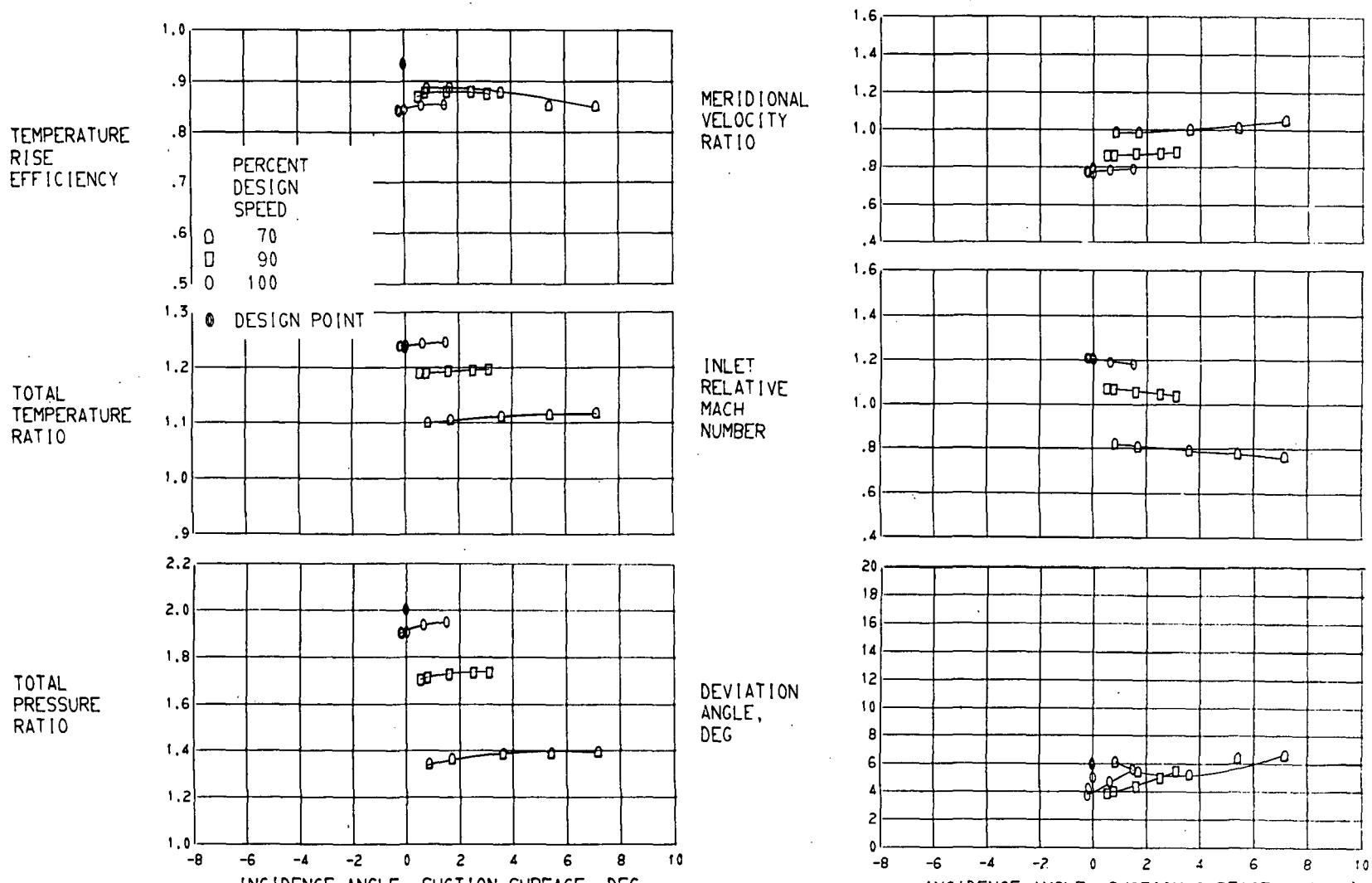
FIGURE 11. - CONTINUED. BLADE-ELEMENT PERFORMANCE FOR ROTOR 18.

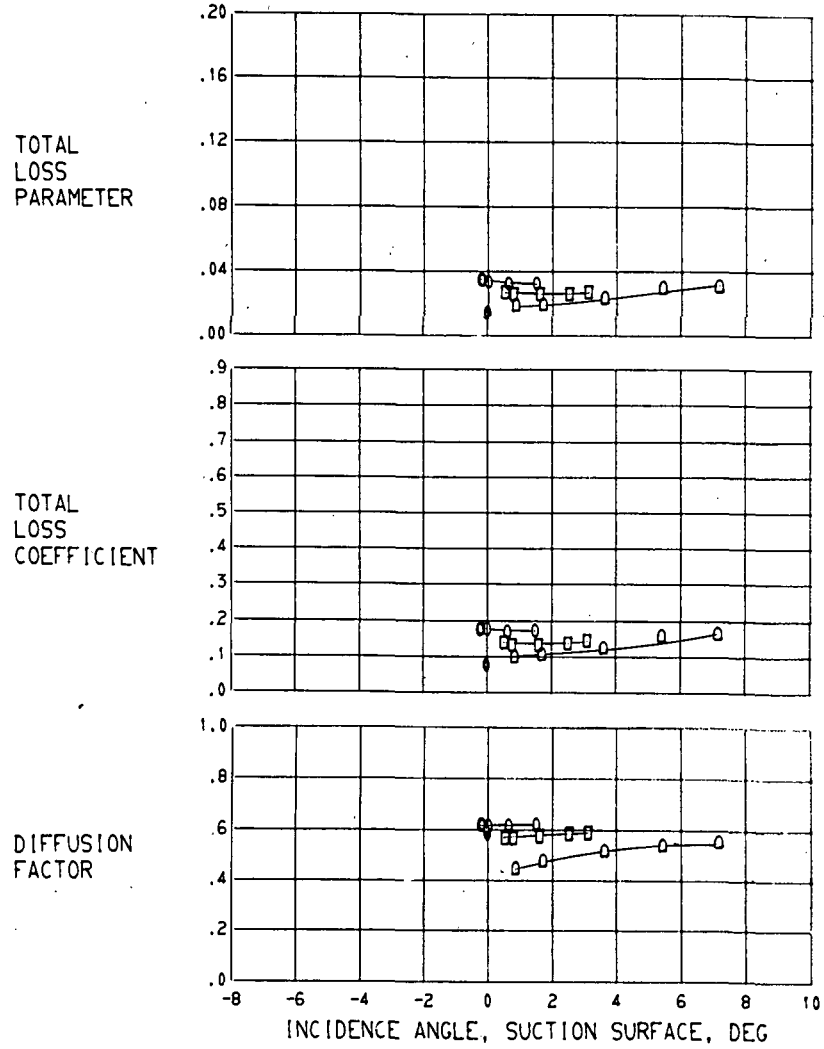

TEMPERATURE RISE EFFICIENCY
TOTAL TEMPERATURE RATIO
TOTAL PRESSURE RATIO
PERCENT DESIGN SPEED
70
90
100
DESIGN POINT
MERIDIONAL VELOCITY RATIO
INLET RELATIVE MACH NUMBER
DEVIATION ANGLE, DEG
INCIDENCE ANGLE, SUCTION SURFACE, DEG
INCIDENCE ANGLE, SUCTION SURFACE, DEG



(C) 30.0 PERCENT SPAN.

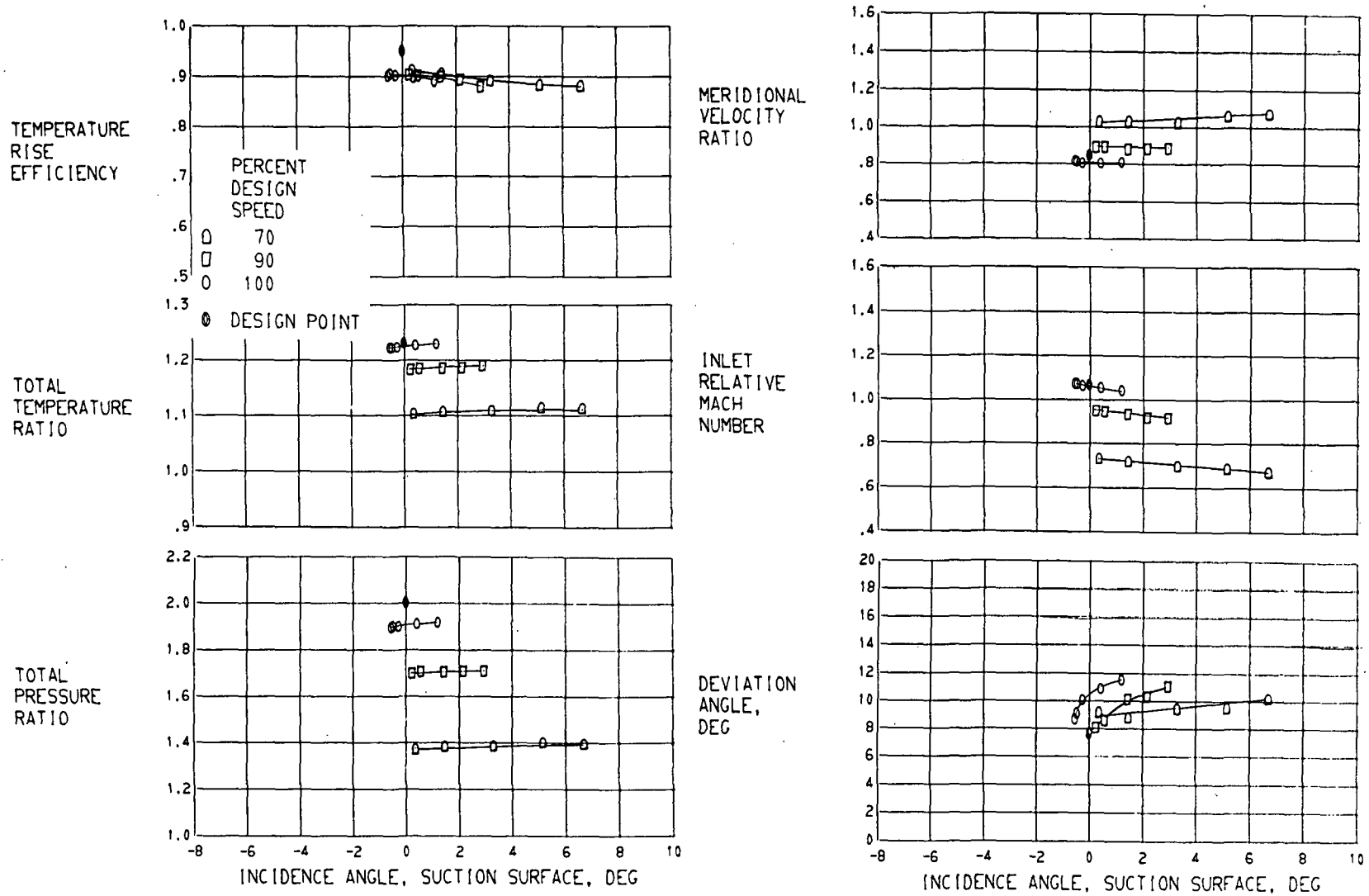
FIGURE 11. - CONTINUED. BLADE-ELEMENT PERFORMANCE FOR ROTOR 18.

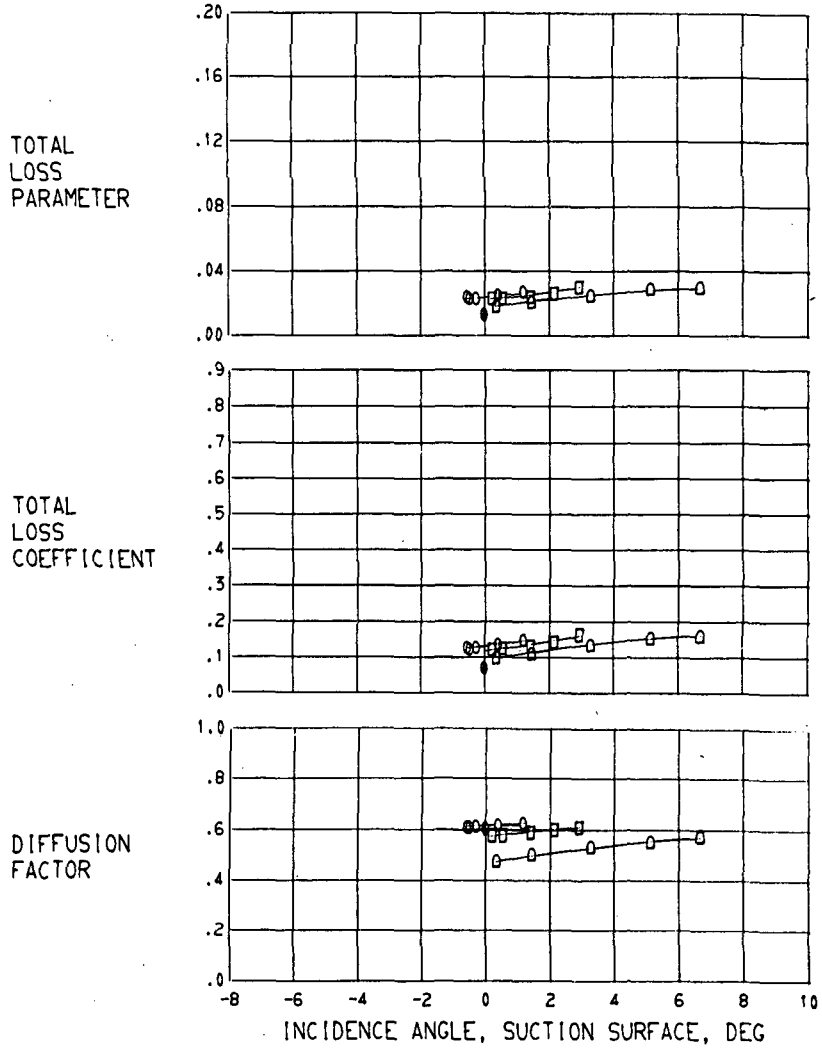

TEMPERATURE RISE EFFICIENCY
TOTAL TEMPERATURE RATIO
TOTAL PRESSURE RATIO
PERCENT DESIGN SPEED
70
90
100
DESIGN POINT
MERIDIONAL VELOCITY RATIO
INLET RELATIVE MACH NUMBER
DEVIATION ANGLE, DEG
INCIDENCE ANGLE, SUCTION SURFACE, DEG
INCIDENCE ANGLE, SUCTION SURFACE, DEG



(D) 47.5 PERCENT SPAN.

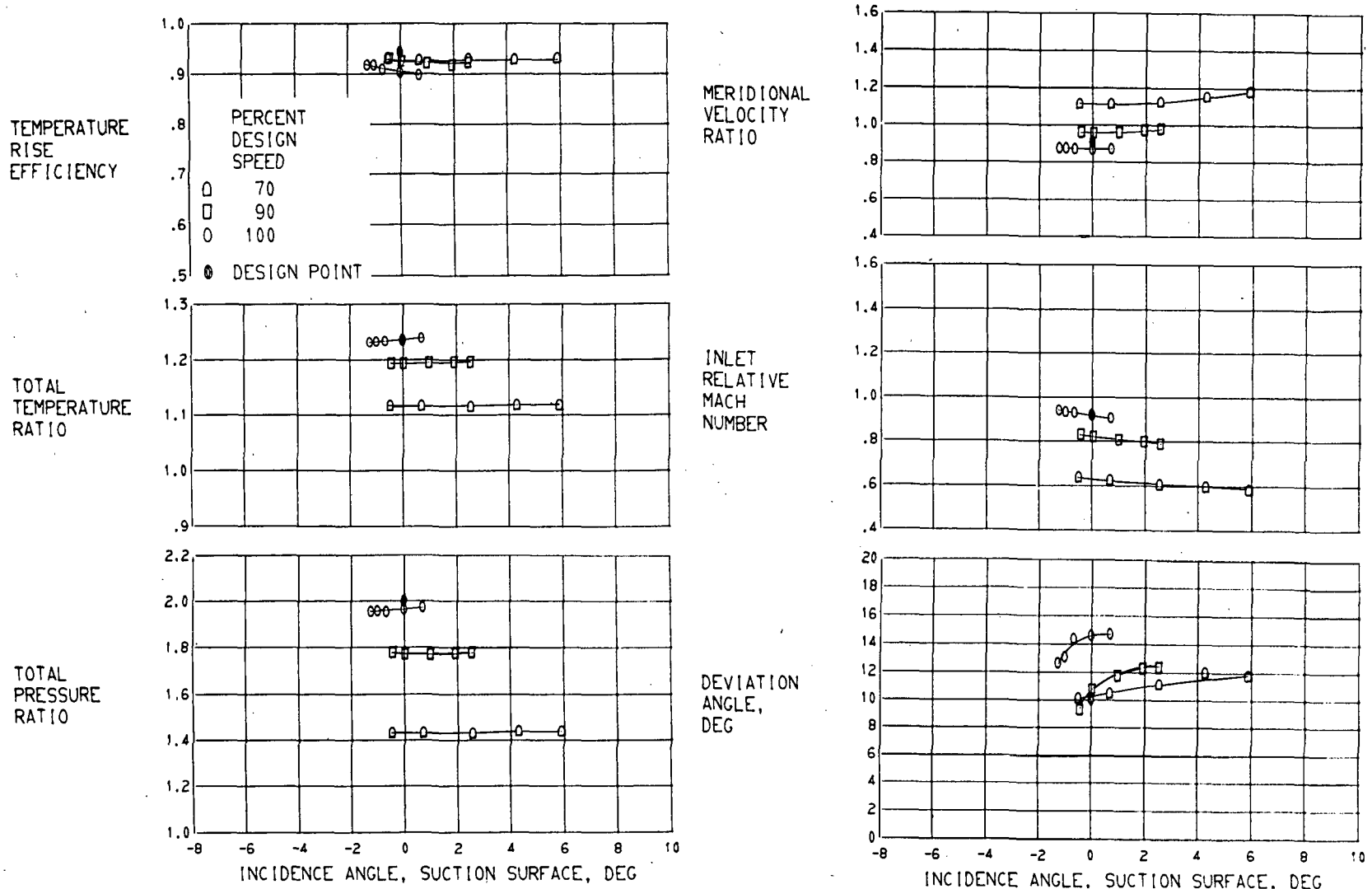
FIGURE 11. - CONTINUED. BLADE-ELEMENT PERFORMANCE FOR ROTOR 18.

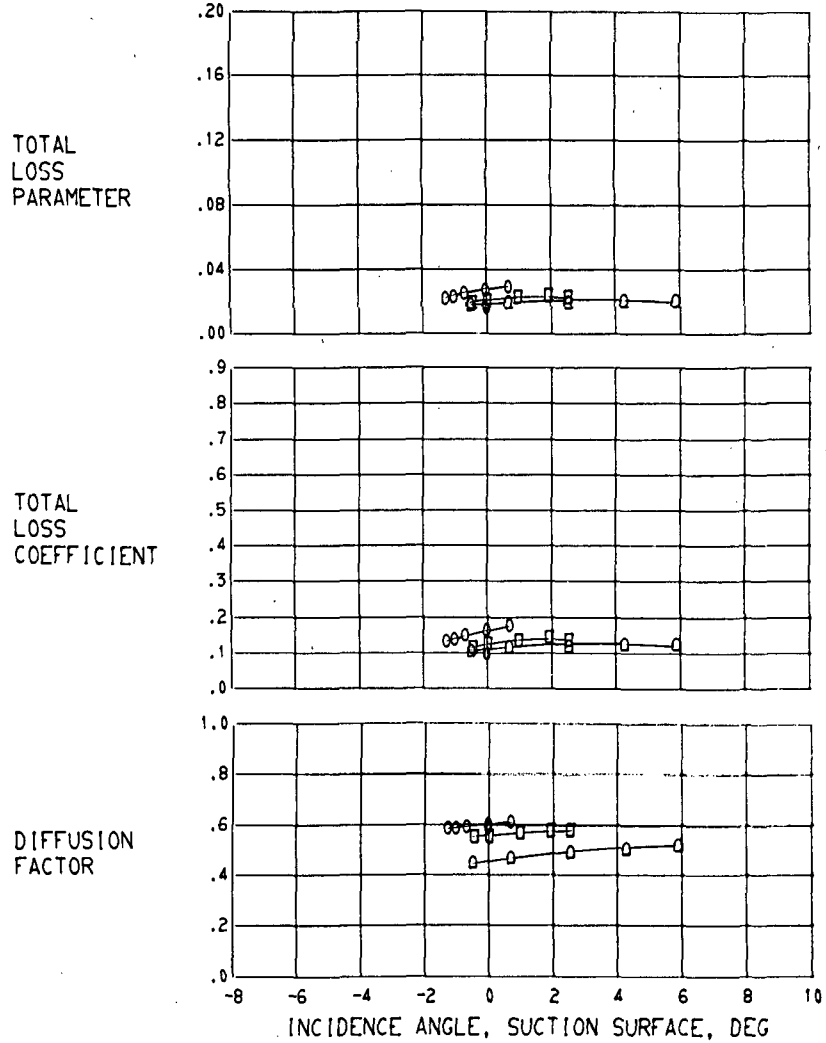

TEMPERATURE RISE EFFICIENCY
TOTAL TEMPERATURE RATIO
TOTAL PRESSURE RATIO
PERCENT DESIGN SPEED
70
90
100
DESIGN POINT
MERIDIONAL VELOCITY RATIO
INLET RELATIVE MACH NUMBER
DEVIATION ANGLE, DEG
INCIDENCE ANGLE, SUCTION SURFACE, DEG
INCIDENCE ANGLE, SUCTION SURFACE, DEG



(E) 70.0 PERCENT SPAN.

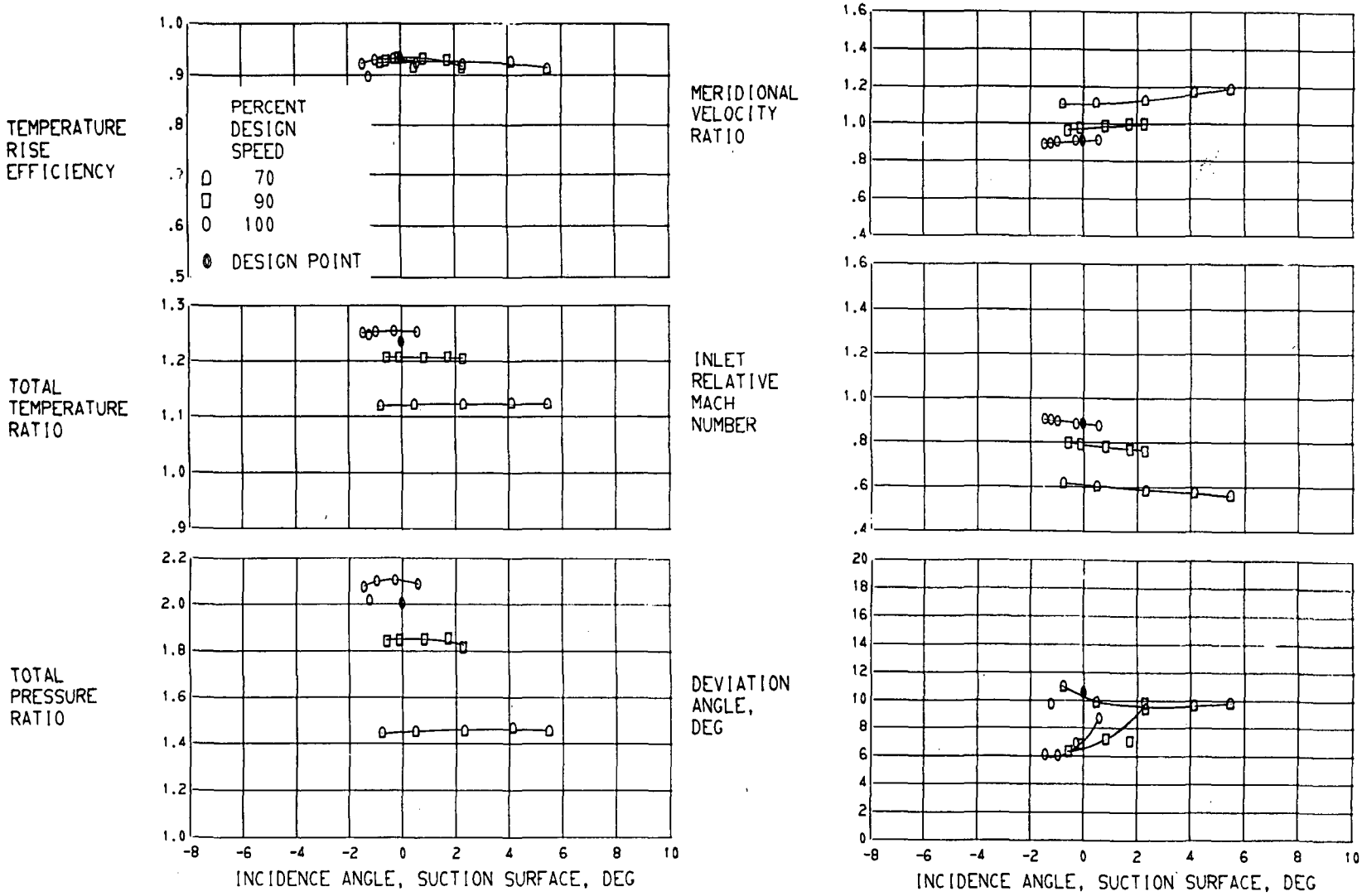
FIGURE 11. - CONTINUED. BLADE-ELEMENT PERFORMANCE FOR ROTOR 18.

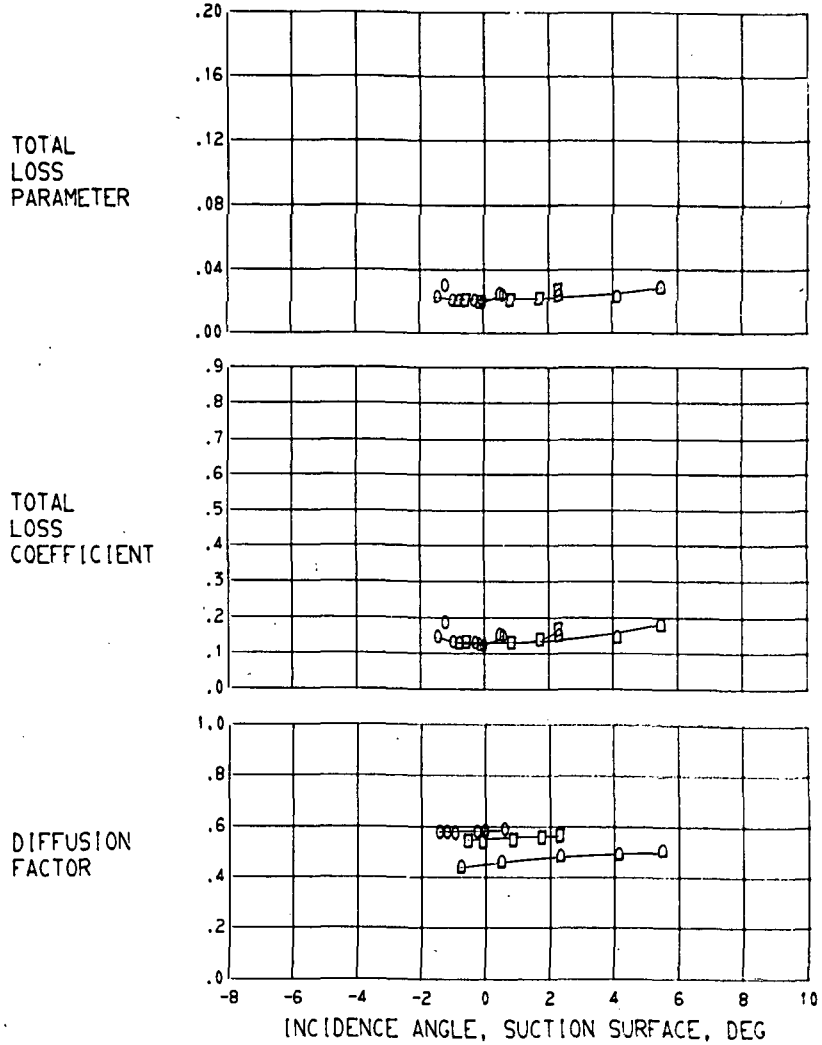

TEMPERATURE RISE EFFICIENCY
TOTAL TEMPERATURE RATIO
TOTAL PRESSURE RATIO
PERCENT DESIGN SPEED
70
90
100
DESIGN POINT
MERIDIONAL VELOCITY RATIO
INLET RELATIVE MACH NUMBER
DEVIATION ANGLE, DEG
INCIDENCE ANGLE, SUCTION SURFACE, DEG
INCIDENCE ANGLE, SUCTION SURFACE, DEG



(F) 90.0 PERCENT SPAN.

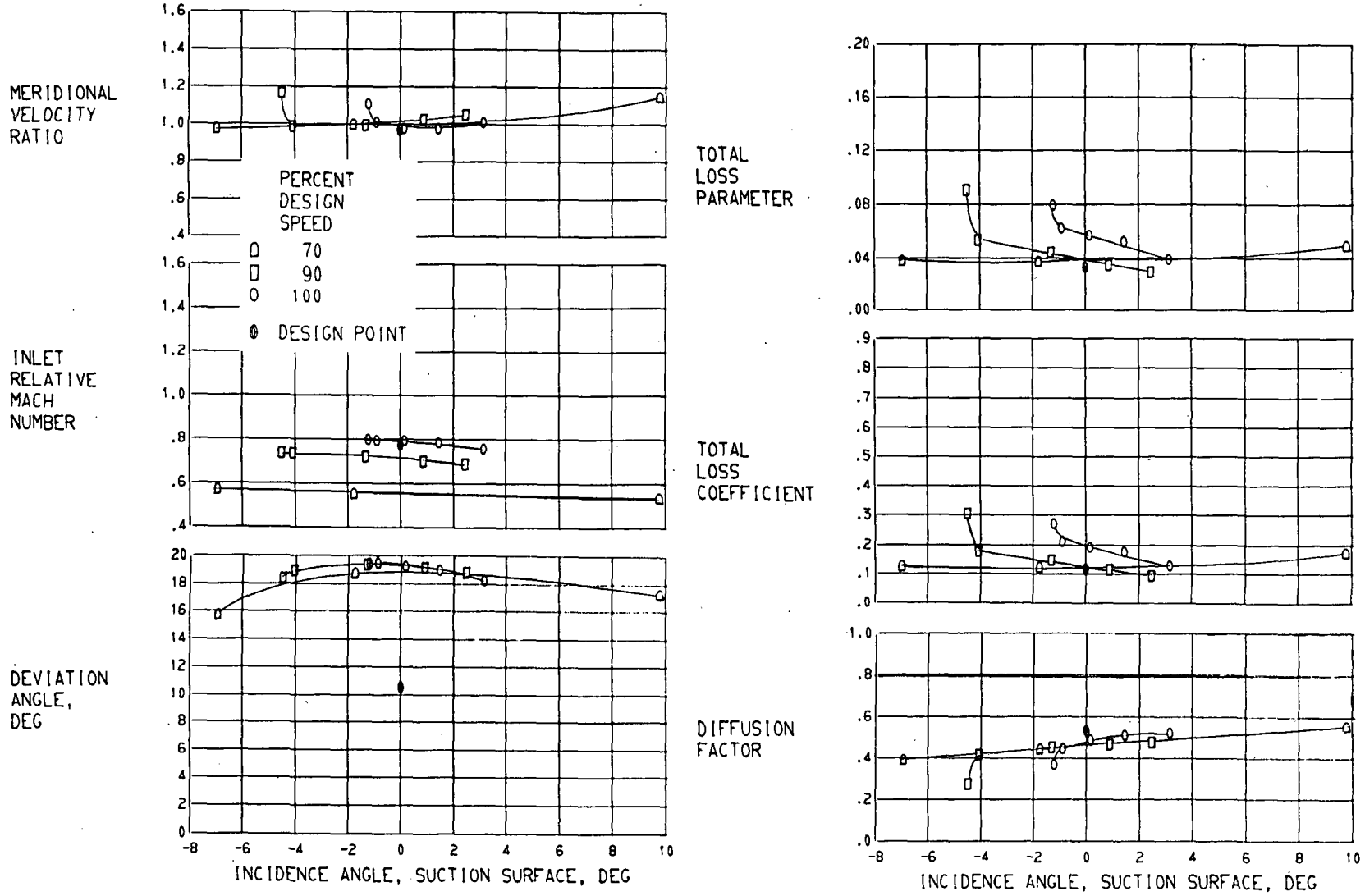
FIGURE 11. - CONTINUED. BLADE-ELEMENT PERFORMANCE FOR ROTOR 18.


TEMPERATURE RISE EFFICIENCY
TOTAL TEMPERATURE RATIO
TOTAL PRESSURE RATIO
PERCENT DESIGN SPEED
70
90
100
DESIGN POINT
MERIDIONAL VELOCITY RATIO
INLET RELATIVE MACH NUMBER
DEVIATION ANGLE, DEG
INCIDENCE ANGLE, SUCTION SURFACE, DEG
INCIDENCE ANGLE, SUCTION SURFACE, DEG



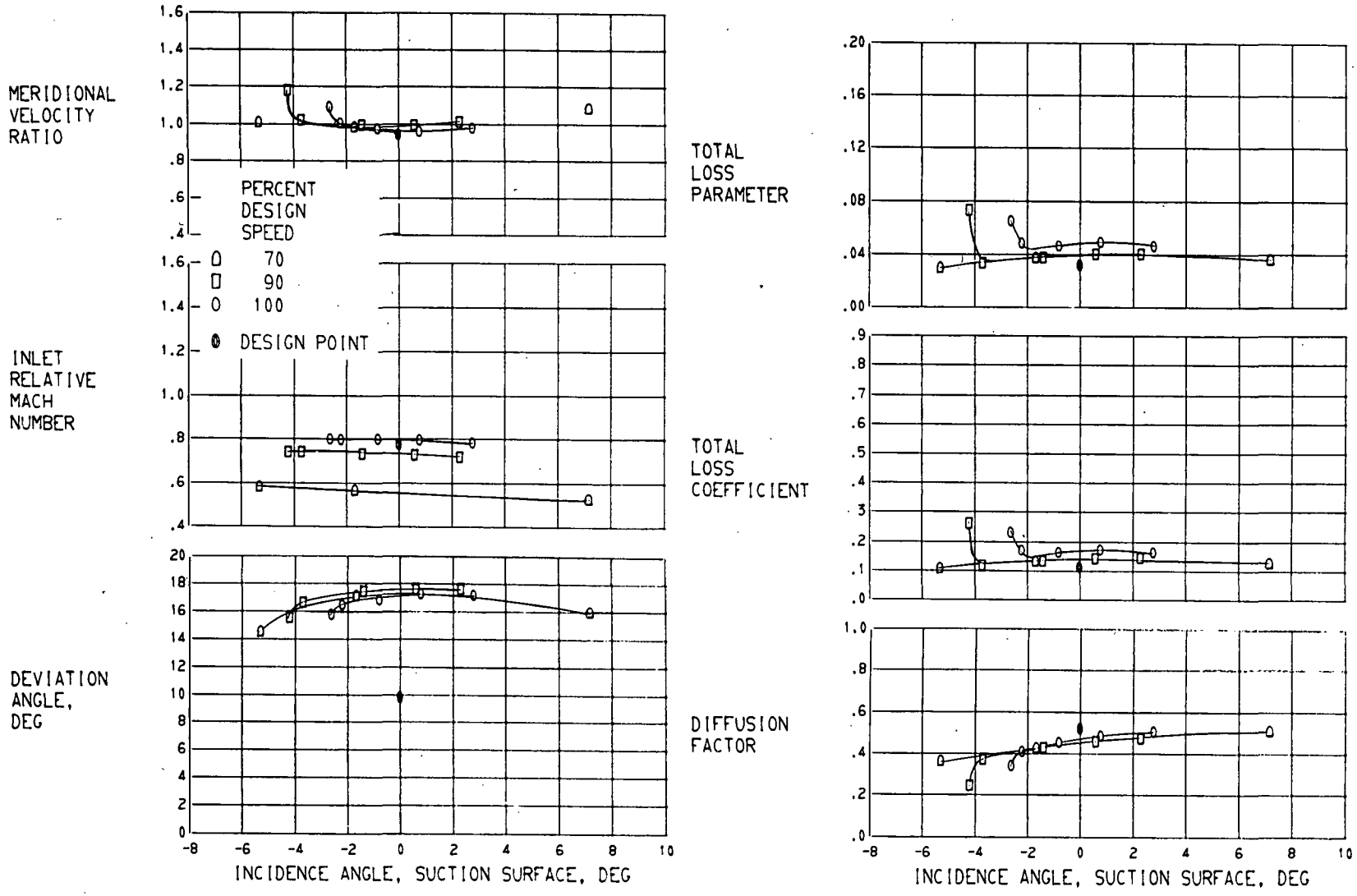
(G) 95.0 PERCENT SPAN.

FIGURE 11. - CONCLUDED. BLADE-ELEMENT PERFORMANCE FOR ROTOR 18.



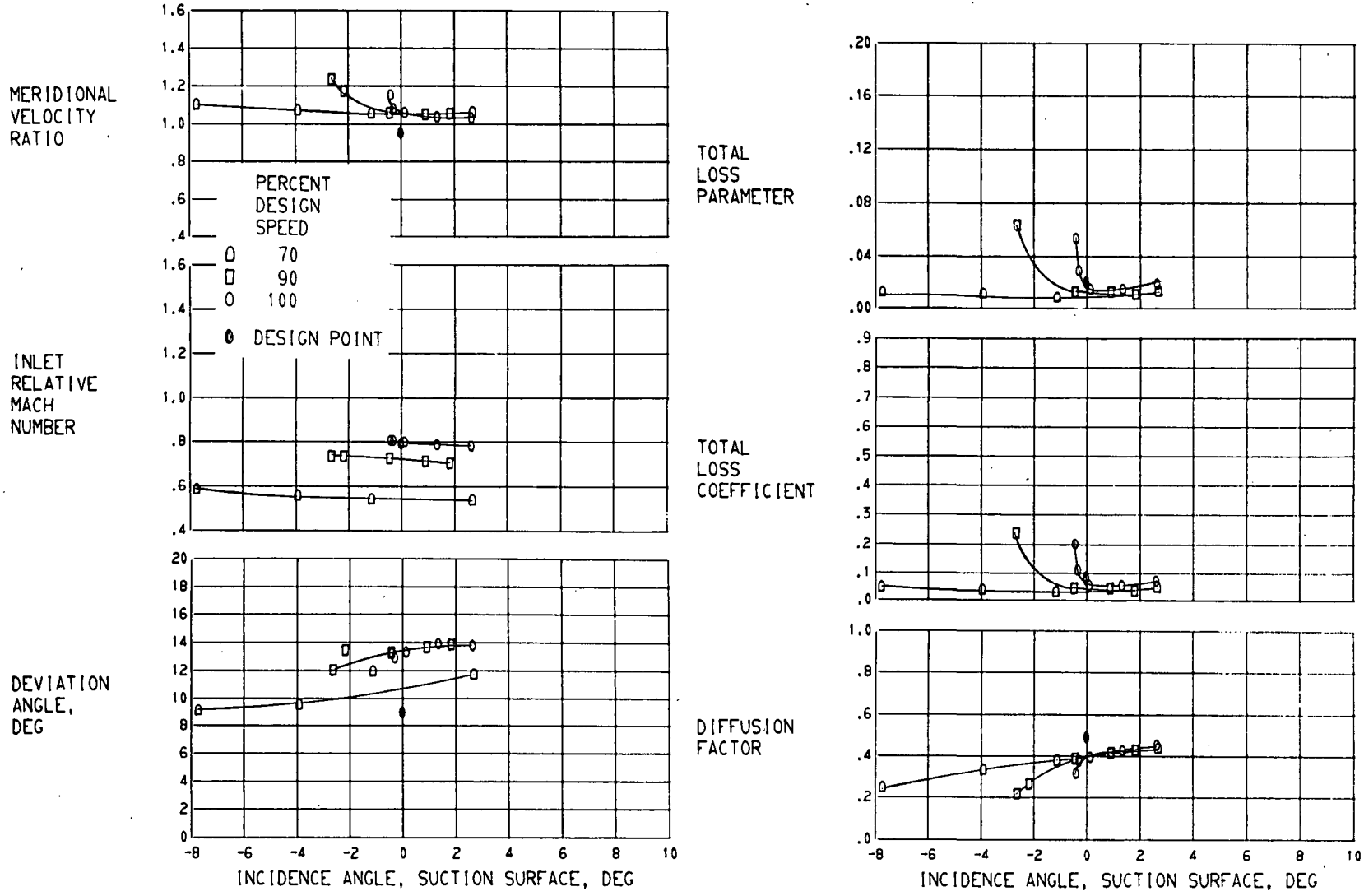
(A) 5.0 PERCENT SPAN.

FIGURE 12. - BLADE-ELEMENT PERFORMANCE FOR STATOR 13.



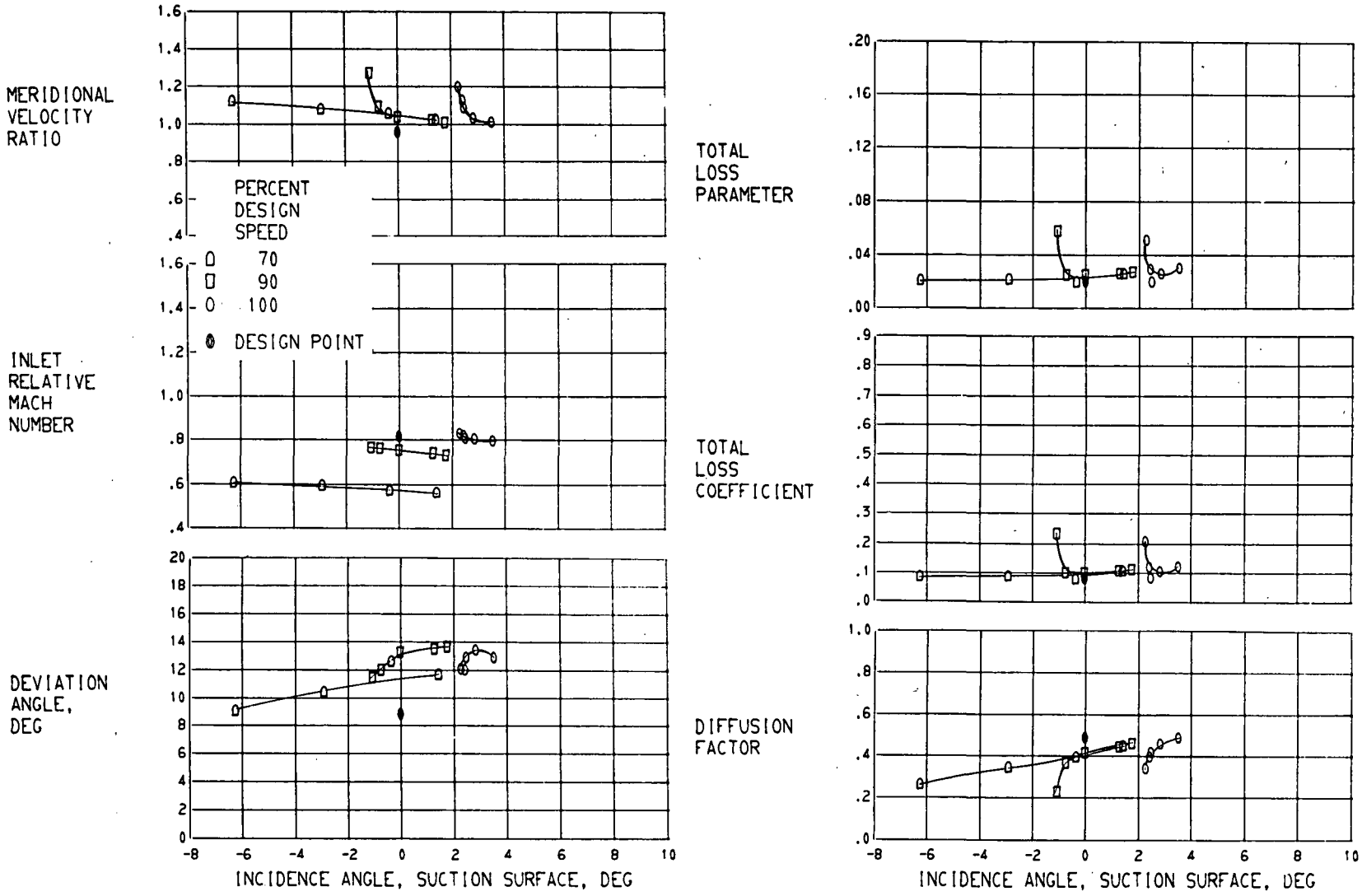
(B) 10.0 PERCENT SPAN.

FIGURE 12. - CONTINUED. BLADE-ELEMENT PERFORMANCE FOR STATOR 13.



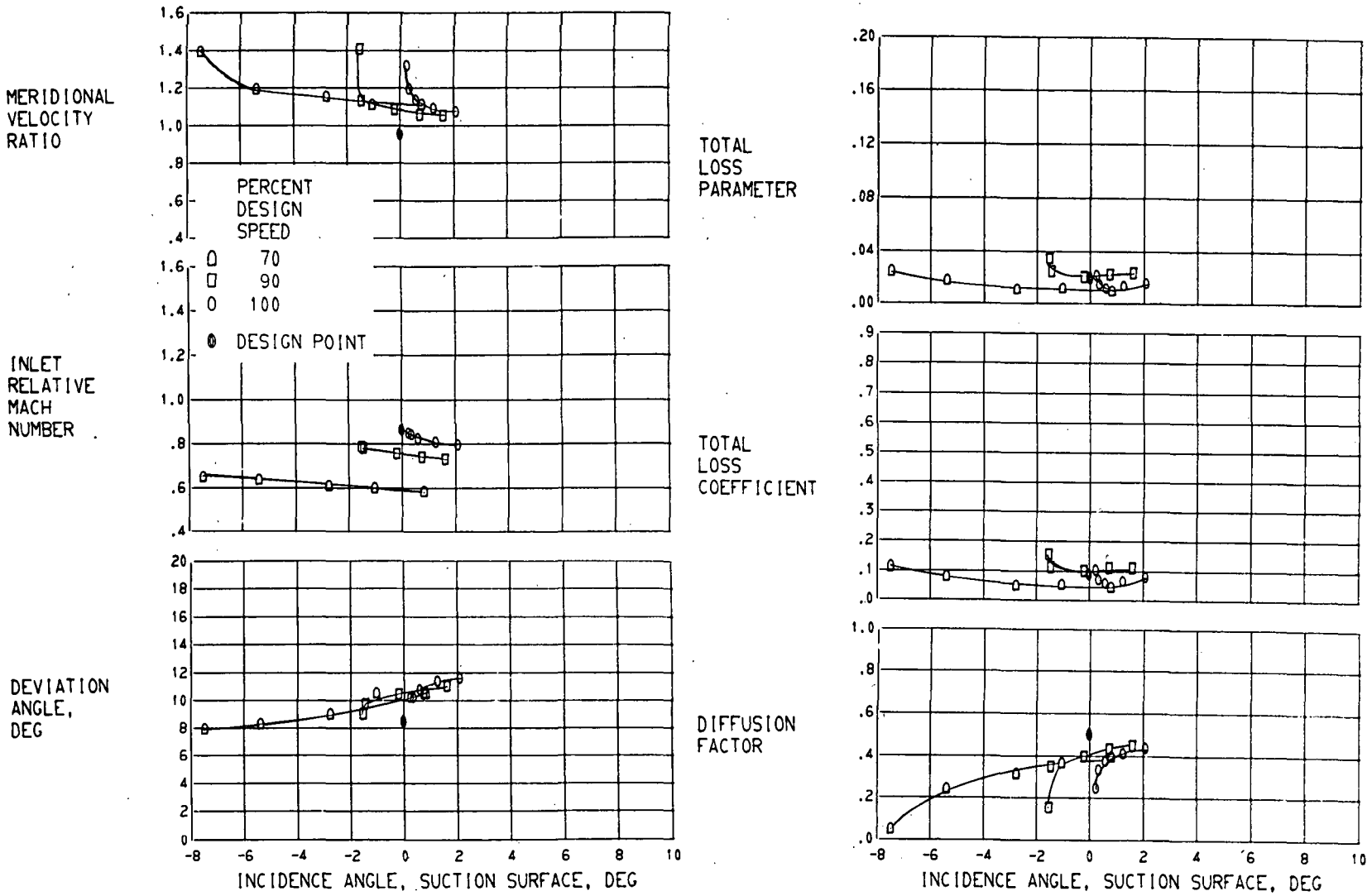
(C) 30.0 PERCENT SPAN.

FIGURE 12. - CONTINUED. BLADE-ELEMENT PERFORMANCE FOR STATOR 13.



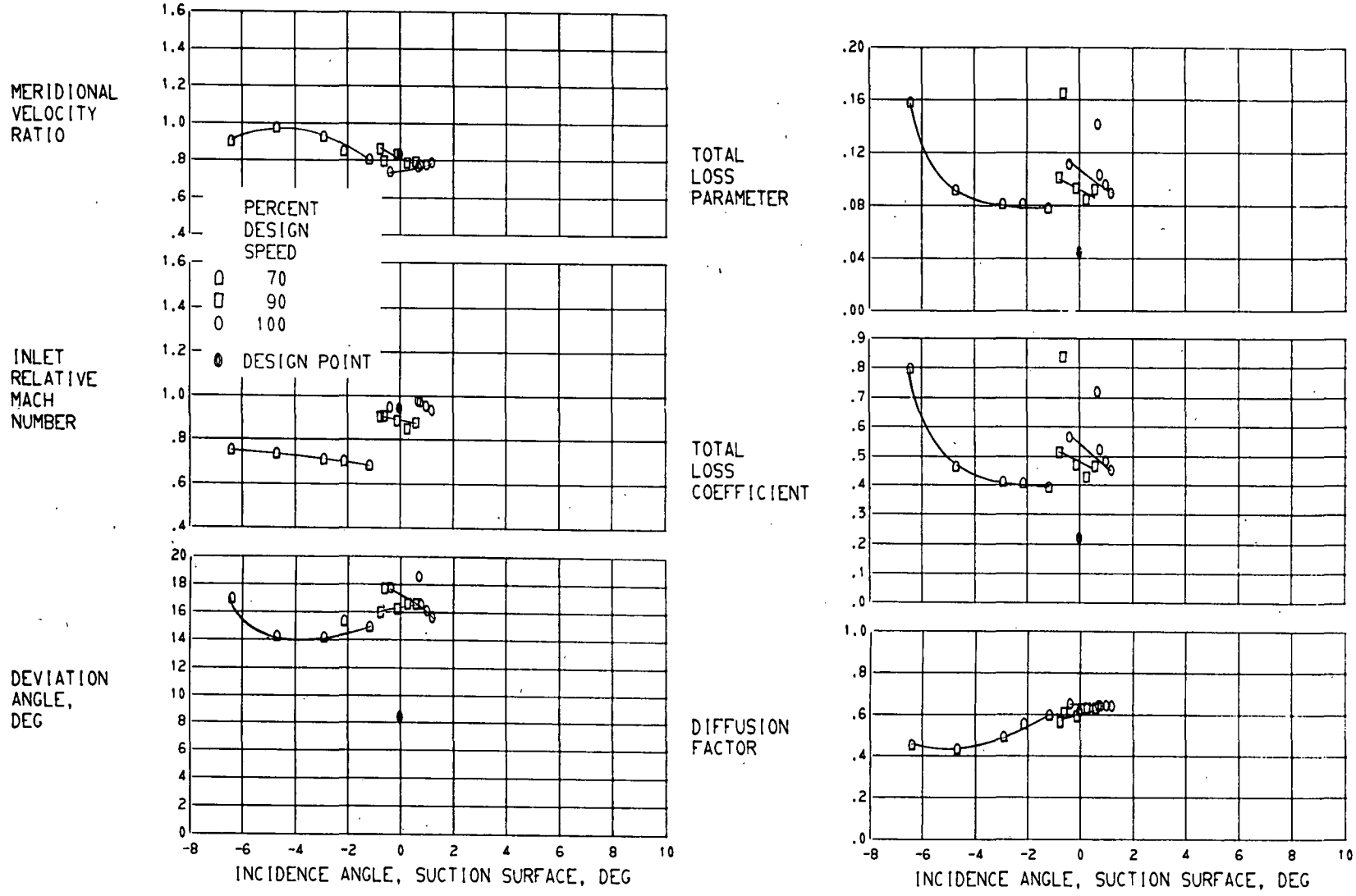
(D) 47.5 PERCENT SPAN.

FIGURE 12. - CONTINUED. BLADE-ELEMENT PERFORMANCE FOR STATOR 13.



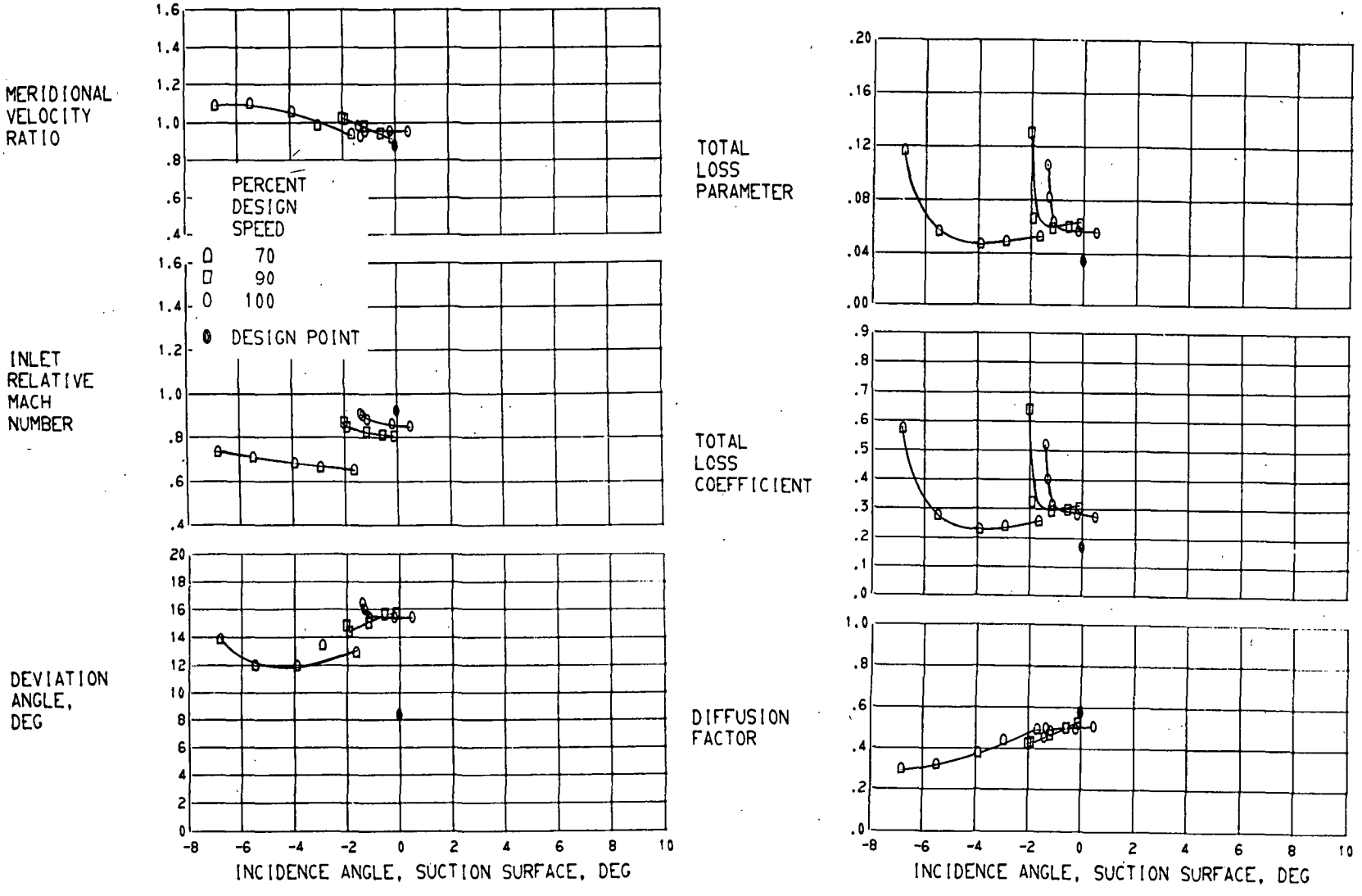
(E) 70.0 PERCENT SPAN.

FIGURE 12. - CONTINUED. BLADE-ELEMENT PERFORMANCE FOR STATOR 13.



(G) 95.0 PERCENT SPAN.

FIGURE 12. - CONCLUDED. BLADE-ELEMENT PERFORMANCE FOR STATOR 13.



(F) 90.0 PERCENT SPAN.

FIGURE 12. - CONTINUED. BLADE-ELEMENT PERFORMANCE FOR STATOR 13.

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