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Summary

The effects of tip clearance on the overall and blade-element performance of an axial-flow transonic fan stage are presented. The 50-centimeter-diameter fan was tested at four tip clearances (nonrotating) from 0.061 to 0.178 centimeter. The calculated radial growth of the blades was 0.040 centimeter at design conditions. The decrease in overall stage performance with increasing clearance is attributed to the loss in rotor performance. For the rotor the effects of clearance on performance parameters extended to about 70 percent of blade span from the tip. The stage stall margin based on an assumed operating line decreased from 15.3 to 0 percent as the clearance increased from 0.061 to 0.178 centimeter.

Introduction

There is a need to increase compressor efficiency in order to improve engine specific fuel consumption (sfc) and its effect on direct operating cost. To increase the efficiency, the compressors are being operated at small rotor tip clearances. However, the desire to decrease engine weight to further improve sfc creates other problems that directly affect compressors operating with tight clearances. Compressor case ovalation and shaft deflections during transients and hard landings will cause casing rubs and open up the clearance. The resultant increase in tip clearance decreases not only efficiency but also the stall margin and tolerance to inlet flow distortion. Therefore it would be desirable to use clearance control to allow for operating with extremely tight clearances at cruise and with loose clearances (to avoid rubs) at the other engine operating conditions.

Since the compressors would be operating at different clearances, it is necessary to understand how performance is affected by clearance and how to minimize the effects. Details of the flow field are needed for compressors operating over a range of rotor tip clearances. Effects of tip clearance on overall performance have been presented in references 1 to 3. However, there is very little information available on its effect on the blade-element performance.

This report presents the overall and blade-element performance of a fan stage experimentally evaluated at four rotor tip clearances (nonrotating) from 0.061 to 0.178 centimeter. The calculated radial growth of the rotor blades was 0.040 centimeter at design conditions. Thus the calculated running clearance will be 0.2 to 1.2 percent of leading-edge blade height. Radial surveys of the flow conditions were made ahead of the rotor, between the rotor and the stator, and downstream of the stator. For each clearance, data were obtained over the stable operating range at 70 and 100 percent of design speed. At the smallest clearance, near-stall conditions were also surveyed at 50, 60, 80, and 90 percent of design speed.

Apparatus and Procedure

Test Facility

The fan stage was tested in the Lewis single-stage compressor facility, which is described in detail in reference 4. A schematic of the facility is shown in figure 1. Atmospheric air enters the test facility at an inlet located on the roof of the building and flows through the flow-measuring orifice and into the plenum chamber upstream of the test stage. The air then passes through the experimental fan stage, enters the collector, and is exhausted to the atmosphere.

Test Stage

The test stage is the same one that was described in detail in reference 5. Thus only a brief description is included herein for completeness.

The overall design parameters for stage 8E–8 are listed in table I, and the flow-path geometry is shown in figure 2. This stage was designed for an overall pressure ratio of 1.750 at a flow of 29.5 kilograms per second (200.6 kg sec/m^2 of annulus area). The design tip speed was 423 meters per second. The hub-tip radius ratio of the 50-centimeter-diameter fan was 0.5. The stage was designed for a tip solidity of 1.5 for the rotor and 1.5 for the stator. This resulted in 49 rotor blades with an aspect ratio of 2.4 and 54 stator blades with an aspect ratio of 2.0.

The rotor and stator are shown in figures 3 and 4, respectively. The rotor had a part-span damper located at about 48 percent of span from the outlet rotor tip. The maximum thickness of the damper was 0.214 centimeter. The axial spacing between the rotor-hub trailing edge and the stator-hub leading edge was 3.33 centimeters.

The design blade-element parameters for the rotor and stator are presented in tables II and III, respectively. The blade geometry for rotor 8E is presented in table IV and that for stator 8 is presented in table V. The symbols and equations are defined in appendixes A and B. The definitions and units of abbreviations used for the tabular data are given in appendix C.

Tip Clearance Change

A solid insert was designed to fit in a casing recess over the tips of the rotor blades (fig. 2). The insert was machined so that it was parallel to the rotor tip with a nominal (nonrotating) clearance of 0.061 centimeter. For the tip clearance studies a uniform increment of material was removed from the insert (fig. 5) in the region over the

rotor tip. The diameter was then faired to the casing diameter to approximately 1.3 centimeters upstream of the blade leading edge and downstream of the trailing edge. The dynamic growth of the wheel and blades plus the eccentricity was calculated to be approximately 0.040 centimeter at design speed; and thus the running clearances at design speed were approximately 0.040 centimeter less than the values presented.

Instrumentation

The compressor weight flow was determined from measurements with a calibrated thin-plate orifice that was 38.9 centimeters in diameter. The temperature at the orifice was measured with two Chromel-Alumel thermocouples. Pressures at the orifice were measured with calibrated transducers.

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

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 those for inner- and outer-wall static-pressure taps are given in figure 7. The combination probe downstream of the stator (station 3) was circumferentially traversed one stator blade passage (6.7°) counterclockwise from the nominal value shown.

An electronic speed counter, in conjunction with a magnetic pickup, was used to measure rotative speed (rpm). All pressures were measured with calibrated transducers.

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

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

At each measuring station the integrated weight flow was computed from the radial survey data. An indication of the consistency of the data can be had by comparing integrated weight flows at each of the measuring stations to the orifice weight flow.

Test Procedure

For the baseline configuration (0.061-cm clearance) the stage survey data were taken at three flow conditions, ranging from maximum flow to near stall at 70 and 100 percent of design speed. At 50, 60, 80, and 90 percent of design speed, radial surveys were taken at the near-stall condition only. Data were recorded at 11 radial positions for each speed and flow condition. For the other three clearances, data were taken at 70 and 100 percent of design speed.

At each radial position the combination probe behind the stator was circumferentially traversed to nine locations across the outlet of the stator passage. The wedge probe was set at midgap because previous studies showed that the static pressure across the stator gap was nearly 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 was repeated.

Calculation Procedure

Measured total temperatures and total pressures were corrected for Mach number and streamline slope. These corrections were based on instrument probe calibrations given in reference 6. The stream static pressure was corrected for Mach number and streamline slope on the basis of an average calibration for the type of probe used.

Because of the physical size of the C-shaped static-pressure wedges, it was impractical to obtain static-pressure measurements at 5, 10, and 95 percent of span. The static pressure at 95 percent of span was obtained by assuming a linear variation in static pressure between the values at the inner wall and those at 90 percent of span. A similar variation was assumed between the static-pressure measurements at the outer wall and those at 30 percent of span to obtain the static pressures at 5 and 10 percent of span.

At each radial position, averaged values of the nine circumferential measurements of pressure, temperature, and flow angle downstream of the stator (station 3) were calculated. The nine values of total temperature were mass averaged to obtain the stator-outlet total temperature. The nine values of total pressure were energy averaged. The flow angle presented for each radial position was calculated from mass-averaged axial and tangential velocities. Circumferential values of pressure,

temperature, and flow angle were used to calculate the 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 from the radial survey data.

The data, measured at the three measuring stations, were translated to the rotor and stator blade leading and trailing edges along design streamlines by the method presented in reference 4.

The weight flow at stall was obtained in the following manner: from a condition near stall 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. The pressure ratio at stall was obtained by extrapolating the total-pressure ratio, obtained from the survey data, along the speed line to 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 effects of tip clearance are presented in three parts: the overall performance of both the rotor and the stage, the radial distribution of several performance parameters, and the blade-element data for the rotor. The overall performance data are presented in table VI. The blade-element data for the four rotor tip clearances are presented for the rotor and stator in tables VII to X. The definitions and units of the abbreviations used for the tabular data are given in appendix C.

Overall Performance

The effects of tip clearance on the overall performance of the rotor and the stage are presented in figures 8 and 9. For each of the four clearances, data are presented at 70 and 100 percent of design speed. For the smallest clearance (0.061 cm), data are also presented for the near-stall condition at 50, 60, 80, and 90 percent of design speed. As the clearance increased, the overall performance of both the rotor and the stage decreased. Stage efficiency decreased 6.7 percentage points as the clearance increased from 0.061 to 0.178 centimeter. The stage stall line moved to higher flow and lower pressure ratio with increasing clearance.

The stall margins based on an assumed operating line passing through the stall point at a clearance of 0.178 centimeter, at design speed, are as follows:

Clearance, cm	Stall margin, percent
0.061	15.3
.102	4.8
.140	2.4
.178	0

To determine the influence of the rotor and the stator on the loss of overall performance, the overall pressure ratio and efficiency were plotted as a function of clearance in figure 10. Data are presented for design speed and a nominal flow of 28.95 kilograms per second. Also shown in the figure is the calculated growth of the blade at design conditions. At all clearances the difference between rotor and stage overall pressure ratio was approximately constant. The difference in efficiency between the rotor and the stage continued to increase as the clearance was increased. Since the energy addition (as indicated by temperature ratio) was less for the larger clearances, the constant-pressure-ratio difference gaves the greater efficiency differences at the higher clearances. Thus it was concluded that the loss in stage performance with increased clearance is the result of the decreased rotor performance.

Radial Distribution

The effects of tip clearance on the radial distribution of rotor and stator performance parameters are presented in figures 11 and 12, respectively. Data are presented for a nominal flow of 28.95 kilograms per second at design speed.

Rotor. – Total-pressure ratio, total-temperature ratio, adiabatic efficiency, deviation angle, meridional velocity ratio, suction-surface incidence angle, diffusion factor, total loss coefficient, and total-loss parameter are presented as functions of percent of span from the tip in figure 11. As can be seen from the figures, the effect of tip clearance was not confined to the tip region: the effect of a change in tip clearance is evident across the blade span.

There appears to have been a flow shift through the rotor blades. Both the magnitude and radial distribution of the incidence angle were essentially unaffected by tip clearance. However, there was a substantial change in both the magnitude and radial distribution of the meridional velocity ratio with tip clearance. With increased clearance there appear to have been increased secondary flows or flow separation in the tip region, as indicated by the deviation angle. This probably caused the flow to shift radially toward the hub. As a result the meridional velocity ratio increased with increasing clearance in the inner two-thirds of the blade span.

The drop in temperature ratio in the tip region was due to the increased deviation angle, and the drop in total-

pressure ratio was due to both the lower energy addition and the increased losses. The drop in energy addition and consequently pressure ratio over the remainder of the blade was due to the blade operating at higher flows.

Stator. – Deviation angle, meridional velocity ratio, incidence angle, diffusion factor, total-loss coefficient, and total-loss parameter are presented as functions of percent of span in figure 12. As a result of the effects of tip clearance on the rotor performance the flow into the stator was also affected by tip clearance, as shown by the incidence angle and the velocity ratio. The stator blade loading (diffusion factor) decreased fairly uniformly as rotor tip clearance was increased. Except in the endwall regions the stator losses were unaffected by tip clearance. The losses in the stator hub increased as the rotor tip clearance increased. At 5 percent of span the stator losses were the highest at the lowest clearance.

Variations with Incidence Angle

The effect of tip clearance on the rotor blade-element performance is presented in figure 13 for design speed at 5, 10, 30, 42.5, 70, 90, and 95 percent of span. For each location, total-pressure ratio, total-temperature ratio, adiabatic efficiency, deviation angle, meridional velocity ratio, inlet relative Mach number, diffusion factor, total-loss coefficient, and total-loss parameter are presented as functions of suction-surface incidence angle.

There was no effect of tip clearance on the inlet relative Mach number over the incidence angle range tested for any of the percent-of-span locations. At 5, 10, 30, 42.5, and 70 percent of span, the pressure ratio and the temperature ratio decreased as the tip clearance was increased; however, at 90 and 95 percent of span there was no change. A similar trend is shown for adiabatic efficiency except that the effect was only experienced to 42.5 percent of span. At 5 and 10 percent of span the meridional velocity ratio was the highest for the smallest clearance; and at 30 to 95 percent of span the opposite was true, with the velocity ratio being the lowest for the smallest clearance. For all span locations the diffusion factor was the highest for the smallest clearance. At 5, 10, 20, and 95 percent of span, the losses were the lowest for the smallest clearance. At 42.5, 70, 90 percent of span there was essentially no effect of clearance on the losses.

The effects of tip clearance on total-pressure ratio and adiabatic efficiency are illustrated in figures 14 and 15. Total-pressure ratio (fig. 14) and adiabatic efficiency (fig. 15) are plotted as functions of tip clearance for 5, 10, 30, 42.5, 70, 90, and 95 percent of span. Data points are presented for a suction-surface incidence angle of 0°. These data points were obtained by interpolating the data presented in figure 13. The effects of tip clearance on both pressure ratio and efficiency diminished with increasing distance from the tip.

Summary of Results

This report has presented the effects of tip clearance on the overall and blade-element performance of an axial-flow transonic fan stage. The stage was tested at four tip clearances from 0.061 to 0.178 centimeter (nonrotating). The calculated radial growth of the rotor blades was 0.040 centimeter at design conditions. The stage was designed for a pressure ratio of 1.75 at a flow of 29.5 kilograms per second and a tip speed of 423 meters per second. The hub-tip radius ratio of the 50-centimeter-diameter fan was 0.5. Detailed radial surveys were made upstream of the rotor, between the rotor and the stator, and downstream of the stator. This investigation yielded the following principal results:

1. At design speed the stage peak efficiency decreased 6.7 percentage points as the tip clearance increased from 0.061 to 0.178 centimeter. For the same increase in clearance, stall margin based on an assumed operating line decreased from 15.3 to 0 percent.

2. The results of the rotor and stator exit surveys indicated that the decreased stage performance with increased clearance was a result of increased rotor losses.

3. The effects of tip clearance were not confined to the rotor tip region. They were evident from the tip to about 70 percent of span. There appears to have been a flow shift through the rotor blades with changes in clearance.

Lewis Research Center
National Aeronautics and Space Administration
Cleveland, Ohio, January 7, 1982

Appendix A

Symbols

ΔA area for radial position, m^2

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

c aerodynamic chord, cm

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 surface at leading edge, deg

N rotative speed, rpm

NR number of radial positions

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 bassed on cone angle, $\arctan(\tan \beta_m' \cos \alpha_c / \cos \alpha_s)$, 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° deviation angle, angle between exit air direction and tangent to blade mean camber line at trailing edge, deg

η efficiency

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

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

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

ρ density

σ solidity, ratio of chord to spacing

$\bar{\omega}$ total-loss coefficient

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

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

Subscripts:

ad adiabatic (temperature rise)

h hub

i index

id ideal

LE blade leading edge

m meridional direction

mom momentum rise

p polytropic

ref reference

TE blade trailing edge

t tip

z axial direction

θ tangential direction

1 instrumentation plane upstream of rotor

2 instrumentation plane between rotor and stator

3 instrumentation plane downstream of stator

Superscript:

$'$ relative to blade

$\bar{}$ average

Appendix B

Equations

Equations for Calculating Blade-Element Parameters

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:

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

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:

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

Profile-loss coefficient:

$$\overline{\omega_p} = \bar{\omega} - \overline{\omega_s} \tag{B6}$$

Total-loss parameter:

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

Profile-loss parameter:

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

Adiabatic (temperature rise) efficiency:

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

Equations for Calculating Overall Performance Parameters

Rotor total-pressure ratio:

$$(\overline{P_2/P_1}) = \left[\frac{\int_{r_h}^{r_t} (P_2/P_1)^{(\gamma-1)/\gamma} \rho V_z r \, dr}{\int_{r_h}^{r_t} \rho V_z r \, dr} \right]^{\gamma/(\gamma-1)}$$

$$= \left[\frac{\sum_{i=1}^{NR} (P_2/P_1)_i^{(\gamma-1)/\gamma} \rho_{2,i} V_{z2,i} \Delta A_{2,i}}{\sum_{i=1}^{NR} \rho_{2,i} V_{z2,i} \Delta A_{2,i}} \right]^{\gamma/(\gamma-1)} \tag{B10}$$

Stage total-pressure ratio:

$$(\overline{P_3/P_1}) = \left[\frac{\int_{r_h}^{r_t} (P_3/P_1)^{(\gamma-1)/\gamma} \rho V_z r \, dr}{\int_{r_h}^{r_t} \rho V_z r \, dr} \right]^{\gamma/(\gamma-1)}$$

$$= \left[\frac{\sum_{i=1}^{NR} (P_3/P_1)_i^{(\gamma-1)/\gamma} \rho_{3,i} V_{z3,i} \Delta A_{3,i}}{\sum_{i=1}^{NR} \rho_{3,i} V_{z3,i} \Delta A_{3,i}} \right]^{\gamma/(\gamma-1)} \tag{B11}$$

Rotor total-temperature ratio:

$$(T_2/T_1) = \frac{\int_{r_h}^{r_t} (T_2/T_1)\, \rho V_z r\, dr}{\int_{r_h}^{r_t} \rho V_z r\, dr}$$

$$= \frac{\sum_{i=1}^{NR} (T_2/T_1)_i \rho_{2,i} V_{z2,i}\, \Delta A_{2,i}}{\sum_{i=1}^{NR} \rho_{2,i} V_{z2,i}\, \Delta A_{2,i}} \qquad \text{(B12)}$$

Rotor adiabatic efficiency:

$$\eta_{ad} = \frac{(\overline{P_2/P_1})^{(\gamma-1)/\gamma} - 1}{(\overline{T_2/T_1}) - 1} \qquad \text{(B13)}$$

Stage total-temperature ratio:

$$(\overline{T_3/T_1}) = \frac{\int_{r_h}^{r_t} (T_3/T_1)\, \rho V_z r\, dr}{\int_{r_h}^{r_t} \rho V_z r\, dr}$$

$$= \frac{\sum_{i=1}^{NR} (T_3/T_1)_i\, \rho_{3,i} V_{z3,i}\, \Delta A_{3,i}}{\sum_{i=1}^{NR} \rho_{3,i} V_{z3,i}\, \Delta A_{3,i}} \qquad \text{(B14)}$$

Stage adiabatic efficiency:

$$\eta_{ad} = \frac{(\overline{P_3/P_1})^{(\gamma-1)/\gamma} - 1}{(\overline{T_3/T_1}) - 1} \qquad \text{(B15)}$$

Rotor-inlet mass-averaged temperature:

$$\overline{T_1} = \frac{\int_{r_h}^{r_t} T_1 \rho V_z r\, dr}{\int_{r_h}^{r_t} \rho V_z r\, dr} = \frac{\sum_{i=1}^{NR} T_{1,i} \rho_{1,i} V_{z1,i}\, \Delta A_{1,i}}{\sum_{i=1}^{NR} \rho_{1,i} V_{z1,i}\, \Delta A_{1,i}} \qquad \text{(B16)}$$

Momentum-rise efficiency:

$$\eta_{mom} = \frac{(\overline{P_2/P_1})^{(\gamma-1)/\gamma} - 1}{\dfrac{\int_{r_h}^{r_t} \left[(UV_\theta)_2 - (UV_\theta)_1\right] \rho V_z r\, dr}{\overline{T}_1 C_p}}$$

$$= \frac{(\overline{P_2/P_1})^{(\gamma-1)/\gamma} - 1}{\dfrac{\sum_{i=1}^{NR} \left[(UV_\theta)_2 - (UV_\theta)_1\right]_i \rho_{2,i} V_{z2,i}\, \Delta A_{2,i}}{\overline{T}_1 C_p}} \qquad \text{(B17)}$$

Head-rise coefficient:

$$\frac{C_p \overline{T}_1}{U_t^2}\left[(P_2/P_1)^{(\gamma-1)/\gamma} - 1\right] \qquad \text{(B18)}$$

Equivalent weight flow:

$$\frac{W\sqrt{\theta}}{\delta} \qquad \text{(B19)}$$

Equivalent rotative speed:

$$\frac{N}{\sqrt{\theta}} \qquad \text{(B20)}$$

Weight flow per unit annulus area:

$$\frac{\frac{W\sqrt{\theta}}{\delta}}{A_{an}} \tag{B21}$$

Weight flow per unit frontal area:

$$\frac{\frac{W\sqrt{\theta}}{\delta}}{A_f} \tag{B22}$$

Flow coefficient:

$$\left(\frac{V_z}{U_t}\right)_{LE} \tag{B23}$$

Stall margin:

$$SM = \left[\frac{(\overline{P_3/P_1})_{\text{stall}}\left(\frac{W\sqrt{\theta}}{\delta}\right)_{\text{ref}}}{(\overline{P_3/P_1})_{\text{ref}}\left(\frac{W\sqrt{\theta}}{\delta}\right)_{\text{stall}}} - 1\right] \times 100 \tag{B24}$$

Rotor polytropic efficiency:

$$\eta_p = \frac{\ln(\overline{P_2/P_1})^{(\gamma-1)/\gamma}}{\ln(\overline{T_2/T_1})} \tag{B25}$$

Stage polytropic efficiency:

$$\eta_p = \frac{\ln(\overline{P_3/P_1})^{(\gamma-1)/\gamma}}{\ln(\overline{T_3/T_1})} \tag{B26}$$

Meridional velocity ratio:

$$\frac{(V_m)_{TE}}{(V_m)_{LE}} \tag{B27}$$

Appendix C

Definitions and Units of Abbreviations Used in Tables

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

ZIC	axial distance from inlet hub to blade leading edge, cm
ZMC	axial distance from inlet hub to blade maximum thickness point, cm
ZOC	axial distance from inlet hub to blade trailing edge, cm
ZTC	axial distance from inlet hub to transition point, cm

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TABLE I. – DESIGN OVERALL PARAMETERS FOR STAGE 8E-8

ROTOR TOTAL PRESSURE RATIO	1.800
STAGE TOTAL PRESSURE RATIO	1.750
ROTOR TOTAL TEMPERATURE RATIO	1.205
STAGE TOTAL TEMPERATURE RATIO	1.205
ROTOR ADIABATIC EFFICIENCY	0.890
STAGE ADIABATIC EFFICIENCY	0.843
ROTOR POLYTROPIC EFFICIENCY	0.898
STAGE POLYTROPIC EFFICIENCY	0.855
ROTOR HEAD RISE COEFFICIENT	0.296
STAGE HEAD RISE COEFFICIENT	0.281
FLOW COEFFICIENT	0.474
WT FLOW PER UNIT FRONTAL AREA	149.172
WT FLOW PER UNIT ANNULUS AREA	200.600
WT FLOW	29.484
RPM	16100.000
TIP SPEED	422.888

TABLE II. – DESIGN BLADE-ELEMENT PARAMETERS FOR ROTOR 8E

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
TIP	25.082	24.701	0.	50.1	65.6	58.7	288.2	1.252	10.13	1.800
1	24.568	24.193	-0.	47.8	64.5	57.6	288.2	1.237	10.13	1.800
2	24.021	23.685	0.	46.3	63.5	56.5	288.2	1.225	10.13	1.800
3	21.754	21.653	0.	45.1	60.0	51.1	288.2	1.206	10.13	1.800
4	20.287	20.383	0.	45.6	58.2	46.7	288.2	1.200	10.13	1.800
5	19.989	20.129	0.	45.8	57.8	45.7	288.2	1.199	10.13	1.800
6	19.690	19.875	0.	46.0	57.5	44.6	288.2	1.199	10.13	1.800
7	19.388	19.621	0.	46.2	57.2	43.5	288.2	1.198	10.13	1.800
8	19.085	19.367	0.	46.5	56.9	42.4	288.2	1.197	10.13	1.800
9	16.891	17.589	0.	48.4	54.6	32.6	288.2	1.194	10.13	1.800
10	14.175	15.557	0.	52.3	52.2	15.8	288.2	1.195	10.13	1.800
11	13.447	15.049	0.	53.7	51.6	9.9	288.2	1.197	10.13	1.800
HUB	12.700	14.541	-0.	55.2	50.9	3.4	288.2	1.199	10.13	1.800

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
TIP	192.1	228.5	464.5	282.3	192.1	146.7	0.	175.3	422.9	416.5
1	197.2	226.6	458.8	284.1	197.2	152.1	-0.	168.0	414.2	407.9
2	201.9	226.0	452.5	283.1	201.9	156.2	0.	163.2	405.0	399.3
3	211.8	230.6	423.5	259.4	211.8	162.9	0.	163.2	366.8	365.1
4	212.2	235.9	402.5	240.6	212.2	165.0	0.	168.6	342.0	343.7
5	211.8	237.1	398.1	236.7	211.8	165.3	0.	170.0	337.0	339.4
6	211.4	238.4	393.6	232.8	211.4	165.6	0.	171.5	332.0	335.1
7	210.8	239.8	389.0	228.9	210.8	165.9	0.	173.2	326.9	330.8
8	210.1	241.3	384.3	225.0	210.1	166.2	0.	174.9	321.8	326.5
9	202.0	253.0	349.2	199.3	202.0	168.0	0.	189.2	284.8	296.6
10	185.3	272.3	302.4	173.2	185.3	166.7	0.	215.3	239.0	262.3
11	179.9	279.1	289.4	167.9	179.9	165.4	0.	224.8	226.7	253.7
HUB	174.2	286.8	276.0	164.1	174.2	163.8	-0.	235.4	214.1	245.2

	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	0.583	0.623	1.411	0.770	0.583	0.400	-6.70	-6.64	0.764	1.590
1	0.600	0.622	1.396	0.779	0.600	0.417	-5.93	-5.61	0.771	1.573
2	0.615	0.623	1.380	0.780	0.615	0.431	-5.03	-4.53	0.774	1.562
3	0.648	0.642	1.296	0.722	0.648	0.454	-0.48	0.09	0.769	1.538
4	0.649	0.660	1.232	0.673	0.649	0.461	2.76	3.15	0.778	1.518
5	0.648	0.664	1.218	0.663	0.648	0.463	3.44	3.79	0.780	1.513
6	0.647	0.668	1.204	0.652	0.647	0.464	4.14	4.44	0.783	1.508
7	0.645	0.673	1.190	0.642	0.645	0.465	4.85	5.10	0.787	1.502
8	0.643	0.677	1.175	0.631	0.643	0.466	5.57	5.77	0.791	1.496
9	0.616	0.715	1.065	0.563	0.616	0.474	11.25	10.87	0.831	1.459
10	0.562	0.775	0.916	0.493	0.562	0.474	19.98	17.83	0.900	1.307
11	0.544	0.796	0.876	0.479	0.544	0.472	22.91	19.78	0.919	1.233
HUB	0.526	0.820	0.833	0.469	0.526	0.468	26.15	21.80	0.941	1.154

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
TIP	0.	2.5	0.0	6.2	0.519	0.725	0.256	0.154	0.045	0.027
1	5.00	2.7	-0.0	5.7	0.501	0.772	0.207	0.111	0.037	0.020
2	10.00	3.0	0.0	5.3	0.490	0.811	0.168	0.078	0.030	0.014
3	30.00	4.1	-0.0	4.8	0.501	0.888	0.102	0.030	0.019	0.006
4	42.50	4.7	-0.0	4.9	0.518	0.913	0.083	0.024	0.016	0.005
5	45.00	4.9	-0.0	5.0	0.522	0.917	0.080	0.024	0.015	0.005
6	47.50	5.0	-0.0	5.1	0.526	0.920	0.078	0.024	0.015	0.005
7	50.00	5.1	-0.0	5.2	0.530	0.923	0.076	0.025	0.015	0.005
8	52.50	5.3	-0.0	5.3	0.534	0.926	0.074	0.027	0.014	0.005
9	70.00	6.2	-0.0	6.5	0.557	0.943	0.066	0.037	0.013	0.007
10	90.00	7.0	-0.0	9.3	0.572	0.937	0.090	0.087	0.017	0.016
11	95.00	7.2	-0.0	10.3	0.570	0.928	0.112	0.111	0.020	0.020
HUB	100.00	7.3	-0.0	11.3	0.562	0.916	0.142	0.142	0.024	0.024

TABLE III. – DESIGN BLADE-ELEMENT PARAMETERS FOR STATOR 8

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
TIP	24.384	24.384	45.2	0.	45.2	0.	360.8	1.001	18.24	0.956
1	23.944	23.948	42.9	-0.	42.9	-0.	356.4	1.000	18.24	0.966
2	23.505	23.539	41.4	0.	41.4	0.	353.1	1.000	18.24	0.973
3	21.741	21.902	40.0	0.	40.0	0.	347.5	1.000	18.24	0.980
4	20.634	20.884	40.4	0.	40.4	0.	345.8	1.000	18.24	0.978
5	20.413	20.681	40.6	0.	40.6	0.	345.6	1.000	18.24	0.978
6	20.192	20.480	40.7	0.	40.7	0.	345.4	1.000	18.24	0.978
7	19.972	20.279	40.9	0.	40.9	0.	345.2	1.000	18.24	0.977
8	19.751	20.079	41.0	0.	41.0	0.	345.0	1.000	18.24	0.977
9	18.221	18.715	42.3	0.	42.3	0.	344.0	1.000	18.24	0.973
10	16.521	17.252	44.9	0.	44.9	0.	344.4	1.000	18.24	0.955
11	16.110	16.904	45.9	0.	45.9	0.	344.9	1.000	18.24	0.942
HUB	15.697	16.485	46.9	-0.	46.9	-0.	345.6	1.000	18.24	0.924

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
TIP	250.5	176.5	250.5	176.5	176.6	176.5	177.6	0.	0.	0.
1	249.2	181.1	249.2	181.1	182.5	181.1	169.7	-0.	0.	0.
2	248.9	184.5	248.9	184.5	186.9	184.5	164.5	0.	0.	0.
3	252.7	190.3	252.7	190.3	193.5	190.3	162.6	0.	0.	0.
4	256.8	191.6	256.8	191.6	195.5	191.6	166.5	0.	0.	0.
5	257.8	191.9	257.8	191.9	195.8	191.9	167.6	0.	0.	0.
6	258.9	192.3	258.9	192.3	196.3	192.3	168.8	0.	0.	0.
7	260.1	192.7	260.1	192.7	196.7	192.7	170.1	0.	0.	0.
8	261.3	193.1	261.3	193.1	197.1	193.1	171.5	0.	0.	0.
9	271.4	197.0	271.4	197.0	200.7	197.0	182.7	0.	0.	0.
10	287.3	196.9	287.3	196.9	203.6	196.9	202.7	0.	0.	0.
11	292.6	195.0	292.6	195.0	203.7	195.0	209.9	0.	0.	0.
HUB	298.5	192.1	298.5	192.1	203.8	192.1	218.1	-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	0.688	0.474	0.688	0.474	0.485	0.474	-0.32	-0.25	0.999	1.041
1	0.689	0.490	0.689	0.490	0.505	0.490	0.30	0.06	0.992	1.015
2	0.692	0.502	0.692	0.502	0.519	0.502	0.88	0.36	0.987	0.998
3	0.710	0.523	0.710	0.523	0.543	0.523	3.13	1.55	0.984	0.994
4	0.724	0.528	0.724	0.528	0.551	0.528	4.76	2.29	0.980	1.008
5	0.728	0.529	0.728	0.529	0.553	0.529	5.12	2.44	0.980	1.012
6	0.731	0.531	0.731	0.531	0.554	0.531	5.50	2.58	0.980	1.017
7	0.735	0.532	0.735	0.532	0.556	0.532	5.89	2.73	0.980	1.022
8	0.739	0.533	0.739	0.533	0.558	0.533	6.29	2.88	0.979	1.027
9	0.772	0.546	0.772	0.546	0.571	0.546	9.60	3.93	0.982	1.110
10	0.823	0.545	0.823	0.545	0.583	0.545	14.78	5.02	0.967	1.240
11	0.840	0.539	0.840	0.539	0.585	0.539	16.35	5.16	0.957	1.287
HUB	0.858	0.530	0.858	0.530	0.586	0.530	18.06	5.28	0.943	1.344

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
TIP	0.	6.1	-0.0	12.3	0.535	0.	0.169	0.169	0.057	0.057
1	5.00	6.1	0.0	11.1	0.500	0.	0.124	0.124	0.041	0.041
2	10.00	6.1	-0.0	10.2	0.474	0.	0.098	0.098	0.032	0.032
3	30.00	6.1	0.0	9.0	0.441	0.	0.070	0.070	0.021	0.021
4	42.50	6.1	0.0	8.7	0.439	0.	0.073	0.073	0.021	0.021
5	45.00	6.1	0.0	8.7	0.439	0.	0.074	0.074	0.021	0.021
6	47.50	6.1	0.0	8.7	0.440	0.	0.075	0.075	0.021	0.021
7	50.00	6.1	0.0	8.6	0.440	0.	0.076	0.076	0.021	0.021
8	52.50	6.1	0.0	8.6	0.440	0.	0.076	0.076	0.021	0.021
9	70.00	6.1	0.0	8.2	0.443	0.	0.082	0.082	0.021	0.021
10	90.00	6.0	0.0	8.1	0.474	0.	0.126	0.126	0.029	0.029
11	95.00	5.9	0.0	8.2	0.491	0.	0.156	0.156	0.035	0.035
HUB	100.00	6.0	0.1	8.2	0.513	0.	0.202	0.199	0.044	0.044

TABLE IV. – BLADE GEOMETRY FOR ROTOR 8E

RP	PERCENT SPAN	RADII RI	RO	BLADE ANGLES KIC	KTC	KOC	DELTA INC	CONE ANGLE
TIP	0.	25.082	24.701	62.92	60.67	52.34	2.49	-9.298
1	5.	24.568	24.193	61.67	59.64	51.79	2.72	-8.836
2	10.	24.021	23.685	60.41	58.43	51.04	2.98	-7.644
3	30.	21.754	21.653	55.93	52.88	46.27	4.06	-1.996
4	43.	20.287	20.383	53.47	49.53	41.81	4.74	1.771
5	45.	19.989	20.129	52.99	48.87	40.74	4.88	2.542
6	48.	19.690	19.875	52.52	48.23	39.60	5.01	3.325
7	50.	19.388	19.621	52.06	47.59	38.38	5.15	4.114
8	53.	19.085	19.367	51.60	46.97	37.09	5.28	4.908
9	70.	16.891	17.589	48.50	42.58	26.07	6.19	10.851
10	90.	14.175	15.557	45.39	39.25	6.42	7.05	18.759
11	95.	13.447	15.049	44.77	38.97	-0.40	7.20	20.972
HUB	100.	12.700	14.541	44.22	38.93	-7.94	7.32	23.205

RP	BLADE THICKNESSES TI	TM	TO	AXIAL DIMENSIONS ZIC	ZMC	ZTC	ZOC
TIP	0.051	0.152	0.051	1.020	2.104	2.330	3.347
1	0.051	0.162	0.051	0.970	2.098	2.290	3.379
2	0.051	0.172	0.051	0.918	2.094	2.246	3.417
3	0.051	0.216	0.051	0.723	2.082	2.039	3.598
4	0.051	0.244	0.051	0.609	2.072	1.879	3.715
5	0.051	0.250	0.051	0.586	2.069	1.844	3.739
6	0.051	0.256	0.051	0.564	2.066	1.808	3.764
7	0.051	0.262	0.051	0.542	2.063	1.772	3.789
8	0.051	0.267	0.051	0.519	2.060	1.734	3.815
9	0.051	0.309	0.051	0.354	2.032	1.439	4.000
10	0.051	0.359	0.051	0.138	1.977	1.037	4.208
11	0.051	0.373	0.051	0.071	1.958	0.920	4.253
HUB	0.051	0.387	0.051	0.000	1.935	0.797	4.295

RP	AERO CHORD	SETTING ANGLE	TOTAL CAMBER	SOLIDITY	X FACTOR	PHISS	AREA RATIO
TIP	4.722	59.68	10.57	1.479	0.628	5.23	1.040
1	4.729	58.59	9.88	1.513	0.646	5.19	1.038
2	4.726	57.37	9.37	1.545	0.676	5.33	1.037
3	4.715	51.92	9.66	1.694	0.844	6.97	1.032
4	4.714	48.21	11.66	1.808	0.896	8.07	1.029
5	4.716	47.42	12.25	1.833	0.901	8.28	1.028
6	4.717	46.61	12.93	1.860	0.904	8.47	1.026
7	4.719	45.78	13.68	1.887	0.904	8.65	1.025
8	4.722	44.93	14.51	1.915	0.902	8.82	1.024
9	4.766	38.06	22.42	2.156	0.887	9.99	1.017
10	4.915	27.89	38.97	2.578	0.753	9.75	1.009
11	4.982	24.74	45.17	2.727	0.695	9.25	1.008
HUB	5.068	21.32	52.16	2.902	0.626	8.56	1.007

TABLE V. – BLADE GEOMETRY FOR STATOR 8

RP	PERCENT SPAN	RADII RI	RADII RO	BLADE ANGLES KIC	BLADE ANGLES KTC	BLADE ANGLES KOC	DELTA INC	CONE ANGLE
TIP	0.	24.384	24.384	39.07	31.42	-12.32	6.09	0.057
1	5.	23.944	23.948	36.81	30.11	-11.06	6.12	0.066
2	10.	23.505	23.539	35.23	29.21	-10.19	5.13	0.494
3	30.	21.741	21.902	33.91	28.71	-8.99	6.14	2.315
4	43.	20.634	20.884	34.34	29.24	-8.73	6.13	3.595
5	45.	20.413	20.681	34.48	29.39	-8.70	6.13	3.868
6	48.	20.192	20.480	34.63	29.54	-8.67	6.13	4.149
7	50.	19.972	20.279	34.80	29.71	-8.64	6.12	4.438
8	53.	19.751	20.079	34.98	29.88	-8.62	6.12	4.733
9	70.	18.221	18.715	36.43	29.64	-8.22	6.06	7.105
10	90.	16.521	17.252	39.40	30.32	-8.12	5.95	10.487
11	95.	16.110	16.904	40.55	30.61	-8.17	5.91	11.382
HUB	100.	15.697	16.485	41.86	30.95	-8.25	5.86	11.308

RP	BLADE THICKNESSES TI	BLADE THICKNESSES TM	BLADE THICKNESSES TO	AXIAL DIMENSIONS ZIC	AXIAL DIMENSIONS ZMC	AXIAL DIMENSIONS ZTC	AXIAL DIMENSIONS ZOC
TIP	0.051	0.279	0.051	7.665	9.447	9.001	11.572
1	0.051	0.279	0.051	7.637	9.454	8.918	11.573
2	0.051	0.279	0.051	7.618	9.459	8.853	11.573
3	0.051	0.279	0.051	7.531	9.393	8.658	11.502
4	0.051	0.279	0.051	7.523	9.381	8.602	11.491
5	0.051	0.279	0.051	7.614	9.471	8.685	11.580
6	0.051	0.279	0.051	7.634	9.489	8.696	11.598
7	0.051	0.279	0.051	7.637	9.491	8.690	11.599
8	0.051	0.279	0.051	7.623	9.475	8.668	11.584
9	0.051	0.279	0.051	7.606	9.460	8.580	11.569
10	0.051	0.279	0.051	7.616	9.456	8.522	11.567
11	0.051	0.279	0.051	7.621	9.455	8.512	11.566
HUB	0.051	0.279	0.051	7.628	9.453	8.504	11.566

RP	AERO CHORD	SETTING ANGLE	TOTAL CAMBER	SOLIDITY	X FACTOR	PHISS	AREA RATIO
TIP	4.194	19.41	51.39	1.478	0.600	12.27	1.164
1	4.193	18.17	47.87	1.505	0.600	11.08	1.145
2	4.194	17.33	45.42	1.532	0.600	10.21	1.131
3	4.197	16.54	42.91	1.653	0.600	9.02	1.102
4	4.202	16.71	43.07	1.740	0.600	8.77	1.087
5	4.203	16.78	43.18	1.758	0.600	8.74	1.084
6	4.204	16.85	43.30	1.777	0.600	8.72	1.081
7	4.205	16.92	43.44	1.796	0.600	8.69	1.078
8	4.207	17.01	43.60	1.815	0.600	8.68	1.075
9	4.223	16.83	44.65	1.965	0.706	10.08	1.069
10	4.258	17.27	47.53	2.167	0.826	12.08	1.073
11	4.270	17.49	48.72	2.223	0.863	12.86	1.078
HUB	4.267	17.75	50.11	2.279	0.903	13.75	1.086

TABLE VI. – OVERALL PERFORMANCE

(a) Nominal nonrotating rotor tip clearance, 0.061 cm

	Nominal rotative speed, percent of design									
	100			90	80	70			60	50
READING NUMBER	3364	3365	3366	3367	3368	3362	3361	3363	3369	3370
ROTOR TOTAL PRESSURE RATIO	1.687	1.793	1.835	1.642	1.465	1.252	1.313	1.336	1.239	1.164
STAGE TOTAL PRESSURE RATIO	1.615	1.728	1.763	1.593	1.429	1.207	1.293	1.311	1.223	1.154
ROTOR TOTAL TEMPERATURE RATIO	1.190	1.210	1.222	1.175	1.137	1.072	1.090	1.103	1.075	1.052
STAGE TOTAL TEMPERATURE RATIO	1.183	1.203	1.218	1.173	1.136	1.071	1.089	1.102	1.074	1.052
ROTOR TEMP. RISE EFFICIENCY	0.849	0.866	0.855	0.869	0.840	0.928	0.899	0.838	0.843	0.853
STAGE TEMP. RISE EFFICIENCY	0.802	0.832	0.807	0.820	0.789	0.781	0.858	0.792	0.794	0.802
ROTOR MOMENTUM RISE EFFICIENCY	0.851	0.881	0.872	0.879	0.843	0.919	0.909	0.843	0.849	0.860
ROTOR HEAD RISE COEFFICIENT	0.260	0.294	0.308	0.304	0.291	0.219	0.269	0.286	0.286	0.284
STAGE HEAD RISE COEFFICIENT	0.237	0.274	0.286	0.284	0.271	0.183	0.253	0.267	0.267	0.269
FLOW COEFFICIENT	0.425	0.414	0.386	0.367	0.334	0.435	0.379	0.324	0.316	0.315
WT FLOW PER UNIT FRONTAL AREA	149.53	146.28	138.92	122.97	103.11	115.20	101.99	88.72	75.05	63.28
WT FLOW PER UNIT ANNULUS AREA	201.08	196.71	186.83	165.37	138.66	154.93	137.16	119.32	100.93	85.10
WT FLOW AT ORIFICE	29.55	28.91	27.46	24.30	20.38	22.77	20.16	17.54	14.83	12.51
WT FLOW AT ROTOR INLET	30.26	29.64	28.12	24.91	20.79	23.29	20.61	17.90	15.13	12.76
WT FLOW AT ROTOR OUTLET	30.03	29.50	28.08	24.90	20.81	23.18	20.61	17.94	15.16	12.79
WT FLOW AT STATOR OUTLET	31.37	30.05	28.80	25.28	21.08	23.88	20.64	18.17	15.28	12.88
ROTATIVE SPEED	16119.2	16085.4	16074.1	14493.0	12893.6	11266.1	11240.2	11253.1	9627.7	8078.3
PERCENT OF DESIGN SPEED	100.1	99.9	99.8	90.0	80.1	70.0	69.8	69.9	59.8	50.2

(b) Nominal nonrotating rotor tip clearance, 0.102 cm

	Nominal rotative speed, percent of design					
	100			70		
READING NUMBER	3381	3383	3382	3386	3385	3384
ROTOR TOTAL PRESSURE RATIO	1.672	1.715	1.734	1.251	1.302	1.327
STAGE TOTAL PRESSURE RATIO	1.568	1.650	1.672	1.208	1.280	1.304
ROTOR TOTAL TEMPERATURE RATIO	1.188	1.198	1.203	1.072	1.087	1.098
STAGE TOTAL TEMPERATURE RATIO	1.183	1.193	1.199	1.072	1.086	1.097
ROTOR TEMP. RISE EFFICIENCY	0.840	0.844	0.837	0.918	0.903	0.856
STAGE TEMP. RISE EFFICIENCY	0.749	0.797	0.796	0.772	0.849	0.816
ROTOR MOMENTUM RISE EFFICIENCY	0.817	0.833	0.831	0.889	0.887	0.853
ROTOR HEAD RISE COEFFICIENT	0.256	0.269	0.274	0.218	0.258	0.277
STAGE HEAD RISE COEFFICIENT	0.221	0.248	0.255	0.183	0.241	0.260
FLOW COEFFICIENT	0.422	0.413	0.403	0.433	0.390	0.348
WT FLOW PER UNIT FRONTAL AREA	148.87	146.39	143.69	114.72	104.97	94.75
WT FLOW PER UNIT ANNULUS AREA	200.21	196.86	193.23	154.27	141.17	127.42
WT FLOW AT ORIFICE	29.42	28.93	28.40	22.67	20.75	18.73
WT FLOW AT ROTOR INLET	30.10	29.64	29.11	23.18	21.19	19.13
WT FLOW AT ROTOR OUTLET	29.49	28.94	28.23	22.90	20.93	18.85
WT FLOW AT STATOR OUTLET	31.30	30.01	29.35	23.64	21.17	19.08
ROTATIVE SPEED	16115.2	16121.4	16130.3	11268.4	11275.7	11279.3
PERCENT OF DESIGN SPEED	100.1	100.1	100.2	70.0	70.0	70.1

(c) Nominal nonrotating rotor tip clearance, 0.140 cm

	Nominal rotative speed, percent of design					
	100			70		
READING NUMBER	3404	3403	3402	3399	3400	3401
ROTOR TOTAL PRESSURE RATIO	1.657	1.675	1.692	1.244	1.292	1.310
STAGE TOTAL PRESSURE RATIO	1.564	1.607	1.632	1.191	1.271	1.290
ROTOR TOTAL TEMPERATURE RATIO	1.187	1.191	1.196	1.070	1.085	1.093
STAGE TOTAL TEMPERATURE RATIO	1.182	1.185	1.191	1.070	1.084	1.092
ROTOR TEMP. RISE EFFICIENCY	0.829	0.832	0.826	0.916	0.896	0.860
STAGE TEMP. RISE EFFICIENCY	0.749	0.784	0.788	0.731	0.842	0.822
ROTOR MOMENTUM RISE EFFICIENCY	0.820	0.827	0.830	0.900	0.898	0.863
ROTOR HEAD RISE COEFFICIENT	0.250	0.256	0.262	0.213	0.251	0.266
STAGE HEAD RISE COEFFICIENT	0.220	0.234	0.243	0.169	0.234	0.250
FLOW COEFFICIENT	0.417	0.415	0.402	0.435	0.393	0.355
WT FLOW PER UNIT FRONTAL AREA	147.61	146.77	143.23	115.25	105.59	96.37
WT FLOW PER UNIT ANNULUS AREA	198.51	197.38	192.62	155.00	142.00	129.59
WT FLOW AT ORIFICE	29.18	29.01	28.31	22.78	20.87	19.05
WT FLOW AT ROTOR INLET	29.88	29.73	29.03	23.30	21.33	19.47
WT FLOW AT ROTOR OUTLET	29.37	29.28	28.44	23.12	21.19	19.24
WT FLOW AT STATOR OUTLET	30.96	30.40	29.37	24.07	21.25	19.39
ROTATIVE SPEED	16126.7	16125.2	16110.9	11274.3	11265.5	11255.5
PERCENT OF DESIGN SPEED	100.2	100.2	100.1	70.0	70.0	69.9

(d) Nominal nonrotating rotor tip clearance, 0.178 cm

	Nominal rotative speed, percent of design				
	100		70		
READING NUMBER	3424	3423	3422	3421	3420
ROTOR TOTAL PRESSURE RATIO	1.655	1.674	1.245	1.292	1.306
STAGE TOTAL PRESSURE RATIO	1.581	1.613	1.191	1.271	1.287
ROTOR TOTAL TEMPERATURE RATIO	1.189	1.195	1.072	1.085	1.092
STAGE TOTAL TEMPERATURE RATIO	1.183	1.188	1.071	1.085	1.091
ROTOR TEMP. RISE EFFICIENCY	0.818	0.815	0.900	0.891	0.859
STAGE TEMP. RISE EFFICIENCY	0.765	0.778	0.719	0.836	0.819
ROTOR MOMENTUM RISE EFFICIENCY	0.805	0.805	0.875	0.879	0.846
ROTOR HEAD RISE COEFFICIENT	0.249	0.255	0.211	0.249	0.260
STAGE HEAD RISE COEFFICIENT	0.224	0.235	0.167	0.232	0.244
FLOW COEFFICIENT	0.413	0.398	0.435	0.394	0.356
WT FLOW PER UNIT FRONTAL AREA	146.54	142.42	115.57	106.20	97.04
WT FLOW PER UNIT ANNULUS AREA	197.08	191.52	155.42	142.81	130.50
WT FLOW AT ORIFICE	28.96	28.15	22.84	20.99	19.18
WT FLOW AT ROTOR INLET	29.70	28.89	23.37	21.46	19.62
WT FLOW AT ROTOR OUTLET	28.84	27.75	22.99	21.10	19.10
WT FLOW AT STATOR OUTLET	30.50	29.14	24.14	21.35	19.56
ROTATIVE SPEED	16165.6	16157.0	11333.9	11328.6	11321.0
PERCENT OF DESIGN SPEED	100.4	100.4	70.4	70.4	70.3

TABLE VII. – BLADE-ELEMENT DATA AT BLADE EDGES FOR NOMINAL NONROTATING ROTOR TIP CLEARANCE OF 0.061 cm

(a) Rotor 8E

(a-1) 100 Percent of design speed; reading 3364

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.567	24.193	0.0	43.8	64.0	54.6	289.3	1.235	10.07	1.715
2	24.021	23.685	0.0	38.6	62.6	53.5	289.2	1.212	10.13	1.724
3	21.753	21.653	0.0	38.6	59.2	49.7	288.3	1.191	10.14	1.725
4	20.287	20.383	0.0	44.1	57.2	46.8	287.9	1.188	10.14	1.651
5	19.990	20.129	0.0	44.2	56.8	47.1	287.5	1.185	10.14	1.625
6	19.690	19.875	0.0	44.4	56.4	47.5	287.9	1.181	10.14	1.605
7	19.388	19.621	0.0	44.1	56.0	47.2	287.8	1.177	10.14	1.598
8	19.086	19.367	0.0	43.8	55.7	45.8	287.6	1.173	10.14	1.609
9	16.891	17.589	0.0	44.1	53.2	37.6	287.5	1.165	10.14	1.634
10	14.176	15.557	0.0	47.8	50.5	20.9	287.6	1.175	10.14	1.721
11	13.447	15.049	0.0	51.3	50.0	12.0	287.7	1.192	10.12	1.787

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	202.4	238.8	461.0	297.5	202.4	172.3	0.1	165.4	414.3	408.0
2	209.6	237.6	456.1	312.6	209.6	185.7	0.1	148.2	405.2	399.6
3	219.0	236.8	427.8	285.9	219.0	185.0	0.1	147.9	367.6	365.9
4	221.0	235.9	408.0	247.5	221.0	169.4	0.1	164.3	343.1	344.7
5	220.7	231.1	403.0	243.5	220.7	165.7	0.1	161.2	337.2	339.6
6	220.9	226.9	399.1	240.0	220.9	162.1	0.1	158.7	332.5	335.7
7	220.7	225.3	395.0	238.1	220.7	161.7	0.0	156.9	327.7	331.6
8	219.8	227.8	390.0	236.1	219.8	164.6	0.0	157.6	322.2	327.0
9	212.7	237.5	355.3	215.3	212.7	170.7	0.1	165.2	284.7	296.5
10	197.3	263.2	310.0	189.1	197.3	176.7	0.0	195.1	239.2	262.5
11	190.2	278.2	296.0	178.0	190.2	174.1	0.1	217.0	226.8	253.9

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.616	0.657	1.402	0.818	0.616	0.474	0.851	1.560
2	0.639	0.660	1.392	0.868	0.639	0.516	0.886	1.544
3	0.672	0.665	1.312	0.803	0.672	0.519	0.845	1.527
4	0.679	0.664	1.254	0.696	0.679	0.477	0.766	1.503
5	0.679	0.650	1.239	0.685	0.679	0.466	0.751	1.495
6	0.679	0.638	1.226	0.675	0.679	0.456	0.734	1.489
7	0.678	0.635	1.214	0.671	0.678	0.456	0.733	1.483
8	0.675	0.644	1.198	0.667	0.675	0.465	0.749	1.476
9	0.652	0.676	1.089	0.613	0.652	0.486	0.802	1.424
10	0.601	0.754	0.944	0.541	0.601	0.506	0.895	1.289
11	0.578	0.795	0.899	0.509	0.578	0.498	0.916	1.218

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	2.1	-0.6	2.6	0.472	0.708	0.258	0.165	0.049	0.032
2	10.00	2.1	-0.9	2.3	0.419	0.795	0.172	0.083	0.033	0.016
3	30.00	3.3	-0.8	3.4	0.433	0.880	0.101	0.029	0.019	0.005
4	42.50	3.7	-1.0	5.0	0.505	0.818	0.159	0.099	0.030	0.019
5	45.00	3.8	-1.1	6.4	0.505	0.804	0.171	0.115	0.032	0.021
6	47.50	3.9	-1.1	7.9	0.506	0.800	0.173	0.120	0.031	0.022
7	50.00	4.0	-1.2	8.9	0.503	0.811	0.163	0.113	0.029	0.020
8	52.50	4.1	-1.2	8.8	0.501	0.840	0.139	0.092	0.025	0.017
9	70.00	4.8	-1.4	11.5	0.504	0.914	0.083	0.056	0.015	0.010
10	90.00	5.3	-1.8	14.4	0.518	0.959	0.052	0.048	0.009	0.009
11	95.00	5.6	-1.6	12.3	0.541	0.939	0.090	0.089	0.016	0.016

TABLE VII. – Continued.

(a) Continued. Rotor 8E

(a-2) 100 Percent of design speed; reading 3365

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	24.567	24.193	0.0	47.9	64.6	53.3	289.4	1.263	10.08	1.869
2	24.021	23.685	0.0	43.9	63.3	52.4	289.1	1.240	10.13	1.868
3	21.753	21.653	0.0	43.9	60.0	50.1	288.2	1.212	10.14	1.818
4	20.287	20.383	0.0	46.8	58.0	46.1	288.0	1.206	10.14	1.780
5	19.990	20.129	0.0	47.4	57.7	45.9	287.9	1.205	10.14	1.763
6	19.690	19.875	0.0	47.8	57.3	45.9	287.8	1.202	10.14	1.740
7	19.388	19.621	0.0	48.4	56.9	45.5	288.1	1.200	10.14	1.731
8	19.086	19.367	0.0	47.9	56.6	44.4	287.5	1.195	10.14	1.734
9	16.891	17.589	0.0	48.0	54.2	37.0	287.6	1.182	10.14	1.720
10	14.176	15.557	0.0	50.6	51.5	22.0	287.7	1.181	10.14	1.758
11	13.447	15.049	0.0	53.8	51.1	11.7	287.8	1.198	10.12	1.834

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	196.5	248.3	458.3	278.7	196.5	166.5	0.0	184.3	414.1	407.8
2	203.4	245.4	453.3	289.6	203.4	176.8	0.1	170.2	405.2	399.5
3	211.6	234.8	423.2	263.5	211.6	169.2	0.1	162.8	366.5	364.8
4	213.1	238.2	402.6	235.1	213.1	163.0	0.1	173.8	341.6	343.3
5	213.0	236.3	398.1	229.5	213.0	159.9	0.1	174.1	336.4	338.8
6	212.7	233.1	393.6	225.2	212.7	156.7	0.1	172.6	331.2	334.4
7	212.9	232.4	389.9	220.1	212.9	154.4	0.1	173.7	326.7	330.6
8	211.9	233.2	385.0	218.8	211.9	156.3	0.1	173.1	321.5	326.3
9	204.9	237.3	350.5	198.9	204.9	158.8	0.0	176.3	284.4	296.1
10	189.6	254.6	304.8	174.3	189.6	161.6	0.1	196.7	238.8	262.0
11	183.0	273.0	291.2	164.6	183.0	161.2	0.1	220.3	226.6	253.6

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	0.596	0.677	1.391	0.760	0.596	0.454	0.847	1.571
2	0.619	0.675	1.380	0.797	0.619	0.487	0.869	1.557
3	0.647	0.653	1.295	0.733	0.647	0.470	0.799	1.536
4	0.653	0.665	1.233	0.657	0.653	0.455	0.765	1.514
5	0.652	0.660	1.219	0.641	0.652	0.446	0.751	1.508
6	0.652	0.651	1.206	0.629	0.652	0.438	0.737	1.502
7	0.652	0.650	1.194	0.615	0.652	0.432	0.725	1.495
8	0.649	0.654	1.179	0.614	0.649	0.438	0.738	1.491
9	0.626	0.670	1.070	0.562	0.626	0.449	0.775	1.448
10	0.576	0.724	0.926	0.496	0.576	0.460	0.852	1.298
11	0.554	0.776	0.882	0.468	0.554	0.458	0.881	1.227

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	2.8	0.1	1.3	0.524	0.743	0.251	0.157	0.050	0.031
2	10.00	2.8	-0.2	1.2	0.482	0.815	0.173	0.084	0.034	0.017
3	30.00	4.0	-0.0	3.8	0.490	0.878	0.113	0.042	0.021	0.008
4	42.50	4.6	-0.2	4.3	0.536	0.869	0.127	0.068	0.024	0.013
5	45.00	4.7	-0.2	5.1	0.543	0.859	0.137	0.081	0.026	0.015
6	47.50	4.8	-0.2	6.4	0.546	0.850	0.147	0.094	0.027	0.018
7	50.00	4.9	-0.3	7.1	0.554	0.850	0.147	0.097	0.027	0.018
8	52.50	5.0	-0.2	7.4	0.550	0.872	0.125	0.078	0.023	0.015
9	70.00	5.8	-0.4	11.0	0.551	0.922	0.083	0.055	0.015	0.010
10	90.00	6.4	-0.7	15.5	0.559	0.966	0.045	0.042	0.008	0.008
11	95.00	6.7	-0.5	12.0	0.581	0.957	0.066	0.066	0.012	0.012

TABLE VII. – Continued.

(a) Continued. Rotor 8E

(a-3) 100 Percent of design speed; reading 3366

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.567	24.193	0.0	53.4	66.7	53.9	288.9	1.280	10.07	1.913
2	24.021	23.685	0.0	49.6	65.5	52.4	288.9	1.260	10.12	1.913
3	21.753	21.653	0.0	47.5	62.1	50.4	288.3	1.225	10.14	1.859
4	20.287	20.383	0.0	49.0	60.1	46.6	288.0	1.216	10.14	1.832
5	19.990	20.129	0.0	49.7	59.8	46.0	287.7	1.215	10.14	1.818
6	19.690	19.875	0.0	51.1	59.4	45.8	288.1	1.216	10.14	1.800
7	19.388	19.621	0.0	51.6	59.0	45.0	287.9	1.213	10.14	1.792
8	19.086	19.367	0.0	50.7	58.6	44.0	288.2	1.209	10.14	1.793
9	16.891	17.589	0.0	50.3	56.2	37.3	287.6	1.191	10.14	1.763
10	14.176	15.557	0.0	52.4	53.3	22.9	287.6	1.187	10.14	1.776
11	13.447	15.049	0.0	55.1	52.7	11.2	287.7	1.202	10.13	1.868

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	177.5	251.3	449.6	253.9	177.5	149.7	0.0	201.8	413.1	406.9
2	184.2	248.6	444.3	264.3	184.2	161.2	0.0	189.3	404.4	398.8
3	193.9	234.5	414.1	248.4	193.9	158.3	0.1	173.0	366.0	364.3
4	196.2	237.1	394.0	226.5	196.2	155.7	0.1	178.8	341.7	343.4
5	195.9	236.2	389.1	220.3	195.9	152.9	0.1	180.1	336.3	338.6
6	196.2	235.2	385.3	211.5	196.2	147.6	0.0	183.2	331.6	334.7
7	196.2	235.0	380.7	206.6	196.2	146.1	0.1	184.1	326.3	330.2
8	196.2	235.5	376.7	207.3	196.2	149.1	0.0	182.3	321.6	326.4
9	190.6	235.7	342.1	189.4	190.6	150.7	0.0	181.2	284.2	296.0
10	177.9	249.4	297.7	165.1	177.9	152.0	0.0	197.7	238.8	262.0
11	172.1	271.2	284.2	158.3	172.1	155.3	0.0	222.4	226.3	253.2

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS
RP	IN	OUT	IN	OUT	IN	OUT	VEL R MACH NO
1	0.536	0.681	1.357	0.688	0.536	0.406	0.843 1.610
2	0.557	0.679	1.344	0.722	0.557	0.440	0.875 1.595
3	0.589	0.648	1.258	0.686	0.589	0.438	0.817 1.574
4	0.597	0.659	1.199	0.629	0.597	0.433	0.794 1.556
5	0.596	0.657	1.184	0.613	0.596	0.425	0.781 1.550
6	0.597	0.653	1.172	0.587	0.597	0.410	0.752 1.545
7	0.597	0.654	1.159	0.575	0.597	0.406	0.744 1.537
8	0.597	0.656	1.146	0.577	0.597	0.415	0.760 1.533
9	0.579	0.663	1.040	0.533	0.579	0.424	0.791 1.498
10	0.538	0.706	0.901	0.467	0.538	0.430	0.855 1.318
11	0.520	0.770	0.858	0.449	0.520	0.441	0.902 1.243

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	4.9	2.2	1.9	0.583	0.726	0.285	0.187	0.056	0.036
2	10.00	5.0	2.0	1.2	0.542	0.782	0.221	0.128	0.044	0.025
3	30.00	6.1	2.1	4.1	0.523	0.861	0.139	0.065	0.026	0.012
4	42.50	6.7	1.9	4.8	0.551	0.873	0.132	0.070	0.025	0.013
5	45.00	6.8	1.9	5.3	0.560	0.866	0.140	0.081	0.026	0.015
6	47.50	6.9	1.9	6.2	0.579	0.849	0.160	0.104	0.030	0.020
7	50.00	6.9	1.8	6.7	0.586	0.851	0.159	0.106	0.030	0.020
8	52.50	7.0	1.8	7.0	0.577	0.867	0.142	0.092	0.027	0.017
9	70.00	7.7	1.5	11.2	0.572	0.921	0.092	0.060	0.017	0.011
10	90.00	8.1	1.1	16.4	0.580	0.953	0.068	0.064	0.012	0.011
11	95.00	8.3	1.1	11.6	0.594	0.968	0.053	0.052	0.009	0.009

TABLE VII. – Continued.

(a) Continued. Rotor 8E

(a-4) 90 Percent of design speed; reading 3367

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	24.567	24.193	0.0	52.4	68.1	54.5	289.6	1.217	10.07	1.693
2	24.021	23.685	0.0	48.8	66.8	52.5	289.4	1.206	10.12	1.700
3	21.753	21.653	0.0	46.5	63.5	50.6	288.1	1.179	10.14	1.656
4	20.287	20.383	0.0	46.9	61.7	46.5	287.7	1.170	10.14	1.643
5	19.990	20.129	0.0	47.9	61.4	45.9	287.7	1.169	10.14	1.634
6	19.690	19.875	0.0	49.4	60.9	45.2	287.9	1.170	10.14	1.622
7	19.388	19.621	0.0	49.7	60.6	44.6	287.7	1.168	10.14	1.616
8	19.086	19.367	0.0	48.8	60.3	43.8	287.6	1.163	10.14	1.612
9	16.891	17.589	0.0	49.5	57.9	38.1	287.7	1.152	10.14	1.580
10	14.176	15.557	0.0	52.1	55.1	21.1	287.6	1.153	10.14	1.618
11	13.447	15.049	0.0	54.7	54.5	10.7	287.7	1.163	10.13	1.672

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	149.9	222.9	401.5	233.8	149.9	135.9	0.0	176.6	372.5	366.9
2	156.3	223.5	397.1	241.9	156.3	147.3	0.0	168.1	365.0	360.0
3	164.5	210.7	369.2	228.3	164.5	145.1	0.0	152.8	330.6	329.1
4	165.9	213.5	349.8	211.8	165.9	145.9	0.0	155.9	308.0	309.5
5	165.6	213.1	345.5	205.2	165.6	142.9	0.0	158.1	303.2	305.3
6	165.9	213.1	341.6	196.8	165.9	138.7	0.0	161.8	298.6	301.4
7	165.8	212.7	337.7	193.2	165.8	137.6	0.0	162.2	294.2	297.8
8	165.2	212.1	333.1	193.7	165.2	139.8	0.1	159.4	289.3	293.5
9	160.9	210.2	302.6	173.4	160.9	136.4	0.0	159.9	256.3	266.9
10	150.4	230.3	262.6	151.5	150.4	141.3	0.0	181.9	215.3	236.3
11	145.6	246.7	250.7	144.9	145.6	142.4	0.0	201.4	204.1	228.4

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID VEL R	MERID PEAK SS MACH NO
1	0.448	0.614	1.200	0.644	0.448	0.375	0.907	1.514
2	0.468	0.619	1.190	0.670	0.468	0.408	0.943	1.502
3	0.495	0.590	1.111	0.639	0.495	0.406	0.882	1.506
4	0.500	0.601	1.054	0.596	0.500	0.411	0.880	1.507
5	0.499	0.600	1.041	0.578	0.499	0.403	0.863	1.508
6	0.500	0.600	1.029	0.554	0.500	0.390	0.836	1.507
7	0.499	0.599	1.018	0.544	0.499	0.388	0.830	1.509
8	0.498	0.599	1.004	0.547	0.498	0.395	0.846	1.512
9	0.484	0.596	0.911	0.492	0.484	0.387	0.847	1.406
10	0.451	0.658	0.788	0.433	0.451	0.404	0.940	1.200
11	0.436	0.706	0.751	0.414	0.436	0.407	0.978	1.133

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	6.3	3.6	2.5	0.562	0.750	0.246	0.192	0.047	0.037
2	10.00	6.3	3.3	1.3	0.527	0.795	0.198	0.147	0.039	0.029
3	30.00	7.6	3.5	4.3	0.503	0.867	0.127	0.086	0.024	0.016
4	42.50	8.2	3.5	4.7	0.518	0.896	0.104	0.069	0.020	0.013
5	45.00	8.4	3.5	5.2	0.531	0.890	0.111	0.077	0.021	0.015
6	47.50	8.4	3.4	5.6	0.552	0.872	0.131	0.100	0.025	0.019
7	50.00	8.6	3.4	6.2	0.556	0.874	0.131	0.100	0.025	0.019
8	52.50	8.7	3.4	6.8	0.544	0.895	0.108	0.079	0.020	0.015
9	70.00	9.4	3.2	12.0	0.552	0.921	0.089	0.080	0.016	0.015
10	90.00	9.9	2.8	14.5	0.564	0.966	0.049	0.049	0.009	0.009
11	95.00	10.1	2.9	11.0	0.578	0.972	0.047	0.047	0.008	0.008

TABLE VII. – Continued.

(a) Continued. Rotor 8E

(a-5) 80 Percent of design speed; reading 3368

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.567	24.193	0.0	52.5	70.1	55.2	290.0	1.166	10.10	1.490
2	24.021	23.685	0.0	48.1	68.9	53.1	289.2	1.162	10.14	1.497
3	21.753	21.653	0.0	47.4	65.9	52.2	287.9	1.139	10.14	1.459
4	20.287	20.383	0.0	49.3	64.3	47.7	287.8	1.135	10.13	1.456
5	19.990	20.129	0.0	50.3	64.0	47.4	288.0	1.134	10.14	1.451
6	19.690	19.875	0.0	50.7	63.7	47.2	287.0	1.131	10.14	1.439
7	19.388	19.621	0.0	52.0	63.3	46.4	288.2	1.132	10.13	1.436
8	19.086	19.367	0.0	52.3	63.0	45.1	287.8	1.132	10.13	1.436
9	16.891	17.589	0.0	48.9	60.4	36.8	287.6	1.120	10.13	1.441
10	14.176	15.557	0.0	51.0	57.4	20.3	287.6	1.118	10.13	1.470
11	13.447	15.049	0.0	53.4	56.8	10.9	287.6	1.126	10.13	1.507

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	120.2	195.4	352.3	208.6	120.2	119.0	0.0	154.9	331.2	326.2
2	125.4	195.9	347.8	217.6	125.4	130.7	0.0	145.9	324.4	319.9
3	131.3	182.1	322.0	201.0	131.3	123.3	0.0	134.0	294.0	292.7
4	131.9	186.6	304.1	180.8	131.9	121.6	0.0	141.5	274.0	275.3
5	132.1	186.2	301.0	175.4	132.1	118.8	0.0	143.4	270.5	272.4
6	131.2	183.8	296.1	171.3	131.2	116.4	0.0	142.2	265.5	268.0
7	131.6	184.8	293.3	165.1	131.6	113.7	0.0	145.6	262.1	265.2
8	131.2	186.1	289.0	161.1	131.2	113.8	0.0	147.2	257.5	261.3
9	129.3	190.6	262.0	156.4	129.3	125.2	0.0	143.7	227.9	237.3
10	122.4	208.0	227.0	139.5	122.4	130.9	0.0	161.6	191.3	209.9
11	118.7	221.4	216.9	134.4	118.7	131.9	0.0	177.8	181.6	203.2

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.356	0.545	1.045	0.582	0.356	0.332	0.990	1.474
2	0.373	0.549	1.034	0.610	0.373	0.366	1.043	1.469
3	0.392	0.515	0.961	0.568	0.392	0.349	0.939	1.474
4	0.394	0.529	0.908	0.513	0.394	0.345	0.922	1.432
5	0.394	0.528	0.899	0.498	0.394	0.337	0.899	1.423
6	0.392	0.523	0.885	0.487	0.392	0.331	0.887	1.410
7	0.393	0.524	0.875	0.468	0.393	0.323	0.864	1.398
8	0.392	0.529	0.863	0.458	0.392	0.323	0.867	1.383
9	0.386	0.545	0.782	0.447	0.386	0.358	0.969	1.275
10	0.365	0.599	0.677	0.402	0.365	0.377	1.070	1.083
11	0.354	0.638	0.646	0.387	0.354	0.380	1.111	1.025

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	8.3	5.5	3.2	0.552	0.726	0.256	0.228	0.048	0.043
2	10.00	8.4	5.4	1.9	0.509	0.756	0.228	0.201	0.044	0.039
3	30.00	10.0	5.9	5.9	0.498	0.820	0.166	0.146	0.030	0.026
4	42.50	10.8	6.1	5.9	0.534	0.842	0.155	0.144	0.029	0.027
5	45.00	11.0	6.1	6.6	0.548	0.836	0.164	0.154	0.030	0.028
6	47.50	11.2	6.2	7.7	0.551	0.837	0.162	0.154	0.030	0.028
7	50.00	11.3	6.1	8.1	0.569	0.826	0.178	0.171	0.032	0.031
8	52.50	11.4	6.1	8.0	0.576	0.828	0.179	0.174	0.033	0.032
9	70.00	12.0	5.8	10.7	0.533	0.915	0.097	0.097	0.018	0.018
10	90.00	12.2	5.1	13.7	0.530	0.983	0.026	0.026	0.005	0.005
11	95.00	12.4	5.2	11.2	0.539	0.986	0.024	0.024	0.004	0.004

TABLE VII. – Continued.

(a) Continued. Rotor 8E

(a-6) 70 Percent of design speed; reading 3362

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	24.567	24.193	0.0	25.6	64.2	54.3	288.9	1.077	10.09	1.230
2	24.021	23.685	0.0	24.9	62.8	53.5	288.8	1.072	10.13	1.231
3	21.753	21.653	0.0	25.8	59.6	50.8	288.1	1.066	10.13	1.237
4	20.287	20.383	0.0	29.0	57.7	47.1	288.0	1.067	10.14	1.236
5	19.990	20.129	0.0	30.0	57.3	45.9	287.8	1.067	10.13	1.238
6	19.690	19.875	0.0	32.0	56.9	44.7	287.7	1.070	10.14	1.237
7	19.388	19.621	0.0	33.0	56.6	43.7	288.0	1.073	10.14	1.237
8	19.086	19.367	0.0	32.4	56.2	42.8	287.9	1.071	10.14	1.242
9	16.891	17.589	0.0	34.4	53.6	35.3	287.8	1.070	10.14	1.261
10	14.176	15.557	0.0	41.3	50.5	18.4	287.9	1.079	10.14	1.309
11	13.447	15.049	0.0	43.8	50.0	12.7	287.8	1.084	10.13	1.332

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	139.9	169.1	321.6	261.1	139.9	152.5	0.0	73.2	289.6	285.2
2	145.6	169.7	318.7	258.9	145.6	153.9	0.0	71.4	283.6	279.6
3	150.7	166.2	297.8	236.8	150.7	149.7	0.0	72.2	256.9	255.7
4	151.8	168.9	283.7	217.0	151.8	147.7	0.0	81.9	239.8	240.9
5	151.4	170.2	280.1	211.8	151.4	147.3	0.0	85.2	235.7	237.4
6	151.0	171.1	276.8	204.0	151.0	145.0	0.0	90.8	232.0	234.2
7	151.1	172.2	274.1	199.6	151.1	144.4	0.0	93.7	228.8	231.5
8	150.9	173.4	271.0	199.6	150.9	146.4	0.0	92.9	225.2	228.5
9	146.8	180.6	247.5	182.6	146.8	149.0	0.0	102.0	199.2	207.5
10	137.7	201.5	216.4	159.6	137.7	151.4	0.0	132.9	167.0	183.3
11	133.3	207.9	207.2	153.9	133.3	150.1	0.0	143.9	158.7	177.6

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	0.418	0.490	0.960	0.756	0.418	0.441	1.090	1.201
2	0.435	0.493	0.953	0.752	0.435	0.447	1.057	1.185
3	0.452	0.484	0.893	0.690	0.452	0.436	0.994	1.174
4	0.455	0.492	0.851	0.633	0.455	0.430	0.973	1.148
5	0.454	0.496	0.841	0.617	0.454	0.430	0.973	1.139
6	0.453	0.498	0.831	0.594	0.453	0.422	0.960	1.131
7	0.453	0.501	0.822	0.580	0.453	0.420	0.956	1.123
8	0.453	0.505	0.813	0.581	0.453	0.427	0.971	1.114
9	0.440	0.528	0.742	0.533	0.440	0.435	1.015	1.037
10	0.412	0.590	0.647	0.467	0.412	0.443	1.100	0.884
11	0.398	0.609	0.619	0.450	0.398	0.439	1.127	0.837

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	2.4	-0.3	2.3	0.263	0.789	0.114	0.113	0.022	0.022
2	10.00	2.3	-0.7	2.3	0.260	0.854	0.075	0.075	0.015	0.014
3	30.00	3.7	-0.4	4.5	0.276	0.954	0.024	0.024	0.005	0.005
4	42.50	4.2	-0.5	5.3	0.315	0.939	0.035	0.035	0.007	0.007
5	45.00	4.3	-0.6	5.2	0.327	0.933	0.040	0.040	0.008	0.008
6	47.50	4.4	-0.6	5.1	0.352	0.890	0.069	0.069	0.013	0.013
7	50.00	4.5	-0.6	5.3	0.363	0.862	0.091	0.091	0.017	0.017
8	52.50	4.6	-0.7	5.7	0.354	0.907	0.061	0.061	0.012	0.012
9	70.00	5.2	-1.0	9.2	0.360	0.982	0.013	0.013	0.003	0.003
10	90.00	5.3	-1.7	11.9	0.387	1.007	-0.008	-0.008	-0.001	-0.001
11	95.00	5.6	-1.6	13.0	0.392	1.015	-0.018	-0.018	-0.003	-0.003

TABLE VII. – Continued.

(a) Continued. Rotor 8E

(a-7) 70 Percent of design speed; reading 3361

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.567	24.193	0.0	39.1	67.1	54.2	288.8	1.108	10.10	1.319
2	24.021	23.685	0.0	36.6	65.9	53.0	288.6	1.100	10.13	1.321
3	21.753	21.653	0.0	36.8	62.9	51.7	288.1	1.086	10.13	1.298
4	20.287	20.383	0.0	39.4	61.3	47.1	287.9	1.086	10.14	1.304
5	19.990	20.129	0.0	39.9	60.9	46.1	288.0	1.087	10.14	1.306
6	19.690	19.875	0.0	40.9	60.6	45.5	287.8	1.087	10.14	1.299
7	19.388	19.621	0.0	42.3	60.3	45.0	287.8	1.087	10.13	1.297
8	19.086	19.367	0.0	41.8	60.0	44.0	288.2	1.087	10.13	1.297
9	16.891	17.589	0.0	43.0	57.6	35.1	287.9	1.083	10.14	1.309
10	14.176	15.557	0.0	47.0	54.7	19.4	287.8	1.085	10.14	1.333
11	13.447	15.049	0.0	49.7	54.1	11.2	287.8	1.092	10.13	1.360

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	122.4	167.3	314.7	222.1	122.4	129.9	0.0	105.4	289.9	285.5
2	126.4	168.0	310.0	224.0	126.4	134.8	0.0	100.3	283.0	279.1
3	130.3	157.4	286.3	203.4	130.3	126.1	0.0	94.2	255.0	253.8
4	130.7	163.4	271.8	185.4	130.7	126.2	0.0	103.7	238.4	239.5
5	130.8	164.8	269.2	182.2	130.8	126.4	0.0	105.7	235.4	237.0
6	130.0	163.7	265.2	176.7	130.0	123.8	0.0	107.2	231.1	233.3
7	130.3	163.9	263.1	171.2	130.3	121.2	0.0	110.4	228.6	231.4
8	130.1	164.6	259.8	170.5	130.1	122.6	0.0	109.8	224.9	228.2
9	126.2	173.1	235.5	154.8	126.2	126.6	0.0	118.1	198.9	207.1
10	118.2	188.4	204.5	136.2	118.2	128.5	0.0	137.8	166.9	183.2
11	114.8	199.1	195.7	131.2	114.8	128.7	0.0	151.9	158.5	177.3

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.364	0.477	0.936	0.633	0.364	0.370	1.061	1.271
2	0.376	0.481	0.923	0.641	0.376	0.386	1.067	1.253
3	0.389	0.453	0.854	0.585	0.389	0.363	0.967	1.222
4	0.390	0.471	0.811	0.534	0.390	0.364	0.966	1.195
5	0.390	0.475	0.803	0.525	0.390	0.364	0.967	1.190
6	0.388	0.472	0.791	0.509	0.388	0.357	0.952	1.179
7	0.389	0.473	0.785	0.494	0.389	0.349	0.930	1.175
8	0.388	0.474	0.775	0.491	0.388	0.353	0.943	1.163
9	0.376	0.501	0.702	0.448	0.376	0.366	1.003	1.078
10	0.352	0.548	0.609	0.396	0.352	0.373	1.087	0.919
11	0.342	0.579	0.582	0.381	0.342	0.374	1.121	0.869

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	5.3	2.6	2.2	0.404	0.764	0.178	0.175	0.034	0.034
2	10.00	5.4	2.4	1.8	0.381	0.831	0.123	0.121	0.024	0.024
3	30.00	7.0	2.9	5.4	0.387	0.903	0.070	0.069	0.013	0.013
4	42.50	7.8	3.1	5.3	0.424	0.913	0.068	0.068	0.013	0.013
5	45.00	8.0	3.1	5.4	0.431	0.913	0.070	0.070	0.013	0.013
6	47.50	8.1	3.1	6.0	0.443	0.892	0.088	0.088	0.017	0.017
7	50.00	8.3	3.1	6.6	0.461	0.887	0.094	0.094	0.018	0.018
8	52.50	8.4	3.1	6.9	0.455	0.890	0.094	0.094	0.018	0.018
9	70.00	9.1	3.0	9.1	0.461	0.961	0.038	0.038	0.007	0.007
10	90.00	9.5	2.4	12.9	0.471	1.005	-0.006	-0.006	-0.001	-0.001
11	95.00	9.7	2.5	11.5	0.480	1.000	-0.000	-0.000	-0.000	-0.000

TABLE VII. – Continued.

(a) Continued. Rotor 8E

(a-8) 70 Percent of design speed; reading 3363

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	24.567	24.193	0.0	58.4	70.8	56.4	288.5	1.140	10.11	1.352
2	24.021	23.685	0.0	51.1	69.8	54.7	288.6	1.127	10.13	1.342
3	21.753	21.653	0.0	44.3	66.8	51.7	288.1	1.102	10.13	1.331
4	20.287	20.383	0.0	46.0	65.1	47.6	288.1	1.098	10.13	1.331
5	19.990	20.129	0.0	47.0	64.7	47.1	288.0	1.097	10.14	1.323
6	19.690	19.875	0.0	48.1	64.4	47.1	288.2	1.096	10.13	1.318
7	19.388	19.621	0.0	49.3	64.0	46.2	288.2	1.097	10.13	1.315
8	19.086	19.367	0.0	49.8	63.7	44.9	288.0	1.097	10.13	1.317
9	16.891	17.589	0.0	47.2	61.1	35.1	287.8	1.091	10.13	1.332
10	14.176	15.557	0.0	50.0	58.1	19.9	288.0	1.088	10.13	1.344
11	13.447	15.049	0.0	52.5	57.5	10.7	288.0	1.094	10.13	1.371

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	100.9	174.0	307.0	165.0	100.9	91.3	0.0	148.1	290.0	285.5
2	104.4	167.7	301.9	182.4	104.4	105.4	0.0	130.4	283.3	279.4
3	109.9	158.9	278.6	183.4	109.9	113.7	0.0	111.0	256.1	254.9
4	111.3	162.6	263.9	167.5	111.3	113.0	0.0	116.9	239.4	240.5
5	111.1	161.3	259.6	161.6	111.1	110.0	0.0	118.0	234.7	236.3
6	111.4	160.2	257.4	157.1	111.4	107.0	0.0	119.2	232.1	234.3
7	111.3	160.8	254.1	151.4	111.3	104.8	0.0	121.9	228.4	231.2
8	111.3	162.3	251.1	147.8	111.3	104.6	0.0	124.1	225.1	228.4
9	109.7	171.0	227.2	142.0	109.7	116.1	0.0	125.5	199.0	207.2
10	104.2	183.5	196.9	125.4	104.2	117.9	0.0	140.6	167.1	183.4
11	101.1	195.1	187.9	120.9	101.1	118.8	0.0	154.8	158.5	177.4

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.299	0.490	0.910	0.465	0.299	0.257	0.905	1.352
2	0.310	0.474	0.895	0.516	0.310	0.298	1.009	1.334
3	0.326	0.454	0.828	0.524	0.326	0.325	1.035	1.293
4	0.331	0.466	0.784	0.480	0.331	0.324	1.016	1.257
5	0.330	0.462	0.771	0.463	0.330	0.315	0.991	1.241
6	0.331	0.459	0.765	0.450	0.331	0.307	0.961	1.235
7	0.331	0.461	0.755	0.434	0.331	0.300	0.941	1.223
8	0.331	0.465	0.746	0.424	0.331	0.300	0.940	1.214
9	0.326	0.493	0.675	0.409	0.326	0.335	1.059	1.117
10	0.309	0.532	0.584	0.363	0.309	0.341	1.131	0.949
11	0.300	0.566	0.557	0.351	0.300	0.344	1.175	0.896

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	9.0	6.3	4.4	0.621	0.644	0.345	0.339	0.063	0.062
2	10.00	9.3	6.3	3.5	0.535	0.689	0.287	0.283	0.054	0.053
3	30.00	10.8	6.8	5.4	0.459	0.837	0.142	0.141	0.026	0.026
4	42.50	11.6	6.9	5.8	0.488	0.869	0.121	0.121	0.023	0.023
5	45.00	11.7	6.8	6.4	0.502	0.862	0.130	0.130	0.024	0.024
6	47.50	11.9	6.9	7.5	0.515	0.856	0.136	0.136	0.025	0.025
7	50.00	12.0	6.8	7.8	0.532	0.844	0.152	0.152	0.028	0.028
8	52.50	12.1	6.8	7.9	0.541	0.848	0.151	0.151	0.028	0.028
9	70.00	12.7	6.5	9.1	0.506	0.935	0.073	0.073	0.014	0.014
10	90.00	12.9	5.8	13.4	0.508	1.001	-0.001	-0.001	-0.000	-0.000
11	95.00	13.0	5.8	11.1	0.516	1.004	-0.006	-0.006	-0.001	-0.001

TABLE VII. – Continued.

(a) Continued. Rotor 8E

(a-9) 60 Percent of design speed; reading 3369

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.567	24.193	0.0	58.3	71.4	56.5	288.5	1.103	10.11	1.252
2	24.021	23.685	0.0	50.4	70.3	54.6	288.4	1.093	10.13	1.245
3	21.753	21.653	0.0	43.1	67.3	51.5	288.2	1.074	10.13	1.237
4	20.287	20.383	0.0	45.5	65.6	47.7	288.1	1.071	10.13	1.234
5	19.990	20.129	0.0	46.4	65.3	47.7	288.1	1.070	10.13	1.228
6	19.690	19.875	0.0	47.7	65.0	47.4	288.1	1.069	10.13	1.225
7	19.388	19.621	0.0	48.8	64.7	46.6	288.0	1.070	10.13	1.223
8	19.086	19.367	0.0	49.4	64.3	45.2	288.1	1.070	10.13	1.223
9	16.891	17.589	0.0	47.5	61.8	35.4	288.0	1.066	10.13	1.233
10	14.176	15.557	0.0	49.9	58.7	18.7	287.9	1.065	10.13	1.249
11	13.447	15.049	0.0	52.1	58.2	10.7	287.9	1.068	10.13	1.263

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	83.5	148.4	261.8	141.7	83.5	78.1	0.0	126.2	248.2	244.4
2	87.0	143.3	257.7	157.8	87.0	91.3	0.0	110.5	242.5	239.2
3	91.5	136.4	237.5	160.0	91.5	99.7	0.0	93.1	219.2	218.2
4	92.6	138.4	224.5	144.2	92.6	97.0	0.0	98.8	204.5	205.5
5	92.6	136.9	221.6	140.1	92.6	94.3	0.0	99.2	201.3	202.8
6	92.6	136.1	219.1	135.5	92.6	91.6	0.0	100.7	198.5	200.4
7	92.5	136.6	216.2	131.0	92.5	90.0	0.0	102.7	195.5	197.8
8	92.5	138.0	213.3	127.4	92.5	89.8	0.0	104.7	192.3	195.1
9	91.4	145.6	193.3	120.6	91.4	98.3	0.0	107.4	170.3	177.3
10	86.7	159.5	167.1	108.4	86.7	102.7	0.0	122.0	142.8	156.7
11	84.1	167.5	159.4	104.8	84.1	103.0	0.0	132.1	135.5	151.6

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.247	0.423	0.774	0.403	0.247	0.222	0.936	1.165
2	0.257	0.409	0.762	0.451	0.257	0.261	1.049	1.148
3	0.271	0.393	0.703	0.461	0.271	0.287	1.089	1.112
4	0.274	0.399	0.665	0.416	0.274	0.280	1.047	1.078
5	0.274	0.395	0.656	0.404	0.274	0.272	1.019	1.069
6	0.274	0.393	0.649	0.391	0.274	0.264	0.989	1.062
7	0.274	0.394	0.640	0.378	0.274	0.260	0.974	1.052
8	0.274	0.398	0.632	0.368	0.274	0.259	0.971	1.041
9	0.271	0.422	0.572	0.350	0.271	0.285	1.076	0.959
10	0.257	0.464	0.494	0.315	0.257	0.299	1.184	0.814
11	0.249	0.488	0.472	0.305	0.249	0.300	1.225	0.770

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	9.6	6.9	4.6	0.617	0.647	0.335	0.335	0.061	0.061
2	10.00	9.8	6.8	3.4	0.525	0.694	0.273	0.273	0.051	0.051
3	30.00	11.4	7.3	5.2	0.442	0.848	0.128	0.128	0.024	0.024
4	42.50	12.2	7.4	6.0	0.480	0.875	0.112	0.112	0.021	0.021
5	45.00	12.3	7.4	7.0	0.490	0.864	0.123	0.123	0.023	0.023
6	47.50	12.5	7.5	7.9	0.506	0.858	0.130	0.130	0.024	0.024
7	50.00	12.6	7.5	8.2	0.521	0.847	0.143	0.143	0.026	0.026
8	52.50	12.7	7.5	8.1	0.532	0.847	0.147	0.147	0.027	0.027
9	70.00	13.3	7.1	9.4	0.507	0.933	0.073	0.073	0.014	0.014
10	90.00	13.5	6.5	12.2	0.499	1.014	-0.020	-0.020	-0.004	-0.004
11	95.00	13.7	6.5	11.0	0.503	1.018	-0.029	-0.029	-0.005	-0.005

TABLE VII. – Continued.

(a) Concluded. Rotor 8E

(a-10) 50 Percent of design speed; reading 3370

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.567	24.193	0.0	55.1	71.3	56.1	288.6	1.069	10.12	1.169
2	24.021	23.685	0.0	48.0	70.2	54.3	288.4	1.063	10.13	1.167
3	21.753	21.653	0.0	42.8	67.5	52.0	288.1	1.051	10.13	1.161
4	20.287	20.383	0.0	44.4	65.8	47.3	288.1	1.050	10.13	1.161
5	19.990	20.129	0.0	45.4	65.5	46.9	288.1	1.049	10.13	1.159
6	19.690	19.875	0.0	46.8	65.2	46.4	288.1	1.049	10.13	1.157
7	19.388	19.621	0.0	48.0	64.8	45.8	288.1	1.049	10.13	1.153
8	19.086	19.367	0.0	48.7	64.5	44.7	288.1	1.049	10.13	1.156
9	16.891	17.589	0.0	46.5	62.1	35.9	288.1	1.046	10.13	1.159
10	14.176	15.557	0.0	49.5	59.0	18.7	287.9	1.045	10.13	1.171
11	13.447	15.049	0.0	51.5	58.5	10.6	288.0	1.048	10.13	1.182

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	70.4	122.4	219.4	125.6	70.4	70.0	0.0	100.4	207.8	204.7
2	73.0	119.7	215.9	137.3	73.0	80.1	0.0	88.9	203.2	200.4
3	76.4	113.3	199.5	135.2	76.4	83.2	0.0	76.9	184.3	183.5
4	77.0	116.7	187.8	123.0	77.0	83.4	0.0	81.7	171.3	172.1
5	77.0	116.0	185.3	119.4	77.0	81.5	0.0	82.6	168.6	169.7
6	77.1	116.1	183.5	115.2	77.1	79.5	0.0	84.6	166.5	168.1
7	76.9	115.3	180.3	110.7	76.9	77.1	0.0	85.7	163.1	165.1
8	77.3	117.2	179.5	108.7	77.3	77.3	0.0	88.0	162.1	164.5
9	75.9	121.9	162.1	103.6	75.9	83.9	0.0	88.4	143.3	149.2
10	72.2	134.3	140.0	92.1	72.2	87.2	0.0	102.2	120.0	131.7
11	69.9	141.8	133.7	89.8	69.9	88.2	0.0	111.0	114.0	127.6

	ABS MACH NO		REL MACH NO		MERID MACH NO			
RP	IN	OUT	IN	OUT	IN	OUT	MERID PEAK SS VEL R	MACH NO
1	0.208	0.352	0.647	0.361	0.208	0.201	0.994	0.972
2	0.215	0.345	0.637	0.396	0.215	0.231	1.098	0.960
3	0.226	0.328	0.589	0.392	0.226	0.241	1.089	0.935
4	0.227	0.339	0.555	0.357	0.227	0.242	1.083	0.903
5	0.227	0.337	0.547	0.346	0.227	0.237	1.059	0.895
6	0.228	0.337	0.542	0.334	0.228	0.231	1.031	0.890
7	0.227	0.335	0.533	0.321	0.227	0.224	1.003	0.877
8	0.228	0.340	0.530	0.316	0.228	0.224	1.001	0.877
9	0.224	0.355	0.479	0.302	0.224	0.244	1.105	0.808
10	0.213	0.392	0.413	0.269	0.213	0.255	1.208	0.684
11	0.206	0.414	0.395	0.262	0.206	0.258	1.262	0.648

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	9.5	6.8	4.2	0.578	0.662	0.301	0.301	0.055	0.055
2	10.00	9.7	6.8	3.1	0.496	0.714	0.242	0.242	0.046	0.046
3	30.00	11.5	7.5	5.7	0.436	0.848	0.123	0.123	0.022	0.022
4	42.50	12.3	7.6	5.5	0.466	0.879	0.105	0.105	0.020	0.020
5	45.00	12.5	7.6	6.2	0.478	0.875	0.111	0.111	0.021	0.021
6	47.50	12.7	7.6	6.8	0.497	0.868	0.119	0.119	0.022	0.022
7	50.00	12.7	7.6	7.5	0.513	0.847	0.142	0.142	0.026	0.026
8	52.50	12.9	7.6	7.6	0.523	0.858	0.134	0.134	0.025	0.025
9	70.00	13.6	7.4	9.9	0.490	0.945	0.058	0.058	0.011	0.011
10	90.00	13.8	6.7	12.2	0.490	1.027	-0.037	-0.037	-0.007	-0.007
11	95.00	14.1	6.9	11.0	0.489	1.028	-0.045	-0.045	-0.008	-0.008

TABLE VII. – Continued.

(b) Stator 8

(b-1) 100 Percent of design speed; reading 3364

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.945	23.947	38.5	4.5	38.5	4.5	357.5	0.982	17.27	0.936
2	23.505	23.538	33.1	2.4	33.1	2.4	350.4	0.991	17.46	0.956
3	21.742	21.902	33.3	0.5	33.3	0.5	343.5	0.996	17.49	0.965
4	20.635	20.884	38.8	-0.8	38.8	-0.8	342.1	0.989	16.75	0.970
5	20.414	20.681	39.0	-1.3	39.0	-1.3	340.8	0.990	16.48	0.980
6	20.193	20.480	39.2	-1.4	39.2	-1.4	340.0	0.990	16.28	0.992
7	19.972	20.279	38.8	-1.0	38.8	-1.0	338.6	0.994	16.21	1.001
8	19.751	20.079	38.4	-1.2	38.4	-1.2	337.5	0.994	16.31	0.996
9	18.219	18.715	37.8	-1.8	37.8	-1.8	334.9	0.998	16.57	0.986
10	16.520	17.252	39.9	3.4	39.9	3.4	337.9	1.010	17.45	0.906
11	16.111	16.904	43.0	4.6	43.0	4.6	343.0	1.004	18.09	0.844

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	268.4	217.6	268.4	217.6	210.1	216.9	167.1	17.3	0.	0.
2	273.2	229.0	273.2	229.0	228.8	228.8	149.3	9.5	0.	0.
3	268.6	235.4	268.6	235.4	224.6	235.4	147.3	1.9	0.	0.
4	258.8	226.8	258.8	226.8	201.6	226.8	162.3	-3.3	0.	0.
5	252.8	225.8	252.8	225.8	196.6	225.8	158.9	-5.0	0.	0.
6	247.4	226.6	247.4	226.6	191.9	226.5	156.2	-5.5	0.	0.
7	245.7	230.3	245.7	230.3	191.4	230.2	154.1	-4.2	0.	0.
8	249.0	231.6	249.0	231.6	195.3	231.5	154.5	-4.7	0.	0.
9	260.1	245.6	260.1	245.6	205.4	245.5	159.5	-7.7	0.	0.
10	286.5	243.8	286.5	243.8	219.9	243.4	183.7	14.3	0.	0.
11	297.2	232.9	297.2	232.9	217.3	232.1	202.7	18.6	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	0.747	0.600	0.747	0.600	0.584	0.598	1.033	0.984
2	0.770	0.638	0.770	0.638	0.645	0.637	1.000	0.871
3	0.764	0.662	0.764	0.662	0.639	0.662	1.048	0.874
4	0.735	0.640	0.735	0.640	0.572	0.640	1.125	0.982
5	0.717	0.638	0.717	0.638	0.558	0.638	1.149	0.957
6	0.702	0.641	0.702	0.641	0.544	0.641	1.181	0.937
7	0.698	0.652	0.698	0.652	0.544	0.652	1.203	0.920
8	0.709	0.657	0.709	0.657	0.556	0.657	1.185	0.918
9	0.747	0.703	0.747	0.703	0.590	0.702	1.195	0.956
10	0.829	0.689	0.829	0.689	0.636	0.688	1.107	1.105
11	0.857	0.652	0.857	0.652	0.627	0.650	1.068	1.231

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	1.7	-4.4	15.6	0.375	0.	0.205	0.205	0.068	0.068
2	10.00	-2.1	-8.2	12.6	0.329	0.	0.136	0.136	0.044	0.044
3	30.00	-0.6	-6.8	9.5	0.287	0.	0.110	0.110	0.033	0.033
4	42.50	4.5	-1.6	7.9	0.306	0.	0.099	0.099	0.028	0.028
5	45.00	4.5	-1.6	7.4	0.290	0.	0.067	0.067	0.019	0.019
6	47.50	4.6	-1.5	7.3	0.267	0.	0.028	0.028	0.008	0.008
7	50.00	4.1	-2.0	7.6	0.241	0.	-0.003	-0.003	-0.001	-0.001
8	52.50	3.4	-2.7	7.5	0.245	0.	0.014	0.014	0.004	0.004
9	70.00	1.6	-4.5	6.4	0.217	0.	0.044	0.044	0.011	0.011
10	90.00	1.0	-5.0	11.4	0.282	0.	0.258	0.258	0.059	0.059
11	95.00	3.1	-2.8	12.7	0.352	0.	0.408	0.408	0.092	0.092

TABLE VII. – Continued.

(b) Continued. Stator 8

(b-2) 100 Percent of design speed; reading 3365

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	23.945	23.947	42.7	6.0	42.7	6.0	365.5	0.984	18.83	0.946
2	23.505	23.538	38.5	5.4	38.5	5.4	358.4	0.993	18.92	0.961
3	21.742	21.902	38.8	2.2	38.8	2.2	349.3	0.997	18.43	0.983
4	20.635	20.884	41.7	1.1	41.7	1.1	347.4	0.992	18.05	0.971
5	20.414	20.681	42.3	0.9	42.3	0.9	346.8	0.992	17.87	0.975
6	20.193	20.480	42.6	0.9	42.6	0.9	345.8	0.993	17.64	0.984
7	19.972	20.279	43.2	0.8	43.2	0.8	345.6	0.992	17.55	0.986
8	19.751	20.079	42.7	0.9	42.7	0.9	343.6	0.995	17.58	0.982
9	18.219	18.715	42.0	-0.6	42.0	-0.6	339.9	0.994	17.44	0.977
10	16.520	17.252	43.2	2.5	43.2	2.5	339.8	1.009	17.82	0.936
11	16.111	16.904	46.1	4.3	46.1	4.3	344.7	1.002	18.57	0.877

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	274.5	196.2	274.5	196.2	201.8	195.2	18[illegible]2	20.5	0.	0.
2	275.2	205.6	275.2	205.6	215.2	204.7	17[illegible].5	19.2	0.	0.
3	258.9	206.3	258.9	206.3	201.9	206.1	162.1	8.0	0.	0.
4	258.1	196.9	258.1	196.9	192.7	196.9	171.7	3.6	0.	0.
5	255.0	195.2	255.0	195.2	188.6	195.2	171.7	3.0	0.	0.
6	250.7	194.4	250.7	194.4	184.4	194.4	169.9	3.0	0.	0.
7	249.2	194.4	249.2	194.4	181.5	194.4	170.7	2.9	0.	0.
8	250.4	194.5	250.4	194.5	184.0	194.5	169.8	3.1	0.	0.
9	254.2	197.4	254.2	197.4	188.7	197.4	170.2	-2.2	0.	0.
10	270.7	205.5	270.7	205.5	197.4	205.3	185.3	9.0	0.	0.
11	285.5	198.0	285.5	198.0	197.9	197.4	205.8	14.8	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	0.756	0.531	0.756	0.531	0.556	0.528	0.967	1.107
2	0.767	0.560	0.767	0.560	0.600	0.558	0.951	1.030
3	0.727	0.569	0.727	0.569	0.567	0.569	1.021	0.986
4	0.726	0.545	0.726	0.545	0.542	0.545	1.022	1.043
5	0.717	0.540	0.717	0.540	0.530	0.540	1.035	1.041
6	0.705	0.538	0.705	0.538	0.519	0.538	1.054	1.028
7	0.701	0.539	0.701	0.539	0.511	0.539	1.071	1.031
8	0.707	0.540	0.707	0.540	0.519	0.540	1.057	1.022
9	0.723	0.552	0.723	0.552	0.537	0.552	1.046	1.033
10	0.775	0.571	0.775	0.571	0.565	0.571	1.040	1.123
11	0.817	0.547	0.817	0.547	0.566	0.546	0.998	1.259

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	-0.2	17.0	0.486	0.	0.171	0.171	0.056	0.056
2	10.00	3.3	-2.8	15.5	0.433	0.	0.122	0.122	0.040	0.040
3	30.00	4.9	-1.3	11.2	0.382	0.	0.058	0.058	0.018	0.018
4	42.50	7.4	1.3	9.8	0.423	0.	0.096	0.096	0.028	0.028
5	45.00	7.9	1.8	9.6	0.421	0.	0.086	0.086	0.025	0.025
6	47.50	8.1	1.9	9.5	0.410	0.	0.058	0.058	0.016	0.016
7	50.00	8.5	2.4	9.5	0.406	0.	0.051	0.051	0.014	0.014
8	52.50	7.8	1.7	9.5	0.405	0.	0.065	0.065	0.018	0.018
9	70.00	5.8	-0.3	7.6	0.394	0.	0.079	0.079	0.020	0.020
10	90.00	4.3	-1.7	10.6	0.387	0.	0.197	0.197	0.045	0.045
11	95.00	6.2	0.3	12.4	0.453	0.	0.346	0.346	0.078	0.078

TABLE VII. – Continued.

(b) Continued. Stator 8

(b-3) 100 Percent of design speed; reading 3366

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	23.945	23.947	48.7	7.2	48.7	7.2	369.9	0.995	19.27	0.964
2	23.505	23.538	44.6	5.5	44.6	5.5	364.2	0.998	19.36	0.968
3	21.742	21.902	42.6	2.2	42.6	2.2	353.2	0.997	18.85	0.973
4	20.635	20.884	44.0	1.3	44.0	1.3	350.3	0.993	18.59	0.961
5	20.414	20.681	44.7	1.0	44.7	1.0	349.6	0.992	18.44	0.962
6	20.193	20.480	46.3	0.8	46.3	0.8	350.1	0.989	18.25	0.967
7	19.972	20.279	46.7	0.9	46.7	0.9	349.2	0.990	18.18	0.969
8	19.751	20.079	45.7	0.8	45.7	0.8	348.5	0.989	18.18	0.966
9	18.219	18.715	44.5	-0.6	44.5	-0.6	342.5	0.992	17.87	0.965
10	16.520	17.252	45.3	2.5	45.3	2.5	341.4	1.008	18.01	0.936
11	16.111	16.904	47.6	4.1	47.6	4.1	345.7	1.003	18.91	0.881

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	271.5	195.5	271.5	195.5	179.2	194.0	203.9	24.3	0.	0.
2	271.7	200.2	271.7	200.2	193.4	199.3	190.8	19.2	0.	0.
3	254.4	191.6	254.4	191.6	187.2	191.5	172.3	7.3	0.	0.
4	254.4	182.6	254.4	182.6	183.1	182.5	176.6	4.1	0.	0.
5	252.5	180.3	252.5	180.3	179.5	180.3	177.5	3.0	0.	0.
6	249.6	178.8	249.6	178.8	172.5	178.8	180.3	2.6	0.	0.
7	248.7	178.2	248.7	178.2	170.7	178.2	180.9	2.7	0.	0.
8	249.8	178.0	249.8	178.0	174.5	178.0	178.7	2.5	0.	0.
9	249.5	177.8	249.5	177.8	177.9	177.8	175.0	-1.8	0.	0.
10	261.8	183.0	261.8	183.0	184.1	182.8	186.2	8.0	0.	0.
11	281.1	180.4	281.1	180.4	189.4	180.0	207.7	12.8	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	0.742	0.522	0.742	0.522	0.490	0.518	1.083	1.237
2	0.749	0.539	0.749	0.539	0.533	0.536	1.030	1.163
3	0.708	0.523	0.708	0.523	0.521	0.523	1.023	1.055
4	0.712	0.500	0.712	0.500	0.512	0.500	0.997	1.077
5	0.706	0.495	0.706	0.495	0.502	0.494	1.004	1.083
6	0.697	0.491	0.697	0.491	0.482	0.491	1.036	1.101
7	0.695	0.489	0.695	0.489	0.477	0.489	1.044	1.104
8	0.700	0.490	0.700	0.490	0.489	0.490	1.020	1.083
9	0.705	0.493	0.705	0.493	0.503	0.493	0.999	1.067
10	0.745	0.504	0.745	0.504	0.524	0.504	0.993	1.134
11	0.801	0.495	0.801	0.495	0.540	0.494	0.950	1.276

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	11.9	5.8	18.2	0.500	0.	0.119	0.119	0.039	0.039
2	10.00	9.4	3.2	15.7	0.469	0.	0.103	0.103	0.034	0.034
3	30.00	8.7	2.6	11.2	0.442	0.	0.094	0.094	0.029	0.029
4	42.50	9.7	3.5	10.0	0.476	0.	0.136	0.136	0.039	0.039
5	45.00	10.3	4.1	9.7	0.481	0.	0.132	0.132	0.038	0.038
6	47.50	11.7	5.6	9.5	0.482	0.	0.117	0.117	0.033	0.033
7	50.00	11.9	5.8	9.5	0.481	0.	0.114	0.114	0.032	0.032
8	52.50	10.8	4.7	9.4	0.480	0.	0.123	0.123	0.034	0.034
9	70.00	8.3	2.2	7.6	0.465	0.	0.124	0.124	0.032	0.032
10	90.00	6.4	0.5	10.6	0.454	0.	0.206	0.206	0.048	0.048
11	95.00	7.7	1.8	12.2	0.510	0.	0.346	0.345	0.078	0.078

TABLE VII. – Continued.

(b) Continued. Stator 8

(b-4) 90 Percent of design speed; reading 3367

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	23.945	23.947	47.9	7.4	47.9	7.4	352.3	1.000	17.05	0.973
2	23.505	23.538	44.0	5.7	44.0	5.7	348.9	0.999	17.20	0.971
3	21.742	21.902	41.8	1.8	41.8	1.8	339.6	0.997	16.80	0.982
4	20.635	20.884	42.0	1.5	42.0	1.5	336.7	0.996	16.66	0.972
5	20.414	20.681	43.0	1.4	43.0	1.4	336.3	0.996	16.57	0.972
6	20.193	20.480	44.6	1.3	44.6	1.3	336.9	0.992	16.45	0.976
7	19.972	20.279	44.8	1.2	44.8	1.2	336.2	0.993	16.39	0.976
8	19.751	20.079	43.8	0.9	43.8	0.9	334.5	0.995	16.34	0.975
9	18.219	18.715	43.9	-1.1	43.9	-1.1	331.3	0.997	16.02	0.979
10	16.520	17.252	45.1	2.7	45.1	2.7	331.5	1.006	16.41	0.944
11	16.111	16.904	47.4	4.3	47.4	4.3	334.5	1.001	16.94	0.902

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	240.7	176.8	240.7	176.8	161.5	175.4	178.5	22.9	0.	0.
2	243.7	180.8	243.7	180.8	175.3	179.9	169.4	17.9	0.	0.
3	228.4	175.9	228.4	175.9	170.3	175.8	152.1	5.5	0.	0.
4	230.1	169.9	230.1	169.9	170.9	169.9	154.0	4.5	0.	0.
5	228.5	168.5	228.5	168.5	167.1	168.5	155.9	4.0	0.	0.
6	227.0	167.7	227.0	167.7	161.8	167.7	159.2	3.7	0.	0.
7	226.1	166.7	226.1	166.7	160.4	166.7	159.3	3.4	0.	0.
8	226.1	165.3	226.1	165.3	163.3	165.3	156.3	2.5	0.	0.
9	222.5	164.0	222.5	164.0	160.2	164.0	154.4	-3.2	0.	0.
10	241.7	172.8	241.7	172.8	170.5	172.6	171.3	8.1	0.	0.
11	255.7	168.4	255.7	168.4	173.1	167.9	188.2	12.7	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 SS VEL R	MERID PEAK SS MACH NO
1	0.668	0.481	0.668	0.481	0.448	0.477	1.086	1.094
2	0.680	0.495	0.680	0.495	0.489	0.492	1.027	1.043
3	0.643	0.488	0.643	0.488	0.480	0.488	1.032	0.940
4	0.652	0.473	0.652	0.473	0.484	0.473	0.994	0.943
5	0.647	0.469	0.647	0.469	0.473	0.469	1.008	0.955
6	0.642	0.467	0.642	0.467	0.457	0.467	1.036	0.977
7	0.640	0.465	0.640	0.465	0.454	0.465	1.039	0.976
8	0.641	0.462	0.641	0.462	0.463	0.462	1.013	0.951
9	0.634	0.460	0.634	0.460	0.456	0.460	1.024	0.947
10	0.693	0.483	0.693	0.483	0.489	0.483	1.013	1.050
11	0.734	0.469	0.734	0.469	0.497	0.468	0.970	1.163

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	11.0	4.9	18.5	0.480	0.	0.104	0.104	0.034	0.034
2	10.00	8.8	2.7	15.9	0.461	0.	0.108	0.108	0.035	0.035
3	30.00	7.9	1.7	10.8	0.423	0.	0.075	0.075	0.023	0.023
4	42.50	7.7	1.6	10.2	0.447	0.	0.115	0.115	0.033	0.033
5	45.00	8.6	2.5	10.1	0.450	0.	0.113	0.113	0.032	0.032
6	47.50	10.0	3.8	9.9	0.453	0.	0.100	0.100	0.028	0.028
7	50.00	10.1	3.9	9.8	0.453	0.	0.099	0.099	0.028	0.028
8	52.50	8.9	2.7	9.5	0.454	0.	0.104	0.104	0.029	0.029
9	70.00	7.7	1.6	7.1	0.441	0.	0.089	0.089	0.023	0.023
10	90.00	6.2	0.3	10.8	0.437	0.	0.202	0.202	0.047	0.047
11	95.00	7.5	1.5	12.4	0.491	0.	0.325	0.325	0.073	0.073

TABLE VII. – Continued.

(b) Continued. Stator 8

(b-5) 80 Percent of design speed; reading 3368

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.945	23.947	48.1	7.9	48.1	7.9	338.2	0.999	15.04	0.979
2	23.505	23.538	43.7	6.5	43.7	6.5	335.9	0.998	15.17	0.976
3	21.742	21.902	42.9	1.5	42.9	1.5	327.9	0.999	14.79	0.983
4	20.635	20.884	44.8	0.5	44.8	0.5	326.6	0.996	14.75	0.973
5	20.414	20.681	45.8	0.4	45.8	0.4	326.6	0.996	14.70	0.975
6	20.193	20.480	46.1	0.4	46.1	0.4	324.5	0.999	14.58	0.981
7	19.972	20.279	47.4	0.5	47.4	0.5	326.2	0.995	14.55	0.983
8	19.751	20.079	47.7	0.6	47.7	0.6	325.7	0.995	14.55	0.982
9	18.219	18.715	43.4	-0.1	43.4	-0.1	322.2	0.999	14.61	0.989
10	16.520	17.252	44.0	2.3	44.0	2.3	321.7	1.007	14.90	0.963
11	16.111	16.904	46.0	3.9	46.0	3.9	323.9	1.003	15.26	0.923

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	210.2	154.2	210.2	154.2	140.3	152.7	156.5	21.2	0.	0.
2	213.0	156.6	213.0	156.6	154.1	155.6	147.0	17.7	0.	0.
3	195.9	147.8	195.9	147.8	143.4	147.7	133.4	3.8	0.	0.
4	198.6	142.3	198.6	142.3	141.0	142.3	139.8	1.3	0.	0.
5	197.2	141.8	197.2	141.8	137.6	141.8	141.4	1.0	0.	0.
6	194.2	141.3	194.2	141.3	134.6	141.3	140.0	1.0	0.	0.
7	194.3	141.7	194.3	141.7	131.4	141.7	143.1	1.3	0.	0.
8	195.3	142.3	195.3	142.3	131.5	142.3	144.4	1.6	0.	0.
9	201.8	154.6	201.8	154.6	146.6	154.6	138.7	-0.2	0.	0.
10	219.0	162.8	219.0	162.8	157.5	162.7	152.2	6.6	0.	0.
11	230.8	154.6	230.8	154.6	160.2	154.2	166.1	10.6	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	0.590	0.426	0.590	0.426	0.394	0.422	1.088	0.972
2	0.600	0.435	0.600	0.435	0.434	0.432	1.010	0.913
3	0.556	0.414	0.556	0.414	0.407	0.414	1.030	0.834
4	0.565	0.400	0.565	0.400	0.401	0.400	1.009	0.871
5	0.561	0.398	0.561	0.398	0.391	0.398	1.031	0.881
6	0.554	0.398	0.554	0.398	0.384	0.398	1.050	0.873
7	0.553	0.399	0.553	0.399	0.374	0.399	1.078	0.892
8	0.556	0.401	0.556	0.401	0.375	0.401	1.081	0.899
9	0.579	0.438	0.579	0.438	0.421	0.438	1.055	0.855
10	0.633	0.461	0.633	0.461	0.455	0.460	1.033	0.935
11	0.668	0.436	0.668	0.436	0.464	0.435	0.962	1.027

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	11.3	5.2	19.0	0.480	0.	0.101	0.101	0.033	0.033
2	10.00	8.4	2.3	16.7	0.463	0.	0.113	0.113	0.036	0.036
3	30.00	9.0	2.9	10.4	0.445	0.	0.089	0.089	0.027	0.027
4	42.50	10.5	4.3	9.2	0.483	0.	0.140	0.140	0.040	0.040
5	45.00	11.4	5.2	9.1	0.482	0.	0.130	0.130	0.037	0.037
6	47.50	11.6	5.4	9.1	0.472	0.	0.099	0.099	0.028	0.028
7	50.00	12.7	6.6	9.1	0.472	0.	0.093	0.093	0.026	0.026
8	52.50	12.8	6.6	9.2	0.471	0.	0.094	0.094	0.026	0.026
9	70.00	7.2	1.1	8.1	0.407	0.	0.052	0.052	0.013	0.013
10	90.00	5.1	-0.9	10.4	0.406	0.	0.158	0.158	0.036	0.036
11	95.00	6.1	0.2	12.0	0.478	0.	0.299	0.299	0.067	0.067

TABLE VII. – Continued.

(b) Continued. Stator 8

(b-6) 70 Percent of design speed; reading 3362

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	23.945	23.947	21.9	5.8	21.9	5.8	311.2	0.996	12.41	0.930
2	23.505	23.538	21.3	3.0	21.3	3.0	309.5	0.998	12.47	0.968
3	21.742	21.902	22.1	-1.0	22.1	-1.0	307.0	0.999	12.53	0.977
4	20.635	20.884	24.9	-1.5	24.9	-1.5	307.2	1.000	12.53	0.984
5	20.414	20.681	25.8	-1.4	25.8	-1.4	307.2	1.000	12.55	0.986
6	20.193	20.480	27.6	-1.3	27.6	-1.3	308.0	0.998	12.54	0.987
7	19.972	20.279	28.5	-1.4	28.5	-1.4	309.0	0.995	12.54	0.985
8	19.751	20.079	27.8	-1.8	27.8	-1.8	308.1	0.997	12.59	0.981
9	18.219	18.715	29.0	-2.5	29.0	-2.5	307.9	1.001	12.78	0.989
10	16.520	17.252	33.9	3.2	33.9	3.2	310.7	1.004	13.27	0.912
11	16.111	16.904	35.7	5.9	35.7	5.9	312.1	1.005	13.49	0.861

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	197.9	179.1	197.9	179.1	183.5	178.1	73.9	18.2	0.	0.
2	198.1	197.3	198.1	197.3	184.6	197.1	71.9	10.4	0.	0.
3	191.2	203.3	191.2	203.3	177.2	203.3	71.9	-3.5	0.	0.
4	192.0	209.8	192.0	209.8	174.1	209.7	80.9	-5.4	0.	0.
5	192.9	211.8	192.9	211.8	173.7	211.8	84.0	-5.1	0.	0.
6	192.7	212.7	192.7	212.7	170.7	212.6	89.4	-4.7	0.	0.
7	193.3	213.4	193.3	213.4	170.0	213.3	92.1	-5.1	0.	0.
8	195.3	214.0	195.3	214.0	172.7	213.9	91.1	-6.9	0.	0.
9	203.3	233.2	203.3	233.2	177.8	233.0	98.5	-10.1	0.	0.
10	224.6	232.8	224.6	232.8	186.4	232.4	125.2	13.0	0.	0.
11	230.2	221.6	230.2	221.6	186.8	220.4	134.4	23.0	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	0.578	0.521	0.578	0.521	0.536	0.518	0.971	0.578
2	0.580	0.579	0.580	0.579	0.541	0.578	1.068	0.580
3	0.561	0.600	0.561	0.600	0.520	0.600	1.148	0.561
4	0.564	0.620	0.564	0.620	0.511	0.620	1.204	0.564
5	0.566	0.626	0.566	0.626	0.510	0.626	1.219	0.566
6	0.565	0.629	0.565	0.629	0.501	0.629	1.246	0.565
7	0.566	0.631	0.566	0.631	0.498	0.631	1.255	0.566
8	0.573	0.633	0.573	0.633	0.507	0.633	1.239	0.573
9	0.598	0.694	0.598	0.694	0.523	0.693	1.310	0.598
10	0.663	0.688	0.663	0.688	0.550	0.687	1.246	0.719
11	0.679	0.650	0.679	0.650	0.551	0.647	1.180	0.791

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	-14.9	-21.0	16.9	0.189	0.	0.344	0.344	0.114	0.114
2	10.00	-13.9	-20.1	13.2	0.105	0.	0.159	0.159	0.052	0.052
3	30.00	-11.8	-17.9	8.0	0.056	0.	0.119	0.119	0.036	0.036
4	42.50	-9.4	-15.5	7.2	0.036	0.	0.080	0.080	0.023	0.023
5	45.00	-8.6	-14.8	7.3	0.033	0.	0.072	0.072	0.021	0.021
6	47.50	-7.0	-13.1	7.4	0.033	0.	0.069	0.069	0.019	0.019
7	50.00	-6.3	-12.4	7.3	0.035	0.	0.075	0.075	0.021	0.021
8	52.50	-7.1	-13.2	6.8	0.041	0.	0.097	0.097	0.027	0.027
9	70.00	-7.3	-13.4	5.7	-0.013	0.	0.050	0.050	0.013	0.013
10	90.00	-5.1	-11.0	11.3	0.076	0.	0.346	0.346	0.080	0.080
11	95.00	-4.2	-10.1	14.0	0.142	0.	0.524	0.524	0.117	0.117

TABLE VII. – Continued.

(b) Continued. Stator 8

(b-7) 70 Percent of design speed; reading 3361

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.945	23.947	34.7	5.7	34.7	5.7	319.9	0.997	13.32	0.977
2	23.505	23.538	32.4	4.4	32.4	4.4	317.4	0.998	13.39	0.984
3	21.742	21.902	32.6	-0.3	32.6	-0.3	312.8	1.000	13.16	0.995
4	20.635	20.884	34.9	-0.3	34.9	-0.3	312.8	0.998	13.21	0.989
5	20.414	20.681	35.3	-0.4	35.3	-0.4	313.0	0.997	13.24	0.987
6	20.193	20.480	36.2	-0.4	36.2	-0.4	312.8	0.997	13.16	0.992
7	19.972	20.279	37.6	-0.3	37.6	-0.3	312.8	0.997	13.14	0.995
8	19.751	20.079	37.1	-0.3	37.1	-0.3	313.2	0.996	13.15	0.994
9	18.219	18.715	37.5	-1.1	37.5	-1.1	311.8	0.998	13.27	0.989
10	16.520	17.252	39.9	1.6	39.9	1.6	312.3	1.006	13.51	0.975
11	16.111	16.904	42.1	4.1	42.1	4.1	314.2	1.003	13.77	0.936

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	187.2	148.9	187.2	148.9	153.9	148.2	106.5	14.9	0.	0.
2	188.8	155.6	188.8	155.6	159.5	155.2	101.0	11.9	0.	0.
3	174.4	152.9	174.4	152.9	147.0	152.9	93.8	-0.8	0.	0.
4	179.0	153.9	179.0	153.9	146.9	153.9	102.4	-0.8	0.	0.
5	180.3	154.4	180.3	154.4	147.1	154.4	104.3	-1.2	0.	0.
6	178.4	155.0	178.4	155.0	143.9	154.9	105.5	-1.2	0.	0.
7	177.7	155.6	177.7	155.6	140.7	155.6	108.5	-0.9	0.	0.
8	178.7	156.2	178.7	156.2	142.6	156.2	107.7	-0.9	0.	0.
9	187.3	163.9	187.3	163.9	148.7	163.8	114.0	-3.1	0.	0.
10	202.3	179.4	202.3	179.4	155.1	179.3	129.8	5.1	0.	0.
11	211.6	170.7	211.6	170.7	157.0	170.3	141.9	12.1	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	0.537	0.424	0.537	0.424	0.442	0.421	0.963	0.628
2	0.544	0.445	0.544	0.445	0.460	0.444	0.973	0.595
3	0.504	0.440	0.504	0.440	0.425	0.440	1.041	0.560
4	0.518	0.443	0.518	0.443	0.425	0.443	1.048	0.615
5	0.522	0.444	0.522	0.444	0.426	0.444	1.050	0.625
6	0.516	0.446	0.516	0.446	0.417	0.446	1.077	0.634
7	0.514	0.449	0.514	0.449	0.407	0.449	1.106	0.655
8	0.517	0.450	0.517	0.450	0.413	0.450	1.095	0.644
9	0.545	0.474	0.545	0.474	0.432	0.474	1.102	0.689
10	0.591	0.518	0.591	0.518	0.453	0.518	1.156	0.788
11	0.618	0.491	0.618	0.491	0.458	0.490	1.085	0.868

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	-2.1	-8.3	16.8	0.367	0.	0.126	0.126	0.042	0.042
2	10.00	-2.9	-9.0	14.6	0.329	0.	0.086	0.086	0.028	0.028
3	30.00	-1.3	-7.5	8.7	0.286	0.	0.032	0.032	0.010	0.010
4	42.50	0.6	-5.5	8.4	0.305	0.	0.068	0.068	0.020	0.020
5	45.00	0.9	-5.2	8.3	0.309	0.	0.079	0.079	0.022	0.022
6	47.50	1.7	-4.5	8.2	0.298	0.	0.048	0.048	0.014	0.014
7	50.00	2.9	-3.2	8.3	0.294	0.	0.030	0.030	0.008	0.008
8	52.50	2.2	-4.0	8.3	0.292	0.	0.036	0.036	0.010	0.010
9	70.00	1.2	-4.8	7.1	0.282	0.	0.060	0.060	0.015	0.015
10	90.00	1.0	-5.0	9.7	0.252	0.	0.117	0.117	0.027	0.027
11	95.00	2.2	-3.7	12.2	0.327	0.	0.282	0.282	0.063	0.063

TABLE VII. – Continued.

(b) Continued. Stator 8

(b-8) 70 Percent of design speed; reading 3363

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.945	23.947	54.5	7.8	54.5	7.8	328.9	0.990	13.67	0.972
2	23.505	23.538	46.9	6.0	46.9	6.0	325.3	0.995	13.59	0.981
3	21.742	21.902	40.0	0.7	40.0	0.7	317.5	0.999	13.49	0.990
4	20.635	20.884	41.4	-0.0	41.4	-0.0	316.3	0.997	13.49	0.981
5	20.414	20.681	42.5	-0.0	42.5	-0.0	315.8	0.997	13.41	0.985
6	20.193	20.480	43.5	-0.1	43.5	-0.1	315.8	0.998	13.36	0.989
7	19.972	20.279	44.7	0.1	44.7	0.1	316.0	0.996	13.33	0.990
8	19.751	20.079	45.2	0.2	45.2	0.2	315.8	0.997	13.35	0.988
9	18.219	18.715	41.8	-0.2	41.8	-0.2	314.1	0.999	13.50	0.987
10	16.520	17.252	43.1	1.9	43.1	1.9	313.4	1.007	13.62	0.977
11	16.111	16.904	45.1	3.7	45.1	3.7	315.1	1.004	13.88	0.943

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	183.7	130.2	183.7	130.2	106.6	128.9	149.7	17.7	0.	0.
2	180.0	132.0	180.0	132.0	123.0	131.3	131.4	13.7	0.	0.
3	172.1	133.8	172.1	133.8	131.9	133.8	110.6	1.6	0.	0.
4	174.4	130.1	174.4	130.1	130.7	130.1	115.4	-0.1	0.	0.
5	172.3	129.3	172.3	129.3	127.1	129.3	116.3	-0.1	0.	0.
6	170.4	129.4	170.4	129.4	123.5	129.4	117.4	-0.2	0.	0.
7	170.2	129.4	170.2	129.4	120.9	129.4	119.8	0.2	0.	0.
8	171.4	129.6	171.4	129.6	120.7	129.6	121.6	0.5	0.	0.
9	181.8	140.7	181.8	140.7	135.6	140.7	121.2	-0.5	0.	0.
10	193.7	151.9	193.7	151.9	141.4	151.9	132.4	4.9	0.	0.
11	204.0	143.5	204.0	143.5	143.9	143.2	144.6	9.2	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	0.519	0.365	0.519	0.365	0.301	0.361	1.210	0.969
2	0.511	0.371	0.511	0.371	0.349	0.369	1.068	0.832
3	0.493	0.380	0.493	0.380	0.378	0.380	1.015	0.691
4	0.501	0.370	0.501	0.370	0.376	0.370	0.995	0.716
5	0.495	0.368	0.495	0.368	0.365	0.368	1.017	0.722
6	0.490	0.368	0.490	0.368	0.355	0.368	1.047	0.729
7	0.489	0.369	0.489	0.369	0.347	0.369	1.070	0.744
8	0.493	0.369	0.493	0.369	0.347	0.369	1.073	0.755
9	0.526	0.403	0.526	0.403	0.392	0.403	1.038	0.746
10	0.563	0.435	0.563	0.435	0.411	0.434	1.074	0.814
11	0.593	0.409	0.593	0.409	0.418	0.408	0.995	0.895

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	17.7	11.6	18.9	0.530	0.	0.165	0.165	0.054	0.054
2	10.00	11.7	5.5	16.1	0.480	0.	0.119	0.119	0.039	0.039
3	30.00	6.1	-0.0	9.7	0.413	0.	0.068	0.068	0.021	0.021
4	42.50	7.1	1.0	8.7	0.443	0.	0.120	0.120	0.034	0.034
5	45.00	8.0	1.9	8.7	0.441	0.	0.097	0.097	0.028	0.028
6	47.50	9.0	2.8	8.6	0.434	0.	0.074	0.074	0.021	0.021
7	50.00	10.0	3.9	8.7	0.434	0.	0.066	0.066	0.018	0.018
8	52.50	10.3	4.2	8.8	0.437	0.	0.077	0.077	0.021	0.021
9	70.00	5.5	-0.5	8.0	0.394	0.	0.076	0.076	0.019	0.019
10	90.00	4.2	-1.7	9.9	0.364	0.	0.116	0.116	0.027	0.027
11	95.00	5.2	-0.7	11.8	0.442	0.	0.270	0.270	0.061	0.061

TABLE VII. – Continued.

(b) Continued. Stator 8

(b-9) 60 Percent of design speed; reading 3369

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	23.945	23.947	54.5	8.1	54.5	8.1	318.2	0.993	12.67	0.980
2	23.505	23.538	46.4	6.0	46.4	6.0	315.2	0.997	12.61	0.986
3	21.742	21.902	38.9	0.5	38.9	0.5	309.5	0.999	12.53	0.991
4	20.635	20.884	41.2	-0.0	41.2	-0.0	308.5	0.999	12.50	0.988
5	20.414	20.681	42.0	-0.1	42.0	-0.1	308.3	0.999	12.45	0.991
6	20.193	20.480	43.2	-0.1	43.2	-0.1	308.1	0.999	12.41	0.993
7	19.972	20.279	44.3	0.0	44.3	0.0	308.1	0.998	12.39	0.994
8	19.751	20.079	44.8	0.2	44.8	0.2	308.3	0.998	12.40	0.993
9	18.219	18.715	42.2	-0.4	42.2	-0.4	307.0	0.999	12.50	0.992
10	16.520	17.252	43.1	2.1	43.1	2.1	306.5	1.006	12.66	0.980
11	16.111	16.904	44.8	4.2	44.8	4.2	307.4	1.004	12.79	0.958

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	156.6	113.6	156.6	113.6	90.8	112.5	127.5	15.9	0.	0.
2	153.8	114.7	153.8	114.7	106.1	114.1	111.3	12.0	0.	0.
3	147.8	115.6	147.8	115.6	115.0	115.6	92.7	1.0	0.	0.
4	148.2	112.8	148.2	112.8	111.6	112.8	97.6	-0.0	0.	0.
5	146.1	112.4	146.1	112.4	108.5	112.4	97.8	-0.2	0.	0.
6	144.6	112.0	144.6	112.0	105.3	112.0	99.1	-0.2	0.	0.
7	144.6	112.0	144.6	112.0	103.5	112.0	100.9	0.1	0.	0.
8	145.7	112.1	145.7	112.1	103.3	112.1	102.7	0.4	0.	0.
9	154.3	120.8	154.3	120.8	114.2	120.7	103.7	-0.8	0.	0.
10	168.1	130.6	168.1	130.6	122.6	130.5	114.9	4.7	0.	0.
11	175.1	123.5	175.1	123.5	124.3	123.1	123.4	9.0	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	0.447	0.322	0.447	0.322	0.259	0.319	1.238	0.834
2	0.440	0.326	0.440	0.326	0.304	0.325	1.076	0.710
3	0.427	0.332	0.427	0.332	0.332	0.332	1.005	0.581
4	0.429	0.324	0.429	0.324	0.323	0.324	1.010	0.608
5	0.422	0.323	0.422	0.323	0.314	0.323	1.036	0.609
6	0.418	0.322	0.418	0.322	0.305	0.322	1.063	0.618
7	0.418	0.322	0.418	0.322	0.299	0.322	1.082	0.630
8	0.421	0.322	0.421	0.322	0.299	0.322	1.085	0.640
9	0.448	0.348	0.448	0.348	0.332	0.348	1.057	0.643
10	0.490	0.376	0.490	0.376	0.358	0.376	1.064	0.709
11	0.511	0.355	0.511	0.355	0.363	0.354	0.991	0.765

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	17.7	11.6	19.1	0.511	0.	0.154	0.154	0.051	0.051
2	10.00	11.2	5.0	16.2	0.465	0.	0.115	0.115	0.037	0.037
3	30.00	5.0	-1.2	9.5	0.405	0.	0.073	0.073	0.022	0.022
4	42.50	6.9	0.7	8.7	0.427	0.	0.102	0.102	0.029	0.029
5	45.00	7.6	1.5	8.6	0.420	0.	0.075	0.075	0.021	0.021
6	47.50	8.7	2.5	8.6	0.417	0.	0.060	0.060	0.017	0.017
7	50.00	9.5	3.4	8.7	0.418	0.	0.053	0.053	0.015	0.015
8	52.50	9.9	3.8	8.8	0.422	0.	0.059	0.059	0.016	0.016
9	70.00	6.0	-0.1	7.9	0.387	0.	0.062	0.062	0.016	0.016
10	90.00	4.2	-1.7	10.2	0.371	0.	0.129	0.129	0.030	0.030
11	95.00	4.9	-1.1	12.3	0.438	0.	0.260	0.260	0.058	0.058

TABLE VII. – Concluded.

(b) Concluded. Stator 8

(b-10) 50 Percent of design speed; reading 3370

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.945	23.947	51.3	8.2	51.3	8.2	308.5	0.996	11.83	0.989
2	23.505	23.538	44.0	5.8	44.0	5.8	306.6	0.998	11.82	0.991
3	21.742	21.902	38.7	0.3	38.7	0.3	302.8	1.000	11.76	0.995
4	20.635	20.884	40.2	0.0	40.2	0.0	302.4	0.999	11.77	0.991
5	20.414	20.681	41.0	-0.2	41.0	-0.2	302.2	0.999	11.74	0.992
6	20.193	20.480	42.4	-0.2	42.4	-0.2	302.3	0.999	11.73	0.993
7	19.972	20.279	43.6	-0.1	43.6	-0.1	302.2	0.999	11.69	0.996
8	19.751	20.079	44.2	0.0	44.2	0.0	302.3	0.998	11.72	0.994
9	18.219	18.715	41.3	-0.7	41.3	-0.7	301.2	1.000	11.75	0.996
10	16.520	17.252	42.8	1.8	42.8	1.8	300.8	1.006	11.87	0.989
11	16.111	16.904	44.3	3.9	44.3	3.9	301.7	1.004	11.97	0.970

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	129.9	97.7	129.9	97.7	81.2	96.7	101.4	14.0	0.	0.
2	129.0	98.6	129.0	98.6	92.8	98.1	89.6	9.9	0.	0.
3	122.5	99.0	122.5	99.0	95.6	99.0	76.6	0.4	0.	0.
4	125.1	97.3	125.1	97.3	95.7	97.3	80.7	0.0	0.	0.
5	124.0	96.7	124.0	96.7	93.5	96.7	81.4	-0.3	0.	0.
6	123.5	96.6	123.5	96.6	91.1	96.6	83.3	-0.3	0.	0.
7	122.1	96.7	122.1	96.7	88.5	96.7	84.2	-0.2	0.	0.
8	123.8	96.9	123.8	96.9	88.7	96.9	86.3	0.1	0.	0.
9	129.4	104.3	129.4	104.3	97.2	104.3	85.3	-1.2	0.	0.
10	141.5	114.3	141.5	114.3	103.8	114.2	96.2	3.6	0.	0.
11	148.4	107.2	148.4	107.2	106.1	107.0	103.7	7.4	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	0.374	0.280	0.374	0.280	0.234	0.277	1.190	0.657
2	0.372	0.284	0.372	0.284	0.268	0.282	1.057	0.570
3	0.356	0.286	0.356	0.286	0.277	0.286	1.035	0.482
4	0.364	0.282	0.364	0.282	0.278	0.282	1.017	0.503
5	0.360	0.280	0.360	0.280	0.272	0.280	1.034	0.508
6	0.359	0.279	0.359	0.279	0.265	0.279	1.060	0.520
7	0.355	0.280	0.355	0.280	0.257	0.280	1.093	0.526
8	0.360	0.281	0.360	0.281	0.258	0.281	1.093	0.539
9	0.377	0.302	0.377	0.302	0.283	0.302	1.072	0.529
10	0.414	0.331	0.414	0.331	0.304	0.331	1.100	0.595
11	0.434	0.310	0.434	0.310	0.311	0.309	1.008	0.643

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	14.5	8.4	19.3	0.472	0.	0.121	0.121	0.040	0.040
2	10.00	8.7	2.6	16.0	0.436	0.	0.100	0.100	0.033	0.033
3	30.00	4.8	-1.3	9.2	0.379	0.	0.055	0.055	0.017	0.017
4	42.50	5.9	-0.3	8.8	0.407	0.	0.103	0.103	0.030	0.030
5	45.00	6.6	0.5	8.5	0.406	0.	0.093	0.093	0.026	0.026
6	47.50	7.9	1.7	8.5	0.407	0.	0.081	0.081	0.023	0.023
7	50.00	8.8	2.7	8.5	0.399	0.	0.043	0.043	0.012	0.012
8	52.50	9.3	3.2	8.7	0.407	0.	0.069	0.069	0.019	0.019
9	70.00	5.0	-1.0	7.6	0.362	0.	0.041	0.041	0.010	0.010
10	90.00	3.9	-2.0	9.9	0.340	0.	0.095	0.095	0.022	0.022
11	95.00	4.4	-1.5	12.0	0.419	0.	0.246	0.246	0.055	0.055

TABLE VIII. – BLADE-ELEMENT DATA AT BLADE EDGES FOR NOMINAL NONROTATING ROTOR TIP CLEARANCE OF 0.102 cm

(a) Rotor 8E

(a-1) 100 Percent of design speed; reading 3381

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.567	24.193	0.	48.1	64.2	56.6	289.1	1.239	10.07	1.631
2	24.021	23.685	-0.0	39.9	63.0	53.6	288.9	1.210	10.13	1.692
3	21.753	21.653	0.	38.8	59.5	49.9	288.4	1.186	10.14	1.697
4	20.287	20.383	-0.0	43.8	57.4	45.7	288.0	1.186	10.14	1.654
5	19.990	20.129	-0.0	44.4	57.1	45.5	287.9	1.186	10.14	1.636
6	19.690	19.875	-0.0	44.5	56.7	45.8	287.8	1.183	10.14	1.617
7	19.388	19.621	0.	44.9	56.3	45.3	287.8	1.180	10.14	1.613
8	19.086	19.367	-0.0	44.4	55.9	44.2	287.9	1.176	10.14	1.618
9	16.891	17.589	0.	44.4	53.4	36.2	287.6	1.167	10.14	1.640
10	14.176	15.557	-0.0	49.2	50.6	18.3	287.6	1.175	10.14	1.726
11	13.447	15.049	-0.0	52.2	50.2	10.6	287.6	1.192	10.12	1.780

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	200.2	232.2	460.1	281.7	200.2	155.1	0.	172.9	414.3	408.0
2	206.6	237.3	454.6	306.9	206.6	182.0	-0.0	152.2	405.0	399.3
3	216.6	235.5	426.6	285.3	216.6	183.6	0.	147.5	367.5	365.8
4	218.5	240.0	406.0	248.3	218.5	173.4	-0.0	166.0	342.1	343.7
5	218.4	237.8	401.7	242.7	218.4	170.0	-0.0	166.2	337.1	339.5
6	218.3	233.8	397.4	238.9	218.3	166.6	-0.0	164.0	332.0	335.2
7	218.4	233.1	393.6	234.7	218.4	165.1	0.	164.5	327.4	331.4
8	218.2	234.6	389.2	233.7	218.2	167.6	-0.0	164.1	322.3	327.0
9	211.4	242.9	355.0	214.9	211.4	173.5	0.	170.1	285.1	296.9
10	196.4	270.1	309.6	186.0	196.4	176.7	-0.0	204.4	239.3	262.6
11	189.1	281.1	295.6	175.3	189.1	172.3	-0.0	222.1	227.1	254.2

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.609	0.637	1.399	0.772	0.609	0.425	0.775	1.565
2	0.630	0.660	1.386	0.854	0.630	0.506	0.881	1.550
3	0.664	0.663	1.307	0.803	0.664	0.517	0.848	1.531
4	0.671	0.677	1.246	0.700	0.671	0.489	0.793	1.504
5	0.670	0.670	1.233	0.684	0.670	0.479	0.778	1.499
6	0.670	0.659	1.220	0.675	0.670	0.470	0.763	1.493
7	0.670	0.658	1.208	0.662	0.670	0.466	0.756	1.487
8	0.670	0.663	1.194	0.661	0.670	0.474	0.768	1.479
9	0.648	0.693	1.087	0.613	0.648	0.495	0.820	1.431
10	0.598	0.776	0.943	0.534	0.598	0.507	0.900	1.292
11	0.574	0.805	0.898	0.502	0.574	0.494	0.911	1.222

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	2.4	-0.3	4.6	0.511	0.628	0.326	0.232	0.059	0.042
2	10.00	2.4	-0.5	2.4	0.433	0.772	0.190	0.101	0.036	0.019
3	30.00	3.5	-0.5	3.6	0.433	0.877	0.102	0.029	0.019	0.006
4	42.50	4.0	-0.8	3.9	0.502	0.829	0.149	0.091	0.029	0.017
5	45.00	4.1	-0.8	4.8	0.509	0.811	0.166	0.110	0.032	0.021
6	47.50	4.2	-0.8	6.2	0.510	0.802	0.175	0.122	0.033	0.023
7	50.00	4.3	-0.9	7.0	0.515	0.814	0.164	0.114	0.031	0.021
8	52.50	4.3	-1.0	7.1	0.510	0.836	0.145	0.098	0.027	0.018
9	70.00	5.0	-1.2	10.1	0.508	0.910	0.087	0.060	0.016	0.011
10	90.00	5.4	-1.6	11.7	0.533	0.963	0.047	0.044	0.009	0.008
11	95.00	5.8	-1.4	10.9	0.552	0.933	0.099	0.098	0.018	0.018

TABLE VIII. – Continued.

(a) Continued. Rotor 8E

(a-2) 100 Percent of design speed; reading 3383

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	24.567	24.193	-0.0	51.1	64.9	58.2	289.2	1.243	10.07	1.663
2	24.021	23.685	-0.0	44.0	63.7	54.0	289.0	1.228	10.13	1.729
3	21.753	21.653	-0.0	40.9	60.2	50.2	288.3	1.195	10.14	1.734
4	20.287	20.383	-0.0	44.8	58.0	45.3	288.0	1.196	10.14	1.722
5	19.990	20.129	-0.0	45.9	57.6	45.2	288.0	1.197	10.14	1.702
6	19.690	19.875	-0.0	46.7	57.2	45.0	287.9	1.196	10.14	1.683
7	19.388	19.621	-0.0	47.0	56.9	44.7	287.9	1.193	10.14	1.669
8	19.086	19.367	-0.0	46.6	56.5	43.6	287.8	1.188	10.14	1.678
9	16.891	17.589	-0.0	46.3	54.0	36.4	287.6	1.174	10.14	1.682
10	14.176	15.557	0.	49.6	51.4	20.3	287.6	1.179	10.14	1.754
11	13.447	15.049	-0.0	53.2	51.0	11.2	287.6	1.196	10.13	1.814

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	193.9	228.2	457.8	271.6	193.9	143.3	-0.0	177.6	414.7	408.4
2	200.6	237.1	452.1	290.3	200.6	170.7	-0.0	164.6	405.1	399.5
3	210.5	233.9	423.0	276.3	210.5	176.9	-0.0	153.0	366.9	365.2
4	213.7	242.2	403.8	244.3	213.7	171.9	-0.0	170.7	342.6	344.2
5	214.1	239.8	399.8	236.8	214.1	167.0	-0.0	172.1	337.6	340.0
6	214.0	237.2	395.3	230.0	214.0	162.5	-0.0	172.7	332.4	335.5
7	213.5	235.2	390.6	225.8	213.5	160.4	-0.0	172.1	327.1	331.0
8	213.5	237.0	386.7	224.9	213.5	162.9	-0.0	172.1	322.4	327.2
9	206.9	241.0	352.4	206.7	206.9	166.4	-0.0	174.3	285.2	297.0
10	191.0	262.4	306.3	181.3	191.0	170.0	0.	199.8	239.5	262.8
11	184.2	276.8	292.4	169.1	184.2	165.9	-0.0	221.5	227.2	254.2

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	0.588	0.624	1.389	0.742	0.588	0.391	0.739	1.580
2	0.610	0.654	1.375	0.801	0.610	0.471	0.851	1.563
3	0.644	0.655	1.293	0.774	0.644	0.496	0.840	1.541
4	0.655	0.681	1.237	0.686	0.655	0.483	0.804	1.517
5	0.656	0.673	1.225	0.664	0.656	0.469	0.780	1.511
6	0.656	0.665	1.211	0.645	0.656	0.456	0.759	1.504
7	0.654	0.660	1.197	0.634	0.654	0.450	0.751	1.497
8	0.654	0.667	1.185	0.633	0.654	0.459	0.763	1.491
9	0.633	0.684	1.077	0.587	0.633	0.473	0.804	1.445
10	0.581	0.750	0.931	0.578	0.581	0.486	0.890	1.302
11	0.558	0.789	0.887	0.642	0.558	0.473	0.901	1.230

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	3.1	0.4	6.2	0.534	0.645	0.319	0.223	0.056	0.039
2	10.00	3.1	0.1	2.8	0.475	0.745	0.227	0.137	0.043	0.026
3	30.00	4.2	0.1	3.9	0.453	0.873	0.110	0.038	0.021	0.007
4	42.50	4.6	-0.2	3.5	0.512	0.855	0.134	0.074	0.026	0.014
5	45.00	4.7	-0.2	4.4	0.526	0.832	0.157	0.100	0.030	0.019
6	47.50	4.7	-0.3	5.5	0.536	0.816	0.173	0.120	0.033	0.023
7	50.00	4.8	-0.3	6.4	0.539	0.817	0.173	0.123	0.033	0.023
8	52.50	4.9	-0.4	6.5	0.536	0.848	0.143	0.095	0.027	0.018
9	70.00	5.6	-0.6	10.3	0.530	0.921	0.080	0.052	0.015	0.010
10	90.00	6.2	-0.8	13.8	0.540	0.971	0.038	0.034	0.007	0.006
11	95.00	6.6	-0.6	11.5	0.568	0.945	0.084	0.083	0.015	0.015

TABLE VIII. – Continued.

(a) Continued. Rotor 8E

(a-3) 100 Percent of design speed; reading 3382

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	24.567	24.193	-0.0	54.0	65.8	59.1	289.1	1.250	10.08	1.681
2	24.021	23.685	-0.0	47.9	64.5	55.4	289.0	1.241	10.13	1.728
3	21.753	21.653	-0.0	42.9	60.9	50.5	288.3	1.202	10.14	1.752
4	20.287	20.383	-0.0	45.4	58.8	45.8	288.0	1.201	10.14	1.746
5	19.990	20.129	-0.0	46.5	58.4	45.3	287.8	1.201	10.14	1.731
6	19.690	19.875	-0.0	47.7	58.0	44.8	287.8	1.202	10.14	1.717
7	19.388	19.621	-0.0	48.4	57.6	44.3	287.9	1.201	10.14	1.704
8	19.086	19.367	-0.0	47.5	57.2	43.2	287.9	1.196	10.14	1.710
9	16.891	17.589	0.	46.9	54.7	36.3	287.6	1.179	10.14	1.708
10	14.176	15.557	-0.0	50.4	52.0	20.8	287.6	1.181	10.14	1.762
11	13.447	15.049	-0.0	53.7	51.6	11.1	287.7	1.197	10.12	1.829

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	186.6	227.9	454.6	260.9	186.6	134.0	-0.0	184.3	414.6	408.3
2	193.4	233.8	449.8	275.8	193.4	156.8	-0.0	173.5	406.0	400.4
3	204.2	233.0	420.3	268.6	204.2	170.8	-0.0	158.5	367.4	365.7
4	208.1	240.6	401.4	242.1	208.1	168.9	-0.0	171.4	343.2	344.9
5	208.1	239.5	396.8	234.2	208.1	164.7	-0.0	173.8	337.8	340.2
6	208.0	238.6	392.3	226.0	208.0	160.5	-0.0	176.6	332.6	335.7
7	208.1	237.6	387.9	220.1	208.1	157.6	-0.0	177.7	327.4	331.3
8	207.7	238.5	383.4	221.0	207.7	161.2	-0.0	175.7	322.2	326.9
9	201.8	241.1	349.4	204.3	201.8	164.7	0.	176.0	285.2	297.0
10	186.9	259.6	303.8	177.1	186.9	165.6	-0.0	200.0	239.5	262.8
11	180.1	275.5	289.8	166.1	180.1	163.0	-0.0	222.1	227.0	254.1

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	0.565	0.621	1.376	0.711	0.565	0.565	0.718	1.595
2	0.587	0.641	1.365	0.756	0.587	0.430	0.810	1.582
3	0.623	0.650	1.282	0.749	0.623	0.477	0.837	1.557
4	0.636	0.674	1.227	0.678	0.636	0.473	0.811	1.533
5	0.636	0.671	1.213	0.656	0.636	0.461	0.792	1.526
6	0.636	0.668	1.199	0.633	0.636	0.449	0.772	1.520
7	0.636	0.665	1.186	0.616	0.636	0.441	0.757	1.511
8	0.635	0.669	1.172	0.620	0.635	0.452	0.776	1.504
9	0.616	0.683	1.066	0.579	0.616	0.467	0.816	1.462
10	0.567	0.740	0.922	0.505	0.567	0.472	0.886	1.309
11	0.545	0.785	0.877	0.473	0.545	0.464	0.905	1.236

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	7.1	0.559	0.639	0.334	0.237	0.057	0.040
2	10.00	4.0	1.0	4.2	0.511	0.702	0.275	0.183	0.051	0.034
3	30.00	5.0	0.9	4.2	0.472	0.860	0.126	0.052	0.024	0.010
4	42.50	5.3	0.6	4.0	0.515	0.859	0.134	0.072	0.026	0.014
5	45.00	5.4	0.5	4.6	0.530	0.843	0.151	0.093	0.029	0.018
6	47.50	5.5	0.5	5.2	0.545	0.826	0.170	0.115	0.033	0.022
7	50.00	5.5	0.4	5.9	0.555	0.818	0.179	0.127	0.034	0.024
8	52.50	5.6	0.3	6.1	0.544	0.846	0.151	0.103	0.029	0.020
9	70.00	6.3	0.1	10.2	0.534	0.925	0.080	0.051	0.015	0.009
10	90.00	6.9	-0.2	14.3	0.551	0.972	0.038	0.034	0.007	0.006
11	95.00	7.2	-0.0	11.4	0.575	0.954	0.072	0.071	0.013	0.013

TABLE VIII. – Continued.

(a) Continued. Rotor 8E

(a-4) 70 Percent of design speed; reading 3386

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	24.567	24.193	-0.0	27.0	64.2	55.1	288.9	1.080	10.10	1.215
2	24.021	23.685	-0.0	26.0	63.0	53.1	288.7	1.074	10.13	1.232
3	21.753	21.653	0.	26.7	59.8	50.6	288.1	1.065	10.13	1.235
4	20.287	20.383	0.	30.0	57.8	47.1	288.0	1.066	10.14	1.233
5	19.990	20.129	-0.0	30.9	57.5	45.9	288.0	1.067	10.14	1.236
6	19.690	19.875	0.	32.5	57.1	44.6	288.0	1.070	10.14	1.237
7	19.388	19.621	0.	33.7	56.7	43.5	287.9	1.072	10.14	1.237
8	19.086	19.367	0.	33.1	56.4	42.5	288.0	1.070	10.14	1.244
9	16.891	17.589	-0.0	35.2	53.8	34.9	287.9	1.070	10.14	1.261
10	14.176	15.557	-0.0	42.1	50.7	17.8	287.8	1.079	10.13	1.310
11	13.447	15.049	-0.0	44.9	50.1	11.8	287.9	1.084	10.12	1.331

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	140.5	165.3	322.7	257.2	140.5	147.2	-0.0	75.2	290.5	286.1
2	144.6	170.9	318.3	255.9	144.6	153.6	-0.0	74.9	283.5	279.6
3	149.5	166.0	297.0	233.8	149.5	148.3	0.	74.7	256.6	255.5
4	150.7	168.3	283.0	213.9	150.7	145.7	0.	84.1	239.5	240.7
5	150.6	169.7	279.9	209.3	150.6	145.6	-0.0	87.2	236.0	237.7
6	150.4	171.0	276.5	202.6	150.4	144.2	0.	92.0	232.1	234.3
7	150.1	172.0	273.4	197.2	150.1	143.0	0.	95.6	228.5	231.3
8	149.9	174.1	270.7	197.8	149.9	145.8	0.	95.1	225.4	228.7
9	146.0	180.8	246.9	180.1	146.0	147.7	-0.0	104.3	199.1	207.3
10	136.8	202.1	216.1	157.4	136.8	149.9	-0.0	135.5	167.2	183.5
11	132.4	208.0	206.7	150.7	132.4	147.5	-0.0	146.7	158.7	177.6

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 VEL R	PEAK SS MACH NO
1	0.420	0.477	0.964	0.743	0.420	0.425	1.047	1.205
2	0.433	0.496	0.952	0.743	0.433	0.446	1.062	1.189
3	0.448	0.484	0.890	0.681	0.448	0.432	0.992	1.176
4	0.452	0.490	0.849	0.624	0.452	0.425	0.967	1.150
5	0.452	0.495	0.840	0.610	0.452	0.424	0.967	1.143
6	0.451	0.498	0.829	0.590	0.451	0.420	0.959	1.133
7	0.450	0.500	0.820	0.574	0.450	0.416	0.953	1.124
8	0.449	0.507	0.812	0.576	0.449	0.425	0.973	1.118
9	0.437	0.528	0.740	0.526	0.437	0.432	1.012	1.038
10	0.409	0.592	0.646	0.461	0.409	0.439	1.096	0.887
11	0.395	0.609	0.617	0.441	0.395	0.432	1.114	0.839

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	2.4	-0.4	3.1	0.279	0.718	0.156	0.155	0.030	0.029
2	10.00	2.4	-0.5	1.9	0.272	0.831	0.090	0.089	0.017	0.017
3	30.00	3.8	-0.2	4.4	0.287	0.950	0.026	0.026	0.005	0.005
4	42.50	4.4	-0.4	5.3	0.326	0.940	0.035	0.035	0.007	0.007
5	45.00	4.5	-0.4	5.2	0.338	0.934	0.039	0.039	0.007	0.007
6	47.50	4.6	-0.4	5.1	0.357	0.891	0.069	0.069	0.013	0.013
7	50.00	4.7	-0.5	5.1	0.372	0.864	0.090	0.090	0.017	0.017
8	52.50	4.8	-0.5	5.4	0.362	0.915	0.056	0.056	0.011	0.011
9	70.00	5.3	-0.9	8.8	0.370	0.987	0.010	0.010	0.002	0.002
10	90.00	5.5	-1.5	11.3	0.399	1.011	-0.011	-0.011	-0.002	-0.002
11	95.00	5.8	-1.4	12.1	0.408	1.007	-0.009	-0.009	-0.002	-0.002

TABLE VIII. – Continued.

(a) Continued. Rotor 8E

(a-5) 70 Percent of design speed; reading 3385

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	24.567	24.193	-0.0	38.9	66.6	55.8	288.8	1.100	10.10	1.279
2	24.021	23.685	0.	37.2	65.4	52.6	288.7	1.099	10.13	1.306
3	21.753	21.653	0.	34.9	62.3	51.2	288.1	1.083	10.14	1.292
4	20.287	20.383	-0.0	37.4	60.5	47.4	288.0	1.081	10.14	1.289
5	19.990	20.129	-0.0	38.1	60.2	46.2	288.0	1.082	10.14	1.293
6	19.690	19.875	-0.0	39.5	59.8	45.2	288.0	1.083	10.14	1.291
7	19.388	19.621	0.	40.7	59.4	44.4	288.0	1.084	10.14	1.286
8	19.086	19.367	-0.0	40.0	59.1	43.7	287.9	1.082	10.13	1.288
9	16.891	17.589	-0.0	41.6	56.7	34.8	287.9	1.080	10.14	1.302
10	14.176	15.557	-0.0	47.0	53.8	17.7	287.8	1.084	10.14	1.333
11	13.447	15.049	0.	49.4	53.3	10.4	287.8	1.091	10.13	1.357

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	125.2	160.9	315.8	222.9	125.2	125.2	-0.0	101.1	289.9	285.5
2	129.9	169.9	312.3	222.9	129.9	135.3	0.	102.9	284.0	280.1
3	134.8	160.5	290.2	210.2	134.8	131.6	0.	91.9	257.0	255.8
4	135.4	163.4	275.0	191.8	135.4	129.7	-0.0	99.2	239.4	240.5
5	135.5	165.5	272.2	188.1	135.5	130.3	-0.0	102.1	236.1	237.8
6	135.4	166.1	269.1	181.9	135.4	128.1	-0.0	105.7	232.6	234.8
7	135.1	166.0	265.8	176.3	135.1	125.9	0.	108.2	228.8	231.6
8	134.7	166.4	262.5	176.1	134.7	127.4	-0.0	107.0	225.3	228.6
9	130.8	175.2	238.4	159.5	130.8	130.9	-0.0	116.4	199.3	207.6
10	122.4	193.6	207.3	138.4	122.4	131.9	-0.0	141.6	167.3	183.6
11	118.5	202.4	198.2	134.0	118.5	131.8	0.	153.6	158.8	177.8

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	0.373	0.460	0.940	0.637	0.373	0.358	1.000	1.260
2	0.387	0.487	0.931	0.639	0.387	0.388	1.042	1.246
3	0.402	0.463	0.866	0.606	0.402	0.379	0.976	1.222
4	0.404	0.472	0.822	0.554	0.404	0.375	0.958	1.190
5	0.405	0.478	0.813	0.544	0.405	0.376	0.961	1.183
6	0.404	0.480	0.804	0.525	0.404	0.370	0.946	1.175
7	0.404	0.479	0.794	0.509	0.404	0.364	0.932	1.164
8	0.403	0.481	0.784	0.509	0.403	0.368	0.946	1.154
9	0.390	0.508	0.712	0.463	0.390	0.380	1.001	1.071
10	0.365	0.564	0.618	0.403	0.365	0.384	1.078	0.914
11	0.353	0.589	0.590	0.390	0.353	0.384	1.112	0.865

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	4.8	2.1	3.9	0.399	0.727	0.192	0.189	0.036	0.035
2	10.00	4.9	1.9	1.4	0.392	0.801	0.142	0.140	0.028	0.027
3	30.00	6.4	2.3	5.0	0.369	0.916	0.057	0.057	0.011	0.011
4	42.50	7.1	2.3	5.7	0.403	0.926	0.054	0.054	0.010	0.010
5	45.00	7.2	2.3	5.5	0.412	0.933	0.050	0.050	0.009	0.009
6	47.50	7.3	2.3	5.6	0.430	0.911	0.069	0.069	0.013	0.013
7	50.00	7.4	2.3	6.1	0.445	0.889	0.088	0.088	0.017	0.017
8	52.50	7.5	2.3	6.6	0.436	0.914	0.068	0.068	0.013	0.013
9	70.00	8.3	2.1	8.8	0.446	0.981	0.017	0.017	0.003	0.003
10	90.00	8.6	1.6	11.2	0.471	1.015	-0.019	-0.019	-0.004	-0.004
11	95.00	8.9	1.7	10.7	0.474	0.999	0.001	0.001	0.000	0.000

TABLE VIII. – Continued.

(a) Concluded. Rotor 8E

(a-6) 70 Percent of design speed; reading 3384

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.567	24.193	0.	50.7	69.3	56.5	288.7	1.122	10.11	1.323
2	24.021	23.685	-0.0	46.0	68.1	54.2	288.6	1.118	10.13	1.329
3	21.753	21.653	-0.0	41.5	65.1	51.9	288.2	1.096	10.13	1.320
4	20.287	20.383	-0.0	43.4	63.4	46.9	288.1	1.094	10.13	1.325
5	19.990	20.129	0.	44.4	63.1	46.5	288.1	1.094	10.14	1.320
6	19.690	19.875	-0.0	45.2	62.7	46.4	288.1	1.092	10.13	1.312
7	19.388	19.621	-0.0	46.7	62.4	45.6	288.1	1.092	10.13	1.308
8	19.086	19.367	0.	47.2	62.0	44.6	288.0	1.092	10.13	1.309
9	16.891	17.589	0.	46.7	59.6	34.7	287.9	1.089	10.13	1.325
10	14.176	15.557	0.	49.9	56.6	18.3	287.8	1.088	10.13	1.345
11	13.447	15.049	-0.0	52.1	55.9	9.8	287.9	1.094	10.13	1.369

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	110.0	165.3	310.5	189.7	110.0	104.7	0.	127.9	290.4	286.0
2	114.1	166.1	305.7	197.4	114.1	115.3	-0.0	119.5	283.7	279.7
3	119.1	158.2	283.2	191.9	119.1	118.5	-0.0	104.8	256.9	255.7
4	120.1	164.4	268.0	175.0	120.1	119.4	-0.0	112.9	239.6	240.7
5	119.8	163.8	264.7	170.0	119.8	117.1	0.	114.5	236.1	237.7
6	119.9	162.0	261.6	165.4	119.9	114.1	-0.0	114.9	232.5	234.7
7	119.9	162.2	258.5	159.2	119.9	111.3	-0.0	118.0	229.0	231.8
8	119.8	163.2	255.4	155.7	119.8	111.0	0.	119.7	225.6	229.0
9	117.3	172.3	231.6	144.1	117.3	118.5	0.	126.0	199.7	208.0
10	110.4	187.8	200.5	127.3	110.4	120.9	0.	143.8	167.4	183.7
11	107.2	198.2	191.4	123.4	107.2	121.6	-0.0	156.5	158.5	177.4

	ABS MACH NO		REL MACH NO		MERID MACH NO				MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT			VEL R	MACH NO
1	0.326	0.468	0.921	0.537	0.326	0.296			0.952	1.320
2	0.339	0.471	0.908	0.560	0.339	0.327			1.011	1.301
3	0.354	0.453	0.843	0.550	0.354	0.339			0.995	1.269
4	0.357	0.472	0.798	0.502	0.357	0.343			0.995	1.233
5	0.357	0.470	0.788	0.488	0.357	0.336			0.977	1.225
6	0.357	0.465	0.779	0.475	0.357	0.328			0.952	1.215
7	0.357	0.466	0.769	0.457	0.357	0.320			0.928	1.204
8	0.356	0.469	0.760	0.448	0.356	0.319			0.927	1.195
9	0.349	0.499	0.689	0.416	0.349	0.342			1.011	1.104
10	0.328	0.545	0.596	0.369	0.328	0.351			1.095	0.939
11	0.319	0.575	0.568	0.358	0.319	0.353			1.134	0.885

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	7.5	4.7	4.5	0.524	0.681	0.272	0.268	0.050	0.049
2	10.00	7.6	4.6	3.0	0.480	0.715	0.242	0.239	0.046	0.045
3	30.00	9.2	5.1	5.6	0.431	0.858	0.115	0.115	0.021	0.021
4	42.50	9.9	5.2	5.2	0.464	0.889	0.097	0.097	0.018	0.018
5	45.00	10.1	5.2	5.8	0.476	0.883	0.103	0.103	0.019	0.019
6	47.50	10.2	5.2	6.8	0.486	0.874	0.112	0.112	0.021	0.021
7	50.00	10.3	5.2	7.3	0.506	0.865	0.122	0.122	0.023	0.023
8	52.50	10.5	5.2	7.5	0.514	0.874	0.116	0.116	0.022	0.022
9	70.00	11.1	4.9	8.6	0.506	0.945	0.058	0.058	0.011	0.011
10	90.00	11.4	4.4	11.8	0.511	1.004	-0.005	-0.005	-0.001	-0.001
11	95.00	11.5	4.3	10.1	0.514	0.997	0.006	0.006	0.001	0.001

TABLE VIII. – Continued.

(b) Stator 8

(b-1) 100 Percent of design speed; reading 3381

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.945	23.947	43.1	5.0	43.1	5.0	358.1	0.984	16.43	0.944
2	23.505	23.538	34.5	2.4	34.5	2.4	349.6	0.993	17.13	0.938
3	21.742	21.902	33.4	0.5	33.4	0.5	342.0	0.996	17.21	0.945
4	20.635	20.884	38.4	-0.4	38.4	-0.4	341.6	0.991	16.77	0.954
5	20.414	20.681	39.0	-0.7	39.0	-0.7	341.4	0.990	16.59	0.962
6	20.193	20.480	39.2	-0.8	39.2	-0.8	340.6	0.991	16.39	0.974
7	19.972	20.279	39.5	-0.8	39.5	-0.8	339.6	0.993	16.36	0.979
8	19.751	20.079	38.9	-1.1	38.9	-1.1	338.7	0.993	16.41	0.979
9	18.219	18.715	38.1	-1.9	38.1	-1.9	335.6	0.997	16.63	0.975
10	16.520	17.252	41.3	5.6	41.3	5.6	338.1	1.012	17.50	0.844
11	16.111	16.904	44.1	7.0	44.1	7.0	342.8	1.008	18.02	0.763

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	255.4	225.5	255.4	225.5	186.4	224.7	174.7	19.7	0.	0.
2	270.8	237.8	270.8	237.8	223.1	237.6	153.4	9.9	0.	0.
3	266.8	242.6	266.8	242.6	222.7	242.6	146.9	2.0	0.	0.
4	264.1	242.8	264.1	242.8	207.1	242.8	164.0	-1.8	0.	0.
5	260.5	243.5	260.5	243.5	202.4	243.5	163.9	-3.0	0.	0.
6	255.4	245.4	255.4	245.4	197.9	245.4	161.4	-3.2	0.	0.
7	254.0	248.1	254.0	248.1	195.9	248.1	161.6	-3.4	0.	0.
8	256.2	250.8	256.2	250.8	199.3	250.8	160.9	-4.7	0.	0.
9	265.9	273.0	265.9	273.0	209.2	272.9	164.2	-9.1	0.	0.
10	291.8	261.3	291.8	261.3	219.4	260.1	192.4	25.6	0.	0.
11	298.2	233.8	298.2	233.8	214.3	232.0	207.4	28.5	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	0.706	0.622	0.706	0.622	0.515	0.620	1.205	1.044
2	0.763	0.664	0.763	0.664	0.629	0.664	1.065	0.910
3	0.760	0.686	0.760	0.686	0.635	0.686	1.089	0.875
4	0.752	0.689	0.752	0.689	0.590	0.689	1.172	0.993
5	0.741	0.692	0.741	0.692	0.576	0.692	1.203	0.990
6	0.726	0.698	0.726	0.698	0.562	0.698	1.240	0.971
7	0.722	0.707	0.722	0.707	0.557	0.707	1.267	0.970
8	0.731	0.716	0.731	0.716	0.568	0.716	1.258	0.960
9	0.766	0.790	0.766	0.790	0.602	0.789	1.305	0.988
10	0.847	0.743	0.847	0.743	0.636	0.739	1.186	1.170
11	0.861	0.654	0.861	0.654	0.619	0.649	1.083	1.267

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	6.3	0.2	16.1	0.319	0.	0.197	0.197	0.065	0.065
2	10.00	-0.7	-6.8	12.6	0.295	0.	0.192	0.192	0.063	0.063
3	30.00	-0.5	-6.6	9.5	0.254	0.	0.174	0.174	0.053	0.053
4	42.50	4.1	-2.1	8.3	0.260	0.	0.149	0.149	0.043	0.043
5	45.00	4.6	-1.6	8.0	0.246	0.	0.124	0.124	0.035	0.035
6	47.50	4.6	-1.5	7.9	0.219	0.	0.086	0.086	0.024	0.024
7	50.00	4.8	-1.3	7.9	0.203	0.	0.071	0.071	0.020	0.020
8	52.50	4.0	-2.1	7.5	0.197	0.	0.072	0.072	0.020	0.020
9	70.00	1.9	-4.2	6.3	0.137	0.	0.078	0.078	0.020	0.020
10	90.00	2.3	-3.6	13.7	0.233	0.	0.416	0.416	0.096	0.096
11	95.00	4.1	-1.8	15.1	0.347	0.	0.618	0.617	0.138	0.138

TABLE VIII. – Continued.

(b) Continued. Stator 8

(b-2) 100 Percent of design speed; reading 3383

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.945	23.947	46.4	5.7	46.4	5.7	359.3	0.990	16.74	0.975
2	23.505	23.538	38.8	4.7	38.8	4.7	354.8	0.993	17.52	0.953
3	21.742	21.902	35.6	1.6	35.6	1.6	344.5	0.998	17.58	0.979
4	20.635	20.884	39.4	1.4	39.4	1.4	344.5	0.992	17.46	0.965
5	20.414	20.681	40.6	1.2	40.6	1.2	344.7	0.991	17.26	0.972
6	20.193	20.480	41.5	1.0	41.5	1.0	344.5	0.990	17.06	0.980
7	19.972	20.279	41.8	1.0	41.8	1.0	343.4	0.990	16.93	0.986
8	19.751	20.079	41.2	0.7	41.2	0.7	341.9	0.993	17.02	0.982
9	18.219	18.715	40.2	-0.7	40.2	-0.7	337.6	0.996	17.05	0.982
10	16.520	17.252	41.9	3.2	41.9	3.2	339.1	1.010	17.79	0.918
11	16.111	16.904	45.3	4.7	45.3	4.7	344.0	1.004	18.37	0.865

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	247.8	190.6	247.8	190.6	170.8	189.7	179.5	18.9	0.	0.
2	265.0	200.8	265.0	200.8	206.6	200.2	165.9	16.4	0.	0.
3	261.8	214.4	261.8	214.4	212.8	214.3	152.4	6.0	0.	0.
4	265.4	211.1	265.4	211.1	204.9	211.0	168.6	5.1	0.	0.
5	260.9	209.9	260.9	209.9	198.1	209.9	169.7	4.3	0.	0.
6	256.6	209.6	256.6	209.6	192.2	209.6	170.0	3.8	0.	0.
7	253.9	210.3	253.9	210.3	189.4	210.3	169.1	3.5	0.	0.
8	256.2	211.5	256.2	211.5	192.8	211.5	168.8	2.6	0.	0.
9	260.8	221.6	260.8	221.6	199.2	221.6	168.3	-2.8	0.	0.
10	281.6	227.4	281.6	227.4	209.5	227.1	188.2	12.6	0.	0.
11	291.0	219.7	291.0	219.7	204.7	218.9	206.9	18.0	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	0.682	0.517	0.682	0.517	0.470	0.515	1.110	1.084
2	0.739	0.550	0.739	0.550	0.576	0.548	0.969	0.999
3	0.741	0.597	0.741	0.597	0.603	0.597	1.007	0.920
4	0.752	0.589	0.752	0.589	0.581	0.589	1.030	1.022
5	0.738	0.586	0.738	0.586	0.561	0.586	1.059	1.028
6	0.725	0.585	0.725	0.585	0.543	0.585	1.091	1.028
7	0.718	0.588	0.718	0.588	0.535	0.588	1.110	1.020
8	0.727	0.592	0.727	0.592	0.547	0.592	1.097	1.014
9	0.746	0.626	0.746	0.626	0.570	0.626	1.113	1.018
10	0.812	0.637	0.812	0.637	0.604	0.636	1.084	1.141
11	0.836	0.611	0.836	0.611	0.588	0.609	1.070	1.265

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	9.6	3.5	16.7	0.446	0.	0.094	0.094	0.031	0.031
2	10.00	3.5	-2.6	14.9	0.426	0.	0.155	0.155	0.050	0.050
3	30.00	1.7	-4.4	10.6	0.349	0.	0.069	0.069	0.021	0.021
4	42.50	5.1	-1.0	10.1	0.381	0.	0.110	0.110	0.032	0.032
5	45.00	6.2	0.0	9.9	0.375	0.	0.091	0.091	0.026	0.026
6	47.50	6.9	0.8	9.7	0.364	0.	0.067	0.067	0.019	0.019
7	50.00	7.0	0.9	9.6	0.352	0.	0.047	0.047	0.013	0.013
8	52.50	6.3	0.2	9.3	0.352	0.	0.060	0.060	0.017	0.017
9	70.00	4.0	-2.1	7.5	0.315	0.	0.057	0.057	0.014	0.014
10	90.00	3.0	-2.9	11.3	0.333	0.	0.234	0.234	0.054	0.054
11	95.00	5.4	-0.5	12.8	0.387	0.	0.367	0.367	0.082	0.082

TABLE VIII. – Continued.

(b) Continued. Stator 8

(b-3) 100 Percent of design speed; reading 3382

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.945	23.947	49.5	5.5	49.5	5.5	361.4	0.991	16.93	0.982
2	23.505	23.538	43.0	4.8	43.0	4.8	358.6	0.992	17.50	0.965
3	21.742	21.902	37.7	2.0	37.7	2.0	346.6	0.998	17.75	0.981
4	20.635	20.884	40.1	1.6	40.1	1.6	345.9	0.993	17.71	0.966
5	20.414	20.681	41.3	1.5	41.3	1.5	345.7	0.992	17.56	0.970
6	20.193	20.480	42.5	1.4	42.5	1.4	346.0	0.990	17.41	0.976
7	19.972	20.279	43.2	1.2	43.2	1.2	345.8	0.989	17.27	0.982
8	19.751	20.079	42.1	0.9	42.1	0.9	344.2	0.991	17.34	0.978
9	18.219	18.715	40.8	-0.4	40.8	-0.4	339.0	0.996	17.31	0.978
10	16.520	17.252	42.9	3.0	42.9	3.0	339.6	1.010	17.86	0.926
11	16.111	16.904	46.0	4.7	46.0	4.7	344.5	1.004	18.51	0.871

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	244.9	182.3	244.9	182.3	159.0	181.5	186.3	17.5	0.	0.
2	256.3	190.2	256.3	190.2	187.5	189.5	174.8	15.9	0.	0.
3	258.0	204.5	258.0	204.5	204.1	204.4	157.8	7.1	0.	0.
4	262.6	201.9	262.6	201.9	200.7	201.9	169.3	5.5	0.	0.
5	259.7	201.0	259.7	201.0	195.1	201.0	171.4	5.2	0.	0.
6	257.0	200.9	257.0	200.9	189.4	200.8	173.8	5.0	0.	0.
7	254.9	201.4	254.9	201.4	185.7	201.3	174.6	4.4	0.	0.
8	256.8	202.2	256.8	202.2	190.5	202.1	172.3	3.3	0.	0.
9	259.9	210.7	259.9	210.7	196.7	210.7	169.9	-1.5	0.	0.
10	276.8	218.5	276.8	218.5	202.9	218.2	188.3	11.5	0.	0.
11	288.4	210.9	288.4	210.9	200.4	210.2	207.5	17.4	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	0.671	0.492	0.671	0.492	0.436	0.490	1.141	1.137
2	0.708	0.516	0.708	0.516	0.518	0.515	1.011	1.061
3	0.727	0.566	0.727	0.566	0.575	0.566	1.001	0.959
4	0.742	0.560	0.742	0.560	0.567	0.560	1.006	1.026
5	0.733	0.558	0.733	0.558	0.551	0.558	1.030	1.039
6	0.725	0.558	0.725	0.558	0.534	0.558	1.060	1.054
7	0.718	0.560	0.718	0.560	0.523	0.560	1.084	1.057
8	0.726	0.563	0.726	0.563	0.538	0.563	1.061	1.037
9	0.742	0.592	0.742	0.592	0.561	0.592	1.071	1.029
10	0.795	0.610	0.795	0.610	0.583	0.609	1.075	1.143
11	0.827	0.585	0.827	0.585	0.574	0.583	1.049	1.271

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	12.7	6.6	16.6	0.484	0.	0.068	0.068	0.023	0.023
2	10.00	7.8	1.6	15.0	0.460	0.	0.122	0.122	0.040	0.040
3	30.00	3.8	-2.3	11.0	0.383	0.	0.065	0.065	0.020	0.020
4	42.50	5.9	-0.3	10.3	0.409	0.	0.110	0.110	0.032	0.032
5	45.00	6.9	0.7	10.2	0.407	0.	0.099	0.099	0.028	0.028
6	47.50	8.0	1.8	10.1	0.402	0.	0.082	0.082	0.023	0.023
7	50.00	8.5	2.4	9.9	0.394	0.	0.062	0.062	0.017	0.017
8	52.50	7.2	1.1	9.6	0.392	0.	0.075	0.075	0.021	0.021
9	70.00	4.6	-1.5	7.8	0.355	0.	0.071	0.071	0.018	0.018
10	90.00	3.9	-2.0	11.1	0.354	0.	0.218	0.218	0.050	0.050
11	95.00	6.1	0.2	12.8	0.413	0.	0.357	0.357	0.080	0.080

TABLE VIII. – Continued.

(b) Continued. Stator 8

(b-4) 70 Percent of design speed; reading 3386

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	23.945	23.947	23.3	5.7	23.3	5.7	311.9	0.996	12.27	0.944
2	23.505	23.538	22.3	3.3	22.3	3.3	310.0	0.997	12.48	0.963
3	21.742	21.902	23.0	-0.8	23.0	-0.8	306.9	1.000	12.51	0.978
4	20.635	20.884	25.8	-1.5	25.8	-1.5	306.9	1.001	12.50	0.986
5	20.414	20.681	26.6	-1.3	26.6	-1.3	307.2	1.000	12.53	0.987
6	20.193	20.480	28.1	-1.2	28.1	-1.2	308.2	0.999	12.53	0.988
7	19.972	20.279	29.2	-1.3	29.2	-1.3	308.8	0.996	12.54	0.987
8	19.751	20.079	28.5	-1.7	28.5	-1.7	308.2	0.998	12.61	0.980
9	18.219	18.715	29.8	-2.4	29.8	-2.4	307.9	1.001	12.79	0.989
10	16.520	17.252	34.7	3.2	34.7	3.2	310.7	1.005	13.28	0.916
11	16.111	16.904	36.8	6.2	36.8	6.2	312.2	1.006	13.47	0.868

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	192.1	177.0	192.1	177.0	176.4	176.1	75.9	17.5	0.	0.
2	199.0	193.1	199.0	193.1	184.1	192.7	75.5	11.0	0.	0.
3	190.4	200.2	190.4	200.2	175.3	200.2	74.4	-2.9	0.	0.
4	190.6	205.9	190.6	205.9	171.6	205.8	83.1	-5.3	0.	0.
5	191.7	208.4	191.7	208.4	171.4	208.3	86.0	-4.7	0.	0.
6	192.3	209.9	192.3	209.9	169.7	209.8	90.5	-4.4	0.	0.
7	192.6	210.1	192.6	210.1	168.2	210.0	93.9	-4.9	0.	0.
8	195.6	210.8	195.6	210.8	171.9	210.7	93.2	-6.3	0.	0.
9	202.8	229.0	202.8	229.0	176.1	228.8	100.6	-9.5	0.	0.
10	224.1	229.9	224.1	229.9	184.2	229.5	127.6	13.0	0.	0.
11	228.6	218.7	228.6	218.7	182.9	217.5	137.1	23.4	0.	0.

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.559	0.514	0.559	0.514	0.514	0.512	0.998	0.559
2	0.583	0.565	0.583	0.565	0.539	0.564	1.047	0.583
3	0.559	0.590	0.559	0.590	0.514	0.590	1.142	0.559
4	0.560	0.607	0.560	0.607	0.504	0.607	1.199	0.560
5	0.563	0.615	0.563	0.615	0.503	0.615	1.216	0.563
6	0.563	0.619	0.563	0.619	0.497	0.619	1.237	0.563
7	0.564	0.620	0.564	0.620	0.493	0.620	1.249	0.564
8	0.574	0.622	0.574	0.622	0.504	0.622	1.225	0.574
9	0.597	0.680	0.597	0.680	0.518	0.680	1.300	0.597
10	0.661	0.678	0.661	0.678	0.544	0.677	1.246	0.746
11	0.674	0.641	0.674	0.641	0.539	0.637	1.189	0.816

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	-13.5	-19.6	16.7	0.179	0.	0.294	0.294	0.097	0.097
2	10.00	-12.9	-19.1	13.5	0.135	0.	0.178	0.178	0.058	0.058
3	30.00	-10.9	-17.0	8.2	0.071	0.	0.113	0.113	0.034	0.034
4	42.50	-8.5	-14.6	7.3	0.053	0.	0.075	0.075	0.022	0.022
5	45.00	-7.8	-13.9	7.4	0.047	0.	0.068	0.068	0.019	0.019
6	47.50	-6.5	-12.6	7.5	0.046	0.	0.060	0.060	0.017	0.017
7	50.00	-5.6	-11.7	7.3	0.051	0.	0.069	0.069	0.019	0.019
8	52.50	-6.4	-12.6	6.9	0.061	0.	0.098	0.098	0.027	0.027
9	70.00	-6.5	-12.6	5.9	0.007	0.	0.051	0.051	0.013	0.013
10	90.00	-4.2	-10.2	11.3	0.089	0.	0.331	0.331	0.076	0.076
11	95.00	-3.1	-9.0	14.2	0.151	0.	0.503	0.503	0.112	0.112

TABLE VIII. – Continued.

(b) Continued. Stator 8

(b-5) 70 Percent of design speed; reading 3385

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.945	23.947	34.6	5.7	34.6	5.7	317.8	1.000	12.92	0.984
2	23.505	23.538	32.9	4.7	32.9	4.7	317.2	0.997	13.23	0.980
3	21.742	21.902	30.8	-0.4	30.8	-0.4	312.1	1.000	13.10	0.991
4	20.635	20.884	33.0	-0.8	33.0	-0.8	311.4	0.999	13.07	0.991
5	20.414	20.681	33.5	-0.7	33.5	-0.7	311.6	0.999	13.11	0.989
6	20.193	20.480	34.9	-0.6	34.9	-0.6	311.9	0.998	13.08	0.992
7	19.972	20.279	35.9	-0.6	35.9	-0.6	312.2	0.997	13.04	0.995
8	19.751	20.079	35.2	-0.6	35.2	-0.6	311.5	0.998	13.05	0.994
9	18.219	18.715	36.1	-1.5	36.1	-1.5	310.8	0.999	13.19	0.989
10	16.520	17.252	39.9	1.5	39.9	1.5	312.1	1.007	13.51	0.971
11	16.111	16.904	41.7	4.2	41.7	4.2	314.0	1.004	13.74	0.931

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	179.8	148.8	179.8	148.8	148.0	148.1	102.2	14.7	0.	0.
2	190.7	159.2	190.7	159.2	160.0	158.7	103.7	13.1	0.	0.
3	179.0	160.1	179.0	160.1	153.8	160.1	91.5	-1.2	0.	0.
4	180.2	161.1	180.2	161.1	151.2	161.1	98.0	-2.4	0.	0.
5	182.2	162.1	182.2	162.1	151.9	162.1	100.7	-2.1	0.	0.
6	181.9	163.3	181.9	163.3	149.3	163.3	104.0	-1.7	0.	0.
7	181.1	163.9	181.1	163.9	146.6	163.9	105.3	-1.6	0.	0.
8	181.9	164.4	181.9	164.4	148.5	164.3	104.9	-1.8	0.	0.
9	190.8	173.3	190.8	173.3	154.2	173.2	112.4	-4.6	0.	0.
10	208.0	189.4	208.0	189.4	159.6	189.3	133.4	4.9	0.	0.
11	215.7	179.7	215.7	179.7	161.1	179.2	143.5	13.1	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	0.516	0.424	0.516	0.424	0.425	0.422	1.001	0.603
2	0.550	0.456	0.550	0.456	0.462	0.454	0.992	0.617
3	0.519	0.462	0.519	0.462	0.446	0.462	1.041	0.519
4	0.523	0.465	0.523	0.465	0.439	0.465	1.065	0.574
5	0.529	0.469	0.529	0.469	0.441	0.468	1.067	0.592
6	0.528	0.472	0.528	0.472	0.433	0.472	1.094	0.619
7	0.525	0.474	0.525	0.474	0.425	0.474	1.118	0.635
8	0.528	0.475	0.528	0.475	0.431	0.475	1.106	0.619
9	0.556	0.503	0.556	0.503	0.450	0.502	1.123	0.674
10	0.609	0.549	0.609	0.549	0.467	0.549	1.186	0.812
11	0.631	0.518	0.631	0.518	0.471	0.517	1.113	0.877

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	-2.2	-8.3	16.7	0.334	0.	0.093	0.093	0.031	0.031
2	10.00	-2.3	-8.4	14.9	0.320	0.	0.108	0.108	0.035	0.035
3	30.00	-3.1	-9.3	8.6	0.262	0.	0.052	0.052	0.016	0.016
4	42.50	-1.3	-7.5	7.9	0.265	0.	0.053	0.053	0.015	0.015
5	45.00	-0.9	-7.0	8.0	0.270	0.	0.066	0.066	0.019	0.019
6	47.50	0.3	-5.8	8.1	0.265	0.	0.049	0.049	0.014	0.014
7	50.00	1.2	-4.9	8.1	0.259	0.	0.030	0.030	0.008	0.008
8	52.50	0.3	-5.8	8.0	0.257	0.	0.037	0.037	0.010	0.010
9	70.00	-0.2	-6.2	6.7	0.246	0.	0.057	0.057	0.014	0.014
10	90.00	1.0	-5.0	9.6	0.229	0.	0.130	0.130	0.030	0.030
11	95.00	1.8	-4.2	12.3	0.299	0.	0.295	0.295	0.066	0.066

TABLE VIII. – Concluded.

(b) Concluded. Stator 8

(b-6) 70 Percent of design speed; reading 3384

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	23.945	23.947	46.5	6.8	46.5	6.8	324.0	0.997	13.37	0.985
2	23.505	23.538	41.7	5.4	41.7	5.4	322.7	0.996	13.46	0.983
3	21.742	21.902	37.2	0.1	37.2	0.1	315.9	0.998	13.37	0.990
4	20.635	20.884	38.8	0.0	38.8	0.0	315.2	0.996	13.43	0.981
5	20.414	20.681	39.8	-0.2	39.8	-0.2	315.0	0.996	13.38	0.984
6	20.193	20.480	40.6	-0.2	40.6	-0.2	314.7	0.997	13.30	0.990
7	19.972	20.279	42.0	-0.2	42.0	-0.2	314.7	0.997	13.26	0.994
8	19.751	20.079	42.4	-0.1	42.4	-0.1	314.4	0.998	13.27	0.993
9	18.219	18.715	41.3	-0.7	41.3	-0.7	313.4	0.998	13.43	0.987
10	16.520	17.252	43.0	2.0	43.0	2.0	313.1	1.007	13.62	0.975
11	16.111	16.904	44.7	4.4	44.7	4.4	315.0	1.004	13.87	0.941

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	178.2	135.5	178.2	135.5	122.7	134.5	129.2	16.0	0.	0.
2	181.0	138.2	181.0	138.2	135.1	137.5	120.4	13.1	0.	0.
3	172.7	139.4	172.7	139.4	137.6	139.4	104.4	0.1	0.	0.
4	177.8	138.9	177.8	138.9	138.5	138.9	111.5	0.0	0.	0.
5	176.5	138.9	176.5	138.9	135.6	138.9	112.9	-0.5	0.	0.
6	173.9	139.5	173.9	139.5	132.1	139.5	113.1	-0.6	0.	0.
7	173.3	140.3	173.3	140.3	128.8	140.3	116.0	-0.5	0.	0.
8	173.9	141.0	173.9	141.0	128.3	141.0	117.4	-0.3	0.	0.
9	184.4	149.5	184.4	149.5	138.6	149.5	121.6	-1.8	0.	0.
10	198.5	162.9	198.5	162.9	145.2	162.8	135.4	5.8	0.	0.
11	207.7	154.9	207.7	154.9	147.5	154.5	146.2	11.8	0.	0.

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.506	0.381	0.506	0.381	0.349	0.379	1.096	0.806
2	0.516	0.390	0.516	0.390	0.385	0.389	1.018	0.750
3	0.497	0.398	0.497	0.398	0.396	0.398	1.013	0.646
4	0.513	0.397	0.513	0.397	0.399	0.397	1.003	0.685
5	0.509	0.397	0.509	0.397	0.391	0.397	1.024	0.694
6	0.501	0.399	0.501	0.399	0.381	0.399	1.056	0.695
7	0.499	0.402	0.499	0.402	0.371	0.402	1.090	0.714
8	0.502	0.404	0.502	0.404	0.370	0.404	1.099	0.721
9	0.534	0.429	0.534	0.429	0.401	0.429	1.079	0.749
10	0.578	0.468	0.578	0.468	0.423	0.467	1.122	0.834
11	0.605	0.443	0.605	0.443	0.429	0.442	1.047	0.904

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	9.7	3.5	17.8	0.451	0.	0.091	0.091	0.030	0.030
2	10.00	6.5	0.4	15.6	0.430	0.	0.104	0.104	0.034	0.034
3	30.00	3.3	-2.9	9.0	0.375	0.	0.066	0.066	0.020	0.020
4	42.50	4.5	-1.6	8.7	0.398	0.	0.114	0.114	0.033	0.033
5	45.00	5.3	-0.8	8.5	0.395	0.	0.099	0.099	0.028	0.028
6	47.50	6.0	-0.1	8.4	0.381	0.	0.062	0.062	0.017	0.017
7	50.00	7.3	1.2	8.4	0.376	0.	0.040	0.040	0.011	0.011
8	52.50	7.5	1.4	8.5	0.374	0.	0.042	0.042	0.011	0.011
9	70.00	5.0	-1.0	7.5	0.357	0.	0.073	0.073	0.019	0.019
10	90.00	4.1	-1.9	10.1	0.326	0.	0.121	0.121	0.028	0.028
11	95.00	4.8	-1.1	12.5	0.395	0.	0.271	0.271	0.061	0.061

TABLE IX. – BLADE-ELEMENT DATA AT BLADE EDGES FOR NOMINAL NONROTATING ROTOR TIP CLEARANCE OF 0.140 cm

(a) Rotor 8E

(a-1) 100 Percent of design speed; reading 3304

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.567	24.193	0.	47.9	64.6	58.9	289.2	1.225	10.07	1.560
2	24.021	23.685	0.	40.8	63.3	54.7	289.0	1.211	10.13	1.642
3	21.753	21.653	0.	37.8	59.9	50.6	288.3	1.184	10.14	1.668
4	20.287	20.383	0.	41.6	57.8	45.9	288.1	1.186	10.14	1.659
5	19.990	20.129	0.0	42.9	57.4	45.7	288.0	1.186	10.14	1.639
6	19.690	19.875	0.	44.1	57.0	45.8	287.9	1.185	10.14	1.616
7	19.388	19.621	0.	44.6	56.6	45.2	287.8	1.183	10.14	1.609
8	19.086	19.367	0.	43.9	56.2	43.8	287.7	1.181	10.14	1.623
9	16.891	17.589	0.0	43.7	53.7	36.5	287.6	1.166	10.14	1.639
10	14.176	15.557	0.0	47.8	50.9	19.2	287.6	1.176	10.14	1.738
11	13.447	15.049	0.	51.7	50.5	10.9	287.7	1.194	10.12	1.787

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	197.2	220.1	459.0	286.0	197.2	147.6	0.	163.3	414.5	408.2
2	203.9	232.2	453.9	304.2	203.9	175.8	0.	151.6	405.5	399.8
3	213.0	232.3	424.4	288.7	213.0	183.4	0.	142.5	367.1	365.4
4	216.2	239.9	405.2	257.6	216.2	179.2	0.	159.4	342.7	344.3
5	216.3	237.5	401.0	249.4	216.3	174.1	0.0	161.5	337.7	340.1
6	216.2	234.2	396.8	241.3	216.2	168.3	0.	162.9	332.7	335.8
7	216.0	233.5	392.4	236.1	216.0	166.3	0.	163.9	327.6	331.5
8	215.6	236.4	388.0	236.0	215.6	170.3	0.	163.9	322.6	327.4
9	209.5	242.1	354.0	217.8	209.5	175.0	0.0	167.4	285.3	297.1
10	194.2	269.6	308.1	191.8	194.2	181.2	0.0	199.6	239.2	262.5
11	187.1	281.1	294.3	177.4	187.1	174.2	0.	220.6	227.2	254.2

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.599	0.604	1.394	0.785	0.599	0.405	0.749	1.572
2	0.621	0.644	1.382	0.844	0.621	0.488	0.863	1.558
3	0.652	0.654	1.299	0.812	0.652	0.516	0.861	1.536
4	0.663	0.676	1.242	0.726	0.663	0.505	0.829	1.512
5	0.663	0.669	1.230	0.703	0.663	0.490	0.805	1.506
6	0.663	0.660	1.217	0.679	0.663	0.474	0.778	1.501
7	0.663	0.658	1.203	0.665	0.663	0.469	0.770	1.493
8	0.661	0.668	1.190	0.667	0.661	0.481	0.790	1.487
9	0.641	0.690	1.083	0.621	0.641	0.499	0.835	1.437
10	0.591	0.774	0.937	0.551	0.591	0.520	0.933	1.295
11	0.568	0.804	0.893	0.508	0.568	0.498	0.931	1.225

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	2.7	0.0	7.0	0.494	0.602	0.334	0.239	0.057	0.041
2	10.00	2.8	-0.2	3.5	0.437	0.721	0.232	0.142	0.043	0.026
3	30.00	3.9	-0.1	4.3	0.419	0.857	0.117	0.045	0.022	0.008
4	42.50	4.3	-0.4	4.1	0.473	0.836	0.143	0.084	0.028	0.016
5	45.00	4.4	-0.5	5.0	0.488	0.815	0.164	0.107	0.031	0.020
6	47.50	4.5	-0.5	6.2	0.503	0.796	0.182	0.128	0.034	0.024
7	50.00	4.6	-0.6	6.9	0.510	0.795	0.184	0.133	0.034	0.025
8	52.50	4.7	-0.6	6.8	0.503	0.822	0.161	0.113	0.030	0.021
9	70.00	5.2	-1.0	10.5	0.497	0.916	0.082	0.055	0.015	0.010
10	90.00	5.8	-1.3	12.6	0.509	0.972	0.035	0.032	0.006	0.006
11	95.00	6.1	-1.1	11.3	0.542	0.929	0.106	0.106	0.019	0.019

TABLE IX. – Continued.

(a) Continued. Rotor 8E

(a-2) 100 Percent of design speed; reading 3403

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	24.567	24.193	0.	48.9	64.9	59.1	289.1	1.227	10.06	1.581
2	24.021	23.685	0.	42.2	63.5	54.5	288.8	1.220	10.13	1.664
3	21.753	21.653	0.0	38.7	60.0	50.5	288.4	1.188	10.14	1.690
4	20.287	20.383	0.	42.4	57.9	45.9	288.0	1.189	10.14	1.676
5	19.990	20.129	0.0	43.6	57.5	45.6	287.7	1.189	10.14	1.659
6	19.690	19.875	0.	44.8	57.1	45.7	288.1	1.188	10.14	1.636
7	19.388	19.621	0.	45.4	56.7	45.1	287.9	1.186	10.14	1.630
8	19.086	19.367	0.0	44.7	56.4	43.7	287.7	1.184	10.14	1.641
9	16.891	17.589	0.	43.9	53.9	36.5	287.8	1.169	10.14	1.658
10	14.176	15.557	0.	48.3	51.2	19.9	287.6	1.176	10.14	1.740
11	13.447	15.049	0.	51.7	50.9	11.3	287.7	1.195	10.12	1.804

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	194.7	220.5	458.4	282.3	194.7	144.8	0.	166.3	415.0	408.7
2	202.2	233.7	453.2	298.2	202.2	173.0	0.	157.1	405.6	399.9
3	211.9	233.1	424.5	285.9	211.9	182.0	0.0	145.6	367.9	366.2
4	214.7	239.6	404.3	254.3	214.7	177.0	0.	161.5	342.6	344.2
5	214.8	237.8	400.0	246.3	214.8	172.5	0.0	163.9	337.5	339.9
6	215.1	234.7	396.3	238.4	215.1	168.6	0.	165.4	332.8	336.0
7	214.8	234.0	391.8	233.0	214.8	164.5	0.	166.5	327.7	331.6
8	214.4	236.6	387.3	232.5	214.4	168.0	0.0	166.6	322.5	327.2
9	207.8	241.9	352.7	217.0	207.8	174.4	0.	167.6	284.9	296.7
10	191.7	265.4	306.2	187.6	191.7	176.4	0.	198.2	238.8	262.0
11	184.6	279.6	292.6	176.7	184.6	173.3	0.	219.4	227.0	254.0

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	0.591	0.605	1.391	0.775	0.591	0.397	0.744	1.580
2	0.616	0.647	1.380	0.825	0.616	0.479	0.856	1.562
3	0.648	0.655	1.299	0.803	0.648	0.511	0.859	1.542
4	0.658	0.675	1.239	0.716	0.658	0.498	0.824	1.515
5	0.658	0.670	1.227	0.693	0.658	0.485	0.802	1.509
6	0.659	0.660	1.214	0.670	0.659	0.468	0.774	1.503
7	0.658	0.659	1.201	0.656	0.658	0.463	0.766	1.496
8	0.657	0.667	1.187	0.656	0.657	0.474	0.784	1.489
9	0.635	0.688	1.078	0.618	0.635	0.496	0.839	1.441
10	0.583	0.760	0.931	0.537	0.583	0.505	0.920	1.296
11	0.560	0.799	0.887	0.505	0.560	0.495	0.939	1.228

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	3.1	0.3	7.2	0.503	0.615	0.327	0.231	0.055	0.039
2	10.00	3.0	-0.0	3.3	0.453	0.713	0.245	0.155	0.046	0.029
3	30.00	4.1	0.0	4.2	0.427	0.860	0.118	0.044	0.022	0.008
4	42.50	4.5	-0.3	4.1	0.482	0.840	0.142	0.083	0.027	0.016
5	45.00	4.6	-0.3	4.9	0.496	0.824	0.158	0.101	0.030	0.019
6	47.50	4.6	-0.4	6.1	0.511	0.802	0.179	0.125	0.034	0.023
7	50.00	4.7	-0.4	6.8	0.519	0.803	0.179	0.128	0.034	0.024
8	52.50	4.8	-0.5	6.7	0.513	0.827	0.159	0.111	0.030	0.021
9	70.00	5.4	-0.8	10.5	0.497	0.922	0.077	0.050	0.014	0.009
10	90.00	6.1	-1.0	13.4	0.519	0.971	0.037	0.034	0.007	0.006
11	95.00	6.5	-0.7	11.6	0.541	0.941	0.089	0.089	0.016	0.016

TABLE IX. – Continued.

(a) Continued. Rotor 8E

(a-3) 100 Percent of design speed; reading 3402

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.567	24.193	0.0	54.6	66.0	60.4	289.0	1.238	10.06	1.610
2	24.021	23.685	0.	46.0	64.6	56.8	288.9	1.229	10.13	1.638
3	21.753	21.653	0.0	40.2	61.0	50.8	288.4	1.194	10.13	1.704
4	20.287	20.383	0.0	43.0	58.8	46.3	288.2	1.193	10.14	1.701
5	19.990	20.129	0.0	44.5	58.4	45.7	287.9	1.193	10.14	1.687
6	19.690	19.875	0.	45.7	58.0	45.4	287.8	1.194	10.14	1.670
7	19.388	19.621	0.	46.5	57.6	44.7	288.5	1.195	10.14	1.663
8	19.086	19.367	0.	45.8	57.3	43.5	287.4	1.191	10.14	1.671
9	16.891	17.589	0.	44.8	54.7	36.1	287.7	1.176	10.14	1.689
10	14.176	15.557	0.	48.7	52.1	20.7	287.7	1.179	10.14	1.754
11	13.447	15.049	0.	52.3	51.6	11.7	287.8	1.196	10.13	1.816

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	184.7	222.7	453.7	260.7	184.7	128.9	0.0	181.6	414.5	408.2
2	192.7	224.4	448.8	284.8	192.7	155.9	0.	161.4	405.4	399.7
3	203.0	231.0	419.3	278.9	203.0	176.4	0.0	149.1	366.9	365.2
4	207.1	237.5	399.9	251.5	207.1	173.7	0.0	162.0	342.2	343.8
5	207.2	236.9	395.4	241.9	207.2	169.0	0.0	166.0	336.8	339.2
6	207.4	235.4	391.5	234.2	207.4	164.4	0.	168.4	332.1	335.2
7	208.0	235.4	388.0	228.2	208.0	162.1	0.	170.8	327.5	331.4
8	206.7	236.9	382.5	227.9	206.7	165.3	0.	169.7	321.8	326.5
9	201.5	242.9	349.0	213.1	201.5	172.2	0.	171.2	285.0	296.8
10	186.5	262.4	303.4	185.3	186.5	173.3	0.	197.0	239.2	262.5
11	179.8	277.1	289.7	173.2	179.8	169.6	0.	219.1	227.1	254.2

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.559	0.608	1.372	0.712	0.559	0.352	0.698	1.599
2	0.584	0.616	1.362	0.782	0.584	0.428	0.809	1.581
3	0.619	0.646	1.278	0.780	0.619	0.494	0.869	1.557
4	0.632	0.667	1.221	0.706	0.632	0.488	0.839	1.530
5	0.633	0.665	1.208	0.679	0.633	0.475	0.816	1.523
6	0.634	0.660	1.197	0.657	0.634	0.461	0.793	1.519
7	0.635	0.660	1.185	0.639	0.635	0.454	0.779	1.511
8	0.632	0.667	1.170	0.641	0.632	0.465	0.800	1.506
9	0.615	0.689	1.065	0.605	0.615	0.489	0.855	1.462
10	0.566	0.750	0.920	0.529	0.566	0.495	0.929	1.307
11	0.544	0.790	0.877	0.494	0.544	0.484	0.943	1.237

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	4.2	1.5	8.4	0.557	0.611	0.346	0.248	0.056	0.041
2	10.00	4.1	1.1	5.6	0.481	0.662	0.298	0.206	0.053	0.036
3	30.00	5.1	1.0	4.5	0.440	0.848	0.132	0.059	0.025	0.011
4	42.50	5.4	0.6	4.5	0.483	0.850	0.138	0.078	0.026	0.015
5	45.00	5.4	0.6	5.0	0.503	0.834	0.155	0.098	0.030	0.019
6	47.50	5.5	0.5	5.9	0.518	0.812	0.178	0.124	0.034	0.023
7	50.00	5.5	0.4	6.4	0.529	0.803	0.189	0.138	0.036	0.026
8	52.50	5.7	0.4	6.4	0.521	0.828	0.166	0.118	0.031	0.022
9	70.00	6.3	0.1	10.0	0.505	0.920	0.083	0.055	0.016	0.010
10	90.00	6.9	-0.2	14.2	0.521	0.973	0.036	0.033	0.007	0.006
11	95.00	7.2	0.0	12.0	0.549	0.947	0.082	0.082	0.015	0.015

TABLE IX. – Continued.

(a) Continued. Rotor 8E

(a-4) 70 Percent of design speed; reading 3399

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	24.567	24.193	0.	25.9	64.1	55.6	289.0	1.077	10.09	1.196
2	24.021	23.685	0.0	24.4	62.9	53.5	288.6	1.072	10.13	1.221
3	21.753	21.653	0.	25.2	59.6	50.8	288.1	1.063	10.14	1.227
4	20.287	20.383	0.0	28.3	57.7	47.3	288.1	1.064	10.13	1.226
5	19.990	20.129	0.	29.6	57.3	46.1	287.6	1.065	10.14	1.230
6	19.690	19.875	0.	31.1	57.0	44.9	288.0	1.069	10.14	1.231
7	19.388	19.621	0.	32.6	56.5	43.6	288.1	1.072	10.14	1.231
8	19.086	19.367	0.	31.8	56.2	42.7	288.1	1.069	10.14	1.238
9	16.891	17.589	0.0	34.0	53.6	35.1	287.8	1.069	10.14	1.259
10	14.176	15.557	0.	41.3	50.5	18.0	287.7	1.079	10.14	1.309
11	13.447	15.049	0.	44.0	49.9	12.4	287.9	1.084	10.12	1.330

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	141.1	163.0	322.4	259.7	141.1	146.7	0.	71.2	289.9	285.5
2	145.4	170.1	318.9	260.6	145.4	154.9	0.0	70.3	283.8	279.8
3	150.2	166.3	297.1	238.1	150.2	150.5	0.	70.7	256.4	255.2
4	151.4	168.4	283.4	218.6	151.4	148.2	0.0	79.9	239.5	240.6
5	151.2	169.9	280.1	215.1	151.2	147.8	0.	83.8	235.7	237.4
6	151.2	171.4	277.3	207.2	151.2	146.8	0.	88.5	232.5	234.7
7	151.2	172.6	274.3	201.0	151.2	145.5	0.	92.9	228.9	231.6
8	151.1	174.5	271.7	201.9	151.1	148.3	0.	92.0	225.7	229.1
9	147.3	181.9	248.0	184.2	147.3	150.7	0.0	101.9	199.5	207.7
10	138.1	203.1	217.0	160.5	138.1	152.6	0.	134.0	167.4	183.7
11	133.5	208.5	207.5	153.6	133.5	150.0	0.	144.9	158.9	177.8

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 VEL R	PEAK SS MACH NO
1	0.421	0.471	0.963	0.751	0.421	0.424	1.040	1.199
2	0.435	0.494	0.954	0.757	0.435	0.450	1.065	1.187
3	0.450	0.485	0.891	0.694	0.450	0.439	1.002	1.172
4	0.454	0.491	0.850	0.638	0.454	0.432	0.979	1.148
5	0.454	0.496	0.841	0.622	0.454	0.431	0.977	1.141
6	0.454	0.499	0.832	0.604	0.454	0.428	0.971	1.133
7	0.454	0.502	0.823	0.585	0.454	0.423	0.962	1.124
8	0.453	0.509	0.815	0.588	0.453	0.432	0.981	1.117
9	0.441	0.532	0.743	0.539	0.441	0.441	1.024	1.038
10	0.413	0.595	0.649	0.470	0.413	0.447	1.105	0.886
11	0.399	0.611	0.620	0.450	0.399	0.439	1.123	0.838

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	-0.5	3.6	0.267	0.686	0.168	0.166	0.031	0.031
2	10.00	2.3	-0.6	2.3	0.254	0.819	0.093	0.092	0.018	0.018
3	30.00	3.7	-0.4	4.5	0.269	0.955	0.023	0.023	0.004	0.004
4	42.50	4.2	-0.5	5.5	0.307	0.940	0.034	0.034	0.006	0.006
5	45.00	4.4	-0.5	5.4	0.321	0.938	0.036	0.036	0.007	0.007
6	47.50	4.5	-0.6	5.3	0.339	0.888	0.069	0.069	0.013	0.013
7	50.00	4.5	-0.6	5.3	0.357	0.854	0.094	0.094	0.018	0.018
8	52.50	4.6	-0.7	5.7	0.346	0.908	0.059	0.059	0.011	0.011
9	70.00	5.1	-1.1	9.0	0.354	0.989	0.008	0.008	0.002	0.002
10	90.00	5.3	-1.8	11.5	0.386	1.010	-0.010	-0.010	-0.002	-0.002
11	95.00	5.6	-1.6	12.7	0.395	1.015	-0.018	-0.018	-0.003	-0.003

TABLE IX. – Continued.

(a) Continued. Rotor 8E

(a-5) 70 Percent of design speed; reading 3400

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	24.567	24.193	0.	37.9	66.4	56.7	288.6	1.097	10.10	1.258
2	24.021	23.685	0.	35.3	65.2	53.0	288.6	1.098	10.13	1.291
3	21.753	21.653	0.	33.1	62.2	51.3	288.2	1.081	10.14	1.285
4	20.287	20.383	0.	35.9	60.3	47.6	288.1	1.079	10.13	1.282
5	19.990	20.129	0.0	36.6	59.9	46.4	288.0	1.079	10.14	1.285
6	19.690	19.875	0.	38.1	59.6	45.3	287.9	1.081	10.14	1.284
7	19.388	19.621	0.	38.8	59.2	44.6	288.7	1.083	10.13	1.280
8	19.086	19.367	0.0	38.3	58.9	43.9	287.5	1.079	10.14	1.280
9	16.891	17.589	0.	40.3	56.4	35.2	288.0	1.078	10.13	1.295
10	14.176	15.557	0.	45.6	53.6	18.7	287.9	1.084	10.14	1.329
11	13.447	15.049	0.	48.2	52.9	11.4	287.8	1.090	10.13	1.350

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	126.5	157.1	316.3	226.1	126.5	124.0	0.	96.4	289.8	285.4
2	130.8	168.2	312.3	228.2	130.8	137.2	0.	97.3	283.6	279.6
3	135.7	160.8	290.5	215.3	135.7	134.7	0.	87.7	256.9	255.7
4	136.8	163.3	275.9	196.4	136.8	132.3	0.	95.7	239.6	240.8
5	136.6	165.2	272.7	192.1	136.6	132.6	0.0	98.6	236.0	237.7
6	136.3	166.0	269.2	185.8	136.3	130.7	0.	102.3	232.1	234.3
7	136.5	166.3	266.7	181.9	136.5	129.6	0.	104.2	229.1	231.8
8	135.4	165.9	262.4	180.8	135.4	130.2	0.0	102.8	224.8	228.1
9	131.8	174.6	238.5	163.1	131.8	133.3	0.	112.9	198.8	207.0
10	123.5	193.0	208.0	142.6	123.5	135.0	0.	137.9	167.4	183.7
11	119.7	201.4	198.5	137.0	119.7	134.3	0.	150.1	158.4	177.2

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	0.377	0.449	0.942	0.646	0.377	0.354	0.980	1.255
2	0.390	0.482	0.931	0.654	0.390	0.393	1.049	1.240
3	0.405	0.464	0.868	0.622	0.405	0.389	0.993	1.219
4	0.409	0.472	0.824	0.568	0.409	0.383	0.967	1.187
5	0.408	0.478	0.815	0.556	0.408	0.384	0.970	1.180
6	0.407	0.480	0.804	0.537	0.407	0.378	0.959	1.169
7	0.407	0.480	0.796	0.525	0.407	0.374	0.949	1.160
8	0.405	0.480	0.785	0.524	0.405	0.377	0.962	1.150
9	0.394	0.507	0.712	0.474	0.394	0.387	1.011	1.065
10	0.368	0.562	0.620	0.415	0.368	0.393	1.094	0.913
11	0.356	0.587	0.591	0.399	0.356	0.391	1.122	0.860

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	4.6	1.9	4.8	0.385	0.696	0.207	0.205	0.038	0.037
2	10.00	4.7	1.7	1.8	0.369	0.771	0.161	0.160	0.031	0.031
3	30.00	6.2	2.2	5.0	0.348	0.916	0.056	0.056	0.010	0.010
4	42.50	6.8	2.1	5.8	0.384	0.929	0.050	0.050	0.009	0.009
5	45.00	7.0	2.1	5.7	0.395	0.938	0.045	0.045	0.009	0.009
6	47.50	7.1	2.1	5.7	0.413	0.915	0.064	0.064	0.012	0.012
7	50.00	7.2	2.0	6.2	0.422	0.881	0.093	0.093	0.018	0.018
8	52.50	7.4	2.1	6.9	0.414	0.925	0.057	0.057	0.011	0.011
9	70.00	8.0	1.8	9.2	0.428	0.976	0.022	0.022	0.004	0.004
10	90.00	8.4	1.3	12.2	0.449	1.010	-0.012	-0.012	-0.002	-0.002
11	95.00	8.5	1.3	11.7	0.456	0.995	0.008	0.008	0.001	0.001

TABLE IX. – Continued.

(a) Concluded. Rotor 8E

(a-6) 70 Percent of design speed; reading 3401

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	24.567	24.193	0.	51.3	69.0	57.1	288.6	1.119	10.10	1.303
2	24.021	23.685	0.	45.9	67.8	56.5	288.4	1.113	10.13	1.290
3	21.753	21.653	0.	38.4	64.6	52.3	288.1	1.089	10.13	1.301
4	20.287	20.383	0.	40.4	62.8	47.1	288.1	1.090	10.14	1.312
5	19.990	20.129	0.	40.6	62.4	46.4	287.8	1.089	10.14	1.310
6	19.690	19.875	0.	41.8	62.1	46.0	288.4	1.090	10.13	1.305
7	19.388	19.621	0.	43.3	61.8	45.4	287.4	1.088	10.14	1.299
8	19.086	19.367	0.0	43.1	61.4	44.5	288.4	1.088	10.14	1.299
9	16.891	17.589	0.0	44.2	59.0	35.2	288.1	1.085	10.13	1.314
10	14.176	15.557	0.	47.7	56.0	19.4	287.9	1.086	10.13	1.338
11	13.447	15.049	0.	50.6	55.4	10.8	287.8	1.092	10.13	1.362

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	110.9	163.5	310.2	188.0	110.9	102.2	0.	127.6	289.7	285.3
2	115.6	157.9	305.8	198.9	115.6	109.9	0.	113.4	283.1	279.2
3	121.6	156.0	283.7	200.0	121.6	122.3	0.	96.9	256.3	255.1
4	123.1	163.7	269.0	183.3	123.1	124.7	0.	106.0	239.2	240.3
5	122.9	163.8	265.6	180.2	122.9	124.3	0.	106.7	235.4	237.1
6	123.3	163.2	263.1	174.9	123.3	121.6	0.	108.8	232.4	234.6
7	122.6	162.2	259.3	168.2	122.6	118.0	0.	111.4	228.5	231.2
8	122.8	163.0	256.1	166.6	122.8	118.9	0.0	111.4	224.8	228.1
9	119.9	172.4	232.6	151.3	119.9	123.6	0.0	120.2	199.3	207.5
10	112.9	187.9	201.7	134.0	112.9	126.4	0.	139.1	167.2	183.5
11	109.3	198.1	192.3	127.9	109.3	125.7	0.	153.1	158.2	177.1

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 VEL R	PEAK SS MACH NO
1	0.329	0.463	0.921	0.533	0.329	0.290	0.921	1.313
2	0.343	0.449	0.909	0.565	0.343	0.312	0.951	1.293
3	0.362	0.448	0.845	0.575	0.362	0.351	1.006	1.258
4	0.367	0.471	0.801	0.527	0.367	0.359	1 013	1.222
5	0.366	0.472	0.791	0.519	0.366	0.358	1.012	1.213
6	0.367	0.469	0.783	0.503	0.367	0.350	0.986	1.204
7	0.366	0.468	0.773	0.485	0.366	0.340	0.962	1.195
8	0.365	0.469	0.762	0.479	0.365	0.342	0.969	1.180
9	0.357	0.498	0.692	0.437	0.357	0.357	1.030	1.094
10	0.336	0.546	0.600	0.389	0.336	0.367	1.119	0.932
11	0.325	0.576	0.572	0.372	0.325	0.365	1.149	0.878

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	7.3	4.5	5.1	0.529	0.661	0.282	0.278	0.051	0.050
2	10.00	7.3	4.3	5.3	0.469	0.670	0.267	0.265	0.048	0.047
3	30.00	8.7	4.6	6.0	0.395	0.876	0.094	0.093	0.017	0.017
4	42.50	9.3	4.6	5.3	0.428	0.898	0.085	0.085	0.016	0.016
5	45.00	9.5	4.6	5.7	0.431	0.900	0.084	0.084	0.016	0.016
6	47.50	9.6	4.5	6.4	0.447	0.878	0.105	0.105	0.020	0.020
7	50.00	9.7	4.6	7.1	0.466	0.882	0.102	0.102	0.019	0.019
8	52.50	9.8	4.5	7.4	0.464	0.883	0.103	0.103	0.019	0.019
9	70.00	10.5	4.3	9.2	0.472	0.956	0.045	0.045	0.009	0.009
10	90.00	10.8	3.7	12.9	0.476	1.005	-0.007	-0.007	-0.001	-0.001
11	95.00	10.9	3.7	11.1	0.489	1.005	-0.008	-0.008	-0.001	-0.001

TABLE IX. – Continued.

(b) Stator 8

(b-1) 100 Percent of design speed; reading 3404

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.945	23.947	43.1	4.6	43.1	4.6	354.3	0.990	15.71	0.970
2	23.505	23.538	35.5	2.7	35.5	2.7	350.0	0.993	16.63	0.952
3	21.742	21.902	32.5	-0.4	32.5	-0.4	341.2	0.996	16.91	0.959
4	20.635	20.884	36.2	-1.1	36.2	-1.1	341.6	0.990	16.81	0.951
5	20.414	20.681	37.4	-1.3	37.4	-1.3	341.6	0.989	16.62	0.960
6	20.193	20.480	38.7	-1.3	38.7	-1.3	341.1	0.990	16.39	0.974
7	19.972	20.279	39.2	-1.3	39.2	-1.3	340.5	0.990	16.32	0.981
8	19.751	20.079	38.4	-1.7	38.4	-1.7	339.7	0.990	16.45	0.977
9	18.219	18.715	37.4	-2.1	37.4	-2.1	335.3	0.998	16.63	0.978
10	16.520	17.252	39.6	4.7	39.6	4.7	338.2	1.011	17.62	0.846
11	16.111	16.904	43.5	6.9	43.5	6.9	343.5	1.005	18.09	0.770

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	241.6	215.8	241.6	215.8	176.5	215.1	165.0	17.1	0.	0.
2	263.0	229.9	263.0	229.9	214.0	229.7	152.7	10.8	0.	0.
3	263.9	239.1	263.9	239.1	222.4	239.1	141.9	-1.6	0.	0.
4	266.8	239.8	266.8	239.8	215.4	239.7	157.4	-4.6	0.	0.
5	262.0	240.2	262.0	240.2	208.1	240.1	159.3	-5.6	0.	0.
6	256.4	242.0	256.4	242.0	200.0	241.9	160.4	-5.5	0.	0.
7	254.8	244.8	254.8	244.8	197.5	244.7	161.0	-5.7	0.	0.
8	258.9	247.8	258.9	247.8	203.0	247.7	160.8	-7.4	0.	0.
9	266.1	269.6	266.1	269.6	211.5	269.4	161.6	-10.0	0.	0.
10	294.6	258.9	294.6	258.9	226.8	258.0	187.9	21.4	0.	0.
11	299.4	233.3	299.4	233.3	217.2	231.7	206.1	27.8	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	0.668	0.595	0.668	0.595	0.488	0.593	1.219	0.987
2	0.738	0.640	0.738	0.640	0.601	0.639	1.073	0.910
3	0.752	0.676	0.752	0.676	0.634	0.676	1.075	0.834
4	0.761	0.680	0.761	0.680	0.614	0.680	1.113	0.941
5	0.746	0.682	0.746	0.682	0.592	0.681	1.154	0.954
6	0.728	0.687	0.728	0.687	0.568	0.687	1.209	0.962
7	0.724	0.697	0.724	0.697	0.561	0.696	1.239	0.964
8	0.738	0.707	0.738	0.707	0.578	0.707	1.220	0.956
9	0.767	0.779	0.767	0.779	0.609	0.778	1.274	0.968
10	0.855	0.735	0.855	0.735	0.659	0.733	1.138	1.133
11	0.864	0.653	0.864	0.653	0.627	0.648	1.066	1.255

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	6.3	0.1	15.6	0.310	0.	0.115	0.115	0.038	0.038
2	10.00	0.3	-5.8	12.9	0.302	0.	0.158	0.158	0.052	0.052
3	30.00	-1.4	-7.5	8.6	0.258	0.	0.132	0.132	0.040	0.040
4	42.50	1.9	-4.3	7.6	0.275	0.	0.153	0.153	0.044	0.044
5	45.00	3.0	-3.1	7.4	0.261	0.	0.131	0.131	0.037	0.037
6	47.50	4.1	-2.0	7.4	0.237	0.	0.088	0.088	0.025	0.025
7	50.00	4.5	-1.7	7.3	0.220	0.	0.064	0.064	0.018	0.018
8	52.50	3.5	-2.6	6.9	0.220	0.	0.076	0.076	0.021	0.021
9	70.00	1.1	-4.9	6.1	0.149	0.	0.069	0.069	0.018	0.018
10	90.00	0.7	-5.2	12.8	0.248	0.	0.405	0.405	0.093	0.093
11	95.00	3.6	-2.4	14.9	0.350	0.	0.596	0.595	0.133	0.133

TABLE IX. – Continued.

(b) Continued. Stator 8

(b-2) 100 Percent of design speed; reading 3403

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	23.945	23.947	44.2	5.3	44.2	5.3	354.8	0.991	15.91	0.985
2	23.505	23.538	37.0	4.2	37.0	4.2	352.2	0.990	16.85	0.953
3	21.742	21.902	33.4	0.2	33.4	0.2	342.6	0.997	17.13	0.979
4	20.635	20.884	36.9	0.0	36.9	0.0	342.4	0.992	16.99	0.966
5	20.414	20.681	38.2	-0.1	38.2	-0.1	342.1	0.990	16.83	0.970
6	20.193	20.480	39.5	-0.1	39.5	-0.1	342.3	0.989	16.59	0.982
7	19.972	20.279	40.0	-0.1	40.0	-0.1	341.5	0.991	16.53	0.988
8	19.751	20.079	39.3	-0.5	39.3	-0.5	340.6	0.991	16.64	0.983
9	18.219	18.715	37.6	-1.6	37.6	-1.6	336.3	0.996	16.81	0.982
10	16.520	17.252	40.4	3.5	40.4	3.5	338.4	1.010	17.65	0.896
11	16.111	16.904	43.5	4.8	43.5	4.8	343.9	1.004	18.26	0.841

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	241.1	197.1	241.1	197.1	172.9	196.2	168.1	18.4	0.	0.
2	263.0	207.6	263.0	207.6	210.0	207.0	158.3	15.3	0.	0.
3	263.7	225.8	263.7	225.8	220.2	225.8	145.0	1.0	0.	0.
4	265.5	222.3	265.5	222.3	212.2	222.3	159.6	0.2	0.	0.
5	261.5	221.2	261.5	221.2	205.6	221.2	161.6	-0.5	0.	0.
6	256.1	222.1	256.1	222.1	197.7	222.1	162.8	-0.4	0.	0.
7	254.5	224.0	254.5	224.0	194.9	224.0	163.6	-0.6	0.	0.
8	258.1	225.9	258.1	225.9	199.8	225.9	163.3	-1.9	0.	0.
9	265.5	241.1	265.5	241.1	210.5	241.0	161.8	-6.6	0.	0.
10	288.0	241.2	288.0	241.2	219.3	240.7	186.7	14.7	0.	0.
11	297.7	233.3	297.7	233.3	215.9	232.5	205.0	19.7	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 SS VEL R	MERID PEAK SS MACH NO
1	0.666	0.539	0.666	0.539	0.478	0.537	1.135	1.009
2	0.736	0.572	0.736	0.572	0.588	0.571	0.986	0.949
3	0.750	0.633	0.750	0.633	0.626	0.633	1.025	0.861
4	0.755	0.625	0.755	0.625	0.604	0.625	1.048	0.957
5	0.743	0.622	0.743	0.622	0.584	0.622	1.076	0.971
6	0.726	0.625	0.726	0.625	0.560	0.625	1.124	0.978
7	0.722	0.631	0.722	0.631	0.553	0.631	1.149	0.982
8	0.734	0.638	0.734	0.638	0.569	0.638	1.130	0.974
9	0.763	0.687	0.763	0.687	0.605	0.687	1.145	0.968
10	0.833	0.680	0.833	0.680	0.635	0.679	1.098	1.127
11	0.858	0.653	0.858	0.653	0.622	0.650	1.077	1.246

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	7.4	1.3	16.4	0.389	0.	0.058	0.058	0.019	0.019
2	10.00	1.8	-4.3	14.4	0.388	0.	0.155	0.155	0.050	0.050
3	30.00	-0.5	-6.7	9.2	0.309	0.	0.068	0.068	0.021	0.021
4	42.50	2.6	-3.5	8.8	0.334	0.	0.109	0.109	0.031	0.031
5	45.00	3.7	-2.4	8.6	0.329	0.	0.099	0.099	0.028	0.028
6	47.50	4.9	-1.2	8.6	0.311	0.	0.059	0.059	0.017	0.017
7	50.00	5.3	-0.8	8.5	0.298	0.	0.040	0.040	0.011	0.011
8	52.50	4.4	-1.8	8.1	0.300	0.	0.055	0.055	0.015	0.015
9	70.00	1.3	-4.8	6.7	0.251	0.	0.056	0.056	0.014	0.014
10	90.00	1.5	-4.5	11.6	0.297	0.	0.283	0.283	0.065	0.065
11	95.00	3.6	-2.3	12.9	0.352	0.	0.417	0.417	0.093	0.093

TABLE IX. – Continued.

(b) Continued. Stator 8

(b-3) 100 Percent of design speed; reading 3402

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	23.945	23.947	50.3	4.9	50.3	4.9	358.0	0.987	16.20	0.988
2	23.505	23.538	41.1	4.3	41.1	4.3	355.0	0.990	16.59	0.981
3	21.742	21.902	35.0	1.3	35.0	1.3	344.3	0.997	17.27	0.981
4	20.635	20.884	37.6	1.0	37.6	1.0	343.7	0.993	17.25	0.967
5	20.414	20.681	39.2	0.9	39.2	0.9	343.5	0.992	17.10	0.971
6	20.193	20.480	40.4	0.8	40.4	0.8	343.8	0.991	16.94	0.980
7	19.972	20.279	41.2	0.7	41.2	0.7	344.7	0.987	16.87	0.985
8	19.751	20.079	40.3	0.4	40.3	0.4	342.3	0.990	16.95	0.981
9	18.219	18.715	38.6	-0.8	38.6	-0.8	338.2	0.994	17.13	0.978
10	16.520	17.252	40.8	3.2	40.8	3.2	339.1	1.010	17.79	0.911
11	16.111	16.904	44.2	4.8	44.2	4.8	344.3	1.004	18.39	0.859

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	238.6	182.2	238.6	182.2	152.6	181.6	183.5	15.6	0.	0.
2	247.3	190.0	247.3	190.0	186.3	189.5	162.6	14.2	0.	0.
3	258.9	208.8	258.9	208.8	212.0	208.8	148.5	4.6	0.	0.
4	262.1	207.0	262.1	207.0	207.5	207.0	160.0	3.7	0.	0.
5	259.2	206.3	259.2	206.3	200.9	206.2	163.7	3.3	0.	0.
6	255.7	206.7	255.7	206.7	194.7	206.7	165.8	2.8	0.	0.
7	254.7	208.4	254.7	208.4	191.6	208.4	167.8	2.5	0.	0.
8	257.2	209.7	257.2	209.7	196.1	209.7	166.4	1.3	0.	0.
9	265.1	223.1	265.1	223.1	207.3	223.1	165.3	-3.3	0.	0.
10	283.7	228.8	283.7	228.8	214.6	228.4	185.5	12.9	0.	0.
11	293.4	221.8	293.4	221.8	210.2	221.1	204.7	18.6	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	0.656	0.495	0.656	0.495	0.419	0.493	1.190	1.128
2	0.685	0.519	0.685	0.519	0.516	0.518	1.017	0.982
3	0.732	0.581	0.732	0.581	0.600	0.581	0.985	0.892
4	0.743	0.577	0.743	0.577	0.588	0.577	0.998	0.961
5	0.734	0.575	0.734	0.575	0.569	0.575	1.026	0.986
6	0.723	0.577	0.723	0.577	0.550	0.577	1.062	0.998
7	0.719	0.582	0.719	0.582	0.541	0.582	1.088	1.008
8	0.729	0.587	0.729	0.587	0.556	0.587	1.069	0.996
9	0.760	0.631	0.760	0.631	0.594	0.631	1.076	0.992
10	0.818	0.642	0.818	0.642	0.619	0.641	1.064	1.119
11	0.843	0.618	0.843	0.618	0.604	0.615	1.052	1.246

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	13.4	7.3	16.0	0.470	0.	0.046	0.046	0.015	0.015
2	10.00	5.9	-0.2	14.5	0.427	0.	0.072	0.072	0.023	0.023
3	30.00	1.1	-5.0	10.3	0.361	0.	0.063	0.063	0.019	0.019
4	42.50	3.3	-2.8	9.7	0.380	0.	0.106	0.106	0.031	0.031
5	45.00	4.7	-1.4	9.6	0.379	0.	0.095	0.095	0.027	0.027
6	47.50	5.9	-0.3	9.4	0.370	0.	0.068	0.068	0.019	0.019
7	50.00	6.5	0.4	9.3	0.361	0.	0.051	0.051	0.014	0.014
8	52.50	5.4	-0.7	9.0	0.360	0.	0.064	0.064	0.018	0.018
9	70.00	2.3	-3.7	7.4	0.318	0.	0.071	0.071	0.018	0.018
10	90.00	1.9	-4.0	11.3	0.330	0.	0.249	0.249	0.057	0.057
11	95.00	4.3	-1.6	12.9	0.382	0.	0.379	0.378	0.085	0.085

TABLE IX. – Continued.

(b) Continued. Stator 8

(b-4) 70 Percent of design speed; reading 3399

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	23.945	23.947	22.3	5.3	22.3	5.3	311.2	0.995	12.07	0.935
2	23.505	23.538	20.9	2.9	20.9	2.9	309.3	0.997	12.37	0.960
3	21.742	21.902	21.6	-0.9	21.6	-0.9	306.3	1.000	12.44	0.971
4	20.635	20.884	24.3	-1.5	24.3	-1.5	306.5	1.001	12.43	0.982
5	20.414	20.681	25.4	-1.4	25.4	-1.4	306.3	1.003	12.46	0.984
6	20.193	20.480	26.7	-1.4	26.7	-1.4	307.8	0.999	12.48	0.984
7	19.972	20.279	28.0	-1.8	28.0	-1.8	308.7	0.994	12.47	0.981
8	19.751	20.079	27.3	-2.2	27.3	-2.2	308.1	0.998	12.55	0.977
9	18.219	18.715	28.6	-2.4	28.6	-2.4	307.6	1.001	12.76	0.987
10	16.520	17.252	33.9	3.7	33.9	3.7	310.5	1.005	13.27	0.887
11	16.111	16.904	35.9	6.5	35.9	6.5	311.9	1.007	13.46	0.835

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	189.9	183.4	189.9	183.4	175.8	182.6	71.9	16.8	0.	0.
2	198.9	203.5	198.9	203.5	185.9	203.2	70.8	10.2	0.	0.
3	191.6	209.9	191.6	209.9	178.2	209.9	70.4	-3.2	0.	0.
4	191.8	217.8	191.8	217.8	174.8	217.8	79.0	-5.8	0.	0.
5	192.9	220.7	192.9	220.7	174.3	220.6	82.7	-5.5	0.	0.
6	193.7	222.1	193.7	222.1	173.1	222.0	87.1	-5.6	0.	0.
7	194.1	222.1	194.1	222.1	171.3	222.0	91.2	-7.0	0.	0.
8	197.0	224.1	197.0	224.1	175.1	224.0	90.3	-8.4	0.	0.
9	205.2	246.5	205.2	246.5	180.1	246.3	98.3	-10.4	0.	0.
10	226.5	238.8	226.5	238.8	188.1	238.3	126.2	15.2	0.	0.
11	230.5	227.9	230.5	227.9	186.6	226.4	135.3	26.0	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	0.553	0.535	0.553	0.535	0.512	0.532	1.039	0.553
2	0.583	0.598	0.583	0.598	0.545	0.598	1.094	0.583
3	0.563	0.621	0.563	0.621	0.524	0.621	1.178	0.563
4	0.564	0.646	0.564	0.646	0.514	0.646	1.246	0.564
5	0.567	0.654	0.567	0.654	0.513	0.654	1.266	0.567
6	0.568	0.659	0.568	0.659	0.508	0.658	1.283	0.568
7	0.569	0.659	0.569	0.659	0.502	0.659	1.296	0.569
8	0.578	0.665	0.578	0.665	0.514	0.665	1.279	0.578
9	0.605	0.738	0.605	0.738	0.531	0.737	1.367	0.605
10	0.669	0.707	0.669	0.707	0.556	0.706	1.267	0.725
11	0.681	0.670	0.681	0.670	0.551	0.665	1.213	0.799

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	-14.6	-20.7	16.3	0.131	0.	0.345	0.345	0.114	0.114
2	10.00	-14.4	-20.5	13.1	0.076	0.	0.194	0.194	0.063	0.063
3	30.00	-12.3	-18.5	8.1	0.020	0.	0.150	0.150	0.045	0.045
4	42.50	-10.0	-16.1	7.2	-0.009	0.	0.091	0.091	0.026	0.026
5	45.00	-9.1	-15.2	7.3	-0.015	0.	0.083	0.083	0.024	0.024
6	47.50	-7.9	-14.0	7.2	-0.013	0.	0.084	0.084	0.023	0.023
7	50.00	-6.7	-12.8	6.8	-0.004	0.	0.095	0.095	0.026	0.026
8	52.50	-7.7	-13.8	6.5	-0.001	0.	0.116	0.116	0.032	0.032
9	70.00	-7.6	-13.7	5.8	-0.068	0.	0.060	0.060	0.015	0.015
10	90.00	-5.1	-11.1	11.7	0.056	0.	0.437	0.437	0.101	0.101
11	95.00	-4.0	-9.9	14.6	0.114	0.	0.618	0.618	0.138	0.138

TABLE IX. – Continued.

(b) Continued. Stator 8

(b-5) 70 Percent of design speed; reading 3400

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.945	23.947	33.6	5.0	33.6	5.0	316.7	1.000	12.71	0.989
2	23.505	23.538	31.1	4.5	31.1	4.5	317.0	0.995	13.08	0.978
3	21.742	21.902	29.0	-0.9	29.0	-0.9	311.6	0.999	13.02	0.990
4	20.635	20.884	31.5	-1.3	31.5	-1.3	310.9	1.000	12.99	0.991
5	20.414	20.681	32.1	-1.2	32.1	-1.2	310.9	1.000	13.03	0.990
6	20.193	20.480	33.4	-1.1	33.4	-1.1	311.2	0.998	13.01	0.991
7	19.972	20.279	34.1	-1.0	34.1	-1.0	312.7	0.994	12.98	0.994
8	19.751	20.079	33.5	-1.0	33.5	-1.0	310.2	1.000	12.98	0.993
9	18.219	18.715	34.7	-1.9	34.7	-1.9	310.6	0.999	13.12	0.990
10	16.520	17.252	38.4	1.4	38.4	1.4	312.0	1.006	13.47	0.969
11	16.111	16.904	40.4	4.3	40.4	4.3	313.7	1.004	13.68	0.929

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	175.9	148.8	175.9	148.8	146.5	148.3	97.4	12.9	0.	0.
2	189.7	158.5	189.7	158.5	162.4	158.0	98.0	12.4	0.	0.
3	180.4	162.5	180.4	162.5	157.8	162.5	87.4	-2.6	0.	0.
4	181.1	163.8	181.1	163.8	154.5	163.8	94.5	-3.8	0.	0.
5	182.8	165.3	182.8	165.3	154.8	165.3	97.2	-3.5	0.	0.
6	182.7	166.0	182.7	166.0	152.5	166.0	100.7	-3.1	0.	0.
7	182.5	166.8	182.5	166.8	151.1	166.7	102.4	-2.9	0.	0.
8	182.4	166.9	182.4	166.9	152.0	166.9	100.8	-3.0	0.	0.
9	191.3	176.8	191.3	176.8	157.2	176.7	109.0	-6.0	0.	0.
10	209.0	192.9	209.0	192.9	163.8	192.8	129.9	4.8	0.	0.
11	216.2	183.4	216.2	183.4	164.5	182.9	140.2	13.6	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	0.506	0.425	0.506	0.425	0.421	0.423	1.012	0.567
2	0.547	0.454	0.547	0.454	0.469	0.453	0.973	0.547
3	0.523	0.469	0.523	0.469	0.458	0.469	1.030	0.523
4	0.526	0.474	0.526	0.474	0.449	0.474	1.060	0.526
5	0.532	0.478	0.532	0.478	0.450	0.478	1.068	0.551
6	0.531	0.481	0.531	0.481	0.443	0.481	1.089	0.588
7	0.529	0.483	0.529	0.483	0.438	0.483	1.103	0.598
8	0.531	0.484	0.531	0.484	0.442	0.484	1.098	0.580
9	0.558	0.514	0.558	0.514	0.459	0.514	1.124	0.645
10	0.612	0.560	0.612	0.560	0.480	0.560	1.177	0.783
11	0.633	0.530	0.633	0.530	0.482	0.528	1.112	0.852

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	-3.2	-9.3	16.0	0.314	0.	0.067	0.067	0.022	0.022
2	10.00	-4.1	-10.2	14.7	0.312	0.	0.119	0.119	0.039	0.039
3	30.00	-4.9	-11.1	8.1	0.250	0.	0.059	0.059	0.018	0.018
4	42.50	-2.8	-9.0	7.4	0.251	0.	0.054	0.054	0.016	0.016
5	45.00	-2.3	-8.4	7.5	0.251	0.	0.059	0.059	0.017	0.017
6	47.50	-1.1	-7.3	7.6	0.250	0.	0.051	0.051	0.014	0.014
7	50.00	-0.6	-6.7	7.6	0.246	0.	0.036	0.036	0.010	0.010
8	52.50	-1.4	-7.5	7.6	0.240	0.	0.040	0.040	0.011	0.011
9	70.00	-1.5	-7.6	6.3	0.227	0.	0.051	0.051	0.013	0.013
10	90.00	-0.5	-6.5	9.5	0.212	0.	0.137	0.137	0.032	0.032
11	95.00	0.5	-5.4	12.4	0.280	0.	0.299	0.299	0.067	0.067

TABLE IX. – Concluded.

(b) Concluded. Stator 8

(b-6) 70 Percent of design speed; reading 3401

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.945	23.947	47.1	5.9	47.1	5.9	322.9	0.993	13.16	0.985
2	23.505	23.538	41.6	4.5	41.6	4.5	320.9	0.995	13.07	0.993
3	21.742	21.902	34.1	-0.6	34.1	-0.6	313.7	1.000	13.18	0.991
4	20.635	20.884	35.9	-0.3	35.9	-0.3	314.0	0.996	13.30	0.982
5	20.414	20.681	36.0	-0.4	36.0	-0.4	313.4	0.997	13.28	0.983
6	20.193	20.480	37.2	-0.3	37.2	-0.3	314.3	0.995	13.22	0.989
7	19.972	20.279	38.6	-0.3	38.6	-0.3	312.6	0.997	13.16	0.994
8	19.751	20.079	38.4	-0.1	38.4	-0.1	313.7	0.996	13.17	0.994
9	18.219	18.715	38.7	-0.9	38.7	-0.9	312.6	0.998	13.32	0.988
10	16.520	17.252	40.7	1.8	40.7	1.8	312.7	1.007	13.56	0.974
11	16.111	16.904	43.1	4.3	43.1	4.3	314.2	1.005	13.79	0.937

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	175.9	136.1	175.9	136.1	119.7	135.4	128.9	14.0	0.	0.
2	171.9	137.2	171.9	137.2	128.5	136.8	114.2	10.9	0.	0.
3	172.0	141.9	172.0	141.9	142.4	141.9	96.5	-1.5	0.	0.
4	178.8	143.8	178.8	143.8	144.9	143.8	104.7	-0.8	0.	0.
5	178.8	144.3	178.8	144.3	144.5	144.3	105.2	-0.9	0.	0.
6	177.2	145.6	177.2	145.6	141.2	145.6	107.1	-0.8	0.	0.
7	175.2	146.2	175.2	146.2	136.9	146.2	109.4	-0.7	0.	0.
8	176.0	147.3	176.0	147.3	138.0	147.3	109.3	-0.2	0.	0.
9	185.6	156.1	185.6	156.1	144.9	156.1	116.1	-2.4	0.	0.
10	200.9	171.1	200.9	171.1	152.4	171.0	131.0	5.4	0.	0.
11	209.4	161.8	209.4	161.8	152.9	161.3	143.0	12.1	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	0.500	0.385	0.500	0.385	0.341	0.383	1.131	0.808
2	0.490	0.389	0.490	0.389	0.366	0.388	1.064	0.712
3	0.496	0.406	0.496	0.406	0.411	0.406	0.997	0.586
4	0.517	0.413	0.517	0.413	0.419	0.413	0.992	0.633
5	0.517	0.414	0.517	0.414	0.418	0.414	0.998	0.634
6	0.512	0.418	0.512	0.418	0.408	0.418	1.031	0.647
7	0.507	0.420	0.507	0.420	0.396	0.420	1.069	0.664
8	0.508	0.423	0.508	0.423	0.399	0.423	1.067	0.658
9	0.539	0.450	0.539	0.450	0.421	0.450	1.077	0.706
10	0.586	0.493	0.586	0.493	0.444	0.492	1.122	0.798
11	0.611	0.464	0.611	0.464	0.446	0.463	1.055	0.879

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	10.3	4.2	16.9	0.443	0.	0.097	0.097	0.032	0.032
2	10.00	6.4	0.3	14.7	0.398	0.	0.049	0.049	0.016	0.016
3	30.00	0.2	-5.9	8.4	0.347	0.	0.058	0.058	0.018	0.018
4	42.50	1.6	-4.6	8.4	0.364	0.	0.110	0.110	0.032	0.032
5	45.00	1.6	-4.5	8.3	0.361	0.	0.102	0.102	0.029	0.029
6	47.50	2.6	-3.5	8.4	0.349	0.	0.069	0.069	0.019	0.019
7	50.00	3.9	-2.2	8.4	0.339	0.	0.040	0.040	0.011	0.011
8	52.50	3.5	-2.7	8.5	0.333	0.	0.039	0.039	0.011	0.011
9	70.00	2.4	-3.6	7.3	0.319	0.	0.066	0.066	0.017	0.017
10	90.00	1.8	-4.2	9.9	0.289	0.	0.123	0.123	0.028	0.028
11	95.00	3.1	-2.8	12.4	0.364	0.	0.282	0.282	0.063	0.063

TABLE X. – BLADE-ELEMENT DATA AT BLADE EDGES FOR NOMINAL NONROTATING ROTOR TIP CLEARANCE OF 0.178 cm

(a) Rotor 8E

(a-1) 100 Percent of design speed; reading 3424

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.567	24.193	0.0	49.6	64.9	60.0	289.2	1.225	10.07	1.545
2	24.021	23.685	0.0	42.4	63.6	55.6	289.0	1.217	10.13	1.611
3	21.753	21.653	0.0	38.5	60.2	50.8	288.2	1.185	10.14	1.660
4	20.287	20.383	0.0	42.0	58.1	46.1	287.9	1.186	10.14	1.659
5	19.990	20.129	0.0	43.1	57.7	45.8	287.8	1.186	10.14	1.640
6	19.690	19.875	0.0	44.6	57.3	45.8	287.9	1.186	10.14	1.619
7	19.388	19.621	0.0	45.9	56.9	45.1	287.8	1.186	10.14	1.612
8	19.086	19.367	0.0	45.3	56.5	43.4	288.1	1.185	10.14	1.627
9	16.891	17.589	0.0	44.2	54.0	36.1	287.6	1.169	10.14	1.654
10	14.176	15.557	0.0	48.6	51.3	19.0	287.6	1.178	10.14	1.747
11	13.447	15.049	0.0	51.9	50.9	10.8	287.6	1.196	10.13	1.807

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	195.3	217.7	459.8	282.1	195.3	141.2	0.0	165.7	416.3	410.0
2	201.6	228.7	453.5	298.6	201.6	168.8	0.0	154.2	406.2	400.6
3	210.5	231.6	423.9	286.8	210.5	181.3	0.0	144.1	368.0	366.3
4	213.8	239.2	404.5	256.6	213.8	177.8	0.0	160.1	343.4	345.1
5	213.6	237.2	399.6	248.3	213.6	173.1	0.0	162.1	337.8	340.2
6	214.1	234.5	396.1	239.4	214.1	166.9	0.0	164.8	333.2	336.4
7	214.0	234.6	391.7	231.2	214.0	163.3	0.0	168.4	328.2	332.1
8	213.8	238.1	387.4	230.8	213.8	167.6	0.0	169.1	323.1	327.8
9	207.8	244.4	353.6	216.8	207.8	175.2	0.0	170.3	286.1	297.9
10	192.7	269.5	307.9	188.7	192.7	178.3	0.0	202.0	240.2	263.6
11	185.6	282.1	294.0	177.4	185.6	174.3	0.0	221.9	228.0	255.2

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.593	0.597	1.396	0.774	0.593	0.387	0.723	1.584
2	0.613	0.632	1.380	0.826	0.613	0.467	0.838	1.566
3	0.644	0.651	1.296	0.806	0.644	0.510	0.861	1.546
4	0.655	0.675	1.239	0.724	0.655	0.501	0.832	1.521
5	0.655	0.669	1.225	0.700	0.655	0.488	0.810	1.513
6	0.656	0.660	1.213	0.674	0.656	0.470	0.780	1.508
7	0.656	0.660	1.200	0.651	0.656	0.460	0.763	1.501
8	0.655	0.671	1.186	0.651	0.655	0.472	0.784	1.493
9	0.636	0.696	1.081	0.618	0.636	0.499	0.843	1.446
10	0.586	0.773	0.936	0.541	0.586	0.511	0.926	1.304
11	0.563	0.807	0.892	0.507	0.563	0.498	0.939	1.234

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	3.0	0.3	8.0	0.505	0.588	0.343	0.245	0.057	0.041
2	10.00	3.1	0.1	4.4	0.451	0.674	0.273	0.182	0.050	0.033
3	30.00	4.3	0.2	4.5	0.424	0.841	0.131	0.057	0.025	0.011
4	42.50	4.6	-0.1	4.4	0.475	0.838	0.142	0.082	0.027	0.016
5	45.00	4.7	-0.2	5.1	0.490	0.818	0.162	0.104	0.031	0.020
6	47.50	4.8	-0.2	6.2	0.508	0.792	0.186	0.131	0.035	0.025
7	50.00	4.9	-0.3	6.7	0.524	0.787	0.193	0.142	0.036	0.027
8	52.50	4.9	-0.3	6.4	0.519	0.807	0.178	0.130	0.034	0.025
9	70.00	5.5	-0.7	10.0	0.501	0.916	0.083	0.055	0.016	0.010
10	90.00	6.1	-1.0	12.5	0.520	0.969	0.041	0.037	0.007	0.007
11	95.00	6.5	-0.7	11.1	0.543	0.942	0.087	0.087	0.016	0.016

TABLE X. – Continued.

(a) Continued. Rotor 8E

(a-2) 100 Percent of design speed; reading 3423

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.567	24.193	0.0	56.7	66.2	61.5	289.1	1.235	10.06	1.577
2	24.021	23.685	0.0	47.9	64.9	58.8	288.8	1.224	10.13	1.574
3	21.753	21.653	0.0	40.7	61.4	50.9	288.5	1.192	10.13	1.679
4	20.287	20.383	0.0	42.6	59.1	46.5	288.0	1.190	10.14	1.686
5	19.990	20.129	0.0	44.1	58.7	45.9	288.2	1.191	10.14	1.673
6	19.690	19.875	0.0	45.7	58.3	45.7	288.1	1.193	10.14	1.653
7	19.388	19.621	0.0	46.7	57.8	45.0	288.1	1.193	10.14	1.646
8	19.086	19.367	0.0	46.5	57.5	43.2	287.7	1.192	10.14	1.663
9	16.891	17.589	0.0	45.1	54.9	35.6	287.6	1.177	10.14	1.686
10	14.176	15.557	0.0	49.0	52.2	19.7	287.6	1.181	10.14	1.762
11	13.447	15.049	0.0	52.6	51.7	11.1	287.6	1.197	10.13	1.817

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	182.8	221.5	453.7	254.7	182.8	121.6	0.0	185.2	415.3	409.0
2	190.0	216.1	447.7	279.7	190.0	144.7	0.0	160.4	405.4	399.7
3	200.3	230.8	418.9	277.6	200.3	174.9	0.0	150.7	367.9	366.2
4	205.1	237.4	399.7	254.0	205.1	174.8	0.0	160.6	343.1	344.8
5	206.2	237.1	396.4	244.6	206.2	170.1	0.0	165.1	338.6	340.9
6	206.3	235.1	392.2	235.3	206.3	164.2	0.0	168.3	333.6	336.8
7	206.4	235.1	387.7	227.9	206.4	161.2	0.0	171.1	328.2	332.2
8	205.8	239.1	383.1	225.5	205.8	164.4	0.0	173.5	323.1	327.9
9	200.6	244.9	348.9	212.4	200.6	172.7	0.0	173.6	285.5	297.3
10	186.2	266.0	303.7	185.3	186.2	174.4	0.0	200.9	240.0	263.4
11	179.6	279.1	290.0	172.9	179.6	169.6	0.0	221.6	227.7	254.9

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.553	0.606	1.371	0.697	0.553	0.333	0.665	1.607
2	0.576	0.593	1.357	0.768	0.576	0.397	0.762	1.587
3	0.610	0.646	1.275	0.777	0.610	0.490	0.873	1.568
4	0.626	0.668	1.220	0.714	0.626	0.492	0.853	1.540
5	0.629	0.666	1.210	0.687	0.629	0.478	0.825	1.534
6	0.630	0.660	1.198	0.660	0.630	0.461	0.796	1.528
7	0.630	0.660	1.184	0.640	0.630	0.452	0.781	1.519
8	0.629	0.673	1.170	0.635	0.629	0.463	0.799	1.514
9	0.612	0.696	1.064	0.603	0.612	0.491	0.861	1.467
10	0.565	0.761	0.922	0.530	0.565	0.499	0.937	1.313
11	0.544	0.796	0.878	0.493	0.544	0.484	0.944	1.241

	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	9.5	0.572	0.591	0.359	0.259	0.057	0.041
2	10.00	4.4	1.4	7.7	0.490	0.619	0.328	0.235	0.055	0.039
3	30.00	5.5	1.4	4.7	0.443	0.830	0.147	0.071	0.027	0.013
4	42.50	5.7	0.9	4.7	0.476	0.846	0.140	0.078	0.027	0.015
5	45.00	5.7	0.8	5.2	0.497	0.830	0.157	0.098	0.030	0.019
6	47.50	5.8	0.8	6.2	0.516	0.802	0.186	0.129	0.035	0.024
7	50.00	5.8	0.7	6.6	0.530	0.794	0.196	0.143	0.037	0.027
8	52.50	5.9	0.6	6.1	0.530	0.816	0.177	0.127	0.034	0.024
9	70.00	6.4	0.2	9.5	0.509	0.911	0.093	0.064	0.018	0.012
10	90.00	7.0	-0.0	13.2	0.524	0.970	0.041	0.037	0.007	0.007
11	95.00	7.3	0.1	11.4	0.552	0.944	0.087	0.086	0.016	0.016

TABLE X. – Continued.

(a) Continued. Rotor 8E

(a-3) 70 Percent of design speed; reading 3422

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	24.567	24.193	0.0	27.7	64.0	55.7	288.9	1.078	10.09	1.192
2	24.021	23.685	0.0	25.2	62.8	53.4	288.7	1.073	10.13	1.221
3	21.753	21.653	0.0	25.7	59.8	50.7	288.1	1.067	10.14	1.230
4	20.287	20.383	0.0	29.1	57.7	47.3	288.0	1.065	10.14	1.226
5	19.990	20.129	0.0	30.4	57.4	46.1	287.6	1.064	10.13	1.229
6	19.690	19.875	0.0	32.0	57.0	44.6	288.5	1.070	10.14	1.235
7	19.388	19.621	0.0	33.5	56.6	43.4	287.7	1.072	10.14	1.234
8	19.086	19.367	0.0	32.3	56.2	42.5	288.0	1.070	10.14	1.241
9	16.891	17.589	0.0	35.0	53.6	34.9	287.8	1.069	10.14	1.259
10	14.176	15.557	0.0	41.7	50.5	18.0	287.9	1.081	10.13	1.310
11	13.447	15.049	0.0	44.7	50.0	11.6	287.8	1.085	10.13	1.336

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	141.8	162.5	323.9	255.7	141.8	143.9	0.0	75.5	291.2	286.8
2	146.4	170.6	320.2	259.2	146.4	154.4	0.0	72.6	284.8	280.8
3	150.6	167.6	298.9	238.5	150.6	151.1	0.0	72.6	258.3	257.1
4	151.6	168.6	284.2	217.2	151.6	147.3	0.0	82.0	240.3	241.5
5	151.6	170.0	281.2	211.7	151.6	146.7	0.0	85.9	236.8	238.5
6	152.1	173.0	279.1	206.0	152.1	146.7	0.0	91.6	234.0	236.2
7	151.6	173.8	275.7	199.4	151.6	144.8	0.0	96.0	230.3	233.0
8	151.4	175.7	272.5	201.2	151.4	148.4	0.0	94.0	226.5	229.9
9	147.6	182.2	248.9	181.9	147.6	149.2	0.0	104.6	200.4	208.7
10	138.8	203.5	218.3	159.7	138.8	151.9	0.0	135.5	168.6	185.0
11	134.2	210.7	208.8	152.9	134.2	149.7	0.0	148.2	160.0	179.0

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	0.424	0.469	0.968	0.739	0.424	0.416	1.014	1.204
2	0.438	0.495	0.958	0.753	0.438	0.448	1.055	1.189
3	0.452	0.488	0.896	0.694	0.452	0.440	1.003	1.183
4	0.455	0.492	0.852	0.633	0.455	0.430	0.972	1.153
5	0.455	0.497	0.844	0.618	0.455	0.429	0.968	1.147
6	0.456	0.503	0.836	0.600	0.456	0.427	0.965	1.140
7	0.455	0.506	0.827	0.581	0.455	0.422	0.955	1.133
8	0.454	0.512	0.817	0.587	0.454	0.433	0.980	1.122
9	0.442	0.533	0.746	0.532	0.442	0.436	1.011	1.044
10	0.415	0.596	0.653	0.468	0.415	0.445	1.094	0.893
11	0.401	0.617	0.624	0.448	0.401	0.438	1.115	0.844

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	-0.5	3.8	0.287	0.663	0.180	0.178	0.033	0.033
2	10.00	2.3	-0.7	2.2	0.263	0.804	0.102	0.101	0.020	0.019
3	30.00	3.8	-0.3	4.4	0.274	0.908	0.050	0.049	0.009	0.009
4	42.50	4.3	-0.4	5.5	0.316	0.928	0.040	0.040	0.008	0.008
5	45.00	4.4	-0.5	5.4	0.331	0.945	0.031	0.031	0.006	0.006
6	47.50	4.5	-0.5	5.0	0.350	0.888	0.070	0.070	0.013	0.013
7	50.00	4.6	-0.5	5.1	0.370	0.857	0.093	0.093	0.018	0.018
8	52.50	4.7	-0.6	5.4	0.352	0.909	0.059	0.059	0.011	0.011
9	70.00	5.2	-1.0	8.8	0.368	0.979	0.015	0.015	0.003	0.003
10	90.00	5.3	-1.7	11.5	0.394	0.995	0.005	0.005	0.001	0.001
11	95.00	5.6	-1.6	11.9	0.405	1.015	-0.019	-0.019	-0.003	-0.003

TABLE X. – Continued.

(a) Continued. Rotor 8E

(a-4) 70 Percent of design speed; reading 3421

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	24.567	24.193	0.0	38.3	66.4	57.6	288.8	1.094	10.10	1.249
2	24.021	23.685	0.0	36.9	65.2	53.2	288.9	1.100	10.13	1.288
3	21.753	21.653	0.0	33.3	62.1	51.2	288.1	1.081	10.13	1.286
4	20.287	20.383	0.0	36.0	60.2	47.6	287.9	1.079	10.14	1.282
5	19.990	20.129	0.0	36.7	59.9	46.4	287.9	1.079	10.14	1.285
6	19.690	19.875	0.0	38.0	59.6	45.5	287.9	1.081	10.14	1.284
7	19.388	19.621	0.0	39.3	59.2	44.5	288.2	1.083	10.14	1.281
8	19.086	19.367	0.0	39.1	58.9	43.7	287.9	1.080	10.14	1.282
9	16.891	17.589	0.0	40.5	56.4	35.0	287.9	1.079	10.14	1.296
10	14.176	15.557	0.0	46.0	53.5	18.3	287.8	1.085	10.13	1.331
11	13.447	15.049	0.0	48.8	52.9	10.6	287.9	1.091	10.13	1.355

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	127.5	154.7	318.2	226.5	127.5	121.4	0.0	95.9	291.6	287.2
2	132.0	168.5	314.5	225.2	132.0	134.8	0.0	101.1	285.5	281.5
3	136.5	161.8	291.8	215.6	136.5	135.2	0.0	88.9	258.0	256.8
4	137.5	163.9	277.2	196.9	137.5	132.7	0.0	96.2	240.6	241.8
5	137.4	165.7	273.9	192.6	137.4	132.8	0.0	99.1	237.0	238.7
6	137.3	166.6	271.1	187.1	137.3	131.2	0.0	102.6	233.8	236.0
7	137.2	167.1	268.0	181.3	137.2	129.3	0.0	105.9	230.2	233.0
8	136.9	167.5	264.7	180.0	136.9	130.1	0.0	105.6	226.6	229.9
9	132.6	175.8	239.6	163.4	132.6	133.8	0.0	114.1	199.6	207.9
10	124.3	194.5	209.1	142.3	124.3	135.1	0.0	139.9	168.1	184.5
11	120.7	203.8	200.0	136.5	120.7	134.1	0.0	153.4	159.6	178.6

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	0.380	0.443	0.948	0.648	0.380	0.347	0.952	1.262
2	0.393	0.482	0.937	0.645	0.393	0.386	1.021	1.247
3	0.408	0.467	0.872	0.623	0.408	0.390	0.991	1.224
4	0.411	0.474	0.829	0.570	0.411	0.384	0.965	1.192
5	0.411	0.480	0.819	0.558	0.411	0.384	0.967	1.184
6	0.410	0.482	0.810	0.541	0.410	0.380	0.956	1.178
7	0.410	0.483	0.801	0.524	0.410	0.374	0.942	1.167
8	0.409	0.485	0.791	0.521	0.409	0.377	0.950	1.158
9	0.396	0.511	0.715	0.474	0.396	0.389	1.009	1.069
10	0.370	0.566	0.623	0.415	0.370	0.394	1.088	0.916
11	0.359	0.593	0.596	0.397	0.359	0.391	1.112	0.866

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	4.6	1.9	5.6	0.387	0.697	0.199	0.196	0.035	0.035
2	10.00	4.7	1.7	2.0	0.387	0.747	0.179	0.177	0.035	0.034
3	30.00	6.2	2.1	4.9	0.351	0.914	0.057	0.057	0.011	0.011
4	42.50	6.8	2.1	5.9	0.386	0.927	0.052	0.052	0.010	0.010
5	45.00	6.9	2.1	5.7	0.396	0.936	0.046	0.046	0.009	0.009
6	47.50	7.1	2.1	5.9	0.412	0.911	0.067	0.067	0.013	0.013
7	50.00	7.2	2.0	6.2	0.429	0.883	0.091	0.091	0.017	0.017
8	52.50	7.3	2.0	6.7	0.425	0.917	0.064	0.064	0.012	0.012
9	70.00	7.9	1.8	9.0	0.431	0.978	0.020	0.020	0.004	0.004
10	90.00	8.3	1.3	11.8	0.455	1.005	-0.006	-0.006	-0.001	-0.001
11	95.00	8.5	1.3	10.9	0.466	0.996	0.006	0.006	0.001	0.001

TABLE X. – Continued.

(a) Concluded. Rotor 8E

(a-5) 70 Percent of design speed; reading 3420

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.567	24.193	0.0	52.3	69.2	58.0	288.9	1.117	10.10	1.291
2	24.021	23.685	0.0	48.7	67.8	58.6	288.8	1.111	10.13	1.269
3	21.753	21.653	0.0	37.6	64.6	52.1	288.1	1.087	10.14	1.297
4	20.287	20.383	0.0	40.0	62.7	47.3	288.2	1.089	10.13	1.307
5	19.990	20.129	0.0	40.7	62.3	46.4	288.0	1.089	10.14	1.307
6	19.690	19.875	0.0	41.7	61.9	45.8	288.1	1.089	10.14	1.302
7	19.388	19.621	0.0	42.9	61.5	45.2	288.2	1.089	10.13	1.298
8	19.086	19.367	0.0	42.7	61.2	44.5	287.5	1.086	10.13	1.296
9	16.891	17.589	0.0	44.2	58.7	35.0	287.9	1.085	10.13	1.313
10	14.176	15.557	0.0	48.0	55.8	18.6	287.9	1.087	10.13	1.342
11	13.447	15.049	0.0	50.6	55.3	10.3	287.9	1.093	10.13	1.369

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	110.5	161.9	311.2	186.7	110.5	98.9	0.0	128.1	290.9	286.5
2	116.1	153.3	307.5	194.0	116.1	101.1	0.0	115.2	284.8	280.8
3	122.1	157.3	284.7	202.9	122.1	124.7	0.0	96.0	257.2	256.0
4	124.4	164.1	270.8	185.3	124.4	125.6	0.0	105.5	240.6	241.7
5	124.4	164.7	267.4	181.0	124.4	124.8	0.0	107.4	236.8	238.4
6	124.6	164.4	264.7	176.3	124.6	122.9	0.0	109.3	233.5	235.7
7	124.9	164.1	261.8	170.8	124.9	120.3	0.0	111.6	230.1	232.9
8	124.1	163.7	257.8	168.8	124.1	120.4	0.0	111.0	225.9	229.3
9	121.7	173.8	234.3	152.1	121.7	124.5	0.0	121.3	200.2	208.5
10	114.3	190.9	203.5	134.8	114.3	127.8	0.0	141.9	168.4	184.8
11	110.8	201.4	194.4	130.0	110.8	127.9	0.0	155.6	159.8	178.8

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.328	0.459	0.923	0.529	0.328	0.280	0.895	1.321
2	0.345	0.435	0.913	0.550	0.345	0.287	0.871	1.300
3	0.364	0.453	0.848	0.583	0.364	0.359	1.021	1.262
4	0.371	0.472	0.807	0.533	0.371	0.362	1.010	1.227
5	0.371	0.474	0.797	0.521	0.371	0.359	1.004	1.217
6	0.371	0.473	0.789	0.508	0.371	0.354	0.986	1.209
7	0.372	0.472	0.780	0.492	0.372	0.346	0.963	1.198
8	0.370	0.472	0.769	0.487	0.370	0.347	0.970	1.187
9	0.362	0.503	0.698	0.440	0.362	0.360	1.023	1.097
10	0.340	0.555	0.605	0.392	0.340	0.371	1.118	0.938
11	0.329	0.585	0.578	0.378	0.329	0.372	1.155	0.886

	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	0.535	0.645	0.290	0.285	0.051	0.050
2	10.00	7.3	4.3	7.4	0.490	0.635	0.288	0.285	0.049	0.048
3	30.00	8.7	4.6	5.8	0.387	0.887	0.083	0.082	0.015	0.015
4	42.50	9.2	4.5	5.5	0.424	0.892	0.088	0.088	0.017	0.017
5	45.00	9.3	4.4	5.7	0.433	0.890	0.092	0.092	0.017	0.017
6	47.50	9.4	4.4	6.3	0.445	0.880	0.101	0.101	0.019	0.019
7	50.00	9.5	4.3	6.9	0.461	0.866	0.115	0.115	0.021	0.021
8	52.50	9.7	4.4	7.4	0.458	0.890	0.094	0.094	0.018	0.018
9	70.00	10.2	4.1	9.0	0.473	0.950	0.050	0.050	0.009	0.009
10	90.00	10.6	3.6	12.1	0.479	1.006	-0.007	-0.007	-0.001	-0.001
11	95.00	10.9	3.7	10.6	0.486	1.004	-0.007	-0.007	-0.001	-0.001

TABLE X. – Continued.

(b) Stator 8

(b-1) 100 Percent of design speed; reading 3424

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	23.945	23.947	44.9	5.5	44.9	5.5	354.2	0.989	15.56	0.984
2	23.505	23.538	37.3	4.1	37.3	4.1	351.6	0.989	16.32	0.961
3	21.742	21.902	33.2	-0.3	33.2	-0.3	341.7	0.996	16.83	0.977
4	20.635	20.884	36.5	-0.9	36.5	-0.9	341.4	0.992	16.82	0.962
5	20.414	20.681	37.7	-0.9	37.7	-0.9	341.2	0.992	16.63	0.969
6	20.193	20.480	39.3	-1.1	39.3	-1.1	341.5	0.989	16.41	0.981
7	19.972	20.279	40.6	-1.0	40.6	-1.0	341.3	0.990	16.34	0.989
8	19.751	20.079	39.8	-1.3	39.8	-1.3	341.4	0.988	16.50	0.984
9	18.219	18.715	37.8	-2.1	37.8	-2.1	336.1	0.996	16.77	0.980
10	16.520	17.252	40.6	4.2	40.6	4.2	338.9	1.009	17.71	0.871
11	16.111	16.904	43.7	5.4	43.7	5.4	343.8	1.005	18.30	0.801

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	237.2	201.3	237.2	201.3	166.1	200.4	167.4	19.2	0.	0.
2	256.5	212.2	256.5	212.2	204.0	211.7	155.4	15.1	0.	0.
3	262.1	231.6	262.1	231.6	219.3	231.6	143.5	-1.3	0.	0.
4	265.6	230.7	265.6	230.7	213.4	230.7	158.1	-3.4	0.	0.
5	261.3	230.3	261.3	230.3	206.7	230.3	159.9	-3.8	0.	0.
6	256.1	231.2	256.1	231.2	198.1	231.2	162.2	-4.3	0.	0.
7	254.5	234.3	254.5	234.3	193.3	234.3	165.4	-4.0	0.	0.
8	259.1	237.1	259.1	237.1	199.1	237.1	165.8	-5.6	0.	0.
9	268.0	255.5	268.0	255.5	211.7	255.4	164.4	-9.5	0.	0.
10	292.4	250.1	292.4	250.1	222.0	249.4	190.3	18.1	0.	0.
11	300.2	232.1	300.2	232.1	217.2	231.1	207.3	21.8	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	0.655	0.553	0.655	0.553	0.464	0.553	1.192	1.008
2	0.717	0.587	0.717	0.587	0.570	0.586	1.038	0.931
3	0.746	0.652	0.746	0.652	0.624	0.652	1.056	0.851
4	0.757	0.651	0.757	0.651	0.608	0.651	1.081	0.948
5	0.744	0.650	0.744	0.650	0.588	0.650	1.114	0.960
6	0.727	0.654	0.727	0.654	0.562	0.654	1.167	0.975
7	0.722	0.663	0.722	0.663	0.549	0.663	1.212	0.996
8	0.737	0.673	0.737	0.673	0.566	0.673	1.191	0.991
9	0.772	0.733	0.772	0.733	0.609	0.733	1.206	0.987
10	0.847	0.708	0.847	0.708	0.643	0.706	1.123	1.151
11	0.866	0.649	0.866	0.649	0.627	0.646	1.064	1.263

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	8.1	1.9	16.5	0.359	0.	0.065	0.065	0.021	0.021
2	10.00	2.1	-4.1	14.3	0.351	0.	0.135	0.135	0.044	0.044
3	30.00	-0.7	-6.8	8.7	0.283	0.	0.074	0.074	0.022	0.022
4	42.50	2.2	-3.9	7.9	0.305	0.	0.120	0.120	0.035	0.035
5	45.00	3.3	-2.8	7.8	0.296	0.	0.102	0.102	0.029	0.029
6	47.50	4.7	-1.4	7.6	0.279	0.	0.065	0.065	0.018	0.018
7	50.00	5.8	-0.3	7.7	0.263	0.	0.037	0.037	0.010	0.010
8	52.50	4.9	-1.2	7.3	0.266	0.	0.052	0.052	0.014	0.014
9	70.00	1.6	-4.5	6.1	0.210	0.	0.061	0.061	0.015	0.015
10	90.00	1.7	-4.3	12.2	0.277	0.	0.345	0.345	0.079	0.079
11	95.00	3.7	-2.2	13.5	0.362	0.	0.514	0.514	0.115	0.115

TABLE X. – Continued.

(b) Continued. Stator 8

(b-2) 100 Percent of design speed; reading 3423

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.945	23.947	52.5	4.7	52.5	4.7	357.1	0.984	15.87	0.986
2	23.505	23.538	43.3	4.0	43.3	4.0	353.3	0.990	15.94	0.995
3	21.742	21.902	35.5	1.2	35.5	1.2	343.9	0.995	17.01	0.980
4	20.635	20.884	37.2	0.7	37.2	0.7	342.7	0.994	17.09	0.965
5	20.414	20.681	38.8	0.6	38.8	0.6	343.3	0.992	16.96	0.969
6	20.193	20.480	40.4	0.6	40.4	0.6	343.6	0.990	16.76	0.981
7	19.972	20.279	41.4	0.7	41.4	0.7	343.6	0.989	16.69	0.988
8	19.751	20.079	41.1	0.4	41.1	0.4	342.8	0.989	16.86	0.981
9	18.219	18.715	38.9	-0.9	38.9	-0.9	338.4	0.994	17.10	0.978
10	16.520	17.252	41.2	3.7	41.2	3.7	339.7	1.009	17.87	0.900
11	16.111	16.904	44.6	5.1	44.6	5.1	344.4	1.004	18.41	0.848

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	235.8	178.9	235.8	178.9	143.5	178.3	187.1	14.7	0.	0.
2	235.8	185.9	235.8	185.9	171.7	185.5	161.7	13.0	0.	0.
3	258.1	209.0	258.1	209.0	210.0	209.0	150.0	4.4	0.	0.
4	262.4	208.4	262.4	208.4	209.1	208.4	158.6	2.5	0.	0.
5	259.8	207.9	259.8	207.9	202.5	207.9	162.8	2.3	0.	0.
6	255.4	208.8	255.4	208.8	194.5	208.8	165.6	2.3	0.	0.
7	254.1	211.2	254.1	211.2	190.5	211.2	168.1	2.6	0.	0.
8	258.7	213.2	258.7	213.2	194.8	213.2	170.2	1.5	0.	0.
9	267.1	228.8	267.1	228.8	208.0	228.8	167.6	-3.4	0.	0.
10	287.1	232.1	287.1	232.1	216.0	231.6	189.2	14.9	0.	0.
11	295.0	223.0	295.0	223.0	210.1	222.1	207.0	19.7	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	0.648	0.487	0.648	0.487	0.394	0.486	1.243	1.165
2	0.652	0.509	0.652	0.509	0.475	0.507	1.080	0.983
3	0.730	0.582	0.730	0.582	0.594	0.582	0.995	0.905
4	0.745	0.582	0.745	0.582	0.594	0.582	0.996	0.951
5	0.737	0.581	0.737	0.581	0.574	0.581	1.027	0.979
6	0.723	0.584	0.723	0.584	0.550	0.584	1.074	0.998
7	0.718	0.591	0.718	0.591	0.539	0.591	1.109	1.012
8	0.734	0.598	0.734	0.598	0.552	0.598	1.094	1.022
9	0.766	0.648	0.766	0.648	0.596	0.648	1.100	1.008
10	0.829	0.652	0.829	0.652	0.623	0.650	1.073	1.144
11	0.848	0.621	0.848	0.621	0.604	0.618	1.057	1.263

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	15.7	9.6	15.8	0.484	0.	0.058	0.058	0.019	0.019
2	10.00	8.0	1.9	14.2	0.417	0.	0.021	0.021	0.007	0.007
3	30.00	1.7	-4.5	10.2	0.360	0.	0.067	0.067	0.020	0.020
4	42.50	2.9	-3.3	9.4	0.376	0.	0.113	0.113	0.032	0.032
5	45.00	4.4	-1.8	9.3	0.374	0.	0.101	0.101	0.029	0.029
6	47.50	5.8	-0.3	9.3	0.361	0.	0.064	0.064	0.018	0.018
7	50.00	6.7	0.6	9.3	0.349	0.	0.040	0.040	0.011	0.011
8	52.50	6.2	0.1	9.0	0.354	0.	0.063	0.063	0.017	0.017
9	70.00	2.6	-3.4	7.4	0.304	0.	0.067	0.067	0.017	0.017
10	90.00	2.3	-3.7	11.7	0.328	0.	0.275	0.275	0.063	0.063
11	95.00	4.6	-1.3	13.2	0.383	0.	0.405	0.404	0.091	0.091

TABLE X. – Continued.

(b) Continued. Stator 8

(b-3) 70 Percent of design speed; reading 3422

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	23.945	23.947	23.9	5.1	23.9	5.1	311.4	0.996	12.03	0.937
2	23.505	23.538	21.5	2.6	21.5	2.6	309.8	0.997	12.37	0.958
3	21.742	21.902	22.0	-0.9	22.0	-0.9	307.5	0.997	12.47	0.969
4	20.635	20.884	25.0	-1.3	25.0	-1.3	306.6	1.002	12.43	0.984
5	20.414	20.681	26.1	-1.3	26.1	-1.3	306.0	1.004	12.46	0.985
6	20.193	20.480	27.5	-1.4	27.5	-1.4	308.7	0.998	12.52	0.982
7	19.972	20.279	29.0	-1.7	29.0	-1.7	308.5	0.996	12.51	0.980
8	19.751	20.079	27.7	-2.1	27.7	-2.1	308.2	0.998	12.58	0.976
9	18.219	18.715	29.6	-2.5	29.6	-2.5	307.8	1.002	12.76	0.989
10	16.520	17.252	34.3	4.0	34.3	4.0	311.0	1.005	13.27	0.885
11	16.111	16.904	36.7	7.2	36.7	7.2	312.3	1.007	13.53	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	188.2	184.6	188.2	184.6	172.1	183.9	76.3	16.3	0.	0.
2	199.2	204.1	199.2	204.1	185.3	203.9	73.1	9.4	0.	0.
3	193.0	211.6	193.0	211.6	178.9	211.6	72.3	-3.2	0.	0.
4	191.6	220.0	191.6	220.0	173.7	220.0	81.0	-5.0	0.	0.
5	192.6	222.6	192.6	222.6	172.9	222.5	84.7	-5.0	0.	0.
6	195.0	224.4	195.0	224.4	172.9	224.3	90.2	-5.5	0.	0.
7	194.9	224.4	194.9	224.4	170.5	224.3	94.3	-6.6	0.	0.
8	198.0	226.6	198.0	226.6	175.3	226.5	92.2	-8.4	0.	0.
9	204.7	250.2	204.7	250.2	178.0	250.0	101.0	-10.8	0.	0.
10	226.4	241.8	226.4	241.8	187.0	241.2	127.6	17.0	0.	0.
11	231.9	224.4	231.9	224.4	186.1	222.6	138.5	28.3	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	0.548	0.538	0.548	0.538	0.501	0.536	1.068	0.548
2	0.583	0.600	0.583	0.600	0.543	0.599	1.101	0.583
3	0.566	0.626	0.566	0.626	0.525	0.626	1.183	0.566
4	0.563	0.652	0.563	0.652	0.510	0.652	1.267	0.563
5	0.566	0.660	0.566	0.660	0.509	0.660	1.287	0.566
6	0.571	0.665	0.571	0.665	0.507	0.665	1.297	0.571
7	0.571	0.666	0.571	0.666	0.500	0.666	1.315	0.571
8	0.581	0.673	0.581	0.673	0.515	0.673	1.292	0.581
9	0.603	0.750	0.603	0.750	0.524	0.749	1.404	0.603
10	0.668	0.716	0.668	0.716	0.552	0.714	1.290	0.741
11	0.685	0.658	0.685	0.658	0.549	0.653	1.196	0.824

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	-12.9	-19.0	16.1	0.125	0.	0.339	0.339	0.112	0.112
2	10.00	-13.7	-19.8	12.8	0.079	0.	0.202	0.202	0.066	0.066
3	30.00	-11.9	-18.0	8.1	0.021	0.	0.158	0.158	0.048	0.048
4	42.50	-9.3	-15.4	7.4	-0.020	0.	0.084	0.084	0.024	0.024
5	45.00	-8.3	-14.5	7.4	-0.024	0.	0.076	0.076	0.022	0.022
6	47.50	-7.0	-13.2	7.3	-0.013	0.	0.093	0.093	0.026	0.026
7	50.00	-5.8	-11.9	7.0	-0.008	0.	0.103	0.103	0.029	0.029
8	52.50	-7.2	-13.3	6.5	-0.006	0.	0.119	0.119	0.033	0.033
9	70.00	-6.7	-12.8	5.8	-0.085	0.	0.051	0.051	0.013	0.013
10	90.00	-4.6	-10.6	12.1	0.042	0.	0.445	0.445	0.102	0.102
11	95.00	-3.3	-9.2	15.3	0.135	0.	0.676	0.676	0.151	0.151

TABLE X. – Continued.

(b) Continued. Stator 8

(b-4) 70 Percent of design speed; reading 3421

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.945	23.947	34.1	5.0	34.1	5.0	316.0	1.002	12.62	0.993
2	23.505	23.538	32.6	4.6	32.6	4.6	317.8	0.994	13.05	0.977
3	21.742	21.902	29.2	-0.8	29.2	-0.8	311.5	1.000	13.03	0.990
4	20.635	20.884	31.5	-1.3	31.5	-1.3	310.7	1.000	12.99	0.991
5	20.414	20.681	32.2	-1.1	32.2	-1.1	310.7	0.999	13.02	0.990
6	20.193	20.480	33.4	-1.0	33.4	-1.0	311.3	0.998	13.01	0.992
7	19.972	20.279	34.6	-1.0	34.6	-1.0	312.1	0.996	12.99	0.995
8	19.751	20.079	34.3	-1.1	34.3	-1.1	311.0	0.998	12.99	0.994
9	18.219	18.715	34.9	-1.8	34.9	-1.8	310.5	0.999	13.13	0.990
10	16.520	17.252	38.8	1.7	38.8	1.7	312.2	1.007	13.49	0.968
11	16.111	16.904	41.1	4.5	41.1	4.5	314.1	1.004	13.73	0.926

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	173.0	148.6	173.0	148.6	143.3	148.0	96.9	13.0	0.	0.
2	189.2	157.6	189.2	157.6	159.4	157.1	101.9	12.5	0.	0.
3	181.5	163.9	181.5	163.9	158.4	163.9	88.5	-2.4	0.	0.
4	181.8	165.2	181.8	165.2	154.9	165.2	95.1	-3.7	0.	0.
5	183.3	166.7	183.3	166.7	155.1	166.6	97.7	-3.3	0.	0.
6	183.5	167.8	183.5	167.8	153.1	167.8	101.0	-2.8	0.	0.
7	183.2	168.6	183.2	168.6	150.8	168.6	104.1	-2.8	0.	0.
8	183.8	169.1	183.8	169.1	151.9	169.0	103.5	-3.3	0.	0.
9	192.5	178.6	192.5	178.6	157.8	178.5	110.1	-5.7	0.	0.
10	210.3	194.5	210.3	194.5	163.9	194.5	131.7	5.7	0.	0.
11	217.9	185.3	217.9	185.3	164.2	184.7	143.3	14.6	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	0.497	0.424	0.497	0.424	0.412	0.422	1.033	0.569
2	0.545	0.451	0.545	0.451	0.459	0.450	0.986	0.602
3	0.527	0.474	0.527	0.474	0.460	0.473	1.034	0.527
4	0.529	0.478	0.529	0.478	0.451	0.478	1.066	0.529
5	0.533	0.483	0.533	0.483	0.451	0.483	1.075	0.556
6	0.533	0.486	0.533	0.486	0.445	0.486	1.096	0.589
7	0.532	0.488	0.532	0.488	0.438	0.488	1.118	0.613
8	0.534	0.490	0.534	0.490	0.442	0.490	1.113	0.604
9	0.562	0.519	0.562	0.519	0.461	0.519	1.131	0.653
10	0.616	0.565	0.616	0.565	0.480	0.564	1.187	0.796
11	0.638	0.535	0.638	0.535	0.481	0.534	1.125	0.874

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	-2.7	-8.8	16.1	0.302	0.	0.044	0.044	0.014	0.014
2	10.00	-2.6	-8.8	14.7	0.321	0.	0.126	0.126	0.041	0.041
3	30.00	-4.7	-10.8	8.2	0.248	0.	0.058	0.058	0.017	0.017
4	42.50	-2.8	-8.9	7.4	0.246	0.	0.052	0.052	0.015	0.015
5	45.00	-2.2	-8.3	7.6	0.247	0.	0.055	0.055	0.016	0.016
6	47.50	-1.2	-7.3	7.7	0.243	0.	0.044	0.044	0.013	0.013
7	50.00	-0.1	-6.2	7.7	0.241	0.	0.031	0.031	0.009	0.009
8	52.50	-0.6	-6.8	7.5	0.239	0.	0.036	0.036	0.010	0.010
9	70.00	-1.3	-7.4	6.4	0.223	0.	0.050	0.050	0.013	0.013
10	90.00	-0.1	-6.1	9.8	0.210	0.	0.142	0.142	0.033	0.033
11	95.00	1.2	-4.7	12.6	0.279	0.	0.308	0.308	0.069	0.069

TABLE X. – Concluded.

(b) Concluded. Stator 8

(b-5) 70 Percent of design speed; reading 3420

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.945	23.947	48.2	6.0	48.2	6.0	322.8	0.991	13.03	0.984
2	23.505	23.538	44.6	4.7	44.6	4.7	320.8	0.993	12.86	1.000
3	21.742	21.902	33.3	-0.6	33.3	-0.6	313.2	1.001	13.15	0.990
4	20.635	20.884	35.5	-0.4	35.5	-0.4	313.9	0.995	13.25	0.983
5	20.414	20.681	36.1	-0.5	36.1	-0.5	313.7	0.995	13.24	0.985
6	20.193	20.480	37.0	-0.4	37.0	-0.4	313.8	0.996	13.20	0.989
7	19.972	20.279	38.1	-0.3	38.1	-0.3	313.9	0.996	13.15	0.994
8	19.751	20.079	37.9	-0.2	37.9	-0.2	312.3	0.999	13.13	0.995
9	18.219	18.715	38.7	-0.9	38.7	-0.9	312.4	0.998	13.30	0.990
10	16.520	17.252	40.9	2.1	40.9	2.1	313.0	1.007	13.60	0.971
11	16.111	16.904	43.0	4.6	43.0	4.6	314.7	1.005	13.86	0.933

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	173.6	134.4	173.6	134.4	115.7	133.6	129.5	14.0	0.	0.
2	165.4	136.0	165.4	136.0	117.8	135.5	116.1	11.2	0.	0.
3	173.9	143.6	173.9	143.6	145.3	143.6	95.6	-1.5	0.	0.
4	179.5	146.6	179.5	146.6	146.1	146.6	104.2	-1.1	0.	0.
5	179.7	147.4	179.7	147.4	145.1	147.4	105.9	-1.3	0.	0.
6	178.7	148.8	178.7	148.8	142.7	148.8	107.6	-0.9	0.	0.
7	177.5	149.8	177.5	149.8	139.6	149.8	109.6	-0.7	0.	0.
8	177.2	150.4	177.2	150.4	139.9	150.4	108.8	-0.6	0.	0.
9	187.2	160.2	187.2	160.2	146.1	160.2	117.1	-2.5	0.	0.
10	204.0	175.7	204.0	175.7	154.1	175.6	133.6	6.5	0.	0.
11	213.0	166.9	213.0	166.9	155.8	166.3	145.3	13.5	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	0.494	0.380	0.494	0.380	0.329	0.378	1.155	0.815
2	0.471	0.386	0.471	0.386	0.335	0.384	1.150	0.731
3	0.502	0.411	0.502	0.411	0.420	0.411	0.989	0.577
4	0.519	0.421	0.519	0.421	0.422	0.421	1.003	0.628
5	0.520	0.424	0.520	0.424	0.420	0.424	1.016	0.639
6	0.517	0.428	0.517	0.428	0.413	0.427	1.043	0.649
7	0.513	0.431	0.513	0.431	0.403	0.431	1.073	0.663
8	0.513	0.433	0.513	0.433	0.405	0.433	1.076	0.655
9	0.544	0.462	0.544	0.462	0.424	0.462	1.097	0.713
10	0.595	0.506	0.595	0.506	0.450	0.506	1.139	0.815
11	0.622	0.479	0.622	0.479	0.455	0.477	1.068	0.893

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	11.4	5.3	17.1	0.447	0.	0.103	0.103	0.034	0.034
2	10.00	9.4	3.2	14.9	0.385	0.	-0.000	-0.000	-0.000	-0.000
3	30.00	-0.5	-6.7	8.4	0.342	0.	0.066	0.066	0.020	0.020
4	42.50	1.2	-4.9	8.3	0.351	0.	0.100	0.100	0.029	0.029
5	45.00	1.7	-4.4	8.2	0.348	0.	0.092	0.092	0.026	0.026
6	47.50	2.4	-3.7	8.3	0.337	0.	0.064	0.064	0.018	0.018
7	50.00	3.4	-2.7	8.4	0.328	0.	0.036	0.036	0.010	0.010
8	52.50	3.0	-3.1	8.4	0.320	0.	0.029	0.029	0.008	0.008
9	70.00	2.5	-3.6	7.3	0.305	0.	0.054	0.054	0.014	0.014
10	90.00	2.0	-4.0	10.2	0.279	0.	0.134	0.134	0.031	0.031
11	95.00	3.1	-2.8	12.7	0.352	0.	0.294	0.294	0.066	0.066

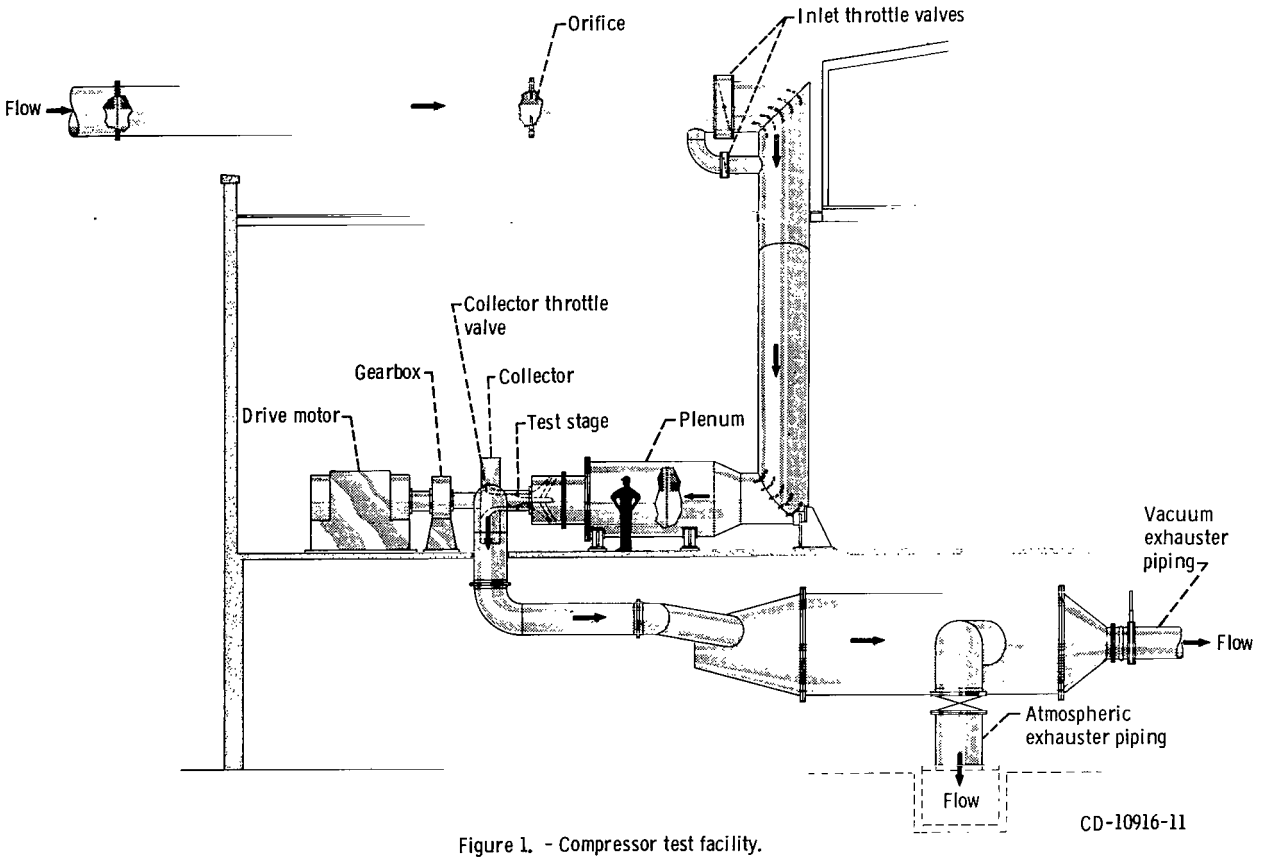
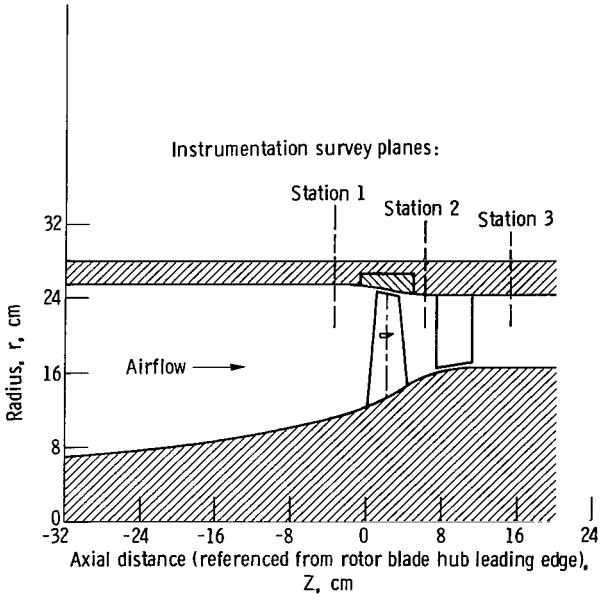


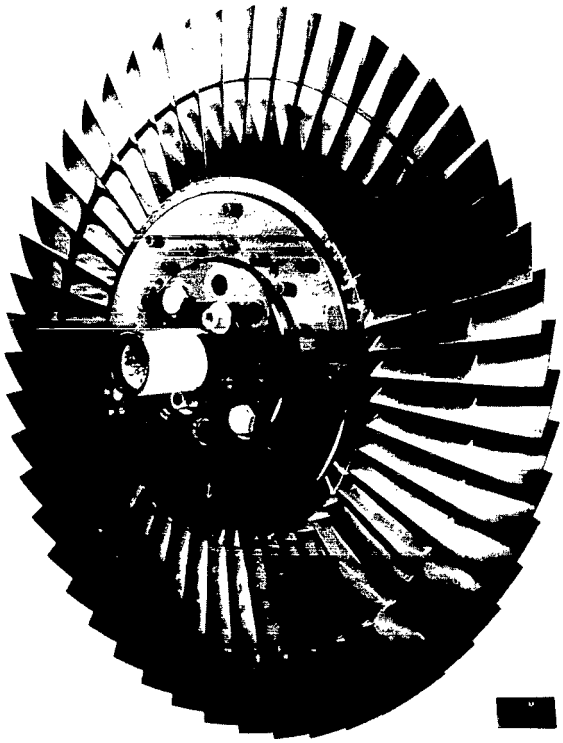
Figure 1. - Compressor test facility.



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		

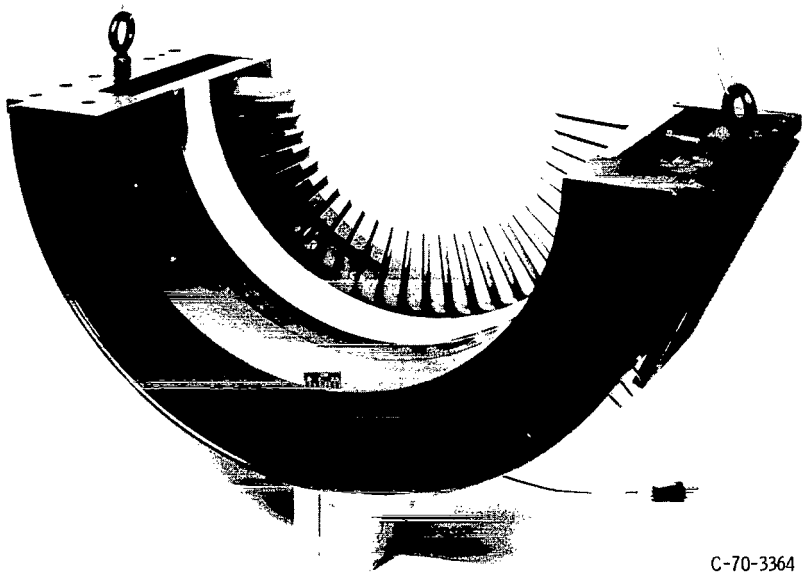
[a]Instrumentation survey plane

Figure 2. - Flow path for stage 8E-8, showing axial location of instrumentation.



C-70-3181

Figure 3. - Rotor 8E.



C-70-3364

Figure 4. - Stator 8.

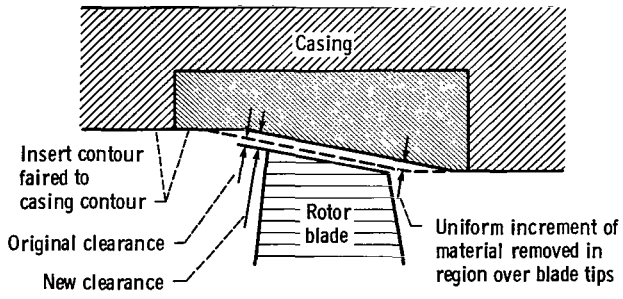
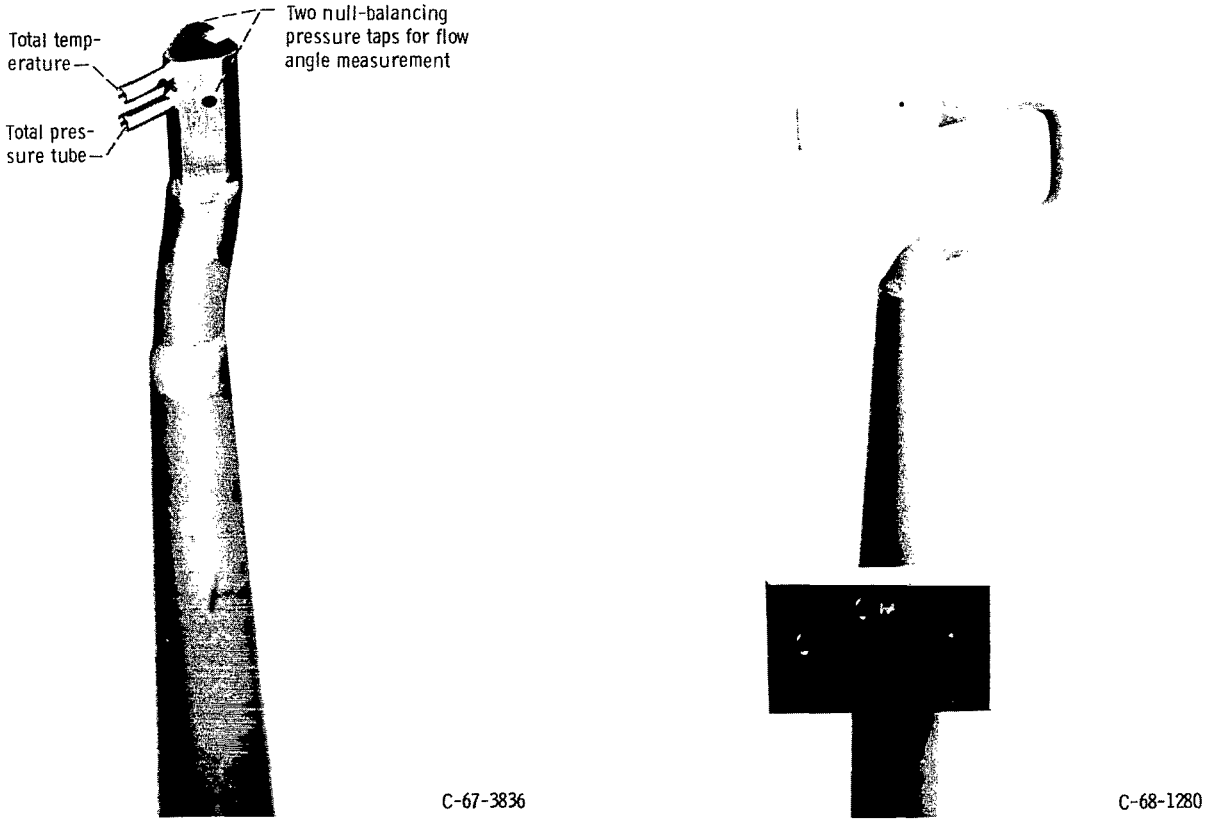


Figure 5. - Method used to change (increase) rotor blade tip clearance.



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

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

Figure 6. - Sensing probes.

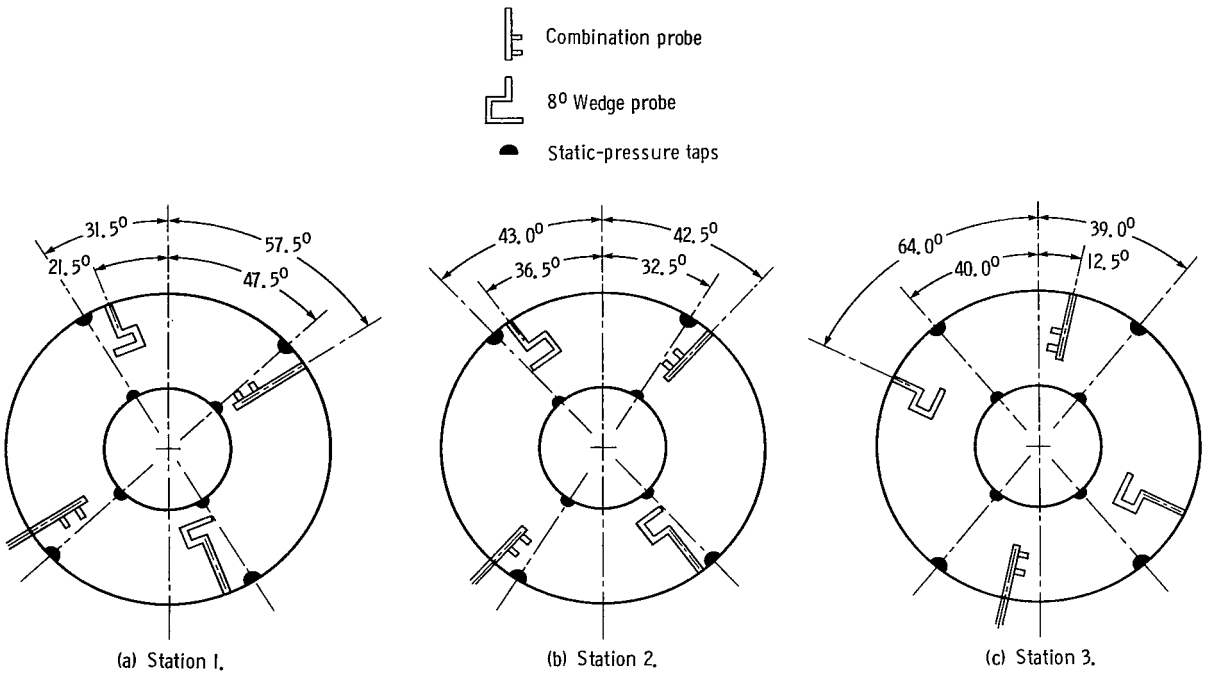


Figure 7. - Circumferential location of instrumentation at measuring stations - facing downstream.

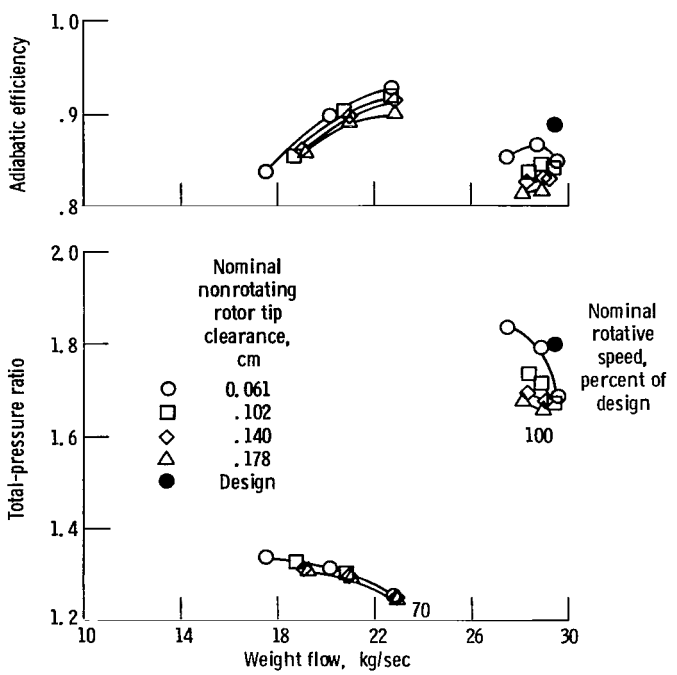


Figure 8. - Effect of tip clearance on overall rotor performance.

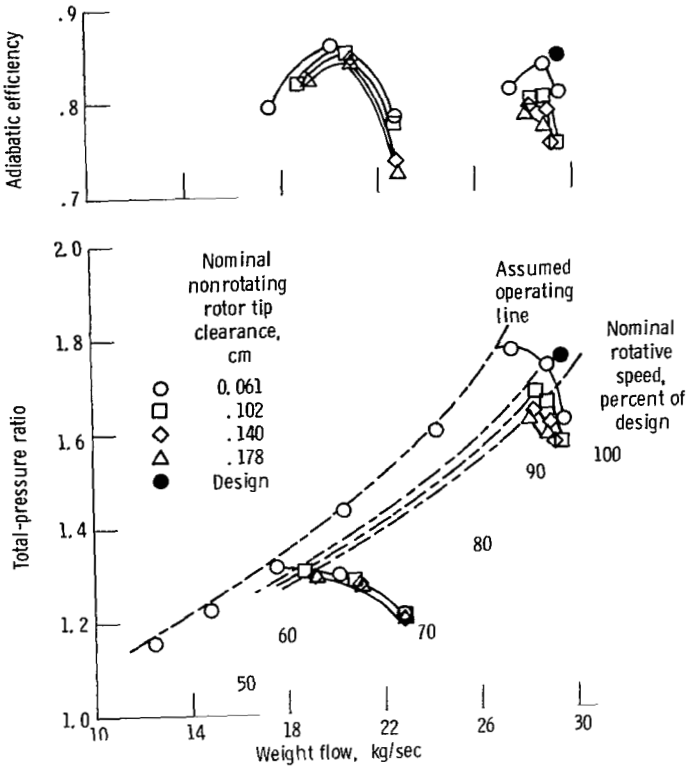


Figure 9. - Effect of tip clearance on overall stage performance.

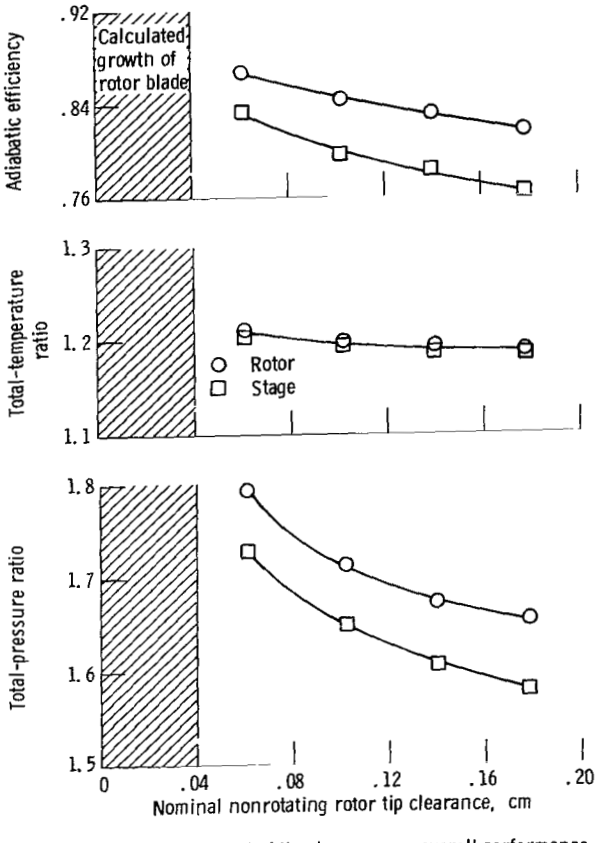


Figure 10. - Effect of tip clearance on overall performance. Design speed; nominal weight flow, 28.95 kg/sec.

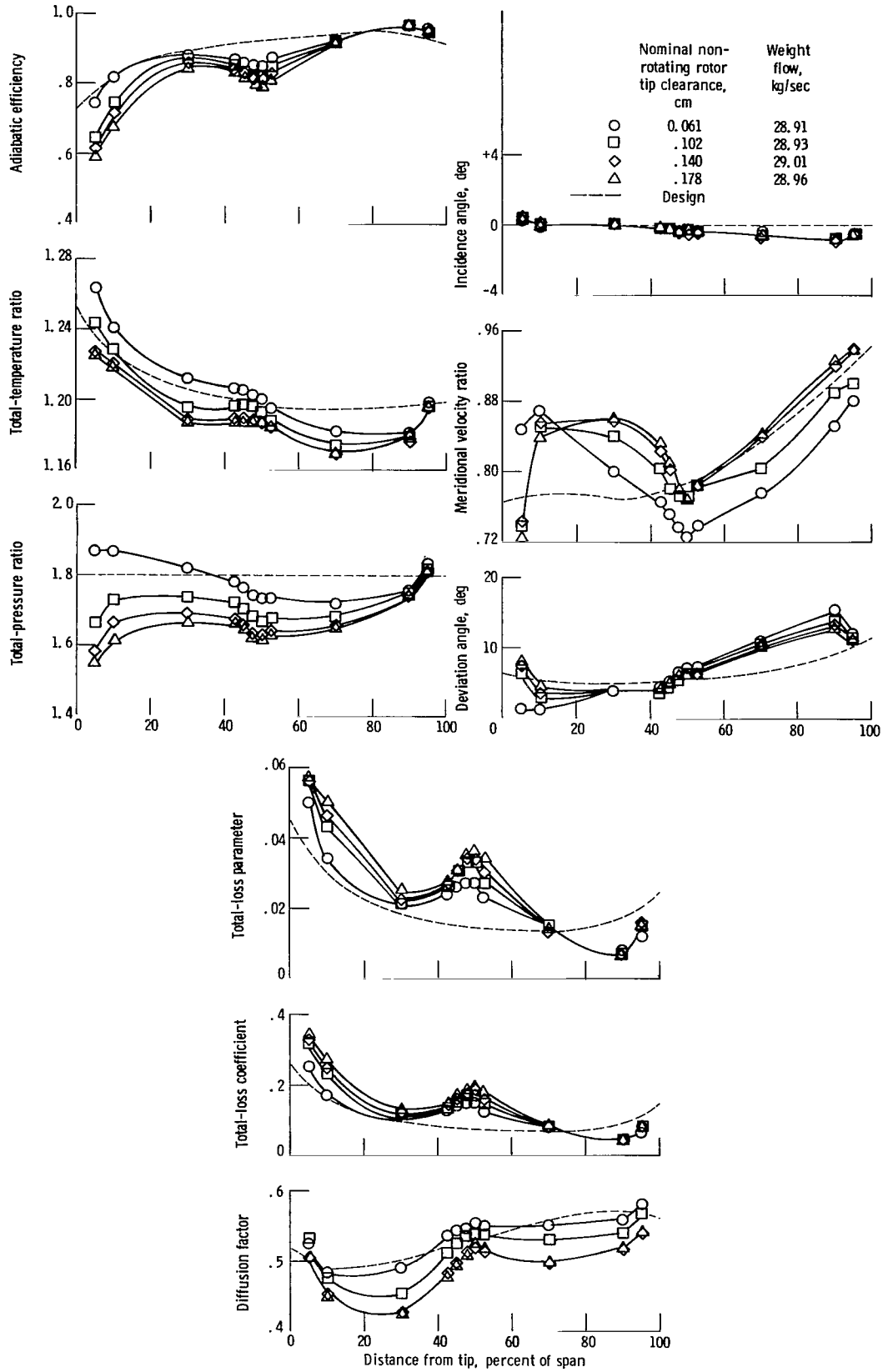


Figure 11. - Effect of tip clearance on radial distribution of rotor parameters. Design speed.

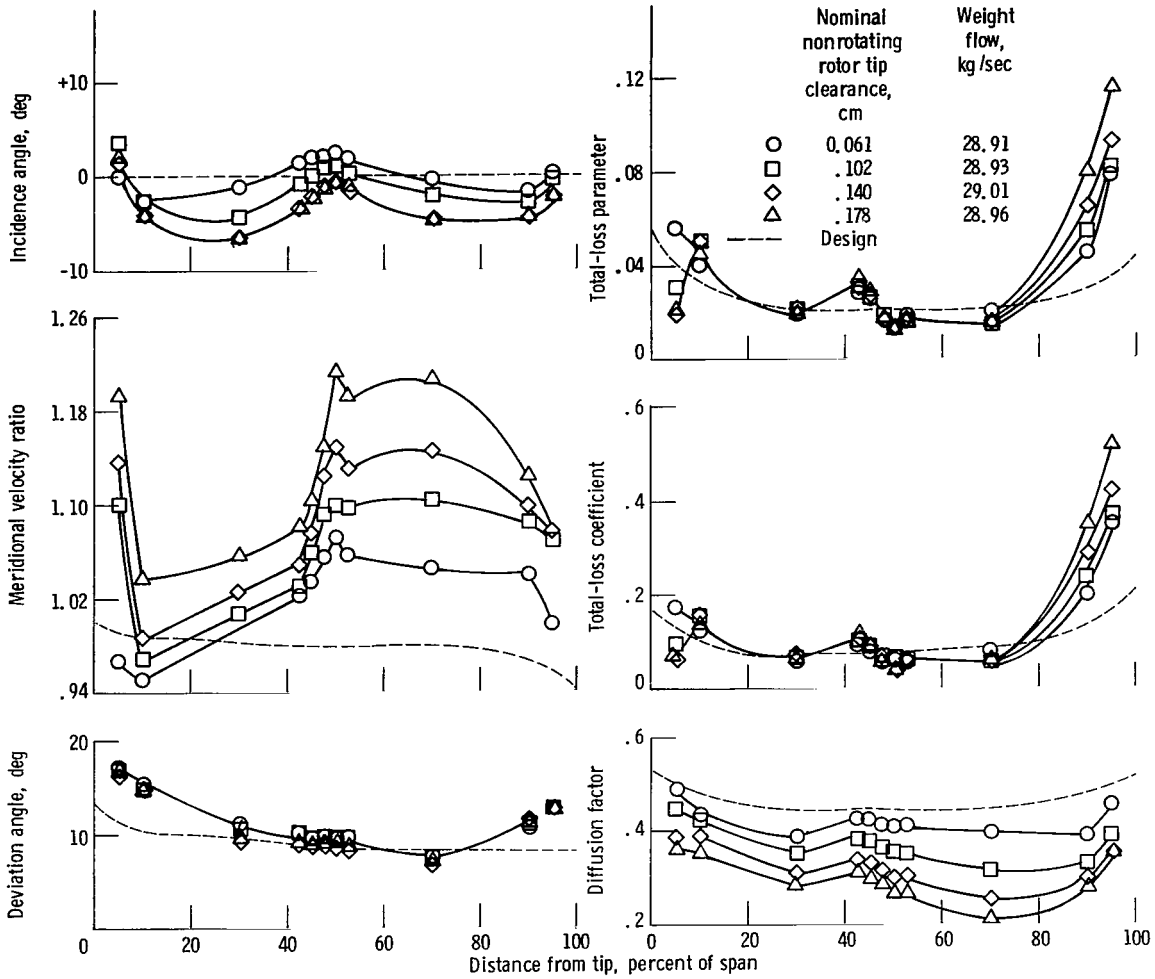
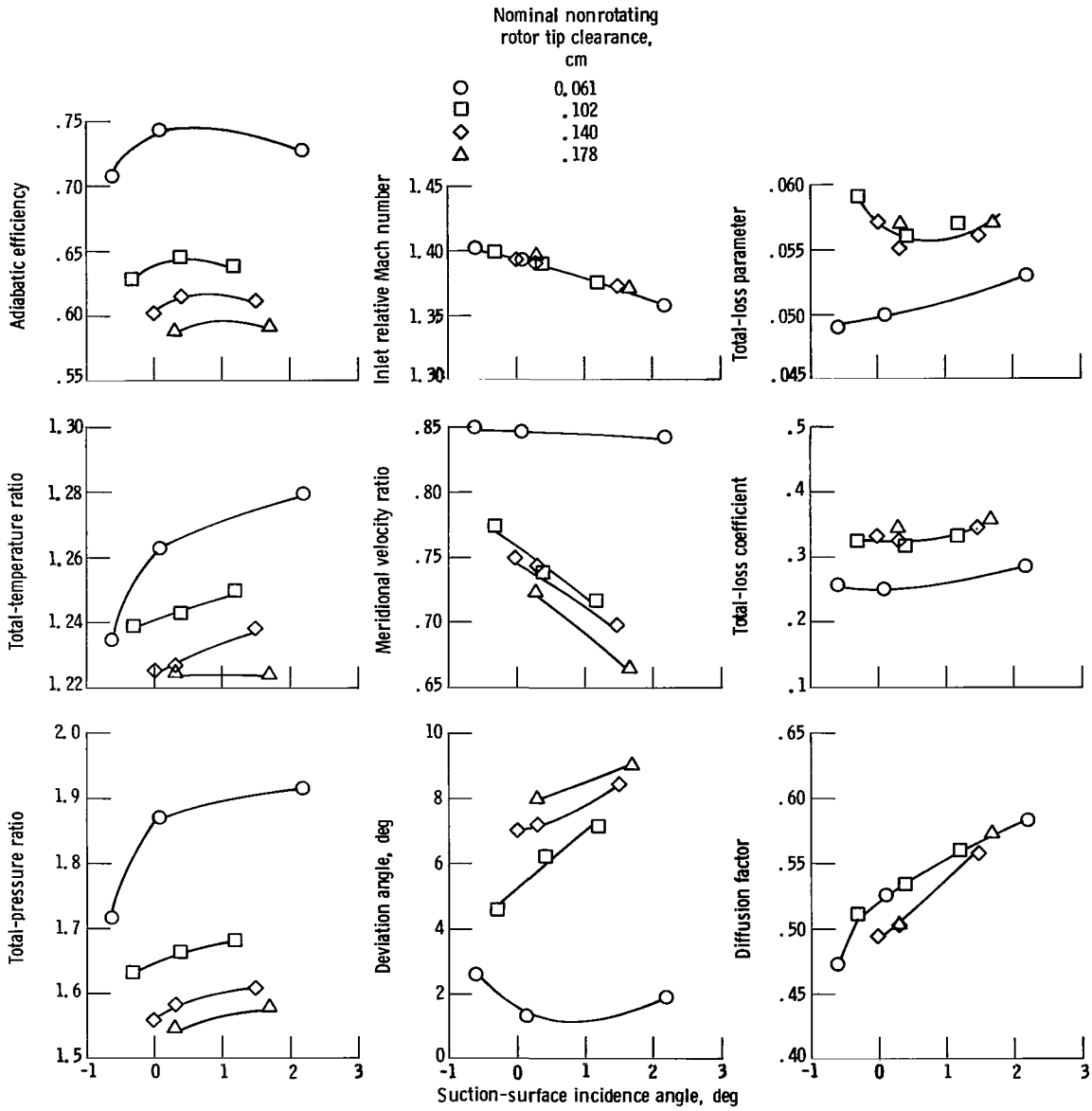
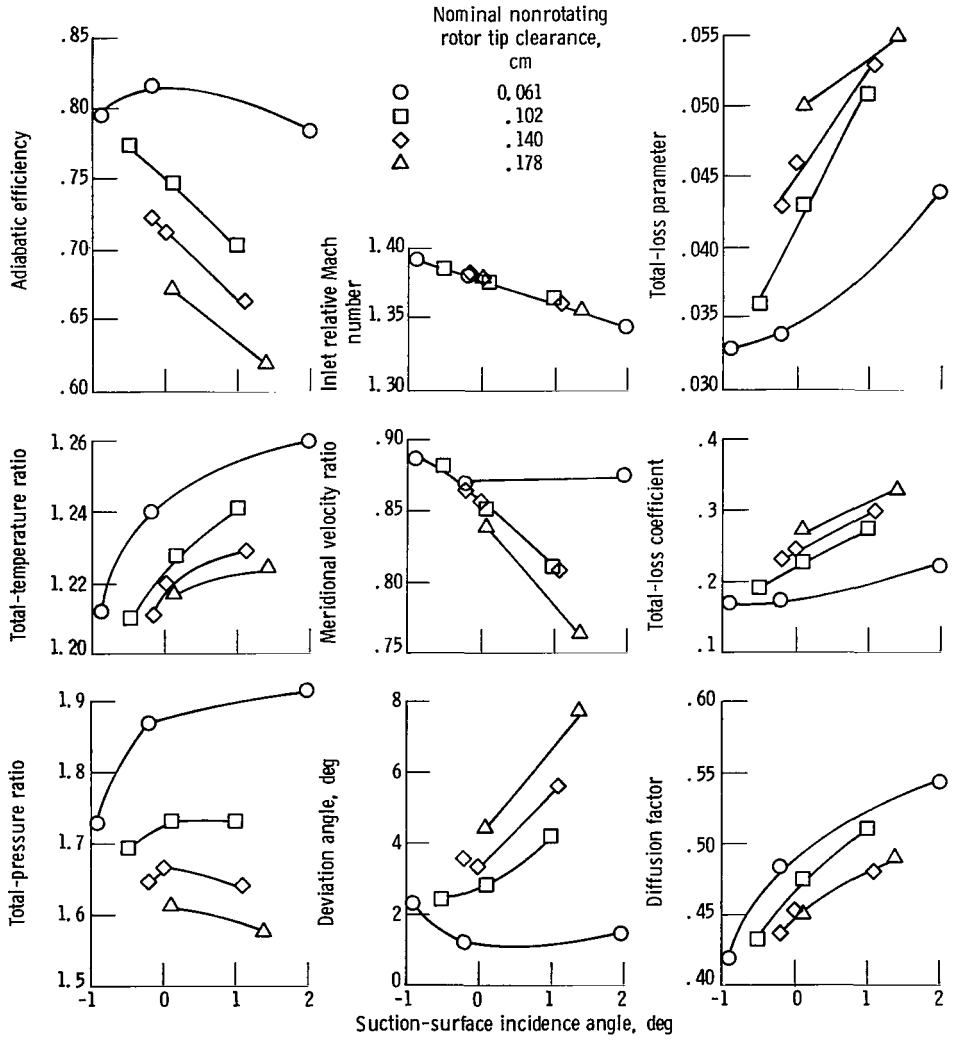


Figure 12. - Effect of tip clearance on radial distribution of stator parameters. Design speed.



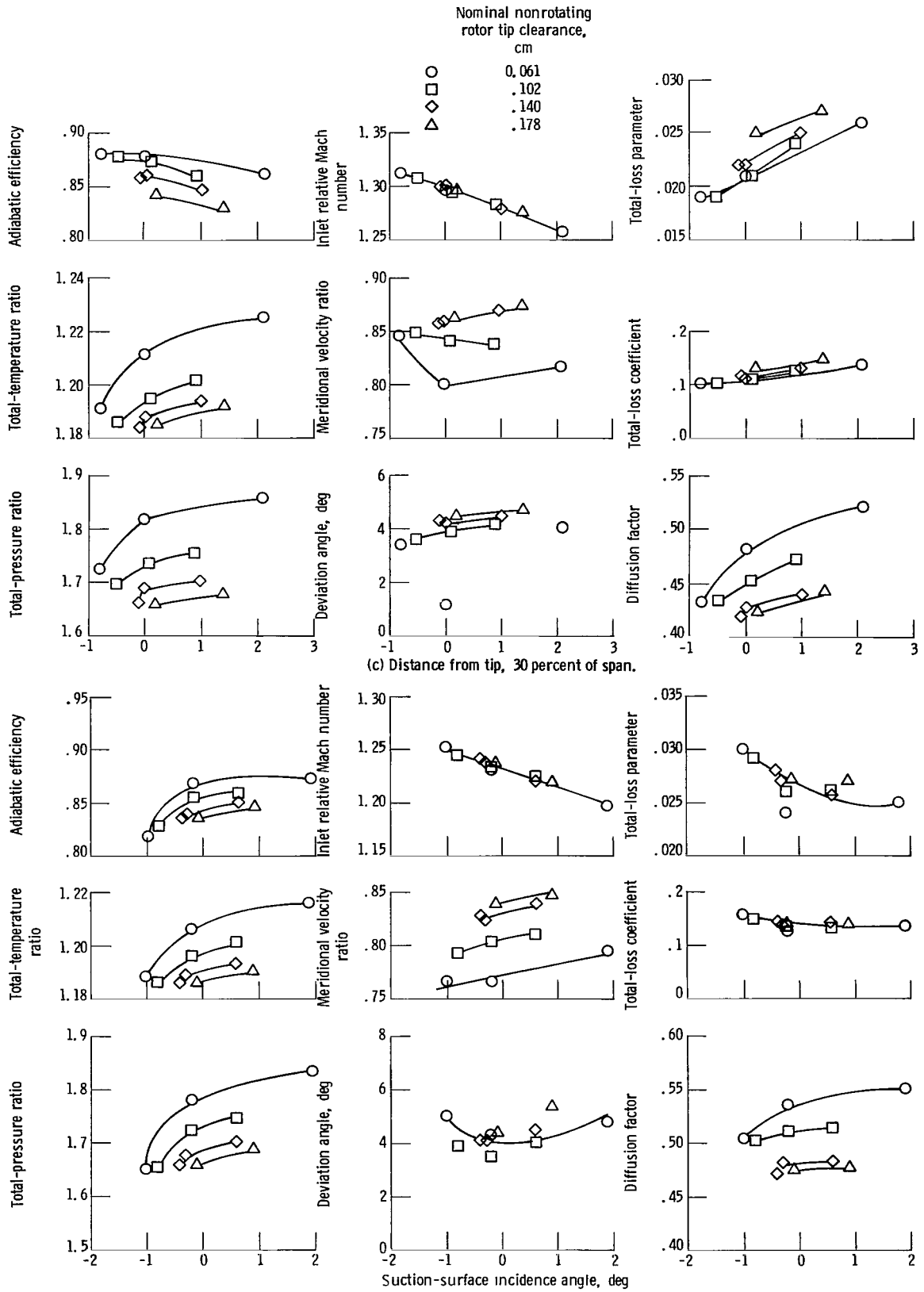
(a) Distance from tip, 5 percent of span.

Figure 13. - Effect of tip clearance on blade-element performance of rotor 8E. Design speed.



(b) Distance from tip, 10 percent of span.

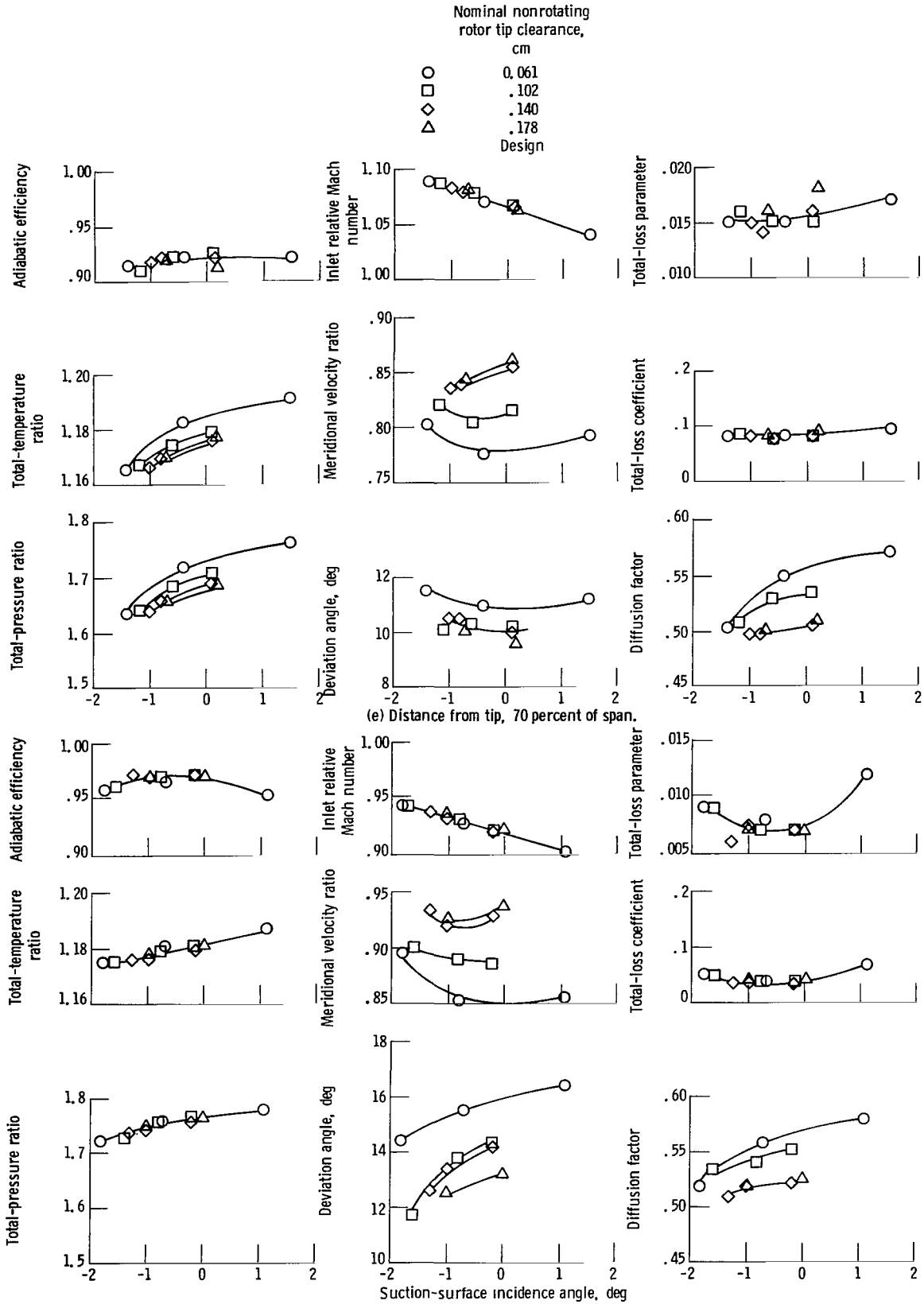
Figure 13. - Continued.



(c) Distance from tip, 30 percent of span.

(d) Distance from tip, 42.5 percent of span.

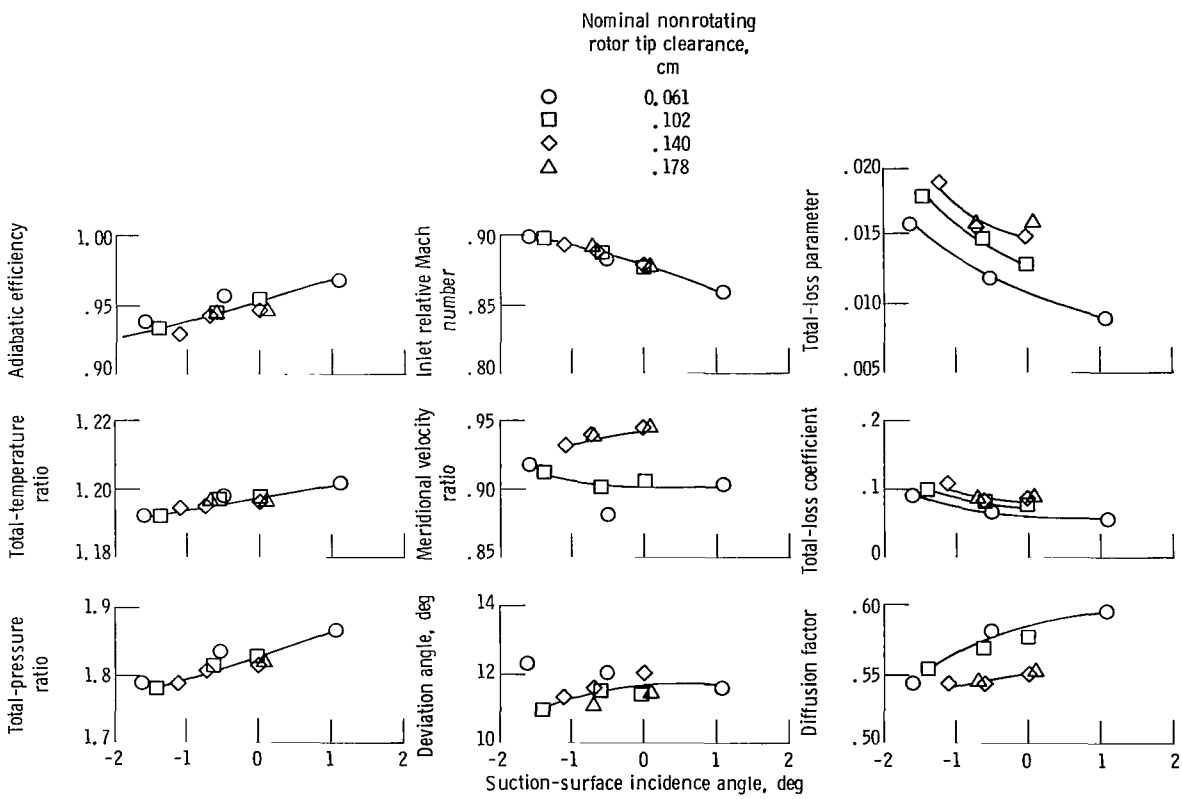
Figure 13. - Continued.



(e) Distance from tip, 70 percent of span.

(f) Distance from tip, 90 percent of span.

Figure 13. - Continued.



(g) Distance from tip, 95 percent of span.

Figure 13. - Concluded.

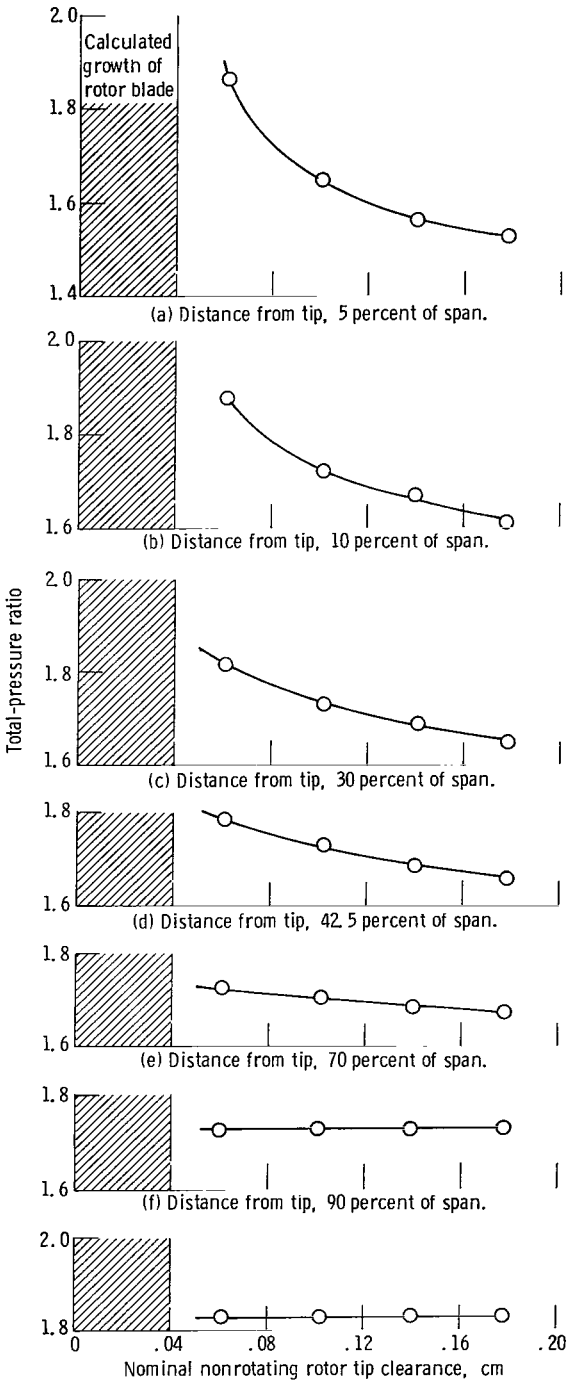


Figure 14. - Effect of tip clearance on blade-element total-pressure ratio. Suction-surface incidence angle, 0^0; design speed.

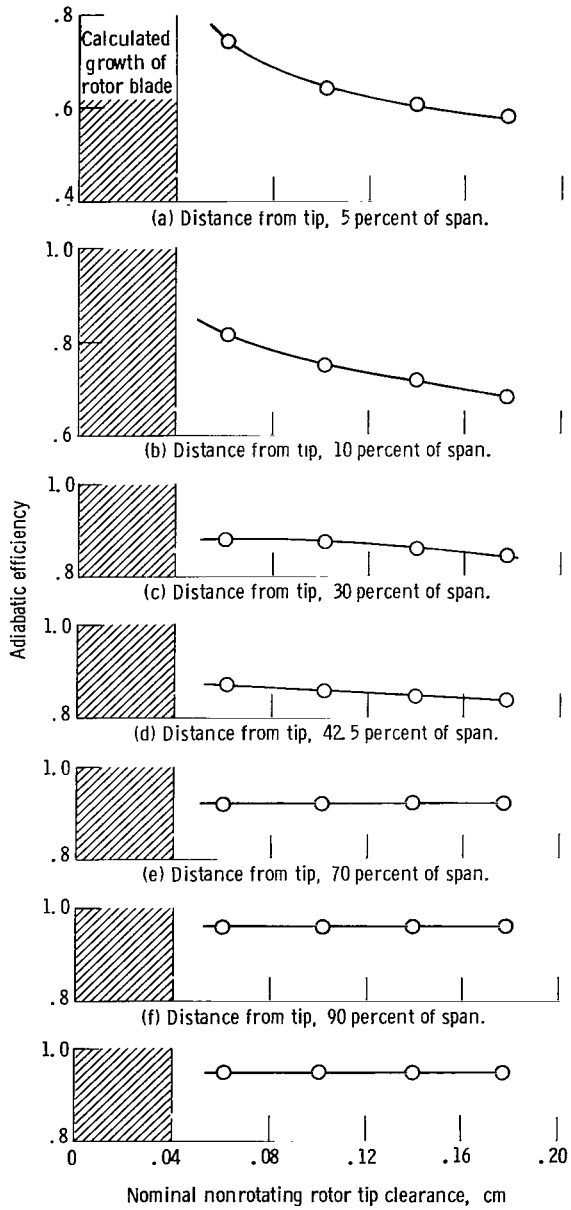


Figure 15. - Effect of tip clearance on blade-element efficiency. Suction-surface incidence angle, 0^0; design speed.

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15. Supplementary Notes

16. Abstract

The effects of tip clearance on the overall and blade-element performance of an axial-flow transonic fan stage are presented. The 50-centimeter-diameter fan was tested at four tip clearances (nonrotating) from 0.061 to 0.178 centimeter. The calculated radial growth of the blades was 0.040 centimeter at design conditions. The decrease in overall stage performance with increasing clearance is attributed to the loss in rotor performance. For the rotor the effects of clearance on performance parameters extended to about 70 percent of blade span from the tip. The stage stall margin based on an assumed operating line decreased from 15.3 to 0 percent as the clearance increased from 0.061 to 0.178 centimeter.

17. Key Words (Suggested by Author(s))

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