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Design and Performance of a 427-Meter-Per-Second-Tip-Speed Two-Stage Fan Having a 2.40 Pressure Ratio

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Design and Performance of a 427-Meter-Per-Second-Tip-Speed Two-Stage Fan Having a 2.40 Pressure Ratio

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SUMMARY

This report presents the aerodynamic design and the overall and blade-element performances of a 427-meter-per-second-tip-speed two-stage fan designed with axially spaced blade rows to reduce noise. This fan was designed and tested to help provide the technology to develop efficient, lightweight engines for short-haul aircraft. The fan was designed for a weight flow of 33.248 kilograms per second, an overall pressure ratio of 2.400, an adiabatic efficiency of 0.846, and a rotative speed of 16 042.8 rpm. The mechanical failure of three rotor dampers on the first-stage rotor prematurely terminated testing. As a result, the fan stall line and peak efficiency at design speed were not defined. At design speed and at an equivalent weight flow of 32.90 kilograms per second the highest overall adiabatic efficiency of the fan was 0.796 at a total pressure ratio of 2.30. At 60 and 80 percent of design speed the overall efficiencies peaked at approximately 0.83. Radial distributions of performance showed that high losses occurred in both the part span damper and tip regions of the first-stage rotor.

INTRODUCTION

NASA Lewis Research Center is actively researching efficient, lightweight propulsive engine systems for short-haul aircraft. Because these aircraft will operate from airports in highly populated areas, they must be quiet. A significant noise source is the fan, which results, in part, from the supersonic flow field and associated flow shocks around high-tip-speed blading and the interaction of pressure wakes from previous blade rows with succeeding blade rows. A considerable reduction in blade-row interaction noise could be obtained by increasing the axial spacing between the blade rows. Because increased spacing of blade rows may reduce the aerodynamic performance, the investigation of the aerodynamic performances of two-stage high-pressure-ratio fans designed with spaced blade rows was initiated.

This report presents the design and experimental performances of a two-stage fan with spaced blade rows. Overall fan performance is presented along with the performance of each rotor and stage. The blade-element performance of each rotor and stator is also presented. The data are presented over the fan stable operating flow range at rotative speeds of 60-, 80-, and 100-percent of design speed. Surveys of the flow conditions were taken at 11 radial positions. The tests were conducted in the multistage compressor test facility at Lewis.

AERODYNAMIC DESIGN

A sketch and coordinates of the flow path for the fan are presented in figure 1. An

assembly photograph of the fan is shown in figure 2. All significant blade design parameters for all four blade rows are presented in tables I to III. The symbols are defined in appendix A, and the equations used for calculating the overall and blade-element performance parameters are presented in appendix B. All definitions and units presented in the tables are given in appendix C.

The fan was designed for a weight flow of 33.248 kilograms per second, an overall pressure ratio of 2.40, an adiabatic efficiency of 0.846, and a rotative speed of 16042.8 rpm.

The basic aerodynamic design procedure consists of selecting the flow path geometry and rotative speed, determining velocity diagrams at the blade leading and trailing edges, based on specified radial distributions of total pressure and loss, and selecting blade shapes that achieve the desired velocity diagrams. The aerodynamic design was accomplished with a computer program which performed the flow field calculations, defined the blade elements along individual streamlines, and stacked these blade elements to produce blade manufacturing coordinates.

The velocity diagrams were calculated at the leading and trailing edges for both rotors and stators and at the instrumentation measuring stations. The velocity diagrams and the flow conditions were calculated by using a streamline-analysis computational procedure, which provided an axisymmetric, compressible-flow solution to the continuity, energy, and radial equilibrium equations. Streamline curvature, enthalpy, and entropy gradients were included in the radial equilibrium equation. The energy input was divided equally between the two rotors. The design radial distribution of the total-pressure profile at each rotor exit was specified as constant. Flow blockages were included to account for boundary-layer blockage along the hub and casing walls. Values of design inlet and outlet boundary-layer blockages, aspect ratio, and the number of blades for each blade row are given in table IV. No allowance was made for blockages due to dampers.

In the first-stage rotor, the blading was of multiple circular arc (MCA) cross section across the entire blade span; in the second-stage rotor the blading was MCA from the tip to 44 percent of span and double circular arc (DCA) over the remainder of the span. Both stators had DCA blading over their entire span. (Percent span is measured from the tip.) For the MCA blading the maximum thickness was specified at 50 percent of chord, and the transition point was located where a normal passage shock was predicted to intersect the suction surface. The turning ratios for all MCA blade elements were selected to provide a choke margin of 4 percent. However, because of an error in the choke margin calculation in the computer program, the actual choke margins were about 3/4 of a percent-age point below the values listed in table III.

Losses calculated within the program were based on a profile loss and a shock loss. The rotor and stator profile losses were based on the profile loss parameter as a func-

tion of the diffusion factor correlations presented in figure 3. The correlations for the rotors and stators were based, in part, on the data in references 1 to 3. The shock losses for the rotors were based on the shock-loss parameter as a function of inlet relative Mach number correlation presented in figure 4. This correlation was based on the analysis of the data obtained from several transonic rotors, including data presented in references 1, 2, and 4.

The incidence angles were set at 0° to the suction surface for all the rotor-blade elements and -3° with reference to the suction surface for all of the stator elements. These selections were based, in part, on data presented in references 1 to 3.

Deviation angle estimates were based on a modified Carter's rule, as discussed in reference 5, and adjusted to reflect the differences noted between the estimated and measured values presented in references 1 and 2.

The Cartesian blade coordinates can be generated for both the MCA and DCA blade elements using the blade geometry listed in table III as input to the blade coordinate computer code presented in reference 6.

The first-stage rotor had part span dampers to reduce blade vibratory stresses. These dampers were located at 42 percent of blade span from the outlet rotor tip. The damper meanline forms a conical surface, which lies in the approximate plane of a streamline. The maximum thickness of the damper was 0.203 centimeter. Leading- and trailing-edge radii were 0.025 centimeter, and the damper axial chord was 1.129 centimeters. The outboard and inboard surfaces of the damper were circular arcs tangent to the leading- and trailing-edge arcs. The damper was located axially at blade midchord. The aerodynamic design did not account for loss or local blockage due to the damper.

The blade thickness distribution of the first-stage rotor and the two stators varied linearly from hub to tip. However, the blade thickness distribution of the second-stage rotor followed a cubic relation to provide an acceptable frequency margin between the first bending mode and a two-per-revolution excitation at 110 percent of design speed. The Campbell diagrams, which show the frequency margin for each blade row, are presented in figure 5. The iteration between the aerodynamic and mechanical design involved a computer program that calculated the stresses and untwist as well as the natural frequency of the blading. The blades were set to account for the untwist calculated for the design speed condition.

ACOUSTIC CONSIDERATIONS

An acoustic analysis was conducted to estimate the noise transmitted upstream of the fan. This analysis was integrated with the aerodynamic design to arrive at an acceptable arrangement of blade row spacing and tip speed. The noise estimations were

based on a curve that presents a trend of blade-row interaction noise with spacing (ref. 7) and the trends in shock noise with tip speed as presented in reference 8. The noise generated by the second stage was arbitrarily reduced 5 decibels on passing through the first stage when estimating the total noise transmitted to the forward plane.

Three blade-row spacing configurations at two fan tip speeds (427 and 457 m/sec) were considered. The base configuration had an overall length-to-diameter ratio (L/D) of 0.500 and close, coupled blading. The other two configurations had a L/D ratio of 0.675. Very large spacing between the first rotor and stator with the remaining blade rows more closely and evenly spaced characterized one of the higher L/D ratio configurations; the other configuration had more evenly spaced blade rows throughout. The L/D = 0.675 configuration with the more evenly spaced blade rows was selected for this fan because it showed the most promise of transmitting the least amount of fan noise upstream.

APPARATUS AND PROCEDURE

Test Fan

The fan is installed in the test facility as a package with rotors, bearings, bearing housings, and casing bench assembled (fig. 2).

The fan rotors are located between two hydrodynamic journal support bearings. The axial thrust of the rotor is absorbed by a hydrodynamic thrust bearing located downstream of the rotors. Three carbon shaft seals isolate the oil from the airstream.

The static radial tip clearances for the first- and second-stage rotors were set at 0.114 and 0.127 centimeter, respectively. With these dimensions, the running clearances were calculated to be 0.025 centimeter at design conditions. Both stator blade rows were shrouded and had endwall clearances of 0.058 centimeter to provide reset capabilities of $\pm 10^{\circ}$ from their design values. Reluctance type proximity probes were used to detect shaft radial movements in the vertical and horizontal planes. Strain gages were attached to several rotor and stator blades of each stage to observe vibratory blade stresses. The strain-gage signals and the proximity probe voltage signals were monitored on oscilloscopes during all tests. Accelerometers were used to determine the horizontal and vertical components of force on the journal bearing housings. These signals were also monitored during all tests.

Compressor Test Facility

The two-stage fan was tested in the NASA Lewis Research Center's multistage compressor facility (fig. 6). The drive system consists of a 11 200-kilowatt electric motor

with a variable-frequency power supply. Motor speed may be controlled from 400 to 3600 rpm. The motor is coupled to a 5.21-gear-ratio speed-increaser gearbox that, in turn, drives the test rotor. The facility is sized for a maximum flow of 45 kilograms per second. In general, the working fluid is atmospheric air. The test facility also has the capability using refrigerated air, supplied at 25 kilograms per second at 243 K by the laboratory's central refrigeration equipment. Atmospheric air enters the test facility at an inlet located on the roof of the building. This inlet is equipped with an air filtration system which traps particles larger than 10 micrometers. The air then passes through a flow measuring station consisting of a thin-plate orifice before going through inlet butterfly throttle valves and into a plenum chamber.

The air is then accelerated to the compressor section, through the test compressor, and into a collector through a sleeve throttle valve. The air, at this point, can be either exhausted directly to the atmosphere through the roof exhaust valve or directed through a water-spray cooling station and into either the central altitude exhaust system or the central atmospheric exhaust system.

The airflow is controlled by the outlet collector sleeve valve. The small inlet butterfly throttle valve can be controlled automatically to maintain any preset plenum tank pressure from approximately 0.2 to 1.0 atmosphere.

For this investigation the test fluid was atmospheric air. For all tests the large inlet valve remained fully opened and the small valve remained closed. With these conditions the plenum tank pressure remained essentially constant (slightly less than atmospheric pressure) over the flow range of the test compressor. The air was exhausted through the water-spray cooling station and into the atmospheric exhaust system.

Instrumentation

Radial surveys of the flow conditions were made at the fan inlet and behind the two stator-blade rows (see fig. 1). Total pressure, total temperature, and flow angle were measured with a combination probe (fig. 7). Each probe was positioned with a null-balancing, stream-directional-sensitive control system that automatically alined the probe to the direction of flow. The thermocouple materials were iron-constantan. All pressures were measured with calibrated transducers. Two combination probes were used at the compressor inlet and behind the first-stage stator, and four combination probes were used behind the second-stage stator. The circumferential locations of the probes at each measuring station are shown in figure 8. The probes behind the stators were circumferentially traversed one stator blade passage clockwise from the nominal values shown.

The fan weight flow was determined by means of a calibrated thin-plate orifice.

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

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

Weight flow, kg/sec	±0.3
Rotative speed, rpm	±30
Flow angle, deg	±1
Temperature, K	±0.6
Total pressure, N/cm^2, at -	
Station 1	±0.07
Station 2	±0.10
Station 3	±0.17

Test Procedure

The data were taken over a range of weight flow from maximum-flow to near-stall conditions at equivalent rotative speeds of 60, 80, and 100 percent of design speed. At each selected flow the data were recorded at 11 radial positions at each of the 3 measuring stations. At each radial position the combination probes behind the stators (stations 2 and 3) were circumferentially traversed to 10 equally spaced locations across a stator blade gap. Values of pressure, temperature, and flow angle were measured at each circumferential position. At the fan inlet (station 1) radial traverses were made to measure pressure, temperature, and flow angle at each radial position.

Calculation Procedure

At each radial position behind the two stationary blade rows, circumferential arrays of total pressure, total temperature, and flow angle were generated across a stator blade gap by arithmetically averaging the measurements from the combination probes at each circumferential position. Also at each radial position behind the two stator blade rows the arithmetically averaged values making up the circumferential arrays of total pressure, total temperature, and flow angle across one blade gap were again averaged as follows to obtain the values reported herein: The total-pressure array was energy averaged; the total-temperature array was mass averaged; and the flow angle array was arithmetically averaged.

Representative radial values of total pressure and total temperature between the rotor and stator blade rows (necessary for individual rotor and stator performance evaluation) were obtained from the arithmetically averaged circumferential arrays of total

pressure and total temperature obtained downstream of the adjoining stator and translated upstream of the stator along design streamlines as follows: At each radial position the total temperature selected was the mass-averaged value of the arithmetically averaged values making up the circumferential array, and the total pressure selected was the highest value of the arithmetically averaged values making up the circumferential array.

Data were reduced using a computer program that calculates the radial distributions of static pressure at each measuring station and the radial distributions of flow angle at stations behind the rotors. Radial distributions of static pressure are calculated within the program from equations of continuity of mass flow and full radial equilibrium, which includes gradients of entropy and enthalpy and uses design streamline curvature, slope, and endwall blockage. Inputs to this program include (1) equivalent weight flow, corrected speed, and radial distributions of total pressure and total temperature behind a rotating blade row or (2) equivalent weight flow and radial distributions of total pressure, total temperature, and flow angle behind a fixed blade row.

To obtain overall performance for each rotor and stage, the radial values of total temperature were mass averaged, and the radial values of total pressure were energy averaged.

All data reported herein have been translated to the leading and trailing edges of each blade row by the method presented in reference 4. All pressures and temperatures were corrected to sea-level conditions based on the inlet conditions of the first stage rotor. Weight flow and rotative speed were corrected to sea-level conditions based on the rotor-inlet conditions of each stage.

RESULTS AND DISCUSSION

The results from this investigation are presented in two main sections. The overall performances for the fan and for the rotors and the stages are presented first. Radial distributions of several performance parameters are then presented for the rotors and stators. The data presented are computer plotted; occasionally a data point falls outside the range of parameters shown in the figure and is omitted.

All of the plotted data and some additional performance parameters are presented in tabular form. The overall performance data are presented in tables V to VII. The blade-element data are presented for the rotors in tables VIII and X and for the stators in tables IX and XI. The definitions and dimensions used for the tabular data are presented in appendix C.

Overall Performance

Two-stage fan performance. - The overall performance of the two-stage fan is presented in figure 9 where total-pressure ratio, total-temperature ratio, and adiabatic efficiency are plotted as functions of equivalent weight flow at 60, 80, and 100 percent of design speed. The stall line was not defined. To minimize the risk of mechanical failure, the stall line was to be established after most of the survey data were recorded and processed. Unfortunately, three first-stage rotor blade dampers cracked and further testing, needed to establish the stall line, was precluded. Without defining the stall point at design speed, there is a high probability that peak adiabatic efficiency was not defined. The highest measured efficiency at design speed was 0.796, and it occurred at a weight flow of 32.9 kilograms per second and a pressure ratio of 2.30. Design values of efficiency, weight flow, and pressure ratio were 0.846, 33.248, and 2.40, respectively. At part speeds peak efficiencies in excess of 0.83 were obtained.

First-stage performance. - The overall performance of the first stage and rotor are presented in figure 10. At design speed and a weight flow of 32.90 kilograms per second, the stage efficiency was 0.802 at a pressure ratio of 1.531. Design values of efficiency and pressure ratio were 0.838 and 1.591, respectively. At part speeds efficiencies in excess of 0.85 were obtained.

The trend in rotor performance (fig. 10) is similar to that for the stage. At design speed and a weight flow of 32.90 kilograms per second, the rotor efficiency was 0.832 at a pressure ratio of 1.555. Design values of efficiency and pressure ratio were 0.886 and 1.632, respectively. At part speeds efficiencies in excess of 0.88 were obtained.

Nondimensional stage performance. - The nondimensional performances of the first stage, first-stage rotor, second stage, and second-stage rotor are presented in figure 11. Head-rise coefficient, temperature-rise coefficient, and adiabatic efficiency are plotted as functions of stage flow coefficient. Data at 60, 80, and 100 percent of design speed are plotted along with the design points. The spread in the speed-line data is attributed to compressibility effects.

First stage: The nondimensional performance curves for the first stage and first-stage rotor (figs. 11(a) and (b)) show characteristics that are similar to those of the dimensional performance curves (figs. 9 and 10).

Second stage: At design speed and a flow coefficient value of 0.486, the interpolated stage values of peak efficiency and head-rise coefficient were 0.83 and 0.258, respectively (fig. 11(c)). Design values of efficiency and head-rise coefficient were 0.861 and 0.257, respectively. Peak efficiency at both 60 and 80 percent of design speed was 0.84, and it occurred at a flow coefficient value of 0.463.

At design speed and a flow coefficient value of 0.486, the interpolated rotor values

of peak efficiency and head-rise coefficient were 0.87 and 0.274, respectively (fig. 11(d)). Design values of efficiency and head-rise coefficient were 0.902 and 0.268, respectively. At part speeds efficiencies in excess of 0.90 were obtained.

Radial Distributions

The radial distributions of selected flow and performance parameters for both rotors and stators are shown in figures 12 to 15. The results are presented for two weight flows at design speed. The data shown represent the flow conditions at weight flows of 32.90 and 33.17 kilograms per second (readings 234 and 201). The design values are shown by solid symbols. In this section performance results at the weight flow of 32.90 kilograms per second (dashed lines) are compared with design values (solid lines).

First-stage rotor. - Total-pressure ratio, total-temperature ratio, and temperature rise efficiency are all lower than design across virtually the entire blade span (fig. 12). Efficiencies are particularly low in both the damper and rotor tip regions. Moderate gradients of incidence angles occur in both the blade tip and hub regions. Greater than design losses (reflected in loss coefficient and loss parameter) occurred across virtually the entire blade span, while the blade loading (diffusion factor) was less than design across virtually the entire blade span. These conditions indicate that the design combination of profile-loss parameter (fig. 3(a)) and shock loss parameter (fig. 4) was underestimated.

First-stage stator. - In general, the stator meridional velocity ratio met design values over the entire blade span (fig. 13). However, incidence angles were approximately 2° less than design values over most of the blade except locally at the hub and tip regions; the deviation angles were, in general, 2° greater than design over the entire blade span. As a result, blade loading (diffusion factor), total-loss coefficient, and total-loss parameter were, in general, all less than design values across the entire blade span.

Second-stage rotor. - The total-pressure ratio is equal to or slightly higher than design across the outer 50 percent of blade span and slightly lower than design across the inner 50 percent (fig. 14). The total-temperature ratio is slightly higher than design across the outer 70 percent of blade span and equal to or slightly less than design across the inner 30 percent. The temperature-rise efficiency was less than design over most of the blade span except in the hub and tip regions. The meridional velocity ratio achieved design values over most of the blade span and exceeded design in the hub region. In general, deviation angles were approximately 2° less than design across the entire blade span except in the hub region. Blade loading (diffusion factor) approximated design values across the entire span except locally at the hub. Losses exceeded design values across most of the blade span except in the hub and tip regions.

Second-stage stator. - Incidence angles are higher than or equal to design across virtually the entire blade span (fig. 15). Deviation angles are 3° to 4° higher than design across the entire blade span. The meridional velocity ratio met design values between the blade tip and 80 percent of span, but it deteriorated rapidly over the remainder of the span, indicating a potential hub problem. Blade loading (diffusion factor), total loss-coefficient, and total-loss parameter approximate the design values between the blade tip and 82 percent of span and exceeded design values over the remainder of the span.

CONCLUDING REMARKS

Although fan overall peak efficiency was not established at design speed, trends in experimental results indicate that peak efficiency probably would not have been significantly greater than those measured. Before establishing the stall line, a limited effort was made to determine whether design performance could be met by resetting both stator vanes. These tests were to be conducted at 80 and 100 percent of design speed. Unfortunately, three vibration dampers on the first-stage rotor cracked, and stator blade reorientation testing was terminated before any data could be obtained at design speed. However, the performance results of stator-blade reorientation at 80 percent of design speed were encouraging. Tests were conducted over a range of vane setting angles with the optimum performance (for range studied) obtained with stators one and two opened 10° and 6°, respectively (rotated in the direction of increased flow capacity). At these vane orientations there was a significant increase in mass flow, total-pressure ratio, total-temperature ratio, and adiabatic efficiency. Mass flow increased 1.3 kilograms per second, and efficiency increased 3 percentage points. Total-pressure ratio increased from 1.64 to 1.72.

It is recognized that this improvement in performance at part speed may not be realized at design speed and that the combination of vane resets which provide optimum benefits is not likely to be the same. However, based on the part-speed results, it is speculated that with stator vane reset the fan would have more closely achieved design performance at design speed.

SUMMARY OF RESULTS

This report presents the aerodynamic design and the overall and blade-element performance of a 427-meter-per-second-tip-speed, two-stage fan designed with widely spaced blade rows to reduce noise. Design weight flow of the fan was 33.25 kilograms per second. Design values of pressure ratio and efficiency were 0.846 and 2.40, re-

spectively. This investigation yielded the following principal results:

1. Peak efficiency was not established at design speed because of a damper failure which terminated testing prematurely.

2. At design speed and an equivalent weight flow of 32.90 kilograms per second, the fan overall highest recorded efficiency was 0.796 at a total pressure ratio of 2.30. At part speeds, peak efficiencies in excess of 0.83 were obtained.

3. At design speed and an equivalent weight flow of 32.90 kilograms per second, the first rotor and stage highest recorded efficiencies were 0.832 and 0.802, respectively. At part speeds, efficiencies for the first rotor and stage exceeded 0.88 and 0.85, respectively.

4. At design speed, peak efficiencies for the second rotor and stage were 0.87 and 0.83, respectively. At part speeds, efficiencies for the second rotor and stage exceeded 0.90 and 0.84, respectively.

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APPENDIX A

SYMBOLS

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

A_f frontal area at rotor leading edge, m^2

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

D diffusion factor

E excitations per revolution

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

P total pressure, N/cm^2

p static pressure, N/cm^2

r radius, cm

SM stall margin

T total temperature, K

U wheel speed, m/sec

V air velocity, m/sec

W weight flow, kg/sec

Z axial distance referenced from rotor-blade-hub leading edge, cm

α_c cone angle, deg

α_s slope of streamline, deg

β air angle, angle between air velocity and axial direction, deg

β'_c relative meridional air angle based on cone angle, arctan (tan β'_m cos α_c/cos α_s), arctan (tan β'_m cos α_c/cos α_s), deg

γ ratio of specific heats (1.40)

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

δ^o	deviation angle, angle between exit-air direction and tangent to blade mean camber line at trailing edge, deg
η	efficiency
θ	ratio of rotor-inlet total temperature to standard temperature of 288.2 K
κ_{mc}	angle between blade-element mean camber line on the conical surface and meridional plane, deg
κ_{ss}	angle between blade-element suction-surface leading edge tangent line on conical surface and meridional plane, deg
σ	solidity, ratio of chord to spacing
φ	flow coefficient
ψ_P	head-rise coefficient
ψ_T	temperature-rise coefficient
$\overline{\omega}$	total-loss coefficient
$\overline{\omega}_p$	profile-loss coefficient
$\overline{\omega}_s$	shock-loss coefficient

Subscripts:

ad	adiabatic (temperature rise)
id	ideal
LE	blade leading edge
m	meridional direction
mom	momentum rise
p	polytropic
TE	blade trailing edge
z	axial direction
θ	tangential direction
1	instrumentation plane upstream of first rotor
2	instrumentation plane between first stator and second rotor
3	instrumentation plane downstream of second stator

Superscript:

'	relative to blade

APPENDIX B

EQUATIONS FOR CALCULATING OVERALL AND BLADE-ELEMENT PERFORMANCE 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 -

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

Diffusion factor -

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

Total-loss coefficient -

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

Profile-loss coefficient -

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

Total-loss parameter -

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

Profile-loss parameter –

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

Adiabatic (temperature rise) efficiency –

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

Equivalent weight flow –

$$\frac{W\sqrt{\theta}}{\delta} \tag{B10}$$

Equivalent rotative speed –

$$\frac{N}{\sqrt{\theta}} \tag{B11}$$

Weight flow per unit annulus area –

$$\frac{\frac{W\sqrt{\theta}}{\delta}}{A_{an}} \tag{B12}$$

Weight flow per unit frontal area –

$$\frac{\frac{W\sqrt{\theta}}{\delta}}{A_f} \tag{B13}$$

Head-rise coefficient -

$$\psi_P = \frac{gJC_pT_{LE}}{U_{tip}^2}\left[\left(\frac{P_{TE}}{P_{LE}}\right)^{(\gamma-1)/\gamma} - 1\right] \tag{B14}$$

Flow coefficient -

$$\varphi = \left(\frac{V_z}{U_{tip}}\right)_{LE} \tag{B15}$$

Temperature-rise coefficient -

$$\psi_P = \frac{C_p}{U_{tip}^2}(T_{TE} - T_{LE}) \tag{B16}$$

Polytropic efficiency -

$$\eta_p = \frac{\ln\left(\frac{P_{TE}}{P_{LE}}\right)^{(\gamma-1)/\gamma}}{\ln\left(\frac{T_{TE}}{T_{LE}}\right)} \tag{B17}$$

APPENDIX C

DEFINITIONS AND UNITS USED IN TABLES

ABS	absolute
AERO CHORD	aerodynamic chord, cm
BETAM	meridional air angle, deg
CHOKE MARGIN	ratio of flow area greater than critical area to critical area
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 by eq. (B2)), deg
KIC	angle between blade-element mean camber line on conical surface at leading edge and meridional plane, deg
KOC	angle between blade-element mean camber line on conical surface at trailing edge and meridional plane, deg
KTC	angle between blade-element mean camber line on conical surface 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 referenced to rotor one 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 blade-element aerodynamic chord on conical surface 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-element angles on mean camber lines, deg (KIC-KOC)
TURNING RATIO	ratio of mean camber line curvatures upstream and downstream of transition point
VEL	velocity, m/sec
WT FLOW	equivalent weight flow, kg/sec
ZI	axial distance to blade leading edge, cm
ZMC	axial distance to blade maximum thickness point, cm
ZO	axial distance to blade trailing edge, cm
ZTC	axial distance to transition point, cm

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TABLE I. - DESIGN OVERALL PARAMETERS

(a) Two-stage fan

TOTAL PRESSURE RATIO	2.400
TOTAL TEMPERATURE RATIO	1.335
ADIABATIC EFFICIENCY	.846
POLYTROPIC EFFICIENCY	.866
WEIGHT FLOW	33.248
RPM	16042.8

(b) Stage one

ROTOR TOTAL PRESSURE RATIO	1.632
STAGE TOTAL PRESSURE RATIO	1.591
ROTOR TOTAL TEMPERATURE RATIO	1.169
STAGE TOTAL TEMPERATURE RATIO	1.169
ROTOR ADIABATIC EFFICIENCY	.886
STAGE ADIABATIC EFFICIENCY	.838
ROTOR POLYTROPIC EFFICIENCY	.894
STAGE POLYTROPIC EFFICIENCY	.848
ROTOR HEAD RISE COEFFICIENT	.239
STAGE HEAD RISE COEFFICIENT	.226
FLOW COEFFICIENT	.453
EQUIVALENT VALUES BASED ON COMPRESSOR INLET	
WT FLOW PER UNIT FRONTAL AREA	164.041
WT FLOW PER UNIT ANNULUS AREA	195.287
WT FLOW	33.248
RPM	16042.800
TIP SPEED	426.720
EQUIVALENT VALUES BASED ON STAGE INLET	
WT FLOW PER UNIT FRONTAL AREA	163.979
WT FLOW PER UNIT ANNULUS AREA	195.213
WT FLOW	33.236
RPM	16042.800
TIP SPEED	426.720

(c) Stage two

ROTOR TOTAL PRESSURE RATIO	1.537
STAGE TOTAL PRESSURE RATIO	1.508
ROTOR TOTAL TEMPERATURE RATIO	1.144
STAGE TOTAL TEMPERATURE RATIO	1.144
ROTOR ADIABATIC EFFICIENCY	.902
STAGE ADIABATIC EFFICIENCY	.861
ROTOR POLYTROPIC EFFICIENCY	.908
STAGE POLYTROPIC EFFICIENCY	.868
ROTOR HEAD RISE COEFFICIENT	.269
STAGE HEAD RISE COEFFICIENT	.257
FLOW COEFFICIENT	.463
EQUIVALENT VALUES BASED ON COMPRESSOR INLET	
WT FLOW PER UNIT FRONTAL AREA	181.801
WT FLOW PER UNIT ANNULUS AREA	260.974
WT FLOW	33.248
RPM	16042.800
TIP SPEED	405.341
EQUIVALENT VALUES BASED ON STAGE INLET	
WT FLOW PER UNIT FRONTAL AREA	123.489
WT FLOW PER UNIT ANNULUS AREA	177.268
WT FLOW	22.584
RPM	14835.823
TIP SPEED	374.845

TABLE II. - DESIGN BLADE-ELEMENT PARAMETERS

(a) Rotor one

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
TIP	25.400	24.938	.0	41.7	68.5	62.1	288.2	1.194	10.14	1.632
1	24.704	24.266	.0	41.8	66.9	61.2	288.2	1.189	10.14	1.632
2	23.977	23.594	.0	41.8	65.4	60.1	288.2	1.185	10.14	1.632
3	22.538	22.250	.0	41.8	63.0	57.1	288.2	1.177	10.14	1.632
4	21.091	20.907	.0	42.1	60.7	53.7	288.2	1.170	10.14	1.632
5	20.219	20.101	.0	42.5	59.4	51.1	288.2	1.167	10.14	1.632
6	19.343	19.294	.0	43.2	58.1	48.2	288.2	1.166	10.14	1.632
7	18.167	18.219	.0	44.3	56.4	43.5	288.2	1.164	10.14	1.632
8	15.134	15.532	.0	46.9	51.9	26.5	288.2	1.160	10.14	1.632
9	13.534	14.188	.0	48.7	49.3	14.5	288.2	1.160	10.14	1.632
10	11.853	12.845	.0	50.2	46.5	.5	288.2	1.160	10.14	1.632
11	10.973	12.173	.0	50.7	44.9	-6.4	288.2	1.159	10.14	1.632
HUB	10.160	11.501	.0	51.1	43.3	-12.8	288.2	1.158	10.14	1.632

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
TIP	168.0	201.7	458.6	322.0	168.0	150.5	.0	134.3	426.7	419.0
1	177.1	201.5	451.3	311.8	177.1	150.2	.0	134.4	415.0	407.7
2	184.5	202.1	443.1	301.8	184.5	150.5	.0	134.8	402.8	396.4
3	192.9	205.3	424.9	282.0	192.9	153.0	.0	136.9	378.6	373.8
4	198.6	209.2	406.2	261.9	198.6	155.2	.0	140.3	354.3	351.2
5	200.8	212.3	394.6	249.4	200.8	156.5	.0	143.5	339.7	337.7
6	202.1	216.2	382.7	236.2	202.1	157.5	.0	148.1	325.0	324.1
7	202.8	222.2	366.5	219.4	202.8	159.2	.0	155.1	305.2	306.1
8	199.5	243.5	323.2	185.8	199.5	166.2	.0	177.9	254.3	260.9
9	195.3	258.8	299.7	176.5	195.3	170.9	.0	194.3	227.4	238.4
10	189.1	278.9	274.6	178.4	189.1	178.4	.0	214.4	199.1	215.8
11	185.0	291.1	261.2	185.5	185.0	184.3	.0	225.3	184.4	204.5
HUB	181.3	303.8	249.0	195.6	181.3	190.8	.0	236.4	170.7	193.2

	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	.506	.559	1.382	.893	.506	.417	-11.06	-12.78	.896	1.505
1	.535	.560	1.364	.866	.535	.417	-9.47	-10.60	.848	1.473
2	.559	.563	1.342	.840	.559	.419	-8.01	-8.73	.816	1.445
3	.586	.574	1.291	.789	.586	.428	-5.71	-5.93	.793	1.402
4	.605	.588	1.237	.736	.605	.436	-3.49	-3.45	.782	1.372
5	.612	.598	1.202	.702	.612	.441	-2.17	-2.09	.779	1.356
6	.616	.610	1.167	.666	.616	.444	-.86	-.79	.779	1.344
7	.619	.629	1.117	.621	.619	.450	.90	.87	.785	1.333
8	.608	.696	.984	.531	.608	.475	5.82	5.00	.833	1.344
9	.594	.744	.912	.508	.594	.491	8.91	7.17	.875	1.295
10	.574	.810	.833	.518	.574	.518	12.90	9.50	.944	1.225
11	.561	.850	.791	.542	.561	.538	15.41	10.77	.996	1.176
HUB	.549	.893	.753	.575	.549	.561	17.84	12.07	1.052	1.129

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
TIP	.00	2.1	.0	2.8	.410	.773	.177	.098	.032	.018
1	5.00	2.3	.0	2.8	.420	.794	.160	.091	.029	.016
2	10.00	2.5	.0	2.9	.429	.814	.145	.084	.026	.015
3	20.00	3.0	-.0	3.1	.447	.849	.119	.073	.022	.014
4	30.00	3.4	-.0	3.4	.467	.882	.096	.061	.018	.012
5	36.00	3.6	-.0	3.7	.481	.897	.086	.056	.017	.011
6	42.00	3.9	-.0	4.0	.498	.905	.081	.057	.016	.011
7	50.00	4.2	-.0	4.5	.520	.916	.076	.058	.015	.012
8	70.00	4.9	.0	6.6	.557	.936	.067	.058	.014	.012
9	80.00	5.0	.0	7.9	.552	.939	.072	.070	.015	.014
10	90.00	4.8	.0	9.1	.502	.940	.081	.081	.015	.015
11	95.00	4.6	.0	10.0	.447	.944	.083	.083	.014	.014
HUB	100.00	4.3	.0	11.6	.376	.948	.082	.082	.013	.013

TABLE II. - Continued. DESIGN BLADE-ELEMENT PARAMETERS

(b) Stator one

	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	38.5	.0	38.5	.0	344.2	1.000	16.54	.979
1	23.758	23.76[illegible]	38.2	.0	38.2	.0	342.7	1.000	16.54	.980
2	23.167	23.200	37.9	.0	37.9	.0	341.3	1.000	16.54	.981
3	21.981	22.068	37.9	.0	37.9	.0	339.1	1.000	16.54	.982
4	20.787	20.927	38.1	.0	38.1	.0	337.2	1.000	16.54	.982
5	20.070	20.243	38.5	.0	38.5	.0	336.4	1.000	16.54	.982
6	19.350	19.558	39.2	.0	39.2	.0	335.9	1.000	16.54	.982
7	18.388	18.650	40.3	.0	40.3	.0	335.4	1.000	16.54	.980
8	15.962	16.388	43.6	.0	43.6	.0	334.4	1.000	16.54	.972
9	14.733	15.263	45.9	.0	45.9	.0	334.2	1.000	16.54	.964
10	13.493	14.144	48.7	.0	48.7	.0	334.2	1.000	16.54	.950
11	12.868	13.586	50.1	.0	50.1	.0	334.0	1.000	16.54	.940
HUB	12.189	12.931	51.7	.0	51.7	.0	333.8	1.000	16.54	.928

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
TIP	221.0	174.2	221.0	174.2	173.0	174.2	137.6	.0	.0	.0
1	222.1	174.2	222.1	174.2	174.7	174.2	137.2	.0	.0	.0
2	223.3	174.3	223.3	174.3	176.1	174.3	137.3	.0	.0	.0
3	225.8	174.7	225.8	174.7	178.3	174.7	138.6	.0	.0	.0
4	228.7	175.2	228.7	175.2	180.0	175.2	141.1	.0	.0	.0
5	230.9	175.5	230.9	175.5	180.7	175.5	143.7	.0	.0	.0
6	233.6	175.6	233.6	175.6	181.0	175.6	147.7	.0	.0	.0
7	237.7	175.3	237.7	175.3	181.4	175.3	153.7	.0	.0	.0
8	251.2	173.4	251.2	173.4	182.0	173.4	173.1	.0	.0	.0
9	260.6	170.8	260.6	170.8	181.3	170.8	187.1	.0	.0	.0
10	271.7	166.8	271.7	166.8	179.5	166.8	204.0	.0	.0	.0
11	277.6	164.6	277.6	164.6	178.0	164.6	213.0	.0	.0	.0
HUB	284.2	162.0	284.2	162.0	176.2	162.0	223.0	.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	.616	.479	.616	.479	.482	.479	-1.22	.46	1.007	.839
1	.621	.480	.621	.480	.489	.480	-.81	.50	.997	.822
2	.626	.481	.626	.481	.494	.481	-.45	.59	.990	.811
3	.636	.484	.636	.484	.502	.484	.21	.90	.980	.803
4	.647	.487	.647	.487	.509	.487	.93	1.33	.973	.805
5	.654	.489	.654	.489	.512	.489	1.38	1.65	.971	.811
6	.663	.489	.663	.489	.514	.489	1.85	2.01	.970	.824
7	.677	.489	.677	.489	.516	.489	2.51	2.50	.966	.843
8	.720	.484	.720	.484	.522	.484	4.34	3.75	.953	.910
9	.750	.477	.750	.477	.522	.477	5.37	4.25	.942	.961
10	.786	.465	.786	.465	.519	.465	6.43	4.42	.929	1.027
11	.805	.459	.805	.459	.516	.459	6.97	4.30	.925	1.064
HUB	.828	.451	.828	.451	.513	.451	7.54	4.13	.919	1.106

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
TIP	.00	3.0	-3.0	17.0	.457	.000	.094	.094	.037	.037
1	5.00	3.0	-3.0	13.9	.453	.000	.086	.086	.033	.033
2	10.00	3.0	-3.0	11.9	.449	.000	.082	.082	.031	.031
3	20.00	2.9	-3.0	10.0	.444	.000	.077	.077	.027	.027
4	30.00	2.8	-3.0	9.3	.441	.000	.073	.073	.025	.025
5	36.00	2.8	-3.0	9.0	.442	.000	.072	.072	.023	.023
6	42.00	2.7	-3.0	8.8	.446	.000	.072	.072	.023	.023
7	50.00	2.7	-3.0	8.6	.454	.000	.077	.077	.023	.023
8	70.00	2.5	-3.0	9.0	.486	.000	.095	.095	.025	.025
9	80.00	2.3	-3.0	9.7	.514	.000	.115	.115	.028	.028
10	90.00	2.2	-3.0	11.7	.549	.000	.150	.150	.033	.033
11	95.00	2.0	-3.0	13.2	.565	.000	.173	.173	.037	.037
HUB	100.00	1.9	-3.0	15.0	.583	.000	.198	.198	.040	.040

TABLE II. - Continued. DESIGN BLADE-ELEMENT PARAMETERS

(c) Rotor two

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
TIP	24.127	23.719	.0	39.2	65.5	57.3	344.3	1.157	16.20	1.530
1	23.533	23.187	.0	39.5	64.4	56.8	342.7	1.154	16.21	1.529
2	23.002	22.707	.0	39.8	63.5	56.2	341.3	1.151	16.22	1.528
3	21.951	21.741	.0	40.0	62.1	54.3	339.1	1.147	16.24	1.527
4	20.900	20.779	.0	40.3	60.7	52.1	337.2	1.143	16.24	1.526
5	20.272	20.206	.0	40.7	60.0	50.5	336.4	1.141	16.24	1.527
6	19.646	19.636	.0	41.3	59.2	48.6	335.9	1.140	16.23	1.527
7	18.813	18.888	.0	42.1	58.3	45.7	335.4	1.139	16.20	1.530
8	16.721	17.072	.0	44.6	56.5	36.4	334.4	1.140	16.08	1.542
9	15.652	16.198	.0	46.6	56.1	30.0	334.2	1.142	15.94	1.555
10	14.537	15.351	.0	49.3	56.7	21.6	334.2	1.147	15.71	1.578
11	13.951	14.938	.0	50.7	57.7	16.5	334.0	1.150	15.55	1.594
HUB	13.289	14.455	.0	52.4	59.2	10.1	333.8	1.154	15.36	1.614

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
TIP	185.0	216.9	445.6	310.7	185.0	168.0	.0	137.1	405.3	398.5
1	189.4	214.6	438.4	302.3	189.4	165.5	.0	136.6	395.3	389.5
2	192.3	213.4	431.7	294.9	192.3	164.0	.0	136.4	386.4	381.5
3	195.2	213.5	417.3	280.5	195.2	163.5	.0	137.3	368.8	365.3
4	196.7	214.6	402.5	266.3	196.7	163.6	.0	138.9	351.1	349.1
5	197.0	216.1	393.4	257.4	197.0	163.8	.0	140.9	340.6	339.5
6	196.6	218.2	384.2	247.9	196.6	164.0	.0	144.0	330.1	329.9
7	195.2	221.6	371.4	235.6	195.2	164.4	.0	148.6	316.1	317.3
8	186.0	233.8	336.9	206.9	186.0	166.6	.0	164.1	280.9	286.8
9	176.6	242.3	316.7	192.2	176.6	166.4	.0	176.0	262.9	272.1
10	160.2	253.7	292.1	178.0	160.2	165.5	.0	192.4	244.2	257.9
11	147.9	260.9	277.2	172.2	147.9	165.1	.0	202.0	234.4	251.0
HUB	133.2	269.7	260.0	167.3	133.2	164.8	.0	213.6	223.3	242.8

	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	.511	.559	1.230	.801	.511	.433	-8.36	-6.25	.908	1.414
1	.525	.555	1.214	.782	.525	.428	-6.98	-5.15	.874	1.386
2	.534	.554	1.199	.765	.534	.426	-5.85	-4.24	.853	1.366
3	.545	.557	1.164	.732	.545	.427	-3.92	-2.71	.837	1.343
4	.551	.563	1.127	.699	.551	.429	-2.14	-1.24	.832	1.324
5	.552	.568	1.103	.677	.552	.431	-1.12	-.38	.832	1.314
6	.552	.575	1.078	.653	.552	.432	-.11	.47	.834	1.304
7	.548	.585	1.042	.622	.548	.434	1.22	1.62	.843	1.298
8	.521	.620	.944	.549	.521	.442	4.72	4.68	.896	1.260
9	.494	.644	.886	.511	.494	.443	6.62	6.36	.943	1.222
10	.446	.676	.813	.474	.446	.441	8.58	8.20	1.033	1.184
11	.411	.696	.770	.459	.411	.440	9.57	9.21	1.116	1.165
HUB	.369	.721	.720	.447	.369	.440	10.69	10.40	1.237	1.143

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
TIP	.00	2.5	-.0	2.4	.421	.819	.136	.095	.028	.020
1	5.00	2.5	-.0	2.5	.427	.835	.124	.089	.026	.019
2	10.00	2.5	-.0	2.6	.433	.849	.114	.084	.024	.017
3	20.00	2.7	-.0	3.0	.444	.873	.097	.074	.020	.015
4	30.00	3.1	-.0	3.4	.455	.897	.081	.063	.017	.013
5	36.00	3.4	-.0	3.7	.463	.907	.074	.059	.016	.012
6	42.00	3.7	-.0	4.0	.474	.913	.071	.059	.015	.012
7	50.00	4.2	-.0	4.6	.488	.923	.066	.057	.014	.012
8	70.00	5.2	-.0	6.4	.520	.939	.060	.058	.013	.013
9	80.00	5.4	-.0	7.8	.539	.942	.065	.064	.014	.014
10	90.00	5.2	-.0	9.9	.553	.942	.076	.076	.017	.017
11	95.00	4.9	-.0	11.3	.553	.944	.082	.082	.018	.018
HUB	100.00	4.7	.1	12.8	.545	.945	.091	.091	.020	.020

TABLE II. - Concluded. DESIGN BLADE-ELEMENT PARAMETERS

(d) Stator two

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
TIP	23.622	23.622	39.2	.0	39.2	.0	398.4	1.000	24.79	.983
1	23.108	23.129	38.8	.0	38.8	.0	395.4	1.000	24.79	.984
2	22.646	22.686	38.5	.0	38.5	.0	392.9	1.000	24.79	.984
3	21.728	21.802	38.2	.0	38.2	.0	388.8	1.000	24.79	.985
4	20.924	20.923	38.1	.0	38.1	.0	385.3	1.000	24.79	.986
5	20.287	20.400	38.3	.0	38.3	.0	383.8	1.000	24.79	.985
6	19.757	19.884	38.8	.0	38.8	.0	383.0	1.000	24.79	.985
7	19.060	19.204	39.5	.0	39.5	.0	382.2	1.000	24.79	.984
8	17.367	17.566	42.1	.0	42.1	.0	381.0	1.000	24.79	.979
9	16.547	16.786	44.5	.0	44.5	.0	381.7	1.000	24.79	.975
10	15.739	16.040	48.0	.0	48.0	.0	383.3	1.000	24.79	.967
11	15.338	15.682	50.3	.0	50.3	.0	384.2	1.000	24.79	.963
HUB	14.869	15.237	52.9	.0	52.9	.0	385.3	1.000	24.79	.958

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
TIP	217.8	170.2	217.8	170.2	168.8	170.2	137.7	.0	.0	.0
1	218.8	170.3	218.8	170.3	170.6	170.3	137.0	.0	.0	.0
2	219.8	170.3	219.8	170.3	172.0	170.3	136.8	.0	.0	.0
3	222.1	170.3	222.1	170.3	174.5	170.3	137.4	.0	.0	.0
4	224.5	170.3	224.5	170.3	176.6	170.3	138.6	.0	.0	.0
5	226.3	170.3	226.3	170.3	177.5	170.3	140.4	.0	.0	.0
6	228.4	170.3	228.4	170.3	178.0	170.3	143.1	.0	.0	.0
7	231.4	170.1	231.4	170.1	178.5	170.1	147.3	.0	.0	.0
8	240.3	169.5	240.3	169.5	178.2	169.5	161.3	.0	.0	.0
9	245.9	168.5	245.9	168.5	175.5	168.5	172.3	.0	.0	.0
10	252.3	167.5	252.3	167.5	168.8	167.5	187.6	.0	.0	.0
11	255.7	167.5	255.7	167.5	163.4	167.5	196.7	.0	.0	.0
HUB	260.2	167.4	260.2	167.4	156.8	167.4	207.7	.0	.0	.0

	ABS MACH NO		REL MACH NO		MERID MACH NO		STREAMLINE SLOPE		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
TIP	.562	.434	.562	.434	.435	.434	-.10	-.03	1.008	.787
1	.567	.435	.567	.435	.442	.435	.19	.18	.998	.775
2	.571	.437	.571	.437	.447	.437	.44	.35	.990	.767
3	.581	.439	.581	.439	.457	.439	.88	.65	.975	.759
4	.591	.441	.591	.441	.465	.441	1.32	.90	.964	.758
5	.597	.442	.597	.442	.468	.442	1.58	1.01	.959	.763
6	.603	.443	.603	.443	.470	.443	1.86	1.11	.956	.773
7	.613	.443	.613	.443	.473	.443	2.23	1.24	.953	.787
8	.639	.442	.639	.442	.474	.442	3.23	1.45	.951	.838
9	.655	.439	.655	.439	.467	.439	3.81	1.53	.960	.884
10	.672	.435	.672	.435	.449	.435	4.55	1.55	.993	.954
11	.681	.435	.681	.435	.435	.435	5.01	1.52	1.025	.999
HUB	.693	.434	.693	.434	.417	.434	5.57	1.49	1.068	1.056

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
TIP	.00	2.8	-3.0	16.2	.471	.000	.086	.086	.034	.034
1	5.00	2.7	-3.0	14.0	.466	.000	.083	.083	.032	.032
2	10.00	2.7	-3.0	12.4	.463	.000	.080	.080	.031	.031
3	20.00	2.7	-3.0	10.4	.461	.000	.073	.073	.027	.027
4	30.00	2.6	-3.0	9.5	.459	.000	.069	.069	.024	.024
5	36.00	2.6	-3.0	9.3	.460	.000	.068	.068	.023	.023
6	42.00	2.6	-3.0	9.2	.464	.000	.069	.069	.023	.023
7	50.00	2.5	-3.0	9.1	.470	.000	.072	.072	.023	.023
8	70.00	2.3	-3.0	9.5	.492	.000	.086	.086	.025	.025
9	80.00	2.3	-3.0	10.5	.511	.000	.102	.102	.029	.029
10	90.00	2.1	-3.0	12.8	.533	.000	.125	.125	.034	.034
11	95.00	2.1	-3.0	14.7	.544	.000	.138	.138	.036	.036
HUB	100.00	1.9	-3.0	17.2	.557	.000	.156	.156	.039	.039

TABLE III. - BLADE GEOMETRY

(a) Rotor one

RP	PERCENT SPAN	RADII RI	RADII RO	BLADE ANGLES KIC	BLADE ANGLES KTC	BLADE ANGLES KOC	DELTA INC	CONE ANGLE
TIP	0.	25.400	24.938	66.34	63.45	59.36	2.04	-12.624
1	5.	24.704	24.266	64.50	61.99	58.37	2.23	-11.279
2	10.	23.977	23.594	62.80	60.43	57.16	2.46	-9.342
3	20.	22.538	22.250	60.02	57.21	54.03	3.01	-6.371
4	30.	21.091	20.907	57.33	53.66	50.21	3.40	-3.741
5	36.	20.219	20.101	55.77	51.46	47.46	3.64	-2.288
6	42.	19.343	19.294	54.23	49.15	44.18	3.89	-.891
7	50.	18.167	18.219	52.18	45.94	39.01	4.21	.898
8	70.	15.134	15.532	46.99	36.89	19.96	4.88	5.684
9	80.	13.534	14.188	44.35	31.92	6.51	4.98	8.621
10	90.	11.853	12.845	41.73	27.08	-8.65	4.78	12.240
11	95.	10.973	12.173	40.46	24.92	-16.35	4.53	14.460
HUB	100.	10.160	11.501	39.30	23.02	-24.12	4.27	15.866

RP	BLADE THICKNESSES TI	TM	TO	AXIAL DIMENSIONS ZI	ZMC	ZTC	ZD
TIP	.047	.136	.047	1.337	2.318	2.722	3.401
1	.052	.148	.051	1.268	2.320	2.688	3.466
2	.056	.161	.056	1.202	2.322	2.647	3.531
3	.065	.187	.066	1.088	2.324	2.544	3.659
4	.074	.212	.076	.973	2.325	2.412	3.795
5	.079	.228	.081	.903	2.325	2.319	3.879
6	.085	.244	.087	.832	2.324	2.215	3.969
7	093	.265	.095	.732	2.320	2.057	4.094
8	.113	.320	.115	.439	2.293	1.555	4.437
9	.124	.350	.126	.273	2.287	1.254	4.589
10	.136	.385	.137	.117	2.285	.952	4.687
11	.143	.405	.143	.054	2.293	.816	4.706
HUB	.149	.423	.150	.000	2.301	.696	4.719

RP	AERO CHORD	SETTING ANGLE	TOTAL CAMBER	SOLIDITY	TURNING RATIO	PHISS	CHOKE MARGIN
TIP	4.739	63.84	6.97	1.288	.298	3.56	.040
1	4.752	62.23	6.13	1.328	.338	3.13	.040
2	4.750	60.60	5.64	1.367	.403	2.92	.040
3	4.743	57.38	5.09	1.450	.621	3.16	.040
4	4.739	53.84	7.12	1.544	.935	3.72	.040
5	4.737	51.54	8.31	1.608	1.089	4.13	.040
6	4.736	49.01	10.05	1.678	1.178	4.63	.040
7	4.736	45.26	13.17	1.782	1.251	5.39	.040
8	4.748	32.63	27.03	2.119	1.356	7.99	.040
9	4.770	24.11	37.84	2.355	1.467	9.56	.040
10	4.826	14.51	50.38	2.674	1.660	10.99	.040
11	4.871	9.66	56.81	2.881	1.786	11.47	.040
HUB	4.923	4.85	63.42	3.111	1.909	11.85	.040

TABLE III. - Continued. BLADE GEOMETRY

(b) Stator one

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	35.53	18.39	-16.99	5.96	.057
1	5.	23.758	23.761	35.19	19.29	-13.93	5.96	.057
2	10.	23.167	23.200	34.98	20.01	-11.87	5.96	.331
3	20.	21.981	22.068	34.96	21.01	-10.04	5.91	.884
4	30.	20.787	20.927	35.24	21.89	-9.30	5.84	1.434
5	36.	20.070	20.243	35.69	22.52	-8.97	5.80	1.778
6	42.	19.350	19.558	36.45	23.26	-8.80	5.75	2.141
7	50.	18.388	18.650	37.60	24.34	-8.62	5.67	2.702
8	70.	15.962	16.388	41.11	27.43	-8.96	5.45	4.427
9	80.	14.733	15.263	43.56	29.39	-9.73	5.32	5.527
10	90.	13.493	14.144	46.49	31.56	-11.65	5.14	6.797
11	95.	12.868	13.586	48.04	32.67	-13.16	5.03	7.501
HUB	100.	12.189	12.931	49.76	33.90	-15.03	4.89	7.754

RP	BLADE THICKNESSES TI	BLADE THICKNESSES TM	BLADE THICKNESSES TO	AXIAL DIMENSIONS ZI	AXIAL DIMENSIONS ZMC	AXIAL DIMENSIONS ZTC	AXIAL DIMENSIONS ZO
TIP	.150	.460	.150	10.457	13.179	12.211	16.112
1	.146	.454	.146	10.474	13.178	12.198	16.106
2	.141	.448	.141	10.486	13.177	12.181	16.101
3	.131	.436	.131	10.497	13.175	12.131	16.094
4	.122	.425	.121	10.507	13.176	12.079	16.092
5	.117	.418	.115	10.515	13.175	12.054	16.091
6	.111	.411	.110	10.524	13.172	12.034	16.089
7	.103	.402	.102	10.541	13.171	12.011	16.089
8	.085	.379	.084	10.584	13.161	11.938	16.087
9	.075	.367	.074	10.613	13.156	11.899	16.088
10	.066	.355	.065	10.639	13.146	11.846	16.094
11	.061	.350	.060	10.647	13.140	11.810	16.098
HUB	.055	.344	.055	10.656	13.132	11.768	16.103

RP	AERO CHORD	SETTING ANGLE	TOTAL CAMBER	SOLIDITY	TURNING RATIO	PHISS	CHOKE MARGIN
TIP	5.729	9.29	52.52	1.271	1.000	10.86	.224
1	5.728	10.63	49.12	1.305	1.000	9.79	.210
2	5.729	11.56	46.85	1.337	1.000	9.02	.199
3	5.729	12.47	45.00	1.408	1.000	8.17	.182
4	5.730	12.99	44.55	1.487	1.000	7.69	.168
5	5.731	13.39	44.66	1.539	1.000	7.57	.161
6	5.732	13.86	45.25	1.594	1.000	7.64	.154
7	5.734	14.54	46.22	1.676	1.000	7.74	.145
8	5.743	16.18	50.07	1.921	1.000	8.19	.121
9	5.751	17.07	53.29	2.075	1.000	8.64	.112
10	5.762	17.65	58.14	2.256	1.000	9.33	.106
11	5.769	17.73	61.20	2.360	1.000	9.72	.106
HUB	5.768	17.70	64.79	2.485	1.000	10.16	.106

TABLE III. - Continued. BLADE GEOMETRY

(c) Rotor two

RP	PERCENT SPAN	RADII RI	RO	BLADE ANGLES KIC	KTC	KOC	DELTA INC	CONE ANGLE
TIP	0.	24.127	23.719	62.90	58.37	54.69	2.57	-8.911
1	5.	23.533	23.187	61.90	57.70	54.18	2.50	-7.354
2	10.	23.002	22.707	61.04	56.96	53.48	2.50	-6.131
3	20.	21.951	21.741	59.42	55.00	51.31	2.69	-4.123
4	30.	20.900	20.779	57.67	52.82	48.70	3.07	-2.246
5	36.	20.272	20.206	56.59	51.42	46.79	3.37	-1.186
6	42.	19.646	19.636	55.52	50.00	44.57	3.70	-.183
7	50.	18.813	18.888	54.14	48.02	41.14	4.17	1.246
8	70.	16.721	17.072	51.30	42.93	29.92	5.19	5.162
9	80.	15.652	16.198	50.65	40.51	22.09	5.41	7.585
10	90.	14.537	15.351	51.37	38.55	11.58	5.23	10.660
11	95.	13.951	14.938	52.58	37.90	5.04	4.95	12.566
HUB	100.	13.289	14.455	54.11	37.26	-2.85	4.58	14.381

RP	BLADE THICKNESSES TI	TM	TO	AXIAL DIMENSIONS ZI	ZMC	ZTC	ZO
TIP	.060	.173	.060	22.053	23.285	23.731	24.661
1	.065	.175	.066	22.019	23.291	23.694	24.699
2	.070	.179	.071	21.987	23.295	23.657	24.737
3	.079	.196	.080	21.917	23.300	23.571	24.826
4	.089	.222	.090	21.836	23.299	23.462	24.919
5	.094	.241	.096	21.786	23.299	23.390	24.980
6	.100	.261	.102	21.736	23.299	23.312	25.044
7	.107	.289	.110	21.667	23.296	23.199	25.134
8	.126	.357	.129	21.486	23.280	22.878	25.374
9	.135	.385	.138	21.393	23.264	22.702	25.500
10	.146	.406	.147	21.299	23.239	22.517	25.623
11	.152	.413	.153	21.251	23.220	22.421	25.679
HUB	.159	.419	.159	21.197	23.196	22.312	25.744

RP	AERO CHORD	SETTING ANGLE	TOTAL CAMBER	SOLIDITY	TURNING RATIO	PHISS	CHOKE MARGIN
TIP	5.111	59.28	8.21	1.292	.599	5.12	.040
1	5.105	58.46	7.72	1.322	.631	4.68	.040
2	5.103	57.62	7.56	1.350	.676	4.48	.040
3	5.099	55.57	8.11	1.412	.814	4.68	.040
4	5.096	53.25	8.97	1.479	.948	4.96	.040
5	5.095	51.71	9.80	1.523	.996	5.16	.040
6	5.095	50.05	10.95	1.569	1.000	5.36	.040
7	5.096	47.66	13.00	1.635	1.001	5.73	.042
8	5.105	40.67	21.37	1.827	1.000	7.13	.054
9	5.118	36.49	28.56	1.944	1.000	8.40	.069
10	5.146	31.70	39.79	2.082	1.000	10.65	.108
11	5.171	29.12	47.54	2.165	1.000	12.34	.146
HUB	5.203	25.97	56.96	2.269	1.000	14.36	.192

TABLE III. - Concluded. BLADE GEOMETRY

(d) Stator two

RP	PERCENT SPAN	RADII RI	RADII RO	BLADE ANGLES KIC	BLADE ANGLES KTC	BLADE ANGLES KOC	DELTA INC	CONE ANGLE
TIP	0.	23.622	23.622	36.44	18.58	-16.16	5.75	.057
1	5.	23.108	23.129	36.03	19.25	-14.04	5.75	.279
2	10.	22.646	22.686	35.76	19.80	-12.44	5.74	.531
3	20.	21.728	21.802	35.53	20.71	-10.38	5.69	.975
4	30.	20.824	20.923	35.50	21.38	-9.53	5.64	1.318
5	36.	20.287	20.400	35.74	21.82	-9.30	5.59	1.504
6	42.	19.757	19.884	36.24	22.33	-9.20	5.55	1.688
7	50.	19.060	19.204	37.03	23.07	-9.11	5.49	1.925
8	70.	17.367	17.566	39.81	25.20	-9.53	5.33	2.663
9	80.	16.547	16.786	42.24	26.63	-10.46	5.23	3.211
10	90.	15.739	16.040	45.90	28.35	-12.81	5.11	4.058
11	95.	15.338	15.682	48.24	29.31	-14.71	5.02	4.649
HUB	100.	14.869	15.237	51.08	30.44	-17.17	4.92	4.978

RP	BLADE THICKNESSES TI	BLADE THICKNESSES TM	BLADE THICKNESSES TO	AXIAL DIMENSIONS ZI	AXIAL DIMENSIONS ZMC	AXIAL DIMENSIONS ZTC	AXIAL DIMENSIONS ZO
TIP	.125	.356	.125	30.141	32.232	31.540	34.500
1	.121	.350	.121	30.150	32.233	31.526	34.497
2	.117	.345	.117	30.157	32.233	31.512	34.494
3	.109	.335	.109	30.166	32.231	31.479	34.488
4	.102	.326	.102	30.172	32.232	31.442	34.487
5	.097	.321	.097	30.176	32.232	31.425	34.486
6	.092	.315	.092	30.181	32.232	31.412	34.486
7	.087	.308	.086	30.188	32.229	31.396	34.485
8	.072	.290	.072	30.214	32.226	31.368	34.487
9	.066	.281	.065	30.234	32.222	31.366	34.491
10	.059	.273	.058	30.259	32.217	31.371	34.501
11	.055	.269	.055	30.272	32.212	31.372	34.507
HUB	.051	.264	.051	30.288	32.205	31.373	34.516

RP	AERO CHORD	SETTING ANGLE	TOTAL CAMBER	SOLIDITY	TURNING RATIO	PHISS	CHOKE MARGIN
TIP	4.426	10.14	52.60	1.253	1.000	12.03	.301
1	4.426	11.00	50.07	1.280	1.000	11.07	.286
2	4.426	11.67	48.20	1.305	1.000	10.34	.274
3	4.427	12.59	45.90	1.360	1.000	9.35	.254
4	4.427	13.00	45.02	1.418	1.000	8.75	.239
5	4.427	13.24	45.04	1.455	1.000	8.60	.231
6	4.428	13.54	45.44	1.493	1.000	8.64	.224
7	4.428	13.99	46.14	1.547	1.000	8.75	.216
8	4.430	15.18	49.34	1.695	1.000	9.47	.199
9	4.432	15.95	52.70	1.778	1.000	10.52	.197
10	4.435	16.63	58.71	1.866	1.000	12.52	.211
11	4.438	16.88	62.95	1.913	1.000	13.93	.228
HUB	4.439	17.13	68.25	1.971	1.000	15.66	.248

TABLE IV. - FAN DESIGN BLOCKAGE ALLOWANCES AND BLADING VALUES

	BLOCKAGE, PERCENT		ASPECT RATIO	NUMBER OF BLADES
	INLET	OUTLET		
ROTOR ONE	2.0	2.6	2.90	43
STATOR ONE	3.6	4.0	1.98	34
ROTOR TWO	4.0	4.0	1.89	38
STATOR TWO	4.0	4.0	1.85	42

TABLE V. - OVERALL PERFORMANCE AT

100 PERCENT OF DESIGN SPEED

(a) Two-stage fan

READING NUMBER	190	201	212	223	234
TOTAL PRESSURE RATIO	2.206	2.096	1.948	1.829	2.300
TOTAL TEMPERATURE RATIO	1.318	1.305	1.285	1.271	1.337
ADIABATIC EFFICIENCY	0.796	0.770	0.734	0.694	0.794
POLYTROPIC EFFICIENCY	0.817	0.792	0.758	0.719	0.817
WEIGHT FLOW	32.85	33.17	33.16	33.11	32.90
WHEEL SPEED, RPM	15923.1	16101.5	16070.6	16029.7	16038.8
PERCENT OF DESIGN SPEED	99.3	100.4	100.2	99.9	100.0
DELTA	0.911	0.910	0.909	0.910	0.910
THETA	1.043	1.041	1.034	1.028	1.022

(b) Stage one

READING NUMBER	190	201	212	223	234
ROTOR TOTAL PRESSURE RATIO	1.526	1.514	1.509	1.505	1.555
STAGE TOTAL PRESSURE RATIO	1.502	1.492	1.487	1.484	1.531
ROTOR TOTAL TEMPERATURE RATIO	1.153	1.152	1.152	1.151	1.161
STAGE TOTAL TEMPERATURE RATIO	1.153	1.152	1.152	1.151	1.161
ROTOR ADIABATIC EFFICIENCY	0.836	0.826	0.822	0.821	0.832
STAGE ADIABATIC EFFICIENCY	0.803	0.796	0.791	0.790	0.802
ROTOR POLYTROPIC EFFICIENCY	0.845	0.836	0.832	0.831	0.842
STAGE POLYTROPIC EFFICIENCY	0.814	0.807	0.803	0.801	0.814
ROTOR HEAD RISE COEFFICIENT	0.215	0.206	0.205	0.205	0.222
STAGE HEAD RISE COEFFICIENT	0.206	0.198	0.197	0.197	0.214
FLOW COEFFICIENT	0.453	0.454	0.455	0.455	0.450
EQUIVALENT VALUES BASED ON STAGE INLET					
WEIGHT FLOW	32.87	33.19	33.17	33.13	32.91
WEIGHT FLOW PER UNIT ANNULUS AREA	193.07	194.95	194.84	194.58	193.32
WEIGHT FLOW PER UNIT FRONTAL AREA	162.18	163.75	163.66	163.44	162.39

(c) Stage two

READING NUMBER	190	201	212	223	234
ROTOR TOTAL PRESSURE RATIO	1.500	1.436	1.354	1.298	1.533
STAGE TOTAL PRESSURE RATIO	1.469	1.405	1.310	1.233	1.502
ROTOR TOTAL TEMPERATURE RATIO	1.142	1.133	1.116	1.104	1.151
STAGE TOTAL TEMPERATURE RATIO	1.142	1.133	1.116	1.104	1.151
ROTOR ADIABATIC EFFICIENCY	0.860	0.818	0.779	0.741	0.858
STAGE ADIABATIC EFFICIENCY	0.813	0.767	0.691	0.592	0.813
ROTOR POLYTROPIC EFFICIENCY	0.868	0.827	0.788	0.750	0.866
STAGE POLYTROPIC EFFICIENCY	0.822	0.778	0.703	0.603	0.823
ROTOR HEAD RISE COEFFICIENT	0.262	0.227	0.189	0.163	0.275
STAGE HEAD RISE COEFFICIENT	0.248	0.213	0.168	0.129	0.261
FLOW COEFFICIENT	0.492	0.499	0.502	0.503	0.480
EQUIVALENT VALUES BASED ON STAGE INLET					
WEIGHT FLOW	23.50	23.88	23.94	23.95	23.17
WEIGHT FLOW PER UNIT ANNULUS AREA	184.50	187.45	187.92	188.03	181.85
WEIGHT FLOW PER UNIT FRONTAL AREA	128.53	130.58	130.91	130.98	126.68

TABLE VI. - OVERALL PERFORMANCE AT

80 PERCENT OF DESIGN SPEED

(a) Two-stage fan

READING NUMBER	245	279	290
TOTAL PRESSURE RATIO	1.726	1.654	1.587
TOTAL TEMPERATURE RATIO	1.204	1.185	1.174
ADIABATIC EFFICIENCY	0.824	0.833	0.810
POLYTROPIC EFFICIENCY	0.837	0.844	0.822
WEIGHT FLOW	24.67	26.19	26.77
WHEEL SPEED, RPM	12805.1	12886.0	12899.9
PERCENT OF DESIGN SPEED	79.8	80.3	80.4
DELTA	0.938	0.928	0.926
THETA	1.027	1.045	1.042

(b) Stage one

READING NUMBER	245	279	290
ROTOR TOTAL PRESSURE RATIO	1.354	1.351	1.345
STAGE TOTAL PRESSURE RATIO	1.337	1.337	1.330
ROTOR TOTAL TEMPERATURE RATIO	1.105	1.102	1.100
STAGE TOTAL TEMPERATURE RATIO	1.105	1.102	1.100
ROTOR ADIABATIC EFFICIENCY	0.862	0.880	0.887
STAGE ADIABATIC EFFICIENCY	0.825	0.847	0.853
ROTOR POLYTROPIC EFFICIENCY	0.868	0.885	0.891
STAGE POLYTROPIC EFFICIENCY	0.832	0.854	0.859
ROTOR HEAD RISE COEFFICIENT	0.234	0.229	0.225
STAGE HEAD RISE COEFFICIENT	0.224	0.221	0.217
FLOW COEFFICIENT	0.386	0.413	0.423
EQUIVALENT VALUES BASED ON STAGE INLET			
WEIGHT FLOW	24.68	26.20	26.78
WEIGHT FLOW PER UNIT ANNULUS AREA	144.97	153.87	157.31
WEIGHT FLOW PER UNIT FRONTAL AREA	121.77	129.25	132.14

(c) Stage two

READING NUMBER	245	279	290
ROTOR TOTAL PRESSURE RATIO	1.310	1.258	1.222
STAGE TOTAL PRESSURE RATIO	1.291	1.237	1.193
ROTOR TOTAL TEMPERATURE RATIO	1.090	1.076	1.068
STAGE TOTAL TEMPERATURE RATIO	1.090	1.076	1.067
ROTOR ADIABATIC EFFICIENCY	0.886	0.896	0.871
STAGE ADIABATIC EFFICIENCY	0.839	0.829	0.764
ROTOR POLYTROPIC EFFICIENCY	0.890	0.899	0.875
STAGE POLYTROPIC EFFICIENCY	0.845	0.834	0.770
ROTOR HEAD RISE COEFFICIENT	0.253	0.211	0.183
STAGE HEAD RISE COEFFICIENT	0.239	0.195	0.160
FLOW COEFFICIENT	0.463	0.496	0.511
EQUIVALENT VALUES BASED ON STAGE INLET			
WEIGHT FLOW	19.41	20.58	21.11
WEIGHT FLOW PER UNIT ANNULUS AREA	152.33	161.51	165.70
WEIGHT FLOW PER UNIT FRONTAL AREA	106.12	112.51	115.43

TABLE VII. - OVERALL PERFORMANCE AT

60 PERCENT OF DESIGN SPEED

(a) Two-stage fan

READING NUMBER	374	396	407	421
TOTAL PRESSURE RATIO	1.362	1.317	1.289	1.225
TOTAL TEMPERATURE RATIO	1.114	1.099	1.091	1.080
ADIABATIC EFFICIENCY	0.812	0.831	0.826	0.752
POLYTROPIC EFFICIENCY	0.820	0.837	0.832	0.759
WEIGHT FLOW	16.68	18.61	19.27	20.50
WHEEL SPEED, RPM	9635.4	9664.6	9652.7	9642.2
PERCENT OF DESIGN SPEED	60.1	60.2	60.2	60.1
DELTA	0.947	0.944	0.942	0.940
THETA	1.038	1.030	1.026	1.038

(b) Stage one

READING NUMBER	374	396	407	421
ROTOR TOTAL PRESSURE RATIO	1.191	1.185	1.179	1.168
STAGE TOTAL PRESSURE RATIO	1.181	1.178	1.172	1.161
ROTOR TOTAL TEMPERATURE RATIO	1.061	1.057	1.054	1.050
STAGE TOTAL TEMPERATURE RATIO	1.061	1.057	1.054	1.050
ROTOR ADIABATIC EFFICIENCY	0.837	0.869	0.887	0.906
STAGE ADIABATIC EFFICIENCY	0.793	0.838	0.855	0.870
ROTOR POLYTROPIC EFFICIENCY	0.841	0.872	0.890	0.908
STAGE POLYTROPIC EFFICIENCY	0.798	0.841	0.858	0.872
ROTOR HEAD RISE COEFFICIENT	0.234	0.226	0.219	0.207
STAGE HEAD RISE COEFFICIENT	0.223	0.218	0.211	0.199
FLOW COEFFICIENT	0.332	0.372	0.387	0.415
EQUIVALENT VALUES BASED ON STAGE INLET				
WEIGHT FLOW	16.68	18.61	19.27	20.51
WEIGHT FLOW PER UNIT ANNULUS AREA	97.99	109.31	113.21	120.44
WEIGHT FLOW PER UNIT FRONTAL AREA	82.31	91.82	95.10	101.17

(c) Stage two

READING NUMBER	374	396	407	421
ROTOR TOTAL PRESSURE RATIO	1.163	1.131	1.116	1.090
STAGE TOTAL PRESSURE RATIO	1.153	1.118	1.100	1.056
ROTOR TOTAL TEMPERATURE RATIO	1.049	1.039	1.035	1.028
STAGE TOTAL TEMPERATURE RATIO	1.049	1.039	1.035	1.028
ROTOR ADIABATIC EFFICIENCY	0.897	0.910	0.914	0.883
STAGE ADIABATIC EFFICIENCY	0.845	0.829	0.789	0.555
ROTOR POLYTROPIC EFFICIENCY	0.899	0.911	0.915	0.885
STAGE POLYTROPIC EFFICIENCY	0.848	0.832	0.792	0.559
ROTOR HEAD RISE COEFFICIENT	0.237	0.190	0.170	0.132
STAGE HEAD RISE COEFFICIENT	0.223	0.173	0.147	0.083
FLOW COEFFICIENT	0.433	0.488	0.510	0.555
EQUIVALENT VALUES BASED ON STAGE INLET				
WEIGHT FLOW	14.55	16.25	16.89	18.10
WEIGHT FLOW PER UNIT ANNULUS AREA	114.22	127.52	132.56	142.09
WEIGHT FLOW PER UNIT FRONTAL AREA	79.57	88.83	92.34	98.98

TABLE VIII. - BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR ONE

(a) Reading 190

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.704	24.265	0.0	41.0	68.8	63.5	288.8	1.170	9.86	1.497
2	23.978	23.594	-0.5	38.0	65.8	61.4	288.5	1.162	10.14	1.480
3	22.537	22.250	-0.2	36.5	62.7	57.3	288.4	1.154	10.15	1.511
4	21.092	20.907	-0.3	37.6	60.6	53.8	288.0	1.153	10.16	1.515
5	20.218	20.102	-0.4	38.9	59.3	51.9	287.9	1.152	10.17	1.505
6	19.342	19.294	-0.4	40.1	58.0	49.6	287.9	1.151	10.17	1.494
7	18.166	18.219	-0.5	40.6	56.3	45.0	287.9	1.149	10.17	1.506
8	15.133	15.532	-0.4	42.2	51.8	27.4	287.9	1.148	10.17	1.563
9	13.533	14.188	-0.3	44.2	49.1	16.2	287.9	1.150	10.17	1.574
10	11.854	12.845	-0.3	47.5	46.8	1.5	287.8	1.155	10.17	1.577
11	10.973	12.172	0.0	48.3	46.9	-5.1	288.9	1.154	9.95	1.607

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	159.7	186.4	441.9	315.7	159.7	140.7	0.0	122.2	412.1	404.7
2	180.1	191.1	440.1	314.4	180.1	150.6	-1.6	117.6	399.9	393.5
3	194.6	201.3	424.1	299.1	194.6	161.7	-0.7	119.8	376.2	371.4
4	198.8	206.2	405.1	276.3	198.8	163.3	-1.1	125.9	351.9	348.8
5	201.2	207.0	394.1	261.2	201.2	161.2	-1.5	129.9	337.3	335.4
6	202.4	208.4	382.0	246.2	202.4	159.4	-1.3	134.2	322.6	321.8
7	203.3	215.5	366.2	231.2	203.3	163.5	-1.7	140.3	302.9	303.8
8	199.4	245.0	322.5	204.7	199.4	181.6	-1.3	164.4	252.1	258.8
9	196.5	261.1	299.9	194.8	196.5	187.0	-1.1	182.1	225.6	236.5
10	186.5	283.2	272.2	191.3	186.5	191.3	-1.1	208.9	197.3	213.7
11	171.2	295.1	250.6	197.0	171.2	196.2	0.1	220.4	183.0	203.0

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.479	0.519	1.326	0.880	0.479	0.392	0.881	1.503
2	0.544	0.536	1.330	0.881	0.544	0.422	0.836	1.450
3	0.591	0.568	1.289	0.844	0.591	0.456	0.831	1.388
4	0.605	0.584	1.233	0.782	0.605	0.462	0.821	1.365
5	0.613	0.586	1.201	0.740	0.613	0.457	0.801	1.351
6	0.617	0.591	1.165	0.698	0.617	0.452	0.788	1.338
7	0.620	0.613	1.117	0.658	0.620	0.465	0.805	1.329
8	0.607	0.705	0.982	0.589	0.607	0.523	0.911	1.339
9	0.598	0.756	0.913	0.564	0.598	0.541	0.952	1.289
10	0.565	0.826	0.826	0.558	0.565	0.558	1.026	1.222
11	0.515	0.864	0.754	0.577	0.515	0.575	1.146	1.173

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	4.2	2.0	5.1	0.389	0.719	0.203	0.133	0.034	0.022
2	10.00	3.0	0.5	4.2	0.384	0.734	0.185	0.125	0.032	0.022
3	20.00	2.6	-0.4	3.2	0.392	0.812	0.132	0.088	0.025	0.016
4	30.00	3.3	-0.1	3.5	0.419	0.825	0.129	0.095	0.025	0.018
5	36.00	3.5	-0.1	4.4	0.441	0.815	0.140	0.111	0.027	0.021
6	42.00	3.8	-0.1	5.5	0.461	0.807	0.150	0.127	0.029	0.024
7	50.00	4.1	-0.1	6.0	0.478	0.834	0.136	0.118	0.027	0.023
8	70.00	4.8	-0.1	7.5	0.488	0.919	0.080	0.071	0.017	0.015
9	80.00	4.8	-0.2	9.6	0.483	0.925	0.083	0.081	0.017	0.016
10	90.00	5.1	0.3	10.1	0.447	0.896	0.139	0.138	0.026	0.026
11	95.00	6.6	2.0	11.4	0.374	0.944	0.086	0.086	0.015	0.015

TABLE VIII. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR ONE

(b) Reading 201

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.704	24.265	-0.1	39.1	68.7	64.1	288.9	1.163	9.86	1.469
2	23.978	23.594	-0.5	36.3	65.7	61.9	288.6	1.156	10.13	1.455
3	22.537	22.250	-0.3	35.1	62.6	57.6	288.2	1.151	10.15	1.491
4	21.092	20.907	-0.4	36.2	60.5	54.1	288.1	1.150	10.17	1.501
5	20.218	20.102	-0.4	37.6	59.1	52.4	288.0	1.149	10.17	1.487
6	19.342	19.294	-0.4	39.0	57.8	50.5	288.0	1.148	10.17	1.471
7	18.166	18.219	-0.5	40.0	56.1	45.7	287.8	1.149	10.17	1.489
8	15.133	15.532	-0.5	41.4	51.8	27.6	287.9	1.150	10.17	1.563
9	13.533	14.188	-0.4	43.4	49.0	16.1	287.9	1.152	10.17	1.586
10	11.854	12.845	-0.4	46.7	46.8	2.1	287.9	1.158	10.17	1.579
11	10.973	12.172	0.1	47.5	47.0	-4.4	289.0	1.156	9.94	1.611

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	162.1	183.9	447.3	326.3	162.1	142.8	-0.1	115.9	416.7	409.3
2	182.8	189.4	445.2	323.7	182.8	152.6	-1.7	112.2	404.1	397.7
3	197.7	201.3	429.5	307.6	197.7	164.7	-0.9	115.8	380.4	375.6
4	202.1	206.6	410.1	284.5	202.1	166.8	-1.3	121.9	355.6	352.4
5	204.4	206.4	398.2	268.2	204.4	163.6	-1.4	125.8	340.2	338.3
6	205.7	206.8	386.4	252.5	205.7	160.7	-1.4	130.2	325.7	324.9
7	206.4	215.1	370.5	235.6	206.4	164.7	-1.8	138.3	305.9	306.8
8	202.2	248.8	326.8	210.7	202.2	186.8	-1.6	164.4	255.1	261.9
9	199.3	266.7	303.9	201.6	199.3	193.7	-1.4	183.2	228.1	239.1
10	188.9	288.2	276.1	197.7	188.9	197.5	-1.2	209.8	200.2	216.9
11	172.9	300.2	253.4	203.2	172.9	202.6	0.2	221.5	185.5	205.8

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.487	0.514	1.343	0.911	0.487	0.399	0.881	1.517
2	0.553	0.532	1.346	0.909	0.553	0.428	0.855	1.462
3	0.601	0.569	1.307	0.870	0.601	0.466	0.833	1.402
4	0.616	0.585	1.250	0.806	0.616	0.473	0.825	1.376
5	0.624	0.585	1.215	0.760	0.624	0.464	0.800	1.357
6	0.628	0.587	1.180	0.716	0.628	0.456	0.781	1.345
7	0.631	0.612	1.132	0.670	0.631	0.469	0.798	1.334
8	0.617	0.716	0.997	0.607	0.617	0.538	0.924	1.358
9	0.607	0.773	0.926	0.584	0.607	0.561	0.972	1.305
10	0.573	0.841	0.838	0.577	0.573	0.577	1.046	1.242
11	0.521	0.881	0.764	0.596	0.521	0.594	1.172	1.189

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	4.1	1.9	5.6	0.367	0.711	0.199	0.123	0.033	0.020
2	10.00	2.9	0.4	4.7	0.366	0.724	0.184	0.119	0.032	0.021
3	20.00	2.5	-0.5	3.6	0.377	0.800	0.136	0.087	0.025	0.016
4	30.00	3.1	-0.3	3.9	0.403	0.821	0.128	0.090	0.024	0.017
5	36.00	3.3	-0.3	4.9	0.426	0.806	0.142	0.111	0.027	0.021
6	42.00	3.6	-0.3	6.3	0.448	0.790	0.158	0.133	0.030	0.025
7	50.00	4.0	-0.3	6.6	0.470	0.811	0.151	0.131	0.030	0.026
8	70.00	4.8	-0.1	7.6	0.477	0.907	0.090	0.079	0.019	0.017
9	80.00	4.7	-0.3	9.5	0.469	0.924	0.084	0.080	0.017	0.016
10	90.00	5.2	0.4	10.7	0.433	0.885	0.152	0.152	0.028	0.028
11	95.00	6.7	2.1	12.0	0.357	0.935	0.099	0.099	0.017	0.017

TABLE VIII. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR ONE

(c) Reading 212

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.704	24.265	-0.1	38.6	68.7	64.1	288.9	1.160	9.86	1.459
2	23.978	23.594	-0.6	35.9	65.7	61.8	288.5	1.154	10.13	1.448
3	22.537	22.250	-0.3	34.8	62.5	57.5	288.4	1.149	10.15	1.485
4	21.092	20.907	-0.4	36.0	60.4	53.9	288.1	1.149	10.17	1.499
5	20.218	20.102	-0.4	37.5	59.1	52.3	288.0	1.149	10.17	1.484
6	19.342	19.294	-0.3	39.2	57.8	50.4	287.9	1.148	10.17	1.465
7	18.166	18.219	-0.5	40.0	56.2	45.7	287.8	1.148	10.17	1.484
8	15.133	15.532	-0.5	41.3	51.8	27.2	287.8	1.151	10.17	1.559
9	13.533	14.188	-0.4	43.5	49.0	15.5	287.8	1.154	10.17	1.585
10	11.854	12.845	-0.4	46.6	46.8	1.5	287.9	1.158	10.17	1.577
11	10.973	12.172	0.1	47.1	47.0	-4.6	289.1	1.156	9.94	1.612

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	162.3	182.5	445.8	326.6	162.3	142.7	-0.3	113.8	415.0	407.6
2	182.7	188.8	444.3	324.2	182.7	153.0	-2.0	110.7	403.0	396.5
3	197.5	201.3	428.3	307.6	197.5	165.3	-0.9	114.9	379.1	374.3
4	201.9	207.1	409.3	284.7	201.9	167.7	-1.2	121.6	354.8	351.7
5	204.3	206.8	397.9	268.3	204.3	164.0	-1.3	125.9	340.2	338.3
6	205.5	206.9	386.0	251.7	205.5	160.3	-1.2	130.7	325.6	324.8
7	206.2	214.9	370.6	235.6	206.2	164.5	-2.0	138.2	306.0	306.9
8	202.0	250.0	326.6	211.0	202.0	187.7	-1.8	165.1	254.9	261.6
9	199.1	268.4	303.7	202.1	199.1	194.7	-1.5	184.8	227.9	238.9
10	188.7	290.4	275.5	199.5	188.7	199.4	-1.2	211.1	199.5	216.2
11	172.4	302.7	252.6	206.7	172.4	206.0	0.2	221.7	184.9	205.1

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.487	0.510	1.339	0.913	0.487	0.399	0.880	1.510
2	0.553	0.531	1.344	0.911	0.553	0.430	0.837	1.459
3	0.601	0.569	1.302	0.870	0.601	0.467	0.837	1.396
4	0.616	0.587	1.248	0.807	0.616	0.475	0.830	1.372
5	0.623	0.587	1.214	0.761	0.623	0.465	0.803	1.356
6	0.627	0.587	1.179	0.714	0.627	0.455	0.780	1.344
7	0.630	0.611	1.132	0.670	0.630	0.468	0.798	1.337
8	0.616	0.720	0.996	0.608	0.616	0.540	0.929	1.357
9	0.607	0.778	0.925	0.586	0.606	0.564	0.978	1.305
10	0.573	0.848	0.836	0.583	0.573	0.583	1.057	1.238
11	0.519	0.889	0.761	0.607	0.519	0.605	1.195	1.184

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	4.0	1.8	5.7	0.363	0.711	0.196	0.123	0.032	0.020
2	10.00	2.8	0.4	4.6	0.362	0.724	0.182	0.118	0.031	0.020
3	20.00	2.5	-0.5	3.4	0.374	0.800	0.135	0.088	0.025	0.016
4	30.00	3.1	-0.3	3.7	0.401	0.822	0.127	0.091	0.024	0.017
5	36.00	3.3	-0.3	4.8	0.425	0.803	0.144	0.113	0.027	0.022
6	42.00	3.6	-0.3	6.3	0.450	0.780	0.166	0.141	0.032	0.027
7	50.00	4.0	-0.2	6.7	0.471	0.804	0.157	0.137	0.031	0.027
8	70.00	4.8	-0.1	7.2	0.476	0.898	0.100	0.089	0.021	0.019
9	80.00	4.7	-0.3	9.0	0.468	0.916	0.094	0.090	0.019	0.018
10	90.00	5.1	0.3	10.1	0.426	0.878	0.161	0.161	0.030	0.030
11	95.00	6.6	2.1	11.8	0.342	0.937	0.097	0.097	0.017	0.017

TABLE VIII. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR ONE

(d) Reading 223

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.704	24.265	-0.1	38.5	68.7	63.9	288.8	1.160	9.86	1.456
2	23.978	23.594	-0.6	35.9	65.7	61.7	288.6	1.154	10.14	1.444
3	22.537	22.250	-0.3	34.6	62.5	57.4	288.4	1.149	10.15	1.481
4	21.392	20.907	-0.5	35.7	60.4	53.7	288.1	1.149	10.17	1.496
5	20.218	20.102	-0.5	37.3	59.1	52.2	288.0	1.148	10.17	1.480
6	19.342	19.294	-0.5	38.8	57.9	50.3	287.9	1.147	10.17	1.462
7	18.166	18.219	-0.6	39.9	56.2	45.6	287.8	1.148	10.17	1.480
8	15.133	15.532	-0.5	41.5	51.8	27.3	287.9	1.150	10.17	1.556
9	13.533	14.188	-0.4	43.6	49.0	15.7	287.9	1.153	10.17	1.578
10	11.854	12.845	-0.4	46.7	46.8	1.6	287.9	1.158	10.17	1.576
11	10.973	12.172	-0.0	47.3	47.0	-4.6	289.2	1.155	9.93	1.607

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	161.7	183.2	445.2	326.2	161.7	143.3	-0.3	114.1	414.5	407.1
2	182.4	189.3	443.5	323.6	182.4	153.3	-1.9	110.9	402.4	395.9
3	197.1	201.5	427.2	307.5	197.1	165.9	-1.0	114.3	378.1	373.2
4	201.5	207.3	408.5	284.6	201.5	168.3	-1.7	121.0	353.6	350.5
5	203.8	206.8	397.4	268.5	203.8	164.6	-1.9	125.2	339.3	337.3
6	205.0	206.7	385.7	252.4	205.0	161.1	-1.9	129.6	324.8	324.0
7	205.8	215.0	369.9	235.5	205.8	164.9	-2.2	137.9	305.2	306.1
8	201.7	248.7	325.8	209.6	201.7	186.3	-1.9	164.7	254.1	260.8
9	198.9	266.9	303.2	200.7	198.9	193.2	-1.5	184.2	227.4	238.4
10	188.4	288.9	275.1	198.1	188.3	198.0	-1.5	210.3	199.1	215.7
11	171.8	300.5	252.0	204.4	171.8	203.7	-0.0	220.9	184.4	204.5

	ABS MACH NO		REL MACH NO		MERID MACH NO			
RP	IN	OUT	IN	OUT	IN	OUT	MERID VEL R	PEAK SS MACH NO
1	0.486	0.512	1.337	0.912	0.486	0.401	0.886	1.510
2	0.551	0.532	1.341	0.910	0.551	0.431	0.841	1.456
3	0.599	0.570	1.299	0.870	0.599	0.469	0.842	1.393
4	0.614	0.588	1.245	0.807	0.614	0.477	0.835	1.370
5	0.622	0.587	1.212	0.761	0.622	0.467	0.808	1.356
6	0.626	0.587	1.177	0.716	0.626	0.457	0.786	1.345
7	0.628	0.612	1.130	0.670	0.628	0.469	0.801	1.335
8	0.615	0.716	0.993	0.603	0.615	0.536	0.924	1.353
9	0.606	0.773	0.923	0.581	0.606	0.560	0.972	1.302
10	0.571	0.844	0.835	0.579	0.571	0.578	1.051	1.236
11	0.517	0.882	0.759	0.600	0.517	0.598	1.186	1.182

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	4.1	1.9	5.5	0.363	0.707	0.199	0.126	0.033	0.021
2	10.00	2.8	0.4	4.5	0.363	0.719	0.185	0.122	0.032	0.021
3	20.00	2.5	-0.5	3.3	0.373	0.799	0.135	0.089	0.025	0.017
4	30.00	3.1	-0.3	3.5	0.400	0.821	0.127	0.091	0.024	0.017
5	36.00	3.4	-0.3	4.7	0.424	0.800	0.146	0.116	0.028	0.022
6	42.00	3.7	-0.2	6.2	0.447	0.780	0.165	0.140	0.031	0.027
7	50.00	4.0	-0.2	6.5	0.470	0.800	0.159	0.140	0.031	0.027
8	70.00	4.8	-0.1	7.3	0.479	0.899	0.099	0.089	0.021	0.019
9	80.00	4.7	-0.3	9.1	0.471	0.912	0.098	0.094	0.020	0.019
10	90.00	5.1	0.4	10.2	0.430	0.881	0.157	0.157	0.029	0.029
11	95.00	6.7	2.2	11.8	0.349	0.936	0.097	0.097	0.017	0.017

TABLE VIII. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR ONE

(e) Reading 234

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.704	24.265	-0.2	42.9	69.0	63.1	288.8	1.184	9.86	1.543
2	23.978	23.594	-0.6	39.9	66.0	61.0	288.5	1.174	10.13	1.522
3	22.537	22.250	-0.3	38.1	62.8	57.0	288.3	1.164	10.15	1.545
4	21.092	20.907	-0.5	38.9	60.7	53.3	287.9	1.162	10.17	1.553
5	20.218	20.102	-0.6	40.1	59.4	51.2	287.9	1.161	10.17	1.545
6	19.342	19.294	-0.6	41.2	58.2	48.9	287.9	1.159	10.17	1.533
7	18.166	18.219	-0.6	41.7	56.4	44.5	288.0	1.156	10.17	1.537
8	15.133	15.532	-0.5	43.6	52.0	27.8	287.9	1.153	10.17	1.577
9	13.535	14.188	-0.5	45.4	49.2	16.6	288.0	1.153	10.17	1.576
10	11.854	12.845	-0.5	48.5	47.0	1.3	288.1	1.158	10.17	1.595
11	10.973	12.172	0.0	49.4	47.2	-5.9	289.2	1.157	9.94	1.632

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	160.2	192.5	446.2	311.2	160.2	140.9	-0.4	131.1	416.0	408.6
2	180.6	196.0	444.0	310.4	180.6	150.5	-2.0	125.6	403.6	397.1
3	195.1	204.7	427.1	295.6	195.1	161.2	-1.1	126.2	378.8	374.0
4	199.4	210.2	408.1	273.3	199.4	163.5	-1.8	132.1	354.2	351.1
5	201.8	211.7	396.9	258.5	201.8	162.0	-2.0	136.3	339.7	337.8
6	203.0	213.1	385.0	244.0	203.0	160.3	-2.1	140.3	325.1	324.3
7	203.8	218.5	368.5	228.7	203.8	163.1	-2.3	145.4	304.8	305.7
8	199.7	243.6	324.7	199.4	199.7	176.5	-1.9	167.9	254.2	260.9
9	196.9	258.2	301.6	189.1	196.9	181.3	-1.6	183.9	226.9	237.9
10	186.5	282.0	273.7	187.1	186.5	187.0	-1.6	211.1	198.7	215.4
11	170.0	294.8	250.4	192.8	170.0	191.8	0.1	223.9	184.0	204.1

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.481	0.534	1.340	0.863	0.481	0.391	0.880	1.521
2	0.546	0.547	1.342	0.866	0.546	0.420	0.833	1.467
3	0.593	0.576	1.298	0.831	0.593	0.453	0.826	1.402
4	0.607	0.593	1.243	0.771	0.607	0.461	0.820	1.379
5	0.615	0.598	1.210	0.730	0.615	0.458	0.803	1.364
6	0.619	0.603	1.174	0.690	0.619	0.454	0.790	1.353
7	0.622	0.620	1.124	0.649	0.622	0.463	0.801	1.339
8	0.609	0.699	0.989	0.572	0.608	0.506	0.883	1.357
9	0.599	0.745	0.918	0.546	0.599	0.523	0.920	1.301
10	0.565	0.820	0.830	0.544	0.565	0.544	1.003	1.236
11	0.512	0.862	0.753	0.563	0.512	0.560	1.128	1.180

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	4.4	2.1	4.7	0.412	0.716	0.216	0.141	0.037	0.024
2	10.00	3.1	0.7	3.8	0.405	0.732	0.196	0.131	0.035	0.023
3	20.00	2.8	-0.2	2.9	0.410	0.808	0.141	0.094	0.027	0.018
4	30.00	3.4	0.0	3.0	0.436	0.826	0.134	0.097	0.026	0.019
5	36.00	3.7	0.0	3.7	0.457	0.821	0.141	0.110	0.028	0.021
6	42.00	3.9	0.1	4.7	0.476	0.815	0.150	0.124	0.029	0.024
7	50.00	4.3	0.0	5.5	0.492	0.838	0.137	0.118	0.027	0.024
8	70.00	5.1	0.2	7.8	0.511	0.909	0.091	0.081	0.019	0.017
9	80.00	4.9	-0.1	10.0	0.507	0.911	0.100	0.096	0.020	0.020
10	90.00	5.4	0.6	9.9	0.467	0.902	0.131	0.131	0.025	0.025
11	95.00	6.9	2.4	10.5	0.393	0.955	0.070	0.070	0.012	0.012

TABLE VIII. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR ONE

(f) Reading 245

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.704	24.265	1.4	44.1	71.4	63.0	289.3	1.117	9.99	1.357
2	23.978	23.594	0.7	42.4	68.8	61.2	288.8	1.113	10.13	1.344
3	22.537	22.250	-1.0	38.7	66.2	58.1	288.1	1.105	10.15	1.349
4	21.092	20.907	-1.5	39.2	64.5	54.9	287.9	1.102	10.15	1.347
5	20.218	20.102	-1.3	41.2	63.3	52.9	287.8	1.103	10.15	1.343
6	19.342	19.294	-1.1	43.0	62.2	50.3	287.9	1.103	10.15	1.342
7	18.166	18.219	-1.1	44.5	60.6	45.9	287.9	1.103	10.15	1.340
8	15.133	15.532	-0.7	45.9	56.3	28.4	287.9	1.100	10.15	1.353
9	13.533	14.188	-0.6	47.3	53.7	15.0	287.9	1.101	10.15	1.376
10	11.854	12.845	-0.4	50.7	51.3	-2.1	288.0	1.106	10.15	1.391
11	10.973	12.172	0.0	51.9	51.1	-8.9	288.8	1.104	10.05	1.394

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	110.3	154.4	346.6	244.6	110.3	110.9	2.7	107.4	331.4	325.5
2	124.3	156.5	343.1	240.3	124.3	115.6	1.5	105.5	321.3	316.2
3	134.1	159.0	332.8	234.6	134.0	124.1	-2.2	99.4	302.4	298.5
4	136.4	161.5	317.0	217.5	136.4	125.0	-3.6	102.1	282.5	280.1
5	137.7	163.1	306.8	203.3	137.7	122.7	-3.2	107.4	271.0	269.5
6	138.5	165.7	296.8	189.9	138.4	121.2	-2.7	113.0	259.8	259.2
7	138.9	170.0	282.9	174.4	138.9	121.2	-2.6	119.2	243.8	244.5
8	136.5	190.3	246.0	150.5	136.5	132.4	-1.7	136.7	202.9	208.3
9	134.6	207.7	227.2	145.9	134.6	140.9	-1.3	152.6	181.7	190.5
10	128.1	229.0	204.8	145.0	128.1	144.9	-0.9	177.3	158.8	172.1
11	118.5	236.3	188.7	147.6	118.5	145.9	0.1	185.9	146.9	163.0

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.327	0.437	1.027	0.692	0.327	0.314	1.006	1.364
2	0.370	0.444	1.021	0.682	0.370	0.328	0.930	1.312
3	0.400	0.454	0.994	0.669	0.400	0.354	0.926	1.298
4	0.408	0.462	0.947	0.622	0.408	0.358	0.917	1.276
5	0.412	0.467	0.917	0.581	0.412	0.351	0.891	1.254
6	0.414	0.474	0.887	0.543	0.414	0.347	0.876	1.234
7	0.415	0.487	0.846	0.500	0.415	0.347	0.873	1.202
8	0.408	0.549	0.735	0.435	0.408	0.382	0.970	1.116
9	0.402	0.603	0.679	0.423	0.402	0.409	1.047	1.064
10	0.382	0.668	0.611	0.423	0.382	0.423	1.131	0.996
11	0.352	0.691	0.561	0.432	0.352	0.426	1.231	0.951

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	6.8	4.6	4.6	0.407	0.778	0.158	0.144	0.027	0.025
2	10.00	5.9	3.4	4.0	0.410	0.778	0.156	0.147	0.027	0.026
3	20.00	6.2	3.2	4.0	0.400	0.853	0.101	0.094	0.018	0.017
4	30.00	7.2	3.8	4.7	0.421	0.867	0.096	0.093	0.018	0.017
5	36.00	7.6	3.9	5.4	0.449	0.853	0.112	0.110	0.021	0.021
6	42.00	8.0	4.1	6.1	0.476	0.847	0.123	0.122	0.023	0.023
7	50.00	8.4	4.2	6.9	0.505	0.848	0.130	0.130	0.025	0.025
8	70.00	9.3	4.4	8.4	0.523	0.906	0.099	0.099	0.021	0.021
9	80.00	9.3	4.4	8.5	0.505	0.944	0.069	0.069	0.014	0.014
10	90.00	9.6	4.8	6.6	0.461	0.933	0.102	0.102	0.019	0.019
11	95.00	10.8	6.2	7.6	0.397	0.953	0.083	0.083	0.014	0.014

TABLE VIII. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR ONE

(g) Reading 279

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.704	24.265	0.8	41.3	70.3	63.2	289.1	1.111	9.97	1.337
2	23.978	23.594	0.6	38.9	67.5	61.0	288.9	1.106	10.13	1.329
3	22.537	22.250	-0.4	36.0	64.7	57.5	288.1	1.100	10.15	1.337
4	21.092	20.907	-1.0	36.5	63.0	54.0	287.9	1.098	10.15	1.344
5	20.218	20.102	-0.9	38.0	61.8	51.7	287.9	1.099	10.15	1.343
6	19.342	19.294	-0.8	39.9	60.5	48.7	287.8	1.101	10.15	1.345
7	18.166	18.219	-0.8	41.5	58.9	44.3	287.8	1.101	10.15	1.346
8	15.133	15.532	-0.6	43.5	54.5	27.6	287.9	1.099	10.15	1.353
9	13.533	14.188	-0.5	45.3	51.8	14.9	287.9	1.101	10.15	1.377
10	11.854	12.845	-0.3	49.2	49.4	-2.0	288.0	1.107	10.15	1.394
11	10.973	12.172	-0.1	49.9	49.3	-8.1	288.6	1.106	10.04	1.402

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	118.6	152.6	352.3	254.1	118.6	114.7	1.6	100.7	333.4	327.4
2	133.5	156.3	348.3	251.3	133.5	121.7	1.4	98.1	323.1	317.9
3	143.9	161.7	337.2	243.1	143.9	130.8	-1.0	95.1	304.0	300.1
4	146.5	165.8	322.1	226.8	146.5	133.3	-2.5	98.5	284.4	281.9
5	148.0	168.3	312.8	214.1	148.0	132.7	-2.4	103.6	273.1	271.6
6	148.8	172.0	302.4	200.0	148.8	132.0	-2.1	110.2	261.1	260.5
7	149.3	176.6	289.0	185.0	149.3	132.4	-2.0	116.9	245.4	246.1
8	146.7	196.3	252.6	160.6	146.6	142.4	-1.5	135.2	204.2	209.6
9	144.6	213.1	233.9	155.2	144.6	150.0	-1.2	151.4	182.6	191.4
10	137.7	236.2	211.7	154.5	137.7	154.4	-0.8	178.7	160.0	173.4
11	127.4	244.2	195.5	159.0	127.4	157.3	-0.2	186.8	148.1	164.3

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.352	0.433	1.046	0.720	0.352	0.325	0.967	1.332
2	0.398	0.445	1.038	0.715	0.398	0.346	0.912	1.271
3	0.431	0.463	1.009	0.696	0.431	0.374	0.909	1.252
4	0.439	0.475	0.965	0.650	0.439	0.382	0.910	1.246
5	0.444	0.483	0.937	0.614	0.443	0.381	0.896	1.229
6	0.446	0.494	0.907	0.574	0.446	0.379	0.887	1.207
7	0.448	0.508	0.866	0.531	0.448	0.380	0.887	1.180
8	0.439	0.568	0.757	0.465	0.439	0.412	0.971	1.103
9	0.433	0.620	0.700	0.451	0.433	0.436	1.037	1.054
10	0.412	0.690	0.633	0.452	0.412	0.451	1.121	0.993
11	0.379	0.716	0.582	0.466	0.379	0.461	1.235	0.953

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	5.7	3.5	4.7	0.384	0.776	0.150	0.137	0.025	0.023
2	10.00	4.6	2.1	3.8	0.379	0.798	0.131	0.124	0.023	0.022
3	20.00	4.7	1.7	3.4	0.377	0.868	0.085	0.081	0.016	0.015
4	30.00	5.6	2.2	3.8	0.397	0.896	0.071	0.068	0.014	0.013
5	36.00	6.0	2.4	4.2	0.421	0.886	0.082	0.081	0.016	0.016
6	42.00	6.3	2.4	4.5	0.449	0.875	0.096	0.095	0.019	0.019
7	50.00	6.7	2.5	5.3	0.476	0.876	0.101	0.101	0.020	0.020
8	70.00	7.5	2.7	7.6	0.493	0.913	0.087	0.087	0.018	0.018
9	80.00	7.5	2.5	8.4	0.478	0.948	0.060	0.060	0.012	0.012
10	90.00	7.8	3.0	6.7	0.435	0.928	0.105	0.105	0.020	0.020
11	95.00	9.0	4.5	8.3	0.361	0.958	0.070	0.070	0.012	0.012

TABLE VIII. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR ONE

(h) Reading 290

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.704	24.265	0.7	39.8	69.9	63.1	289.1	1.108	9.96	1.325
2	23.978	23.594	0.4	36.9	67.0	60.9	288.9	1.102	10.13	1.320
3	22.537	22.250	-0.5	34.4	64.2	57.4	288.1	1.097	10.15	1.327
4	21.092	20.907	-1.1	34.9	62.4	54.1	287.9	1.096	10.15	1.334
5	20.218	20.102	-1.0	36.4	61.1	51.6	287.8	1.097	10.15	1.335
6	19.342	19.294	-0.9	38.4	59.9	48.6	287.9	1.099	10.15	1.338
7	18.166	18.219	-0.9	39.8	58.2	43.9	287.9	1.099	10.15	1.342
8	15.133	15.532	-0.6	42.2	53.8	27.6	287.9	1.098	10.15	1.353
9	13.533	14.188	-0.5	44.3	51.1	15.4	287.9	1.100	10.15	1.372
10	11.854	12.845	-0.3	48.2	48.6	-1.4	288.0	1.107	10.15	1.393
11	10.973	12.172	-0.1	48.5	48.6	-7.2	288.6	1.105	10.04	1.407

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	121.8	151.7	353.5	258.0	121.8	116.6	1.4	97.2	333.3	327.3
2	137.2	156.5	351.3	257.5	137.2	125.1	0.9	94.0	324.3	319.1
3	147.9	162.3	339.7	248.1	147.9	133.9	-1.2	91.8	304.6	300.7
4	150.6	165.9	325.2	231.9	150.6	136.0	-2.9	95.0	285.4	282.9
5	152.1	168.7	314.7	218.4	152.1	135.7	-2.6	100.2	272.9	271.3
6	152.9	172.7	304.8	204.7	152.9	135.4	-2.3	107.2	261.3	260.7
7	153.4	178.1	291.1	190.1	153.4	136.8	-2.3	113.9	245.1	245.8
8	150.7	198.2	255.3	165.8	150.7	146.9	-1.5	133.0	204.5	209.9
9	148.6	214.1	236.6	158.9	148.6	153.2	-1.2	149.7	183.0	191.8
10	141.4	237.9	214.0	158.7	141.4	158.7	-0.8	177.2	159.9	173.2
11	130.8	247.1	197.9	165.0	130.8	163.7	-0.2	185.1	148.3	164.5

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.362	0.431	1.051	0.732	0.362	0.331	0.957	1.317
2	0.409	0.446	1.048	0.734	0.409	0.357	0.912	1.259
3	0.443	0.465	1.018	0.711	0.443	0.384	0.905	1.233
4	0.452	0.477	0.975	0.666	0.452	0.391	0.903	1.240
5	0.456	0.485	0.944	0.628	0.456	0.390	0.893	1.216
6	0.459	0.496	0.915	0.588	0.459	0.389	0.886	1.197
7	0.461	0.512	0.874	0.547	0.460	0.394	0.892	1.168
8	0.452	0.574	0.766	0.480	0.452	0.426	0.975	1.097
9	0.445	0.623	0.709	0.462	0.445	0.446	1.031	1.051
10	0.423	0.696	0.640	0.465	0.423	0.464	1.122	0.988
11	0.390	0.726	0.590	0.484	0.390	0.481	1.252	0.951

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	5.2	3.0	4.7	0.371	0.776	0.145	0.133	0.025	0.023
2	10.00	4.1	1.7	3.7	0.363	0.808	0.120	0.113	0.021	0.020
3	20.00	4.1	1.1	3.3	0.363	0.872	0.079	0.075	0.015	0.014
4	30.00	5.1	1.7	3.9	0.384	0.899	0.067	0.064	0.013	0.012
5	36.00	5.3	1.7	4.1	0.407	0.891	0.076	0.074	0.015	0.014
6	42.00	5.7	1.8	4.4	0.436	0.878	0.090	0.089	0.018	0.018
7	50.00	6.0	1.8	4.9	0.459	0.887	0.090	0.090	0.018	0.018
8	70.00	6.8	2.0	7.6	0.476	0.924	0.073	0.073	0.015	0.015
9	80.00	6.8	1.8	8.8	0.467	0.948	0.059	0.059	0.012	0.012
10	90.00	7.0	2.2	7.2	0.420	0.932	0.097	0.097	0.018	0.018
11	95.00	8.3	3.8	9.3	0.337	0.975	0.041	0.041	0.007	0.007

TABLE VIII. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR ONE

(i) Reading 374

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.704	24.265	-0.7	49.5	74.3	65.9	288.8	1.072	10.06	1.188
2	23.978	23.594	-0.4	49.3	71.7	64.9	288.4	1.069	10.13	1.179
3	22.537	22.250	-0.7	45.7	69.2	61.5	288.2	1.063	10.14	1.178
4	21.092	20.907	-0.7	43.7	67.6	56.7	288.1	1.060	10.14	1.185
5	20.218	20.102	-0.6	44.3	66.6	53.9	288.1	1.060	10.14	1.187
6	19.342	19.294	-0.8	45.2	65.4	50.9	288.0	1.060	10.14	1.186
7	18.166	18.219	-0.9	46.0	64.2	46.4	288.0	1.059	10.14	1.188
8	15.133	15.532	-0.8	46.5	60.3	28.0	288.0	1.057	10.14	1.195
9	13.533	14.188	-0.6	48.3	57.8	13.8	288.0	1.058	10.14	1.207
10	11.854	12.845	-0.4	52.0	55.3	-3.6	288.0	1.062	10.14	1.215
11	10.973	12.172	-0.2	53.1	54.4	-10.6	288.4	1.061	10.12	1.212

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	70.3	110.4	259.1	175.5	70.3	71.7	-0.8	84.0	248.6	244.2
2	80.1	110.5	255.0	170.0	80.1	72.0	-0.5	83.8	241.6	237.7
3	86.6	111.9	244.0	163.8	86.6	78.2	-1.1	80.1	227.0	224.1
4	88.0	117.5	230.7	154.4	88.0	84.9	-1.1	81.2	212.1	210.2
5	89.0	120.9	223.7	146.9	89.0	86.5	-1.0	84.4	204.3	203.1
6	89.6	123.2	215.5	137.6	89.6	86.8	-1.3	87.5	194.8	194.3
7	89.8	127.4	206.0	128.3	89.8	88.5	-1.5	91.7	184.0	184.5
8	88.0	143.9	177.5	112.1	87.9	99.0	-1.3	104.4	152.9	157.0
9	86.6	157.3	162.3	107.8	86.6	104.7	-0.9	117.4	136.4	143.0
10	83.5	173.8	146.8	107.3	83.5	107.1	-0.6	136.8	120.1	130.1
11	79.6	179.1	136.8	109.5	79.6	107.6	-0.3	143.1	110.9	123.1

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.207	0.316	0.764	0.503	0.207	0.205	1.020	1.111
2	0.237	0.317	0.753	0.488	0.237	0.207	0.899	1.062
3	0.256	0.322	0.722	0.472	0.256	0.225	0.902	1.018
4	0.260	0.339	0.682	0.446	0.260	0.245	0.965	0.993
5	0.263	0.349	0.662	0.424	0.263	0.250	0.973	0.979
6	0.265	0.356	0.638	0.398	0.265	0.251	0.968	0.958
7	0.266	0.369	0.610	0.371	0.266	0.256	0.985	0.941
8	0.260	0.419	0.525	0.326	0.260	0.288	1.126	0.869
9	0.256	0.459	0.480	0.314	0.256	0.305	1.209	0.820
10	0.247	0.508	0.434	0.314	0.247	0.313	1.282	0.769
11	0.235	0.525	0.404	0.321	0.235	0.315	1.351	0.731

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	9.7	7.5	7.5	0.445	0.705	0.208	0.208	0.032	0.032
2	10.00	8.8	6.4	7.7	0.453	0.695	0.213	0.213	0.033	0.033
3	20.00	9.2	6.1	7.5	0.442	0.762	0.164	0.164	0.027	0.027
4	30.00	10.2	6.8	6.4	0.446	0.827	0.126	0.126	0.022	0.022
5	36.00	10.8	7.2	6.4	0.462	0.840	0.122	0.122	0.022	0.022
6	42.00	11.2	7.3	6.7	0.484	0.837	0.133	0.133	0.025	0.025
7	50.00	12.0	7.8	7.4	0.504	0.854	0.127	0.127	0.025	0.025
8	70.00	13.3	8.4	8.0	0.511	0.912	0.098	0.098	0.020	0.020
9	80.00	13.4	8.4	7.2	0.494	0.944	0.075	0.075	0.016	0.016
10	90.00	13.7	8.9	5.1	0.451	0.930	0.118	0.118	0.022	0.022
11	95.00	14.1	9.5	5.9	0.391	0.930	0.133	0.133	0.023	0.023

TABLE VIII. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR ONE

(j) Reading 396

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.704	24.265	-0.5	42.7	72.3	64.2	288.8	1.064	10.05	1.175
2	23.978	23.594	-0.7	40.0	69.6	62.5	288.5	1.060	10.13	1.168
3	22.537	22.250	-0.6	36.7	66.9	59.1	288.2	1.055	10.14	1.173
4	21.092	20.907	-0.6	37.5	65.3	55.4	288.1	1.054	10.14	1.176
5	20.218	20.102	-0.7	39.0	64.1	52.6	288.0	1.056	10.14	1.180
6	19.342	19.294	-0.7	40.4	63.0	49.6	288.0	1.056	10.14	1.181
7	18.166	18.219	-0.8	41.6	61.5	44.8	288.0	1.056	10.14	1.184
8	15.133	15.532	-0.5	43.2	57.4	27.7	288.0	1.055	10.14	1.191
9	13.535	14.188	-0.4	45.2	54.7	14.9	288.0	1.057	10.14	1.203
10	11.854	12.845	-0.2	49.1	52.1	-2.1	288.0	1.060	10.14	1.212
11	10.973	12.172	-0.0	49.9	51.2	-8.4	288.4	1.060	10.11	1.213

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	79.6	111.3	262.5	188.2	79.6	81.9	-0.8	75.4	249.4	244.9
2	90.4	112.5	259.3	187.0	90.4	86.2	-1.1	72.2	242.0	238.1
3	97.5	115.9	248.6	181.1	97.5	92.9	-0.9	69.3	227.7	224.8
4	99.1	120.5	236.6	168.3	99.0	95.6	-1.1	73.4	213.8	211.9
5	100.0	123.8	229.0	158.3	100.0	96.2	-1.2	77.9	204.8	203.6
6	100.5	126.8	221.4	148.8	100.5	96.5	-1.2	82.2	196.0	195.6
7	100.7	131.1	211.0	138.2	100.7	98.0	-1.5	87.1	183.9	184.4
8	99.1	147.7	183.6	121.6	99.1	107.7	-0.9	101.2	153.7	157.7
9	97.5	160.5	168.9	117.0	97.5	113.0	-0.6	113.9	137.2	143.9
10	93.7	177.4	152.4	116.2	93.7	116.2	-0.4	134.1	119.8	129.8
11	89.2	183.6	142.4	119.5	89.2	118.3	-0.0	140.5	111.0	123.1

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.235	0.320	0.775	0.541	0.235	0.235	1.028	1.075
2	0.267	0.324	0.767	0.539	0.267	0.248	0.954	1.026
3	0.289	0.335	0.736	0.524	0.289	0.269	0.953	0.980
4	0.294	0.349	0.701	0.487	0.294	0.277	0.965	0.964
5	0.297	0.359	0.679	0.459	0.297	0.279	0.961	0.947
6	0.298	0.368	0.656	0.431	0.298	0.280	0.961	0.931
7	0.299	0.380	0.626	0.401	0.299	0.284	0.973	0.908
8	0.294	0.430	0.544	0.354	0.294	0.314	1.087	0.846
9	0.289	0.469	0.500	0.342	0.289	0.330	1.160	0.803
10	0.278	0.520	0.452	0.341	0.278	0.340	1.239	0.749
11	0.264	0.539	0.421	0.351	0.264	0.347	1.325	0.716

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	7.7	5.5	5.8	0.391	0.730	0.169	0.169	0.028	0.028
2	10.00	6.7	4.3	5.3	0.382	0.751	0.150	0.150	0.025	0.025
3	20.00	6.9	3.9	5.1	0.368	0.855	0.086	0.086	0.015	0.015
4	30.00	7.9	4.5	5.2	0.390	0.871	0.082	0.082	0.015	0.015
5	36.00	8.3	4.7	5.1	0.416	0.869	0.090	0.090	0.017	0.017
6	42.00	8.8	4.9	5.4	0.440	0.863	0.101	0.101	0.020	0.020
7	50.00	9.3	5.1	5.8	0.463	0.875	0.100	0.100	0.020	0.020
8	70.00	10.4	5.5	7.7	0.471	0.922	0.079	0.079	0.016	0.016
9	80.00	10.4	5.4	8.3	0.455	0.954	0.055	0.055	0.011	0.011
10	90.00	10.4	5.6	6.6	0.409	0.936	0.099	0.099	0.019	0.019
11	95.00	10.9	6.3	8.1	0.341	0.949	0.089	0.089	0.015	0.015

TABLE VIII. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR ONE

(k) Reading 407

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.704	24.265	-0.5	39.2	71.7	64.3	288.5	1.059	10.04	1.163
2	23.978	23.594	-0.6	36.2	69.0	62.5	288.4	1.055	10.13	1.158
3	22.537	22.250	-0.6	33.5	66.2	58.8	288.0	1.051	10.14	1.166
4	21.092	20.907	-0.6	34.8	64.4	55.2	288.1	1.051	10.14	1.168
5	20.218	20.102	-0.6	36.4	63.2	52.6	288.2	1.052	10.14	1.171
6	19.342	19.294	-0.7	37.9	62.1	49.5	288.0	1.053	10.14	1.174
7	18.166	18.219	-0.9	38.9	60.5	44.6	288.0	1.054	10.14	1.178
8	15.133	15.532	-0.6	41.2	56.2	27.8	288.1	1.054	10.14	1.187
9	13.533	14.188	-0.4	43.6	53.6	15.7	288.1	1.055	10.14	1.199
10	11.854	12.845	-0.2	47.7	50.9	-1.2	288.1	1.059	10.14	1.211
11	10.973	12.172	0.0	48.6	50.2	-7.5	288.4	1.059	10.11	1.214

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	82.6	109.2	263.2	195.1	82.6	84.6	-0.7	69.0	249.2	244.8
2	93.8	111.7	261.4	195.3	93.8	90.2	-1.0	65.9	243.0	239.1
3	101.3	116.7	250.6	188.0	101.3	97.2	-1.0	64.4	228.2	225.3
4	102.9	120.6	237.8	173.6	102.9	99.0	-1.0	68.9	213.4	211.5
5	103.9	123.4	230.1	163.5	103.9	99.3	-1.1	73.2	204.3	203.1
6	104.4	127.0	222.9	154.3	104.4	100.2	-1.3	77.9	195.7	195.2
7	104.8	131.7	212.7	144.1	104.8	102.5	-1.7	82.7	183.4	184.0
8	103.0	148.4	185.0	126.2	103.0	111.6	-1.0	97.8	152.7	156.7
9	101.4	160.8	170.9	121.0	101.4	116.5	-0.7	110.9	136.9	143.5
10	97.4	178.6	154.5	120.2	97.4	120.1	-0.3	132.2	119.7	129.7
11	92.4	185.6	144.4	123.9	92.4	122.8	0.1	139.2	110.9	123.0

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.244	0.315	0.778	0.562	0.244	0.244	1.025	1.062
2	0.278	0.323	0.774	0.564	0.278	0.261	0.961	1.017
3	0.300	0.338	0.743	0.545	0.300	0.282	0.960	0.969
4	0.305	0.350	0.705	0.504	0.305	0.287	0.962	0.947
5	0.308	0.358	0.683	0.474	0.308	0.288	0.956	0.929
6	0.310	0.369	0.661	0.448	0.310	0.291	0.960	0.917
7	0.311	0.383	0.631	0.419	0.311	0.298	0.979	0.895
8	0.306	0.433	0.549	0.368	0.306	0.325	1.083	0.831
9	0.301	0.470	0.507	0.354	0.301	0.341	1.149	0.794
10	0.289	0.524	0.458	0.352	0.289	0.352	1.234	0.742
11	0.274	0.545	0.427	0.364	0.274	0.361	1.329	0.711

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	7.1	4.9	5.9	0.358	0.745	0.146	0.146	0.024	0.024
2	10.00	6.1	3.6	5.3	0.346	0.777	0.122	0.122	0.021	0.021
3	20.00	6.1	3.1	4.8	0.339	0.881	0.065	0.065	0.012	0.012
4	30.00	7.0	3.6	5.0	0.365	0.890	0.065	0.065	0.012	0.012
5	36.00	7.4	3.8	5.1	0.390	0.883	0.075	0.075	0.014	0.014
6	42.00	7.8	3.9	5.3	0.414	0.877	0.085	0.085	0.017	0.017
7	50.00	8.3	4.1	5.6	0.434	0.891	0.082	0.082	0.016	0.016
8	70.00	9.2	4.3	7.8	0.446	0.937	0.061	0.061	0.013	0.013
9	80.00	9.3	4.3	9.1	0.434	0.962	0.044	0.044	0.009	0.009
10	90.00	9.3	4.5	7.5	0.389	0.946	0.080	0.080	0.015	0.015
11	95.00	9.8	5.3	9.0	0.318	0.965	0.058	0.058	0.010	0.010

TABLE VIII. - Concluded. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR ONE

(ℓ) Reading 421

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.704	24.265	-0.5	33.1	70.4	64.2	288.4	1.050	10.04	1.140
2	23.978	23.594	-0.3	30.2	67.6	61.9	288.3	1.047	10.13	1.140
3	22.537	22.250	-0.3	28.3	64.6	58.2	288.2	1.045	10.14	1.146
4	21.092	20.907	-0.4	30.2	62.7	54.6	288.1	1.046	10.14	1.153
5	20.218	20.102	-0.3	31.7	61.5	52.0	288.1	1.047	10.14	1.157
6	19.342	19.294	-0.4	33.5	60.3	48.8	288.1	1.049	10.14	1.160
7	18.166	18.219	-0.6	34.8	58.7	43.9	288.0	1.050	10.14	1.166
8	15.133	15.532	-0.5	38.3	54.3	27.1	288.0	1.052	10.14	1.186
9	13.533	14.188	-0.3	41.3	51.7	15.4	288.1	1.054	10.14	1.195
10	11.854	12.845	-0.3	45.3	49.1	0.1	288.1	1.058	10.14	1.208
11	10.973	12.172	-0.1	46.6	48.2	-6.7	288.6	1.059	10.10	1.213

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	89.0	107.6	265.7	207.2	89.0	90.2	-0.7	58.7	249.7	245.2
2	100.4	112.6	263.0	206.4	100.4	97.3	-0.6	56.6	242.5	238.6
3	108.2	118.5	252.5	197.5	108.2	103.9	-0.5	56.8	227.6	224.7
4	110.0	122.8	240.2	183.7	110.0	106.2	-0.7	61.7	212.8	210.9
5	111.1	125.8	233.0	173.8	111.1	107.1	-0.6	66.1	204.2	203.0
6	111.7	129.2	225.5	163.8	111.7	107.8	-0.8	71.3	195.1	194.6
7	112.1	134.9	215.7	153.0	112.1	110.7	-1.3	77.0	183.0	183.6
8	110.4	153.5	189.3	135.3	110.4	120.4	-0.9	95.2	152.9	156.9
9	108.7	165.7	175.3	129.0	108.7	124.5	-0.6	109.3	136.9	143.5
10	104.4	182.4	159.4	128.3	104.4	128.3	-0.5	129.7	120.0	130.0
11	98.9	189.9	148.4	131.5	98.9	130.6	-0.2	137.9	110.4	122.5

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.263	0.311	0.786	0.606	0.263	0.261	1.013	1.038
2	0.297	0.327	0.779	0.599	0.297	0.282	0.970	0.984
3	0.321	0.345	0.749	0.574	0.321	0.302	0.961	0.934
4	0.327	0.358	0.713	0.533	0.327	0.309	0.965	0.916
5	0.330	0.366	0.692	0.506	0.330	0.312	0.964	0.901
6	0.332	0.376	0.670	0.477	0.332	0.314	0.965	0.887
7	0.333	0.393	0.641	0.448	0.333	0.323	0.988	0.868
8	0.328	0.449	0.562	0.395	0.328	0.352	1.090	0.816
9	0.323	0.485	0.520	0.378	0.323	0.365	1.145	0.781
10	0.310	0.536	0.473	0.377	0.310	0.377	1.229	0.737
11	0.293	0.559	0.439	0.387	0.293	0.384	1.320	0.702

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	5.8	3.6	5.8	0.304	0.760	0.117	0.117	0.019	0.019
2	10.00	4.7	2.2	4.3	0.294	0.812	0.087	0.087	0.015	0.015
3	20.00	4.6	1.6	4.4	0.296	0.894	0.050	0.050	0.009	0.009
4	30.00	5.4	2.0	4.5	0.321	0.914	0.045	0.045	0.009	0.009
5	36.00	5.7	2.1	4.5	0.343	0.908	0.052	0.052	0.010	0.010
6	42.00	6.1	2.2	4.7	0.369	0.890	0.068	0.068	0.013	0.013
7	50.00	6.5	2.3	4.9	0.390	0.903	0.066	0.066	0.013	0.013
8	70.00	7.3	2.5	7.1	0.407	0.960	0.036	0.036	0.008	0.008
9	80.00	7.3	2.4	8.8	0.399	0.963	0.040	0.040	0.008	0.008
10	90.00	7.4	2.7	8.8	0.354	0.953	0.065	0.065	0.012	0.012
11	95.00	7.9	3.3	9.7	0.284	0.971	0.046	0.046	0.008	0.008

TABLE IX. - BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR ONE

(a) Reading 190

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.757	23.762	37.5	0.2	37.5	0.2	337.9	1.000	14.76	0.986
2	23.167	23.200	34.2	0.4	34.2	0.4	335.1	1.000	15.00	0.986
3	21.981	22.068	32.6	0.0	32.6	0.0	332.8	1.000	15.33	0.991
4	20.787	20.927	33.6	-0.2	33.6	-0.2	332.0	1.000	15.40	0.991
5	20.071	20.244	34.8	-0.3	34.8	-0.3	331.6	1.000	15.30	0.992
6	19.350	19.558	36.1	-1.2	36.1	-1.2	331.2	1.000	15.19	0.991
7	18.387	18.649	36.6	-0.9	36.6	-0.9	330.8	1.000	15.32	0.988
8	15.961	16.388	38.6	0.1	38.6	0.1	330.6	1.000	15.89	0.984
9	14.732	15.263	41.3	0.1	41.3	0.1	331.0	1.000	16.00	0.983
10	13.492	14.143	45.8	0.3	45.8	0.3	332.5	1.000	16.03	0.962
11	12.868	13.586	47.6	-2.1	47.6	-2.1	333.4	1.000	16.00	0.930

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	205.1	158.9	205.1	158.9	162.7	158.9	124.8	0.5	0.	0.
2	212.9	167.9	212.9	167.9	176.0	167.9	119.8	1.2	0.	0.
3	225.0	180.2	225.0	180.2	189.5	180.2	121.3	0.2	0.	0.
4	228.8	183.3	228.8	183.3	190.5	183.3	126.6	-0.6	0.	0.
5	227.7	181.1	227.7	181.1	186.8	181.1	130.1	-0.8	0.	0.
6	227.2	178.7	227.2	178.7	185.6	178.7	133.9	-3.9	0.	0.
7	233.0	180.9	233.0	180.9	187.0	180.9	139.1	-3.0	0.	0.
8	256.6	195.6	256.6	195.6	200.6	195.6	160.0	0.3	0.	0.
9	266.0	201.0	266.0	201.0	200.0	201.0	175.4	0.5	0.	0.
10	277.4	195.5	277.4	195.5	193.4	195.4	198.8	1.1	0.	0.
11	282.1	180.6	282.1	180.6	190.1	180.5	208.5	-6.6	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	0.575	0.440	0.575	0.440	0.456	0.440	0.977	0.762
2	0.601	0.468	0.601	0.468	0.497	0.467	0.954	0.709
3	0.640	0.505	0.640	0.505	0.539	0.505	0.951	0.681
4	0.652	0.515	0.652	0.515	0.543	0.515	0.962	0.706
5	0.650	0.509	0.650	0.509	0.533	0.509	0.969	0.727
6	0.649	0.502	0.649	0.502	0.524	0.502	0.973	0.744
7	0.667	0.509	0.667	0.509	0.535	0.509	0.968	0.753
8	0.742	0.553	0.742	0.553	0.580	0.553	0.975	0.803
9	0.772	0.569	0.772	0.569	0.580	0.569	1.005	0.868
10	0.807	0.551	0.807	0.551	0.562	0.551	1.011	0.993
11	0.821	0.506	0.821	0.506	0.553	0.506	0.950	1.034

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	3.1	-2.9	14.9	0.457	0.	0.069	0.069	0.027	0.027
2	10.00	0.0	-5.9	13.0	0.420	0.	0.062	0.062	0.023	0.023
3	20.00	-1.6	-7.5	10.9	0.390	0.	0.036	0.036	0.013	0.013
4	30.00	-0.8	-6.7	9.9	0.385	0.	0.038	0.038	0.013	0.013
5	36.00	-0.0	-5.8	9.5	0.390	0.	0.034	0.034	0.011	0.011
6	42.00	0.4	-5.3	8.4	0.403	0.	0.037	0.037	0.012	0.012
7	50.00	-0.2	-5.8	8.5	0.404	0.	0.046	0.046	0.014	0.014
8	70.00	-1.7	-7.2	9.9	0.398	0.	0.051	0.051	0.013	0.013
9	80.00	-1.5	-6.8	10.7	0.400	0.	0.053	0.053	0.013	0.013
10	90.00	0.1	-5.0	12.8	0.450	0.	0.110	0.110	0.024	0.024
11	95.00	0.4	-4.6	11.9	0.517	0.	0.196	0.196	0.041	0.041

TABLE IX. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR ONE

(b) Reading 201

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.757	23.762	35.6	-0.7	35.6	-0.7	336.1	1.000	14.47	0.987
2	23.167	23.200	32.6	-0.0	32.6	-0.0	333.7	1.000	14.74	0.988
3	21.981	22.068	31.2	-0.0	31.2	-0.0	331.7	1.000	15.13	0.991
4	20.787	20.927	32.2	-0.2	32.2	-0.2	331.3	1.000	15.27	0.990
5	20.071	20.244	33.6	-0.5	33.6	-0.5	330.9	1.000	15.12	0.992
6	19.350	19.558	35.0	-1.7	35.0	-1.7	330.5	1.000	14.96	0.992
7	18.387	18.649	36.0	-1.1	36.0	-1.1	330.6	1.000	15.14	0.989
8	15.961	16.388	37.7	-0.1	37.7	-0.1	331.1	1.000	15.90	0.984
9	14.732	15.263	40.4	0.2	40.4	0.2	331.8	1.000	16.13	0.982
10	13.492	14.143	45.0	0.2	45.0	0.2	333.3	1.000	16.05	0.967
11	12.868	13.586	46.9	-2.3	46.9	-2.3	334.1	1.000	16.02	0.930

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	203.3	157.6	203.3	157.6	165.2	157.5	118.4	-2.0	0.	0.
2	212.0	168.0	212.0	168.0	178.6	168.0	114.3	-0.1	0.	0.
3	226.1	182.4	226.1	182.4	193.4	182.4	117.2	-0.1	0.	0.
4	230.4	186.2	230.4	186.2	195.1	186.2	122.6	-0.5	0.	0.
5	227.9	183.2	227.9	183.2	189.9	183.2	126.0	-1.6	0.	0.
6	226.1	180.2	226.1	180.2	185.2	180.1	129.8	-5.3	0.	0.
7	233.0	183.6	233.0	183.6	188.5	183.6	137.0	-3.6	0.	0.
8	261.5	203.6	261.5	203.6	206.9	203.6	159.9	-0.2	0.	0.
9	272.5	211.9	272.5	211.9	207.7	211.9	176.5	0.8	0.	0.
10	282.4	207.6	282.4	207.6	199.7	207.6	199.7	0.6	0.	0.
11	286.9	191.6	286.9	191.6	196.0	191.5	209.5	-7.7	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	0.571	0.437	0.571	0.437	0.464	0.457	0.954	0.720
2	0.599	0.469	0.599	0.469	0.505	0.469	0.941	0.667
3	0.645	0.513	0.645	0.513	0.551	0.513	0.943	0.645
4	0.658	0.524	0.658	0.524	0.557	0.524	0.955	0.658
5	0.651	0.516	0.651	0.516	0.543	0.516	0.964	0.684
6	0.646	0.507	0.646	0.507	0.529	0.507	0.973	0.710
7	0.667	0.517	0.667	0.517	0.540	0.517	0.974	0.734
8	0.757	0.577	0.757	0.577	0.599	0.577	0.984	0.778
9	0.792	0.601	0.792	0.601	0.603	0.601	1.020	0.857
10	0.822	0.586	0.822	0.586	0.581	0.586	1.039	0.987
11	0.836	0.538	0.836	0.538	0.571	0.538	0.977	1.032

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	1.3	-4.7	14.1	0.452	0.	0.065	0.065	0.025	0.025
2	10.00	-1.5	-7.4	12.7	0.409	0.	0.056	0.056	0.021	0.021
3	20.00	-2.9	-8.8	10.9	0.377	0.	0.035	0.035	0.013	0.013
4	30.00	-2.2	-8.1	10.0	0.371	0.	0.038	0.038	0.013	0.013
5	36.00	-1.3	-7.1	9.3	0.377	0.	0.032	0.032	0.010	0.010
6	42.00	-0.6	-6.3	8.0	0.390	0.	0.031	0.031	0.010	0.010
7	50.00	-0.7	-6.4	8.4	0.391	0.	0.041	0.041	0.012	0.012
8	70.00	-2.5	-8.0	9.8	0.379	0.	0.049	0.049	0.013	0.013
9	80.00	-2.3	-7.6	10.8	0.375	0.	0.053	0.053	0.013	0.013
10	90.00	-0.6	-5.8	12.7	0.418	0.	0.093	0.093	0.021	0.021
11	95.00	-0.3	-5.3	11.8	0.488	0.	0.191	0.191	0.040	0.040

TABLE IX. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR ONE

(c) Reading 212

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.757	23.762	35.1	-0.5	35.1	-0.5	335.2	1.000	14.38	0.987
2	23.167	23.200	32.2	0.0	32.2	0.0	333.0	1.000	14.67	0.987
3	21.981	22.068	30.9	-0.0	30.9	-0.0	331.5	1.000	15.07	0.991
4	20.787	20.927	32.0	0.0	32.0	0.0	331.1	1.000	15.24	0.989
5	20.071	20.244	33.5	-0.1	33.5	-0.1	330.8	1.000	15.09	0.990
6	19.350	19.558	35.2	-1.1	35.2	-1.1	330.4	1.000	14.90	0.992
7	18.387	18.649	36.1	-0.5	36.1	-0.5	330.6	1.000	15.09	0.989
8	15.961	16.388	37.7	0.5	37.7	0.5	331.2	1.000	15.85	0.986
9	14.732	15.263	40.5	1.0	40.5	1.0	332.0	1.000	16.11	0.982
10	13.492	14.143	44.9	0.9	44.9	0.9	333.6	1.000	16.03	0.966
11	12.868	13.586	46.5	-1.7	46.5	-1.7	334.2	1.000	16.01	0.929

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	202.0	156.9	202.0	156.9	165.2	156.9	116.2	-1.4	0.	0.
2	211.6	167.8	211.6	167.8	179.0	167.8	112.7	0.1	0.	0.
3	226.4	183.0	226.4	183.0	194.2	183.0	116.3	-0.1	0.	0.
4	231.2	187.2	231.2	187.2	196.2	187.2	122.3	0.1	0.	0.
5	228.5	183.9	228.5	183.9	190.5	183.9	126.1	-0.2	0.	0.
6	226.1	180.6	226.1	180.6	184.7	180.6	130.4	-3.3	0.	0.
7	232.7	184.0	232.7	184.0	188.1	184.0	137.0	-1.7	0.	0.
8	262.8	204.8	262.8	204.8	208.0	204.8	160.7	1.9	0.	0.
9	274.3	213.3	274.3	213.3	208.7	213.3	178.0	3.7	0.	0.
10	284.6	209.1	284.6	209.1	201.5	209.1	201.0	3.2	0.	0.
11	289.2	193.8	289.2	193.8	199.2	193.7	209.7	-5.9	0.	0.

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.568	0.436	0.568	0.436	0.464	0.436	0.950	0.706
2	0.599	0.469	0.599	0.469	0.507	0.469	0.937	0.653
3	0.646	0.515	0.646	0.515	0.554	0.515	0.942	0.646
4	0.661	0.527	0.661	0.527	0.561	0.527	0.954	0.661
5	0.653	0.518	0.653	0.518	0.544	0.518	0.965	0.684
6	0.646	0.508	0.646	0.508	0.528	0.508	0.978	0.717
7	0.666	0.518	0.666	0.518	0.539	0.518	0.978	0.736
8	0.761	0.580	0.761	0.580	0.602	0.580	0.985	0.783
9	0.797	0.605	0.797	0.605	0.607	0.605	1.022	0.867
10	0.829	0.591	0.829	0.591	0.587	0.591	1.037	0.993
11	0.844	0.544	0.844	0.544	0.581	0.544	0.972	1.027

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	0.8	-5.2	14.3	0.446	0.	0.065	0.065	0.025	0.025
2	10.00	-1.9	-7.9	12.8	0.406	0.	0.060	0.060	0.022	0.022
3	20.00	-3.2	-9.1	10.9	0.374	0.	0.036	0.036	0.013	0.013
4	30.00	-2.4	-8.3	10.2	0.368	0.	0.042	0.042	0.014	0.014
5	36.00	-1.3	-7.1	9.8	0.374	0.	0.038	0.038	0.012	0.012
6	42.00	-0.4	-6.1	8.6	0.386	0.	0.031	0.031	0.010	0.010
7	50.00	-0.6	-6.3	9.0	0.386	0.	0.044	0.044	0.013	0.013
8	70.00	-2.5	-8.0	10.4	0.376	0.	0.045	0.045	0.012	0.012
9	80.00	-2.2	-7.5	11.6	0.373	0.	0.053	0.053	0.013	0.013
10	90.00	-0.7	-5.8	13.4	0.416	0.	0.094	0.094	0.021	0.021
11	95.00	-0.7	-5.7	12.3	0.484	0.	0.191	0.191	0.040	0.040

TABLE IX. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR ONE

(d) Reading 223

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.757	23.762	35.1	-0.1	35.1	-0.1	335.1	1.000	14.35	0.988
2	23.167	23.200	32.2	0.3	32.2	0.3	333.0	1.000	14.64	0.988
3	21.981	22.068	30.7	0.0	30.7	0.0	331.2	1.000	15.03	0.991
4	20.787	20.927	31.7	0.0	31.7	0.0	330.9	1.000	15.21	0.989
5	20.071	20.244	33.3	-0.1	33.3	-0.1	330.7	1.000	15.04	0.991
6	19.350	19.558	34.8	-1.3	34.8	-1.3	330.2	1.000	14.87	0.993
7	18.387	18.649	35.9	-0.8	35.9	-0.8	330.4	1.000	15.05	0.990
8	15.961	16.388	37.8	0.3	37.8	0.3	331.0	1.000	15.83	0.985
9	14.732	15.263	40.6	0.8	40.6	0.8	331.9	1.000	16.04	0.984
10	13.492	14.143	45.0	0.7	45.0	0.7	333.3	1.000	16.02	0.963
11	12.868	13.586	46.7	-2.0	46.7	-2.0	334.0	1.000	15.97	0.929

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	202.8	157.7	202.8	157.7	165.9	157.7	116.6	-0.3	0.	0.
2	212.1	168.0	212.1	168.0	179.5	168.0	113.0	0.9	0.	0.
3	226.8	182.7	226.8	182.7	195.0	182.7	115.7	0.0	0.	0.
4	231.6	187.1	231.6	187.1	197.0	187.1	121.7	0.1	0.	0.
5	228.7	184.0	228.7	184.0	191.2	184.0	125.4	-0.3	0.	0.
6	226.2	180.9	226.2	180.9	185.7	180.9	129.2	-4.2	0.	0.
7	233.0	184.2	233.0	184.2	188.7	184.2	136.7	-2.6	0.	0.
8	261.2	204.8	261.2	204.8	206.3	204.8	160.3	1.1	0.	0.
9	272.6	213.2	272.6	213.2	207.0	213.2	177.4	2.9	0.	0.
10	283.1	208.8	285.1	208.8	200.2	208.8	200.2	2.7	0.	0.
11	287.2	193.6	287.2	193.6	197.0	193.5	208.9	-6.8	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	0.570	0.438	0.570	0.438	0.467	0.438	0.950	0.708
2	0.600	0.469	0.600	0.469	0.508	0.469	0.936	0.655
3	0.647	0.514	0.647	0.514	0.556	0.514	0.937	0.647
4	0.662	0.527	0.662	0.527	0.564	0.527	0.949	0.662
5	0.654	0.518	0.654	0.518	0.547	0.518	0.962	0.673
6	0.647	0.509	0.647	0.509	0.531	0.509	0.974	0.706
7	0.667	0.519	0.667	0.519	0.540	0.519	0.976	0.732
8	0.756	0.580	0.756	0.580	0.597	0.580	0.993	0.788
9	0.792	0.605	0.792	0.605	0.601	0.605	1.030	0.867
10	0.825	0.590	0.825	0.590	0.583	0.590	1.043	0.990
11	0.837	0.544	0.837	0.544	0.574	0.544	0.982	1.026

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	0.8	-5.2	14.7	0.443	0.	0.059	0.059	0.023	0.023
2	10.00	-1.9	-7.9	13.1	0.405	0.	0.056	0.056	0.021	0.021
3	20.00	-3.4	-9.3	10.9	0.375	0.	0.036	0.036	0.013	0.013
4	30.00	-2.6	-8.5	10.2	0.368	0.	0.044	0.044	0.015	0.015
5	36.00	-1.5	-7.3	9.8	0.373	0.	0.034	0.034	0.011	0.011
6	42.00	-0.7	-6.5	8.4	0.384	0.	0.029	0.029	0.009	0.009
7	50.00	-0.8	-6.5	8.7	0.386	0.	0.040	0.040	0.012	0.012
8	70.00	-2.4	-7.8	10.2	0.373	0.	0.049	0.049	0.013	0.013
9	80.00	-2.1	-7.4	11.4	0.369	0.	0.048	0.048	0.012	0.012
10	90.00	-0.6	-5.7	13.3	0.413	0.	0.101	0.101	0.022	0.022
11	95.00	-0.5	-5.5	12.0	0.481	0.	0.193	0.193	0.041	0.041

TABLE IX. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR ONE

(e) Reading 234

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.757	23.762	39.4	1.3	39.4	1.3	342.0	1.000	15.22	0.987
2	23.167	23.200	36.0	1.1	36.0	1.1	338.8	1.000	15.43	0.984
3	21.981	22.068	34.1	0.5	34.1	0.5	335.6	1.000	15.69	0.991
4	20.787	20.927	34.9	0.5	34.9	0.5	334.7	1.000	15.79	0.991
5	20.071	20.244	36.0	0.8	36.0	0.8	334.3	1.000	15.71	0.991
6	19.350	19.558	37.1	-0.1	37.1	-0.1	333.7	1.000	15.59	0.990
7	18.387	18.649	37.7	-0.3	37.7	-0.3	332.9	1.000	15.63	0.991
8	15.961	16.388	40.1	0.8	40.1	0.8	331.9	1.000	16.04	0.988
9	14.732	15.263	42.5	1.2	42.5	1.2	331.9	1.000	16.03	0.985
10	13.492	14.143	46.8	2.9	46.8	2.9	333.7	1.000	16.21	0.958
11	12.868	13.586	48.7	-0.4	48.7	-0.4	334.7	1.000	16.21	0.927

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	210.9	162.9	210.9	162.9	163.0	162.8	133.9	3.8	0.	0.
2	217.5	168.6	217.5	168.6	175.9	168.5	127.9	3.2	0.	0.
3	228.0	179.1	228.0	179.1	188.8	179.1	127.8	1.5	0.	0.
4	232.4	182.8	232.4	182.8	190.6	182.8	132.9	1.8	0.	0.
5	232.2	180.7	232.2	180.7	187.8	180.7	136.5	2.6	0.	0.
6	231.7	178.0	231.7	178.0	184.7	178.0	139.9	-0.3	0.	0.
7	235.6	179.4	235.6	179.4	186.4	179.4	144.1	-0.8	0.	0.
8	253.9	188.2	253.9	188.2	194.3	188.2	163.4	2.5	0.	0.
9	262.2	190.2	262.2	190.2	193.4	190.2	177.1	4.0	0.	0.
10	275.8	184.1	275.8	184.1	189.0	183.8	201.0	9.2	0.	0.
11	281.7	169.2	281.7	169.2	185.8	169.2	211.8	-1.0	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	0.588	0.448	0.588	0.448	0.455	0.448	0.999	0.823
2	0.611	0.467	0.611	0.467	0.494	0.467	0.958	0.769
3	0.646	0.500	0.646	0.500	0.535	0.500	0.949	0.741
4	0.661	0.511	0.661	0.511	0.542	0.511	0.959	0.760
5	0.661	0.506	0.661	0.506	0.534	0.506	0.962	0.777
6	0.660	0.498	0.660	0.498	0.526	0.498	0.964	0.790
7	0.673	0.503	0.673	0.503	0.532	0.503	0.963	0.794
8	0.732	0.530	0.732	0.530	0.560	0.530	0.969	0.849
9	0.758	0.536	0.758	0.536	0.559	0.536	0.983	0.898
10	0.800	0.516	0.800	0.516	0.548	0.515	0.973	1.017
11	0.818	0.472	0.818	0.472	0.539	0.472	0.911	1.068

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	5.1	-0.8	16.2	0.464	0.	0.064	0.064	0.025	0.025
2	10.00	2.0	-4.0	13.9	0.439	0.	0.071	0.071	0.027	0.027
3	20.00	0.1	-5.9	11.5	0.411	0.	0.035	0.035	0.012	0.012
4	30.00	0.5	-5.3	10.8	0.402	0.	0.036	0.036	0.012	0.012
5	36.00	1.2	-4.6	10.7	0.408	0.	0.037	0.037	0.012	0.012
6	42.00	1.6	-4.1	9.6	0.420	0.	0.040	0.040	0.013	0.013
7	50.00	1.0	-4.6	9.3	0.421	0.	0.033	0.033	0.010	0.010
8	70.00	-0.1	-5.6	10.7	0.421	0.	0.040	0.040	0.011	0.011
9	80.00	-0.2	-5.5	11.9	0.431	0.	0.048	0.048	0.012	0.012
10	90.00	1.2	-3.9	15.5	0.483	0.	0.123	0.123	0.027	0.027
11	95.00	1.6	-3.4	13.8	0.555	0.	0.207	0.207	0.044	0.044

TABLE IX. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR ONE

(f) Reading 245

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.757	23.762	40.9	1.4	40.9	1.4	323.2	1.000	13.55	0.989
2	23.167	23.200	38.9	1.7	38.9	1.7	321.5	1.000	13.61	0.989
3	21.981	22.068	35.2	0.1	35.2	0.1	318.3	1.000	13.70	0.992
4	20.787	20.927	35.7	-0.3	35.7	-0.3	317.4	1.000	13.67	0.993
5	20.071	20.244	37.6	0.3	37.6	0.3	317.5	1.000	13.63	0.994
6	19.350	19.558	39.4	0.2	39.4	0.2	317.7	1.000	13.62	0.992
7	18.387	18.649	40.9	0.3	40.9	0.3	317.5	1.000	13.60	0.992
8	15.961	16.388	42.7	-0.4	42.7	-0.4	316.6	1.000	13.73	0.991
9	14.732	15.263	44.5	0.9	44.5	0.9	317.0	1.000	13.96	0.982
10	13.492	14.143	48.9	3.9	48.9	3.9	318.5	1.000	14.12	0.965
11	12.868	13.586	50.8	-1.8	50.8	-1.8	319.0	1.000	14.01	0.948

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	167.7	131.5	167.7	131.5	126.8	131.5	109.7	3.3	0.	0.
2	171.0	134.7	171.0	134.7	133.0	134.6	107.4	4.0	0.	0.
3	174.6	139.6	174.6	139.6	142.7	139.6	100.7	0.2	0.	0.
4	176.1	140.5	176.1	140.5	143.1	140.5	102.7	-0.8	0.	0.
5	176.4	139.5	176.4	139.5	139.8	139.5	107.6	0.6	0.	0.
6	177.7	138.4	177.7	138.4	137.4	138.4	112.7	0.4	0.	0.
7	180.3	138.1	180.3	138.1	136.3	138.1	118.1	0.7	0.	0.
8	196.1	144.3	196.1	144.3	144.1	144.3	133.0	-1.0	0.	0.
9	209.7	150.5	209.7	150.5	149.6	150.5	147.0	2.5	0.	0.
10	223.9	147.7	223.9	147.7	147.1	147.3	168.8	9.9	0.	0.
11	226.7	132.6	226.7	132.6	143.2	132.5	175.8	-4.1	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	0.476	0.370	0.476	0.370	0.360	0.370	1.037	0.698
2	0.487	0.380	0.487	0.380	0.379	0.380	1.013	0.672
3	0.500	0.397	0.500	0.397	0.409	0.397	0.979	0.608
4	0.506	0.400	0.506	0.400	0.411	0.400	0.982	0.610
5	0.506	0.397	0.506	0.397	0.401	0.397	0.998	0.638
6	0.510	0.393	0.510	0.393	0.394	0.393	1.007	0.664
7	0.518	0.393	0.518	0.393	0.392	0.393	1.013	0.686
8	0.567	0.411	0.567	0.411	0.417	0.411	1.001	0.729
9	0.609	0.429	0.609	0.429	0.434	0.429	1.006	0.781
10	0.652	0.420	0.652	0.420	0.428	0.419	1.001	0.891
11	0.660	0.376	0.660	0.376	0.417	0.375	0.926	0.923

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	7.1	1.1	16.8	0.459	0.	0.080	0.080	0.031	0.031
2	10.00	5.4	-0.6	15.0	0.438	0.	0.073	0.073	0.027	0.027
3	20.00	1.7	-4.2	11.6	0.404	0.	0.049	0.049	0.017	0.017
4	30.00	1.9	-4.0	10.4	0.399	0.	0.041	0.041	0.014	0.014
5	36.00	3.3	-2.5	10.7	0.405	0.	0.037	0.037	0.012	0.012
6	42.00	4.3	-1.4	10.4	0.418	0.	0.048	0.048	0.015	0.015
7	50.00	4.7	-0.9	10.3	0.427	0.	0.047	0.047	0.014	0.014
8	70.00	3.0	-2.4	10.0	0.440	0.	0.048	0.048	0.012	0.012
9	80.00	2.4	-2.9	12.1	0.445	0.	0.082	0.082	0.020	0.020
10	90.00	3.9	-1.3	16.9	0.494	0.	0.139	0.139	0.031	0.031
11	95.00	4.2	-0.8	12.8	0.579	0.	0.204	0.204	0.043	0.043

TABLE IX. - *Continued.* BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR ONE

(g) Reading 279

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.757	23.762	38.1	2.8	38.1	2.8	321.4	1.000	13.33	0.989
2	23.167	23.200	35.5	2.4	35.5	2.4	319.5	1.000	13.46	0.990
3	21.981	22.068	32.6	0.9	32.6	0.9	316.8	1.000	13.57	0.994
4	20.787	20.927	32.9	0.7	32.9	0.7	316.3	1.000	13.65	0.994
5	20.071	20.244	34.4	1.5	34.4	1.5	316.5	1.000	13.63	0.994
6	19.350	19.558	36.2	2.2	36.2	2.2	316.9	1.000	13.66	0.994
7	18.387	18.649	37.8	2.5	37.8	2.5	316.9	1.000	13.66	0.994
8	15.961	16.388	40.2	1.5	40.2	1.5	316.4	1.000	13.74	0.993
9	14.732	15.263	42.4	2.0	42.4	2.0	317.0	1.000	13.98	0.984
10	13.492	14.143	47.3	4.1	47.3	4.1	319.0	1.000	14.15	0.974
11	12.868	13.586	48.9	0.2	48.9	0.2	319.2	1.000	14.08	0.946

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	166.7	131.7	166.7	131.7	131.2	131.5	102.8	6.4	0.	0.
2	172.3	138.7	172.3	138.7	140.3	138.6	99.9	5.9	0.	0.
3	178.9	146.8	178.9	146.8	150.7	146.8	96.3	2.2	0.	0.
4	182.4	149.9	182.4	149.9	153.1	149.9	99.1	1.9	0.	0.
5	183.7	150.8	183.7	150.8	151.6	150.7	103.7	3.9	0.	0.
6	186.1	151.8	186.1	151.8	150.2	151.6	109.9	6.0	0.	0.
7	189.0	152.6	189.0	152.6	149.4	152.4	115.9	6.6	0.	0.
8	203.6	156.4	203.6	156.4	155.4	156.4	131.5	4.1	0.	0.
9	216.1	164.0	216.1	164.0	159.5	163.9	145.8	5.8	0.	0.
10	231.3	163.6	231.3	163.6	156.8	163.2	170.1	11.8	0.	0.
11	234.6	145.3	234.6	145.3	154.3	145.3	176.7	0.5	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	0.474	0.372	0.474	0.372	0.373	0.371	1.002	0.625
2	0.492	0.393	0.492	0.393	0.401	0.393	0.988	0.589
3	0.514	0.419	0.514	0.419	0.433	0.419	0.974	0.514
4	0.526	0.428	0.526	0.428	0.441	0.428	0.979	0.526
5	0.529	0.431	0.529	0.431	0.437	0.430	0.994	0.553
6	0.536	0.433	0.536	0.433	0.433	0.433	1.010	0.597
7	0.545	0.436	0.545	0.436	0.431	0.435	1.021	0.623
8	0.591	0.448	0.591	0.448	0.451	0.447	1.006	0.664
9	0.629	0.470	0.629	0.470	0.464	0.469	1.028	0.717
10	0.675	0.467	0.675	0.467	0.457	0.466	1.041	0.848
11	0.685	0.413	0.685	0.413	0.451	0.413	0.942	0.872

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	2.8	-3.1	16.7	0.432	0.	0.080	0.080	0.031	0.031
2	10.00	0.4	-5.5	14.2	0.399	0.	0.063	0.063	0.024	0.024
3	20.00	-2.4	-8.3	10.9	0.366	0.	0.035	0.035	0.012	0.012
4	30.00	-2.4	-8.2	10.0	0.357	0.	0.038	0.038	0.013	0.013
5	36.00	-1.4	-7.2	10.4	0.355	0.	0.032	0.032	0.010	0.010
6	42.00	-0.3	-6.1	11.0	0.359	0.	0.033	0.033	0.010	0.010
7	50.00	0.1	-5.5	11.0	0.364	0.	0.035	0.035	0.011	0.011
8	70.00	-0.9	-6.4	10.4	0.392	0.	0.033	0.033	0.009	0.009
9	80.00	-1.2	-6.5	11.7	0.394	0.	0.068	0.068	0.016	0.016
10	90.00	0.8	-4.3	15.7	0.440	0.	0.098	0.098	0.022	0.022
11	95.00	0.7	-4.3	13.3	0.535	0.	0.199	0.199	0.042	0.042

TABLE IX. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR ONE

(h) Reading 290

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.757	23.762	36.6	2.5	36.6	2.5	320.3	1.000	13.20	0.988
2	23.167	23.200	33.5	2.4	33.5	2.4	318.4	1.000	13.37	0.989
3	21.981	22.068	31.0	0.9	31.0	0.9	315.9	1.000	13.47	0.993
4	20.787	20.927	31.4	0.8	31.4	0.8	315.4	1.000	13.54	0.994
5	20.071	20.244	32.9	1.3	32.9	1.3	315.6	1.000	13.55	0.994
6	19.350	19.558	34.7	2.1	34.7	2.1	316.3	1.000	13.58	0.995
7	18.387	18.649	36.1	2.4	36.1	2.4	316.3	1.000	13.62	0.993
8	15.961	16.388	38.9	1.5	38.9	1.5	316.0	1.000	13.73	0.992
9	14.732	15.263	41.5	1.6	41.5	1.6	316.7	1.000	13.93	0.986
10	13.492	14.143	46.3	3.5	46.3	3.5	318.7	1.000	14.14	0.977
11	12.868	13.586	47.5	0.1	47.5	0.1	318.9	1.000	14.12	0.945

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	166.3	133.6	166.3	133.6	133.5	133.5	99.2	5.9	0.	0.
2	173.3	141.4	173.3	141.4	144.4	141.3	95.7	5.9	0.	0.
3	180.3	150.0	180.3	150.0	154.5	150.0	92.9	2.2	0.	0.
4	183.3	153.3	183.3	153.3	156.4	153.3	95.5	2.1	0.	0.
5	185.0	154.7	185.0	154.7	155.4	154.7	100.4	3.6	0.	0.
6	187.7	156.4	187.7	156.4	154.3	156.3	106.9	5.6	0.	0.
7	191.5	158.1	191.5	158.1	154.7	158.0	112.9	6.7	0.	0.
8	206.3	162.5	206.3	162.5	160.6	162.5	129.5	4.2	0.	0.
9	217.6	170.4	217.6	170.4	163.0	170.4	144.1	4.8	0.	0.
10	233.3	171.5	233.3	171.5	161.2	171.1	168.7	10.4	0.	0.
11	237.5	154.3	237.5	154.3	160.4	154.3	175.1	0.2	0.	0.

	ABS MACH NO		REL MACH NO		MERID MACH NO			
RP	IN	OUT	IN	OUT	IN	OUT	MERID PEAK SS VEL R	MACH NO
1	0.474	0.378	0.474	0.378	0.380	0.377	1.000	0.600
2	0.496	0.402	0.496	0.402	0.414	0.401	0.978	0.552
3	0.520	0.429	0.520	0.429	0.445	0.429	0.971	0.520
4	0.529	0.439	0.529	0.439	0.451	0.439	0.980	0.529
5	0.534	0.443	0.534	0.443	0.449	0.443	0.995	0.534
6	0.542	0.448	0.542	0.448	0.445	0.447	1.013	0.551
7	0.553	0.452	0.553	0.452	0.447	0.452	1.021	0.583
8	0.599	0.466	0.599	0.466	0.467	0.466	1.012	0.629
9	0.634	0.489	0.634	0.489	0.475	0.489	1.045	0.692
10	0.682	0.491	0.682	0.491	0.471	0.490	1.062	0.829
11	0.695	0.439	0.695	0.439	0.469	0.439	0.962	0.848

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	1.4	-4.6	16.4	0.412	0.	0.083	0.083	0.032	0.032
2	10.00	-1.5	-7.4	14.2	0.378	0.	0.074	0.074	0.028	0.028
3	20.00	-4.0	-9.9	10.9	0.346	0.	0.039	0.039	0.014	0.014
4	30.00	-3.9	-9.7	10.0	0.334	0.	0.037	0.037	0.012	0.012
5	36.00	-2.9	-8.7	10.3	0.333	0.	0.034	0.034	0.011	0.011
6	42.00	-1.8	-7.5	10.8	0.335	0.	0.029	0.029	0.009	0.009
7	50.00	-1.5	-7.2	11.0	0.339	0.	0.039	0.039	0.012	0.012
8	70.00	-2.3	-7.7	10.4	0.368	0.	0.036	0.036	0.009	0.009
9	80.00	-2.1	-7.5	11.3	0.368	0.	0.061	0.061	0.015	0.015
10	90.00	-0.2	-5.4	15.1	0.412	0.	0.087	0.087	0.019	0.019
11	95.00	-0.6	-5.6	13.2	0.502	0.	0.200	0.200	0.042	0.042

TABLE IX. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR ONE

(i) Reading 374

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.757	23.762	46.6	4.3	46.6	4.3	309.5	1.000	11.95	0.993
2	23.167	23.200	46.2	2.2	46.2	2.2	308.4	1.000	11.94	0.995
3	21.981	22.068	42.4	1.0	42.4	1.0	306.3	1.000	11.94	0.996
4	20.787	20.927	40.4	1.0	40.4	1.0	305.4	1.000	12.01	0.995
5	20.071	20.244	40.9	2.3	40.9	2.3	305.3	1.000	12.04	0.994
6	19.350	19.558	41.8	1.9	41.8	1.9	305.2	1.000	12.03	0.995
7	18.387	18.649	42.6	2.1	42.6	2.1	305.0	1.000	12.05	0.993
8	15.961	16.388	43.5	0.6	43.5	0.6	304.5	1.000	12.11	0.993
9	14.732	15.263	45.6	2.4	45.6	2.4	304.8	1.000	12.23	0.990
10	13.492	14.143	50.0	4.1	50.0	4.1	305.7	1.000	12.32	0.980
11	12.868	13.586	51.8	-1.0	51.8	-1.0	306.0	1.000	12.27	0.969

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	118.1	90.4	118.1	90.4	81.1	90.1	85.8	6.8	0.	0.
2	118.2	90.9	118.2	90.9	81.9	90.9	85.3	3.5	0.	0.
3	120.1	93.5	120.1	93.5	88.6	93.5	81.1	1.7	0.	0.
4	126.1	97.2	126.1	97.2	96.0	97.2	81.7	1.7	0.	0.
5	129.1	98.5	129.1	98.5	97.6	98.4	84.6	3.9	0.	0.
6	130.8	98.7	130.8	98.7	97.4	98.7	87.3	3.2	0.	0.
7	134.1	99.3	134.1	99.3	98.7	99.2	90.8	3.7	0.	0.
8	147.7	105.8	147.7	105.8	107.2	105.8	101.6	1.1	0.	0.
9	158.3	111.8	158.3	111.8	110.9	111.7	113.0	4.6	0.	0.
10	170.0	109.3	170.0	109.3	109.2	109.0	130.3	7.9	0.	0.
11	172.3	96.7	172.3	96.7	106.5	96.7	135.4	-1.7	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	0.339	0.258	0.339	0.258	0.233	0.257	1.111	0.545
2	0.340	0.260	0.340	0.260	0.255	0.260	1.110	0.535
3	0.346	0.268	0.346	0.268	0.256	0.268	1.054	0.493
4	0.365	0.280	0.365	0.280	0.278	0.280	1.013	0.484
5	0.374	0.284	0.374	0.284	0.282	0.283	1.009	0.496
6	0.379	0.284	0.379	0.284	0.282	0.284	1.012	0.506
7	0.389	0.286	0.389	0.286	0.286	0.286	1.005	0.517
8	0.430	0.305	0.430	0.305	0.312	0.305	0.987	0.540
9	0.462	0.323	0.462	0.323	0.323	0.322	1.007	0.584
10	0.497	0.315	0.497	0.315	0.319	0.314	0.999	0.672
11	0.504	0.278	0.504	0.278	0.311	0.278	0.908	0.694

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	11.3	5.4	18.2	0.491	0.	0.094	0.094	0.036	0.036
2	10.00	11.1	5.1	14.0	0.489	0.	0.071	0.071	0.027	0.027
3	20.00	7.4	1.5	11.0	0.456	0.	0.051	0.051	0.018	0.018
4	30.00	5.0	-0.8	10.2	0.441	0.	0.053	0.053	0.018	0.018
5	36.00	5.1	-0.7	11.1	0.439	0.	0.064	0.064	0.021	0.021
6	42.00	5.3	-0.5	10.6	0.446	0.	0.058	0.058	0.018	0.018
7	50.00	4.9	-0.7	10.7	0.452	0.	0.066	0.066	0.020	0.020
8	70.00	2.3	-3.2	9.4	0.459	0.	0.062	0.062	0.016	0.016
9	80.00	1.9	-3.4	12.0	0.456	0.	0.075	0.075	0.018	0.018
10	90.00	3.4	-1.7	15.7	0.512	0.	0.131	0.131	0.029	0.029
11	95.00	3.6	-1.4	12.1	0.603	0.	0.198	0.198	0.042	0.042

TABLE IX. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR ONE

(j) Reading 396

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.757	23.762	39.7	4.1	39.7	4.1	307.4	1.000	11.81	0.995
2	23.167	23.200	36.8	2.7	36.8	2.7	305.9	1.000	11.83	0.996
3	21.981	22.068	33.6	0.1	33.6	0.1	303.9	1.000	11.90	0.997
4	20.787	20.927	34.3	0.6	34.3	0.6	303.8	1.000	11.93	0.997
5	20.071	20.244	35.7	1.9	35.7	1.9	304.0	1.000	11.96	0.997
6	19.350	19.558	37.0	2.0	37.0	2.0	304.3	1.000	11.97	0.997
7	18.387	18.649	38.2	2.4	38.2	2.4	304.2	1.000	12.00	0.996
8	15.961	16.388	40.1	1.2	40.1	1.2	304.0	1.000	12.07	0.995
9	14.732	15.263	42.5	1.9	42.5	1.9	304.4	1.000	12.20	0.991
10	13.492	14.143	47.1	3.6	47.1	3.6	305.4	1.000	12.29	0.985
11	12.868	13.586	48.6	-0.3	48.6	-0.3	305.7	1.000	12.26	0.968

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	120.6	97.8	120.6	97.8	92.8	97.6	77.0	7.0	0.	0.
2	122.8	100.6	122.8	100.6	98.3	100.5	73.6	4.7	0.	0.
3	126.9	105.3	126.9	105.3	105.7	105.3	70.1	0.2	0.	0.
4	131.1	108.9	131.1	108.9	108.4	108.9	73.8	1.2	0.	0.
5	133.8	110.8	133.8	110.8	108.7	110.7	78.0	3.7	0.	0.
6	136.1	112.1	136.1	112.1	108.7	112.0	82.0	3.9	0.	0.
7	139.5	113.7	139.5	113.7	109.6	113.6	86.3	4.7	0.	0.
8	152.8	119.5	152.8	119.5	116.8	119.5	98.5	2.5	0.	0.
9	162.5	125.8	162.5	125.8	119.9	125.7	109.7	4.2	0.	0.
10	174.2	125.4	174.2	125.4	118.5	125.2	127.6	7.9	0.	0.
11	177.1	112.3	177.1	112.3	117.1	112.3	132.9	-0.6	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	0.347	0.281	0.347	0.281	0.267	0.280	1.051	0.458
2	0.355	0.289	0.355	0.289	0.284	0.289	1.023	0.421
3	0.368	0.304	0.368	0.304	0.307	0.304	0.997	0.368
4	0.381	0.315	0.381	0.315	0.315	0.315	1.005	0.381
5	0.388	0.320	0.388	0.320	0.316	0.320	1.019	0.393
6	0.395	0.324	0.395	0.324	0.316	0.324	1.031	0.423
7	0.405	0.329	0.405	0.329	0.319	0.328	1.037	0.438
8	0.446	0.346	0.446	0.346	0.341	0.346	1.023	0.450
9	0.475	0.364	0.475	0.364	0.350	0.364	1.049	0.499
10	0.510	0.363	0.510	0.363	0.347	0.362	1.056	0.603
11	0.519	0.324	0.519	0.324	0.343	0.324	0.959	0.622

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	2.8	-3.1	16.3	0.411	0.	0.061	0.061	0.023	0.023
2	10.00	0.2	-5.8	12.8	0.390	0.	0.047	0.047	0.017	0.017
3	20.00	-3.1	-9.0	8.5	0.365	0.	0.033	0.033	0.012	0.012
4	30.00	-2.7	-8.5	8.2	0.355	0.	0.031	0.031	0.010	0.010
5	36.00	-1.7	-7.5	9.2	0.352	0.	0.033	0.033	0.011	0.011
6	42.00	-1.1	-6.8	9.1	0.356	0.	0.033	0.033	0.010	0.010
7	50.00	-1.1	-6.8	9.3	0.358	0.	0.034	0.034	0.010	0.010
8	70.00	-2.7	-8.2	8.4	0.379	0.	0.039	0.039	0.010	0.010
9	80.00	-2.8	-8.1	10.0	0.379	0.	0.060	0.060	0.014	0.014
10	90.00	-1.1	-6.2	13.6	0.428	0.	0.089	0.089	0.020	0.020
11	95.00	-1.2	-6.2	11.2	0.521	0.	0.189	0.189	0.040	0.040

TABLE IX. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR ONE

(k) Reading 407

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.757	23.762	36.3	3.2	36.3	3.2	305.6	1.000	11.68	0.996
2	23.167	23.200	33.1	1.8	33.1	1.8	304.3	1.000	11.73	0.996
3	21.981	22.068	30.5	-0.1	30.5	-0.1	302.7	1.000	11.82	0.996
4	20.787	20.927	31.7	0.3	31.7	0.3	302.8	1.000	11.85	0.997
5	20.071	20.244	33.1	1.2	33.1	1.2	303.2	1.000	11.87	0.997
6	19.350	19.558	34.5	1.6	34.5	1.6	303.4	1.000	11.90	0.997
7	18.387	18.649	35.5	2.2	35.5	2.2	303.5	1.000	11.94	0.996
8	15.961	16.388	38.1	1.2	38.1	1.2	303.5	1.000	12.04	0.995
9	14.732	15.263	40.8	1.3	40.8	1.3	304.0	1.000	12.16	0.992
10	13.492	14.143	45.8	3.0	45.8	3.0	305.2	1.000	12.28	0.987
11	12.868	13.586	47.3	-0.1	47.3	-0.1	305.5	1.000	12.27	0.968

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	119.1	99.3	119.1	99.3	96.0	99.2	70.5	5.5	0.	0.
2	122.9	103.7	122.9	103.7	102.9	103.6	67.1	3.3	0.	0.
3	128.6	109.7	128.6	109.7	110.8	109.7	65.2	-0.2	0.	0.
4	132.0	113.1	132.0	113.1	112.4	113.1	69.3	0.6	0.	0.
5	134.1	114.9	134.1	114.9	112.3	114.9	73.3	2.4	0.	0.
6	137.1	116.8	137.1	116.8	112.9	116.7	77.7	3.2	0.	0.
7	141.0	119.3	141.0	119.3	114.7	119.2	82.0	4.5	0.	0.
8	154.1	125.1	154.1	125.1	121.2	125.1	95.2	2.6	0.	0.
9	163.4	131.7	163.4	131.7	123.6	131.6	106.8	3.0	0.	0.
10	175.7	133.1	175.7	133.1	122.6	132.9	125.9	6.9	0.	0.
11	179.2	120.9	179.2	120.9	121.6	120.9	131.6	-0.3	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	0.344	0.286	0.344	0.286	0.277	0.285	1.033	0.408
2	0.356	0.299	0.356	0.299	0.298	0.299	1.007	0.356
3	0.374	0.318	0.374	0.318	0.322	0.318	0.990	0.374
4	0.384	0.328	0.384	0.328	0.327	0.328	1.006	0.384
5	0.390	0.333	0.390	0.333	0.327	0.333	1.023	0.390
6	0.399	0.338	0.399	0.338	0.329	0.338	1.034	0.399
7	0.411	0.346	0.411	0.346	0.334	0.345	1.039	0.411
8	0.450	0.363	0.450	0.363	0.354	0.363	1.032	0.450
9	0.478	0.382	0.478	0.382	0.362	0.382	1.065	0.478
10	0.515	0.386	0.515	0.386	0.359	0.385	1.084	0.576
11	0.525	0.349	0.525	0.349	0.357	0.349	0.994	0.599

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	-0.6	-6.6	15.4	0.375	0.	0.052	0.052	0.020	0.020
2	10.00	-3.6	-9.5	12.0	0.350	0.	0.042	0.042	0.016	0.016
3	20.00	-6.2	-12.1	8.2	0.327	0.	0.039	0.039	0.014	0.014
4	30.00	-5.3	-11.1	7.9	0.318	0.	0.031	0.031	0.010	0.010
5	36.00	-4.3	-10.1	8.4	0.314	0.	0.029	0.029	0.009	0.009
6	42.00	-3.6	-9.4	8.6	0.318	0.	0.032	0.032	0.010	0.010
7	50.00	-3.8	-9.4	9.1	0.317	0.	0.035	0.035	0.011	0.011
8	70.00	-4.7	-10.1	8.4	0.343	0.	0.036	0.036	0.009	0.009
9	80.00	-4.5	-9.8	9.3	0.344	0.	0.058	0.058	0.014	0.014
10	90.00	-2.5	-7.6	12.9	0.389	0.	0.077	0.077	0.017	0.017
11	95.00	-2.5	-7.5	11.3	0.477	0.	0.188	0.188	0.040	0.040

TABLE IX. - Concluded. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR ONE

(ℓ) Reading 421

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.757	23.762	30.4	0.4	30.4	0.4	302.9	1.000	11.44	0.995
2	23.167	23.200	27.4	-0.5	27.4	-0.5	301.9	1.000	11.55	0.995
3	21.981	22.068	25.9	-1.3	25.9	-1.3	301.0	1.000	11.63	0.997
4	20.787	20.927	27.2	-1.1	27.2	-1.1	301.2	1.000	11.70	0.996
5	20.071	20.244	28.6	-0.5	28.6	-0.5	301.6	1.000	11.73	0.996
6	19.350	19.558	30.3	0.0	30.3	0.0	302.1	1.000	11.76	0.997
7	18.387	18.649	31.6	0.6	31.6	0.6	302.3	1.000	11.83	0.996
8	15.961	16.388	35.3	0.2	35.3	0.2	303.0	1.000	12.03	0.993
9	14.732	15.263	38.5	-0.0	38.5	-0.0	303.7	1.000	12.13	0.992
10	13.492	14.143	43.3	0.7	43.3	0.7	304.9	1.000	12.26	0.989
11	12.868	13.586	45.3	-0.9	45.3	-0.9	305.5	1.000	12.26	0.968

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	118.7	101.0	118.7	101.0	102.4	101.0	60.0	0.7	0.	0.
2	125.3	109.0	125.3	109.0	111.3	109.0	57.7	-1.0	0.	0.
3	131.8	116.9	131.8	116.9	118.6	116.9	57.5	-2.6	0.	0.
4	135.8	120.8	135.8	120.8	120.8	120.8	62.1	-2.4	0.	0.
5	138.2	123.1	138.2	123.1	121.3	123.1	66.2	-1.1	0.	0.
6	141.0	125.7	141.0	125.7	121.7	125.7	71.1	0.0	0.	0.
7	145.8	129.5	145.8	129.5	124.2	129.5	76.3	1.3	0.	0.
8	160.5	138.2	160.5	138.2	131.0	138.2	92.6	0.5	0.	0.
9	169.1	145.7	169.1	145.7	132.3	145.7	105.2	-0.0	0.	0.
10	180.0	148.3	180.0	148.3	131.0	148.3	123.5	1.9	0.	0.
11	185.6	137.8	185.6	137.8	129.3	137.8	130.4	-2.3	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	0.344	0.292	0.344	0.292	0.297	0.292	0.987	0.344
2	0.365	0.316	0.365	0.316	0.324	0.316	0.980	0.365
3	0.385	0.340	0.385	0.340	0.346	0.340	0.985	0.385
4	0.396	0.351	0.396	0.351	0.353	0.351	1.000	0.396
5	0.403	0.358	0.403	0.358	0.354	0.358	1.015	0.403
6	0.411	0.366	0.411	0.366	0.355	0.366	1.035	0.411
7	0.426	0.377	0.426	0.377	0.363	0.377	1.043	0.426
8	0.470	0.402	0.470	0.402	0.384	0.402	1.055	0.470
9	0.496	0.424	0.496	0.424	0.388	0.424	1.101	0.496
10	0.529	0.431	0.529	0.431	0.385	0.431	1.132	0.576
11	0.539	0.400	0.539	0.400	0.380	0.400	1.066	0.611

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	-4.7	-10.7	14.5	0.340	0.	0.068	0.068	0.026	0.026
2	10.00	-7.4	-13.4	11.5	0.305	0.	0.052	0.052	0.020	0.020
3	20.00	-9.0	-14.9	8.9	0.275	0.	0.034	0.034	0.012	0.012
4	30.00	-7.9	-13.8	8.3	0.270	0.	0.039	0.039	0.013	0.013
5	36.00	-6.9	-12.7	8.6	0.267	0.	0.041	0.041	0.013	0.013
6	42.00	-6.0	-11.8	8.9	0.265	0.	0.030	0.030	0.009	0.009
7	50.00	-5.9	-11.6	9.3	0.264	0.	0.036	0.036	0.011	0.011
8	70.00	-5.7	-11.2	9.3	0.286	0.	0.049	0.049	0.013	0.013
9	80.00	-4.9	-10.3	9.9	0.286	0.	0.049	0.049	0.012	0.012
10	90.00	-3.1	-8.2	12.5	0.322	0.	0.063	0.063	0.014	0.014
11	95.00	-2.7	-7.7	12.4	0.398	0.	0.179	0.179	0.038	0.038

TABLE X. - BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR TWO

(a) Reading 190

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.533	23.188	0.2	38.8	66.3	56.0	337.9	1.153	14.55	1.546
2	23.002	22.708	0.4	40.4	64.2	55.0	335.1	1.157	14.80	1.528
3	21.951	21.742	0.0	39.5	61.1	52.8	332.8	1.150	15.20	1.499
4	20.899	20.780	-0.2	38.8	59.4	50.2	332.0	1.144	15.25	1.497
5	20.272	20.206	-0.2	38.8	59.0	48.6	331.6	1.141	15.18	1.505
6	19.647	19.637	-1.1	38.4	58.8	47.0	331.2	1.140	15.05	1.517
7	18.814	18.887	-0.8	38.7	57.5	44.2	330.8	1.137	15.14	1.510
8	16.721	17.071	0.1	40.4	52.8	35.0	330.6	1.133	15.65	1.467
9	15.651	16.198	0.1	42.4	51.2	28.4	331.0	1.136	15.73	1.470
10	14.536	15.352	0.3	43.6	52.2	21.7	332.5	1.136	15.42	1.488
11	13.952	14.938	-2.3	42.5	56.0	20.1	333.4	1.136	14.88	1.524

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	172.4	217.0	428.3	302.3	172.4	169.0	0.5	136.1	392.5	386.8
2	185.2	218.3	424.9	289.9	185.2	166.4	1.2	141.4	383.7	378.8
3	202.2	219.7	418.3	280.3	202.2	169.6	0.2	139.7	366.4	362.9
4	206.9	221.7	406.0	270.3	206.9	172.8	-0.6	138.9	348.7	346.7
5	204.1	223.2	395.7	262.9	204.1	173.9	-0.8	139.9	338.2	337.1
6	200.6	224.0	387.5	257.7	200.5	175.7	-3.9	139.0	327.7	327.5
7	202.1	227.7	375.6	247.5	202.1	177.6	-2.9	142.5	313.7	314.9
8	211.5	240.6	349.6	223.7	211.5	183.2	0.3	155.9	278.6	284.4
9	209.1	251.3	333.9	211.1	209.1	185.7	0.5	169.4	260.9	270.0
10	187.1	261.2	304.9	203.6	187.1	189.1	1.1	180.2	241.9	255.5
11	161.7	263.6	288.6	206.9	161.5	194.4	-6.4	178.1	232.7	249.2

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.479	0.566	1.189	0.789	0.479	0.441	0.980	1.428
2	0.518	0.571	1.189	0.759	0.518	0.435	0.898	1.379
3	0.571	0.579	1.181	0.739	0.571	0.447	0.839	1.321
4	0.586	0.587	1.149	0.716	0.586	0.458	0.835	1.291
5	0.578	0.592	1.120	0.698	0.578	0.462	0.852	1.289
6	0.567	0.596	1.096	0.685	0.567	0.467	0.876	1.302
7	0.572	0.607	1.064	0.660	0.572	0.474	0.879	1.278
8	0.601	0.646	0.993	0.601	0.601	0.492	0.866	1.185
9	0.593	0.676	0.948	0.568	0.593	0.499	0.888	1.135
10	0.526	0.703	0.857	0.548	0.526	0.509	1.011	1.110
11	0.451	0.709	0.805	0.557	0.450	0.523	1.203	1.168

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	4.3	1.8	1.7	0.413	0.861	0.107	0.069	0.023	0.015
2	10.00	3.1	0.6	1.4	0.439	0.820	0.141	0.110	0.030	0.023
3	20.00	1.7	-1.0	1.4	0.447	0.813	0.143	0.120	0.031	0.026
4	30.00	1.7	-1.4	1.5	0.450	0.846	0.118	0.101	0.025	0.022
5	36.00	2.4	-1.0	1.8	0.452	0.873	0.100	0.086	0.022	0.019
6	42.00	3.3	-0.4	2.5	0.452	0.902	0.079	0.065	0.017	0.014
7	50.00	3.3	-0.9	3.0	0.4[illegible]	0.910	0.074	0.065	0.016	0.014
8	70.00	1.4	-3.7	5.1	0.46[illegible]	0.869	0.115	0.113	0.026	0.025
9	80.00	0.5	-4.9	6.3	0.500	0.851	0.143	0.143	0.032	0.032
10	90.00	0.6	-4.6	10.0	0.477	0.879	0.136	0.136	0.030	0.030
11	95.00	3.1	-1.8	14.8	0.435	0.936	0.079	0.079	0.017	0.017

TABLE X. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR TWO

(b) Reading 201

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.533	23.188	-0.7	35.5	66.8	58.0	336.1	1.141	14.29	1.449
2	23.002	22.708	-0.0	35.8	64.5	56.1	333.7	1.142	14.56	1.445
3	21.951	21.742	-0.0	34.0	61.1	53.6	331.7	1.133	15.00	1.425
4	20.899	20.780	-0.1	33.8	59.2	51.7	331.3	1.127	15.12	1.414
5	20.272	20.206	-0.5	34.2	58.9	50.4	330.9	1.126	15.00	1.419
6	19.647	19.637	-1.5	34.3	59.0	49.3	330.5	1.126	14.85	1.428
7	18.814	18.887	-1.0	35.5	57.3	46.4	330.6	1.126	14.98	1.421
8	16.721	17.071	-0.0	37.2	51.9	35.0	331.1	1.129	15.65	1.421
9	15.651	16.198	0.2	39.0	50.0	26.7	331.8	1.137	15.84	1.452
10	14.536	15.352	0.2	40.1	51.0	19.4	333.3	1.140	15.52	1.491
11	13.952	14.938	-2.5	38.6	55.0	18.1	334.1	1.139	14.90	1.534

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	170.9	207.9	434.0	319.2	170.8	169.3	-2.0	120.6	397.0	391.1
2	185.4	213.5	429.8	310.6	185.4	173.2	-0.1	124.9	387.7	382.7
3	205.0	217.7	423.6	304.4	205.0	180.4	-0.1	121.9	370.5	367.0
4	210.7	218.0	411.0	292.2	210.7	181.3	-0.5	121.2	352.3	350.3
5	206.7	217.5	400.2	282.3	206.7	179.8	-1.6	122.4	341.1	340.0
6	202.4	216.9	392.3	275.0	202.3	179.2	-5.3	122.1	330.9	330.7
7	205.4	221.7	380.5	261.5	205.4	180.5	-3.6	128.8	316.8	318.0
8	221.1	247.6	358.4	240.7	221.1	197.1	-0.2	149.8	281.9	287.8
9	221.0	267.4	343.5	232.5	221.0	207.7	0.8	168.4	263.7	273.0
10	198.2	283.7	315.0	230.3	198.2	217.2	0.6	182.6	245.5	259.3
11	170.8	287.4	297.3	236.5	170.6	224.8	-7.5	179.1	235.9	252.6

	ABS MACH NO		REL MACH NO		MERID MACH NO			
RP	IN	OUT	IN	OUT	IN	OUT	MERID VEL R	PEAK SS MACH NO
1	0.475	0.545	1.208	0.837	0.475	0.444	0.991	1.463
2	0.520	0.563	1.205	0.819	0.520	0.457	0.934	1.403
3	0.580	0.579	1.199	0.809	0.580	0.480	0.880	1.335
4	0.598	0.582	1.166	0.780	0.598	0.484	0.860	1.298
5	0.586	0.581	1.135	0.754	0.586	0.480	0.870	1.299
6	0.573	0.580	1.112	0.735	0.573	0.479	0.886	1.318
7	0.582	0.593	1.079	0.700	0.582	0.483	0.879	1.283
8	0.630	0.667	1.021	0.648	0.630	0.531	0.892	1.163
9	0.629	0.722	0.978	0.628	0.629	0.561	0.940	1.118
10	0.558	0.768	0.887	0.624	0.558	0.588	1.096	1.111
11	0.477	0.779	0.830	0.641	0.476	0.609	1.317	1.176

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	4.9	2.4	3.7	0.371	0.789	0.147	0.101	0.029	0.020
2	10.00	3.4	0.9	2.5	0.384	0.778	0.156	0.120	0.032	0.025
3	20.00	1.6	-1.1	2.3	0.383	0.795	0.139	0.113	0.029	0.024
4	30.00	1.5	-1.6	2.9	0.389	0.814	0.126	0.107	0.026	0.022
5	36.00	2.3	-1.1	3.6	0.396	0.830	0.118	0.102	0.025	0.021
6	42.00	3.4	-0.3	4.8	0.403	0.846	0.110	0.094	0.023	0.020
7	50.00	3.2	-1.0	5.2	0.419	0.834	0.124	0.113	0.026	0.024
8	70.00	0.6	-4.6	5.1	0.444	0.815	0.151	0.150	0.034	0.034
9	80.00	-0.8	-6.2	4.6	0.451	0.820	0.166	0.166	0.038	0.038
10	90.00	-0.5	-5.8	7.7	0.411	0.862	0.150	0.150	0.034	0.034
11	95.00	2.1	-2.8	12.9	0.354	0.933	0.082	0.082	0.018	0.018

TABLE X. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR TWO

(c) Reading 212

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.533	23.188	-0.5	29.7	66.8	60.1	335.2	1.113	14.20	1.317
2	23.002	22.708	0.0	29.9	64.4	57.1	333.0	1.117	14.49	1.334
3	21.951	21.742	-0.0	28.4	60.9	54.0	331.5	1.113	14.94	1.327
4	20.899	20.780	0.0	27.9	58.9	52.2	331.1	1.106	15.08	1.321
5	20.272	20.206	-0.1	28.5	58.7	51.3	330.8	1.105	14.94	1.327
6	19.647	19.637	-0.9	28.9	58.7	50.4	330.4	1.106	14.78	1.333
7	18.814	18.887	-0.5	30.4	57.1	47.9	330.6	1.107	14.92	1.325
8	16.721	17.071	0.5	33.6	51.5	35.7	331.2	1.117	15.62	1.346
9	15.651	16.198	0.9	35.8	49.4	26.3	332.0	1.129	15.82	1.402
10	14.536	15.352	0.9	37.3	50.4	17.9	333.6	1.137	15.49	1.481
11	13.952	14.938	-1.9	36.7	54.4	16.4	334.2	1.139	14.88	1.507

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	170.1	194.2	431.7	338.4	170.1	168.7	-1.4	96.2	395.3	389.5
2	185.1	207.5	428.5	331.3	185.1	179.9	0.1	103.4	386.6	381.6
3	205.7	217.0	422.8	324.5	205.7	190.9	-0.1	103.3	369.3	365.8
4	211.9	217.2	410.4	313.5	211.9	192.0	0.1	101.7	351.6	349.6
5	207.6	216.0	399.5	303.8	207.6	189.9	-0.2	102.9	341.1	340.0
6	202.9	214.4	390.8	294.5	202.9	187.7	-3.3	103.5	330.7	330.5
7	205.9	218.0	379.4	280.4	205.9	188.1	-1.7	110.3	316.9	318.2
8	222.5	249.8	357.4	256.2	222.5	208.1	1.9	138.1	281.6	287.5
9	222.5	276.7	342.2	250.4	222.5	224.5	3.6	161.8	263.6	272.8
10	199.6	299.4	313.3	250.4	199.5	238.2	3.1	181.3	244.7	258.4
11	172.5	302.2	296.2	252.6	172.4	242.4	-5.7	180.5	235.1	251.7

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.474	0.515	1.203	0.897	0.474	0.447	0.992	1.458
2	0.520	0.553	1.203	0.883	0.520	0.479	0.972	1.399
3	0.583	0.583	1.197	0.871	0.583	0.512	0.928	1.328
4	0.602	0.586	1.166	0.845	0.602	0.518	0.906	1.289
5	0.589	0.583	1.134	0.820	0.589	0.512	0.915	1.290
6	0.575	0.578	1.108	0.794	0.575	0.506	0.925	1.306
7	0.584	0.588	1.076	0.756	0.584	0.508	0.914	1.273
8	0.634	0.677	1.018	0.695	0.634	0.564	0.936	1.143
9	0.633	0.753	0.974	0.681	0.633	0.611	1.009	1.090
10	0.562	0.817	0.883	0.683	0.562	0.650	1.194	1.086
11	0.482	0.824	0.827	0.689	0.481	0.661	1.406	1.156

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	4.9	2.4	5.8	0.301	0.725	0.157	0.112	0.030	0.021
2	10.00	3.4	0.9	3.6	0.316	0.729	0.161	0.126	0.032	0.025
3	20.00	1.5	-1.2	2.6	0.319	0.741	0.151	0.126	0.031	0.026
4	30.00	1.2	-1.8	3.5	0.320	0.777	0.128	0.110	0.027	0.023
5	36.00	2.1	-1.3	4.5	0.324	0.799	0.118	0.103	0.024	0.021
6	42.00	3.2	-0.5	5.8	0.333	0.805	0.119	0.104	0.024	0.021
7	50.00	3.0	-1.2	6.7	0.351	0.782	0.139	0.130	0.029	0.027
8	70.00	0.2	-5.0	5.7	0.388	0.756	0.183	0.182	0.041	0.040
9	80.00	-1.3	-6.7	4.2	0.389	0.785	0.188	0.187	0.043	0.043
10	90.00	-1.1	-6.3	6.2	0.341	0.865	0.146	0.146	0.033	0.033
11	95.00	1.5	-3.4	11.2	0.297	0.895	0.126	0.126	0.028	0.028

TABLE X. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR TWO

(d) Reading 223

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.533	23.188	-0.1	25.7	66.6	60.9	335.1	1.095	14.19	1.241
2	23.002	22.708	0.3	25.6	64.3	57.8	333.0	1.100	14.46	1.265
3	21.951	21.742	0.0	24.6	60.8	54.6	331.2	1.098	14.90	1.262
4	20.899	20.780	0.0	24.5	58.8	53.0	330.9	1.093	15.04	1.255
5	20.272	20.206	-0.1	24.9	58.6	52.0	330.7	1.092	14.92	1.262
6	19.647	19.637	-1.2	24.8	58.7	51.1	330.2	1.093	14.77	1.272
7	18.814	18.887	-0.7	26.3	57.1	48.7	330.4	1.094	14.89	1.267
8	16.721	17.071	0.3	29.8	51.5	36.1	331.0	1.107	15.58	1.286
9	15.651	16.198	0.7	32.5	49.5	26.0	331.9	1.123	15.78	1.380
10	14.536	15.352	0.7	34.6	50.5	17.9	333.3	1.133	15.44	1.452
11	13.952	14.938	-2.2	34.4	54.5	16.7	334.0	1.135	14.84	1.453

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	171.0	189.4	430.5	351.2	171.0	170.7	-0.3	82.1	394.8	389.0
2	185.4	204.6	427.4	345.8	185.4	184.5	0.9	88.6	386.0	381.1
3	205.4	215.2	421.6	337.5	205.4	195.6	0.0	89.7	368.2	364.7
4	211.7	214.9	409.3	324.6	211.7	195.5	0.1	89.2	350.4	348.4
5	207.8	214.1	398.8	315.8	207.8	194.2	-0.3	90.1	340.2	339.1
6	203.3	213.5	391.0	308.6	203.3	193.8	-4.2	89.6	329.9	329.7
7	206.1	217.1	379.5	294.7	206.1	194.7	-2.6	96.0	316.0	317.3
8	222.4	253.8	357.3	272.6	222.4	220.2	1.1	126.1	280.7	286.6
9	222.4	286.9	342.2	269.0	222.4	241.8	2.8	154.3	262.9	272.1
10	199.3	309.6	313.1	267.8	199.3	254.9	2.6	175.7	244.1	257.8
11	172.4	308.8	296.3	266.0	172.3	254.8	-6.7	174.5	234.4	251.0

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.477	0.506	1.200	0.953	0.477	0.456	0.998	1.449
2	0.520	0.550	1.200	0.929	0.520	0.495	0.995	1.393
3	0.582	0.582	1.195	0.913	0.582	0.529	0.952	1.324
4	0.601	0.583	1.163	0.880	0.601	0.530	0.923	1.284
5	0.590	0.581	1.132	0.857	0.590	0.527	0.935	1.285
6	0.576	0.579	1.109	0.838	0.576	0.526	0.953	1.306
7	0.585	0.589	1.077	0.800	0.585	0.528	0.944	1.273
8	0.634	0.692	1.019	0.744	0.634	0.601	0.990	1.143
9	0.633	0.786	0.974	0.737	0.633	0.663	1.087	1.092
10	0.562	0.851	0.882	0.736	0.562	0.700	1.279	1.086
11	0.481	0.846	0.827	0.729	0.481	0.698	1.479	1.158

	PERCENT	INCIDENCE*		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	4.7	2.2	6.6	0.256	0.670	0.162	0.119	0.030	0.022
2	10.00	3.2	0.7	4.2	0.266	0.697	0.156	0.122	0.031	0.024
3	20.00	1.4	-1.3	3.2	0.275	0.699	0.154	0.130	0.032	0.027
4	30.00	1.2	-1.9	4.3	0.280	0.717	0.144	0.127	0.029	0.026
5	36.00	2.0	-1.4	5.2	0.282	0.746	0.132	0.117	0.027	0.024
6	42.00	3.2	-0.5	6.5	0.287	0.766	0.127	0.112	0.025	0.022
7	50.00	3.0	-1.2	7.5	0.303	0.745	0.145	0.135	0.029	0.027
8	70.00	0.2	-5.0	6.2	0.334	0.692	0.212	0.211	0.047	0.047
9	80.00	-1.2	-6.7	3.8	0.330	0.781	0.183	0.183	0.042	0.042
10	90.00	-1.1	-6.3	6.2	0.281	0.845	0.162	0.162	0.037	0.037
11	95.00	1.6	-3.4	11.5	0.248	0.835	0.192	0.192	0.042	0.042

TABLE X. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR TWO

(e) Reading 234

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.533	23.188	1.2	41.5	65.7	54.6	342.0	1.165	15.02	1.581
2	23.002	22.708	1.0	42.8	64.2	53.7	338.8	1.169	15.18	1.569
3	21.951	21.742	0.4	42.0	61.4	51.8	335.6	1.161	15.55	1.529
4	20.899	20.780	0.5	41.1	59.4	49.6	334.7	1.152	15.65	1.519
5	20.272	20.206	0.7	41.2	59.0	47.9	334.3	1.148	15.56	1.524
6	19.647	19.637	-0.1	40.6	58.9	46.2	333.7	1.146	15.43	1.537
7	18.814	18.887	-0.2	40.6	57.7	42.7	332.9	1.145	15.49	1.540
8	16.721	17.071	0.7	43.0	53.9	34.3	331.9	1.140	15.84	1.516
9	15.651	16.198	1.1	46.5	52.6	28.4	331.9	1.142	15.79	1.495
10	14.536	15.352	2.9	48.2	53.1	19.7	333.7	1.142	15.53	1.526
11	13.952	14.938	-0.4	45.7	57.1	17.8	334.7	1.142	15.02	1.570

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	176.8	227.3	430.5	294.0	176.8	170.1	3.8	150.8	396.3	390.5
2	185.9	227.7	426.5	282.2	185.9	167.1	3.3	154.7	387.2	382.2
3	200.7	226.4	418.7	272.2	200.7	168.2	1.5	151.5	369.0	365.5
4	206.2	226.3	405.6	262.9	206.2	170.5	1.8	148.9	351.0	349.0
5	203.5	227.7	394.5	255.6	203.5	171.4	2.6	149.9	340.6	339.5
6	199.6	228.8	386.1	250.9	199.6	173.7	-0.3	148.9	330.2	330.0
7	200.2	234.6	374.5	242.1	200.2	178.0	-0.8	152.8	315.7	316.9
8	202.9	242.7	344.4	214.7	202.9	177.4	2.5	165.7	280.8	286.7
9	197.4	247.3	325.3	193.7	197.4	170.3	3.9	179.3	262.4	271.5
10	176.5	261.5	293.6	185.3	176.3	174.4	9.0	194.8	243.7	257.4
11	152.0	266.5	279.8	195.7	152.0	186.3	-1.0	190.6	233.9	250.4

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.488	0.588	1.189	0.760	0.488	0.440	0.962	1.410
2	0.517	0.591	1.187	0.732	0.517	0.433	0.899	1.377
3	0.564	0.592	1.176	0.712	0.564	0.440	0.838	1.326
4	0.581	0.596	1.143	0.692	0.581	0.449	0.827	1.289
5	0.573	0.601	1.111	0.674	0.573	0.452	0.842	1.283
6	0.562	0.605	1.087	0.664	0.562	0.459	0.870	1.298
7	0.565	0.623	1.056	0.643	0.565	0.473	0.889	1.282
8	0.574	0.649	0.974	0.574	0.574	0.474	0.874	1.206
9	0.557	0.661	0.918	0.518	0.557	0.455	0.863	1.151
10	0.494	0.700	0.821	0.496	0.493	0.467	0.989	1.091
11	0.422	0.714	0.777	0.524	0.422	0.499	1.225	1.157

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	3.8	1.3	0.3	0.445	0.843	0.128	0.093	0.028	0.020
2	10.00	3.1	0.6	0.1	0.469	0.812	0.156	0.126	0.034	0.028
3	20.00	1.9	-0.8	0.5	0.476	0.796	0.166	0.143	0.036	0.031
4	30.00	1.8	-1.3	0.9	0.474	0.833	0.135	0.119	0.030	0.026
5	36.00	2.4	-1.0	1.1	0.474	0.862	0.113	0.100	0.025	0.022
6	42.00	3.3	-0.4	1.6	0.473	0.893	0.090	0.077	0.020	0.017
7	50.00	3.5	-0.6	1.5	0.479	0.904	0.084	0.075	0.019	0.017
8	70.00	2.6	-2.6	4.4	0.508	0.902	0.093	0.091	0.021	0.021
9	80.00	1.9	-3.5	6.3	0.546	0.852	0.154	0.154	0.035	0.035
10	90.00	1.6	-3.7	8.0	0.525	0.898	0.126	0.126	0.029	0.029
11	95.00	4.2	-0.7	12.6	0.464	0.965	0.048	0.048	0.011	0.011

TABLE X. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR TWO

(f) Reading 245

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.533	23.188	1.4	35.9	65.6	57.4	323.2	1.091	13.40	1.288
2	23.002	22.708	1.6	36.5	64.2	55.8	321.5	1.092	13.46	1.293
3	21.951	21.742	0.1	35.5	62.3	53.4	318.3	1.092	13.59	1.290
4	20.899	20.780	-0.3	34.5	61.0	51.0	317.4	1.088	13.58	1.293
5	20.272	20.206	0.2	34.9	60.3	49.2	317.5	1.086	13.55	1.301
6	19.647	19.637	0.1	35.4	59.9	47.4	317.7	1.085	13.51	1.306
7	18.814	18.887	0.2	36.9	58.9	44.3	317.5	1.087	13.49	1.310
8	16.721	17.071	-0.4	39.5	55.7	33.3	316.6	1.092	13.60	1.321
9	15.651	16.198	0.9	42.2	53.2	25.4	317.0	1.096	13.71	1.331
10	14.536	15.352	3.9	43.5	52.5	16.8	318.5	1.094	13.63	1.339
11	13.952	14.938	-1.9	39.4	57.8	16.7	319.0	1.094	13.29	1.370

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	141.8	168.0	343.0	252.4	141.7	136.1	3.4	98.5	315.7	311.0
2	147.1	171.3	337.9	244.9	147.1	137.8	4.0	101.8	308.2	304.3
3	154.2	174.2	332.2	237.6	154.2	141.8	0.2	101.1	294.5	291.7
4	155.7	175.6	321.1	230.0	155.7	144.7	-0.8	99.6	280.0	278.4
5	154.4	178.0	312.0	223.3	154.4	146.0	0.6	101.8	271.7	270.9
6	152.9	180.0	304.7	216.8	152.9	146.7	0.4	104.2	263.9	263.8
7	151.8	183.6	294.0	205.2	151.7	146.9	0.7	110.2	252.5	253.5
8	153.8	200.2	272.6	185.0	153.8	154.5	-0.9	127.2	224.2	228.9
9	155.5	212.3	259.4	174.0	155.4	157.2	2.4	142.7	210.1	217.4
10	142.2	226.8	233.2	171.9	141.9	164.6	9.7	156.0	194.7	205.7
11	120.2	230.9	225.5	186.2	120.1	178.4	-4.0	146.6	186.8	200.0

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.400	0.456	0.967	0.685	0.400	0.369	0.960	1.246
2	0.416	0.466	0.956	0.666	0.416	0.375	0.937	1.206
3	0.440	0.477	0.947	0.650	0.440	0.388	0.920	1.186
4	0.445	0.483	0.917	0.632	0.445	0.397	0.929	1.159
5	0.441	0.490	0.890	0.615	0.441	0.402	0.945	1.136
6	0.436	0.495	0.869	0.597	0.436	0.404	0.960	1.125
7	0.433	0.506	0.839	0.565	0.433	0.405	0.968	1.095
8	0.439	0.554	0.779	0.511	0.439	0.427	1.005	1.016
9	0.444	0.588	0.741	0.482	0.444	0.435	1.011	0.944
10	0.404	0.630	0.663	0.477	0.403	0.457	1.160	0.867
11	0.340	0.642	0.637	0.518	0.339	0.496	1.485	0.966

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	3.7	1.2	3.1	0.368	0.826	0.109	0.106	0.022	0.022
2	10.00	3.1	0.6	2.2	0.382	0.827	0.112	0.110	0.023	0.023
3	20.00	2.9	0.2	2.0	0.392	0.822	0.117	0.116	0.025	0.024
4	30.00	3.3	0.2	2.3	0.389	0.870	0.086	0.085	0.018	0.018
5	36.00	3.7	0.4	2.4	0.390	0.909	0.062	0.062	0.013	0.013
6	42.00	4.4	0.7	2.8	0.397	0.927	0.051	0.051	0.011	0.011
7	50.00	4.8	0.6	3.1	0.416	0.923	0.058	0.058	0.013	0.013
8	70.00	4.4	-0.8	3.4	0.451	0.899	0.090	0.090	0.021	0.021
9	80.00	2.5	-2.9	3.3	0.471	0.889	0.111	0.111	0.026	0.026
10	90.00	1.0	-4.3	5.1	0.418	0.922	0.094	0.094	0.022	0.022
11	95.00	5.0	0.0	11.5	0.334	1.004	-0.005	-0.005	-0.001	-0.001

TABLE X. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR TWO

(g) Reading 279

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.533	23.188	2.6	30.1	65.5	59.4	321.4	1.071	13.18	1.219
2	23.002	22.708	2.2	29.5	63.5	56.8	319.5	1.073	13.33	1.230
3	21.951	21.742	0.8	27.8	61.1	54.1	316.8	1.072	13.49	1.229
4	20.899	20.780	0.6	27.4	59.2	51.9	316.3	1.070	13.56	1.231
5	20.272	20.206	1.3	28.1	58.2	50.0	316.5	1.069	13.56	1.238
6	19.647	19.637	2.0	29.0	57.0	47.7	316.9	1.069	13.58	1.245
7	18.814	18.887	2.2	30.5	55.8	44.3	316.9	1.071	13.57	1.256
8	16.721	17.071	1.4	33.0	53.0	33.9	316.4	1.079	13.64	1.276
9	15.651	16.198	1.9	36.0	50.5	25.5	317.0	1.087	13.76	1.299
10	14.536	15.352	4.2	38.1	49.7	17.0	319.0	1.089	13.79	1.312
11	13.952	14.938	0.2	35.9	55.0	16.4	319.2	1.090	13.32	1.346

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	142.0	159.1	341.9	270.7	141.8	137.7	6.5	79.8	317.6	312.9
2	151.7	168.0	339.7	266.8	151.6	146.1	5.9	82.8	310.0	306.0
3	162.5	173.6	335.8	262.0	162.5	153.6	2.2	80.9	296.1	293.3
4	166.7	175.9	325.9	253.1	166.7	156.1	1.9	81.0	281.8	280.2
5	167.7	179.2	317.8	246.1	167.6	158.1	3.9	84.4	273.9	273.0
6	168.4	183.2	309.1	238.3	168.3	160.3	5.9	88.8	265.2	265.1
7	168.4	189.1	299.4	227.9	168.3	163.0	6.5	95.9	254.1	255.1
8	167.2	208.0	277.6	210.1	167.2	174.5	4.0	113.3	225.6	230.4
9	169.7	224.3	266.4	201.1	169.6	181.5	5.6	131.8	211.1	218.5
10	157.3	241.4	242.4	198.6	156.9	189.9	11.5	149.1	196.2	207.2
11	131.3	244.3	229.2	206.2	131.3	197.8	0.5	143.3	188.3	201.6

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.401	0.436	0.967	0.742	0.401	0.377	0.971	1.242
2	0.431	0.462	0.966	0.734	0.431	0.402	0.964	1.192
3	0.465	0.481	0.961	0.726	0.465	0.425	0.945	1.156
4	0.478	0.488	0.935	0.703	0.478	0.434	0.937	1.118
5	0.481	0.498	0.912	0.684	0.481	0.439	0.943	1.086
6	0.483	0.510	0.886	0.663	0.483	0.446	0.952	1.049
7	0.483	0.526	0.859	0.634	0.483	0.453	0.968	1.018
8	0.480	0.580	0.796	0.586	0.480	0.487	1.044	0.957
9	0.487	0.626	0.764	0.562	0.486	0.507	1.070	0.891
10	0.448	0.675	0.691	0.555	0.447	0.531	1.210	0.828
11	0.372	0.683	0.649	0.577	0.372	0.553	1.506	0.921

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	3.6	1.1	5.1	0.289	0.821	0.089	0.087	0.017	0.017
2	10.00	2.5	-0.0	3.2	0.298	0.831	0.088	0.086	0.018	0.018
3	20.00	1.6	-1.1	2.8	0.302	0.837	0.084	0.084	0.017	0.017
4	30.00	1.6	-1.5	3.2	0.305	0.876	0.065	0.065	0.014	0.014
5	36.00	1.6	-1.8	3.2	0.309	0.912	0.047	0.047	0.010	0.010
6	42.00	1.5	-2.2	3.2	0.315	0.938	0.035	0.035	0.007	0.007
7	50.00	1.7	-2.5	3.2	0.330	0.942	0.035	0.035	0.008	0.008
8	70.00	1.7	-3.5	3.9	0.352	0.912	0.067	0.067	0.015	0.015
9	80.00	-0.2	-5.6	3.4	0.369	0.896	0.091	0.091	0.021	0.021
10	90.00	-1.9	-7.1	5.3	0.321	0.904	0.102	0.102	0.024	0.024
11	95.00	2.2	-2.8	11.2	0.249	0.987	0.016	0.016	0.003	0.003

TABLE X. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR TWO

(h) Reading 290

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.533	23.188	2.4	25.7	65.2	60.9	320.3	1.058	13.05	1.159
2	23.002	22.708	2.2	25.1	63.1	57.8	318.4	1.061	13.22	1.174
3	21.951	21.742	0.8	23.2	60.6	54.6	315.9	1.061	13.38	1.185
4	20.899	20.780	0.7	23.0	58.7	52.3	315.4	1.059	13.46	1.188
5	20.272	20.206	1.2	23.8	57.5	50.3	315.6	1.060	13.47	1.196
6	19.647	19.637	1.8	24.6	56.2	47.9	316.3	1.060	13.51	1.206
7	18.814	18.887	2.2	26.2	54.7	44.3	316.3	1.063	13.52	1.220
8	16.721	17.071	1.4	29.0	51.9	34.2	316.0	1.072	13.62	1.242
9	15.651	16.198	1.5	31.7	49.5	26.3	316.7	1.080	13.73	1.271
10	14.536	15.352	3.5	34.7	48.5	16.8	318.7	1.087	13.81	1.298
11	13.952	14.938	0.1	33.7	53.6	15.0	318.9	1.090	13.34	1.340

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	144.1	152.5	343.2	282.4	144.0	137.4	6.0	66.1	317.5	312.8
2	154.8	164.7	342.1	280.2	154.7	149.2	5.9	69.9	311.1	307.1
3	166.3	174.2	338.1	276.5	166.2	160.2	2.3	68.5	296.7	293.9
4	170.8	177.6	328.5	267.5	170.8	163.4	2.1	69.4	282.8	281.1
5	172.3	181.2	320.3	259.6	172.3	165.9	3.6	73.0	273.6	272.7
6	173.9	186.3	312.6	252.8	173.8	169.4	5.6	77.6	265.4	265.3
7	174.9	193.4	302.8	242.6	174.8	173.6	6.6	85.3	253.9	254.9
8	174.0	213.9	281.9	226.3	173.9	187.2	4.1	103.6	226.0	230.7
9	176.5	231.4	271.9	219.6	176.4	196.9	4.7	121.7	211.6	219.0
10	164.7	253.1	248.2	217.3	164.4	208.0	10.1	144.2	196.1	207.1
11	139.1	259.5	234.1	223.4	139.1	215.8	0.2	144.1	188.5	201.9

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.408	0.421	0.973	0.779	0.408	0.379	0.954	1.238
2	0.441	0.456	0.975	0.776	0.441	0.413	0.964	1.189
3	0.477	0.486	0.970	0.771	0.477	0.447	0.963	1.147
4	0.491	0.497	0.945	0.748	0.491	0.457	0.957	1.108
5	0.496	0.507	0.921	0.726	0.496	0.464	0.963	1.071
6	0.500	0.521	0.899	0.707	0.500	0.474	0.975	1.033
7	0.503	0.541	0.871	0.679	0.503	0.486	0.993	0.992
8	0.500	0.601	0.811	0.635	0.500	0.525	1.076	0.938
9	0.507	0.650	0.782	0.617	0.507	0.553	1.116	0.379
10	0.470	0.712	0.709	0.611	0.469	0.585	1.266	0.816
11	0.394	0.730	0.664	0.629	0.394	0.607	1.552	0.909

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	3.3	0.8	6.6	0.243	0.736	0.109	0.106	0.020	0.019
2	10.00	2.1	-0.4	4.3	0.250	0.767	0.100	0.099	0.020	0.019
3	20.00	1.1	-1.6	3.2	0.251	0.810	0.083	0.082	0.017	0.017
4	30.00	1.0	-2.1	3.6	0.255	0.848	0.067	0.067	0.014	0.014
5	36.00	0.9	-2.5	3.5	0.260	0.879	0.056	0.056	0.012	0.012
6	42.00	0.7	-3.0	3.4	0.265	0.913	0.042	0.042	0.009	0.009
7	50.00	0.6	-3.6	3.2	0.278	0.925	0.040	0.040	0.009	0.009
8	70.00	0.6	-4.6	4.2	0.295	0.885	0.077	0.077	0.017	0.017
9	80.00	-1.2	-6.6	4.1	0.305	0.882	0.094	0.094	0.022	0.022
10	90.00	-3.0	-8.2	5.1	0.258	0.889	0.111	0.111	0.025	0.025
11	95.00	0.7	-4.2	9.8	0.193	0.962	0.044	0.044	0.010	0.010

TABLE X. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR TWO

(i) Reading 374

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.533	23.188	4.1	36.3	67.2	59.9	309.5	1.047	11.87	1.144
2	23.002	22.708	2.1	34.9	66.7	57.8	308.4	1.049	11.87	1.152
3	21.951	21.742	0.9	34.8	65.0	54.8	306.3	1.050	11.90	1.153
4	20.899	20.780	0.9	34.3	62.9	52.3	305.4	1.048	11.95	1.152
5	20.272	20.206	2.1	34.5	61.7	50.4	305.3	1.047	11.97	1.154
6	19.647	19.637	1.7	34.3	61.0	48.6	305.2	1.046	11.96	1.155
7	18.814	18.887	1.9	35.3	59.9	45.6	305.0	1.046	11.97	1.159
8	16.721	17.071	0.5	36.6	56.3	34.1	304.5	1.050	12.02	1.170
9	15.651	16.198	2.2	39.6	53.1	25.0	304.8	1.053	12.11	1.181
10	14.536	15.352	4.2	40.6	53.0	17.2	305.7	1.054	12.07	1.189
11	13.952	14.938	-1.1	37.2	58.3	16.9	306.0	1.054	11.88	1.206

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	96.8	117.6	249.4	189.1	96.6	94.8	6.9	69.6	236.8	233.3
2	98.5	122.2	248.5	187.9	98.5	100.2	3.6	69.9	231.7	228.8
3	102.2	126.3	242.0	179.7	102.2	103.6	1.7	72.2	221.1	219.0
4	106.6	128.1	234.2	172.9	106.6	105.8	1.7	72.3	210.2	209.0
5	108.0	130.6	228.1	168.9	108.0	107.7	3.9	74.0	204.8	204.1
6	108.0	131.8	222.6	164.6	108.0	108.9	3.2	74.2	197.8	197.7
7	108.2	135.6	215.9	158.2	108.1	110.7	3.7	78.3	190.6	191.3
8	112.1	151.3	201.9	146.8	112.1	121.5	1.0	90.1	169.0	172.5
9	115.1	163.9	191.6	139.4	115.0	126.3	4.5	104.5	157.8	163.3
10	105.6	175.5	174.9	139.4	105.3	133.2	7.7	114.3	147.3	155.5
11	88.2	178.5	167.8	148.6	88.2	142.2	-1.7	107.9	141.1	151.0

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.277	0.330	0.713	0.530	0.276	0.266	0.982	0.960
2	0.282	0.343	0.712	0.527	0.282	0.281	1.018	0.961
3	0.294	0.356	0.696	0.506	0.294	0.292	1.014	0.940
4	0.307	0.362	0.675	0.488	0.307	0.299	0.992	0.901
5	0.311	0.370	0.657	0.478	0.311	0.305	0.997	0.873
6	0.311	0.373	0.642	0.466	0.311	0.308	1.008	0.856
7	0.312	0.384	0.623	0.448	0.312	0.314	1.024	0.836
8	0.324	0.430	0.583	0.417	0.324	0.345	1.084	0.774
9	0.332	0.466	0.554	0.396	0.332	0.359	1.099	0.704
10	0.304	0.500	0.504	0.397	0.303	0.379	1.265	0.667
11	0.253	0.509	0.482	0.424	0.253	0.405	1.613	0.738

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	5.3	2.8	5.6	0.336	0.831	0.091	0.091	0.017	0.017
2	10.00	5.6	3.1	4.2	0.342	0.843	0.088	0.088	0.017	0.017
3	20.00	5.6	2.9	3.4	0.360	0.828	0.102	0.102	0.021	0.021
4	30.00	5.2	2.2	3.5	0.363	0.854	0.088	0.088	0.018	0.018
5	36.00	5.1	1.8	3.6	0.360	0.897	0.063	0.063	0.013	0.013
6	42.00	5.5	1.8	4.0	0.362	0.916	0.053	0.053	0.011	0.011
7	50.00	5.8	1.6	4.4	0.373	0.925	0.050	0.050	0.011	0.011
8	70.00	5.0	-0.2	4.2	0.395	0.916	0.068	0.068	0.015	0.015
9	80.00	2.4	-3.0	2.8	0.409	0.913	0.083	0.083	0.019	0.019
10	90.00	1.4	-3.8	5.5	0.354	0.939	0.069	0.069	0.016	0.016
11	95.00	5.5	0.5	11.6	0.270	1.025	-0.031	-0.031	-0.007	-0.007

TABLE X. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR TWO

(j) Reading 396

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.533	23.188	3.8	26.8	65.6	60.1	307.4	1.035	11.75	1.097
2	23.002	22.708	2.5	25.9	64.4	57.8	305.9	1.037	11.79	1.105
3	21.951	21.742	0.1	23.5	62.5	54.9	303.9	1.037	11.86	1.111
4	20.899	20.780	0.6	22.9	60.4	52.6	303.8	1.035	11.89	1.113
5	20.272	20.206	1.7	23.6	58.9	50.5	304.0	1.034	11.92	1.117
6	19.647	19.637	1.8	24.1	57.8	48.4	304.3	1.034	11.93	1.121
7	18.814	18.887	2.2	25.8	56.2	45.0	304.2	1.036	11.96	1.126
8	16.721	17.071	1.1	28.6	52.8	35.0	304.0	1.042	12.01	1.141
9	15.651	16.198	1.8	31.2	50.0	27.2	304.4	1.045	12.09	1.154
10	14.536	15.352	3.6	34.8	49.1	16.6	305.4	1.051	12.11	1.178
11	13.952	14.938	-0.3	33.1	54.2	15.3	305.7	1.053	11.88	1.201

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	104.9	116.9	253.2	209.1	104.7	104.3	7.0	52.8	237.5	234.0
2	109.2	123.0	252.3	207.4	109.1	110.6	4.7	53.8	232.2	229.2
3	115.4	128.8	249.8	205.6	115.4	118.1	0.2	51.3	221.8	219.7
4	119.7	132.2	242.2	200.5	119.7	121.8	1.2	51.3	211.8	210.6
5	121.8	135.5	235.6	195.1	121.7	124.1	3.7	54.2	205.4	204.7
6	123.0	138.5	230.7	190.4	122.9	126.4	3.9	56.6	199.1	199.0
7	124.3	143.2	223.5	182.2	124.2	128.9	4.7	62.4	190.5	191.2
8	126.9	158.5	210.0	169.9	126.9	139.2	2.4	75.9	169.8	173.4
9	129.7	171.3	201.7	164.8	129.6	146.5	4.1	88.9	158.7	164.3
10	121.0	190.0	184.3	162.8	120.8	156.0	7.7	108.5	146.9	155.2
11	102.1	194.8	174.6	169.2	102.1	163.2	-0.6	106.4	141.1	151.0

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.301	0.331	0.727	0.591	0.301	0.295	0.997	0.936
2	0.314	0.349	0.727	0.588	0.314	0.314	1.014	0.922
3	0.334	0.367	0.723	0.586	0.334	0.336	1.024	0.909
4	0.347	0.377	0.702	0.572	0.347	0.348	1.017	0.871
5	0.353	0.387	0.682	0.557	0.353	0.355	1.020	0.833
6	0.356	0.396	0.668	0.544	0.356	0.361	1.028	0.812
7	0.360	0.409	0.647	0.521	0.360	0.368	1.038	0.780
8	0.368	0.454	0.609	0.486	0.368	0.398	1.097	0.728
9	0.376	0.491	0.585	0.472	0.376	0.419	1.130	0.671
10	0.350	0.545	0.533	0.467	0.349	0.447	1.291	0.625
11	0.294	0.558	0.503	0.485	0.294	0.468	1.597	0.699

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	3.7	1.2	5.8	0.242	0.771	0.089	0.089	0.017	0.017
2	10.00	3.3	0.8	4.2	0.249	0.789	0.087	0.087	0.017	0.017
3	20.00	3.1	0.4	3.6	0.249	0.827	0.072	0.072	0.015	0.015
4	30.00	2.7	-0.4	3.9	0.242	0.902	0.041	0.041	0.008	0.008
5	36.00	2.3	-1.1	3.7	0.242	0.949	0.022	0.022	0.005	0.005
6	42.00	2.3	-1.4	3.8	0.247	0.970	0.013	0.013	0.003	0.003
7	50.00	2.1	-2.1	3.8	0.264	0.953	0.023	0.023	0.005	0.005
8	70.00	1.5	-3.7	5.1	0.288	0.926	0.047	0.047	0.011	0.011
9	80.00	-0.7	-6.1	5.1	0.293	0.918	0.061	0.061	0.014	0.014
10	90.00	-2.5	-7.7	5.0	0.252	0.933	0.066	0.066	0.015	0.015
11	95.00	1.3	-3.6	10.1	0.178	1.021	-0.024	-0.024	-0.005	-0.005

TABLE X. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR TWO

(k) Reading 407

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.533	23.188	3.0	22.1	65.4	61.6	305.6	1.028	11.63	1.072
2	23.002	22.708	1.7	21.2	63.9	58.3	304.3	1.031	11.69	1.086
3	21.951	21.742	-0.1	19.1	61.6	54.6	302.7	1.032	11.78	1.096
4	20.899	20.780	0.3	18.7	59.5	52.5	302.8	1.030	11.81	1.099
5	20.272	20.206	1.1	19.4	58.0	50.9	303.2	1.029	11.84	1.099
6	19.647	19.637	1.4	20.1	56.7	48.9	303.4	1.029	11.86	1.103
7	18.814	18.887	2.0	21.9	54.9	45.2	303.5	1.031	11.90	1.111
8	16.721	17.071	1.1	25.0	51.3	34.6	303.5	1.038	11.98	1.128
9	15.651	16.198	1.2	27.5	48.9	27.5	304.0	1.042	12.05	1.144
10	14.536	15.352	3.0	31.5	47.5	17.3	305.2	1.049	12.12	1.164
11	13.952	14.938	-0.1	31.0	52.2	14.8	305.5	1.052	11.88	1.194

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	106.5	111.9	255.1	218.1	106.4	103.7	5.5	42.1	237.4	233.9
2	112.5	123.1	255.9	218.3	112.5	114.8	3.3	44.5	233.1	230.1
3	120.3	132.8	252.9	216.8	120.3	125.5	-0.2	43.4	222.3	220.2
4	124.5	135.2	244.9	210.3	124.5	128.0	0.6	43.3	211.5	210.2
5	126.4	136.8	238.7	204.4	126.4	129.0	2.4	45.5	204.8	204.1
6	128.3	139.8	233.9	199.8	128.3	131.3	3.1	48.0	198.8	198.7
7	130.5	146.0	226.8	192.2	130.5	135.5	4.5	54.4	190.0	190.7
8	132.9	164.2	212.8	180.9	132.9	148.8	2.5	69.4	168.7	172.2
9	135.8	177.3	206.4	177.3	135.8	157.2	2.9	81.9	158.3	163.9
10	128.4	196.3	189.9	175.3	128.2	167.3	6.7	102.7	146.7	155.0
11	109.8	203.8	179.0	180.6	109.8	174.7	-0.3	104.9	141.0	151.0

	ABS MACH NO		REL MACH NO		MERID MACH NO			
RP	IN	OUT	IN	OUT	IN	OUT	MERID PEAK SS VEL R	MACH NO
1	0.307	0.318	0.735	0.620	0.306	0.295	0.975	0.940
2	0.325	0.351	0.739	0.622	0.325	0.327	1.021	0.925
3	0.349	0.380	0.734	0.621	0.349	0.359	1.044	0.898
4	0.361	0.388	0.711	0.603	0.361	0.367	1.029	0.857
5	0.367	0.392	0.693	0.586	0.367	0.370	1.020	0.822
6	0.373	0.401	0.679	0.573	0.372	0.376	1.023	0.796
7	0.379	0.419	0.659	0.551	0.379	0.389	1.038	0.755
8	0.386	0.472	0.618	0.520	0.386	0.428	1.120	0.699
9	0.395	0.510	0.600	0.510	0.394	0.452	1.158	0.654
10	0.372	0.565	0.550	0.504	0.371	0.481	1.305	0.606
11	0.316	0.586	0.516	0.520	0.316	0.503	1.591	0.680

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	3.4	0.9	7.3	0.199	0.724	0.085	0.085	0.015	0.015
2	10.00	2.9	0.4	4.7	0.206	0.774	0.077	0.077	0.015	0.015
3	20.00	2.2	-0.5	3.3	0.204	0.846	0.054	0.054	0.011	0.011
4	30.00	1.8	-1.3	3.8	0.200	0.925	0.026	0.026	0.005	0.005
5	36.00	1.4	-2.0	4.1	0.203	0.949	0.018	0.018	0.004	0.004
6	42.00	1.2	-2.5	4.4	0.207	0.971	0.011	0.011	0.002	0.002
7	50.00	0.7	-3.4	4.1	0.220	0.975	0.011	0.011	0.002	0.002
8	70.00	0.0	-5.2	4.7	0.237	0.925	0.042	0.042	0.010	0.010
9	80.00	-1.8	-7.2	5.4	0.241	0.924	0.051	0.051	0.012	0.012
10	90.00	-4.0	-9.2	5.7	0.202	0.911	0.078	0.078	0.018	0.018
11	95.00	-0.7	-5.7	9.6	0.131	1.004	-0.005	-0.005	-0.001	-0.001

TABLE X. - Concluded. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR ROTOR TWO

(ℓ) Reading 421

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.533	23.188	0.4	11.4	65.4	62.1	302.9	1.017	11.38	1.038
2	23.002	22.708	-0.5	11.7	63.1	58.2	301.9	1.021	11.50	1.054
3	21.951	21.742	-1.2	11.0	60.2	54.9	301.0	1.021	11.59	1.060
4	20.899	20.780	-1.0	11.5	58.0	52.6	301.2	1.021	11.65	1.063
5	20.272	20.206	-0.5	12.3	56.6	50.6	301.6	1.022	11.68	1.070
6	19.647	19.637	0.0	12.9	55.0	48.4	302.1	1.022	11.72	1.076
7	18.814	18.887	0.5	14.5	53.0	44.8	302.3	1.024	11.78	1.083
8	16.721	17.071	0.2	19.1	48.8	34.7	303.0	1.032	11.95	1.109
9	15.651	16.198	-0.0	22.0	46.5	28.0	303.7	1.038	12.03	1.121
10	14.536	15.352	0.8	26.9	45.5	18.1	304.9	1.047	12.12	1.149
11	13.952	14.938	-1.0	27.3	48.8	14.9	305.5	1.050	11.86	1.177

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	108.5	114.4	260.7	239.5	108.4	112.1	0.7	22.7	237.8	234.4
2	118.5	129.0	262.0	239.5	118.5	126.3	-1.0	26.2	232.6	229.7
3	128.4	138.1	258.5	235.9	128.4	135.5	-2.6	26.4	221.7	219.6
4	133.2	141.4	251.5	228.3	133.2	138.6	-2.4	28.2	210.9	209.7
5	135.8	145.7	246.6	224.1	135.8	142.4	-1.1	31.0	204.7	204.0
6	138.5	150.2	241.8	220.3	138.5	146.4	0.0	33.4	198.2	198.1
7	142.1	156.8	235.9	214.1	142.1	151.8	1.3	39.3	189.6	190.3
8	147.2	175.7	223.7	201.8	147.2	166.0	0.4	57.6	168.9	172.4
9	150.4	188.7	218.4	198.3	150.4	175.0	-0.0	70.6	158.3	163.8
10	142.8	208.8	203.6	195.8	142.7	186.1	1.9	94.6	147.1	155.4
11	124.7	216.2	189.4	198.8	124.7	192.1	-2.2	99.2	140.4	150.3

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.314	0.329	0.755	0.688	0.314	0.322	1.034	0.968
2	0.344	0.372	0.761	0.690	0.344	0.364	1.065	0.928
3	0.374	0.399	0.753	0.682	0.374	0.392	1.056	0.880
4	0.389	0.409	0.734	0.660	0.389	0.401	1.040	0.839
5	0.396	0.421	0.719	0.648	0.396	0.412	1.048	0.807
6	0.404	0.434	0.705	0.637	0.404	0.424	1.057	0.770
7	0.415	0.454	0.688	0.619	0.415	0.439	1.068	0.717
8	0.430	0.508	0.653	0.584	0.430	0.480	1.127	0.653
9	0.439	0.546	0.637	0.573	0.439	0.506	1.163	0.637
10	0.415	0.604	0.592	0.566	0.415	0.538	1.304	0.592
11	0.360	0.625	0.548	0.575	0.360	0.556	1.541	0.653

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	3.5	1.0	7.8	0.113	0.637	0.066	0.066	0.012	0.012
2	10.00	2.0	-0.5	4.6	0.124	0.736	0.058	0.058	0.011	0.011
3	20.00	0.8	-1.9	3.6	0.127	0.797	0.046	0.046	0.009	0.009
4	30.00	0.3	-2.7	3.9	0.133	0.831	0.041	0.041	0.008	0.008
5	36.00	-0.0	-3.4	3.8	0.134	0.906	0.024	0.024	0.005	0.005
6	42.00	-0.5	-4.2	3.8	0.133	0.972	0.008	0.008	0.002	0.002
7	50.00	-1.2	-5.4	3.7	0.142	0.969	0.009	0.009	0.002	0.002
8	70.00	-2.5	-7.7	4.7	0.168	0.924	0.033	0.033	0.008	0.008
9	80.00	-4.2	-9.7	5.9	0.177	0.875	0.067	0.067	0.015	0.015
10	90.00	-6.0	-11.3	6.4	0.151	0.861	0.104	0.104	0.024	0.024
11	95.00	-4.0	-9.0	9.7	0.078	0.957	0.039	0.039	0.009	0.009

TABLE XI. - BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR TWO

(a) Reading 190

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.109	23.129	38.1	-0.9	38.1	-0.9	389.7	1.000	22.49	0.979
2	22.647	22.685	39.1	-0.2	39.1	-0.2	387.6	1.000	22.62	0.982
3	21.727	21.801	37.6	-0.2	37.6	-0.2	382.9	1.000	22.79	0.984
4	20.823	20.922	36.5	-0.7	36.5	-0.7	379.8	1.000	22.84	0.985
5	20.287	20.401	36.4	-1.1	36.4	-1.1	378.5	1.000	22.84	0.985
6	19.756	19.883	35.8	-1.5	35.8	-1.5	377.5	1.000	22.82	0.985
7	19.060	19.205	36.1	-1.3	36.1	-1.3	376.1	1.000	22.86	0.984
8	17.369	17.567	37.9	-1.3	37.9	-1.3	374.4	1.000	22.95	0.983
9	16.548	16.787	40.1	-1.0	40.1	-1.0	376.1	1.000	23.12	0.981
10	15.740	16.040	42.2	0.6	42.2	0.6	377.8	1.000	22.95	0.940
11	15.339	15.682	42.0	0.5	42.0	0.5	378.7	1.000	22.67	0.928

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	221.4	172.7	221.4	172.7	174.2	172.7	136.6	-2.8	0.	0.
2	224.9	177.6	224.9	177.6	174.6	177.6	141.7	-0.7	0.	0.
3	229.0	182.7	229.0	182.7	181.4	182.7	139.8	-0.5	0.	0.
4	232.8	184.3	232.8	184.3	187.1	184.3	138.6	-2.3	0.	0.
5	234.8	184.3	234.8	184.3	189.0	184.3	139.3	-3.4	0.	0.
6	236.1	184.2	236.1	184.2	191.5	184.1	138.2	-4.9	0.	0.
7	239.7	184.3	239.7	184.3	193.7	184.3	141.2	-4.3	0.	0.
8	249.6	195.0	249.6	195.0	197.0	194.9	153.3	-4.3	0.	0.
9	257.3	195.2	257.3	195.2	196.7	195.2	165.8	-3.4	0.	0.
10	261.5	175.2	261.5	175.2	193.6	175.2	175.7	1.8	0.	0.
11	259.3	159.5	259.3	159.5	192.8	159.5	173.4	1.3	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	0.578	0.446	0.578	0.446	0.455	0.446	0.991	0.810
2	0.590	0.460	0.590	0.460	0.458	0.460	1.018	0.837
3	0.605	0.477	0.605	0.477	0.479	0.477	1.007	0.814
4	0.619	0.483	0.619	0.483	0.497	0.483	0.985	0.796
5	0.626	0.484	0.626	0.484	0.504	0.484	0.975	0.794
6	0.630	0.484	0.630	0.484	0.511	0.484	0.961	0.775
7	0.642	0.486	0.642	0.486	0.519	0.486	0.952	0.781
8	0.672	0.516	0.672	0.516	0.531	0.516	0.989	0.815
9	0.693	0.516	0.693	0.516	0.530	0.516	0.992	0.867
10	0.704	0.459	0.704	0.459	0.521	0.459	0.905	0.895
11	0.697	0.416	0.697	0.416	0.518	0.416	0.827	0.857

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	3.7	-2.0	14.8	0.466	0.	0.103	0.103	0.040	0.040
2	10.00	5.0	-0.8	13.9	0.453	0.	0.084	0.084	0.032	0.032
3	20.00	3.8	-1.9	11.9	0.427	0.	0.073	0.073	0.027	0.027
4	30.00	2.7	-2.9	10.5	0.421	0.	0.064	0.064	0.023	0.023
5	36.00	2.3	-3.3	9.9	0.423	0.	0.064	0.064	0.022	0.022
6	42.00	1.2	-4.3	9.3	0.422	0.	0.065	0.065	0.022	0.022
7	50.00	0.7	-4.8	9.4	0.426	0.	0.068	0.068	0.022	0.022
8	70.00	-0.3	-5.6	9.9	0.404	0.	0.063	0.063	0.019	0.019
9	80.00	-0.4	-5.7	11.1	0.425	0.	0.070	0.070	0.020	0.020
10	90.00	-2.0	-7.1	15.1	0.507	0.	0.212	0.212	0.057	0.057
11	95.00	-4.6	-9.6	16.8	0.557	0.	0.262	0.262	0.068	0.068

TABLE XI. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR TWO

(b) Reading 201.

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.109	23.129	34.7	-1.1	34.7	-1.1	383.5	1.000	20.69	0.982
2	22.647	22.685	34.5	-0.3	34.5	-0.3	381.0	1.000	21.04	0.985
3	21.727	21.801	32.2	-0.2	32.2	-0.2	376.0	1.000	21.37	0.983
4	20.823	20.922	31.6	-0.3	31.6	-0.3	373.5	1.000	21.38	0.983
5	20.287	20.401	31.9	-0.6	31.9	-0.6	372.7	1.000	21.29	0.984
6	19.756	19.883	31.8	-1.2	31.8	-1.2	372.3	1.000	21.20	0.985
7	19.060	19.205	32.9	-1.6	32.9	-1.6	372.3	1.000	21.28	0.990
8	17.369	17.567	34.6	-1.2	34.6	-1.2	373.8	1.000	22.24	0.984
9	16.548	16.787	36.7	-0.2	36.7	-0.2	377.1	1.000	22.99	0.980
10	15.740	16.040	38.6	0.8	38.6	0.8	379.9	1.000	23.14	0.934
11	15.339	15.682	38.1	0.5	38.1	0.5	380.5	1.000	22.85	0.906

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	212.4	170.0	212.4	170.0	174.6	169.9	121.0	-3.4	0.	0.
2	220.9	180.9	220.9	180.9	181.9	180.9	125.2	-1.0	0.	0.
3	228.7	189.1	228.7	189.1	193.5	189.1	121.9	-0.6	0.	0.
4	231.0	189.3	231.0	189.3	196.8	189.3	120.9	-0.9	0.	0.
5	230.7	188.0	230.7	188.0	195.9	188.0	121.9	-2.1	0.	0.
6	230.3	187.6	230.3	187.6	195.7	187.5	121.4	-4.1	0.	0.
7	234.8	191.6	234.8	191.6	197.1	191.5	127.6	-5.2	0.	0.
8	259.0	221.5	259.0	221.5	213.1	221.4	147.2	-4.5	0.	0.
9	276.0	234.7	276.0	234.7	221.4	234.7	164.9	-1.0	0.	0.
10	285.4	222.9	285.4	222.9	223.0	222.8	178.1	3.1	0.	0.
11	282.9	202.5	282.9	202.5	222.7	202.5	174.4	1.8	0.	0.

	ABS MACH NO		REL MACH NO		MERID MACH NO			
RP	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
1	0.558	0.442	0.558	0.442	0.459	0.442	0.973	0.714
2	0.584	0.473	0.584	0.473	0.481	0.473	0.995	0.733
3	0.610	0.499	0.610	0.499	0.516	0.499	0.977	0.690
4	0.619	0.501	0.619	0.501	0.527	0.501	0.962	0.661
5	0.619	0.498	0.619	0.498	0.526	0.498	0.959	0.661
6	0.618	0.497	0.618	0.497	0.525	0.497	0.958	0.638
7	0.631	0.508	0.631	0.508	0.530	0.508	0.972	0.674
8	0.701	0.592	0.701	0.592	0.577	0.591	1.039	0.740
9	0.748	0.627	0.748	0.627	0.600	0.627	1.060	0.823
10	0.773	0.590	0.773	0.590	0.604	0.590	0.999	0.866
11	0.765	0.533	0.765	0.533	0.602	0.533	0.909	0.796

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	0.3	-5.4	14.5	0.428	0.	0.095	0.095	0.037	0.037
2	10.00	0.4	-5.4	13.7	0.400	0.	0.071	0.071	0.027	0.027
3	20.00	-1.7	-7.4	11.8	0.370	0.	0.079	0.079	0.029	0.029
4	30.00	-2.3	-8.0	10.8	0.366	0.	0.075	0.075	0.026	0.026
5	36.00	-2.2	-7.8	10.3	0.369	0.	0.069	0.069	0.024	0.024
6	42.00	-2.8	-8.4	9.6	0.368	0.	0.065	0.065	0.022	0.022
7	50.00	-2.5	-8.0	9.2	0.366	0.	0.043	0.043	0.014	0.014
8	70.00	-3.6	-8.9	10.0	0.317	0.	0.058	0.058	0.017	0.017
9	80.00	-4.0	-9.2	11.8	0.317	0.	0.064	0.064	0.018	0.018
10	90.00	-5.7	-10.8	15.2	0.382	0.	0.201	0.201	0.054	0.054
11	95.00	-8.6	-13.6	16.8	0.442	0.	0.292	0.292	0.076	0.076

TABLE XI. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR TWO

(c) Reading 212

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	23.109	23.129	29.0	-2.0	29.0	-2.0	372.9	1.000	18.70	0.985
2	22.647	22.685	28.7	-1.1	28.7	-1.1	372.1	1.000	19.33	0.984
3	21.727	21.801	26.7	-0.3	26.7	-0.3	369.0	1.000	19.82	0.975
4	20.823	20.922	25.9	-0.7	25.9	-0.7	366.3	1.000	19.92	0.970
5	20.287	20.401	26.3	-1.0	26.3	-1.0	365.5	1.000	19.83	0.971
6	19.756	19.883	26.6	-1.3	26.6	-1.3	365.4	1.000	19.70	0.977
7	19.060	19.205	27.9	-1.5	27.9	-1.5	365.8	1.000	19.76	0.982
8	17.369	17.567	31.0	-1.4	31.0	-1.4	370.0	1.000	21.04	0.972
9	16.548	16.787	33.3	-0.2	33.3	-0.2	374.8	1.000	22.18	0.968
10	15.740	16.040	35.8	1.3	35.8	1.3	379.2	1.000	22.93	0.914
11	15.339	15.682	36.2	0.4	36.2	0.4	380.5	1.000	22.42	0.884

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	198.9	176.6	198.9	176.6	173.9	176.5	96.5	-6.0	0.	0.
2	215.7	193.3	215.7	193.3	189.2	193.2	103.7	-3.6	0.	0.
3	230.0	204.4	230.0	204.4	205.4	204.4	103.4	-0.9	0.	0.
4	232.7	203.9	232.7	203.9	209.4	203.9	101.5	-2.4	0.	0.
5	231.8	202.8	231.8	202.8	207.9	202.8	102.5	-3.4	0.	0.
6	230.1	203.1	230.1	203.1	205.8	203.1	102.9	-4.6	0.	0.
7	233.4	207.4	233.4	207.4	206.2	207.3	109.3	-5.6	0.	0.
8	263.8	242.8	263.8	242.8	226.2	242.7	135.7	-5.7	0.	0.
9	288.5	265.7	288.5	265.7	241.1	265.7	158.4	-0.9	0.	0.
10	302.6	263.6	302.6	263.6	245.6	263.5	176.8	6.0	0.	0.
11	297.4	242.1	297.4	242.1	239.8	242.0	175.8	1.6	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	0.528	0.466	0.528	0.466	0.462	0.466	1.015	0.528
2	0.576	0.513	0.576	0.513	0.505	0.513	1.022	0.576
3	0.620	0.547	0.620	0.547	0.554	0.547	0.995	0.620
4	0.630	0.547	0.630	0.547	0.567	0.547	0.974	0.630
5	0.629	0.545	0.629	0.545	0.564	0.545	0.976	0.629
6	0.624	0.546	0.624	0.546	0.558	0.546	0.987	0.624
7	0.633	0.558	0.633	0.558	0.559	0.558	1.005	0.633
8	0.719	0.657	0.719	0.657	0.617	0.656	1.073	0.719
9	0.789	0.720	0.789	0.720	0.659	0.720	1.102	0.789
10	0.827	0.709	0.827	0.709	0.671	0.709	1.073	0.827
11	0.809	0.645	0.809	0.645	0.652	0.645	1.009	0.809

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	-5.5	-11.3	13.5	0.314	0.	0.088	0.088	0.035	0.035
2	10.00	-5.6	-11.3	12.8	0.295	0.	0.079	0.079	0.030	0.030
3	20.00	-7.3	-13.0	11.6	0.278	0.	0.110	0.110	0.040	0.040
4	30.00	-8.2	-13.8	10.3	0.281	0.	0.127	0.127	0.045	0.045
5	36.00	-8.0	-13.6	9.8	0.282	0.	0.123	0.123	0.042	0.042
6	42.00	-8.2	-13.7	9.4	0.273	0.	0.101	0.101	0.034	0.034
7	50.00	-7.6	-13.1	9.0	0.270	0.	0.078	0.078	0.025	0.025
8	70.00	-7.4	-12.7	9.6	0.237	0.	0.098	0.098	0.029	0.029
9	80.00	-7.5	-12.7	11.7	0.233	0.	0.096	0.096	0.027	0.027
10	90.00	-8.7	-13.8	15.6	0.279	0.	0.239	0.239	0.064	0.064
11	95.00	-10.5	-15.5	16.6	0.337	0.	0.332	0.332	0.087	0.087

TABLE XI. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR TWO

(d) Reading 223

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.109	23.129	25.1	-3.7	25.1	-3.7	366.9	1.000	17.60	0.975
2	22.647	22.685	24.6	-2.1	24.6	-2.1	366.1	1.000	18.30	0.975
3	21.727	21.801	23.1	-0.7	23.1	-0.7	363.7	1.000	18.80	0.960
4	20.823	20.922	22.6	-0.7	22.6	-0.7	361.7	1.000	18.87	0.959
5	20.287	20.401	22.8	-0.9	22.8	-0.9	361.1	1.000	18.82	0.957
6	19.756	19.883	22.7	-1.2	22.7	-1.2	360.9	1.000	18.79	0.957
7	19.060	19.205	23.9	-1.4	23.9	-1.4	361.4	1.000	18.87	0.961
8	17.369	17.567	27.2	-1.2	27.2	-1.2	366.6	1.000	20.04	0.968
9	16.548	16.787	29.9	-0.5	29.9	-0.5	372.8	1.000	21.79	0.949
10	15.740	16.040	33.0	0.2	33.0	0.2	377.6	1.000	22.42	0.869
11	15.339	15.682	34.0	-0.8	34.0	-0.8	379.0	1.000	21.55	0.839

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	194.3	194.5	194.3	194.5	176.0	194.1	82.4	-12.4	0.	0.
2	213.5	211.4	213.5	211.4	194.2	211.3	98.8	-7.9	0.	0.
3	229.2	221.8	229.2	221.8	210.9	221.7	89.8	-2.6	0.	0.
4	231.4	221.3	231.4	221.3	213.6	221.3	89.0	-2.6	0.	0.
5	231.2	220.2	231.2	220.2	213.1	220.2	89.7	-3.3	0.	0.
6	231.0	220.2	231.0	220.2	213.2	220.1	89.0	-4.8	0.	0.
7	234.4	224.5	234.4	224.5	214.2	224.4	95.1	-5.5	0.	0.
8	271.2	268.7	271.2	268.7	241.3	268.6	123.9	-5.9	0.	0.
9	303.0	295.5	303.0	295.5	262.7	295.5	151.1	-2.5	0.	0.
10	314.8	285.5	314.8	285.5	264.0	285.5	171.4	1.1	0.	0.
11	304.0	255.7	304.0	255.7	252.0	255.6	170.0	-3.8	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	0.520	0.520	0.520	0.520	0.471	0.519	1.103	0.520
2	0.575	0.569	0.575	0.569	0.523	0.569	1.088	0.575
3	0.623	0.601	0.623	0.601	0.573	0.601	1.051	0.623
4	0.631	0.601	0.631	0.601	0.582	0.601	1.036	0.631
5	0.631	0.599	0.631	0.599	0.582	0.599	1.033	0.631
6	0.631	0.599	0.631	0.599	0.582	0.599	1.033	0.631
7	0.640	0.611	0.640	0.611	0.585	0.611	1.048	0.640
8	0.745	0.737	0.745	0.737	0.663	0.737	1.113	0.745
9	0.836	0.813	0.836	0.813	0.725	0.813	1.125	0.836
10	0.867	0.776	0.867	0.776	0.727	0.776	1.081	0.867
11	0.831	0.686	0.831	0.686	0.689	0.685	1.014	0.831

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	-9.5	-15.2	11.9	0.189	0.	0.146	0.146	0.057	0.057
2	10.00	-9.7	-15.5	11.8	0.183	0.	0.126	0.126	0.048	0.048
3	20.00	-11.0	-16.7	11.2	0.181	0.	0.175	0.175	0.064	0.064
4	30.00	-11.4	-17.1	10.3	0.183	0.	0.175	0.175	0.062	0.062
5	36.00	-11.4	-17.0	9.9	0.186	0.	0.184	0.184	0.063	0.063
6	42.00	-12.1	-17.7	9.4	0.183	0.	0.184	0.184	0.062	0.062
7	50.00	-11.6	-17.1	9.2	0.181	0.	0.163	0.163	0.053	0.053
8	70.00	-11.2	-16.5	9.7	0.150	0.	0.103	0.103	0.030	0.030
9	80.00	-10.8	-16.1	11.5	0.166	0.	0.138	0.138	0.039	0.039
10	90.00	-11.4	-16.5	14.5	0.237	0.	0.338	0.338	0.090	0.090
11	95.00	-12.7	-17.8	15.3	0.307	0.	0.443	0.443	0.116	0.116

TABLE XI. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR TWO

(e) Reading 234

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.109	23.129	40.8	2.4	40.8	2.4	398.6	1.000	23.74	0.979
2	22.647	22.685	41.5	3.0	41.5	3.0	395.9	1.000	23.82	0.976
3	21.727	21.801	40.1	2.7	40.1	2.7	389.7	1.000	23.77	0.980
4	20.823	20.922	38.9	2.3	38.9	2.3	385.5	1.000	23.76	0.984
5	20.287	20.401	38.7	1.9	38.7	1.9	383.8	1.000	23.72	0.985
6	19.756	19.883	38.1	1.4	38.1	1.4	382.4	1.000	23.72	0.986
7	19.060	19.205	38.0	1.4	38.0	1.4	381.1	1.000	23.86	0.988
8	17.369	17.567	40.5	0.9	40.5	0.9	378.2	1.000	24.02	0.984
9	16.548	16.787	44.3	1.8	44.3	1.8	379.2	1.000	23.60	0.982
10	15.740	16.040	46.8	2.9	46.8	2.9	381.2	1.000	23.69	0.944
11	15.339	15.682	45.1	2.4	45.1	2.4	382.3	1.000	23.58	0.935

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	231.7	177.5	231.7	177.5	175.4	177.4	151.3	7.3	0.	0.
2	234.1	177.1	234.1	177.1	175.2	176.9	155.1	9.2	0.	0.
3	235.2	177.5	235.2	177.5	179.8	177.3	151.6	8.3	0.	0.
4	236.8	178.5	236.8	178.5	184.4	178.4	148.6	7.0	0.	0.
5	238.5	178.5	238.5	178.5	186.1	178.4	149.3	5.8	0.	0.
6	240.2	179.4	240.2	179.4	189.1	179.3	148.0	4.3	0.	0.
7	246.2	183.3	246.2	183.3	194.1	183.2	151.4	4.5	0.	0.
8	250.5	185.0	250.5	185.0	190.3	185.0	162.8	3.0	0.	0.
9	251.2	175.0	251.2	175.0	179.7	174.9	175.5	5.6	0.	0.
10	260.4	157.3	260.4	157.3	178.2	157.1	190.0	7.8	0.	0.
11	261.8	147.7	261.8	147.7	184.7	147.6	185.6	6.2	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	0.600	0.453	0.600	0.453	0.454	0.453	1.011	0.894
2	0.609	0.454	0.609	0.454	0.456	0.453	1.009	0.914
3	0.617	0.458	0.617	0.458	0.472	0.458	0.986	0.883
4	0.625	0.464	0.625	0.464	0.487	0.463	0.967	0.856
5	0.632	0.465	0.632	0.465	0.493	0.464	0.959	0.855
6	0.637	0.468	0.637	0.468	0.502	0.468	0.948	0.837
7	0.656	0.480	0.656	0.480	0.517	0.479	0.944	0.845
8	0.671	0.486	0.671	0.486	0.510	0.486	0.972	0.882
9	0.672	0.458	0.672	0.458	0.481	0.458	0.973	0.942
10	0.697	0.409	0.697	0.409	0.477	0.408	0.882	1.001
11	0.700	0.383	0.700	0.383	0.494	0.383	0.799	0.943

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	6.3	0.6	18.0	0.476	0.	0.096	0.096	0.038	0.038
2	10.00	7.4	1.6	17.0	0.482	0.	0.110	0.110	0.042	0.042
3	20.00	6.2	0.5	14.7	0.469	0.	0.089	0.089	0.033	0.033
4	30.00	5.0	-0.6	13.4	0.456	0.	0.069	0.069	0.024	0.024
5	36.00	4.7	-0.9	12.8	0.458	0.	0.063	0.063	0.022	0.022
6	42.00	3.5	-2.1	12.2	0.453	0.	0.057	0.057	0.019	0.019
7	50.00	2.6	-2.9	12.2	0.447	0.	0.050	0.050	0.016	0.016
8	70.00	2.4	-2.9	12.1	0.448	0.	0.061	0.061	0.018	0.018
9	80.00	3.8	-1.5	13.9	0.492	0.	0.071	0.071	0.020	0.020
10	90.00	2.6	-2.5	17.3	0.582	0.	0.200	0.200	0.054	0.054
11	95.00	-1.4	-6.5	18.7	0.613	0.	0.235	0.235	0.061	0.061

TABLE XI. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR TWO

(f) Reading 245

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.109	23.129	35.2	0.9	35.2	0.9	352.5	1.000	17.26	0.983
2	22.647	22.685	35.3	2.1	35.3	2.1	351.1	1.000	17.41	0.991
3	21.727	21.801	33.8	1.7	33.8	1.7	347.5	1.000	17.53	0.988
4	20.823	20.922	32.5	1.2	32.5	1.2	345.2	1.000	17.57	0.992
5	20.287	20.401	32.7	1.1	32.7	1.1	344.7	1.000	17.63	0.991
6	19.756	19.883	33.1	1.1	33.1	1.1	344.8	1.000	17.65	0.990
7	19.060	19.205	34.4	0.9	34.4	0.9	345.0	1.000	17.68	0.991
8	17.369	17.567	37.1	0.9	37.1	0.9	345.7	1.000	17.97	0.990
9	16.548	16.787	40.1	1.8	40.1	1.8	347.3	1.000	18.25	0.985
10	15.740	16.040	42.1	3.0	42.1	3.0	348.6	1.000	18.25	0.959
11	15.339	15.682	38.8	2.4	38.8	2.4	348.9	1.000	18.21	0.941

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	171.4	134.7	171.4	134.7	140.0	134.7	98.9	2.1	0.	0.
2	176.6	145.2	176.6	145.2	144.1	145.1	102.1	5.3	0.	0.
3	181.7	151.5	181.7	151.5	151.0	151.5	101.1	4.5	0.	0.
4	184.7	153.7	184.7	153.7	155.7	153.7	99.4	3.1	0.	0.
5	187.6	155.5	187.6	155.5	157.8	155.5	101.4	3.1	0.	0.
6	189.7	156.5	189.7	156.5	159.0	156.5	103.6	3.0	0.	0.
7	193.0	158.4	193.0	158.4	159.2	158.3	109.2	2.5	0.	0.
8	207.4	172.6	207.4	172.6	165.4	172.6	125.1	2.7	0.	0.
9	216.9	177.7	216.9	177.7	166.0	177.6	139.7	5.5	0.	0.
10	227.0	167.8	227.0	167.8	168.5	167.6	152.2	8.9	0.	0.
11	227.7	155.9	227.7	155.9	177.4	155.8	142.8	6.5	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	0.465	0.363	0.465	0.363	0.380	0.363	0.963	0.603
2	0.481	0.393	0.481	0.393	0.393	0.392	1.007	0.617
3	0.499	0.413	0.499	0.413	0.414	0.412	1.003	0.596
4	0.509	0.420	0.509	0.420	0.429	0.420	0.987	0.569
5	0.518	0.426	0.518	0.426	0.435	0.425	0.985	0.575
6	0.524	0.428	0.524	0.428	0.439	0.428	0.985	0.579
7	0.533	0.433	0.533	0.433	0.440	0.433	0.995	0.609
8	0.575	0.474	0.575	0.474	0.458	0.474	1.043	0.676
9	0.602	0.487	0.602	0.487	0.460	0.487	1.070	0.749
10	0.630	0.458	0.630	0.458	0.468	0.457	0.995	0.796
11	0.632	0.424	0.632	0.424	0.493	0.424	0.878	0.685

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	0.7	-5.0	16.5	0.434	0.	0.123	0.123	0.048	0.048
2	10.00	1.1	-4.7	16.0	0.387	0.	0.062	0.062	0.024	0.024
3	20.00	-0.2	-5.9	13.6	0.361	0.	0.075	0.075	0.027	0.027
4	30.00	-1.4	-7.1	12.2	0.351	0.	0.050	0.050	0.018	0.018
5	36.00	-1.5	-7.1	12.0	0.351	0.	0.052	0.052	0.018	0.018
6	42.00	-1.6	-7.2	11.8	0.352	0.	0.056	0.056	0.019	0.019
7	50.00	-1.0	-6.5	11.5	0.357	0.	0.051	0.051	0.016	0.016
8	70.00	-1.2	-6.5	12.0	0.341	0.	0.048	0.048	0.014	0.014
9	80.00	-0.6	-5.8	13.8	0.354	0.	0.069	0.069	0.020	0.020
10	90.00	-2.3	-7.4	17.4	0.428	0.	0.174	0.174	0.047	0.047
11	95.00	-7.9	-12.9	18.6	0.470	0.	0.251	0.251	0.066	0.066

TABLE XI. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR TWO

(g) Reading 279

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.109	23.129	29.5	-0.1	29.5	-0.1	344.1	1.000	16.07	0.989
2	22.647	22.685	28.5	0.8	28.5	0.8	342.9	1.000	16.39	0.991
3	21.727	21.801	26.3	0.5	26.3	0.5	339.7	1.000	16.58	0.987
4	20.823	20.922	25.6	0.3	25.6	0.3	338.3	1.000	16.69	0.989
5	20.287	20.401	26.1	0.5	26.1	0.5	338.3	1.000	16.79	0.989
6	19.756	19.883	26.8	0.7	26.8	0.7	338.7	1.000	16.91	0.986
7	19.060	19.205	28.2	0.9	28.2	0.9	339.5	1.000	17.05	0.985
8	17.369	17.567	30.7	0.1	30.7	0.1	341.4	1.000	17.41	0.988
9	16.548	16.787	33.8	1.0	33.8	1.0	344.4	1.000	17.87	0.985
10	15.740	16.040	36.7	2.5	36.7	2.5	347.4	1.000	18.09	0.957
11	15.339	15.682	35.4	2.2	35.4	2.2	347.8	1.000	17.93	0.930

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	162.7	141.9	162.7	141.9	141.6	141.9	80.1	-0.2	0.	0.
2	174.1	155.0	174.1	155.0	153.0	155.0	83.0	2.2	0.	0.
3	182.8	163.3	182.8	163.3	163.9	163.3	81.0	1.5	0.	0.
4	187.0	167.1	187.0	167.1	168.6	167.1	80.8	1.0	0.	0.
5	191.0	170.4	191.0	170.4	171.5	170.4	84.1	1.4	0.	0.
6	195.5	173.5	195.5	173.5	174.4	173.5	88.3	2.1	0.	0.
7	201.3	178.2	201.3	178.2	177.4	178.2	95.0	2.8	0.	0.
8	218.4	198.6	218.4	198.6	187.9	198.6	111.3	0.4	0.	0.
9	232.0	211.0	232.0	211.0	192.8	211.0	129.0	3.9	0.	0.
10	243.2	206.8	243.2	206.8	195.0	206.6	145.4	9.2	0.	0.
11	241.2	190.1	241.2	190.1	196.7	190.0	139.5	7.3	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	0.446	0.387	0.446	0.387	0.388	0.387	1.002	0.471
2	0.480	0.425	0.480	0.425	0.422	0.425	1.013	0.480
3	0.508	0.451	0.508	0.451	0.455	0.451	0.996	0.508
4	0.521	0.463	0.521	0.463	0.470	0.463	0.991	0.521
5	0.533	0.473	0.533	0.473	0.478	0.473	0.994	0.533
6	0.546	0.481	0.546	0.481	0.487	0.481	0.995	0.546
7	0.562	0.494	0.562	0.494	0.495	0.494	1.004	0.562
8	0.611	0.553	0.611	0.553	0.526	0.553	1.057	0.611
9	0.649	0.587	0.649	0.587	0.540	0.587	1.095	0.649
10	0.681	0.572	0.681	0.572	0.546	0.571	1.060	0.684
11	0.674	0.523	0.674	0.523	0.550	0.522	0.966	0.674

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	-4.8	-10.5	15.7	0.321	0.	0.088	0.088	0.035	0.035
2	10.00	-5.5	-11.3	15.0	0.287	0.	0.061	0.061	0.023	0.023
3	20.00	-7.5	-13.2	12.7	0.266	0.	0.084	0.084	0.031	0.031
4	30.00	-8.1	-13.8	11.6	0.257	0.	0.065	0.065	0.023	0.023
5	36.00	-7.9	-13.4	11.5	0.256	0.	0.065	0.065	0.022	0.022
6	42.00	-7.6	-13.2	11.7	0.259	0.	0.077	0.077	0.026	0.026
7	50.00	-7.1	-12.6	11.8	0.262	0.	0.076	0.076	0.025	0.025
8	70.00	-7.4	-12.7	11.4	0.240	0.	0.053	0.053	0.016	0.016
9	80.00	-6.7	-11.9	13.3	0.241	0.	0.062	0.062	0.017	0.017
10	90.00	-7.4	-12.5	17.1	0.298	0.	0.160	0.160	0.043	0.043
11	95.00	-11.1	-16.1	18.7	0.353	0.	0.266	0.266	0.069	0.069

TABLE XI. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR TWO

(h) Reading 290

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.109	23.129	25.2	-1.0	25.2	-1.0	339.0	1.000	15.12	0.989
2	22.647	22.685	24.2	-0.5	24.2	-0.5	337.9	1.000	15.52	0.990
3	21.727	21.801	21.8	-0.1	21.8	-0.1	335.3	1.000	15.86	0.980
4	20.823	20.922	21.4	-0.1	21.4	-0.1	334.2	1.000	15.99	0.982
5	20.287	20.401	21.9	0.2	21.9	0.2	334.4	1.000	16.11	0.982
6	19.756	19.883	22.6	0.4	22.6	0.4	335.2	1.000	16.29	0.978
7	19.060	19.205	24.0	0.5	24.0	0.5	336.3	1.000	16.50	0.976
8	17.369	17.567	26.7	0.0	26.7	0.0	338.8	1.000	16.93	0.983
9	16.548	16.787	29.5	0.7	29.5	0.7	342.2	1.000	17.46	0.977
10	15.740	16.040	33.3	2.4	33.3	2.4	346.5	1.000	17.93	0.947
11	15.339	15.682	33.2	1.7	33.2	1.7	347.8	1.000	17.87	0.918

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	156.1	148.6	156.1	148.6	141.3	148.6	66.4	-2.6	0.	0.
2	171.3	163.7	171.3	163.7	156.3	163.7	70.1	-1.4	0.	0.
3	184.5	174.2	184.5	174.2	171.2	174.2	68.6	-0.4	0.	0.
4	190.0	178.7	190.0	178.7	176.9	178.7	69.3	-0.2	0.	0.
5	194.5	182.8	194.5	182.8	180.4	182.8	72.7	0.7	0.	0.
6	200.4	187.0	200.4	187.0	184.9	187.0	77.1	1.3	0.	0.
7	207.8	193.1	207.8	193.1	189.8	193.1	84.5	1.8	0.	0.
8	226.7	215.0	226.7	215.0	202.6	215.0	101.8	0.2	0.	0.
9	241.7	229.9	241.7	229.9	210.3	229.9	119.1	2.9	0.	0.
10	256.3	232.5	256.3	232.5	214.2	232.3	140.6	9.9	0.	0.
11	256.3	220.5	256.3	220.5	214.4	220.4	140.3	6.4	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	0.431	0.410	0.431	0.410	0.390	0.409	1.051	0.431
2	0.475	0.454	0.475	0.454	0.434	0.454	1.048	0.475
3	0.516	0.486	0.516	0.486	0.479	0.486	1.017	0.516
4	0.533	0.500	0.533	0.500	0.497	0.500	1.010	0.533
5	0.546	0.512	0.546	0.512	0.507	0.512	1.013	0.546
6	0.563	0.523	0.563	0.523	0.520	0.523	1.011	0.563
7	0.584	0.541	0.584	0.541	0.534	0.541	1.017	0.584
8	0.639	0.604	0.639	0.604	0.571	0.604	1.061	0.639
9	0.682	0.645	0.682	0.645	0.593	0.645	1.093	0.682
10	0.722	0.649	0.722	0.649	0.603	0.648	1.084	0.722
11	0.720	0.612	0.720	0.612	0.603	0.612	1.028	0.720

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	-9.2	-14.9	14.8	0.221	0.	0.092	0.092	0.036	0.036
2	10.00	-9.9	-15.6	13.7	0.204	0.	0.069	0.069	0.026	0.026
3	20.00	-12.0	-17.7	12.0	0.193	0.	0.119	0.119	0.044	0.044
4	30.00	-12.4	-18.0	11.2	0.188	0.	0.101	0.101	0.035	0.035
5	36.00	-12.1	-17.7	11.3	0.187	0.	0.099	0.099	0.034	0.034
6	42.00	-11.9	-17.4	11.3	0.193	0.	0.112	0.112	0.038	0.038
7	50.00	-11.3	-16.8	11.4	0.199	0.	0.115	0.115	0.037	0.037
8	70.00	-11.4	-16.7	11.3	0.183	0.	0.072	0.072	0.021	0.021
9	80.00	-11.0	-16.2	12.9	0.183	0.	0.085	0.085	0.024	0.024
10	90.00	-10.9	-16.0	17.0	0.228	0.	0.179	0.179	0.048	0.048
11	95.00	-13.3	-18.3	18.1	0.274	0.	0.282	0.282	0.074	0.074

TABLE XI. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR TWO

(i) Reading 374

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.109	23.129	35.7	0.3	35.7	0.3	324.0	1.000	13.58	0.992
2	22.647	22.685	33.8	1.1	33.8	1.1	323.5	1.000	13.68	0.994
3	21.727	21.801	33.3	0.7	33.3	0.7	321.7	1.000	13.72	0.994
4	20.823	20.922	32.5	0.3	32.5	0.3	320.1	1.000	13.77	0.994
5	20.287	20.401	32.5	0.6	32.5	0.6	319.5	1.000	13.81	0.993
6	19.756	19.883	32.2	0.5	32.2	0.5	319.2	1.000	13.82	0.994
7	19.060	19.205	33.1	0.6	33.1	0.6	319.1	1.000	13.87	0.994
8	17.369	17.567	34.4	0.5	34.4	0.5	319.7	1.000	14.07	0.994
9	16.548	16.787	37.5	1.4	37.5	1.4	321.1	1.000	14.31	0.991
10	15.740	16.040	39.3	2.7	39.3	2.7	322.2	1.000	14.35	0.979
11	15.339	15.682	36.5	2.1	36.5	2.1	322.4	1.000	14.33	0.962

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	119.8	98.9	119.8	98.9	97.3	98.9	69.9	0.6	0.	0.
2	125.8	106.9	125.8	106.9	104.5	106.9	70.1	2.0	0.	0.
3	131.4	112.0	131.4	112.0	109.8	111.9	72.2	1.5	0.	0.
4	134.3	114.0	134.3	114.0	113.2	114.0	72.1	0.6	0.	0.
5	137.1	115.7	137.1	115.7	115.6	115.6	73.7	1.2	0.	0.
6	138.5	117.2	138.5	117.2	117.2	117.2	73.8	1.1	0.	0.
7	142.3	120.2	142.3	120.2	119.3	120.2	77.6	1.4	0.	0.
8	156.9	135.9	156.9	135.9	129.5	135.9	88.6	1.1	0.	0.
9	167.8	144.8	167.8	144.8	133.1	144.7	102.2	3.5	0.	0.
10	176.2	140.9	176.2	140.9	136.4	140.8	111.5	6.6	0.	0.
11	176.5	129.2	176.5	129.2	141.8	129.1	105.1	4.8	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	0.336	0.276	0.336	0.276	0.273	0.276	1.016	0.442
2	0.353	0.299	0.353	0.299	0.293	0.299	1.023	0.435
3	0.371	0.315	0.371	0.315	0.310	0.315	1.019	0.438
4	0.380	0.321	0.380	0.321	0.320	0.321	1.006	0.426
5	0.388	0.326	0.388	0.326	0.328	0.326	1.000	0.429
6	0.393	0.331	0.393	0.331	0.332	0.331	1.000	0.418
7	0.404	0.340	0.404	0.340	0.338	0.340	1.008	0.435
8	0.447	0.385	0.447	0.385	0.369	0.385	1.049	0.465
9	0.478	0.410	0.478	0.410	0.379	0.410	1.087	0.547
10	0.502	0.398	0.502	0.398	0.389	0.397	1.032	0.579
11	0.503	0.364	0.503	0.364	0.404	0.363	0.910	0.503

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	1.5	-4.4	16.0	0.401	0.	0.107	0.107	0.042	0.042
2	10.00	-0.2	-6.0	15.2	0.357	0.	0.071	0.071	0.027	0.027
3	20.00	-0.5	-6.2	12.8	0.346	0.	0.066	0.066	0.024	0.024
4	30.00	-1.3	-7.0	11.5	0.338	0.	0.064	0.064	0.022	0.022
5	36.00	-1.6	-7.2	11.6	0.338	0.	0.070	0.070	0.024	0.024
6	42.00	-2.4	-7.9	11.4	0.329	0.	0.060	0.060	0.020	0.020
7	50.00	-2.3	-7.8	11.4	0.327	0.	0.052	0.052	0.017	0.017
8	70.00	-3.8	-9.1	11.6	0.298	0.	0.050	0.050	0.015	0.015
9	80.00	-3.0	-8.3	13.5	0.302	0.	0.065	0.065	0.018	0.018
10	90.00	-5.0	-10.1	17.1	0.358	0.	0.133	0.133	0.036	0.036
11	95.00	-10.0	-15.1	18.5	0.415	0.	0.239	0.239	0.062	0.062

TABLE XI. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR TWO

(j) Reading 396

	RADIUS		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.109	23.129	26.3	-1.1	26.3	-1.1	318.0	1.000	12.89	0.990
2	22.647	22.685	25.0	-0.1	25.0	-0.1	317.1	1.000	13.02	0.996
3	21.727	21.801	22.3	-0.1	22.3	-0.1	315.1	1.000	13.17	0.991
4	20.823	20.922	21.4	-0.3	21.4	-0.3	314.3	1.000	13.24	0.992
5	20.287	20.401	22.0	0.0	22.0	0.0	314.3	1.000	13.32	0.990
6	19.756	19.883	22.4	0.3	22.4	0.3	314.7	1.000	13.38	0.990
7	19.060	19.205	23.9	0.7	23.9	0.7	315.2	1.000	13.46	0.990
8	17.369	17.567	26.6	0.3	26.6	0.3	316.6	1.000	13.71	0.993
9	16.548	16.787	29.3	0.6	29.3	0.6	318.3	1.000	13.95	0.990
10	15.740	16.040	33.5	2.1	33.5	2.1	321.0	1.000	14.26	0.981
11	15.339	15.682	32.5	2.2	32.5	2.2	321.8	1.000	14.26	0.958

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	119.5	107.9	119.5	107.9	107.1	107.9	53.0	-2.1	0.	0.
2	127.4	120.3	127.4	120.3	115.4	120.3	55.9	-0.2	0.	0.
3	135.5	128.5	135.5	128.5	125.4	128.5	51.4	-0.3	0.	0.
4	140.4	131.8	140.4	131.8	130.7	131.8	51.2	-0.7	0.	0.
5	144.2	134.9	144.2	134.9	133.7	134.9	54.0	0.1	0.	0.
6	147.7	137.8	147.7	137.8	136.6	137.8	56.3	0.7	0.	0.
7	152.5	142.4	152.5	142.4	139.4	142.4	61.8	1.7	0.	0.
8	166.5	156.9	166.5	156.9	148.9	156.9	74.6	0.7	0.	0.
9	177.6	169.4	177.6	169.4	154.9	169.4	87.0	1.8	0.	0.
10	191.9	174.2	191.9	174.2	160.1	174.1	105.8	6.4	0.	0.
11	192.9	163.5	192.9	163.5	162.7	163.4	103.6	6.2	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	0.338	0.305	0.338	0.305	0.303	0.305	1.007	0.338
2	0.361	0.341	0.361	0.341	0.327	0.341	1.043	0.361
3	0.387	0.366	0.387	0.366	0.358	0.366	1.025	0.387
4	0.401	0.376	0.401	0.376	0.374	0.376	1.009	0.401
5	0.413	0.385	0.413	0.385	0.383	0.385	1.008	0.413
6	0.423	0.393	0.423	0.393	0.391	0.393	1.009	0.423
7	0.437	0.407	0.437	0.407	0.399	0.407	1.021	0.437
8	0.477	0.449	0.477	0.449	0.427	0.449	1.054	0.477
9	0.510	0.485	0.510	0.485	0.444	0.485	1.094	0.510
10	0.550	0.497	0.550	0.497	0.459	0.497	1.088	0.550
11	0.553	0.464	0.553	0.464	0.466	0.464	1.004	0.553

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	-8.1	-13.8	14.6	0.277	0.	0.137	0.137	0.053	0.053
2	10.00	-9.0	-14.8	14.0	0.218	0.	0.047	0.047	0.018	0.018
3	20.00	-11.6	-17.3	11.9	0.192	0.	0.089	0.089	0.033	0.033
4	30.00	-12.4	-18.1	10.9	0.191	0.	0.079	0.079	0.028	0.028
5	36.00	-12.1	-17.7	11.0	0.193	0.	0.086	0.086	0.030	0.030
6	42.00	-12.2	-17.7	11.1	0.193	0.	0.091	0.091	0.030	0.030
7	50.00	-11.4	-16.9	11.5	0.193	0.	0.084	0.084	0.027	0.027
8	70.00	-11.5	-16.9	11.4	0.188	0.	0.049	0.049	0.015	0.015
9	80.00	-11.3	-16.5	12.7	0.180	0.	0.059	0.059	0.017	0.017
10	90.00	-10.8	-15.9	16.6	0.229	0.	0.101	0.101	0.027	0.027
11	95.00	-14.1	-19.1	18.5	0.283	0.	0.226	0.226	0.059	0.059

TABLE XI. - Continued. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR TWO

(k) Reading 407

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.109	23.129	21.6	-1.4	21.6	-1.4	314.1	1.000	12.47	0.993
2	22.647	22.685	20.4	-0.4	20.4	-0.4	313.7	1.000	12.70	0.996
3	21.727	21.801	18.0	-0.4	18.0	-0.4	312.2	1.000	12.91	0.984
4	20.823	20.922	17.5	-0.4	17.5	-0.4	311.8	1.000	12.98	0.986
5	20.287	20.401	18.1	0.0	18.1	0.0	312.0	1.000	13.01	0.987
6	19.756	19.883	18.6	0.2	18.6	0.2	312.3	1.000	13.08	0.987
7	19.060	19.205	20.2	0.5	20.2	0.5	313.0	1.000	13.22	0.984
8	17.369	17.567	23.1	0.1	23.1	0.1	315.0	1.000	13.52	0.986
9	16.548	16.787	25.7	0.3	25.7	0.3	316.9	1.000	13.79	0.988
10	15.740	16.040	30.2	1.8	30.2	1.8	320.1	1.000	14.12	0.981
11	15.339	15.682	30.4	2.2	30.4	2.2	321.3	1.000	14.18	0.958

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	114.5	113.2	114.5	113.2	106.4	113.1	42.2	-2.7	0.	0.
2	127.9	127.4	127.9	127.4	119.8	127.4	44.6	-0.8	0.	0.
3	140.3	135.7	140.3	135.7	133.4	135.7	43.5	-0.9	0.	0.
4	144.2	138.7	144.2	138.7	137.6	138.7	43.3	-0.9	0.	0.
5	146.3	141.9	146.3	141.9	139.1	141.9	45.3	0.1	0.	0.
6	149.8	145.2	149.8	145.2	142.0	145.2	47.7	0.5	0.	0.
7	156.2	150.0	156.2	150.0	146.7	150.0	53.9	1.3	0.	0.
8	173.6	167.5	173.6	167.5	159.6	167.5	68.2	0.3	0.	0.
9	184.9	182.5	184.9	182.5	166.7	182.5	80.1	0.9	0.	0.
10	199.0	191.4	199.0	191.4	172.0	191.3	100.2	6.1	0.	0.
11	201.9	185.5	201.9	185.5	174.2	185.4	102.2	7.2	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	0.326	0.322	0.326	0.322	0.303	0.322	1.063	0.326
2	0.365	0.364	0.365	0.364	0.342	0.364	1.063	0.365
3	0.403	0.389	0.403	0.389	0.383	0.389	1.017	0.403
4	0.414	0.398	0.414	0.398	0.395	0.398	1.008	0.414
5	0.420	0.407	0.420	0.407	0.400	0.407	1.020	0.420
6	0.431	0.417	0.431	0.417	0.408	0.417	1.023	0.431
7	0.449	0.431	0.449	0.431	0.422	0.431	1.023	0.449
8	0.500	0.482	0.500	0.482	0.460	0.482	1.049	0.500
9	0.533	0.525	0.533	0.525	0.480	0.525	1.095	0.533
10	0.573	0.550	0.573	0.550	0.525	0.549	1.112	0.573
11	0.581	0.531	0.581	0.531	0.501	0.530	1.064	0.581

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	-12.7	-18.5	14.3	0.165	0.	0.096	0.096	0.037	0.037
2	10.00	-13.7	-19.4	13.7	0.139	0.	0.046	0.046	0.018	0.018
3	20.00	-15.8	-21.5	11.6	0.149	0.	0.154	0.154	0.057	0.057
4	30.00	-16.4	-22.0	10.8	0.146	0.	0.130	0.130	0.046	0.046
5	36.00	-16.0	-21.6	11.0	0.136	0.	0.110	0.110	0.038	0.038
6	42.00	-16.0	-21.5	11.1	0.136	0.	0.108	0.108	0.036	0.036
7	50.00	-15.2	-20.7	11.3	0.148	0.	0.124	0.124	0.040	0.040
8	70.00	-15.0	-20.3	11.3	0.150	0.	0.090	0.090	0.026	0.026
9	80.00	-14.9	-20.1	12.4	0.133	0.	0.069	0.069	0.019	0.019
10	90.00	-14.0	-19.1	16.3	0.164	0.	0.093	0.093	0.025	0.025
11	95.00	-16.2	-21.2	18.6	0.203	0.	0.204	0.204	0.053	0.053

TABLE XI. - Concluded. BLADE-ELEMENT PERFORMANCE AT BLADE EDGES

FOR STATOR TWO

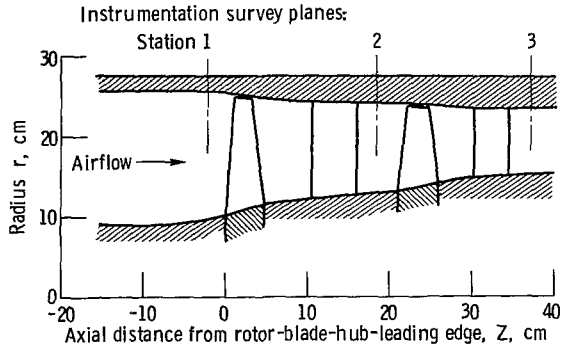
(ℓ) Reading 421

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	23.109	23.129	11.2	-1.9	11.2	-1.9	308.0	1.000	11.82	0.980
2	22.647	22.685	11.3	-0.9	11.3	-0.9	308.1	1.000	12.12	0.983
3	21.727	21.801	10.4	-0.5	10.4	-0.5	307.4	1.000	12.28	0.966
4	20.823	20.922	10.7	0.1	10.7	0.1	307.6	1.000	12.39	0.972
5	20.287	20.401	11.3	0.4	11.3	0.4	308.1	1.000	12.50	0.969
6	19.783	19.883	11.8	0.3	11.8	0.3	308.7	1.000	12.61	0.964
7	19.060	19.205	13.3	0.7	13.3	0.7	309.6	1.000	12.76	0.964
8	17.369	17.567	17.6	-0.1	17.6	-0.1	312.8	1.000	13.25	0.968
9	16.548	16.787	20.3	0.3	20.3	0.3	315.2	1.000	13.49	0.974
10	15.740	16.040	25.7	2.1	25.7	2.1	319.2	1.000	13.93	0.974
11	15.339	15.682	26.8	2.8	26.8	2.8	320.7	1.000	13.96	0.943

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	117.4	130.3	117.4	130.3	115.2	130.2	22.8	-4.3	0.	0.
2	134.6	146.5	134.6	146.5	132.0	146.5	26.3	-2.2	0.	0.
3	146.7	153.7	146.7	153.7	144.3	153.7	26.5	-1.4	0.	0.
4	151.9	157.7	151.9	157.7	149.2	157.7	28.1	0.1	0.	0.
5	157.1	161.6	157.1	161.6	154.0	161.6	30.8	1.0	0.	0.
6	162.4	164.3	162.4	164.3	159.0	164.3	33.2	0.9	0.	0.
7	169.7	170.9	169.7	170.9	165.1	170.9	39.0	2.0	0.	0.
8	187.6	191.8	187.6	191.8	178.9	191.8	56.6	-0.4	0.	0.
9	198.8	209.6	198.8	209.6	186.4	209.6	69.1	1.0	0.	0.
10	212.9	222.5	212.9	222.5	191.9	222.4	92.2	8.2	0.	0.
11	214.5	214.5	214.5	214.5	191.6	214.2	96.6	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	0.338	0.376	0.338	0.376	0.331	0.375	1.131	0.338
2	0.388	0.424	0.388	0.424	0.381	0.424	1.110	0.388
3	0.425	0.446	0.425	0.446	0.418	0.446	1.065	0.425
4	0.440	0.458	0.440	0.458	0.433	0.458	1.057	0.440
5	0.456	0.469	0.456	0.469	0.447	0.469	1.049	0.456
6	0.471	0.477	0.471	0.477	0.461	0.477	1.033	0.471
7	0.493	0.496	0.493	0.496	0.479	0.496	1.035	0.493
8	0.545	0.558	0.545	0.558	0.519	0.558	1.072	0.545
9	0.577	0.610	0.577	0.610	0.541	0.610	1.124	0.577
10	0.617	0.647	0.617	0.647	0.556	0.646	1.159	0.617
11	0.620	0.620	0.620	0.620	0.554	0.619	1.118	0.620

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	-23.2	-28.9	13.8	-0.020	0.	0.263	0.263	0.103	0.103
2	10.00	-22.8	-28.6	13.2	-0.008	0.	0.172	0.172	0.066	0.066
3	20.00	-23.5	-29.2	11.5	0.022	0.	0.289	0.289	0.106	0.106
4	30.00	-23.2	-28.8	11.3	0.026	0.	0.221	0.221	0.078	0.078
5	36.00	-22.7	-28.3	11.3	0.037	0.	0.232	0.232	0.080	0.080
6	42.00	-22.8	-28.3	11.2	0.055	0.	0.257	0.257	0.086	0.086
7	50.00	-22.1	-27.6	11.4	0.063	0.	0.237	0.237	0.077	0.077
8	70.00	-20.6	-25.9	11.1	0.067	0.	0.178	0.178	0.052	0.052
9	80.00	-20.2	-25.5	12.4	0.041	0.	0.131	0.131	0.037	0.037
10	90.00	-18.6	-23.7	16.6	0.059	0.	0.114	0.114	0.031	0.031
11	95.00	-19.8	-24.8	19.2	0.104	0.	0.248	0.248	0.065	0.065



Flow path coordinates

Axial distance Z, cm	Radius, r, cm Outer	Inner
-15.237	25.654	8.994
-10.160	25.654	8.903
-5.080	25.654	9.093
[a]-2.347	25.651	9.543
0	25.570	10.160
2.540	25.128	10.973
5.080	24.681	11.565
7.620	24.460	11.902
10.160	24.384	12.139
12.700	↓	12.438
15.240	↓	12.822
17.780	↓	13.025
[a]18.659	↓	13.038
20.320	24.328	13.152
22.860	23.993	13.627
25.400	23.655	14.371
27.940	23.622	14.699
30.033	↓	14.849
34.610	↓	15.237
[a]36.706	↓	15.240
40.640	↓	15.240

[a]Instrumentation survey plane

Figure 1. - Flow path for two-stage fan.

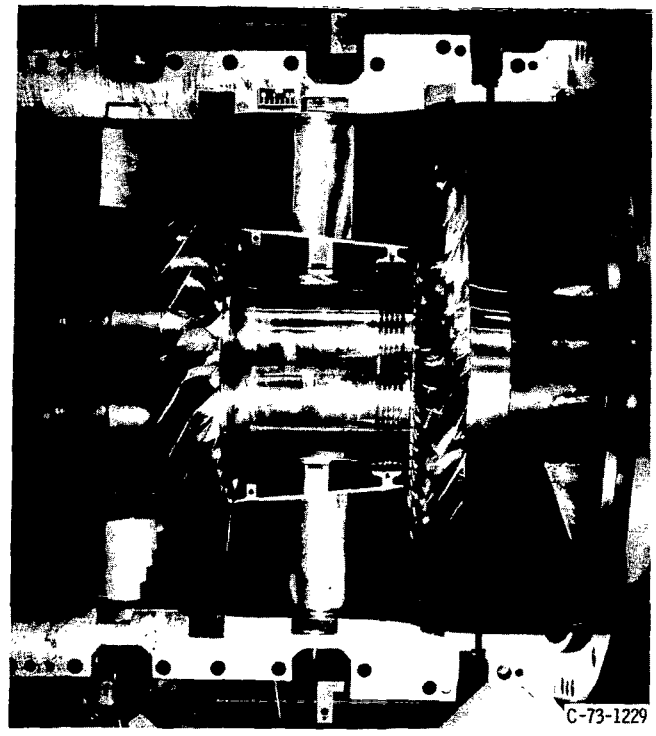


Figure 2. - Two-stage fan.

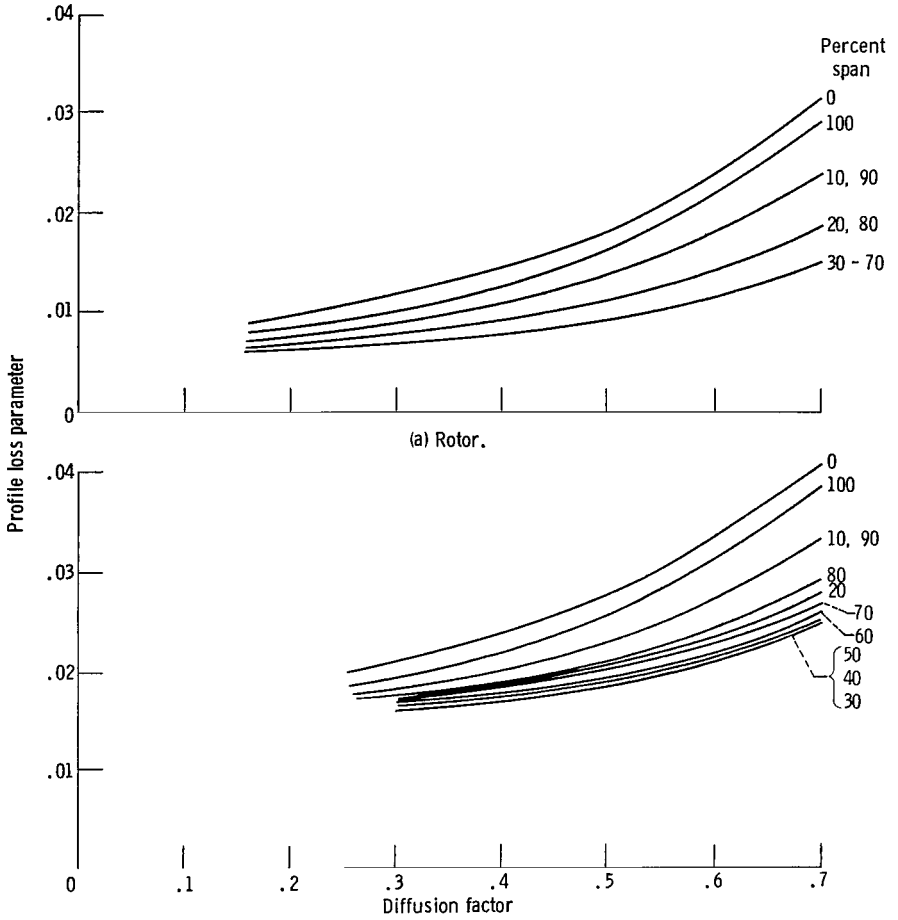


Figure 3. - Profile loss correlation.

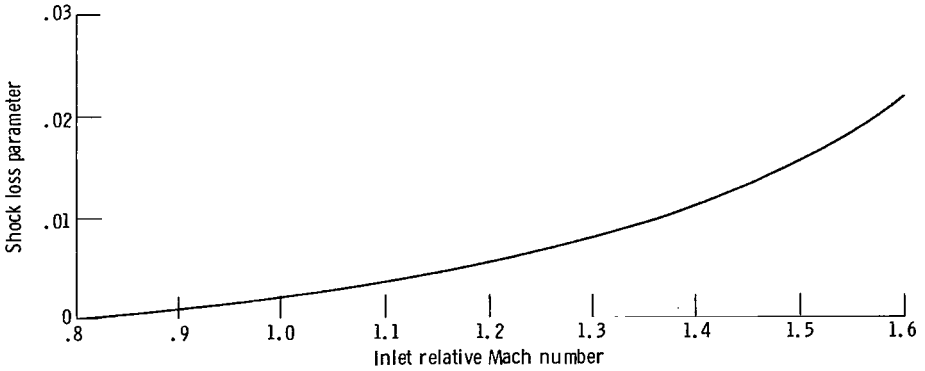


Figure 4. - Shock-loss correlation.

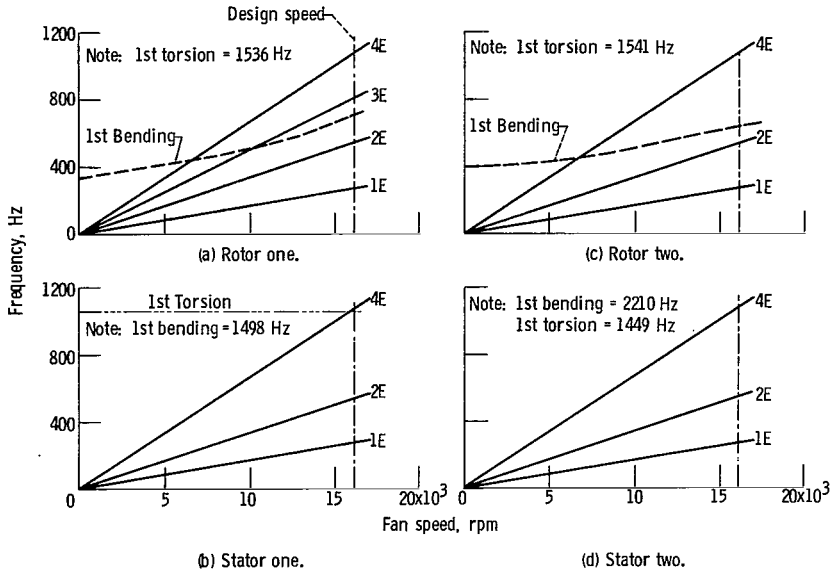


Figure 5. - Campbell diagrams for the four blade rows.

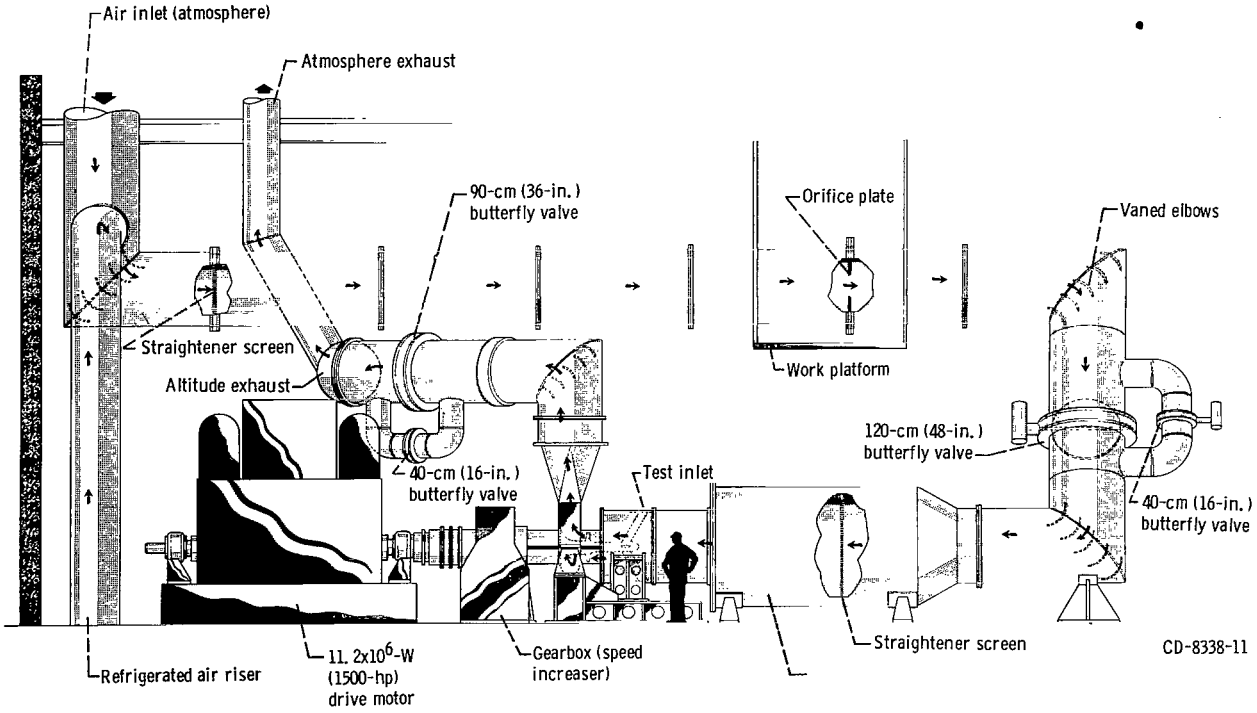


Figure 6. - Multistage compressor test facility.

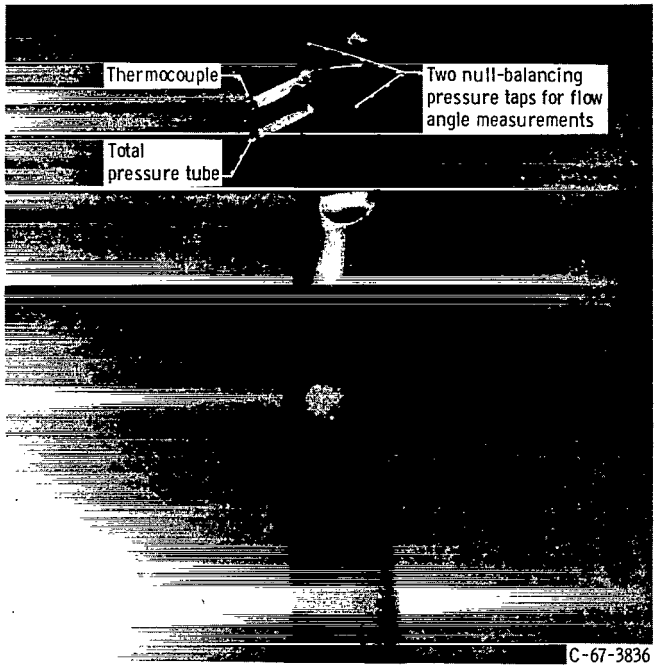


Figure 7. - Combination total pressure, total temperature, and flow angle survey probe.

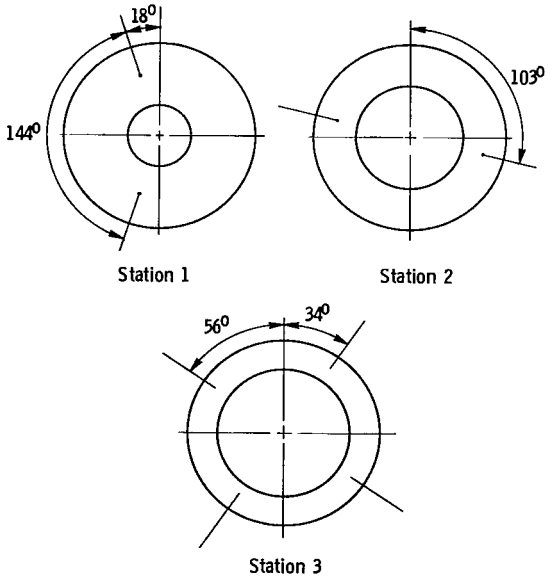


Figure 8. - Circumferential locations of measurements (looking downstream; clockwise rotation).

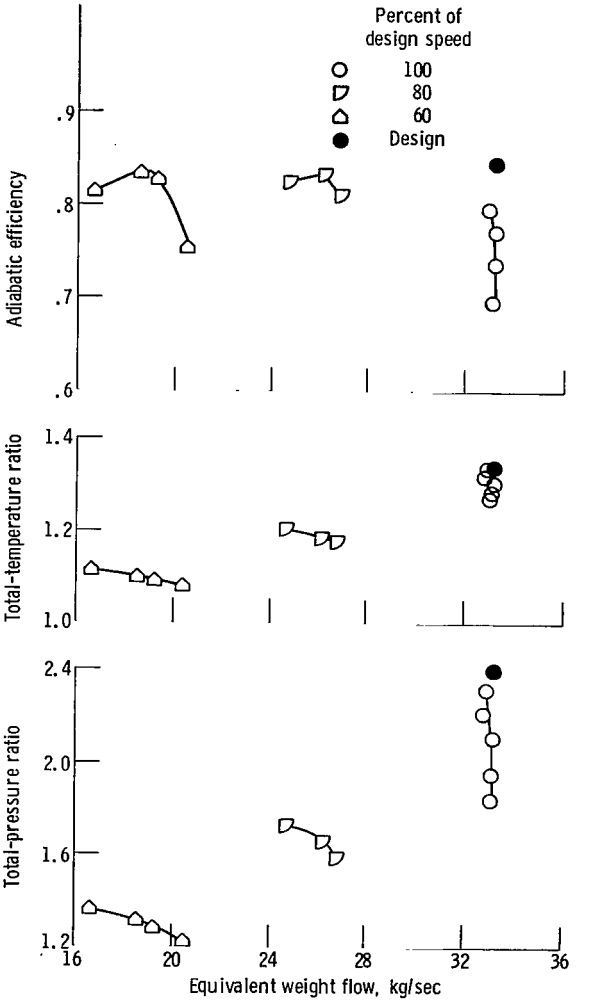
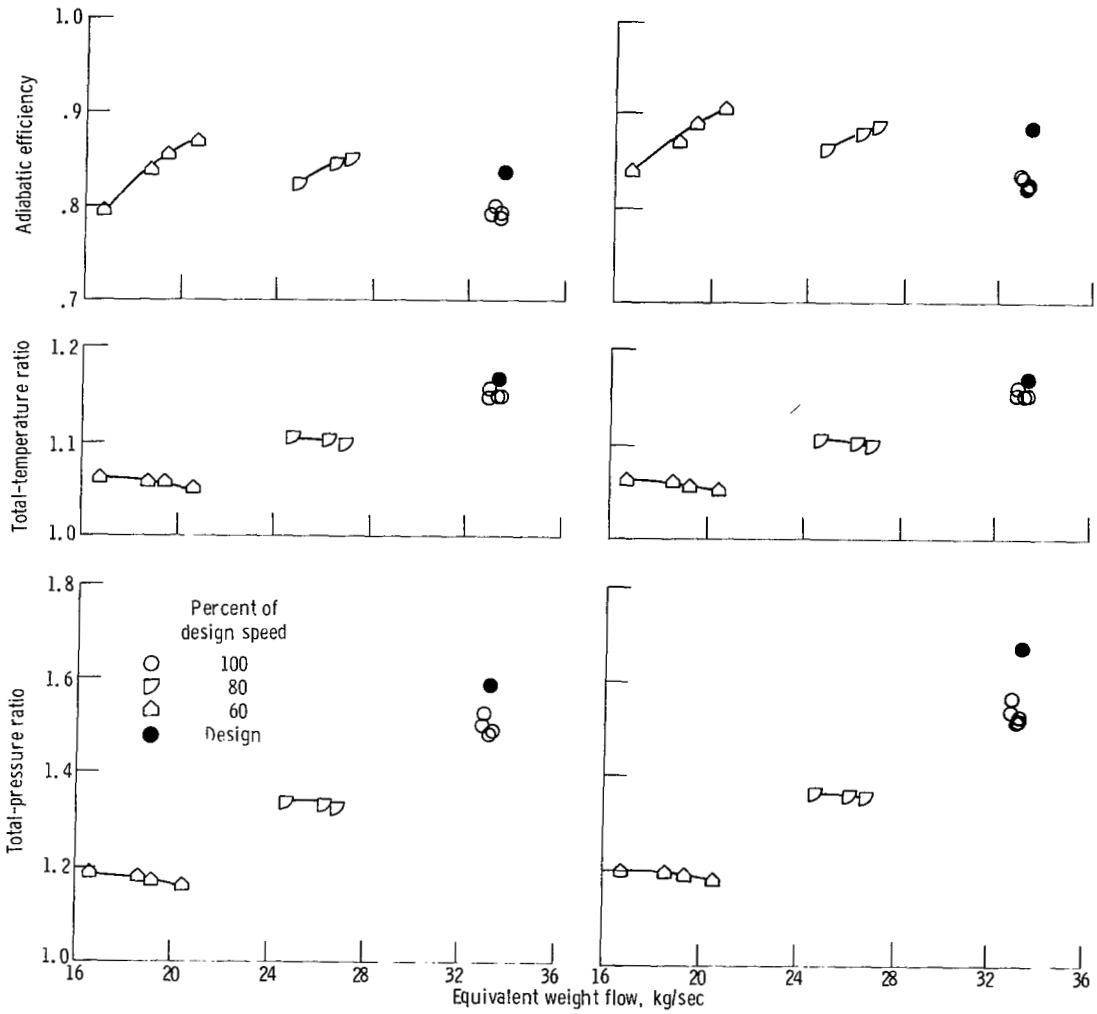


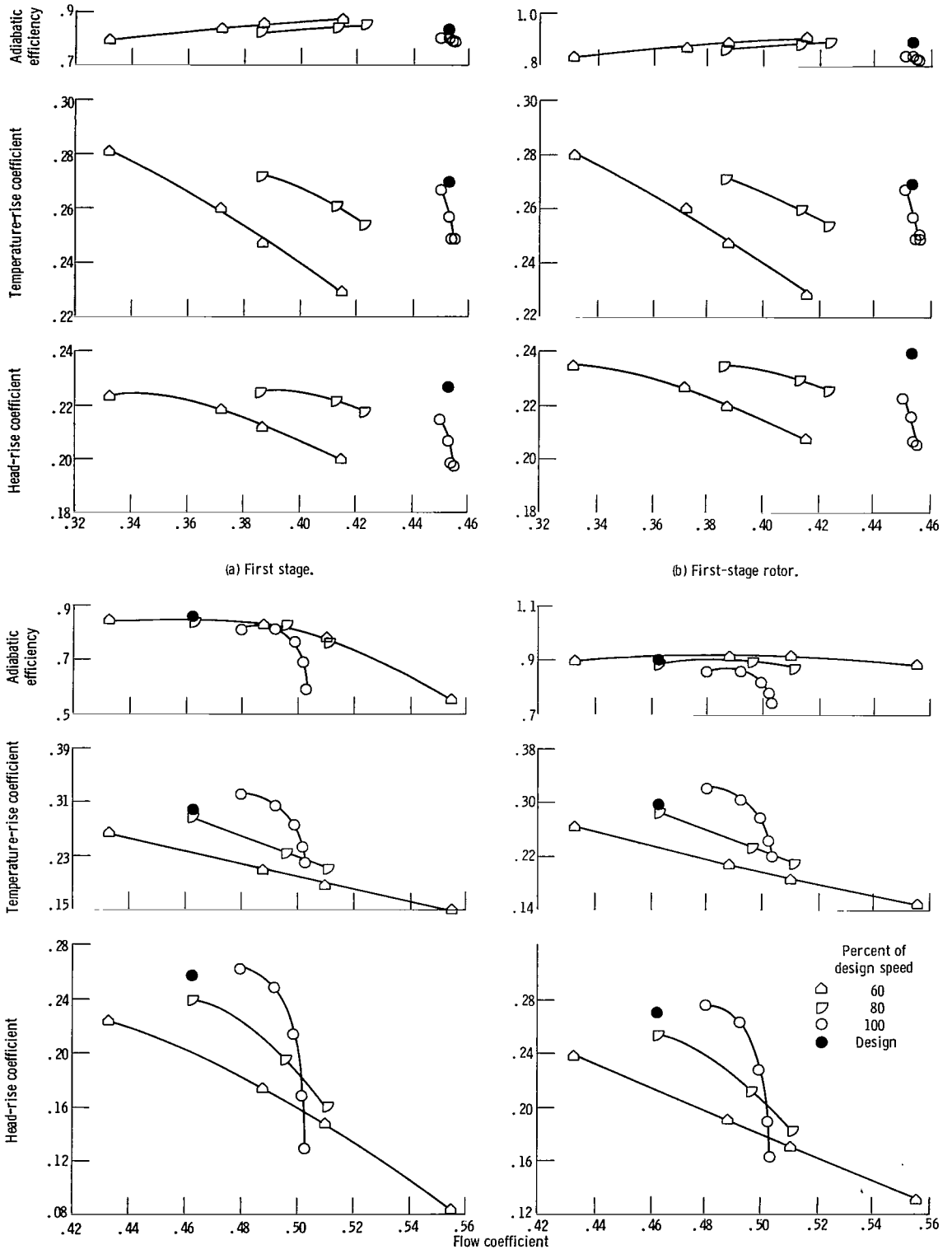
Figure 9. - Overall performance of two-stage fan.



(a) Stage.

(b) Rotor.

Figure 10. - Overall performance of first stage of two-stage fan.



(a) First stage.

(b) First-stage rotor.

(c) Second stage.

(d) Second-stage rotor.

Figure 11. - Nondimensional overall performance.

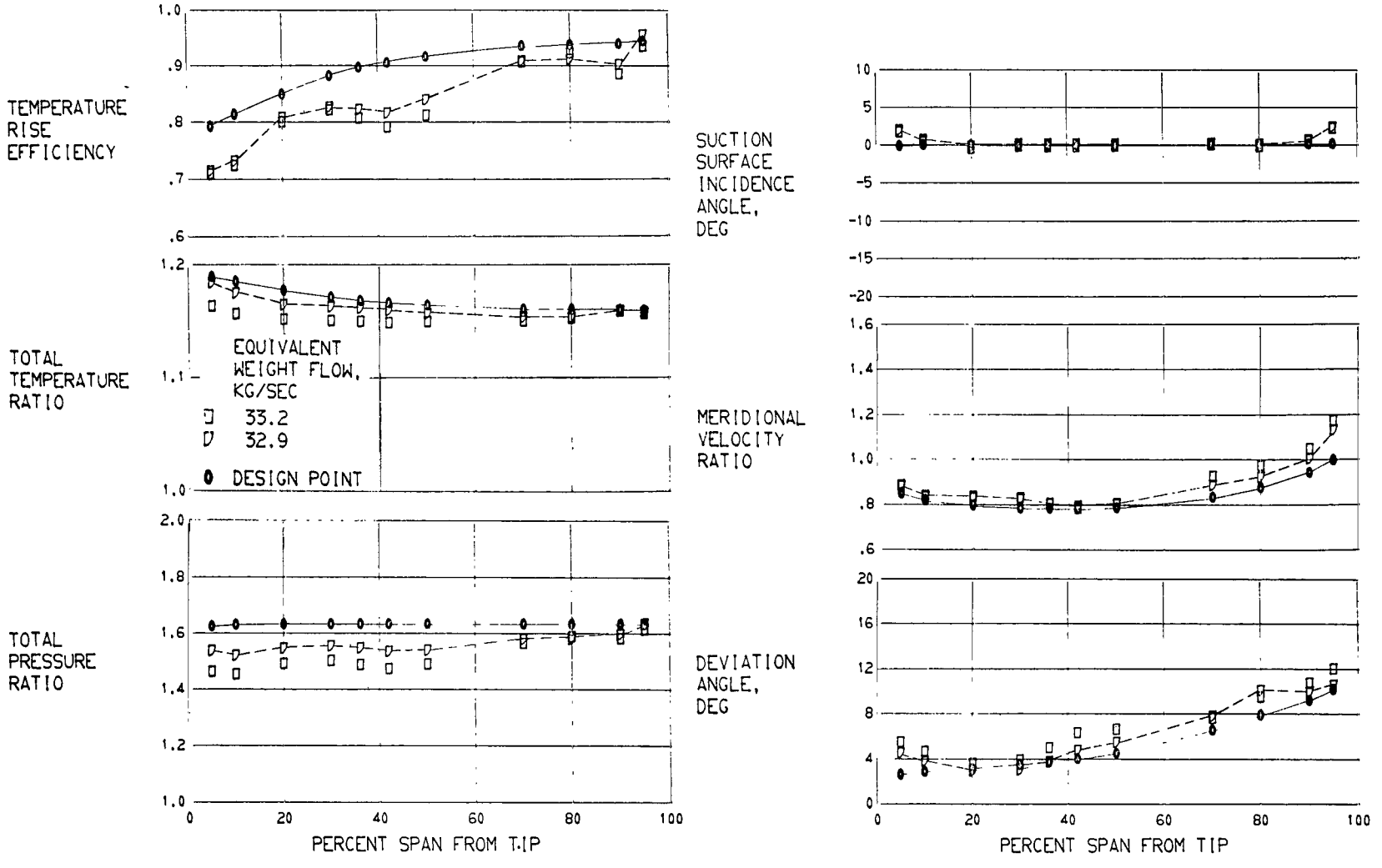


FIGURE 12. - RADIAL DISTRIBUTIONS OF PERFORMANCE PARAMETERS FOR FIRST STAGE ROTOR AT DESIGN SPEED.

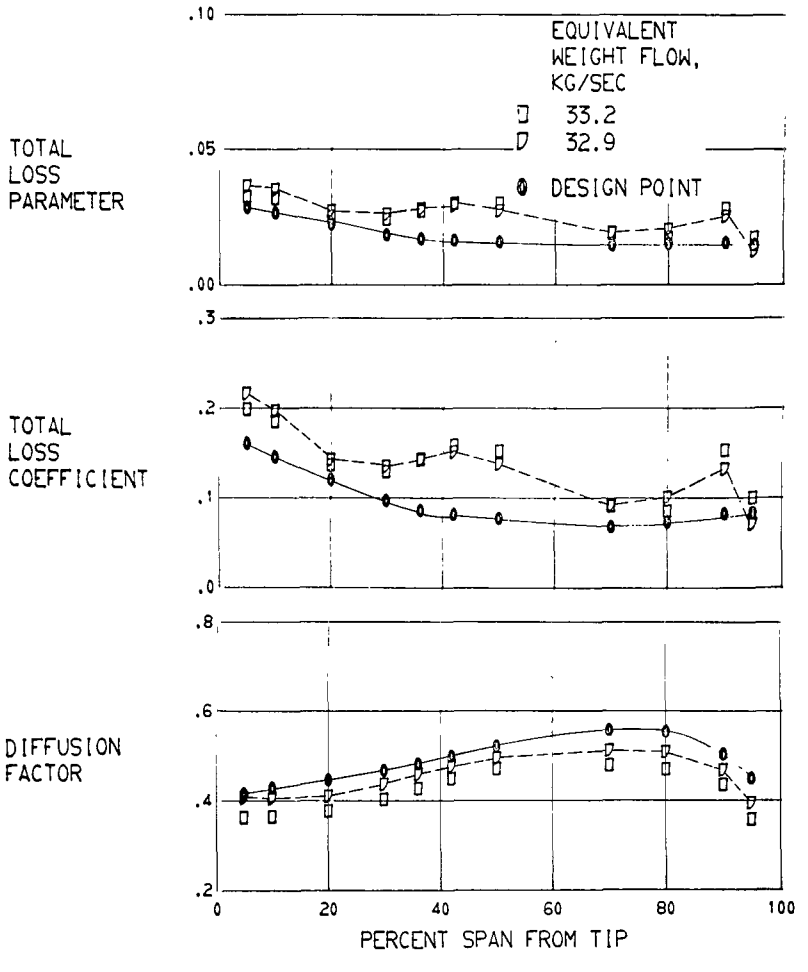


FIGURE 12. - CONCLUDED.

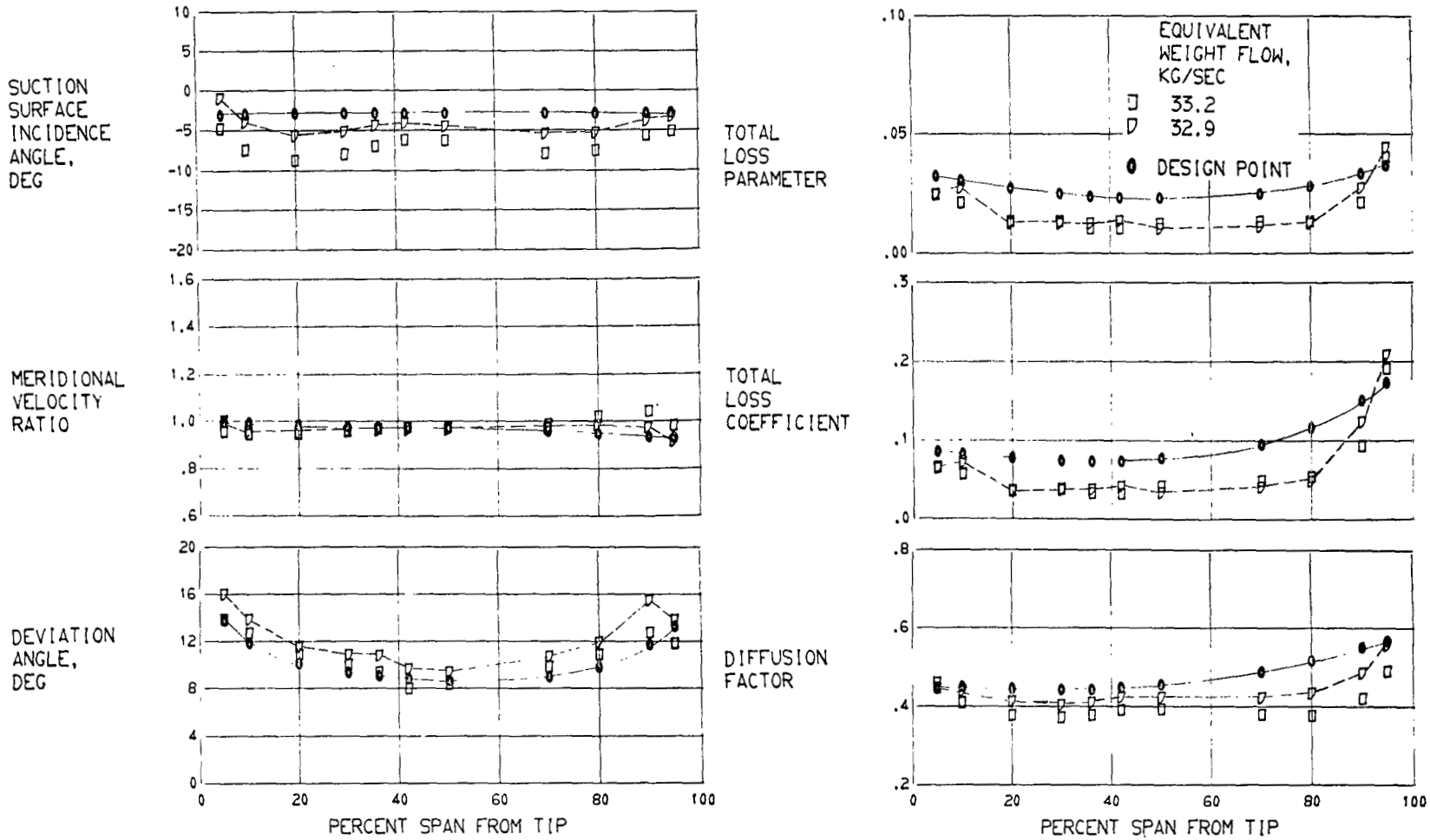


FIGURE 13. - RADIAL DISTRIBUTIONS OF PERFORMANCE PARAMETERS FOR FIRST STAGE STATOR AT DESIGN SPEED.

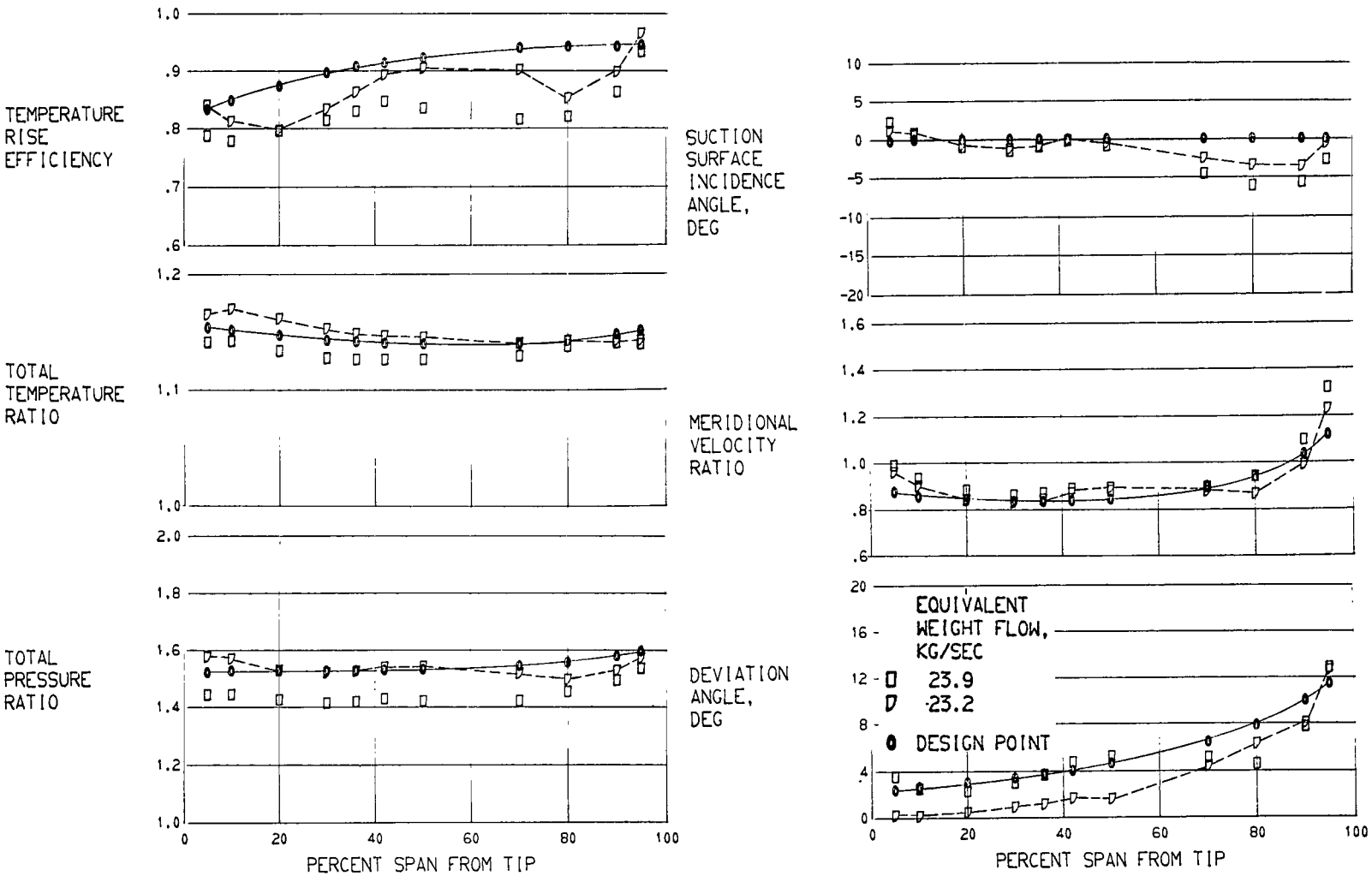


FIGURE 14. - RADIAL DISTRIBUTIONS OF PERFORMANCE PARAMETERS FOR SECOND STAGE ROTOR AT DESIGN SPEED.

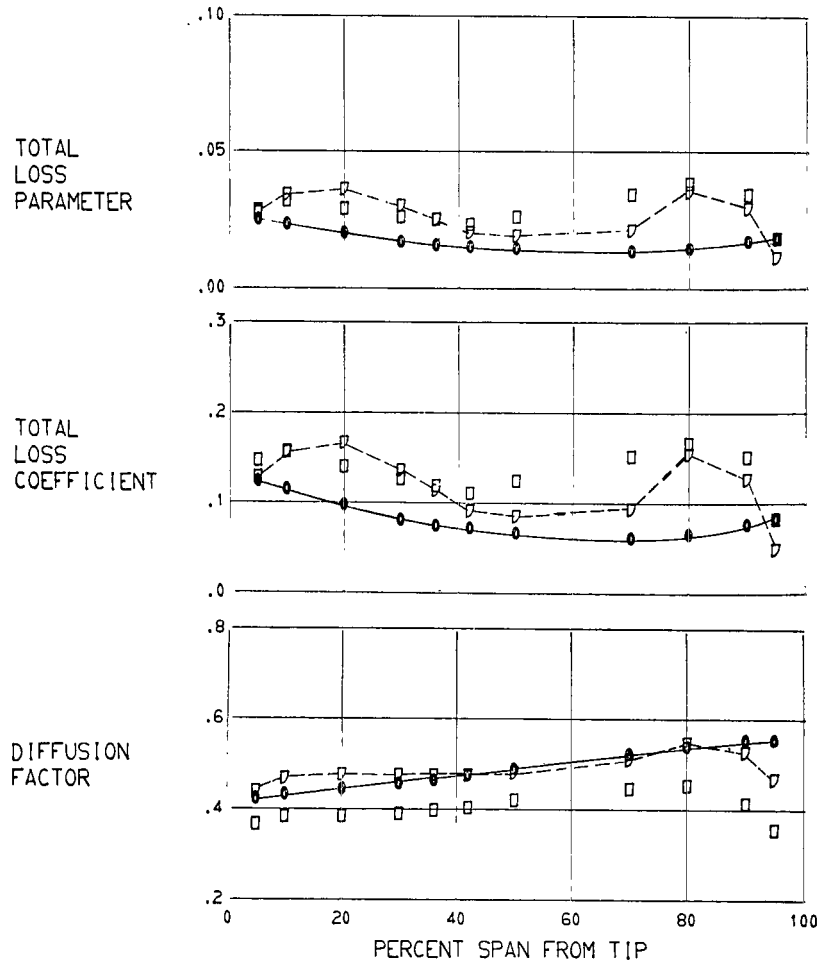


FIGURE 14. - CONCLUDED.

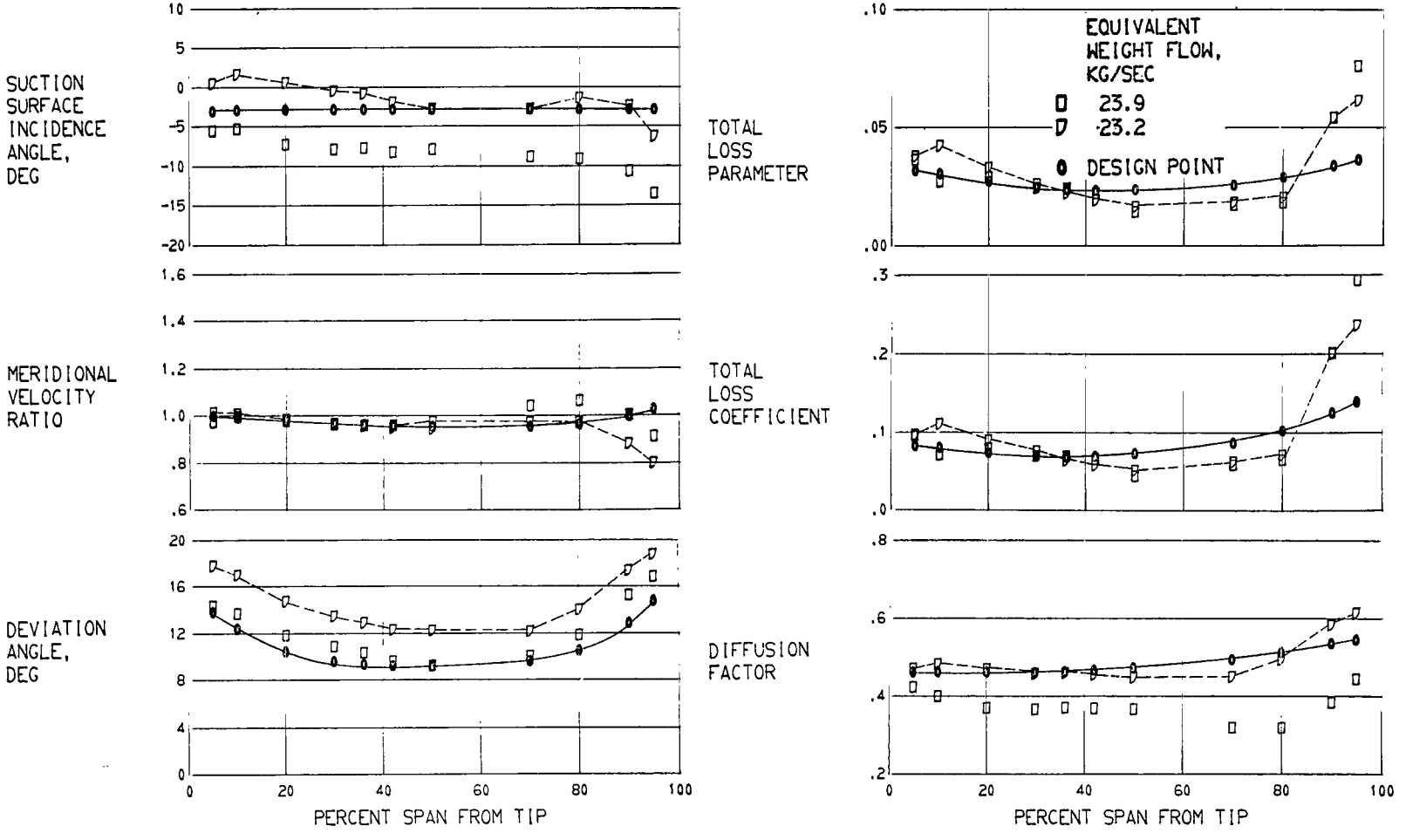


FIGURE 15. - RADIAL DISTRIBUTIONS OF PERFORMANCE PARAMETERS FOR SECOND STAGE STATOR AT DESIGN SPEED.

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16. Abstract

This report presents the aerodynamic design and the overall and blade-element performances of a 427-meter-per-second-tip-speed two-stage fan designed with axially spaced blade rows to reduce noise transmitted upstream of the fan. At design speed the highest recorded adiabatic efficiency was 0.796 at a pressure ratio of 2.30. Peak efficiency was not established at design speed because of a damper failure which terminated testing prematurely. The overall efficiencies, at 60 and 80 percent of design speed, peaked at approximately 0.83.

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