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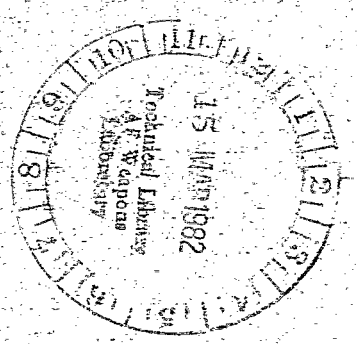

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PERFORMANCE OF SINGLE-STAGE AXIAL-FLOW TRANSONIC COMPRESSOR WITH ROTOR AND STATOR ASPECT RATIOS OF 1.63 AND 1.78, RESPECTIVELY, AND WITH DESIGN PRESSURE RATIO OF 1.82

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Performance of Single-Stage Axial-Flow Transonic Compressor With Rotor and Stator Aspect Ratios of 1.63 and 1.78, Respectively, and With Design Pressure Ratio of 1.82

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Summary

The overall and blade-element performance of an axial-flow transonic compressor stage is presented herein. The stage is one of a series of single stages that were designed and tested to investigate the effects of pressure ratio and aspect ratio on the performance characteristics of inlet stages of an advanced-core compressor. This stage was designed for a pressure ratio of 1.82 at a flow of 20.2 kilograms per second and a tip speed of 455 meters per second. The rotor aspect ratio was 1.63 and the stator aspect ratio was 1.78. The stage was tested over the stable operating flow range from 50 to 100 percent of design speed. At design speed the rotor achieved a peak efficiency of 0.852 at a pressure ratio of 1.766. The stage peak efficiency of 0.821 occurred at a pressure ratio of 1.817 and a flow of 20.83 kilograms per second. The stage achieved a stall margin based on conditions at peak efficiency and stall of about 11 percent at design speed.

Introduction

The research program on axial-flow fans and compressors for advanced airbreathing engines at the NASA Lewis Research Center includes the study of advanced-core compressor designs typical of those required to achieve pressure ratios to 20 in as few as six stages. A preliminary aerodynamic study was conducted for an eight-stage core compressor with a pressure ratio of 20 and an inlet rotor tip speed of 455 meters per second. The flow path had a constant meanline diameter with an inlet hub-tip ratio of 0.7. Both the speed and loading per stage were considerably higher than in current state-of-the-art core compressors. This design was used to pattern single stages that are representative of the inlet, middle, and rear stages of the eight-stage, 20-pressure-ratio compressor.

Four single stages that are representative of the inlet stage for a multistage compressor were designed and tested. These four stages (designated stages 35, 36, 37, and 38) represent two levels of pressure ratio and two levels of rotor aspect ratio. Stage 35 was the first stage of the eight-stage design. Stages 35 and 37 have a rotor aspect ratio of 1.19 and design pressure ratios of 1.82 and 2.05, respectively; stages 36 and 38 have a rotor aspect ratio of 1.63 and design pressure ratios of 1.82 and 2.05, respectively. The design and the overall performance comparison for all four stages are presented in reference 1. A brief summary of both the overall and blade-element performance of the four stages is presented in reference 2. Detailed blade-element data for stages 35, 37, and 38 are presented in references 3, 4, and 5, respectively.

This report presents the detailed radial distribution of performance parameters and blade-element data for the higher-aspect-ratio, lower-pressure-ratio stage in this series (stage 36). The overall performance of the stage is also included. Data are presented over the stable operating flow range for rotative speeds from 50 to 100 percent of design speed. Data are presented in tabular form as well as in plots. The symbols are defined and the equations presented in appendixes A and B.

Aerodynamic Design

The detailed aerodynamic design for stage 36 is presented in reference 1, and therefore only a brief summary of the aerodynamic design parameters is presented herein.

The flow path geometry, including instrumentation stations, is shown in figure 1. The design overall performance parameters are shown in table I. The stage was designed for a total-pressure ratio of 1.82, an airflow of 20.2 kilograms per second, and a rotor tip speed of 455 meters per second. The design blade-element parameters are presented in table II. The rotor-inlet relative Mach number varies from 1.487 at the tip to 1.117 at the hub; the stator-inlet Mach number varies from 0.699 at the tip to 0.742 at the hub. The rotor diffusion factor at the hub and tip is approximately 0.49, with a maximum value of 0.51 at 85 percent of span; the stator hub diffusion factor is 0.41.

The blade geometry is presented in table III for the rotor and the stator. Both the rotor and the stator have multiple-circular-arc (MCA) blade shapes. The rotor has 48 blades, the tip solidity is 1.3, and the aspect ratio is 1.63. The stator has 62 blades, the tip solidity is 1.3, and the aspect ratio is 1.78. The rotor and the stator are shown in figure 2. Manufacturing coordinates for both the rotor and the stator are presented in reference 1.

The nominal nonrotating tip clearance was 0.071 centimeter. On the basis of the calculated growths of the blade and disk, it is estimated that the running clearance will be 0.018 centimeter at design conditions.

Apparatus and Procedure

Compressor Test Facility

The compressor stage was tested in the Lewis Research Center single-stage compressor test facility (fig. 3), which is described in detail in reference 6. Atmospheric air enters the facility at an inlet located on the roof of the building and flows through the flow-measuring orifice and into the plenum upstream of the test stage. The air passes through the experimental compressor stage into the collector and the atmospheric exhaust system.

Instrumentation

The airflow was determined from measurements on a calibrated thin-plate orifice. The orifice temperature was obtained from an average of two Chromel-constantan thermocouple measurements. Orifice pressures were measured by calibrated transducers. An electronic speed counter, in conjunction with a magnetic pickup, was used to measure rotative speed.

Radial surveys of flow conditions at station 1, upstream of the rotor (fig. 1), were made with two combination probes (fig. 4(a)) and two 18° wedge probes (fig. 4(b)). The combination measures total temperature, total pressure, and flow angle. The wedge probe measures static pressure and flow angle. Each probe was equipped with a null-balancing control system that automatically aligned the probe with the flow direction. Chromel-constantan thermocouples were used to measure temperature.

Because of the close spacing between the rotor and the stator (approx 0.7 cm), no measurements were made between them. At station 3 (downstream of the stator) two combination probes and two wedge probes were traversed both circumferentially and radially to obtain the distributions of pressure, temperature, and flow angle.

Static-pressure taps were installed on both the inner and outer wall casings at stations 1 and 3. The circumferential location of the instrumentation at stations 1 and 3 is shown in figure 5. The combination probes at station 3 were circumferentially traversed one stator blade gap counterclockwise from the values shown in figure 5. The estimated errors in the data, as based on inherent accuracies of the instrumentation and the recording system, are as follows:

Airflow, kg/sec	±0.3
Rotative speed, rpm	±30
Flow angle, deg	±1.0
Temperature, K	±0.6
Rotor-inlet (station 1) total pressure, N/cm^2	±0.01
Rotor-inlet (station 1) static pressure, N/cm^2	±0.03
Stator-outlet (station 3) total pressure, N/cm^2	±0.17
Stator-outlet (station 3) static pressure, N/cm^2	±0.10

An indication of the consistency of the data may be had by comparing the integrated airflow at each station to the airflow at the orifice in table IV.

Test Procedure

The stage survey data were taken over a range of flows and speeds. For 70, 90, and 100 percent of design speed, data were recorded at five or more flows from maximum to near-stall conditions. For 50, 60, and 80 percent of design speed, data were recorded at the near-stall flow only. Data were taken at nine radial positions for each flow point.

At each radial position the two combination probes behind the stator were traversed circumferentially to nine locations across the stator gap. The wedge static probes were set at midgap because preliminary studies showed that the the static pressure across the gap was essentially constant. Values of total pressure, temperature, and flow angle were recorded at each circumferential position at station 3. At the last circumferential position, values of pressure, temperature, and flow angle were also recorded at station 1. All probes were then traversed to the next radial position, and the circumferential traverse procedure was repeated.

Calculation Procedure

Measured total pressures, static pressures, and total temperatures were corrected for Mach number and streamline slope. These corrections were based on an average calibration for the type of instrument used. Orifice airflow, rotative speed, total pressures, static pressures, and temperatures were all corrected to standard-day conditions based on the rotor inlet.

The circumferential distribution of static pressure downstream of the stator was assumed to be constant at each radial position and equal to the midgap values. At each radial position, averaged values of nine circumferential measurements of total pressure, total temperature, and flow angle downstream of the stator (station 3) were obtained in the following manner: The midgap static pressure was used with the local total pressure, total temperature, and flow angle to calculate the circumferential distributions of velocity, static density, and axial and tangential velocity components. These distributions are used in the circumferential mass-averaging process. The nine values of total temperature were mass averaged to obtain the circumferentially averaged stator-outlet total temperature. The nine values of total pressure were divided by the rotor-inlet total pressure and converted to corresponding isentropic temperature ratios. These ratios were mass averaged, and the resulting value was converted (through the isentropic-temperature-ratio–pressure-ratio relation) to an average total-pressure ratio. The average absolute velocity was obtained from the midgap static pressure, the average

total pressure, and the total temperature. The average tangential velocity component was calculated by mass averaging the local tangential velocity. The average absolute and tangential velocity components were used to calculate the average axial velocity and flow angle. This calculation was performed for each of the two sets of probes at station 3, and the results from each set of probes were averaged to obtain single, averaged values of total pressure, total temperature, static pressure, and flow angle at each radial position. To obtain the overall performance, the radial distributions of the circumferentially averaged total temperature and total pressure were averaged by using a procedure similar to that used for averaging the circumferential distributions of these parameters.

The values of pressure, temperature, and flow angle at station 2 were obtained as follows: At each radial position total pressure and total temperature were translated along design streamlines from station 3. The mass-averaged total temperature was used as the total temperature for station 2. The arithmetic mean of the three highest total-pressure values from the circumferential distribution at station 3 was used as the total pressure at station 2. The radial distributions of static pressure and flow angle were calculated on the basis of continuity of mass flow and radial equilibrium. Measured airflow, rotative speed, and design values of geometry and annulus wall blockage were specified.

At each measuring station the integrated airflow was computed from the survey data. The data at the three stations were translated to the blade leading and trailing edges by the method presented in reference 5.

At each of the six rotative speeds the backpressure on the stage was increased (by closing the sleeve valve in the collector) until a stalled condition was evident. Stall was detected by a sudden drop in stage-outlet pressure, which was measured by a probe located at midpassage and recorded on an X-Y plotter. Stall was also correlated by large increases in blade stresses on both the rotor and the stator, along with a sudden increase in noise level. The airflow at stall was obtained in the following manner: From a condition near stall the sleeve valve was slowly closed in small increments. At each increment the airflow was obtained. The airflow obtained just before stall occurred is called the stall airflow. The pressure ratio at stall was obtained by extrapolating the total pressure obtained from the survey data to the stall airflow.

Results and Discussion

The results of this investigation are presented in three parts: overall performance of both the rotor and the stage, radial distribution of several performance parameters, and blade-element data for both the rotor and the stator. The overall performance data are presented in table IV. For each overall performance data point, blade-element data are presented for the rotor and stator in tables V and VI, respectively. The abbreviations and units used for the tabular data are defined in appendix C.

Overall Performance

The overall performance of the rotor and the stage are presented in figures 6 and 7, respectively. At design speed the rotor and the stage achieved peak efficiencies of 0.852 and 0.821, respectively. The rotor peak efficiency occurred at the maximum flow (20.94 kg/sec) and a pressure ratio of 1.766. The stage peak efficiency occurred at a flow rate of 20.83 kilograms per second and a pressure ratio of 1.817. The design rotor and stage pressure ratios were 1.863 and 1.82, respectively. The flow at which rotor peak efficiency occurred was about 3 percent higher than design. The stage stalled at approximately the design flow but at a pressure ratio higher than the design value. The peak rotor efficiencies at 70 and 90 percent of design speeds were 0.912 and 0.892, respectively. The stage exhibited reasonably good (27 percent) stall margin based on conditions at peak efficiency and stall at 70 percent of design speed, but only about 11 percent at design speed.

Radial Distributions

Radial distributions of several parameters are presented in figures 8 and 9 for the rotor and the stator, respectively, for design speed at three flow conditions: maximum, peak efficiency, and near stall. These distributions show the aerodynamic performance at various spanwise locations for a given flow and the change in these parameters over the flow range. The design distributions are presented by the solid symbols.

Rotor. – For the stage peak efficiency condition (20.8 kg/sec) the radial distribution of incidence angle was significantly different than the design distribution. Probably because of the very thick wall boundary layer, the incidence angle was greater than design in the tip region (5 percent span). Since the flow was greater than design, the incidence angle was less than design over the remainder of the blade. Although the diffusion factors agreed reasonably well with the design values, the pressure ratio was slightly less than design from the tip to 50 percent of span. From 70 percent of span to the hub the pressure ratio was slightly greater than design.

As the flow was decreased from choke to stall conditions, incidence angle, diffusion factor, temperature ratio, and pressure ratio increased fairly uniformly across the blade passages. At the stall conditions the rotor diffusion factor varied from about 0.51 at the tip to 0.57 at the hub. The flow at the stall condition was approximately equal to the design flow.

Stator. – At the peak efficiency condition (20.8 kg/sec) the losses and diffusion factors were less than design except in the tip region. From the tip to 85 percent of span the deviation angle was greater than design. At 5 percent of span the deviation angle was almost twice the design value. As with the rotor the incidence angle and the diffusion factor increased fairly uniformly across the blade passages as the flow was decreased from choke to stall conditions. This is attributed to the fairly uniform radial variation in energy addition (temperature ratio) and consequently tangential velocity out of the rotor.

All three flow conditions show very high losses in the tip region (5 percent span). The circumferential distribution of total pressure (fig. 10) indicates possible separation on the suction surface of the blade, which would contribute to this high loss condition.

Variations with Incidence Angle

The variations of selected blade-element parameters with suction-surface incidence angle are presented in figures 11 and 12 for the rotor and the stator, respectively. The data are presented for 70, 90, and 100 percent of design speed for blade elements located at 5, 10, 15, 30, 50, 70, 85, 90, and 95 percent of span from the blade tip. Design values are represented by solid symbols, and experimental values by open symbols. The data presented are computer plotted, and occasionally a data point will be omitted because it falls outside the range of the parameters shown in the figure. These data points do appear, however, in the appropriate tables in this report. In this section comparisons are made between design values and design speed data.

Rotor. – Meridional velocity ratio, inlet relative Mach number, deviation angle, total-loss parameter, total-loss coefficient, diffusion factor, adiabatic efficiency, total-temperature ratio, and total-pressure ratio are plotted as functions of suction-surface incidence angle in figure 11. At design speed all the rotor blade elements operated over a rather narrow incidence angle range (less than 4°). Except at 5 percent of span the minimum loss occurred at lower than design incidence angles. The minimum losses were less than the design values at 5, 10, 15, and 30 percent of span. At the other span locations, minimum losses are equal to or greater than the design values.

At 70, 85, 90, and 95 percent of span, compressor stall occurred before design incidence angle was encountered.

Stator. – Meridional velocity ratio, inlet relative Mach number, deviation angle, total-loss coefficient, total-loss parameter, and diffusion factor are plotted as functions of suction-surface incidence angle in figure 12. At design speed the stator operated over a range of incidence of slightly less than 10° for all elements. Except at 5, 50, and 70 percent of span the stator operated over that range of incidence angle without any appreciable change in losses. At these three span locations, minimum losses will occur at incidence angles greater than design. In the tip region (5, 10, and 15 percent of span) the minimum losses were greater than design. For the other span locations the minimum losses were significantly less than design. At 5, 10, and 30 percent of span the measured diffusion factor at the design incidence angle was greater than design. At all the other span locations the measured diffusion factors were equal to the design values.

Summary of Results

This report has presented the overall and blade-element performance of a single-stage, axial-flow transonic compressor stage that is representative of an inlet stage of an advanced-core compressor. This is one of a series of stages designed to investigate the effects of aspect ratio and pressure ratio on the stage performance characteristics. The stage was designed for a pressure ratio of 1.82 at a flow of 20.2 kilograms per second. The rotor and stator aspect ratios were 1.63 and 1.78, respectively. Detailed radial surveys of the flow condition were made over the stable operating range for speeds from 50 to 100 percent of design. This investigation yielded the following results:

1. At design speed the rotor peak efficiency of 0.852 occurred at the maximum flow of 20.94 kilograms per second and a pressure ratio of 1.766.

2. The stage peak efficiency of 0.821 occurred at a flow of 20.83 kilograms per second and a pressure ratio of 1.817. Stage stall margin was 11 percent at design speed.

3. At the design-speed, stage-peak-efficiency condition, the spanwise distribution of rotor incidence angle and pressure ratio was different from design. Because of a probable thick boundary layer the incidence angle was greater than design and the pressure ratio was less than design in the tip region. In the hub region the incidence angle was less than design and the pressure ratio was greater than design.

4. In the tip region (5 to 15 percent of span) the minimum stator losses were greater than design as a result of probable separation on the suction surface. For the other span locations the minimum losses were significantly less than the design values.

Lewis Research Center
National Aeronautics and Space Administration
Cleveland, Ohio, August 14, 1981

Appendix A

Symbols

ΔA area for radial position, m^2

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

A_f frontal area at rotor leading edge, m^2

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

c aerodynamic chord, cm

D diffusion factor

i_{mc} mean incidence angle, angle between inlet air direction and line tangent to blade mean camber line at leading edge, deg

i_{ss} suction-surface incidence angle, angle between inlet air direction and line tangent to blade suction surface at leading edge, deg

N rotative speed, rpm

NR number of radial positions

P total pressure, N/cm^2

p static pressure, N/cm^2

r radius, cm

SM stall margin

T total temperature, K

U wheel speed, m/sec

V air velocity, m/sec

W airflow, kg/sec

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

α_c cone angle, deg

α_s slope of streamline, deg

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

β_c' relative meridional air angle bassed on cone angle, $\arctan(\tan \beta_m' \cos \alpha_c / \cos \alpha_s)$, deg

γ ratio of specific heats (1.40)

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

$\delta°$ deviation angle, angle between exit air direction and tangent to blade mean camber line at trailing edge, deg

η efficiency

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

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

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

ρ density

σ solidity, ratio of chord to spacing

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

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

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

Subscripts:

ad adiabatic (temperature rise)

h hub

i index

id ideal

LE blade leading edge

m meridional direction

mom momentum rise

p polytropic

ref reference

TE blade trailing edge

t tip

z axial direction

θ tangential direction

1 instrumentation plane upstream of rotor

2 instrumentation plane between rotor and stator

3 instrumentation plane downstream of stator

Superscript:

$'$ relative to blade

$\bar{}$ average

Appendix B
Equations

Equations for Calculating Blade-Element Parameters

Suction-surface incidence angle:

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

Mean incidence angle:

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

Deviation angle:

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

Diffusion factor:

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

Total-loss coefficient:

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

Profile-loss coefficient:

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

Total-loss parameter:

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

Profile-loss parameter:

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

Adiabatic (temperature rise) efficiency:

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

Equations for Calculating Overall Performance Parameters

Rotor total-pressure ratio:

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

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

Stage total-pressure ratio:

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

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

Rotor total-temperature ratio:

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

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

Rotor adiabatic efficiency:

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

Stage total-temperature ratio:

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

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

Stage adiabatic efficiency:

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

Rotor-inlet mass-averaged temperature:

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

Momentum-rise efficiency:

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

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

Head-rise coefficient:

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

Equivalent airflow:

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

Equivalent rotative speed:

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

Airflow per unit annulus area:

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

Airflow per unit frontal area:

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

Flow coefficient:

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

Stall margin:

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

Rotor polytropic efficiency:

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

Stage polytropic efficiency:

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

Meridional velocity ratio:

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

Appendix C

Definitions and Units of Abbreviations Used in Tables

ABS	absolute
AERO CHORD	aerodynamic chord, cm
AIRFLOW	equivalent airflow, kg/sec
ASPECT RATIO	mean blade height ratioed to mean projected chord
BETAM	meridional air angle, deg
CHOKE MARGIN	ratio of actual flow area minus critical area to critical area (where local Mach number is 1)
CONE ANGLE	angle between axial direction and conical surface representing blade element, deg
DELTA INC	difference between mean camber blade angle and suction surface blade angle at leading edge, deg
DEV	deviation angle (defined by eq. (B3)), deg
D-FACT	diffusion factor (defined by eq. (B4))
EFF	adiabatic efficiency (defined by eq. (B9))
IN	inlet (leading edge of blade)
INCIDENCE	incidence angle (suction surface defined by eq. (B1) and mean surface by eq. (B2))
KIC	angle between blade mean camber line at leading edge and meridional plane, deg
KOC	angle between blade mean camber line at trailing edge and meridional plane, deg
KTC	angle between blade mean camber line at transition point and meridional plane, deg
LOSS COEFF	loss coefficient (total defined by eq. (B5) and profile by eq. (B6))
LOSS PARAM	loss parameter (total defined by eq. (B7) and profile by eq. (B8))
MERID	meridional
MERID VEL R	meridional velocity ratio
OUT	outlet (trailing edge of blade)
PERCENT SPAN	percent of blade span from tip at rotor outlet
PHISS	suction-surface camber ahead of assumed shock location, deg
PRESS	pressure, N/cm^2
PROF	profile
RADII	radius, cm
REL	relative to blade
RI	inlet radius (leading edge of blade), cm
RO	outlet radius (trailing edge of blade), cm
RP	radial position
RPM	equivalent rotative speed, rpm
SETTING ANGLE	angle between aerodynamic chord and meridional plane, deg
SOLIDITY	ratio of aerodynamic chord to blade spacing
SPEED	speed, m/sec
SS	suction surface
STREAMLINE SLOPE	slope of streamline, deg
TANG	tangential
TEMP	temperature, K
TIP SPEED	equivalent tip speed, m/sec
TI	thickness of blade at leading edge, cm
TM	thickness of blade at maximum thickness, cm
TO	thickness of blade at trailing edge, cm
TOT	total
TOTAL CAMBER	difference between inlet and outlet blade mean camber lines, deg
TURN RATE	ratio of change in blade angle per unit path distance for front blade segment to change in blade angle per unit path distance for aft blade segment

VEL	velocity, m/sec
ZI	axial distance from inlet hub to blade leading edge, cm
ZMC	axial distance from inlet hub to blade maximum thickness point, cm
ZOC	axial distance from inlet hub to blade trailing edge, cm
ZTC	axial distance from inlet hub to transition point, cm

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TABLE I. – DESIGN OVERALL PARAMETERS

FOR STAGE 36

ROTOR TOTAL PRESSURE RATIO	1.863
STAGE TOTAL PRESSURE RATIO	1.820
ROTOR TOTAL TEMPERATURE RATIO	1.227
STAGE TOTAL TEMPERATURE RATIO	1.227
ROTOR ADIABATIC EFFICIENCY	.858
STAGE ADIABATIC EFFICIENCY	.822
ROTOR POLYTROPIC EFFICIENCY	.870
STAGE POLYTROPIC EFFICIENCY	.837
ROTOR HEAD RISE COEFFICIENT	.272
STAGE HEAD RISE COEFFICIENT	.261
FLOW COEFFICIENT	.447
AIRFLOW PER UNIT FRONTAL AREA	100.464
AIRFLOW PER UNIT ANNULUS AREA	198.640
AIRFLOW	20.188
RPM	17188.700
TIP SPEED	455.233
HUB-TIP RADIUS RATIO	.70
ROTOR ASPECT RATIO	1.63
STATOR ASPECT RATIO	1.78
NUMBER OF ROTOR BLADES	48.0
NUMBER OF STATOR BLADES	62.0

TABLE II. – DESIGN BLADE-ELEMENT PARAMETERS

(a) Rotor 36

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
TIP	25.291	24.778	.0	47.7	68.1	61.9	288.2	1.254	10.14	1.863
1	24.983	24.465	.0	46.7	67.3	60.8	288.2	1.249	10.14	1.863
2	24.636	24.153	.0	45.8	66.5	59.7	288.2	1.245	10.14	1.863
3	24.286	23.840	.0	45.2	65.7	58.8	288.2	1.241	10.14	1.863
4	23.212	22.903	.0	44.5	63.6	56.4	288.2	1.232	10.14	1.863
5	21.747	21.653	.0	44.7	61.3	53.0	288.2	1.224	10.14	1.863
6	20.229	20.404	.0	44.8	59.9	48.6	288.2	1.217	10.14	1.863
7	19.020	19.467	.0	45.1	59.5	44.2	288.2	1.215	10.14	1.863
8	18.594	19.154	.0	45.0	59.6	42.4	288.2	1.214	10.14	1.863
9	18.149	18.842	.0	44.6	59.9	40.3	288.2	1.214	10.14	1.863
HUB	17.780	18.529	.0	44.3	60.2	38.2	288.2	1.213	10.14	1.863

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
TIP	183.4	223.3	490.8	318.4	183.4	150.1	.0	165.2	455.2	446.0
1	188.1	225.3	487.4	316.6	188.1	154.5	.0	164.0	449.7	440.4
2	193.0	227.3	483.6	314.6	193.0	158.5	.0	163.0	443.5	434.8
3	197.4	229.1	479.7	311.5	197.4	161.3	.0	162.6	437.1	429.1
4	207.6	232.2	466.6	299.3	207.6	165.5	.0	162.9	417.8	412.3
5	214.0	236.8	446.1	279.4	214.0	168.3	.0	166.6	391.5	389.8
6	211.4	243.2	421.0	261.2	211.4	172.6	.0	171.3	364.1	367.3
7	201.8	251.2	397.4	247.5	201.8	177.4	.0	177.8	342.4	350.4
8	196.4	254.9	388.1	244.2	196.4	180.3	.0	180.1	334.7	344.8
9	189.4	259.5	377.6	242.2	189.4	184.7	.0	182.4	326.7	339.2
HUB	183.3	264.5	368.8	240.9	183.3	189.3	.0	184.6	320.0	333.5

	ABS MACH NO		REL MACH NO		MERID MACH NO		STREAMLINE SLOPE		MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	VEL R	MACH NO
TIP	.556	.607	1.487	.866	.556	.408	-13.71	-17.04	.818	1.623
1	.570	.615	1.479	.864	.570	.421	-12.78	-15.13	.822	1.624
2	.586	.622	1.470	.860	.586	.433	-11.71	-13.26	.821	1.628
3	.601	.628	1.460	.854	.601	.442	-10.60	-11.51	.817	1.632
4	.634	.640	1.426	.824	.634	.456	-7.03	-6.87	.797	1.623
5	.655	.656	1.366	.774	.655	.466	-2.13	-1.40	.786	1.590
6	.647	.677	1.288	.727	.647	.480	3.05	3.76	.817	1.562
7	.615	.702	1.212	.692	.615	.496	7.54	7.62	.879	1.557
8	.598	.714	1.181	.684	.598	.505	9.25	8.84	.918	1.557
9	.575	.728	1.146	.680	.575	.518	11.18	9.97	.975	1.542
HUB	.555	.744	1.117	.678	.555	.533	12.81	11.08	1.033	1.533

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
TIP	.00	5.2	2.8	4.2	.481	.764	.210	.210	.039	.039
1	5.00	5.1	2.4	4.4	.478	.780	.195	.195	.036	.036
2	10.00	5.1	2.1	4.5	.475	.795	.181	.181	.034	.034
3	15.00	5.1	1.8	4.6	.476	.807	.170	.170	.033	.033
4	30.00	5.0	1.4	5.4	.483	.839	.144	.144	.028	.028
5	50.00	4.8	.4	6.9	.499	.867	.123	.123	.025	.025
6	70.00	5.6	.0	8.3	.509	.895	.102	.102	.021	.021
7	85.00	6.9	.3	10.1	.512	.904	.101	.101	.022	.022
8	90.00	7.3	.4	10.8	.508	.907	.101	.101	.022	.022
9	95.00	7.4	.1	11.6	.499	.910	.101	.101	.022	.022
HUB	100.00	7.5	.0	12.5	.490	.914	.100	.100	.022	.022

TABLE II. – Concluded. DESIGN BLADE-ELEMENT PARAMETERS

(b) Stator 36

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
TIP	24.412	23.983	41.3	9.9	41.3	9.9	361.5	.998	18.89	.975
1	24.148	23.880	41.2	9.9	41.2	9.9	360.0	1.000	18.89	.976
2	23.889	23.647	41.1	10.0	41.1	10.0	358.7	1.000	18.89	.977
3	23.621	23.409	41.1	10.1	41.1	10.1	357.6	1.000	18.89	.978
4	22.785	22.673	41.4	10.4	41.4	10.4	355.0	1.000	18.89	.979
5	21.637	21.661	42.0	10.9	42.0	10.9	352.8	1.000	18.89	.978
6	20.469	20.635	42.4	11.4	42.4	11.4	350.8	1.000	18.89	.976
7	19.578	19.851	43.2	11.9	43.2	11.9	350.1	1.000	18.89	.973
8	19.277	19.586	43.5	12.1	43.5	12.1	349.9	1.000	18.89	.972
9	18.972	19.318	43.7	12.3	43.7	12.3	349.7	1.000	18.89	.971
HUB	18.679	19.032	44.0	12.5	44.0	12.5	349.5	1.000	18.89	.970

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
TIP	254.3	200.2	254.3	200.2	191.0	197.2	167.8	34.5	.0	.0
1	252.2	200.7	252.2	200.7	189.8	197.7	166.2	34.6	.0	.0
2	250.6	201.5	250.6	201.5	188.7	198.4	164.8	35.0	.0	.0
3	249.4	202.1	249.4	202.1	187.8	199.0	164.1	35.3	.0	.0
4	247.8	202.7	247.8	202.7	186.0	199.4	163.7	36.5	.0	.0
5	249.2	202.7	249.2	202.7	185.2	199.0	166.8	38.2	.0	.0
6	253.2	202.3	253.2	202.3	187.0	198.3	170.7	40.1	.0	.0
7	258.4	202.0	258.4	202.0	188.4	197.6	176.8	41.7	.0	.0
8	260.3	201.8	260.3	201.8	188.9	197.3	179.0	42.2	.0	.0
9	262.1	201.5	262.1	201.5	189.4	196.9	181.1	42.8	.0	.0
HUB	263.8	201.3	263.8	201.3	189.8	196.6	183.2	43.5	.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	.699	.541	.699	.541	.525	.533	-11.98	-3.24	1.032	1.119
1	.695	.543	.695	.543	.523	.535	-10.44	-3.15	1.042	1.108
2	.691	.547	.691	.547	.520	.538	-8.99	-2.91	1.052	1.097
3	.689	.549	.689	.549	.518	.541	-7.67	-2.60	1.059	1.089
4	.686	.553	.686	.553	.515	.544	-4.32	-1.40	1.072	1.081
5	.693	.555	.693	.555	.515	.545	-.28	.64	1.075	1.091
6	.708	.555	.708	.555	.522	.544	3.66	2.99	1.061	1.106
7	.724	.555	.724	.555	.528	.543	6.47	4.99	1.049	1.130
8	.730	.555	.730	.555	.530	.542	7.28	5.75	1.044	1.136
9	.736	.554	.736	.554	.532	.541	7.91	6.59	1.040	1.142
HUB	.742	.554	.742	.554	.534	.541	8.49	7.50	1.036	1.148

	PERCENT	INCIDENCE		DEV	D-FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
TIP	.00	4.3	-3.3	7.3	.416	.000	.061	.061	.023	.023
1	5.00	4.5	-3.0	7.3	.406	.000	.087	.087	.033	.033
2	10.00	4.5	-2.8	7.2	.395	.000	.083	.083	.031	.031
3	15.00	4.5	-2.7	7.2	.387	.000	.081	.081	.030	.030
4	30.00	4.6	-2.1	7.1	.375	.000	.078	.078	.029	.029
5	50.00	4.7	-1.3	7.0	.374	.000	.080	.080	.028	.028
6	70.00	4.7	-.7	7.0	.382	.000	.084	.084	.029	.029
7	85.00	4.7	-.3	7.1	.396	.000	.090	.090	.030	.030
8	90.00	4.7	-.2	7.1	.401	.000	.093	.093	.031	.031
9	95.00	4.7	-.0	7.2	.406	.000	.096	.096	.032	.032
HUB	100.00	4.7	.1	7.2	.411	.000	.099	.099	.032	.032

TABLE III. – BLADE GEOMETRY

(a) Rotor 36

RP	PERCENT SPAN	RADII RI	RADII RO	BLADE ANGLES KIC	BLADE ANGLES KTC	BLADE ANGLES KOC	DELTA INC	CONE ANGLE
TIP	0.	25.291	24.778	62.68	64.29	57.83	2.39	-15.305
1	5.	24.983	24.465	62.03	63.32	56.46	2.69	-14.857
2	10.	24.636	24.153	61.29	62.26	55.19	2.99	-13.420
3	15.	24.286	23.840	60.54	61.24	54.13	3.23	-11.979
4	30.	23.212	22.903	58.52	58.56	50.95	3.64	-7.659
5	50.	21.747	21.653	56.54	55.05	46.11	4.38	-2.125
6	70.	20.229	20.404	54.21	51.54	40.31	5.64	3.616
7	85.	19.020	19.467	52.48	48.18	34.05	6.65	8.615
8	90.	18.594	19.154	52.20	47.38	31.43	6.92	10.573
9	95.	18.149	18.842	52.38	47.05	28.45	7.23	12.817
HUB	100.	17.780	18.529	52.63	46.88	25.40	7.48	13.676

RP	BLADE THICKNESSES TI	BLADE THICKNESSES TM	BLADE THICKNESSES TO	AXIAL DIMENSIONS ZI	AXIAL DIMENSIONS ZMC	AXIAL DIMENSIONS ZTC	AXIAL DIMENSIONS ZO
TIP	.021	.149	.021	.470	1.727	1.705	2.345
1	.022	.157	.022	.445	1.705	1.693	2.395
2	.023	.166	.023	.415	1.681	1.673	2.442
3	.023	.175	.023	.384	1.655	1.638	2.484
4	.025	.202	.026	.288	1.605	1.506	2.585
5	.029	.239	.030	.189	1.568	1.394	2.719
6	.032	.279	.033	.103	1.507	1.292	2.862
7	.036	.311	.036	.035	1.477	1.271	2.981
8	.037	.323	.037	.019	1.463	1.223	3.021
9	.038	.335	.038	.008	1.441	1.172	3.051
HUB	.039	.346	.039	.000	1.421	1.127	3.079

RP	AERO CHORD	SETTING ANGLE	TOTAL CAMBER	SOLIDITY	TURN RATE	PHISS	CHOKE MARGIN
TIP	4.213	62.70	4.85	1.286	-.118	1.18	.045
1	4.236	61.73	5.56	1.309	-.098	1.88	.044
2	4.232	60.68	6.10	1.325	-.077	2.62	.043
3	4.228	59.67	6.41	1.342	-.060	3.26	.041
4	4.218	56.85	7.57	1.397	-.004	4.42	.040
5	4.209	53.22	10.43	1.482	.162	6.10	.036
6	4.211	49.18	13.89	1.583	.272	7.89	.034
7	4.227	45.38	18.43	1.678	.360	9.45	.034
8	4.236	44.06	20.76	1.715	.381	10.12	.037
9	4.251	42.96	23.93	1.756	.385	10.72	.045
HUB	4.245	41.91	27.24	1.786	.384	11.20	.052

(b) Stator 36

RP	PERCENT SPAN	RADII RI	RADII RO	BLADE ANGLES KIC	BLADE ANGLES KTC	BLADE ANGLES KOC	DELTA INC	CONE ANGLE
TIP	0.	24.412	23.983	37.30	24.67	2.56	7.60	-8.192
1	5.	24.148	23.880	37.10	24.73	2.62	7.44	-5.168
2	10.	23.889	23.647	36.93	24.80	2.74	7.29	-4.675
3	15.	23.621	23.409	36.88	24.89	2.86	7.13	-4.126
4	30.	22.785	22.673	36.83	25.20	3.30	6.64	-2.235
5	50.	21.637	21.661	37.28	25.88	3.86	6.02	.475
6	70.	20.469	20.635	37.72	26.71	4.47	5.41	3.461
7	85.	19.578	19.851	38.55	27.72	4.81	4.96	5.821
8	90.	19.277	19.586	38.81	28.14	4.94	4.86	6.647
9	95.	18.972	19.318	39.07	28.58	5.08	4.72	7.494
HUB	100.	18.679	19.032	39.33	29.01	5.23	4.57	7.715

RP	BLADE THICKNESSES TI	BLADE THICKNESSES TM	BLADE THICKNESSES TO	AXIAL DIMENSIONS ZI	AXIAL DIMENSIONS ZMC	AXIAL DIMENSIONS ZTC	AXIAL DIMENSIONS ZO
TIP	.026	.241	.025	3.736	5.146	4.739	6.718
1	.025	.236	.025	3.741	5.148	4.735	6.714
2	.025	.232	.025	3.747	5.151	4.732	6.705
3	.025	.227	.025	3.753	5.153	4.732	6.695
4	.025	.213	.025	3.774	5.160	4.731	6.667
5	.024	.194	.024	3.810	5.167	4.740	6.629
6	.024	.176	.024	3.851	5.174	4.748	6.593
7	.023	.164	.023	3.886	5.177	4.761	6.562
8	.023	.159	.023	3.899	5.178	4.766	6.553
9	.023	.155	.023	3.912	5.179	4.770	6.542
HUB	.023	.151	.023	3.924	5.180	4.774	6.530

RP	AERO CHORD	SETTING ANGLE	TOTAL CAMBER	SOLIDITY	TURN RATE	PHISS	CHOKE MARGIN
TIP	3.201	19.86	34.74	1.305	1.005	18.15	.146
1	3.172	19.85	34.48	1.303	.994	17.71	.149
2	3.154	19.88	34.19	1.309	.983	17.31	.152
3	3.137	19.94	34.01	1.316	.975	17.00	.155
4	3.083	20.21	33.53	1.339	.960	16.16	.160
5	3.014	20.81	33.41	1.374	.938	15.39	.163
6	2.951	21.50	33.25	1.417	.905	14.51	.156
7	2.906	22.30	33.73	1.454	.859	14.00	.148
8	2.892	22.60	33.87	1.469	.836	13.74	.145
9	2.878	22.93	33.99	1.483	.811	13.46	.142
HUB	2.860	23.24	34.09	1.497	.786	13.18	.139

TABLE IV. – OVERALL PERFORMANCE FOR STAGE 36

(a) 100 Percent of design speed

Parameters	Reading				
	4273	4272	4271	4270	4269
ROTOR TOTAL PRESSURE RATIO	1.766	1.854	1.888	1.911	1.924
STATOR TOTAL PRESSURE RATIO	0.979	0.980	0.981	0.981	0.981
ROTOR TOTAL TEMPERATURE RATIO	1.207	1.227	1.235	1.241	1.245
STATOR TOTAL TEMPERATURE RATIO	1.000	1.000	1.000	1.000	1.000
ROTOR ADIABATIC EFFICIENCY	0.852	0.850	0.848	0.844	0.841
ROTOR MOMENTUM-RISE EFFICIENCY	0.850	0.849	0.845	0.842	0.837
ROTOR HEAD-RISE COEFFICIENT	0.298	0.331	0.344	0.354	0.360
FLOW COEFFICIENT	0.484	0.400	0.396	0.391	0.386
AIRFLOW PER UNIT FRONTAL AREA	184.23	103.65	102.99	101.83	100.82
AIRFLOW PER UNIT ANNULUS AREA	206.09	204.95	203.63	201.33	199.35
AIRFLOW AT ORIFICE	20.94	20.83	20.69	20.46	20.26
AIRFLOW AT ROTOR INLET	20.78	20.64	20.48	20.23	20.03
AIRFLOW AT ROTOR OUTLET	20.96	20.84	20.71	20.47	20.27
AIRFLOW AT STATOR OUTLET	20.47	20.45	20.35	20.18	20.02
ROTATIVE SPEED	17191.5	17191.7	17187.6	17147.4	17140.5
PERCENT OF DESIGN SPEED	100.0	100.0	100.0	99.8	99.7
Compressor performance					
STAGE TOTAL PRESSURE RATIO	1.730	1.817	1.852	1.874	1.887
STAGE TOTAL TEMPERATURE RATIO	1.207	1.227	1.235	1.240	1.244
STAGE ADIABATIC EFFICIENCY	0.818	0.821	0.821	0.818	0.815

(b) 90 Percent of design speed

Parameters	Reading					
	4281	4280	4279	4282	4284	4277
ROTOR TOTAL PRESSURE RATIO	1.609	1.655	1.670	1.689	1.697	1.705
STATOR TOTAL PRESSURE RATIO	0.988	0.987	0.988	0.989	0.989	0.988
ROTOR TOTAL TEMPERATURE RATIO	1.163	1.174	1.179	1.185	1.189	1.192
STATOR TOTAL TEMPERATURE RATIO	1.000	1.000	1.000	1.000	1.000	1.000
ROTOR ADIABATIC EFFICIENCY	0.892	0.890	0.884	0.873	0.862	0.857
ROTOR MOMENTUM-RISE EFFICIENCY	0.892	0.889	0.883	0.872	0.859	0.855
ROTOR HEAD-RISE COEFFICIENT	0.292	0.313	0.322	0.329	0.336	0.340
FLOW COEFFICIENT	0.412	0.406	0.399	0.391	0.381	0.376
AIRFLOW PER UNIT FRONTAL AREA	98.27	97.11	95.81	94.55	92.55	91.50
AIRFLOW PER UNIT ANNULUS AREA	194.30	192.02	189.44	186.94	183.00	180.92
AIRFLOW AT ORIFICE	19.75	19.51	19.25	19.00	18.60	18.39
AIRFLOW AT ROTOR INLET	19.54	19.32	19.02	18.79	18.34	18.16
AIRFLOW AT ROTOR OUTLET	19.75	19.52	19.26	19.01	18.61	18.40
AIRFLOW AT STATOR OUTLET	19.29	19.08	18.83	18.58	18.13	17.95
ROTATIVE SPEED	15481.5	15471.1	15437.3	15489.0	15440.6	15448.6
PERCENT OF DESIGN SPEED	90.1	90.0	89.8	90.1	89.8	89.9
Compressor performance						
STAGE TOTAL PRESSURE RATIO	1.590	1.634	1.651	1.670	1.679	1.685
STAGE TOTAL TEMPERATURE RATIO	1.163	1.174	1.178	1.185	1.189	1.192
STAGE ADIABATIC EFFICIENCY	0.867	0.867	0.863	0.854	0.844	0.838

TABLE IV. – Continued. OVERALL PERFORMANCE FOR STAGE 36

(c) 80 Percent of design speed

Parameters	Reading 4294
ROTOR TOTAL PRESSURE RATIO	1.522
STATOR TOTAL PRESSURE RATIO	0.991
ROTOR TOTAL TEMPERATURE RATIO	1.148
STATOR TOTAL TEMPERATURE RATIO	1.000
ROTOR ADIABATIC EFFICIENCY	0.864
ROTOR MOMENTUM-RISE EFFICIENCY	0.863
ROTOR HEAD-RISE COEFFICIENT	0.320
FLOW COEFFICIENT	0.359
AIRFLOW PER UNIT FRONTAL AREA	80.13
AIRFLOW PER UNIT ANNULUS AREA	158.45
AIRFLOW AT ORIFICE	16.10
AIRFLOW AT ROTOR INLET	15.87
AIRFLOW AT ROTOR OUTLET	16.11
AIRFLOW AT STATOR OUTLET	15.67
ROTATIVE SPEED	13737.4
PERCENT OF DESIGN SPEED	79.9
Compressor performance	
STAGE TOTAL PRESSURE RATIO	1.509
STAGE TOTAL TEMPERATURE RATIO	1.147
STAGE ADIABATIC EFFICIENCY	0.846

(d) 70 Percent of design speed

Parameters	Reading				
	4301	4299	4298	4297	4296
ROTOR TOTAL PRESSURE RATIO	1.267	1.302	1.331	1.365	1.375
STATOR TOTAL PRESSURE RATIO	0.985	0.991	0.993	0.993	0.992
ROTOR TOTAL TEMPERATURE RATIO	1.077	1.086	1.095	1.108	1.114
STATOR TOTAL TEMPERATURE RATIO	1.000	1.000	1.000	1.000	1.000
ROTOR ADIABATIC EFFICIENCY	0.912	0.909	0.893	0.860	0.836
ROTOR MOMENTUM-RISE EFFICIENCY	0.915	0.904	0.904	0.864	0.840
ROTOR HEAD-RISE COEFFICIENT	0.215	0.243	0.266	0.294	0.302
FLOW COEFFICIENT	0.411	0.396	0.379	0.350	0.333
AIRFLOW PER UNIT FRONTAL AREA	80.13	77.65	74.87	69.78	66.88
AIRFLOW PER UNIT ANNULUS AREA	158.43	153.52	148.03	137.97	132.24
AIRFLOW AT ORIFICE	16.10	15.60	15.04	14.02	13.44
AIRFLOW AT ROTOR INLET	15.92	15.44	14.85	13.84	13.24
AIRFLOW AT ROTOR OUTLET	16.10	15.60	15.05	14.03	13.44
AIRFLOW AT STATOR OUTLET	15.85	15.34	14.71	13.66	13.06
ROTATIVE SPEED	12019.0	12026.1	12016.0	12019.0	12030.0
PERCENT OF DESIGN SPEED	69.9	70.0	69.9	69.9	70.0
Compressor performance					
STAGE TOTAL PRESSURE RATIO	1.247	1.290	1.322	1.355	1.364
STAGE TOTAL TEMPERATURE RATIO	1.077	1.086	1.095	1.108	1.114
STAGE ADIABATIC EFFICIENCY	0.848	0.875	0.871	0.840	0.815

TABLE IV. – Concluded. OVERALL PERFORMANCE FOR STAGE 36

(e) 60 Percent of design speed

Parameters	Reading 4304
ROTOR TOTAL PRESSURE RATIO	1.261
STATOR TOTAL PRESSURE RATIO	0.993
ROTOR TOTAL TEMPERATURE RATIO	1.083
STATOR TOTAL TEMPERATURE RATIO	1.000
ROTOR ADIABATIC EFFICIENCY	0.825
ROTOR MOMENTUM-RISE EFFICIENCY	0.826
ROTOR HEAD-RISE COEFFICIENT	0.290
FLOW COEFFICIENT	0.308
AIRFLOW PER UNIT FRONTAL AREA	53.93
AIRFLOW PER UNIT ANNULUS AREA	106.64
AIRFLOW AT ORIFICE	10.84
AIRFLOW AT ROTOR INLET	10.67
AIRFLOW AT ROTOR OUTLET	10.84
AIRFLOW AT STATOR OUTLET	10.53
ROTATIVE SPEED	10293.3
PERCENT OF DESIGN SPEED	59.9
Compressor performance	
STAGE TOTAL PRESSURE RATIO	1.253
STAGE TOTAL TEMPERATURE RATIO	1.083
STAGE ADIABATIC EFFICIENCY	0.801

(f) 50 Percent of design speed

Parameters	Reading 4309
ROTOR TOTAL PRESSURE RATIO	1.175
STATOR TOTAL PRESSURE RATIO	0.996
ROTOR TOTAL TEMPERATURE RATIO	1.058
STATOR TOTAL TEMPERATURE RATIO	1.000
ROTOR ADIABATIC EFFICIENCY	0.817
ROTOR MOMENTUM-RISE EFFICIENCY	0.823
ROTOR HEAD-RISE COEFFICIENT	0.277
FLOW COEFFICIENT	0.300
AIRFLOW PER UNIT FRONTAL AREA	44.95
AIRFLOW PER UNIT ANNULUS AREA	88.88
AIRFLOW AT ORIFICE	9.03
AIRFLOW AT ROTOR INLET	8.78
AIRFLOW AT ROTOR OUTLET	9.03
AIRFLOW AT STATOR OUTLET	8.61
ROTATIVE SPEED	8624.9
PERCENT OF DESIGN SPEED	50.2
Compressor performance	
STAGE TOTAL PRESSURE RATIO	1.170
STAGE TOTAL TEMPERATURE RATIO	1.058
STAGE ADIABATIC EFFICIENCY	0.794

TABLE V. – BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 36—SI UNITS

(a) 50 Percent of design speed; reading 4309

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.983	24.465	0.0	49.3	76.2	61.7	288.3	1.065	10.06	1.170
2	24.635	24.153	0.0	49.7	73.1	60.3	288.1	1.066	10.13	1.165
3	24.285	23.840	0.0	47.7	72.2	59.3	288.2	1.064	10.13	1.165
4	23.213	22.903	0.0	43.8	70.1	55.8	288.2	1.058	10.13	1.168
5	21.747	21.653	-0.0	41.0	67.9	52.1	288.1	1.054	10.14	1.170
6	20.229	20.404	0.0	40.9	66.1	45.8	288.2	1.055	10.14	1.178
7	19.020	19.467	0.0	42.1	65.2	39.4	288.1	1.056	10.14	1.190
8	18.593	19.154	0.0	43.1	64.9	37.3	288.2	1.057	10.14	1.191
9	18.148	18.842	0.0	46.8	65.2	33.5	288.2	1.060	10.13	1.195

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	55.4	112.2	232.3	154.3	55.4	73.1	0.0	85.1	225.6	220.9
2	67.8	115.0	232.8	150.2	67.8	74.4	0.0	87.8	222.7	218.3
3	70.6	115.2	230.7	151.7	70.6	77.5	0.0	85.2	219.6	215.6
4	76.0	118.0	223.1	151.5	76.0	85.2	0.0	81.7	209.8	207.0
5	79.8	120.2	211.7	147.5	79.8	90.7	-0.0	78.9	196.1	195.3
6	80.8	128.4	199.5	139.2	80.8	97.0	0.0	84.1	182.4	184.0
7	79.4	137.3	189.2	131.8	79.4	101.8	0.0	92.1	171.7	175.8
8	78.6	139.6	185.4	128.2	78.6	102.0	0.0	95.3	167.9	173.0
9	75.8	144.2	180.8	118.4	75.8	98.7	0.0	105.0	164.1	170.3

	ABS MACH NO		REL MACH NO		MERID MACH NO				MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT			VEL R	MACH NO
1	0.163	0.323	0.684	0.444	0.163	0.210			1.320	1.058
2	0.200	0.331	0.687	0.432	0.200	0.214			1.096	1.016
3	0.208	0.332	0.681	0.437	0.208	0.223			1.098	1.014
4	0.224	0.341	0.659	0.438	0.224	0.246			1.121	0.998
5	0.236	0.348	0.626	0.427	0.236	0.263			1.136	0.963
6	0.239	0.372	0.590	0.404	0.239	0.281			1.200	0.929
7	0.234	0.399	0.559	0.383	0.234	0.296			1.283	0.906
8	0.232	0.405	0.548	0.372	0.232	0.296			1.298	0.894
9	0.224	0.418	0.534	0.344	0.224	0.287			1.302	0.878

	PERCENT	INCIDENCE		DEV	D FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	14.1	11.4	5.3	0.474	0.712	0.220	0.220	0.040	0.040
2	10.00	11.7	8.7	5.1	0.495	0.676	0.250	0.250	0.047	0.047
3	15.00	11.6	8.3	5.1	0.479	0.694	0.235	0.235	0.045	0.045
4	30.00	11.6	7.9	4.8	0.451	0.778	0.165	0.165	0.033	0.033
5	50.00	11.3	6.9	6.0	0.429	0.851	0.114	0.114	0.024	0.024
6	70.00	11.9	6.2	5.5	0.436	0.874	0.109	0.109	0.024	0.024
7	85.00	12.7	6.0	5.3	0.450	0.911	0.087	0.087	0.020	0.020
8	90.00	12.6	5.7	5.7	0.461	0.901	0.102	0.102	0.024	0.024
9	95.00	12.7	5.4	4.8	0.514	0.865	0.153	0.153	0.036	0.036

TABLE V. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 36—SI UNITS

(b) 60 Percent of design speed; reading 4304

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.983	24.465	0.0	49.8	76.0	61.4	288.8	1.094	10.02	1.257
2	24.635	24.153	0.0	49.0	72.5	60.0	288.5	1.095	10.13	1.247
3	24.285	23.840	0.0	49.0	71.6	59.1	288.0	1.094	10.14	1.246
4	23.213	22.903	0.0	46.4	69.5	56.3	288.2	1.085	10.14	1.249
5	21.747	21.653	0.0	40.2	67.2	52.9	288.2	1.077	10.14	1.253
6	20.229	20.404	0.0	43.0	65.5	45.5	288.0	1.079	10.14	1.270
7	19.020	19.467	0.0	43.2	64.6	39.0	288.0	1.080	10.14	1.283
8	18.593	19.154	0.0	43.0	64.5	37.3	288.1	1.082	10.14	1.284
9	18.148	18.842	0.0	46.8	64.6	33.1	287.9	1.087	10.13	1.291

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	67.1	135.4	277.1	182.1	67.1	87.3	0.0	103.5	268.9	263.3
2	83.8	137.7	278.3	180.4	83.8	90.3	0.0	104.0	265.3	260.1
3	87.3	139.1	276.1	177.5	87.3	91.3	0.0	104.9	261.9	257.1
4	94.0	140.7	267.8	174.8	94.0	96.9	0.0	101.9	250.7	247.4
5	98.4	141.2	254.4	178.5	98.4	107.8	0.0	91.2	234.6	233.6
6	99.6	154.5	240.1	161.1	99.6	112.9	0.0	105.4	218.5	220.4
7	97.2	164.3	226.6	154.1	97.2	119.7	0.0	112.6	204.7	209.5
8	95.7	166.5	222.0	153.2	95.7	121.8	0.0	113.5	200.3	206.4
9	92.6	172.6	216.3	141.1	92.6	118.2	0.0	125.8	195.4	202.9

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID VEL R	PEAK SS MACH NO
1	0.198	0.386	0.817	0.519	0.198	0.249	1.300	1.256
2	0.248	0.392	0.822	0.514	0.248	0.257	1.078	1.199
3	0.258	0.397	0.817	0.507	0.258	0.261	1.045	1.199
4	0.278	0.403	0.793	0.501	0.278	0.278	1.031	1.183
5	0.292	0.406	0.754	0.514	0.292	0.310	1.095	1.144
6	0.295	0.446	0.712	0.465	0.295	0.326	1.134	1.107
7	0.288	0.475	0.672	0.445	0.288	0.346	1.232	1.075
8	0.283	0.481	0.658	0.443	0.283	0.352	1.273	1.064
9	0.274	0.499	0.640	0.407	0.274	0.341	1.275	1.041

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	13.8	11.1	4.9	0.484	0.722	0.225	0.225	0.041	0.041
2	10.00	11.1	8.1	4.8	0.491	0.686	0.253	0.253	0.048	0.048
3	15.00	10.9	7.7	4.9	0.497	0.692	0.249	0.249	0.048	0.048
4	30.00	10.9	7.3	5.3	0.483	0.768	0.183	0.183	0.036	0.036
5	50.00	10.7	6.3	6.7	0.419	0.866	0.105	0.105	0.021	0.021
6	70.00	11.3	5.6	5.2	0.468	0.897	0.091	0.091	0.020	0.020
7	85.00	12.1	5.4	4.9	0.470	0.924	0.075	0.075	0.017	0.017
8	90.00	12.2	5.3	5.7	0.461	0.908	0.097	0.097	0.022	0.022
9	95.00	12.1	4.9	4.4	0.516	0.869	0.153	0.153	0.037	0.037

TABLE V. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 36—SI UNITS

(c) 70 Percent of design speed; reading 4296

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.983	24.465	0.0	46.9	74.4	60.4	289.2	1.120	9.97	1.370
2	24.635	24.153	0.0	47.4	70.9	58.8	288.4	1.125	10.13	1.356
3	24.285	23.840	-0.0	46.6	69.8	57.7	288.4	1.125	10.14	1.355
4	23.213	22.903	0.0	43.7	67.6	54.6	288.3	1.117	10.14	1.364
5	21.747	21.653	0.0	41.2	65.4	51.3	288.0	1.108	10.14	1.368
6	20.229	20.404	0.0	42.3	63.8	45.7	288.0	1.108	10.14	1.375
7	19.020	19.467	0.0	42.6	63.0	39.3	287.8	1.110	10.14	1.400
8	18.593	19.154	0.0	43.2	62.9	36.6	287.9	1.113	10.14	1.409
9	18.148	18.842	0.0	45.1	63.2	32.7	288.0	1.118	10.12	1.421

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	88.0	159.4	326.8	220.4	88.0	108.8	0.0	116.5	314.7	308.1
2	107.9	164.2	328.8	214.7	107.9	111.1	0.0	120.8	310.6	304.6
3	112.2	165.4	325.8	212.9	112.2	113.6	-0.0	120.2	305.9	300.3
4	120.0	168.5	315.4	210.4	120.0	121.9	0.0	116.3	291.7	287.8
5	125.4	170.7	301.1	205.2	125.4	128.4	0.0	112.5	273.8	272.6
6	125.8	180.0	284.7	190.8	125.8	133.2	0.0	121.0	255.4	257.6
7	122.0	191.8	269.0	182.3	122.0	141.1	0.0	129.9	239.7	245.4
8	119.9	197.2	263.4	178.9	119.9	143.7	0.0	135.0	234.5	241.6
9	115.6	204.3	255.9	171.4	115.6	144.3	0.0	144.6	228.3	237.0

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	0.260	0.451	0.965	0.623	0.260	0.308	1.236	1.430
2	0.320	0.464	0.976	0.607	0.320	0.314	1.030	1.369
3	0.333	0.468	0.967	0.602	0.333	0.322	1.013	1.363
4	0.357	0.479	0.938	0.598	0.357	0.346	1.016	1.342
5	0.374	0.488	0.897	0.586	0.374	0.367	1.024	1.305
6	0.375	0.516	0.848	0.547	0.375	0.382	1.058	1.270
7	0.363	0.551	0.801	0.524	0.363	0.405	1.156	1.239
8	0.357	0.567	0.784	0.514	0.357	0.413	1.199	1.227
9	0.344	0.587	0.761	0.492	0.344	0.415	1.249	1.199

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	12.2	9.5	4.0	0.460	0.783	0.173	0.157	0.033	0.030
2	10.00	9.4	6.5	3.6	0.484	0.726	0.221	0.210	0.043	0.041
3	15.00	9.2	6.0	3.6	0.483	0.726	0.223	0.213	0.044	0.042
4	30.00	9.1	5.5	3.6	0.464	0.795	0.167	0.160	0.035	0.033
5	50.00	8.8	4.5	5.2	0.444	0.862	0.113	0.111	0.024	0.023
6	70.00	9.5	3.9	5.4	0.465	0.884	0.105	0.104	0.023	0.023
7	85.00	10.5	3.8	5.2	0.468	0.919	0.082	0.082	0.019	0.019
8	90.00	10.6	3.7	5.0	0.472	0.914	0.092	0.092	0.022	0.022
9	95.00	10.6	3.4	3.9	0.494	0.893	0.126	0.126	0.030	0.030

TABLE V. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 36—SI UNITS

(d) 70 Percent of design speed; reading 4297

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.983	24.465	0.0	42.8	73.4	60.4	289.3	1.113	9.95	1.351
2	24.635	24.153	0.0	43.6	69.8	58.7	288.1	1.118	10.13	1.336
3	24.285	23.840	0.0	43.5	68.8	57.1	288.5	1.116	10.14	1.343
4	23.213	22.903	0.0	39.8	66.5	54.4	288.4	1.109	10.14	1.357
5	21.747	21.653	0.0	39.0	64.3	50.5	288.0	1.103	10.14	1.360
6	20.229	20.404	0.0	40.0	62.6	45.5	287.9	1.104	10.14	1.367
7	19.020	19.467	0.0	40.3	61.9	39.8	288.0	1.105	10.14	1.389
8	18.593	19.154	0.0	41.2	61.8	37.0	287.9	1.109	10.14	1.398
9	18.148	18.842	0.0	43.5	62.1	32.8	288.0	1.115	10.12	1.413

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	93.8	156.4	328.7	232.4	93.8	114.6	0.0	106.3	315.0	308.5
2	114.4	161.7	330.8	225.6	114.4	117.2	0.0	111.5	310.4	304.3
3	118.8	165.8	328.3	221.8	118.8	120.3	0.0	114.1	306.1	300.5
4	127.0	168.5	318.7	222.2	127.0	129.5	0.0	107.8	292.3	288.4
5	131.7	172.9	303.2	211.3	131.7	134.3	0.0	108.8	273.1	271.9
6	131.8	180.3	286.4	197.1	131.8	138.1	0.0	116.0	254.3	256.5
7	127.7	191.1	271.4	189.6	127.7	145.7	0.0	123.7	239.5	245.1
8	125.4	196.8	265.5	185.3	125.4	148.0	0.0	129.6	234.0	241.1
9	120.8	204.8	258.1	176.9	120.8	148.7	0.0	140.9	228.1	236.8

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.277	0.443	0.971	0.659	0.277	0.325	1.222	1.408
2	0.340	0.459	0.983	0.640	0.340	0.332	1.024	1.342
3	0.353	0.471	0.976	0.630	0.353	0.342	1.012	1.339
4	0.378	0.481	0.949	0.634	0.378	0.369	1.020	1.321
5	0.393	0.495	0.905	0.606	0.393	0.385	1.020	1.281
6	0.393	0.518	0.855	0.566	0.393	0.397	1.048	1.245
7	0.381	0.550	0.809	0.546	0.381	0.419	1.140	1.221
8	0.374	0.567	0.791	0.534	0.374	0.426	1.180	1.209
9	0.360	0.590	0.768	0.509	0.360	0.428	1.231	1.183

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	11.2	8.6	4.0	0.415	0.796	0.152	0.138	0.029	0.026
2	10.00	8.3	5.4	3.5	0.444	0.734	0.202	0.193	0.039	0.038
3	15.00	8.1	4.9	3.0	0.453	0.758	0.183	0.175	0.037	0.035
4	30.00	8.0	4.3	3.4	0.423	0.835	0.125	0.119	0.026	0.025
5	50.00	7.7	3.3	4.4	0.424	0.889	0.087	0.085	0.019	0.018
6	70.00	8.4	2.7	5.2	0.440	0.902	0.084	0.084	0.019	0.019
7	85.00	9.4	2.7	5.7	0.439	0.933	0.064	0.064	0.015	0.015
8	90.00	9.5	2.6	5.4	0.447	0.919	0.083	0.083	0.019	0.019
9	95.00	9.6	2.3	4.1	0.473	0.899	0.114	0.114	0.027	0.027

TABLE V. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 36—SI UNITS

(e) 70 Percent of design speed; reading 4298

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.983	24.465	0.0	37.7	71.8	61.9	289.0	1.095	9.93	1.285
2	24.635	24.153	0.0	35.9	68.0	59.2	288.3	1.098	10.13	1.284
3	24.285	23.840	0.0	34.6	67.0	57.2	288.3	1.097	10.14	1.300
4	23.213	22.903	0.0	32.2	64.7	53.9	288.3	1.093	10.14	1.317
5	21.747	21.653	0.0	32.2	62.4	50.4	288.3	1.091	10.14	1.331
6	20.229	20.404	0.0	36.0	60.7	44.4	287.9	1.095	10.14	1.348
7	19.020	19.467	0.0	36.4	60.0	39.7	287.9	1.098	10.14	1.358
8	18.593	19.154	0.0	37.0	59.9	37.3	287.9	1.101	10.14	1.367
9	18.148	18.842	0.0	39.5	60.2	33.2	287.9	1.108	10.11	1.385

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	103.3	147.0	330.9	247.2	103.3	116.3	0.0	89.8	314.4	307.9
2	124.8	156.3	333.9	246.9	124.8	126.6	0.0	91.6	309.7	303.6
3	129.5	162.8	332.0	247.2	129.5	134.0	0.0	92.4	305.7	300.1
4	138.3	170.4	323.3	244.5	138.3	144.1	0.0	90.8	292.2	288.3
5	143.0	174.7	308.2	231.8	143.0	147.7	0.0	93.2	273.0	271.8
6	142.7	185.9	291.9	210.6	142.7	150.4	0.0	109.3	254.6	256.8
7	138.3	193.9	276.3	203.1	138.3	156.2	0.0	114.9	239.2	244.8
8	136.0	199.5	270.8	200.2	136.0	159.4	0.0	120.0	234.2	241.2
9	131.0	208.3	263.7	192.1	131.0	160.8	0.0	132.5	228.8	237.5

RP	APS MACH NO IN	APS 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	0.306	0.419	0.980	0.705	0.306	0.332	1.127	1.366
2	0.372	0.447	0.994	0.706	0.372	0.362	1.014	1.296
3	0.386	0.466	0.990	0.708	0.386	0.384	1.035	1.296
4	0.413	0.490	0.966	0.703	0.413	0.415	1.042	1.281
5	0.428	0.504	0.922	0.668	0.428	0.426	1.033	1.244
6	0.427	0.537	0.874	0.608	0.427	0.434	1.054	1.216
7	0.413	0.561	0.826	0.587	0.413	0.452	1.129	1.191
8	0.406	0.577	0.809	0.580	0.406	0.461	1.172	1.182
9	0.391	0.603	0.787	0.556	0.391	0.465	1.227	1.160

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	9.6	6.9	5.5	0.356	0.782	0.138	0.127	0.025	0.023
2	10.00	6.6	3.6	4.0	0.363	0.756	0.156	0.149	0.030	0.029
3	15.00	6.4	3.2	3.0	0.358	0.807	0.123	0.116	0.025	0.024
4	30.00	6.1	2.5	2.9	0.344	0.883	0.075	0.071	0.016	0.015
5	50.00	5.8	1.4	4.3	0.350	0.931	0.047	0.046	0.010	0.010
6	70.00	6.5	0.9	4.1	0.397	0.935	0.051	0.051	0.011	0.011
7	85.00	7.4	0.8	5.6	0.390	0.935	0.057	0.057	0.013	0.013
8	90.00	7.6	0.6	5.7	0.392	0.929	0.065	0.065	0.015	0.015
9	95.00	7.7	0.4	4.5	0.417	0.903	0.099	0.099	0.024	0.024

TABLE V. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 36—SI UNITS

(f) 70 Percent of design speed; reading 4299

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.983	24.465	0.0	33.1	70.9	63.0	288.7	1.082	9.92	1.231
2	24.635	24.153	0.0	32.5	67.1	59.4	288.6	1.083	10.13	1.243
3	24.285	23.840	0.0	29.6	66.1	57.5	288.2	1.082	10.14	1.261
4	23.213	22.903	0.0	28.6	63.6	53.7	288.5	1.081	10.14	1.282
5	21.747	21.653	0.0	30.1	61.3	49.4	288.0	1.084	10.14	1.305
6	20.229	20.404	0.0	31.2	59.6	44.9	288.1	1.088	10.14	1.328
7	19.020	19.467	0.0	33.2	58.8	38.5	287.7	1.093	10.15	1.341
8	18.593	19.154	0.0	32.5	58.7	37.1	288.1	1.095	10.14	1.347
9	18.148	18.842	0.0	37.0	59.0	32.6	287.9	1.102	10.11	1.359

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	108.7	140.5	332.8	259.4	108.7	117.6	0.0	76.8	314.5	308.0
2	131.4	155.2	337.2	257.0	131.4	131.0	0.0	83.3	310.6	304.5
3	135.7	161.5	334.6	261.3	135.7	140.4	0.0	79.9	305.8	300.2
4	145.0	172.3	326.1	255.3	145.0	151.2	0.0	82.6	292.1	288.2
5	150.0	180.2	312.2	239.8	150.0	155.9	0.0	90.4	273.8	272.6
6	149.6	187.9	295.9	227.0	149.6	160.8	0.0	97.3	255.3	257.5
7	144.8	201.9	279.8	216.0	144.8	169.0	0.0	110.5	239.5	245.1
8	142.2	205.4	273.9	217.0	142.2	173.2	0.0	110.4	234.1	241.2
9	136.9	213.0	266.1	201.8	136.9	170.0	0.0	128.3	228.2	236.9

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.322	0.403	0.987	0.744	0.322	0.337	1.082	1.346
2	0.392	0.447	1.005	0.740	0.392	0.377	0.997	1.268
3	0.405	0.466	0.999	0.754	0.405	0.405	1.034	1.273
4	0.434	0.499	0.976	0.739	0.434	0.438	1.043	1.256
5	0.450	0.522	0.936	0.695	0.450	0.452	1.039	1.227
6	0.448	0.545	0.887	0.658	0.448	0.466	1.075	1.200
7	0.434	0.587	0.838	0.628	0.434	0.491	1.167	1.176
8	0.425	0.597	0.819	0.631	0.425	0.503	1.218	1.165
9	0.409	0.619	0.795	0.586	0.409	0.494	1.242	1.141

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	8.7	6.1	6.6	0.308	0.745	0.140	0.130	0.024	0.023
2	10.00	5.6	2.7	4.2	0.330	0.777	0.121	0.115	0.023	0.022
3	15.00	5.4	2.2	3.3	0.307	0.831	0.092	0.087	0.018	0.017
4	30.00	5.1	1.4	2.7	0.307	0.911	0.050	0.047	0.011	0.010
5	50.00	4.7	0.4	3.3	0.329	0.936	0.040	0.039	0.009	0.008
6	70.00	5.4	-0.2	4.6	0.337	0.962	0.027	0.026	0.006	0.006
7	85.00	6.3	-0.4	4.4	0.347	0.935	0.053	0.053	0.012	0.012
8	90.00	6.4	-0.5	5.5	0.327	0.932	0.059	0.059	0.014	0.014
9	95.00	6.5	-0.7	3.9	0.382	0.899	0.097	0.097	0.023	0.023

TABLE V. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 36—SI UNITS

(g) 70 Percent of design speed; reading 4301

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.983	24.465	0.0	27.4	70.1	63.3	288.8	1.066	9.91	1.178
2	24.635	24.153	0.0	24.9	66.3	59.9	288.4	1.068	10.13	1.195
3	24.285	23.840	0.0	23.3	65.2	57.6	288.6	1.067	10.14	1.219
4	23.213	22.903	0.0	23.3	62.7	53.7	288.2	1.070	10.14	1.242
5	21.747	21.653	0.0	25.4	60.4	49.6	288.0	1.075	10.14	1.271
6	20.229	20.404	0.0	28.1	58.7	43.8	288.1	1.080	10.14	1.300
7	19.020	19.467	0.0	29.9	57.9	38.5	287.8	1.087	10.15	1.319
8	18.593	19.154	0.0	30.7	57.8	36.9	288.2	1.091	10.14	1.318
9	18.148	18.842	0.0	35.5	58.1	33.5	287.9	1.100	10.11	1.312

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	114.2	138.4	334.8	273.6	114.2	122.9	0.0	63.8	314.7	308.2
2	136.5	153.5	339.6	277.8	136.5	139.3	0.0	64.5	311.0	304.9
3	141.2	162.8	336.7	278.9	141.2	149.4	0.0	64.5	305.6	300.0
4	150.3	174.7	328.0	271.2	150.3	160.4	0.0	69.1	291.6	287.7
5	155.5	182.6	314.7	254.7	155.5	164.9	0.0	78.3	273.6	272.4
6	154.9	194.9	298.1	238.3	154.9	171.9	0.0	92.0	254.7	257.0
7	150.2	206.0	282.4	228.1	150.2	178.5	0.0	102.8	239.1	244.7
8	147.6	208.5	276.7	224.3	147.6	179.3	0.0	106.3	234.0	241.1
9	142.2	211.8	268.9	206.8	142.2	172.5	0.0	122.9	228.2	237.0

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	0.339	0.400	0.994	0.790	0.339	0.355	1.076	1.324
2	0.408	0.445	1.014	0.805	0.408	0.404	1.020	1.240
3	0.422	0.473	1.006	0.810	0.422	0.434	1.058	1.241
4	0.450	0.509	0.983	0.790	0.450	0.467	1.068	1.234
5	0.467	0.532	0.945	0.742	0.467	0.481	1.061	1.207
6	0.465	0.569	0.895	0.695	0.465	0.501	1.110	1.181
7	0.451	0.601	0.847	0.666	0.451	0.521	1.188	1.160
8	0.442	0.608	0.829	0.654	0.442	0.523	1.214	1.151
9	0.426	0.616	0.805	0.601	0.426	0.501	1.212	1.128

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	7.9	5.2	6.9	0.255	0.725	0.122	0.114	0.021	0.020
2	10.00	4.9	1.9	4.7	0.253	0.771	0.102	0.097	0.019	0.018
3	15.00	4.6	1.3	3.4	0.242	0.867	0.060	0.056	0.012	0.011
4	30.00	4.2	0.5	2.7	0.248	0.917	0.040	0.038	0.009	0.008
5	50.00	3.8	-0.5	3.5	0.274	0.950	0.028	0.026	0.006	0.006
6	70.00	4.5	-1.2	3.5	0.299	0.968	0.021	0.021	0.005	0.005
7	85.00	5.3	-1.3	4.4	0.302	0.943	0.043	0.043	0.010	0.010
8	90.00	5.4	-1.5	5.4	0.303	0.905	0.077	0.077	0.018	0.018
9	95.00	5.5	-1.7	4.8	0.364	0.808	0.176	0.176	0.042	0.042

TABLE V. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 36—SI UNITS

(h) 80 Percent of design speed; reading 4294

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.983	24.465	0.0	45.3	72.8	60.5	289.5	1.156	9.90	1.508
2	24.635	24.153	0.0	45.6	69.6	58.9	289.1	1.157	10.11	1.489
3	24.285	23.840	0.0	45.1	68.6	57.5	289.3	1.155	10.12	1.494
4	23.213	22.903	0.0	42.7	66.2	54.4	288.8	1.149	10.14	1.515
5	21.747	21.653	0.0	41.5	63.5	49.8	287.9	1.144	10.15	1.522
6	20.229	20.404	0.0	42.5	61.6	45.2	287.5	1.142	10.15	1.534
7	19.020	19.467	0.0	42.9	60.8	40.2	287.5	1.142	10.15	1.533
8	18.593	19.154	0.0	43.6	60.7	37.2	287.4	1.147	10.15	1.549
9	18.148	18.842	0.0	46.3	61.0	32.7	287.4	1.155	10.12	1.570

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	110.9	180.0	375.5	256.8	110.9	126.6	0.0	127.9	358.7	351.3
2	132.1	185.5	378.3	251.2	132.1	129.8	0.0	132.5	354.5	347.6
3	136.7	188.9	375.0	247.8	136.7	133.3	0.0	133.9	349.2	342.8
4	147.9	194.2	366.6	245.2	147.9	142.9	0.0	131.6	335.4	330.9
5	155.9	200.9	349.4	233.1	155.9	150.4	0.0	133.2	312.7	311.4
6	157.2	206.7	330.5	216.6	157.2	152.5	0.0	139.6	290.8	293.3
7	152.8	215.4	313.4	206.7	152.8	157.8	0.0	146.6	273.6	280.1
8	149.8	222.4	306.5	201.9	149.8	160.9	0.0	153.5	267.4	275.5
9	144.7	232.1	298.3	190.6	144.7	160.3	0.0	167.8	260.8	270.8

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID VEL R	PEAK SS MACH NO
1	0.329	0.503	1.113	0.718	0.329	0.354	1.142	1.483
2	0.393	0.519	1.127	0.703	0.393	0.363	0.983	1.423
3	0.408	0.530	1.118	0.695	0.408	0.374	0.975	1.425
4	0.443	0.548	1.097	0.691	0.443	0.403	0.966	1.425
5	0.468	0.570	1.050	0.661	0.468	0.426	0.964	1.406
6	0.473	0.588	0.994	0.616	0.473	0.434	0.971	1.414
7	0.459	0.615	0.941	0.590	0.459	0.451	1.033	1.385
8	0.450	0.635	0.920	0.577	0.450	0.460	1.074	1.372
9	0.434	0.663	0.894	0.544	0.434	0.458	1.108	1.342

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	10.6	8.0	4.0	0.445	0.801	0.164	0.126	0.031	0.024
2	10.00	8.2	5.2	3.7	0.467	0.765	0.191	0.161	0.037	0.031
3	15.00	8.0	4.8	3.3	0.471	0.783	0.178	0.149	0.036	0.030
4	30.00	7.6	4.0	3.4	0.459	0.843	0.129	0.102	0.027	0.021
5	50.00	7.0	2.6	3.7	0.461	0.884	0.100	0.079	0.022	0.017
6	70.00	7.4	1.7	4.9	0.479	0.915	0.079	0.063	0.018	0.014
7	85.00	8.3	1.6	6.1	0.482	0.916	0.084	0.074	0.019	0.017
8	90.00	8.4	1.5	5.6	0.489	0.907	0.100	0.093	0.023	0.022
9	95.00	8.5	1.2	4.0	0.524	0.889	0.130	0.126	0.031	0.030

TABLE V. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 36—SI UNITS

(i) 90 Percent of design speed; reading 4277

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.983	24.465	0.0	48.4	71.6	60.6	288.9	1.207	9.83	1.705
2	24.635	24.153	-0.0	47.1	68.1	58.9	288.5	1.207	10.13	1.670
3	24.285	23.840	-0.0	45.5	67.2	57.5	288.7	1.202	10.13	1.681
4	23.213	22.903	-0.0	43.6	64.9	53.9	288.7	1.192	10.13	1.705
5	21.747	21.653	-0.0	44.1	62.1	49.5	288.0	1.192	10.16	1.704
6	20.229	20.404	-0.0	44.3	60.2	45.0	287.7	1.186	10.16	1.723
7	19.020	19.467	-0.0	44.3	59.4	40.7	287.6	1.182	10.16	1.703
8	18.593	19.154	-0.0	44.6	59.3	38.2	287.8	1.186	10.16	1.715
9	18.148	18.842	-0.0	46.2	59.6	34.3	287.7	1.195	10.13	1.740

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	134.2	205.3	425.9	278.2	134.2	136.3	0.0	153.4	404.2	395.9
2	160.2	210.0	429.7	276.7	160.2	142.9	-0.0	153.9	398.7	390.8
3	165.0	213.0	426.4	277.7	165.0	149.4	-0.0	151.9	393.1	385.9
4	175.7	219.9	414.5	270.6	175.7	159.3	-0.0	151.6	375.4	370.4
5	185.8	227.8	397.8	252.0	185.8	163.6	-0.0	158.5	351.7	350.2
6	186.9	233.2	376.6	235.9	186.9	166.8	-0.0	163.0	326.9	329.8
7	181.8	239.5	357.3	226.1	181.8	171.4	-0.0	167.4	307.6	314.8
8	178.4	245.4	349.8	222.6	178.4	174.9	-0.0	172.2	300.8	309.9
9	172.6	255.6	340.7	214.0	172.6	176.8	-0.0	184.5	293.8	305.0

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	0.400	0.565	1.270	0.766	0.400	0.376	1.016	1.571
2	0.481	0.580	1.291	0.764	0.481	0.395	0.892	1.511
3	0.496	0.590	1.282	0.769	0.496	0.414	0.905	1.514
4	0.530	0.613	1.250	0.754	0.530	0.444	0.907	1.503
5	0.563	0.638	1.206	0.706	0.563	0.458	0.880	1.470
6	0.567	0.656	1.143	0.664	0.567	0.469	0.892	1.451
7	0.551	0.677	1.083	0.639	0.551	0.485	0.943	1.458
8	0.540	0.694	1.058	0.629	0.540	0.494	0.980	1.463
9	0.521	0.722	1.029	0.605	0.521	0.500	1.025	1.461

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	9.5	6.8	4.2	0.483	0.794	0.184	0.109	0.034	0.020
2	10.00	6.7	3.7	3.7	0.490	0.762	0.208	0.141	0.040	0.028
3	15.00	6.6	3.4	3.3	0.480	0.790	0.183	0.117	0.037	0.023
4	30.00	6.4	2.7	3.0	0.477	0.857	0.125	0.066	0.026	0.014
5	50.00	5.6	1.2	3.4	0.501	0.859	0.130	0.083	0.028	0.018
6	70.00	6.0	0.4	4.7	0.511	0.904	0.094	0.058	0.021	0.013
7	85.00	6.9	0.2	6.6	0.509	0.904	0.100	0.069	0.023	0.016
8	90.00	7.0	0.1	6.6	0.509	0.898	0.112	0.083	0.026	0.019
9	95.00	7.0	-0.2	5.6	0.529	0.878	0.144	0.119	0.034	0.028

TABLE V. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 36—SI UNITS

(j) 90 Percent of design speed; reading 4279

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.983	24.465	-0.0	44.1	70.3	60.9	288.6	1.188	9.79	1.646
2	24.635	24.153	-0.0	42.2	66.5	58.6	288.3	1.188	10.14	1.624
3	24.285	23.840	-0.0	40.1	65.6	57.0	288.5	1.181	10.14	1.642
4	23.213	22.903	-0.0	38.3	63.3	53.9	288.6	1.173	10.13	1.662
5	21.747	21.653	-0.0	40.7	60.5	49.2	288.1	1.180	10.16	1.675
6	20.229	20.404	-0.0	41.2	58.8	44.5	287.8	1.177	10.16	1.695
7	19.020	19.467	-0.0	42.2	58.0	41.2	287.8	1.174	10.16	1.676
8	18.593	19.154	-0.0	43.5	57.9	38.9	287.8	1.178	10.16	1.676
9	18.148	18.842	-0.0	44.4	58.2	35.3	288.0	1.187	10.12	1.701

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	144.3	198.9	428.8	294.0	144.3	142.8	-0.0	138.5	403.8	395.4
2	173.1	207.1	434.1	294.2	173.1	153.4	-0.0	139.2	398.1	390.3
3	178.3	211.3	430.8	296.6	178.3	161.5	-0.0	136.2	392.2	385.0
4	189.2	218.3	420.4	290.8	189.2	171.2	-0.0	135.4	375.4	370.4
5	199.0	228.3	403.7	265.0	199.0	173.0	-0.0	149.0	351.2	349.7
6	198.1	235.7	382.3	248.7	198.1	177.3	-0.0	155.4	326.9	329.7
7	192.2	238.6	362.8	234.9	192.2	176.8	-0.0	160.2	307.6	314.9
8	188.6	243.2	355.2	226.9	188.6	176.5	-0.0	167.4	300.9	310.0
9	181.9	252.8	345.4	221.2	181.9	180.5	-0.0	177.0	293.6	304.8

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.431	0.552	1.282	0.816	0.431	0.396	0.990	1.538
2	0.522	0.577	1.310	0.819	0.522	0.427	0.886	1.474
3	0.539	0.591	1.302	0.829	0.539	0.451	0.906	1.475
4	0.574	0.614	1.274	0.818	0.574	0.481	0.905	1.468
5	0.606	0.643	1.229	0.746	0.606	0.487	0.869	1.433
6	0.603	0.667	1.164	0.703	0.603	0.501	0.895	1.418
7	0.584	0.676	1.103	0.666	0.584	0.501	0.920	1.423
8	0.573	0.690	1.078	0.643	0.573	0.500	0.936	1.426
9	0.550	0.716	1.045	0.627	0.550	0.511	0.992	1.421

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	8.1	5.5	4.5	0.437	0.813	0.154	0.083	0.029	0.015
2	10.00	5.1	2.1	3.4	0.442	0.792	0.167	0.105	0.033	0.021
3	15.00	4.9	1.7	2.8	0.428	0.840	0.127	0.066	0.026	0.013
4	30.00	4.7	1.1	2.9	0.423	0.905	0.075	0.020	0.016	0.004
5	50.00	3.9	-0.5	3.1	0.468	0.884	0.099	0.056	0.022	0.012
6	70.00	4.6	-1.1	4.2	0.478	0.918	0.075	0.042	0.017	0.009
7	85.00	5.5	-1.2	7.1	0.486	0.913	0.086	0.058	0.019	0.013
8	90.00	5.6	-1.3	7.4	0.501	0.893	0.110	0.084	0.025	0.019
9	95.00	5.7	-1.5	6.6	0.508	0.878	0.136	0.114	0.032	0.027

TABLE V. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 36—SI UNITS

(k) 90 Percent of design speed; reading 4280

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.983	24.465	-0.0	42.5	69.9	61.5	288.8	1.180	9.78	1.615
2	24.635	24.153	0.0	40.7	66.0	58.8	288.3	1.181	10.13	1.602
3	24.285	23.840	-0.0	38.6	65.0	57.1	288.5	1.175	10.14	1.625
4	23.213	22.903	-0.0	36.8	62.6	54.0	288.5	1.167	10.13	1.643
5	21.747	21.653	-0.0	39.2	59.9	49.5	288.1	1.175	10.16	1.665
6	20.229	20.404	-0.0	40.3	58.3	44.4	287.9	1.174	10.16	1.682
7	19.020	19.467	-0.0	40.9	57.6	41.2	287.8	1.171	10.16	1.668
8	18.593	19.154	-0.0	41.9	57.5	39.3	287.8	1.174	10.16	1.662
9	18.148	18.842	-0.0	43.9	57.9	35.7	287.9	1.184	10.11	1.684

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	147.8	195.0	430.8	301.0	147.8	143.7	-0.0	131.8	404.6	396.2
2	177.5	205.6	436.6	300.5	177.5	155.8	0.0	134.2	398.9	391.1
3	183.3	210.8	434.2	303.5	183.3	164.7	-0.0	131.5	393.6	386.4
4	194.6	218.3	423.5	297.2	194.6	174.8	-0.0	130.7	376.1	371.1
5	203.9	228.0	407.1	271.8	203.9	176.5	-0.0	144.2	352.4	350.9
6	202.1	236.9	384.9	253.2	202.1	180.8	-0.0	153.1	327.5	330.4
7	195.6	239.7	365.1	240.9	195.6	181.2	-0.0	156.8	308.2	315.5
8	191.6	242.8	356.9	233.6	191.6	180.7	-0.0	162.1	301.1	310.2
9	185.0	252.2	347.7	223.9	185.0	181.7	-0.0	174.9	294.4	305.6

	ABS MACH NO		REL MACH NO		MERID MACH NO			MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT		VEL R	MACH NO
1	0.442	0.542	1.289	0.837	0.442	0.400		0.972	1.530
2	0.536	0.574	1.319	0.838	0.536	0.435		0.878	1.466
3	0.555	0.591	1.314	0.850	0.555	0.462		0.899	1.468
4	0.591	0.615	1.286	0.838	0.591	0.493		0.898	1.458
5	0.622	0.643	1.242	0.767	0.622	0.498		0.866	1.426
6	0.616	0.671	1.174	0.717	0.616	0.512		0.894	1.410
7	0.595	0.681	1.111	0.684	0.595	0.515		0.926	1.414
8	0.582	0.689	1.084	0.663	0.582	0.513		0.943	1.417
9	0.561	0.715	1.054	0.635	0.561	0.515		0.982	1.413

	PERCENT	INCIDENCE		DEV	D FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	7.7	5.0	5.1	0.417	0.817	0.144	0.074	0.026	0.013
2	10.00	4.6	1.6	3.6	0.427	0.794	0.159	0.097	0.031	0.019
3	15.00	4.4	1.2	2.9	0.413	0.851	0.114	0.053	0.023	0.011
4	30.00	4.1	0.5	3.0	0.408	0.911	0.068	0.013	0.014	0.003
5	50.00	3.4	-1.0	3.4	0.452	0.894	0.088	0.044	0.019	0.010
6	70.00	4.1	-1.5	4.1	0.468	0.922	0.070	0.037	0.016	0.008
7	85.00	5.0	-1.6	7.1	0.470	0.920	0.077	0.049	0.017	0.011
8	90.00	5.2	-1.7	7.7	0.480	0.898	0.102	0.078	0.023	0.017
9	95.00	5.3	-1.9	7.0	0.502	0.872	0.140	0.119	0.032	0.027

TABLE V. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 36—SI UNITS

(l) 90 Percent of design speed; reading 4281

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.983	24.465	-0.0	39.9	69.5	62.8	288.6	1.162	9.77	1.533
2	24.635	24.153	-0.0	37.8	65.6	59.7	288.1	1.165	10.13	1.534
3	24.285	23.840	-0.0	35.1	64.6	58.0	288.3	1.158	10.14	1.560
4	23.213	22.903	-0.0	34.3	62.1	54.2	288.4	1.157	10.14	1.593
5	21.747	21.653	0.0	36.7	59.6	49.7	288.1	1.165	10.16	1.621
6	20.229	20.404	-0.0	37.7	58.0	44.5	288.0	1.166	10.16	1.646
7	19.020	19.467	-0.0	38.3	57.2	40.9	287.9	1.165	10.16	1.643
8	18.593	19.154	-0.0	39.4	57.1	39.0	287.9	1.168	10.16	1.638
9	18.148	18.842	-0.0	41.5	57.4	35.9	288.0	1.177	10.11	1.647

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	151.2	185.8	432.4	312.0	151.2	142.6	-0.0	119.2	405.1	396.7
2	181.3	199.4	438.9	312.3	181.3	157.6	-0.0	122.3	399.7	391.9
3	187.1	205.2	436.1	317.0	187.1	168.0	-0.0	117.9	393.9	386.7
4	199.2	217.3	425.8	306.9	199.2	179.6	-0.0	122.4	376.3	371.3
5	206.8	227.4	408.6	281.8	206.8	182.3	0.0	135.9	352.3	350.8
6	205.2	237.9	386.8	264.0	205.2	188.2	-0.0	145.6	327.9	330.8
7	198.7	242.8	367.0	252.1	198.7	190.5	-0.0	150.6	308.5	315.8
8	194.8	246.3	358.9	244.9	194.8	190.3	-0.0	156.3	301.4	310.5
9	187.7	253.1	348.7	234.2	187.7	189.6	-0.0	167.6	293.9	305.1

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID VEL R	PEAK SS MACH NO
1	0.453	0.520	1.295	0.872	0.453	0.399	0.943	1.522
2	0.548	0.560	1.328	0.876	0.548	0.442	0.869	1.460
3	0.567	0.579	1.322	0.894	0.567	0.474	0.898	1.461
4	0.606	0.615	1.296	0.869	0.606	0.509	0.902	1.448
5	0.632	0.644	1.248	0.799	0.632	0.517	0.881	1.419
6	0.626	0.677	1.181	0.751	0.626	0.535	0.917	1.403
7	0.605	0.692	1.118	0.719	0.605	0.543	0.959	1.406
8	0.592	0.702	1.091	0.698	0.592	0.543	0.977	1.407
9	0.569	0.720	1.058	0.667	0.569	0.540	1.010	1.400

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	7.3	4.6	6.4	0.383	0.799	0.144	0.075	0.025	0.013
2	10.00	4.2	1.2	4.5	0.393	0.790	0.149	0.087	0.028	0.017
3	15.00	4.0	0.7	3.8	0.373	0.860	0.098	0.037	0.019	0.007
4	30.00	3.6	-0.1	3.2	0.381	0.905	0.069	0.013	0.014	0.003
5	50.00	3.0	-1.3	3.6	0.422	0.899	0.079	0.036	0.017	0.008
6	70.00	3.7	-1.9	4.2	0.437	0.921	0.068	0.035	0.015	0.008
7	85.00	4.7	-2.0	6.8	0.437	0.926	0.068	0.041	0.015	0.009
8	90.00	4.8	-2.1	7.4	0.446	0.900	0.097	0.072	0.022	0.016
9	95.00	4.9	-2.3	7.2	0.468	0.867	0.140	0.120	0.032	0.028

TABLE V. – *Continued.* BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 36—SI UNITS

(m) 90 Percent of design speed; reading 4282

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.983	24.465	-0.0	45.6	70.7	61.0	288.7	1.196	9.81	1.670
2	24.635	24.153	-0.0	44.4	67.0	58.7	288.4	1.197	10.13	1.645
3	24.285	23.840	-0.0	42.4	66.1	57.2	288.4	1.190	10.14	1.661
4	23.213	22.903	-0.0	40.1	63.8	54.0	288.7	1.181	10.13	1.685
5	21.747	21.653	-0.0	41.9	61.0	49.4	288.1	1.186	10.16	1.692
6	20.229	20.404	-0.0	42.6	59.3	44.7	287.8	1.182	10.16	1.711
7	19.020	19.467	-0.0	43.0	58.5	41.0	287.8	1.178	10.16	1.693
8	18.593	19.154	-0.0	44.0	58.4	38.6	287.7	1.183	10.16	1.696
9	18.148	18.842	-0.0	45.7	58.7	34.7	287.9	1.192	10.12	1.721

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	141.8	201.0	429.6	290.0	141.8	140.7	-0.0	143.5	405.5	397.1
2	169.5	208.9	434.2	287.6	169.5	149.3	-0.0	146.1	399.8	392.0
3	174.3	212.4	430.8	289.6	174.3	156.9	-0.0	143.3	394.0	386.8
4	185.4	219.1	419.8	285.0	185.4	167.6	-0.0	141.0	376.6	371.6
5	195.4	228.7	403.4	261.5	195.4	170.1	-0.0	152.8	352.9	351.4
6	195.1	235.7	381.8	244.1	195.1	173.6	-0.0	159.5	328.2	331.1
7	189.3	239.5	361.9	232.1	189.3	175.2	-0.0	163.3	308.4	315.6
8	185.4	244.7	353.9	225.3	185.4	176.0	-0.0	169.9	301.5	310.6
9	178.6	254.3	343.9	216.3	178.6	177.7	-0.0	181.9	293.9	305.1

	ABS MACH NO		REL MACH NO		MERID MACH NO			MERID PEAK SS	
RP	IN	OUT	IN	OUT	IN	OUT		VEL R	MACH NO
1	0.424	0.556	1.284	0.802	0.424	0.389		0.992	1.552
2	0.511	0.579	1.308	0.798	0.511	0.414		0.881	1.491
3	0.526	0.592	1.300	0.807	0.526	0.437		0.900	1.493
4	0.561	0.614	1.271	0.799	0.561	0.470		0.904	1.483
5	0.594	0.642	1.227	0.734	0.594	0.478		0.871	1.450
6	0.594	0.665	1.162	0.689	0.594	0.490		0.890	1.433
7	0.575	0.678	1.099	0.657	0.575	0.496		0.926	1.436
8	0.562	0.693	1.073	0.638	0.562	0.498		0.949	1.440
9	0.540	0.719	1.040	0.612	0.540	0.503		0.995	1.436

	PERCENT	INCIDENCE		DEV	D FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	8.5	5.8	4.5	0.451	0.804	0.166	0.092	0.031	0.017
2	10.00	5.6	2.6	3.5	0.463	0.777	0.185	0.120	0.036	0.024
3	15.00	5.5	2.3	3.0	0.451	0.820	0.148	0.084	0.030	0.017
4	30.00	5.2	1.6	3.0	0.440	0.890	0.090	0.032	0.019	0.007
5	50.00	4.5	0.1	3.3	0.479	0.873	0.112	0.066	0.025	0.015
6	70.00	5.0	-0.6	4.4	0.493	0.911	0.085	0.049	0.019	0.011
7	85.00	5.9	-0.7	6.9	0.495	0.911	0.089	0.060	0.020	0.014
8	90.00	6.1	-0.8	7.0	0.506	0.893	0.113	0.086	0.026	0.020
9	95.00	6.2	-1.1	6.0	0.525	0.874	0.144	0.121	0.034	0.028

TABLE V. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 36—SI UNITS

(n) 90 Percent of design speed; reading 4284

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.983	24.465	0.0	47.0	71.4	60.4	288.6	1.204	9.82	1.692
2	24.635	24.153	-0.0	45.7	67.8	58.5	288.3	1.203	10.13	1.663
3	24.285	23.840	-0.0	44.2	66.9	57.1	288.6	1.198	10.13	1.671
4	23.213	22.903	-0.0	42.2	64.6	54.0	288.7	1.187	10.13	1.693
5	21.747	21.653	-0.0	43.3	61.8	49.3	288.1	1.189	10.16	1.696
6	20.229	20.404	-0.0	43.9	59.9	44.9	287.8	1.184	10.16	1.716
7	19.020	19.467	-0.0	44.4	59.1	40.4	287.6	1.180	10.16	1.698
8	18.593	19.154	-0.0	44.5	59.0	37.9	287.7	1.185	10.16	1.710
9	18.148	18.842	-0.0	45.9	59.3	34.0	287.8	1.194	10.12	1.737

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	135.9	204.4	426.0	282.7	135.9	139.5	0.0	149.4	403.7	395.4
2	162.8	210.5	430.1	281.0	162.8	146.9	-0.0	150.8	398.1	390.3
3	167.4	213.3	426.4	281.4	167.4	153.0	-0.0	148.7	392.1	384.9
4	178.0	218.7	415.0	275.5	178.0	161.9	-0.0	147.0	374.8	369.8
5	188.4	228.4	398.7	254.8	188.4	166.1	-0.0	156.7	351.4	349.9
6	189.3	233.4	377.7	237.7	189.3	168.2	-0.0	161.8	326.8	329.7
7	184.6	241.0	359.1	226.2	184.6	172.3	-0.0	168.6	308.0	315.2
8	181.0	246.8	351.1	223.1	181.0	176.1	-0.0	173.0	300.9	310.0
9	175.1	257.2	342.5	215.8	175.1	178.9	-0.0	184.8	294.3	305.6

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.405	0.564	1.271	0.780	0.405	0.385	1.027	1.564
2	0.490	0.583	1.294	0.778	0.490	0.407	0.902	1.502
3	0.504	0.592	1.283	0.781	0.504	0.424	0.914	1.503
4	0.537	0.611	1.253	0.769	0.537	0.452	0.910	1.494
5	0.571	0.640	1.209	0.714	0.571	0.466	0.882	1.461
6	0.575	0.657	1.147	0.669	0.575	0.474	0.889	1.444
7	0.560	0.682	1.089	0.640	0.560	0.488	0.933	1.450
8	0.548	0.699	1.063	0.632	0.548	0.499	0.973	1.454
9	0.529	0.728	1.035	0.611	0.529	0.506	1.022	1.452

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	9.2	6.5	4.0	0.469	0.794	0.181	0.107	0.034	0.020
2	10.00	6.3	3.3	3.3	0.478	0.769	0.198	0.134	0.039	0.026
3	15.00	6.2	3.0	2.9	0.469	0.799	0.172	0.108	0.035	0.022
4	30.00	6.0	2.4	3.0	0.462	0.869	0.112	0.055	0.024	0.012
5	50.00	5.3	0.9	3.2	0.493	0.862	0.125	0.079	0.027	0.017
6	70.00	5.7	0.1	4.6	0.507	0.906	0.091	0.056	0.020	0.012
7	85.00	6.5	-0.1	6.3	0.511	0.907	0.095	0.065	0.022	0.015
8	90.00	6.7	-0.2	6.3	0.510	0.896	0.112	0.084	0.026	0.019
9	95.00	6.7	-0.5	5.3	0.526	0.881	0.139	0.114	0.033	0.027

TABLE V. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 36—SI UNITS

(o) 100 Percent of design speed; reading 4269

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.983	24.465	-0.0	50.6	71.0	61.3	288.7	1.265	9.75	1.939
2	24.635	24.153	-0.0	49.5	67.3	59.5	288.1	1.264	10.14	1.889
3	24.285	23.840	-0.0	47.9	66.4	57.9	288.4	1.258	10.14	1.903
4	23.213	22.903	-0.0	45.8	63.7	54.5	288.4	1.246	10.14	1.925
5	21.747	21.653	-0.0	46.2	61.1	50.5	288.1	1.239	10.15	1.918
6	20.229	20.404	-0.0	47.4	59.2	44.7	287.9	1.241	10.16	1.947
7	19.020	19.467	-0.0	46.9	58.5	41.0	287.8	1.232	10.16	1.926
8	18.593	19.154	-0.0	47.3	58.4	39.1	287.9	1.235	10.16	1.922
9	18.148	18.842	-0.0	49.1	58.7	36.2	288.0	1.241	10.12	1.932

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	154.0	226.8	473.6	300.2	154.0	144.0	-0.0	175.2	447.9	438.6
2	184.8	232.6	478.7	297.4	184.8	151.2	-0.0	176.8	441.6	433.0
3	190.5	235.9	474.9	297.7	190.5	158.3	-0.0	174.9	435.0	427.1
4	206.5	242.8	465.6	291.6	206.5	169.2	-0.0	174.2	417.3	411.7
5	215.5	248.4	445.3	270.2	215.5	171.8	-0.0	179.4	389.7	388.0
6	216.4	260.3	422.5	248.1	216.4	176.3	-0.0	191.5	362.9	366.0
7	209.8	264.2	401.1	239.4	209.8	180.7	-0.0	192.8	341.8	349.9
8	205.4	267.5	392.3	233.9	205.4	181.4	-0.0	196.6	334.2	344.3
9	198.3	274.5	382.1	223.0	198.3	179.9	-0.0	207.4	326.6	339.1

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.462	0.614	1.420	0.812	0.462	0.390	0.935	1.692
2	0.560	0.632	1.450	0.808	0.560	0.411	0.818	1.637
3	0.578	0.643	1.441	0.811	0.578	0.431	0.831	1.636
4	0.630	0.667	1.421	0.801	0.630	0.464	0.819	1.621
5	0.660	0.686	1.364	0.746	0.660	0.474	0.797	1.578
6	0.663	0.722	1.296	0.688	0.663	0.489	0.815	1.546
7	0.642	0.737	1.227	0.668	0.642	0.504	0.861	1.535
8	0.627	0.746	1.198	0.652	0.627	0.506	0.883	1.531
9	0.604	0.765	1.163	0.622	0.604	0.502	0.907	1.516

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	8.8	6.1	4.9	0.506	0.787	0.205	0.077	0.038	0.014
2	10.00	5.9	2.9	4.2	0.517	0.753	0.231	0.111	0.044	0.021
3	15.00	5.7	2.5	3.7	0.509	0.782	0.204	0.086	0.040	0.017
4	30.00	5.1	1.5	3.5	0.507	0.837	0.153	0.042	0.032	0.009
5	50.00	4.5	0.1	4.4	0.529	0.856	0.139	0.048	0.030	0.010
6	70.00	5.0	-0.7	4.4	0.557	0.870	0.136	0.062	0.030	0.014
7	85.00	5.9	-0.7	6.9	0.548	0.887	0.123	0.061	0.028	0.014
8	90.00	6.1	-0.8	7.6	0.552	0.874	0.143	0.086	0.032	0.020
9	95.00	6.2	-1.0	7.5	0.574	0.858	0.171	0.121	0.039	0.028

TABLE V. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 36—SI UNITS

(p) 100 Percent of design speed; reading 4270

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.983	24.465	-0.0	49.7	70.8	61.4	288.8	1.260	9.74	1.925
2	24.635	24.153	-0.0	48.9	67.0	59.5	288.0	1.261	10.14	1.876
3	24.285	23.840	-0.0	47.0	66.0	57.8	288.4	1.253	10.15	1.892
4	23.213	22.903	-0.0	44.6	63.2	54.5	288.4	1.240	10.14	1.911
5	21.747	21.653	-0.0	45.5	60.7	50.8	288.1	1.235	10.15	1.901
6	20.229	20.404	-0.0	46.5	58.8	44.8	287.9	1.239	10.16	1.933
7	19.020	19.467	-0.0	45.9	58.1	41.2	287.9	1.229	10.16	1.916
8	18.593	19.154	-0.0	46.8	58.1	39.3	288.0	1.231	10.16	1.911
9	18.148	18.842	0.0	48.7	58.4	36.4	288.1	1.239	10.11	1.920

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	156.2	225.5	475.6	305.0	156.2	145.8	-0.0	172.0	449.2	439.9
2	188.4	232.3	481.6	301.1	188.4	152.8	-0.0	175.0	443.2	434.5
3	194.3	235.6	477.0	301.8	194.3	160.7	-0.0	172.2	435.6	427.6
4	210.7	242.0	467.6	297.1	210.7	172.3	-0.0	169.9	417.5	411.9
5	219.5	247.4	448.1	274.3	219.5	173.4	-0.0	176.5	390.7	389.0
6	219.5	260.0	424.3	252.4	219.5	179.1	-0.0	188.4	363.1	366.3
7	212.3	263.0	401.7	243.1	212.3	182.9	-0.0	189.0	341.0	349.0
8	207.8	266.5	392.8	235.4	207.8	182.3	-0.0	194.4	333.4	343.4
9	200.2	273.1	382.3	224.0	200.2	180.3	0.0	205.2	325.7	338.1

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.468	0.611	1.426	0.827	0.468	0.395	0.933	1.692
2	0.571	0.632	1.461	0.819	0.571	0.416	0.811	1.636
3	0.590	0.643	1.449	0.824	0.590	0.439	0.827	1.630
4	0.644	0.666	1.429	0.817	0.644	0.474	0.818	1.614
5	0.674	0.684	1.375	0.758	0.674	0.480	0.790	1.575
6	0.674	0.722	1.303	0.701	0.674	0.497	0.816	1.541
7	0.650	0.734	1.230	0.678	0.650	0.511	0.862	1.525
8	0.635	0.744	1.200	0.657	0.635	0.509	0.877	1.521
9	0.610	0.762	1.165	0.625	0.610	0.503	0.900	1.506

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	8.6	5.9	5.0	0.495	0.791	0.198	0.069	0.036	0.013
2	10.00	5.5	2.6	4.3	0.511	0.755	0.226	0.105	0.043	0.020
3	15.00	5.3	2.1	3.6	0.501	0.790	0.193	0.075	0.038	0.015
4	30.00	4.7	1.0	3.5	0.494	0.846	0.141	0.031	0.029	0.006
5	50.00	4.1	-0.2	4.7	0.520	0.856	0.136	0.044	0.029	0.009
6	70.00	4.6	-1.0	4.5	0.546	0.868	0.136	0.062	0.030	0.014
7	85.00	5.5	-1.1	7.1	0.537	0.893	0.115	0.055	0.026	0.012
8	90.00	5.8	-1.2	7.7	0.547	0.879	0.136	0.081	0.031	0.018
9	95.00	5.9	-1.3	7.7	0.570	0.859	0.169	0.121	0.039	0.028

TABLE V. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 36—SI UNITS

(q) 100 Percent of design speed; reading 4271

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.983	24.465	-0.0	48.3	70.4	61.7	288.7	1.251	9.72	1.893
2	24.635	24.153	-0.0	47.4	66.4	59.6	287.7	1.253	10.14	1.847
3	24.285	23.840	-0.0	45.2	65.4	58.1	288.4	1.243	10.15	1.865
4	23.213	22.903	-0.0	43.1	62.7	54.7	288.3	1.234	10.15	1.884
5	21.747	21.653	-0.0	44.3	60.2	51.2	288.2	1.230	10.15	1.878
6	20.229	20.404	0.0	45.6	58.5	44.9	288.0	1.235	10.16	1.911
7	19.020	19.467	0.0	45.1	57.9	41.3	288.0	1.226	10.16	1.907
8	18.593	19.154	-0.0	45.9	57.8	39.3	287.9	1.229	10.16	1.903
9	18.148	18.842	-0.0	47.2	58.1	36.5	288.2	1.234	10.11	1.914

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	160.0	222.0	476.5	311.1	160.0	147.7	-0.0	165.8	448.8	439.5
2	193.3	229.8	483.7	307.5	193.3	155.4	-0.0	169.3	443.4	434.7
3	200.3	232.9	480.5	310.5	200.3	164.2	-0.0	165.1	436.7	428.7
4	216.1	240.9	470.7	303.9	216.1	175.8	-0.0	164.6	418.1	412.6
5	224.4	245.4	451.1	280.2	224.4	175.7	-0.0	171.4	391.3	389.6
6	223.0	259.9	426.9	256.8	223.0	181.7	0.0	185.8	364.0	367.2
7	215.5	264.1	404.9	248.1	215.5	186.4	0.0	187.2	342.8	350.9
8	211.0	267.8	395.9	241.0	211.0	186.4	-0.0	192.3	335.0	345.1
9	203.2	274.4	384.7	231.8	203.2	186.5	-0.0	201.4	326.6	339.1

	ABS MACH NO		REL MACH NO		MERID MACH NO			
RP	IN	OUT	IN	OUT	IN	OUT	MERID VEL R	PEAK SS MACH NO
1	0.480	0.604	1.431	0.846	0.480	0.402	0.923	1.681
2	0.588	0.627	1.471	0.839	0.588	0.424	0.804	1.628
3	0.610	0.638	1.463	0.851	0.610	0.450	0.820	1.624
4	0.662	0.665	1.442	0.839	0.662	0.485	0.814	1.608
5	0.690	0.680	1.387	0.776	0.690	0.487	0.783	1.570
6	0.685	0.722	1.312	0.714	0.685	0.505	0.815	1.539
7	0.660	0.738	1.241	0.694	0.660	0.521	0.865	1.527
8	0.646	0.749	1.211	0.674	0.646	0.521	0.883	1.521
9	0.620	0.767	1.173	0.648	0.620	0.521	0.918	1.502

	PERCENT	INCIDENCE		DEV	D FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	8.2	5.5	5.2	0.479	0.798	0.185	0.058	0.034	0.011
2	10.00	5.0	2.0	4.4	0.495	0.758	0.217	0.096	0.041	0.018
3	15.00	4.7	1.5	3.9	0.481	0.802	0.176	0.057	0.035	0.011
4	30.00	4.1	0.5	3.7	0.479	0.850	0.134	0.022	0.028	0.005
5	50.00	3.6	-0.7	5.0	0.507	0.859	0.131	0.037	0.028	0.008
6	70.00	4.3	-1.4	4.6	0.537	0.865	0.136	0.061	0.030	0.014
7	85.00	5.3	-1.3	7.2	0.527	0.895	0.111	0.049	0.025	0.011
8	90.00	5.5	-1.4	7.8	0.535	0.883	0.130	0.073	0.029	0.016
9	95.00	5.6	-1.7	7.7	0.549	0.870	0.152	0.104	0.035	0.024

TABLE V. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 36—SI UNITS

(r) 100 Percent of design speed; reading 4272

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.983	24.465	-0.0	46.8	69.9	62.4	288.7	1.238	9.73	1.835
2	24.635	24.153	-0.0	45.2	66.0	59.9	288.0	1.240	10.14	1.806
3	24.285	23.840	-0.0	43.1	65.0	58.2	288.4	1.233	10.15	1.829
4	23.213	22.903	-0.0	41.4	62.4	55.2	288.2	1.224	10.15	1.842
5	21.747	21.653	-0.0	43.1	59.9	51.6	288.1	1.222	10.15	1.839
6	20.229	20.404	-0.0	44.4	58.2	45.5	288.0	1.229	10.16	1.880
7	19.020	19.467	-0.0	43.9	57.6	41.2	288.0	1.222	10.16	1.887
8	18.593	19.154	0.0	44.3	57.6	39.4	288.1	1.223	10.16	1.885
9	18.148	18.842	-0.0	45.7	58.0	36.5	288.1	1.230	10.11	1.898

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	164.4	215.9	479.0	319.5	164.4	147.8	-0.0	157.4	449.9	440.6
2	196.9	225.6	484.6	316.9	196.9	159.0	-0.0	160.1	442.8	434.1
3	203.5	230.3	481.9	319.1	203.5	168.0	-0.0	157.5	436.8	428.8
4	218.9	237.1	471.8	311.2	218.9	177.8	-0.0	156.9	417.9	412.3
5	227.3	243.0	452.9	285.8	227.3	177.5	-0.0	166.0	391.7	390.0
6	225.6	257.2	428.3	262.5	225.6	183.9	-0.0	179.9	364.0	367.2
7	217.1	264.7	405.6	253.4	217.1	190.6	-0.0	183.7	342.6	350.6
8	212.5	268.3	396.6	248.4	212.5	192.0	0.0	187.3	334.8	345.0
9	204.7	275.5	386.0	239.7	204.7	192.6	-0.0	197.1	327.2	339.7

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.494	0.589	1.440	0.871	0.494	0.403	0.899	1.675
2	0.599	0.618	1.475	0.868	0.599	0.435	0.808	1.618
3	0.620	0.633	1.469	0.877	0.620	0.462	0.826	1.618
4	0.672	0.656	1.447	0.861	0.672	0.492	0.812	1.602
5	0.700	0.675	1.394	0.794	0.700	0.493	0.781	1.567
6	0.694	0.716	1.318	0.731	0.694	0.512	0.815	1.534
7	0.666	0.742	1.244	0.710	0.666	0.534	0.878	1.522
8	0.650	0.752	1.214	0.697	0.650	0.538	0.904	1.516
9	0.625	0.772	1.178	0.672	0.625	0.540	0.941	1.501

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	7.7	5.0	6.0	0.457	0.794	0.181	0.054	0.032	0.010
2	10.00	4.6	1.6	4.7	0.470	0.766	0.202	0.083	0.038	0.016
3	15.00	4.4	1.1	4.1	0.458	0.808	0.164	0.046	0.032	0.009
4	30.00	3.8	0.2	4.2	0.459	0.852	0.127	0.016	0.026	0.003
5	50.00	3.3	-1.0	5.5	0.492	0.858	0.127	0.033	0.027	0.007
6	70.00	4.0	-1.6	5.2	0.520	0.864	0.134	0.060	0.030	0.013
7	85.00	5.1	-1.6	7.1	0.512	0.898	0.107	0.045	0.024	0.010
8	90.00	5.3	-1.6	7.8	0.513	0.891	0.118	0.062	0.027	0.014
9	95.00	5.4	-1.8	7.8	0.527	0.872	0.147	0.098	0.034	0.022

TABLE V. – Concluded. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 36—SI UNITS

(s) 100 Percent of design speed; reading 4273

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.983	24.465	-0.0	42.9	69.7	63.8	288.4	1.210	9.71	1.708
2	24.635	24.153	0.0	40.9	65.8	60.8	288.0	1.212	10.14	1.703
3	24.285	23.840	-0.0	38.6	64.7	59.0	288.4	1.205	10.15	1.729
4	23.213	22.903	0.0	37.8	62.0	56.2	288.4	1.200	10.15	1.739
5	21.747	21.653	-0.0	39.9	59.6	52.6	288.2	1.205	10.16	1.743
6	20.229	20.404	-0.0	41.4	57.9	46.1	287.9	1.212	10.16	1.810
7	19.020	19.467	-0.0	40.9	57.4	41.6	288.0	1.208	10.16	1.825
8	18.593	19.154	-0.0	40.8	57.4	40.0	288.0	1.208	10.16	1.825
9	18.148	18.842	-0.0	42.2	57.7	36.9	288.1	1.218	10.11	1.844

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	166.0	202.9	479.0	336.3	166.0	148.5	-0.0	138.2	449.3	440.0
2	199.8	216.8	487.4	336.6	199.8	164.0	0.0	141.9	444.6	435.9
3	206.5	222.4	482.6	337.6	206.5	173.8	-0.0	138.8	436.2	428.2
4	222.7	230.1	474.0	327.1	222.7	181.9	0.0	140.9	418.4	412.8
5	229.9	237.2	454.5	299.7	229.9	181.9	-0.0	152.2	392.0	390.3
6	227.7	254.5	428.9	275.3	227.7	190.9	-0.0	168.2	363.4	366.6
7	219.0	264.0	406.0	266.9	219.0	199.7	-0.0	172.7	341.8	349.9
8	214.5	267.7	397.7	264.4	214.5	202.6	-0.0	175.1	334.8	345.0
9	206.6	276.7	387.1	256.2	206.6	204.9	-0.0	186.0	327.3	339.8

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.500	0.558	1.441	0.925	0.500	0.409	0.895	1.669
2	0.609	0.599	1.485	0.931	0.609	0.453	0.821	1.620
3	0.630	0.617	1.473	0.937	0.630	0.483	0.842	1.610
4	0.684	0.642	1.456	0.912	0.684	0.507	0.817	1.598
5	0.709	0.662	1.401	0.837	0.709	0.508	0.791	1.564
6	0.702	0.713	1.321	0.772	0.702	0.535	0.839	1.528
7	0.672	0.744	1.246	0.752	0.672	0.563	0.912	1.514
8	0.657	0.756	1.218	0.746	0.657	0.572	0.944	1.512
9	0.631	0.781	1.182	0.723	0.631	0.578	0.992	1.497

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	7.5	4.8	7.4	0.407	0.787	0.170	0.044	0.029	0.007
2	10.00	4.4	1.4	5.6	0.418	0.776	0.175	0.053	0.032	0.010
3	15.00	4.0	0.8	4.8	0.407	0.826	0.135	0.018	0.026	0.003
4	30.00	3.4	-0.2	5.2	0.416	0.854	0.114	0.003	0.023	0.001
5	50.00	3.1	-1.3	6.5	0.453	0.840	0.133	0.039	0.027	0.008
6	70.00	3.7	-1.9	5.8	0.483	0.870	0.121	0.047	0.026	0.010
7	85.00	4.8	-1.8	7.5	0.471	0.902	0.097	0.037	0.022	0.008
8	90.00	5.1	-1.9	8.4	0.465	0.900	0.102	0.046	0.023	0.010
9	95.00	5.2	-2.0	8.2	0.477	0.877	0.135	0.087	0.031	0.020

TABLE VI. – BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 36—SI UNITS

(a) 50 Percent of design speed; reading 4309

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.148	23.879	44.9	16.9	44.9	16.9	306.9	1.000	11.78	0.985
2	23.889	23.647	46.0	15.6	46.0	15.6	307.1	1.000	11.80	0.992
3	23.622	23.409	44.5	14.4	44.5	14.4	306.7	1.000	11.80	0.995
4	22.786	22.672	41.2	10.7	41.2	10.7	305.0	1.000	11.83	0.997
5	21.638	21.661	38.9	10.8	38.9	10.8	303.7	1.000	11.86	0.997
6	20.470	20.635	39.0	12.1	39.0	12.1	304.0	1.000	11.94	0.997
7	19.578	19.850	40.5	12.1	40.5	12.1	304.3	1.000	12.07	0.995
8	19.276	19.586	41.8	12.4	41.8	12.4	304.5	1.000	12.08	0.995
9	18.971	19.317	46.0	13.9	46.0	13.9	305.6	1.000	12.11	0.990

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	122.2	88.0	122.2	88.0	86.6	84.2	86.2	25.5	0.0	0.0
2	123.4	95.2	123.4	95.2	85.7	91.6	88.8	25.6	0.0	0.0
3	122.8	97.9	122.8	97.9	87.6	94.8	86.0	24.3	0.0	0.0
4	124.6	102.2	124.6	102.2	93.7	100.4	82.1	19.0	0.0	0.0
5	125.9	104.3	125.9	104.3	98.1	102.5	79.0	19.5	0.0	0.0
6	133.3	111.2	133.3	111.2	103.6	108.8	83.8	23.4	0.0	0.0
7	140.9	116.9	140.9	116.9	107.1	114.3	91.5	24.6	0.0	0.0
8	142.2	118.1	142.2	118.1	106.1	115.3	94.7	25.3	0.0	0.0
9	145.1	117.5	145.1	117.5	100.9	114.1	104.3	28.3	0.0	0.0

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID VEL R	PEAK SS MACH NO
1	0.352	0.252	0.352	0.252	0.250	0.241	0.973	0.606
2	0.356	0.273	0.356	0.273	0.247	0.263	1.069	0.623
3	0.354	0.281	0.354	0.281	0.253	0.272	1.082	0.600
4	0.360	0.294	0.360	0.294	0.271	0.289	1.072	0.566
5	0.365	0.301	0.365	0.301	0.284	0.296	1.045	0.536
6	0.387	0.322	0.387	0.322	0.301	0.314	1.050	0.560
7	0.410	0.338	0.410	0.338	0.311	0.331	1.067	0.602
8	0.413	0.341	0.413	0.341	0.308	0.333	1.087	0.619
9	0.421	0.339	0.421	0.339	0.293	0.329	1.131	0.686

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	8.1	0.7	14.2	0.472	0.000	0.177	0.177	0.065	0.065
2	10.00	9.3	2.0	12.8	0.426	0.000	0.100	0.100	0.037	0.037
3	15.00	7.8	0.6	11.5	0.395	0.000	0.063	0.063	0.023	0.023
4	30.00	4.5	-2.2	7.4	0.369	0.000	0.032	0.032	0.012	0.012
5	50.00	1.6	-4.4	6.9	0.343	0.000	0.031	0.031	0.011	0.011
6	70.00	1.3	-4.1	7.7	0.324	0.000	0.028	0.028	0.010	0.010
7	85.00	2.0	-3.0	7.3	0.332	0.000	0.047	0.047	0.016	0.016
8	90.00	3.0	-1.9	7.4	0.333	0.000	0.042	0.042	0.014	0.014
9	95.00	6.9	2.2	8.8	0.364	0.000	0.084	0.084	0.027	0.027

TABLE VI. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 36—SI UNITS

(b) 60 Percent of design speed; reading 4304

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.148	23.879	45.3	17.9	45.3	17.9	315.8	1.000	12.60	0.979
2	23.889	23.647	45.2	16.9	45.2	16.9	315.9	1.000	12.63	0.987
3	23.622	23.409	45.6	15.1	45.6	15.1	315.0	1.000	12.63	0.992
4	22.786	22.672	43.8	11.0	43.8	11.0	312.8	1.000	12.66	0.996
5	21.638	21.661	38.0	10.9	38.0	10.9	310.4	1.000	12.71	0.996
6	20.470	20.635	41.0	13.7	41.0	13.7	310.7	1.000	12.87	0.993
7	19.578	19.850	41.6	12.4	41.6	12.4	311.0	1.000	13.01	0.994
8	19.276	19.586	41.6	12.7	41.6	12.7	311.7	1.000	13.02	0.995
9	18.971	19.317	46.0	14.6	46.0	14.6	313.0	1.000	13.08	0.990

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	147.5	105.8	147.5	105.8	103.8	100.7	104.8	32.6	0.0	0.0
2	148.3	113.5	148.3	113.5	104.5	108.6	105.1	33.0	0.0	0.0
3	148.1	116.5	148.1	116.5	103.6	112.5	105.9	30.4	0.0	0.0
4	148.0	121.8	148.0	121.8	106.8	119.5	102.5	23.3	0.0	0.0
5	148.3	125.2	148.3	125.2	116.9	123.0	91.3	23.6	0.0	0.0
6	160.2	132.8	160.2	132.8	120.9	129.0	105.1	31.6	0.0	0.0
7	168.6	139.4	168.6	139.4	126.1	136.2	111.9	29.9	0.0	0.0
8	169.8	141.2	169.8	141.2	126.9	137.7	112.8	31.0	0.0	0.0
9	173.8	142.7	173.8	142.7	120.8	138.1	124.9	36.0	0.0	0.0

	ABS MACH NO		REL MACH NO		MERID MACH NO			
RP	IN	OUT	IN	OUT	IN	OUT	MERID VEL R	PEAK SS MACH NO
1	0.421	0.300	0.421	0.300	0.297	0.285	0.970	0.731
2	0.423	0.322	0.423	0.322	0.299	0.308	1.039	0.730
3	0.424	0.331	0.424	0.331	0.296	0.320	1.086	0.735
4	0.425	0.348	0.425	0.348	0.307	0.341	1.119	0.704
5	0.428	0.359	0.428	0.359	0.337	0.353	1.052	0.615
6	0.463	0.381	0.463	0.381	0.349	0.370	1.068	0.702
7	0.488	0.401	0.488	0.401	0.365	0.391	1.080	0.736
8	0.491	0.405	0.491	0.405	0.367	0.395	1.085	0.734
9	0.502	0.409	0.502	0.409	0.349	0.396	1.143	0.817

	PERCENT	INCIDENCE		DEV	D FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	8.5	1.1	15.3	0.472	0.000	0.179	0.179	0.065	0.065
2	10.00	8.5	1.2	14.1	0.422	0.000	0.112	0.112	0.041	0.041
3	15.00	8.9	1.8	12.3	0.408	0.000	0.071	0.071	0.026	0.026
4	30.00	7.0	0.4	7.7	0.378	0.000	0.033	0.033	0.012	0.012
5	50.00	0.7	-5.3	7.0	0.321	0.000	0.037	0.037	0.013	0.013
6	70.00	3.3	-2.1	9.3	0.331	0.000	0.048	0.048	0.016	0.016
7	85.00	3.1	-1.9	7.5	0.338	0.000	0.041	0.041	0.014	0.014
8	90.00	2.9	-2.0	7.7	0.330	0.000	0.036	0.036	0.012	0.012
9	95.00	6.9	2.2	9.5	0.349	0.000	0.063	0.063	0.020	0.020

TABLE VI. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 36—SI UNITS

(c) 70 Percent of design speed; reading 4296

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.148	23.879	42.1	16.3	42.1	16.3	324.0	1.000	13.66	0.978
2	23.889	23.647	43.3	15.1	43.3	15.1	324.5	1.000	13.73	0.987
3	23.622	23.409	43.1	14.5	43.1	14.5	324.4	1.000	13.74	0.994
4	22.786	22.672	40.9	12.0	40.9	12.0	322.0	1.000	13.83	0.994
5	21.638	21.661	38.8	11.2	38.8	11.2	319.3	1.000	13.87	0.995
6	20.470	20.635	40.1	11.9	40.1	11.9	319.0	1.000	13.94	0.994
7	19.578	19.850	40.9	12.0	40.9	12.0	319.5	1.000	14.20	0.991
8	19.276	19.586	41.8	12.7	41.8	12.7	320.3	1.000	14.29	0.989
9	18.971	19.317	44.2	14.6	44.2	14.6	322.0	1.000	14.38	0.983

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	176.0	127.6	176.0	127.6	130.5	122.5	118.0	35.8	0.0	0.0
2	178.0	137.6	178.0	137.6	129.5	132.9	122.2	35.8	0.0	0.0
3	177.6	143.2	177.6	143.2	129.8	138.7	121.3	35.8	0.0	0.0
4	178.6	149.0	178.6	149.0	135.1	145.7	116.9	31.0	0.0	0.0
5	179.5	151.4	179.5	151.4	139.8	148.5	112.6	29.3	0.0	0.0
6	187.1	155.3	187.1	155.3	143.0	152.0	120.6	32.0	0.0	0.0
7	197.2	162.8	197.2	162.8	149.0	159.3	129.1	33.9	0.0	0.0
8	201.2	165.5	201.2	165.5	150.0	161.5	134.1	36.3	0.0	0.0
9	206.0	167.1	206.0	167.1	147.7	161.7	143.6	42.2	0.0	0.0

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.500	0.358	0.500	0.358	0.371	0.344	0.939	0.813
2	0.505	0.387	0.505	0.387	0.368	0.373	1.026	0.840
3	0.504	0.403	0.504	0.403	0.368	0.390	1.069	0.830
4	0.509	0.421	0.509	0.421	0.385	0.412	1.079	0.794
5	0.514	0.430	0.514	0.430	0.401	0.422	1.062	0.754
6	0.537	0.442	0.537	0.442	0.411	0.433	1.062	0.799
7	0.568	0.464	0.568	0.464	0.429	0.454	1.069	0.843
8	0.579	0.471	0.579	0.471	0.432	0.460	1.077	0.869
9	0.592	0.475	0.592	0.475	0.425	0.460	1.095	0.928

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	5.4	-2.1	13.6	0.456	0.000	0.143	0.143	0.053	0.053
2	10.00	6.7	-0.6	12.3	0.414	0.000	0.081	0.081	0.030	0.030
3	15.00	6.4	-0.8	11.6	0.378	0.000	0.040	0.040	0.015	0.015
4	30.00	4.1	-2.5	8.7	0.346	0.000	0.035	0.035	0.013	0.013
5	50.00	1.6	-4.5	7.3	0.325	0.000	0.030	0.030	0.011	0.011
6	70.00	2.4	-3.0	7.4	0.336	0.000	0.032	0.032	0.011	0.011
7	85.00	2.4	-2.6	7.2	0.338	0.000	0.047	0.047	0.016	0.016
8	90.00	3.0	-1.8	7.7	0.341	0.000	0.052	0.052	0.017	0.017
9	95.00	5.2	0.4	9.5	0.352	0.000	0.082	0.082	0.027	0.027

TABLE VI. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 36—SI UNITS

(d) 70 Percent of design speed; reading 4297

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.148	23.879	38.0	15.7	38.0	15.7	321.9	1.000	13.45	0.978
2	23.889	23.647	39.5	14.0	39.5	14.0	322.0	1.000	13.54	0.990
3	23.622	23.409	39.9	13.6	39.9	13.6	322.0	1.000	13.62	0.995
4	22.786	22.672	37.0	11.6	37.0	11.6	319.8	1.000	13.76	0.995
5	21.638	21.661	36.6	10.8	36.6	10.8	317.7	1.000	13.79	0.995
6	20.470	20.635	37.9	11.3	37.9	11.3	317.7	1.000	13.86	0.995
7	19.578	19.850	38.6	11.6	38.6	11.6	318.3	1.000	14.08	0.991
8	19.276	19.586	39.8	12.2	39.8	12.2	319.3	1.000	14.17	0.990
9	18.971	19.317	42.6	14.1	42.6	14.1	321.2	1.000	14.29	0.982

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	175.0	132.5	175.0	132.5	137.9	127.6	107.7	35.8	0.0	0.0
2	177.3	144.0	177.3	144.0	136.9	139.7	112.7	34.7	0.0	0.0
3	179.5	151.6	179.5	151.6	137.7	147.3	115.2	35.7	0.0	0.0
4	180.1	158.0	180.1	158.0	143.8	154.8	108.3	31.8	0.0	0.0
5	182.5	161.0	182.5	161.0	146.5	158.1	108.9	30.2	0.0	0.0
6	188.2	164.7	188.2	164.7	148.5	161.5	115.6	32.2	0.0	0.0
7	197.1	170.5	197.1	170.5	154.0	167.0	123.0	34.3	0.0	0.0
8	201.2	173.3	201.2	173.3	154.6	169.4	128.8	36.7	0.0	0.0
9	206.8	175.5	206.8	175.5	152.2	170.3	140.0	42.7	0.0	0.0

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.498	0.374	0.498	0.374	0.393	0.360	0.926	0.741
2	0.505	0.407	0.505	0.407	0.390	0.395	1.021	0.774
3	0.512	0.429	0.512	0.429	0.393	0.417	1.070	0.788
4	0.515	0.450	0.515	0.450	0.412	0.440	1.076	0.735
5	0.525	0.460	0.525	0.460	0.421	0.452	1.079	0.729
6	0.542	0.471	0.542	0.471	0.428	0.462	1.087	0.764
7	0.568	0.488	0.568	0.488	0.444	0.478	1.084	0.799
8	0.580	0.496	0.580	0.496	0.446	0.484	1.096	0.831
9	0.596	0.501	0.596	0.501	0.438	0.486	1.118	0.901

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	1.3	-6.2	13.0	0.402	0.000	0.141	0.141	0.052	0.052
2	10.00	2.8	-4.5	11.2	0.358	0.000	0.061	0.061	0.023	0.023
3	15.00	3.2	-3.9	10.7	0.325	0.000	0.029	0.029	0.011	0.011
4	30.00	0.2	-6.4	8.3	0.282	0.000	0.029	0.029	0.011	0.011
5	50.00	-0.7	-6.7	7.0	0.275	0.000	0.029	0.029	0.010	0.010
6	70.00	0.2	-5.2	6.8	0.280	0.000	0.029	0.029	0.010	0.010
7	85.00	0.1	-4.9	6.8	0.288	0.000	0.047	0.047	0.016	0.016
8	90.00	1.0	-3.8	7.3	0.292	0.000	0.050	0.050	0.017	0.017
9	95.00	3.6	-1.2	9.0	0.307	0.000	0.082	0.082	0.027	0.027

TABLE VI. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 36—SI UNITS

(e) 70 Percent of design speed; reading 4298

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.148	23.879	33.0	15.4	33.0	15.4	316.5	1.000	12.76	0.977
2	23.889	23.647	32.0	13.4	32.0	13.4	316.5	1.000	13.01	0.991
3	23.622	23.409	31.2	12.2	31.2	12.2	316.2	1.000	13.19	0.995
4	22.786	22.672	29.6	10.8	29.6	10.8	315.0	1.000	13.36	0.995
5	21.638	21.661	30.0	10.5	30.0	10.5	314.6	1.000	13.50	0.994
6	20.470	20.635	33.9	10.8	33.9	10.8	315.3	1.000	13.68	0.993
7	19.578	19.850	34.6	10.9	34.6	10.9	316.0	1.000	13.77	0.993
8	19.276	19.586	35.6	11.5	35.6	11.5	316.8	1.000	13.87	0.992
9	18.971	19.317	38.6	12.9	38.6	12.9	319.0	1.000	14.01	0.985

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	167.0	142.5	167.0	142.5	140.0	137.4	91.0	37.9	0.0	0.0
2	175.0	158.3	175.0	158.3	148.5	154.0	92.7	36.6	0.0	0.0
3	180.2	168.0	180.2	168.0	154.2	164.2	93.2	35.4	0.0	0.0
4	185.0	175.6	185.0	175.6	160.9	172.5	91.3	32.8	0.0	0.0
5	186.7	181.5	186.7	181.5	161.8	178.4	93.3	33.2	0.0	0.0
6	195.4	188.0	195.4	188.0	162.2	184.6	109.0	35.3	0.0	0.0
7	201.1	191.3	201.1	191.3	165.5	187.8	114.3	36.1	0.0	0.0
8	205.0	193.6	205.0	193.6	166.8	189.7	119.2	38.5	0.0	0.0
9	210.9	195.9	210.9	195.9	164.8	190.9	131.6	43.7	0.0	0.0

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.479	0.406	0.479	0.406	0.401	0.391	0.981	0.628
2	0.503	0.453	0.503	0.453	0.427	0.440	1.037	0.637
3	0.519	0.482	0.519	0.482	0.444	0.471	1.065	0.638
4	0.535	0.506	0.535	0.506	0.465	0.497	1.072	0.613
5	0.540	0.524	0.540	0.524	0.468	0.515	1.103	0.613
6	0.566	0.543	0.566	0.543	0.470	0.534	1.138	0.718
7	0.583	0.553	0.583	0.553	0.480	0.543	1.135	0.736
8	0.595	0.559	0.595	0.559	0.484	0.548	1.137	0.762
9	0.611	0.564	0.611	0.564	0.477	0.550	1.158	0.840

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	-3.8	-11.2	12.8	0.270	0.000	0.160	0.160	0.059	0.059
2	10.00	-4.7	-12.0	10.6	0.220	0.000	0.054	0.054	0.020	0.020
3	15.00	-5.6	-12.7	9.3	0.191	0.000	0.032	0.032	0.012	0.012
4	30.00	-7.2	-13.9	7.5	0.169	0.000	0.029	0.029	0.011	0.011
5	50.00	-7.3	-13.3	6.7	0.145	0.000	0.032	0.032	0.012	0.012
6	70.00	-3.8	-9.2	6.4	0.170	0.000	0.035	0.035	0.012	0.012
7	85.00	-3.9	-8.8	6.1	0.181	0.000	0.032	0.032	0.011	0.011
8	90.00	-3.2	-8.1	6.5	0.188	0.000	0.038	0.038	0.013	0.013
9	95.00	-0.4	-5.2	7.8	0.209	0.000	0.067	0.067	0.022	0.022

TABLE VI. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 36—SI UNITS

(f) 70 Percent of design speed; reading 4299

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.148	23.879	28.8	15.3	28.8	15.3	312.5	1.000	12.21	0.972
2	23.889	23.647	28.7	12.7	28.7	12.7	312.4	1.000	12.60	0.988
3	23.622	23.409	26.4	11.6	26.4	11.6	312.0	1.000	12.79	0.994
4	22.786	22.672	26.1	10.6	26.1	10.6	311.8	1.000	13.00	0.991
5	21.638	21.661	27.8	10.5	27.8	10.5	312.3	1.000	13.23	0.991
6	20.470	20.635	29.1	10.8	29.1	10.8	313.4	1.000	13.47	0.990
7	19.578	19.850	31.5	11.4	31.5	11.4	314.6	1.000	13.60	0.991
8	19.276	19.586	31.1	11.6	31.1	11.6	315.5	1.000	13.67	0.991
9	18.971	19.317	36.1	12.9	36.1	12.9	317.3	1.000	13.74	0.989

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	161.6	152.2	161.6	152.2	141.6	146.8	77.8	40.2	0.0	0.0
2	175.5	172.1	175.5	172.1	154.0	167.9	84.3	37.8	0.0	0.0
3	181.0	182.7	181.0	182.7	162.1	179.0	80.6	36.7	0.0	0.0
4	188.6	190.1	188.6	190.1	169.3	186.9	83.0	34.9	0.0	0.0
5	193.7	198.1	193.7	198.1	171.3	194.8	90.5	36.2	0.0	0.0
6	199.2	205.3	199.2	205.3	174.0	201.7	96.9	38.6	0.0	0.0
7	210.6	209.3	210.6	209.3	179.7	205.2	109.9	41.3	0.0	0.0
8	212.3	211.3	212.3	211.3	181.8	206.9	109.7	42.7	0.0	0.0
9	216.1	213.1	216.1	213.1	174.5	207.7	127.4	47.7	0.0	0.0

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.466	0.438	0.466	0.438	0.408	0.422	1.036	0.533
2	0.508	0.498	0.508	0.498	0.446	0.485	1.091	0.575
3	0.525	0.530	0.525	0.530	0.470	0.519	1.104	0.525
4	0.549	0.553	0.549	0.553	0.493	0.544	1.104	0.549
5	0.564	0.578	0.564	0.578	0.499	0.568	1.137	0.564
6	0.580	0.599	0.580	0.599	0.507	0.588	1.159	0.610
7	0.614	0.610	0.614	0.610	0.524	0.598	1.142	0.695
8	0.619	0.615	0.619	0.615	0.530	0.603	1.138	0.676
9	0.629	0.619	0.629	0.619	0.508	0.604	1.190	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	-8.0	-15.5	12.6	0.149	0.000	0.199	0.199	0.074	0.074
2	10.00	-8.0	-15.3	9.9	0.122	0.000	0.075	0.075	0.028	0.028
3	15.00	-10.3	-17.4	8.7	0.084	0.000	0.034	0.034	0.013	0.013
4	30.00	-10.7	-17.3	7.3	0.088	0.000	0.047	0.047	0.017	0.017
5	50.00	-9.4	-15.5	6.7	0.079	0.000	0.045	0.045	0.016	0.016
6	70.00	-8.6	-14.0	6.4	0.072	0.000	0.050	0.050	0.017	0.017
7	85.00	-7.1	-12.0	6.5	0.116	0.000	0.039	0.039	0.013	0.013
8	90.00	-7.7	-12.5	6.7	0.110	0.000	0.039	0.039	0.013	0.013
9	95.00	-2.9	-7.6	7.8	0.135	0.000	0.046	0.046	0.015	0.015

TABLE VI. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 36—SI UNITS

(g) 70 Percent of design speed; reading 4301

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.148	23.879	23.5	14.8	23.5	14.8	308.0	1.000	11.68	0.957
2	23.889	23.647	21.6	11.9	21.6	11.9	307.9	1.000	12.10	0.985
3	23.622	23.409	20.6	10.9	20.6	10.9	308.0	1.000	12.36	0.992
4	22.786	22.672	21.0	10.0	21.0	10.0	308.3	1.000	12.60	0.982
5	21.638	21.661	23.3	10.1	23.3	10.1	309.5	1.000	12.89	0.983
6	20.470	20.635	26.1	10.8	26.1	10.8	311.2	1.000	13.18	0.984
7	19.578	19.850	28.2	11.6	28.2	11.6	312.9	1.000	13.38	0.985
8	19.276	19.586	29.3	12.5	29.3	12.5	314.4	1.000	13.37	0.990
9	18.971	19.317	34.6	15.0	34.6	15.0	316.7	1.000	13.27	0.986

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	161.9	167.8	161.9	167.8	148.4	162.3	64.6	42.8	0.0	0.0
2	177.0	191.1	177.0	191.1	164.6	187.0	65.2	39.5	0.0	0.0
3	185.3	202.5	185.3	202.5	173.5	198.8	65.1	38.4	0.0	0.0
4	193.4	208.8	193.4	208.8	180.5	205.6	69.4	36.3	0.0	0.0
5	198.0	217.4	198.0	217.4	181.9	214.1	78.4	38.0	0.0	0.0
6	208.1	224.7	208.1	224.7	186.8	220.8	91.7	42.0	0.0	0.0
7	216.0	229.0	216.0	229.0	190.3	224.3	102.2	46.0	0.0	0.0
8	216.1	232.7	216.1	232.7	188.5	227.2	105.7	50.4	0.0	0.0
9	215.1	232.5	215.1	232.5	177.1	224.6	122.1	60.3	0.0	0.0

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.470	0.488	0.470	0.488	0.431	0.472	1.093	0.470
2	0.517	0.560	0.517	0.560	0.480	0.548	1.136	0.517
3	0.542	0.596	0.542	0.596	0.507	0.585	1.146	0.542
4	0.567	0.615	0.567	0.615	0.529	0.606	1.139	0.567
5	0.580	0.641	0.580	0.641	0.533	0.631	1.177	0.580
6	0.610	0.663	0.610	0.663	0.547	0.651	1.182	0.610
7	0.633	0.674	0.633	0.674	0.558	0.661	1.178	0.633
8	0.632	0.685	0.632	0.685	0.551	0.668	1.205	0.632
9	0.626	0.681	0.626	0.681	0.515	0.658	1.268	0.769

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	-13.3	-20.7	12.1	0.017	0.000	0.304	0.304	0.113	0.113
2	10.00	-15.1	-22.4	9.2	-.023	0.000	0.093	0.093	0.035	0.035
3	15.00	-16.2	-23.3	8.1	-.037	0.000	0.042	0.042	0.016	0.016
4	30.00	-15.8	-22.4	6.7	-.015	0.000	0.090	0.090	0.033	0.033
5	50.00	-14.0	-20.0	6.2	-.024	0.000	0.084	0.084	0.030	0.030
6	70.00	-11.6	-17.0	6.3	0.003	0.000	0.071	0.071	0.025	0.025
7	85.00	-10.3	-15.2	6.8	0.028	0.000	0.062	0.062	0.021	0.021
8	90.00	-9.5	-14.4	7.5	0.008	0.000	0.041	0.041	0.014	0.014
9	95.00	-4.5	-9.2	9.9	0.013	0.000	0.060	0.060	0.020	0.020

TABLE VI. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 36—SI UNITS

(h) 80 Percent of design speed; reading 4294

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.148	23.879	40.2	15.8	40.2	15.8	334.5	1.000	14.94	0.974
2	23.889	23.647	41.3	14.4	41.3	14.4	334.6	1.000	15.05	0.986
3	23.622	23.409	41.4	13.6	41.4	13.6	334.2	1.000	15.13	0.993
4	22.786	22.672	39.7	12.4	39.7	12.4	331.9	1.000	15.36	0.993
5	21.638	21.661	39.0	11.8	39.0	11.8	329.4	1.000	15.44	0.993
6	20.470	20.635	40.2	11.9	40.2	11.9	328.3	1.000	15.57	0.993
7	19.578	19.850	41.1	11.4	41.1	11.4	328.2	1.000	15.56	0.993
8	19.276	19.586	42.2	12.3	42.2	12.3	329.6	1.000	15.72	0.988
9	18.971	19.317	45.4	14.5	45.4	14.5	331.9	1.000	15.90	0.978

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	200.6	145.3	200.6	145.3	153.2	139.8	129.5	39.6	0.0	0.0
2	202.9	156.2	202.9	156.2	152.4	151.2	134.0	39.0	0.0	0.0
3	204.3	163.5	204.3	163.5	153.3	158.9	135.1	38.6	0.0	0.0
4	207.1	172.0	207.1	172.0	159.3	168.0	132.3	36.8	0.0	0.0
5	211.9	176.0	211.9	176.0	164.7	172.2	133.3	36.0	0.0	0.0
6	215.4	180.9	215.4	180.9	164.5	177.0	139.1	37.2	0.0	0.0
7	221.8	181.8	221.8	181.8	167.2	178.3	145.8	35.9	0.0	0.0
8	227.2	184.7	227.2	184.7	168.3	180.5	152.6	39.5	0.0	0.0
9	234.0	187.1	234.0	187.1	164.2	181.1	166.6	46.8	0.0	0.0

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.564	0.403	0.564	0.403	0.431	0.387	0.912	0.882
2	0.571	0.434	0.571	0.434	0.429	0.420	0.992	0.910
3	0.576	0.455	0.576	0.455	0.432	0.443	1.037	0.915
4	0.586	0.482	0.586	0.482	0.451	0.470	1.054	0.890
5	0.603	0.495	0.603	0.495	0.469	0.485	1.046	0.888
6	0.615	0.511	0.615	0.511	0.470	0.500	1.076	0.916
7	0.635	0.514	0.635	0.514	0.478	0.504	1.066	0.946
8	0.650	0.521	0.650	0.521	0.482	0.509	1.072	0.983
9	0.669	0.526	0.669	0.526	0.469	0.509	1.103	1.075

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	3.5	-4.0	13.2	0.450	0.000	0.133	0.133	0.049	0.049
2	10.00	4.6	-2.7	11.7	0.411	0.000	0.070	0.070	0.026	0.026
3	15.00	4.7	-2.4	10.8	0.380	0.000	0.036	0.036	0.013	0.013
4	30.00	2.9	-3.7	9.0	0.343	0.000	0.036	0.036	0.013	0.013
5	50.00	1.7	-4.3	7.9	0.337	0.000	0.031	0.031	0.011	0.011
6	70.00	2.5	-2.9	7.4	0.326	0.000	0.030	0.030	0.010	0.010
7	85.00	2.6	-2.4	6.6	0.349	0.000	0.029	0.029	0.010	0.010
8	90.00	3.4	-1.4	7.4	0.354	0.000	0.048	0.048	0.016	0.016
9	95.00	6.4	1.7	9.4	0.370	0.000	0.084	0.084	0.027	0.027

TABLE VI. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 36—SI UNITS

(i) 90 Percent of design speed; reading 4277

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.148	23.879	43.1	15.6	43.1	15.6	348.9	1.000	16.76	0.968
2	23.889	23.647	42.6	14.2	42.6	14.2	348.2	1.000	16.91	0.980
3	23.622	23.409	41.5	13.4	41.5	13.4	347.1	1.000	17.03	0.991
4	22.786	22.672	40.5	12.4	40.5	12.4	344.2	1.000	17.26	0.990
5	21.638	21.661	41.4	12.3	41.4	12.3	343.2	1.000	17.31	0.992
6	20.470	20.635	42.0	12.5	42.0	12.5	341.3	1.000	17.50	0.990
7	19.578	19.850	42.5	10.9	42.5	10.9	339.8	1.000	17.30	0.990
8	19.276	19.586	43.0	11.7	43.0	11.7	341.2	1.000	17.42	0.986
9	18.971	19.317	45.3	13.7	45.3	13.7	344.0	1.000	17.62	0.973

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	227.3	157.9	227.3	157.9	165.9	152.1	155.4	42.4	0.0	0.0
2	229.7	169.9	229.7	169.9	169.0	164.8	155.6	41.5	0.0	0.0
3	231.1	179.2	231.1	179.2	173.0	174.3	153.3	41.4	0.0	0.0
4	234.8	187.2	234.8	187.2	178.7	182.8	152.4	40.1	0.0	0.0
5	239.8	191.4	239.8	191.4	179.8	187.0	158.6	40.6	0.0	0.0
6	242.8	196.9	242.8	196.9	180.5	192.3	162.5	42.6	0.0	0.0
7	246.6	193.8	246.6	193.8	181.9	190.2	166.4	36.7	0.0	0.0
8	250.7	195.4	250.7	195.4	183.2	191.3	171.1	39.7	0.0	0.0
9	257.8	197.1	257.8	197.1	181.3	191.5	183.3	46.7	0.0	0.0

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID VEL R	PEAK SS MACH NO
1	0.631	0.429	0.631	0.429	0.460	0.414	0.917	1.048
2	0.639	0.464	0.639	0.464	0.470	0.450	0.975	1.046
3	0.644	0.491	0.644	0.491	0.482	0.478	1.008	1.027
4	0.658	0.517	0.658	0.517	0.501	0.505	1.023	1.016
5	0.674	0.530	0.674	0.530	0.506	0.517	1.040	1.048
6	0.686	0.547	0.686	0.547	0.510	0.534	1.065	1.063
7	0.699	0.539	0.699	0.539	0.516	0.530	1.046	1.074
8	0.710	0.543	0.710	0.543	0.519	0.532	1.044	1.095
9	0.729	0.546	0.729	0.546	0.513	0.530	1.056	1.170

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	6.4	-1.0	12.9	0.498	0.000	0.136	0.136	0.050	0.050
2	10.00	6.0	-1.3	11.4	0.452	0.000	0.081	0.081	0.030	0.030
3	15.00	4.8	-2.3	10.5	0.410	0.000	0.039	0.039	0.014	0.014
4	30.00	3.7	-2.9	9.1	0.382	0.000	0.038	0.038	0.014	0.014
5	50.00	4.1	-1.9	8.4	0.381	0.000	0.032	0.032	0.011	0.011
6	70.00	4.3	-1.1	8.0	0.362	0.000	0.039	0.039	0.013	0.013
7	85.00	3.9	-1.0	6.1	0.393	0.000	0.035	0.035	0.012	0.012
8	90.00	4.3	-0.6	6.8	0.397	0.000	0.050	0.050	0.017	0.017
9	95.00	6.3	1.5	8.6	0.411	0.000	0.090	0.090	0.029	0.029

TABLE VI. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 36—SI UNITS

(j) 90 Percent of design speed; reading 4279

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.148	23.879	38.8	15.3	38.8	15.3	342.9	1.000	16.11	0.965
2	23.889	23.647	37.6	14.0	37.6	14.0	342.4	1.000	16.46	0.980
3	23.622	23.409	36.1	12.6	36.1	12.6	340.8	1.000	16.65	0.992
4	22.786	22.672	35.1	11.4	35.1	11.4	338.4	1.000	16.84	0.991
5	21.638	21.661	38.0	11.7	38.0	11.7	339.9	1.000	17.01	0.988
6	20.470	20.635	38.8	11.7	38.8	11.7	338.8	1.000	17.23	0.990
7	19.578	19.850	40.3	10.7	40.3	10.7	337.9	1.000	17.03	0.992
8	19.276	19.586	42.0	10.9	42.0	10.9	339.0	1.000	17.03	0.991
9	18.971	19.317	43.5	12.4	43.5	12.4	341.8	1.000	17.21	0.976

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	223.9	167.2	223.9	167.2	174.5	161.3	140.3	44.1	0.0	0.0
2	230.5	183.6	230.5	183.6	182.5	178.2	140.7	44.3	0.0	0.0
3	233.3	194.3	233.3	194.3	188.5	189.6	137.5	42.3	0.0	0.0
4	236.4	201.3	236.4	201.3	193.3	197.3	136.1	39.8	0.0	0.0
5	242.2	207.4	242.2	207.4	190.9	203.1	149.1	42.2	0.0	0.0
6	247.1	213.4	247.1	213.4	192.6	209.0	154.9	43.2	0.0	0.0
7	246.4	211.2	246.4	211.2	188.0	207.5	159.3	39.4	0.0	0.0
8	248.8	211.6	248.8	211.6	185.0	207.8	166.3	40.0	0.0	0.0
9	255.3	211.9	255.3	211.9	185.2	206.9	175.7	45.5	0.0	0.0

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.626	0.460	0.626	0.460	0.488	0.444	0.924	0.949
2	0.647	0.507	0.647	0.507	0.512	0.492	0.976	0.950
3	0.657	0.540	0.657	0.540	0.531	0.527	1.006	0.926
4	0.669	0.563	0.669	0.563	0.547	0.552	1.021	0.911
5	0.686	0.580	0.686	0.580	0.540	0.568	1.064	0.985
6	0.702	0.599	0.702	0.599	0.547	0.586	1.085	1.012
7	0.701	0.593	0.701	0.593	0.534	0.583	1.104	1.025
8	0.707	0.593	0.707	0.593	0.526	0.582	1.123	1.064
9	0.724	0.591	0.724	0.591	0.525	0.577	1.117	1.118

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	2.1	-5.4	12.6	0.420	0.000	0.151	0.151	0.056	0.056
2	10.00	0.9	-6.3	11.2	0.365	0.000	0.081	0.081	0.030	0.030
3	15.00	-0.6	-7.7	9.7	0.324	0.000	0.033	0.033	0.012	0.012
4	30.00	-1.6	-8.3	8.1	0.301	0.000	0.035	0.035	0.013	0.013
5	50.00	0.7	-5.3	7.9	0.304	0.000	0.044	0.044	0.016	0.016
6	70.00	1.1	-4.3	7.2	0.295	0.000	0.037	0.037	0.013	0.013
7	85.00	1.8	-3.2	5.9	0.308	0.000	0.029	0.029	0.010	0.010
8	90.00	3.2	-1.7	5.9	0.320	0.000	0.032	0.032	0.011	0.011
9	95.00	4.5	-0.3	7.3	0.339	0.000	0.081	0.081	0.027	0.027

TABLE VI. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 36—SI UNITS

(k) 90 Percent of design speed; reading 4280

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.148	23.879	37.2	15.5	37.2	15.5	340.7	1.000	15.71	0.961
2	23.889	23.647	36.1	13.7	36.1	13.7	340.6	1.000	16.24	0.977
3	23.622	23.409	34.6	12.2	34.6	12.2	338.9	1.000	16.48	0.989
4	22.786	22.672	33.6	11.1	33.6	11.1	336.8	1.000	16.65	0.991
5	21.638	21.661	36.5	11.5	36.5	11.5	338.5	1.000	16.91	0.986
6	20.470	20.635	37.8	11.4	37.8	11.4	337.9	1.000	17.09	0.989
7	19.578	19.850	38.9	10.6	38.9	10.6	337.0	1.000	16.95	0.991
8	19.276	19.586	40.3	10.9	40.3	10.9	337.9	1.000	16.88	0.991
9	18.971	19.317	43.0	12.0	43.0	12.0	341.0	1.000	17.03	0.978

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	220.7	170.0	220.7	170.0	175.7	163.8	133.5	45.5	0.0	0.0
2	230.0	188.5	230.0	188.5	185.8	183.1	135.7	44.7	0.0	0.0
3	234.0	200.0	234.0	200.0	192.7	195.4	132.8	42.4	0.0	0.0
4	237.5	207.2	237.5	207.2	197.8	203.3	131.4	40.0	0.0	0.0
5	242.8	214.3	242.8	214.3	195.2	210.0	144.3	42.7	0.0	0.0
6	248.9	220.2	248.9	220.2	196.7	215.8	152.6	43.7	0.0	0.0
7	248.1	218.4	248.1	218.4	193.0	214.7	155.9	40.0	0.0	0.0
8	248.8	217.9	248.8	217.9	189.6	214.0	161.1	41.2	0.0	0.0
9	254.8	217.9	254.8	217.9	186.5	213.1	173.7	45.3	0.0	0.0

	ABS MACH NO		REL MACH NO		MERID MACH NO			
RP	IN	OUT	IN	OUT	IN	OUT	MERID VEL R	PEAK SS MACH NO
1	0.619	0.469	0.619	0.469	0.493	0.452	0.932	0.904
2	0.647	0.523	0.647	0.523	0.523	0.508	0.986	0.917
3	0.661	0.558	0.661	0.558	0.544	0.546	1.014	0.896
4	0.674	0.582	0.674	0.582	0.561	0.571	1.028	0.881
5	0.689	0.602	0.689	0.602	0.554	0.590	1.076	0.954
6	0.709	0.620	0.709	0.620	0.560	0.608	1.097	0.997
7	0.707	0.616	0.707	0.616	0.550	0.605	1.113	1.001
8	0.708	0.613	0.708	0.613	0.540	0.602	1.129	1.027
9	0.723	0.610	0.723	0.610	0.529	0.597	1.143	1.104

	PERCENT	INCIDENCE		DEV	D FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	0.5	-7.0	12.9	0.384	0.000	0.172	0.172	0.064	0.064
2	10.00	-0.5	-7.8	11.0	0.333	0.000	0.094	0.094	0.035	0.035
3	15.00	-2.1	-9.3	9.4	0.293	0.000	0.043	0.043	0.016	0.016
4	30.00	-3.2	-9.8	7.8	0.272	0.000	0.036	0.036	0.013	0.013
5	50.00	-0.8	-6.8	7.6	0.269	0.000	0.052	0.052	0.018	0.018
6	70.00	0.1	-5.3	7.0	0.269	0.000	0.037	0.037	0.013	0.013
7	85.00	0.4	-4.5	5.7	0.278	0.000	0.030	0.030	0.010	0.010
8	90.00	1.6	-3.3	5.9	0.286	0.000	0.032	0.032	0.011	0.011
9	95.00	3.9	-0.8	6.9	0.312	0.000	0.074	0.074	0.025	0.025

TABLE VI. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 36—SI UNITS

(l) 90 Percent of design speed; reading 4281

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.148	23.879	34.7	15.2	34.7	15.2	335.5	1.000	14.98	0.958
2	23.889	23.647	33.3	13.2	33.3	13.2	335.6	1.000	15.54	0.976
3	23.622	23.409	31.1	11.9	31.1	11.9	333.8	1.000	15.83	0.989
4	22.786	22.672	31.1	11.0	31.1	11.0	333.7	1.000	16.14	0.991
5	21.638	21.661	33.9	11.1	33.9	11.1	335.5	1.000	16.46	0.986
6	20.470	20.635	35.3	11.1	35.3	11.1	335.9	1.000	16.73	0.990
7	19.578	19.850	36.4	10.7	36.4	10.7	335.3	1.000	16.69	0.990
8	19.276	19.586	37.8	10.8	37.8	10.8	336.3	1.000	16.64	0.991
9	18.971	19.317	40.5	11.7	40.5	11.7	338.9	1.000	16.66	0.982

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	212.0	174.4	212.0	174.4	174.2	168.3	120.8	45.6	0.0	0.0
2	225.1	195.1	225.1	195.1	188.2	190.0	123.6	44.6	0.0	0.0
3	230.1	207.4	230.1	207.4	197.0	203.0	119.0	42.7	0.0	0.0
4	238.1	217.8	238.1	217.8	203.8	213.8	123.0	41.6	0.0	0.0
5	243.7	225.6	243.7	225.6	202.2	221.3	136.0	43.6	0.0	0.0
6	251.5	231.6	251.5	231.6	205.4	227.2	145.2	44.8	0.0	0.0
7	252.6	230.6	252.6	230.6	203.4	226.6	149.7	42.8	0.0	0.0
8	253.4	230.1	253.4	230.1	200.2	226.0	155.3	43.1	0.0	0.0
9	256.2	228.3	256.2	228.3	194.8	223.6	166.5	46.2	0.0	0.0

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.598	0.486	0.598	0.486	0.491	0.469	0.966	0.821
2	0.637	0.547	0.637	0.547	0.533	0.533	1.010	0.839
3	0.655	0.585	0.655	0.585	0.560	0.573	1.030	0.805
4	0.679	0.617	0.679	0.617	0.582	0.605	1.049	0.824
5	0.695	0.639	0.695	0.639	0.577	0.627	1.094	0.899
6	0.719	0.657	0.719	0.657	0.587	0.644	1.106	0.947
7	0.723	0.655	0.723	0.655	0.582	0.643	1.114	0.959
8	0.724	0.652	0.724	0.652	0.572	0.640	1.129	0.987
9	0.730	0.644	0.730	0.644	0.555	0.630	1.148	1.053

K°	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	-2.0	-9.5	12.5	0.315	0.000	0.195	0.195	0.072	0.072
2	10.00	-3.4	-10.7	10.4	0.269	0.000	0.099	0.099	0.037	0.037
3	15.00	-5.6	-12.7	9.0	0.226	0.000	0.044	0.044	0.016	0.016
4	30.00	-5.7	-12.3	7.7	0.214	0.000	0.034	0.034	0.012	0.012
5	50.00	-3.4	-9.4	7.3	0.212	0.000	0.051	0.051	0.018	0.018
6	70.00	-2.5	-7.9	6.7	0.219	0.000	0.035	0.035	0.012	0.012
7	85.00	-2.2	-7.1	5.9	0.231	0.000	0.032	0.032	0.011	0.011
8	90.00	-1.0	-5.8	5.8	0.241	0.000	0.031	0.031	0.010	0.010
9	95.00	1.5	-3.2	6.6	0.265	0.000	0.059	0.059	0.019	0.019

TABLE VI. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 36—SI UNITS

(m) 90 Percent of design speed; reading 4282

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.148	23.879	40.3	15.5	40.3	15.5	345.3	1.000	16.38	0.967
2	23.889	23.647	39.8	13.9	39.8	13.9	345.2	1.000	16.67	0.982
3	23.622	23.409	38.4	12.9	38.4	12.9	343.3	1.000	16.84	0.992
4	22.786	22.672	36.9	11.7	36.9	11.7	340.8	1.000	17.07	0.992
5	21.638	21.661	39.2	11.9	39.2	11.9	341.6	1.000	17.18	0.990
6	20.470	20.635	40.2	12.0	40.2	12.0	340.2	1.000	17.39	0.990
7	19.578	19.850	41.1	10.7	41.1	10.7	339.0	1.000	17.19	0.991
8	19.276	19.586	42.5	11.3	42.5	11.3	340.3	1.000	17.23	0.989
9	18.971	19.317	44.7	13.0	44.7	13.0	343.1	1.000	17.41	0.975

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	225.0	163.3	225.0	163.3	171.7	157.3	145.4	43.5	0.0	0.0
2	230.6	178.6	230.6	178.6	177.1	173.4	147.7	42.9	0.0	0.0
3	232.8	188.8	232.8	188.8	182.5	184.0	144.6	42.0	0.0	0.0
4	236.1	196.3	236.1	196.3	188.8	192.2	141.8	39.9	0.0	0.0
5	242.0	201.5	242.0	201.5	187.5	197.2	152.9	41.6	0.0	0.0
6	246.4	207.3	246.4	207.3	188.3	202.7	159.0	43.2	0.0	0.0
7	247.1	204.7	247.1	204.7	186.2	201.1	162.4	37.8	0.0	0.0
8	250.1	205.5	250.1	205.5	184.5	201.6	168.9	40.2	0.0	0.0
9	256.6	206.4	256.6	206.4	182.2	201.2	180.6	46.3	0.0	0.0

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.627	0.447	0.627	0.447	0.479	0.431	0.917	0.981
2	0.644	0.491	0.644	0.491	0.495	0.477	0.979	0.994
3	0.653	0.522	0.653	0.522	0.512	0.509	1.009	0.972
4	0.666	0.546	0.666	0.546	0.532	0.535	1.018	0.947
5	0.683	0.561	0.683	0.561	0.529	0.549	1.052	1.010
6	0.698	0.579	0.698	0.579	0.533	0.566	1.077	1.039
7	0.702	0.572	0.702	0.572	0.529	0.562	1.080	1.046
8	0.709	0.574	0.709	0.574	0.523	0.563	1.093	1.080
9	0.727	0.574	0.727	0.574	0.516	0.559	1.104	1.152

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	3.5	-3.9	12.8	0.450	0.000	0.142	0.142	0.053	0.053
2	10.00	3.2	-4.1	11.1	0.401	0.000	0.075	0.075	0.028	0.028
3	15.00	1.7	-5.4	10.0	0.358	0.000	0.032	0.032	0.012	0.012
4	30.00	0.1	-6.5	8.4	0.330	0.000	0.033	0.033	0.012	0.012
5	50.00	1.9	-4.1	8.1	0.334	0.000	0.036	0.036	0.013	0.013
6	70.00	2.5	-2.9	7.6	0.324	0.000	0.036	0.036	0.012	0.012
7	85.00	2.6	-2.4	5.8	0.343	0.000	0.031	0.031	0.011	0.011
8	90.00	3.7	-1.2	6.3	0.351	0.000	0.039	0.039	0.013	0.013
9	95.00	5.7	1.0	7.8	0.369	0.000	0.083	0.083	0.027	0.027

TABLE VI. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 36—SI UNITS

(n) 90 Percent of design speed; reading 4284

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.148	23.879	41.7	15.5	41.7	15.5	347.5	1.000	16.62	0.968
2	23.889	23.647	41.2	14.0	41.2	14.0	346.9	1.000	16.84	0.981
3	23.622	23.409	40.2	13.1	40.2	13.1	345.7	1.000	16.93	0.991
4	22.786	22.672	39.1	12.1	39.1	12.1	342.6	1.000	17.14	0.992
5	21.638	21.661	40.6	12.0	40.6	12.0	342.6	1.000	17.23	0.992
6	20.470	20.635	41.5	12.2	41.5	12.2	340.8	1.000	17.43	0.990
7	19.578	19.850	42.5	10.8	42.5	10.8	339.4	1.000	17.25	0.991
8	19.276	19.586	43.0	11.4	43.0	11.4	340.8	1.000	17.37	0.987
9	18.971	19.317	45.0	13.3	45.0	13.3	343.6	1.000	17.58	0.974

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	227.7	158.9	227.7	158.9	170.0	153.1	151.4	42.5	0.0	0.0
2	231.4	172.7	231.4	172.7	174.1	167.6	152.5	41.8	0.0	0.0
3	232.5	181.9	232.5	181.9	177.5	177.2	150.1	41.3	0.0	0.0
4	234.3	189.6	234.3	189.6	181.9	185.4	147.7	39.6	0.0	0.0
5	240.9	194.3	240.9	194.3	182.8	190.0	156.8	40.5	0.0	0.0
6	243.2	199.9	243.2	199.9	182.1	195.4	161.2	42.1	0.0	0.0
7	248.1	196.9	248.1	196.9	182.9	193.4	167.6	37.0	0.0	0.0
8	252.2	198.5	252.2	198.5	184.6	194.6	171.9	39.4	0.0	0.0
9	259.5	200.3	259.5	200.3	183.4	194.9	183.6	46.2	0.0	0.0

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.633	0.433	0.633	0.433	0.473	0.417	0.900	1.021
2	0.645	0.473	0.645	0.473	0.485	0.459	0.963	1.025
3	0.649	0.500	0.649	0.500	0.496	0.487	0.998	1.006
4	0.658	0.525	0.658	0.525	0.511	0.513	1.020	0.986
5	0.678	0.539	0.678	0.539	0.515	0.527	1.039	1.036
6	0.688	0.557	0.688	0.557	0.515	0.544	1.073	1.055
7	0.704	0.549	0.704	0.549	0.519	0.539	1.057	1.083
8	0.715	0.552	0.715	0.552	0.524	0.541	1.054	1.101
9	0.735	0.555	0.735	0.555	0.520	0.540	1.063	1.173

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	4.9	-2.5	12.9	0.487	0.000	0.137	0.137	0.051	0.051
2	10.00	4.5	-2.8	11.2	0.438	0.000	0.078	0.078	0.029	0.029
3	15.00	3.5	-3.6	10.2	0.397	0.000	0.035	0.035	0.013	0.013
4	30.00	2.3	-4.3	8.8	0.364	0.000	0.034	0.034	0.012	0.012
5	50.00	3.3	-2.7	8.2	0.369	0.000	0.029	0.029	0.010	0.010
6	70.00	3.8	-1.6	7.7	0.350	0.000	0.036	0.036	0.013	0.013
7	85.00	4.0	-1.0	6.0	0.386	0.000	0.033	0.033	0.011	0.011
8	90.00	4.2	-0.7	6.5	0.390	0.000	0.046	0.046	0.015	0.015
9	95.00	6.0	1.3	8.2	0.404	0.000	0.085	0.085	0.028	0.028

TABLE VI. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 36—SI UNITS

(o) 100 Percent of design speed; reading 4269

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.148	23.879	45.3	15.5	45.3	15.5	365.2	1.000	18.91	0.961
2	23.889	23.647	44.9	14.8	44.9	14.8	364.3	1.000	19.14	0.973
3	23.622	23.409	43.8	14.2	43.8	14.2	362.8	1.000	19.30	0.982
4	22.786	22.672	42.6	13.3	42.6	13.3	359.4	1.000	19.53	0.983
5	21.638	21.661	43.5	12.3	43.5	12.3	356.9	1.000	19.47	0.982
6	20.470	20.635	45.0	13.9	45.0	13.9	357.3	1.000	19.78	0.983
7	19.578	19.850	45.0	11.8	45.0	11.8	354.6	1.000	19.56	0.982
8	19.276	19.586	45.8	11.9	45.8	11.9	355.5	1.000	19.52	0.981
9	18.971	19.317	48.2	13.2	48.2	13.2	357.5	1.000	19.55	0.973

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	249.9	168.4	249.9	168.4	176.0	162.2	177.5	45.1	0.0	0.0
2	253.3	181.4	253.3	181.4	179.4	175.4	178.8	46.4	0.0	0.0
3	255.1	191.0	255.1	191.0	184.1	185.1	176.5	46.8	0.0	0.0
4	258.7	198.3	258.7	198.3	190.5	192.9	175.1	45.7	0.0	0.0
5	260.9	199.0	260.9	199.0	189.3	194.4	179.6	42.2	0.0	0.0
6	270.1	208.3	270.1	208.3	191.1	202.2	190.9	50.0	0.0	0.0
7	271.3	204.1	271.3	204.1	192.0	199.8	191.7	41.9	0.0	0.0
8	272.6	204.4	272.6	204.4	190.1	200.0	195.4	42.3	0.0	0.0
9	276.4	204.3	276.4	204.3	184.4	198.9	205.9	46.5	0.0	0.0

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID VEL R	PEAK SS MACH NO
1	0.682	0.448	0.682	0.448	0.480	0.432	0.922	1.182
2	0.693	0.485	0.693	0.485	0.491	0.469	0.977	1.188
3	0.700	0.513	0.700	0.513	0.505	0.497	1.005	1.170
4	0.715	0.537	0.715	0.537	0.526	0.522	1.013	1.155
5	0.724	0.540	0.724	0.540	0.525	0.528	1.027	1.176
6	0.752	0.567	0.752	0.567	0.532	0.550	1.058	1.241
7	0 759	0.557	0.759	0.557	0.537	0.545	1.040	1.230
8	0.762	0.557	0.762	0.557	0.531	0.545	1.052	1.246
9	0.771	0.555	0.771	0.555	0.514	0.541	1.079	1.313

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	8.5	1.1	12.9	0.532	0.000	0.146	0.146	0.054	0.054
2	10.00	8.2	0.9	12.1	0.485	0.000	0.099	0.099	0.037	0.037
3	15.00	7.1	-0.0	11.3	0.446	0.000	0.063	0.063	0.023	0.023
4	30.00	5.8	-0.8	10.0	0.421	0.000	0.058	0.058	0.021	0.021
5	50.00	6.2	0.2	8.4	0.429	0.000	0.061	0.061	0.022	0.022
6	70.00	7.2	1.8	9.4	0.412	0.000	0.054	0.054	0.019	0.019
7	85.00	6.4	1.5	7.0	0.435	0.000	0.058	0.058	0.019	0.019
8	90.00	7.0	2.2	7.0	0.439	0.000	0.058	0.058	0.019	0.019
9	95.00	9.1	4.4	8.1	0.453	0.000	0.083	0.083	0.027	0.027

TABLE VI. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 36—SI UNITS

(p) 100 Percent of design speed; reading 4270

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.148	23.879	44.3	15.5	44.3	15.5	363.9	1.000	18.74	0.960
2	23.889	23.647	44.3	14.7	44.3	14.7	363.1	1.000	19.02	0.973
3	23.622	23.409	42.9	14.0	42.9	14.0	361.4	1.000	19.20	0.983
4	22.786	22.672	41.3	13.0	41.3	13.0	357.7	1.000	19.39	0.983
5	21.638	21.661	42.7	12.1	42.7	12.1	355.9	1.000	19.31	0.982
6	20.470	20.635	44.0	13.7	44.0	13.7	356.6	1.000	19.63	0.984
7	19.578	19.850	44.0	11.7	44.0	11.7	353.8	1.000	19.47	0.982
8	19.276	19.586	45.3	11.8	45.3	11.8	354.6	1.000	19.41	0.981
9	18.971	19.317	47.8	13.0	47.8	13.0	356.8	1.000	19.42	0.973

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	249.3	168.8	249.3	168.8	178.3	162.6	174.3	45.1	0.0	0.0
2	253.5	183.3	253.5	183.3	181.6	177.3	177.0	46.5	0.0	0.0
3	255.5	193.4	255.5	193.4	187.2	187.7	173.8	46.8	0.0	0.0
4	258.7	200.8	258.7	200.8	194.4	195.7	170.8	45.3	0.0	0.0
5	260.3	201.3	260.3	201.3	191.2	196.8	176.6	42.2	0.0	0.0
6	270.3	212.1	270.3	212.1	194.4	206.1	187.8	50.3	0.0	0.0
7	270.5	208.9	270.5	208.9	194.5	204.5	187.9	42.5	0.0	0.0
8	271.7	208.7	271.7	208.7	191.0	204.3	193.2	42.5	0.0	0.0
9	275.0	208.4	275.0	208.4	184.7	203.1	203.8	46.9	0.0	0.0

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.682	0.450	0.682	0.450	0.487	0.434	0.912	1.160
2	0.695	0.491	0.695	0.491	0.498	0.475	0.976	1.177
3	0.703	0.521	0.703	0.521	0.515	0.506	1.002	1.152
4	0.717	0.545	0.717	0.545	0.538	0.531	1.007	1.127
5	0.723	0.548	0.723	0.548	0.531	0.536	1.029	1.156
6	0.753	0.579	0.753	0.579	0.542	0.562	1.060	1.219
7	0.757	0.572	0.757	0.572	0.545	0.560	1.051	1.203
8	0.760	0.571	0.760	0.571	0.534	0.559	1.070	1.231
9	0.768	0.568	0.768	0.568	0.516	0.553	1.099	1.298

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	7.6	0.2	12.8	0.524	0.000	0.151	0.151	0.056	0.056
2	10.00	7.6	0.3	11.9	0.475	0.000	0.097	0.097	0.036	0.036
3	15.00	6.2	-1.0	11.1	0.433	0.000	0.062	0.062	0.023	0.023
4	30.00	4.5	-2.1	9.7	0.406	0.000	0.058	0.058	0.021	0.021
5	50.00	5.4	-0.6	8.2	0.414	0.000	0.063	0.063	0.022	0.022
6	70.00	6.3	0.9	9.2	0.394	0.000	0.051	0.051	0.017	0.017
7	85.00	5.5	0.5	6.9	0.411	0.000	0.058	0.058	0.020	0.020
8	90.00	6.5	1.7	6.8	0.418	0.000	0.060	0.060	0.020	0.020
9	95.00	8.8	4.0	7.9	0.432	0.000	0.082	0.082	0.027	0.027

TABLE VI. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 36—SI UNITS

(q) 100 Percent of design speed; reading 4271

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.148	23.879	42.9	15.4	42.9	15.4	361.1	1.000	18.41	0.958
2	23.889	23.647	42.8	14.7	42.8	14.7	360.5	1.000	18.73	0.973
3	23.622	23.409	41.0	14.0	41.0	14.0	358.6	1.000	18.93	0.982
4	22.786	22.672	39.8	12.7	39.8	12.7	355.6	1.000	19.11	0.983
5	21.638	21.661	41.5	12.0	41.5	12.0	354.3	1.000	19.06	0.980
6	20.470	20.635	43.2	13.4	43.2	13.4	355.6	1.000	19.41	0.985
7	19.578	19.850	43.2	11.8	43.2	11.8	353.1	1.000	19.38	0.981
8	19.276	19.586	44.3	11.5	44.3	11.5	353.7	1.000	19.33	0.981
9	18.971	19.317	46.3	12.7	46.3	12.7	355.7	1.000	19.35	0.973

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	246.9	170.3	246.9	170.3	180.9	164.2	168.0	45.4	0.0	0.0
2	252.0	186.9	252.0	186.9	185.0	180.7	171.2	47.4	0.0	0.0
3	254.0	197.7	254.0	197.7	191.6	191.8	166.7	47.9	0.0	0.0
4	258.6	205.0	258.6	205.0	198.7	200.0	165.5	45.2	0.0	0.0
5	258.9	205.7	258.9	205.7	193.9	201.2	171.5	42.9	0.0	0.0
6	270.7	216.8	270.7	216.8	197.4	211.0	185.2	50.1	0.0	0.0
7	272.1	214.9	272.1	214.9	198.5	210.4	186.1	43.9	0.0	0.0
8	273.4	214.7	273.4	214.7	195.6	210.4	191.1	42.7	0.0	0.0
9	276.7	214.4	276.7	214.4	191.3	209.2	200.0	47.1	0.0	0.0

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID VEL R	PEAK SS MACH NO
1	0.677	0.456	0.677	0.456	0.496	0.440	0.908	1.119
2	0.693	0.503	0.693	0.503	0.509	0.487	0.977	1.139
3	0.701	0.536	0.701	0.536	0.529	0.520	1.001	1.106
4	0.719	0.559	0.719	0.559	0.552	0.545	1.006	1.093
5	0.721	0.562	0.721	0.562	0.540	0.550	1.037	1.122
6	0.756	0.593	0.756	0.593	0.551	0.577	1.069	1.201
7	0.763	0.590	0.763	0.590	0.557	0.578	1.060	1.190
8	0.767	0.589	0.767	0.589	0.548	0.577	1.076	1.216
9	0.775	0.586	0.775	0.586	0.535	0.572	1.094	1.269

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	6.1	-1.3	12.8	0.502	0.000	0.160	0.160	0.059	0.059
2	10.00	6.1	-1.2	11.9	0.448	0.000	0.097	0.097	0.036	0.036
3	15.00	4.3	-2.8	11.1	0.401	0.000	0.063	0.063	0.023	0.023
4	30.00	3.0	-3.6	9.4	0.382	0.000	0.058	0.058	0.021	0.021
5	50.00	4.2	-1.8	8.2	0.386	0.000	0.068	0.068	0.024	0.024
6	70.00	5.5	0.0	8.9	0.374	0.000	0.049	0.049	0.017	0.017
7	85.00	4.6	-0.3	7.0	0.388	0.000	0.060	0.060	0.020	0.020
8	90.00	5.6	0.7	6.5	0.397	0.000	0.060	0.060	0.020	0.020
9	95.00	7.2	2.5	7.6	0.409	0.000	0.083	0.083	0.027	0.027

TABLE VI. – Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 36—SI UNITS

(r) 100 Percent of design speed; reading 4272

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.148	23.879	41.4	15.6	41.4	15.6	357.6	1.000	17.85	0.957
2	23.889	23.647	40.5	14.6	40.5	14.6	357.2	1.000	18.31	0.971
3	23.622	23.409	38.9	13.7	38.9	13.7	355.6	1.000	18.56	0.981
4	22.786	22.672	38.1	12.4	38.1	12.4	352.7	1.000	18.69	0.983
5	21.638	21.661	40.3	11.8	40.3	11.8	352.0	1.000	18.68	0.979
6	20.470	20.635	41.9	13.1	41.9	13.1	353.9	1.000	19.10	0.984
7	19.578	19.850	41.9	11.7	41.9	11.7	351.9	1.000	19.17	0.981
8	19.276	19.586	42.7	11.4	42.7	11.4	352.3	1.000	19.14	0.980
9	18.971	19.317	44.7	12.5	44.7	12.5	354.4	1.000	19.19	0.972

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	241.3	174.2	241.3	174.2	181.1	167.8	159.4	46.9	0.0	0.0
2	249.4	192.1	249.4	192.1	189.8	185.9	161.8	48.3	0.0	0.0
3	252.9	203.2	252.9	203.2	196.7	197.4	159.0	48.2	0.0	0.0
4	255.6	209.3	255.6	209.3	201.2	204.5	157.7	44.8	0.0	0.0
5	257.0	210.5	257.0	210.5	196.1	206.1	166.1	43.1	0.0	0.0
6	268.6	222.5	268.6	222.5	200.0	216.7	179.3	50.6	0.0	0.0
7	273.2	222.3	273.2	222.3	203.2	217.7	182.6	45.0	0.0	0.0
8	274.5	222.0	274.5	222.0	201.8	217.5	186.1	44.1	0.0	0.0
9	278.2	221.4	278.2	221.4	197.7	216.1	195.7	48.1	0.0	0.0

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.664	0.470	0.664	0.470	0.498	0.452	0.926	1.063
2	0.689	0.520	0.689	0.520	0.524	0.504	0.979	1.077
3	0.701	0.554	0.701	0.554	0.545	0.538	1.004	1.057
4	0.712	0.574	0.712	0.574	0.561	0.561	1.016	1.043
5	0.717	0.578	0.717	0.578	0.547	0.566	1.051	1.087
6	0.751	0.612	0.751	0.612	0.559	0.596	1.083	1.161
7	0.768	0.613	0.768	0.613	0.571	0.600	1.071	1.167
8	0.772	0.611	0.772	0.611	0.567	0.599	1.078	1.181
9	0.781	0.608	0.781	0.608	0.555	0.593	1.093	1.237

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	4.6	-2.8	13.0	0.459	0.000	0.169	0.169	0.063	0.063
2	10.00	3.8	-3.5	11.8	0.405	0.000	0.108	0.108	0.040	0.040
3	15.00	2.2	-4.9	10.8	0.364	0.000	0.067	0.067	0.025	0.025
4	30.00	1.3	-5.3	9.1	0.347	0.000	0.059	0.059	0.021	0.021
5	50.00	3.0	-3.0	8.0	0.355	0.000	0.072	0.072	0.025	0.025
6	70.00	4.2	-1.3	8.7	0.339	0.000	0.053	0.053	0.018	0.018
7	85.00	3.4	-1.5	6.9	0.358	0.000	0.059	0.059	0.020	0.020
8	90.00	3.9	-0.9	6.5	0.365	0.000	0.061	0.061	0.021	0.021
9	95.00	5.7	1.0	7.4	0.381	0.000	0.085	0.085	0.028	0.028

TABLE VI. – Concluded. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 36—SI UNITS

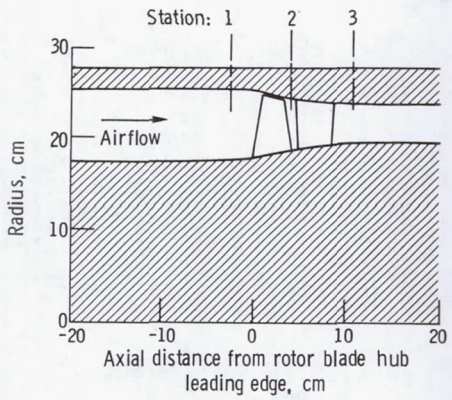
(s) 100 Percent of design speed; reading 4273

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRESS IN	TOTAL PRESS RATIO
1	24.148	23.879	37.6	15.6	37.6	15.6	349.1	1.000	16.59	0.958
2	23.889	23.647	36.1	14.2	36.1	14.2	349.0	1.000	17.27	0.971
3	23.622	23.409	34.4	13.1	34.4	13.1	347.5	1.000	17.55	0.983
4	22.786	22.672	34.5	11.8	34.5	11.8	346.2	1.000	17.64	0.986
5	21.638	21.661	37.1	11.6	37.1	11.6	347.2	1.000	17.71	0.979
6	20.470	20.635	38.8	12.8	38.8	12.8	349.0	1.000	18.39	0.975
7	19.578	19.850	38.8	11.7	38.8	11.7	347.8	1.000	18.54	0.979
8	19.276	19.586	39.2	11.4	39.2	11.4	348.0	1.000	18.54	0.980
9	18.971	19.317	41.2	12.2	41.2	12.2	350.9	1.000	18.65	0.972

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	229.7	181.9	229.7	181.9	182.1	175.3	140.0	48.8	0.0	0.0
2	243.3	202.4	243.3	202.4	196.5	196.3	143.4	49.6	0.0	0.0
3	247.8	214.2	247.8	214.2	204.4	208.6	140.1	48.6	0.0	0.0
4	250.4	220.4	250.4	220.4	206.4	215.8	141.7	44.9	0.0	0.0
5	252.6	223.1	252.6	223.1	201.5	218.6	152.3	44.7	0.0	0.0
6	267.4	234.7	267.4	234.7	208.3	228.8	167.7	52.0	0.0	0.0
7	274.1	236.3	274.1	236.3	213.7	231.5	171.7	47.8	0.0	0.0
8	275.4	236.0	275.4	236.0	213.6	231.3	173.9	46.8	0.0	0.0
9	280.3	235.1	280.3	235.1	210.8	229.8	184.7	49.8	0.0	0.0

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.638	0.498	0.638	0.498	0.506	0.479	0.962	0.939
2	0.679	0.557	0.679	0.557	0.548	0.540	0.999	0.962
3	0.694	0.593	0.694	0.593	0.573	0.577	1.020	0.938
4	0.704	0.613	0.704	0.613	0.580	0.600	1.045	0.941
5	0.709	0.620	0.709	0.620	0.566	0.607	1.085	0.997
6	0.754	0.653	0.754	0.653	0.587	0.636	1.098	1.087
7	0.776	0.659	0.776	0.659	0.605	0.645	1.083	1.095
8	0.780	0.658	0.780	0.658	0.605	0.645	1.083	1.100
9	0.792	0.652	0.792	0.652	0.595	0.637	1.090	1.161

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	0.8	-6.6	12.9	0.362	0.000	0.177	0.177	0.065	0.065
2	10.00	-0.6	-7.8	11.4	0.317	0.000	0.111	0.111	0.041	0.041
3	15.00	-2.3	-9.4	10.2	0.277	0.000	0.062	0.062	0.023	0.023
4	30.00	-2.3	-9.0	8.5	0.264	0.000	0.049	0.049	0.018	0.018
5	50.00	-0.2	-6.2	7.7	0.271	0.000	0.074	0.074	0.026	0.026
6	70.00	1.1	-4.3	8.3	0.274	0.000	0.081	0.081	0.028	0.028
7	85.00	0.3	-4.7	6.8	0.291	0.000	0.064	0.064	0.021	0.021
8	90.00	0.4	-4.5	6.5	0.298	0.000	0.060	0.060	0.020	0.020
9	95.00	2.2	-2.5	7.1	0.321	0.000	0.084	0.084	0.028	0.028

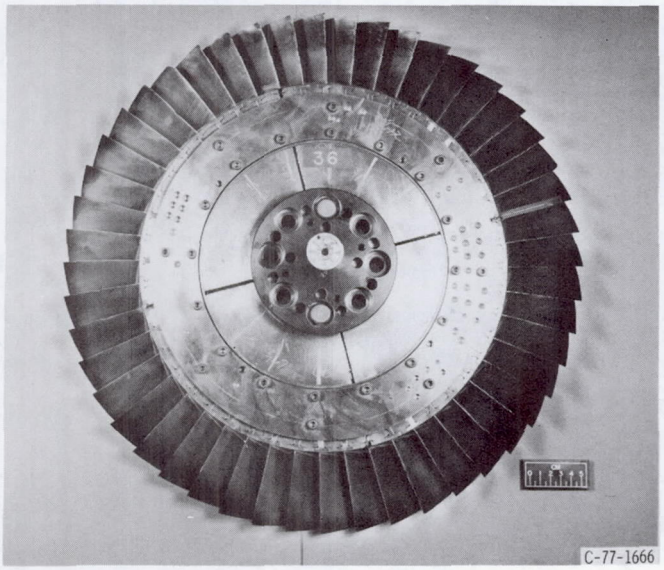


Flow path coordinates

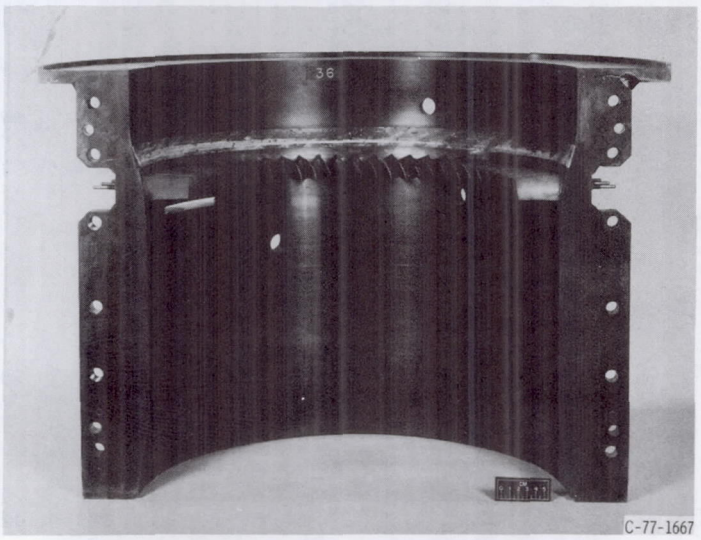
Inner		Outer	
Axial distance, cm	Radius, cm	Axial distance, cm	Radius, cm
-22.860	17.526	-22.860	25.654
-15.400	17.526	-15.400	25.654
-7.620	17.526	-7.620	25.654
-2.568	17.539	[a]-2.568	25.643
0	17.780	0	25.400
1.854	18.255	.632	25.247
4.137	18.714	1.854	24.925
4.859	18.821	1.974	24.882
6.566	19.035	3.282	24.511
8.890	19.279	[b]4.445	24.285
10.640	19.380	4.859	24.232
12.700	19.431	6.538	24.145
15.400	19.431	8.628	24.011
		[a]8.890	23.993
		10.640	23.851
		12.700	23.749
		15.400	23.749

[a]Survey planes.
[b]Calculation plane.

Figure 1. - Flow path and instrumentation stations.



(a) Rotor.



(b) Stator.

Figure 2. - Stage blade rows.

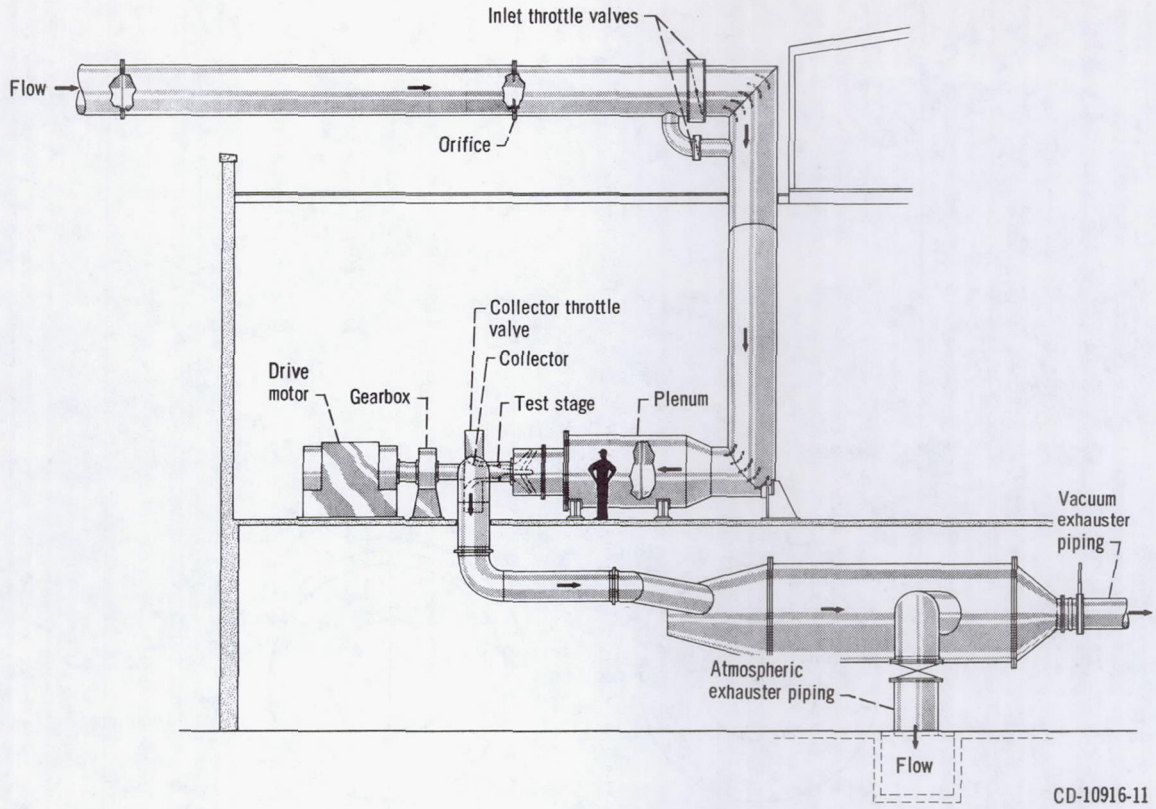
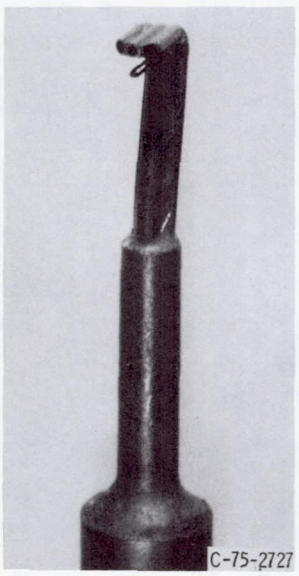


Figure 3. - Compressor test facility.



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

(b) Wedge probe (static pressure and flow angle).

Figure 4. - Traverse probes.

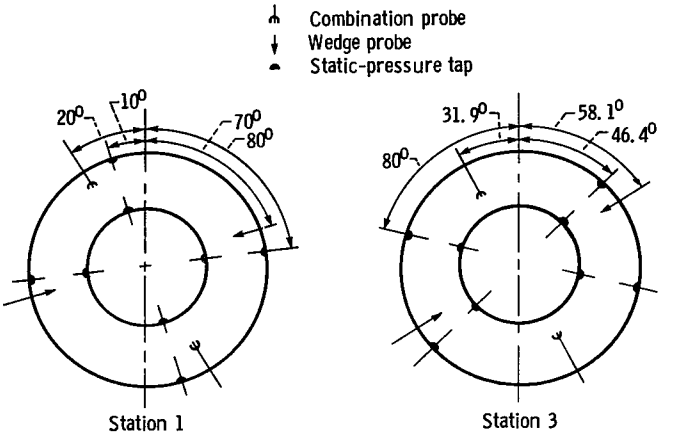


Figure 5. - Circumferential location of instrumentation at measuring station (facing upstream).

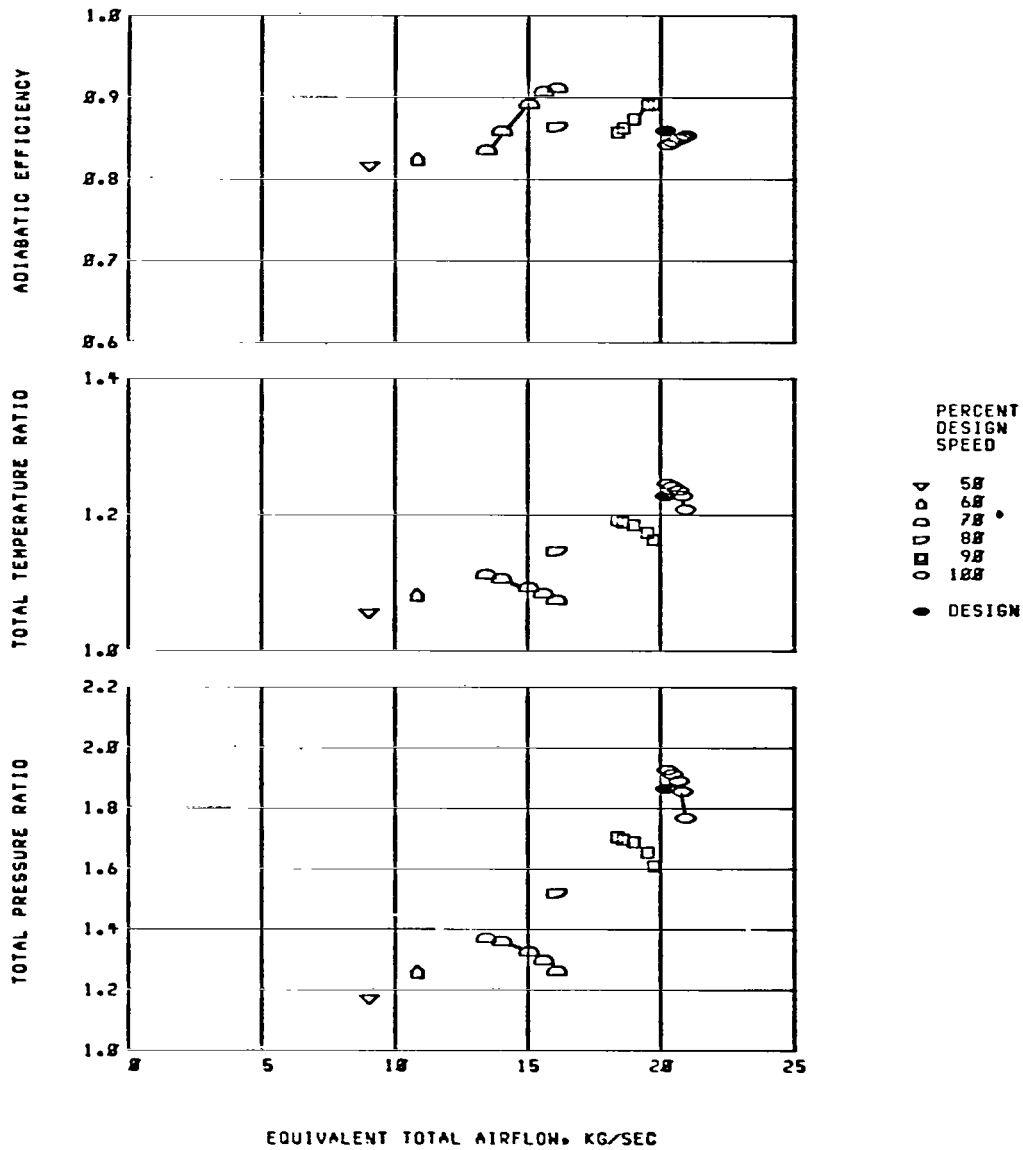


Figure 6. - Overall performance for rotor 36.

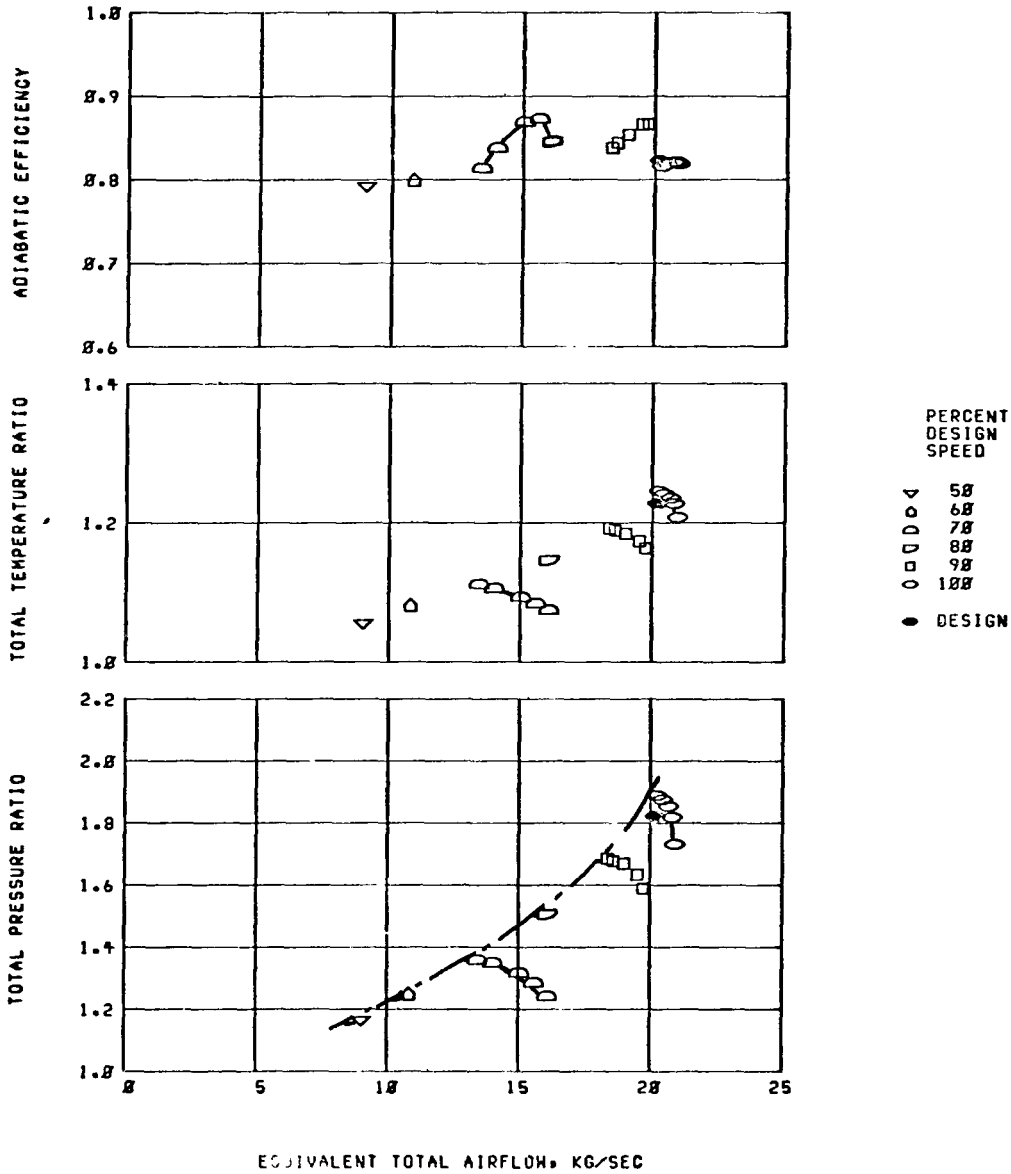


Figure 7. - Overall performance for stage 36.

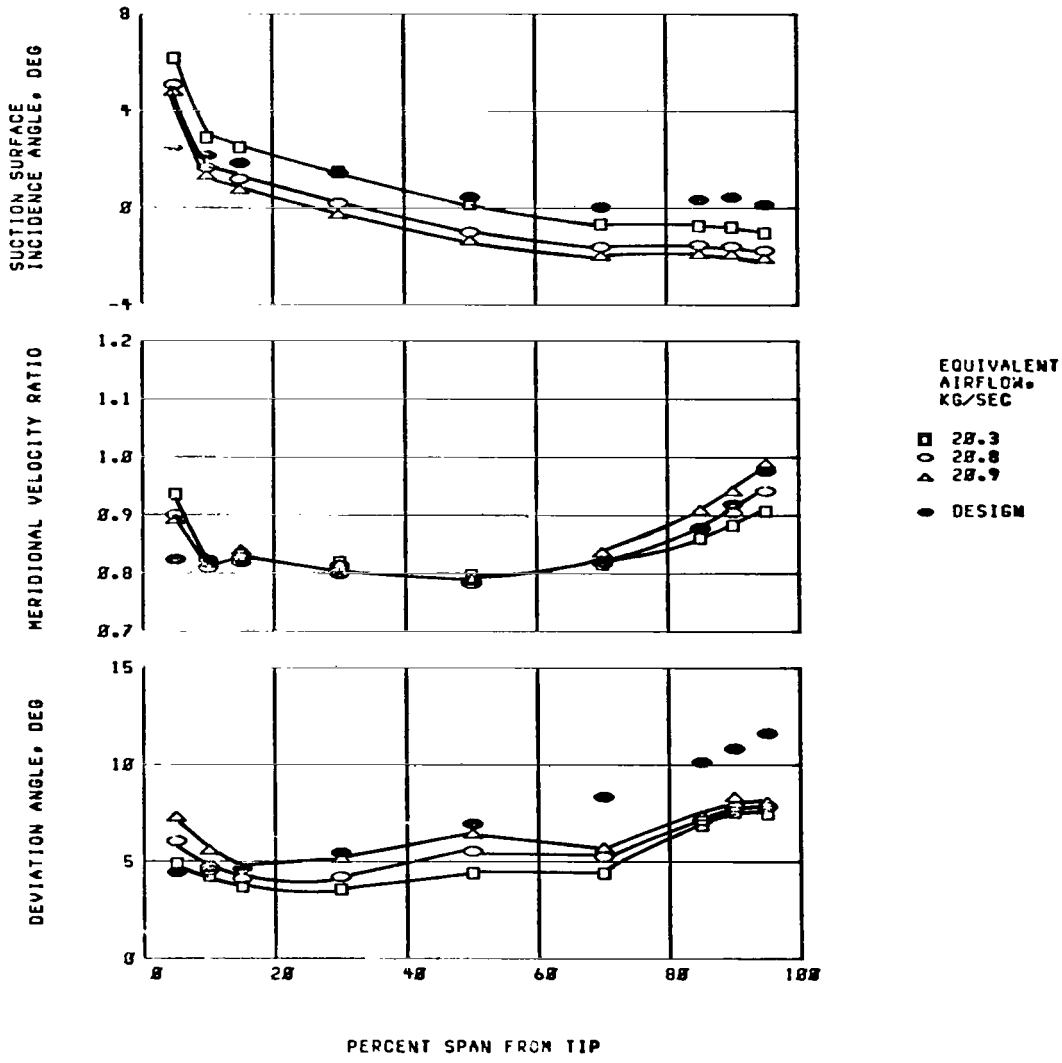


Figure 8. - Radial distribution of performance for rotor 36. 100 Percent of design speed.

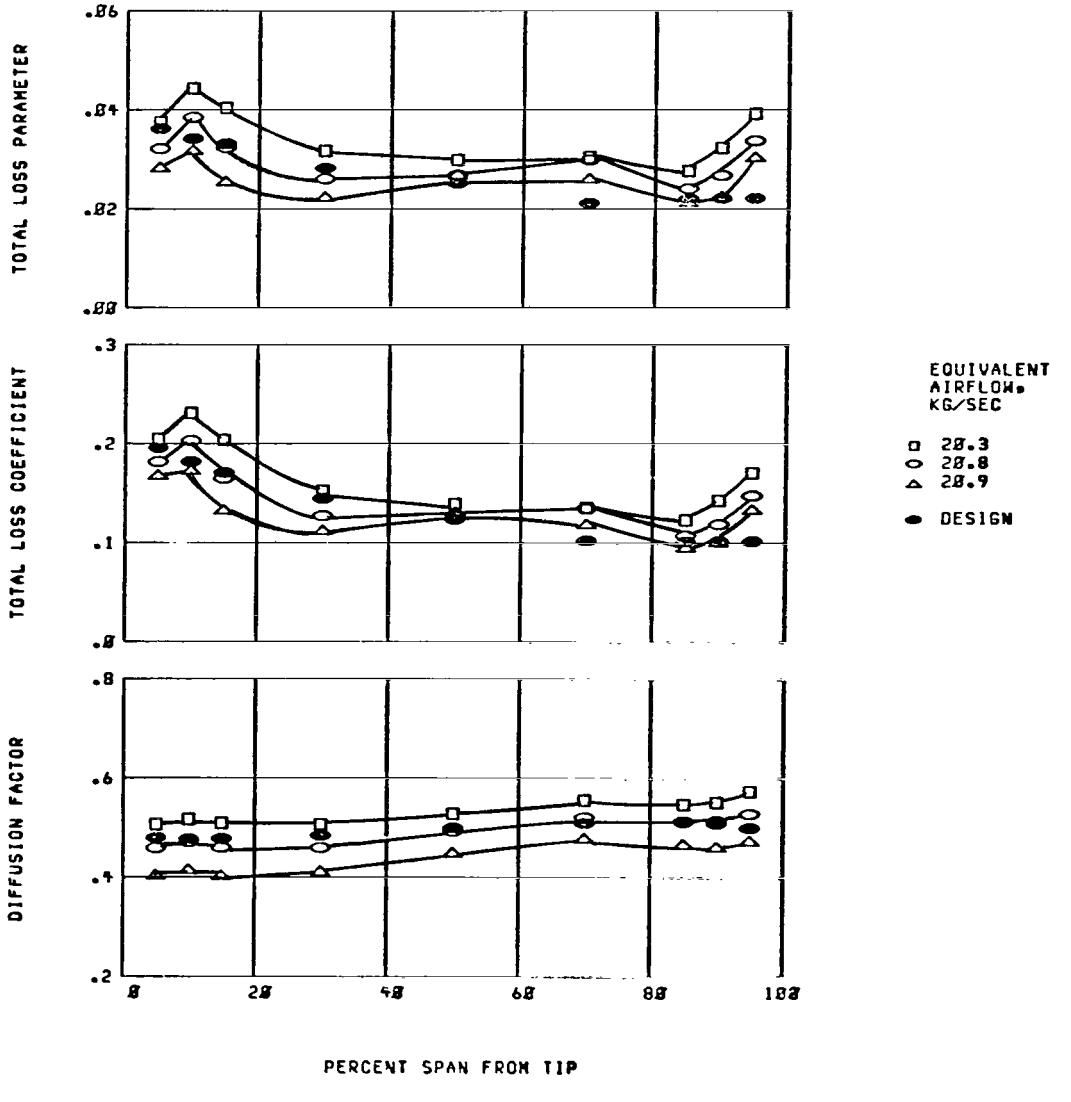


Figure 8. - Continued. Radial distribution of performance for rotor 36. 100 Percent of design speed.

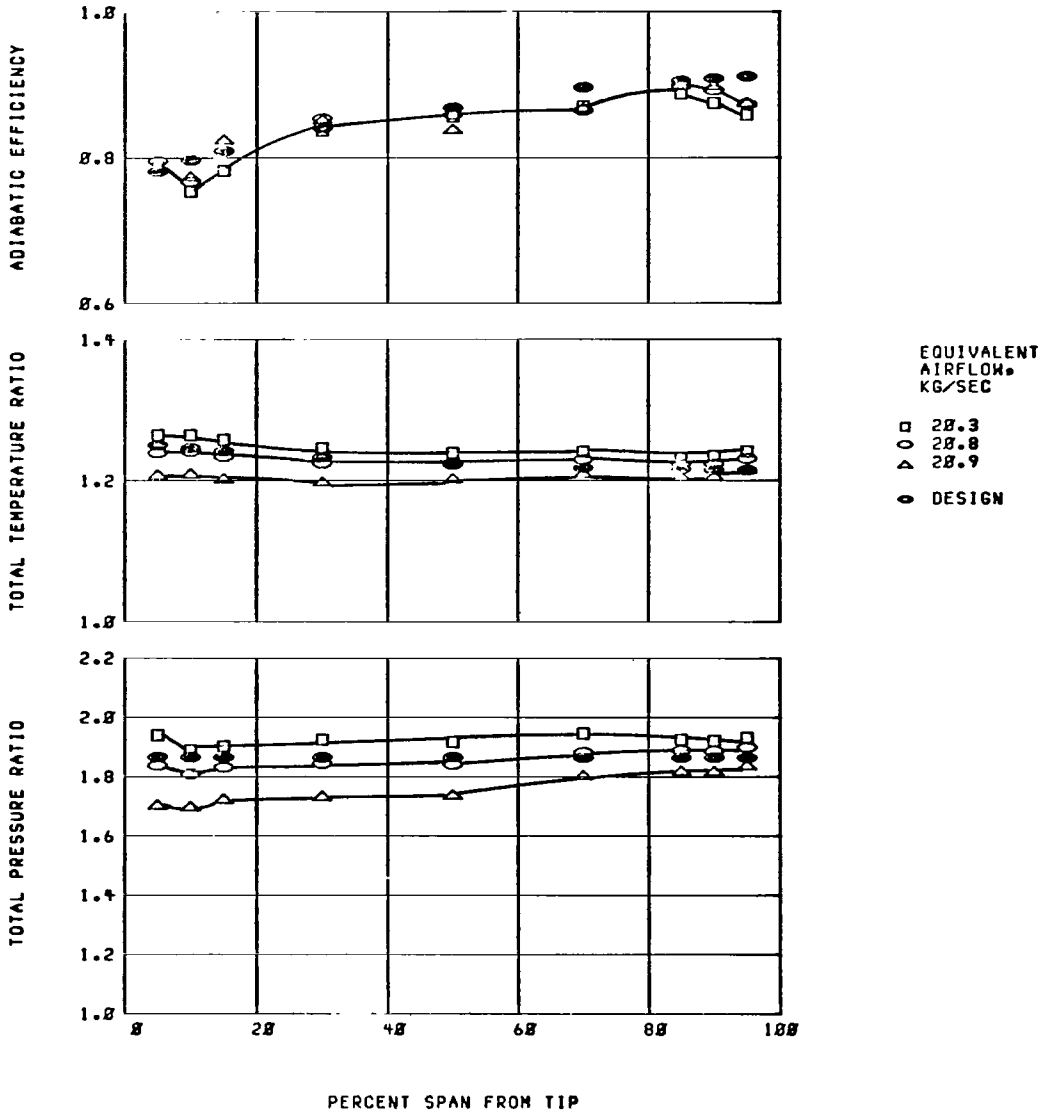


Figure 8. - Concluded. Radial distribution of performance for rotor 36. 100 Percent of design speed.

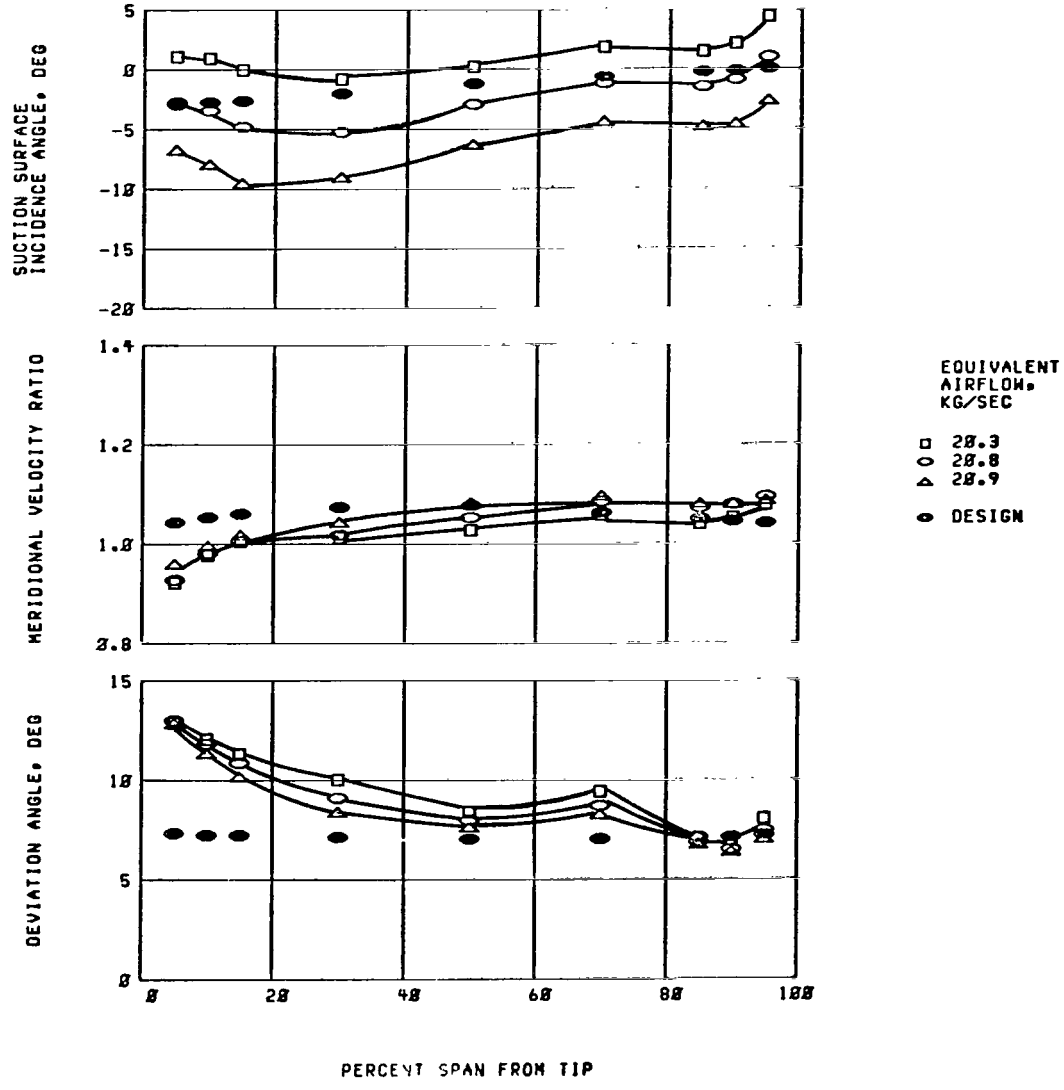


Figure 9. - Radial distribution of performance for stator 36. 100 Percent of design speed.

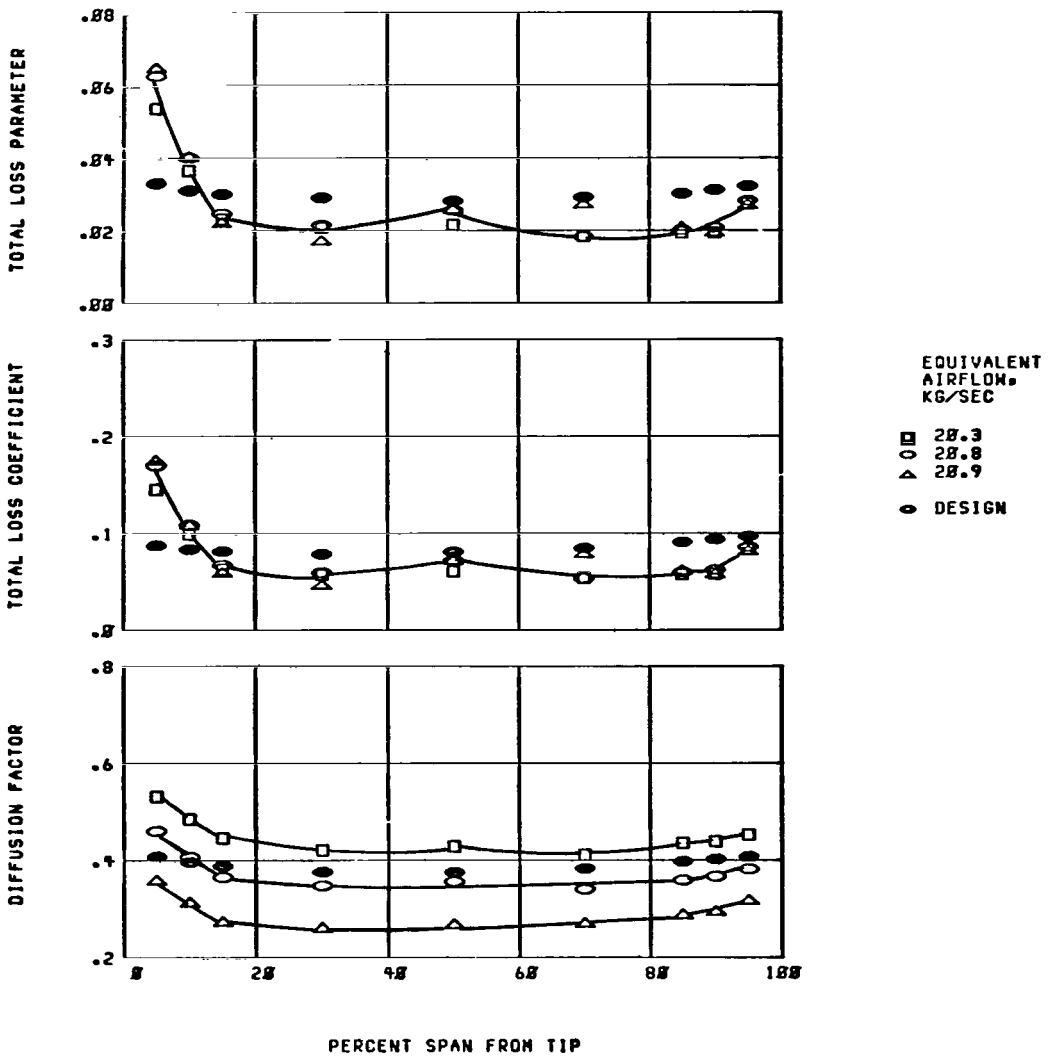


Figure 9. - Concluded. Radial distribution of performance for stator 36. 100 Percent of design speed.

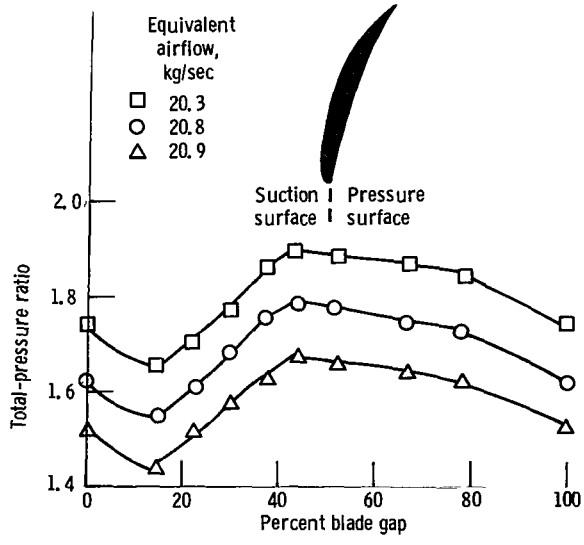
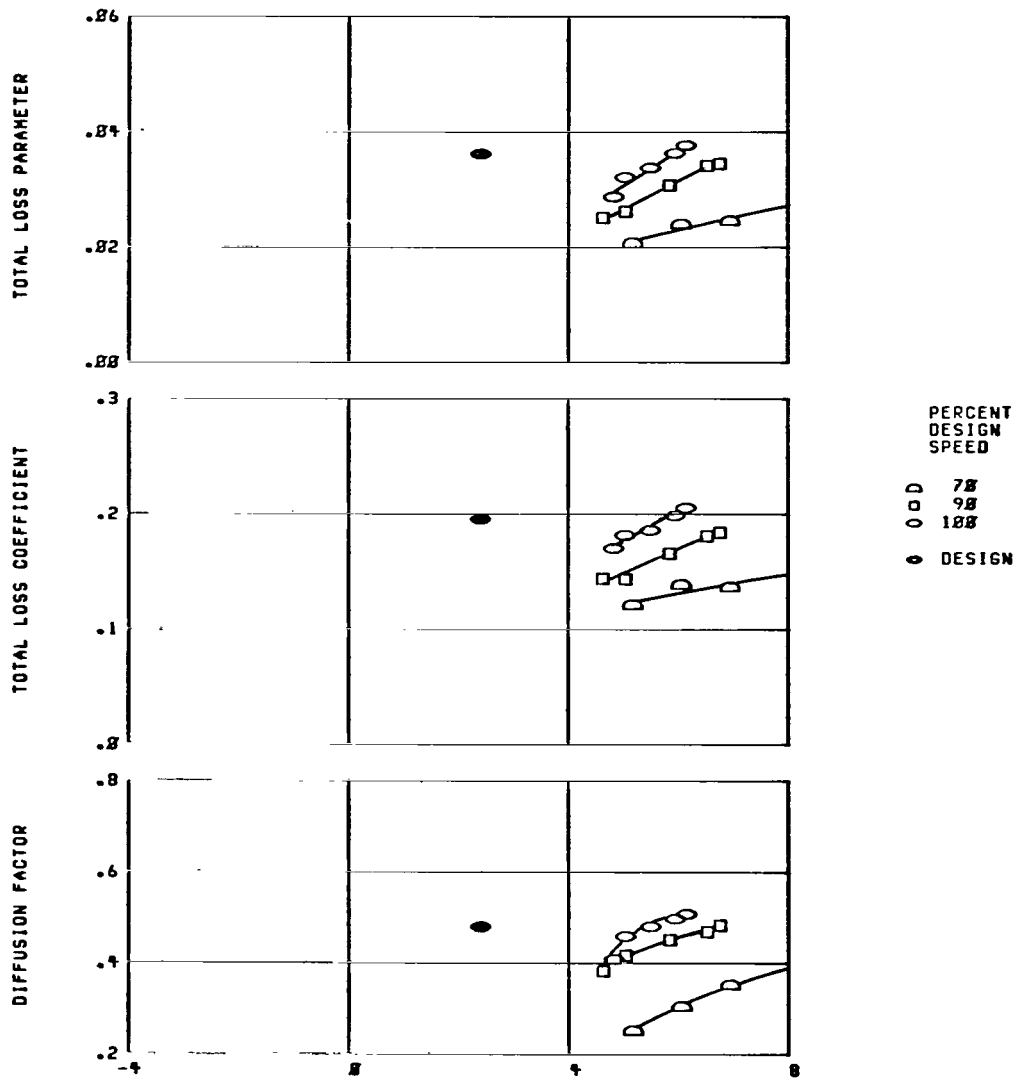
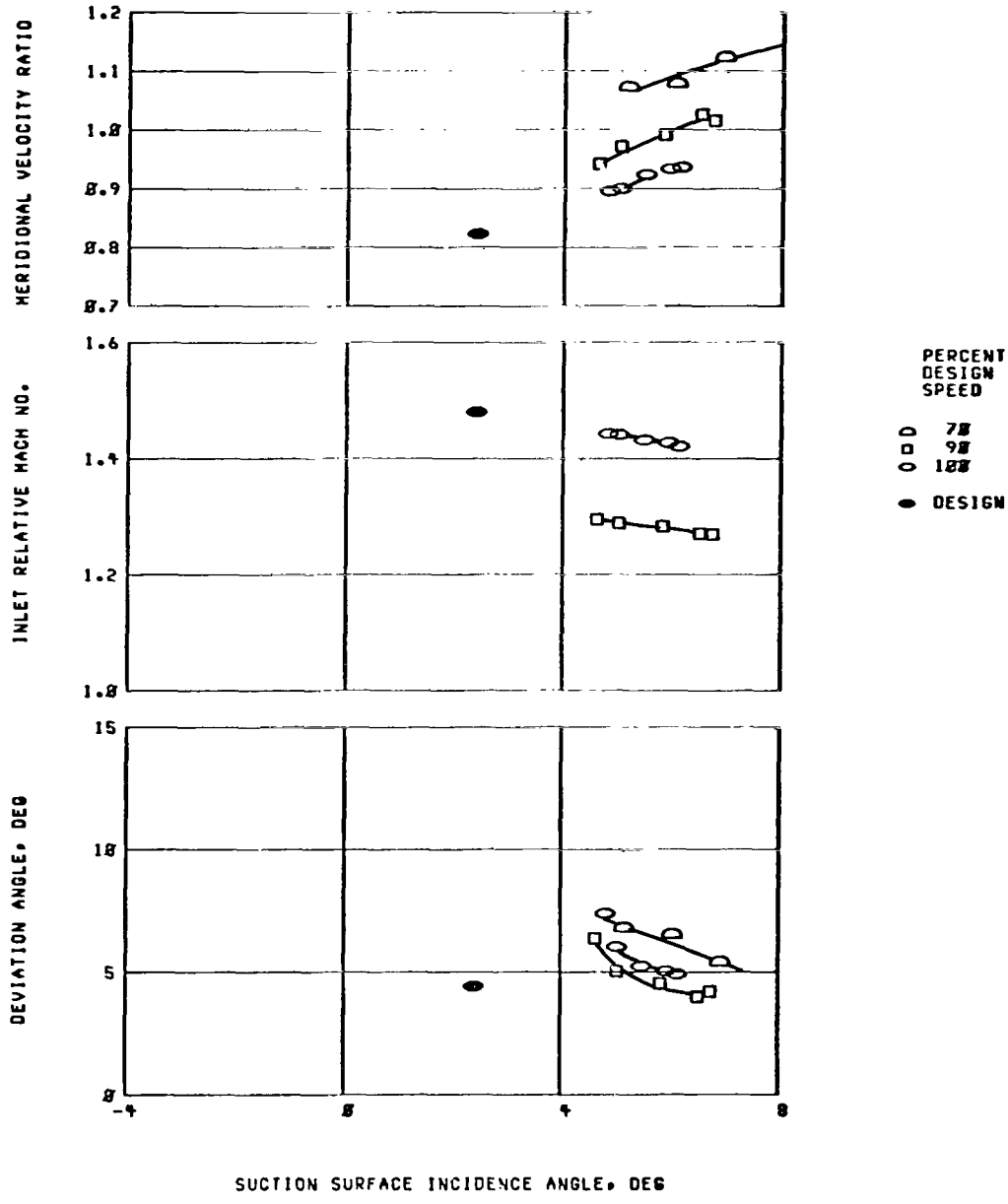


Figure 10. - Circumferential distribution of total-pressure ratio at station 3. 100 Percent of design speed; location, 5 percent of span.



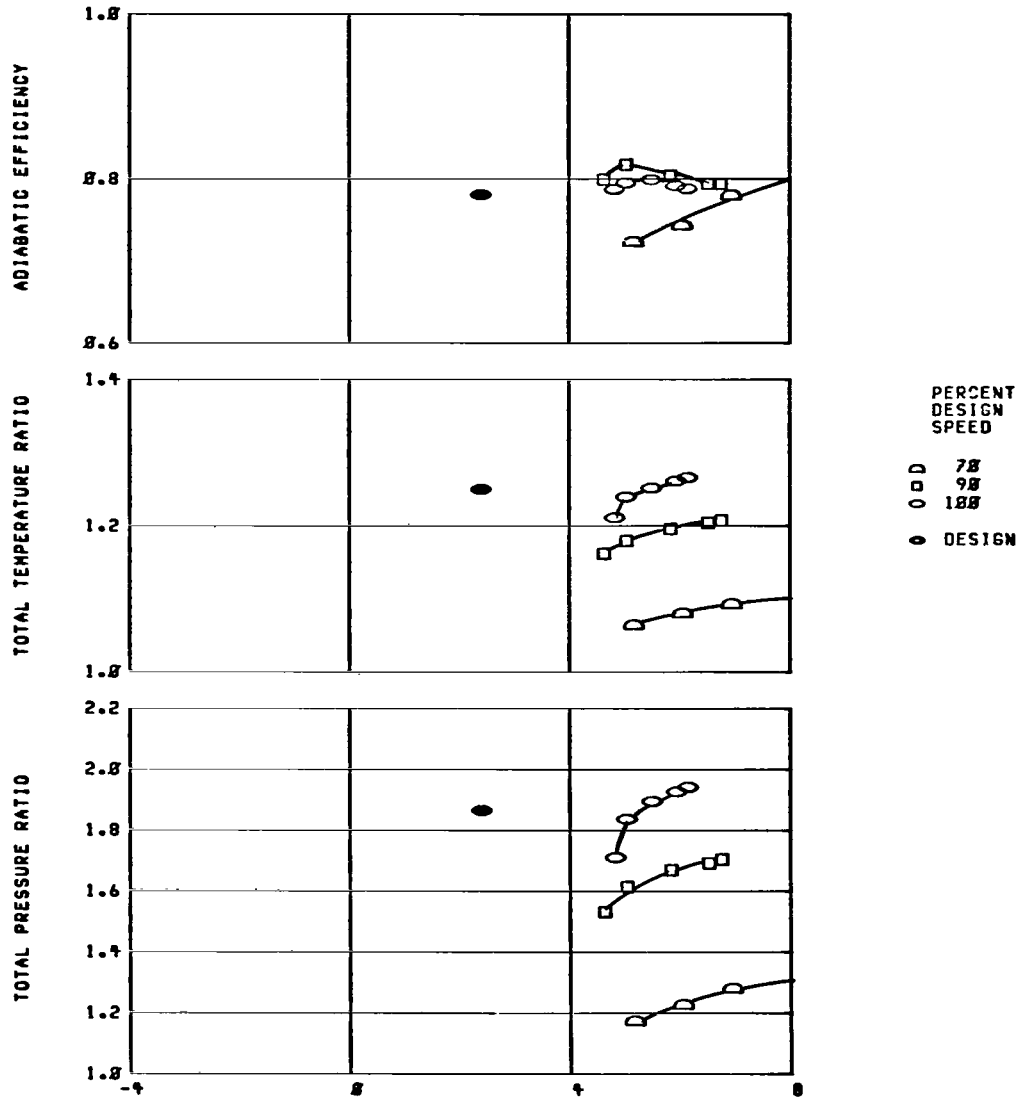
(a) Location, 5 percent of span.

Figure 11. - Blade-element performance for rotor 36.



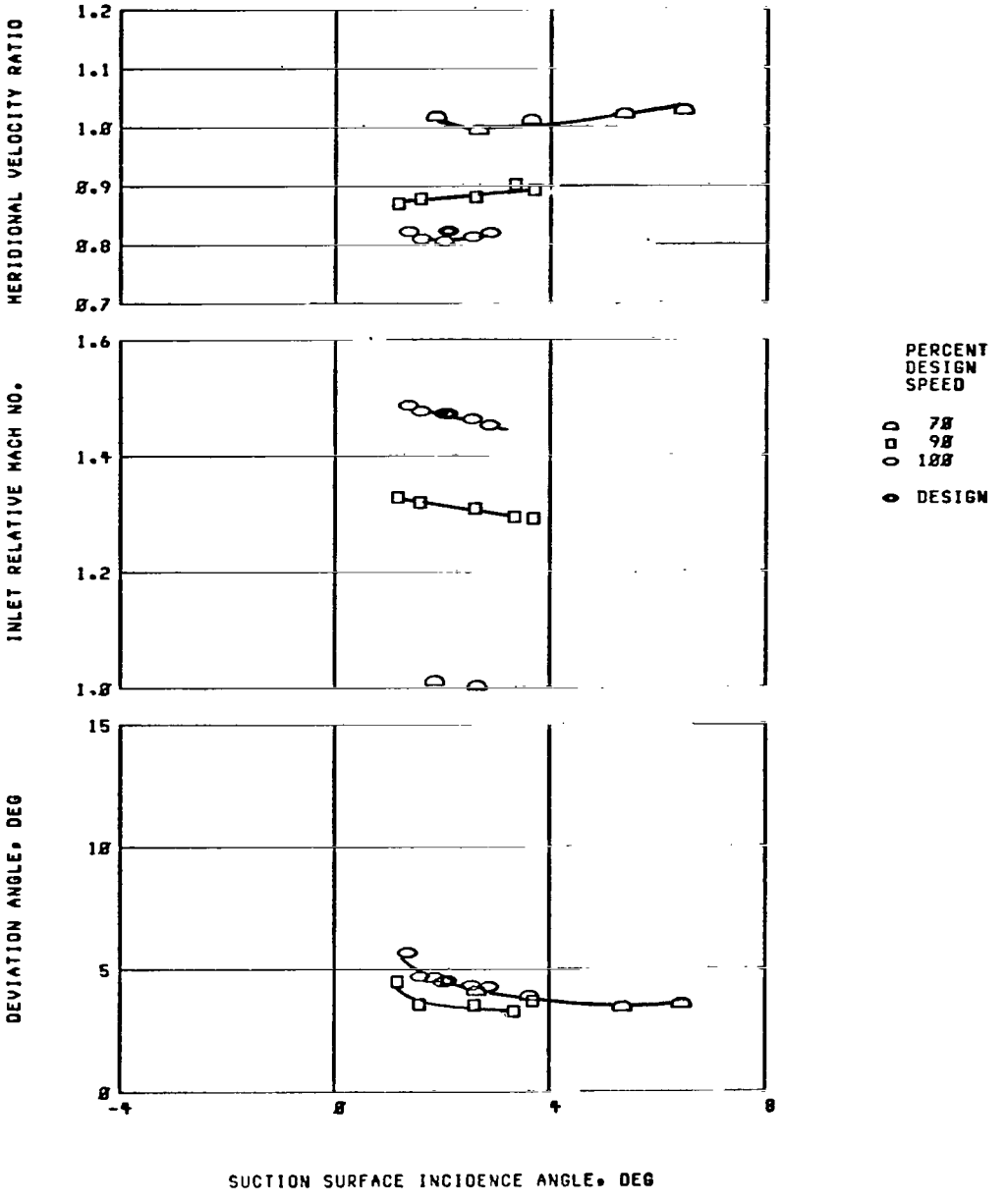
(a) Continued. Location, 5 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



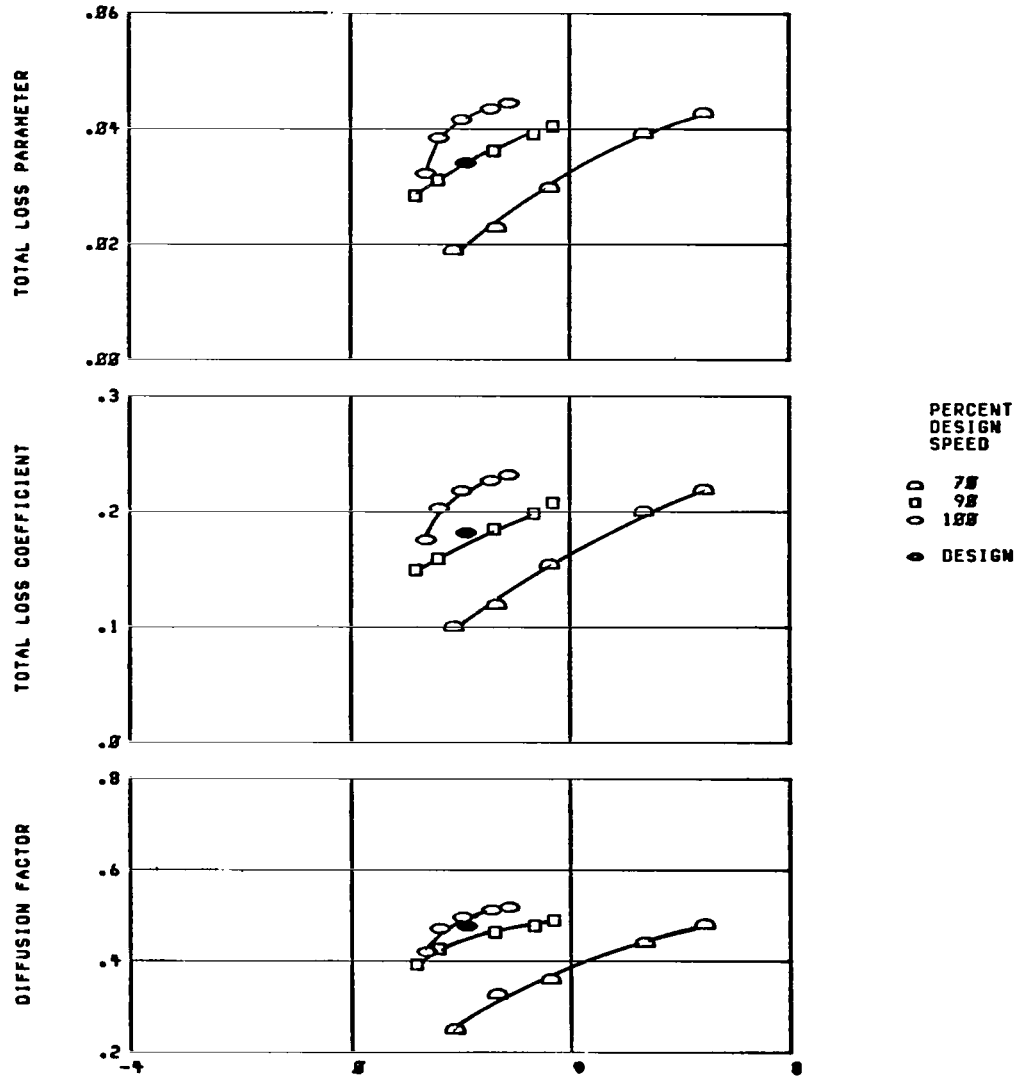
(a) Concluded. Location, 5 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



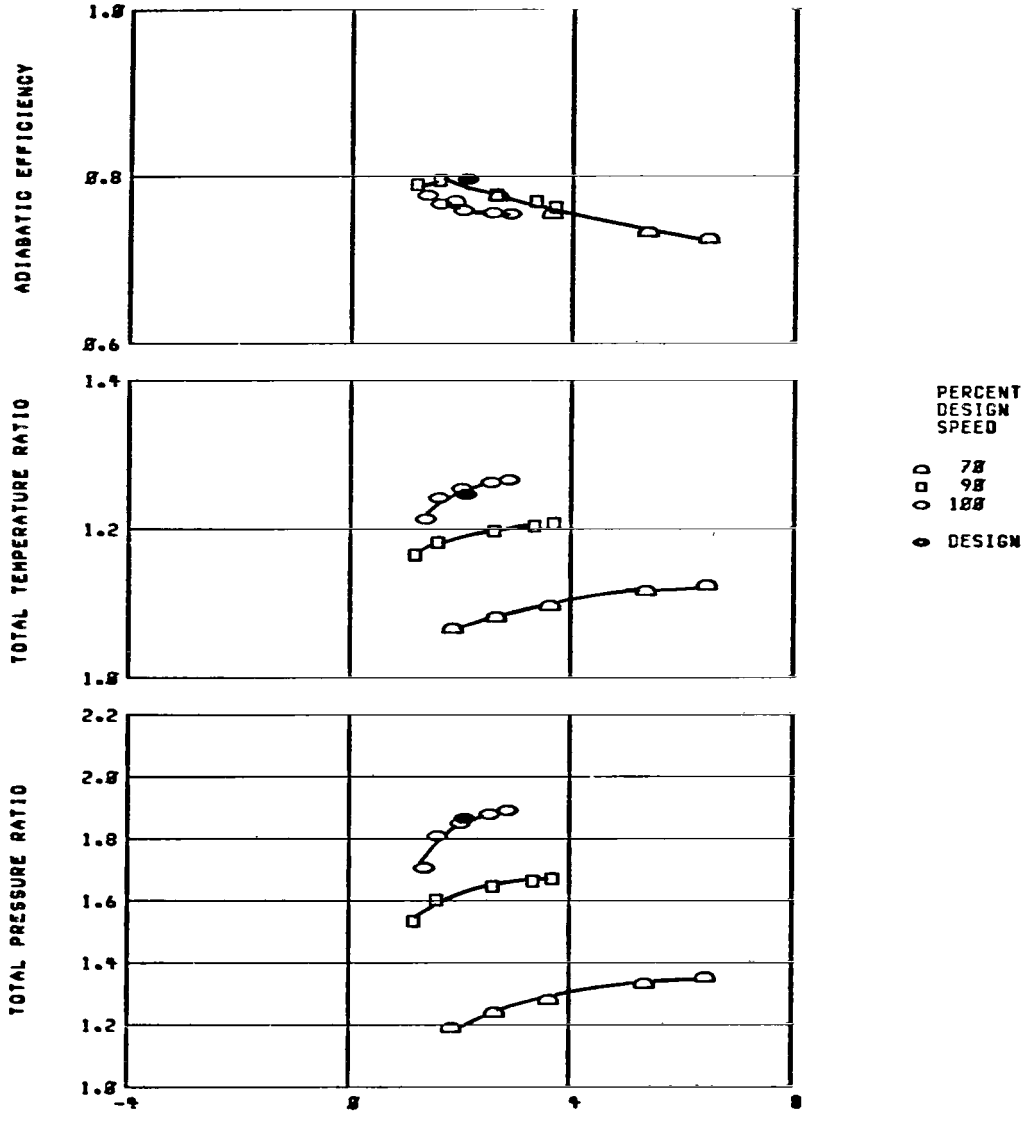
(b) Location, 10 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



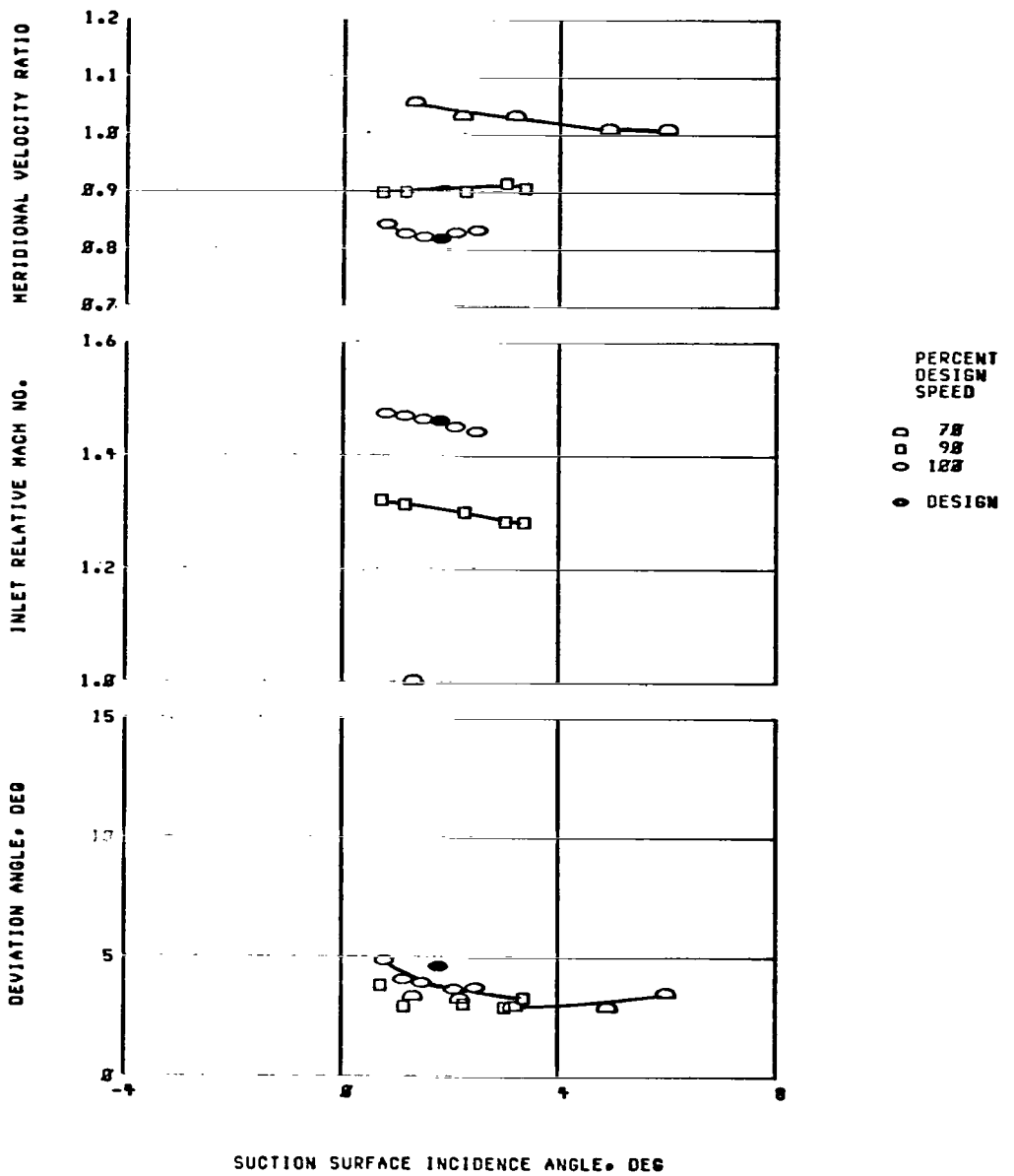
(b) Continued. Location, 10 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



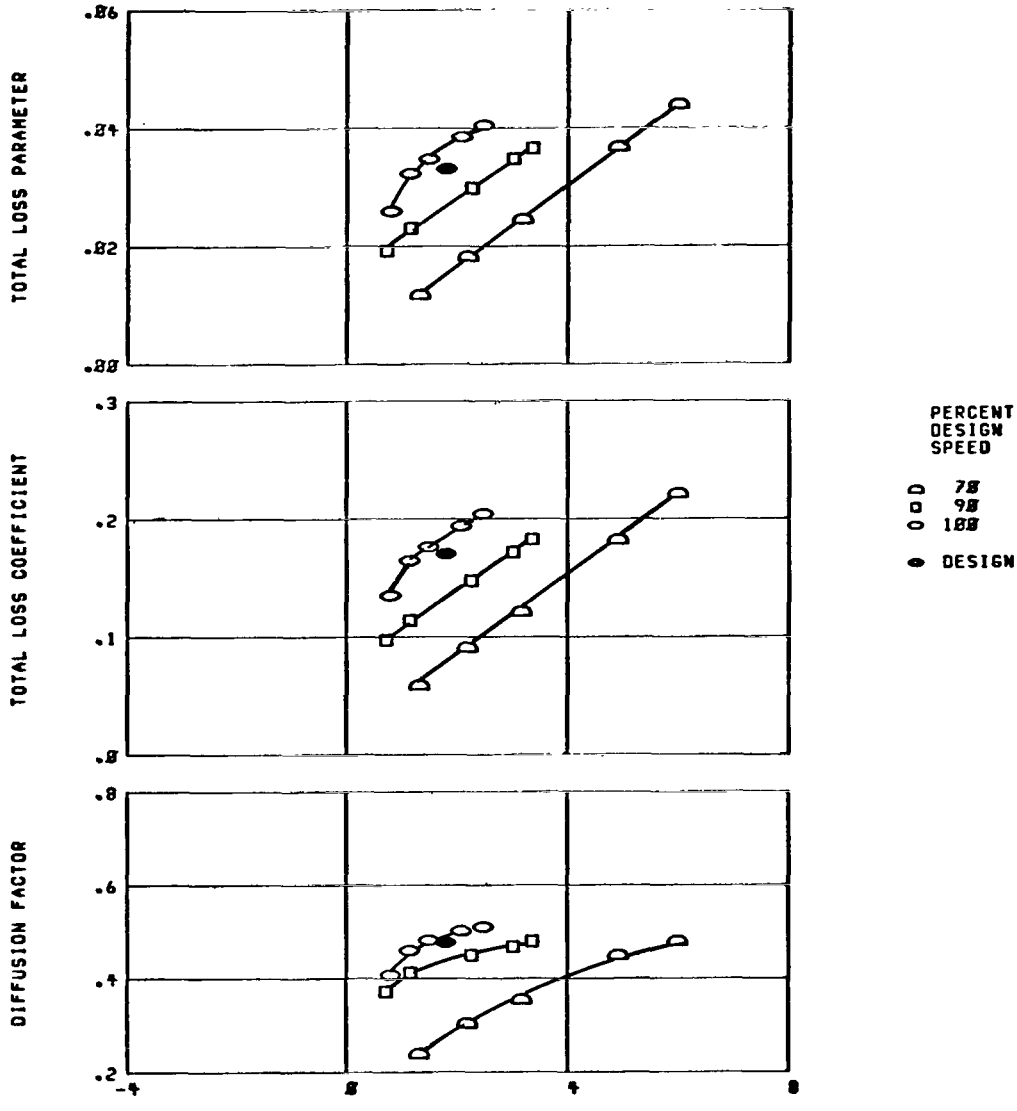
(b) Concluded. Location, 10 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



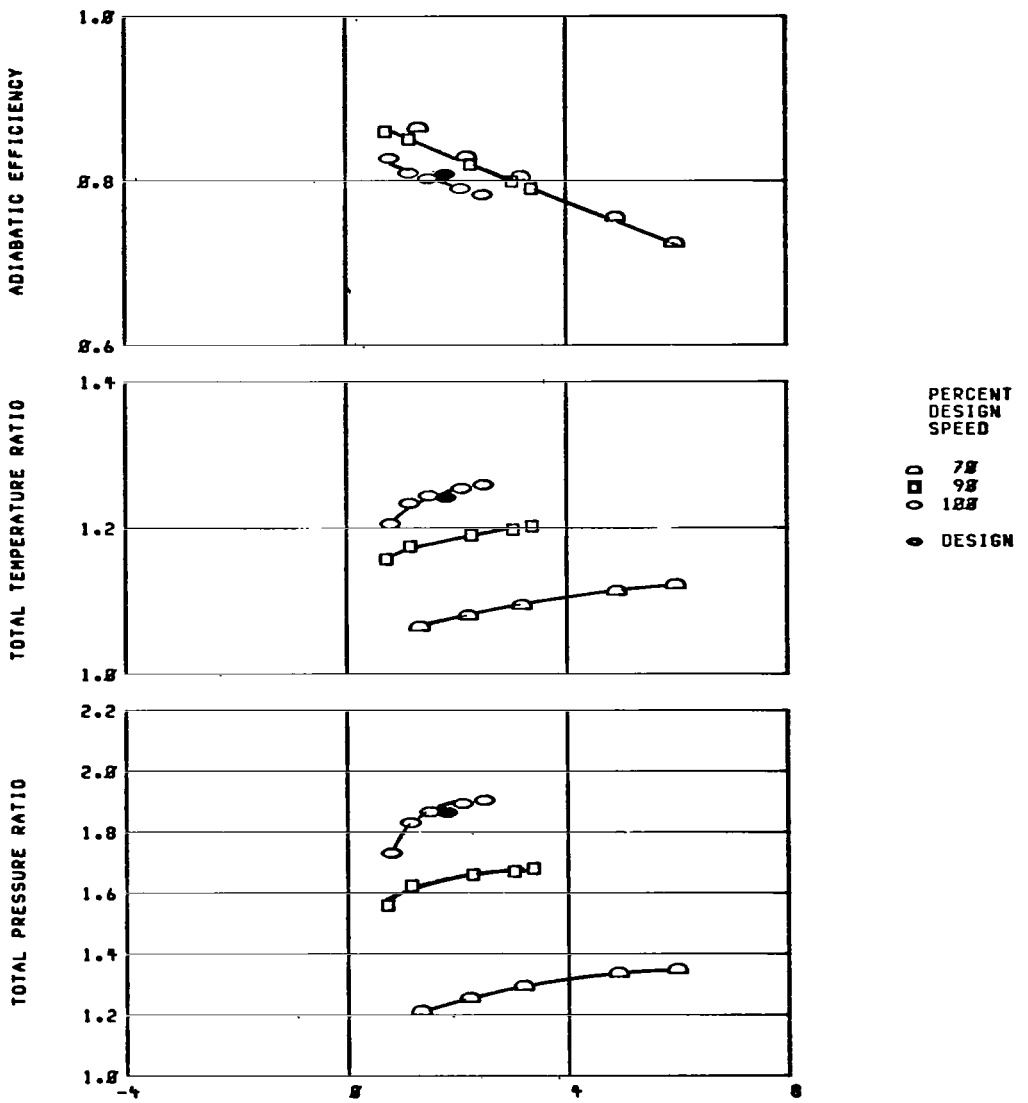
(c) Location, 15 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



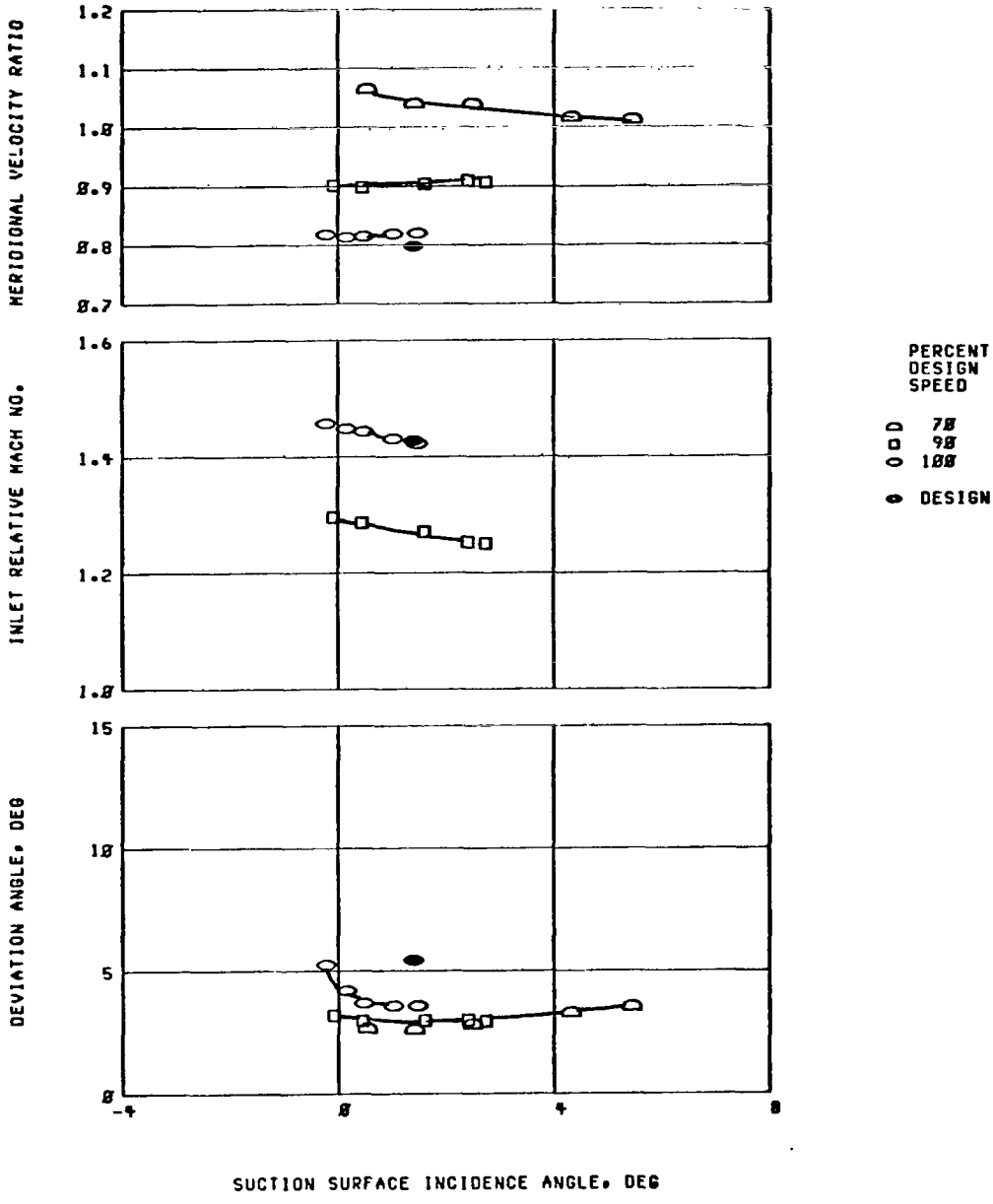
(c) Continued. Location, 15 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



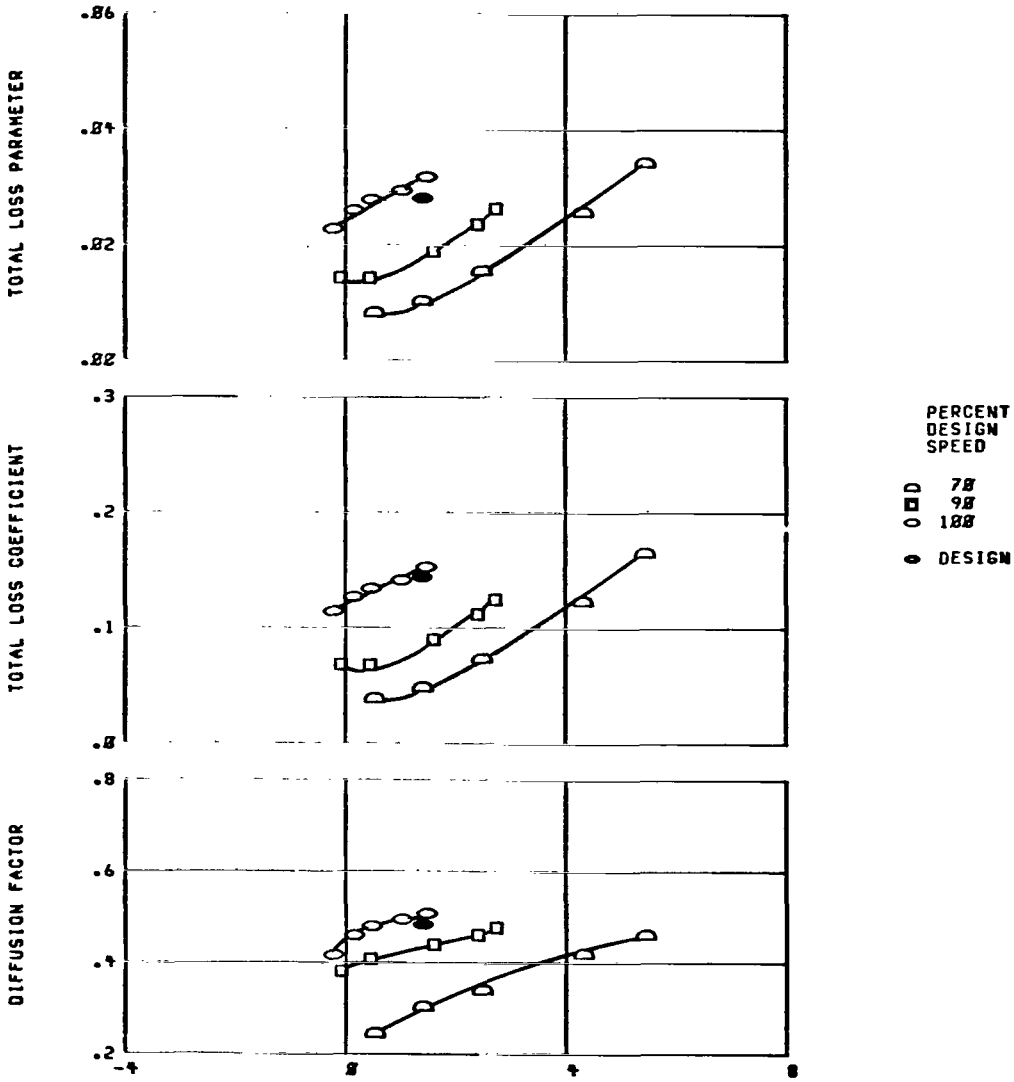
(c) Concluded. Location, 15 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



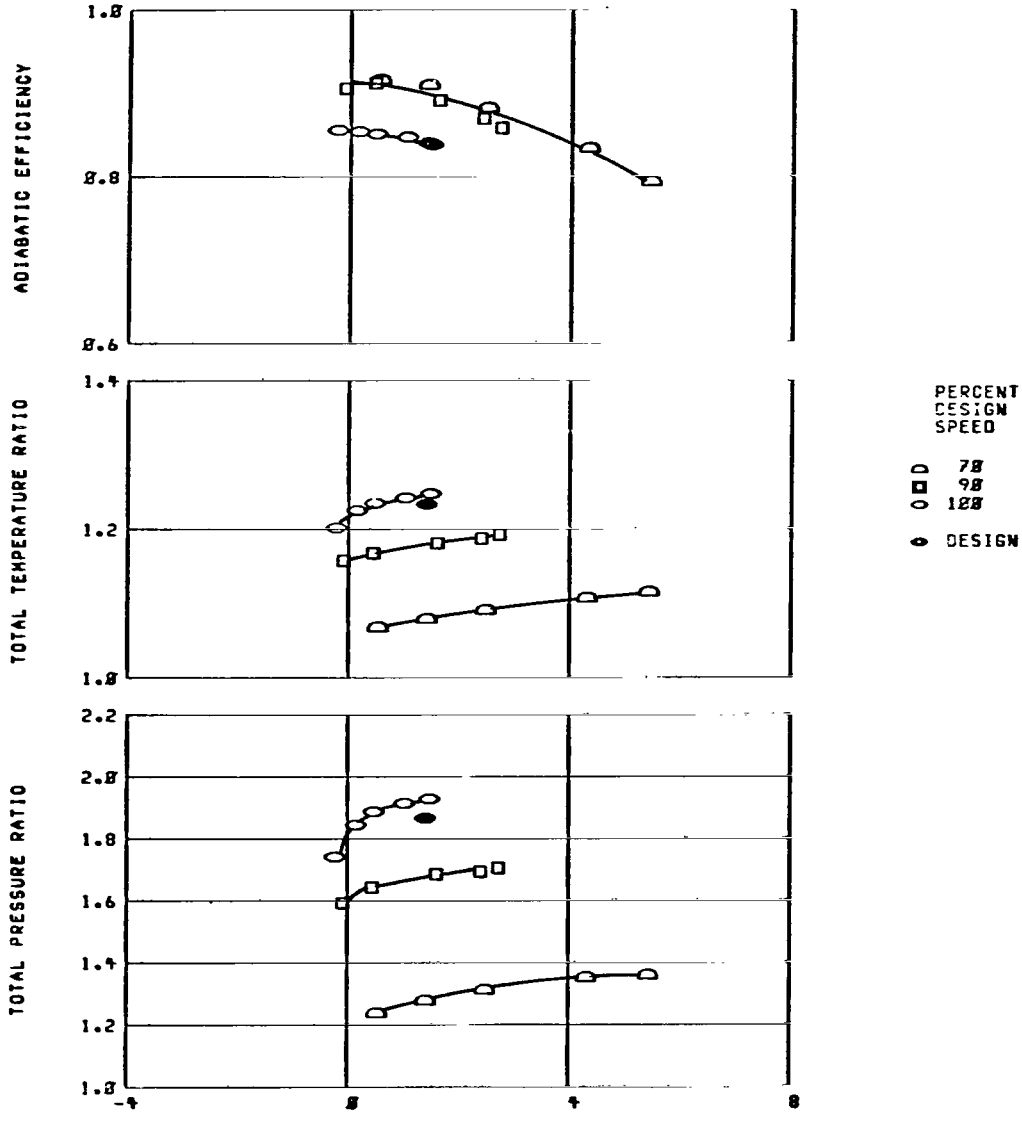
(d) Location, 30 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



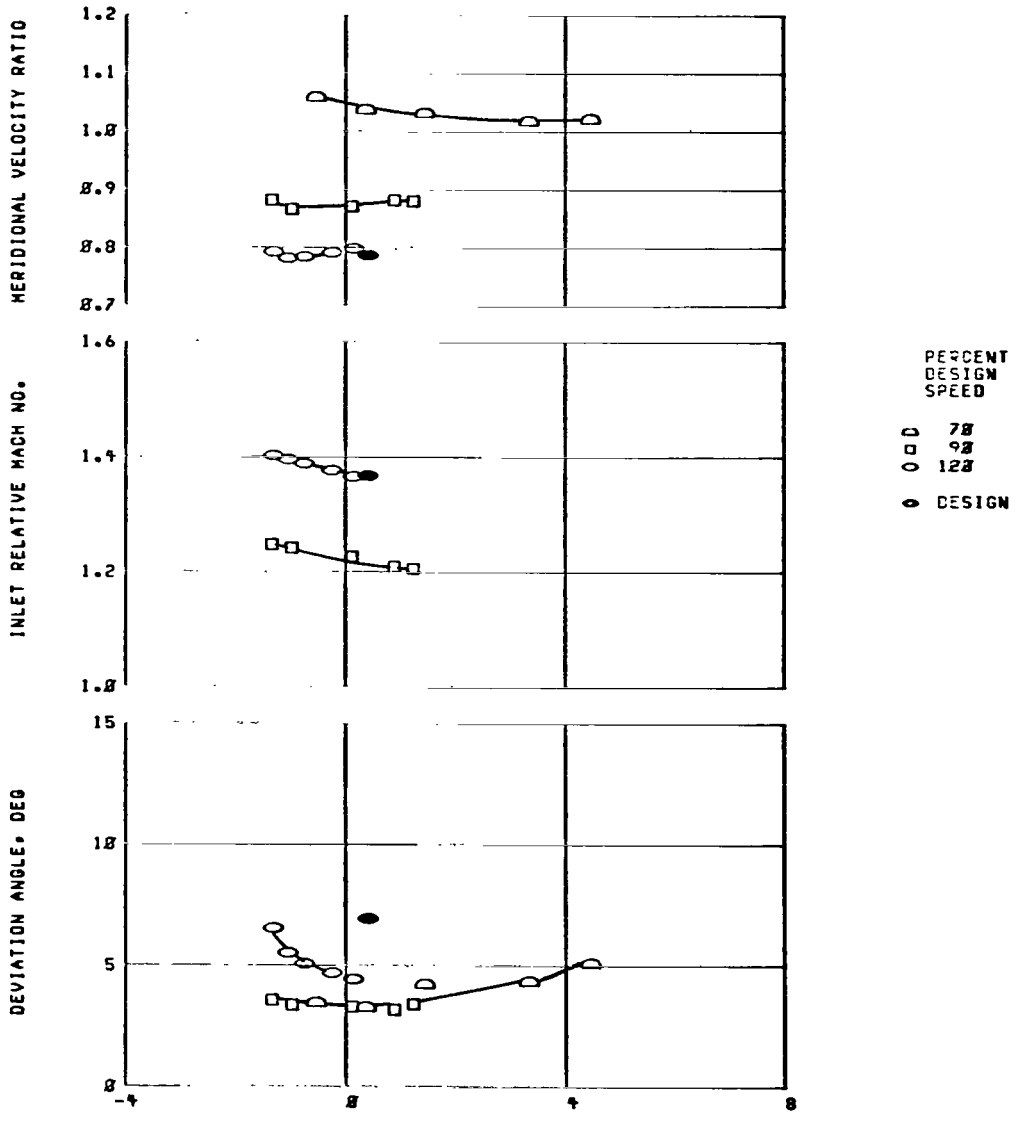
(d) Continued. Location, 30 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



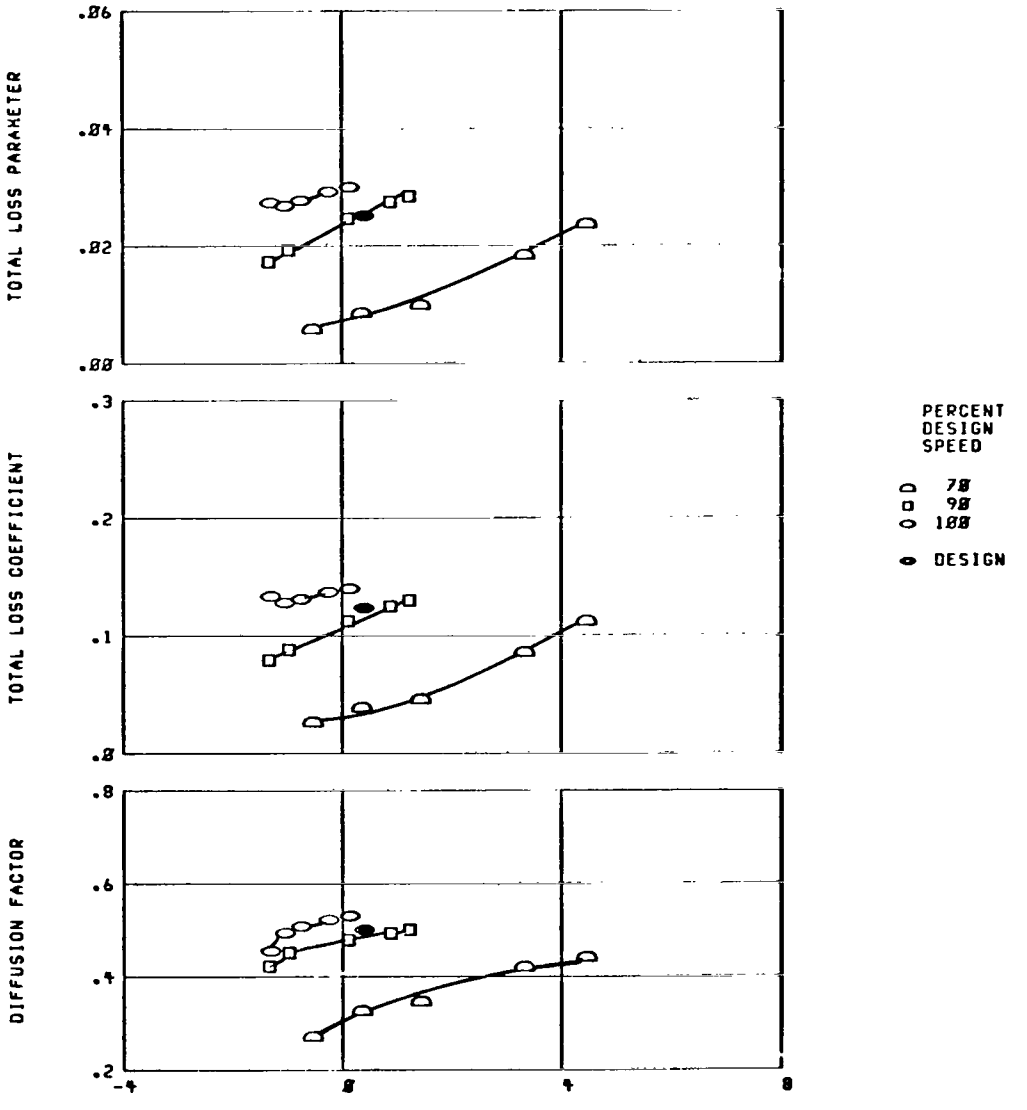
(d) Concluded. Location, 30 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



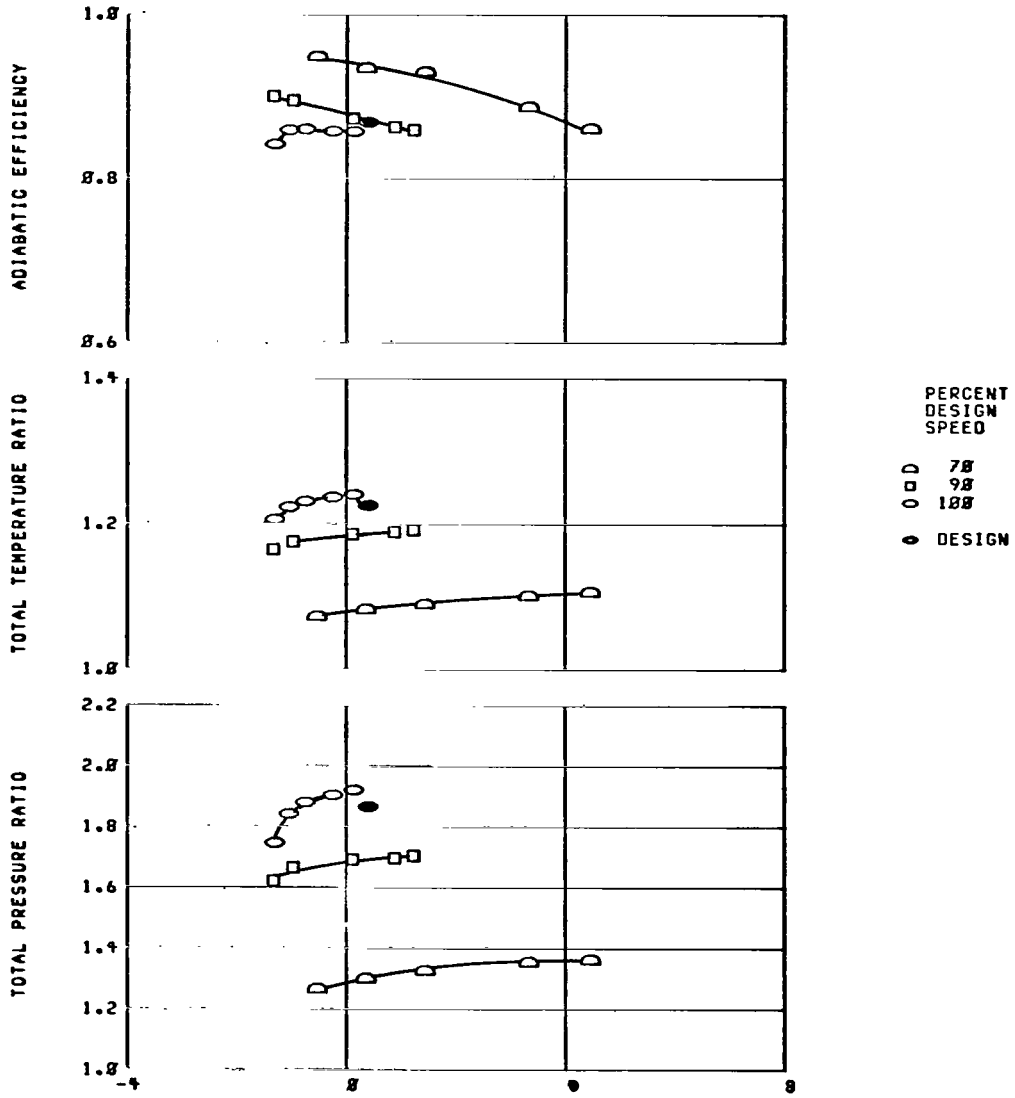
(e) Location, 50 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



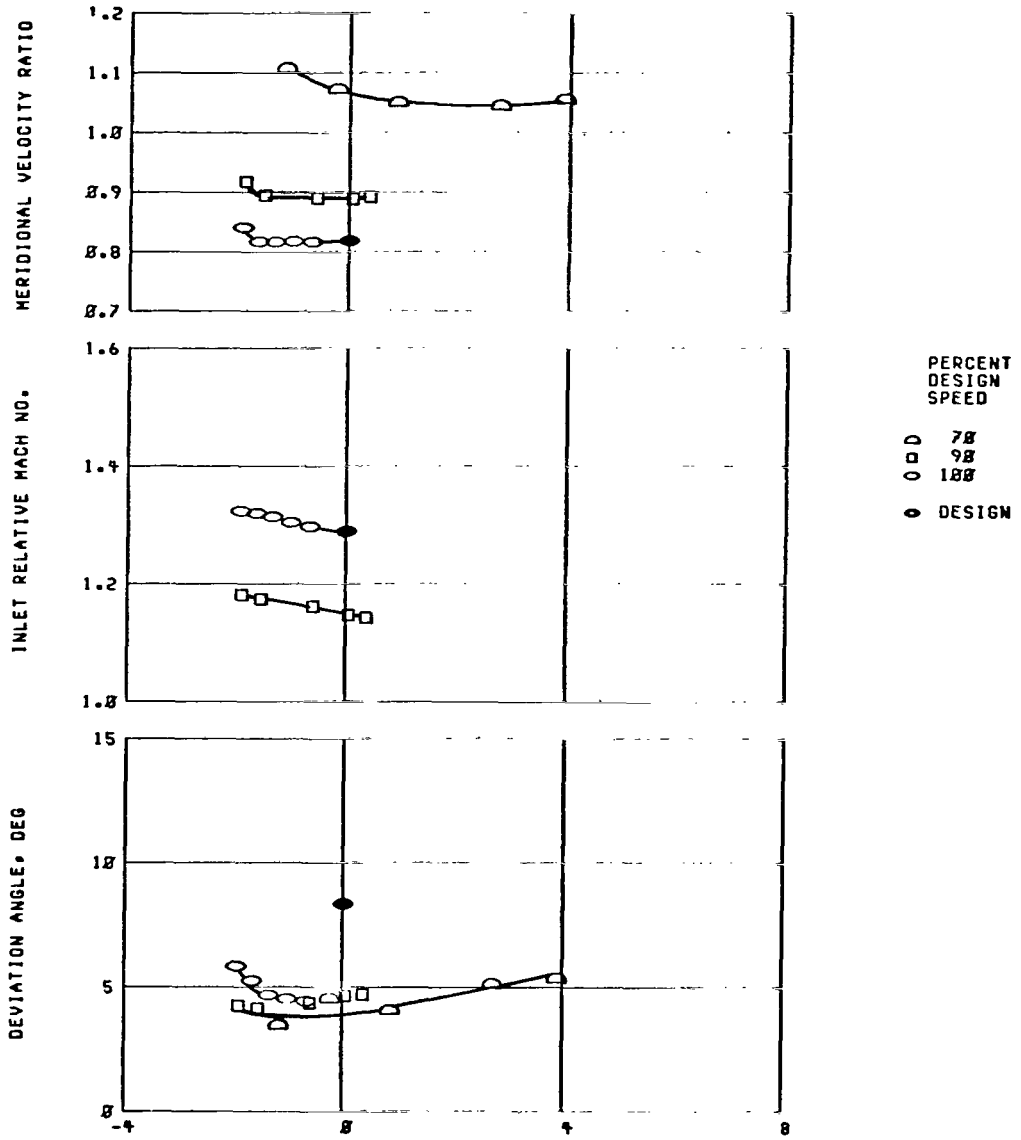
(e) Continued. Location, 50 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



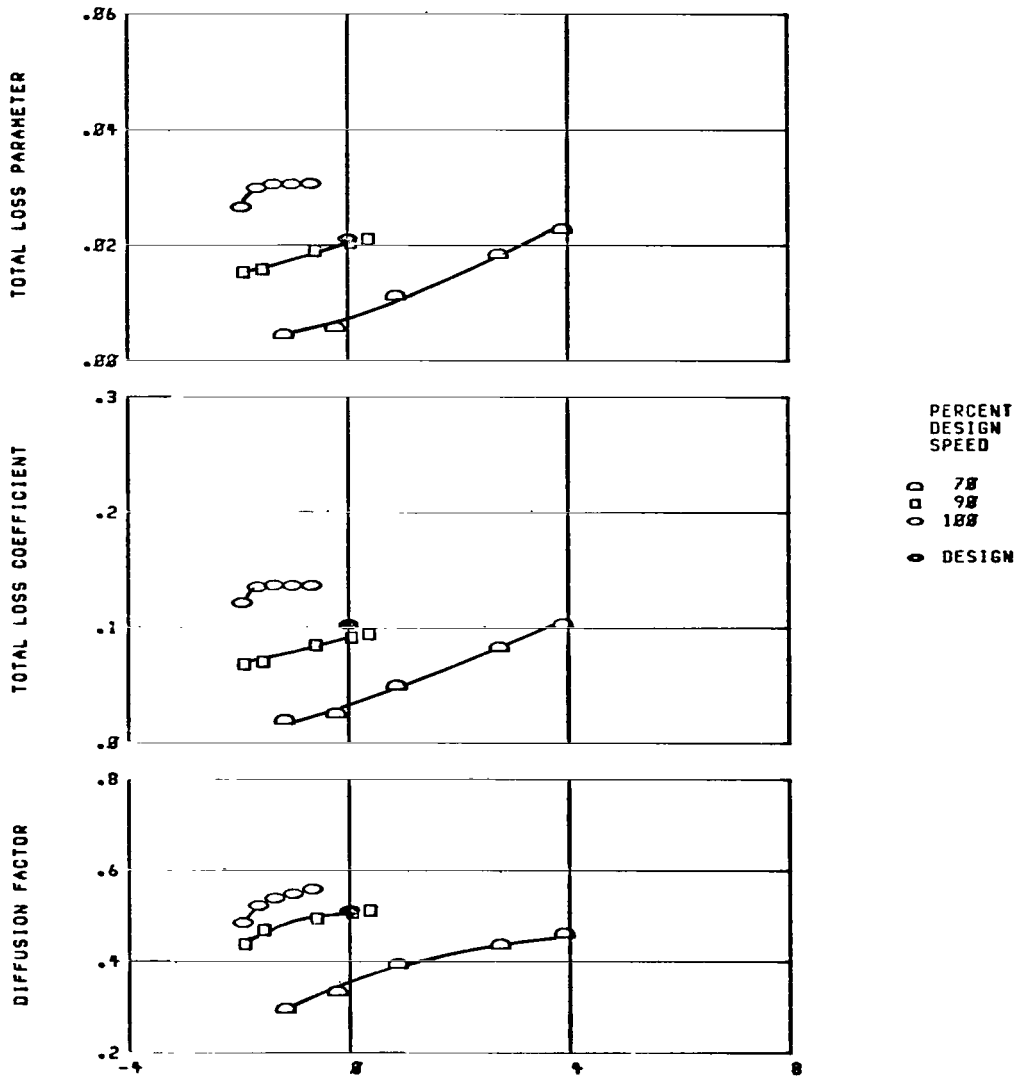
(e) Concluded. Location, 50 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



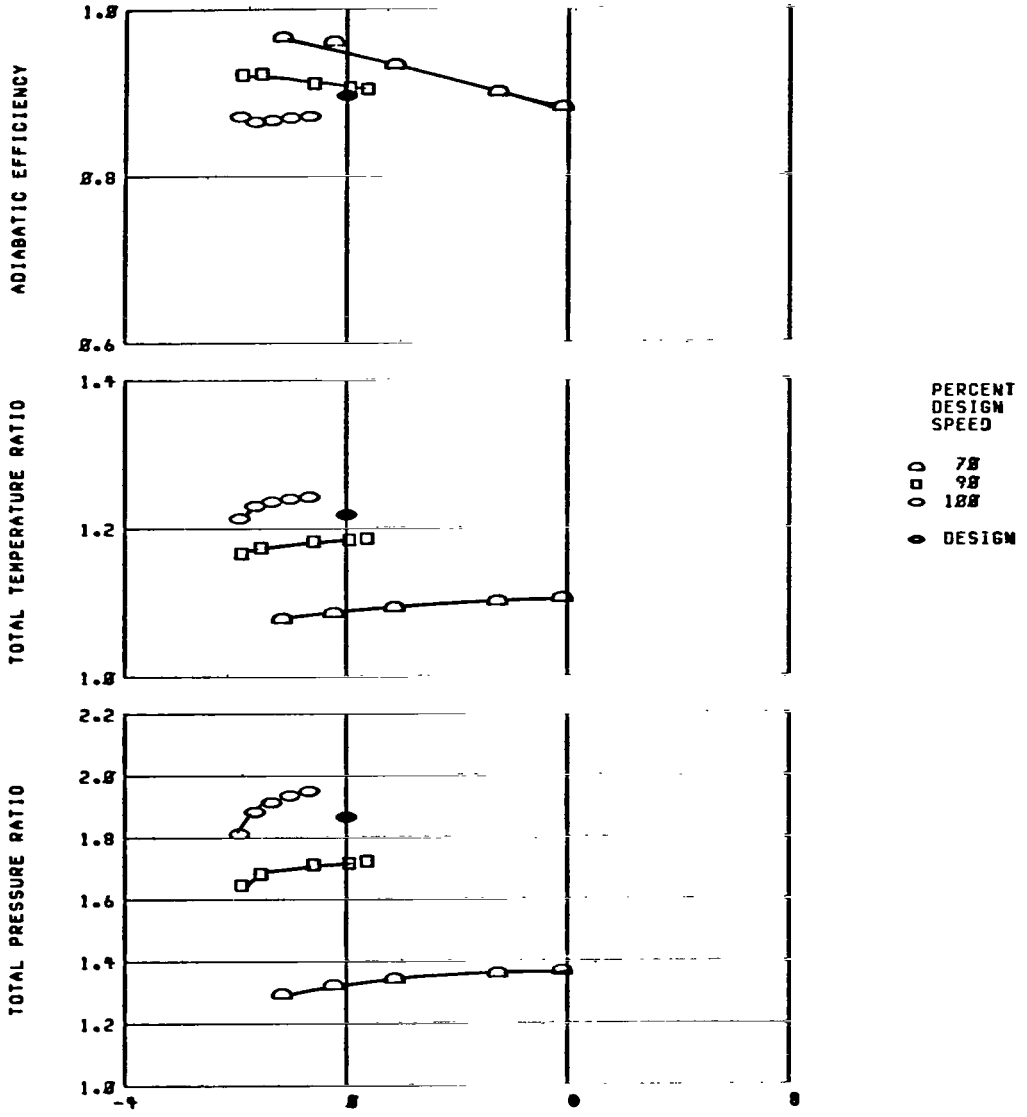
(f) Location, 70 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



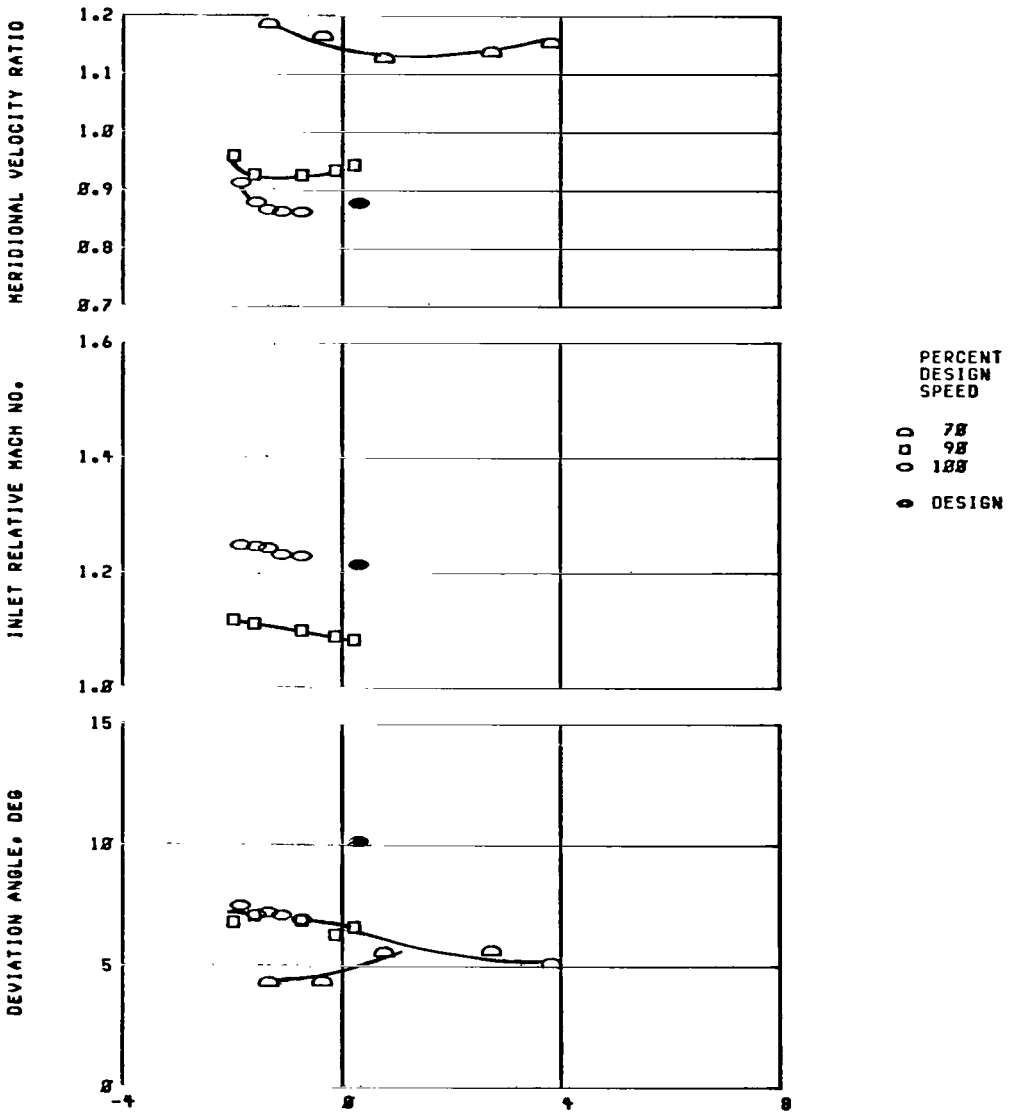
(f) Continued. Location, 70 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



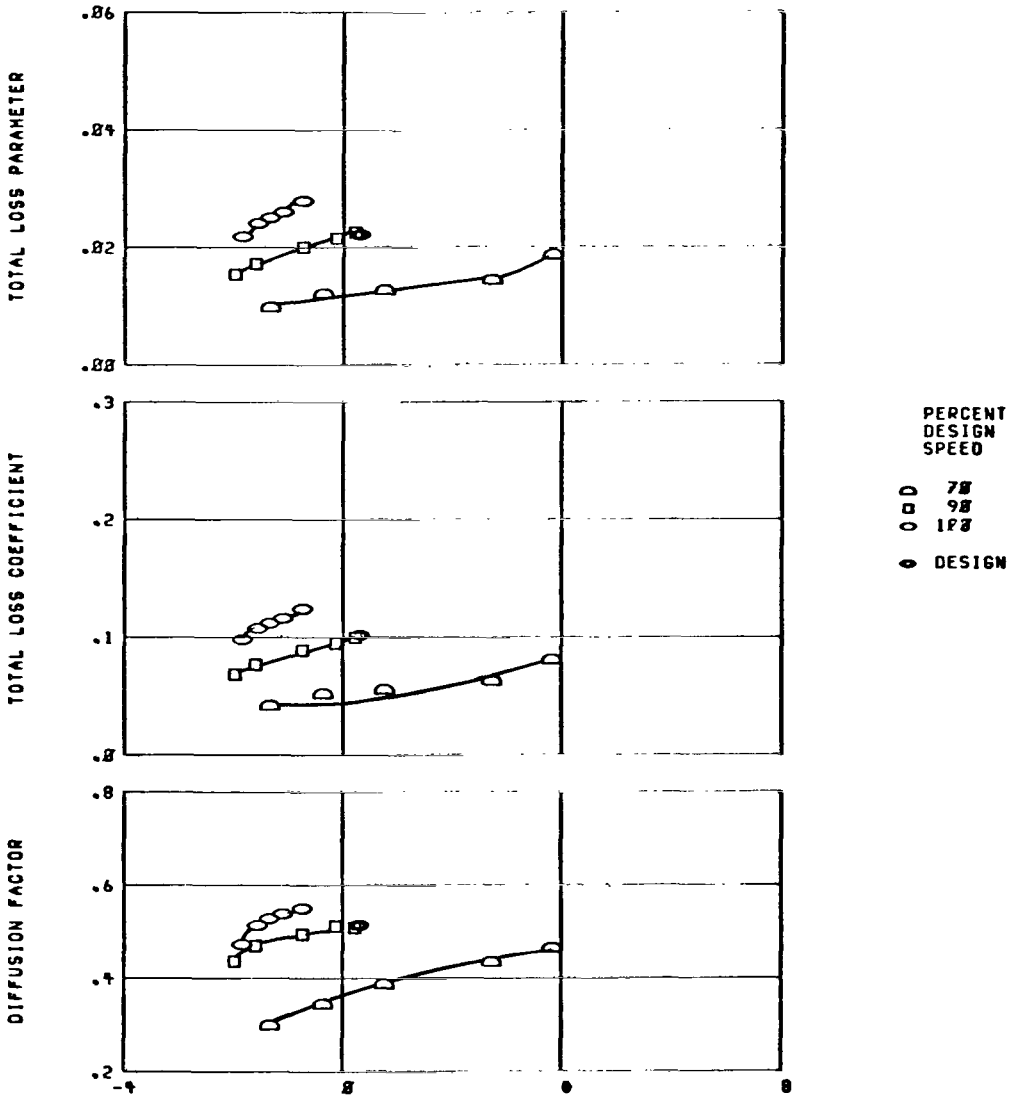
(f) Concluded. Location, 70 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



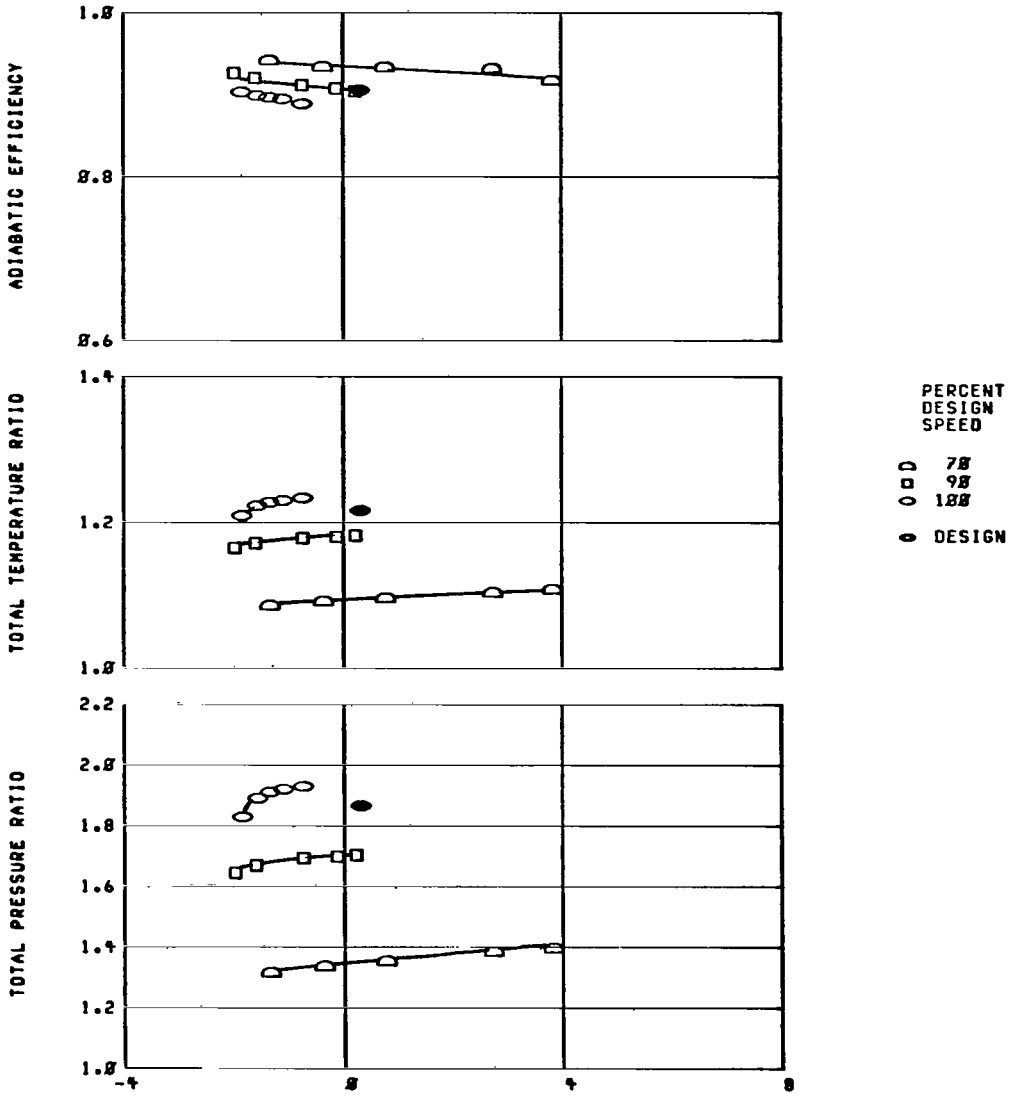
(g) Location, 85 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



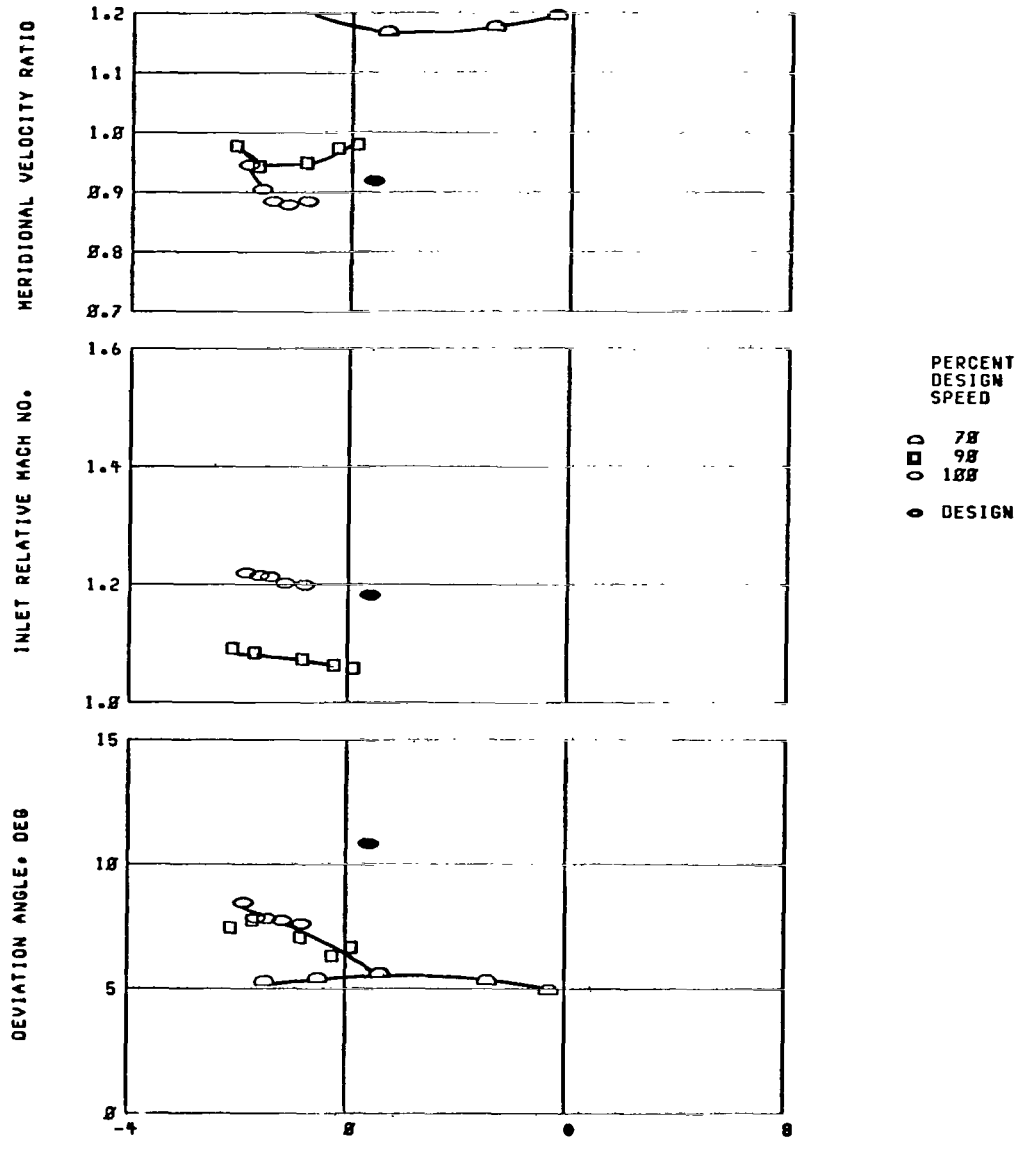
(g) Continued. Location, 85 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



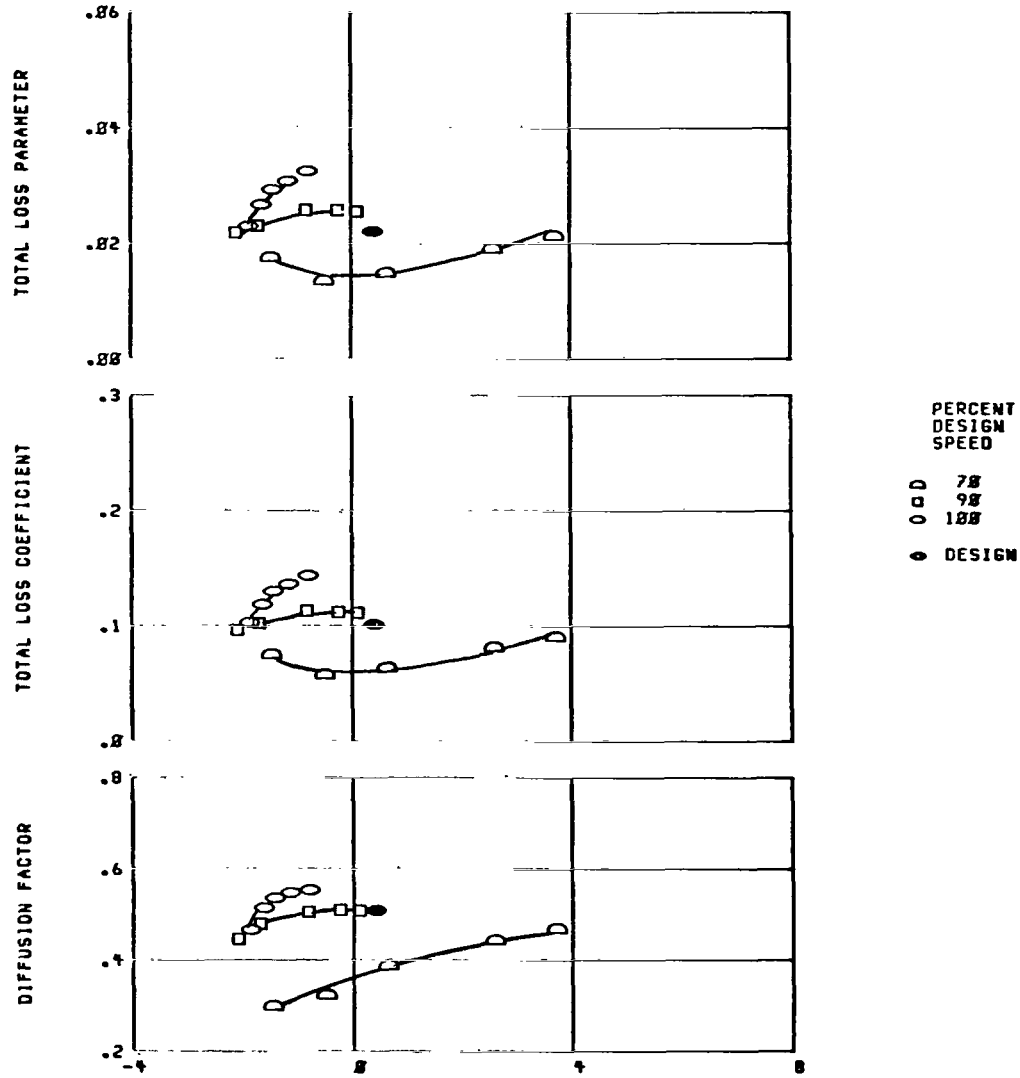
(g) Concluded. Location, 85 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



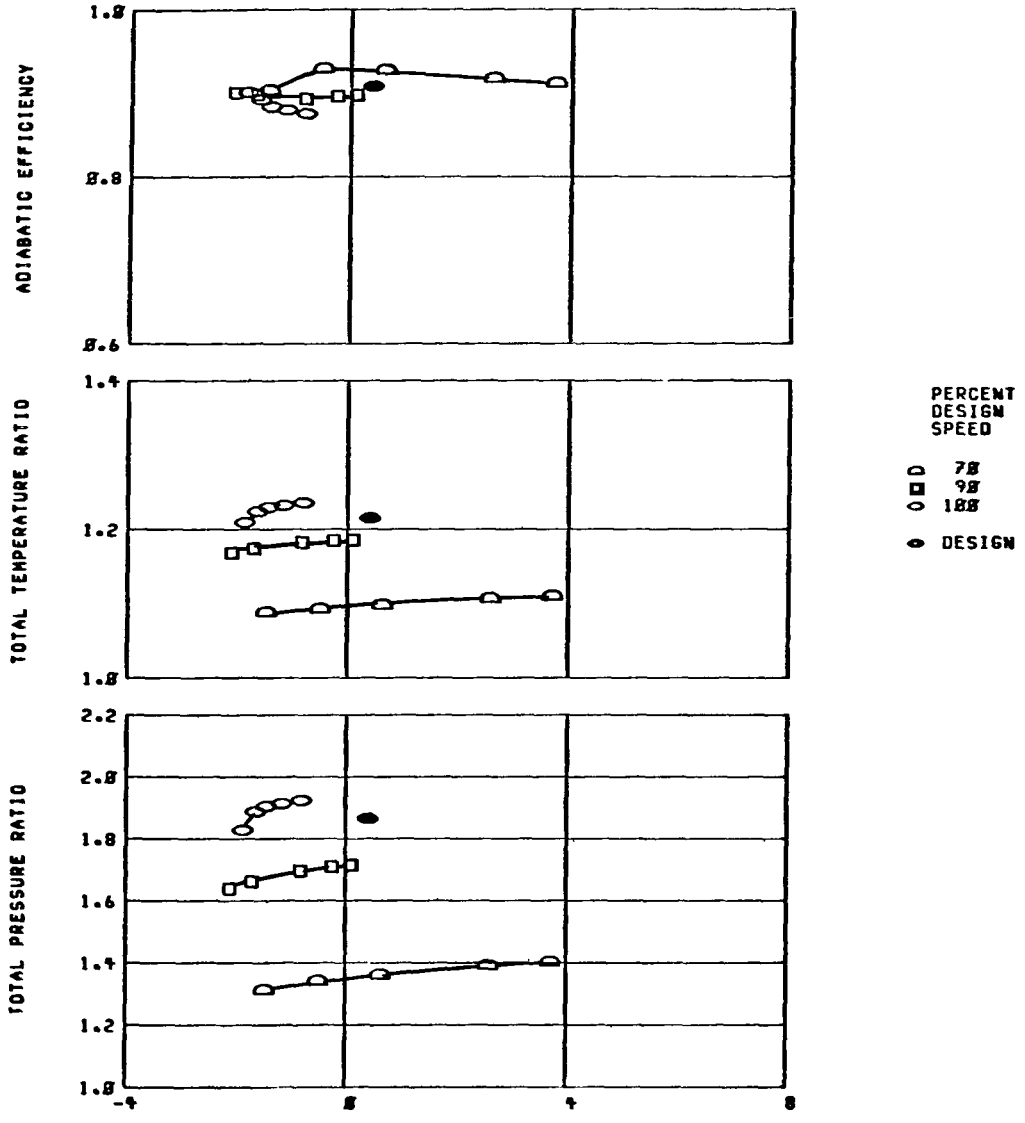
(h) Location, 90 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



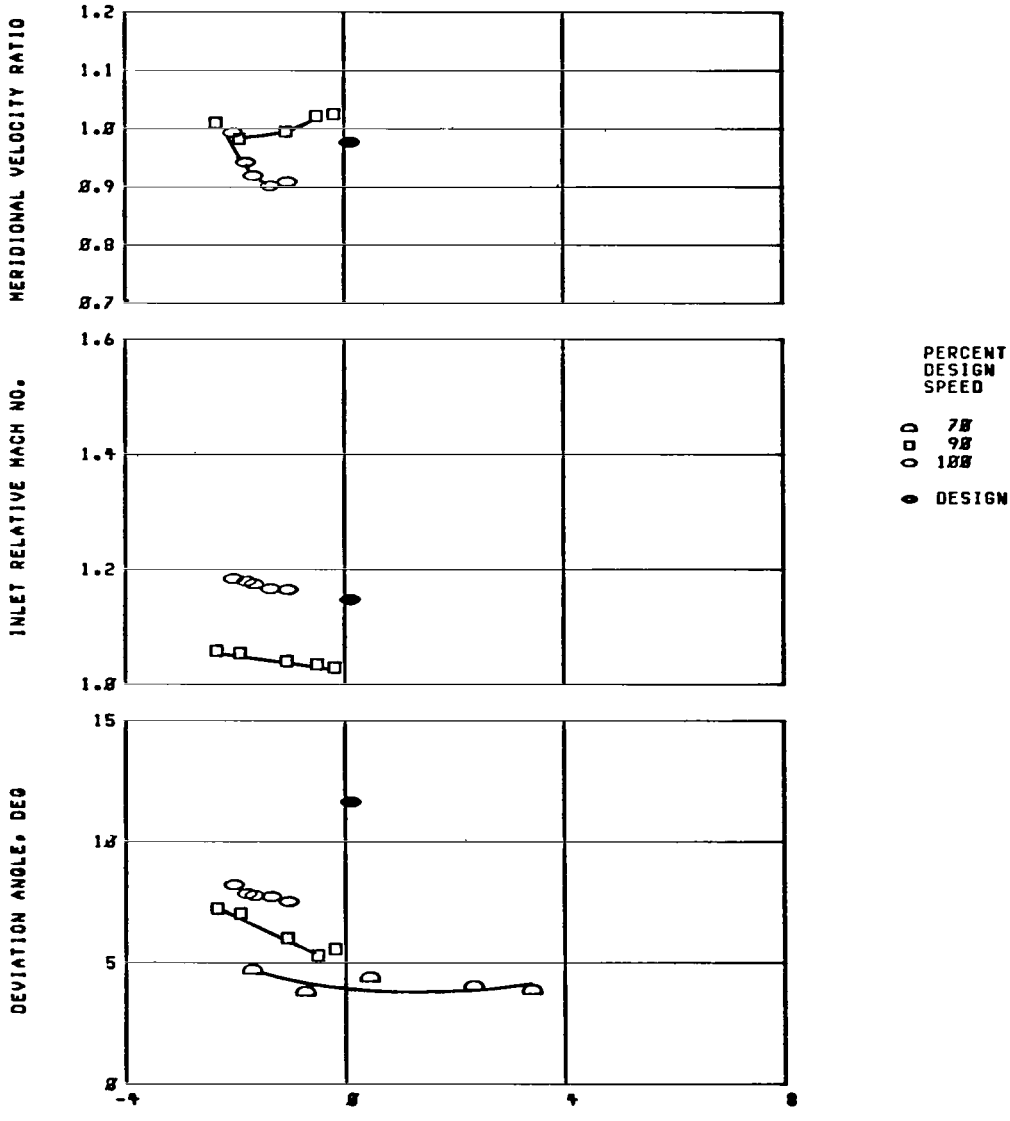
(h) Continued. Location, 90 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



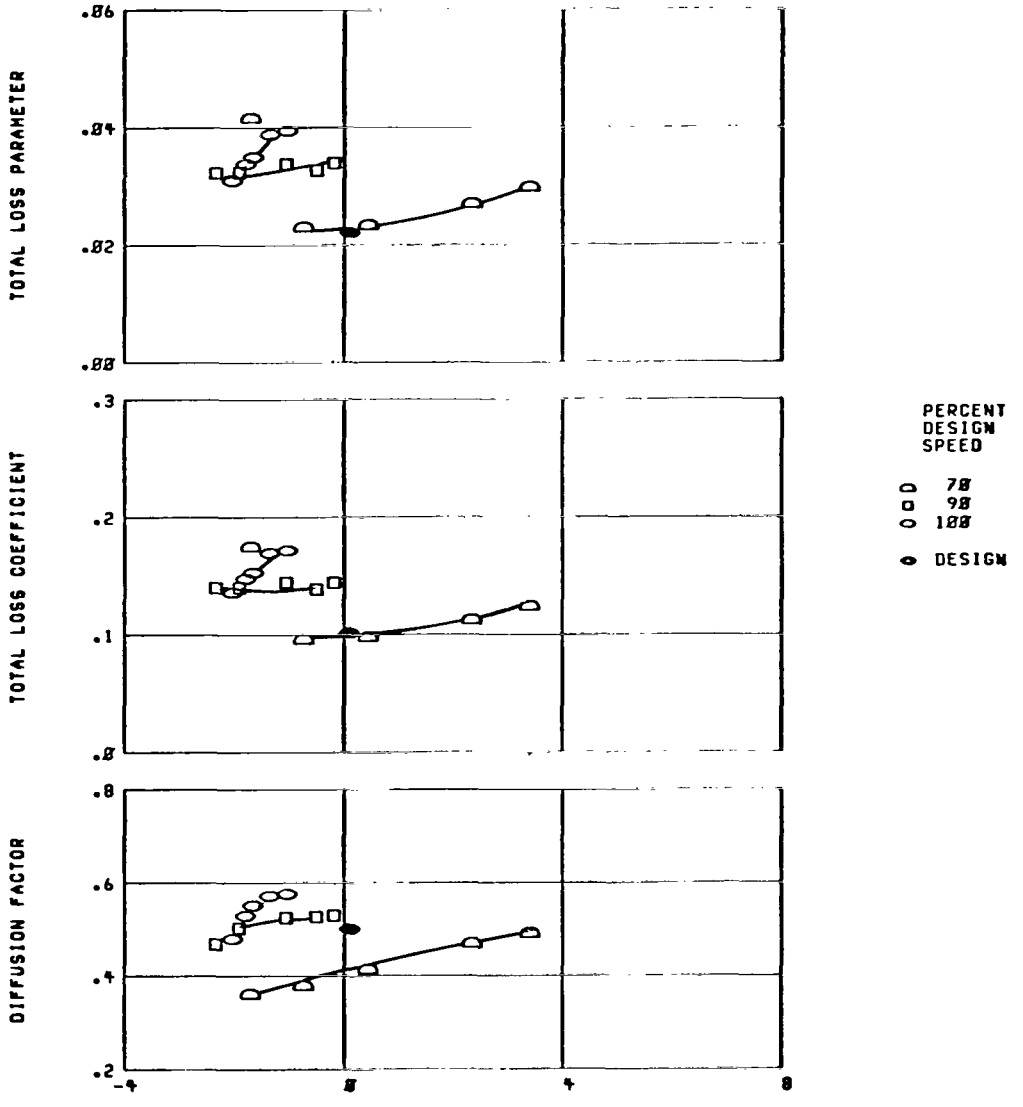
(h) Concluded. Location, 90 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



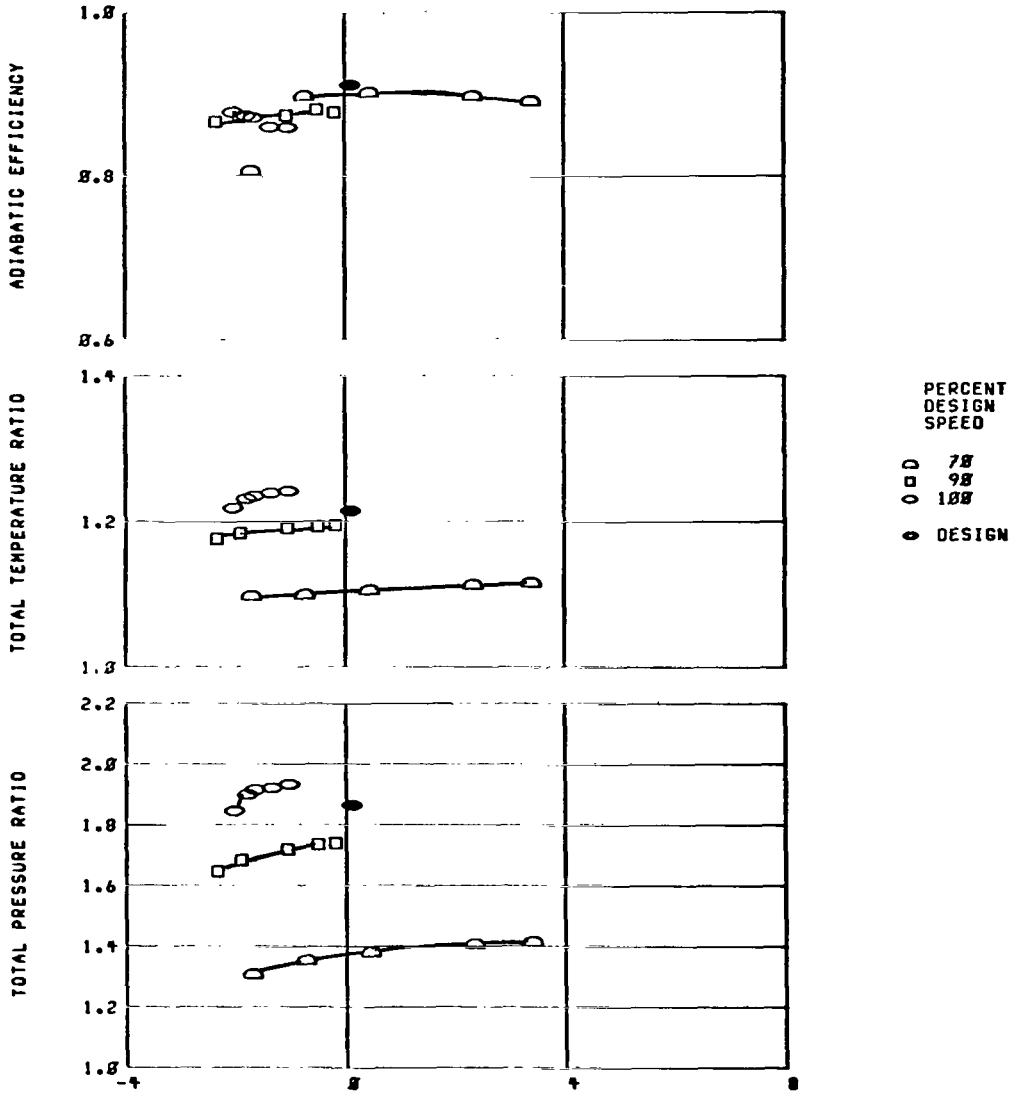
(i) Location, 95 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



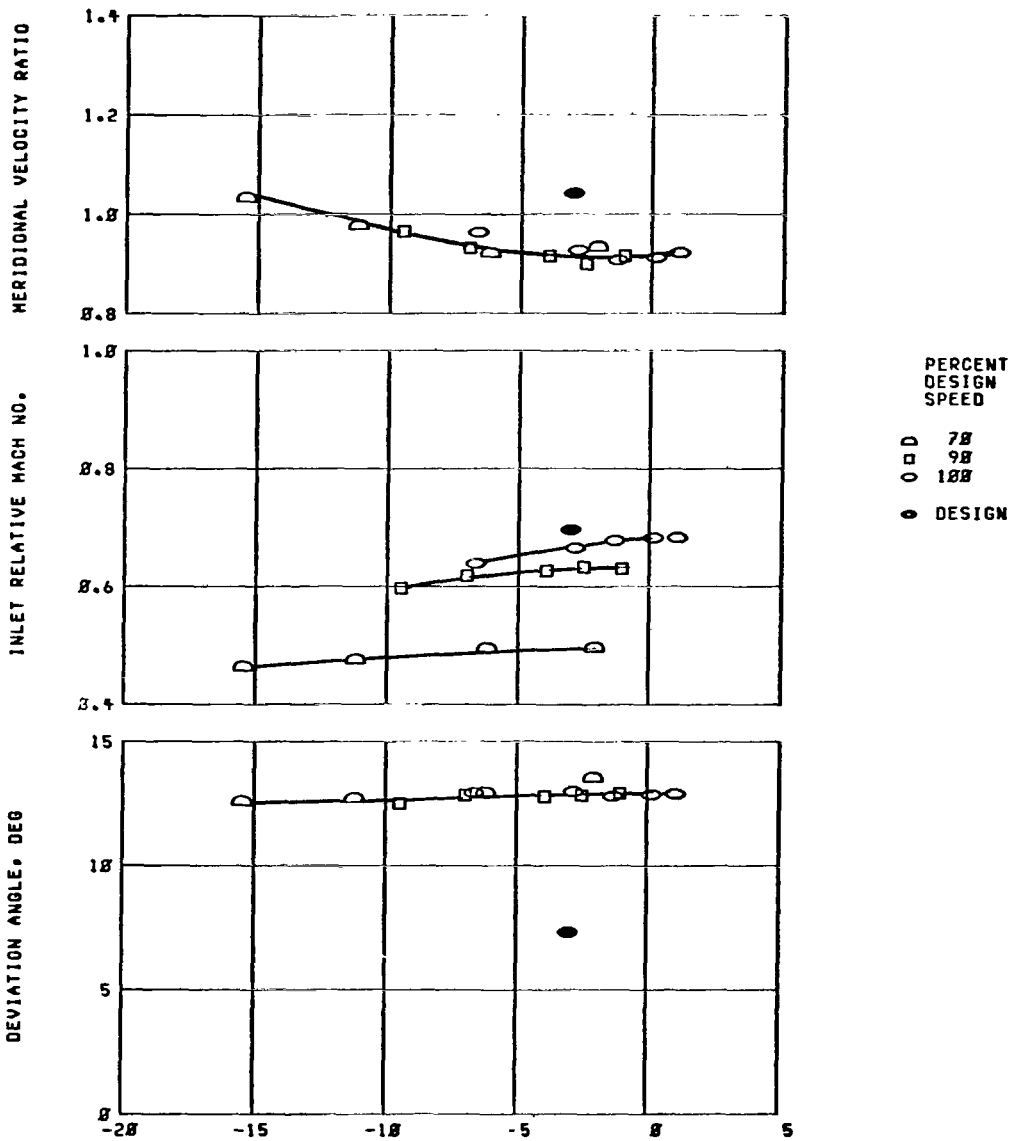
(i) Continued. Location, 95 percent of span.

Figure 11. - Continued. Blade-element performance for rotor 36.



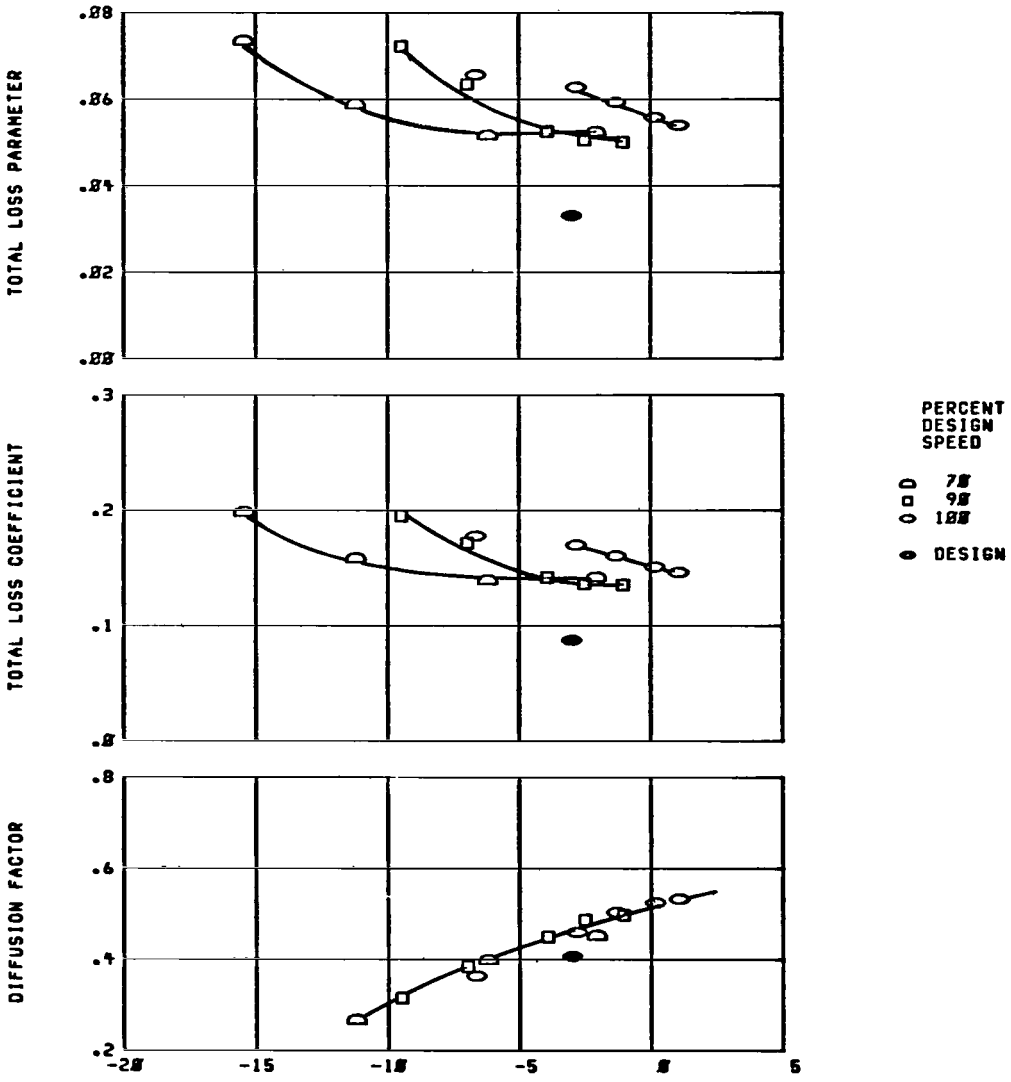
(i) Concluded. Location, 95 percent of span.

Figure 11. - Concluded. Blade-element performance for rotor 36.



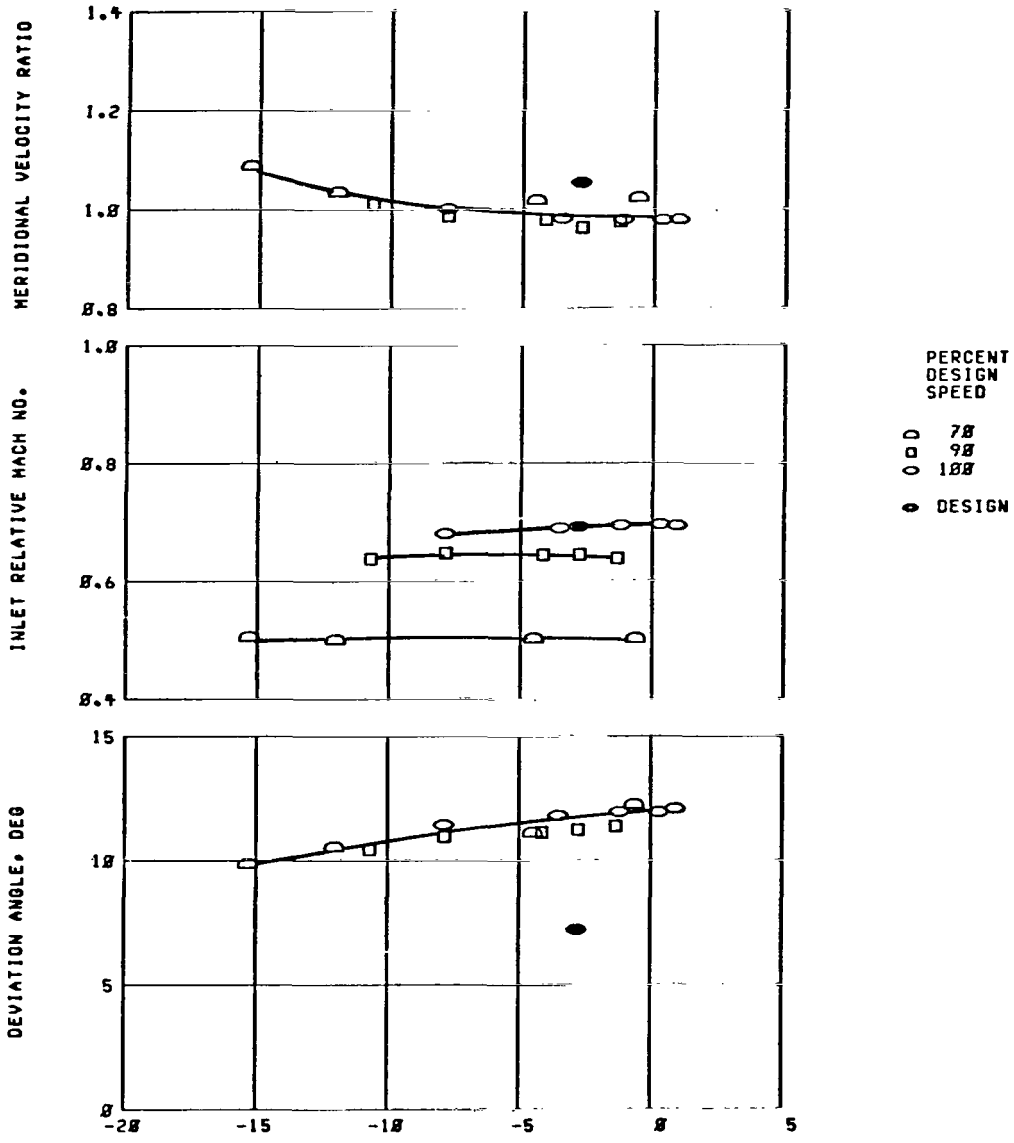
(a) Location, 5 percent of span.

Figure 12. - Blade-element performance for stator 36.



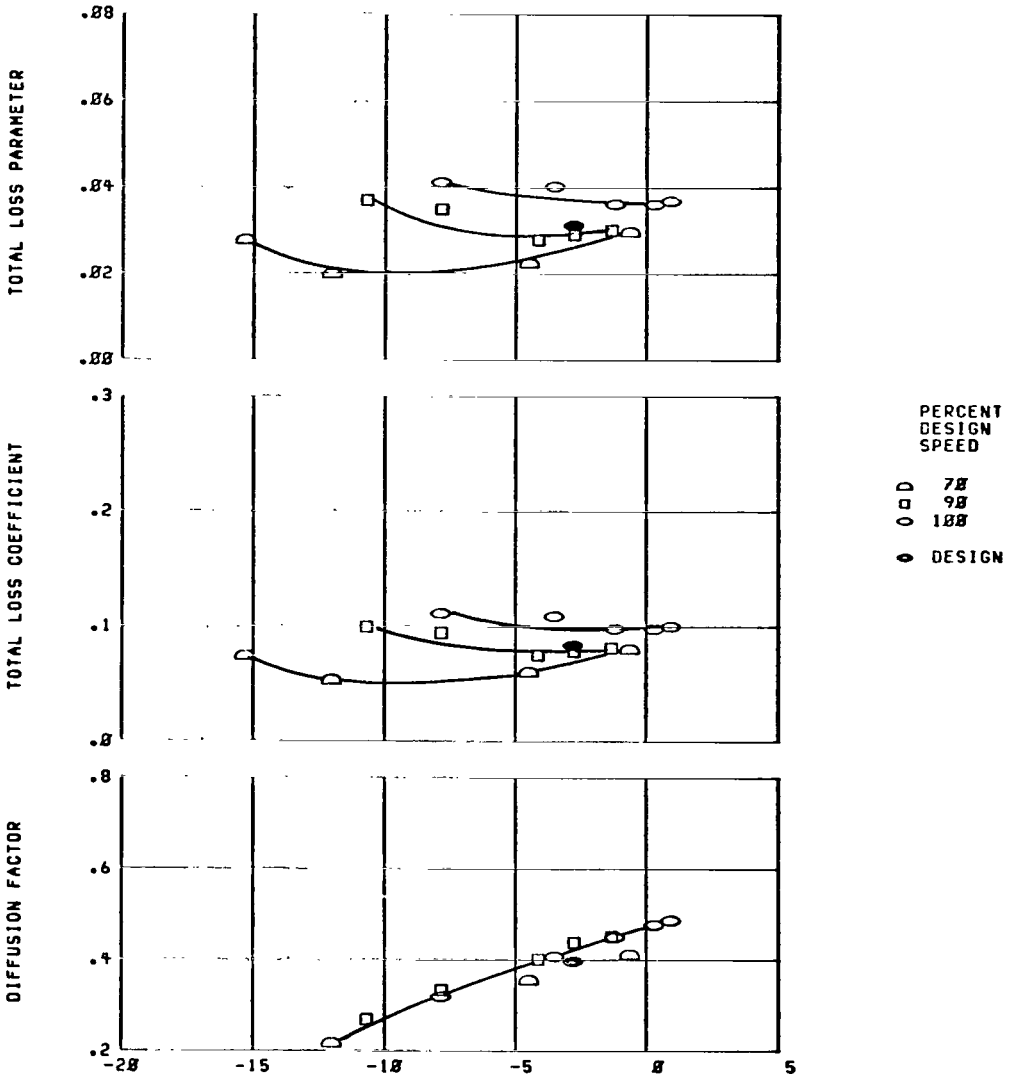
(a) Concluded. Location, 5 percent of span.

Figure 12. - Continued. Blade-element performance for stator 36.



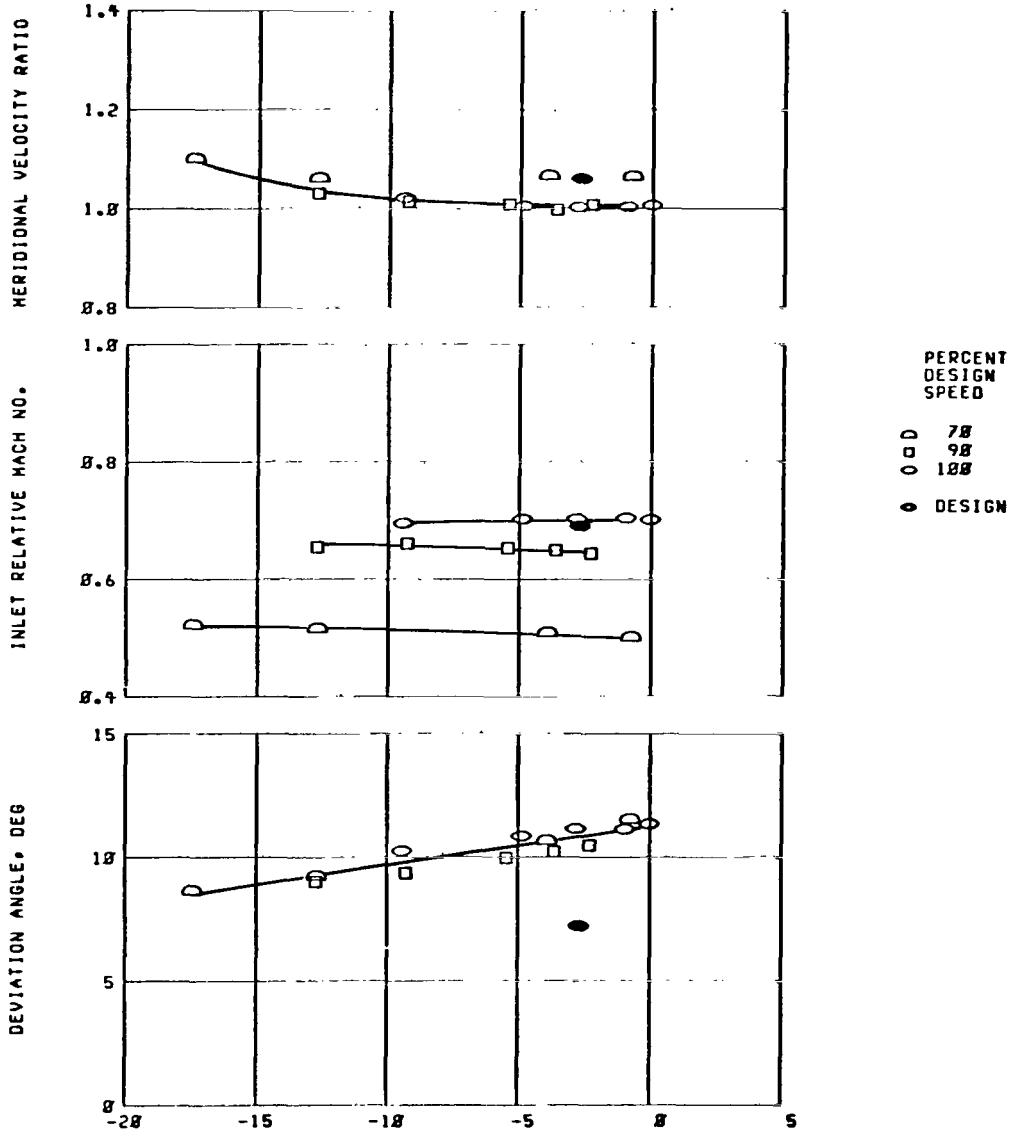
(b) Location, 10 percent of span.

Figure 12. - Continued. Blade-element performance for stator 36.



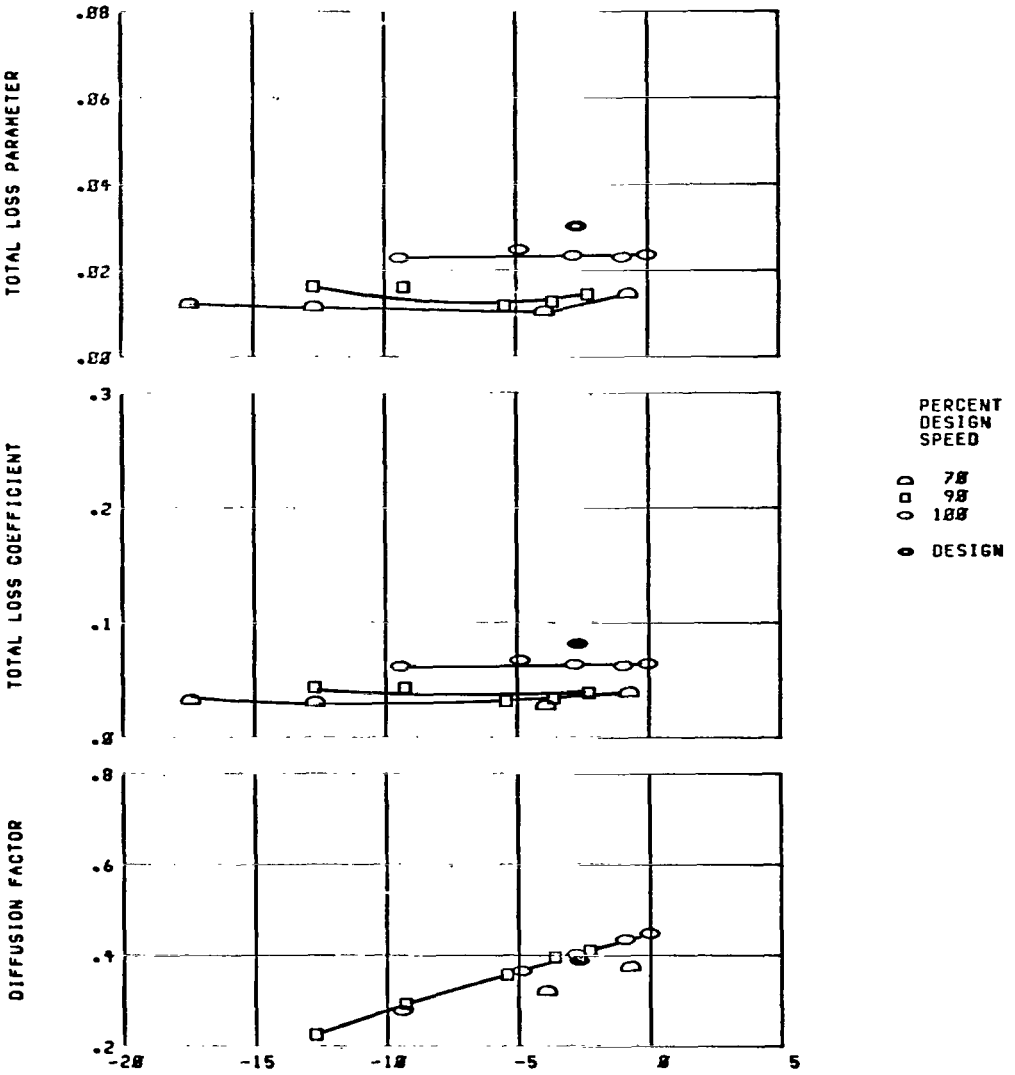
(b) Concluded. Location, 10 percent of span.

Figure 12. - Continued. Blade-element performance for stator 36.



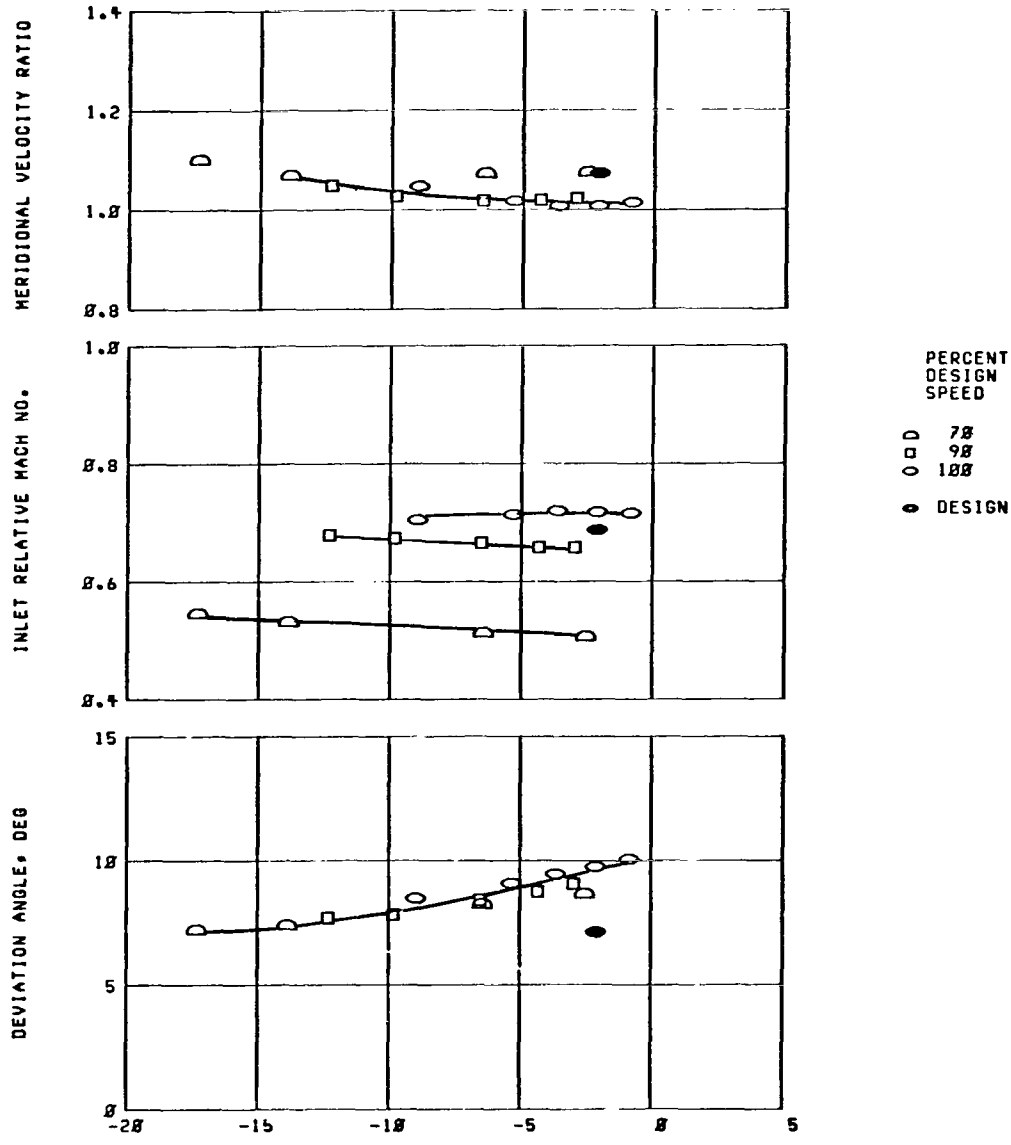
(c) Location, 15 percent of span.

Figure 12. - Continued. Blade-element performance for stator 36.



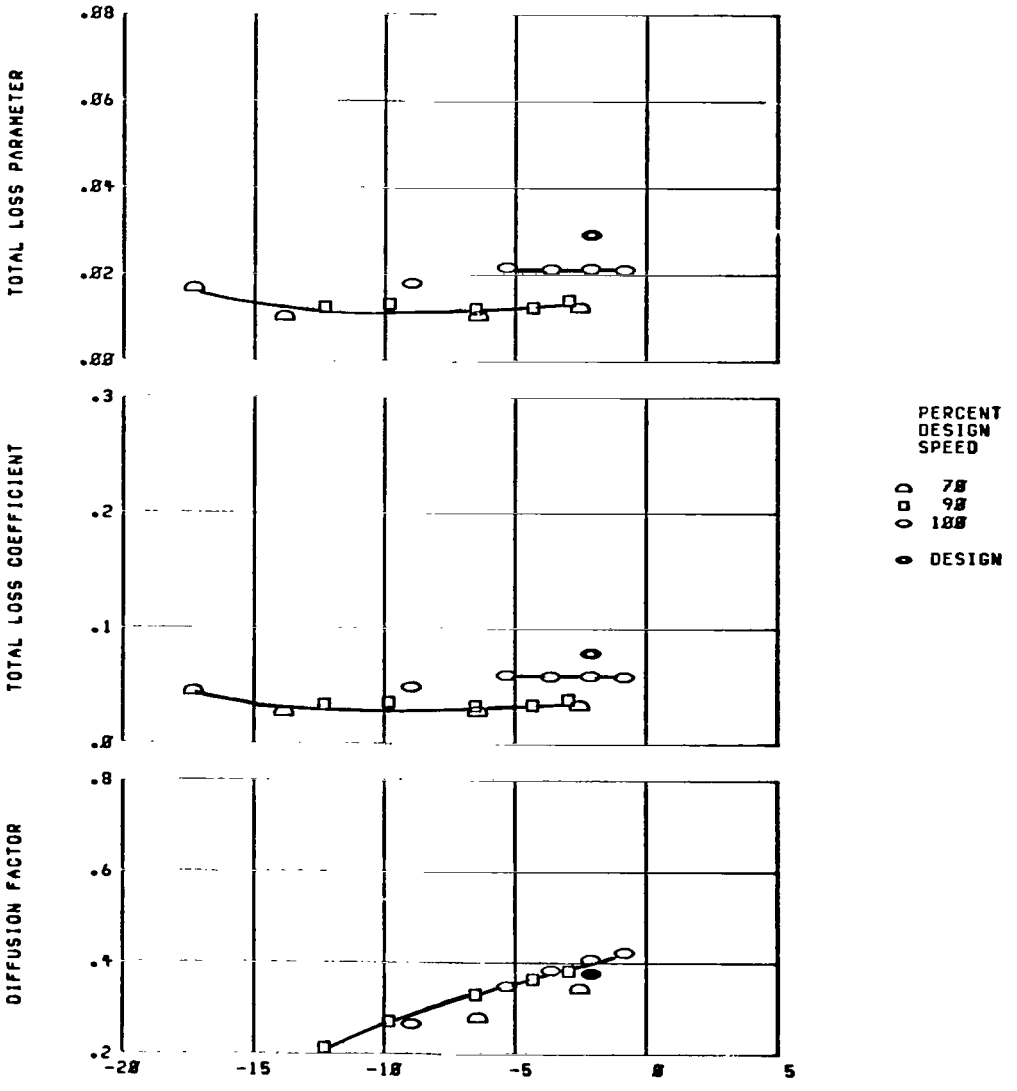
(c) Concluded. Location, 15 percent of span.

Figure 12. - Continued. Blade-element performance for stator 36.



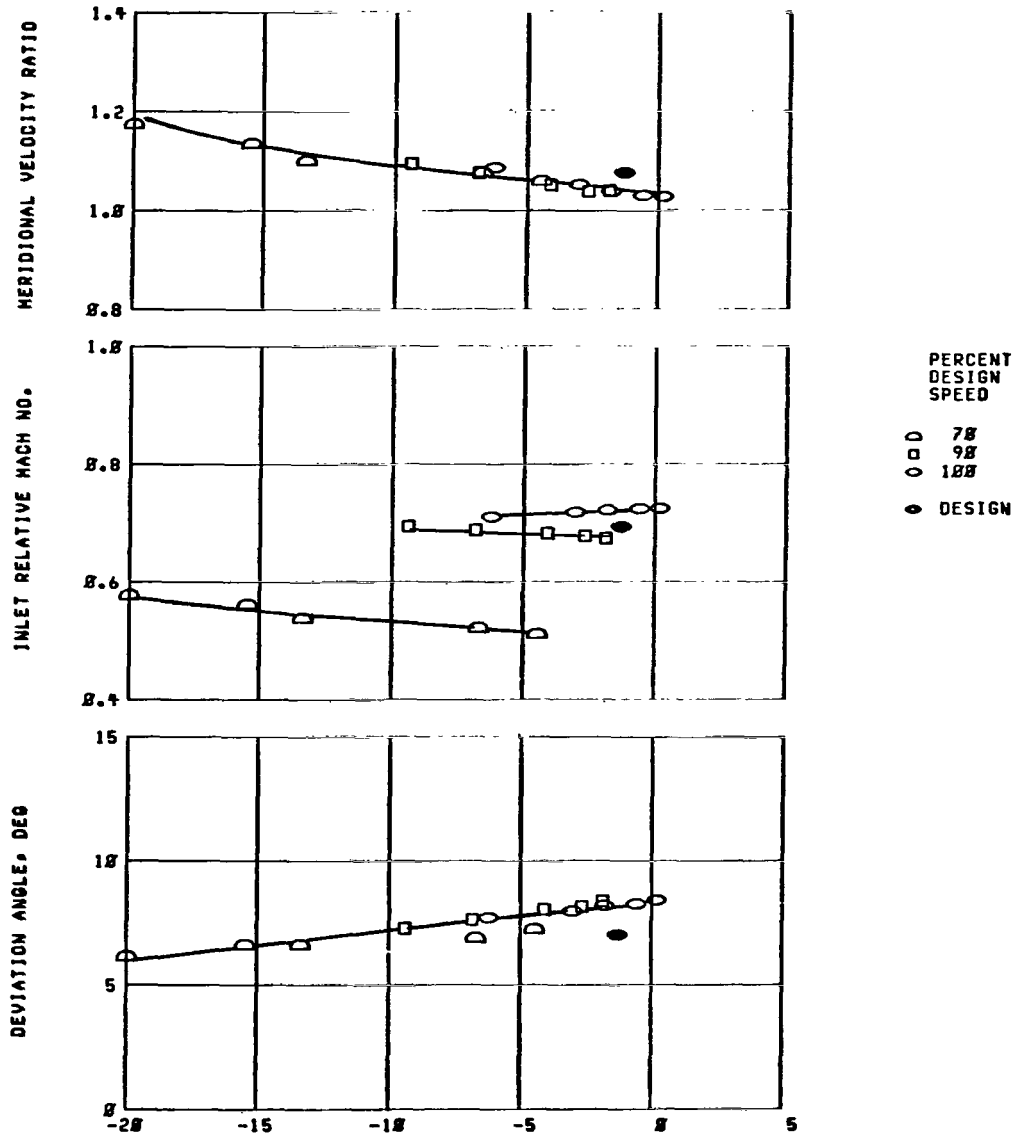
(d) Location, 30 percent of span.

Figure 12. - Continued. Blade-element performance for stator 36.



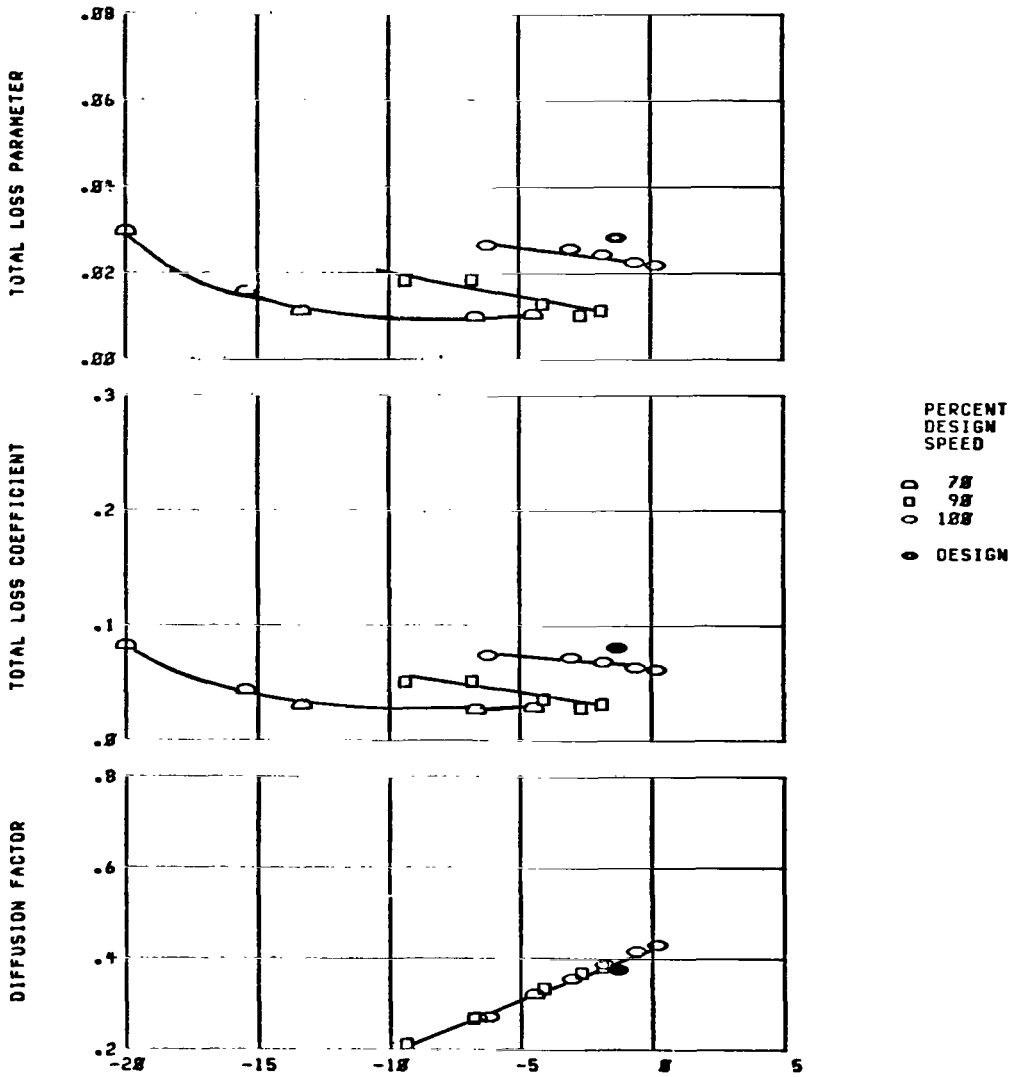
(d) Concluded. Location, 30 percent of span.

Figure 12. - Continued. Blade-element performance for stator 36.



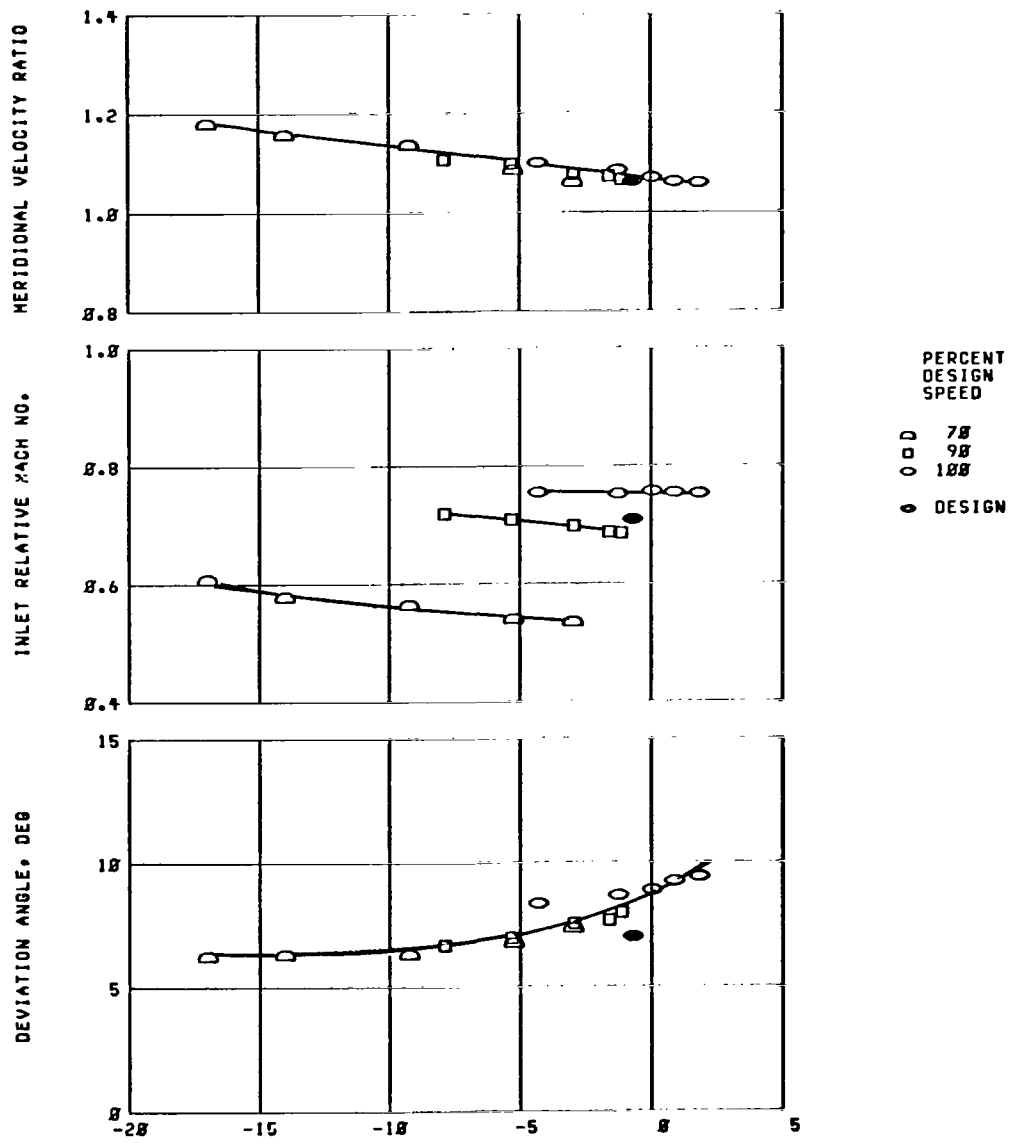
(e) Location, 50 percent of span.

Figure 12. - Continued. Blade-element performance for stator 36.



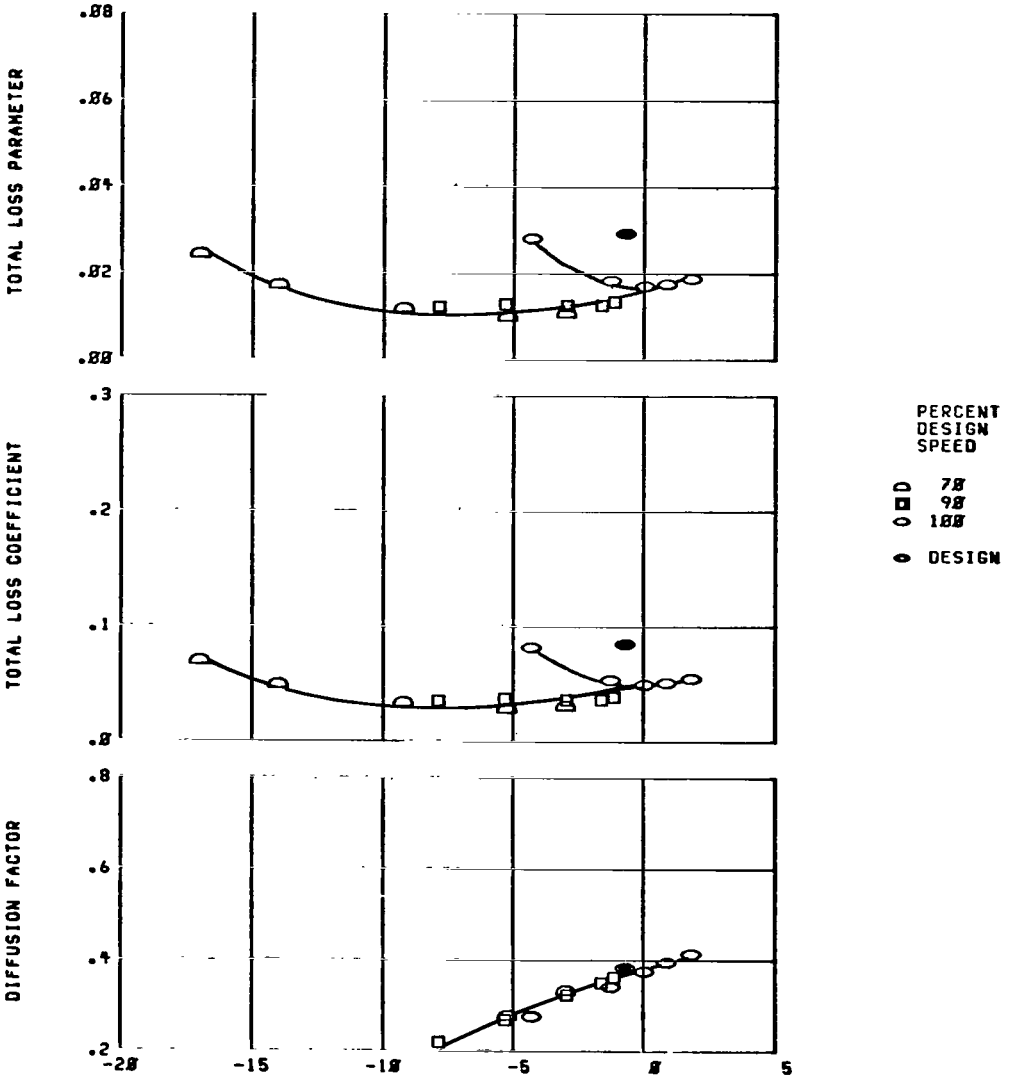
(e) Concluded. Location, 50 percent of span.

Figure 12. - Continued. Blade-element performance for stator 36.



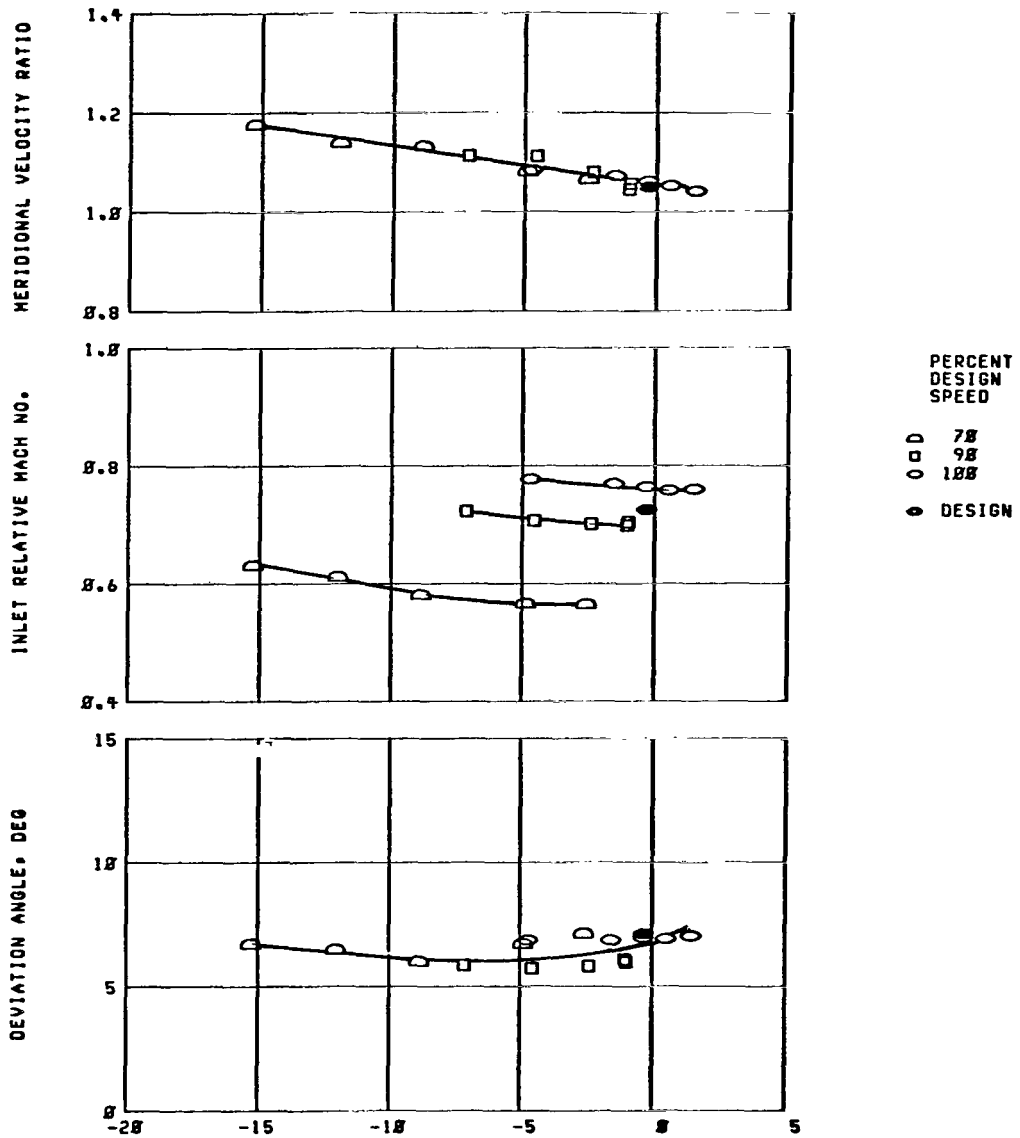
(f) Location, 70 percent of span.

Figure 12. - Continued. Blade-element performance for stator 36.



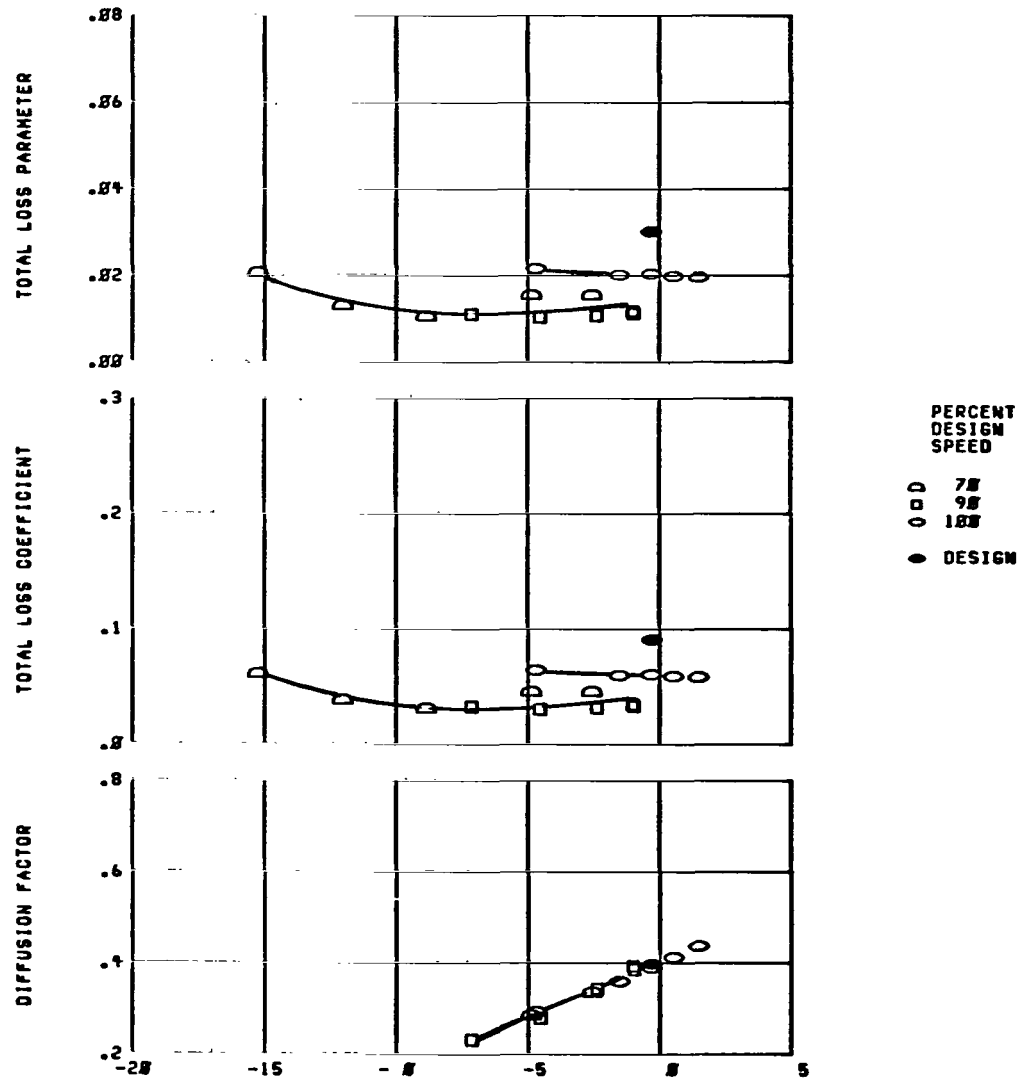
(f) Concluded. Location, 70 percent of span.

Figure 12. - Continued. Blade-element performance for stator 36.



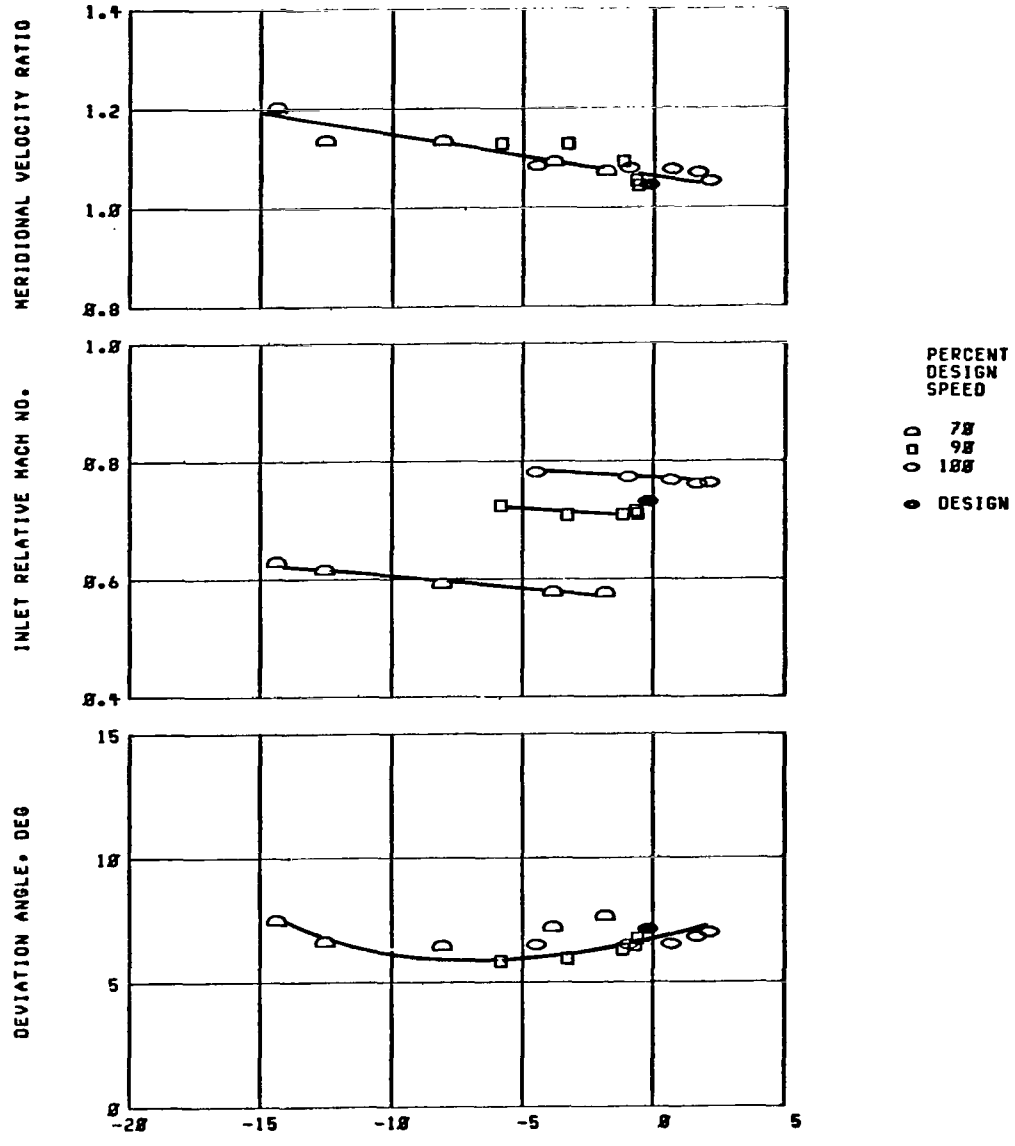
(g) Location, 85 percent of span.

Figure 12. - Continued. Blade-element performance for stator 36.



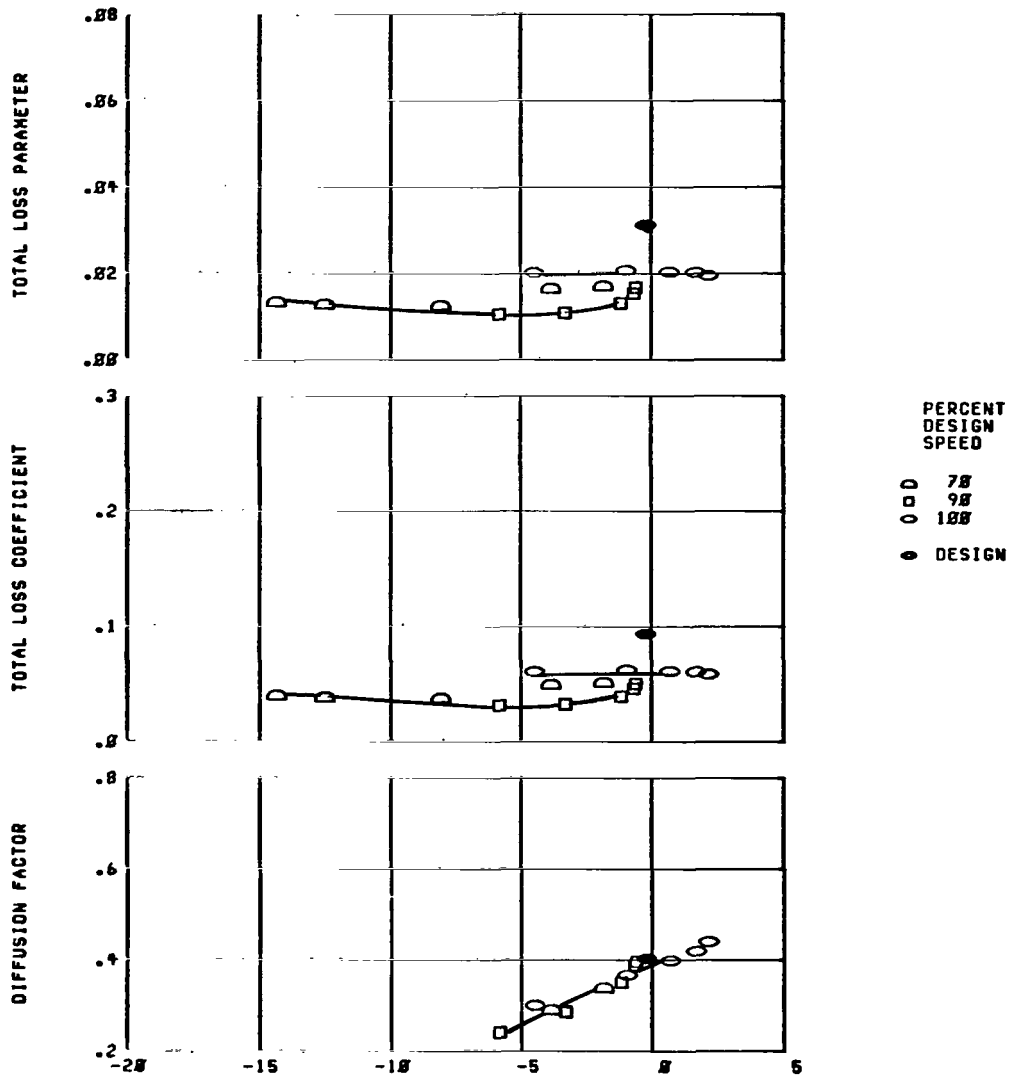
(g) Concluded. Location, 85 percent of span.

Figure 12. - Continued. Blade-element performance for stator 36.



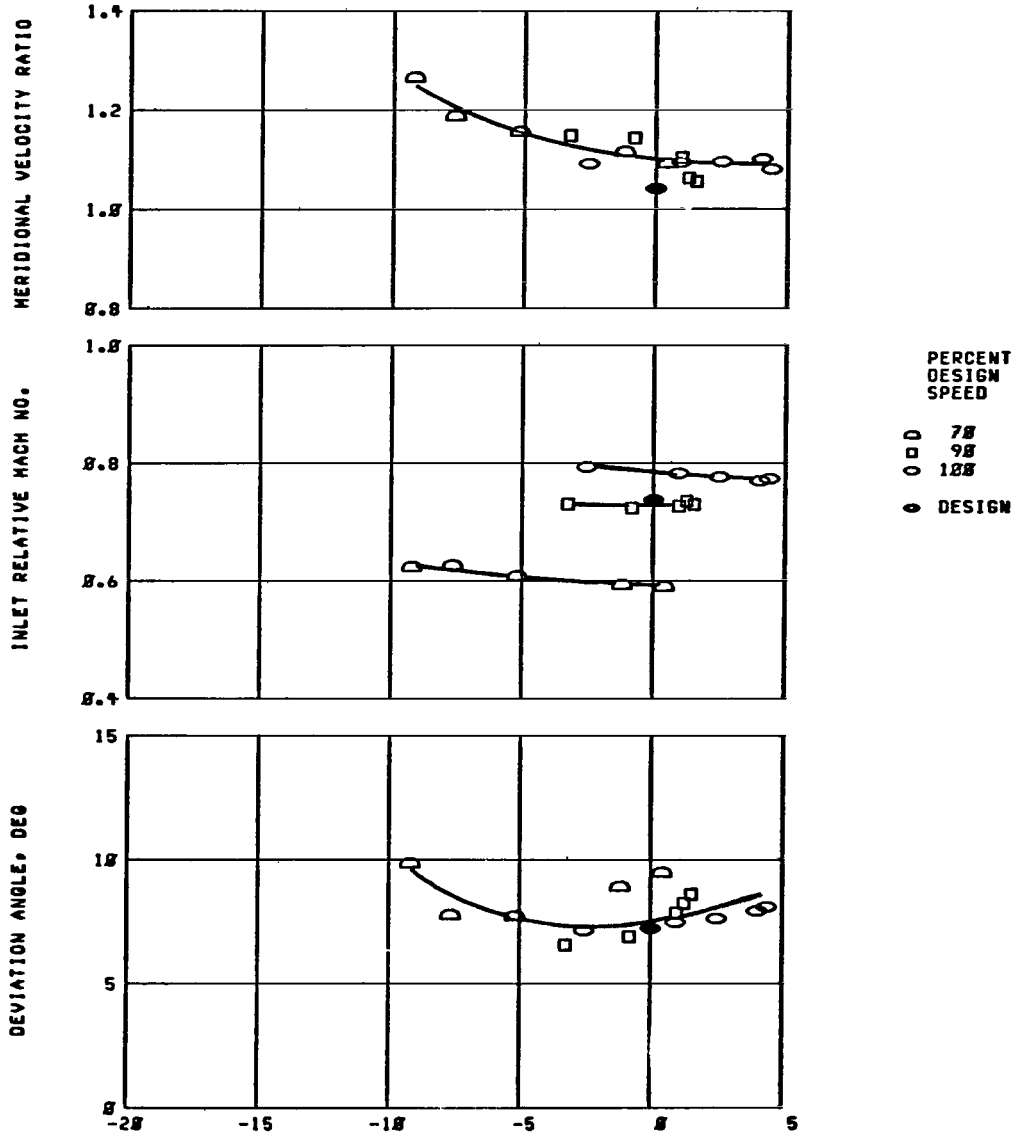
(h) Location, 90 percent of span.

Figure 12. - Continued. Blade-element performance for stator 36.



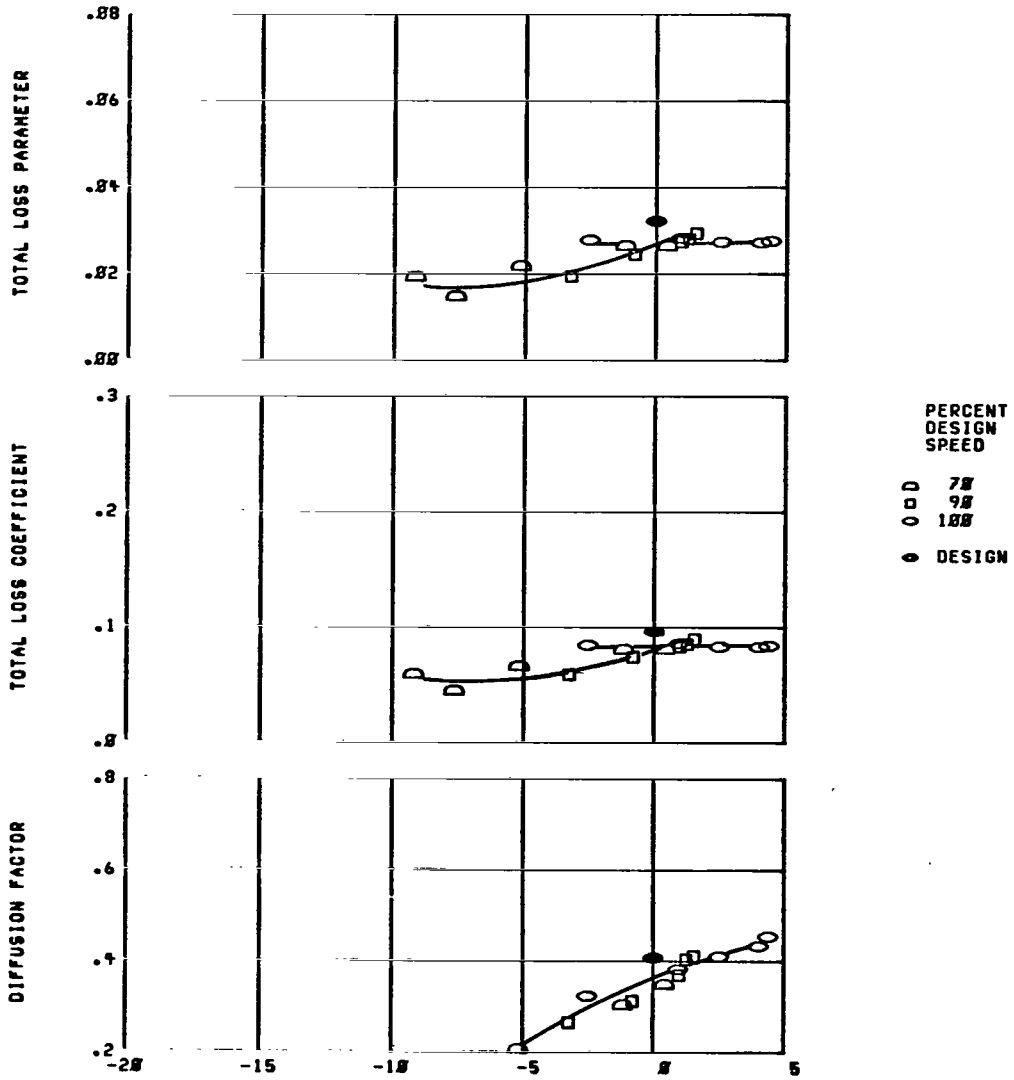
(h) Concluded. Location, 90 percent of span.

Figure 12. - Continued. Blade-element performance for stator 36.



(i) Location, 95 percent of span.

Figure 12. - Continued. Blade-element performance for stator 36.



(i) Concluded. Location, 95 percent of span.

Figure 12. - Concluded. Blade-element performance for stator 36.

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16. Abstract

The overall and blade-element performance of a transonic compressor stage is presented over the stable operating flow range for speeds from 50 to 100 percent of design. The stage was designed for a pressure ratio of 1.82 at a flow of 20.2 kg/sec and a tip speed of 455 m/sec. At design speed the stage achieved a peak efficiency of 0.821 at a pressure ratio of 1.817. The stage stall margin at design speed based on conditions at stall and peak efficiency was about 11 percent.

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