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Performance of Single-Stage Axial-Flow Transonic Compressor With Rotor and Stator Aspect Ratios of 1.63 and 1.77, Respectively, and With Design Pressure Ratio of 2.05

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Summary

The overall and blade-element performance of an axial-flow transonic compressor stage is presented. This stage is one of a series of single stages that was designed and tested to investigate the effects of aspect ratio and pressure ratio on the performance characteristics of inlet stages of an advanced-core compressor. This stage was designed for a pressure ratio of 2.05 at a flow of 20.2 kilograms per second and a tip speed of 455 meters per second. The rotor aspect ratio is 1.63 and the stator aspect ratio is 1.77. 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 0.849 at a pressure ratio of 1.969. The stage peak efficiency of 0.831 occurred at a pressure ratio of 1.944. For both the rotor and the stage, peak efficiency occurred at the minimum flow conditions, which were higher than the design flow.

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 study of the aerodynamic and mechanical design 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 the loading per stage are considerably higher than in current state-of-the-art core compressors. The 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, 36, and 37 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, higher-pressure-ratio stage in this series (stage 38). 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 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 2.05, 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 1.486 at the tip to 1.118 at the hub; the stator-inlet Mach number varies from 0.712 at the tip to 0.792 at the hub. The rotor diffusion factor at the hub and tip is roughly 0.58, with a maximum value of 0.61 at 85 percent of span; the stator hub diffusion factor of 0.58 is the maximum value.

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 1.77. The rotor and the stator are shown in figure 2. Manufacturing coordinates for both rotor and stator are presented in reference 1.

Apparatus and Procedure

Compressor Test Facility

The compressor stage was tested in the Lewis 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 readings. Orifice pressures were measured by calibrated transducers. An electronic speed counter, in conjuction 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 probe 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 distribution 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 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

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 measurements showed that 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 set equal to the midgap values for each radial position. 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 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 average total temperature. The average tangential velocity component was calculated by mass averaging the local circumferential values of tangential velocity. The average absolute velocity and the average tangential velocity component 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. The results from each set of probes were averaged in the same manner as above 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 caculated on the basis of continuity of mass flow and radial equilibrium. Measured airflow, rotative speed, design values of geometry, and annulus wall blockages were specified.

At each measuring station the integrated airflow was computed from the survey data and is presented in table IV. The data, at the three stations, were translated to the blade leading and trailing edges by the method presented in reference 4.

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 total 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 performances for 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 0.849 and 0.831, respectively. For both the rotor and the stage the peak efficiency occurred near the minimum flow conditions. The rotor and stage pressure ratios at the peak efficiency conditions were 1.969 and 1.944, respectively. The design values of rotor and stage pressure ratio are 2.105 and 2.05. The stage stall point and peak efficiency point occurred at a flow slightly higher than the design value. The peak rotor efficiencies at 70 and 90 percent of design speed were 0.949 and 0.901, respectively.

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, midflow, and near stall. These distributions show how the blade rows operated 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.—The radial distributions of diffusion factor and meridional velocity ratio were very similar to the design distributions. The radial distribution of incidence angle was different from design, being about 3° more than design in the tip region and about 2° less than design in the hub region. In the tip region the lowest losses occurred at the maximum flow condition. For the near-stall flow of 20.4 kilograms per second the diffusion factor was less than design over the entire blade span. For all three flow conditions shown, the total-pressure ratio and total-temperature ratio were significantly below the design values.

Reference 1 states that the steep wall-static-pressure gradients caused by strong shock patterns were probably responsible for the relatively poor flow range of this stage.

Stator.—Since the rotor did not operate at its design condition, the stator operated at off-design conditions over the entire blade span. The stage stalled at a flow higher than design, and the temperature rise was less than design. As a result the meridional velocity was greater than design and the tangential velocity was less. Thus the measured incidence angles were less than the design values. In the tip region both the deviation angle and the losses were significantly higher than design values. The losses over the remainder of the blade span were less than the design values. Although the diffusion factor was the lowest for a flow of 21.0 kilograms per second, the losses were highest. This indicates that the stators were operating on the choke side of the loss curves.

Variations with Incidence Angle

The variations of selected blade-element parameters with suction-surface incidence angle are presented in figures 10 and 11 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 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 10. At design speed all the rotor blade elements operated over a very narrow incidence angle range (less than 1.5°). Except at 5 percent of span the minimum loss occurred at lower than design incidence angles. Except in the tip region (5, 10, and 15 percent of span), compressor stall occurred before the design incidence was encountered. The minimum losses were less than the design values at 5, 10, 15, and 30 percent of span. At the other locations the minimum losses were greater than the design values.

Stator.—Meridional velocity ratio, inlet Mach number, deviation angle, total-loss parameter, total-loss coefficent, and diffusion factor are plotted as functions of suction-surface angle in figure 11. The upper range of incidence over which the stator operated was limited by rotor stall. Except at 5 percent of span the stator operated at incidence angles less than the design value. At 5 percent of span the stator incidence angle at compressor stall was equal to the design value.

At 5, 30, and 50 percent of span the incidence angle corresponding to minimum possible loss was not encountered. For the other span locations, minimum losses occurred at incidence less than the design. Except for 5 and 10 percent of span, the measured losses were less than the design losses.

The rotor and the stator are not well matched, especially in the region from the tip to 30 percent of span. Most of the rotor elements have minimum losses at or near the maximum flow conditions. The stator elements, however, appear to have their minimum losses at or near the minimum flow conditions.

Summary of Results

This report has presented the overall and blade-element performance of a single-stage, axial-flow transonic compressor 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 performance characteristics. The rotor and stator aspect ratios are 1.63 and 1.77, respectively. The stage was designed for a pressure ratio of 2.05 at a flow of 20.2 kilograms per second and a tip speed of 455 meters per second. Detailed radial surveys of the flow conditions were made over the stable operating range at speeds from 50 to 100 percent of design. This investigation yielded the following results:

1. At design speed the peak stage efficiency of 0.831 occurred near the stall flow of 20.4 kilograms per second. The pressure ratio was 1.944.

2. The rotor peak efficiency of 0.849 occurred near the minimum flow condition. The rotor pressure ratio was 1.969.

3. The rotor and stator are not well matched, especially in the region from the tip to 30 percent of span. Most of the rotor elements have minimum losses at the maximum flow conditions, but the stator appears to have minimum losses near the minimum flow conditions.

Lewis Research Center
National Aeronautics and Space Administration
Cleveland, Ohio, August 13, 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

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

η efficiency

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

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

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

ρ density

σ solidity, ratio of chord to spacing

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

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

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

Subscripts:

ad adiabatic (temperature rise)

h hub

i index

id ideal

LE blade leading edge

m meridional direction

mom momentum rise

p polytropic

ref reference

TE blade trailing edge

t tip

z axial direction

θ tangential direction

1 instrumentation plane upstream of rotor

2 instrumentation plane between rotor and stator

3 instrumentation plane downstream of stator

Superscript:

$'$ relative to blade

$\bar{}$ average

Appendix B
Equations

Equations for Calculating Blade-Element Parameters

Suction-surface incidence angle:

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

Mean incidence angle:

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

Deviation angle:

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

Diffusion factor:

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

Total-loss coefficient:

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

Profile-loss coefficient:

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

Total-loss parameter:

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

Profile-loss parameter:

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

Adiabatic (temperature rise) efficiency:

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

Equations for Calculating Overall Performance Parameters

Rotor total-pressure ratio:

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

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

Stage total-pressure ratio:

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

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

Rotor total-temperature ratio:

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

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

Rotor adiabatic efficiency:

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

Stage total-temperature ratio:

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

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

Stage adiabatic efficiency:

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

Rotor-inlet mass-averaged temperature:

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

Momentum-rise efficiency:

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

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

Head-rise coefficient:

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

Equivalent 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

References

1. Reid, Lonnie; and Moore, Royce D.: Design and Overall Performance of Four Highly Loaded, High Speed Inlet Stages for an Advanced High-Pressure-Ratio Core Compressor. NASA TP-1337, 1978.
2. Reid, Lonnie; and Moore, Royce D.: Experimental Study of Low Aspect Ratio Compressor Blading. J. Eng. Power, vol. 102, no. 4, Oct. 1980, pp. 875-882. (NASA TM-79280, 1979.)
3. Reid, Lonnie; and Moore, Royce D.: Performance of Single-Stage Axial-Flow Transonic Compressor with Rotor and Stator Aspect Ratios of 1.19 and 1.26, Respectively, and with Design Pressure Ratio of 1.82. NASA TP-1338, 1978.
4. Moore, Royce D.; and Reid, Lonnie: Performance of Single-Stage Axial-Flow Transonic Compressor with Rotor and Stator Aspect Ratios of 1.19 and 1.26, Respectively, and with Design Pressure Ratio of 2.05. NASA TP-1659, 1980.
5. Moore, Royce D.; and Reid, Lonnie: 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. NASA TP-1974, 1981.
6. Urasek, Donald C.; and Janetzke, David C.: Performance of Tandem-Bladed Transonic Compressor Rotor with Rotor Tip Speed of 1375 Feet Per Second. NASA TM X-2484, 1972.

TABLE I.—DESIGN OVERALL PARAMETERS FOR STAGE 38

ROTOR TOTAL PRESSURE RATIO	2.105
STAGE TOTAL PRESSURE RATIO	2.050
ROTOR TOTAL TEMPERATURE RATIO	1.269
STAGE TOTAL TEMPERATURE RATIO	1.269
ROTOR ADIABATIC EFFICIENCY	.878
STAGE ADIABATIC EFFICIENCY	.844
ROTOR POLYTROPIC EFFICIENCY	.890
STAGE POLYTROPIC EFFICIENCY	.859
ROTOR HEAD RISE COEFFICIENT	.331
STAGE HEAD RISE COEFFICIENT	.318
FLOW COEFFICIENT	.448
AIRFLOW PER UNIT FRONTAL AREA	100.525
AIRFLOW PER UNIT ANNULUS AREA	198.877
AIRFLOW	20.188
RPM	17188.700
TIP SPEED	455.096
HUB-TIP RADIUS RATIO	.70
ROTOR ASPECT RATIO	1.63
STATOR ASPECT RATIO	1.77
NUMBER OF ROTOR BLADES	48.0
NUMBER OF STATOR BLADES	62.0

TABLE II.—DESIGN BLADE-ELEMENT PARAMETERS

(a) Rotor 38

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
TIP	25.283	24.770	.0	55.2	68.1	61.5	288.2	1.300	10.14	2.105
1	24.979	24.459	.0	53.8	67.3	60.1	288.2	1.294	10.14	2.105
2	24.641	24.148	.0	52.7	66.5	58.8	288.2	1.289	10.14	2.105
3	24.297	23.837	.0	52.0	65.7	57.6	288.2	1.284	10.14	2.105
4	23.231	22.904	.0	51.0	63.6	54.6	288.2	1.274	10.14	2.105
5	21.762	21.660	.0	51.2	61.3	50.2	288.2	1.267	10.14	2.105
6	20.236	20.416	.0	51.2	59.8	44.7	288.2	1.259	10.14	2.105
7	19.020	19.483	.0	51.5	59.4	39.1	288.2	1.258	10.14	2.105
8	18.593	19.172	.0	51.5	59.6	36.8	288.2	1.257	10.14	2.105
9	18.151	18.861	.0	51.2	59.8	34.3	288.2	1.257	10.14	2.105
HUB	17.780	18.550	.0	50.8	60.1	31.7	288.2	1.256	10.14	2.105

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
TIP	183.2	237.9	490.6	285.0	183.2	135.8	.0	195.3	455.1	445.9
1	187.7	239.9	487.2	284.3	187.7	141.5	.0	193.7	449.6	440.3
2	192.6	241.9	483.5	283.2	192.6	146.6	.0	192.4	443.5	434.7
3	197.0	243.8	479.7	280.7	197.0	150.2	.0	192.0	437.3	429.1
4	207.7	248.0	466.9	269.2	207.7	155.9	.0	192.9	418.2	412.3
5	214.4	254.4	446.5	249.4	214.4	159.5	.0	198.1	391.7	389.9
6	211.8	262.6	421.4	231.6	211.8	164.7	.0	204.6	364.2	367.5
7	202.1	272.3	397.6	218.3	202.1	169.4	.0	213.1	342.4	350.7
8	196.7	276.4	388.2	215.1	196.7	172.2	.0	216.2	334.7	345.1
9	189.8	281.3	377.8	213.6	189.8	176.4	.0	219.1	326.7	339.5
HUB	183.7	286.5	369.0	212.7	183.7	181.0	.0	222.1	320.0	333.9

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	STREAMLINE SLOPE IN	STREAMLINE SLOPE OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
TIP	.555	.638	1.486	.764	.555	.364	-13.76	-16.98	.741	1.597
1	.570	.645	1.478	.765	.570	.381	-12.93	-15.12	.754	1.599
2	.585	.653	1.469	.764	.585	.396	-11.99	-13.31	.761	1.605
3	.600	.659	1.460	.759	.600	.406	-10.93	-11.59	.763	1.614
4	.635	.675	1.427	.732	.635	.424	-7.34	-6.90	.751	1.627
5	.657	.696	1.368	.682	.657	.436	-2.33	-1.37	.744	1.602
6	.648	.723	1.290	.638	.648	.453	2.96	3.79	.777	1.575
7	.616	.753	1.212	.604	.616	.469	7.49	7.56	.838	1.553
8	.599	.766	1.181	.596	.599	.477	9.20	8.71	.875	1.549
9	.576	.781	1.147	.593	.576	.490	11.09	9.73	.930	1.539
HUB	.557	.798	1.118	.592	.557	.504	12.71	10.72	.985	1.535

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
TIP	.00	5.2	2.9	6.4	.572	.787	.216	.216	.040	.040
1	5.00	5.1	2.4	6.5	.567	.804	.198	.198	.038	.038
2	10.00	5.1	2.1	6.7	.563	.820	.182	.182	.036	.036
3	15.00	5.0	1.8	6.7	.562	.832	.169	.169	.034	.034
4	30.00	5.0	1.4	7.3	.570	.862	.141	.141	.029	.029
5	50.00	4.8	.4	8.7	.591	.887	.120	.120	.026	.026
6	70.00	5.6	.0	10.2	.604	.911	.100	.100	.022	.022
7	85.00	6.6	.0	12.4	.613	.917	.101	.101	.023	.023
8	90.00	6.9	.0	12.9	.611	.919	.103	.103	.024	.024
9	95.00	7.2	.0	13.3	.603	.921	.104	.104	.024	.024
HUB	100.00	7.5	.1	13.7	.595	.924	.103	.103	.025	.025

TABLE II.—Concluded. DESIGN BLADE-ELEMENT PARAMETERS

(b) Stator 38

RP	RADII IN	RADII OUT	ABS BETAM IN	ABS BETAM OUT	REL BETAM IN	REL BETAM OUT	TOTAL TEMP IN	TOTAL TEMP RATIO	TOTAL PRES IN
TIP	24.397	23.983	48.9	11.2	48.9	11.2	374.7	.997	21.33
1	24.136	23.882	48.6	11.2	48.6	11.2	372.9	1.000	21.33
2	23.881	23.655	48.2	11.3	48.2	11.3	371.3	1.000	21.33
3	23.617	23.421	48.1	11.3	48.1	11.3	370.0	1.000	21.33
4	22.789	22.689	48.1	11.6	48.1	11.6	367.2	1.000	21.33
5	21.645	21.676	48.7	12.2	48.7	12.2	365.0	1.000	21.33
6	20.477	20.646	49.0	12.8	49.0	12.8	362.9	1.000	21.33
7	19.587	19.856	49.9	13.4	49.9	13.4	362.5	1.000	21.33
8	19.287	19.589	50.2	13.6	50.2	13.6	362.4	1.000	21.33
9	18.983	19.320	50.5	13.9	50.5	13.9	362.2	1.000	21.33
HUB	18.682	19.032	50.8	14.2	50.8	14.2	361.9	1.000	21.33

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
TIP	263.2	177.7	263.2	177.7	173.0	174.4	198.4	34.5	.0
1	261.9	178.3	261.9	178.3	173.3	174.9	196.3	34.6	.0
2	260.9	179.3	260.9	179.3	173.7	175.8	194.6	35.0	.0
3	260.3	180.0	260.3	180.0	173.9	176.5	193.7	35.3	.0
4	260.6	180.9	260.6	180.9	174.1	177.1	193.8	36.5	.0
5	264.1	181.0	264.1	181.0	174.4	176.9	198.3	38.2	.0
6	270.1	180.5	270.1	180.5	177.1	176.0	204.0	40.1	.0
7	277.1	179.6	277.1	179.6	178.5	174.7	212.0	41.7	.0
8	279.6	179.1	279.6	179.1	178.8	174.0	214.9	42.2	.0
9	282.0	178.4	282.0	178.4	179.3	173.2	217.7	42.8	.0
HUB	284.5	177.7	284.5	177.7	179.7	172.3	220.5	43.5	.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	STREAMLINE SLOPE IN	STREAMLINE SLOPE OUT	MERID P VEL R H
TIP	.712	.469	.712	.469	.468	.460	-11.73	-3.19	1.008
1	.710	.471	.710	.471	.470	.462	-10.16	-3.09	1.009
2	.709	.475	.709	.475	.472	.465	-8.70	-2.83	1.012
3	.708	.477	.708	.477	.473	.468	-7.38	-2.50	1.015
4	.712	.482	.712	.482	.476	.472	-4.08	-1.25	1.017
5	.725	.484	.725	.484	.479	.473	-.10	.78	1.014
6	.746	.484	.746	.484	.489	.472	3.76	3.09	.994
7	.768	.482	.768	.482	.495	.468	6.48	5.05	.979
8	.776	.480	.776	.480	.496	.467	7.24	5.80	.973
9	.784	.478	.784	.478	.498	.464	7.81	6.64	.966
HUB	.792	.477	.792	.477	.500	.462	8.34	7.55	.959

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D-FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS P TOT
TIP	.00	4.2	-3.2	9.4	.566	.000	.063	.063	.024
1	5.00	4.4	-2.9	9.4	.558	.000	.091	.091	.034
2	10.00	4.4	-2.8	9.3	.548	.000	.087	.087	.033
3	15.00	4.4	-2.7	9.2	.541	.000	.084	.084	.031
4	30.00	4.5	-2.1	9.0	.532	.000	.080	.080	.029
5	50.00	4.7	-1.3	8.9	.535	.000	.082	.082	.029
6	70.00	4.7	-.7	8.9	.545	.000	.087	.087	.030
7	85.00	5.4	.4	9.1	.561	.000	.094	.094	.032
8	90.00	5.6	.8	9.2	.567	.000	.098	.098	.032
9	95.00	5.1	.3	9.2	.574	.000	.103	.103	.034
HUB	100.00	4.5	-.2	9.3	.581	.000	.107	.107	.035

TABLE III.—BLADE GEOMETRY

(a) Rotor 38

RP	PERCENT SPAN	RADII RI	RADII RO	BLADE ANGLES KIC	BLADE ANGLES KTC	BLADE ANGLES KOC	DELTA INC	CONE ANGLE
TIP	0.	25.283	24.770	62.69	65.32	55.39	2.38	-15.363
1	5.	24.979	24.459	62.05	64.34	53.70	2.68	-14.949
2	10.	24.641	24.148	61.34	63.25	52.12	2.98	-13.674
3	15.	24.297	23.837	60.59	62.14	50.83	3.22	-12.304
4	30.	23.231	22.904	58.53	58.87	47.21	3.63	-7.979
5	50.	21.762	21.660	56.51	54.97	41.52	4.35	-2.243
6	70.	20.236	20.416	54.16	51.32	34.46	5.63	3.612
7	85.	19.020	19.483	52.74	48.16	26.64	6.61	8.643
8	90.	18.593	19.172	52.55	47.49	23.76	6.88	10.561
9	95.	18.151	18.861	52.51	47.06	20.74	7.18	12.701
HUB	100.	17.780	18.550	52.52	46.76	17.69	7.43	13.547

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	.504	1.738	1.717	2.371
1	.022	.157	.022	.479	1.717	1.706	2.425
2	.022	.166	.022	.450	1.695	1.687	2.477
3	.023	.174	.023	.418	1.672	1.656	2.525
4	.025	.202	.026	.311	1.622	1.526	2.648
5	.029	.239	.030	.200	1.586	1.409	2.797
6	.032	.278	.033	.109	1.522	1.304	2.958
7	.036	.311	.036	.039	1.485	1.277	3.083
8	.037	.323	.037	.021	1.468	1.226	3.122
9	.038	.336	.038	.009	1.452	1.179	3.159
HUB	.039	.346	.039	.000	1.438	1.138	3.194

RP	AERO CHORD	SETTING ANGLE	TOTAL CAMBER	SOLIDITY	TURN RATE	PHISS	CHOKE MARGIN
TIP	4.215	62.82	7.30	1.287	-.126	.41	.036
1	4.235	61.77	8.35	1.309	-.111	1.15	.037
2	4.232	60.64	9.21	1.325	-.096	1.94	.038
3	4.228	59.51	9.76	1.342	-.083	2.71	.039
4	4.218	56.18	11.32	1.397	-.024	4.50	.047
5	4.208	52.04	14.99	1.481	.112	6.42	.049
6	4.210	47.50	19.70	1.582	.193	8.21	.049
7	4.228	43.45	26.10	1.678	.252	9.59	.047
8	4.239	42.09	28.79	1.715	.269	10.22	.049
9	4.255	40.83	31.77	1.756	.278	10.73	.054
HUB	4.253	39.62	34.83	1.789	.283	11.14	.059

TABLE III.—Concluded. BLADE GEOMETRY

(b) Stator 38

RP	PERCENT SPAN	RADII RI	RADII RO	BLADE ANGLES KIC	BLADE ANGLES KTC	BLADE ANGLES KOC	DELTA INC	CONE ANGLE
TIP	0.	24.397	23.983	44.98	27.05	1.67	7.46	-8.087
1	5.	24.136	23.882	44.50	27.09	1.75	7.32	-4.998
2	10.	23.881	23.655	44.10	27.15	1.93	7.19	-4.455
3	15.	23.617	23.421	43.86	27.23	2.09	7.05	-3.894
4	30.	22.789	22.689	43.59	27.57	2.60	6.60	-2.022
5	50.	21.645	21.676	43.93	28.33	3.23	6.02	.648
6	70.	20.477	20.646	44.32	29.30	3.92	5.46	3.609
7	85.	19.587	19.856	44.52	30.02	4.31	5.02	5.857
8	90.	19.287	19.589	44.62	30.39	4.45	4.88	6.647
9	95.	18.983	19.320	45.46	31.27	4.63	4.76	7.481
HUB	100.	18.682	19.032	46.40	32.22	4.81	4.64	7.890

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	3.803	5.142	4.886	6.717
1	.025	.236	.025	3.806	5.145	4.879	6.713
2	.025	.232	.025	3.810	5.148	4.872	6.705
3	.025	.227	.025	3.816	5.152	4.869	6.697
4	.025	.213	.025	3.835	5.159	4.861	6.668
5	.024	.195	.024	3.871	5.166	4.863	6.630
6	.024	.177	.024	3.912	5.173	4.866	6.592
7	.023	.164	.023	3.950	5.183	4.881	6.568
8	.023	.159	.023	3.963	5.186	4.887	6.559
9	.023	.155	.023	3.979	5.182	4.887	6.542
HUB	.023	.151	.023	3.994	5.177	4.885	6.523

RP	AERO CHORD	SETTING ANGLE	TOTAL CAMBER	SOLIDITY	TURN RATE	PHISS	CHOKE MARGIN
TIP	3.201	23.23	43.32	1.306	1.005	24.08	.218
1	3.171	23.12	42.75	1.303	.994	23.37	.216
2	3.154	23.07	42.17	1.309	.984	22.74	.214
3	3.137	23.07	41.77	1.316	.976	22.25	.212
4	3.084	23.28	40.99	1.338	.961	21.14	.212
5	3.016	23.89	40.70	1.374	.939	20.16	.210
6	2.952	24.63	40.40	1.417	.905	19.07	.197
7	2.906	25.18	40.21	1.454	.860	18.46	.189
8	2.891	25.44	40.17	1.468	.836	18.16	.186
9	2.877	26.11	40.83	1.482	.811	17.81	.183
HUB	2.859	26.85	41.59	1.496	.785	17.46	.180

TABLE IV.—OVERALL PERFORMANCE FOR STAGE 38

(a) 100 Percent of design speed

Parameters	Reading					
	4129	4128	4123	4121	4120	4119
ROTOR TOTAL PRESSURE RATIO	1.799	1.846	1.858	1.912	1.969	2.004
STATOR TOTAL PRESSURE RATIO	0.980	0.984	0.985	0.986	0.987	0.987
ROTOR TOTAL TEMPERATURE RATIO	1.217	1.226	1.228	1.240	1.252	1.259
STATOR TOTAL TEMPERATURE RATIO	1.000	1.000	1.000	1.000	1.000	1.000
ROTOR ADIABATIC EFFICIENCY	0.842	0.847	0.847	0.848	0.849	0.848
ROTOR MOMENTUM-RISE EFFICIENCY	0.839	0.844	0.845	0.846	0.845	0.847
ROTOR HEAD-RISE COEFFICIENT	0.310	0.327	0.333	0.351	0.372	0.386
FLOW COEFFICIENT	0.409	0.408	0.407	0.405	0.400	0.394
AIRFLOW PER UNIT FRONTAL AREA	104.41	104.13	104.11	103.75	102.91	101.80
AIRFLOW PER UNIT ANNULUS AREA	206.57	206.00	205.96	205.25	203.60	201.40
AIRFLOW AT ORIFICE	20.97	20.91	20.91	20.83	20.67	20.44
AIRFLOW AT ROTOR INLET	20.97	20.93	20.89	20.83	20.65	20.43
AIRFLOW AT ROTOR OUTLET	20.98	20.92	20.92	20.85	20.68	20.46
AIRFLOW AT STATOR OUTLET	21.10	21.01	20.94	20.91	20.81	20.64
ROTATIVE SPEED	17223.9	17226.8	17185.7	17221.7	17227.9	17205.9
PERCENT OF DESIGN SPEED	100.2	100.2	100.0	100.2	100.2	100.1
Compressor performance						
STAGE TOTAL PRESSURE RATIO	1.763	1.816	1.829	1.885	1.944	1.977
STAGE TOTAL TEMPERATURE RATIO	1.218	1.226	1.229	1.240	1.252	1.259
STAGE ADIABATIC EFFICIENCY	0.809	0.821	0.823	0.827	0.831	0.831

(b) 90 Percent of design speed

Parameters	Reading				
	4140	4139	4133	4132	4131
ROTOR TOTAL PRESSURE RATIO	1.654	1.697	1.732	1.764	1.778
STATOR TOTAL PRESSURE RATIO	0.978	0.984	0.987	0.990	0.990
ROTOR TOTAL TEMPERATURE RATIO	1.173	1.182	1.189	1.197	1.201
STATOR TOTAL TEMPERATURE RATIO	1.000	1.000	1.000	1.000	1.000
ROTOR ADIABATIC EFFICIENCY	0.896	0.897	0.901	0.894	0.888
ROTOR MOMENTUM-RISE EFFICIENCY	0.894	0.896	0.899	0.893	0.887
ROTOR HEAD-RISE COEFFICIENT	0.313	0.331	0.350	0.362	0.370
FLOW COEFFICIENT	0.419	0.417	0.412	0.406	0.397
AIRFLOW PER UNIT FRONTAL AREA	98.41	98.41	97.28	96.41	94.73
AIRFLOW PER UNIT ANNULUS AREA	194.69	194.70	192.46	190.75	187.42
AIRFLOW AT ORIFICE	19.76	19.76	19.54	19.36	19.02
AIRFLOW AT ROTOR INLET	19.77	19.74	19.51	19.33	18.99
AIRFLOW AT ROTOR OUTLET	19.77	19.77	19.55	19.37	19.03
AIRFLOW AT STATOR OUTLET	19.71	19.60	19.44	19.28	18.81
ROTATIVE SPEED	15462.1	15516.3	15447.0	15507.9	15478.7
PERCENT OF DESIGN SPEED	90.0	90.3	89.9	90.2	90.1
Compressor performance					
STAGE TOTAL PRESSURE RATIO	1.617	1.670	1.710	1.746	1.761
STAGE TOTAL TEMPERATURE RATIO	1.173	1.182	1.189	1.197	1.201
STAGE ADIABATIC EFFICIENCY	0.851	0.867	0.877	0.877	0.872

TABLE IV.—Continued. OVERALL PERFORMANCE FOR STAGE 38

(c) 80 Percent of design speed

Parameters	Reading 4093
ROTOR TOTAL PRESSURE RATIO	1.577
STATOR TOTAL PRESSURE RATIO	0.991
ROTOR TOTAL TEMPERATURE RATIO	1.154
STATOR TOTAL TEMPERATURE RATIO	1.000
ROTOR ADIABATIC EFFICIENCY	0.905
ROTOR MOMENTUM-RISE EFFICIENCY	0.901
ROTOR HEAD-RISE COEFFICIENT	0.351
FLOW COEFFICIENT	0.384
AIRFLOW PER UNIT FRONTAL AREA	83.47
AIRFLOW PER UNIT ANNULUS AREA	165.13
AIRFLOW AT ORIFICE	16.76
AIRFLOW AT ROTOR INLET	16.79
AIRFLOW AT ROTOR OUTLET	16.77
AIRFLOW AT STATOR OUTLET	16.55
ROTATIVE SPEED	13735.9
PERCENT OF DESIGN SPEED	79.9
Compressor performance	
STAGE TOTAL PRESSURE RATIO	1.563
STAGE TOTAL TEMPERATURE RATIO	1.153
STAGE ADIABATIC EFFICIENCY	0.887

(d) 70 Percent of design speed

Parameters	Reading					
	4097	4098	4099	4100	4101	4095
ROTOR TOTAL PRESSURE RATIO	1.333	1.360	1.381	1.396	1.410	1.420
STATOR TOTAL PRESSURE RATIO	0.974	0.986	0.990	0.992	0.993	0.993
ROTOR TOTAL TEMPERATURE RATIO	1.090	1.098	1.104	1.109	1.114	1.120
STATOR TOTAL TEMPERATURE RATIO	1.000	1.000	1.000	1.000	1.000	1.000
ROTOR ADIABATIC EFFICIENCY	0.949	0.937	0.926	0.915	0.903	0.876
ROTOR MOMENTUM-RISE EFFICIENCY	0.951	0.935	0.927	0.914	0.903	0.874
ROTOR HEAD-RISE COEFFICIENT	0.267	0.289	0.306	0.318	0.329	0.338
FLOW COEFFICIENT	0.416	0.404	0.391	0.381	0.368	0.350
AIRFLOW PER UNIT FRONTAL AREA	80.39	78.14	76.02	74.29	72.21	68.96
AIRFLOW PER UNIT ANNULUS AREA	159.05	154.60	150.40	146.98	142.85	136.44
AIRFLOW AT ORIFICE	16.14	15.69	15.27	14.92	14.50	13.85
AIRFLOW AT ROTOR INLET	16.11	15.66	15.24	14.89	14.46	13.81
AIRFLOW AT ROTOR OUTLET	16.15	15.70	15.27	14.92	14.50	13.85
AIRFLOW AT STATOR OUTLET	16.12	15.55	15.08	14.71	14.27	13.59
ROTATIVE SPEED	12026.2	12003.6	11999.4	12002.6	12005.1	12014.2
PERCENT OF DESIGN SPEED	70.0	69.8	69.8	69 8	69.8	69.9
Compressor performance						
STAGE TOTAL PRESSURE RATIO	1.299	1.341	1.367	1.385	1.400	1.410
STAGE TOTAL TEMPERATURE RATIO	1.090	1.098	1.105	1.109	1.114	1.120
STAGE ADIABATIC EFFICIENCY	0.857	0.892	0.895	0.892	0.884	0.859

TABLE IV.—Concluded. OVERALL PERFORMANCE

FOR STAGE 38

(e) Percent of design speed

Parameters	Reading 4104
ROTOR TOTAL PRESSURE RATIO	1.312
STATOR TOTAL PRESSURE RATIO	0.994
ROTOR TOTAL TEMPERATURE RATIO	1.093
STATOR TOTAL TEMPERATURE RATIO	1.000
ROTOR ADIABATIC EFFICIENCY	0.870
ROTOR MOMENTUM-RISE EFFICIENCY	0.869
ROTOR HEAD-RISE COEFFICIENT	0.322
FLOW COEFFICIENT	0.328
AIRFLOW PER UNIT FRONTAL AREA	58.49
AIRFLOW PER UNIT ANNULUS AREA	115.71
AIRFLOW AT ORIFICE	11.75
AIRFLOW AT ROTOR INLET	11.66
AIRFLOW AT ROTOR OUTLET	11.75
AIRFLOW AT STATOR OUTLET	11.60
ROTATIVE SPEED	10621.2
PERCENT OF DESIGN SPEED	61.8
Compressor performance	
STAGE TOTAL PRESSURE RATIO	1.304
STAGE TOTAL TEMPERATURE RATIO	1.093
STAGE ADIABATIC EFFICIENCY	0.851

(f) 50 Percent of design speed

Parameters	Reading 4102
ROTOR TOTAL PRESSURE RATIO	1.194
STATOR TOTAL PRESSURE RATIO	0.996
ROTOR TOTAL TEMPERATURE RATIO	1.059
STATOR TOTAL TEMPERATURE RATIO	1.000
ROTOR ADIABATIC EFFICIENCY	0.878
ROTOR MOMENTUM-RISE EFFICIENCY	0.879
ROTOR HEAD-RISE COEFFICIENT	0.310
FLOW COEFFICIENT	0.317
AIRFLOW PER UNIT FRONTAL AREA	46.28
AIRFLOW PER UNIT ANNULUS AREA	91.55
AIRFLOW AT ORIFICE	9.29
AIRFLOW AT ROTOR INLET	9.21
AIRFLOW AT ROTOR OUTLET	9.29
AIRFLOW AT STATOR OUTLET	9.16
ROTATIVE SPEED	8562.7
PERCENT OF DESIGN SPEED	49.8
Compressor performance	
STAGE TOTAL PRESSURE RATIO	1.189
STAGE TOTAL TEMPERATURE RATIO	1.059
STAGE ADIABATIC EFFICIENCY	0.858

TABLE V.—BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 38—SI UNITS

(a) 50 Percent of design speed; reading 4102

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	24.978	24.460	0.0	48.5	74.8	61.3	288.9	1.063	10.07	1.181
2	24.641	24.148	-0.0	49.4	72.0	59.9	288.1	1.066	10.13	1.176
3	24.298	23.838	0.0	47.9	71.1	58.8	288.5	1.063	10.13	1.175
4	23.231	22.903	0.0	43.3	69.0	54.8	288.6	1.058	10.13	1.184
5	21.763	21.659	0.0	40.5	66.7	50.1	288.4	1.055	10.14	1.189
6	20.236	20.417	-0.0	43.1	64.9	42.9	287.9	1.058	10.14	1.202
7	19.020	19.482	0.0	43.7	64.1	35.5	287.4	1.061	10.14	1.213
8	18.593	19.172	0.0	44.1	63.9	33.1	287.6	1.062	10.14	1.217
9	18.151	18.859	0.0	48.5	64.3	27.9	287.3	1.067	10.12	1.225

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	60.6	111.9	231.8	154.2	60.6	74.1	0.0	83.9	223.7	219.0
2	71.9	115.1	232.3	149.3	71.9	74.9	-0.0	87.4	220.9	216.5
3	74.5	115.5	230.3	149.6	74.5	77.5	0.0	85.8	217.9	213.7
4	80.1	119.6	223.2	150.9	80.1	87.0	0.0	82.1	208.3	205.4
5	83.7	124.3	211.8	147.4	83.7	94.6	0.0	80.7	194.6	193.7
6	84.9	134.5	200.5	134.0	84.9	98.2	-0.0	92.0	181.6	183.3
7	82.7	144.5	189.3	128.4	82.7	104.5	0.0	99.8	170.3	174.4
8	81.7	147.9	186.0	126.9	81.7	106.3	0.0	102.9	167.1	172.3
9	78.5	154.1	181.1	115.6	78.5	102.2	0.0	115.4	163.2	169.5

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	0.178	0.322	0.682	0.443	0.178	0.213	1.222	1.005
2	0.212	0.331	0.686	0.430	0.212	0.216	1.042	0.972
3	0.220	0.333	0.679	0.431	0.220	0.223	1.039	0.973
4	0.236	0.345	0.659	0.436	0.236	0.251	1.087	0.975
5	0.247	0.360	0.626	0.427	0.247	0.274	1.130	0.947
6	0.251	0.390	0.593	0.389	0.251	0.285	1.156	0.919
7	0.245	0.420	0.560	0.373	0.245	0.304	1.264	0.885
8	0.242	0.430	0.550	0.369	0.242	0.309	1.300	0.876
9	0.232	0.448	0.536	0.336	0.232	0.297	1.301	0.863

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	12.7	10.0	7.6	0.472	0.767	0.176	0.176	0.032	0.032
2	10.00	10.5	7.5	7.7	0.498	0.718	0.219	0.219	0.041	0.041
3	15.00	10.4	7.2	7.9	0.488	0.745	0.194	0.194	0.037	0.037
4	30.00	10.4	6.8	7.5	0.454	0.853	0.110	0.110	0.023	0.023
5	50.00	10.2	5.9	8.5	0.433	0.932	0.053	0.053	0.011	0.011
6	70.00	10.8	5.1	8.5	0.477	0.931	0.063	0.063	0.015	0.015
7	85.00	11.3	4.7	8.8	0.481	0.936	0.067	0.067	0.016	0.016
8	90.00	11.3	4.4	9.2	0.482	0.936	0.070	0.070	0.017	0.017
9	95.00	11.7	4.5	6.9	0.546	0.894	0.131	0.131	0.033	0.033

TABLE V.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 38—SI UNITS

(b) 60 Percent of design speed; reading 4104

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	24.978	24.460	0.0	50.1	74.4	61.4	289.1	1.101	10.02	1.291
2	24.641	24.148	0.0	50.1	71.3	59.9	288.3	1.103	10.13	1.281
3	24.298	23.838	0.0	49.1	70.4	58.7	288.4	1.100	10.14	1.280
4	23.231	22.903	0.0	45.0	68.2	55.0	288.4	1.092	10.14	1.293
5	21.763	21.659	0.0	42.2	65.8	49.7	288.2	1.087	10.14	1.304
6	20.236	20.417	-0.0	43.0	64.1	42.5	287.8	1.090	10.14	1.326
7	19.020	19.482	0.0	43.4	63.2	35.8	287.7	1.093	10.14	1.342
8	18.593	19.172	0.0	43.9	63.1	32.9	288.0	1.094	10.14	1.349
9	18.151	18.859	0.0	47.1	63.5	28.0	287.8	1.101	10.11	1.363

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	77.5	140.0	288.7	187.9	77.5	89.8	0.0	107.4	278.1	272.4
2	92.7	143.8	289.7	183.5	92.7	92.1	0.0	110.4	274.5	269.0
3	96.1	144.6	286.8	182.4	96.1	94.7	0.0	109.2	270.2	265.1
4	103.6	148.4	278.4	182.9	103.6	104.9	0.0	105.0	258.4	254.8
5	108.6	155.9	265.2	178.5	108.6	115.5	0.0	104.6	241.9	240.8
6	109.4	167.6	250.0	166.3	109.4	122.5	-0.0	114.4	224.8	226.8
7	106.7	179.0	236.9	160.4	106.7	130.1	0.0	122.9	211.5	216.7
8	104.9	183.7	231.8	157.6	104.9	132.3	0.0	127.4	206.7	213.1
9	100.5	191.5	225.4	147.7	100.5	130.4	0.0	140.3	201.8	209.7

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	0.229	0.398	0.852	0.534	0.229	0.255	1.159	1.243
2	0.274	0.409	0.857	0.522	0.274	0.262	0.994	1.196
3	0.285	0.412	0.849	0.519	0.285	0.270	0.986	1.196
4	0.307	0.425	0.825	0.523	0.307	0.300	1.013	1.198
5	0.323	0.448	0.787	0.513	0.323	0.332	1.063	1.167
6	0.325	0.483	0.743	0.479	0.325	0.353	1.120	1.128
7	0.317	0.517	0.704	0.463	0.317	0.376	1.220	1.091
8	0.311	0.531	0.688	0.455	0.311	0.382	1.261	1.076
9	0.298	0.553	0.669	0.426	0.298	0.376	1.298	1.060

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	9.6	7.8	0.490	0.752	0.200	0.200	0.037	0.037
2	10.00	9.9	6.9	7.7	0.509	0.715	0.232	0.231	0.044	0.044
3	15.00	9.7	6.5	7.8	0.505	0.729	0.219	0.219	0.042	0.042
4	30.00	9.6	6.0	7.7	0.477	0.832	0.133	0.133	0.027	0.027
5	50.00	9.3	5.0	8.1	0.460	0.909	0.075	0.075	0.016	0.016
6	70.00	9.9	4.2	8.1	0.480	0.929	0.067	0.067	0.016	0.016
7	85.00	10.4	3.8	9.1	0.479	0.945	0.059	0.059	0.014	0.014
8	90.00	10.4	3.6	9.0	0.483	0.951	0.055	0.055	0.014	0.014
9	95.00	10.9	3.7	7.0	0.526	0.917	0.104	0.104	0.026	0.026

TABLE V.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 38—SI UNITS

(c) 70 Percent of design speed; reading 4095

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	24.978	24.460	0.0	47.4	73.0	60.0	289.0	1.125	9.99	1.395
2	24.641	24.148	0.0	47.6	70.0	58.4	288.5	1.128	10.13	1.381
3	24.298	23.838	0.0	47.9	69.0	57.0	288.1	1.130	10.14	1.383
4	23.231	22.903	0.0	44.5	66.6	53.4	288.7	1.120	10.14	1.411
5	21.763	21.659	0.0	42.7	64.3	48.6	288.2	1.115	10.14	1.415
6	20.236	20.417	-0.0	43.9	62.6	42.7	287.9	1.116	10.14	1.425
7	19.020	19.482	0.0	44.5	61.9	35.9	287.7	1.120	10.14	1.452
8	18.593	19.172	0.0	45.3	61.8	32.5	287.4	1.124	10.14	1.464
9	18.151	18.859	0.0	46.6	62.4	28.1	287.7	1.130	10.10	1.484

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	95.9	161.2	328.6	218.4	95.9	109.2	0.0	118.6	314.3	307.7
2	112.7	165.3	329.6	213.0	112.7	111.5	0.0	122.1	309.7	303.5
3	117.1	168.8	327.2	207.9	117.1	113.1	0.0	125.3	305.5	299.8
4	126.1	173.4	318.2	207.5	126.1	123.8	0.0	121.5	292.1	288.0
5	132.1	180.4	304.2	200.6	132.1	132.7	0.0	122.3	274.0	272.7
6	132.0	189.2	286.8	185.5	132.0	136.4	-0.0	131.1	254.6	256.8
7	127.8	201.6	271.5	177.6	127.8	143.9	0.0	141.2	239.5	245.3
8	125.4	208.3	265.6	173.6	125.4	146.4	0.0	148.2	234.1	241.4
9	119.4	216.9	257.6	169.1	119.4	149.2	0.0	157.5	228.3	237.2

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.284	0.455	0.972	0.616	0.284	0.308	1.138	1.371
2	0.335	0.467	0.979	0.601	0.335	0.315	0.989	1.319
3	0.348	0.477	0.973	0.588	0.348	0.320	0.966	1.323
4	0.375	0.493	0.947	0.589	0.375	0.352	0.982	1.325
5	0.394	0.515	0.908	0.573	0.394	0.379	1.004	1.297
6	0.394	0.542	0.856	0.531	0.394	0.390	1.033	1.258
7	0.381	0.579	0.810	0.510	0.381	0.413	1.126	1.220
8	0.374	0.599	0.792	0.499	0.374	0.421	1.167	1.205
9	0.355	0.623	0.767	0.486	0.355	0.428	1.250	1.187

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	10.8	8.2	6.3	0.472	0.798	0.165	0.154	0.031	0.029
2	10.00	8.5	5.6	6.3	0.492	0.753	0.203	0.196	0.040	0.039
3	15.00	8.3	5.1	6.1	0.506	0.750	0.209	0.202	0.042	0.041
4	30.00	8.1	4.5	6.1	0.484	0.860	0.116	0.110	0.025	0.024
5	50.00	7.8	3.4	7.1	0.476	0.910	0.078	0.075	0.017	0.017
6	70.00	8.4	2.8	8.2	0.498	0.917	0.079	0.078	0.018	0.018
7	85.00	9.1	2.5	9.2	0.503	0.941	0.064	0.064	0.015	0.015
8	90.00	9.2	2.3	8.6	0.512	0.930	0.080	0.080	0.020	0.020
9	95.00	9.7	2.6	7.1	0.521	0.922	0.098	0.098	0.025	0.025

TABLE V.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 38—SI UNITS

(d) 70 Percent of design speed; reading 4101

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	24.978	24.460	0.0	45.4	71.8	60.5	288.6	1.119	9.99	1.374
2	24.641	24.148	-0.0	44.8	68.8	58.5	288.1	1.121	10.13	1.365
3	24.298	23.838	0.0	43.3	67.8	56.8	288.7	1.118	10.14	1.372
4	23.231	22.903	0.0	40.2	65.4	52.7	288.4	1.112	10.14	1.397
5	21.763	21.659	0.0	39.9	63.0	47.9	288.3	1.109	10.14	1.413
6	20.236	20.417	0.0	41.4	61.4	42.7	287.8	1.112	10.14	1.419
7	19.020	19.482	-0.0	42.5	60.7	36.5	287.8	1.115	10.14	1.435
8	18.593	19.172	0.0	43.6	60.7	32.9	287.5	1.120	10.14	1.450
9	18.151	18.859	0.0	45.7	61.3	27.9	287.6	1.127	10.10	1.477

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	103.4	158.0	331.6	225.4	103.4	111.0	0.0	112.4	315.1	308.6
2	120.4	163.6	333.5	222.2	120.4	116.1	-0.0	115.2	311.0	304.8
3	124.4	166.6	329.5	221.3	124.4	121.3	0.0	114.3	305.1	299.3
4	133.4	174.5	320.9	220.2	133.4	133.3	0.0	112.5	291.9	287.7
5	139.0	182.4	306.4	208.6	139.0	139.9	0.0	117.0	273.0	271.7
6	138.5	189.7	289.6	193.3	138.5	142.2	0.0	125.5	254.3	256.6
7	134.0	200.2	273.9	183.7	134.0	147.6	-0.0	135.3	238.8	244.6
8	131.1	207.8	267.7	179.3	131.1	150.5	0.0	143.2	233.4	240.6
9	125.0	218.4	260.1	172.6	125.0	152.6	0.0	156.2	228.1	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	0.306	0.447	0.983	0.638	0.306	0.314	1.074	1.346
2	0.358	0.464	0.992	0.630	0.358	0.329	0.964	1.296
3	0.370	0.473	0.981	0.628	0.370	0.344	0.974	1.290
4	0.398	0.498	0.957	0.628	0.398	0.380	0.999	1.299
5	0.415	0.522	0.915	0.597	0.415	0.401	1.007	1.269
6	0.414	0.544	0.866	0.555	0.414	0.408	1.027	1.237
7	0.400	0.576	0.818	0.528	0.400	0.424	1.101	1.198
8	0.392	0.598	0.799	0.516	0.392	0.433	1.148	1.184
9	0.373	0.628	0.775	0.497	0.373	0.439	1.221	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	9.6	7.0	6.8	0.448	0.801	0.153	0.144	0.029	0.027
2	10.00	7.4	4.4	6.4	0.463	0.767	0.179	0.173	0.035	0.034
3	15.00	7.1	3.9	5.9	0.457	0.802	0.152	0.146	0.031	0.030
4	30.00	6.9	3.2	5.5	0.439	0.892	0.084	0.079	0.018	0.017
5	50.00	6.5	2.2	6.4	0.448	0.949	0.042	0.040	0.009	0.009
6	70.00	7.3	1.6	8.2	0.470	0.943	0.051	0.051	0.012	0.012
7	85.00	7.9	1.3	9.8	0.478	0.946	0.055	0.055	0.013	0.013
8	90.00	8.0	1.1	9.0	0.489	0.937	0.070	0.070	0.017	0.017
9	95.00	8.6	1.4	6.9	0.511	0.925	0.091	0.091	0.023	0.023

TABLE V.—*Continued.* BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 38—SI UNITS

(e) 70 Percent of design speed; reading 4100

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	24.978	24.460	0.0	42.7	71.2	61.1	288.7	1.110	9.98	1.346
2	24.641	24.148	0.0	42.0	68.1	58.6	288.5	1.112	10.13	1.342
3	24.298	23.838	0.0	40.5	67.1	56.7	288.6	1.111	10.14	1.355
4	23.231	22.903	0.0	37.4	64.6	52.6	288.8	1.105	10.14	1.380
5	21.763	21.659	0.0	38.1	62.2	47.8	288.0	1.106	10.14	1.400
6	20.236	20.417	0.0	39.5	60.6	42.2	287.8	1.108	10.14	1.412
7	19.020	19.482	-0.0	40.9	59.9	36.3	287.6	1.113	10.14	1.428
8	18.593	19.172	0.0	42.1	59.8	33.1	287.7	1.116	10.14	1.439
9	18.151	18.859	-0.0	44.1	60.4	28.2	287.8	1.125	10.10	1.466

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	106.8	153.0	331.9	233.0	106.8	112.5	0.0	103.7	314.2	307.7
2	124.6	160.7	333.9	229.6	124.6	119.5	0.0	107.6	309.8	303.6
3	129.2	166.0	331.7	229.9	129.2	126.3	0.0	107.7	305.5	299.7
4	138.4	174.8	323.2	228.8	138.4	139.0	0.0	106.1	292.0	287.9
5	144.3	183.4	309.2	214.9	144.0	144.4	0.0	113.1	273.6	272.3
6	143.3	192.0	292.0	200.1	143.3	148.2	0.0	122.2	254.4	256.6
7	138.5	202.0	276.1	189.5	138.5	152.6	-0.0	132.4	238.8	244.6
8	135.7	208.7	270.1	184.7	135.7	154.8	0.0	140.0	233.5	240.8
9	129.3	219.2	262.1	178.5	129.3	157.3	-0.0	152.6	228.0	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	0.317	0.434	0.984	0.661	0.317	0.319	1.053	1.326
2	0.371	0.457	0.994	0.653	0.371	0.340	0.959	1.271
3	0.385	0.473	0.988	0.654	0.385	0.360	0.977	1.274
4	0.413	0.500	0.965	0.655	0.413	0.398	1.004	1.281
5	0.431	0.527	0.925	0.617	0.431	0.415	1.003	1.257
6	0.429	0.552	0.874	0.576	0.429	0.426	1.034	1.225
7	0.414	0.582	0.826	0.546	0.414	0.440	1.102	1.187
8	0.406	0.602	0.807	0.532	0.406	0.446	1.141	1.173
9	0.386	0.631	0.782	0.514	0.386	0.453	1.217	1.158

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	9.0	6.3	7.4	0.416	0.804	0.141	0.133	0.026	0.025
2	10.00	6.6	3.6	6.5	0.433	0.784	0.155	0.150	0.030	0.029
3	15.00	6.4	3.2	5.8	0.427	0.817	0.132	0.127	0.027	0.026
4	30.00	6.1	2.4	5.3	0.409	0.919	0.058	0.054	0.013	0.012
5	50.00	5.7	1.4	6.2	0.428	0.951	0.039	0.037	0.009	0.008
6	70.00	6.4	0.8	7.8	0.448	0.956	0.038	0.038	0.009	0.009
7	85.00	7.1	0.5	9.6	0.458	0.950	0.050	0.050	0.012	0.012
8	90.00	7.2	0.3	9.2	0.470	0.942	0.061	0.061	0.015	0.015
9	95.00	7.8	0.6	7.2	0.488	0.925	0.089	0.089	0.022	0.022

TABLE V.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 38—SI UNITS

(f) 70 Percent of design speed; reading 4099

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	24.978	24.460	-0.0	40.5	70.7	61.6	288.7	1.103	9.96	1.320
2	24.641	24.148	0.0	38.9	67.5	58.6	288.2	1.105	10.13	1.322
3	24.298	23.838	0.0	37.3	66.4	56.6	288.3	1.104	10.14	1.337
4	23.231	22.903	0.0	35.2	64.0	52.5	288.4	1.101	10.14	1.364
5	21.763	21.659	0.0	36.3	61.6	47.7	288.1	1.102	10.14	1.386
6	20.236	20.417	-0.0	37.2	59.9	42.5	288.1	1.103	10.14	1.399
7	19.020	19.482	0.0	39.0	59.2	36.9	287.8	1.108	10.14	1.414
8	18.593	19.172	0.0	40.4	59.2	33.6	287.6	1.113	10.14	1.426
9	18.151	18.859	-0.0	42.0	59.8	28.8	288.1	1.121	10.09	1.455

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	110.0	149.8	332.9	239.2	110.0	113.9	-0.0	97.3	314.1	307.6
2	128.0	159.0	334.4	237.8	128.0	123.8	0.0	99.8	309.0	302.8
3	133.1	165.1	333.1	238.8	133.1	131.3	0.0	100.0	305.3	299.5
4	142.4	175.1	324.7	235.2	142.4	143.1	0.0	101.0	291.9	287.7
5	148.1	184.4	311.0	220.5	148.1	148.5	0.0	109.2	273.5	272.2
6	147.6	192.1	293.9	207.7	147.6	153.1	-0.0	116.1	254.2	256.5
7	142.5	201.9	278.3	196.4	142.5	157.0	0.0	126.9	239.1	244.9
8	139.7	208.9	272.5	191.2	139.7	159.2	0.0	135.3	234.0	241.2
9	132.9	220.0	263.9	186.6	132.9	163.6	-0.0	147.1	228.0	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	0.326	0.426	0.988	0.681	0.326	0.324	1.035	1.312
2	0.382	0.454	0.997	0.678	0.382	0.353	0.967	1.252
3	0.397	0.472	0.994	0.682	0.397	0.375	0.986	1.257
4	0.426	0.503	0.971	0.675	0.426	0.411	1.005	1.267
5	0.444	0.530	0.932	0.634	0.444	0.427	1.003	1.244
6	0.442	0.554	0.880	0.599	0.442	0.441	1.037	1.211
7	0.427	0.583	0.833	0.567	0.427	0.453	1.102	1.178
8	0.418	0.603	0.815	0.552	0.418	0.460	1.139	1.166
9	0.397	0.535	0.788	0.538	0.397	0.472	1.231	1.148

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	5.8	7.9	0.392	0.801	0.134	0.127	0.024	0.023
2	10.00	6.0	3.0	6.5	0.401	0.787	0.145	0.140	0.028	0.028
3	15.00	5.7	2.5	5.7	0.394	0.834	0.112	0.108	0.023	0.022
4	30.00	5.4	1.8	5.3	0.386	0.923	0.053	0.049	0.012	0.011
5	50.00	5.1	0.7	6.1	0.409	0.959	0.030	0.029	0.007	0.007
6	70.00	5.7	0.1	8.1	0.419	0.973	0.022	0.022	0.005	0.005
7	85.00	6.4	-0.2	10.2	0.432	0.961	0.037	0.037	0.009	0.009
8	90.00	6.5	-0.4	9.7	0.445	0.946	0.055	0.055	0.013	0.013
9	95.00	7.1	-0.1	7.8	0.455	0.939	0.070	0.070	0.017	0.017

TABLE V.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 38—SI UNITS

(g) 70 Percent of design speed; reading 4098

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	24.978	24.460	0.0	37.6	69.9	62.8	288.8	1.093	9.96	1.274
2	24.641	24.148	0.0	35.3	66.8	58.8	288.4	1.096	10.13	1.293
3	24.298	23.838	0.0	33.2	65.7	56.6	288.4	1.093	10.14	1.312
4	23.231	22.903	0.0	32.2	63.2	52.4	288.4	1.093	10.14	1.340
5	21.763	21.659	-0.0	33.1	60.8	47.7	288.2	1.096	10.14	1.368
6	20.236	20.417	0.0	35.7	59.1	42.1	287.8	1.100	10.14	1.384
7	19.020	19.482	0.0	37.0	58.4	36.5	287.8	1.104	10.14	1.396
8	18.593	19.172	0.0	37.4	58.3	33.9	288.2	1.106	10.14	1.408
9	18.151	18.859	0.0	39.7	59.0	29.0	288.0	1.117	10.09	1.436

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	114.8	142.7	334.1	247.4	114.8	113.0	0.0	87.2	313.8	307.3
2	133.2	157.8	337.6	248.9	133.2	128.8	0.0	91.0	310.2	304.0
3	137.8	164.8	335.0	250.8	137.8	138.0	0.0	90.1	305.3	299.6
4	147.5	176.4	327.4	244.9	147.5	149.3	0.0	93.9	292.2	288.1
5	152.8	185.2	312.9	230.4	152.8	155.1	-0.0	101.2	273.0	271.7
6	152.2	194.8	296.6	213.3	152.2	158.2	0.0	113.7	254.6	256.8
7	147.0	205.2	280.6	204.1	147.0	164.0	0.0	123.4	239.0	244.9
8	144.4	211.5	274.8	202.4	144.4	168.0	0.0	128.4	233.9	241.2
9	137.0	222.4	266.0	195.6	137.0	171.1	0.0	142.1	228.0	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	0.341	0.407	0.992	0.706	0.341	0.322	0.984	1.290
2	0.397	0.452	1.007	0.712	0.397	0.369	0.967	1.228
3	0.411	0.473	1.000	0.720	0.411	0.396	1.001	1.238
4	0.442	0.508	0.980	0.706	0.442	0.430	1.012	1.251
5	0.458	0.535	0.938	0.665	0.458	0.448	1.015	1.225
6	0.457	0.563	0.890	0.617	0.457	0.457	1.040	1.201
7	0.441	0.594	0.841	0.591	0.441	0.475	1.115	1.165
8	0.432	0.612	0.823	0.586	0.432	0.487	1.164	1.152
9	0.409	0.644	0.795	0.566	0.409	0.495	1.249	1.138

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	9.1	0.358	0.774	0.137	0.131	0.024	0.023
2	10.00	5.3	2.3	6.7	0.364	0.797	0.125	0.121	0.024	0.024
3	15.00	5.0	1.8	5.7	0.351	0.866	0.082	0.078	0.017	0.016
4	30.00	4.7	1.0	5.2	0.354	0.939	0.039	0.035	0.008	0.008
5	50.00	4.3	-0.1	6.2	0.372	0.980	0.014	0.013	0.003	0.003
6	70.00	5.0	-0.7	7.7	0.402	0.973	0.022	0.021	0.005	0.005
7	85.00	5.6	-1.0	9.8	0.405	0.960	0.036	0.036	0.009	0.009
8	90.00	5.7	-1.2	10.0	0.402	0.964	0.034	0.034	0.008	0.008
9	95.00	6.3	-0.8	8.0	0.420	0.932	0.074	0.074	0.019	0.019

TABLE V.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 38—SI UNITS

(h) 70 Percent of design speed; reading 4097

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	24.978	24.460	0.0	33.4	69.4	62.9	289.1	1.081	9.94	1.236
2	24.641	24.148	0.0	29.7	66.0	59.2	288.7	1.081	10.13	1.254
3	24.298	23.838	0.0	29.6	65.0	56.7	287.9	1.085	10.14	1.278
4	23.231	22.903	0.0	28.1	62.4	52.9	288.4	1.083	10.14	1.313
5	21.763	21.659	0.0	29.8	60.0	47.8	288.2	1.088	10.14	1.342
6	20.236	20.417	0.0	32.2	58.3	42.8	288.2	1.093	10.14	1.360
7	19.020	19.482	0.0	34.4	57.5	36.5	287.7	1.099	10.14	1.377
8	18.593	19.172	0.0	35.1	57.5	33.8	287.7	1.104	10.14	1.390
9	18.151	18.859	0.0	38.3	58.0	29.3	287.6	1.114	10.09	1.411

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	118.5	141.0	336.0	258.7	118.5	117.8	0.0	77.6	314.4	307.9
2	137.9	155.2	339.0	263.7	137.9	134.9	0.0	76.9	309.7	303.5
3	142.8	165.4	337.8	261.7	142.8	143.8	0.0	81.8	306.2	300.4
4	152.8	176.5	330.2	257.9	152.8	155.7	0.0	83.1	292.8	288.6
5	158.4	187.4	316.6	242.5	158.4	162.7	0.0	93.0	274.1	272.8
6	157.6	195.5	299.7	225.4	157.6	165.5	0.0	104.1	254.9	257.2
7	152.4	208.5	283.8	214.0	152.4	172.0	0.0	117.9	239.4	245.2
8	149.3	214.9	277.7	211.6	149.3	175.7	0.0	123.6	234.2	241.4
9	142.8	224.4	269.8	201.8	142.8	176.0	0.0	139.2	228.9	237.8

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	0.352	0.404	0.998	0.742	0.352	0.338	0.994	1.277
2	0.412	0.447	1.012	0.759	0.412	0.388	0.978	1.199
3	0.427	0.477	1.011	0.755	0.427	0.415	1.007	1.212
4	0.458	0.511	0.990	0.746	0.458	0.451	1.019	1.235
5	0.476	0.543	0.951	0.703	0.476	0.472	1.027	1.214
6	0.473	0.567	0.900	0.654	0.473	0.480	1.050	1.187
7	0.458	0.606	0.852	0.622	0.458	0.500	1.128	1.154
8	0.448	0.624	0.833	0.615	0.448	0.511	1.177	1.142
9	0.428	0.651	0.808	0.586	0.428	0.511	1.233	1.130

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	7.1	4.5	9.2	0.317	0.765	0.126	0.121	0.022	0.021
2	10.00	4.5	1.5	7.1	0.307	0.824	0.093	0.090	0.018	0.017
3	15.00	4.3	1.1	5.8	0.315	0.858	0.078	0.075	0.016	0.015
4	30.00	3.9	0.2	5.6	0.308	0.969	0.017	0.014	0.004	0.003
5	50.00	3.5	-0.9	6.3	0.333	0.995	0.004	0.002	0.001	0.000
6	70.00	4.1	-1.5	8.3	0.358	0.993	0.005	0.005	0.001	0.001
7	85.00	4.7	-1.9	9.8	0.371	0.963	0.031	0.031	0.008	0.008
8	90.00	4.8	-2.1	9.9	0.370	0.947	0.049	0.049	0.012	0.012
9	95.00	5.4	-1.8	8.3	0.402	0.905	0.099	0.099	0.025	0.025

TABLE V.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 38—SI UNITS

(i) 80 Percent of design speed; reading 4093

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	24.978	24.460	0.0	47.8	70.9	61.2	289.9	1.159	9.93	1.524
2	24.641	24.148	0.0	46.5	68.1	59.1	289.5	1.160	10.11	1.513
3	24.298	23.838	0.0	44.6	67.2	57.5	289.8	1.155	10.12	1.524
4	23.231	22.903	0.0	41.8	64.7	52.9	288.8	1.151	10.14	1.565
5	21.763	21.659	0.0	42.5	61.9	47.2	287.8	1.154	10.15	1.588
6	20.236	20.417	0.0	43.3	60.0	42.2	287.4	1.150	10.15	1.600
7	19.020	19.482	0.0	44.3	59.2	36.9	287.1	1.154	10.15	1.603
8	18.593	19.172	0.0	45.3	59.2	33.6	287.0	1.159	10.15	1.619
9	18.151	18.859	0.0	44.8	58.8	31.5	287.0	1.158	10.15	1.619

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	124.0	178.9	379.3	249.4	124.0	120.2	0.0	132.5	358.4	351.0
2	142.1	184.9	381.3	247.9	142.1	127.3	0.0	134.1	353.9	346.8
3	146.7	188.5	378.9	249.5	146.7	134.2	0.0	132.4	349.4	342.8
4	158.2	199.5	369.8	246.4	158.2	148.6	0.0	133.0	334.2	329.5
5	167.3	211.6	354.9	229.6	167.3	156.0	0.0	143.0	312.9	311.4
6	168.4	218.1	336.3	214.4	168.4	158.8	0.0	149.6	291.1	293.7
7	163.0	226.8	318.5	203.1	163.0	162.4	0.0	158.3	273.6	280.2
8	159.9	234.5	312.1	198.2	159.9	165.0	0.0	166.6	268.0	276.4
9	158.4	238.7	305.8	198.7	158.4	169.4	0.0	168.1	261.7	271.9

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	0.368	0.499	1.126	0.695	0.368	0.335	0.970	1.402
2	0.424	0.517	1.138	0.693	0.424	0.356	0.896	1.356
3	0.438	0.528	1.131	0.699	0.438	0.376	0.915	1.365
4	0.475	0.563	1.109	0.695	0.475	0.419	0.940	1.383
5	0.504	0.600	1.070	0.651	0.504	0.442	0.932	1.373
6	0.508	0.621	1.015	0.610	0.508	0.452	0.943	1.381
7	0.491	0.647	0.960	0.580	0.491	0.463	0.996	1.357
8	0.482	0.669	0.940	0.566	0.482	0.471	1.032	1.345
9	0.477	0.683	0.921	0.568	0.477	0.485	1.070	1.312

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	6.0	7.5	0.475	0.803	0.163	0.136	0.030	0.025
2	10.00	6.7	3.7	6.9	0.481	0.787	0.174	0.152	0.034	0.029
3	15.00	6.5	3.3	6.6	0.471	0.823	0.144	0.121	0.029	0.024
4	30.00	6.1	2.5	5.6	0.461	0.906	0.078	0.054	0.017	0.012
5	50.00	5.4	1.0	5.7	0.489	0.919	0.072	0.054	0.017	0.012
6	70.00	5.8	0.1	7.8	0.504	0.955	0.043	0.028	0.010	0.007
7	85.00	6.4	-0.2	10.2	0.512	0.941	0.062	0.054	0.015	0.013
8	90.00	6.5	-0.4	9.7	0.523	0.929	0.080	0.073	0.019	0.018
9	95.00	6.2	-1.0	10.5	0.510	0.936	0.074	0.070	0.018	0.017

TABLE V.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 38—SI UNITS

(j) 90 Percent of design speed; reading 4131

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	24.978	24.460	0.0	50.5	70.1	62.0	289.2	1.211	9.87	1.713
2	24.641	24.148	0.0	49.2	66.8	59.9	288.5	1.212	10.13	1.689
3	24.298	23.838	0.0	46.6	65.9	58.1	288.9	1.204	10.14	1.705
4	23.231	22.903	0.0	42.9	63.5	53.2	288.4	1.196	10.12	1.769
5	21.763	21.659	0.0	44.4	60.5	46.8	288.4	1.203	10.15	1.802
6	20.236	20.417	0.0	44.9	58.7	42.1	287.5	1.199	10.16	1.815
7	19.020	19.482	0.0	45.9	58.0	37.7	287.4	1.198	10.16	1.789
8	18.593	19.172	0.0	46.8	58.0	34.8	287.7	1.202	10.16	1.802
9	18.151	18.859	0.0	48.1	58.5	30.8	287.7	1.211	10.11	1.831

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	146.2	201.2	430.3	273.1	146.2	128.1	0.0	155.2	404.7	396.3
2	170.8	207.7	434.3	270.7	170.8	135.8	0.0	157.1	399.3	391.3
3	175.9	211.2	431.4	274.4	175.9	145.0	0.0	153.6	394.0	386.5
4	187.6	223.6	420.5	273.3	187.6	163.7	0.0	152.3	376.4	371.1
5	199.3	240.6	405.1	251.1	199.3	172.0	0.0	168.2	352.7	351.0
6	198.8	245.4	383.1	234.2	198.8	173.7	0.0	173.4	327.5	330.4
7	192.9	251.3	363.8	221.0	192.9	174.8	0.0	180.6	308.5	315.9
8	188.8	258.2	356.0	215.1	188.8	176.6	0.0	188.3	301.8	311.2
9	180.7	267.9	345.4	208.1	180.7	178.8	0.0	199.5	294.4	305.9

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	0.437	0.552	1.286	0.750	0.437	0.352	0.876	1.510
2	0.515	0.572	1.309	0.746	0.515	0.374	0.795	1.460
3	0.530	0.584	1.301	0.758	0.530	0.401	0.824	1.467
4	0.568	0.623	1.274	0.762	0.568	0.456	0.873	1.479
5	0.607	0.673	1.233	0.702	0.607	0.481	0.863	1.451
6	0.606	0.690	1.167	0.659	0.606	0.489	0.874	1.432
7	0.587	0.709	1.106	0.623	0.587	0.493	0.906	1.422
8	0.573	0.728	1.081	0.607	0.573	0.498	0.935	1.422
9	0.547	0.756	1.046	0.587	0.547	0.504	0.989	1.427

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	8.3	0.502	0.787	0.190	0.125	0.034	0.022
2	10.00	5.4	2.4	7.7	0.512	0.764	0.207	0.148	0.039	0.028
3	15.00	5.2	2.0	7.2	0.495	0.805	0.169	0.109	0.033	0.022
4	30.00	4.9	1.3	5.9	0.479	0.905	0.084	0.026	0.018	0.006
5	50.00	4.0	-0.3	5.2	0.520	0.901	0.094	0.047	0.022	0.011
6	70.00	4.6	-1.1	7.7	0.532	0.934	0.066	0.030	0.016	0.007
7	85.00	5.2	-1.4	11.0	0.542	0.915	0.092	0.064	0.022	0.015
8	90.00	5.3	-1.6	10.9	0.552	0.908	0.105	0.080	0.025	0.019
9	95.00	5.8	-1.4	9.8	0.565	0.895	0.130	0.108	0.032	0.026

TABLE V.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 38—SI UNITS

(k) 90 Percent of design speed; reading 4132

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	24.978	24.460	0.0	49.0	69.7	62.3	288.6	1.204	9.84	1.693
2	24.641	24.148	0.0	46.8	66.2	59.7	288.3	1.204	10.13	1.673
3	24.298	23.838	0.0	43.8	65.3	57.8	288.7	1.195	10.14	1.697
4	23.231	22.903	0.0	40.9	62.8	53.0	288.5	1.188	10.13	1.756
5	21.763	21.659	0.0	43.3	59.9	46.9	288.3	1.200	10.15	1.786
6	20.236	20.417	0.0	44.3	58.2	41.8	287.6	1.198	10.16	1.804
7	19.020	19.482	0.0	45.2	57.5	38.2	287.7	1.194	10.16	1.773
8	18.593	19.172	0.0	46.5	57.5	35.4	287.6	1.200	10.16	1.782
9	18.151	18.859	0.0	47.7	57.9	31.4	287.9	1.208	10.11	1.808

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	150.0	198.5	432.7	279.8	150.0	130.2	0.0	149.8	405.9	397.5
2	176.3	206.3	437.5	280.0	176.3	141.1	0.0	150.5	400.4	392.4
3	181.5	210.8	434.5	285.2	181.5	152.0	0.0	146.0	394.8	387.3
4	193.8	224.5	424.1	281.7	193.8	169.7	0.0	147.0	377.2	371.9
5	204.8	240.2	408.4	255.8	204.8	174.8	0.0	164.8	353.3	351.6
6	203.5	247.2	386.1	237.5	203.5	177.0	0.0	172.7	328.2	331.1
7	196.8	250.2	366.2	224.2	196.8	176.2	0.0	177.7	308.8	316.3
8	193.0	256.6	358.7	216.6	193.0	176.5	0.0	186.3	302.3	311.8
9	184.6	266.0	347.6	209.6	184.6	178.9	0.0	196.9	294.5	306.0

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	0.449	0.547	1.296	0.771	0.449	0.359	0.868	1.504
2	0.532	0.570	1.321	0.774	0.532	0.390	0.800	1.451
3	0.549	0.585	1.313	0.792	0.549	0.422	0.837	1.457
4	0.589	0.628	1.288	0.788	0.589	0.475	0.876	1.467
5	0.625	0.673	1.246	0.716	0.625	0.489	0.853	1.441
6	0.621	0.696	1.179	0.668	0.621	0.498	0.870	1.423
7	0.599	0.706	1.115	0.633	0.599	0.497	0.895	1.411
8	0.587	0.724	1.091	0.611	0.587	0.498	0.915	1.411
9	0.559	0.751	1.053	0.591	0.559	0.505	0.969	1.412

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	8.6	0.484	0.794	0.178	0.112	0.032	0.020
2	10.00	4.8	1.8	7.6	0.488	0.777	0.188	0.129	0.036	0.025
3	15.00	4.6	1.4	6.9	0.468	0.837	0.135	0.076	0.027	0.015
4	30.00	4.2	0.6	5.7	0.459	0.927	0.062	0.005	0.013	0.001
5	50.00	3.4	-1.0	5.4	0.509	0.901	0.092	0.045	0.021	0.010
6	70.00	4.0	-1.6	7.4	0.527	0.929	0.071	0.035	0.017	0.008
7	85.00	4.7	-1.9	11.5	0.534	0.915	0.090	0.062	0.021	0.015
8	90.00	4.8	-2.1	11.5	0.550	0.899	0.113	0.089	0.027	0.021
9	95.00	5.3	-1.9	10.4	0.561	0.887	0.136	0.115	0.033	0.028

TABLE V.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 38—SI UNITS

(l) 90 Percent of design speed; reading 4133

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	24.978	24.460	0.0	47.0	69.2	62.7	288.5	1.192	9.84	1.646
2	24.641	24.148	-0.0	44.7	65.8	60.0	288.2	1.192	10.14	1.633
3	24.298	23.838	-0.0	41.6	64.8	57.9	288.6	1.183	10.14	1.663
4	23.231	22.903	0.0	39.1	62.3	53.0	288.6	1.180	10.13	1.717
5	21.763	21.659	-0.0	41.9	59.5	46.9	288.1	1.193	10.16	1.763
6	20.236	20.417	-0.0	42.9	57.8	42.1	287.8	1.191	10.16	1.775
7	19.020	19.482	0.0	44.0	57.1	38.2	287.8	1.189	10.16	1.749
8	18.593	19.172	-0.0	44.9	57.1	36.0	287.9	1.192	10.16	1.749
9	18.151	18.859	0.0	46.8	57.5	32.1	288.0	1.202	10.10	1.770

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	153.2	192.9	432.1	286.6	153.2	131.6	0.0	141.1	404.0	395.6
2	179.5	202.1	437.1	287.0	179.5	143.7	-0.0	142.2	398.6	390.6
3	184.9	207.7	434.4	292.4	184.9	155.4	-0.0	137.9	393.1	385.6
4	197.1	223.0	424.1	287.4	197.1	173.0	0.0	140.7	375.5	370.2
5	207.3	239.2	408.5	260.7	207.3	177.9	-0.0	159.8	352.0	350.3
6	205.8	246.1	386.7	243.0	205.8	180.4	-0.0	167.4	327.4	330.3
7	199.0	250.2	366.5	229.0	199.0	180.0	0.0	173.7	307.8	315.2
8	195.1	254.5	358.8	222.7	195.1	180.2	-0.0	179.6	301.0	310.4
9	186.6	263.3	347.8	212.6	186.6	180.1	0.0	192.0	293.5	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	0.459	0.533	1.295	0.792	0.459	0.364	0.859	1.487
2	0.543	0.561	1.322	0.796	0.543	0.399	0.801	1.435
3	0.560	0.579	1.315	0.815	0.560	0.433	0.840	1.441
4	0.599	0.626	1.289	0.807	0.599	0.486	0.878	1.451
5	0.633	0.672	1.248	0.732	0.633	0.500	0.859	1.429
6	0.629	0.694	1.181	0.686	0.629	0.509	0.876	1.412
7	0.606	0.708	1.116	0.648	0.606	0.509	0.904	1.398
8	0.593	0.720	1.091	0.630	0.593	0.510	0.924	1.397
9	0.566	0.744	1.054	0.601	0.566	0.509	0.965	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	7.0	4.3	9.0	0.460	0.798	0.166	0.104	0.029	0.018
2	10.00	4.3	1.3	7.8	0.465	0.785	0.173	0.117	0.033	0.022
3	15.00	4.1	0.9	7.0	0.444	0.854	0.116	0.059	0.023	0.012
4	30.00	3.7	0.1	5.7	0.440	0.930	0.057	0.002	0.012	0.000
5	50.00	3.0	-1.3	5.4	0.494	0.913	0.078	0.033	0.018	0.008
6	70.00	3.7	-2.0	7.6	0.509	0.932	0.066	0.031	0.016	0.007
7	85.00	4.3	-2.3	11.5	0.518	0.918	0.084	0.059	0.020	0.014
8	90.00	4.4	-2.5	12.1	0.528	0.901	0.108	0.085	0.025	0.020
9	95.00	4.9	-2.3	11.1	0.549	0.878	0.143	0.123	0.035	0.030

TABLE V.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 38—SI UNITS

(m) 90 Percent of design speed; reading 4139

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	24.978	24.460	0.0	44.1	68.9	63.5	289.5	1.176	9.83	1.584
2	24.641	24.1 8	0.0	42.0	65.4	60.5	288.6	1.178	10.13	1.583
3	24.298	23.838	0.0	39.6	64.4	58.1	288.3	1.175	10.14	1.620
4	23.231	22.903	0.0	37.4	61.9	53.5	288.6	1.172	10.13	1.672
5	21.763	21.659	-0.0	39.6	59.2	47.9	288.1	1.183	10.16	1.721
6	20.236	20.417	0.0	41.2	57.5	42.1	287.8	1.187	10.16	1.748
7	19.020	19.482	0.0	42.3	56.8	38.0	287.6	1.186	10.16	1.739
8	18.593	19.172	-0.0	43.5	56.8	35.6	287.5	1.191	10.16	1.740
9	18.151	18.859	0.0	45.1	57.3	32.3	287.9	1.199	10.10	1.751

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	155.8	185.6	433.7	298.5	155.8	133.2	0.0	129.2	404.8	396.4
2	183.1	198.1	440.4	298.9	183.1	147.3	0.0	132.5	400.6	392.6
3	188.8	206.2	437.5	301.2	188.8	159.0	0.0	131.3	394.6	387.2
4	201.9	221.5	428.1	295.8	201.9	176.0	0.0	134.5	377.5	372.2
5	211.2	236.3	412.0	271.4	211.2	182.1	-0.0	150.7	353.7	352.0
6	209.3	248.0	389.7	251.4	209.3	186.7	0.0	163.2	328.7	331.7
7	202.5	253.6	369.9	238.0	202.5	187.6	0.0	170.6	309.5	317.1
8	198.1	258.2	361.7	230.6	198.1	187.4	-0.0	177.7	302.6	312.0
9	189.6	265.3	350.4	221.6	189.6	187.4	0.0	187.8	294.7	306.2

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.467	0.515	1.299	0.828	0.467	0.369	0.855	1.481
2	0.554	0.552	1.332	0.833	0.554	0.410	0.804	1.434
3	0.573	0.577	1.327	0.843	0.573	0.445	0.842	1.439
4	0.615	0.624	1.304	0.833	0.615	0.496	0.872	1.450
5	0.646	0.666	1.260	0.765	0.646	0.513	0.862	1.429
6	0.640	0.701	1.192	0.711	0.640	0.528	0.892	1.410
7	0.618	0.719	1.129	0.675	0.618	0.532	0.926	1.396
8	0.604	0.733	1.102	0.654	0.604	0.532	0.946	1.395
9	0.575	0.751	1.064	0.628	0.575	0.531	0.988	1.395

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	6.7	4.1	9.8	0.424	0.799	0.154	0.092	0.026	0.016
2	10.00	4.0	1.0	8.3	0.434	0.786	0.161	0.104	0.030	0.019
3	15.00	3.7	0.5	7.2	0.422	0.845	0.117	0.059	0.023	0.012
4	30.00	3.3	-0.3	6.2	0.421	0.918	0.063	0.007	0.013	0.001
5	50.00	2.6	-1.7	6.3	0.464	0.915	0.073	0.026	0.016	0.006
6	70.00	3.3	-2.3	7.6	0.488	0.924	0.072	0.036	0.017	0.008
7	85.00	4.0	-2.6	11.3	0.496	0.920	0.081	0.054	0.019	0.013
8	90.00	4.1	-2.7	11.7	0.508	0.900	0.106	0.082	0.025	0.020
9	95.00	4.6	-2.6	11.3	0.523	0.873	0.145	0.125	0.035	0.030

TABLE V.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 38—SI UNITS

(n) 90 Percent of design speed; reading 4140

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	24.978	24.460	-0.0	42.3	68.7	64.0	288.7	1.165	9.83	1.529
2	24.641	24.148	0.0	38.9	65.3	60.7	288.3	1.164	10.13	1.539
3	24.298	23.838	-0.0	36.5	64.3	58.4	288.6	1.161	10.14	1.574
4	23.231	22.903	-0.0	35.3	61.7	53.7	288.6	1.164	10.13	1.629
5	21.763	21.659	-0.0	38.1	59.1	48.2	287.9	1.175	10.15	1.677
6	20.236	20.417	0.0	39.6	57.4	42.7	288.1	1.178	10.16	1.709
7	19.020	19.482	0.0	40.9	56.7	38.0	287.6	1.180	10.16	1.702
8	18.593	19.172	0.0	41.7	56.7	35.9	287.6	1.184	10.16	1.703
9	18.151	18.859	0.0	43.9	57.2	32.7	287.9	1.193	10.10	1.710

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	157.4	180.7	434.0	305.4	157.4	133.7	-0.0	121.5	404.5	396.1
2	183.6	194.1	439.2	308.6	183.6	151.0	0.0	121.9	399.0	391.1
3	189.5	202.7	436.6	311.3	189.5	162.9	-0.0	120.6	393.3	385.9
4	202.6	219.6	427.3	300.9	202.6	178.2	-0.0	128.4	376.2	370.9
5	211.1	234.2	411.0	276.7	211.1	184.3	-0.0	144.6	352.6	350.9
6	209.6	245.4	389.1	257.0	209.6	189.0	0.0	156.6	327.9	330.8
7	202.1	253.2	368.3	242.8	202.1	191.4	0.0	165.9	307.9	315.3
8	197.9	257.4	360.2	237.2	197.9	192.2	0.0	171.2	300.9	310.3
9	189.5	264.0	349.6	225.9	189.5	190.1	0.0	183.2	293.7	305.2

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.472	0.504	1.302	0.851	0.472	0.373	0.849	1.477
2	0.556	0.544	1.330	0.865	0.556	0.423	0.823	1.427
3	0.575	0.570	1.324	0.875	0.575	0.458	0.860	1.431
4	0.617	0.620	1.301	0.850	0.617	0.503	0.879	1.442
5	0.646	0.662	1.258	0.783	0.646	0.521	0.873	1.424
6	0.641	0.696	1.189	0.729	0.641	0.536	0.901	1.404
7	0.617	0.720	1.124	0.691	0.617	0.544	0.947	1.390
8	0.603	0.732	1.097	0.675	0.603	0.547	0.971	1.388
9	0.575	0.749	1.061	0.641	0.575	0.540	1.003	1.390

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	6.5	3.8	10.4	0.402	0.779	0.160	0.098	0.027	0.016
2	10.00	3.8	0.8	8.5	0.401	0.798	0.142	0.087	0.026	0.016
3	15.00	3.6	0.4	7.5	0.389	0.859	0.100	0.044	0.019	0.009
4	30.00	3.1	-0.5	6.4	0.403	0.913	0.065	0.010	0.014	0.002
5	50.00	2.6	-1.8	6.7	0.445	0.908	0.076	0.030	0.017	0.007
6	70.00	3.2	-2.4	8.2	0.467	0.930	0.064	0.029	0.015	0.007
7	85.00	3.9	-2.7	11.3	0.476	0.912	0.087	0.061	0.020	0.014
8	90.00	4.0	-2.9	12.0	0.482	0.896	0.108	0.085	0.026	0.020
9	95.00	4.5	-2.7	11.7	0.506	0.858	0.159	0.139	0.038	0.033

TABLE V.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 38—SI UNITS

(o) 100 Percent of design speed; reading 4119

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	24.978	24.460	0.0	53.8	69.8	63.1	288.6	1.272	9.85	1.938
2	24.641	24.148	0.0	51.6	66.7	60.7	288.3	1.271	10.14	1.912
3	24.298	23.838	0.0	50.3	65.7	58.7	288.0	1.269	10.14	1.935
4	23.231	22.903	0.0	47.4	62.9	54.4	288.5	1.256	10.14	1.983
5	21.763	21.659	0.0	47.3	60.3	49.2	288.3	1.254	10.15	2.000
6	20.236	20.417	0.0	48.7	58.6	42.1	287.9	1.260	10.16	2.055
7	19.020	19.482	0.0	48.0	57.9	37.4	287.9	1.252	10.16	2.047
8	18.593	19.172	0.0	48.5	57.9	35.0	287.8	1.254	10.16	2.053
9	18.151	18.859	0.0	50.0	58.6	31.7	287.9	1.262	10.08	2.068

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	165.4	223.6	479.2	291.5	165.4	131.9	0.0	180.5	449.8	440.4
2	191.1	230.1	482.8	291.4	191.1	142.8	0.0	180.5	443.4	434.5
3	197.5	236.2	480.5	290.4	197.5	150.9	0.0	181.7	438.1	429.8
4	214.0	244.8	469.5	285.1	214.0	165.8	0.0	180.1	418.0	412.1
5	223.6	256.6	451.3	266.2	223.6	174.0	0.0	188.7	392.1	390.2
6	222.9	273.0	427.3	242.8	222.9	180.1	0.0	205.1	364.6	367.9
7	215.0	280.0	404.9	235.7	215.0	187.2	0.0	208.2	343.2	351.5
8	210.3	285.0	395.7	230.8	210.3	189.0	0.0	213.3	335.3	345.7
9	200.1	292.2	383.5	220.8	200.1	187.8	0.0	223.9	327.2	340.0

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	0.603	1.442	0.786	0.498	0.356	0.797	1.647
2	0.580	0.622	1.465	0.788	0.580	0.386	0.747	1.606
3	0.601	0.641	1.463	0.788	0.601	0.410	0.764	1.616
4	0.655	0.670	1.437	0.780	0.655	0.453	0.775	1.613
5	0.687	0.706	1.387	0.732	0.687	0.479	0.778	1.587
6	0.685	0.755	1.314	0.671	0.685	0.498	0.808	1.554
7	0.659	0.779	1.241	0.656	0.659	0.521	0.871	1.527
8	0.643	0.794	1.211	0.643	0.643	0.527	0.899	1.517
9	0.610	0.814	1.169	0.615	0.610	0.523	0.939	1.512

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	4.9	9.4	0.534	0.764	0.227	0.106	0.039	0.018
2	10.00	5.2	2.2	8.5	0.536	0.750	0.236	0.122	0.044	0.022
3	15.00	5.0	1.8	7.8	0.535	0.772	0.216	0.100	0.042	0.019
4	30.00	4.3	0.7	7.2	0.529	0.842	0.151	0.039	0.031	0.008
5	50.00	3.8	-0.6	7.7	0.551	0.863	0.137	0.040	0.030	0.009
6	70.00	4.4	-1.2	7.6	0.584	0.878	0.134	0.055	0.031	0.013
7	85.00	5.1	-1.5	10.7	0.573	0.902	0.114	0.051	0.027	0.012
8	90.00	5.2	-1.6	11.1	0.576	0.897	0.125	0.069	0.030	0.016
9	95.00	5.9	-1.3	10.7	0.594	0.881	0.154	0.104	0.037	0.025

TABLE V.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 38—SI UNITS

(p) 100 Percent of design speed; reading 4120

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	24.978	24.460	0.0	52.0	69.4	63.4	288.7	1.261	9.84	1.893
2	24.641	24.148	0.0	50.3	66.2	61.0	288.3	1.262	10.13	1.870
3	24.298	23.838	0.0	48.0	65.3	59.0	288.6	1.255	10.15	1.896
4	23.231	22.903	0.0	45.2	62.4	54.5	288.6	1.246	10.14	1.944
5	21.763	21.659	0.0	46.6	59.8	49.5	288.1	1.248	10.15	1.962
6	20.236	20.417	0.0	47.7	58.2	42.1	287.7	1.256	10.16	2.019
7	19.020	19.482	0.0	46.8	57.6	37.5	288.0	1.248	10.16	2.028
8	18.593	19.172	0.0	47.6	57.6	34.9	287.6	1.252	10.16	2.035
9	18.151	18.859	0.0	48.7	58.3	31.7	288.0	1.259	10.07	2.054

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	169.8	218.9	481.9	301.1	169.8	134.9	0.0	172.4	451.0	441.6
2	195.6	226.8	485.5	298.7	195.6	145.0	0.0	174.4	444.4	435.5
3	202.1	232.0	482.9	300.9	202.1	155.2	0.1	172.5	438.6	430.3
4	218.7	243.6	472.8	295.2	218.7	171.5	0.0	173.0	419.2	413.3
5	228.0	255.0	453.9	270.0	228.0	175.3	0.0	185.2	392.5	390.6
6	226.2	273.3	429.6	247.9	226.2	183.8	0.0	202.2	365.2	368.4
7	217.7	280.2	406.4	242.0	217.7	191.9	0.0	204.2	343.2	351.6
8	212.8	286.1	397.0	235.3	212.8	193.0	0.0	211.1	335.2	345.6
9	202.2	293.5	384.7	227.4	202.2	193.5	0.0	220.6	327.3	340.0

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	0.511	0.592	1.451	0.814	0.511	0.365	0.795	1.642
2	0.595	0.615	1.476	0.810	0.595	0.393	0.741	1.602
3	0.615	0.632	1.470	0.820	0.615	0.423	0.768	1.608
4	0.670	0.669	1.449	0.811	0.670	0.471	0.784	1.610
5	0.702	0.703	1.398	0.744	0.702	0.483	0.769	1.582
6	0.697	0.757	1.323	0.687	0.697	0.509	0.813	1.552
7	0.668	0.781	1.247	0.674	0.668	0.536	0.882	1.521
8	0.652	0.799	1.216	0.657	0.652	0.539	0.907	1.511
9	0.617	0.819	1.173	0.634	0.617	0.540	0.957	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	7.2	4.5	9.7	0.510	0.766	0.217	0.096	0.037	0.017
2	10.00	4.8	1.8	8.8	0.519	0.749	0.230	0.114	0.042	0.021
3	15.00	4.6	1.3	8.1	0.509	0.787	0.194	0.078	0.037	0.015
4	30.00	3.9	0.3	7.2	0.506	0.851	0.137	0.024	0.028	0.005
5	50.00	3.3	-1.0	8.0	0.542	0.854	0.142	0.044	0.031	0.010
6	70.00	4.0	-1.6	7.7	0.572	0.868	0.142	0.063	0.033	0.015
7	85.00	4.8	-1.8	10.8	0.556	0.904	0.109	0.047	0.026	0.011
8	90.00	4.9	-1.9	11.0	0.565	0.894	0.126	0.070	0.030	0.017
9	95.00	5.6	-1.6	10.7	0.575	0.883	0.149	0.100	0.036	0.024

TABLE V.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 38—SI UNITS

(q) 100 Percent of design speed; reading 4121

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	24.978	24.460	0.0	49.3	69.0	63.9	288.8	1.243	9.82	1.820
2	24.641	24.148	0.0	47.4	65.8	61.1	288.1	1.246	10.14	1.811
3	24.298	23.838	0.0	45.1	64.8	59.0	288.4	1.239	10.14	1.842
4	23.231	22.903	0.0	42.8	62.0	54.9	288.4	1.231	10.14	1.884
5	21.763	21.659	0.0	44.7	59.4	50.4	288.1	1.237	10.15	1.895
6	20.236	20.417	0.0	46.0	57.8	43.2	288.0	1.245	10.16	1.954
7	19.020	19.482	0.0	45.3	57.3	37.6	287.8	1.242	10.16	1.990
8	18.593	19.172	0.0	45.6	57.3	35.2	287.7	1.244	10.15	1.999
9	18.151	18.859	0.0	46.7	58.0	31.8	288.1	1.252	10.07	2.024

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	172.6	211.4	482.3	312.6	172.6	137.7	0.0	160.4	450.3	441.0
2	199.4	222.2	487.2	310.9	199.4	150.4	0.0	163.6	444.5	435.7
3	206.0	228.3	484.1	313.0	206.0	161.2	0.0	161.6	438.1	429.8
4	222.7	239.6	474.4	305.9	222.7	175.9	0.0	162.7	418.9	413.0
5	232.2	250.2	456.1	278.7	232.2	177.7	0.0	176.1	392.7	390.8
6	229.6	268.4	431.1	255.6	229.6	186.3	0.0	193.2	364.9	368.1
7	220.2	280.4	407.6	248.8	220.2	197.1	0.0	199.4	343.0	351.3
8	215.3	286.2	398.6	245.0	215.3	200.1	0.0	204.7	335.5	346.0
9	204.5	294.8	385.8	237.7	204.5	202.1	0.0	214.6	327.1	339.9

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	0.520	0.575	1.453	0.850	0.520	0.374	0.798	1.632
2	0.607	0.606	1.484	0.848	0.607	0.410	0.754	1.596
3	0.629	0.625	1.477	0.857	0.629	0.442	0.782	1.599
4	0.684	0.661	1.457	0.844	0.684	0.486	0.790	1.603
5	0.717	0.692	1.408	0.771	0.717	0.492	0.765	1.577
6	0.708	0.745	1.329	0.710	0.708	0.517	0.812	1.544
7	0.676	0.784	1.252	0.696	0.676	0.551	0.895	1.515
8	0.660	0.802	1.222	0.686	0.660	0.560	0.930	1.507
9	0.624	0.825	1.177	0.666	0.624	0.566	0.988	1.499

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	6.8	4.1	10.2	0.478	0.768	0.204	0.085	0.034	0.014
2	10.00	4.4	1.4	8.9	0.487	0.753	0.214	0.099	0.039	0.018
3	15.00	4.1	0.9	8.1	0.477	0.798	0.175	0.060	0.034	0.012
4	30.00	3.4	-0.2	7.6	0.477	0.857	0.125	0.012	0.026	0.003
5	50.00	2.9	-1.5	8.8	0.519	0.846	0.143	0.045	0.031	0.010
6	70.00	3.6	-2.0	8.7	0.549	0.860	0.145	0.066	0.033	0.015
7	85.00	4.5	-2.1	10.9	0.537	0.900	0.112	0.050	0.026	0.012
8	90.00	4.7	-2.2	11.3	0.537	0.897	0.119	0.064	0.028	0.015
9	95.00	5.3	-1.9	10.8	0.545	0.887	0.140	0.092	0.034	0.022

TABLE V.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 38—SI UNITS

(r) 100 Percent of design speed; reading 4123

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	24.978	24.460	0.0	47.6	69.1	64.8	289.1	1.226	9.80	1.744
2	24.641	24.148	0.0	45.6	65.7	61.6	287.9	1.232	10.13	1.744
3	24.298	23.838	0.0	42.5	64.6	59.4	288.8	1.222	10.15	1.782
4	23.231	22.903	0.0	40.4	61.8	55.1	288.7	1.218	10.14	1.828
5	21.763	21.659	0.0	43.0	59.2	50.7	287.9	1.227	10.15	1.840
6	20.236	20.417	0.0	44.4	57.7	43.8	287.8	1.235	10.16	1.902
7	19.020	19.482	0.0	43.7	57.1	37.9	287.7	1.235	10.16	1.947
8	18.593	19.172	0.0	43.8	57.1	35.5	287.9	1.236	10.16	1.958
9	18.151	18.859	0.0	45.4	57.7	31.7	287.9	1.247	10.09	1.988

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	171.7	202.6	480.7	320.7	171.7	136.6	0.0	149.6	449.0	439.7
2	200.3	216.3	486.8	318.4	200.3	151.3	0.0	154.6	443.6	434.8
3	207.2	222.9	483.6	323.0	207.2	164.3	0.0	150.7	437.0	428.7
4	224.6	237.1	474.8	315.5	224.6	180.5	0.0	153.7	418.3	412.4
5	233.0	247.3	455.5	285.4	233.0	180.8	0.0	168.7	391.4	389.6
6	230.7	265.6	431.2	262.9	230.7	189.9	0.0	185.7	364.3	367.5
7	221.5	279.9	407.9	256.3	221.5	202.3	0.0	193.4	342.5	350.9
8	216.3	285.8	398.5	253.4	216.3	206.3	0.0	197.8	334.6	345.1
9	206.1	296.2	386.3	244.3	206.1	207.8	0.0	211.0	326.7	339.5

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	0.517	0.553	1.447	0.875	0.517	0.373	0.796	1.628
2	0.611	0.593	1.483	0.873	0.611	0.415	0.755	1.591
3	0.632	0.614	1.475	0.889	0.632	0.452	0.793	1.591
4	0.690	0.658	1.459	0.875	0.690	0.501	0.804	1.597
5	0.719	0.687	1.407	0.792	0.719	0.502	0.776	1.570
6	0.712	0.740	1.330	0.733	0.712	0.529	0.823	1.540
7	0.681	0.785	1.254	0.719	0.681	0.567	0.914	1.510
8	0.663	0.803	1.222	0.712	0.663	0.580	0.953	1.500
9	0.630	0.832	1.180	0.686	0.630	0.584	1.008	1.493

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	6.9	4.2	11.1	0.451	0.762	0.198	0.081	0.032	0.013
2	10.00	4.2	1.2	9.5	0.464	0.744	0.213	0.098	0.038	0.018
3	15.00	3.9	0.7	8.5	0.447	0.808	0.157	0.044	0.030	0.008
4	30.00	3.2	-0.4	7.8	0.451	0.864	0.113	0.002	0.023	0.000
5	50.00	2.7	-1.6	9.2	0.498	0.839	0.145	0.048	0.031	0.010
6	70.00	3.5	-2.1	9.3	0.527	0.856	0.143	0.065	0.033	0.015
7	85.00	4.3	-2.3	11.2	0.514	0.893	0.116	0.055	0.027	0.013
8	90.00	4.5	-2.4	11.6	0.511	0.898	0.115	0.061	0.027	0.014
9	95.00	5.1	-2.1	10.7	0.526	0.880	0.146	0.099	0.035	0.024

TABLE V.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 38—SI UNITS

(s) 100 Percent of design speed; reading 4128

	RADII		ABS BETAM		REL BETAM		TOTAL TEMP		TOTAL PRESS	
RP	IN	OUT	IN	OUT	IN	OUT	IN	RATIO	IN	RATIO
1	24.978	24.460	0.0	47.0	69.1	64.9	288.7	1.223	9.79	1.730
2	24.641	24.148	0.0	44.2	65.6	61.5	288.0	1.226	10.14	1.736
3	24.298	23.838	0.0	41.7	64.6	59.5	288.6	1.219	10.15	1.772
4	23.231	22.903	0.0	40.2	61.7	55.5	288.3	1.216	10.14	1.812
5	21.763	21.659	0.0	42.5	59.2	51.1	288.4	1.223	10.16	1.826
6	20.236	20.417	0.0	44.0	57.6	44.1	287.8	1.233	10.16	1.891
7	19.020	19.482	0.0	43.6	57.1	38.3	287.8	1.233	10.16	1.938
8	18.593	19.172	0.0	43.9	57.1	35.8	287.6	1.236	10.16	1.950
9	18.151	18.859	0.0	45.0	57.7	32.2	287.9	1.245	10.08	1.981

	ABS VEL		REL VEL		MERID VEL		TANG VEL		WHEEL SPEED	
RP	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
1	172.1	201.3	481.8	324.2	172.1	137.4	0.0	147.1	450.1	440.7
2	201.2	215.6	487.2	323.7	201.2	154.5	0.0	150.4	443.7	434.8
3	208.3	222.8	485.5	327.5	208.3	166.4	0.0	148.2	438.6	430.3
4	225.4	235.5	475.9	317.4	225.4	180.0	0.0	151.8	419.2	413.3
5	234.3	245.6	457.0	288.6	234.3	181.2	0.0	165.9	392.4	390.6
6	231.5	264.9	432.5	265.3	231.5	190.6	0.0	184.1	365.3	368.6
7	222.1	278.7	408.6	257.1	222.1	201.9	0.0	192.1	343.0	351.3
8	216.9	285.2	399.8	253.5	216.9	205.5	0.0	197.8	335.8	346.3
9	206.8	295.5	387.5	246.8	206.8	208.9	0.0	209.1	327.8	340.5

	ABS MACH NO		REL MACH NO		MERID MACH NO		MERID PEAK SS
RP	IN	OUT	IN	OUT	IN	OUT	VEL R MACH NO
1	0.519	0.550	1.452	0.886	0.519	0.376	0.798 1.633
2	0.613	0.592	1.485	0.889	0.613	0.424	0.768 1.589
3	0.636	0.615	1.482	0.904	0.636	0.459	0.799 1.597
4	0.693	0.653	1.464	0.881	0.693	0.499	0.798 1.600
5	0.723	0.682	1.411	0.801	0.723	0.503	0.773 1.572
6	0.715	0.739	1.335	0.740	0.715	0.531	0.823 1.543
7	0.683	0.782	1.256	0.721	0.683	0.566	0.909 1.511
8	0.666	0.802	1.227	0.712	0.666	0.577	0.947 1.505
9	0.632	0.830	1.184	0.694	0.632	0.587	1.010 1.496

	PERCENT	INCIDENCE		DEV	D FACT	EFF	LOSS COEFF		LOSS PARAM	
RP	SPAN	MEAN	SS				TOT	PROF	TOT	PROF
1	5.00	6.9	4.2	11.2	0.442	0.761	0.196	0.077	0.032	0.012
2	10.00	4.1	1.1	9.3	0.451	0.756	0.199	0.084	0.036	0.015
3	15.00	3.9	0.7	8.6	0.438	0.813	0.152	0.036	0.029	0.007
4	30.00	3.2	-0.5	8.2	0.446	0.857	0.118	0.005	0.024	0.001
5	50.00	2.7	-1.7	9.6	0.491	0.842	0.140	0.043	0.030	0.009
6	70.00	3.5	-2.2	9.6	0.522	0.856	0.142	0.063	0.032	0.014
7	85.00	4.3	-2.4	11.5	0.513	0.893	0.115	0.054	0.027	0.013
8	90.00	4.5	-2.4	11.9	0.512	0.891	0.122	0.066	0.029	0.016
9	95.00	5.1	-2.1	11.2	0.520	0.879	0.146	0.097	0.035	0.023

TABLE V.—Concluded. BLADE-ELEMENT DATA AT BLADE EDGES FOR ROTOR 38—SI UNITS

(t) 100 Percent of design speed; reading 4129

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	24.978	24.460	0.0	44.4	68.9	65.1	288.6	1.209	9.80	1.670
2	24.641	24.148	0.0	41.4	65.5	61.6	288.0	1.211	10.14	1.684
3	24.298	23.838	0.0	39.6	64.5	59.6	288.3	1.208	10.15	1.720
4	23.231	22.903	0.0	38.8	61.6	55.8	288.3	1.207	10.14	1.762
5	21.763	21.659	0.0	41.0	59.1	51.3	288.2	1.216	10.15	1.779
6	20.236	20.417	0.0	42.2	57.6	44.6	288.1	1.224	10.16	1.850
7	19.020	19.492	0.0	42.1	57.0	38.5	287.8	1.227	10.16	1.895
8	18.593	19.172	0.0	42.2	57.1	36.2	287.9	1.228	10.16	1.909
9	18.151	18.859	0.0	43.7	57.7	32.2	287.9	1.240	10.09	1.948

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	173.8	197.3	483.1	334.4	173.8	140.9	0.0	138.1	450.7	441.4
2	202.3	212.2	487.9	335.2	202.3	159.3	0.0	140.2	444.0	435.1
3	209.1	220.7	485.7	335.8	209.1	170.2	0.0	140.6	438.4	430.1
4	226.2	233.0	476.2	323.0	226.2	181.6	0.0	145.9	419.0	413.1
5	234.9	244.8	457.8	295.4	234.9	184.7	0.0	160.7	393.0	391.1
6	231.7	262.4	432.1	273.1	231.7	194.4	0.0	176.2	364.8	368.0
7	222.4	278.4	408.6	263.9	222.4	206.4	0.0	186.8	342.8	351.1
8	217.1	284.8	399.4	261.7	217.1	211.1	0.0	191.1	335.3	345.7
9	207.3	296.9	387.7	253.9	207.3	214.8	0.0	205.0	327.6	340.4

RP	ABS MACH NO IN	ABS MACH NO OUT	REL MACH NO IN	REL MACH NO OUT	MERID MACH NO IN	MERID MACH NO OUT	MERID PEAK SS VEL R	MERID PEAK SS MACH NO
1	0.524	0.542	1.457	0.919	0.524	0.387	0.811	1.632
2	0.617	0.586	1.488	0.925	0.617	0.440	0.787	1.588
3	0.639	0.612	1.484	0.930	0.639	0.472	0.814	1.595
4	0.696	0.649	1.465	0.900	0.696	0.506	0.803	1.598
5	0.726	0.682	1.414	0.823	0.726	0.515	0.786	1.574
6	0.715	0.733	1.333	0.763	0.715	0.543	0.839	1.539
7	0.684	0.783	1.256	0.742	0.684	0.581	0.928	1.509
8	0.666	0.803	1.225	0.737	0.666	0.595	0.972	1.501
9	0.633	0.837	1.184	0.715	0.633	0.605	1.036	1.495

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	6.7	4.0	11.4	0.416	0.754	0.192	0.072	0.031	0.012
2	10.00	4.0	1.0	9.5	0.420	0.762	0.184	0.070	0.033	0.012
3	15.00	3.8	0.6	8.7	0.415	0.805	0.151	0.036	0.029	0.007
4	30.00	3.1	-0.6	8.5	0.430	0.849	0.120	0.007	0.024	0.001
5	50.00	2.6	-1.7	9.8	0.473	0.829	0.146	0.048	0.031	0.010
6	70.00	3.4	-2.2	10.2	0.497	0.859	0.135	0.057	0.030	0.013
7	85.00	4.2	-2.4	11.8	0.492	0.884	0.122	0.061	0.029	0.014
8	90.00	4.4	-2.5	12.3	0.487	0.889	0.122	0.067	0.029	0.016
9	95.00	5.0	-2.2	11.2	0.499	0.873	0.151	0.102	0.036	0.025

TABLE VI.—BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 38—SI UNITS

(a) 50 Percent of design speed; reading 4102

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	24.135	23.881	43.9	16.4	43.9	16.4	307.2	1.000	11.89	0.988
2	23.881	23.655	45.5	15.2	45.5	15.2	307.1	1.000	11.91	0.992
3	23.617	23.421	44.6	14.3	44.6	14.3	306.8	1.000	11.91	0.996
4	22.789	22.690	40.8	10.1	40.8	10.1	305.3	1.000	12.00	0.997
5	21.646	21.676	38.3	10.1	38.3	10.1	304.1	1.000	12.06	0.996
6	20.477	20.645	41.3	11.9	41.3	11.9	304.6	1.000	12.18	0.997
7	19.588	19.855	42.2	12.0	42.2	12.0	304.8	1.000	12.29	0.996
8	19.286	19.588	42.9	12.6	42.9	12.6	305.3	1.000	12.34	0.995
9	18.984	19.319	47.8	14.2	47.8	14.2	306.5	1.000	12.40	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	122.7	88.4	122.7	88.4	88.5	84.8	85.0	25.0	0.0	0.0
2	123.8	93.2	123.8	93.2	86.7	89.9	88.3	24.5	0.0	0.0
3	123.3	96.9	123.3	96.9	87.8	93.9	86.6	24.0	0.0	0.0
4	126.2	106.8	126.2	106.8	95.6	105.1	82.5	13.7	0.0	0.0
5	130.2	110.6	130.2	110.6	102.1	108.9	80.7	19.5	0.0	0.0
6	139.1	118.2	139.1	118.2	104.5	115.7	91.7	24.3	0.0	0.0
7	147.7	123.4	147.7	123.4	109.4	120.7	99.3	25.6	0.0	0.0
8	150.2	125.4	150.2	125.4	110.0	122.4	102.3	27.3	0.0	0.0
9	154.7	125.7	154.7	125.7	103.8	121.9	114.6	30.8	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	0.353	0.253	0.353	0.253	0.255	0.243	0.958	0.576
2	0.357	0.267	0.357	0.267	0.250	0.258	1.037	0.599
3	0.356	0.278	0.356	0.278	0.253	0.269	1.069	0.584
4	0.365	0.308	0.365	0.308	0.276	0.303	1.100	0.546
5	0.378	0.320	0.378	0.320	0.296	0.315	1.066	0.523
6	0.404	0.342	0.404	0.342	0.304	0.335	1.107	0.587
7	0.430	0.357	0.430	0.357	0.318	0.349	1.103	0.634
8	0.437	0.363	0.437	0.363	0.320	0.354	1.112	0.651
9	0.449	0.363	0.449	0.363	0.302	0.352	1.174	0.728

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	-0.3	-7.6	14.6	0.469	0.000	0.142	0.142	0.052	0.052
2	10.00	1.7	-5.5	13.3	0.446	0.000	0.090	0.090	0.033	0.033
3	15.00	0.9	-6.1	12.2	0.409	0.000	0.053	0.053	0.019	0.019
4	30.00	-2.7	-9.3	7.5	0.344	0.000	0.030	0.030	0.011	0.011
5	50.00	-5.6	-11.6	6.9	0.322	0.000	0.039	0.039	0.014	0.014
6	70.00	-3.1	-8.5	7.9	0.320	0.000	0.028	0.028	0.010	0.010
7	85.00	-2.3	-7.3	7.6	0.334	0.000	0.036	0.036	0.012	0.012
8	90.00	-1.7	-6.5	8.1	0.333	0.000	0.037	0.037	0.012	0.012
9	95.00	2.4	-2.4	9.5	0.367	0.000	0.087	0.087	0.028	0.028

TABLE VI.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 38—SI UNITS

(b) 60 Percent of design speed; reading 4104

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	24.135	23.881	45.3	17.1	45.3	17.1	318.1	1.000	12.93	0.983
2	23.881	23.655	46.2	15.9	46.2	15.9	317.9	1.000	12.98	0.990
3	23.617	23.421	45.7	14.6	45.7	14.6	317.3	1.000	12.98	0.995
4	22.789	22.690	42.4	10.1	42.4	10.1	314.9	1.000	13 1	0.997
5	21.646	21.676	39.9	10.0	39.9	10.0	313.2	1.000	13.22	0.996
6	20.477	20.645	41.1	11.9	41.1	11.9	313.8	1.000	13.44	0.994
7	19.588	19.855	41.8	11.7	41.8	11.7	314.4	1.000	13.60	0.994
8	19.286	19.588	42.7	12.4	42.7	12.4	315.0	1.000	13.68	0.993
9	18.984	19.319	46.4	14.4	46.4	14.4	316.8	1.000	13.78	0.984

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	153.2	107.6	153.2	107.6	107.8	102.9	108.8	31.6	0.0	0.0
2	154.7	114.1	154.7	114.1	107.1	109.7	111.6	31.2	0.0	0.0
3	154.2	118.4	154.2	118.4	107.8	114.5	110.3	29.9	0.0	0.0
4	156.5	130.0	156.5	130.0	115.6	128.0	105.5	22.7	0.0	0.0
5	163.2	135.5	163.2	135.5	125.2	133.4	104.7	23.5	0.0	0.0
6	173.6	144.0	173.6	144.0	130.9	140.9	114.0	29.7	0.0	0.0
7	183.3	150.6	183.3	150.6	136.6	147.5	122.2	30.6	0.0	0.0
8	186.8	153.1	186.8	153.1	137.3	149.6	126.7	32.8	0.0	0.0
9	192.4	154.3	192.4	154.3	132.6	149.5	139.4	38.3	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	0.436	0.304	0.436	0.304	0.307	0.290	0.954	0.733
2	0.441	0.322	0.441	0.322	0.305	0.310	1.024	0.751
3	0.440	0.335	0.440	0.335	0.308	0.324	1.063	0.738
4	0.449	0.370	0.449	0.370	0.332	0.365	1.107	0.696
5	0.470	0.387	0.470	0.387	0.361	0.382	1.066	0.676
6	0.501	0.412	0.501	0.412	0.378	0.403	1.077	0.725
7	0.530	0.432	0.530	0.432	0.395	0.423	1.080	0.774
8	0.540	0.439	0.540	0.439	0.397	0.428	1.090	0.801
9	0.556	0.441	0.556	0.441	0.383	0.427	1.127	0.874

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	1.1	-6.2	15.3	0.493	0.000	0.135	0.135	0.050	0.050
2	10.00	2.3	-4.9	13.9	0.463	0.000	0.081	0.081	0.030	0.030
3	15.00	2.0	-5.1	12.5	0.432	0.000	0.041	0.041	0.015	0.015
4	30.00	-1.2	-7.8	7.5	0.368	0.000	0.023	0.023	0.008	0.008
5	50.00	-4.0	-10.0	6.8	0.351	0.000	0.026	0.026	0.009	0.009
6	70.00	-3.2	-8.7	8.0	0.341	0.000	0.040	0.040	0.014	0.014
7	85.00	-2.7	-7.7	7.4	0.348	0.000	0.033	0.033	0.011	0.011
8	90.00	-1.9	-6.8	7.9	0.349	0.000	0.040	0.040	0.013	0.013
9	95.00	1.0	-3.8	9.7	0.372	0.000	0.084	0.084	0.027	0.027

TABLE VI.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 38—SI UNITS

(c) 70 Percent of design speed; reading 4095

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	24.135	23.881	42.3	15.9	42.3	15.9	325.1	1.000	13.94	0.981
2	23.881	23.655	43.4	14.5	43.4	14.5	325.5	1.000	13.99	0.989
3	23.617	23.421	44.3	13.8	44.3	13.8	325.5	1.000	14.03	0.994
4	22.789	22.690	41.7	11.0	41.7	11.0	323.4	1.000	14.31	0.993
5	21.646	21.676	40.3	9.9	40.3	9.9	321.2	1.000	14.35	0.996
6	20.477	20.645	41.8	11.0	41.8	11.0	321.4	1.000	14.45	0.995
7	19.588	19.855	42.9	11.2	42.9	11.2	322.1	1.000	14.72	0.992
8	19.286	19.588	44.1	12.1	44.1	12.1	322.9	1.000	14.85	0.989
9	18.984	19.319	45.9	14.0	45.9	14.0	325.0	1.000	14.99	0.980

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	178.6	123.8	178.6	123.8	132.1	119.1	120.2	33.9	0.0	0.0
2	179.6	129.6	179.6	129.6	130.4	125.5	123.4	32.5	0.0	0.0
3	180.9	135.8	180.9	135.8	129.4	131.8	126.5	32.5	0.0	0.0
4	183.5	150.7	183.5	150.7	137.0	147.9	122.1	28.8	0.0	0.0
5	189.2	154.0	189.2	154.0	144.3	151.7	122.3	26.6	0.0	0.0
6	196.0	158.9	196.0	158.9	146.0	156.0	130.7	30.3	0.0	0.0
7	206.4	166.4	206.4	166.4	151.3	163.2	140.5	32.4	0.0	0.0
8	211.7	169.4	211.7	169.4	152.1	165.6	147.3	35.6	0.0	0.0
9	218.0	171.3	218.0	171.3	151.8	166.2	156.5	41.4	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	0.507	0.347	0.507	0.347	0.375	0.333	0.902	0.799
2	0.509	0.363	0.509	0.363	0.370	0.351	0.962	0.819
3	0.513	0.381	0.513	0.381	0.367	0.370	1.019	0.838
4	0.523	0.425	0.523	0.425	0.390	0.418	1.079	0.798
5	0.542	0.437	0.542	0.437	0.413	0.430	1.051	0.787
6	0.562	0.451	0.562	0.451	0.419	0.443	1.068	0.829
7	0.594	0.473	0.594	0.473	0.435	0.464	1.079	0.889
8	0.609	0.481	0.609	0.481	0.437	0.470	1.089	0.932
9	0.626	0.485	0.626	0.485	0.436	0.471	1.095	0.973

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	-1.8	-9.2	14.1	0.494	0.000	0.118	0.118	0.043	0.043
2	10.00	-0.4	-7.6	12.5	0.473	0.000	0.068	0.068	0.025	0.025
3	15.00	0.7	-6.4	11.7	0.448	0.000	0.036	0.036	0.013	0.013
4	30.00	-1.8	-8.4	8.4	0.370	0.000	0.040	0.040	0.015	0.015
5	50.00	-3.6	-9.7	6.7	0.370	0.000	0.025	0.025	0.009	0.009
6	70.00	-2.5	-7.9	7.1	0.369	0.000	0.025	0.025	0.009	0.009
7	85.00	-1.6	-6.6	6.9	0.372	0.000	0.036	0.036	0.012	0.012
8	90.00	-0.5	-5.4	7.7	0.377	0.000	0.048	0.048	0.016	0.016
9	95.00	0.4	-4.3	9.3	0.390	0.000	0.086	0.086	0.028	0.028

TABLE VI.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 38—SI UNITS

(d) 70 Percent of design speed; reading 4101

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	24.135	23.881	40.3	15.6	40.3	15.6	322.9	1.000	13.73	0.980
2	23.881	23.655	40.6	13.5	40.6	13.5	323.0	1.000	13.83	0.989
3	23.617	23.421	39.7	13.0	39.7	13.0	322.7	1.000	13.90	0.995
4	22.789	22.690	37.4	10.5	37.4	10.5	320.8	1.000	14.16	0.996
5	21.646	21.676	37.5	9.8	37.5	9.8	319.9	1.000	14.33	0.994
6	20.477	20.645	39.4	10.3	39.4	10.3	320.0	1.000	14.39	0.992
7	19.588	19.855	40.9	10.8	40.9	10.8	320.8	1.000	14.55	0.993
8	19.286	19.588	42.3	11.9	42.3	11.9	321.9	1.000	14.71	0.991
9	18.984	19.319	45.0	13.7	45.0	13.7	324.3	1.000	14.92	0.980

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	176.2	129.5	176.2	129.5	134.4	124.7	113.9	34.7	0.0	0.0
2	179.1	137.0	179.1	137.0	136.1	133.2	116.5	32.1	0.0	0.0
3	180.7	145.3	180.7	145.3	139.1	141.5	115.3	32.8	0.0	0.0
4	186.3	160.2	186.3	160.2	148.0	157.5	113.1	29.2	0.0	0.0
5	192.2	166.0	192.2	166.0	152.4	163.5	117.1	28.3	0.0	0.0
6	197.2	169.2	197.2	169.2	152.4	166.5	125.2	30.3	0.0	0.0
7	205.5	174.5	205.5	174.5	155.3	171.4	134.6	32.8	0.0	0.0
8	211.5	178.3	211.5	178.3	156.4	174.4	142.4	36.8	0.0	0.0
9	219.5	181.0	219.5	181.0	155.3	175.8	155.2	42.8	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 VEL R	PEAK SS MACH NO
1	0.501	0.364	0.501	0.364	0.382	0.351	0.928	0.756
2	0.510	0.386	0.510	0.386	0.387	0.375	0.979	0.771
3	0.515	0.410	0.515	0.410	0.396	0.400	1.018	0.760
4	0.533	0.455	0.533	0.455	0.424	0.448	1.064	0.735
5	0.552	0.473	0.552	0.473	0.438	0.466	1.073	0.749
6	0.567	0.483	0.567	0.483	0.438	0.475	1.092	0.788
7	0.592	0.498	0.592	0.498	0.447	0.489	1.103	0.847
8	0.610	0.508	0.610	0.508	0.451	0.497	1.115	0.896
9	0.632	0.514	0.632	0.514	0.447	0.500	1.132	0.963

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	-3.9	-11.2	13.8	0.439	0.000	0.128	0.128	0.047	0.047
2	10.00	-3.3	-10.5	11.6	0.417	0.000	0.069	0.069	0.025	0.025
3	15.00	-4.0	-11.1	10.9	0.371	0.000	0.028	0.028	0.010	0.010
4	30.00	-6.2	-12.8	7.9	0.309	0.000	0.025	0.025	0.009	0.009
5	50.00	-6.4	-12.4	6.6	0.304	0.000	0.032	0.032	0.011	0.011
6	70.00	-4.9	-10.4	6.4	0.310	0.000	0.040	0.040	0.014	0.014
7	85.00	-3.6	-8.6	6.5	0.319	0.000	0.032	0.032	0.011	0.011
8	90.00	-2.3	-7.2	7.5	0.325	0.000	0.042	0.042	0.014	0.014
9	95.00	-0.4	-5.2	9.0	0.346	0.000	0.087	0.087	0.028	0.028

TABLE VI.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 38—SI UNITS

(e) 70 Percent of design speed; reading 4100

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	24.135	23.881	37.6	15.9	37.6	15.9	320.5	1.000	13.43	0.978
2	23.881	23.655	37.8	13.5	37.8	13.5	320.7	1.000	13.60	0.988
3	23.617	23.421	36.8	12.7	36.8	12.7	320.6	1.000	13.74	0.995
4	22.789	22.690	34.6	10.4	34.6	10.4	319.1	1.000	13.99	0.995
5	21.646	21.676	35.7	9.9	35.7	9.9	318.6	1.000	14.20	0.993
6	20.477	20.645	37.4	10.2	37.4	10.2	319.0	1.000	14.33	0.990
7	19.588	19.855	39.3	10.7	39.3	10.7	320.0	1.000	14.48	0.989
8	19.286	19.588	40.9	11.6	40.9	11.6	321.1	1.000	14.60	0.990
9	18.984	19.319	43.4	13.5	43.4	13.5	323.7	1.000	14.80	0.980

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	172.1	133.4	172.1	133.4	136.3	128.3	105.1	36.4	0.0	0.0
2	177.5	143.1	177.5	143.1	140.3	139.1	108.8	33.5	0.0	0.0
3	181.3	152.9	181.3	152.9	145.1	149.1	108.7	33.7	0.0	0.0
4	187.8	168.0	187.8	168.0	154.6	165.3	106.6	30.3	0.0	0.0
5	194.0	174.6	194.0	174.6	157.6	172.0	113.2	29.9	0.0	0.0
6	200.3	178.6	200.3	178.6	159.1	175.8	121.8	31.6	0.0	0.0
7	207.8	182.8	207.8	182.8	160.8	179.6	131.7	34.0	0.0	0.0
8	212.8	186.6	212.8	186.6	160.9	182.8	139.2	37.5	0.0	0.0
9	220.5	189.5	220.5	189.5	160.2	184.3	151.6	44.3	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	0.491	0.377	0.491	0.377	0.389	0.362	0.941	0.696
2	0.507	0.405	0.507	0.405	0.401	0.394	0.992	0.718
3	0.518	0.434	0.518	0.434	0.415	0.423	1.028	0.714
4	0.539	0.480	0.539	0.480	0.444	0.472	1.069	0.690
5	0.559	0.500	0.559	0.500	0.454	0.493	1.092	0.721
6	0.578	0.512	0.578	0.512	0.459	0.504	1.105	0.763
7	0.600	0.523	0.600	0.523	0.464	0.514	1.117	0.825
8	0.614	0.534	0.614	0.534	0.465	0.523	1.136	0.872
9	0.636	0.541	0.636	0.541	0.462	0.526	1.150	0.935

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	-6.5	-13.9	14.1	0.380	0.000	0.142	0.142	0.052	0.052
2	10.00	-6.1	-13.3	11.6	0.357	0.000	0.073	0.073	0.027	0.027
3	15.00	-6.9	-13.9	10.6	0.315	0.000	0.030	0.030	0.011	0.011
4	30.00	-8.9	-15.5	7.8	0.258	0.000	0.026	0.026	0.009	0.009
5	50.00	-8.2	-14.3	6.6	0.256	0.000	0.036	0.036	0.013	0.013
6	70.00	-6.9	-12.3	6.3	0.266	0.000	0.052	0.052	0.018	0.018
7	85.00	-5.2	-10.2	6.4	0.280	0.000	0.051	0.051	0.017	0.017
8	90.00	-3.7	-8.6	7.1	0.283	0.000	0.043	0.043	0.014	0.014
9	95.00	-2.0	-6.8	8.9	0.302	0.000	0.084	0.084	0.028	0.028

TABLE VI.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 38—SI UNITS

(f) 70 Percent of design speed; reading 4099

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	24.135	23.881	35.5	16.1	35.5	16.1	318.4	1.000	13.15	0.977
2	23.881	23.655	34.7	13.7	34.7	13.7	318.6	1.000	13.39	0.986
3	23.617	23.421	33.7	12.2	33.7	12.2	318.2	1.000	13.56	0.994
4	22.789	22.690	32.5	10.3	32.5	10.3	317.4	1.000	13.83	0.993
5	21.646	21.676	34.0	9.9	34.0	9.9	317.5	1.000	14.06	0.991
6	20.477	20.645	35.1	9.9	35.1	9.9	317.9	1.000	14.19	0.988
7	19.588	19.855	37.3	10.5	37.3	10.5	318.9	1.000	14.34	0.986
8	19.286	19.588	39.1	11.3	39.1	11.3	320.1	1.000	14.46	0.988
9	18.984	19.319	41.3	13.3	41.3	13.3	322.8	1.000	14.69	0.979

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	169.6	138.6	169.6	138.6	138.1	133.2	98.6	38.4	0.0	0.0
2	177.2	149.8	177.2	149.8	145.7	145.6	100.9	35.4	0.0	0.0
3	181.8	160.0	181.8	160.0	151.2	156.4	101.0	33.8	0.0	0.0
4	189.0	175.7	189.0	175.7	159.4	172.9	101.5	31.3	0.0	0.0
5	195.6	182.9	195.6	182.9	162.2	180.2	109.3	31.4	0.0	0.0
6	201.2	187.3	201.2	187.3	164.6	184.5	115.7	32.3	0.0	0.0
7	208.1	190.7	208.1	190.7	165.5	187.5	126.2	34.9	0.0	0.0
8	213.3	194.4	213.3	194.4	165.6	190.6	134.5	38.0	0.0	0.0
9	221.6	197.7	221.6	197.7	166.6	192.4	146.1	45.6	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	0.485	0.393	0.485	0.393	0.395	0.378	0.965	0.652
2	0.508	0.426	0.508	0.426	0.417	0.414	0.999	0.664
3	0.522	0.457	0.522	0.457	0.434	0.446	1.034	0.661
4	0.545	0.504	0.545	0.504	0.459	0.496	1.084	0.652
5	0.565	0.526	0.565	0.526	0.468	0.518	1.110	0.692
6	0.581	0.539	0.581	0.539	0.476	0.531	1.121	0.718
7	0.602	0.548	0.602	0.548	0.479	0.539	1.133	0.785
8	0.617	0.559	0.617	0.559	0.479	0.548	1.151	0.838
9	0.640	0.566	0.640	0.566	0.481	0.551	1.155	0.893

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	-16.0	14.3	0.321	0.000	0.157	0.157	0.058	0.058
2	10.00	-9.2	-16.3	11.7	0.297	0.000	0.084	0.084	0.031	0.031
3	15.00	-10.0	-17.0	10.1	0.261	0.000	0.034	0.034	0.013	0.013
4	30.00	-11.0	-17.6	7.7	0.210	0.000	0.037	0.037	0.014	0.014
5	50.00	-10.0	-16.0	6.7	0.210	0.000	0.046	0.046	0.017	0.017
6	70.00	-9.2	-14.7	6.0	0.214	0.000	0.057	0.057	0.020	0.020
7	85.00	-7.2	-12.2	6.2	0.233	0.000	0.066	0.066	0.022	0.022
8	90.00	-5.5	-10.4	6.8	0.241	0.000	0.053	0.053	0.018	0.018
9	95.00	-4.2	-8.9	8.7	0.258	0.000	0.089	0.089	0.029	0.029

TABLE VI.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 38—SI UNITS

(g) 70 Percent of design speed; reading 4098

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	24.135	23.881	32.8	16.6	32.8	16.6	315.6	1.000	12.68	0.972
2	23.881	23.655	31.2	13.0	31.2	13.0	316.0	1.000	13.11	0.984
3	23.617	23.421	29.7	11.3	29.7	11.3	315.3	1.000	13.30	0.994
4	22.789	22.690	29.5	10.0	29.5	10.0	315.1	1.000	13.58	0.989
5	21.646	21.676	30.8	9.7	30.8	9.7	315.8	1.000	13.88	0.985
6	20.477	20.645	33.7	9.9	33.7	9.9	316.6	1.000	14.04	0.983
7	19.588	19.855	35.3	10.6	35.3	10.6	317.7	1.000	14.16	0.983
8	19.286	19.588	36.1	11.3	36.1	11.3	318.8	1.000	14.28	0.987
9	18.984	19.319	39.0	12.9	39.0	12.9	321.7	1.000	14.49	0.979

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	162.9	148.1	162.9	148.1	136.9	142.0	88.3	42.2	0.0	0.0
2	177.6	160.3	177.6	160.3	151.9	156.2	92.1	36.0	0.0	0.0
3	183.5	171.6	183.5	171.6	159.4	168.3	91.0	33.6	0.0	0.0
4	191.6	186.3	191.6	186.3	166.8	183.5	94.4	32.3	0.0	0.0
5	197.7	194.3	197.7	194.3	169.8	191.5	101.3	32.9	0.0	0.0
6	204.6	199.4	204.6	199.4	170.3	196.5	113.4	34.3	0.0	0.0
7	212.2	202.6	212.2	202.6	173.2	199.1	122.7	37.4	0.0	0.0
8	216.7	206.2	216.7	206.2	175.1	202.2	127.6	40.5	0.0	0.0
9	224.4	209.1	224.4	209.1	174.4	203.8	141.2	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	0.467	0.423	0.467	0.423	0.393	0.406	1.037	0.582
2	0.511	0.459	0.511	0.459	0.437	0.447	1.028	0.599
3	0.530	0.494	0.530	0.494	0.460	0.484	1.056	0.579
4	0.555	0.539	0.555	0.539	0.483	0.530	1.100	0.583
5	0.573	0.562	0.573	0.562	0.492	0.554	1.128	0.621
6	0.594	0.577	0.594	0.577	0.494	0.569	1.153	0.697
7	0.616	0.586	0.616	0.586	0.503	0.576	1.150	0.757
8	0.629	0.596	0.629	0.596	0.508	0.585	1.155	0.785
9	0.650	0.602	0.650	0.602	0.505	0.587	1.168	0.855

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	-11.4	-18.7	14.8	0.201	0.000	0.204	0.204	0.075	0.075
2	10.00	-12.7	-19.9	11.0	0.220	0.000	0.098	0.098	0.037	0.037
3	15.00	-14.0	-21.0	9.2	0.185	0.000	0.032	0.032	0.012	0.012
4	30.00	-14.0	-20.6	7.4	0.149	0.000	0.060	0.060	0.022	0.022
5	50.00	-13.1	-19.1	6.5	0.143	0.000	0.076	0.076	0.027	0.027
6	70.00	-10.7	-16.1	6.0	0.161	0.000	0.080	0.080	0.028	0.028
7	85.00	-9.2	-14.2	6.3	0.182	0.000	0.077	0.077	0.026	0.026
8	90.00	-8.5	-13.4	6.9	0.183	0.000	0.057	0.057	0.019	0.019
9	95.00	-6.5	-11.2	8.3	0.208	0.000	0.083	0.083	0.027	0.027

TABLE VI.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 38—SI UNITS

(h) 70 Percent of design speed; reading 4097

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	24.135	23.881	28.8	16.1	28.8	16.1	312.7	1.000	12.29	0.954
2	23.881	23.655	26.0	13.0	26.0	13.0	312.1	1.000	12.71	0.977
3	23.617	23.421	26.3	11.4	26.3	11.4	312.2	1.000	12.96	0.992
4	22.789	22.690	25.6	10.0	25.6	10.0	312.5	1.000	13.31	0.974
5	21.646	21.676	27.5	10.1	27.5	10.1	313.6	1.000	13.61	0.971
6	20.477	20.645	30.2	10.6	30.2	10.6	314.8	1.000	13.80	0.970
7	19.588	19.855	32.8	11.5	32.8	11.5	316.3	1.000	13.97	0.968
8	19.286	19.588	33.8	12.3	33.8	12.3	317.7	1.000	14.10	0.977
9	18.984	19.319	37.6	14.1	37.6	14.1	320.4	1.000	14.24	0.971

RP	ABS VEL IN	ABS VEL OUT	REL VEL IN	REL VEL OUT	MERID VEL IN	MERID VEL OUT	TANG VEL IN	TANG VEL OUT	WHEEL SPEED IN	WHEEL SPEED OUT
1	163.3	161.2	163.3	161.2	143.1	154.8	78.6	44.8	0.0	0.0
2	177.5	179.9	177.5	179.9	159.6	175.3	77.7	40.4	0.0	0.0
3	185.9	192.2	185.9	192.2	166.6	188.4	82.5	37.8	0.0	0.0
4	193.3	206.1	193.3	206.1	174.4	203.0	83.5	35.7	0.0	0.0
5	201.5	214.3	201.5	214.3	178.7	211.0	93.1	37.6	0.0	0.0
6	206.5	219.7	206.5	219.7	178.6	216.0	103.8	40.5	0.0	0.0
7	216.5	223.5	216.5	223.5	182.0	219.0	117.2	44.6	0.0	0.0
8	220.8	227.5	220.8	227.5	183.4	222.3	122.9	48.4	0.0	0.0
9	226.6	229.5	226.6	229.5	179.5	222.6	138.3	56.0	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	0.471	0.464	0.471	0.464	0.412	0.446	1.082	0.499
2	0.514	0.521	0.514	0.521	0.462	0.508	1.098	0.514
3	0.540	0.559	0.540	0.559	0.484	0.548	1.131	0.540
4	0.563	0.602	0.563	0.602	0.507	0.593	1.164	0.563
5	0.587	0.627	0.587	0.627	0.520	0.617	1.180	0.587
6	0.601	0.643	0.601	0.643	0.520	0.632	1.209	0.601
7	0.631	0.653	0.631	0.653	0.530	0.640	1.204	0.707
8	0.643	0.664	0.643	0.664	0.534	0.649	1.212	0.743
9	0.658	0.667	0.658	0.667	0.521	0.647	1.240	0.832

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	-15.4	-22.7	14.3	0.094	0.000	0.327	0.327	0.120	0.120
2	10.00	-17.9	-25.1	11.0	0.068	0.000	0.137	0.137	0.051	0.051
3	15.00	-17.4	-24.4	9.2	0.059	0.000	0.042	0.042	0.016	0.016
4	30.00	-18.0	-24.6	7.4	0.027	0.000	0.132	0.132	0.049	0.049
5	50.00	-16.4	-22.4	6.9	0.036	0.000	0.141	0.141	0.051	0.051
6	70.00	-14.2	-19.6	6.7	0.043	0.000	0.140	0.140	0.049	0.049
7	85.00	-11.7	-16.7	7.2	0.081	0.000	0.134	0.134	0.045	0.045
8	90.00	-10.8	-15.6	7.8	0.082	0.000	0.095	0.095	0.032	0.032
9	95.00	-7.8	-12.6	9.5	0.107	0.000	0.116	0.116	0.038	0.038

TABLE VI.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 38—SI UNITS

(i) 80 Percent of design speed; reading 4093

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	24.135	23.881	42.6	15.9	42.6	15.9	336.1	1.000	15.14	0.976
2	23.881	23.655	42.1	14.0	42.1	14.0	335.7	1.000	15.30	0.986
3	23.617	23.421	40.8	13.0	40.8	13.0	334.8	1.000	15.41	0.993
4	22.789	22.690	38.9	10.4	38.9	10.4	332.4	1.000	15.86	0.993
5	21.646	21.676	40.0	10.3	40.0	10.3	332.0	1.000	16.11	0.992
6	20.477	20.645	41.1	10.1	41.1	10.1	330.7	1.000	16.24	0.992
7	19.588	19.855	42.6	10.2	42.6	10.2	331.1	1.000	16.27	0.990
8	19.286	19.588	44.0	11.2	44.0	11.2	332.6	1.000	16.43	0.985
9	18.984	19.319	44.1	11.2	44.1	11.2	332.3	1.000	16.43	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	198.5	140.6	198.5	140.6	146.2	135.2	134.3	38.4	0.0	0.0
2	202.2	148.8	202.2	148.8	150.0	144.4	135.6	36.0	0.0	0.0
3	204.4	157.1	204.4	157.1	154.6	153.1	133.7	35.2	0.0	0.0
4	213.0	176.0	213.0	176.0	165.8	173.1	133.7	31.8	0.0	0.0
5	222.7	183.5	222.7	183.5	170.7	180.5	143.1	32.7	0.0	0.0
6	226.7	187.7	226.7	187.7	170.8	184.8	149.1	33.0	0.0	0.0
7	232.7	188.1	232.7	188.1	171.3	185.1	157.4	33.1	0.0	0.0
8	238.5	190.4	238.5	190.4	171.7	186.8	165.6	36.9	0.0	0.0
9	240.1	190.0	240.1	190.0	172.6	186.4	167.0	36.9	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	0.557	0.388	0.557	0.388	0.410	0.373	0.925	0.883
2	0.568	0.412	0.568	0.412	0.421	0.400	0.963	0.888
3	0.575	0.436	0.575	0.436	0.435	0.425	0.990	0.872
4	0.604	0.493	0.604	0.493	0.470	0.485	1.044	0.864
5	0.634	0.515	0.634	0.515	0.486	0.507	1.058	0.913
6	0.647	0.529	0.647	0.529	0.488	0.521	1.082	0.938
7	0.665	0.530	0.665	0.530	0.490	0.521	1.081	0.990
8	0.682	0.535	0.682	0.535	0.491	0.525	1.088	1.041
9	0.688	0.535	0.688	0.535	0.494	0.524	1.080	1.026

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	-1.6	-8.9	14.1	0.479	0.000	0.127	0.127	0.047	0.047
2	10.00	-1.7	-8.9	12.0	0.454	0.000	0.072	0.072	0.027	0.027
3	15.00	-2.9	-9.9	10.9	0.416	0.000	0.034	0.034	0.012	0.012
4	30.00	-4.7	-11.3	7.8	0.353	0.000	0.032	0.032	0.012	0.012
5	50.00	-4.0	-10.0	7.0	0.356	0.000	0.034	0.034	0.012	0.012
6	70.00	-3.2	-8.6	6.2	0.352	0.000	0.031	0.031	0.011	0.011
7	85.00	-1.9	-6.9	5.8	0.374	0.000	0.041	0.041	0.014	0.014
8	90.00	-0.6	-5.5	6.7	0.383	0.000	0.057	0.057	0.019	0.019
9	95.00	-1.4	-6.1	6.6	0.389	0.000	0.056	0.056	0.019	0.019

TABLE VI.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 38—SI UNITS

(j) 50 Percent of design speed; reading 4131

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	24.135	23.881	45.2	15.9	45.2	15.9	350.2	1.000	16.90	0.973
2	23.881	23.655	44.7	14.1	44.7	14.1	349.5	1.000	17.11	0.983
3	23.617	23.421	42.7	12.7	42.7	12.7	347.9	1.000	17.28	0.992
4	22.789	22.690	39.8	10.8	39.8	10.8	344.8	1.000	17.90	0.992
5	21.646	21.676	41.6	11.3	41.6	11.3	347.1	1.000	18.29	0.991
6	20.477	20.645	42.7	10.6	42.7	10.6	344.7	1.000	18.43	0.991
7	19.588	19.855	44.2	10.2	44.2	10.2	344.2	1.000	18.17	0.992
8	19.286	19.588	45.5	11.0	45.5	11.0	345.8	1.000	18.31	0.987
9	18.984	19.319	47.4	12.5	47.4	12.5	348.3	1.000	18.50	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	221.8	146.5	221.8	146.5	156.4	140.9	157.3	43.2	0.0	0.0
2	226.0	155.9	226.0	155.9	160.6	151.2	158.9	37.9	0.0	0.0
3	228.5	165.5	228.5	165.5	167.9	161.4	155.0	36.5	0.0	0.0
4	239.1	187.8	239.1	187.8	183.7	184.4	153.1	35.1	0.0	0.0
5	253.2	197.9	253.2	197.9	189.2	194.1	168.3	38.8	0.0	0.0
6	255.1	201.8	255.1	201.8	187.6	198.4	172.9	37.3	0.0	0.0
7	257.6	197.6	257.6	197.6	184.6	194.5	179.7	34.9	0.0	0.0
8	262.4	199.3	262.4	199.3	183.9	195.6	187.2	38.0	0.0	0.0
9	269.1	199.6	269.1	199.6	182.1	194.9	198.2	43.1	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	0.613	0.397	0.613	0.397	0.432	0.381	0.901	1.026
2	0.626	0.423	0.626	0.423	0.445	0.411	0.941	1.034
3	0.635	0.451	0.635	0.451	0.467	0.440	0.961	1.003
4	0.670	0.518	0.670	0.518	0.515	0.509	1.004	0.981
5	0.711	0.545	0.711	0.545	0.532	0.535	1.026	1.066
6	0.720	0.559	0.720	0.559	0.529	0.549	1.058	1.081
7	0.728	0.547	0.728	0.547	0.522	0.538	1.054	1.124
8	0.742	0.551	0.742	0.551	0.520	0.540	1.064	1.170
9	0.760	0.549	0.760	0.549	0.514	0.536	1.071	1.220

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	1.0	-6.3	14.1	0.544	0.000	0.120	0.120	0.044	0.044
2	10.00	0.8	-6.4	12.1	0.516	0.000	0.071	0.071	0.026	0.026
3	15.00	-1.0	-8.0	10.6	0.474	0.000	0.033	0.033	0.012	0.012
4	30.00	-3.7	-10.3	8.2	0.400	0.000	0.029	0.029	0.011	0.011
5	50.00	-2.3	-8.3	8.1	0.404	0.000	0.031	0.031	0.011	0.011
6	70.00	-1.7	-7.1	6.7	0.395	0.000	0.029	0.029	0.010	0.010
7	85.00	-0.3	-5.3	5.8	0.424	0.000	0.028	0.028	0.009	0.009
8	90.00	0.9	-4.0	6.5	0.432	0.000	0.043	0.043	0.014	0.014
9	95.00	2.0	-2.8	7.8	0.450	0.000	0.086	0.086	0.028	0.028

TABLE VI.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 38—SI UNITS

(k) 90 Percent of design speed; reading 4132

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	24.135	23.881	43.6	16.1	43.6	16.1	347.6	1.000	16.66	0.971
2	23.881	23.655	42.3	13.7	42.3	13.7	347.0	1.000	16.95	0.980
3	23.617	23.421	39.8	12.1	39.8	12.1	344.9	1.000	17.20	0.990
4	22.789	22.690	37.7	10.3	37.7	10.3	342.9	1.000	17.78	0.990
5	21.646	21.676	40.6	11.0	40.6	11.0	346.0	1.000	18.14	0.992
6	20.477	20.645	42.0	10.4	42.0	10.4	344.5	1.000	18.33	0.991
7	19.588	19.855	43.5	9.9	43.5	9.9	343.5	1.000	18.01	0.992
8	19.286	19.588	45.2	10.5	45.2	10.5	345.1	1.000	18.10	0.988
9	18.984	19.319	47.0	11.9	47.0	11.9	347.7	1.000	18.27	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	220.0	152.2	220.0	152.2	159.3	146.2	151.8	42.2	0.0	0.0
2	226.2	162.7	226.2	162.7	167.3	158.1	152.2	38.4	0.0	0.0
3	230.0	173.9	230.0	173.9	176.6	170.0	147.4	36.4	0.0	0.0
4	241.5	195.4	241.5	195.4	191.0	192.3	147.7	35.0	0.0	0.0
5	253.4	206.2	253.4	206.2	192.4	202.4	164.9	39.2	0.0	0.0
6	257.3	210.1	257.3	210.1	191.3	206.7	172.2	37.9	0.0	0.0
7	256.7	205.0	256.7	205.0	186.2	201.9	176.7	35.3	0.0	0.0
8	260.9	205.9	260.9	205.9	183.8	202.5	185.2	37.5	0.0	0.0
9	267.3	205.7	267.3	205.7	182.2	201.3	195.6	42.3	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	0.610	0.414	0.610	0.414	0.442	0.398	0.918	0.990
2	0.629	0.444	0.629	0.444	0.465	0.432	0.945	0.988
3	0.643	0.477	0.643	0.477	0.494	0.467	0.962	0.952
4	0.680	0.542	0.680	0.542	0.538	0.533	1.006	0.946
5	0.713	0.571	0.713	0.571	0.542	0.560	1.052	1.043
6	0.727	0.584	0.727	0.584	0.541	0.574	1.081	1.075
7	0.726	0.569	0.726	0.569	0.527	0.561	1.084	1.103
8	0.738	0.571	0.738	0.571	0.520	0.561	1.102	1.157
9	0.755	0.568	0.755	0.568	0.514	0.556	1.105	1.202

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	-0.5	-7.8	14.3	0.501	0.000	0.130	0.130	0.048	0.048
2	10.00	-1.6	-8.8	11.7	0.474	0.000	0.084	0.084	0.031	0.031
3	15.00	-3.8	-10.9	10.0	0.429	0.000	0.041	0.041	0.015	0.015
4	30.00	-5.8	-12.4	7.7	0.366	0.000	0.039	0.039	0.014	0.014
5	50.00	-3.3	-9.4	7.7	0.367	0.000	0.026	0.026	0.009	0.009
6	70.00	-2.3	-7.8	6.5	0.366	0.000	0.029	0.029	0.010	0.010
7	85.00	-1.0	-6.0	5.6	0.389	0.000	0.028	0.028	0.010	0.010
8	90.00	0.6	-4.3	6.0	0.401	0.000	0.040	0.040	0.013	0.013
9	95.00	1.6	-3.2	7.2	0.421	0.000	0.084	0.084	0.028	0.028

TABLE VI.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 38—SI UNITS

(l) 90 Percent of design speed; reading 4133

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	24.135	23.881	41.6	16.5	41.6	16.5	343.8	1.000	16.20	0.968
2	23.881	23.655	40.1	13.5	40.1	13.5	343.4	1.000	16.55	0.978
3	23.617	23.421	37.6	11.9	37.6	11.9	341.4	1.000	16.86	0.989
4	22.789	22.690	35.9	10.5	35.9	10.5	340.4	1.000	17.39	0.988
5	21.646	21.676	39.2	10.8	39.2	10.8	343.6	1.000	17.90	0.984
6	20.477	20.645	40.5	10.3	40.5	10.3	342.8	1.000	18.03	0.990
7	19.588	19.855	42.2	9.9	42.2	9.9	342.1	1.000	17.77	0.989
8	19.286	19.588	43.5	10.3	43.5	10.3	343.3	1.000	17.77	0.988
9	18.984	19.319	46.1	11.5	46.1	11.5	346.1	1.000	17.89	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	215.3	156.7	215.3	156.7	161.0	150.2	143.0	44.5	0.0	0.0
2	223.1	168.4	223.1	168.4	170.6	163.8	143.8	39.4	0.0	0.0
3	228.3	180.7	228.3	180.7	180.9	176.8	139.2	37.4	0.0	0.0
4	241.0	201.7	241.0	201.7	195.1	198.4	141.4	36.6	0.0	0.0
5	253.2	213.1	253.2	213.1	196.3	209.3	159.9	40.1	0.0	0.0
6	256.9	217.7	256.9	217.7	195.2	214.2	166.9	39.0	0.0	0.0
7	257.1	213.2	257.1	213.2	190.5	210.0	172.8	36.7	0.0	0.0
8	259.2	213.5	259.2	213.5	187.9	210.1	178.6	38.4	0.0	0.0
9	264.7	212.6	264.7	212.6	183.5	208.4	190.7	42.4	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	0.600	0.429	0.600	0.429	0.448	0.412	0.933	0.932
2	0.624	0.463	0.624	0.463	0.477	0.450	0.960	0.933
3	0.641	0.500	0.641	0.500	0.508	0.489	0.977	0.899
4	0.681	0.562	0.681	0.562	0.551	0.553	1.017	0.904
5	0.715	0.593	0.715	0.593	0.555	0.583	1.066	1.011
6	0.728	0.608	0.728	0.608	0.553	0.598	1.097	1.040
7	0.729	0.595	0.729	0.595	0.540	0.586	1.103	1.076
8	0.734	0.595	0.734	0.595	0.532	0.585	1.118	1.110
9	0.748	0.590	0.748	0.590	0.519	0.578	1.136	1.168

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	-2.6	-9.9	14.7	0.449	0.000	0.147	0.147	0.054	0.054
2	10.00	-3.7	-10.9	11.6	0.425	0.000	0.095	0.095	0.035	0.035
3	15.00	-6.1	-13.2	9.8	0.379	0.000	0.047	0.047	0.017	0.017
4	30.00	-7.6	-14.2	7.9	0.326	0.000	0.047	0.047	0.017	0.017
5	50.00	-4.8	-10.8	7.6	0.330	0.000	0.054	0.054	0.019	0.019
6	70.00	-3.8	-9.2	6.4	0.327	0.000	0.033	0.033	0.011	0.011
7	85.00	-2.3	-7.3	5.6	0.351	0.000	0.036	0.036	0.012	0.012
8	90.00	-1.0	-5.9	5.9	0.358	0.000	0.039	0.039	0.013	0.013
9	95.00	0.7	-4.1	6.9	0.383	0.000	0.079	0.079	0.026	0.026

TABLE VI.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 38—SI UNITS

(m) 90 Percent of design speed; reading 4139

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	24.135	23.881	38.8	16.9	38.8	16.9	340.4	1.000	15.56	0.966
2	23.881	23.655	37.4	13.7	37.4	13.7	340.1	1.000	16.05	0.975
3	23.617	23.421	35.5	11.9	35.5	11.9	338.7	1.000	16.43	0.986
4	22.789	22.690	34.2	10.9	34.2	10.9	338.3	1.000	16.94	0.985
5	21.646	21.676	36.8	11.0	36.8	11.0	341.0	1.000	17.48	0.978
6	20.477	20.645	38.8	10.9	38.8	10.9	341.7	1.000	17.76	0.987
7	19.588	19.855	40.5	10.4	40.5	10.4	341.2	1.000	17.66	0.984
8	19.286	19.588	42.1	10.7	42.1	10.7	342.3	1.000	17.67	0.984
9	18.984	19.319	44.3	11.9	44.3	11.9	345.1	1.000	17.68	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	209.2	162.6	209.2	162.6	163.1	155.6	131.0	47.4	0.0	0.0
2	220.6	176.0	220.6	176.0	175.3	171.0	134.0	41.6	0.0	0.0
3	228.1	189.3	228.1	189.3	185.6	185.2	132.5	39.2	0.0	0.0
4	240.5	209.9	240.5	209.9	198.9	206.1	135.2	39.5	0.0	0.0
5	251.4	221.0	251.4	221.0	201.2	216.9	150.8	42.3	0.0	0.0
6	259.8	228.4	259.8	228.4	202.6	224.3	162.7	43.2	0.0	0.0
7	261.4	225.8	261.4	225.8	198.9	222.1	169.7	40.7	0.0	0.0
8	263.6	226.0	263.6	226.0	195.6	222.1	176.6	41.8	0.0	0.0
9	267.0	223.9	267.0	223.9	191.0	219.1	186.6	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	0.585	0.448	0.585	0.448	0.456	0.429	0.954	0.852
2	0.619	0.487	0.619	0.487	0.492	0.473	0.975	0.869
3	0.643	0.527	0.643	0.527	0.523	0.516	0.998	0.856
4	0.682	0.589	0.682	0.589	0.564	0.578	1.036	0.862
5	0.713	0.619	0.713	0.619	0.571	0.608	1.078	0.949
6	0.738	0.641	0.738	0.641	0.576	0.630	1.107	1.010
7	0.744	0.634	0.744	0.634	0.566	0.623	1.117	1.053
8	0.750	0.633	0.750	0.633	0.556	0.622	1.135	1.095
9	0.757	0.624	0.757	0.624	0.541	0.611	1.147	1.136

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	-12.7	15.2	0.378	0.000	0.164	0.164	0.060	0.060
2	10.00	-6.5	-13.7	11.7	0.364	0.000	0.110	0.110	0.041	0.041
3	15.00	-8.2	-15.2	9.8	0.327	0.000	0.056	0.056	0.021	0.021
4	30.00	-9.3	-15.9	8.3	0.276	0.000	0.055	0.055	0.020	0.020
5	50.00	-7.1	-13.1	7.8	0.278	0.000	0.075	0.075	0.027	0.027
6	70.00	-5.5	-11.0	7.0	0.282	0.000	0.043	0.043	0.015	0.015
7	85.00	-4.0	-9.0	6.1	0.304	0.000	0.052	0.052	0.017	0.017
8	90.00	-2.5	-7.4	6.2	0.315	0.000	0.050	0.050	0.017	0.017
9	95.00	-1.1	-5.9	7.3	0.336	0.000	0.083	0.083	0.027	0.027

TABLE VI.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 38—SI UNITS

(n) 90 Percent of design speed; reading 4140

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	24.135	23.881	36.9	17.0	36.9	17.0	336.4	1.000	15.03	0.958
2	23.881	23.655	34.4	12.9	34.4	12.9	335.6	1.000	15.59	0.969
3	23.617	23.421	32.6	11.3	32.6	11.3	335.1	1.000	15.96	0.986
4	22.789	22.690	32.6	10.8	32.6	10.8	335.9	1.000	16.50	0.980
5	21.646	21.676	35.3	11.3	35.3	11.3	338.4	1.000	17.03	0.975
6	20.477	20.645	37.2	11.4	37.2	11.4	339.4	1.000	17.36	0.977
7	19.588	19.855	39.1	11.1	39.1	11.1	339.3	1.000	17.29	0.975
8	19.286	19.588	40.3	11.3	40.3	11.3	340.4	1.000	17.30	0.978
9	18.984	19.319	43.2	12.5	43.2	12.5	343.5	1.000	17.27	0.969

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	205.0	173.4	205.0	173.4	163.8	165.9	123.2	50.7	0.0	0.0
2	218.4	187.7	218.4	187.7	180.3	183.0	123.3	41.8	0.0	0.0
3	226.3	201.6	226.3	201.6	190.7	197.7	121.8	39.6	0.0	0.0
4	239.4	222.0	239.4	222.0	201.6	218.1	129.1	41.6	0.0	0.0
5	250.1	232.9	250.1	232.9	204.0	228.4	144.7	45.7	0.0	0.0
6	257.9	238.5	257.9	238.5	205.3	233.8	156.1	47.1	0.0	0.0
7	261.7	236.2	261.7	236.2	203.2	231.8	164.9	45.4	0.0	0.0
8	263.3	236.8	263.3	236.8	200.9	232.1	170.2	46.6	0.0	0.0
9	265.9	233.9	265.9	233.9	193.8	228.3	182.0	50.7	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	0.576	0.483	0.576	0.483	0.460	0.461	1.012	0.802
2	0.617	0.525	0.617	0.525	0.509	0.512	1.015	0.799
3	0.641	0.567	0.641	0.567	0.541	0.556	1.036	0.782
4	0.681	0.628	0.681	0.628	0.574	0.616	1.082	0.819
5	0.712	0.658	0.712	0.658	0.581	0.646	1.120	0.909
6	0.735	0.674	0.735	0.674	0.585	0.661	1.139	0.965
7	0.747	0.668	0.747	0.668	0.580	0.655	1.141	1.021
8	0.751	0.668	0.751	0.668	0.573	0.655	1.156	1.051
9	0.755	0.656	0.755	0.656	0.551	0.640	1.178	1.105

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	-7.2	-14.6	15.2	0.291	0.000	0.211	0.211	0.077	0.077
2	10.00	-9.5	-16.7	10.9	0.285	0.000	0.139	0.139	0.052	0.052
3	15.00	-11.1	-18.2	9.2	0.248	0.000	0.059	0.059	0.022	0.022
4	30.00	-10.9	-17.5	8.2	0.210	0.000	0.076	0.076	0.028	0.028
5	50.00	-8.6	-14.6	8.1	0.213	0.000	0.087	0.087	0.031	0.031
6	70.00	-7.1	-12.5	7.5	0.223	0.000	0.078	0.078	0.027	0.027
7	85.00	-5.4	-10.4	6.7	0.253	0.000	0.082	0.082	0.028	0.028
8	90.00	-4.3	-9.2	6.9	0.259	0.000	0.071	0.071	0.024	0.024
9	95.00	-2.2	-7.0	7.9	0.285	0.000	0.099	0.099	0.033	0.033

TABLE VI.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 38—SI UNITS

(o) 100 Percent of design speed; reading 4119

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	24.135	23.881	48.6	16.2	48.6	16.2	367.2	1.000	19.08	0.967
2	23.881	23.655	47.1	15.4	47.1	15.4	366.5	1.000	19.38	0.973
3	23.617	23.421	46.3	15.0	46.3	15.0	365.4	1.000	19.63	0.982
4	22.789	22.690	44.2	13.3	44.2	13.3	362.5	1.000	20.11	0.989
5	21.646	21.676	44.6	12.2	44.6	12.2	361.5	1.000	20.30	0.990
6	20.477	20.645	46.4	13.9	46.4	13.9	362.8	1.000	20.87	0.988
7	19.588	19.855	46.3	12.3	46.3	12.3	360.3	1.000	20.79	0.986
8	19.286	19.588	47.1	12.3	47.1	12.3	361.0	1.000	20.85	0.983
9	18.984	19.319	49.3	13.2	49.3	13.2	363.3	1.000	20.84	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	243.9	153.6	243.9	153.6	161.4	147.5	182.9	42.8	0.0	0.0
2	249.0	163.3	249.0	163.3	169.4	157.4	182.5	43.5	0.0	0.0
3	253.6	174.4	253.6	174.4	175.1	168.5	183.4	45.0	0.0	0.0
4	259.6	194.6	259.6	194.6	186.1	189.4	181.1	44.7	0.0	0.0
5	268.8	199.8	268.8	199.8	191.3	195.3	188.8	42.1	0.0	0.0
6	282.3	211.4	282.3	211.4	194.6	205.2	204.5	50.7	0.0	0.0
7	286.6	209.1	286.6	209.1	198.1	204.3	207.1	44.6	0.0	0.0
8	289.5	209.6	289.5	209.6	197.1	204.8	212.1	44.7	0.0	0.0
9	293.3	207.3	293.3	207.3	191.2	201.8	222.4	47.4	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	0.662	0.406	0.662	0.406	0.438	0.390	0.914	1.186
2	0.678	0.433	0.678	0.433	0.461	0.418	0.929	1.176
3	0.693	0.465	0.693	0.465	0.478	0.449	0.962	1.178
4	0.714	0.524	0.714	0.524	0.512	0.510	1.018	1.151
5	0.743	0.539	0.743	0.539	0.529	0.527	1.021	1.188
6	0.783	0.571	0.783	0.571	0.540	0.555	1.054	1.276
7	0.800	0.567	0.800	0.567	0.553	0.554	1.031	1.290
8	0.808	0.568	0.808	0.568	0.550	0.555	1.039	1.318
9	0.817	0.559	0.817	0.559	0.533	0.544	1.055	1.365

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	4.4	-2.9	14.4	0.593	0.000	0.130	0.130	0.048	0.048
2	10.00	3.3	-3.9	13.5	0.559	0.000	0.101	0.101	0.037	0.037
3	15.00	2.6	-4.4	12.8	0.521	0.000	0.064	0.064	0.024	0.024
4	30.00	0.7	-5.9	10.7	0.447	0.000	0.037	0.037	0.013	0.013
5	50.00	0.7	-5.3	8.9	0.455	0.000	0.034	0.034	0.012	0.012
6	70.00	2.1	-3.4	9.9	0.442	0.000	0.035	0.035	0.012	0.012
7	85.00	1.8	-3.2	8.0	0.463	0.000	0.040	0.039	0.013	0.013
8	90.00	2.5	-2.4	7.8	0.471	0.000	0.049	0.048	0.016	0.016
9	95.00	3.9	-0.9	8.6	0.492	0.000	0.079	0.076	0.026	0.025

TABLE VI.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 38—SI UNITS

(p) 100 Percent of design speed; reading 4120

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	24.135	23.881	46.6	16.3	46.6	16.3	364.1	1.000	18.63	0.966
2	23.881	23.655	45.7	15.3	45.7	15.3	363.7	1.000	18.95	0.974
3	23.617	23.421	44.0	14.5	44.0	14.5	362.2	1.000	19.24	0.983
4	22.789	22.690	42.0	12.6	42.0	12.6	359.5	1.000	19.71	0.988
5	21.646	21.676	43.9	11.6	43.9	11.6	359.6	1.000	19.91	0.988
6	20.477	20.645	45.4	13.3	45.4	13.3	361.4	1.000	20.51	0.989
7	19.588	19.855	45.0	11.9	45.0	11.9	359.3	1.000	20.60	0.988
8	19.286	19.588	46.2	11.9	46.2	11.9	360.0	1.000	20.67	0.985
9	18.984	19.319	48.0	12.9	48.0	12.9	362.5	1.000	20.68	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	240.5	155.9	240.5	155.9	165.3	149.6	174.7	43.8	0.0	0.0
2	246.5	167.0	246.5	167.0	172.2	161.1	176.3	44.0	0.0	0.0
3	250.8	178.5	250.8	178.5	180.5	172.9	174.1	44.6	0.0	0.0
4	259.7	198.4	259.7	198.4	193.0	193.6	173.8	43.3	0.0	0.0
5	267.4	204.0	267.4	204.0	192.8	199.8	185.3	41.1	0.0	0.0
6	283.2	216.8	283.2	216.8	198.9	211.0	201.6	49.7	0.0	0.0
7	287.4	216.8	287.4	216.8	203.4	212.1	203.1	44.8	0.0	0.0
8	290.9	217.2	290.9	217.2	201.5	212.6	209.9	44.9	0.0	0.0
9	294.8	215.7	294.8	215.7	197.1	210.2	219.2	48.2	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	0.655	0.414	0.655	0.414	0.450	0.398	0.905	1.129
2	0.673	0.445	0.673	0.445	0.470	0.430	0.935	1.135
3	0.688	0.478	0.688	0.478	0.495	0.463	0.958	1.115
4	0.718	0.537	0.718	0.537	0.533	0.524	1.003	1.103
5	0.741	0.553	0.741	0.553	0.534	0.541	1.036	1.166
6	0.788	0.588	0.788	0.588	0.553	0.573	1.061	1.255
7	0.804	0.590	0.804	0.590	0.569	0.577	1.043	1.260
8	0.814	0.591	0.814	0.591	0.564	0.578	1.055	1.302
9	0.823	0.584	0.823	0.584	0.550	0.569	1.066	1.339

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	2.4	-4.9	14.5	0.563	0.000	0.136	0.136	0.050	0.050
2	10.00	1.8	-5.4	13.3	0.529	0.000	0.100	0.100	0.037	0.037
3	15.00	0.3	-6.8	12.3	0.486	0.000	0.063	0.063	0.023	0.023
4	30.00	-1.5	-8.1	10.0	0.425	0.000	0.042	0.042	0.015	0.015
5	50.00	-0.1	-6.1	8.4	0.433	0.000	0.038	0.038	0.014	0.014
6	70.00	1.1	-4.4	9.3	0.422	0.000	0.031	0.031	0.011	0.011
7	85.00	0.5	-4.5	7.6	0.433	0.000	0.036	0.036	0.012	0.012
8	90.00	1.6	-3.3	7.4	0.444	0.000	0.043	0.043	0.014	0.014
9	95.00	2.6	-2.2	8.3	0.461	0.000	0.071	0.069	0.023	0.023

TABLE VI.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 38—SI UNITS

(q) 100 Percent of design speed; reading 4121

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	24.135	23.881	43.9	16.8	43.9	16.8	359.0	1.000	17.88	0.963
2	23.881	23.655	42.7	15.0	42.7	15.0	358.8	1.000	18.36	0.969
3	23.617	23.421	40.9	13.7	40.9	13.7	357.3	1.000	18.69	0.981
4	22.789	22.690	39.5	12.0	39.5	12.0	355.2	1.000	19.11	0.985
5	21.646	21.676	42.0	11.2	42.0	11.2	356.4	1.000	19.24	0.986
6	20.477	20.645	43.7	12.4	43.7	12.4	358.6	1.000	19.85	0.990
7	19.588	19.855	43.5	11.6	43.5	11.6	357.3	1.000	20.21	0.986
8	19.286	19.538	44.2	11.4	44.2	11.4	358.0	1.000	20.30	0.986
9	18.984	19.319	46.0	12.5	46.0	12.5	360.5	1.000	20.38	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	234.6	160.8	234.6	160.8	169.1	154.0	162.6	46.4	0.0	0.0
2	243.9	173.8	243.9	173.8	179.2	167.9	165.4	44.9	0.0	0.0
3	249.1	186.2	249.1	186.2	188.2	180.9	163.1	44.3	0.0	0.0
4	257.1	205.3	257.1	205.3	198.5	200.9	163.5	42.7	0.0	0.0
5	263.4	210.4	263.4	210.4	195.8	206.4	176.2	40.7	0.0	0.0
6	279.0	224.4	279.0	224.4	201.8	219.1	192.6	48.3	0.0	0.0
7	288.3	227.2	288.3	227.2	209.2	222.6	198.4	45.7	0.0	0.0
8	291.8	228.0	291.8	228.0	209.2	223.5	203.5	45.1	0.0	0.0
9	296.5	227.2	296.5	227.2	206.0	221.8	213.2	49.1	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	0.643	0.431	0.643	0.431	0.463	0.413	0.911	1.048
2	0.670	0.467	0.670	0.467	0.493	0.452	0.937	1.062
3	0.688	0.504	0.688	0.504	0.520	0.489	0.961	1.043
4	0.715	0.560	0.715	0.560	0.551	0.548	1.012	1.037
5	0.732	0.574	0.732	0.574	0.544	0.563	1.054	1.106
6	0.778	0.613	0.778	0.613	0.563	0.598	1.086	1.195
7	0.809	0.622	0.809	0.622	0.587	0.610	1.064	1.228
8	0.819	0.624	0.819	0.624	0.588	0.612	1.068	1.257
9	0.831	0.619	0.831	0.619	0.577	0.605	1.077	1.294

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	-0.3	-7.6	15.0	0.506	0.000	0.151	0.151	0.056	0.056
2	10.00	-1.1	-8.3	13.0	0.478	0.000	0.118	0.118	0.044	0.044
3	15.00	-2.8	-9.8	11.6	0.435	0.000	0.070	0.070	0.026	0.026
4	30.00	-4.1	-10.7	9.4	0.378	0.000	0.053	0.053	0.019	0.019
5	50.00	-1.9	-8.0	7.9	0.388	0.000	0.047	0.047	0.017	0.017
6	70.00	-0.6	-6.1	8.5	0.377	0.000	0.029	0.029	0.010	0.010
7	85.00	-1.0	-6.0	7.3	0.392	0.000	0.039	0.039	0.013	0.013
8	90.00	-0.4	-5.3	7.0	0.401	0.000	0.041	0.040	0.014	0.014
9	95.00	0.5	-4.2	7.8	0.418	0.000	0.065	0.065	0.022	0.021

TABLE VI.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 38—SI UNITS

(r) 100 Percent of design speed; reading 4123

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	24.135	23.881	42.1	16.8	42.1	16.8	354.5	1.000	17.09	0.963
2	23.881	23.655	40.9	14.7	40.9	14.7	354.6	1.000	17.68	0.969
3	23.617	23.421	38.3	13.4	38.3	13.4	352.9	1.000	18.08	0.981
4	22.789	22.690	37.1	11.7	37.1	11.7	351.5	1.000	18.53	0.983
5	21.646	21.676	40.2	11.2	40.2	11.2	353.2	1.000	18.68	0.983
6	20.477	20.645	41.9	12.2	41.9	12.2	355.5	1.000	19.32	0.987
7	19.588	19.855	41.8	11.3	41.8	11.3	355.3	1.000	19.78	0.988
8	19.286	19.588	42.3	11.2	42.3	11.2	355.7	1.000	19.89	0.986
9	18.984	19.319	44.7	12.3	44.7	12.3	358.9	1.000	20.05	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	226.0	165.7	226.0	165.7	167.6	158.6	151.6	47.9	0.0	0.0
2	238.7	179.8	238.7	179.8	180.4	173.9	156.3	45.8	0.0	0.0
3	245.1	192.8	245.1	192.8	192.2	187.6	152.1	44.6	0.0	0.0
4	256.1	212.6	256.1	212.6	204.2	208.2	154.5	43.1	0.0	0.0
5	261.4	217.8	261.4	217.8	199.5	213.6	168.8	42.4	0.0	0.0
6	277.0	231.7	277.0	231.7	206.0	226.4	185.1	49.1	0.0	0.0
7	288.7	236.8	288.7	236.8	215.2	232.2	192.4	46.5	0.0	0.0
8	292.1	236.9	292.1	236.9	216.0	232.4	196.6	45.9	0.0	0.0
9	298.2	236.2	298.2	236.2	212.0	230.8	209.6	50.2	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	0.621	0.448	0.621	0.448	0.461	0.429	0.946	0.977
2	0.659	0.488	0.659	0.488	0.498	0.471	0.964	1.004
3	0.680	0.526	0.680	0.526	0.534	0.512	0.976	0.973
4	0.715	0.585	0.715	0.585	0.571	0.573	1.019	0.979
5	0.730	0.598	0.730	0.598	0.557	0.587	1.070	1.058
6	0.776	0.637	0.776	0.637	0.577	0.623	1.099	1.146
7	0.813	0.653	0.813	0.653	0.606	0.640	1.079	1.187
8	0.823	0.653	0.823	0.653	0.609	0.640	1.075	1.210
9	0.838	0.647	0.838	0.647	0.596	0.633	1.088	1.268

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	-2.0	-9.3	15.0	0.445	0.000	0.160	0.160	0.059	0.059
2	10.00	-3.0	-10.1	12.8	0.425	0.000	0.124	0.124	0.046	0.046
3	15.00	-5.3	-12.4	11.3	0.381	0.000	0.073	0.073	0.027	0.027
4	30.00	-6.4	-13.0	9.1	0.333	0.000	0.058	0.058	0.021	0.021
5	50.00	-3.7	-9.7	8.0	0.343	0.000	0.058	0.058	0.021	0.021
6	70.00	-2.4	-7.8	8.3	0.336	0.000	0.039	0.039	0.013	0.013
7	85.00	-2.7	-7.7	7.0	0.352	0.000	0.033	0.033	0.011	0.011
8	90.00	-2.3	-7.2	6.7	0.363	0.000	0.040	0.040	0.013	0.013
9	95.00	-0.8	-5.5	7.6	0.386	0.000	0.068	0.067	0.022	0.022

TABLE VI.—Continued. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 38—SI UNITS

(s) 100 Percent of design speed; reading 4128

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	24.135	23.881	41.5	16.8	41.5	16.8	353.0	1.000	16.93	0.963
2	23.881	23.655	39.5	14.3	39.5	14.3	353.0	1.000	17.60	0.966
3	23.617	23.421	37.5	13.0	37.5	13.0	351.6	1.000	17.98	0.980
4	22.789	22.690	36.9	11.2	36.9	11.2	350.6	1.000	18.38	0.983
5	21.646	21.676	39.7	11.0	39.7	11.0	352.7	1.000	18.55	0.981
6	20.477	20.645	41.6	11.8	41.6	11.8	355.0	1.000	19.21	0.986
7	19.588	19.855	41.7	11.0	41.7	11.0	354.8	1.000	19.68	0.989
8	19.286	19.588	42.4	11.0	42.4	11.0	355.5	1.000	19.80	0.986
9	18.984	19.319	44.3	11.9	44.3	11.9	358.6	1.000	19.98	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	225.1	167.4	225.1	167.4	168.6	160.3	149.1	48.4	0.0	0.0
2	239.2	182.7	239.2	182.7	184.6	177.0	152.1	45.2	0.0	0.0
3	245.8	195.7	245.8	195.7	195.0	190.6	149.6	44.1	0.0	0.0
4	254.4	215.0	254.4	215.0	203.5	210.9	152.6	41.9	0.0	0.0
5	259.8	220.3	259.8	220.3	199.9	216.3	166.0	41.9	0.0	0.0
6	276.5	234.3	276.5	234.3	206.8	229.4	183.5	48.0	0.0	0.0
7	287.4	239.6	287.4	239.6	214.7	235.2	191.1	45.8	0.0	0.0
8	291.5	239.7	291.5	239.7	215.2	235.3	196.7	45.7	0.0	0.0
9	297.6	238.3	297.6	238.3	213.2	233.2	207.7	49.3	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	0.620	0.454	0.620	0.454	0.465	0.434	0.950	0.961
2	0.662	0.497	0.662	0.497	0.511	0.481	0.959	0.977
3	0.684	0.535	0.684	0.535	0.542	0.521	0.978	0.957
4	0.711	0.592	0.711	0.592	0.569	0.581	1.036	0.968
5	0.726	0.606	0.726	0.606	0.558	0.595	1.082	1.039
6	0.775	0.646	0.775	0.646	0.580	0.632	1.109	1.135
7	0.809	0.662	0.809	0.662	0.605	0.650	1.095	1.179
8	0.822	0.661	0.822	0.661	0.607	0.649	1.093	1.211
9	0.837	0.654	0.837	0.654	0.600	0.640	1.094	1.255

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	-2.7	-10.0	15.0	0.430	0.000	0.164	0.164	0.060	0.060
2	10.00	-4.4	-11.6	12.4	0.408	0.000	0.133	0.133	0.049	0.049
3	15.00	-6.2	-13.3	10.9	0.368	0.000	0.076	0.076	0.028	0.028
4	30.00	-6.7	-13.3	8.6	0.318	0.000	0.061	0.061	0.022	0.022
5	50.00	-4.2	-10.3	7.7	0.326	0.000	0.063	0.063	0.023	0.023
6	70.00	-2.7	-8.2	7.9	0.324	0.000	0.044	0.044	0.015	0.015
7	85.00	-2.8	-7.8	6.7	0.338	0.000	0.033	0.033	0.011	0.011
8	90.00	-2.2	-7.0	6.5	0.352	0.000	0.039	0.039	0.013	0.013
9	95.00	-1.2	-5.9	7.3	0.376	0.000	0.074	0.073	0.024	0.024

TABLE VI.—Concluded. BLADE-ELEMENT DATA AT BLADE EDGES FOR STATOR 38—SI UNITS

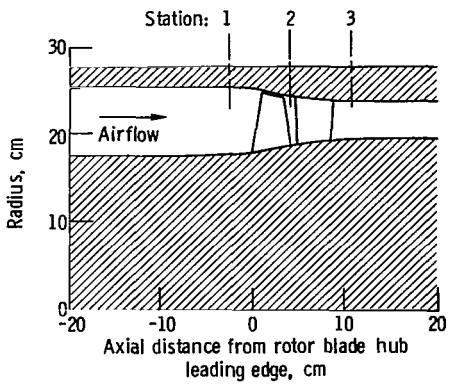
(t) 100 Percent of design speed; reading 4129

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	24.135	23.881	38.9	16.7	38.9	16.7	349.0	1.000	16.36	0.955
2	23.881	23.655	36.6	13.7	36.6	13.7	348.8	1.000	17.07	0.960
3	23.617	23.421	35.4	12.3	35.4	12.3	348.3	1.000	17.45	0.979
4	22.789	22.690	35.5	11.1	35.5	11.1	347.9	1.000	17.87	0.980
5	21.646	21.676	38.2	11.1	38.2	11.1	350.4	1.000	18.06	0.976
6	20.477	20.645	39.7	12.0	39.7	12.0	352.6	1.000	18.80	0.980
7	19.588	19.855	40.2	11.3	40.2	11.3	353.0	1.000	19.25	0.988
8	19.286	19.588	40.6	11.3	40.6	11.3	353.6	1.000	19.39	0.985
9	18.984	19.319	42.9	12.2	42.9	12.2	357.1	1.000	19.65	0.966

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	222.8	177.2	222.8	177.2	173.4	169.7	139.9	50.8	0.0	0.0
2	237.9	192.3	237.9	192.3	191.1	186.8	141.8	45.7	0.0	0.0
3	245.2	206.1	245.2	206.1	200.0	201.3	141.9	44.1	0.0	0.0
4	252.6	225.8	252.6	225.8	205.7	221.6	146.7	43.3	0.0	0.0
5	259.9	231.4	259.9	231.4	204.2	227.1	160.7	44.7	0.0	0.0
6	274.9	244.4	274.9	244.4	211.4	239.0	175.7	50.8	0.0	0.0
7	287.9	249.2	287.9	249.2	220.0	244.3	185.8	49.0	0.0	0.0
8	291.8	248.7	291.8	248.7	221.5	243.9	190.0	48.6	0.0	0.0
9	299.3	246.0	299.3	246.0	219.4	240.5	203.7	52.0	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	0.617	0.484	0.617	0.484	0.480	0.464	0.979	0.902
2	0.663	0.528	0.663	0.528	0.532	0.513	0.978	0.911
3	0.686	0.568	0.686	0.568	0.559	0.555	1.007	0.909
4	0.709	0.627	0.709	0.627	0.577	0.615	1.077	0.930
5	0.728	0.641	0.728	0.641	0.572	0.629	1.112	1.005
6	0.773	0.678	0.773	0.678	0.594	0.663	1.131	1.082
7	0.813	0.692	0.813	0.692	0.621	0.679	1.111	1.143
8	0.825	0.690	0.825	0.690	0.626	0.677	1.101	1.164
9	0.845	0.679	0.845	0.679	0.619	0.663	1.096	1.226

RP	PERCENT SPAN	INCIDENCE MEAN	INCIDENCE SS	DEV	D FACT	EFF	LOSS COEFF TOT	LOSS COEFF PROF	LOSS PARAM TOT	LOSS PARAM PROF
1	5.00	-5.3	-12.6	14.9	0.360	0.000	0.199	0.199	0.073	0.073
2	10.00	-7.3	-14.5	11.8	0.347	0.000	0.156	0.156	0.058	0.058
3	15.00	-8.3	-15.4	10.2	0.312	0.000	0.080	0.080	0.030	0.030
4	30.00	-8.0	-14.6	8.5	0.260	0.000	0.070	0.070	0.026	0.026
5	50.00	-5.7	-11.7	7.9	0.272	0.000	0.079	0.079	0.028	0.028
6	70.00	-4.6	-10.0	8.1	0.270	0.000	0.061	0.061	0.021	0.021
7	85.00	-4.3	-9.3	7.0	0.296	0.000	0.035	0.035	0.012	0.012
8	90.00	-4.0	-8.8	6.8	0.311	0.000	0.041	0.041	0.014	0.014
9	95.00	-2.6	-7.3	7.6	0.346	0.000	0.091	0.091	0.030	0.030

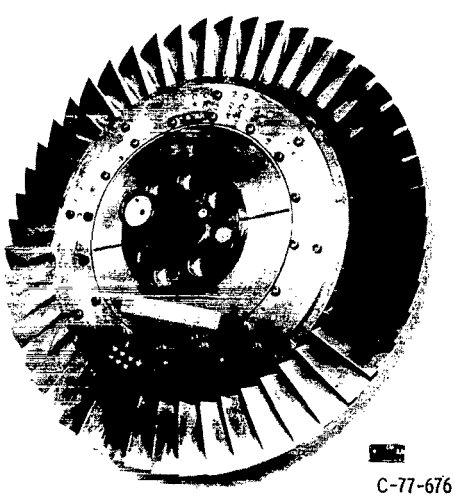


Flow path coordinates

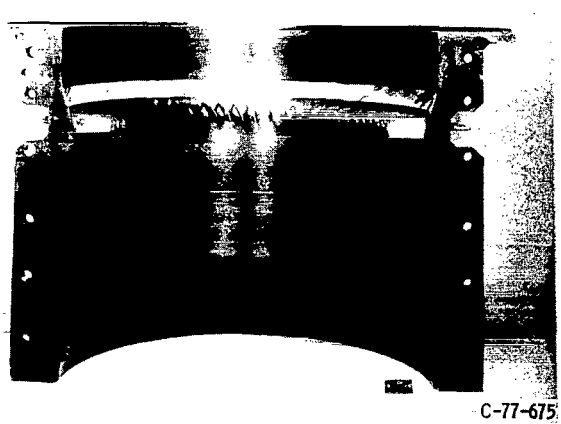
Inner		Outer	
Axial distance, cm	Radius, cm	Axial distance, cm	Radius, cm
-22.860	17.526	-22.860	25.654
-15.400	17.526	-15.400	25.654
-7.620	17.526	-7.620	25.654
[a] -2.568	17.539	-2.568	25.643
0	17.780	0	25.400
1.854	18.255	.632	25.247
4.137	18.714	1.854	24.925
4.859	18.821	1.974	24.882
6.566	19.035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

[a] Instrumentation survey planes.

Figure 1. - Flow path and instrumentation stations.



(a) Rotor



(b) Stator

Figure 2. - Stage blade rows.

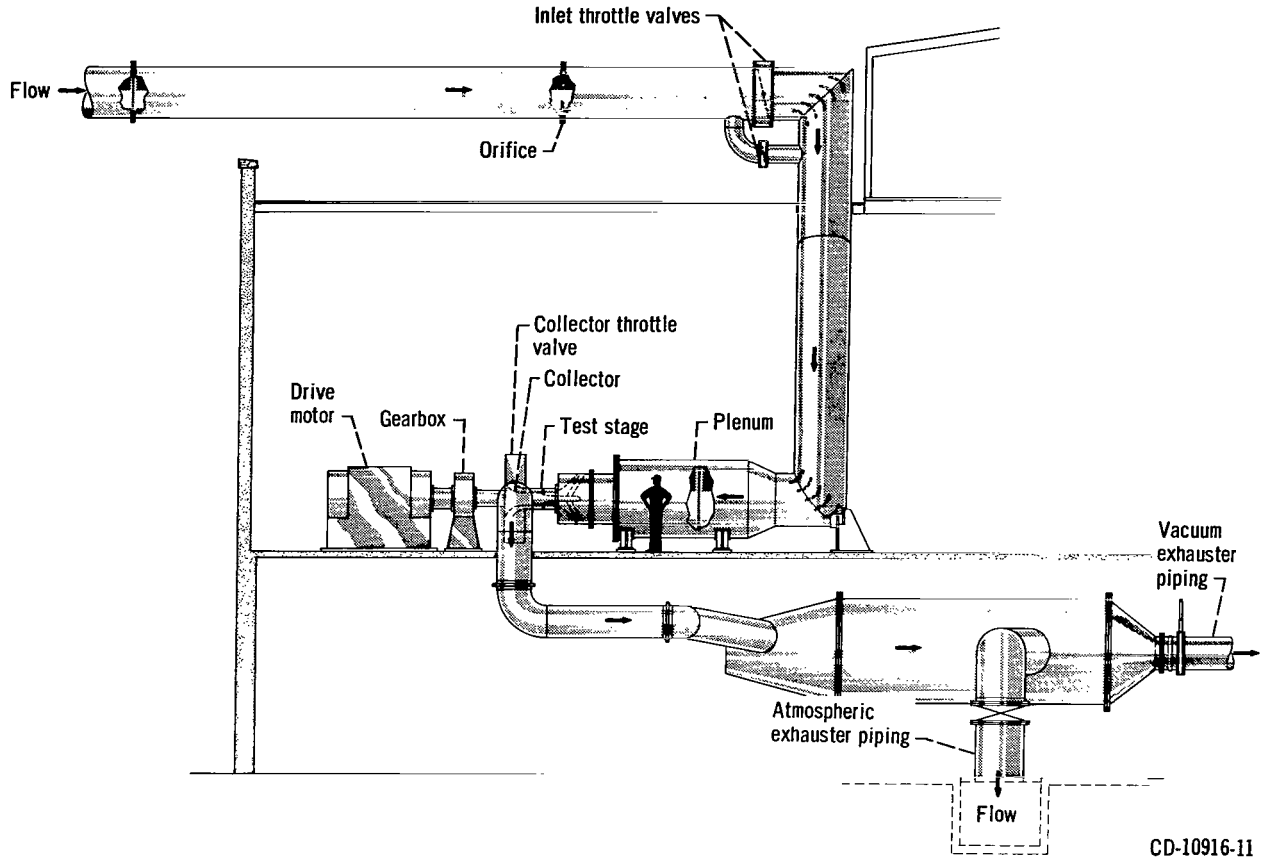
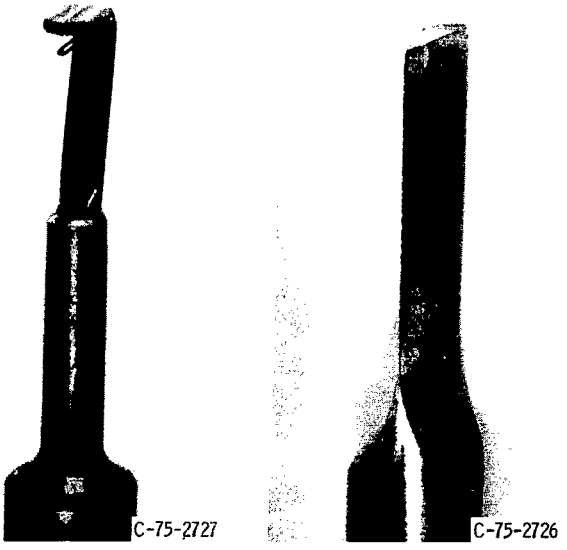


Figure 3.- Compressor test facility.



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

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

Figure 4. - Traverse probes.

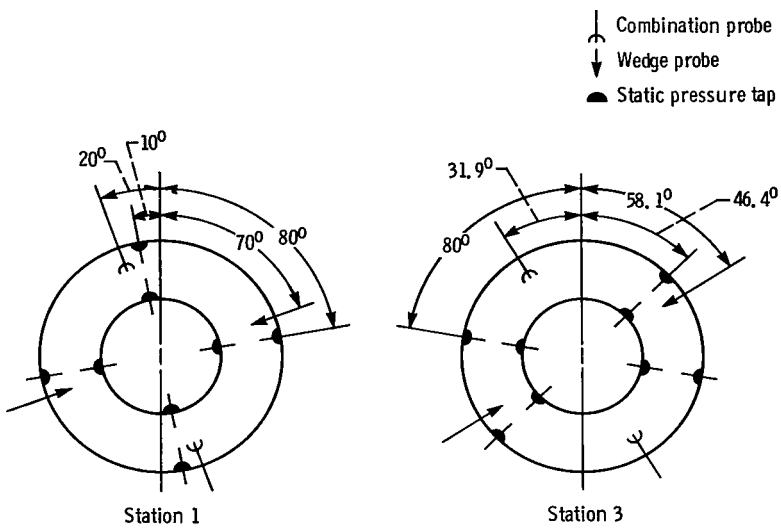


Figure 5. - Circumferential location of instrumentation at measuring station (facing upstream).

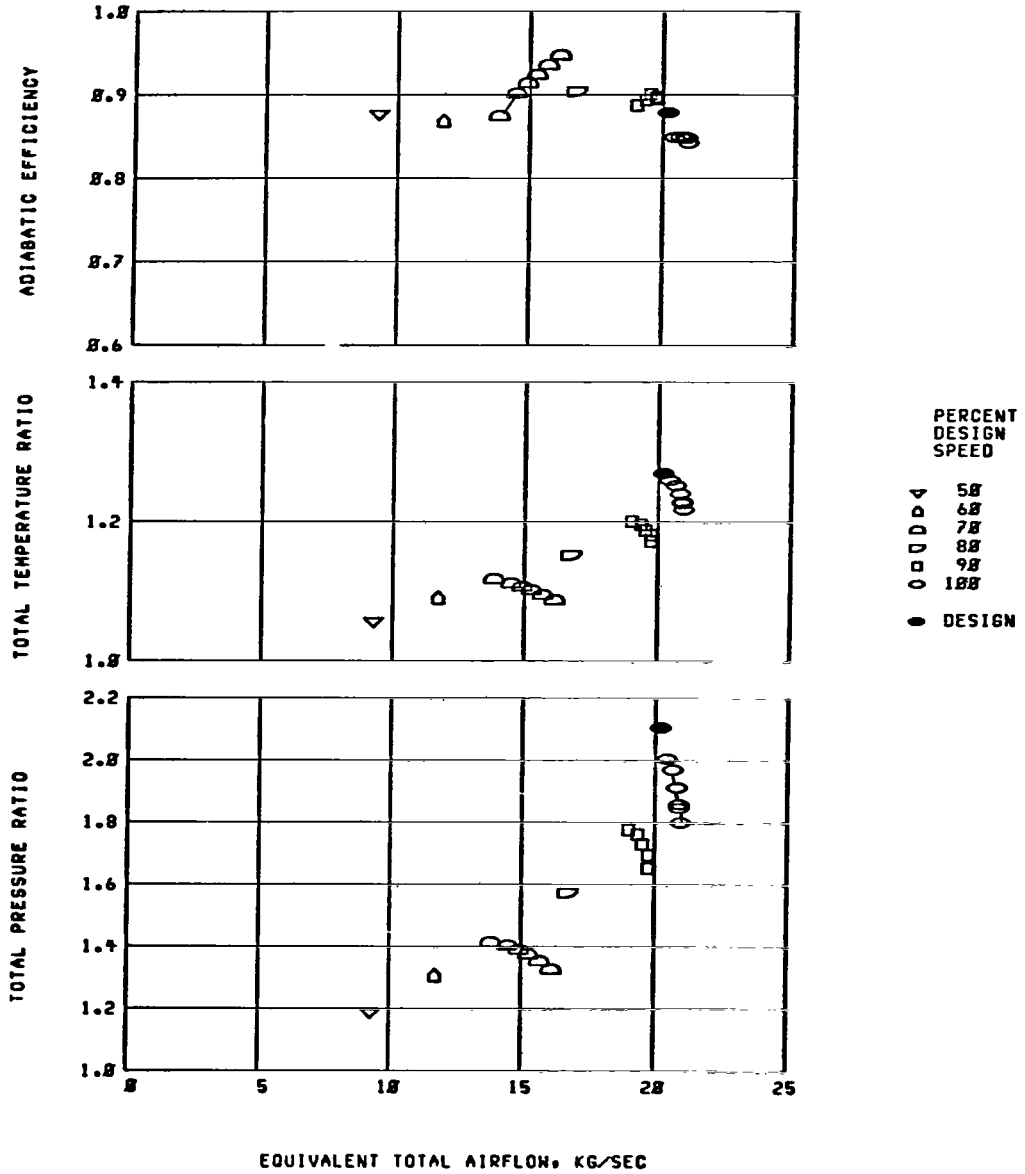


Figure 6. - Overall performance for rotor 38.

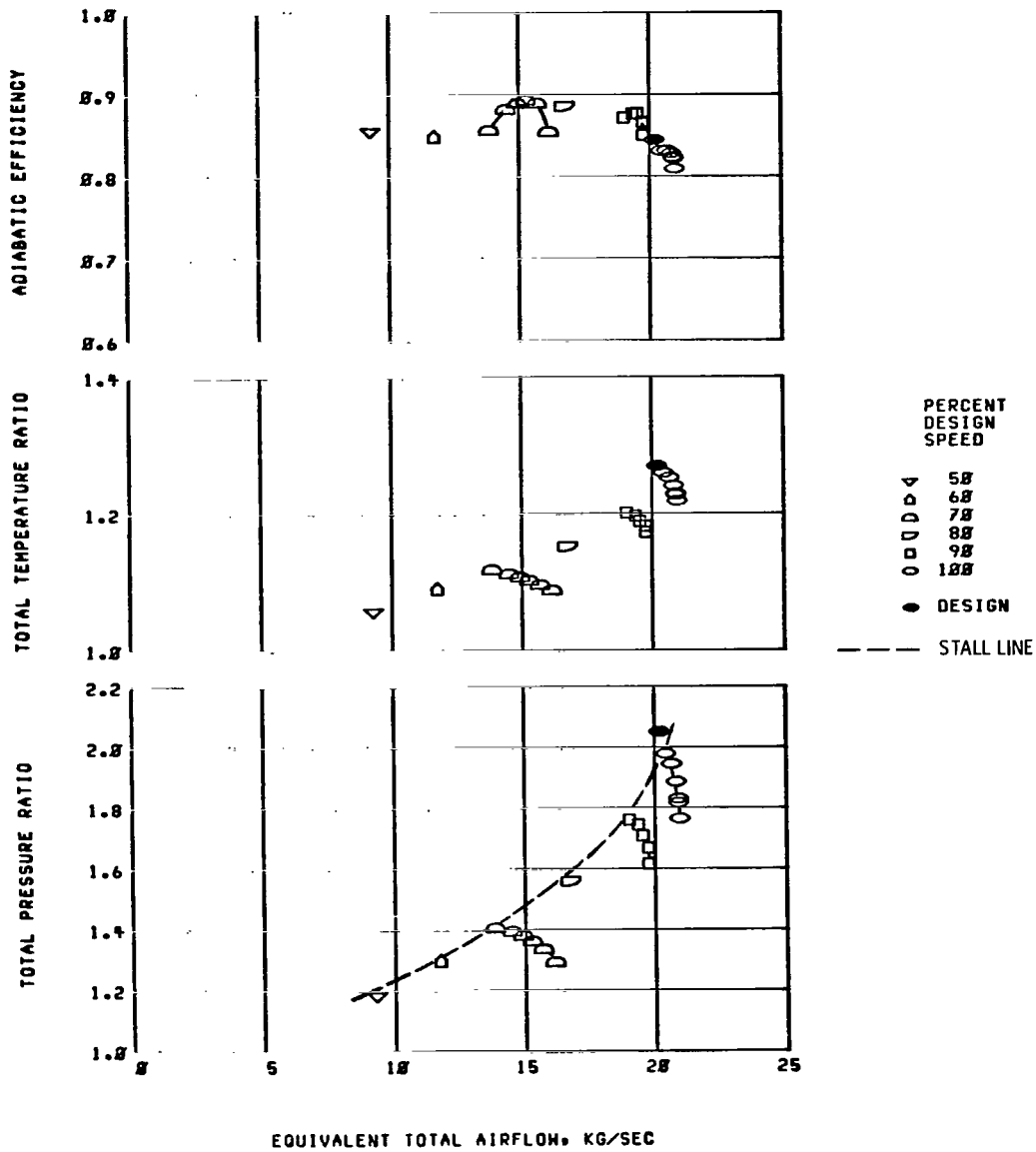


Figure 7. - Overall performance for stage 38.

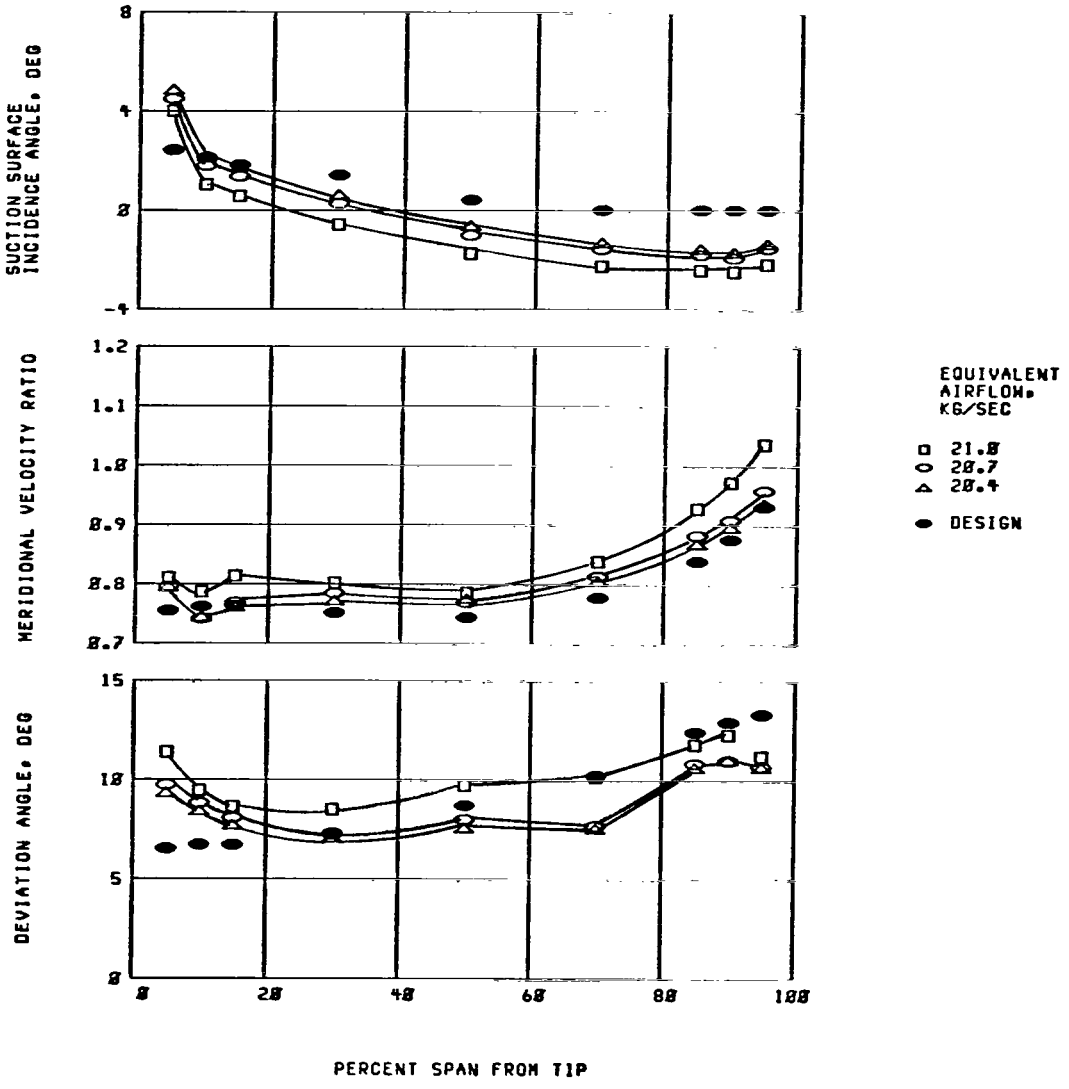


Figure 8. - Radial distribution of performance for rotor 38. 100 Percent of design speed.

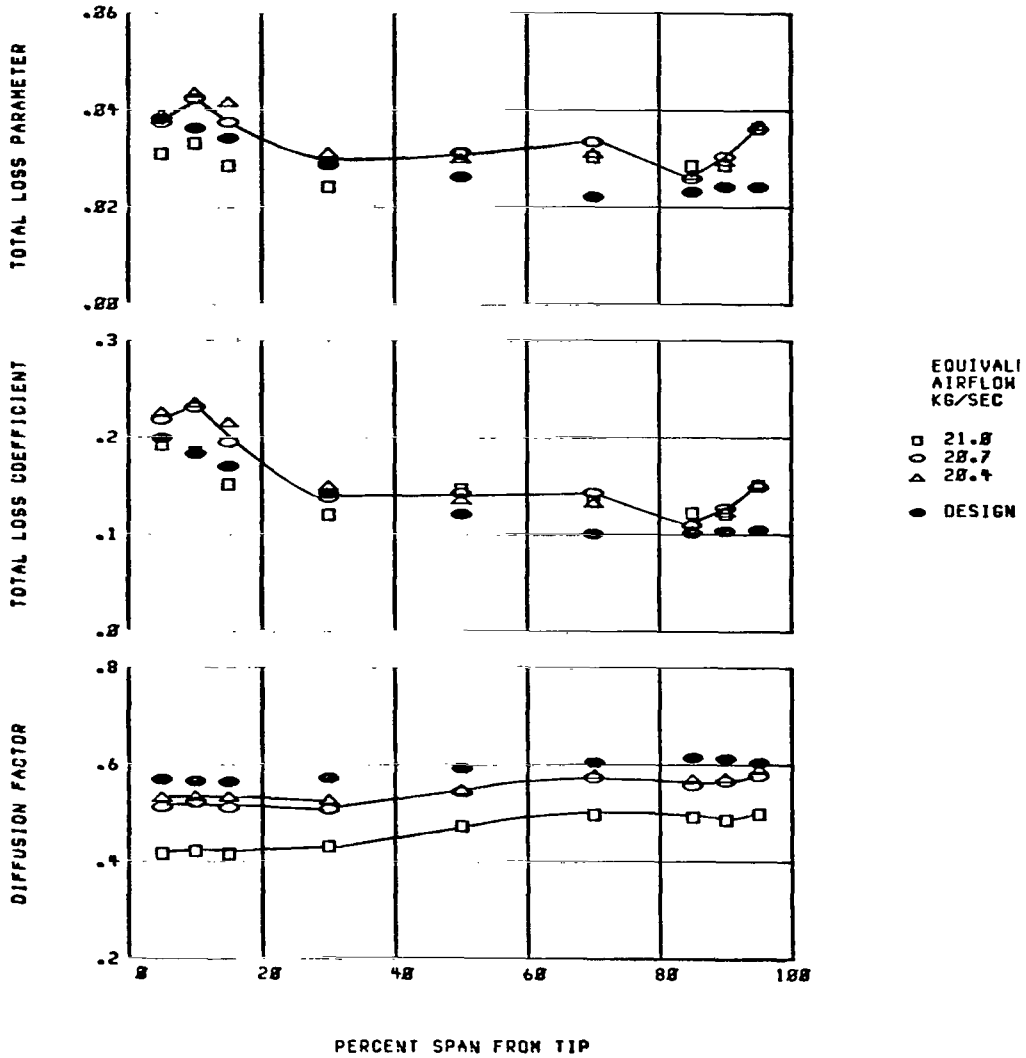


Figure 8. - Continued. Radial distribution of performance for rotor 38. 100 Percent of design speed.

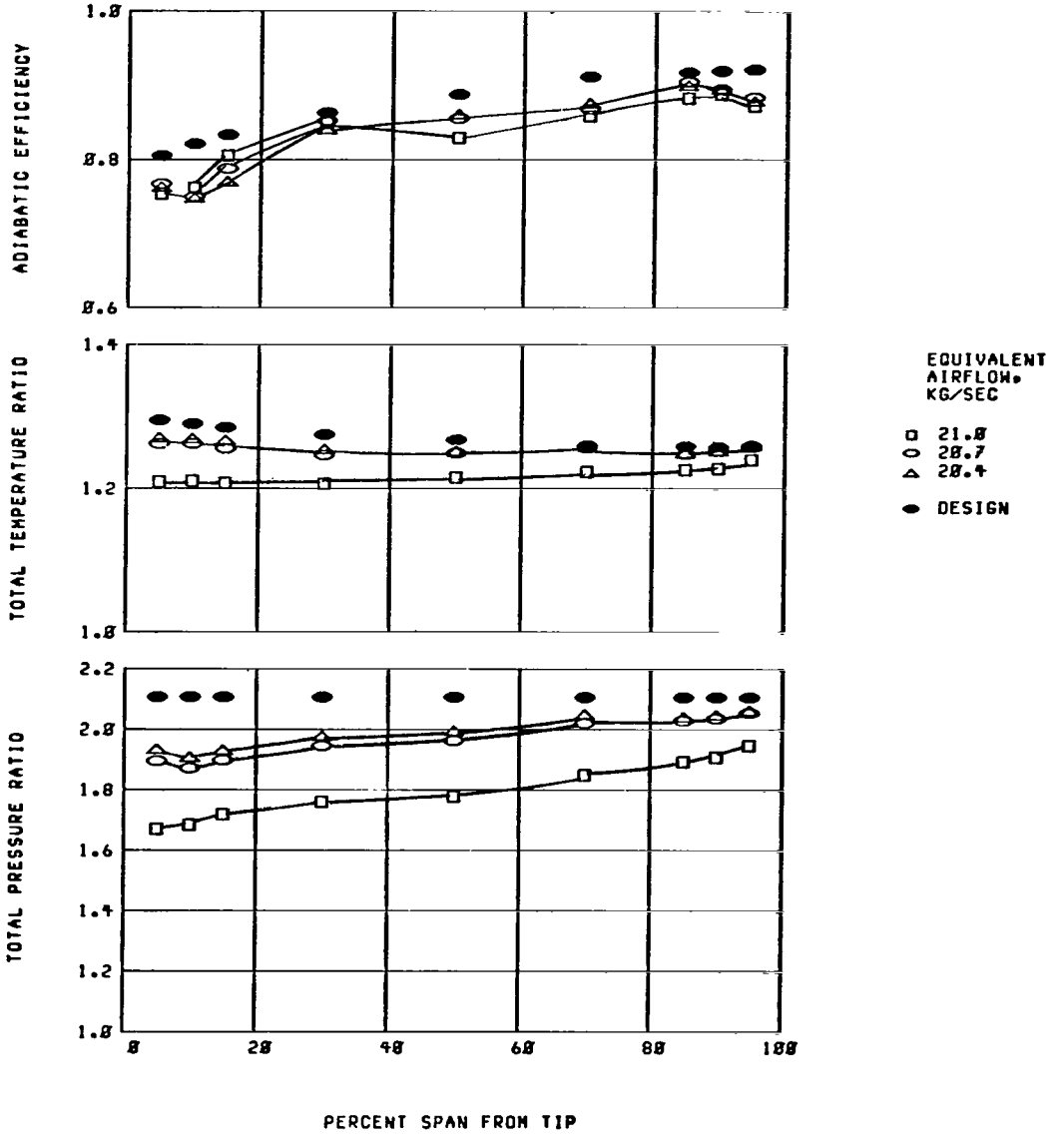


Figure 8. - Concluded. Radial distribution of performance for rotor 38. 100 Percent of design speed.

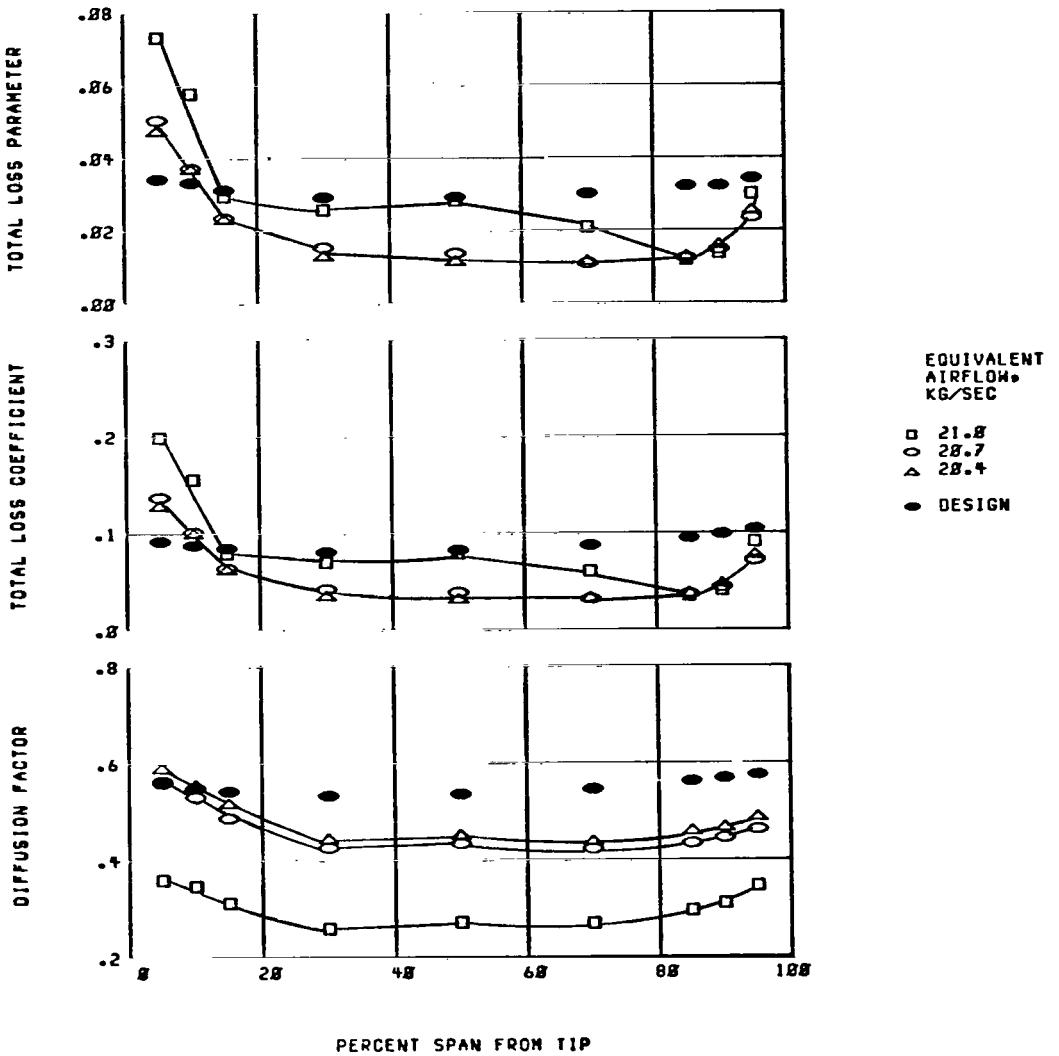


Figure 9. - Radial distribution of performance for stator 38. 100 Percent of design speed.

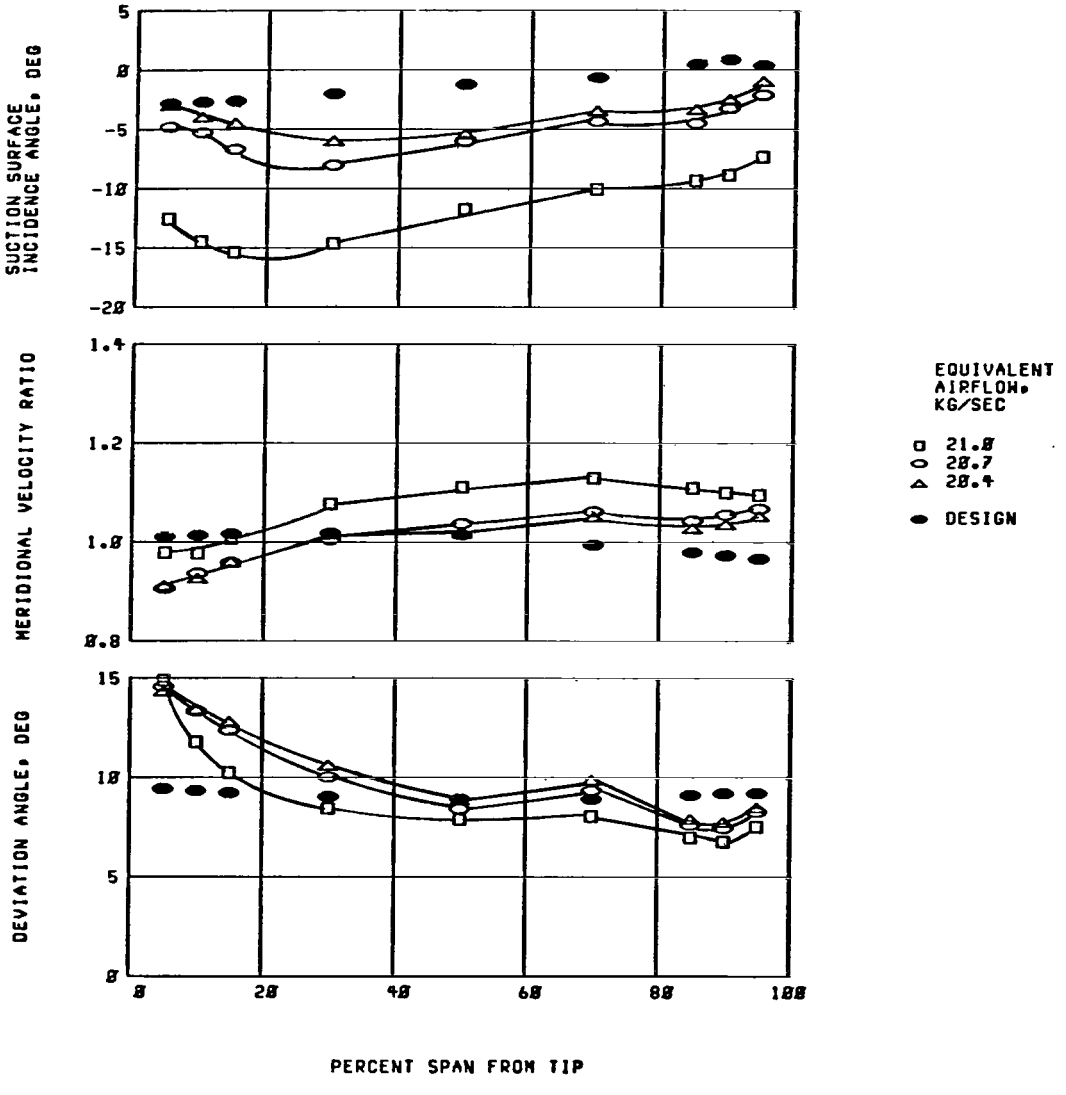
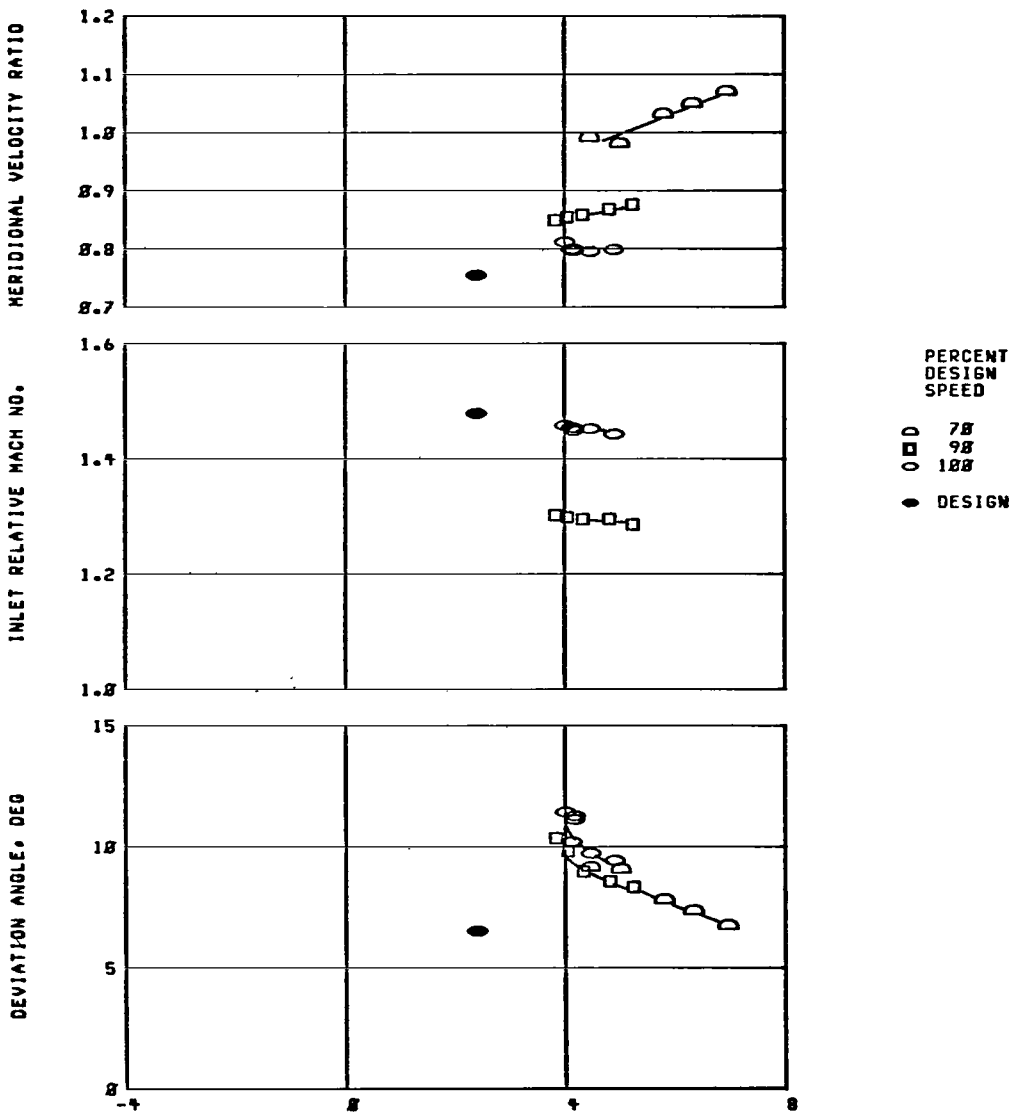
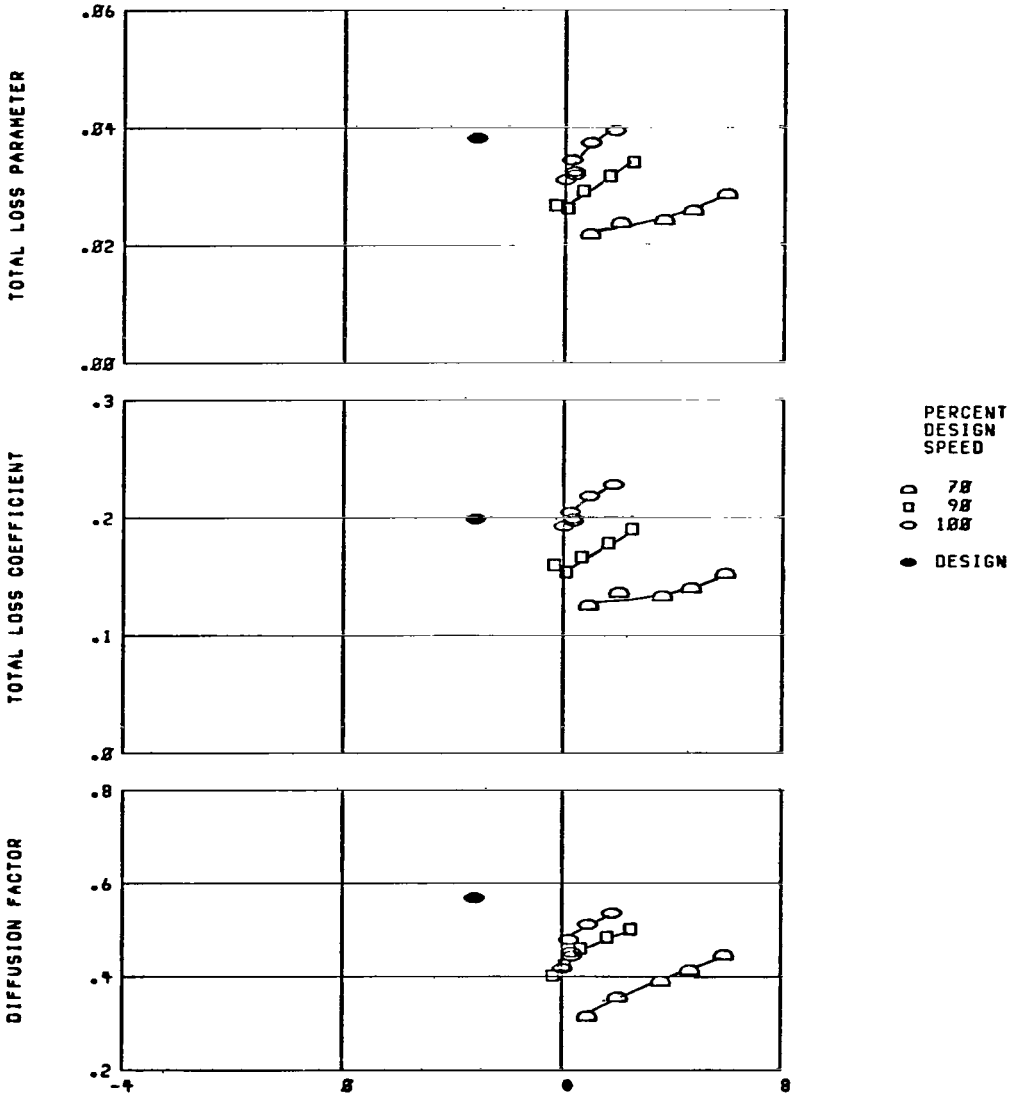


Figure 9. - Concluded. Radial distribution of performance for stator 38. 100 Percent of design speed.



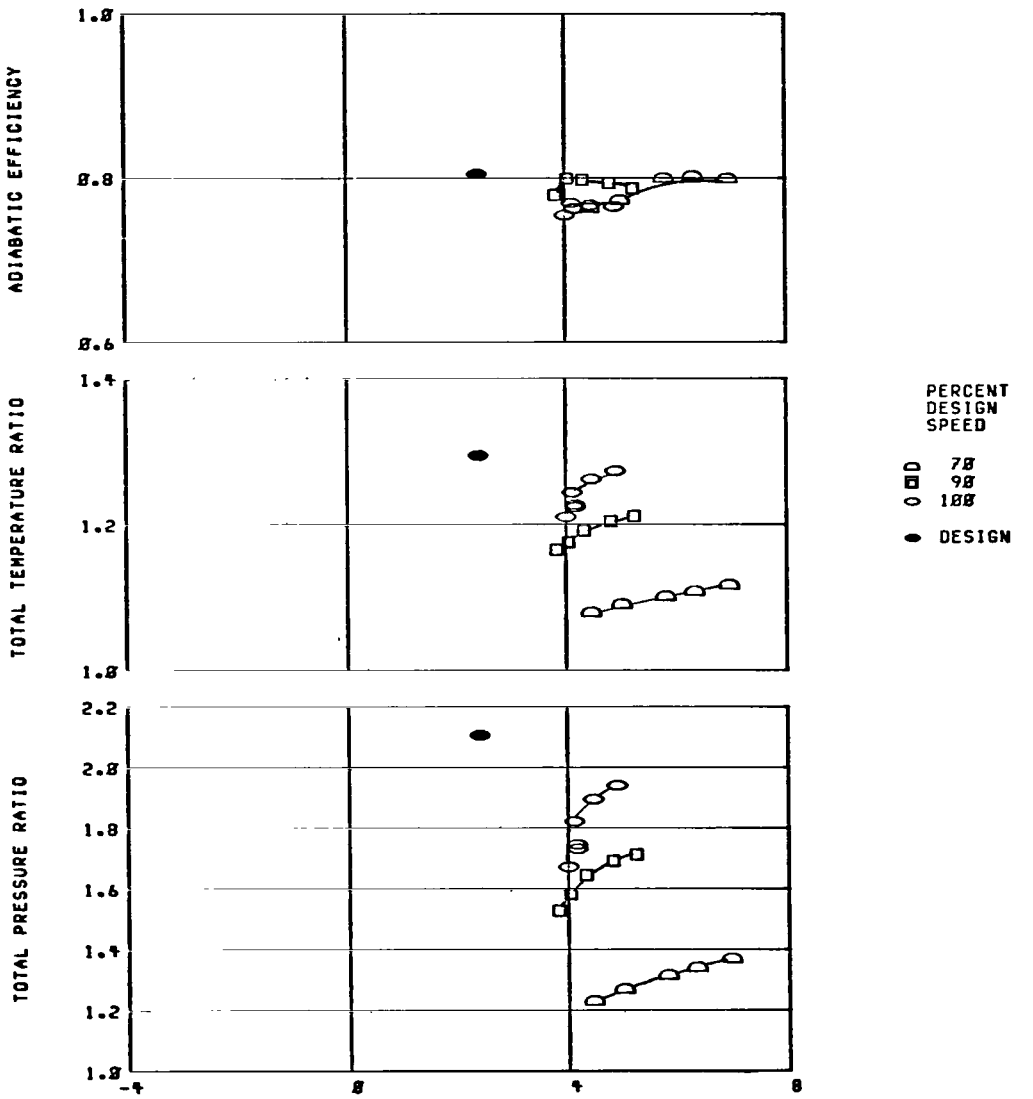
(a) Location, 5 percent of span.

Figure 10. - Blade-element performance for rotor 38.



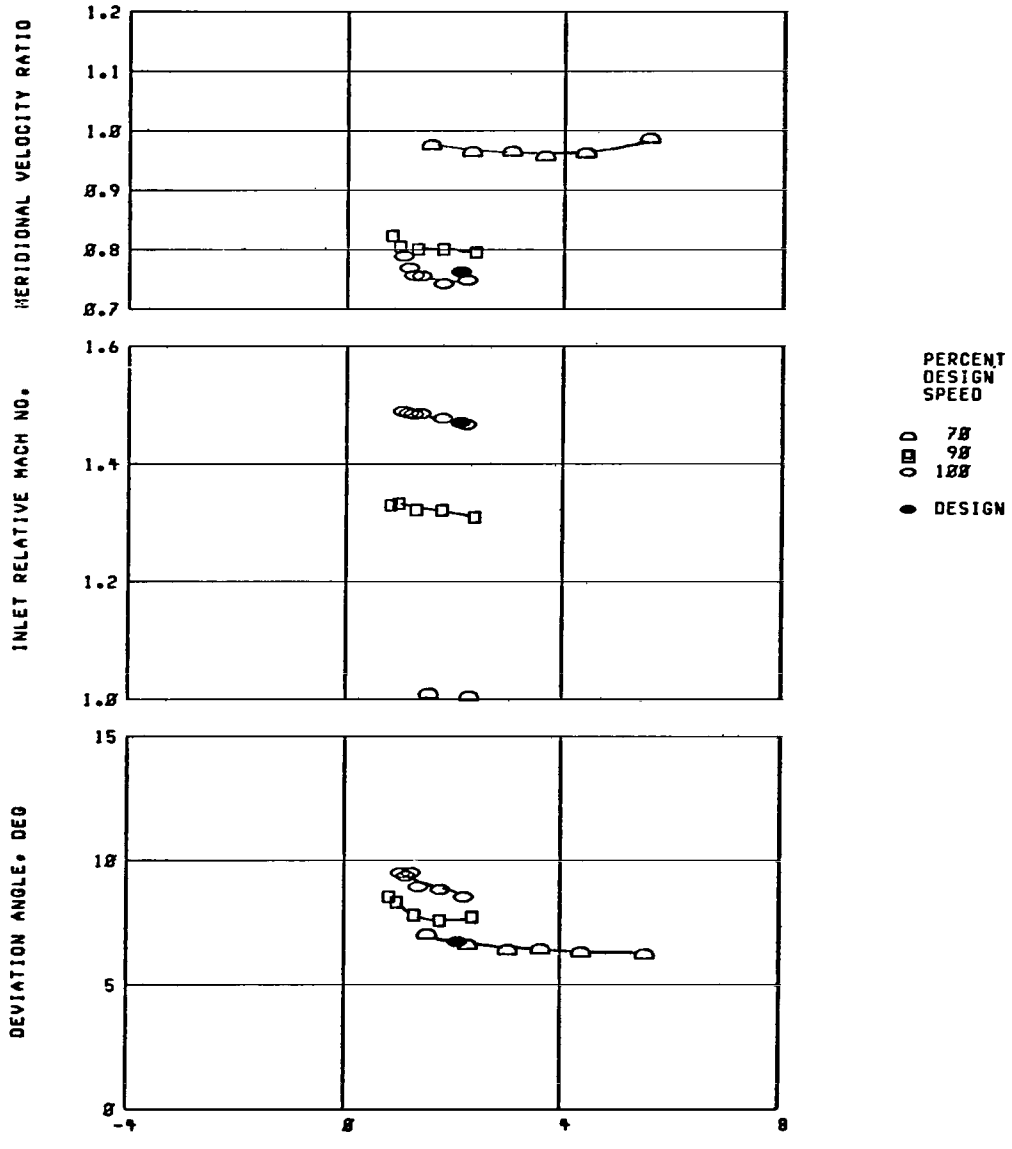
(a) Continued. Location, 5 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



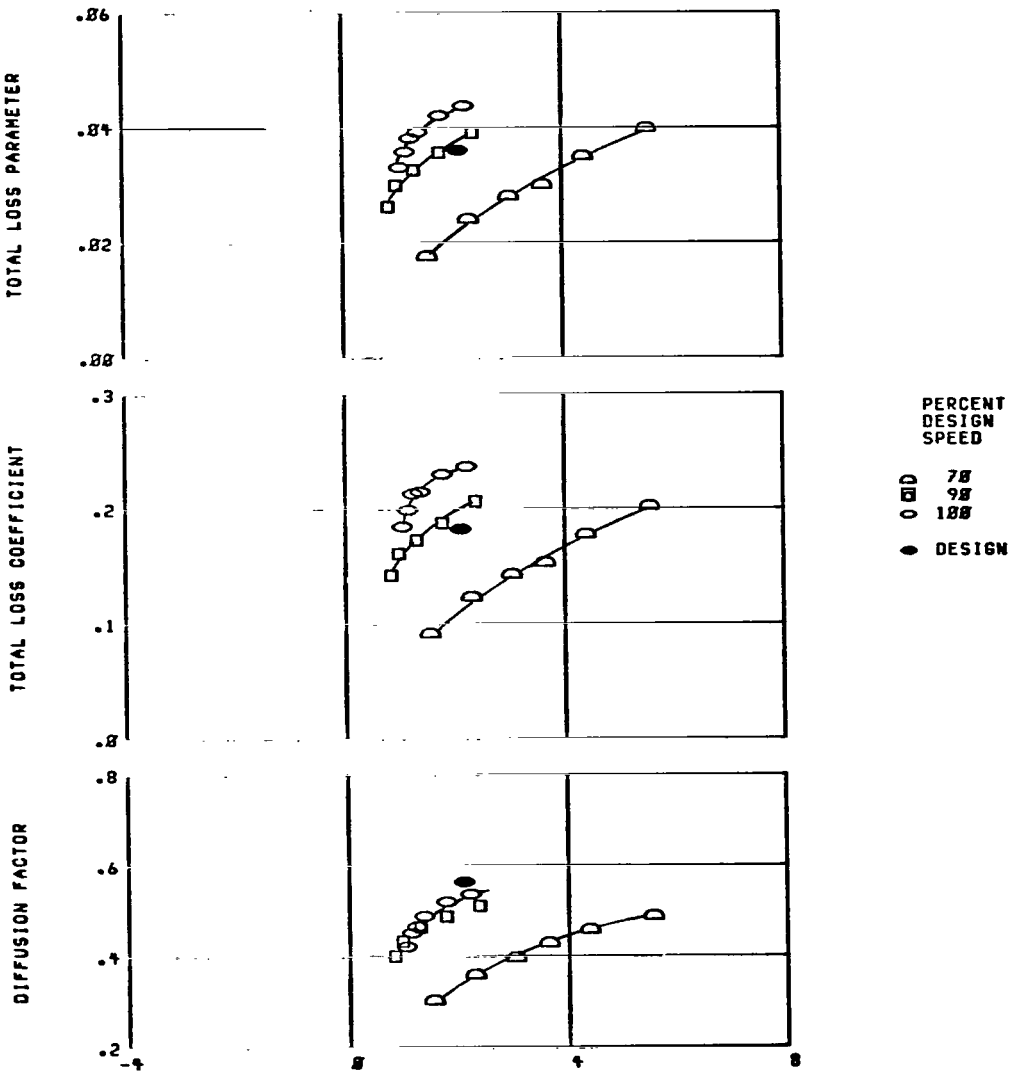
(a) Concluded. Location, 5 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



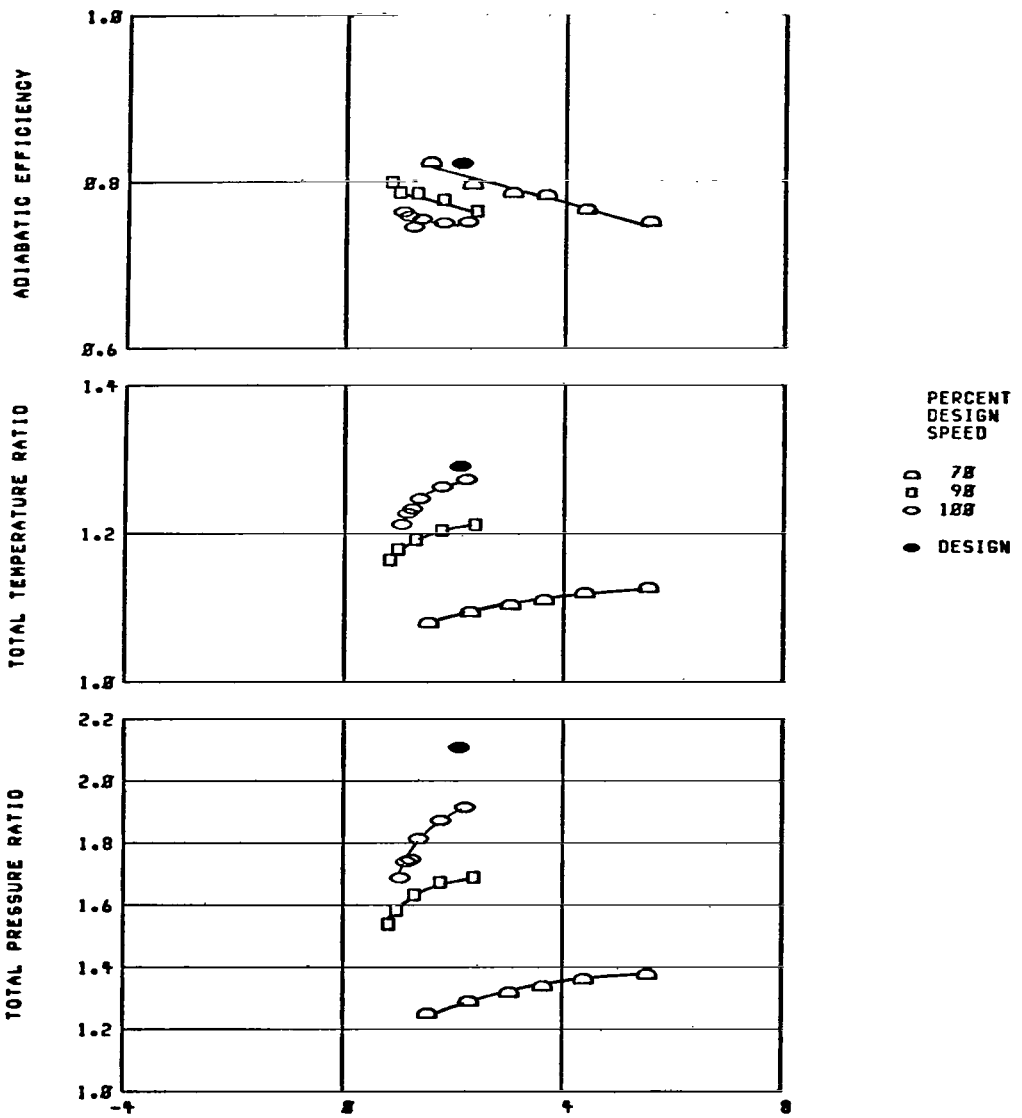
(b) Location, 10 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



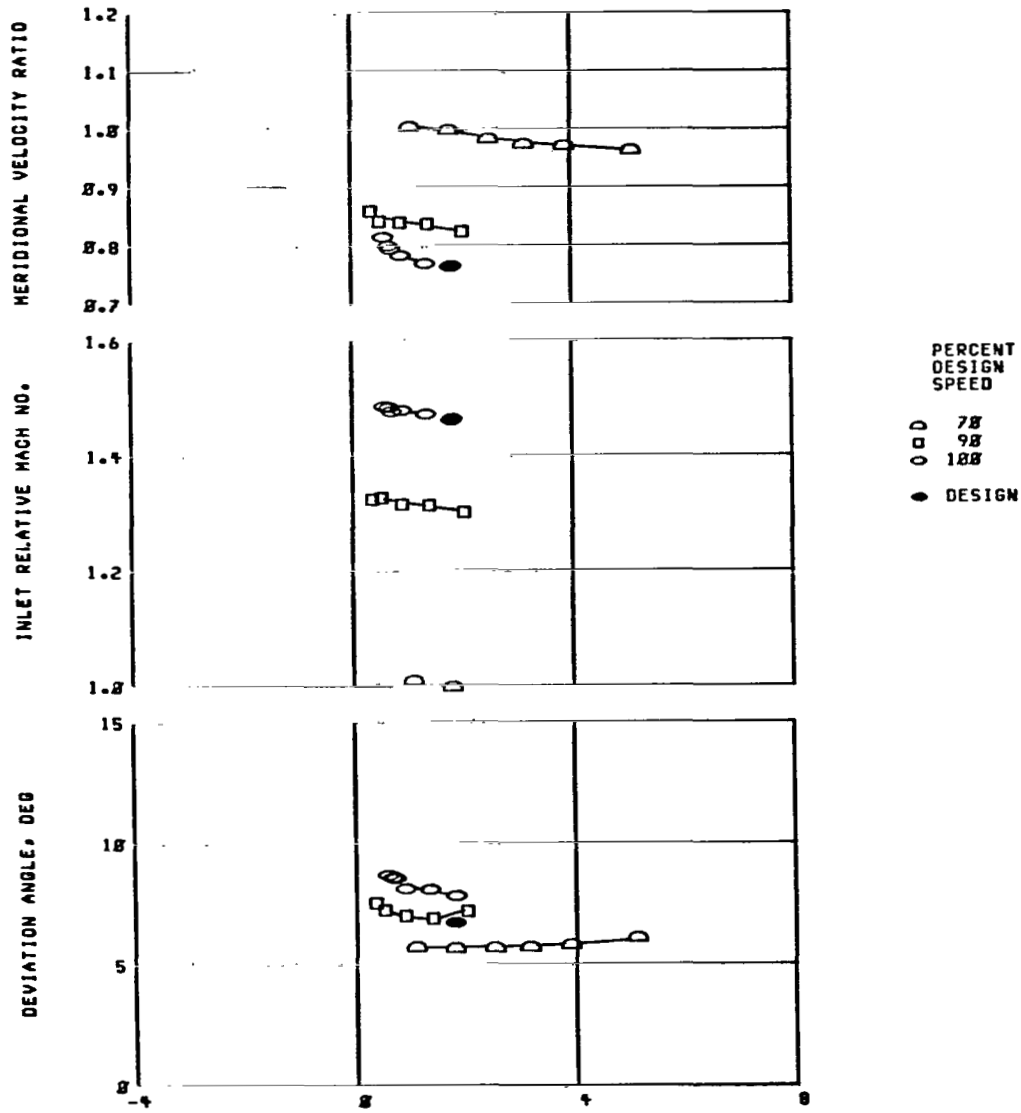
(b) Continued. Location, 10 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



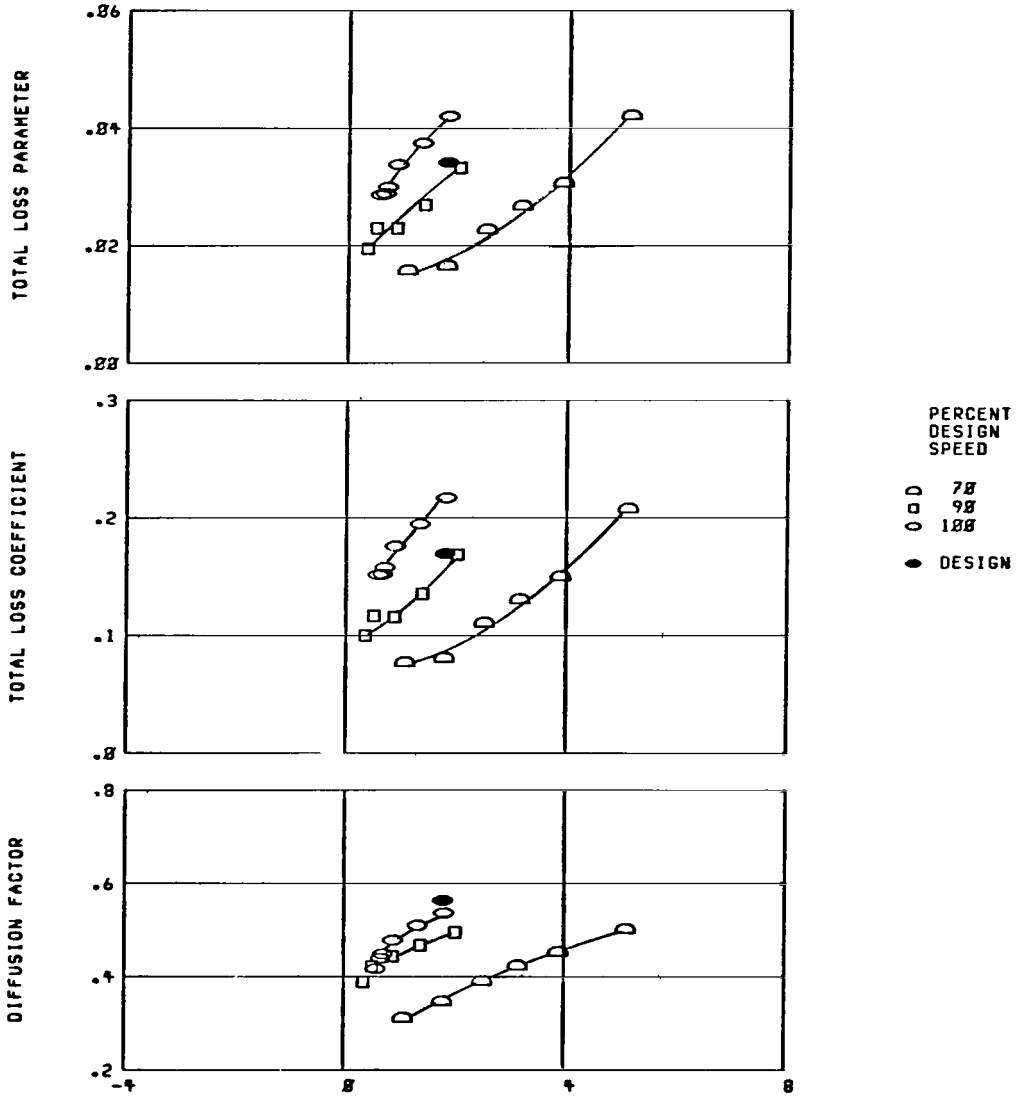
(b) Concluded. Location, 10 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



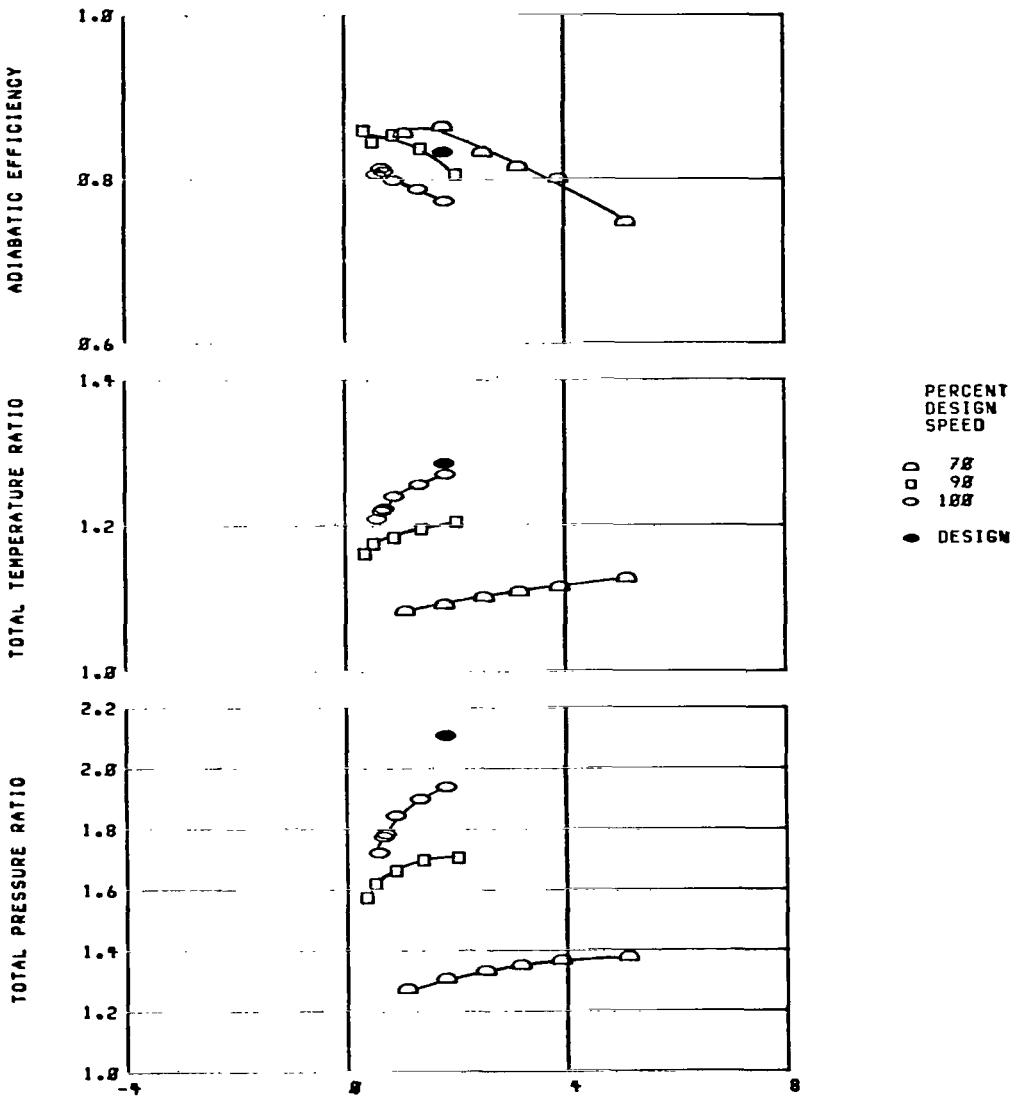
(c) Location, 15 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



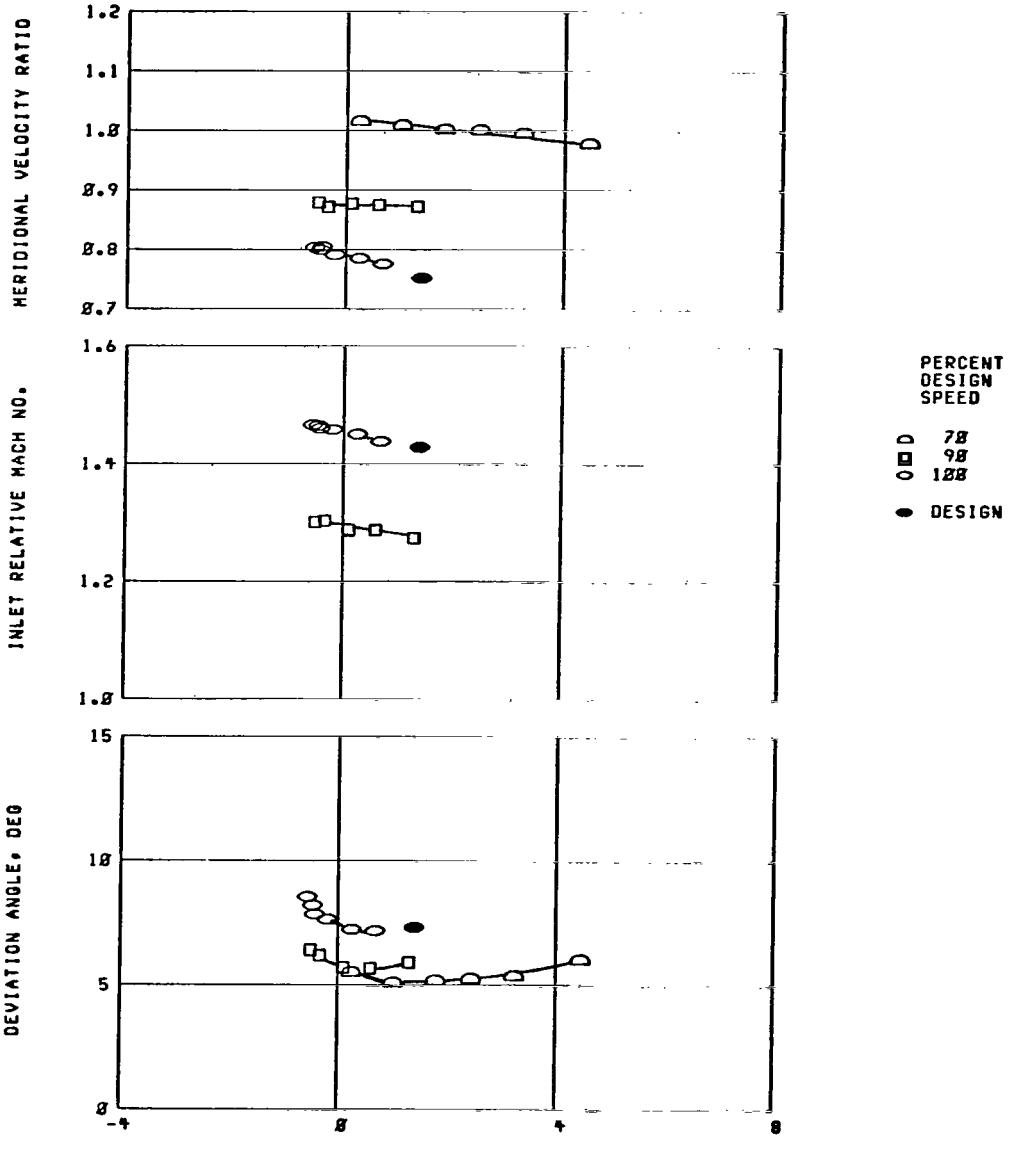
(c) Continued. Location, 15 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



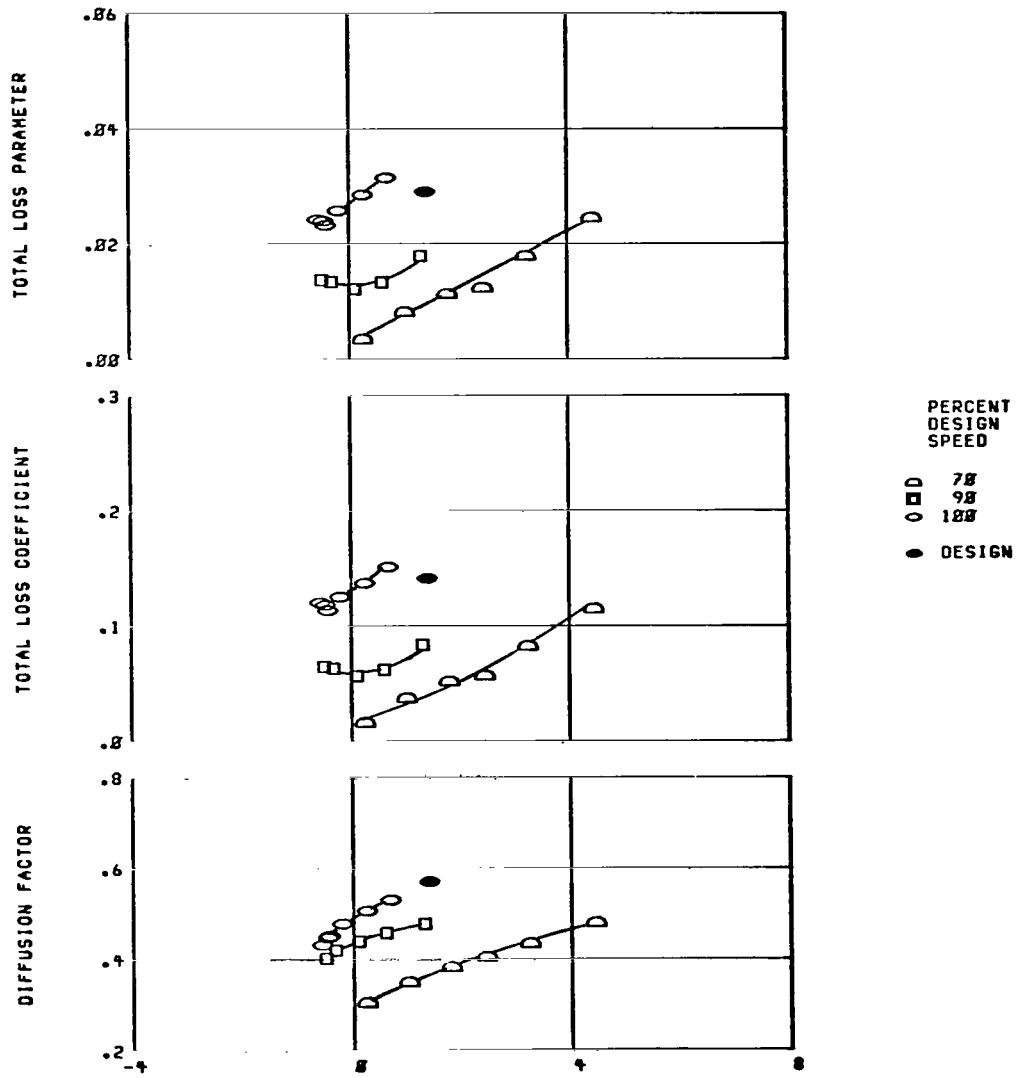
(c) Concluded. Location, 15 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



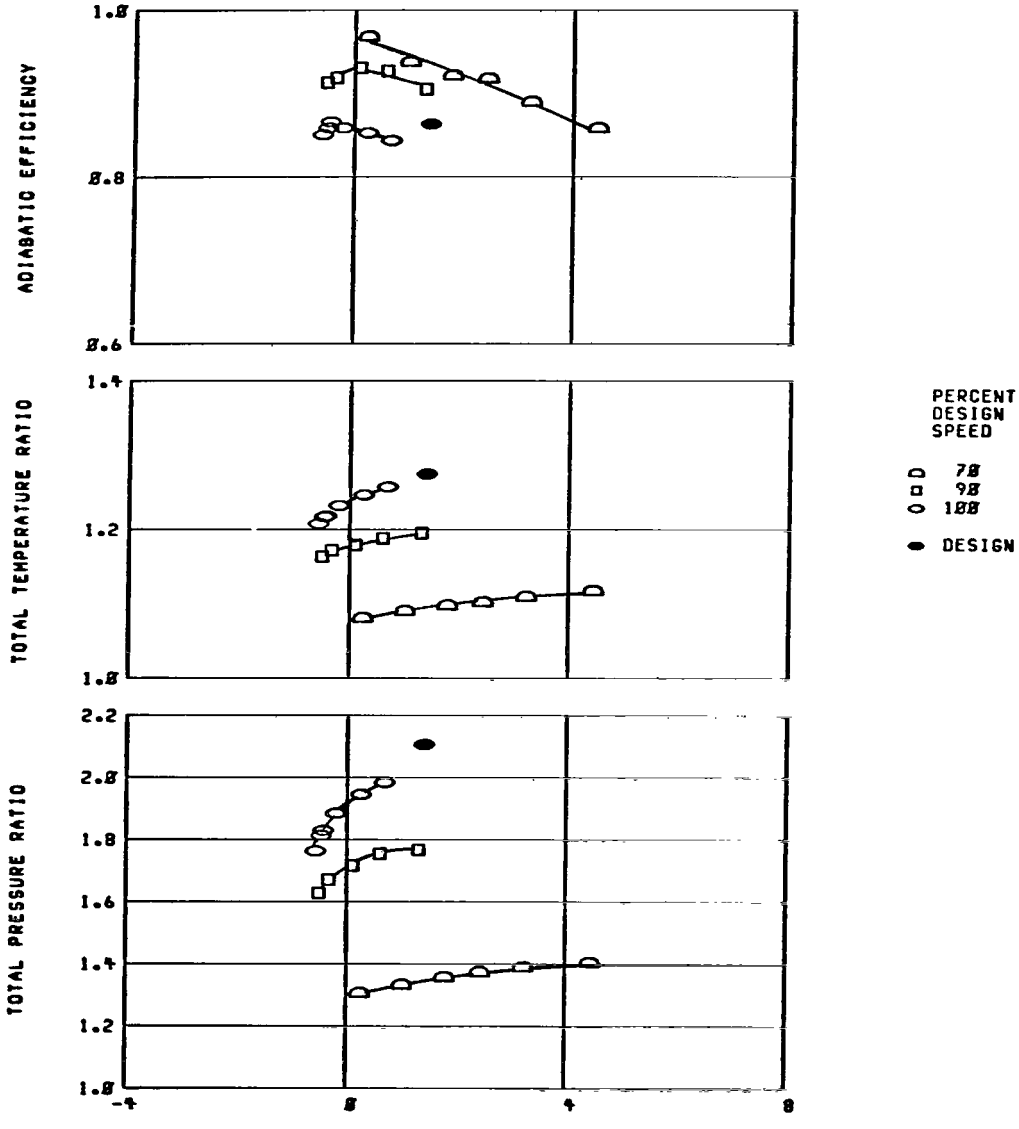
(d) Location, 30 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



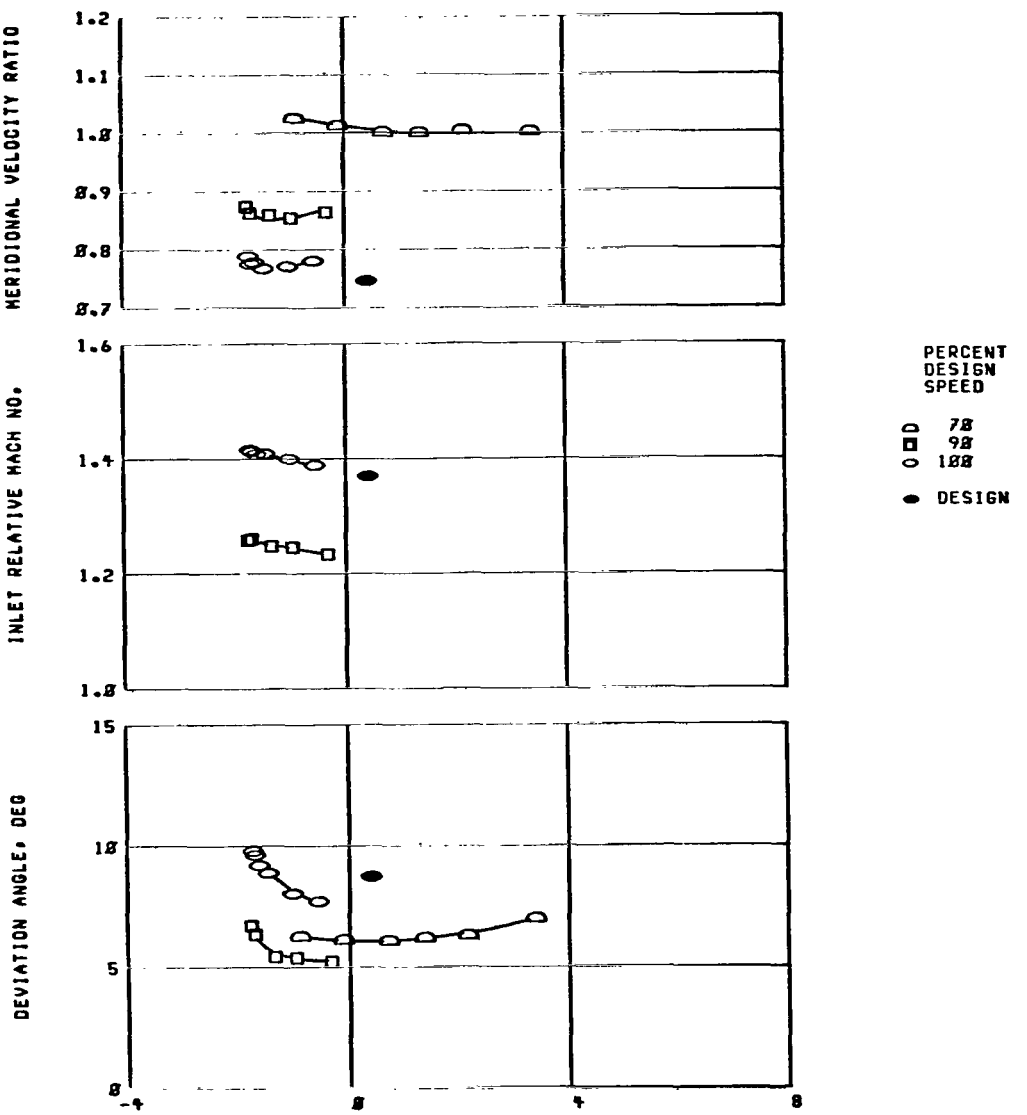
(d) Continued. Location, 30 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



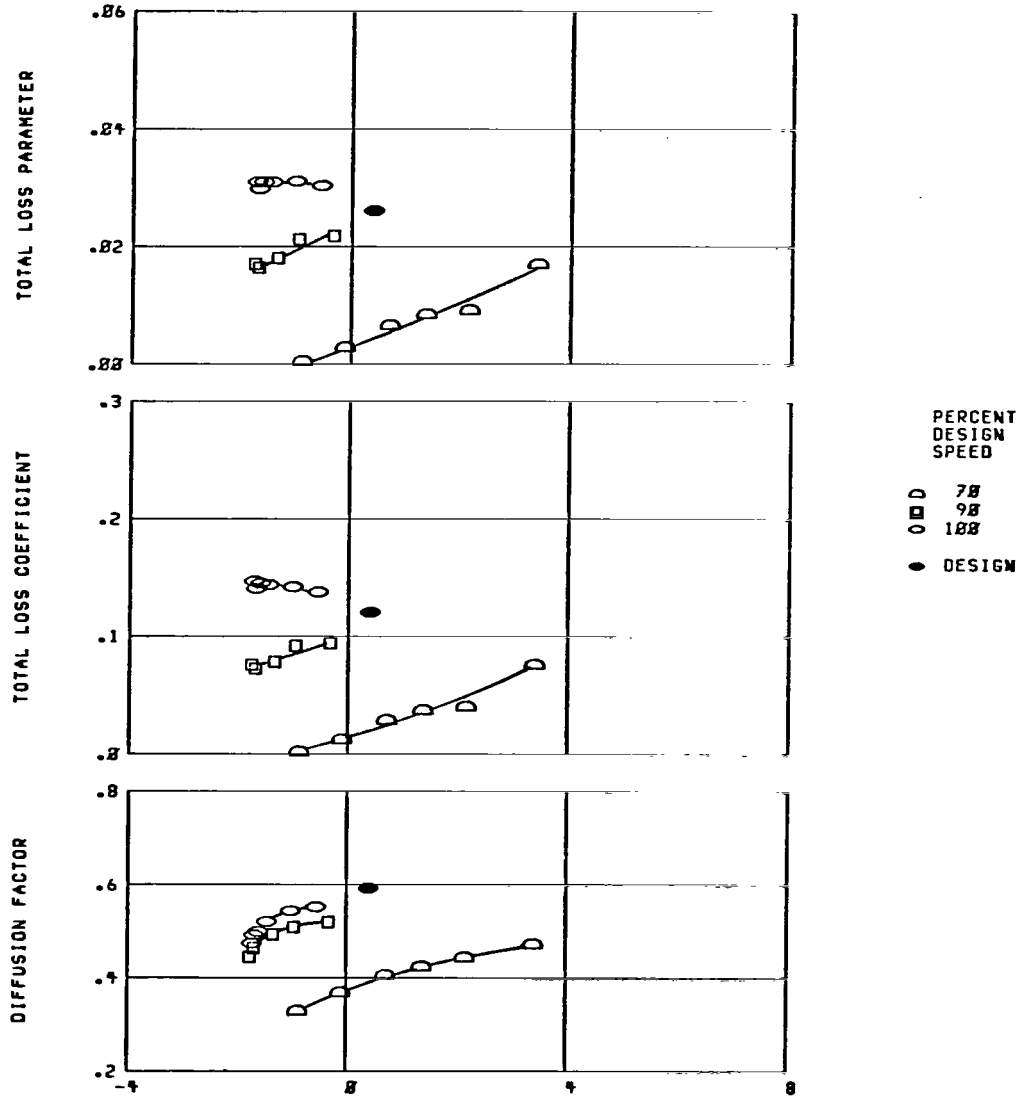
(d) Concluded. Location, 30 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



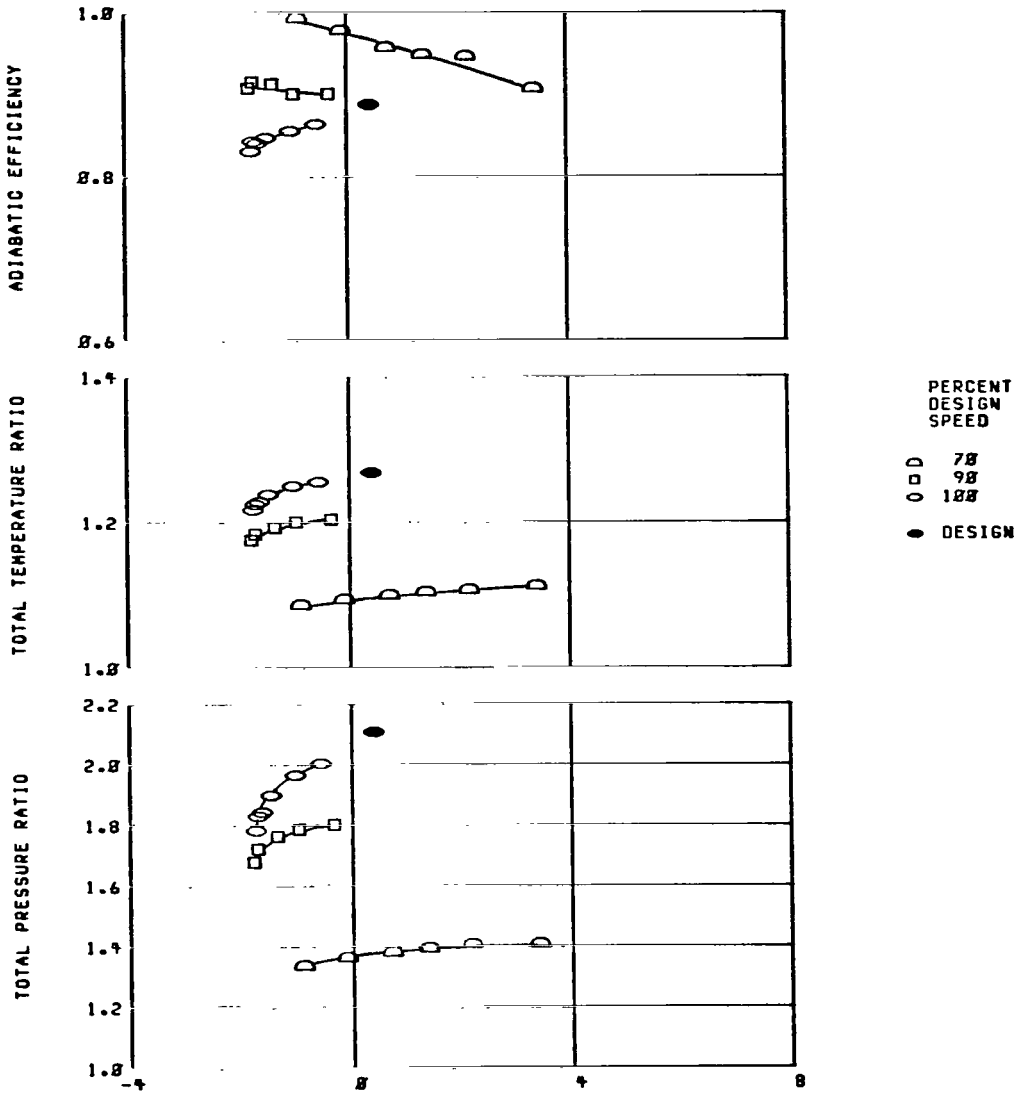
(e) Location, 50 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



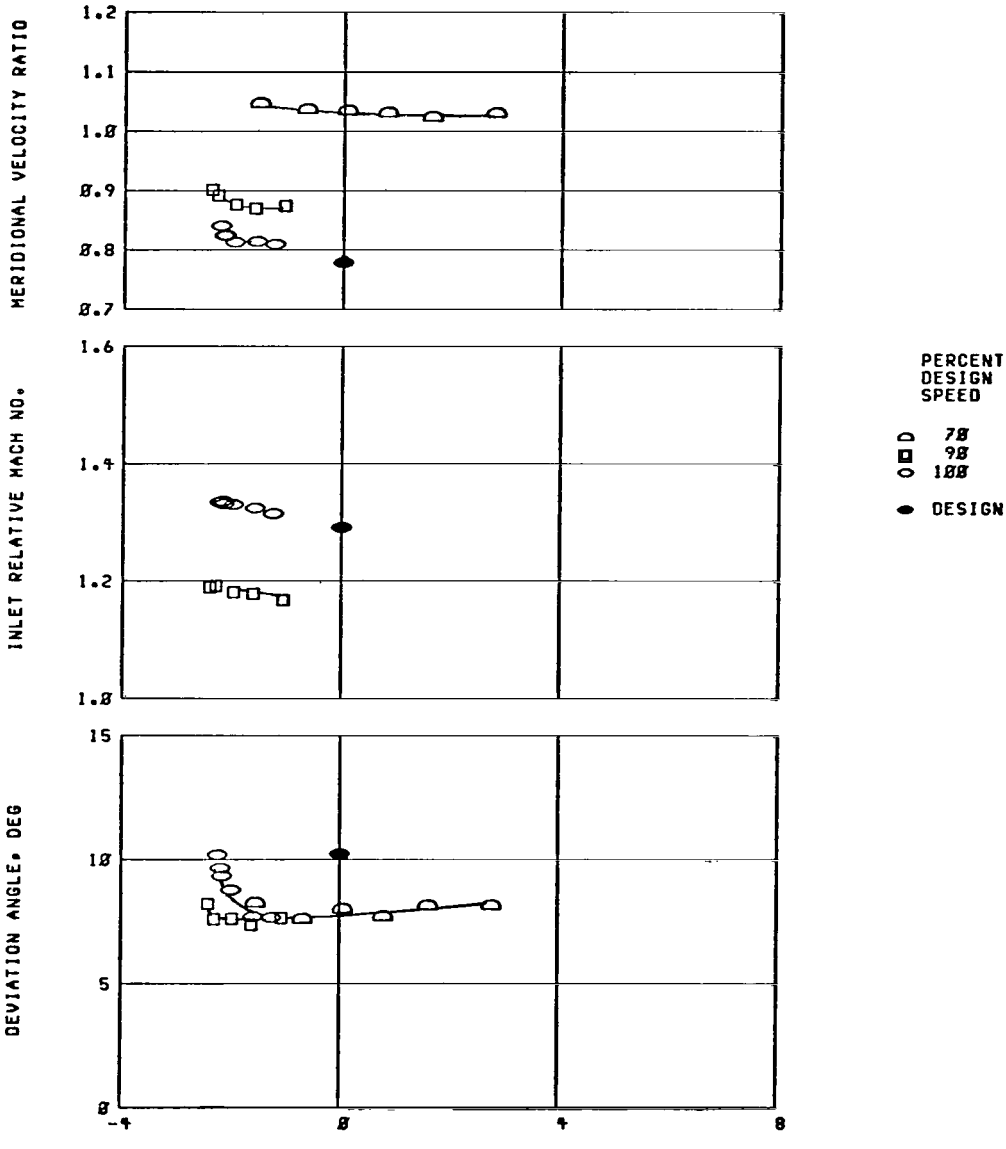
(e) Continued. Location, 50 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



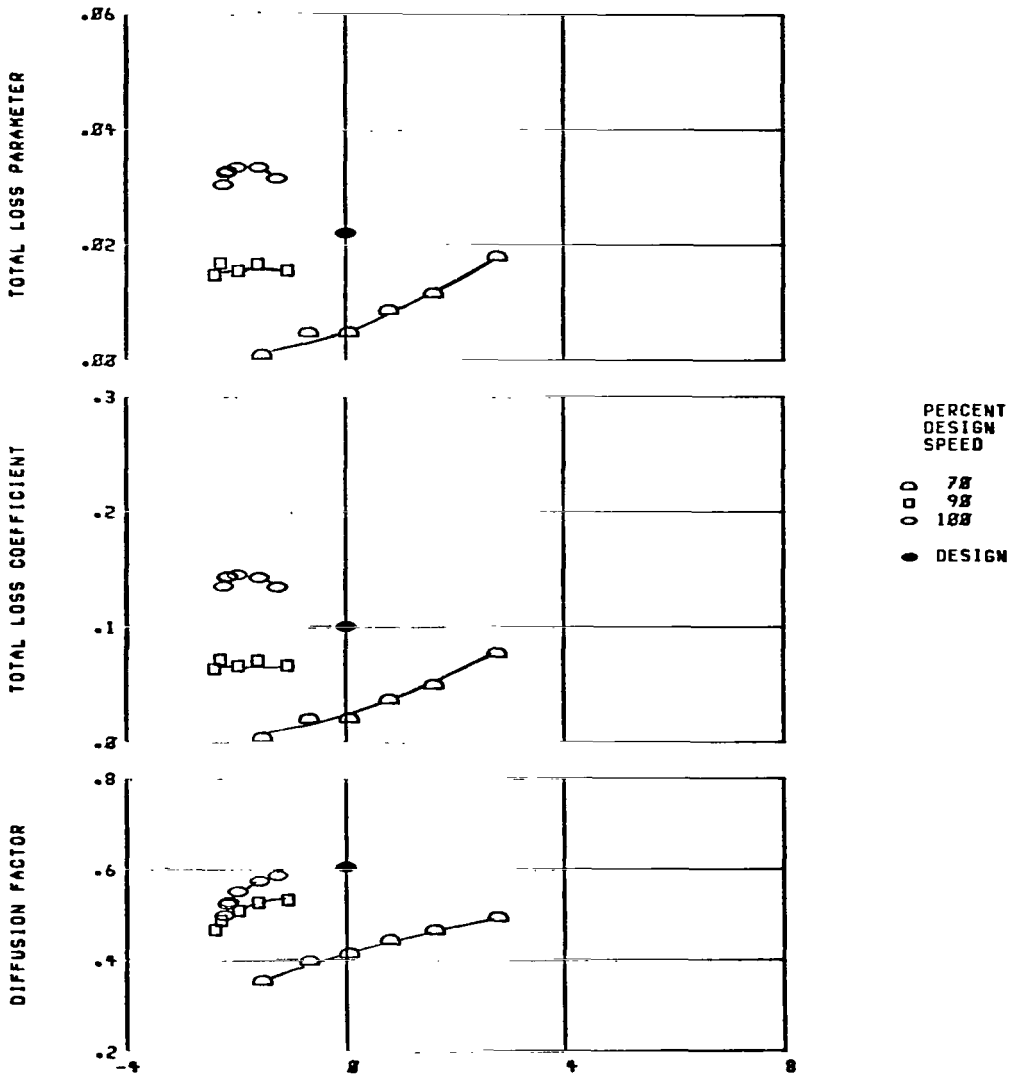
(e) Concluded. Location, 50 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



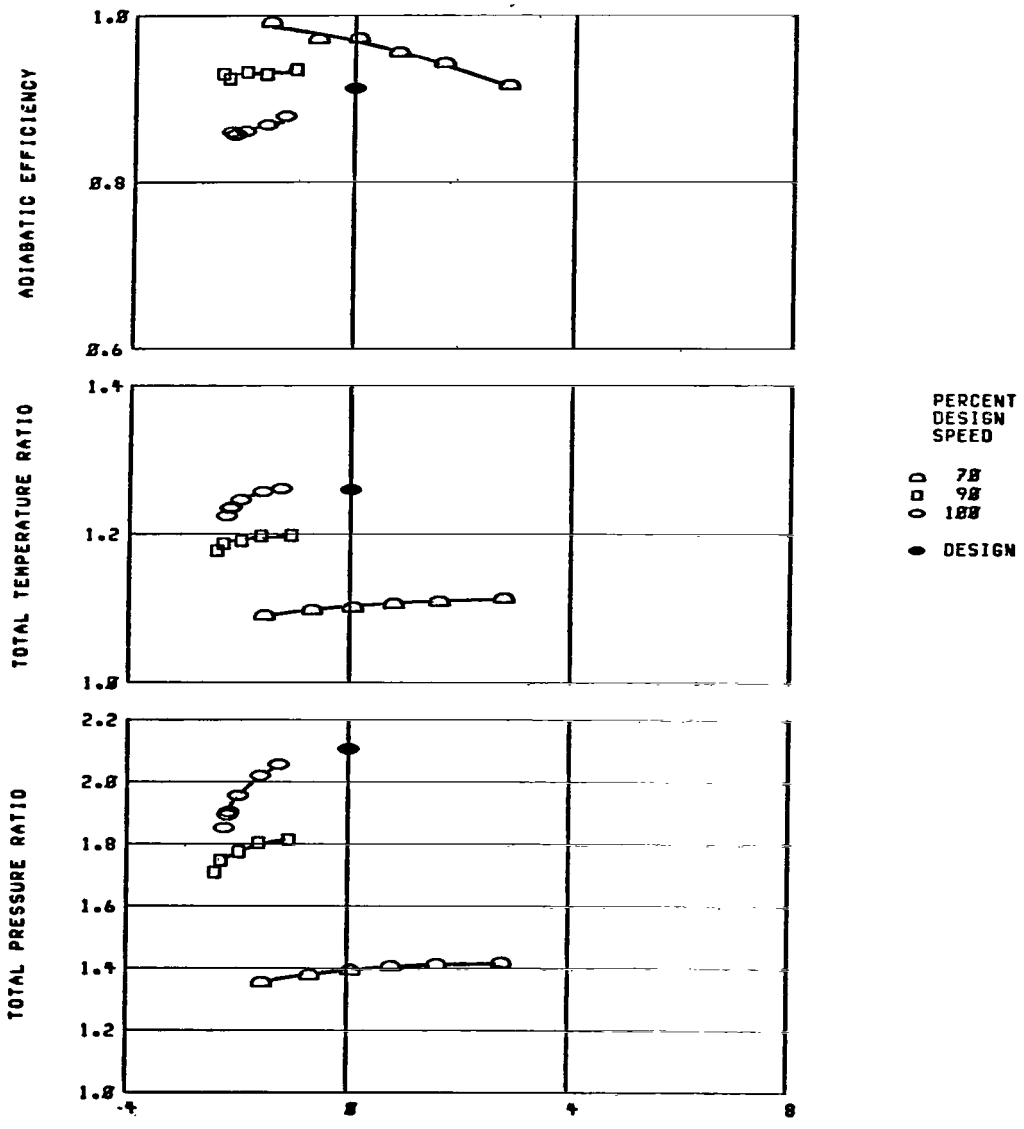
(f) Location, 70 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



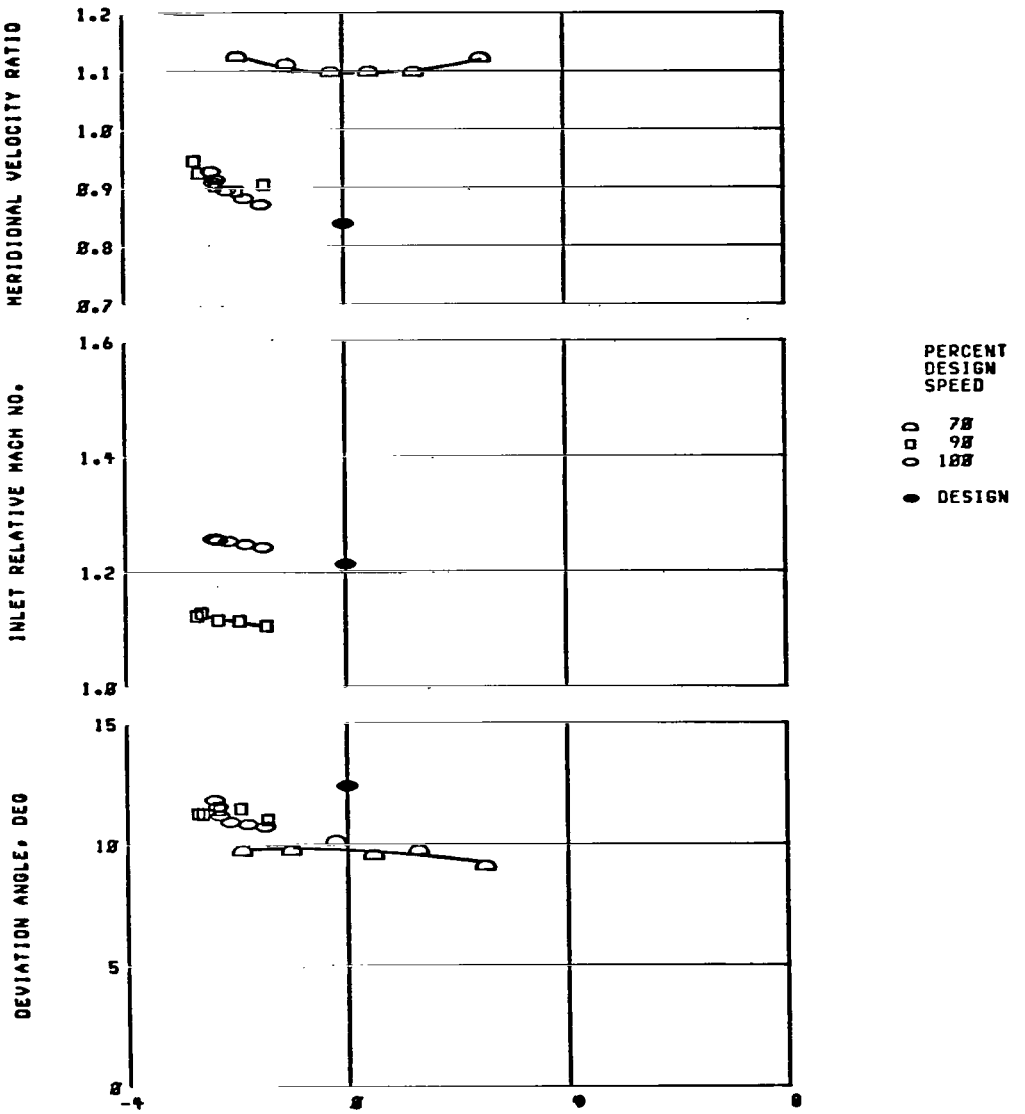
(f) Continued. Location, 70 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



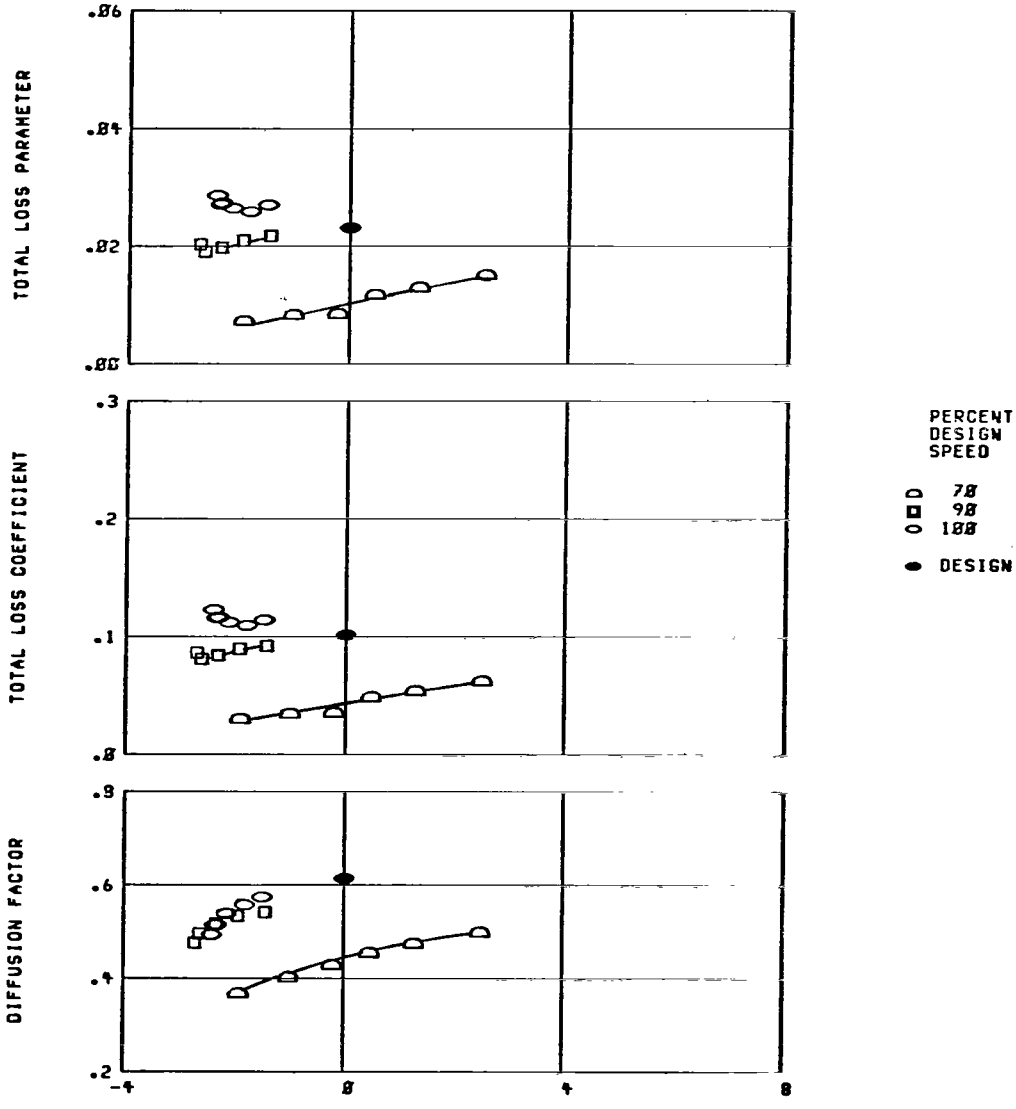
(f) Concluded. Location, 70 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



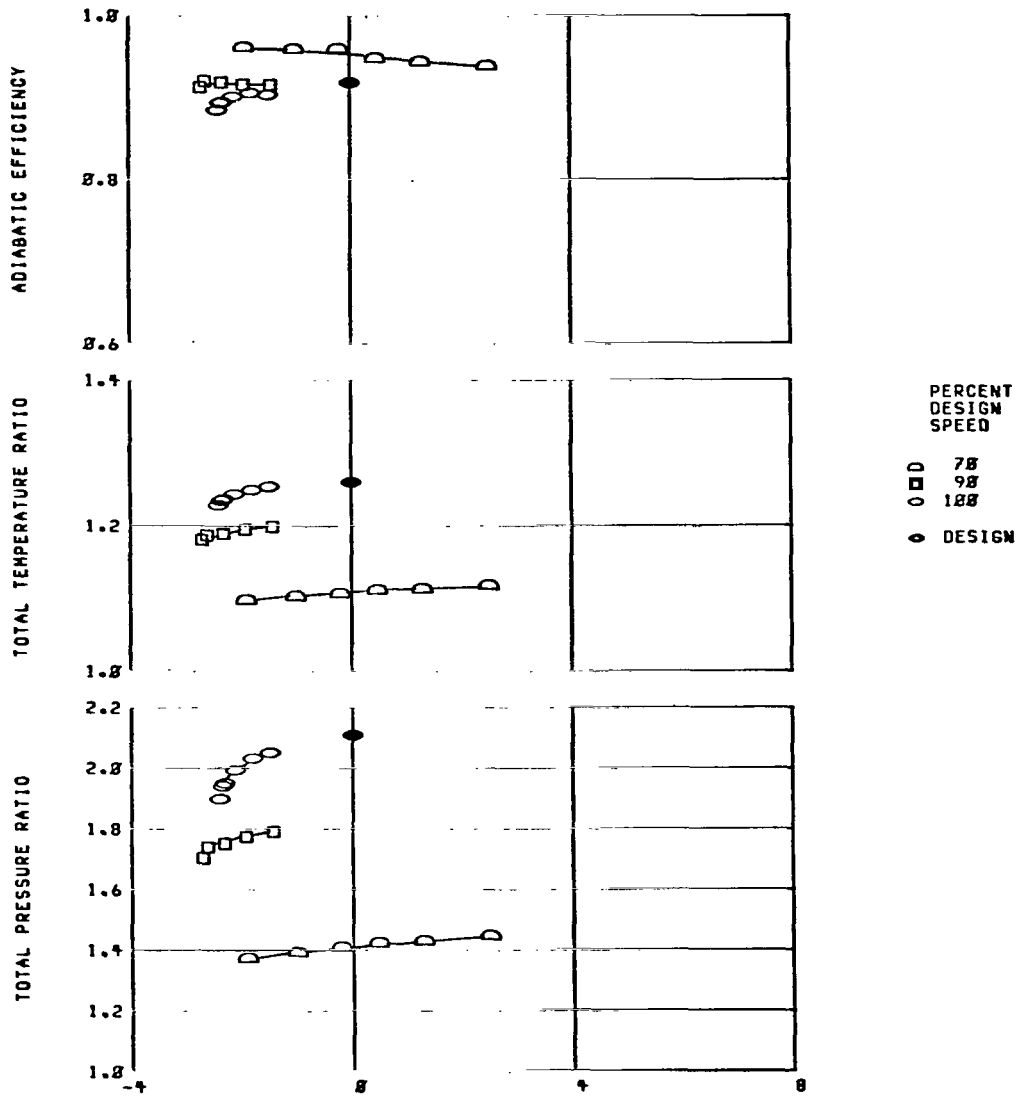
(g) Location, 85 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



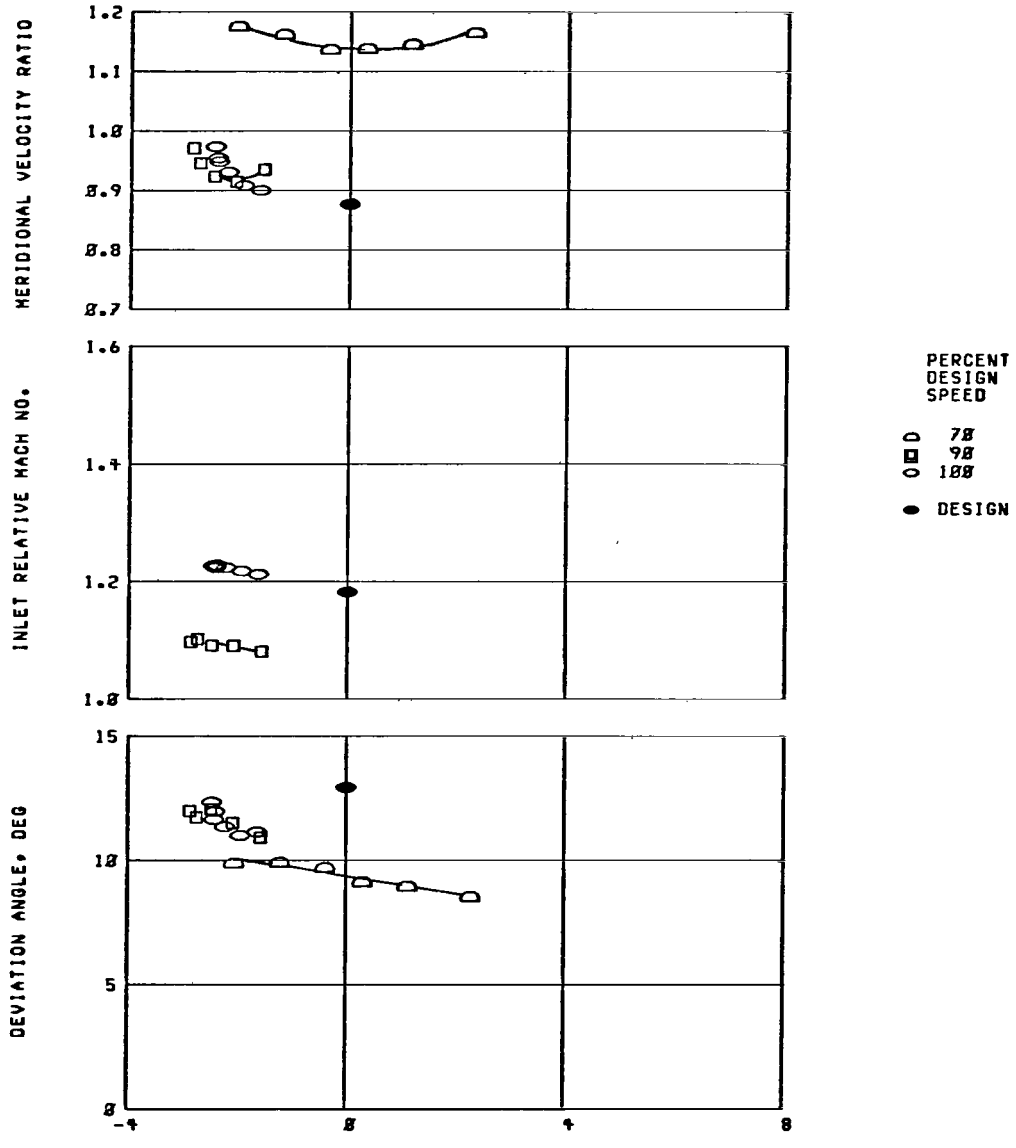
(g) Continued. Location, 85 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



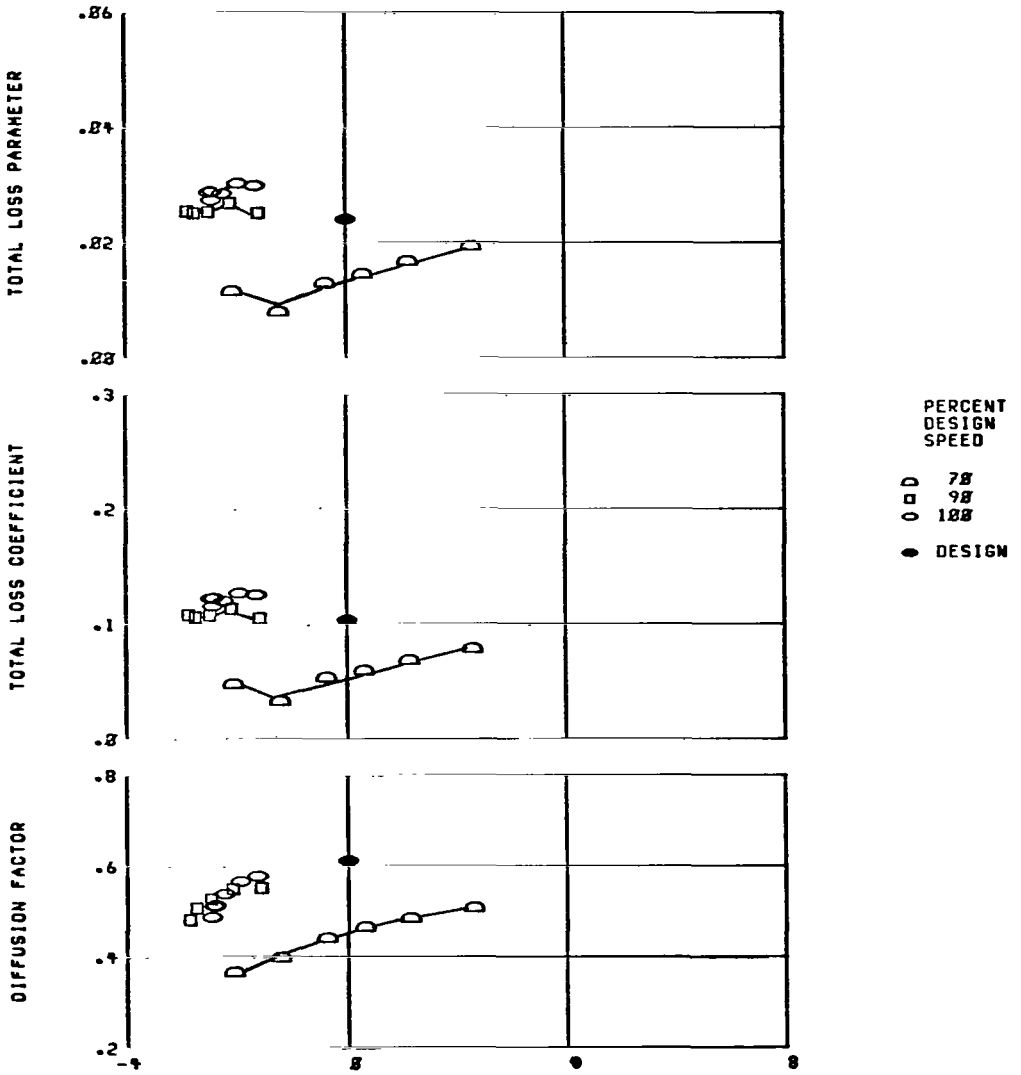
(g) Concluded. Location, 85 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



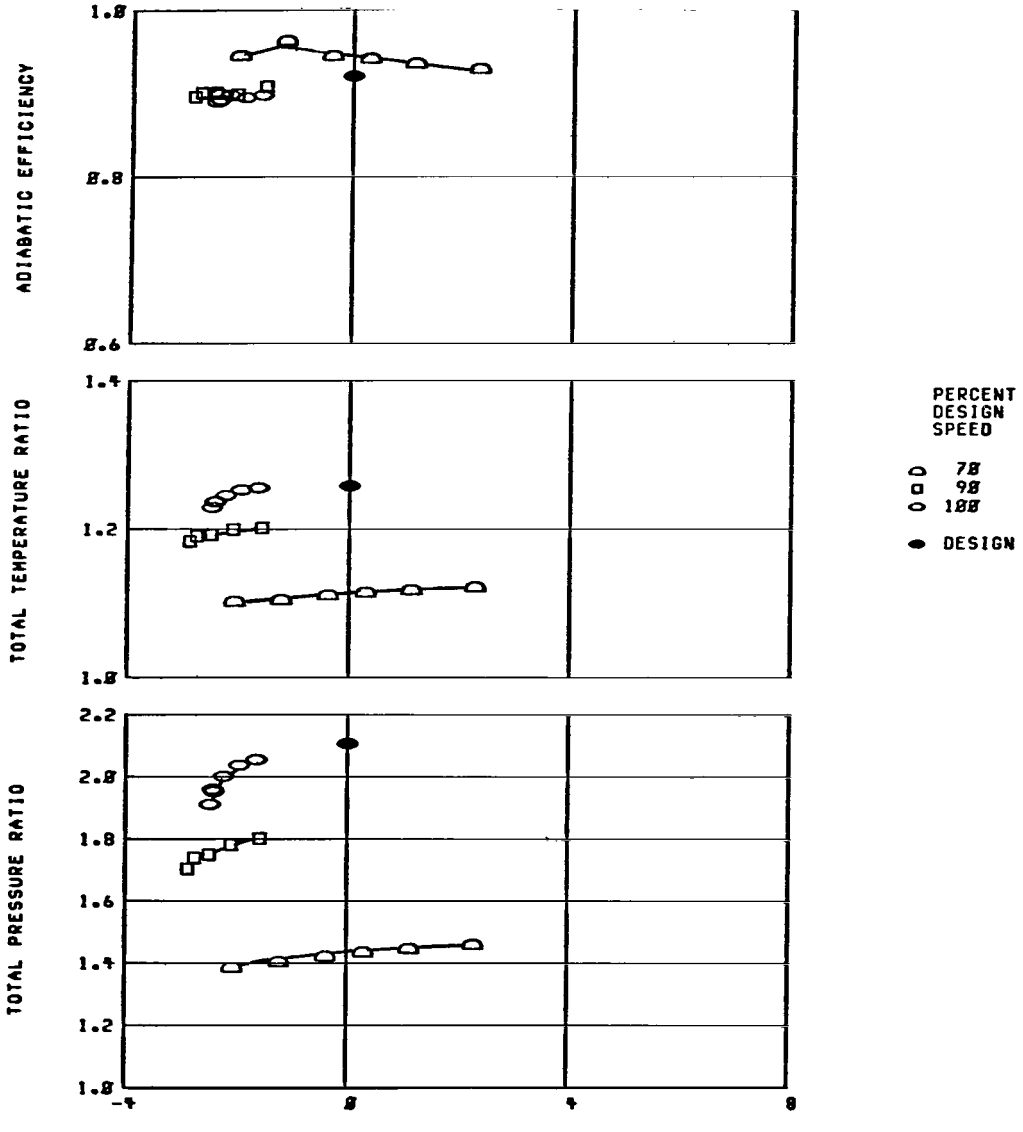
(h) Location, 90 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



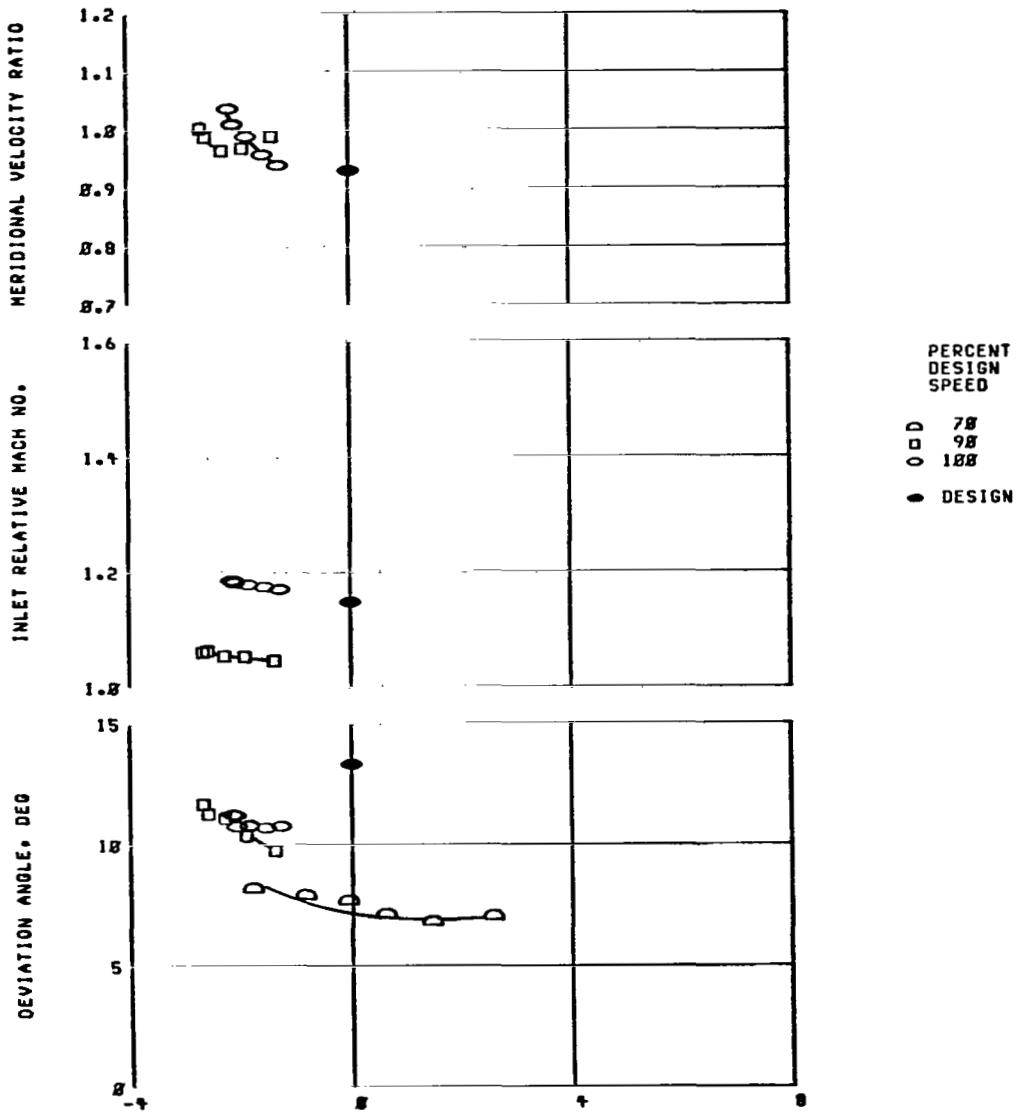
(h) Continued. Location, 90 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



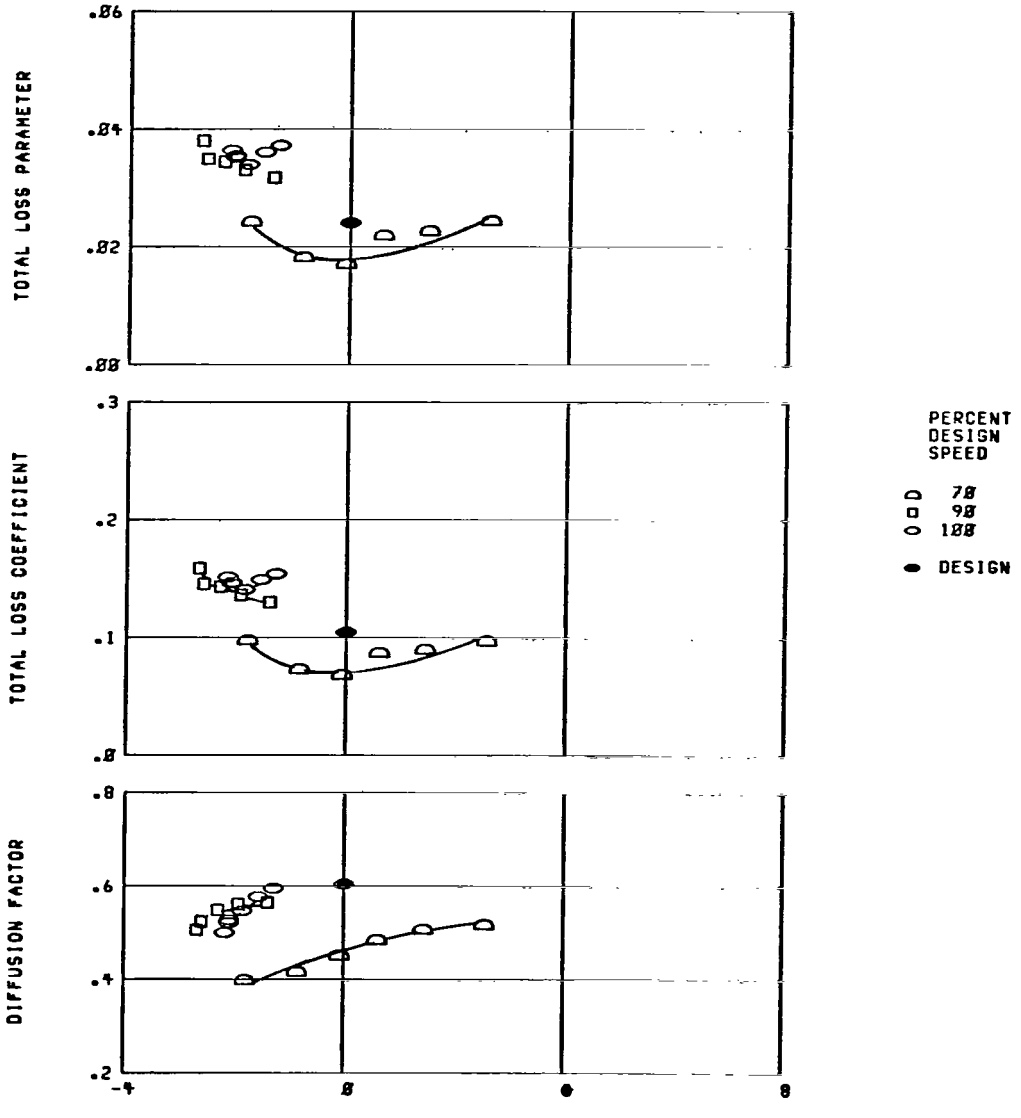
(h) Concluded. Location, 90 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



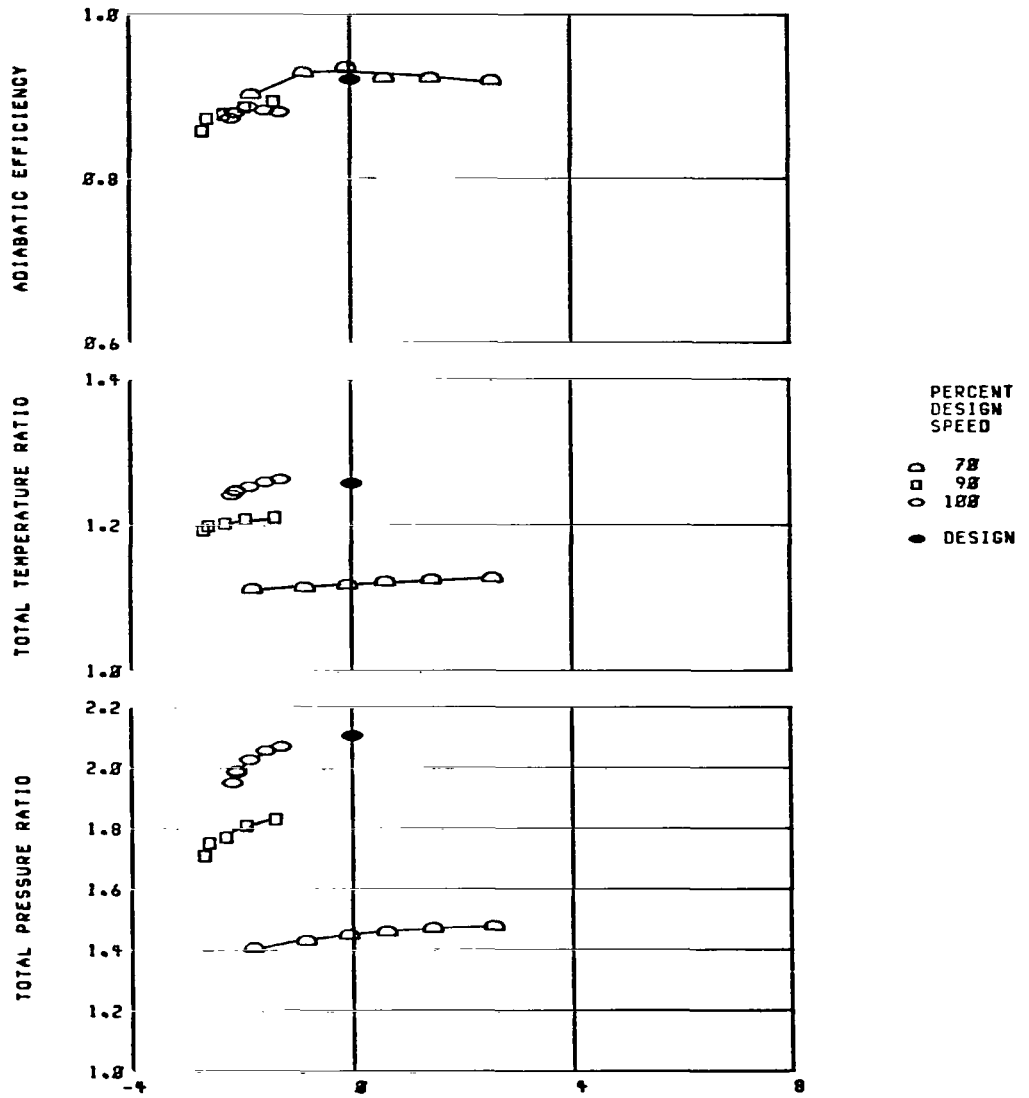
(i) Location, 95 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



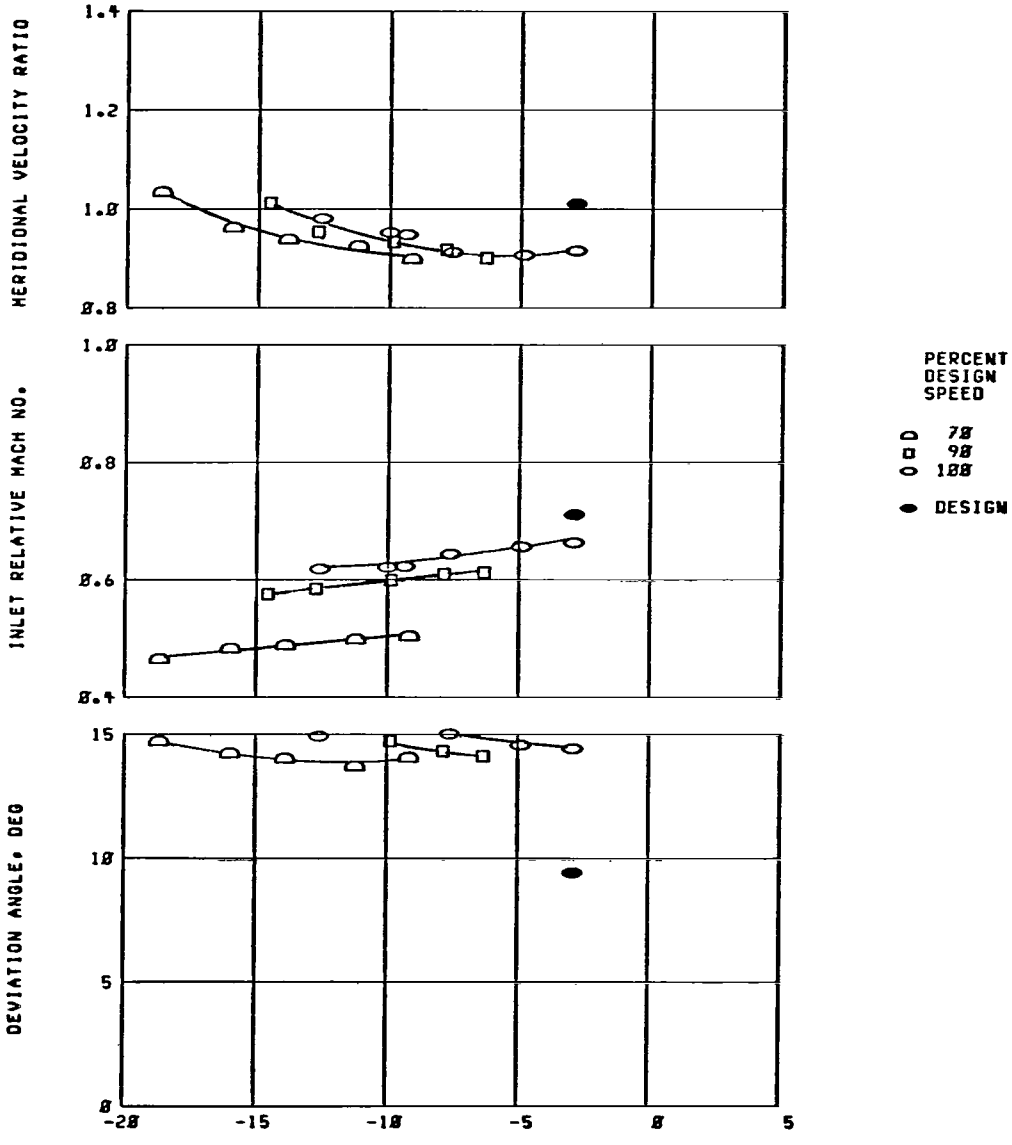
(i) Continued. Location, 95 percent of span.

Figure 10. - Continued. Blade-element performance for rotor 38.



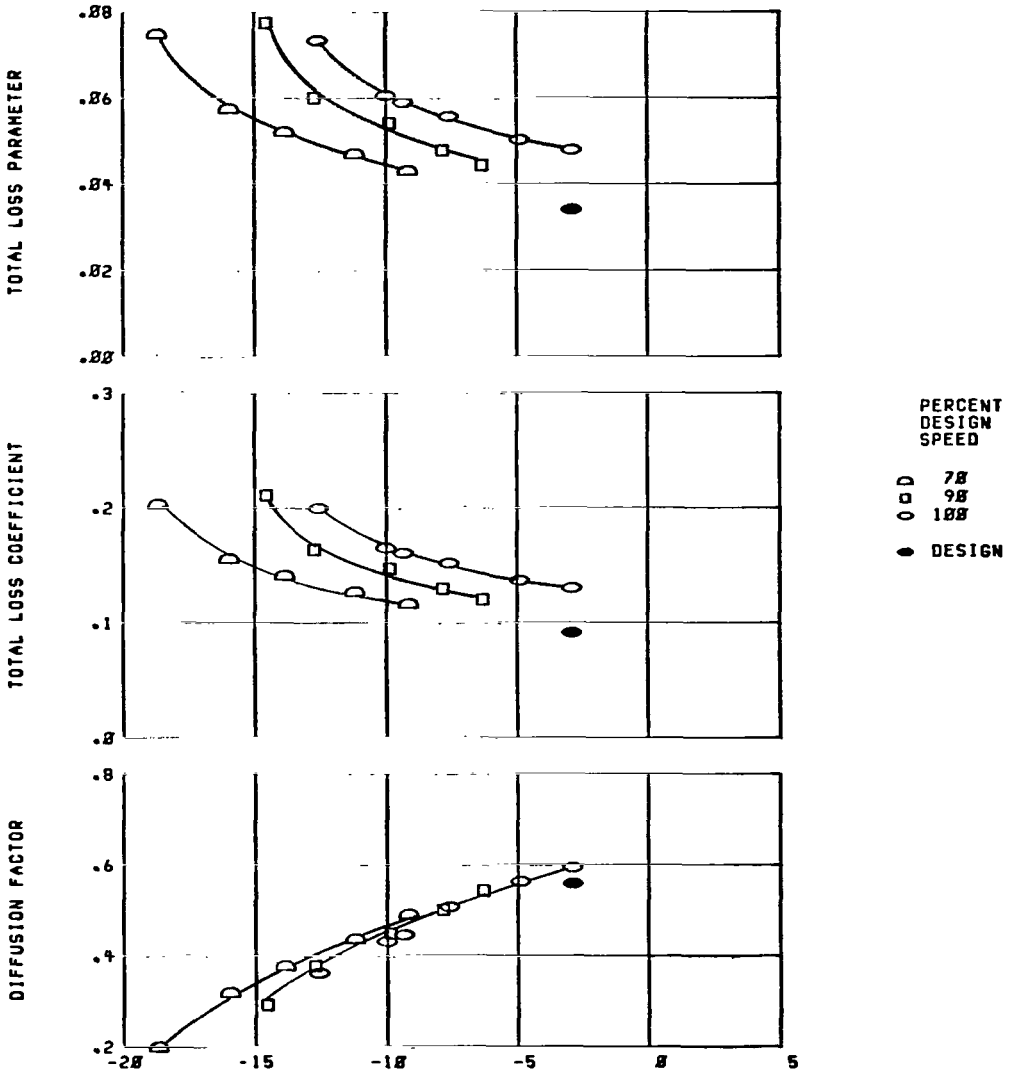
(i) Concluded. Location, 95 percent of span.

Figure 10. - Concluded. Blade-element performance for rotor 38.



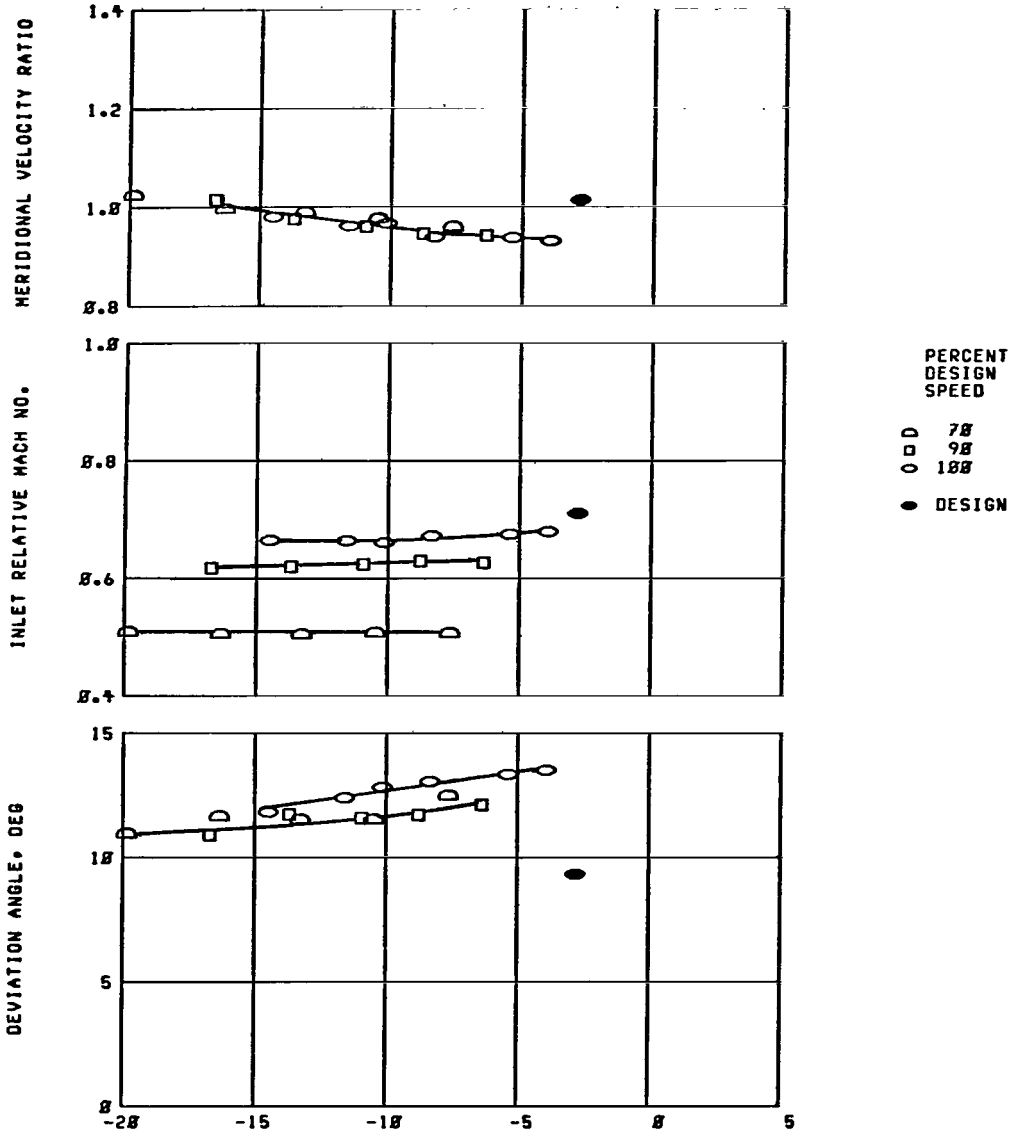
(a) Location, 5 percent of span.

Figure 11. - Blade-element performance for stator 38.



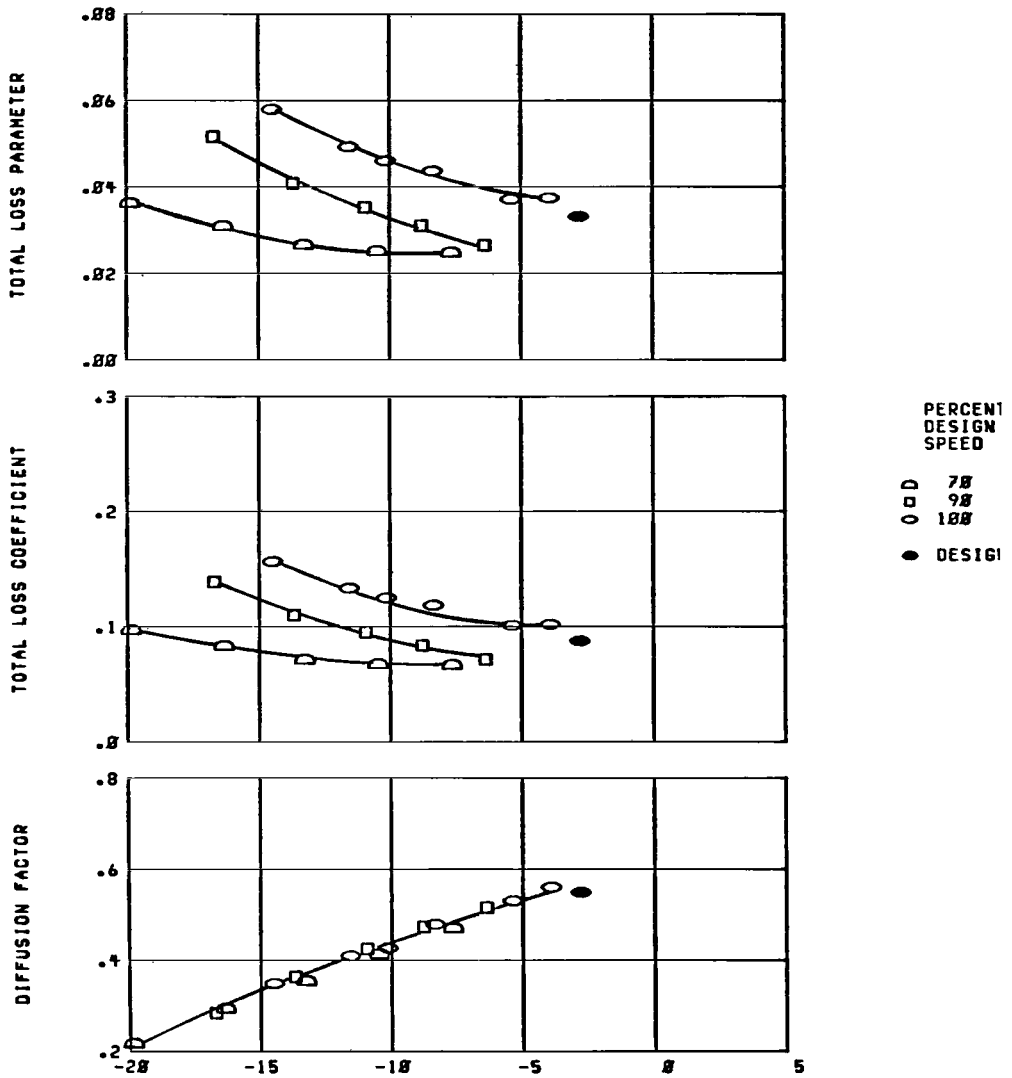
(a) Concluded. Location, 5 percent of span.

Figure 11. - Continued. Blade-element performance for stator 38.



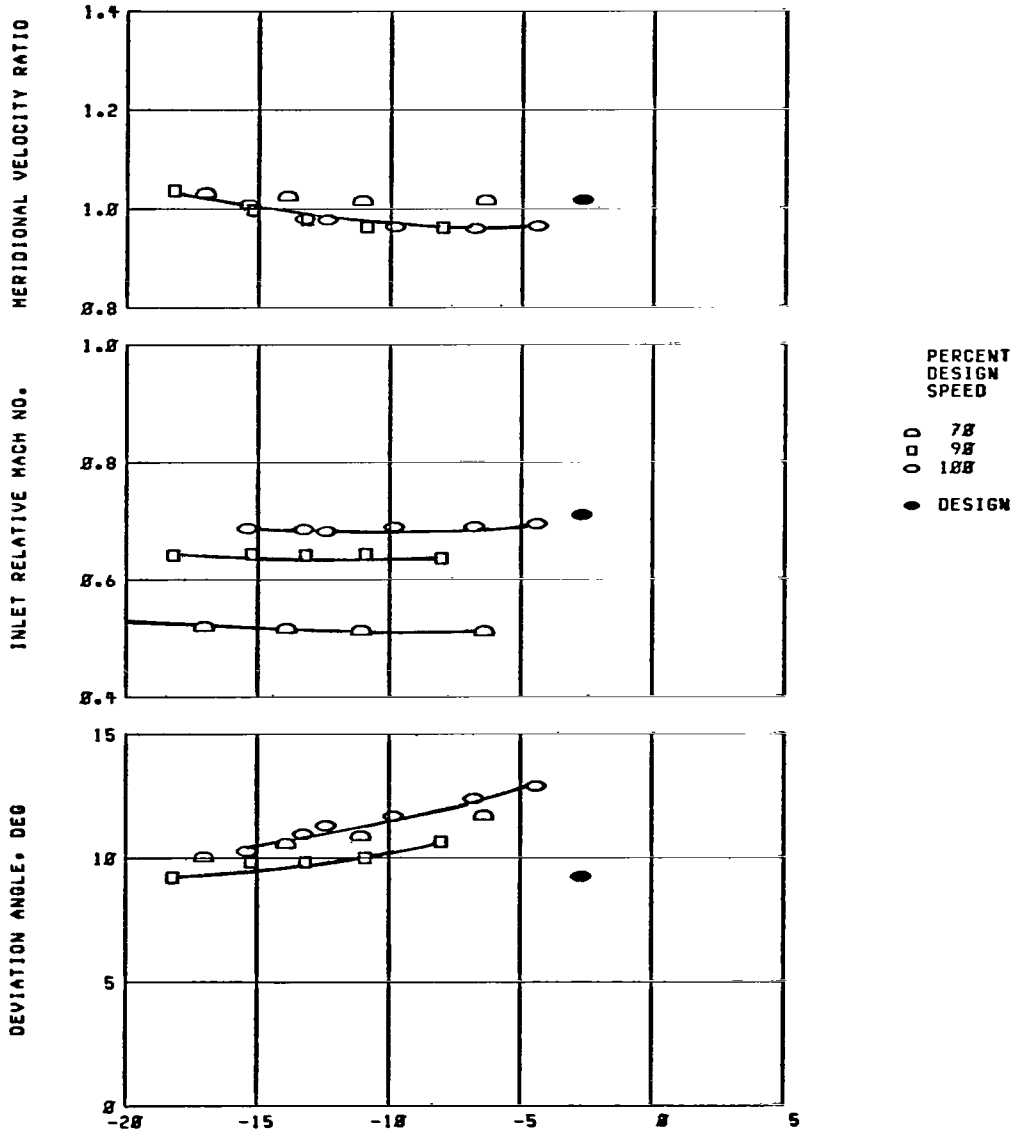
(b) Location, 10 percent of span.

Figure 11. - Continued. Blade-element performance for stator 38.



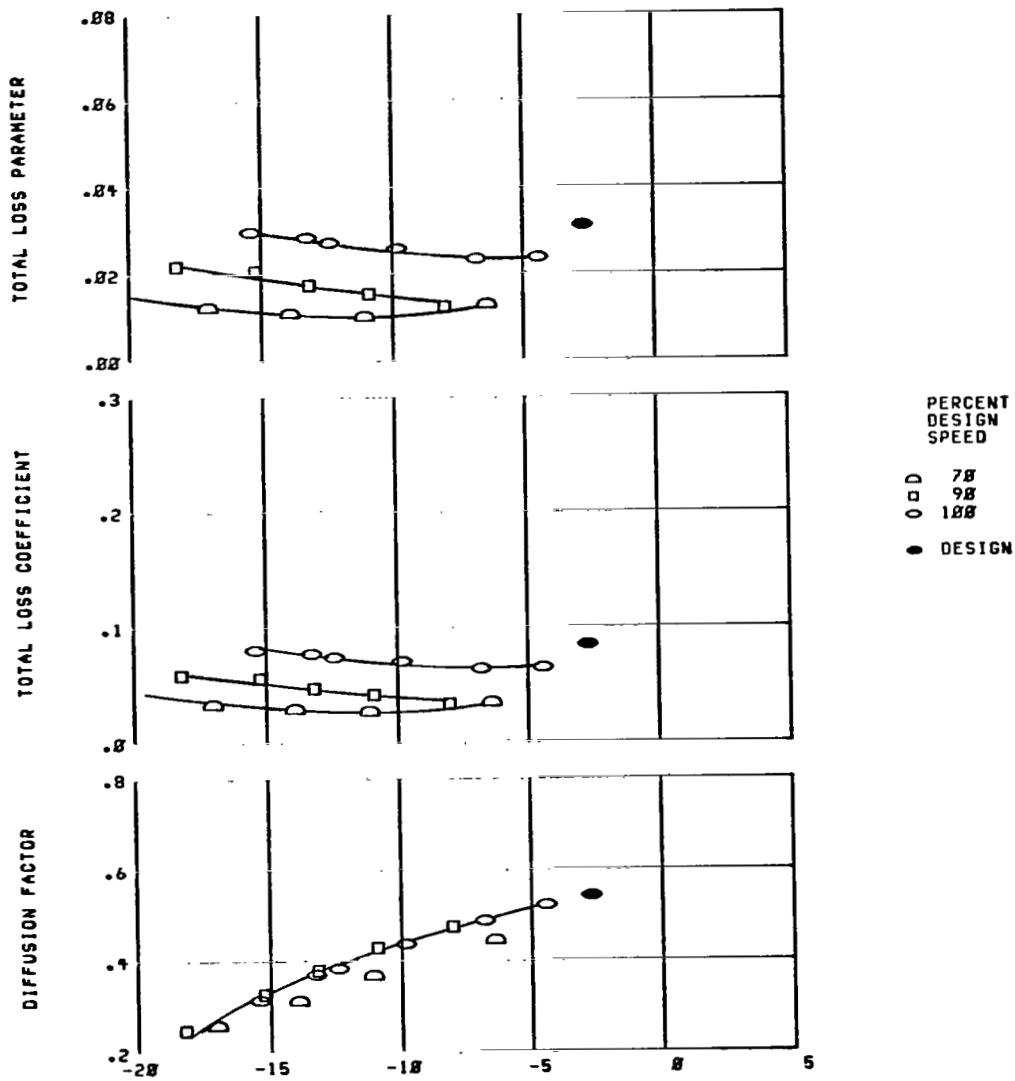
(b) Concluded. Location, 10 percent of span.

Figure 11. - Continued. Blade-element performance for stator 38.



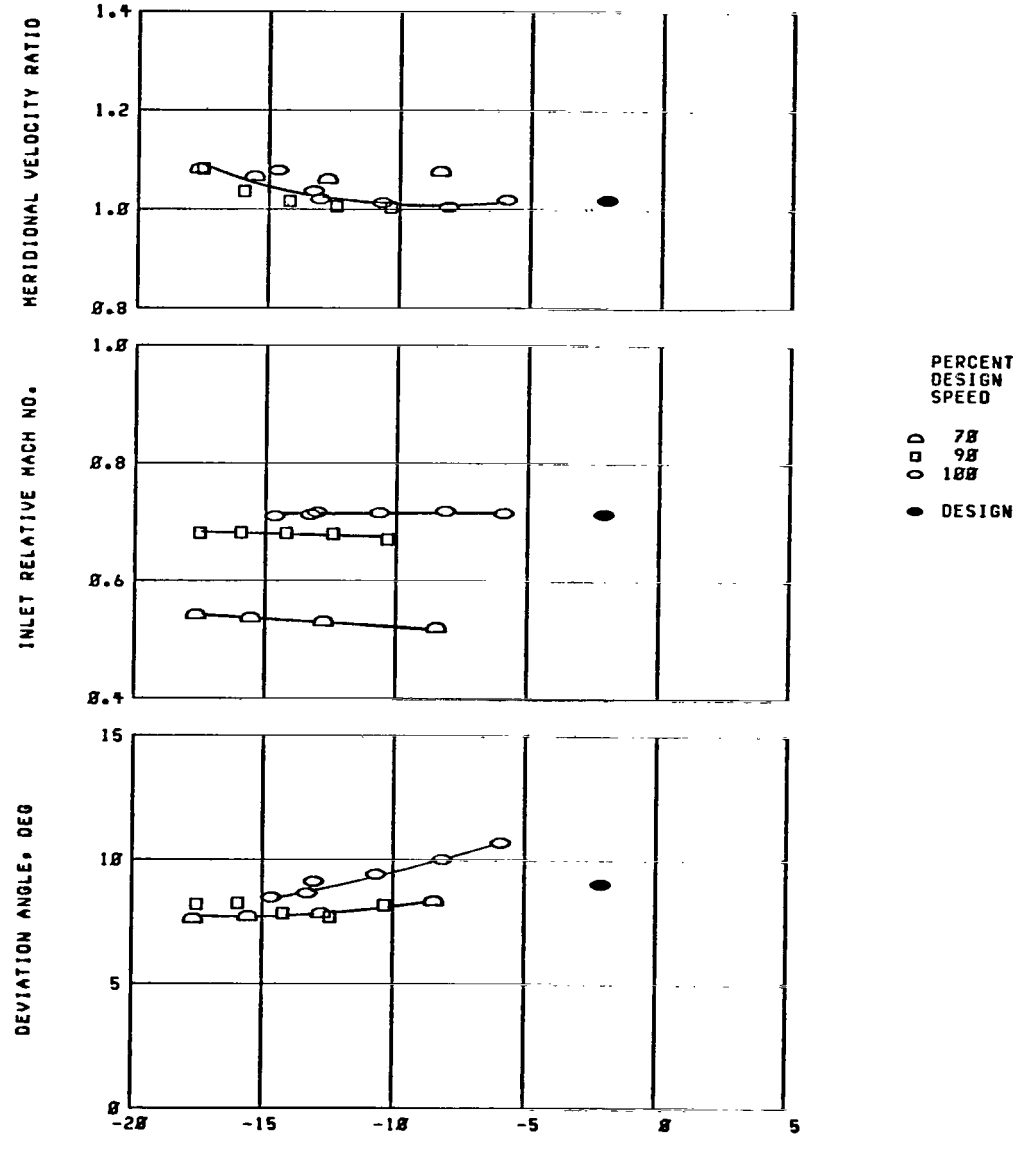
(c) Location, 15 percent of span.

Figure 11. - Continued. Blade-element performance for stator 38.



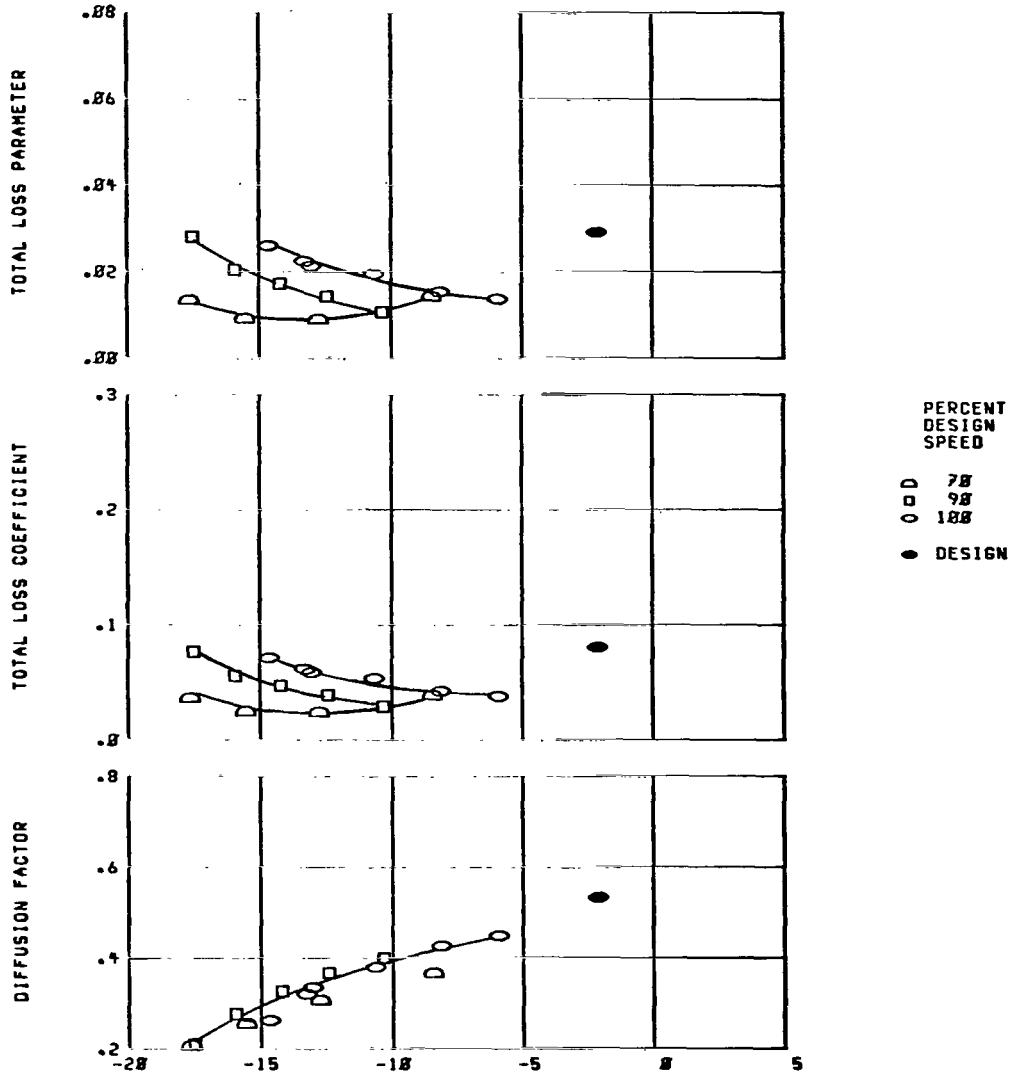
(c) Concluded. Location, 15 percent of span.

Figure 11. - Continued. Blade-element performance for stator 38.



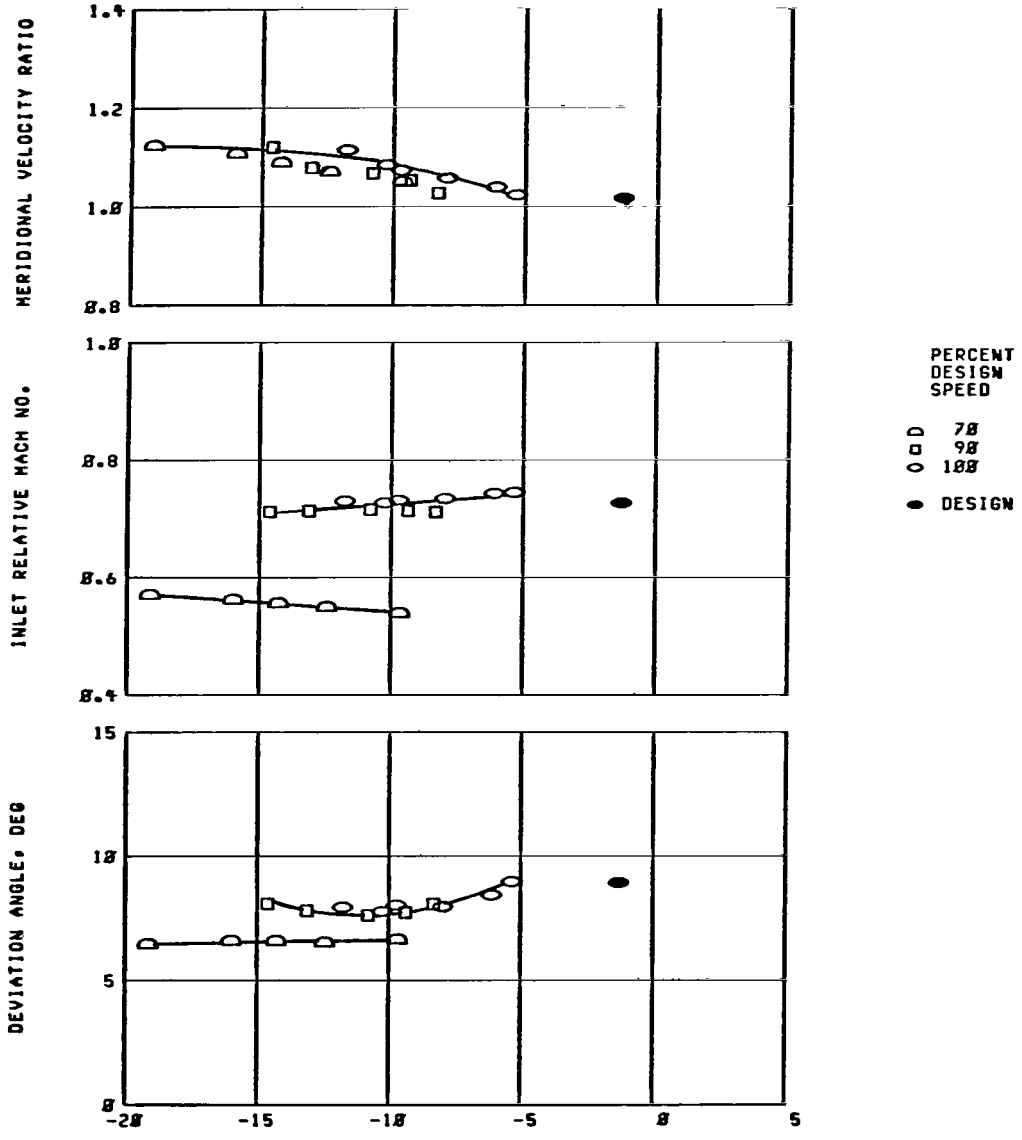
(d) Location, 30 percent of span.

Figure 11. - Continued. Blade-element performance for stator 38.



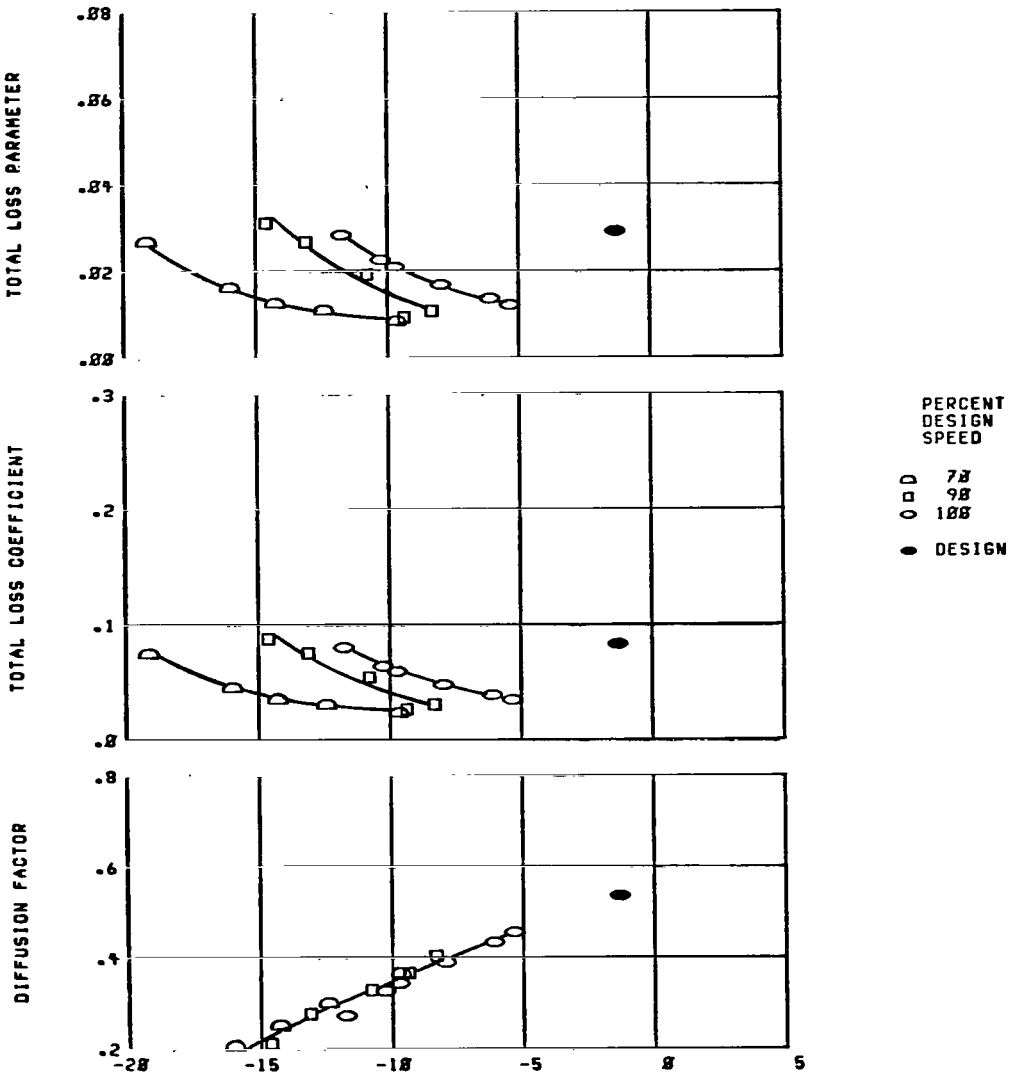
(d) Concluded. Location, 30 percent of span.

Figure 11. - Continued. Blade-element performance for stator 38.



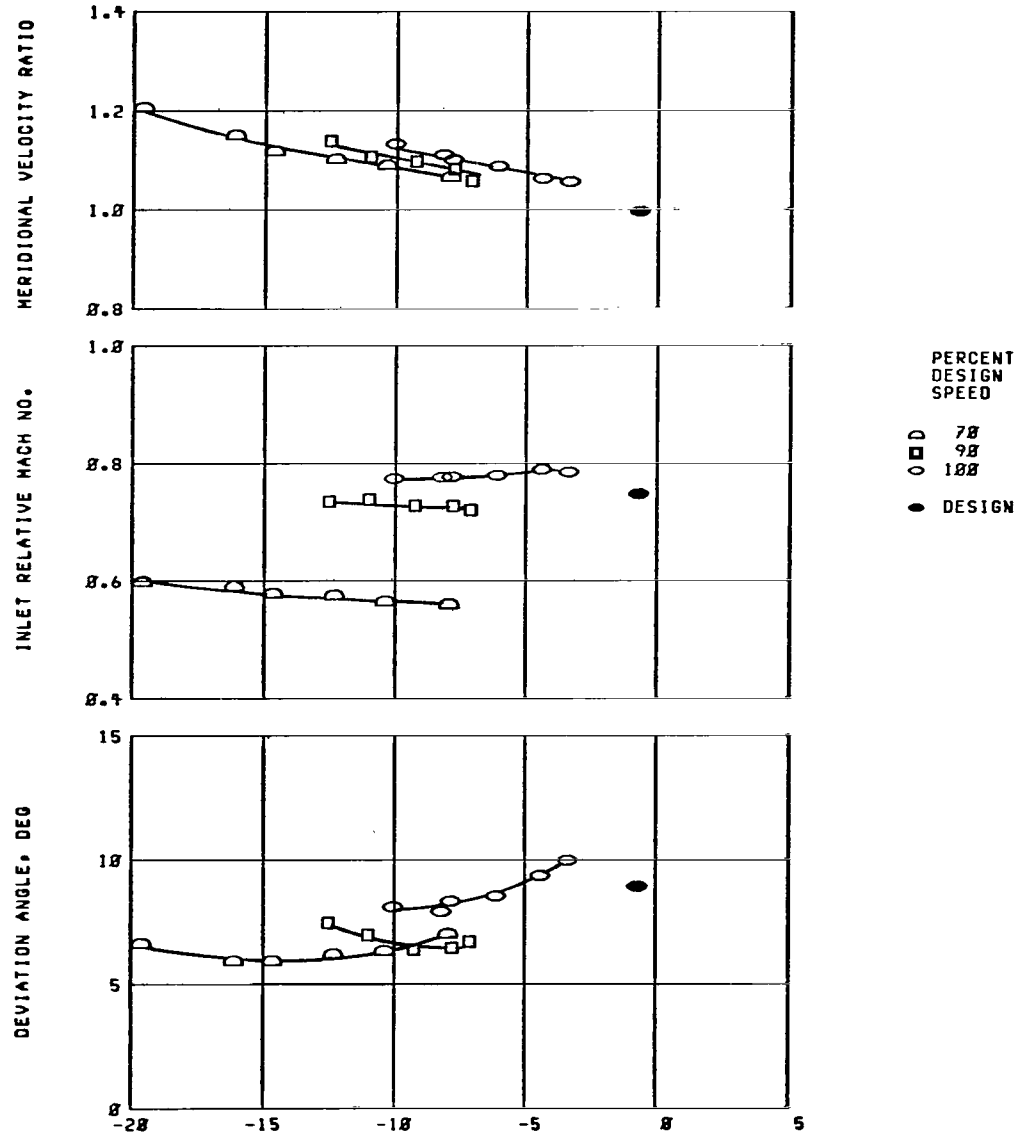
(e) Location, 50 percent of span.

Figure 11. - Continued. Blade-element performance for stator 38.



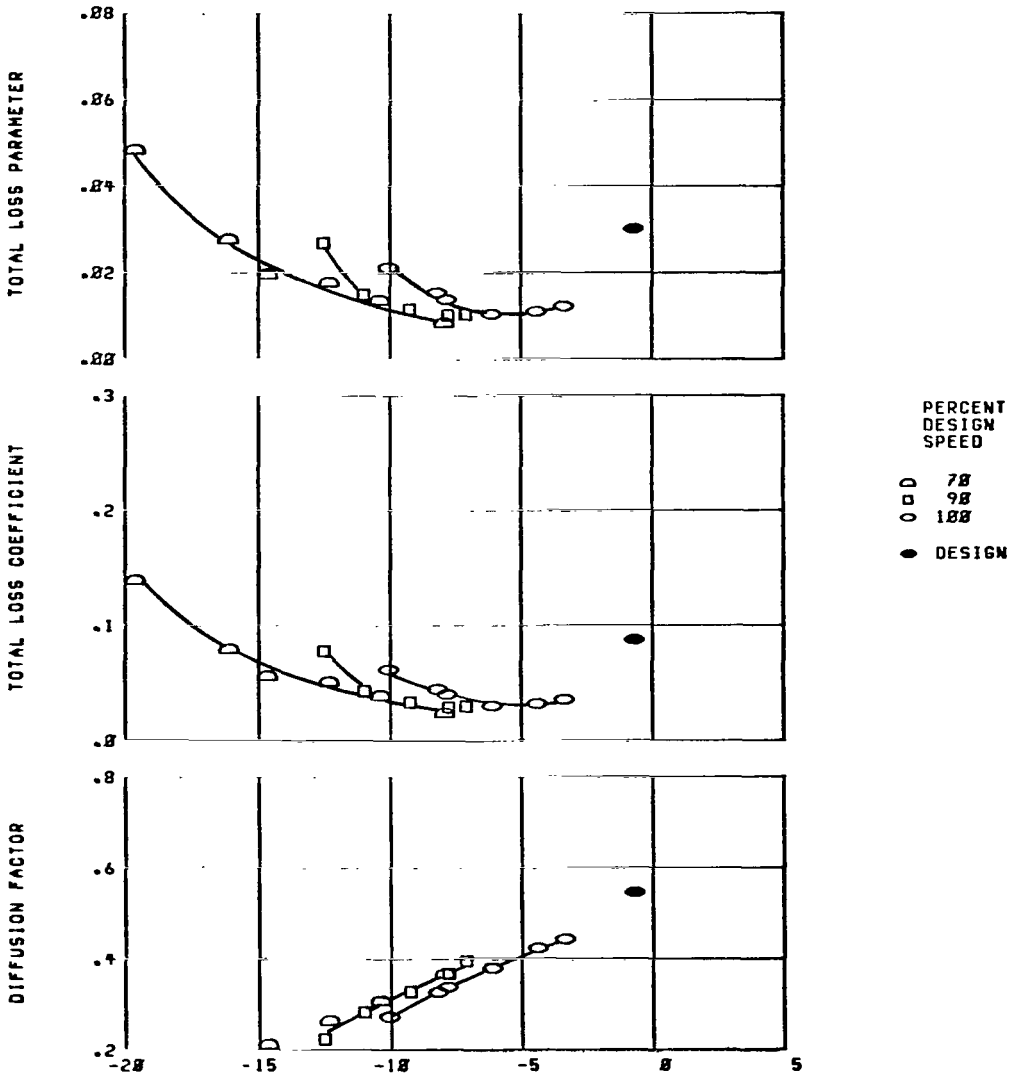
(e) Concluded. Location, 50 percent of span.

Figure 11. - Continued. Blade-element performance for stator 38.



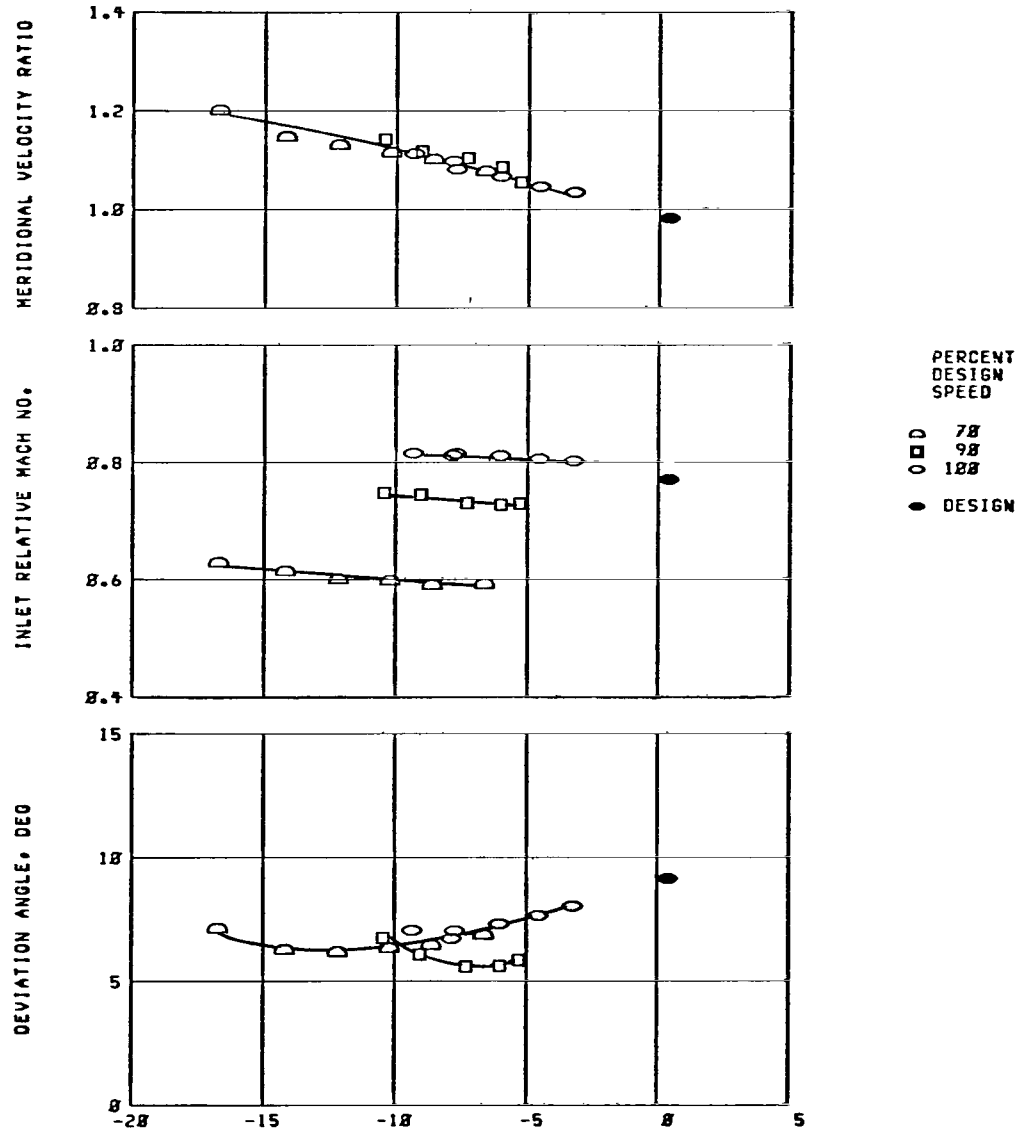
(f) Location, 70 percent of span.

Figure 11. - Continued. Blade-element performance for stator 38.



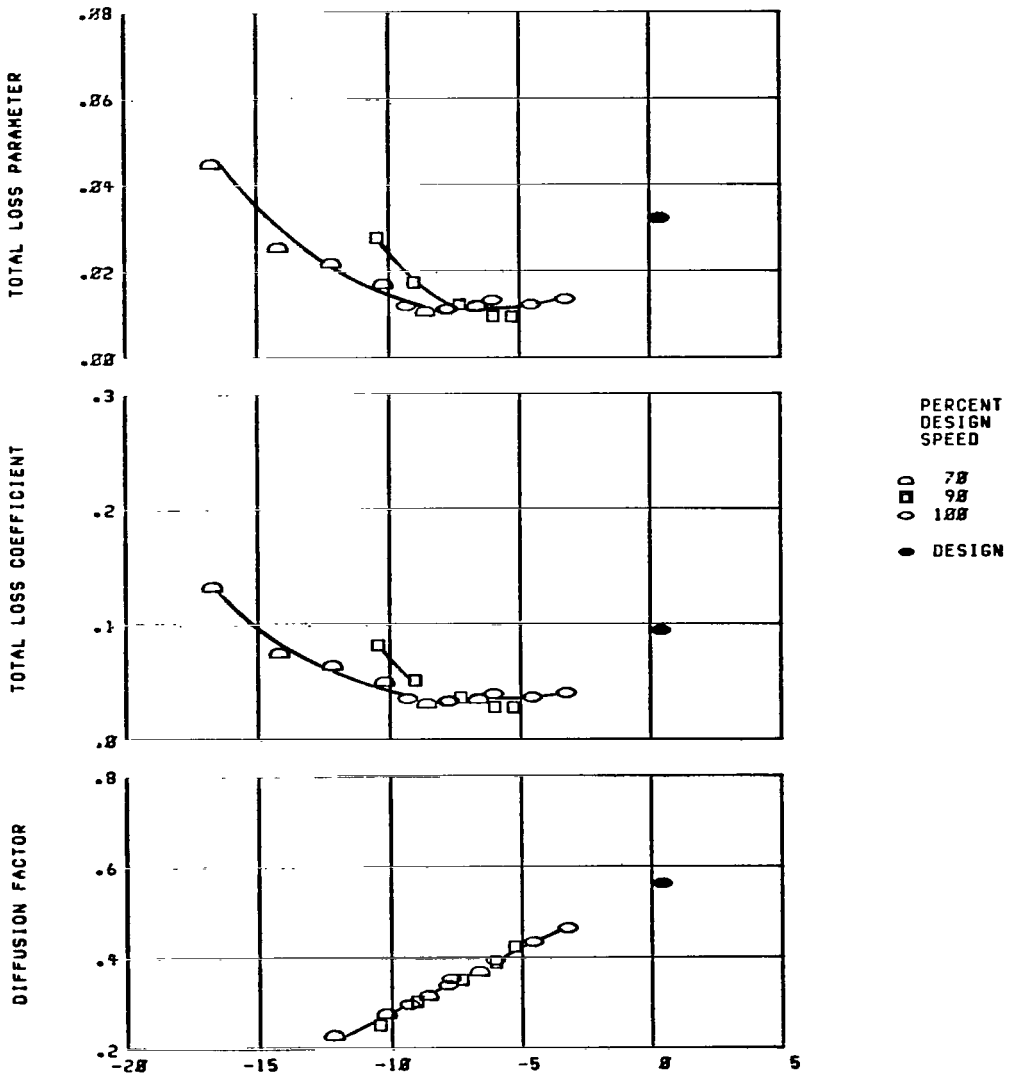
(f) Concluded. Location, 70 percent of span.

Figure 11. - Continued. Blade-element performance for stator 38.



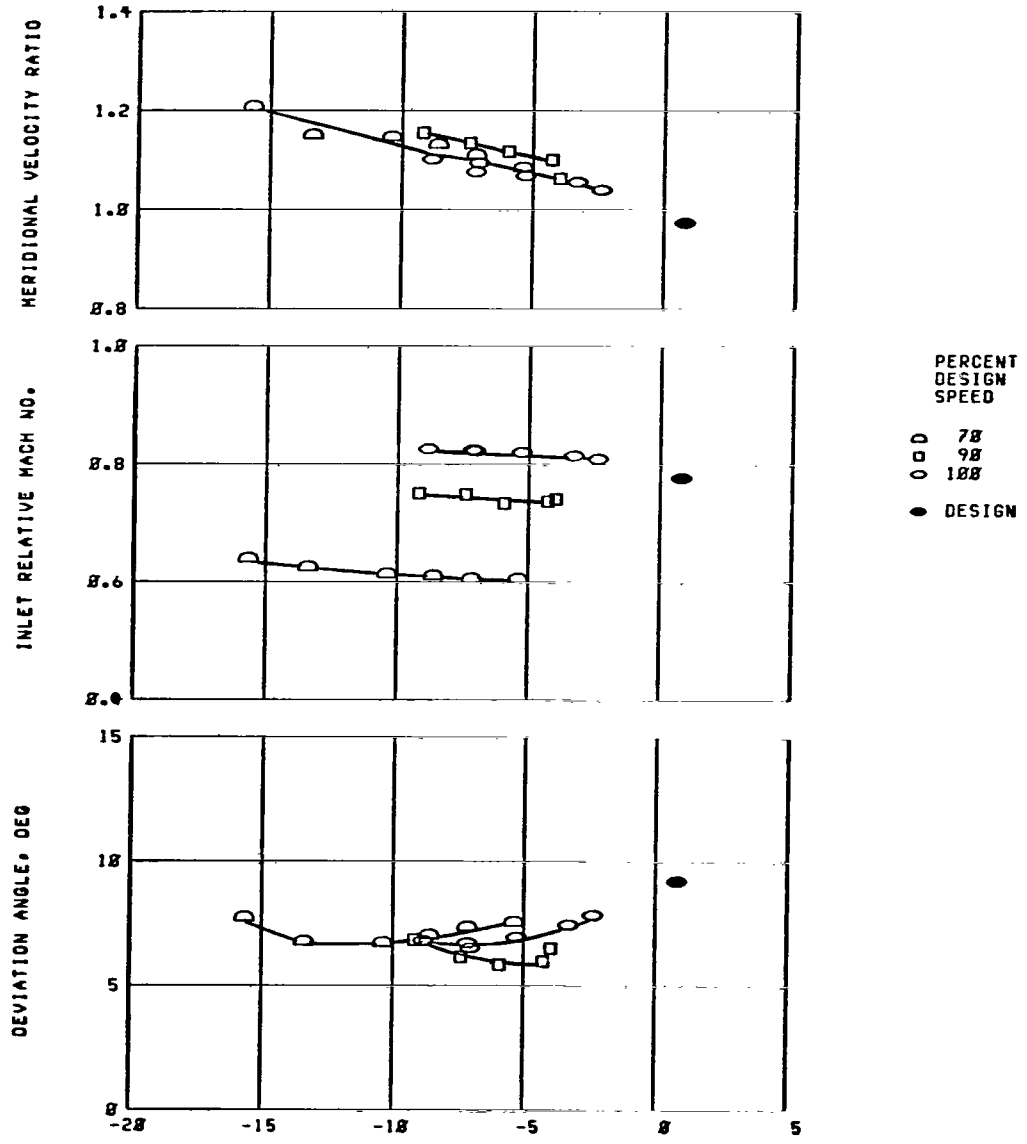
(g) Location, 85 percent of span.

Figure 11. - Continued. Blade-element performance for stator 38.



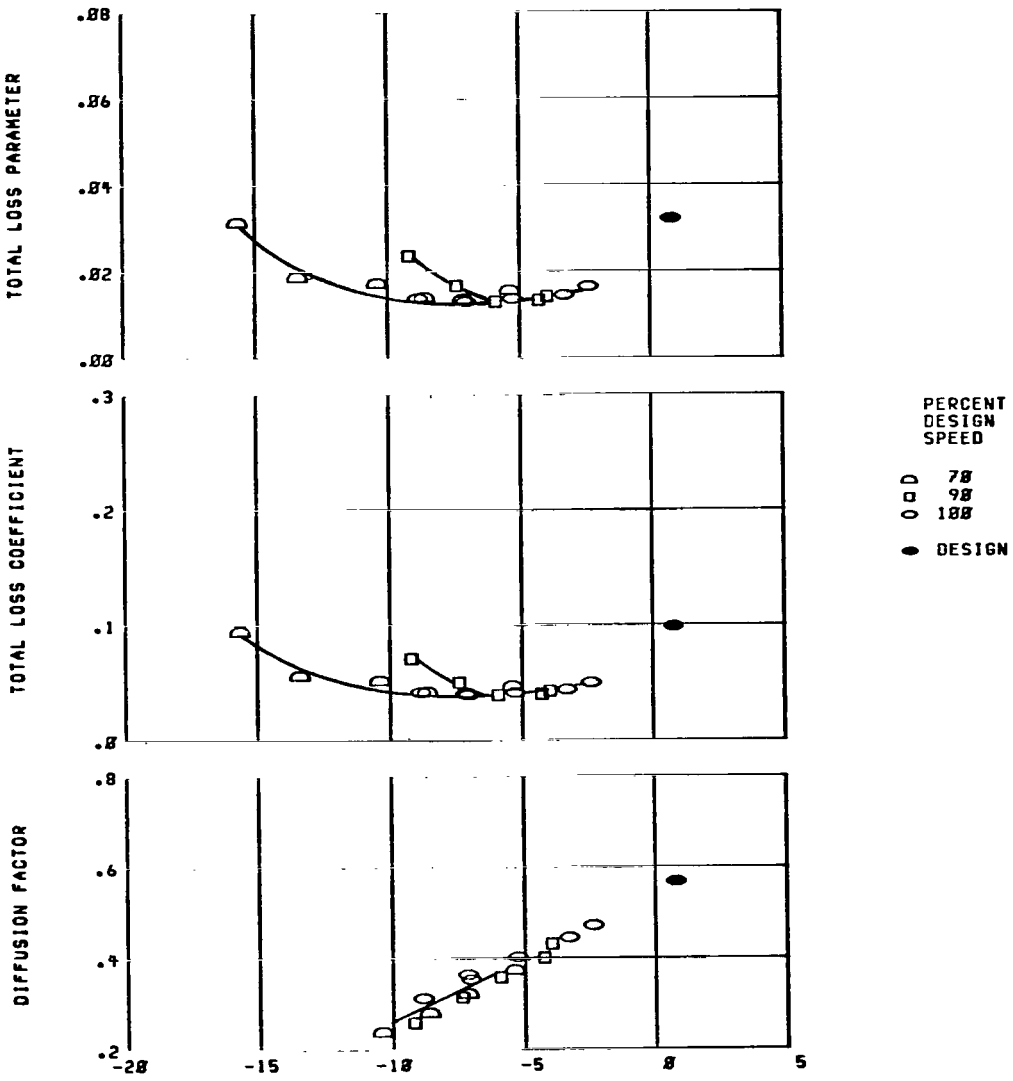
(g) Concluded. Location, 85 percent of span.

Figure 11. - Continued. Blade-element performance for stator 38.



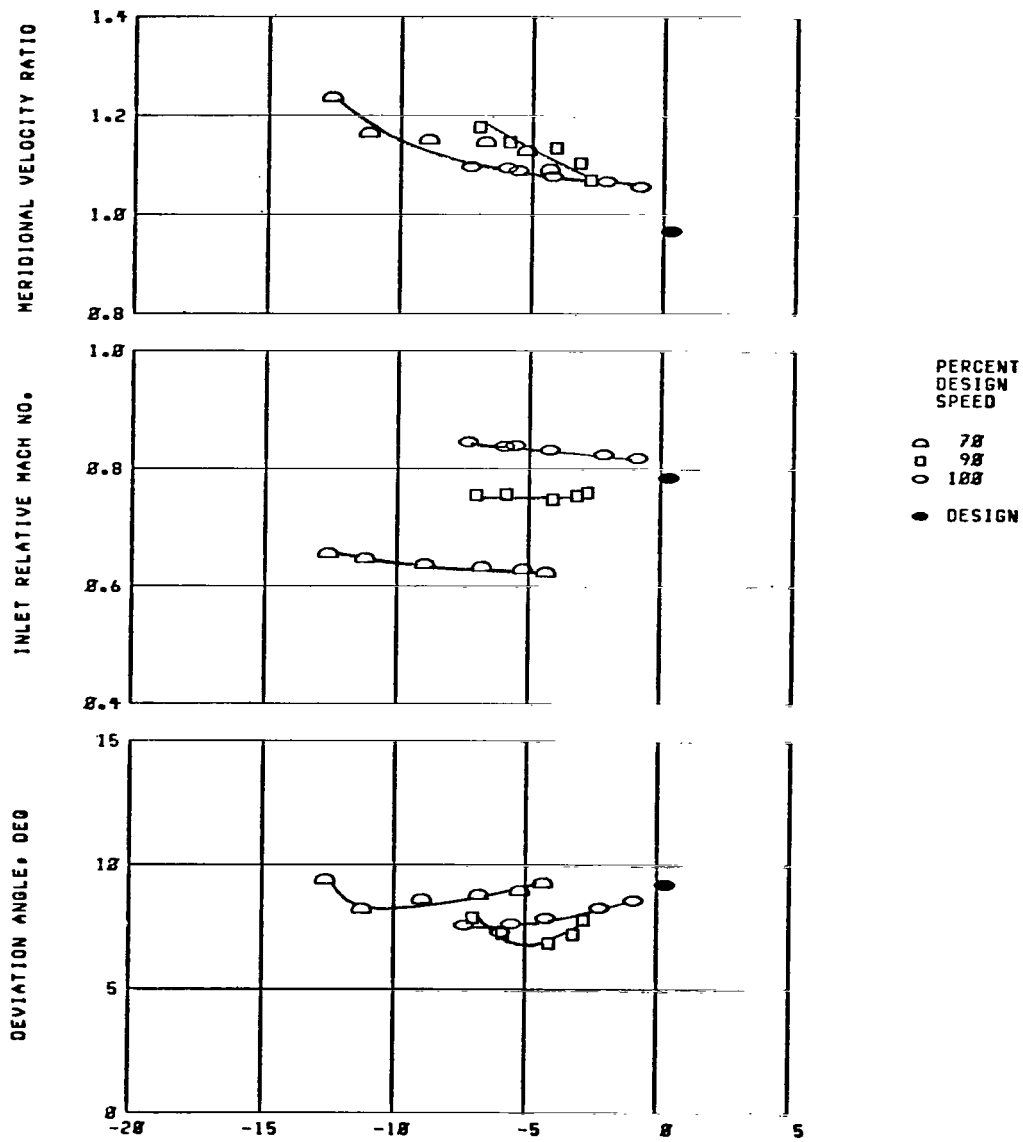
(h) Location, 90 percent of span.

Figure 11. - Continued. Blade-element performance for stator 38.



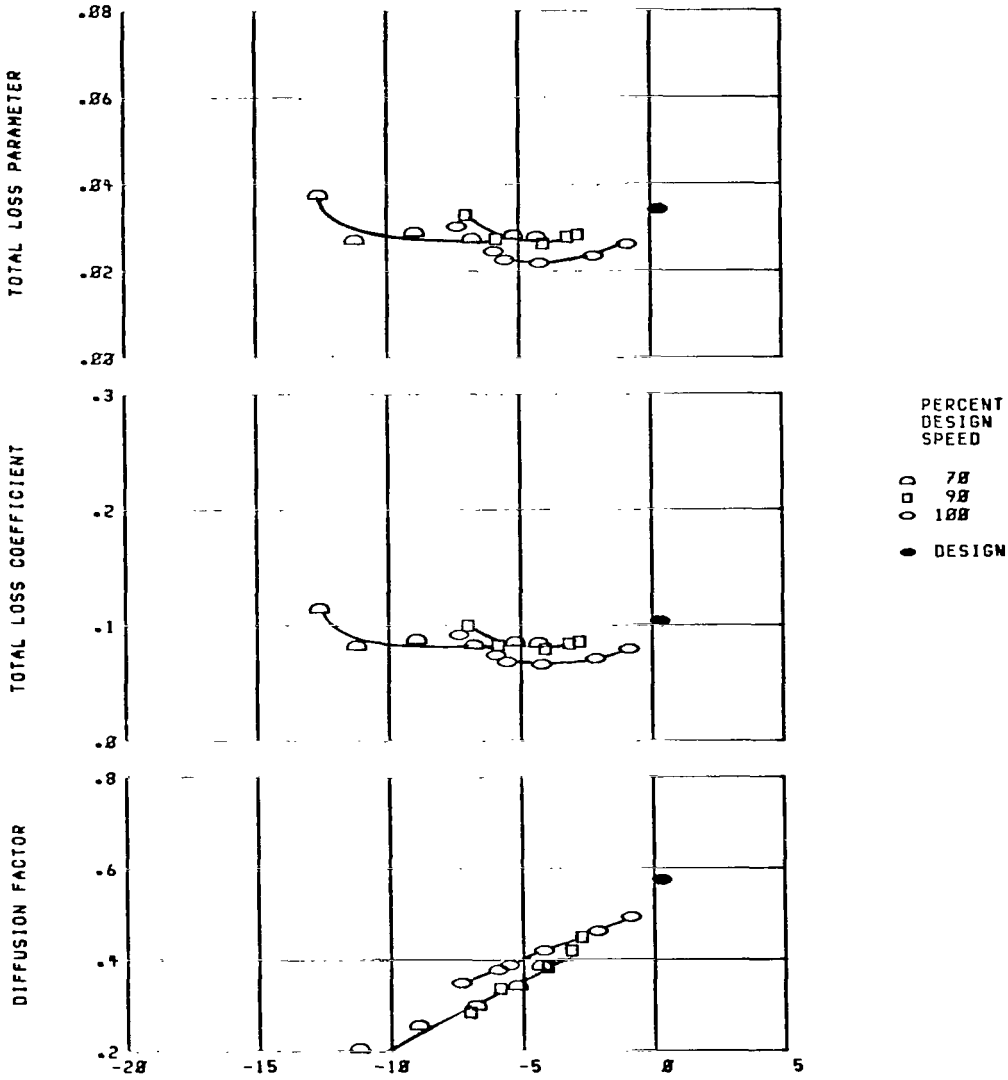
(h) Concluded. Location, 90 percent of span.

Figure 11. - Continued. Blade-element performance for stator 38.



(i) Location, 95 percent of span.

Figure 11. - Continued. Blade-element performance for stator 38.



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

Figure 11. - Concluded. Blade-element performance for stator 38.

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PERFORMANCE OF SINGLE-STAGE AXIAL-FLOW TRANSONIC COMPRESSOR WITH ROTOR AND STATOR ASPECT RATIOS OF 1.63 AND 1.77, RESPECTIVELY, AND WITH DESIGN PRESSURE RATIO OF 2.05

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16. Abstract

The overall and blade-element performance of a transonic compressor stage is presented over the stable operating range for speeds from 50 to 100 percent of design. The stage was designed for a pressure ratio of 2.05 at a flow of 20.2 kg/sec and a tip speed of 455 m/sec. At design speed the rotor and stage achieved peak efficiencies of 0.849 and 0.831, respectively, at the minimum flow condition. The stage stall point occurred at a flow higher than the design flow.

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