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SINGLE-STAGE EVALUATION OF HIGHLY-LOADED HIGH-MACH-NUMBER COMPRESSOR STAGES
V. DATA AND PERFORMANCE OF BASELINE, CORNER-BLOW, WALL-SUCTION, AND COMBINED CORNER-BLOW WALL-SUCTION STATOR

By

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16. Abstract

A single-stage compressor with a rotor tip speed of 1600 ft/sec and a 0.5 hub tip ratio was used to investigate the effects of several stator endwall treatment methods on stage range and performance. These endwall treatment methods consisted of stator corner-blow, annular wall suction upstream of stator leading edge, and combined corner-blow and annular wall suction. The overall stage performance with corner blow was essentially the same as the baseline performance. The performance for the annular wall suction and the combined corner-blow and wall suction showed a reduction in peak efficiency of 2.5 percentage points compared to the baseline data.

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FOREWORD

The work described herein was done under NASA Contract NAS3-10482 by the Pratt & Whitney Aircraft Division of United Aircraft Corporation, East Hartford, Connecticut. The Project Manager was Mr. L. Reid, NASA-Lewis Research Center, Fluid System Components Division. The work was performed during the period 11 June 1971 through 28 October 1971.

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SUMMARY

A compressor stage with a rotor tip speed of 1600 ft/sec was tested to evaluate the effectiveness of several stator endwall treatment methods. Blowing was applied in the corners formed by the stator suction surface and the ID wall and stator suction surface and OD wall. Annulus suction was applied at both ID and OD walls ahead of the stator leading edge plane. A combination of blowing and annulus wall suction was also applied at both ID and OD.

Comparison of data taken with and without blowing showed no significant changes in stage performance. With suction and combined suction and blowing, the corrected peak efficiency dropped 2.5 percent relative to the baseline. Blowing and combined suction and blowing gave reduced stator endwall losses, but these reductions were too small and too local to affect the overall stage performance. The weight flows at surge were practically the same for each of the stator endwall treatment methods and resulted in a surge line identical to that for the baseline data.

INTRODUCTION

Recent results from research compressors have shown that compressor rotors can be designed to operate with a high aerodynamic blade loading and/or a high inlet relative Mach number and still achieve good efficiency (85 to 94 percent) with acceptable stall-margin (12 to 15 percent). However, there is a severe penalty on stage efficiency due to high stator-losses. The major portion of the high loss region occurs in the vicinity of the stator endwalls. Therefore, gains in stage performance are limited by the level of losses in the stator endwall regions. In addition to high stator-losses, in many cases the stall-free range of the compressor stage is limited by stator stall.

As part of Contract NAS3-10482, a stator endwall treatment test program was initiated to investigate the effectiveness of various types of endwall treatments on reducing stator losses and increasing the stator stall-free range of operation. The single-stage compressor used in this investigation was the same compressor used in the work presented in reference 1 with stator corner-blow and wall-suction added. To evaluate the effect of endwall treatment on stator range, the stator vanes were restaggered four degrees open (increased incidence) with respect to the design stagger. This compressor had a design rotor tip-speed of 1600 ft/sec and demonstrated a rotor pressure ratio of 2.0, a rotor efficiency of 89 percent, a stage pressure ratio of 1.946, and a stage efficiency of 84.5 percent.

Small amounts of blowing air have been used in the past to energize boundary layers. The corner-blow technique is an adaptation of this concept to stator endwalls. Since stator endwall loss is a function of inlet condition, a reduction in inlet boundary layer should reduce the loss; the wall-suction concept is an effort to do this.

This report presents the results of applying stator corner-blow, wall suction, and combined corner-blow and wall suction to a highly-loaded, high-Mach-number single-stage compressor.

TEST APPARATUS

TEST COMPRESSOR

The compressor used in this program, Figure 1, was a highly-loaded, high-Mach-number, single-stage compressor with no inlet guide vanes, 30 MCA rotor blades, and 44 MCA stator vanes. It was the same compressor as used in the work presented in reference 1 except for the addition of corner-blow nozzles and wall suction slits and restaggered stator blades. The stator blades were restagged four degrees to increase incidence so that the effects of endwall boundary layer control treatments on stator flow range could be evaluated. The rotor was the same one used in the work presented in reference 2. A summary of rotor and stator design parameters is provided in the table below. Complete design details are given in reference 3.

MCA ROTOR AND STATOR DESIGN PARAMETERS

% Span	Dia – 1	Dia – 2	β^* 1	β^* 2	β^* 1ss	β^* sh	Solidity
ROTOR – STATIONS 8 AND 9							
5 (hub)	17.47	19.77	48.97	1.87	55.40	45.74	2.276
10	18.47	20.41	49.59	9.63	56.02	46.76	2.173
15	19.47	21.05	50.44	16.51	56.59	47.76	2.080
30	22.31	22.96	53.77	29.73	57.87	50.53	1.855
50	25.79	25.52	56.40	42.30	59.30	54.68	1.638
70	28.95	28.08	59.08	50.53	61.07	59.17	1.476
85	31.29	29.99	61.63	54.11	62.96	63.01	1.379
90	31.88	30.63	62.53	55.10	63.65	64.18	1.355
95 (tip)	32.50	31.27	63.21	55.84	64.14	64.96	1.332
STATOR – STATIONS 10 AND 11							
5 (hub)	20.41	21.49	39.23	-16.41	42.15	34.47	2.010
10	21.01	21.96	38.27	-15.44	41.21	32.62	1.959
15	21.59	22.43	37.42	-14.89	40.36	30.94	1.911
30	23.31	23.90	35.44	-15.22	38.44	27.18	1.781
50	25.60	25.89	33.60	-16.04	36.72	24.01	1.632
70	27.82	27.90	32.45	-17.48	35.68	22.38	1.508
85	29.41	29.38	32.12	-19.91	35.44	22.82	1.430
90	29.91	29.86	32.15	-21.40	35.48	23.36	1.407
95 (tip)	30.38	30.29	32.33	-23.69	35.69	24.40	1.387

NOTE: Symbol definitions appear in Appendix D.

AERODYNAMIC DESIGN

Corner-Blow Stator

Significant improvements in stator performance can be obtained by reducing endwall losses. Studies have shown that separation in the corner between the stator suction surface and endwalls is a major source of loss. A stator endwall boundary layer control system was designed which uses blowing to energize this corner flow. The methods used to determine the separation points of the corner boundary layer and to calculate blowing flow rates required to prevent separation are outlined below.

The shape parameter introduced by K. Gersten [ref. 4] for a three-dimensional corner boundary layer

$$\Gamma_3 = \frac{\sqrt{-\overline{\theta}_3}}{V_{fs}} \frac{dV_{fs}}{dx} \left(\frac{V_{fs}\sqrt{-\overline{\theta}_3}}{\nu} \right)^{1/4} \tag{1}$$

was used as the criterion for corner separation. Gersten found that turbulent corner separation occurs for $\Gamma_3 = -0.007$. A chordwise distribution of Γ_3 was calculated from airfoil static pressure distribution data obtained from the MCA stator tests conducted under NASA Contract NAS3-7614 in which stator geometry and aerodynamic conditions were very similar to those of the subject investigation. The distribution of the local values of pressure coefficient used is shown in Figure 2. Two probable points of corner boundary layer separation are indicated on the chordwise distribution of Γ_3 shown in Figure 3. They occur at approximately 22 and 52 percent of the stator chord length where Γ_3 is about -0.007. Even when the boundary layer at 22 percent chord was assumed to be completed energized, calculations showed that separation may still occur at approximately 65 percent chord. Nozzles were located in both the hub and tip stator case at 18 and 48 percent chord to blow high-energy air into the corner boundary layer just upstream of each potential separation point. Blowing simultaneously through both sets of nozzles should prevent separation at both chordwise locations. Requirements for operating with one-half optimum blowing flow were met by using nozzles at only one chordwise location, giving reduced flow while maintaining high velocity in the blowing flow.

The blowing rate required to prevent separation at each separation point is given by the expression

$$W_{blow} = \rho_{fs} V_{fs} \left(K \sqrt{-1.1\overline{\theta}_3} \; \delta^*_{x2} \right) \tag{2}$$

where K is a shape factor for corner boundary layers obtained empirically from P&WA cascade experiments.

Figure 4 presents a sketch of the corner boundary layer showing the extent of the interference region, t, where the stator gapwise velocity profiles are affected by the corner.

Chordwise distributions of the velocity and interference momentum loss area used in the solution of equation (2) were calculated from the pressure coefficients, C_p, obtained from the stator tests conducted under NASA Contract NAS3-7614. The distribution of δ^*_{x2} was found from a correlation of cascade data [ref. 5]. A correlation of endwall boundary layer growth [ref. 5] was used to predict displacement thicknesses on hub and tip walls at the rotor exit and stator exit. Rotor inlet boundary layer measurements obtained in tests of a similar single-stage compressor in the same test stand were assumed to be the same for the subject stage. Calculated growths through the rotor and stator gave displacement thicknesses at the stator exit which were in good agreement with displacement thicknesses calculated from wake rake measurements during tests of this compressor.

Blowing flow rates at the probable points of boundary separation were established by intergrating chordwise distributions of the local values of flow given by equation (2). This procedure provided a flow rate at one point equivalent to what would be supplied by a continuous slit at the corner between the stator suction surface and the endwalls. It gave a surplus flow to insure that the boundary layer was energized. The total design flow at 18 and 48 percent chord was 0.158 lb/sec at the hub for 44 vanes calculated with this procedure and 0.096 lb/sec at the tip. The nozzles were designed to operate choked, with blowing flow rate controlled by the stator hub and tip supply pressures.

Wall-Suction-Stator

A wall-suction boundary layer control scheme was designed to improve stator performance by reducing the stator inlet displacement thickness. This was accomplished by removing wall boundary layer air through annular slits upstream of the stator leading edge, Figure 5. Enough flow was extracted to reduce δ^*_{x2}, the boundary layer thickness at the stator inlet, below the value at which separation was predicted to occur. This value of δ^*_{x2} was calculated using the expression

$$\frac{2\,\delta^*_{x2}}{c} = \left(\frac{K_2}{\Delta P/q}\right) - K_1 \tag{3}$$

where $K_2 = \left(\frac{\delta^*_{x2}}{c} + \frac{\delta^*_{x1}}{c}\right)\frac{\Delta P}{q}$

and $K_1 = \left(\frac{\delta^*_{x2}}{c} - \frac{\delta^*_{x1}}{c}\right)$

K_1 and K_2 have been correlated with cascade data [ref. 5].

The amount of suction flow required to obtain the desired δ^*_{x2} was obtained from

$$W_{SUCTION} = 2\pi r\ \rho_{fs}\ V_m \left(\theta_{a,2} - \theta_{a,1}\right) \tag{4}$$

where $\theta_{a,2}$ is the momentum thickness downstream of the suction slit

$$\theta_{a,2} = \frac{1}{H_a}\left(\frac{\delta^*_{x2}}{\delta^*_{x2}/\delta^*_{a,2}}\right) \tag{5}$$

and $\theta_{a,1}$ is the momentum thickness upstream of the suction slit

$$\theta_{a,1} = \frac{\delta^*_{a,1}}{H_{a,1}} \tag{6}$$

where

$$H_a = \frac{2}{n} + 1 \text{ and } \frac{\delta^*_a}{\delta} = \frac{1}{n+1}$$

The displacement thickness, δ^*_a, and the boundary layer thickness, δ, were calculated from data taken during the MCA and tandem rotor tests.

The hub and tip suction slit flow rates calculated using equation (4) were 2.02 and 2.66 lb/sec, respectively. The tip slit was designed to operate choked, but choked operation of the hub slit was not possible because of piping limitations.

MECHANICAL DESIGN

Baseline Stator

The baseline stator configuration was the same as that tested with stator hub slit suction [ref. 2] except that there were no suction slits in the corner between the vane suction surface and the hub endwall. As shown in Figure 1, tubes were located in the hub and tip endwalls which were used as blowing nozzles during the corner-blow-stator test. Blowing flow was not supplied to these tubes during baseline stator tests.

Corner-Blow-Stator

Blowing nozzles were located at 18 and 48 percent of the chord length in corners followed by the vane suction surfaces and endwalls at both the stator hub and tip (Figure 5). These nozzles directed blowing flow tangent to vane suction surface and at an angle of between 10 and 15 degrees to the endwalls. Four common manifolds supplied pressurized air to sets of blowing nozzles at the same location on all the vanes. The flow rate into each of the four common manifolds and the total pressure and total temperature in each manifold were measured. These measurements were used to calculate the pressure of air entering the compressor using a calibration of Pt-nozzle-exit/Pt-manifold versus blowing flow rate corrected to the manifold temperature and pressure. Each set of forty-four blowing tubes at a given vane location could be operated and controlled independent of the other sets.

A sample vane and blowing-nozzle-assembly was calibrated to determine the choke flow rate and pressure loss for each of the four nozzle configurations. The assembly was connected to a variable high-pressure air supply to simulate the manifold that supplies the nozzles in the test stage. Flow rates were measured for nozzle exit pressures from 1.4 to 2.2 times atmosheric pressure, and the choke flow rate was determined for each nozzle. Based on the results of this calibration, a blowing nozzle tube inner diameter of 0.096 inch was selected. With this tube size, the ID and OD nozzles were capable of supplying 260 and 240 percent of their respective design flow rates.

Wall-Suction-Stator

Wall boundary layer air was extracted through annular slits in the flowpath casing, shown in Figure 6, and collected in separate hub and tip plenums which were evacuated by external exhausters. The hub slit annulus was 0.170 inch wide and made an angle of 38 degrees with the flowpath. The tip slit annulus was 0.140 inch wide and made on air angle of 25 degrees with the flowpath. Flow rate, total pressure, and total temperature were measured for each plenum.

Four hollow struts ahead of the rear bearing supports removed the boundary layer air extracted through the hub slit (Figure 1). Flowpath exit area requirements limited the number and size of the struts used to remove the suction flow. Additional blockage from more than four struts would have caused the compressor discharge flow to choke near the hub at the wide open throttle data point. With only four struts and a requirement to pass a flow of 2.02 lb/sec, it was necessary to design the suction system for low pressure-loss. Slit manifold pressure was below the lowest gapwise static pressure previously measured at the stator inlet; therefore, recirculation should not have occurred in the slots during slot suction testing.

During the corner blow stator test, the annular wall-suction slits were sealed to prevent recirculation in the slits due to the static pressure variation across the gap between adjacent stator vanes. Access for removing the sealer material from the hub and tip slits was obtained by removing the rotor and front shaft assembly at the test stand.

Combined Corner-Blow Wall-Suction Stator

Simultaneous or independent operation of the corner-blow nozzles and the annular wall-suction slits was possible with this stator. For tests with combined corner-blowing and wall suction, both treatments were operated simultaneously.

FACILITIES

To satisfy the blowing and suction flow requirements for the boundary layer control treatments, connecting piping was designed to provide access to the test facility suction and high pressure air supply systems (Figure 7). The design provided remotely and independently controllable flow rates for each of the four sets of blow nozzles and each of the two annular wall-suction slits. Other facility hardware was the same as described in reference 1.

INSTRUMENTATION AND CALIBRATION

Static pressure in the four blowing-nozzle manifolds and in the hub annular wall-suction slit plenum was measured by means of four static pressure taps, and the total temperature was measured with two bare-wire thermocouples. Eight static pressure taps and four bare-wire thermocouples were used to measure the static pressure and total temperature in the tip wall-suction slit plenum. There were two static pressure taps and one thermocouple in each of four 90-degree segments of the tip plenum. Blowing and suction flow rates for each manifold or plenum were measured by means of sharp edge orifices. Other instrumentation was as described in reference 1. Typical instrumentation is shown in Figure 8, and axial and circumferential locations of instrumentation are shown in Figures 9 and 10, respectively.

TEST PROCEDURE

Uniform inlet-flow was used for all tests. Vibratory stresses were measured with strain gages located at selected blades and vanes and were monitored and/or recorded by on-stand equipment. The test program was divided into two phases. During the first phase, which included baseline and corner-blow stator tests, the annular wall-suction slit upstream of the stator was sealed to prevent the baseline stator performance from being affected by recirculation in these slits. The second phase of the test program was conducted after this sealer material was removed. This was accomplished at the test stand by separating the rotor front-shaft assembly from the rear shaft to provide access to the suction slits.

PHASE I – BASELINE AND CORNER-BLOW STATOR TESTS

Corner-Blow Flow Optimization Tests

To determine the optimum corner-blow flow to be used for subsequent testing, overall and blade element performance data were taken at five points at design speed near peak efficiency. At each of these five data points, a different combination of the four sets of blowing nozzles were operated at choke flow. Choke flow through the forty-four hub nozzles at 18 and 48 percent chord-lengths was 0.22 lb/sec and 0.19 lb/sec, respectively. Choke flow through the tip nozzles at 18 and 48 percent chord-lengths was 0.21 lb/sec for each set of nozzles. The following nozzle combinations were tested:

1. all four nozzles operative
2. only the two hub nozzles operative
3. only the two tip nozzles operative
4. only the hub and tip nozzles at 18 percent of the vane chord-length operative
5. only the hub and tip nozzles at 48 percent of the vane chord-length operative.

Data were taken at another point without blowing flow to provide a baseline for comparing the effects of the different nozzle combinations. The compressor discharge throttle setting was identical for all six data points and only the number of operative nozzles was varied. Because of the small changes in performance seen with blowing, combination 1 (all four nozzles operative) was selected as the optimum combination for further testing.

Rotating-Stall Surveys

Rotating stall surveys were conducted at 50, 70, 90, and 100 percent of design speed. The surveys were conducted both without blowing flow and with optimum blowing flow. These surveys consisted of determining the point of initiation of rotating stall and the radial extent of the stall zones. As the discharge throttle was closed from wide open into stall, velocity fluctuations at the rotor inlet were measured and recorded simultaneously with the measurements from strain gages, a speed signal, and the measurements from a stator leading edge static pressure probe. The strain gages were located on selected stators and rotors, and the velocity fluctuations were measured by means of three-sensor hot-film probes at 25, 50, and 80 percent span from the hub.

Overall and Blade Element Performance Tests

Twenty overall and blade element performance data points were taken without blowing flow and 20 with blowing flow. The points were taken over a range between wide-open throttle and stall at 50, 70, 90, and 100 percent of design speed. Stall flow was also measured for each of these percent speeds. Sixteen performance data points were taken with choked blowing flow through different combinations of nozzles. Five data points were taken at both 70 and 100 percent of design speed with the optimum flow rate; all four blowing nozzles were operative. At design speed, five points were also taken with one-half the optimum flow rate—choked blowing flow through two of the four nozzles (the hub and tip nozzles at only 48 percent of the vane chord-length). One additional near-stall point was taken with the hub and tip nozzles at only 18 percent of the vane chord-length operative. The data points taken without blowing flow were at identical compressor throttle settings. This was accomplished by first setting a particular operating condition without blowing, taking overall and blade-element performance data, and then successively repeating the data point after introducing blowing flow through the different nozzle combinations to be tested.

Boundary Layer Surveys

Boundary layer surveys were conducted at the stator inlet and exit for six data points at design speed. At three discharge throttle settings, data were taken first without blowing flow and then with choked blowing flow through all four nozzles. A boundary layer survey was also conducted at a near-surge point at 90 percent of design speed without blowing flow. These surveys consisted of radial and tangential traverses of total pressure, total temperature, static pressure, and airflow angle at 15 radial locations. Tangential traverse data were used to make contour plots of these parameters at the stator exit.

PHASE II — WALL-SUCTION AND COMBINED CORNER-BLOW WALL-SUCTION STATOR TESTS

Wall-Suction/Flow Optimization Tests

At the design speed and peak efficiency throttle setting, five data points were taken with different amounts of suction flow through the hub and tip annular slits to determine the optimum suction flow rate for further testing. Data points for the following conditions were obtained:

1. maximum suction flow through both the hub and tip slits

2. maximum suction flow through the hub slit only

3. maximum suction flow through the tip slit only

4. 75 percent of the maximum hub and 84 percent of the maximum tip suction flow rate

5. 65 percent of the maximum hub and 76 percent of the maximum tip suction flow rate

The maximum hub suction flow rate achieved was 1.71 lb/sec as compared to a design flow rate of 2.02 lb/sec. Design hub suction flow rate was not achieved because of high losses in the piping system used to remove the hub suction flow. The maximum tip suction flow rate achieved was 2.67 lb/sec as compared to a design flow rate of 2.66 lb/sec. Maximum flow through the hub and tip annular slits was selected as the optimum flow rate for further testing.

Rotating Stall Surveys

Rotating stall surveys were conducted at 50, 70, 90, and 100 percent of design speed with the optimum wall-suction and with combined optimum corner-blowing and optimum wall-suction flow. These surveys were conducted in the same manner as for the baseline and corner-blowing stator tests.

Overall and Blade-Element Performance Tests

Eight overall and blade-element performance data points were taken at 70 and 100 percent of design speed with both optimum wall-suction flow and combined optimum wall-suction and corner-blowing (a total of sixteen data points). For each boundary layer treatment, five of the data points were taken at 70 percent of design speed, but only three data points were taken at design speed because the program was abbreviated due to test facility difficulties. As in the baseline and corner-blow stator tests, speed and throttle settings were made with suction only and then data points were taken with and without blowing flow.

Boundary Layer Survey

Boundary layer surveys were conducted at three throttle-settings at design speed with wall-suction and then with combined wall-suction and corner-blowing (a total of six data points). The surveys were conducted at approximately the same operating conditions as the boundary layer surveys with the baseline and corner-blow stators so that the stator exit contours could be compared for all four stators.

CALCULATION PROCEDURES

Raw data measurements from all probes were converted to engineering units, aerodynamically corrected, and mass averaged in the same manner as discussed in reference 1 for uniform inlet flow. Blade element and overall performance parameters were calculated similar to reference 1 but with corrections made to account for flow added or extracted between the rotor inlet and stator exit. The corrections made are explained below.

The flow-field analysis computer program of reference 1 was used with modified input procedures to simulate the physical processes of blowing and wall suction. Each data point with blowing and without blowing (baseline) was taken at the same throttle setting. Each data point with blowing and wall-suction combined and wall-suction alone was also taken at the same throttle setting. The input to the flow-field program for blowing included measured distributions of rotor total pressure ratio and temperature ratio from the baseline point and with radial distributions of stator exit pressure, air angle, and wake blockage factors from blowing point measurements. For the combined blowing and suction points, the flow-field program input used radial distributions of rotor total pressure ratio and total temperature ratio from the suction-alone point with stator exit pressure, air angle, and wake blockages as measured with combined blowing and suction.

All points with suction had stator leading and trailing edge blockage factors reduced so that the streamline calculation used the correct effective flow area to obtain velocity distributions at these locations.

The computer program used to calculate overall system efficiency and pressure ratio was separate from the computer program used to calculate stator recovery. System efficiency was defined as ideal-work/actual-work in the conventional manner but accounted for blowing and suction flows. Ideal work is the net isentropic work required to bring all constituent flows reaching the stator exit to the mass-averaged stator exit pressure. This ideal work accounts for high-pressure blowing from an outside source. The actual-work calculation included rotor work done on the flow that reaches the stator exit and rotor work on the suction flow extracted at the stator inlet. It did not include the work done by the facility exhausters or blowers. System performance was calculated for each configuration tested using equations derived in Appendix B. Calculations for the corner blow and combined blowing-suction configuration included overall pressure ratio and stator recovery corrections due to the mixing of high-pressure blowing air with mainstream air. The wall-suction overall rotor and stage pressure ratios and stator recovery are the radially mass-averaged values calculated by the flow-field program as was done for baseline performance. A detailed description of the overall performance calculation for each configuration is provided in Appendix B. Adjusted efficiency, pressure ratio, and stator recovery are tabulated for each data point in Appendix C.

For the boundary layer survey points, overall performance and blade element calculations were made using the wake rake data, and contour plots of P, p, β, and T were generated from combination-probe measurements. Velocities were calculated from measurements of total and static pressure, total temperature, and air angle as described in reference 2.

RESULTS AND DISCUSSION

The results of the baseline, corner-blow, annular slit suction, and combined corner-blow and annular slit suction stator tests are discussed under the headings "Shakedown Test" and "Performance Test". The shakedown results include some brief observations of vibratory stress levels and rotating stall phenomena which occurred during the surge cycle. Also included are the results of the flow optimization test for the corner-blow stator.

Overall performance for rotor and stage is presented for the baseline (no endwall treatment), corner-blow, annular slit suction, and combined corner-blow and annular slit suction stator tests. Rotor blade elements plots are presented for the baseline stator test only. Stator blade elements plots are presented for the baseline, corner-blow, annular slit suction, and combined corner-blow and annular slit suction stator tests. Gapwise distributions of stator exit total pressures are presented for the baseline, corner-blow, annular slit suction, and combined corner-blow and annular slit suction stator test for the near-surge and near-choke conditions at 70 and 100 percent design speed. Contour plots of stator exit traverse data are presented for three weight flows at 70 and 100 percent design speed for the baseline, corner-blow, annular slit suction, and combined corner-blow and slit suction.

SHAKEDOWN TEST

Levels of vibratory stresses on the blades and vanes were recorded during accelerations and decelerations between 50 and 105 percent of design speed with wide-open throttle and near-stall throttle settings. All observed blade and vane vibratory stress levels were within acceptable limits.

At all speeds, minimum flow was determined by compressor surge for both the baseline and for all boundary layer control combinations. This was determined from continuous recordings of signals from a three-sensor, hot-film probe at the rotor inlet, from strain gages, and from static pressure probes located along the flow-path walls. At high speeds these measurements showed large fluctuations in velocity simultaneous with high vibratory stresses in rotor and stator blades and static pressure variations. Periodic fluctuations in velocity indicated that rotating stall occurred at the beginning of the surge cycle.

Optimization tests were conducted at 100 percent design speed to determine the most favorable locations and rates of blowing and suction. Figure 11 presents stator wake rake data at a part-throttle flow for the near-wall locations of 5 and 90 percent of span from the hub. Vane wakes at these span locations indicated that most of the benefit of blowing was being achieved with the 48 percent chord nozzles and that the tip was being benefitted more than the hub. However, due to the small magnitude of the changes observed and the small amount of flow required to choke each nozzle, it was decided that the test program would be conducted with all blowing nozzles and suction slits active.

PERFORMANCE TEST

Overall Performance

Overall baseline rotor and stage performance is presented in Figures 12 and 13. Stage performance with and without selected rates of suction and/or blowing is presented in Figure 14. The stall line in each case was established by extrapolating the characteristic speed-lines to measured stall airflows, shown as slashed symbols on the figures. Peak baseline rotor efficiency was 86.7 percent at design speed and 87.0 percent at 70 percent speed.

Stage performance for baseline and maximum blowing revealed no changes in the pressure ratio, airflow characteristic at 70 and 100 percent design speed. Local changes in stator performance near endwalls were too small to affect overall performance. The same observation could be made for the configuration with suction and combined suction and blowing. Both uncorrected and corrected efficiencies are presented in Figure 14. For blowing, the efficiency correction, which accounts for the addition of high energy air behind the rotor, reduced the peak stage efficiency by a 0.5 percentage point at design speed and by 1.3 percentage points at 70 percent design speed. With suction, the efficiency correction, reflecting the rotor work done on the bleed flow, reduced peak stage efficiency by 2.5 percentage points at design speed and by 3.5 percentage points at 70 percent design speed. The efficiency corrections with combined blowing and suction were consistent with corrections for blowing alone and suction alone. In general, differences in pressure ratios between the baseline stator and the stator with blowing or suction were small.

Blade Element Performance

Figure 15 presents blade element total pressure loss coefficient, diffusion factor, and deviation versus incident angle for the baseline rotor. Figures 16 through 19 present stator blade element data with and without blowing, with suction, and with combined blowing and suction.

Some caution should be observed in interpreting the blade element loss and loading data since the calculation procedure satisfied continuity accounting for mass addition or removal between axial stations, but losses were calculated based on the differences between peak total pressure and mass flow averaged total pressure from stator exit rake wake measurements. With a jet of high-pressure blowing air at one gapwise location, the peak pressure may not represent a true average, stable-inlet pressure. Also, the effects on streamline of adding or subtracting flow at particular locations were not accounted for. A tabulation of the data is given in Appendix C.

Stator Wake Rake Total Pressure Profiles

Gapwise distributions of stator-exit total pressure are presented in Figures 20 through 27 at 70 and 100 percent design speed for the near-surge and wide-open throttle positions. Figures 20 to 23 show a comparison of stator wake profiles with and without blowing. Similarly, Figures 24 to 27 show a comparison of suction with combined suction and blowing. The largest change in wake profile due to blowing was found to occur at 70 percent design speed for the wide-open throttle point. This was also true for the effect of stator hub-slit suction discussed in reference 2,which achieved significant improvements in stator hub wake profiles. A plot of the integrated difference in stator wake total pressure with and without blowing is presented in Figure 28. The improvement at each span location at 70 percent design speed and wide open throttle is shown. Also shown on the graph is the product of the total nozzle area and the difference between the nozzle total pressure and stator baseline exit average total pressure. The resulting parameter reflects the effect of mixing with the free-stream air and, in a sense, is proportional to the minimum total pressure change to be expected at stator exit due to blowing. Figure 28 indicates that jet mixing had affected a region out to 5 percent span from the hub and from 85 to 95 percent span at the tip. Reductions in stator loss were approximately equal to the pressure rise obtained by simple mixing of the nozzle and free-stream flow. However, the greater part of the reduction of stator loss was achieved using only the 48 percent chord corner nozzle, as shown during the optimization tests.

A comparison of baseline stator wakes with those having suction (Figure 20 versus 24 and Figure 22 versus 26) reveals only small differences at both 70 and 100 percent design for the near-surge flow. As these points were not run back-to-back, some differnces in wake peak pressure ratio are evident. However, the peak-to-valley wake pressure difference at hub and tip was slightly smaller for the case with suction as compared to baseline indicating improved exit total pressures near the walls. Examination of the wide open flow (Figure 21 versus 25 and Figure 23 versus 27) for both speeds indicates that the situation had been altered, and the difference in stator wake peak-to-valley pressure was now greater at the 5 and 95 percent span locations for the case having suction compared to baseline, indicating an increase in wake depth with suction.

Contour Plots of Stator Exit Traverse Data

Circumferential traverses were made at the stator exit for part-throttle, maximum efficiency, and near-stall points at 100 and 70 percent design speed, for the baseline, blowing, suction, and combined suction and blowing configurations. Measurements of total and static pressure, total temperature, and absolute air-angle were obtained at 3.8, 4.9, 5.9, 8.4, 11.0, 15.4, 31.0, 51.2, 72.7, 87.8, 92.8, 94.1, 95.3, 96.6, and 97.4 percent passage height from the hub. Tangential spacing gave 15 readings across a stator gap at 90 percent span and 11 readings at 4.3 percent span. These measurements were used to calculate velocity vectors and to construct contour plots showing patterns of P/P_{INLET}, T/T_{INLET}, airflow angle, and $Vm/\sqrt{\theta_T}$ at the stator exit instrumentation plane. These contours are shown in Figures 29 through 48.

Comparison of stator exit plane total pressure plots shown on Figures 29 (for design speed) and 44 (for 90 percent design speed) reveals no significant differences between the baseline stator and the stator with blowing, suction, or combined blowing and suction. These results are more easily seen on the stator wake profiles discussed previously.

Rapid Response Hot-Film Data

Some indication of post-surge behavior of this stage may be gained by examining the traces of hot-film probes positioned approximately 2.2 inches upstream of the rotor at 25, 50, and 85 percent span. Traces from these probes are shown on Figure 49 for the 100 percent design speed. For the baseline, the surge pulse reaches the measurement plane uniformly at root, mean, and tip. Pulse duration was not constant over the span but indicates that the hub recovered first and was followed by the mean and tip sections. Overall pulse duration was 0.014 second.

The traces obtained during surge with blowing indicate no significant change in the surge pulse. However, a significant change in the surge pulse can be seen for the test with suction. As before, the pulse reaches the measurement plane uniformly at root, mean, and tip. The magnitude of the perturbation, however, was dramatically reduced at the hub. The length of the surge pulse was approximately 0.013 second.

For combined blowing and suction, there was no significant change in post-surge behavior compared to suction only. Evidently annular suction had changed the characteristic of the stage in the deep-stall mode, resulting in a reduction in pulse severity and radial extent.

It should be noted that the hub suction slot was much closer to the rotor trailing edge than was the tip suction slot. This would make the hub slot more effective in changing rotor characteristics than the tip slot. As indicated in reference 2, the high speed surge is believed to be controlled by the rotor. The presence of an essentially choked suction slot near the rotor hub can be expected to significantly change the aerodynamic flow path of the rotor at the very low flows encountered during a surge pulse.

SUMMARY REMARKS

The use of stator corner-blow and annular slit suction ahead of the stator leading edge and combined corner-blowing and annular slit suction, did not produce any significant changes in the unstall or presurge performance of the stage. All of these endwall treatments showed some improvement in stator recovery in the regions of 5 percent span and 85 to 95 percent span from the hub. These local improvements in stator recovery were not enough to produce significant improvements in overall stator recovery.

The subject endwall treatments showed no improvements in stator range. Examination of stator performance at the near-surge point for the baseline (no blowing or suction) indicates that this stator was performing reasonably well without endwall treatment in spite of the fact that the stator had been restaggered four degrees open (4 degree increase in incidence angle).

Hot-film data indicated a reduction in the severity of the surge pulse for the stage when suction was applied behind the stalling rotor.

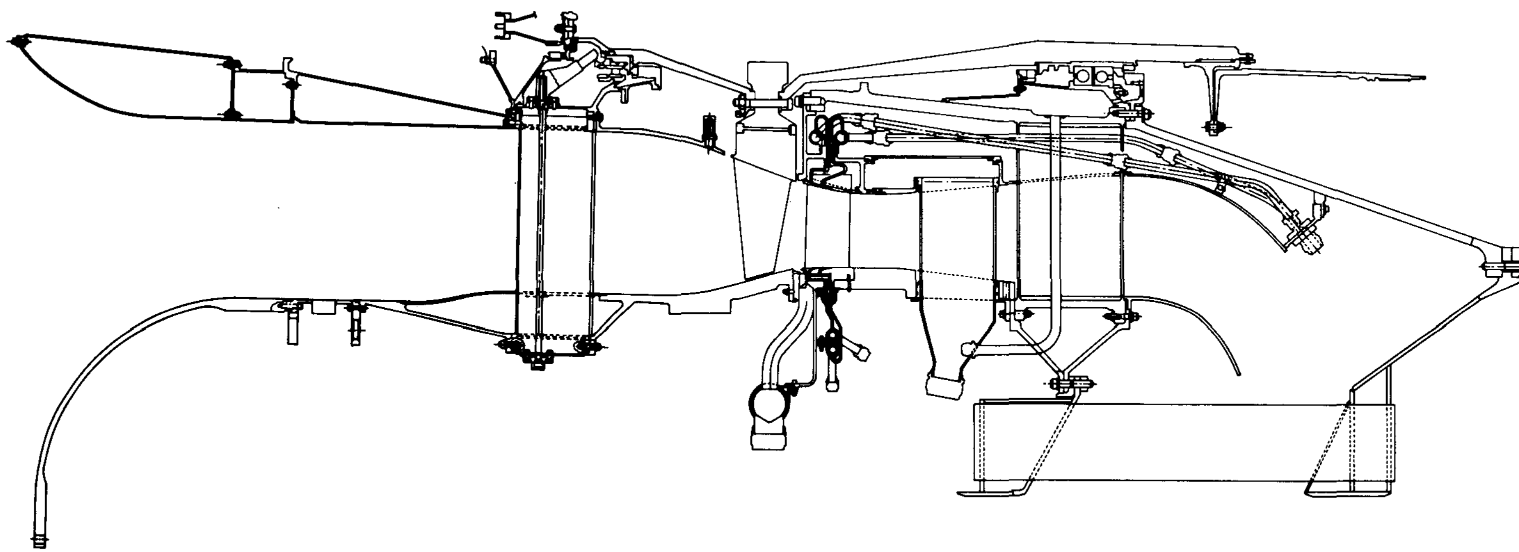


Figure 1 Cross Section of Test Compressor

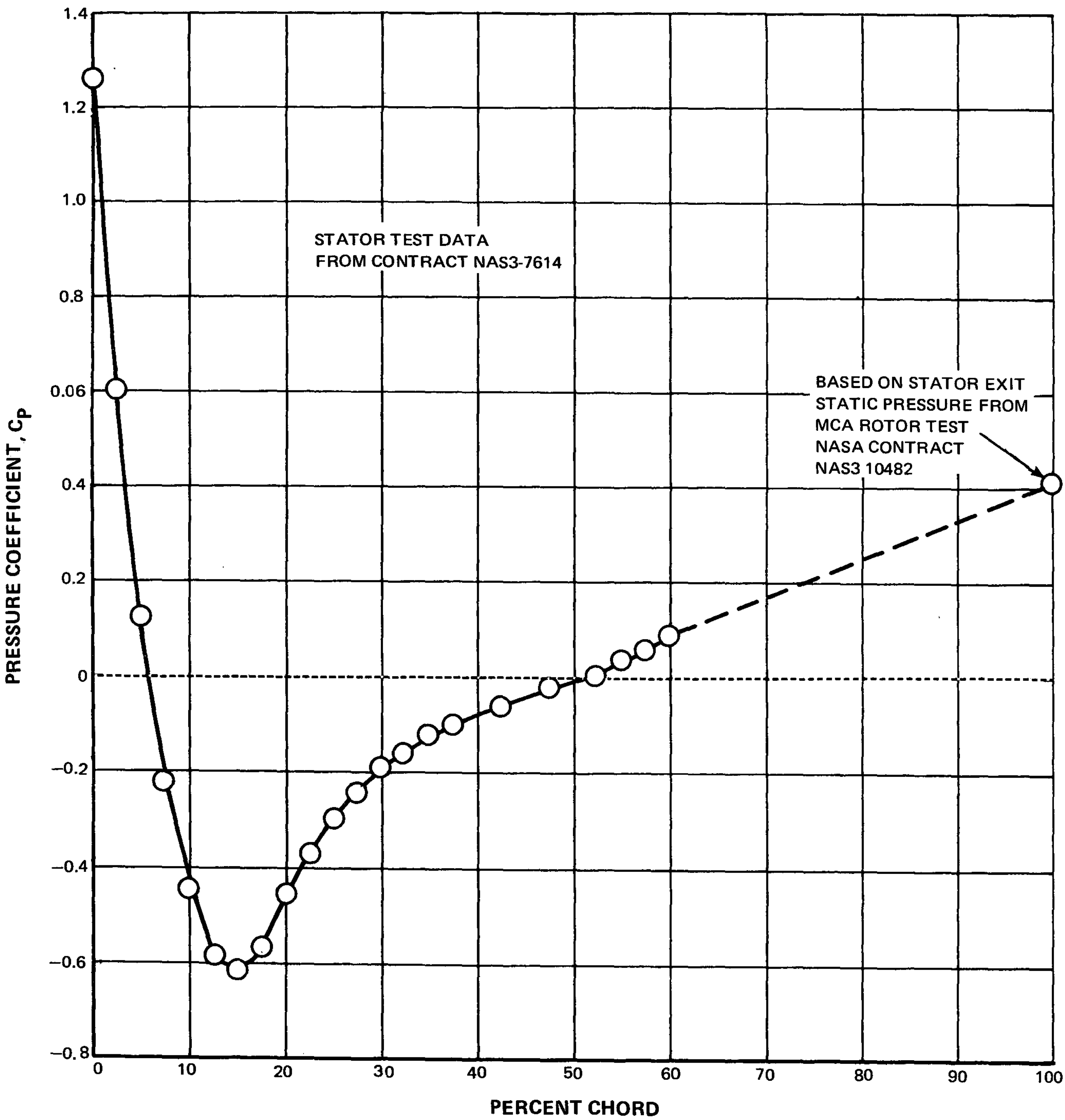


Figure 2 Chordwise Distribution of Pressure Coefficient

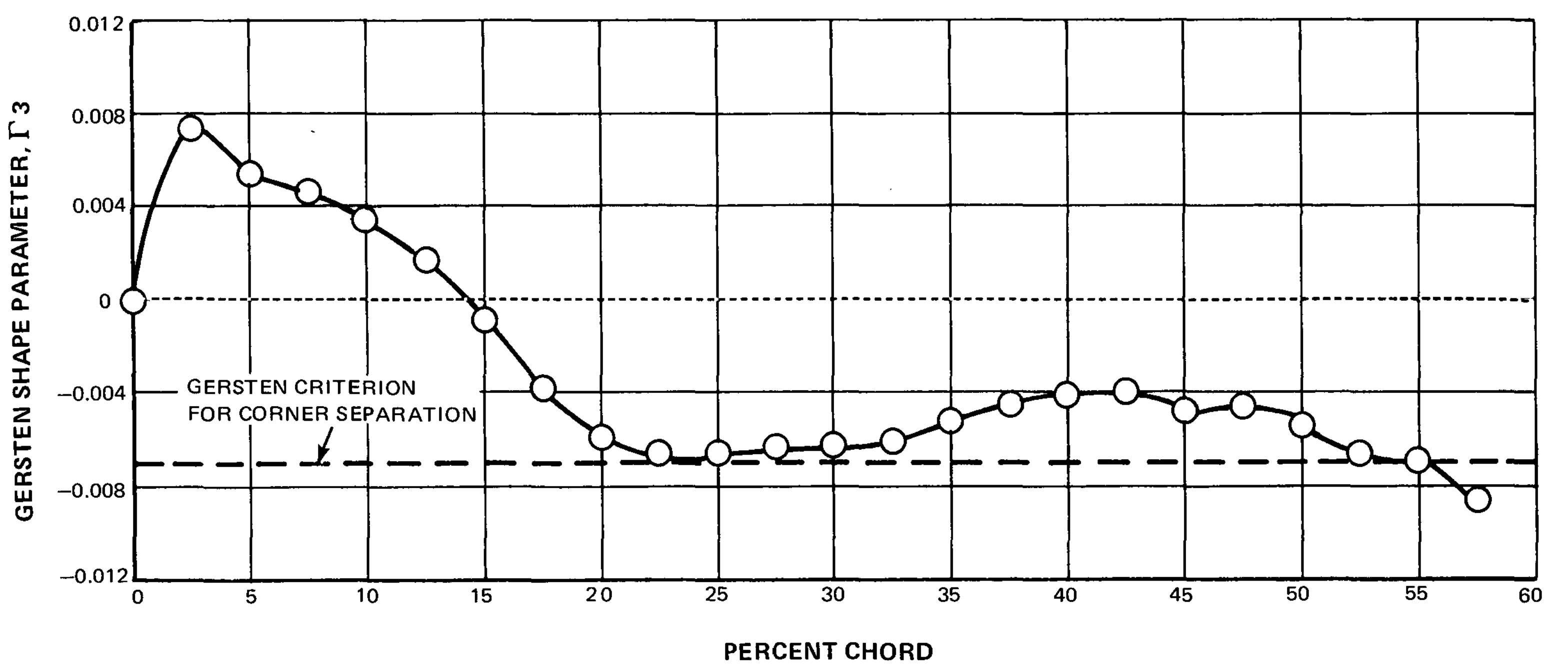


Figure 3 Chordwise Distribution of Gersten Shape Parameter

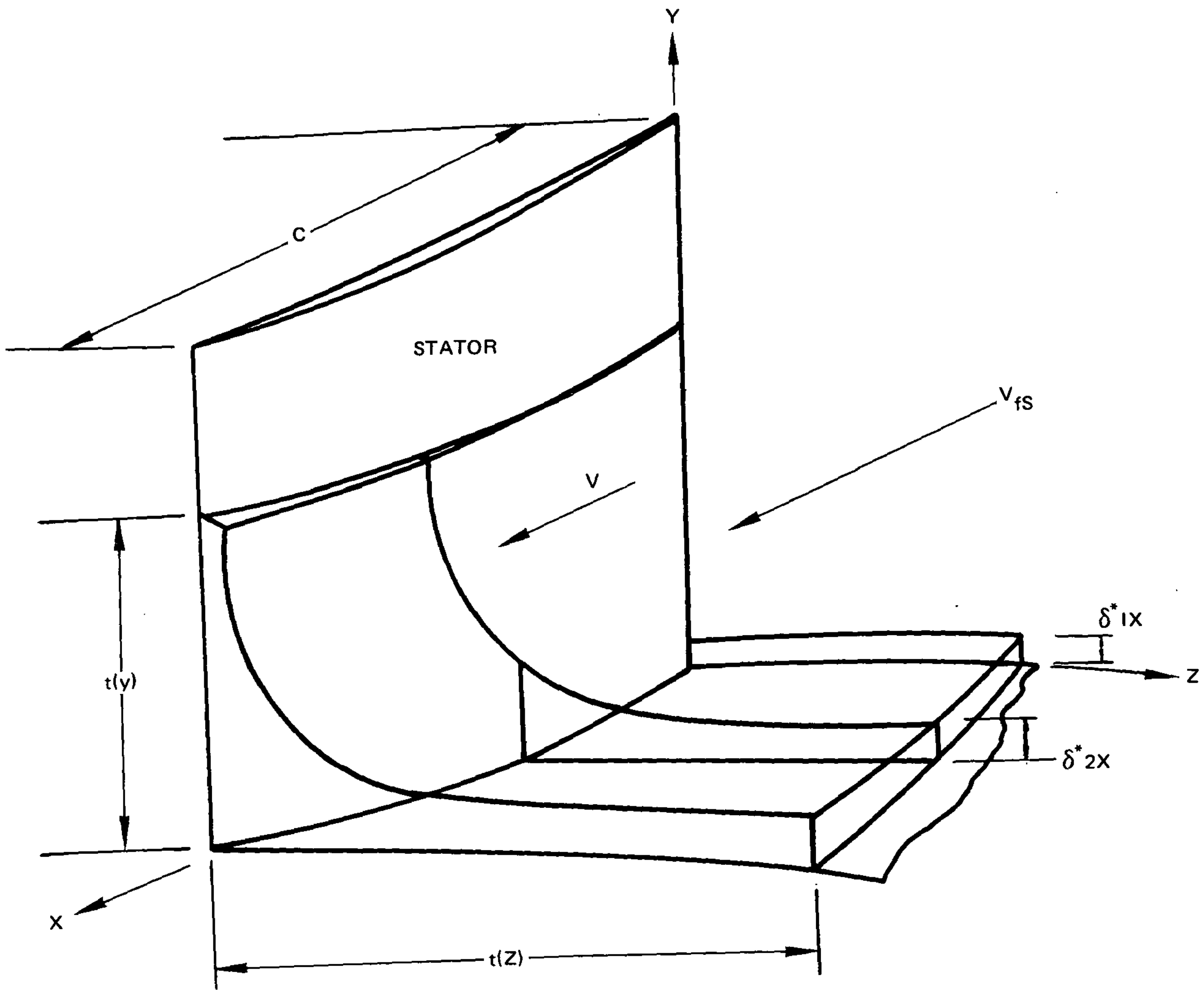


Figure 4 Three Dimensional Corner Boundary Layer

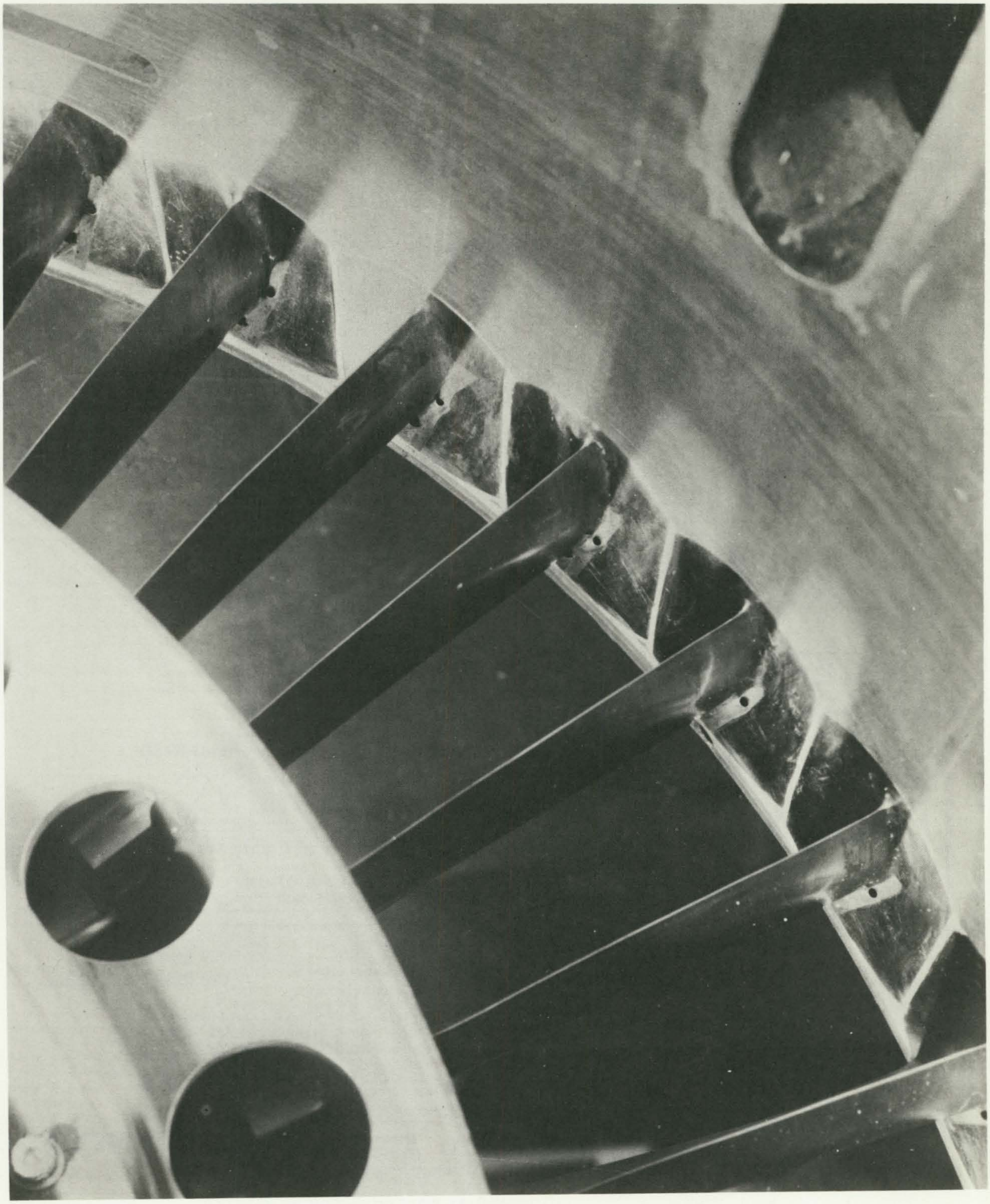


Figure 5 Stator Blow Configuration

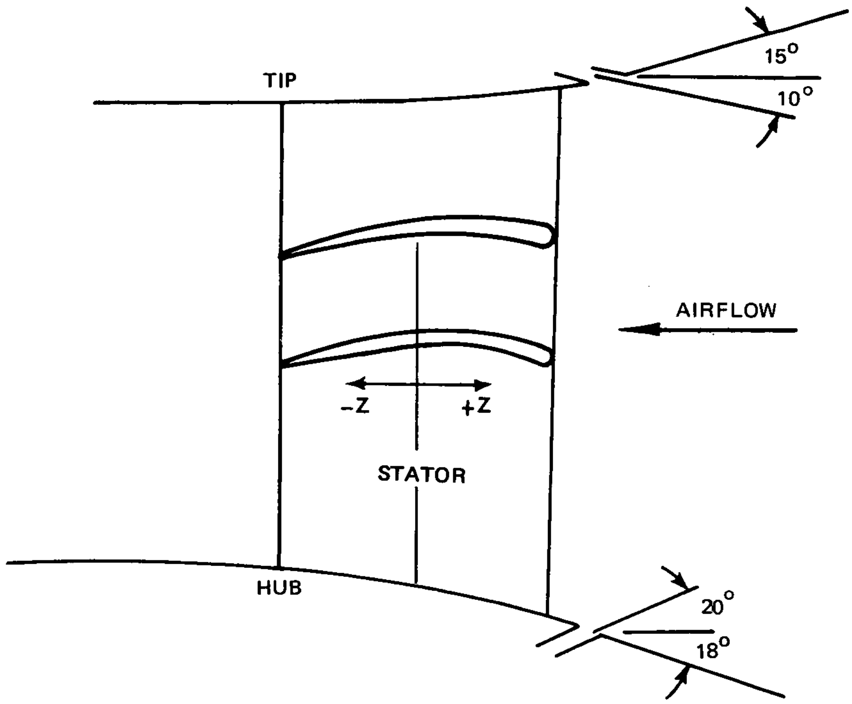


Figure 6 Wall-Suction-Slit Configuration

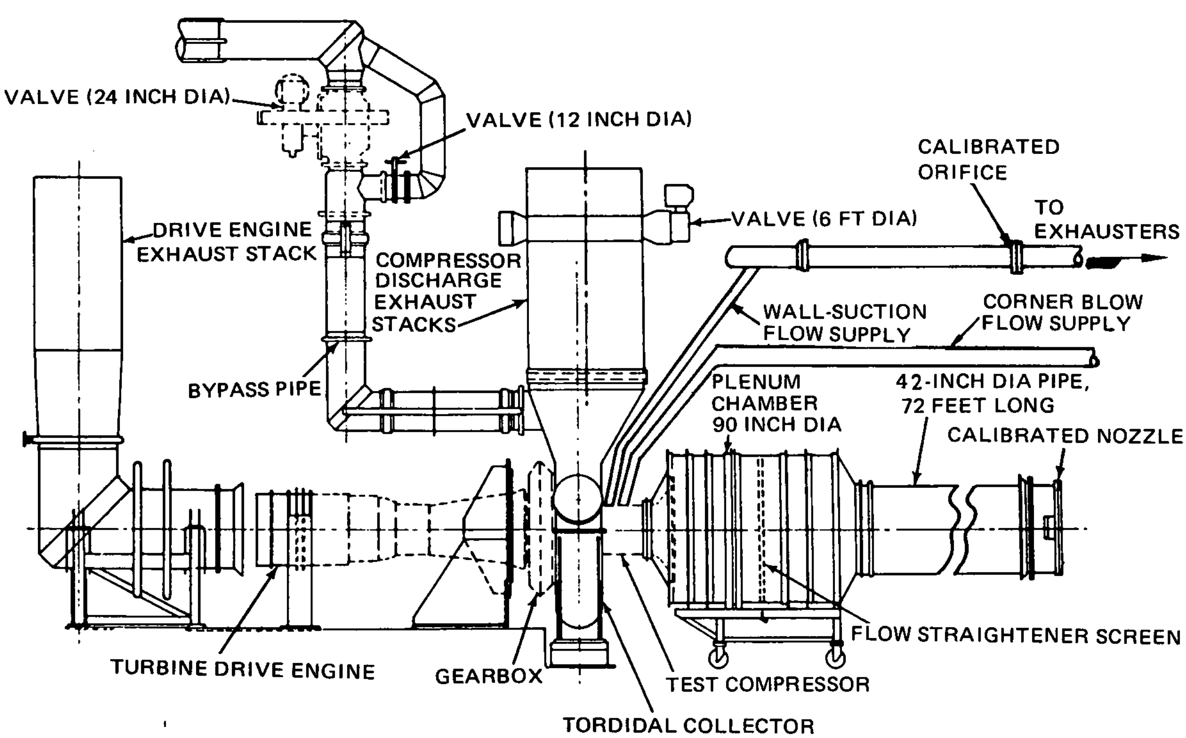
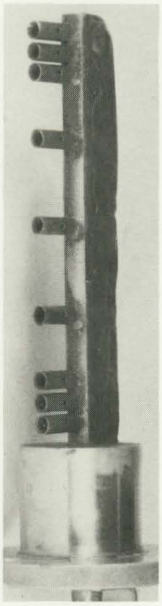
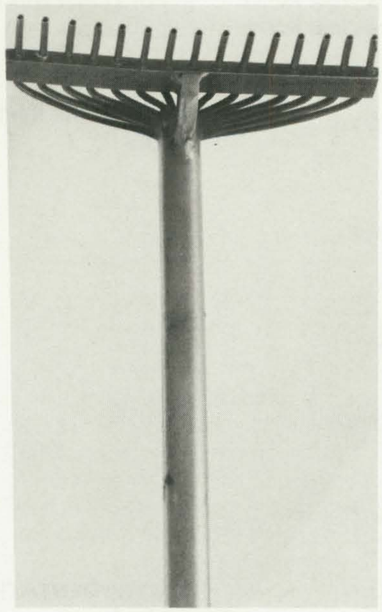


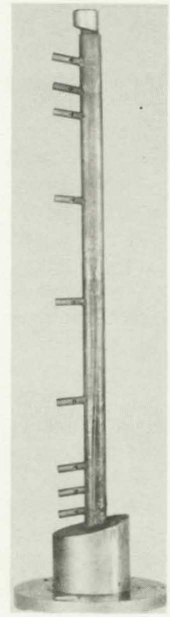
Figure 7 Schematic of Compressor Test Facility



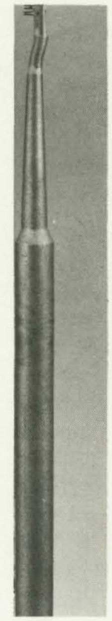
XP-99889
(a)
RADIAL
TEMPERATURE
RAKE



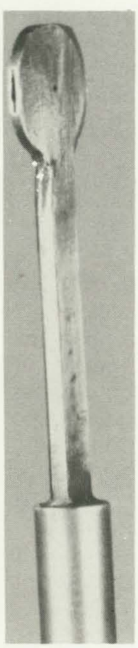
XPN-1815
(b)
TRAVERSABLE
TOTAL PRESSURE
RAKE



XP-99886
(c)
TOTAL
PRESSURE
RAKE

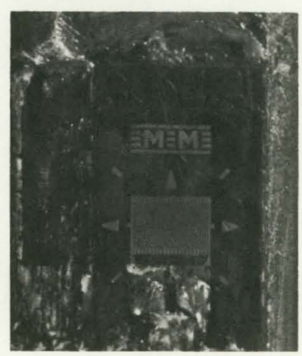


XPN-660
(d)
COMBINATION
PROBE



XP-99893
(e)
TRAVERSABLE
DISK
PROBE

XP-19285
(f)
HOT
FILM
PROBE



XP-19286

Figure 8 Typical Instrumentation

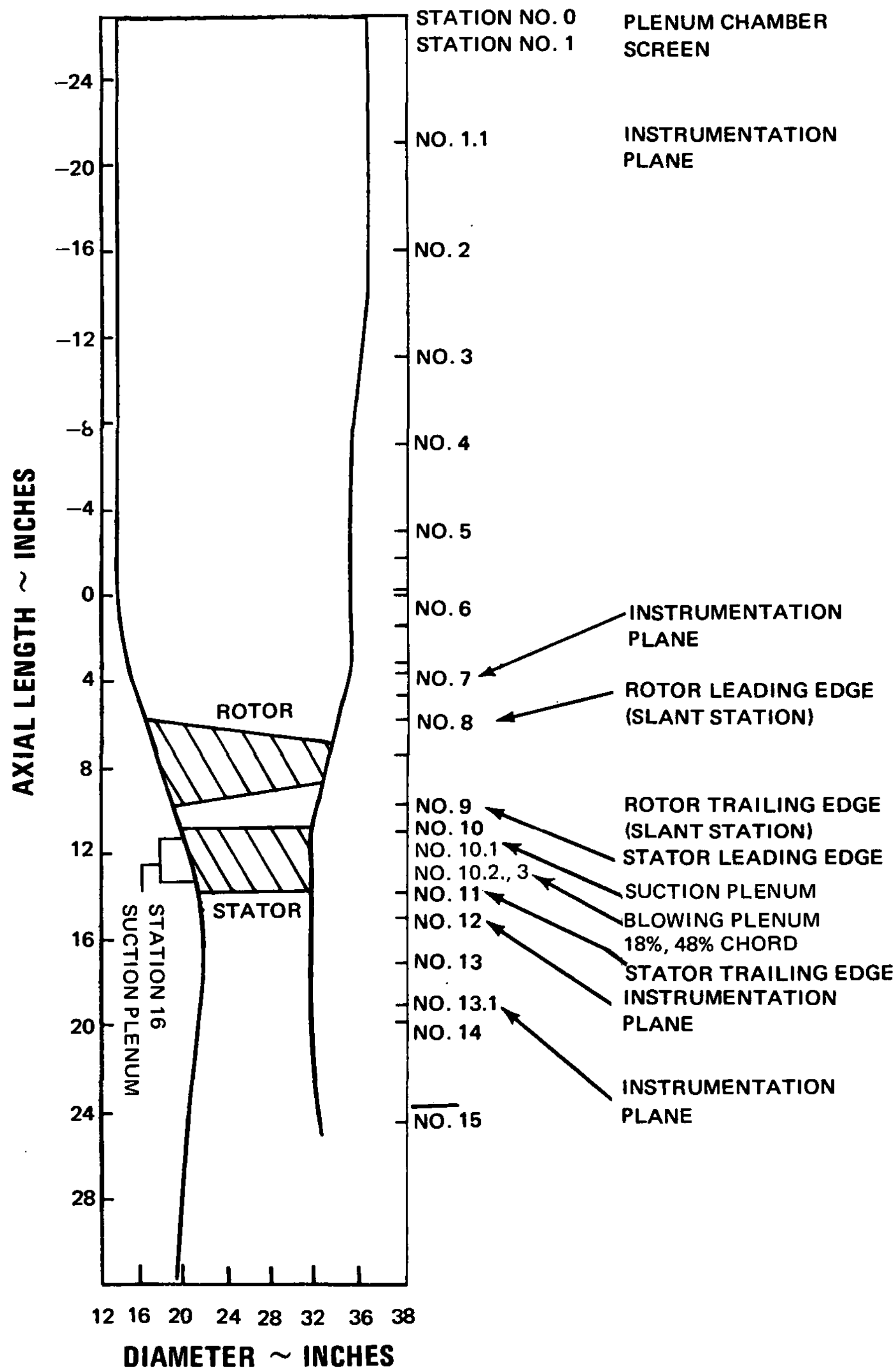


Figure 9 Axial Station Number Designation and Location of Instrumentation

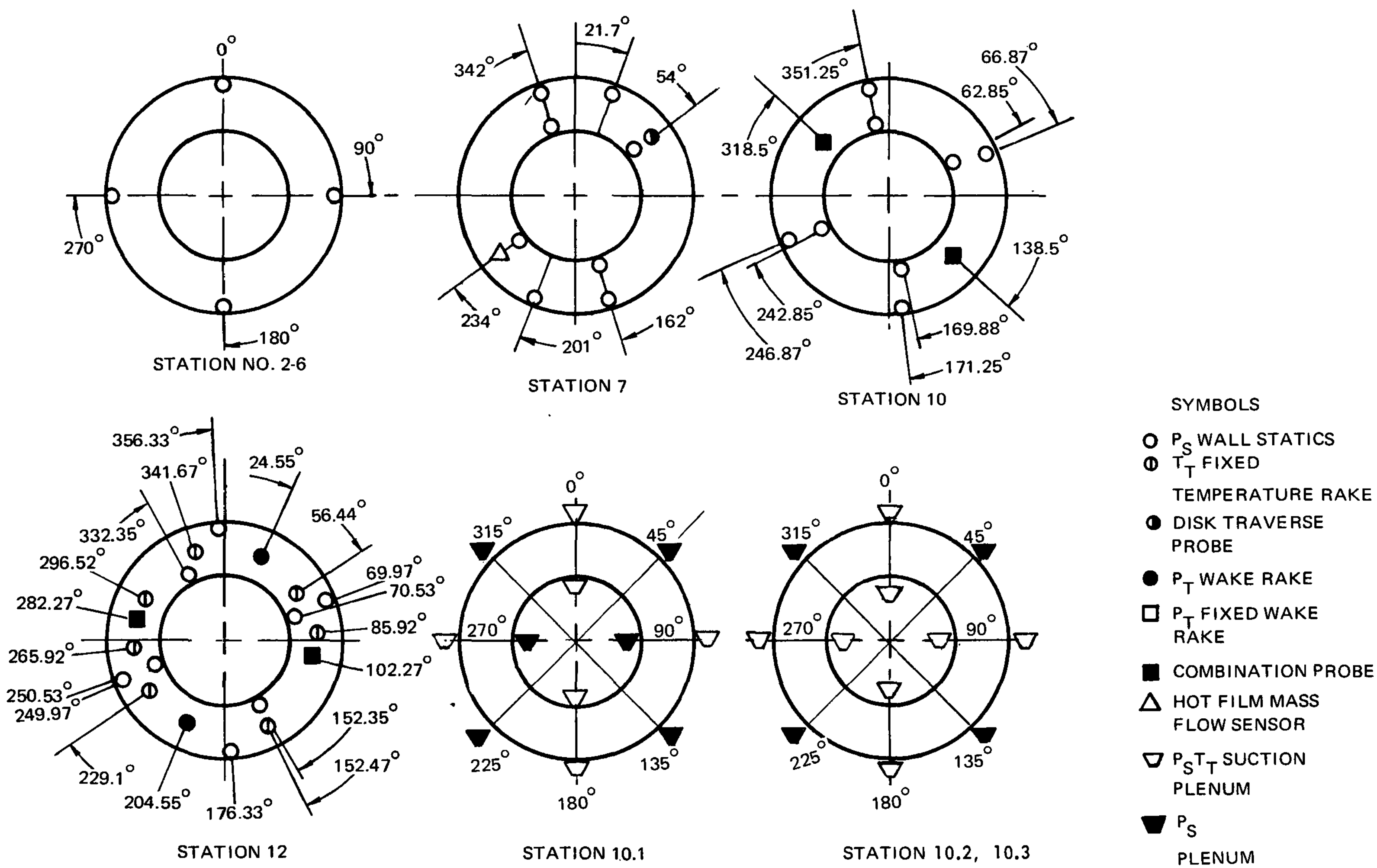


Figure 10 Circumferential Location of Instrumentation, Viewed from Rear

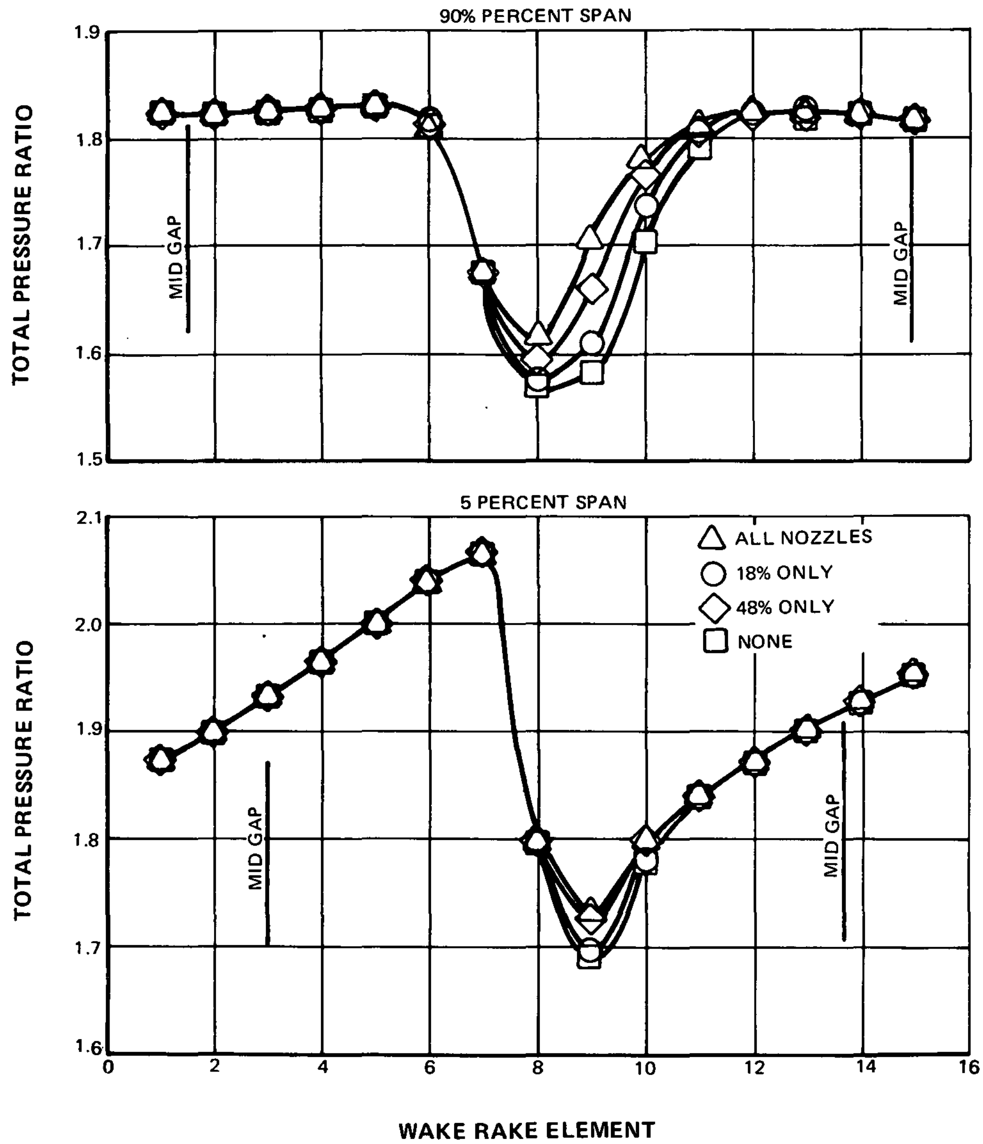


Figure 11 Stator Total Pressure Wakes With Partial and Full Blowing

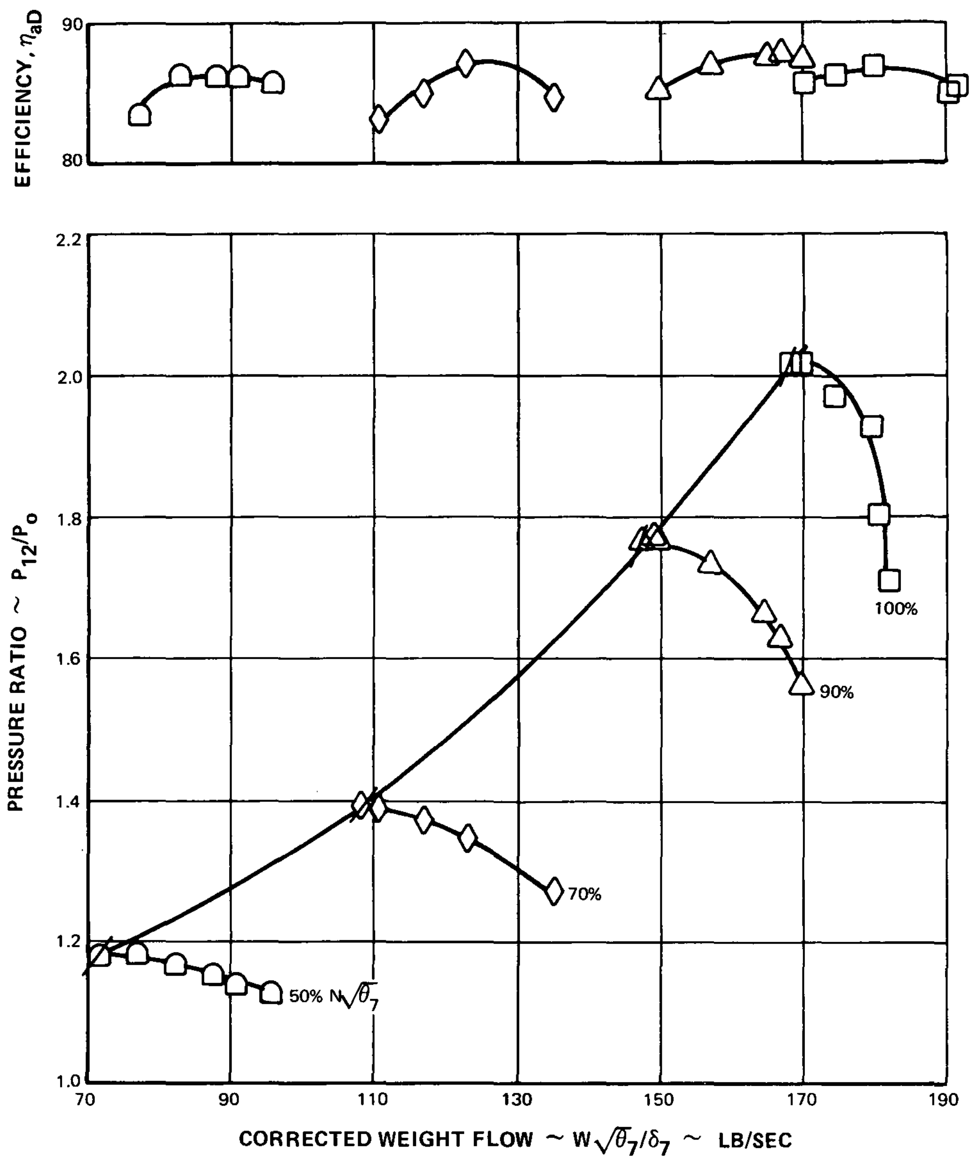


Figure 12 Rotor Overall Performance

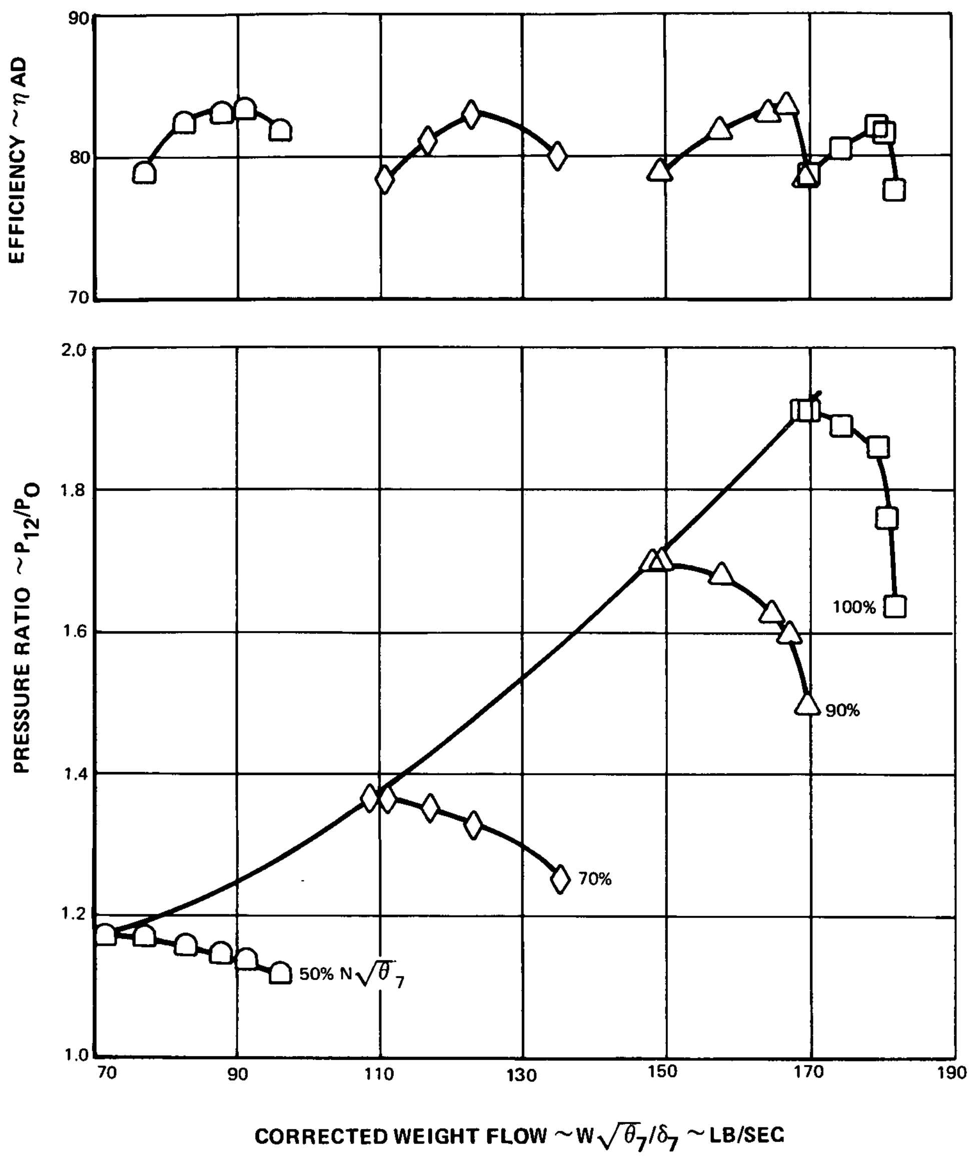


Figure 13 Stage Overall Performance - Baseline

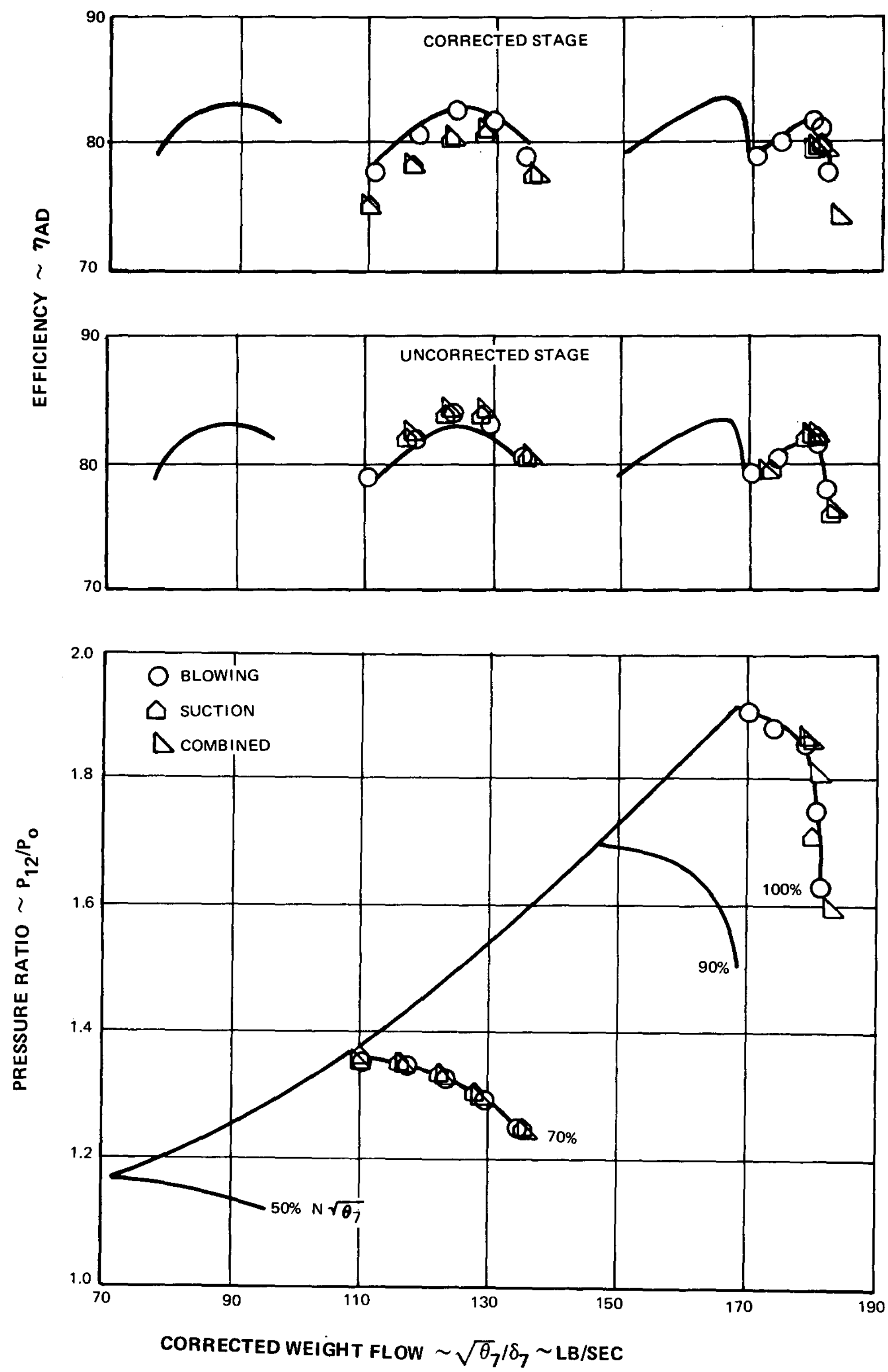


Figure 14 Stage Overall Performance - Blowing, Suction, Combined Blowing and Suction

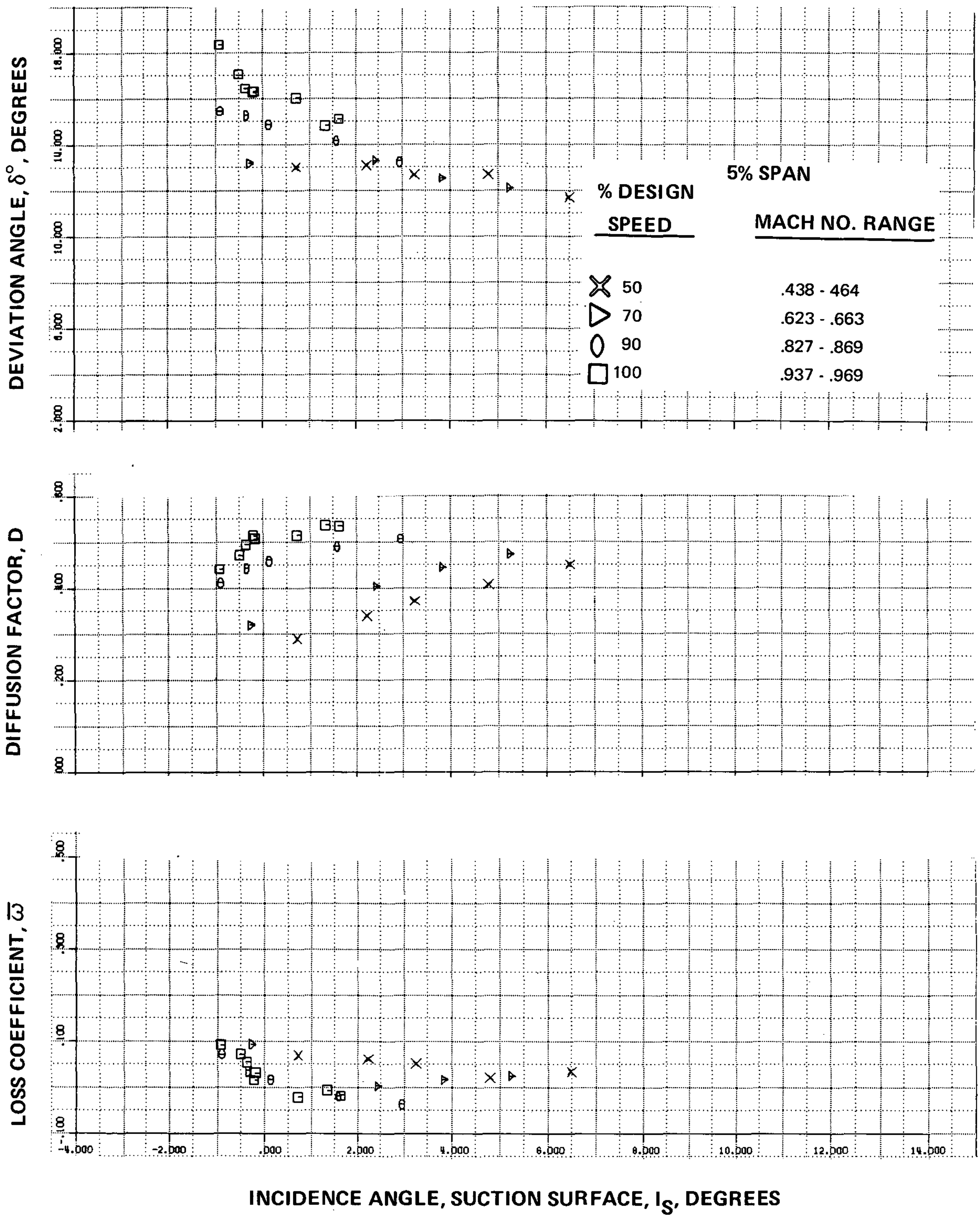


Figure 15a Blade Element Data - Rotor

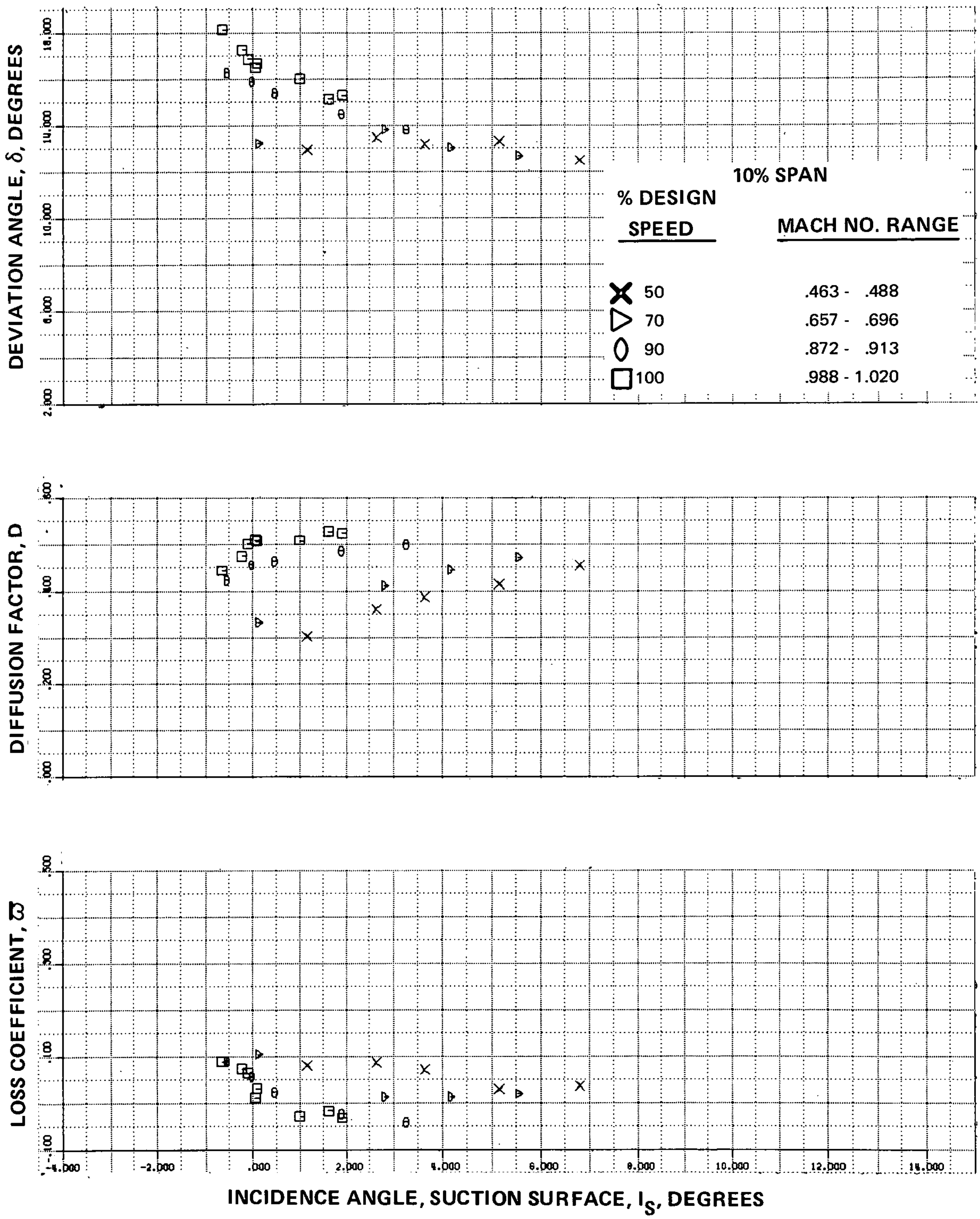


Figure 15b Blade Element Data - Rotor

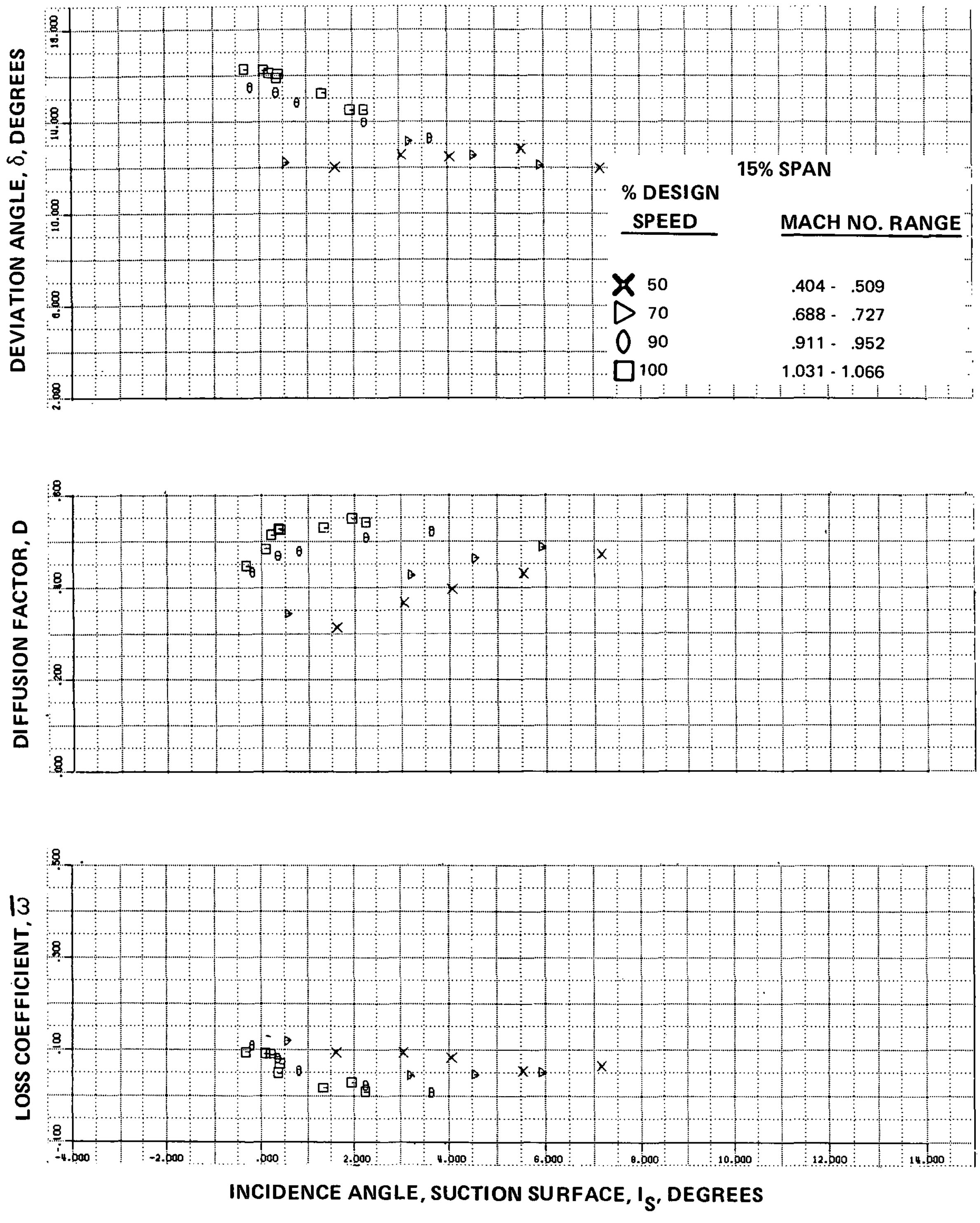


Figure 15c Blade Element Data - Rotor

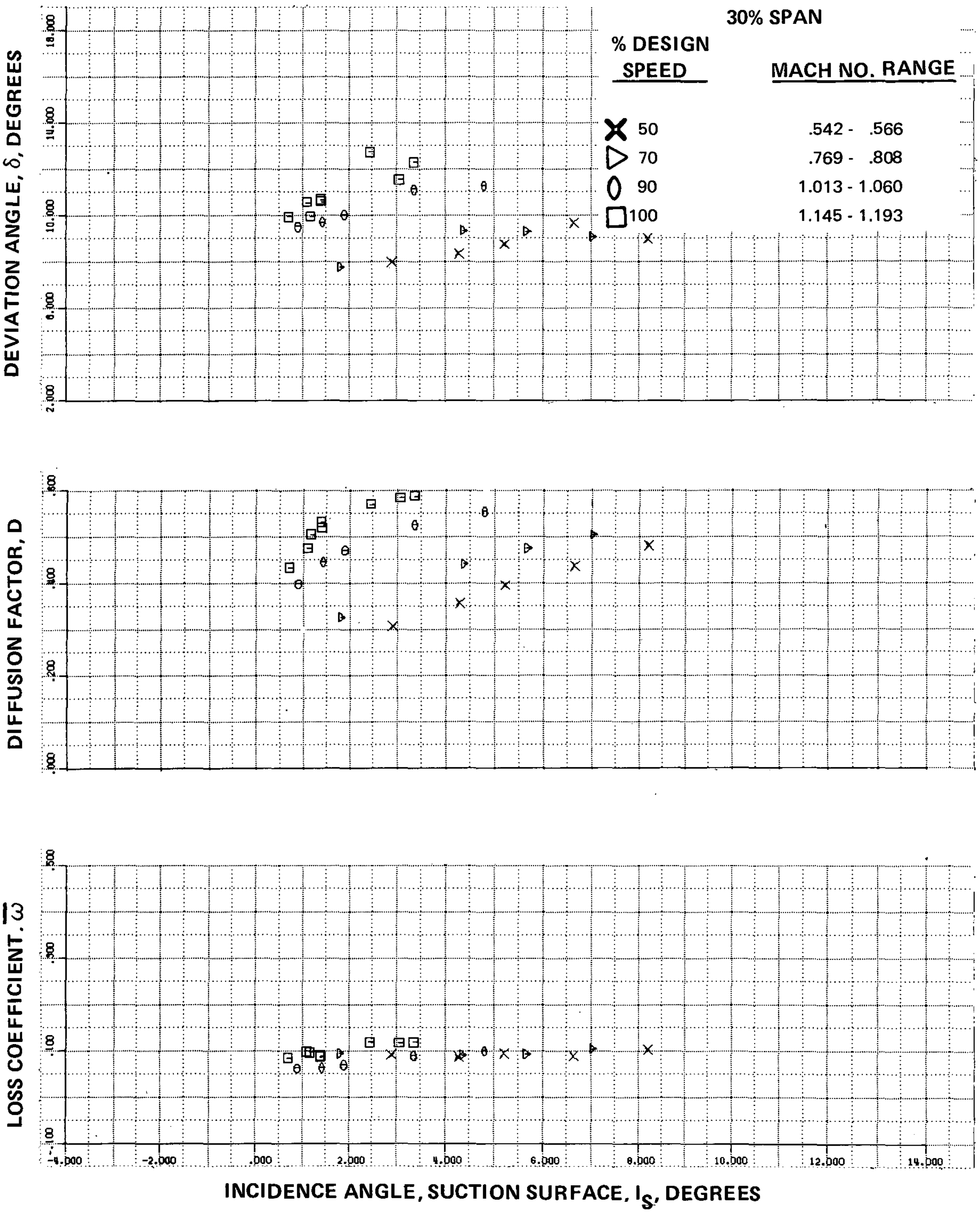


Figure 15d Blade Element Data - Rotor

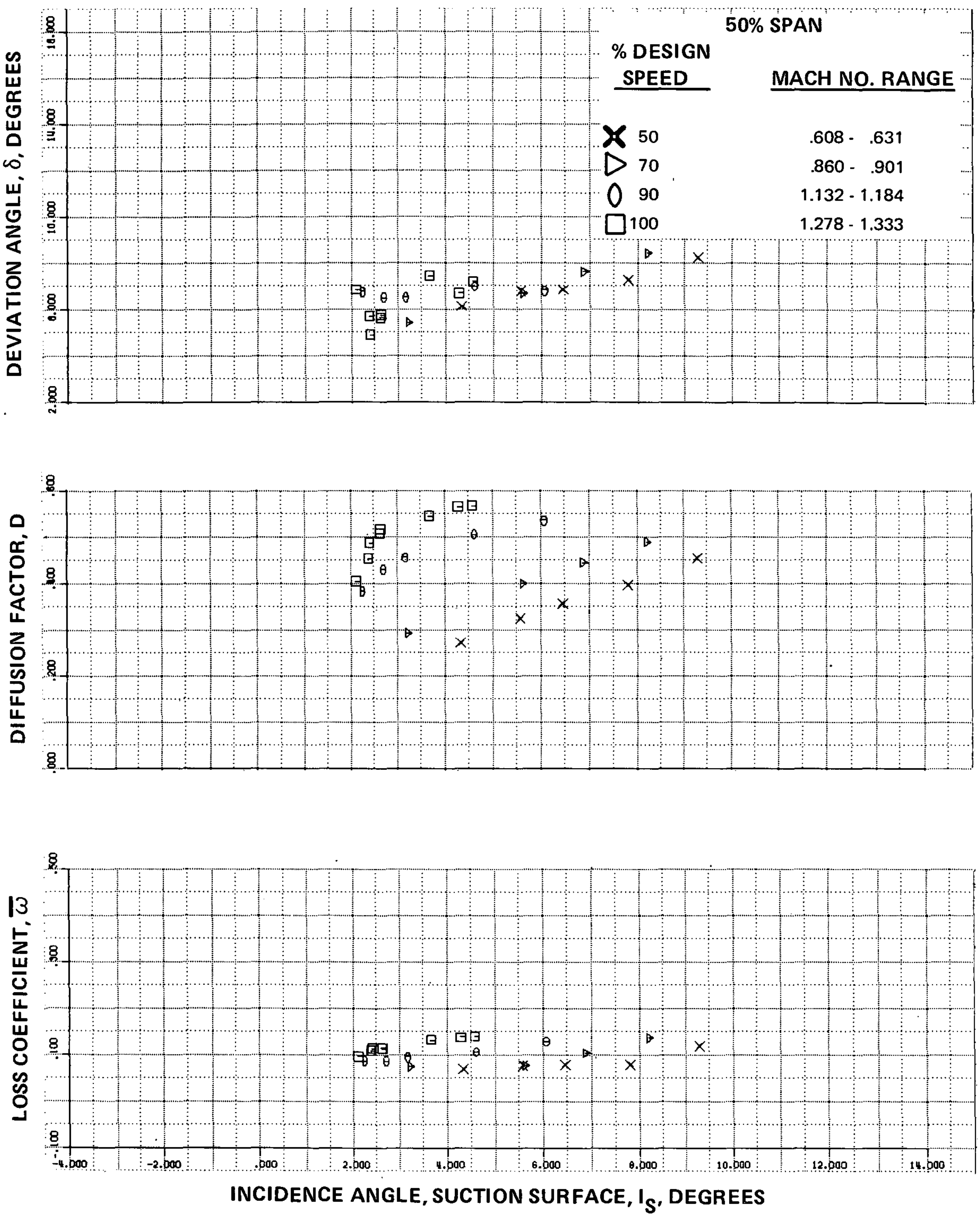


Figure 15e Blade Element Data - Rotor

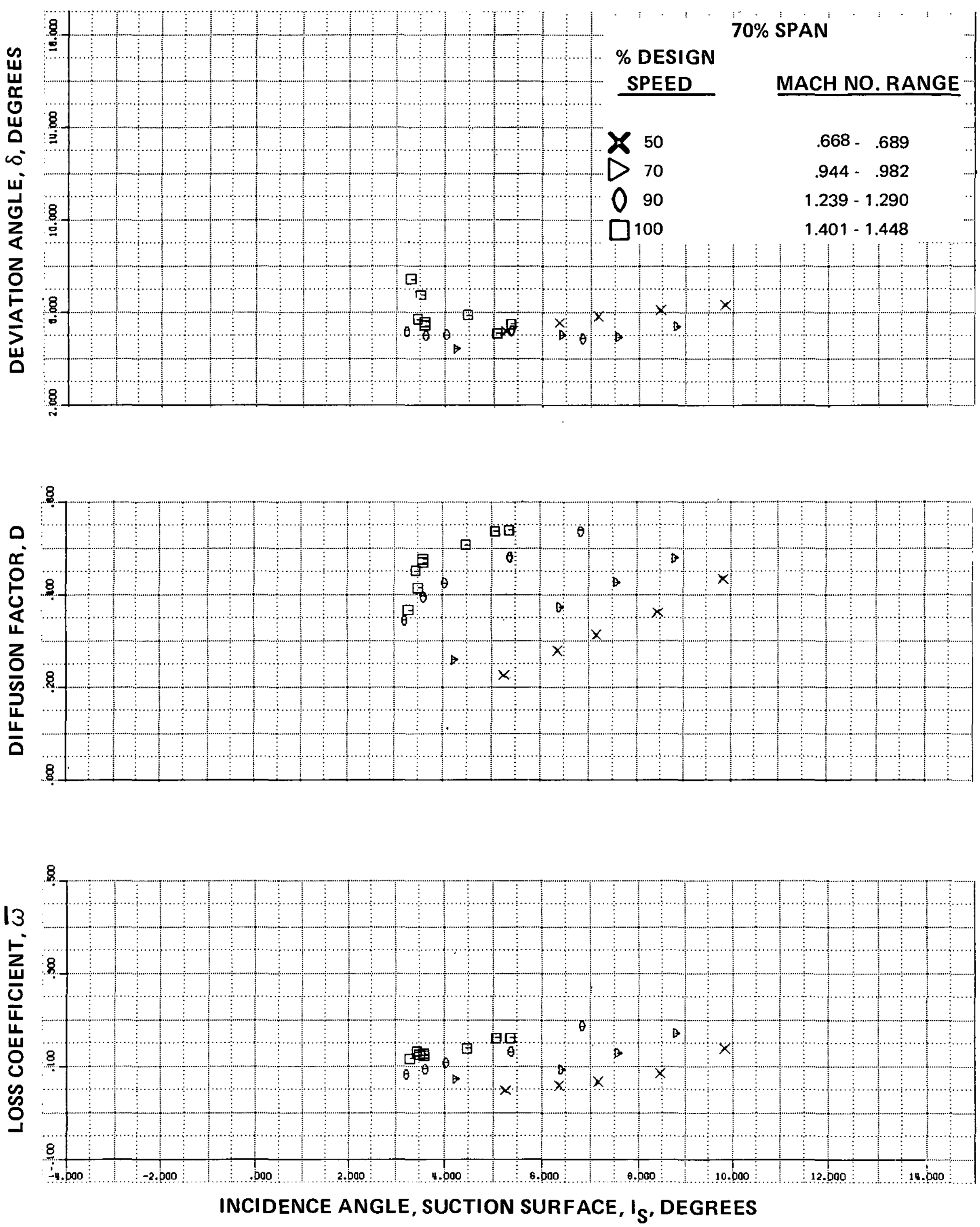


Figure 15f Blade Element Data - Rotor

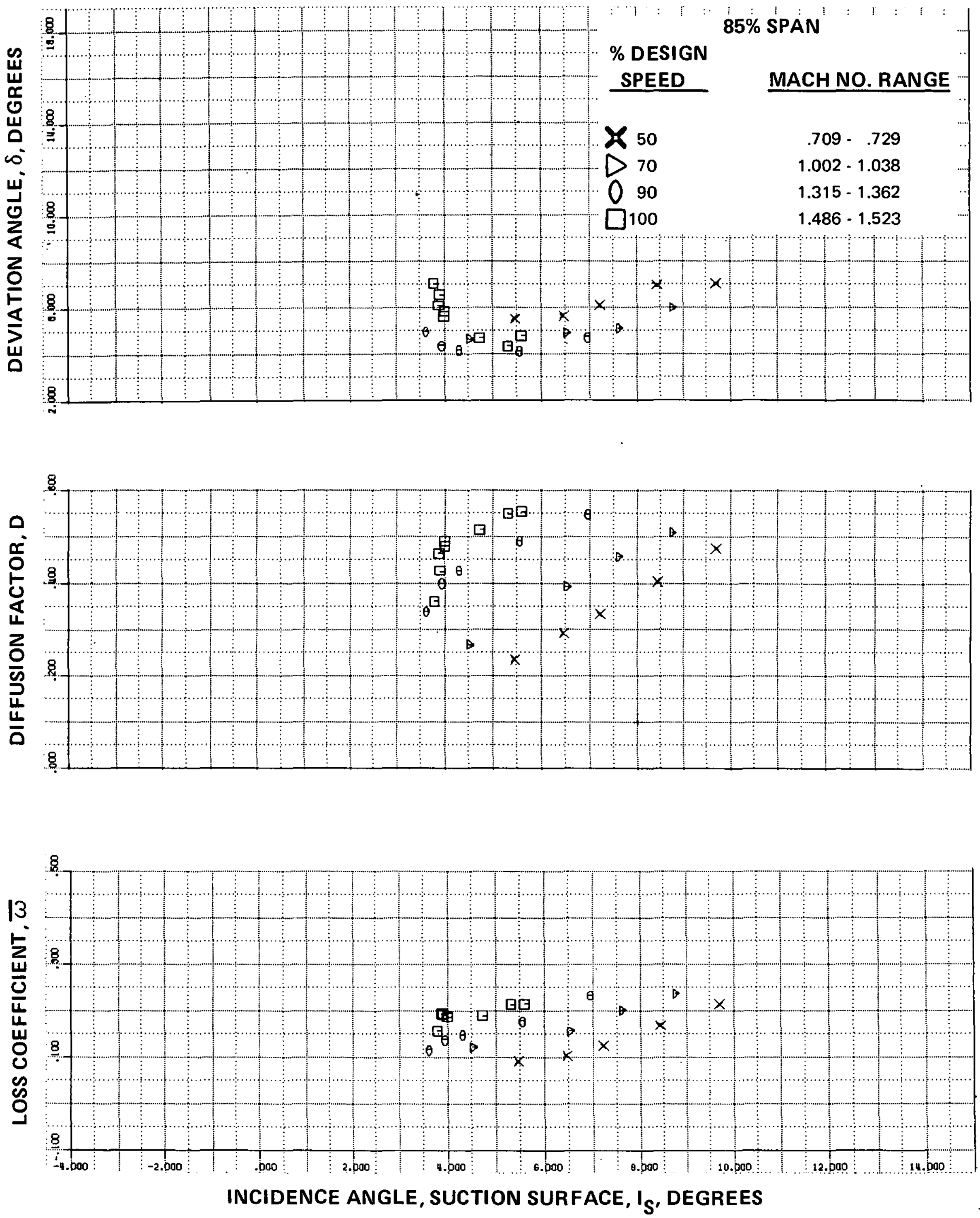


Figure 15g Blade Element Data - Rotor

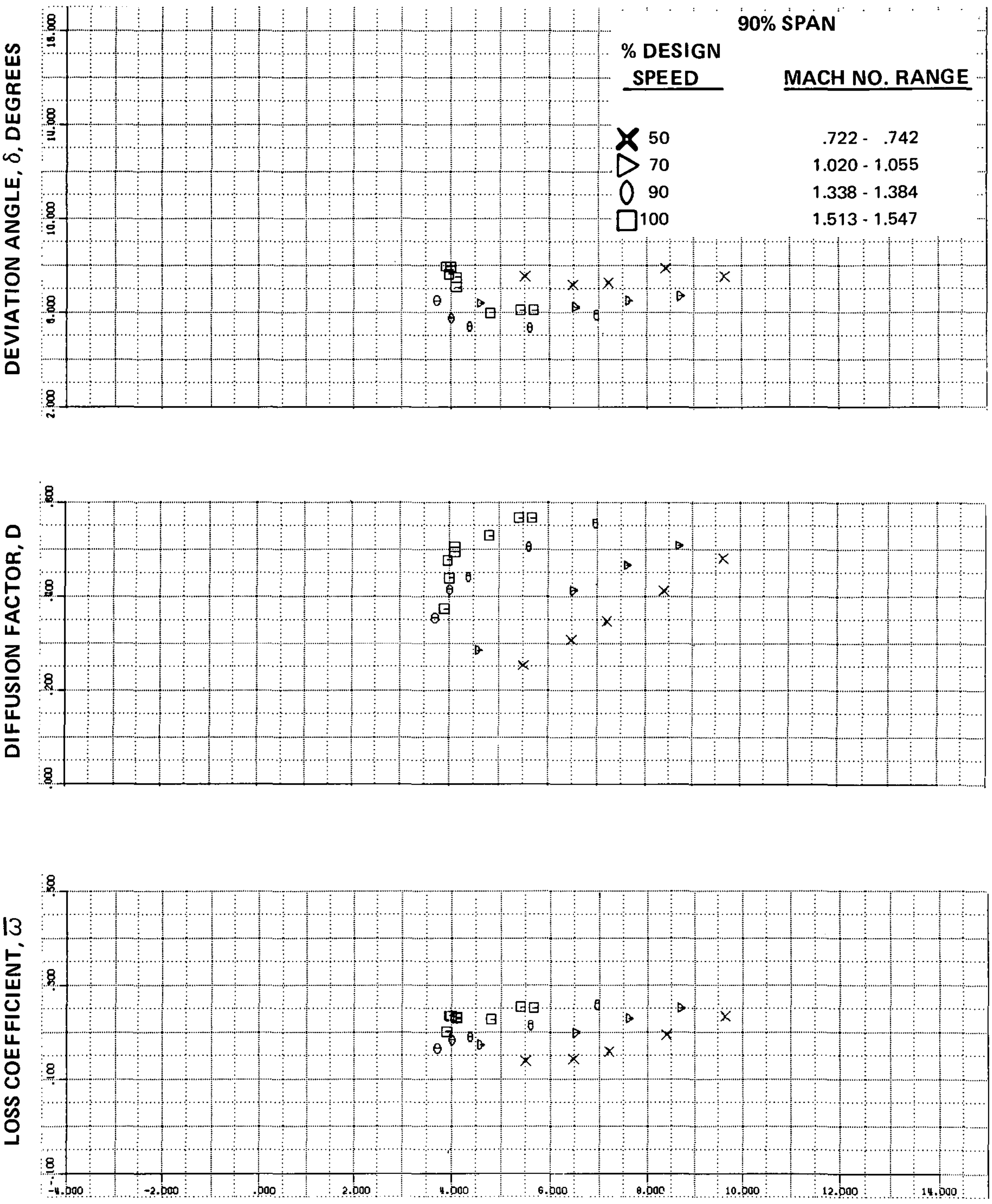


Figure 15h Blade Element Data - Rotor

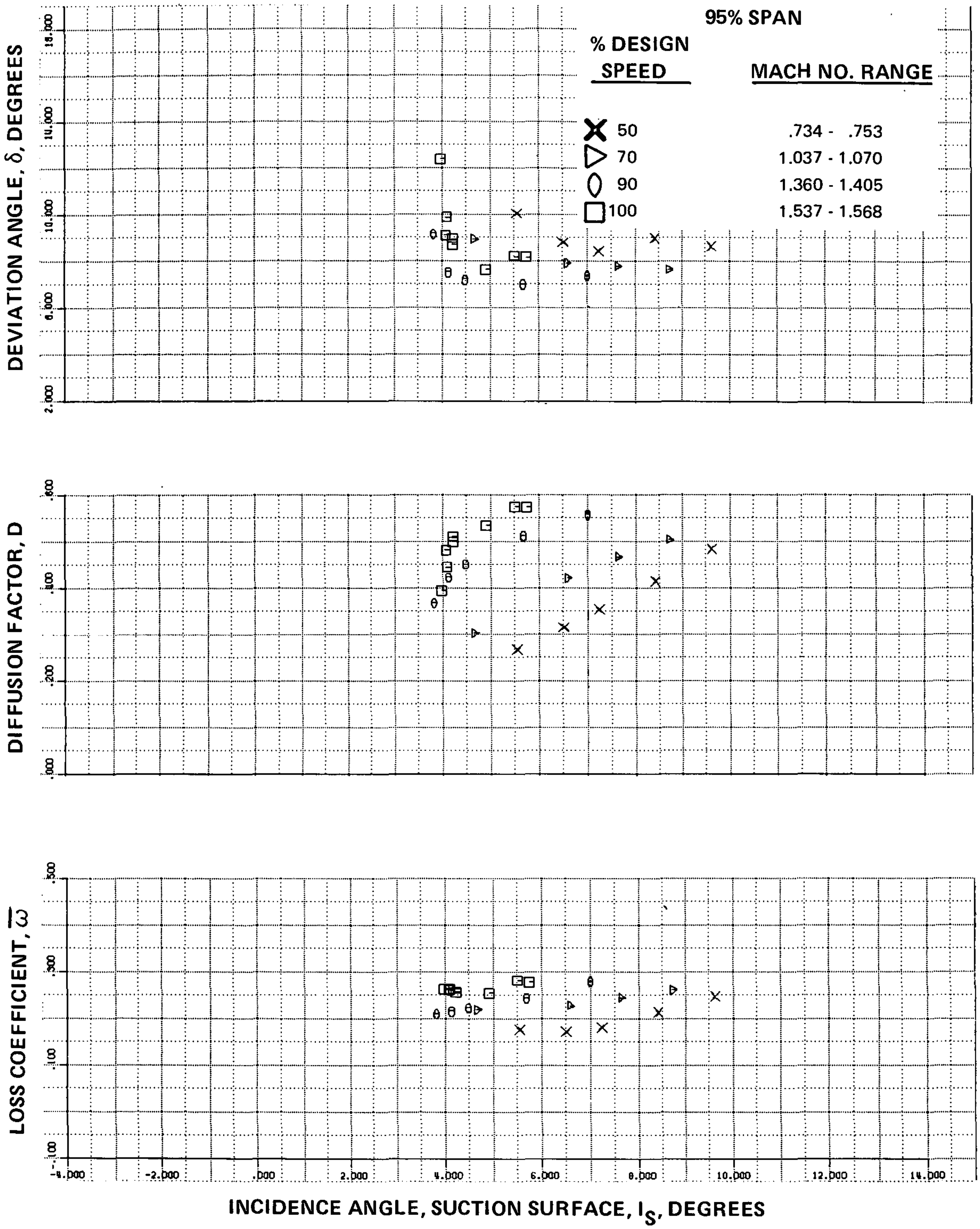


Figure 15i Blade Element Data - Rotor

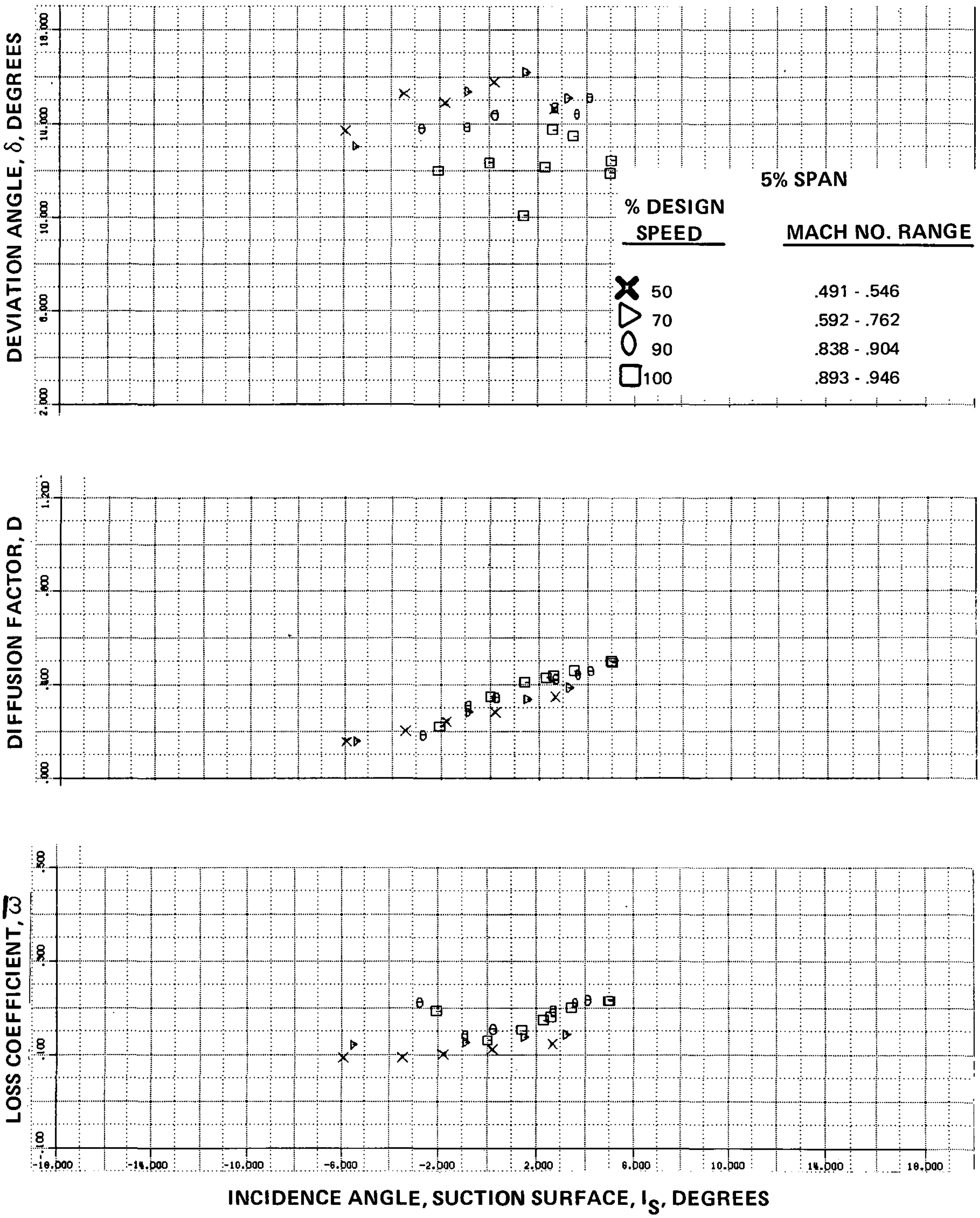


Figure 16a Blade Element Data - Baseline Stator

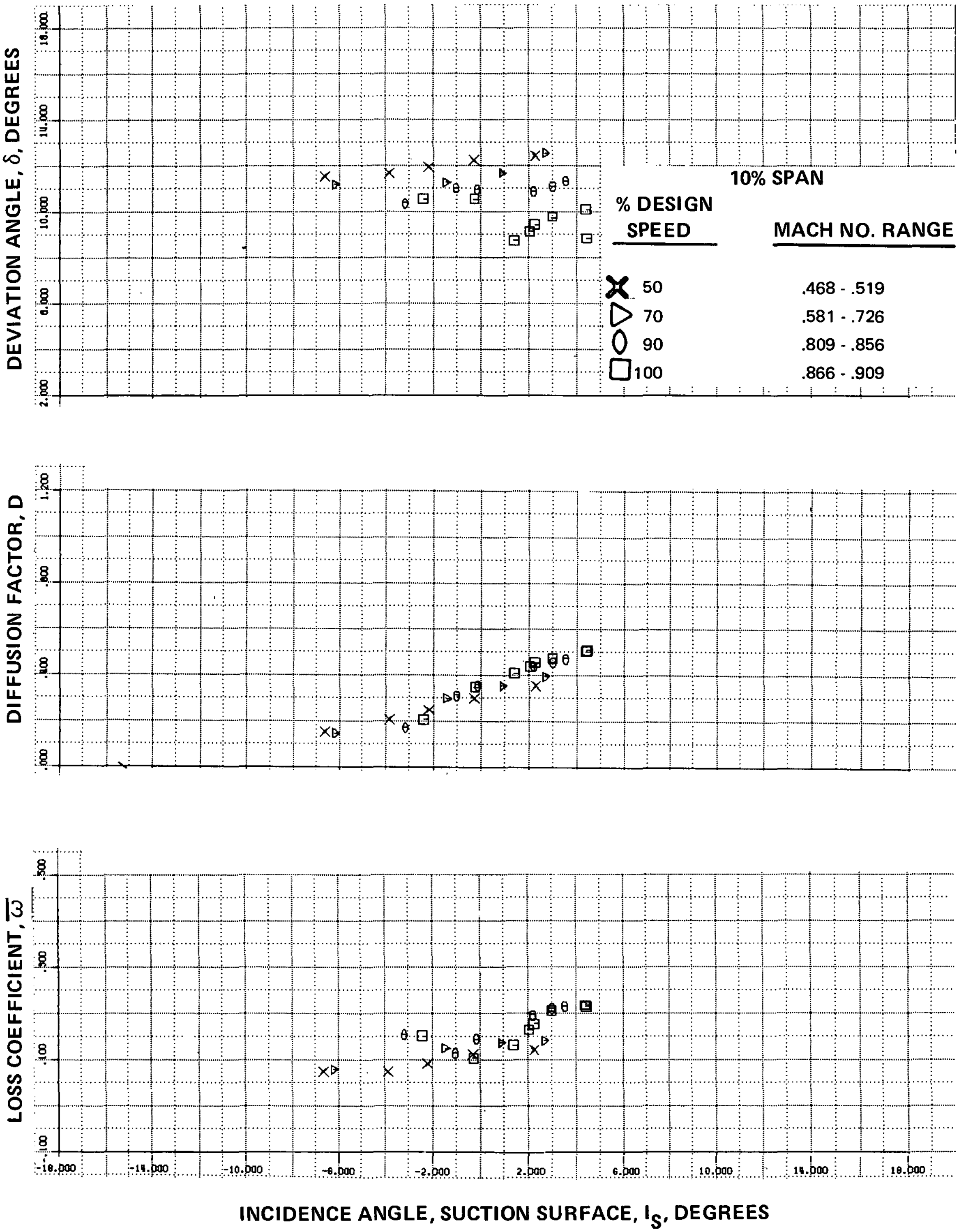
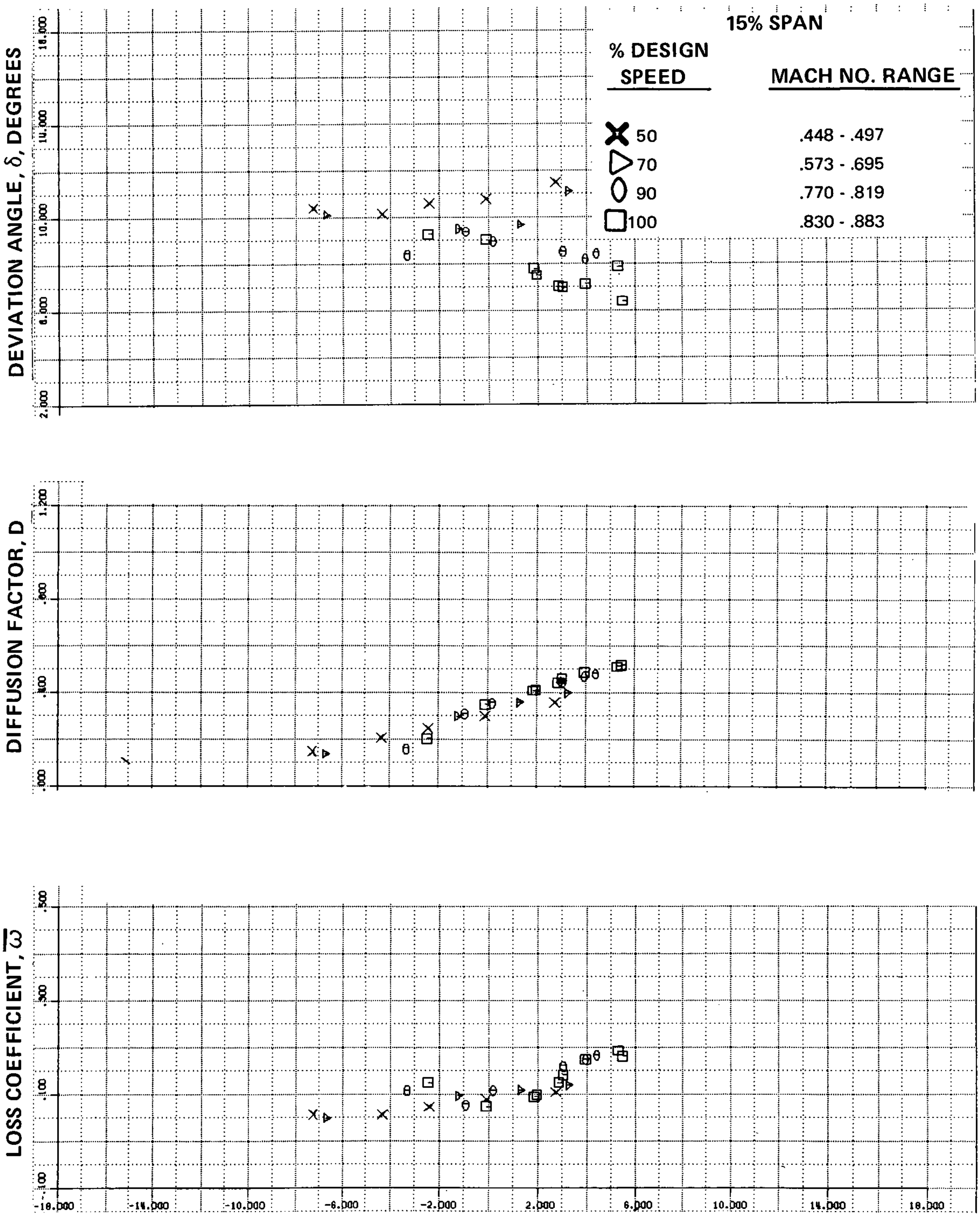


Figure 16b Blade Element Data - Baseline Stator



INCIDENCE ANGLE, SUCTION SURFACE, I_S, DEGREES

Figure 16c Blade Element Data - Baseline Stator

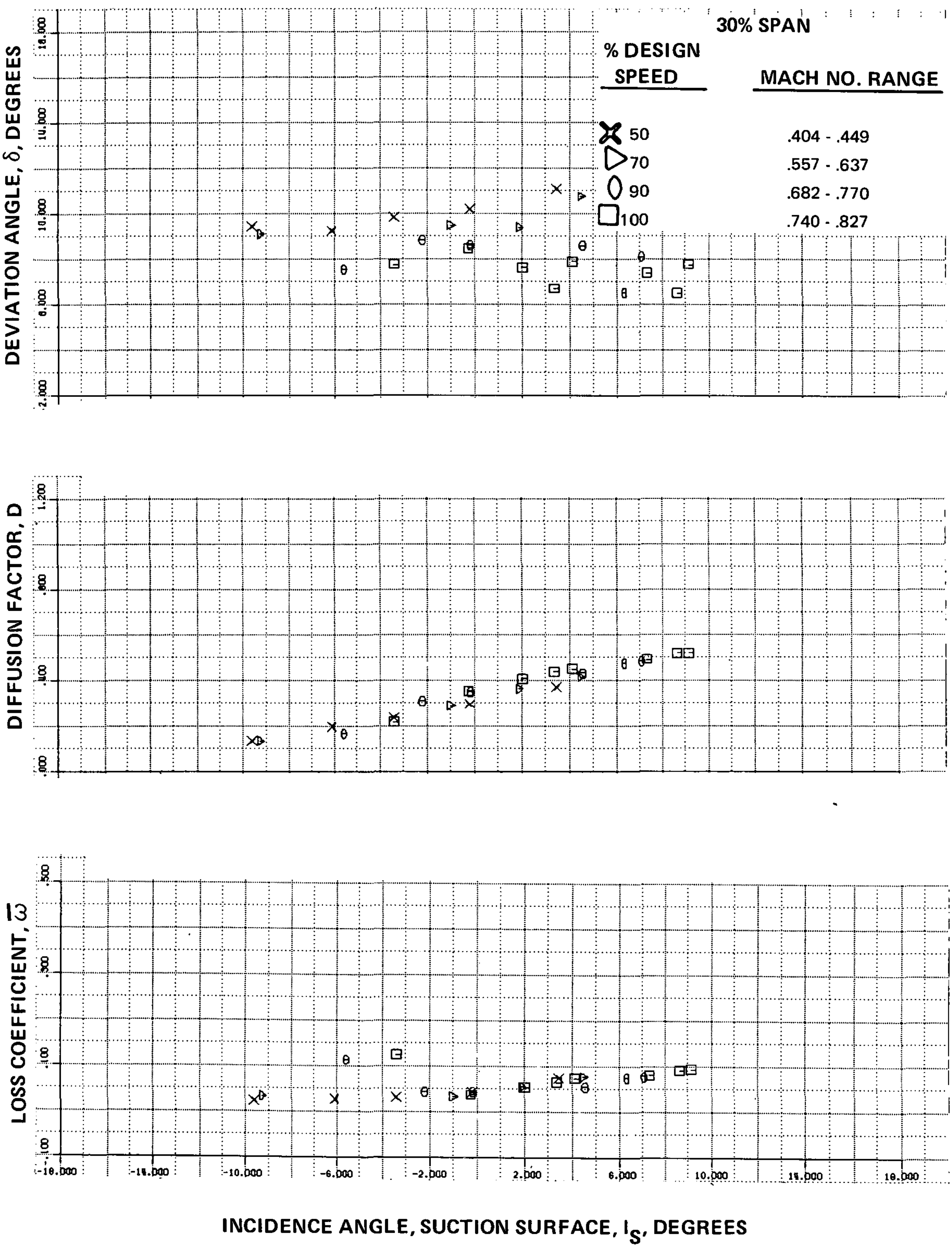


Figure 16d Blade Element Data - Baseline Stator

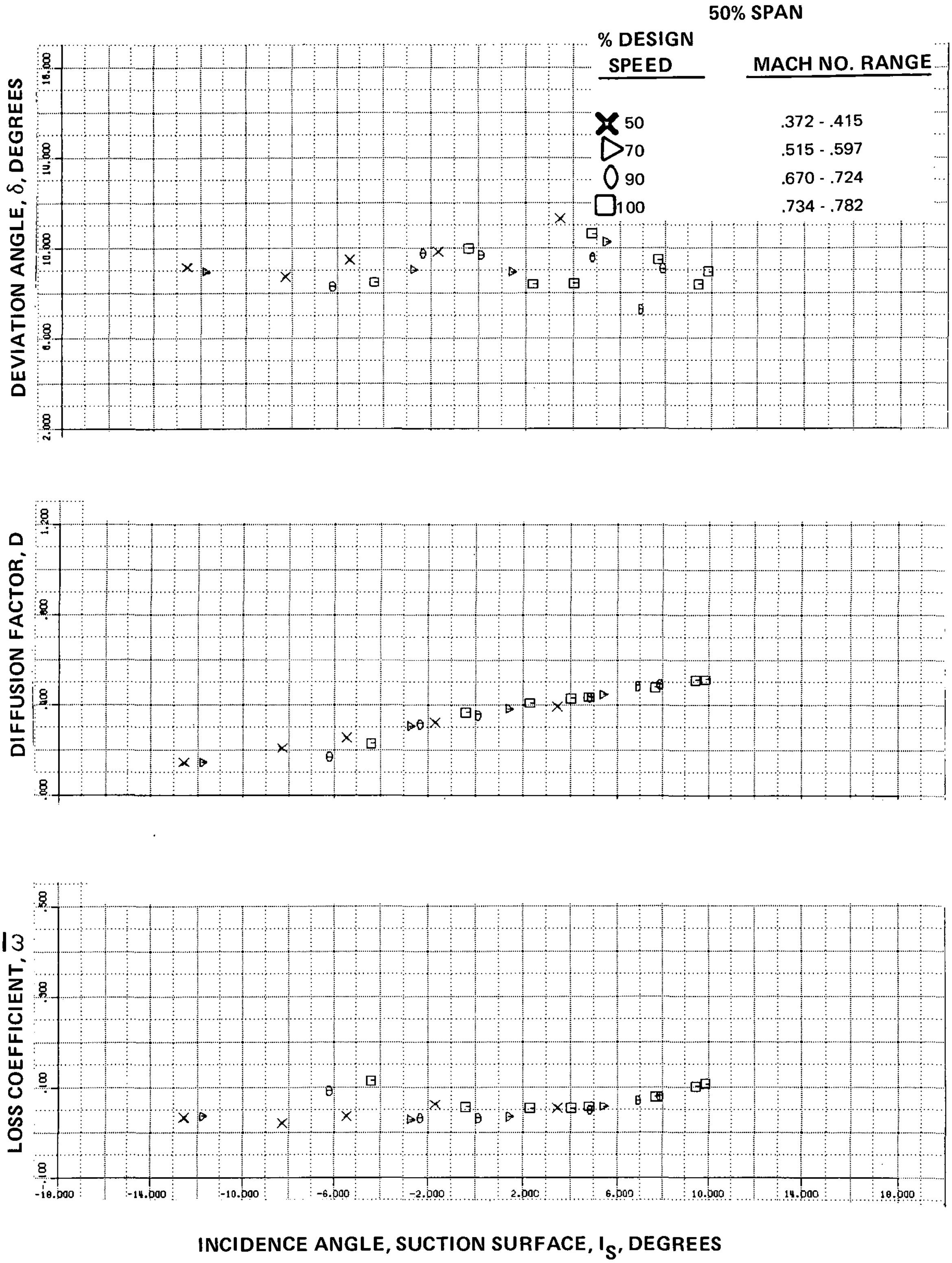


Figure 16e Blade Element Data - Baseline Stator

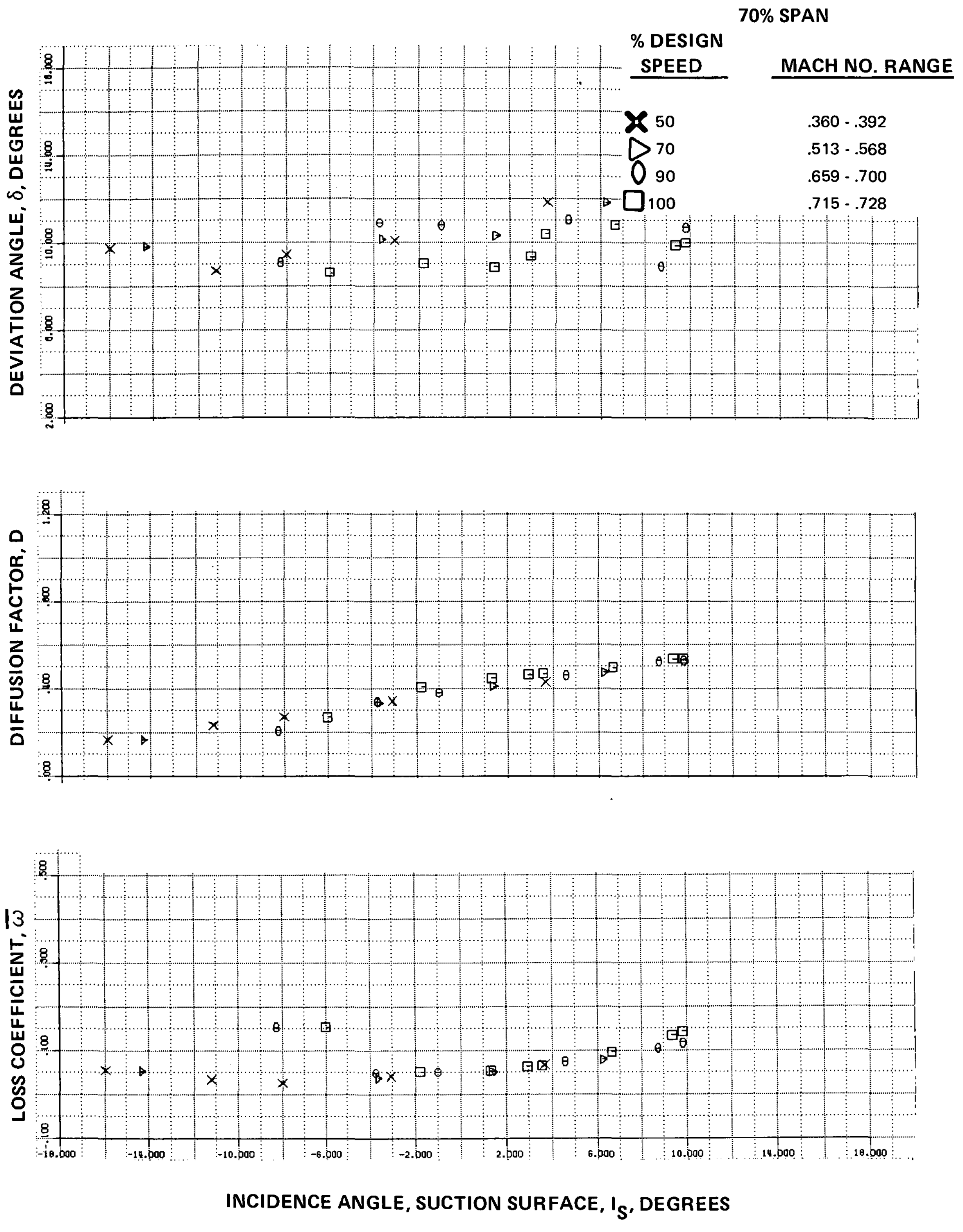


Figure 16f Blade Element Data - Baseline Stator

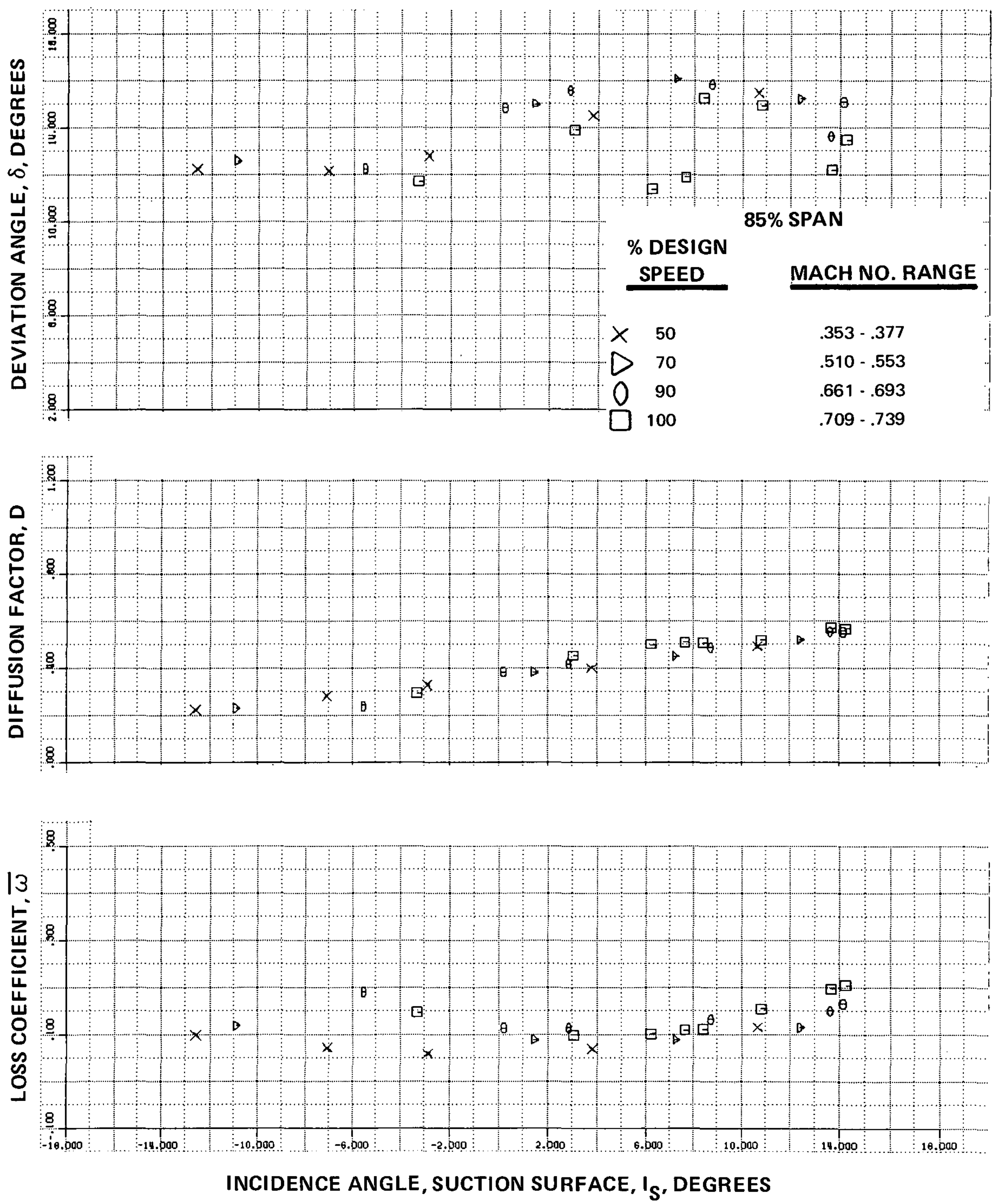


Figure 16g Blade Element Data - Baseline Stator

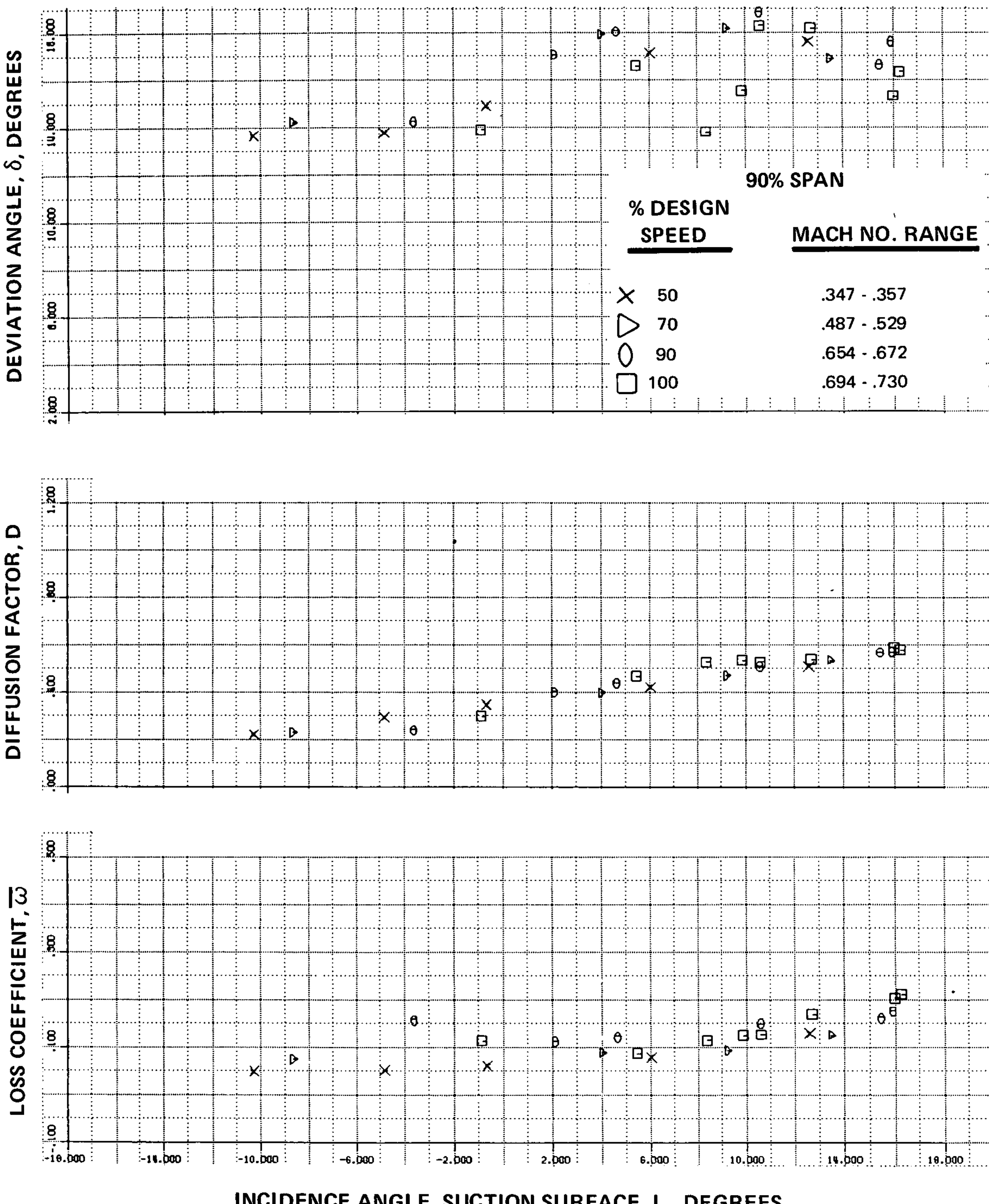


Figure 16h Blade Element Data - Baseline Stator

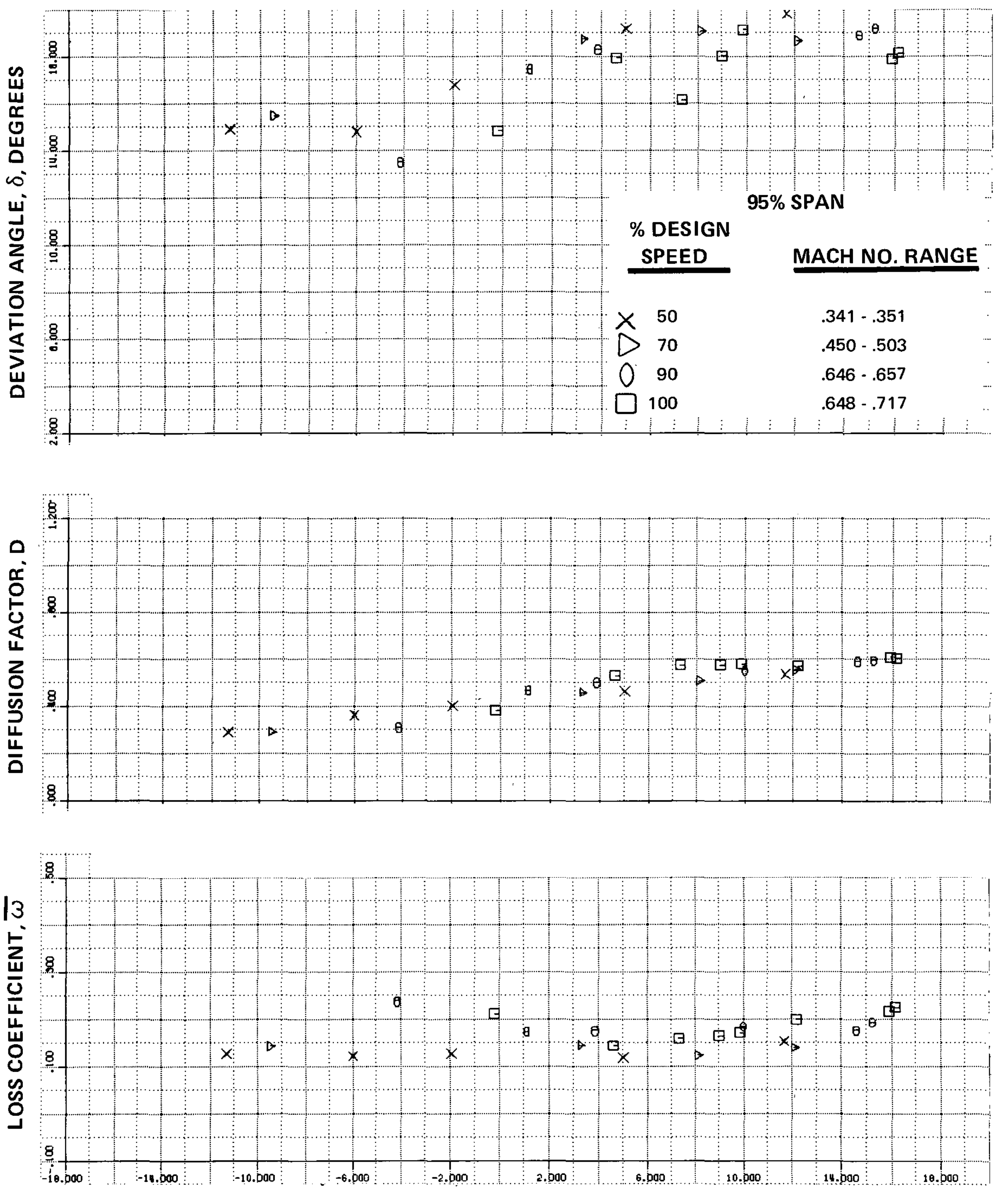


Figure 16i Blade Element Data - Baseline Stator

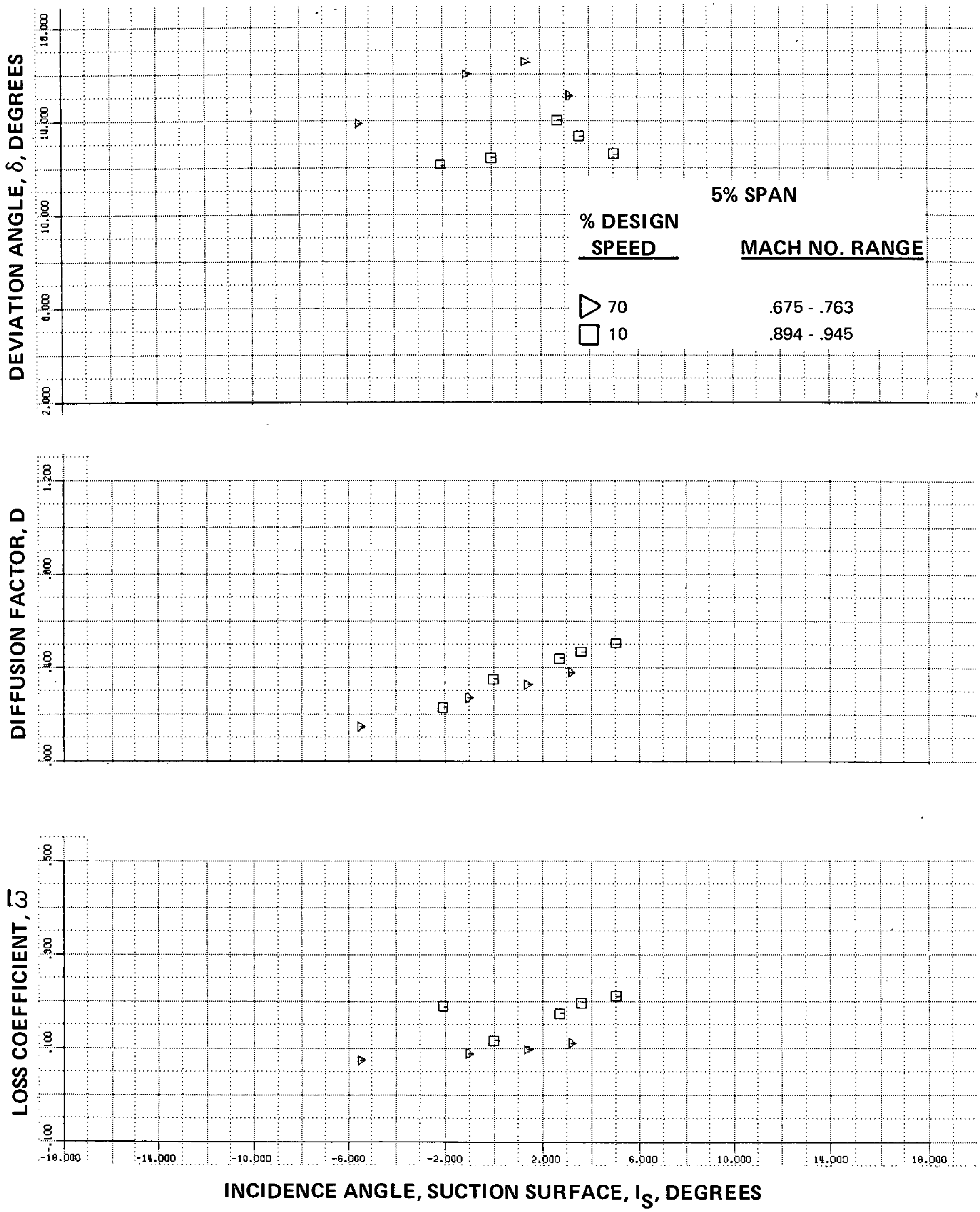


Figure 17a Blade Element Data - Blowing

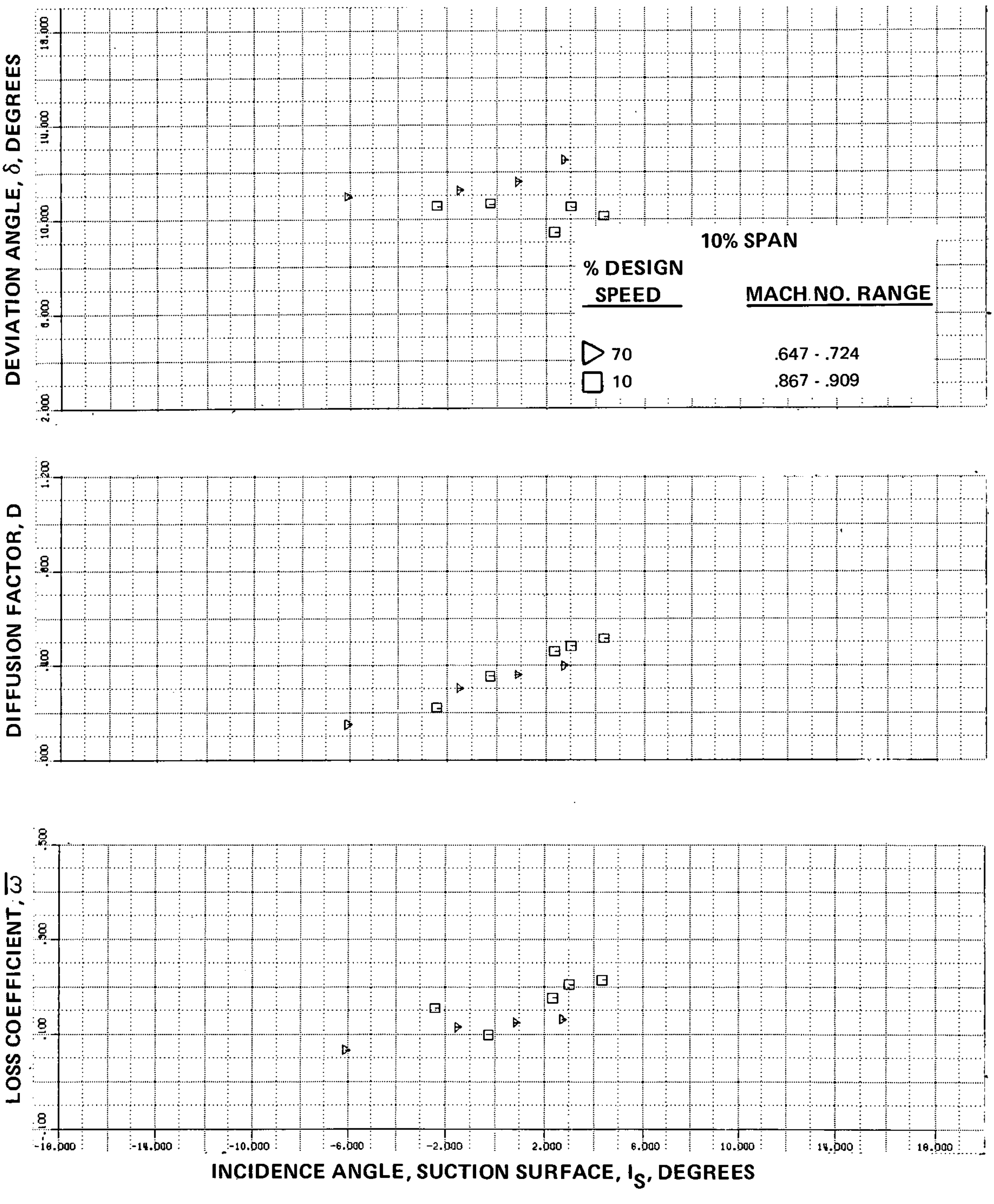


Figure 17b Blade Element Data - Blowing

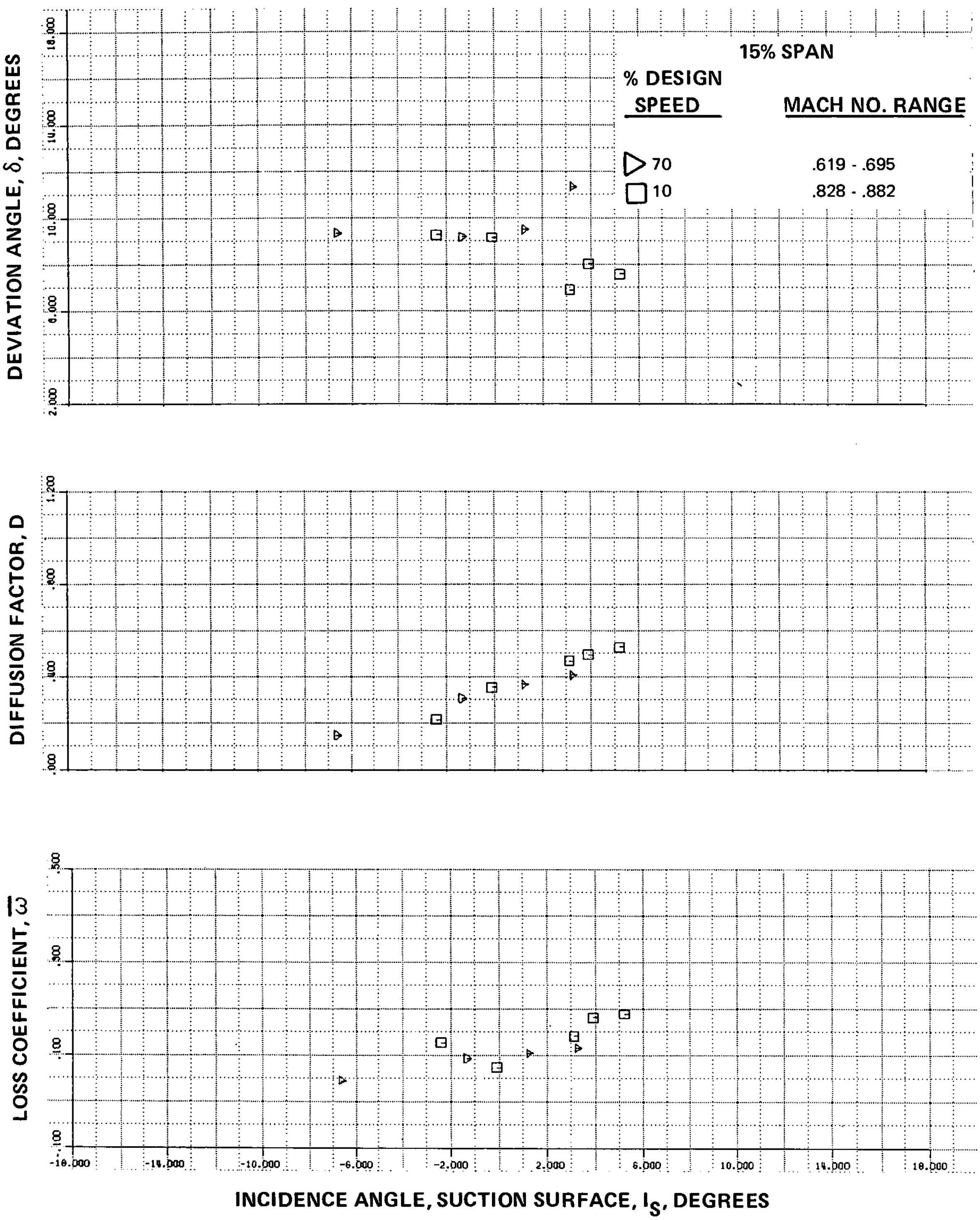


Figure 17c Blade Element Data - Blowing

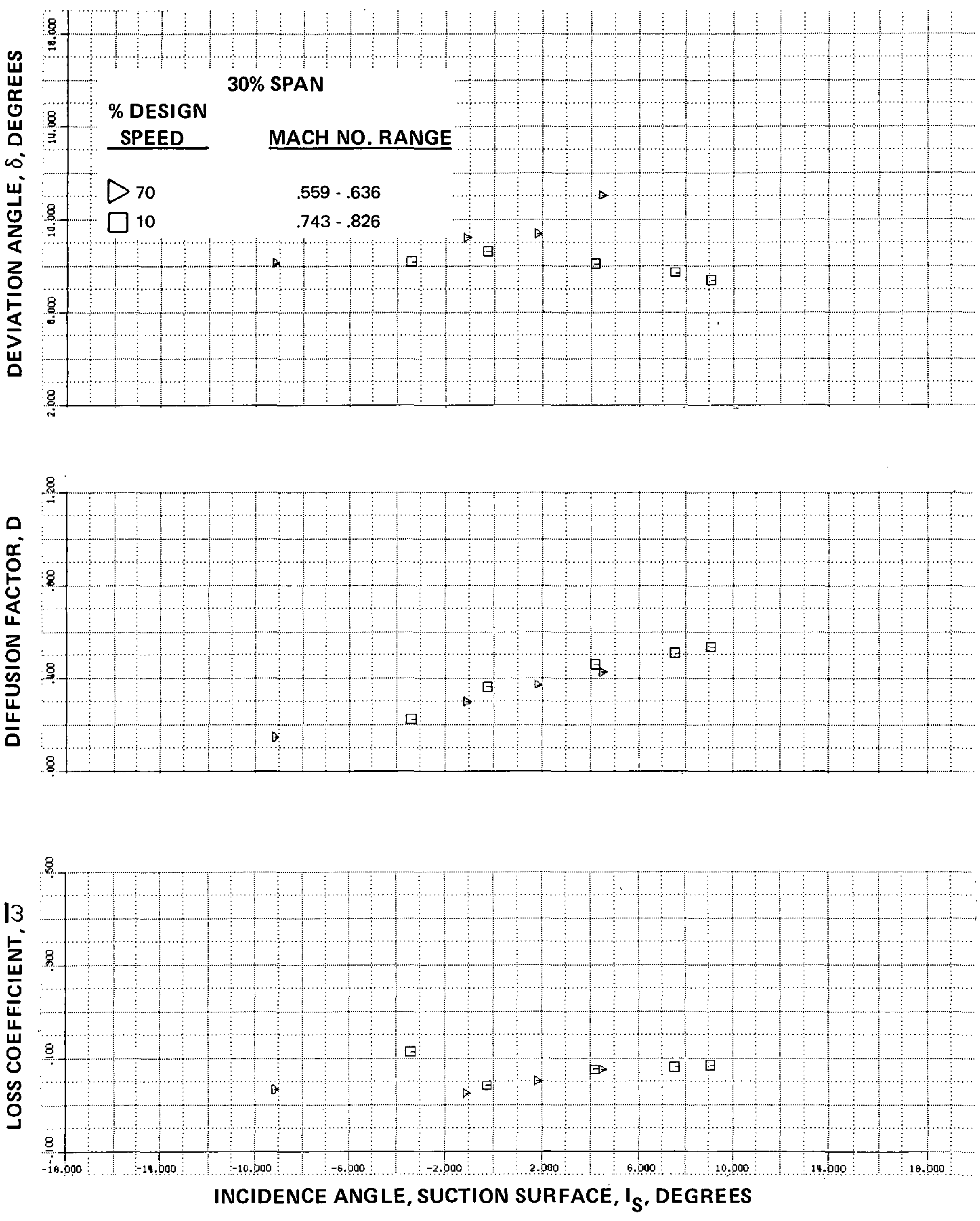


Figure 17d Blade Element Data - Blowing

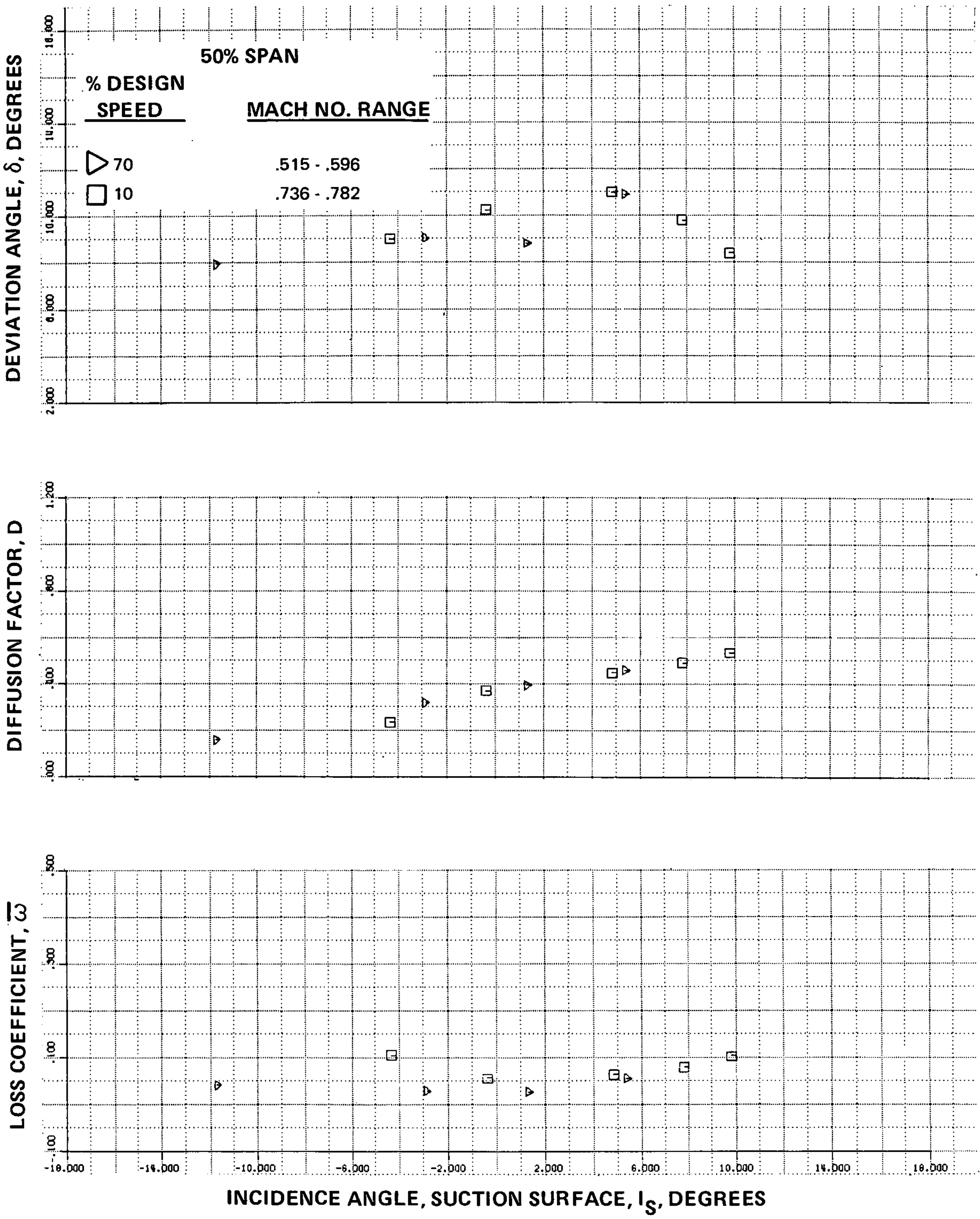


Figure 17e Blade Element Data - Blowing

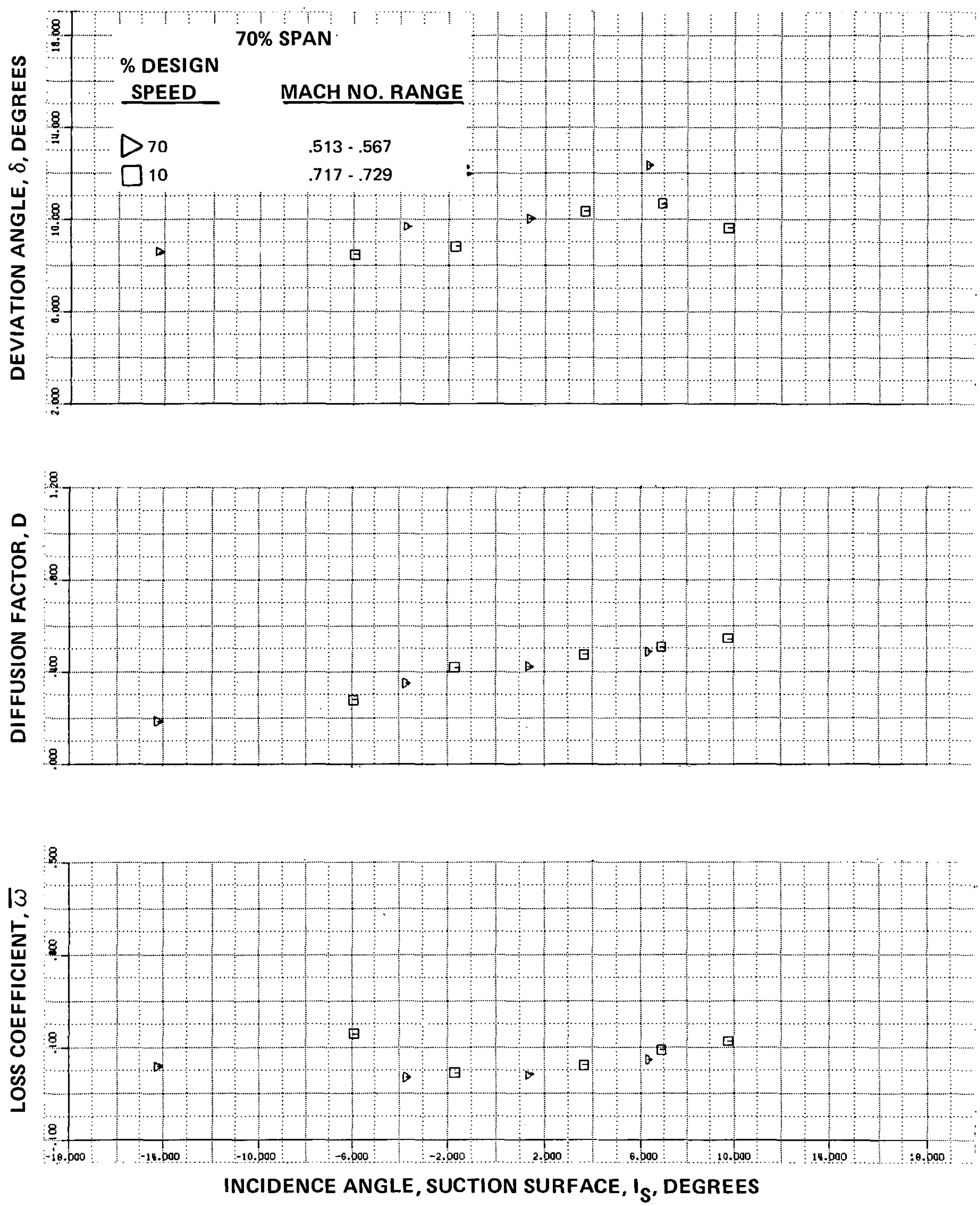


Figure 17f Blade Element Data - Blowing

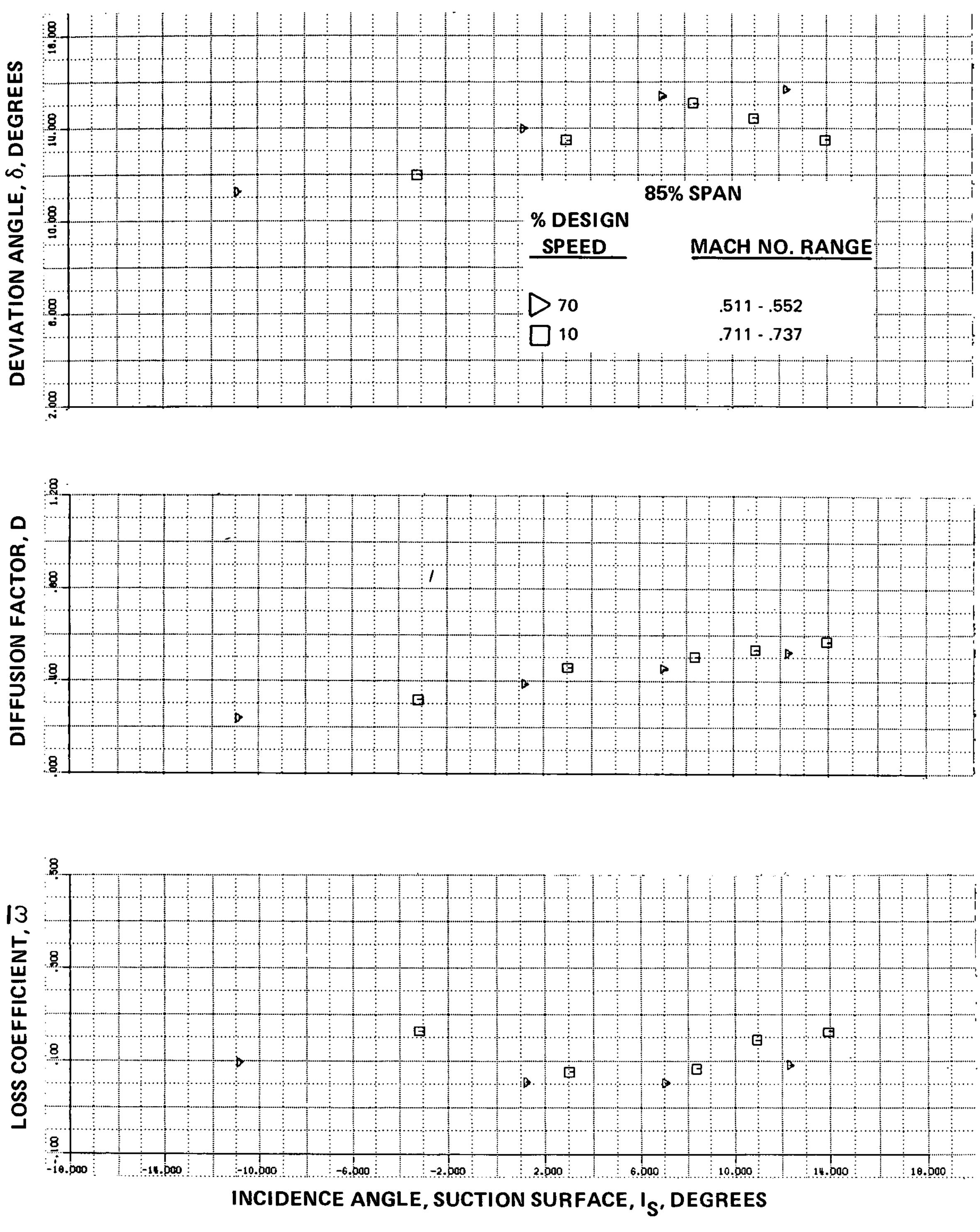


Figure 17g Blade Element Data - Blowing

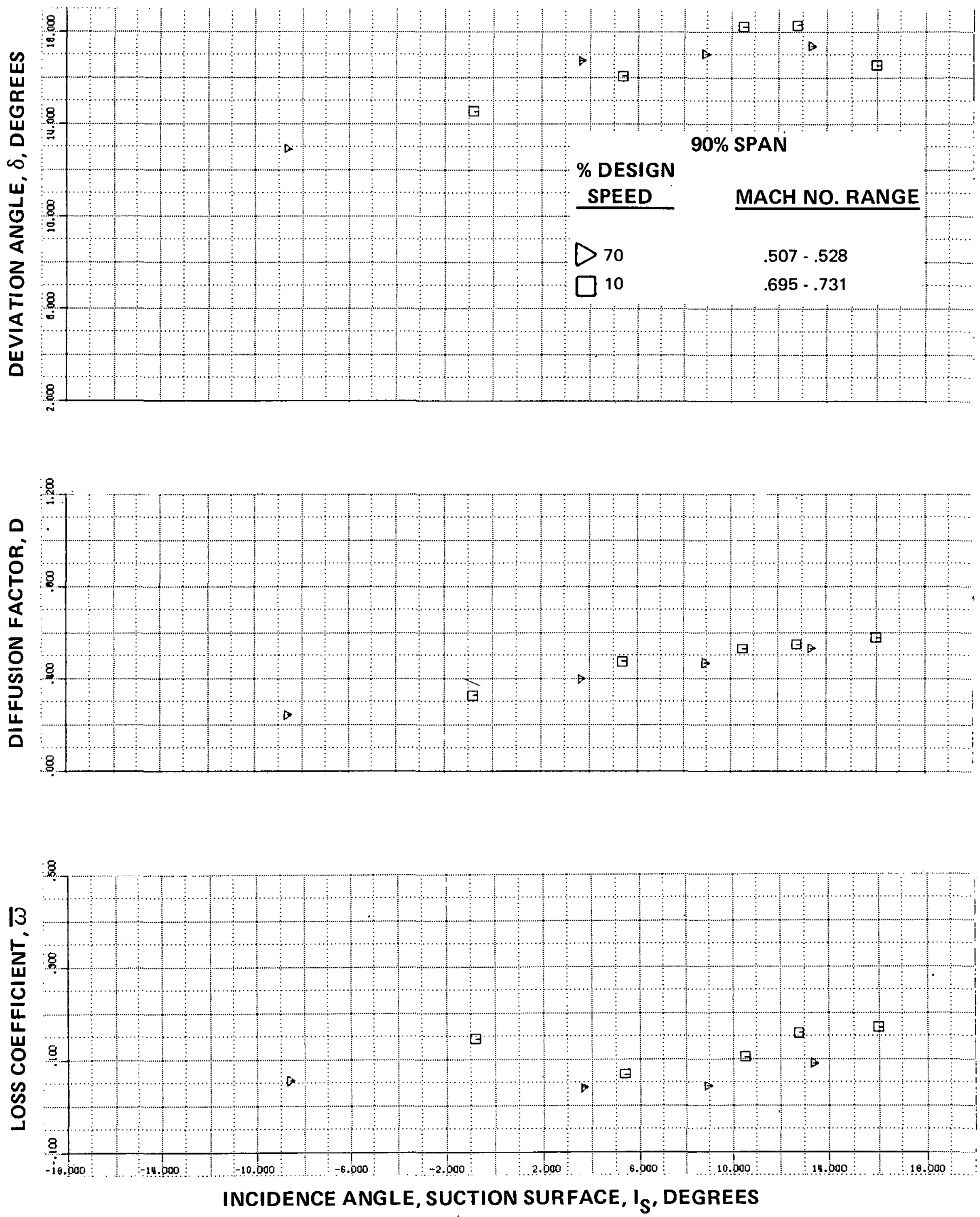


Figure 17h Blade Element Data - Blowing

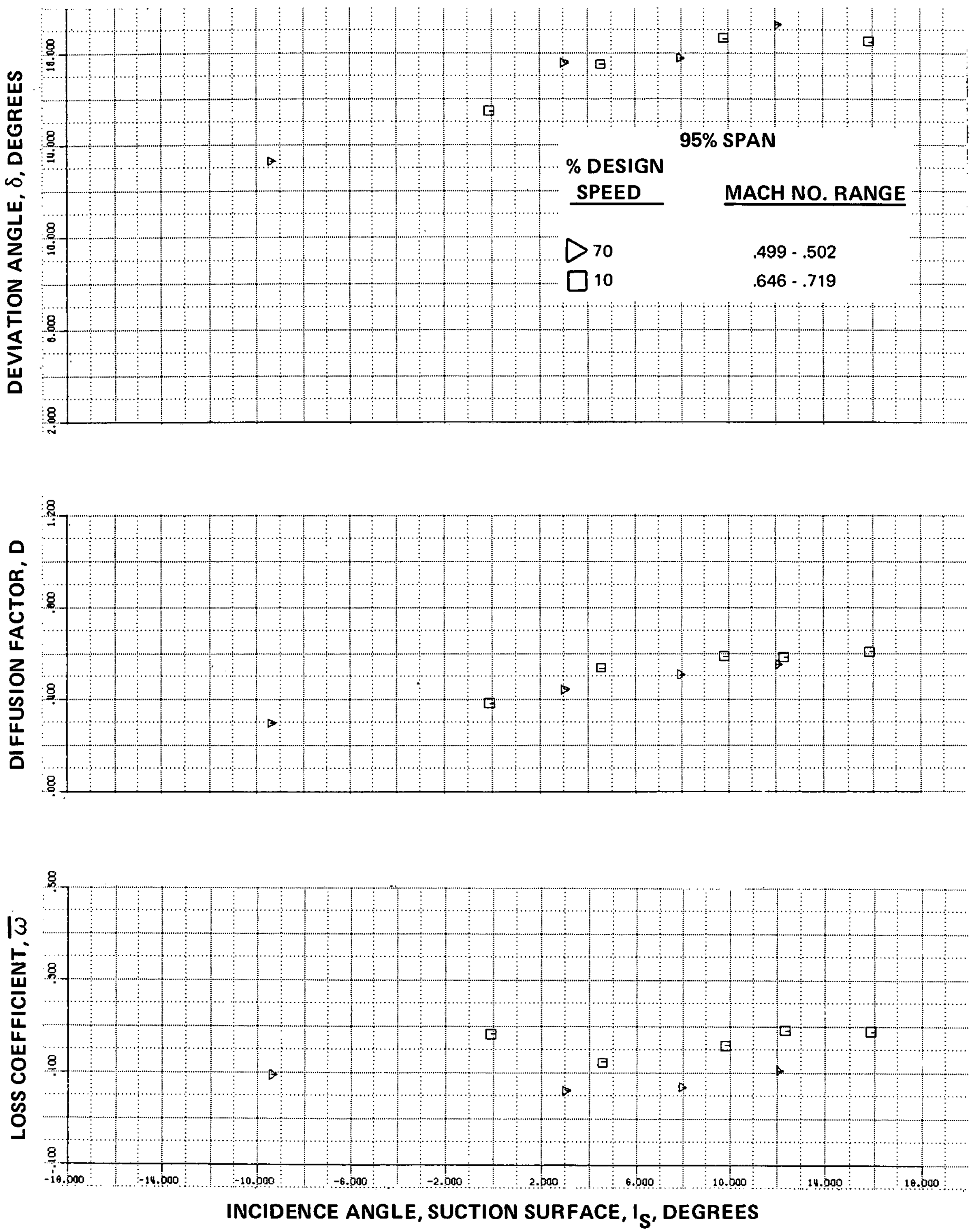


Figure 17i Blade Element Data - Blowing

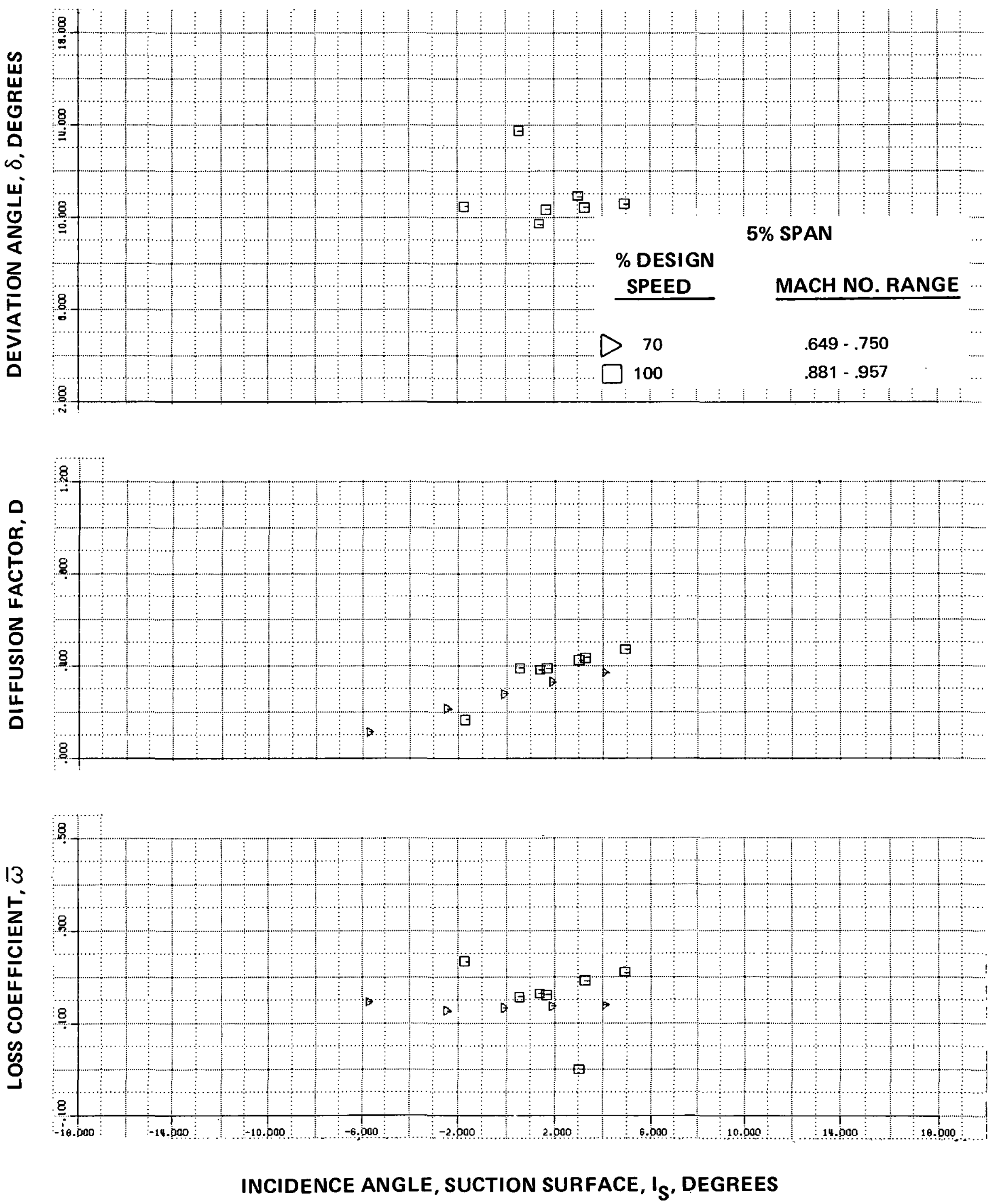


Figure 18a Blade Element Data - Suction

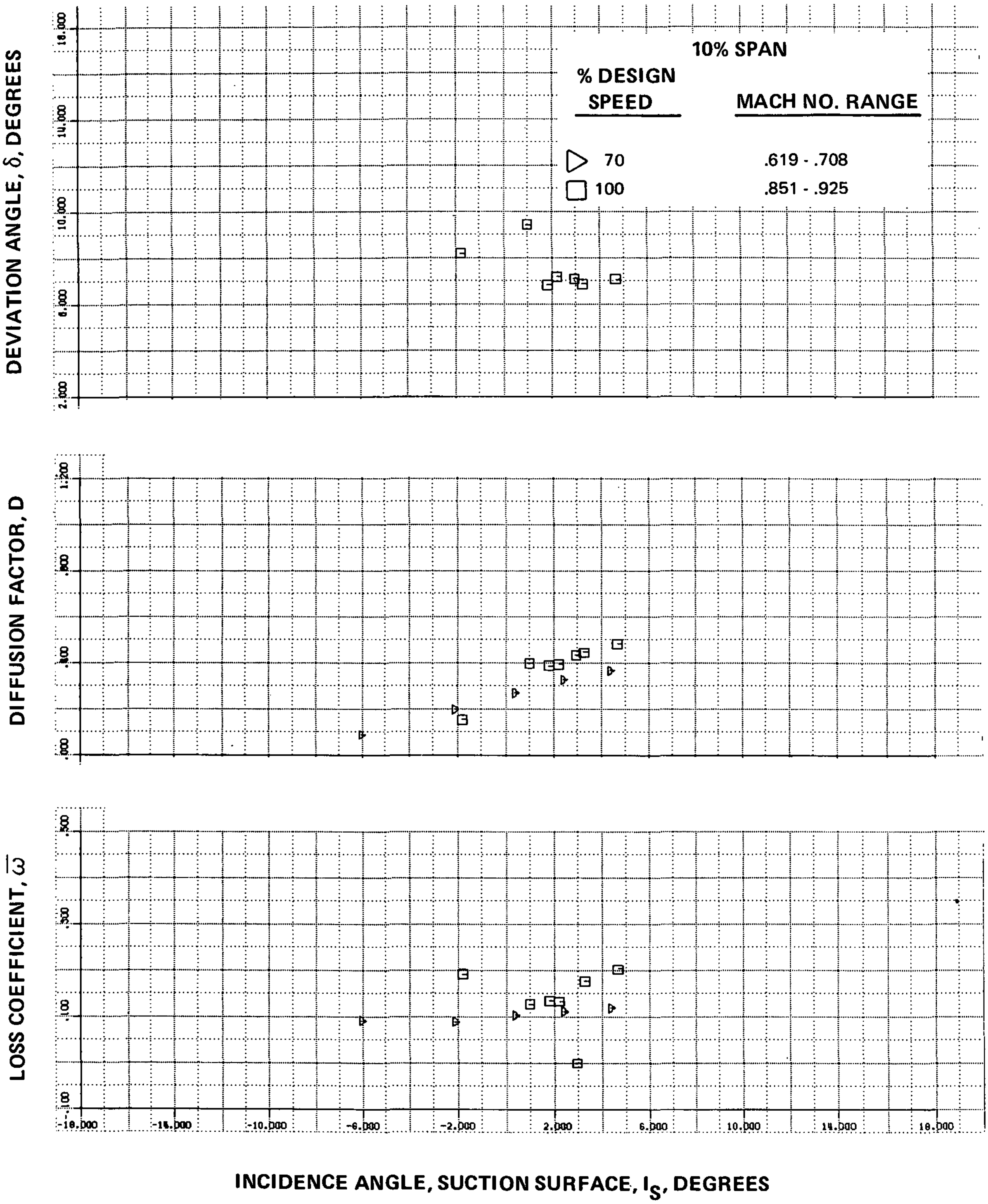


Figure 18b Blade Element Data - Suction

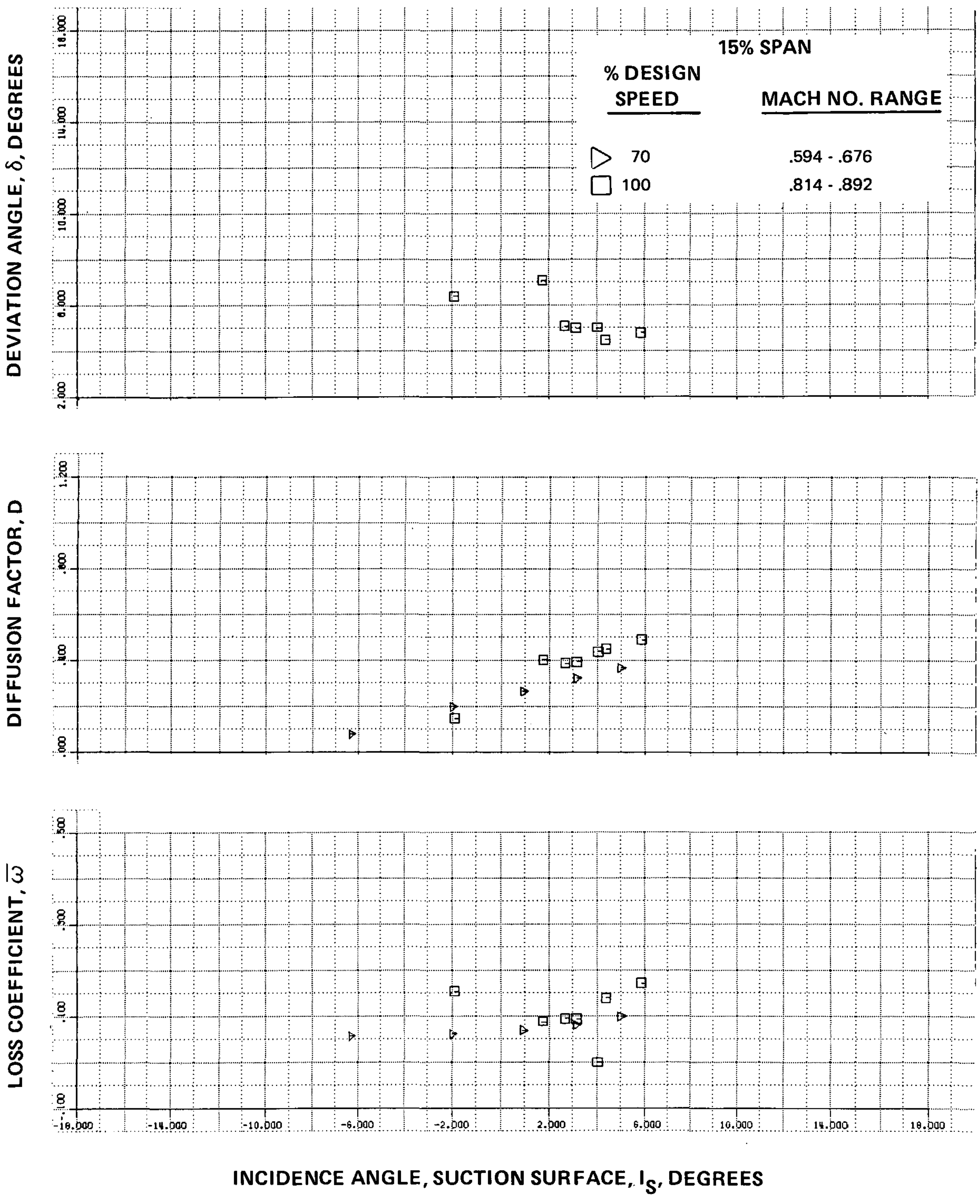


Figure 18c Blade Element Data - Suction

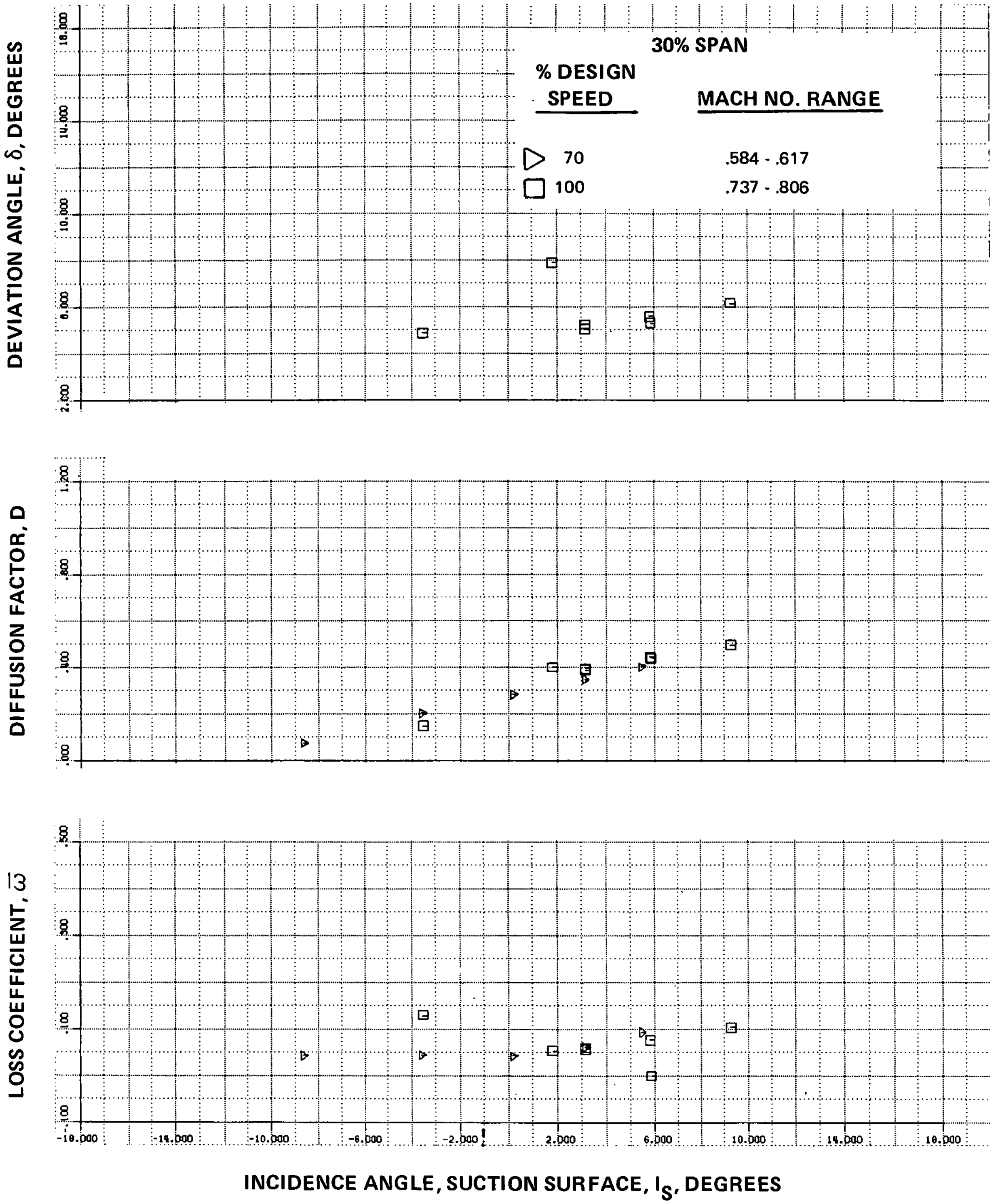


Figure 18d Blade Element Data - Suction

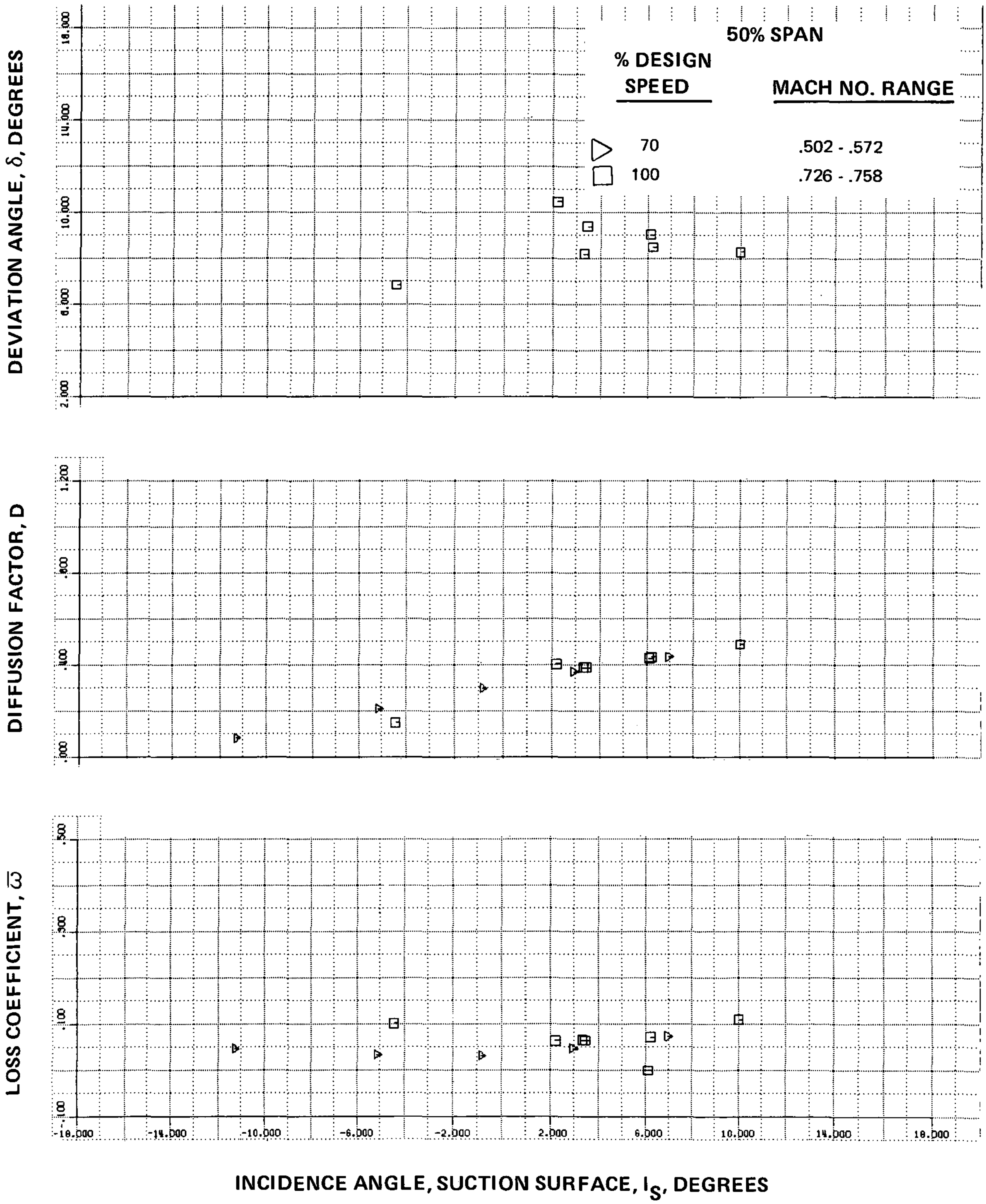


Figure 18e Blade Element Data - Suction

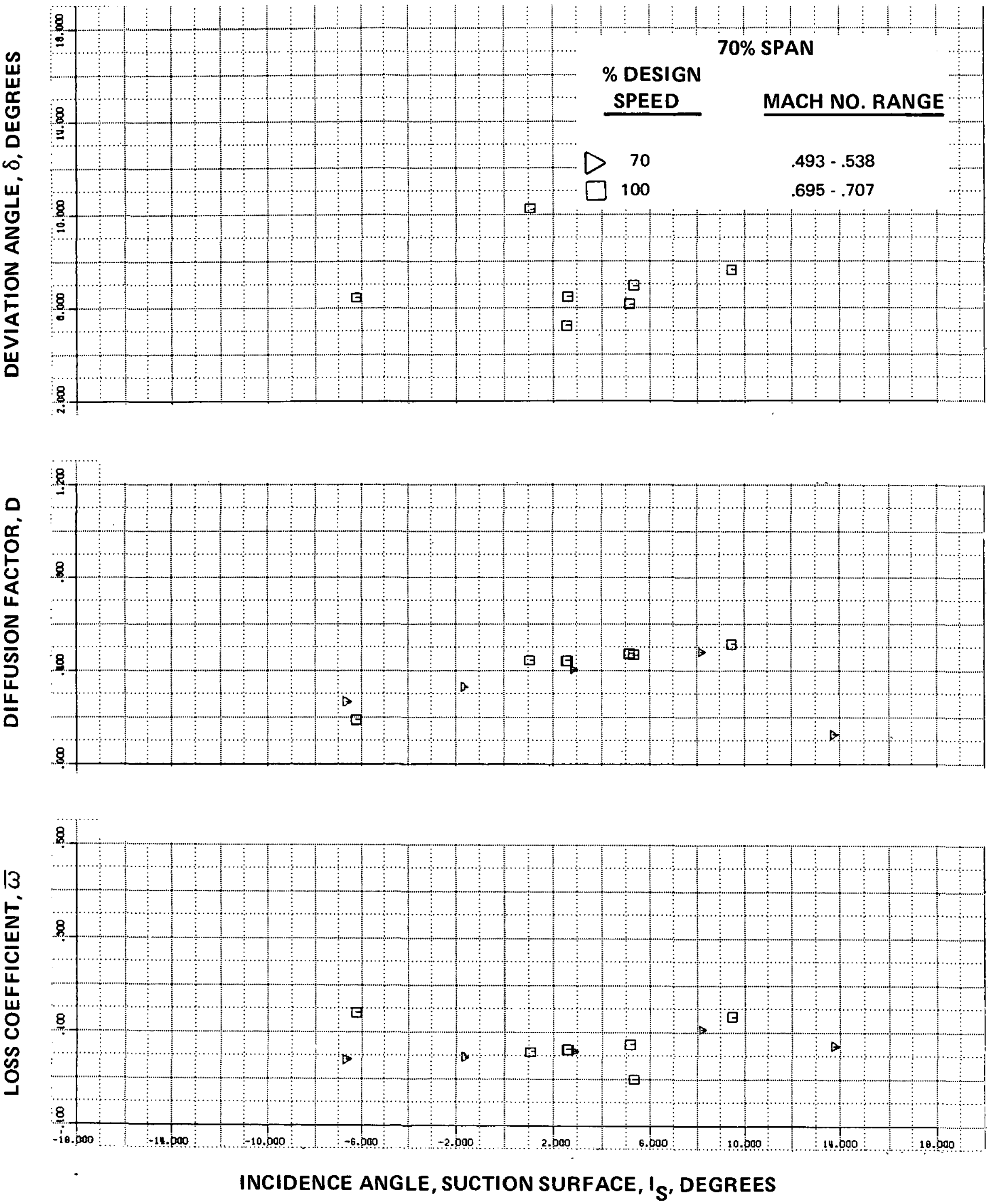


Figure 18f Blade Element Data - Suction

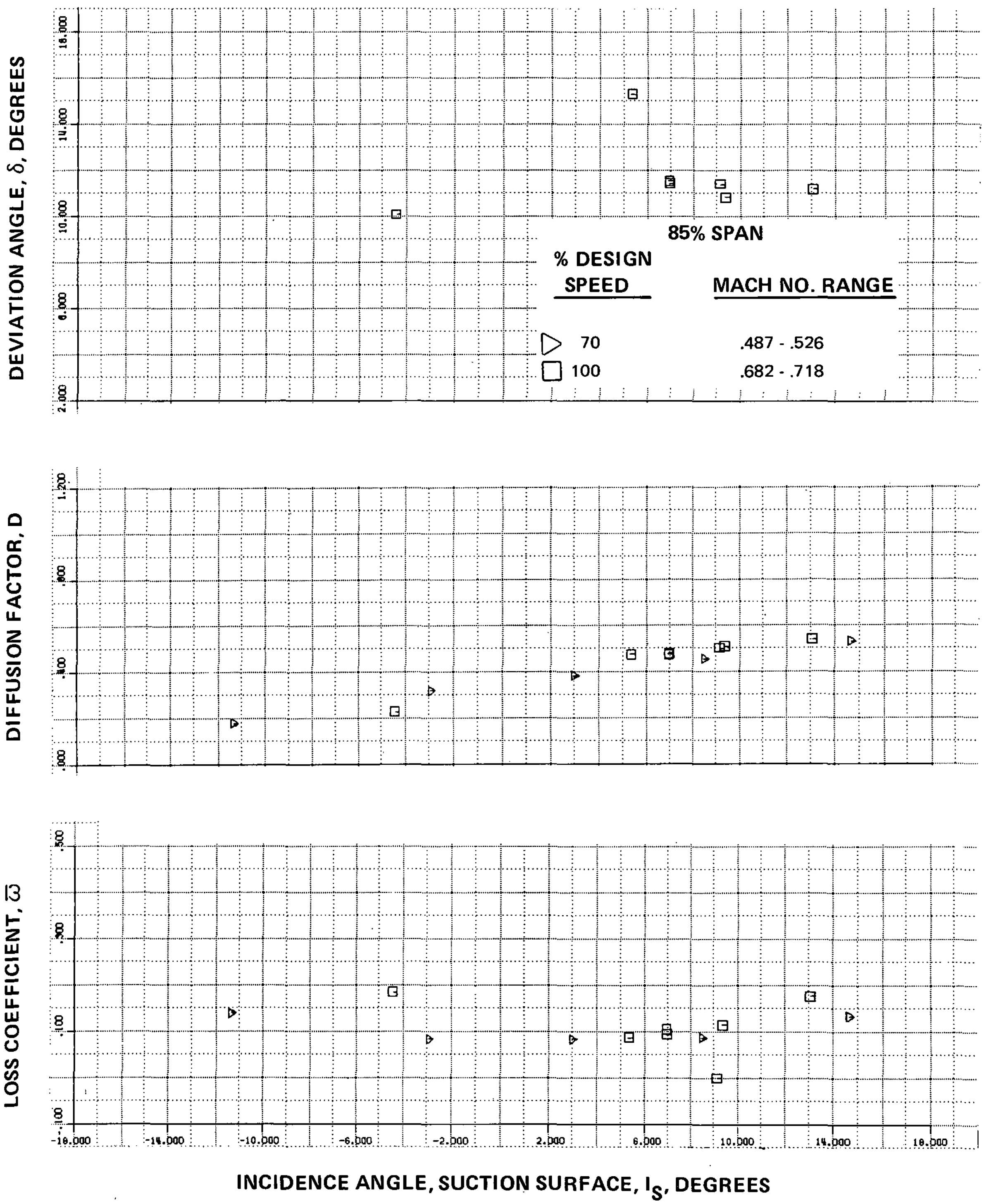


Figure 18g Blade Element Data - Suction

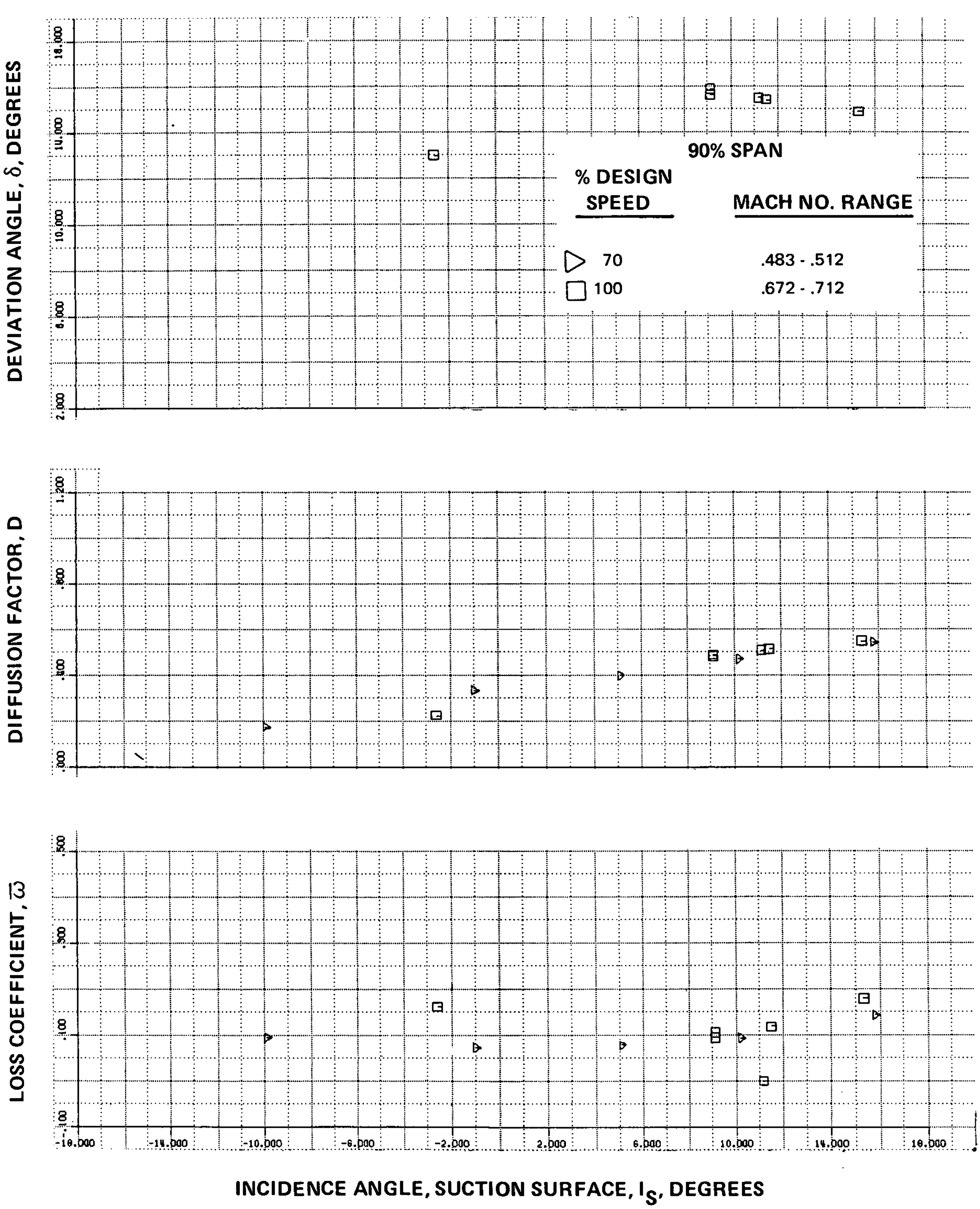


Figure 18h Blade Element Data - Suction

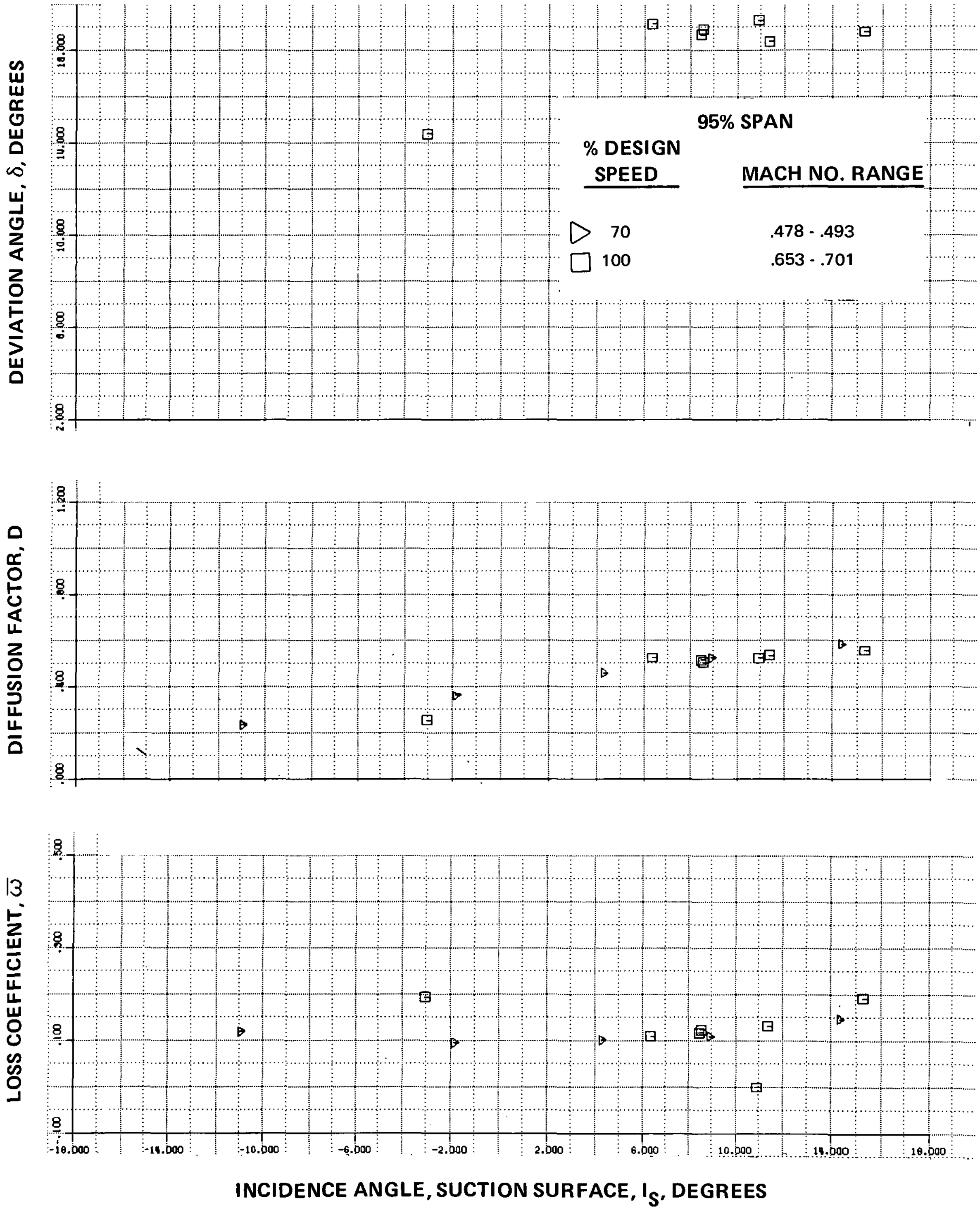


Figure 18i Blade Element Data - Suction

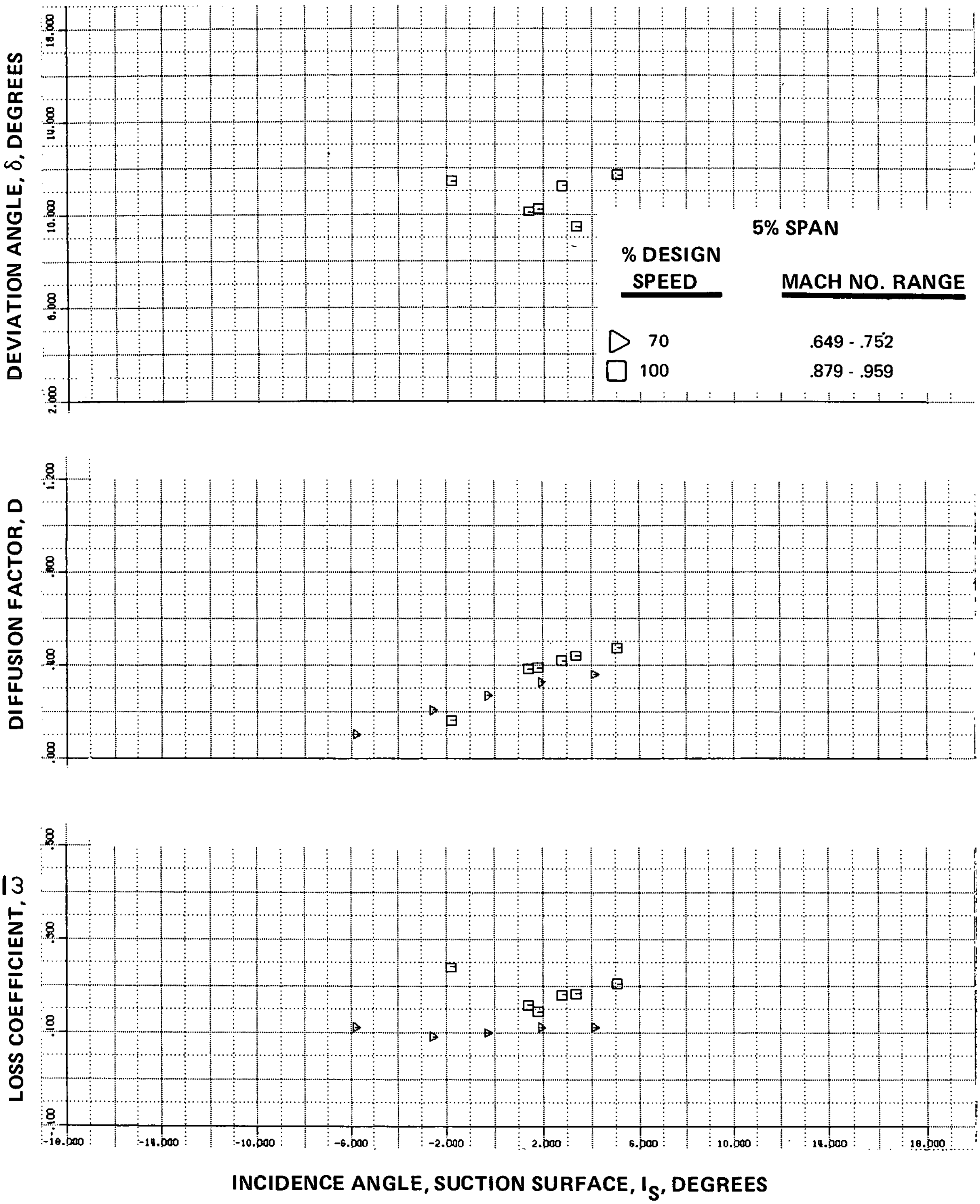


Figure 19a Blade Element Data - Combined

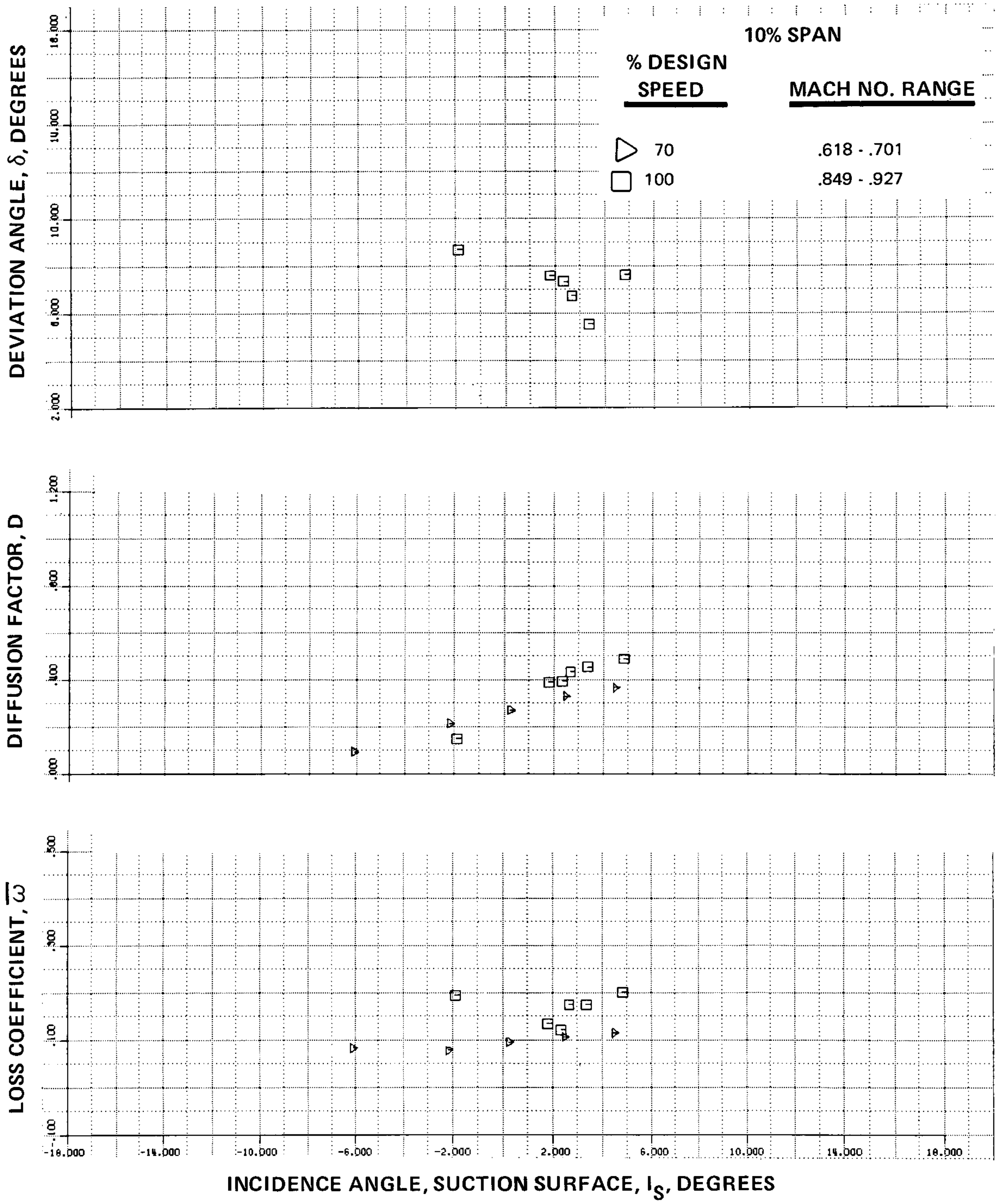


Figure 19b Blade Element Data - Combined

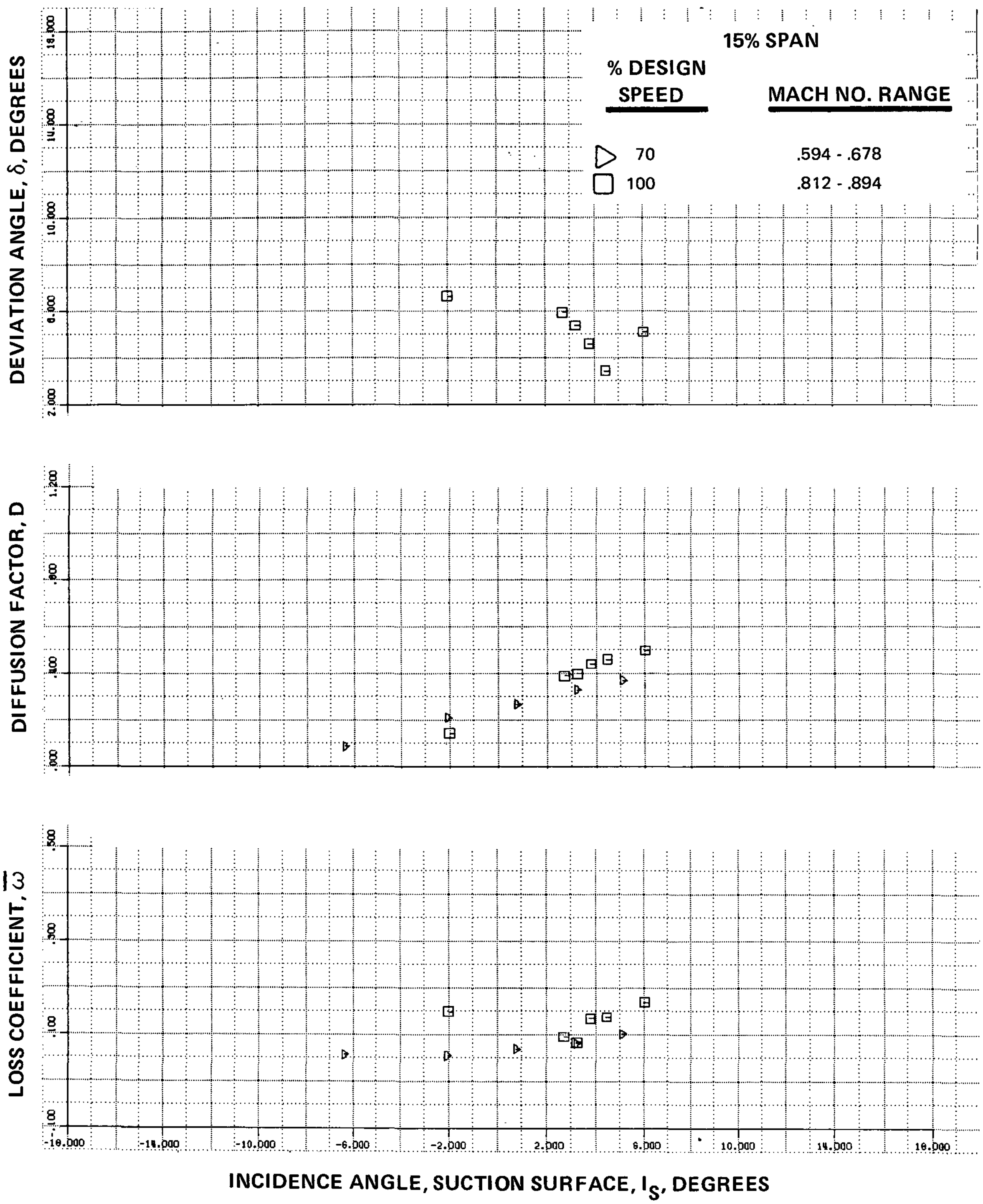


Figure 19c Blade Element Data - Combined

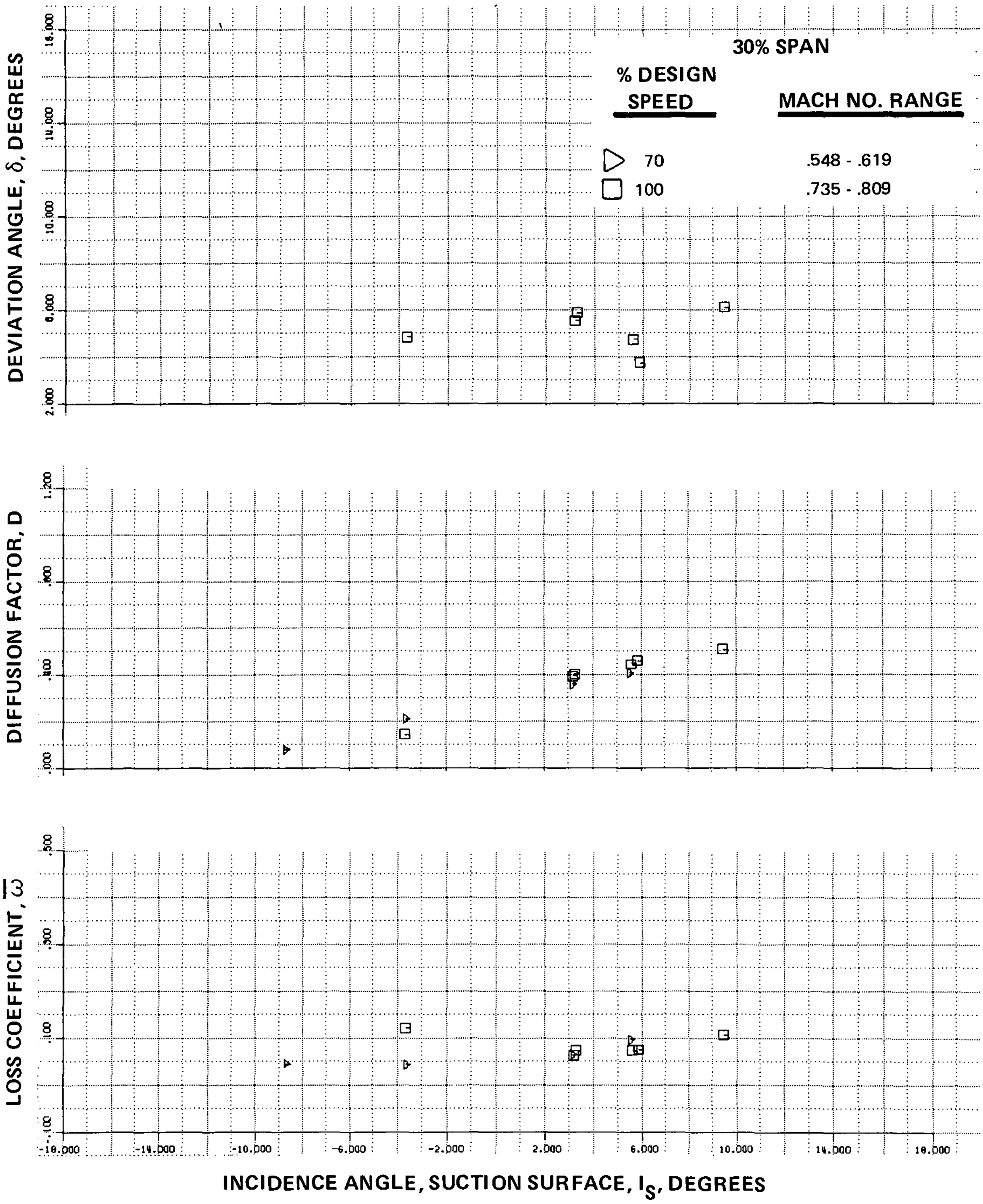


Figure 19d Blade Element Data - Combined

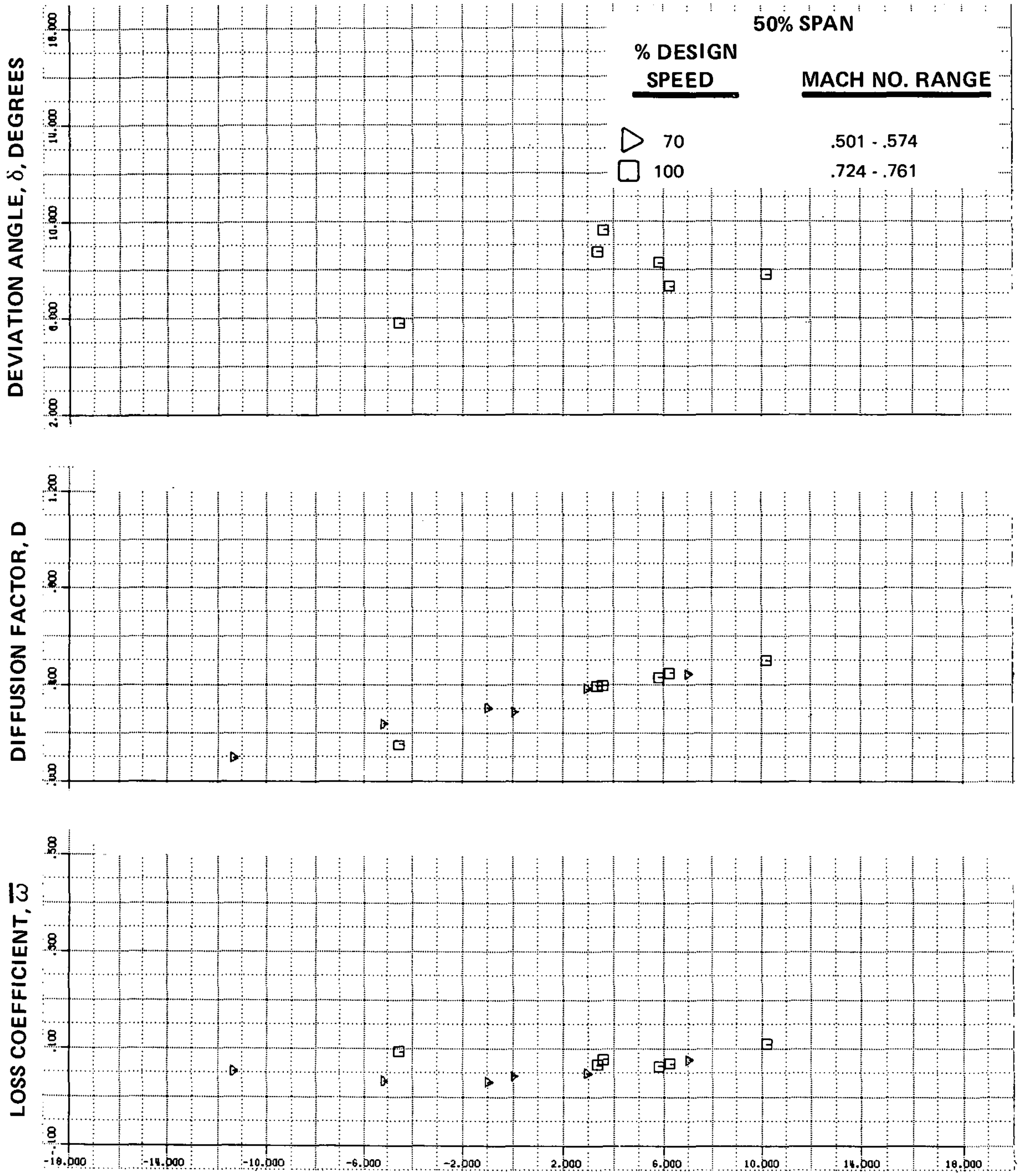


Figure 19e Blade Element Data - Combined

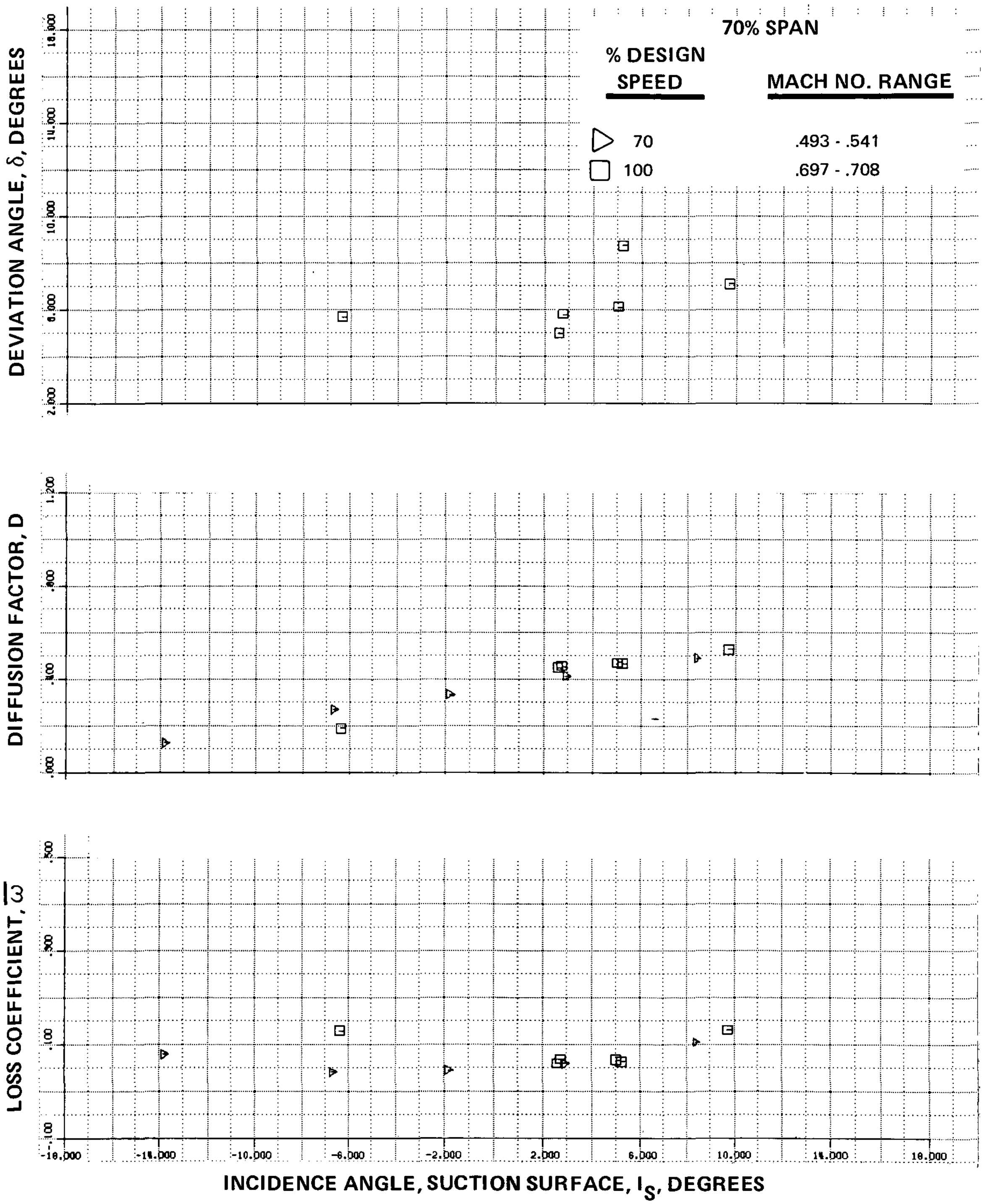


Figure 19f Blade Element Data - Combined

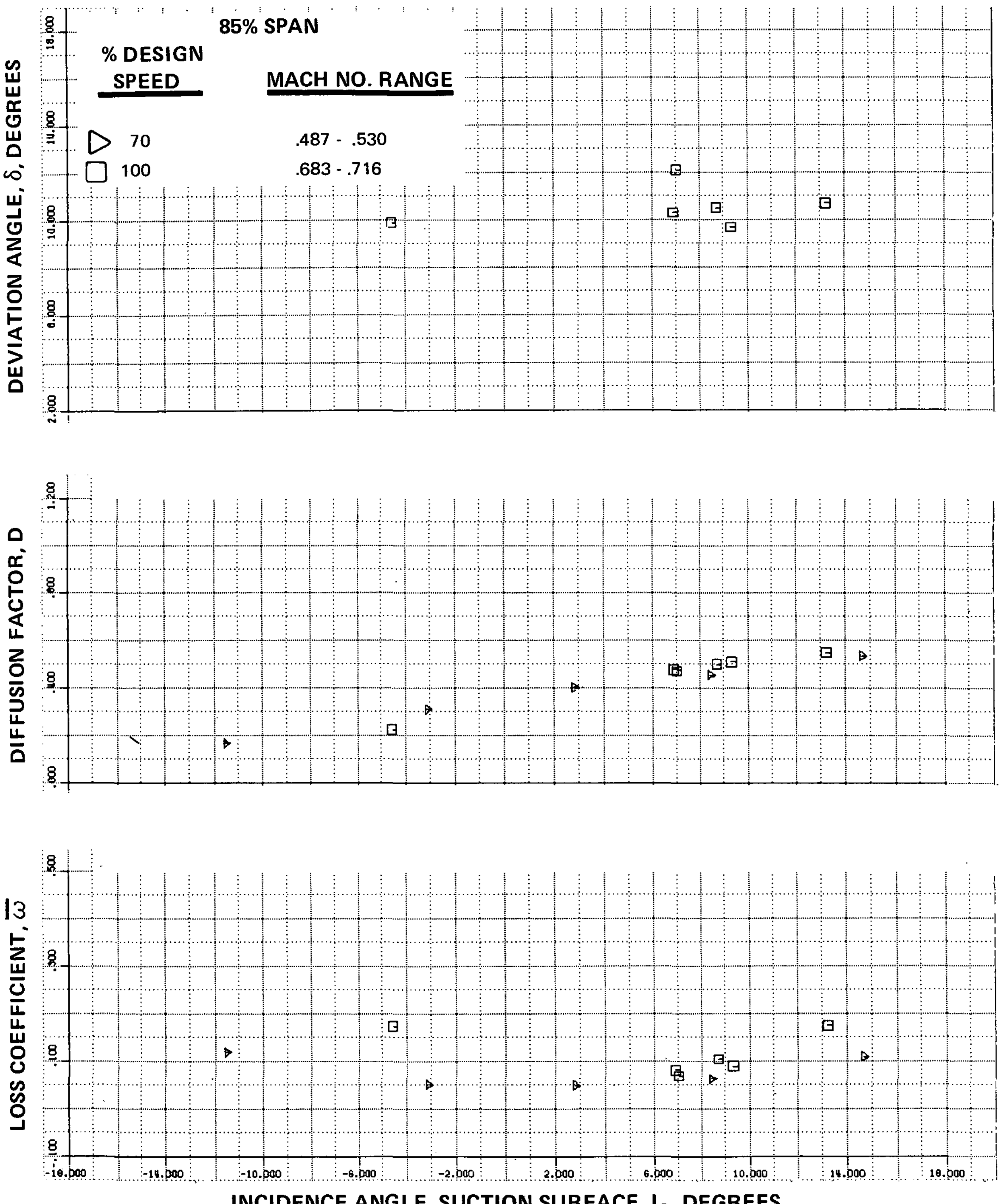


Figure 19g Blade Element Data - Combined

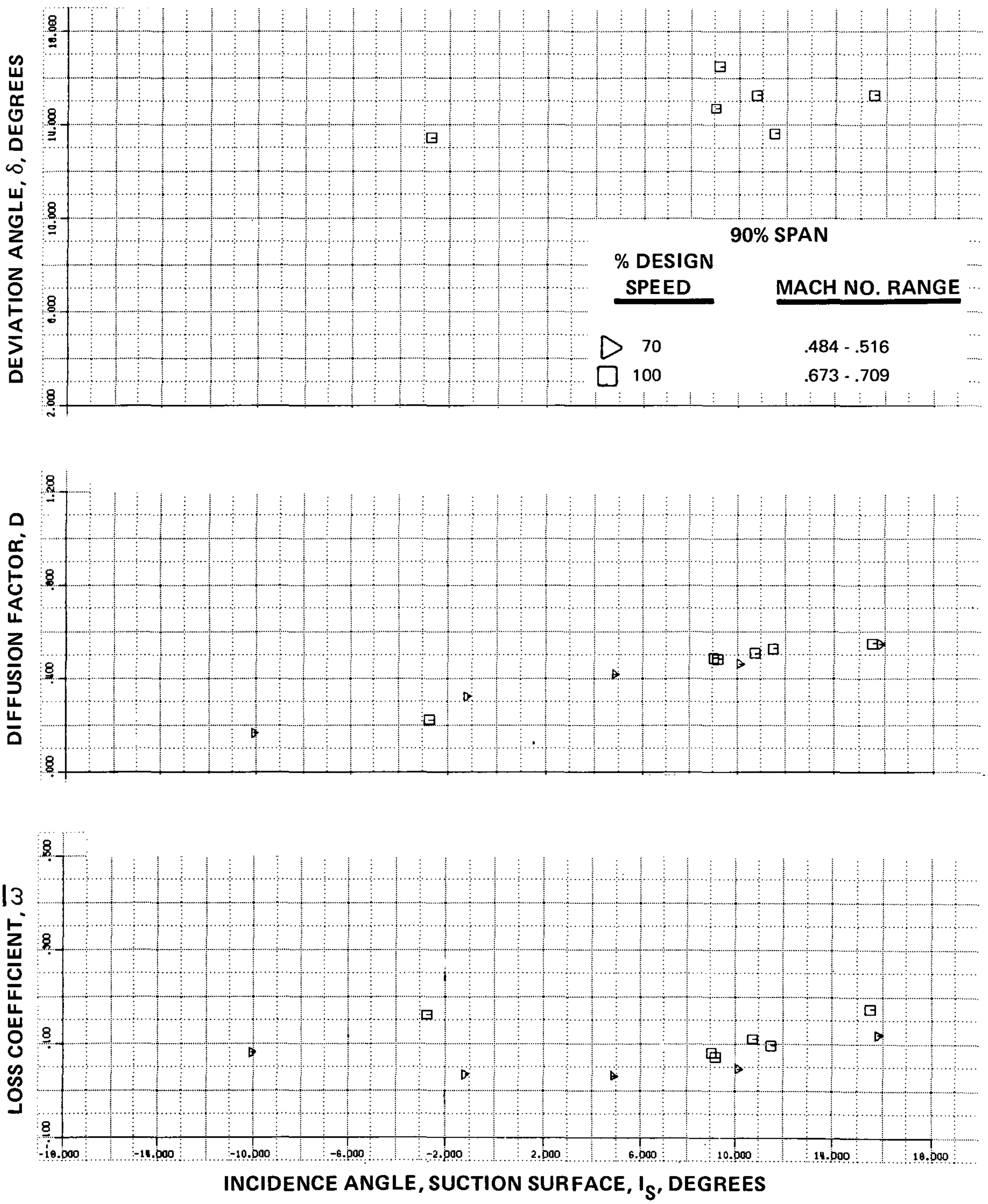


Figure 19h Blade Element Data - Combined

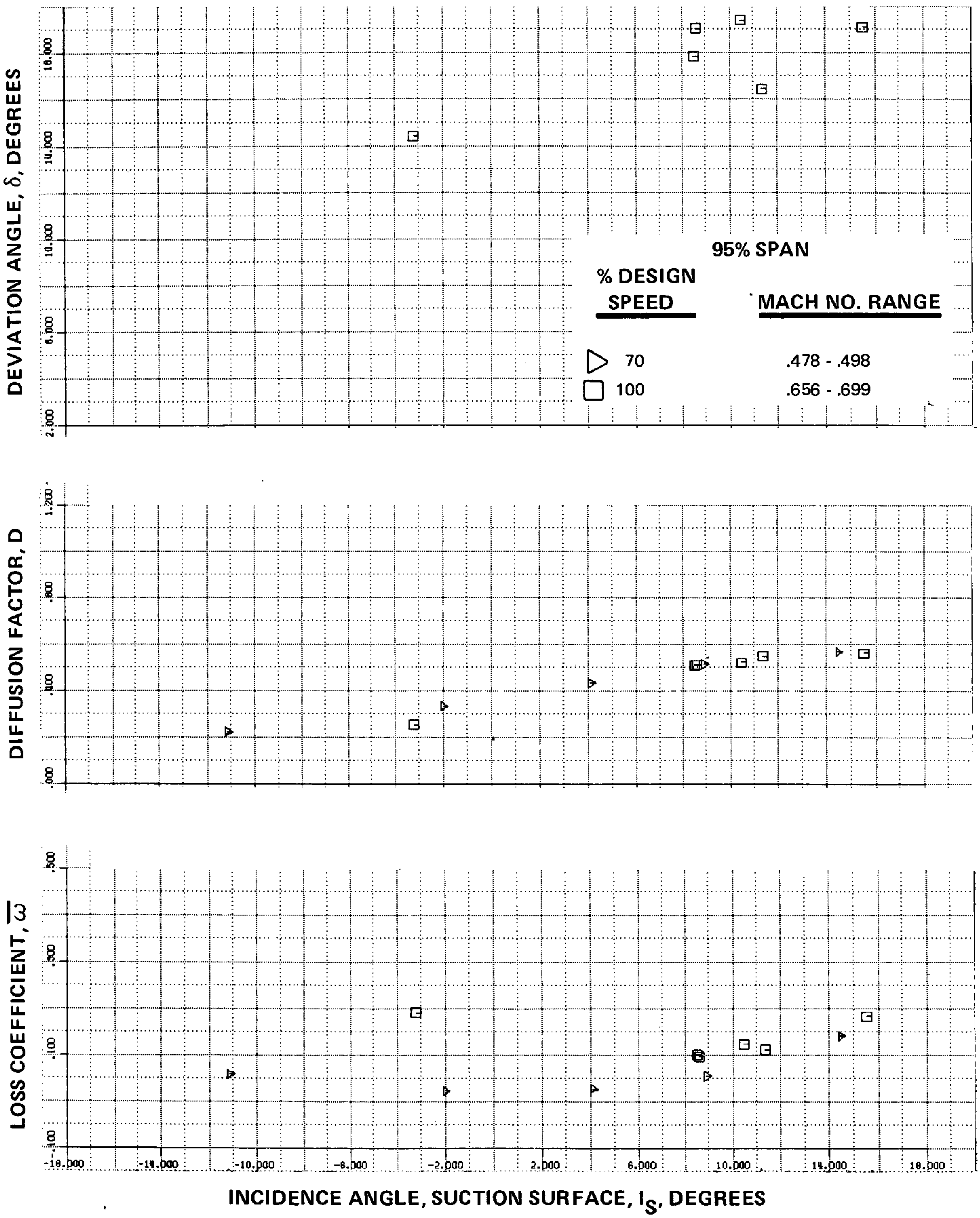


Figure 19i Blade Element Data - Combined

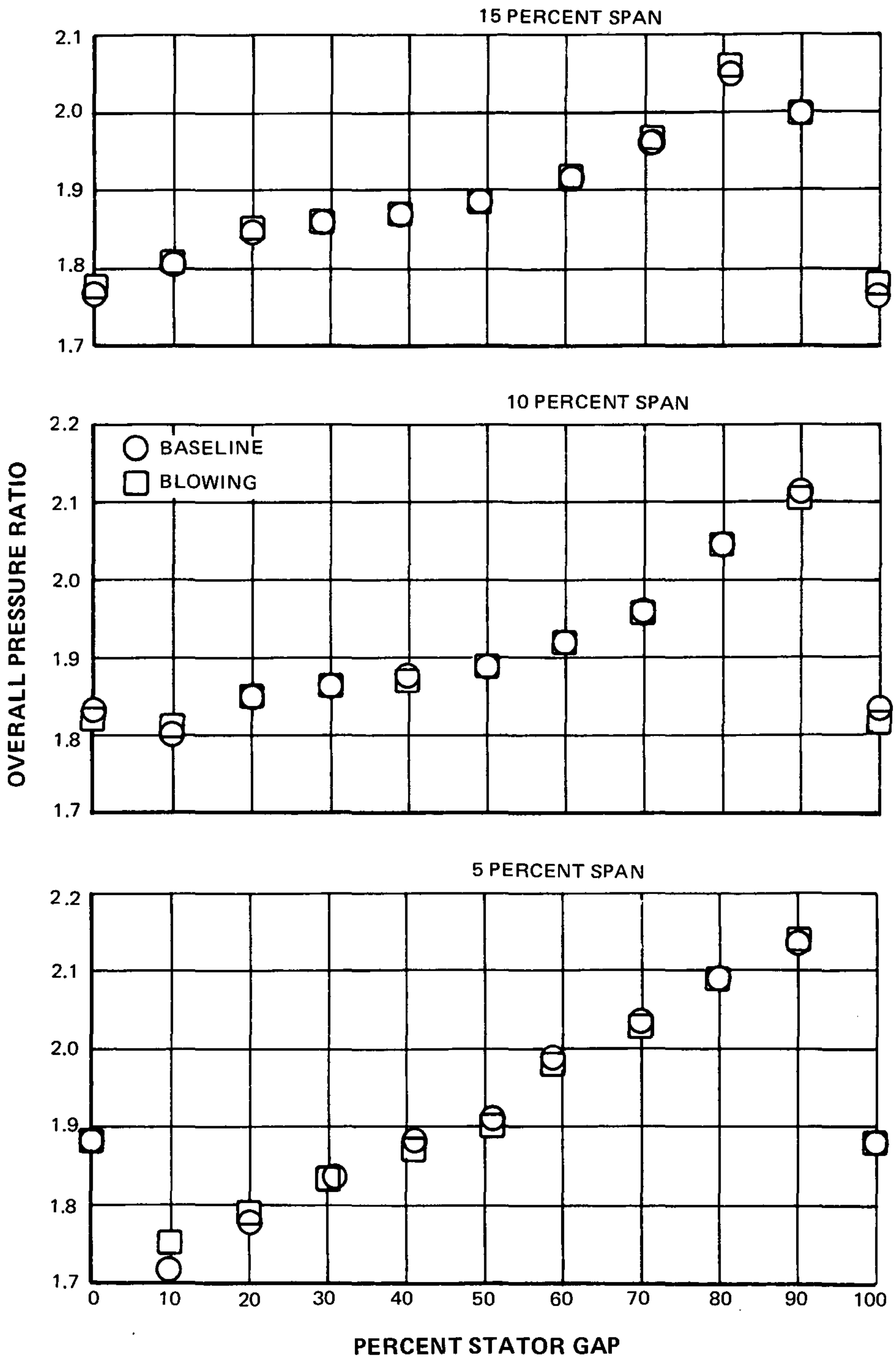


Figure 20a Stator Total Pressure Wake, Baseline and Blowing - 100% Design Speed, Near Surge

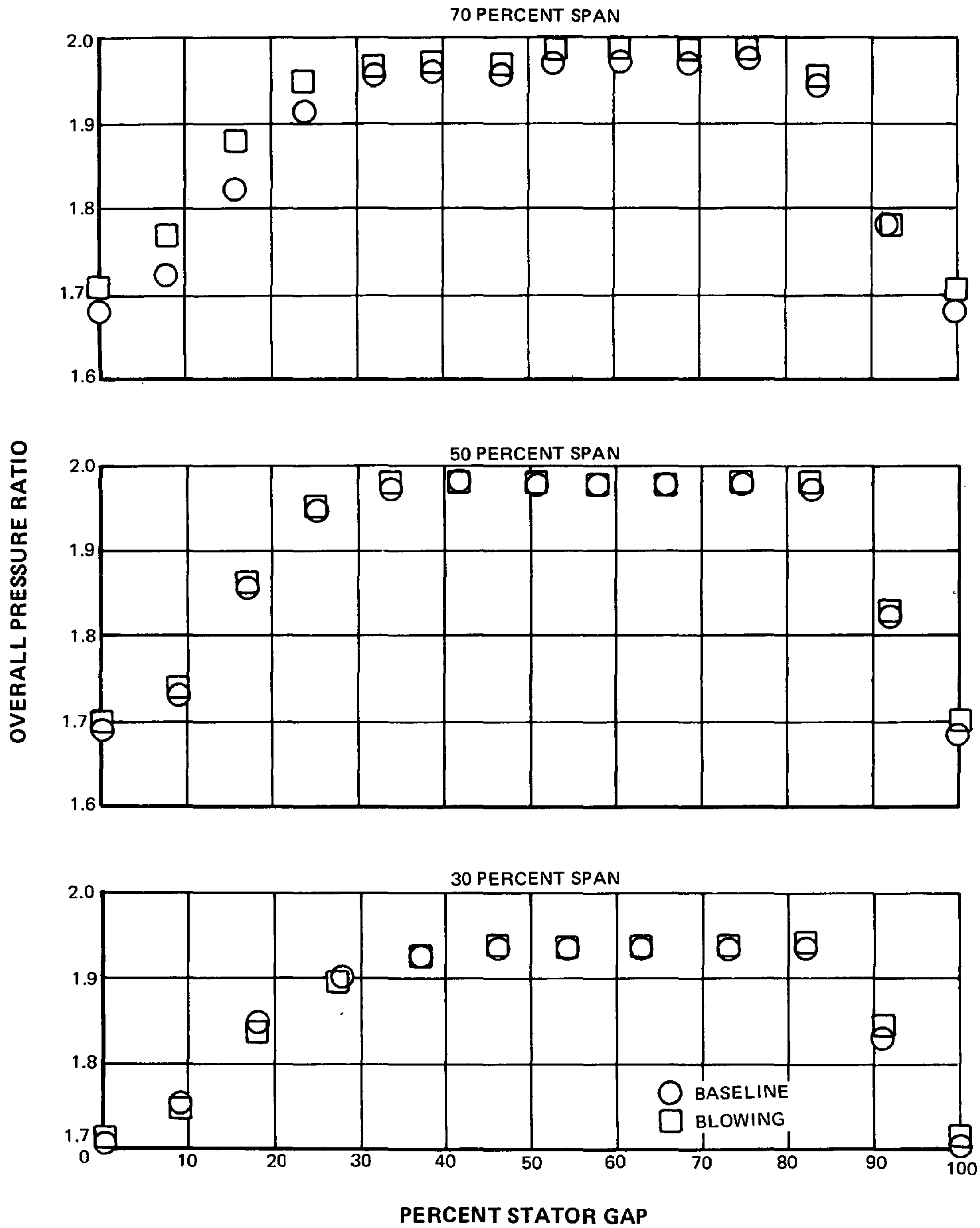


Figure 20b Stator Total Pressure Wake, Baseline and Blowing - 100% Design Speed, Near Surge

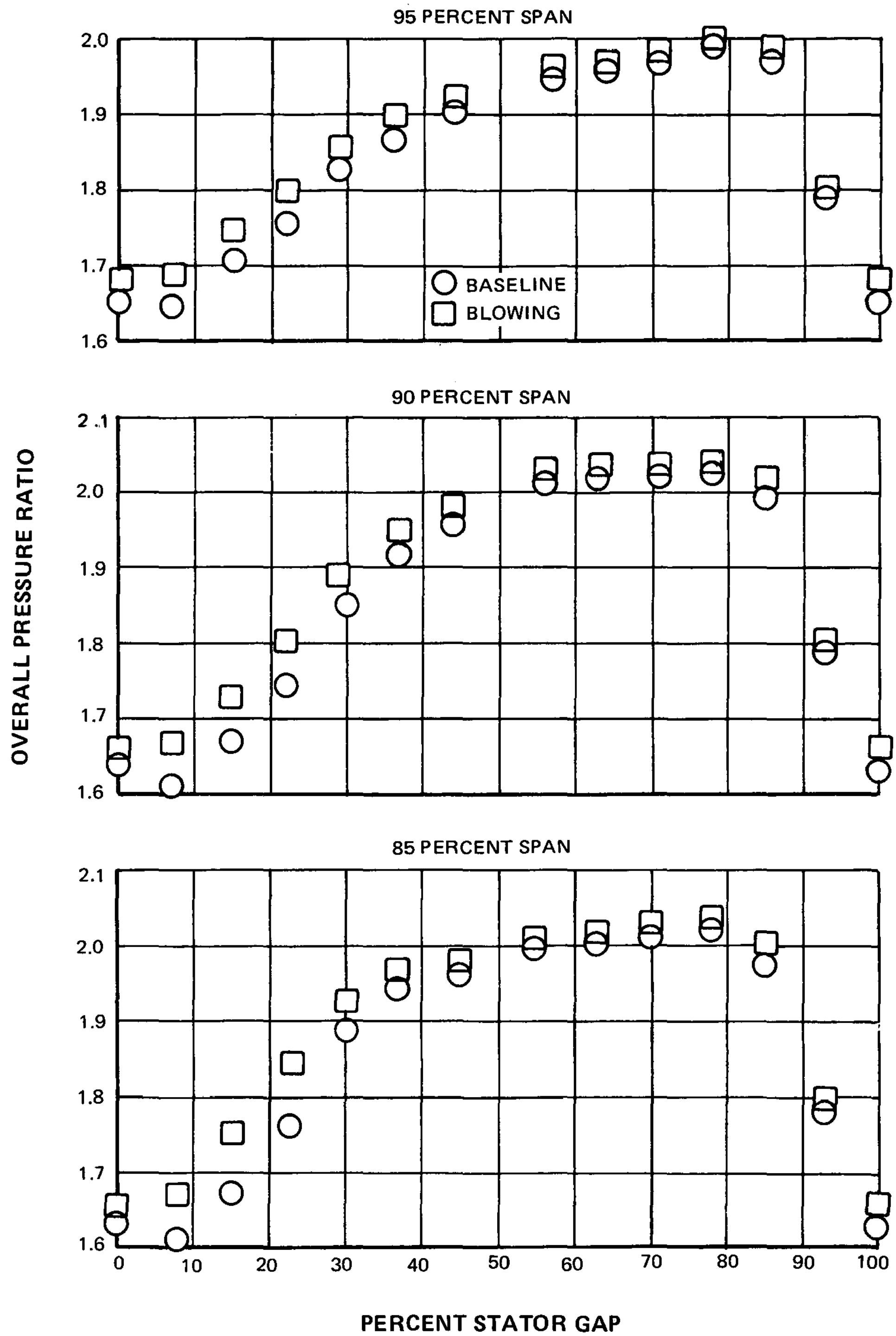


Figure 20c Stator Total Pressure Wake, Baseline and Blowing - 100% Design Speed, Near Surge

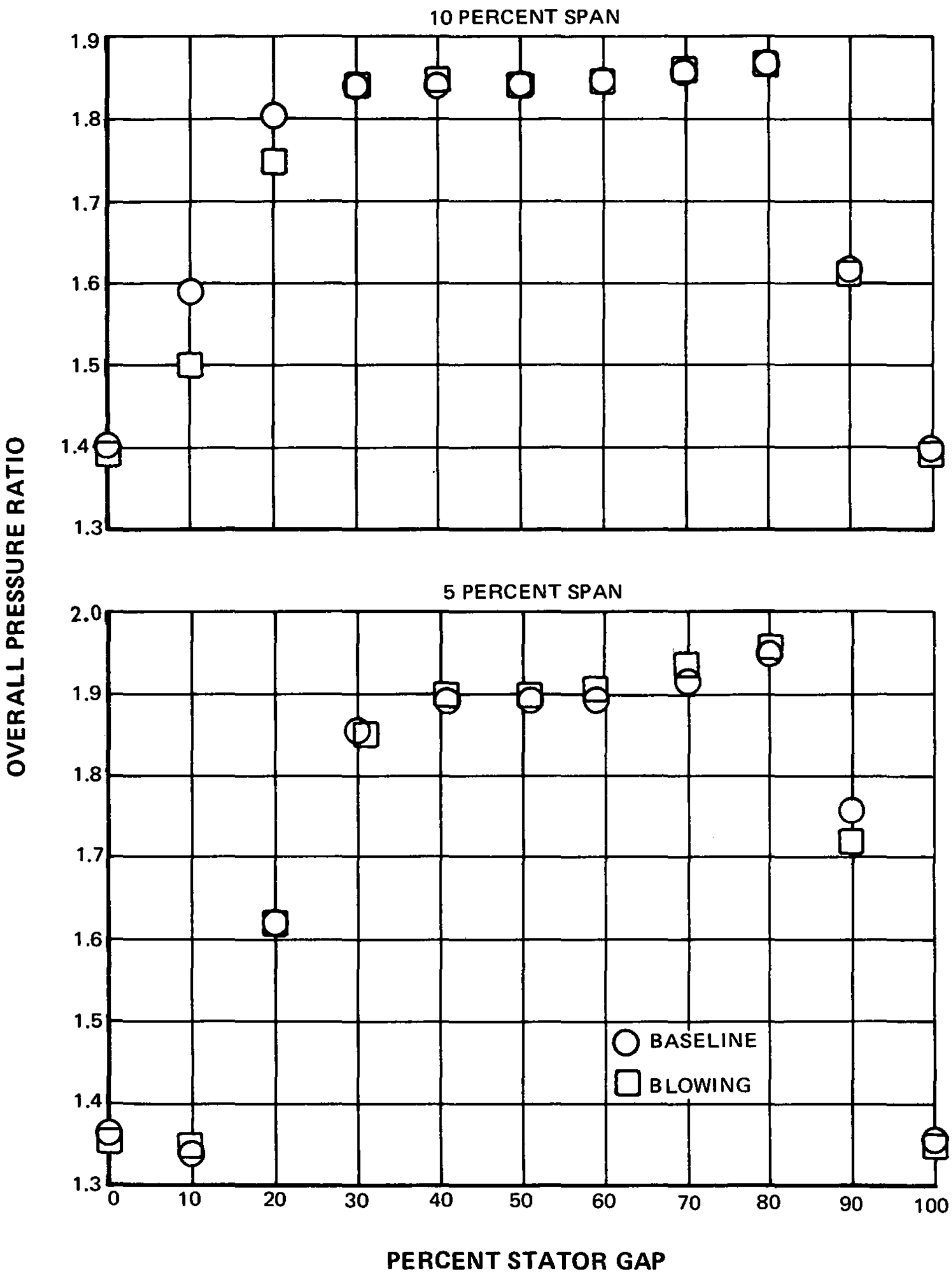


Figure 21a Stator Total Pressure Wake, Baseline and Blowing - 100% Design Speed, Wide Open

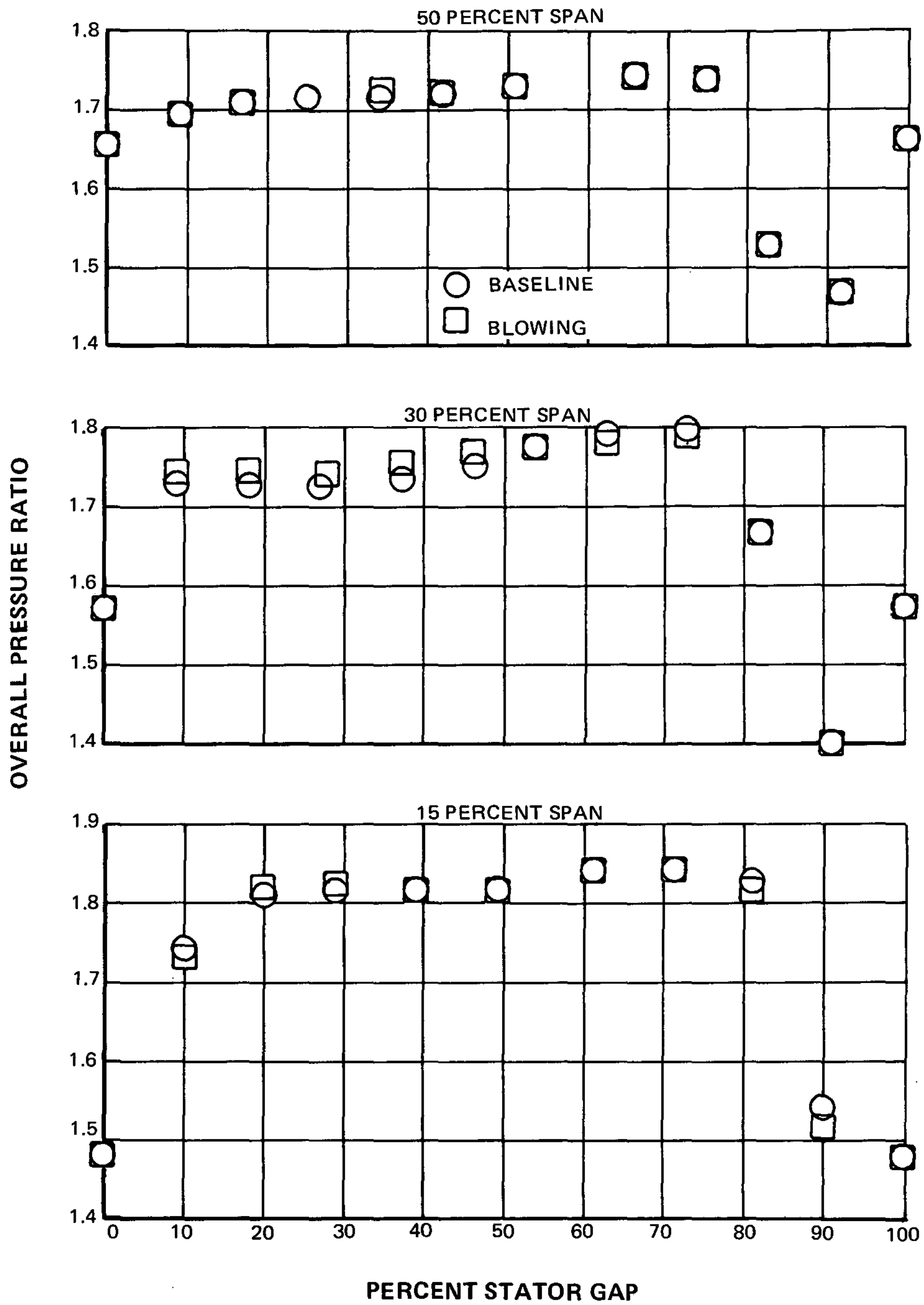


Figure 21b Stator Total Pressure Wake, Baseline and Blowing - 100% Design Speed, Wide Open

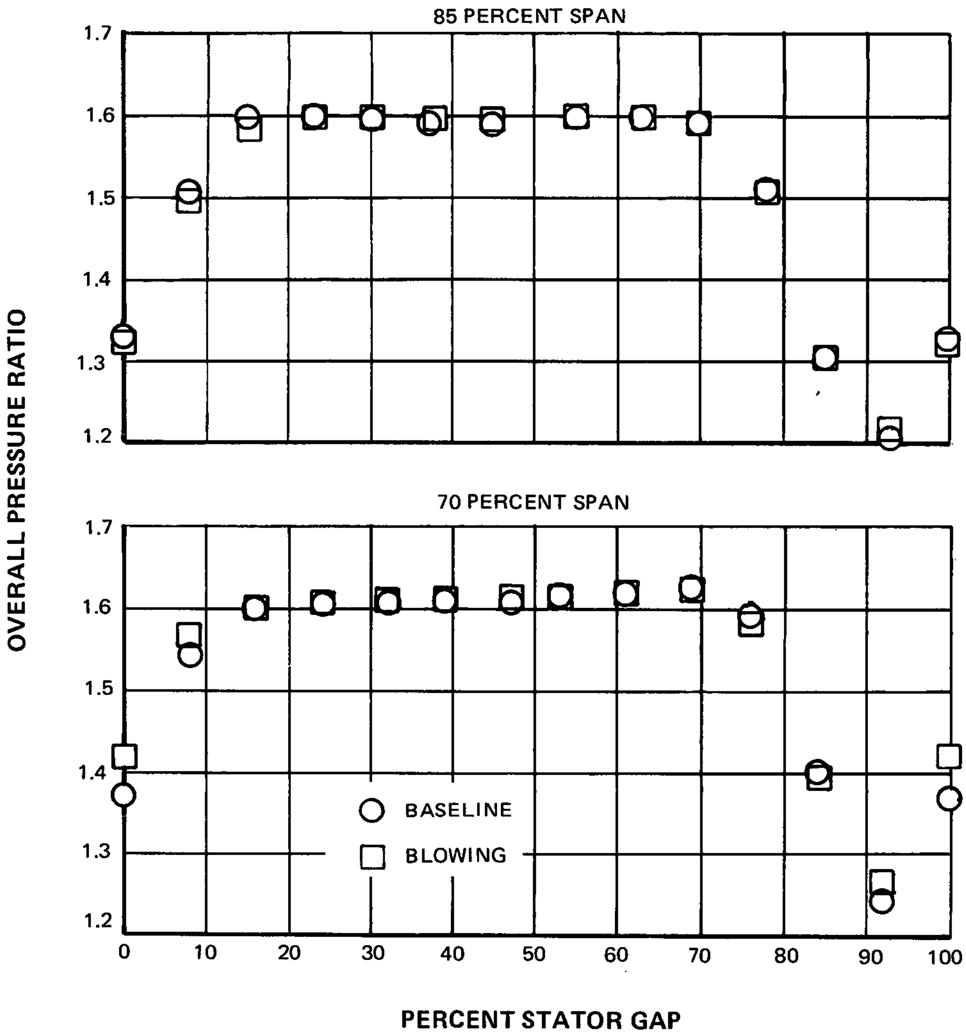


Figure 21c Stator Total Pressure Wake, Baseline and Blowing - 100% Design Speed, Wide Open

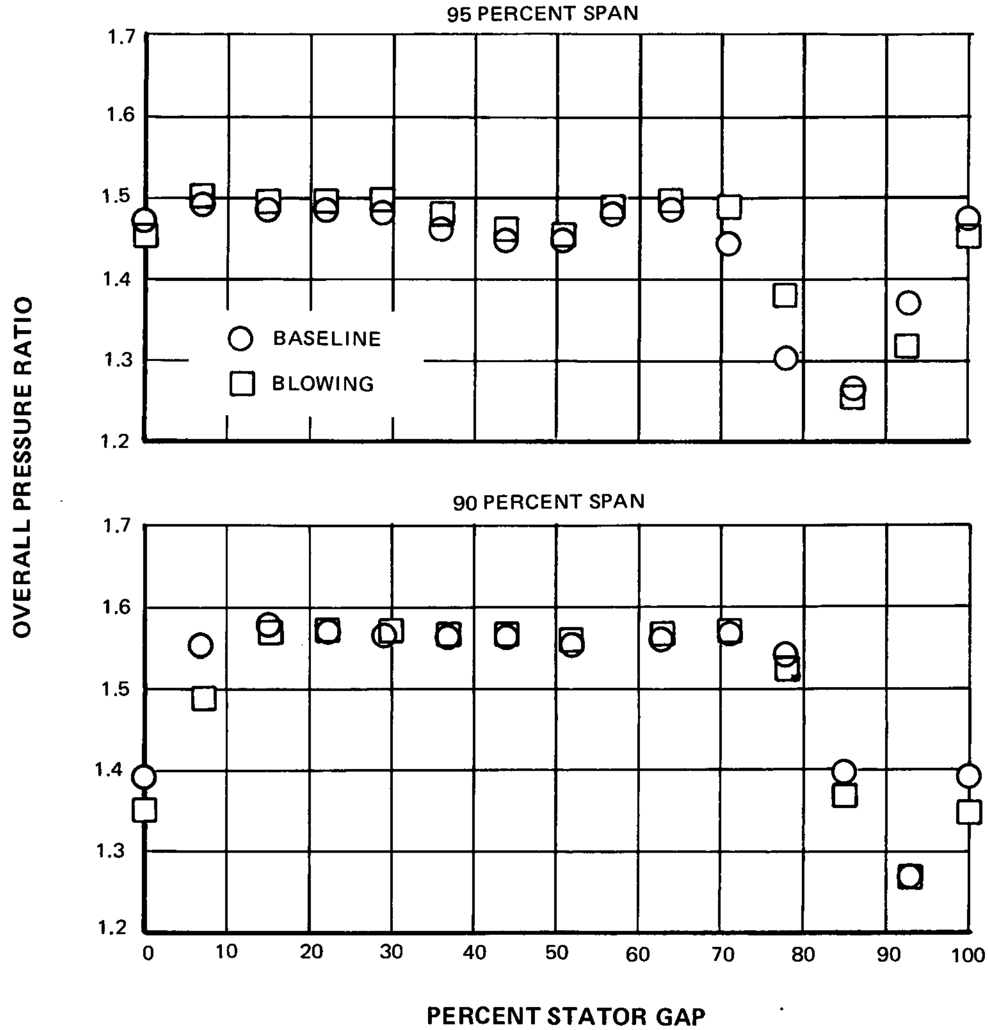


Figure 21d Stator Total Pressure Wake, Baseline and Blowing - 100% Design Speed, Wide Open

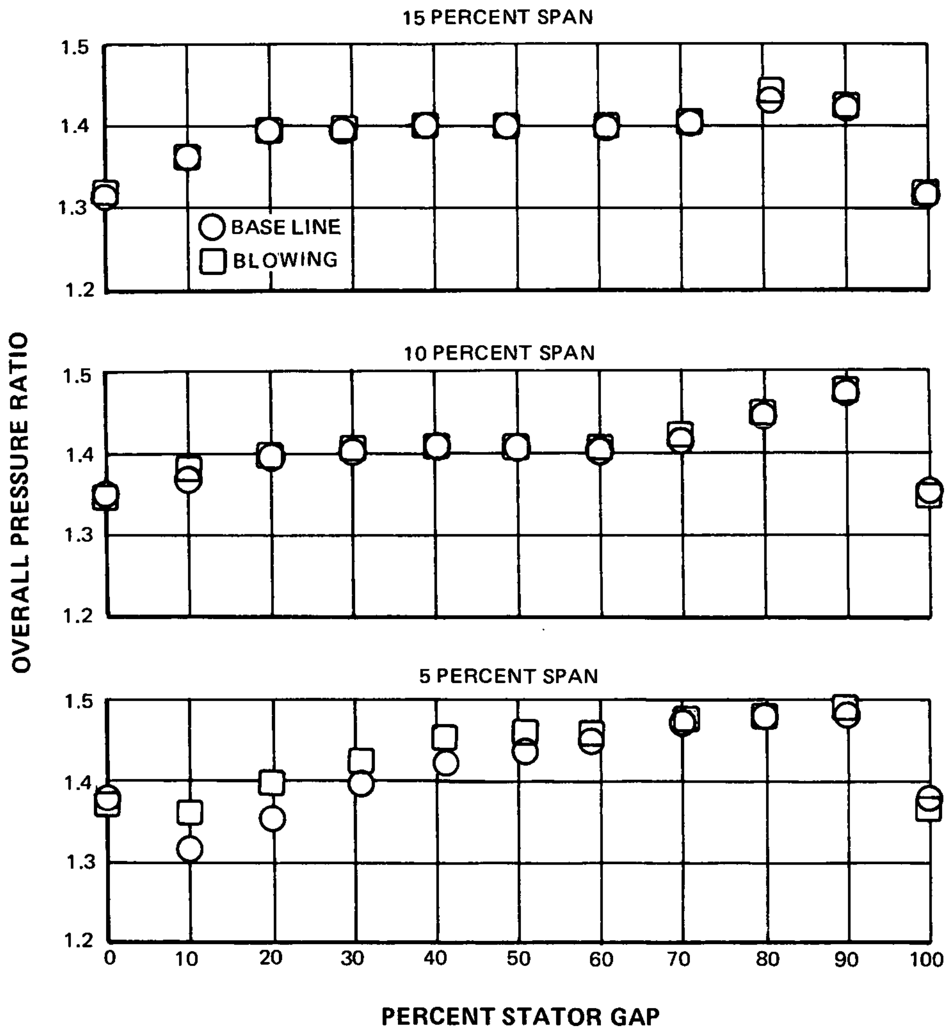


Figure 22a Stator Total Pressure Wake, Baseline and Blowing - 70% Design Speed, Near Surge

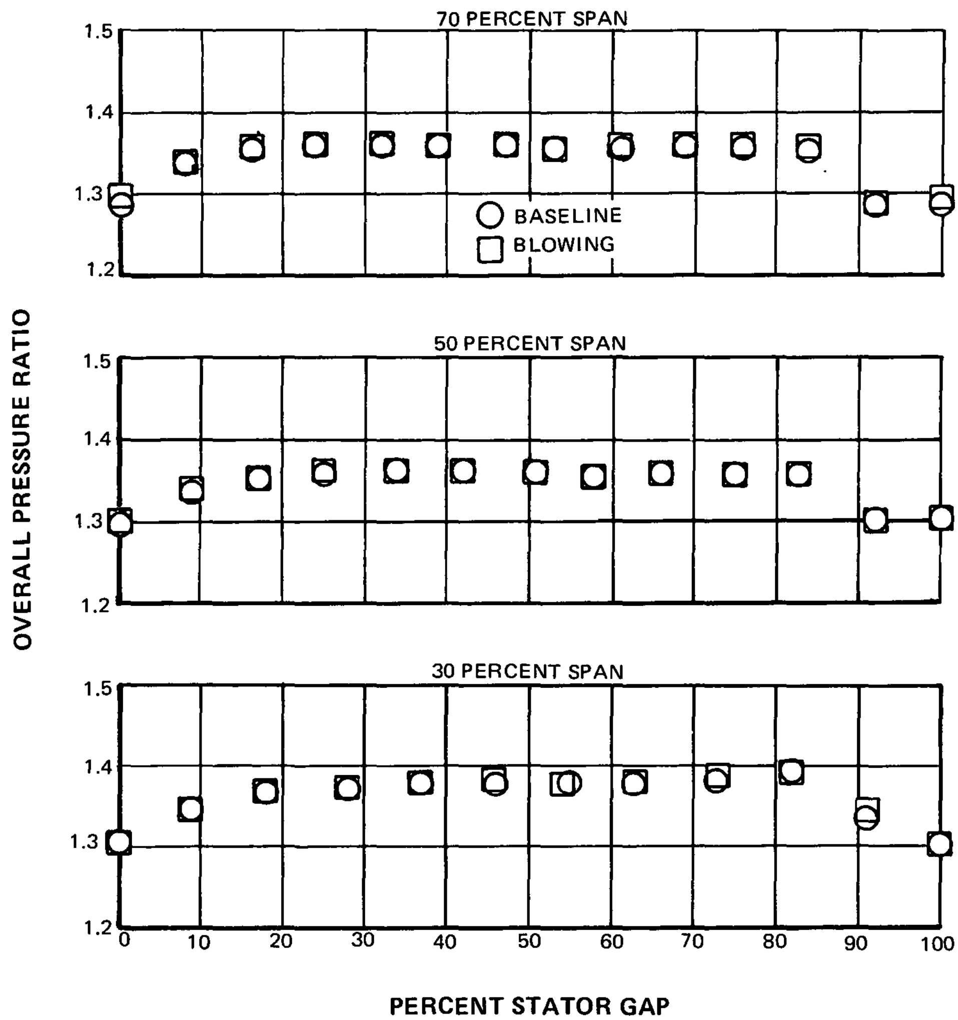


Figure 22b Stator Total Pressure Wake, Baseline and Blowing - 70% Design Speed, Near Surge

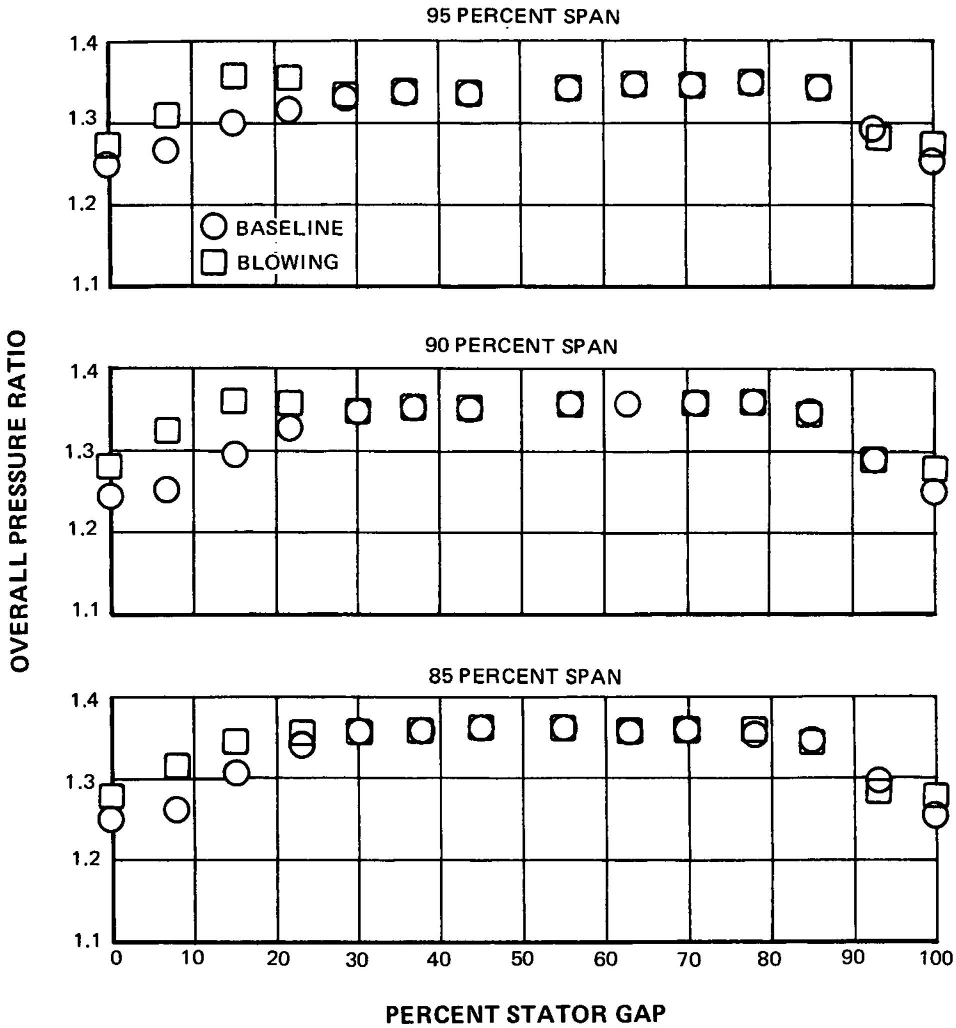


Figure 22c Stator Total Pressure Wake, Baseline and Blowing - 70% Design Speed, Near Surge

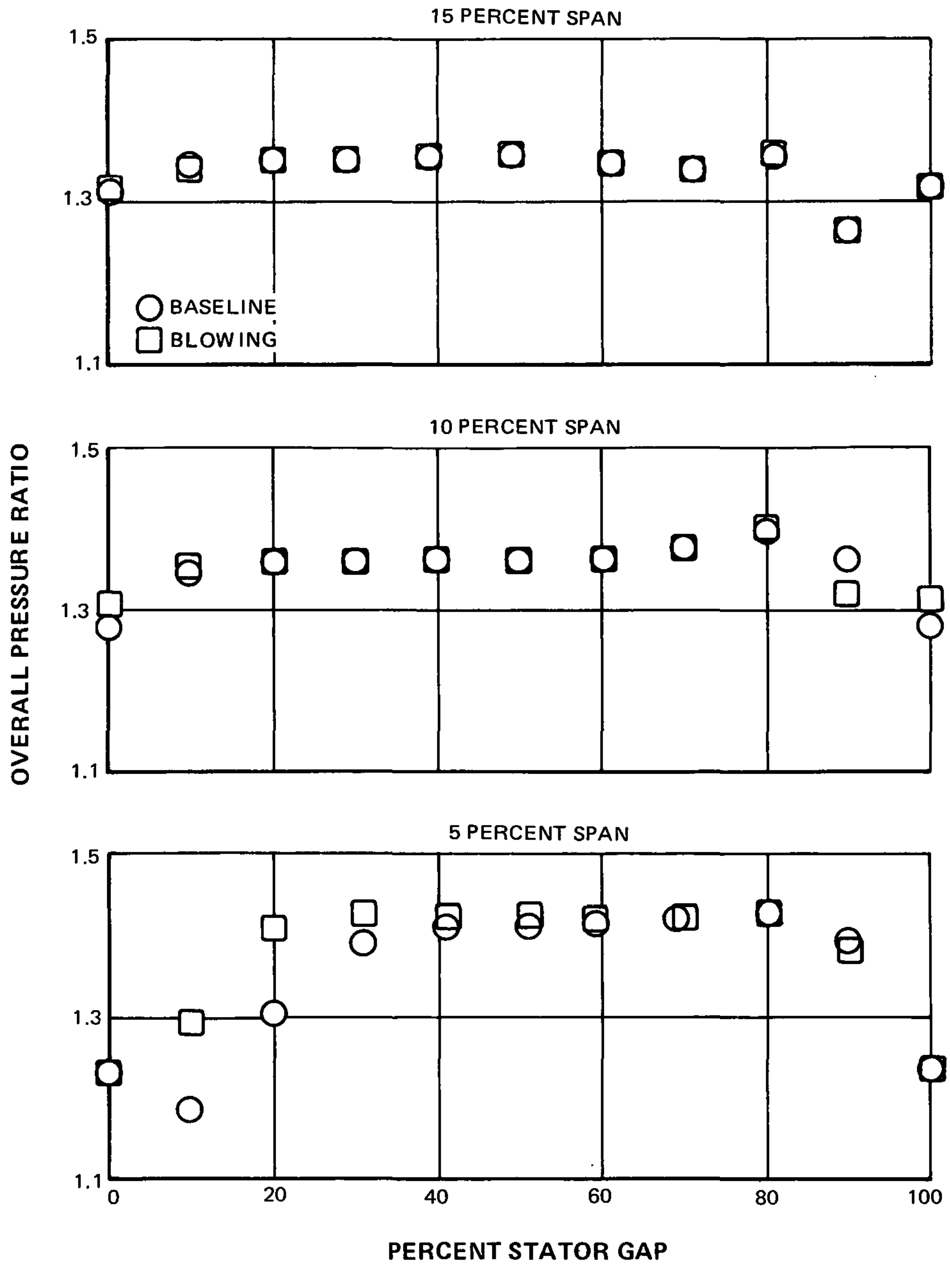


Figure 23a Stator Total Pressure Wake, Baseline and Blowing - 70% Design Speed, Wide Open

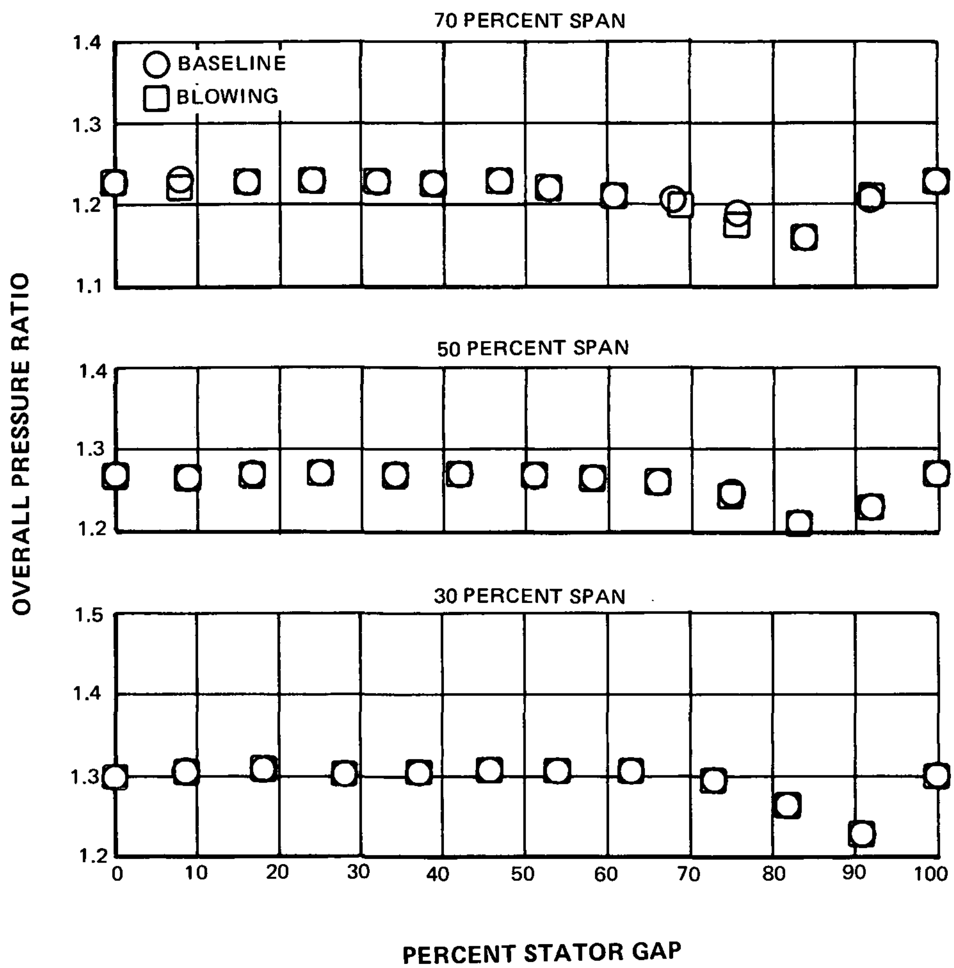


Figure 23b Stator Total Pressure Wake, Baseline and Blowing - 70% Design Speed, Wide Open

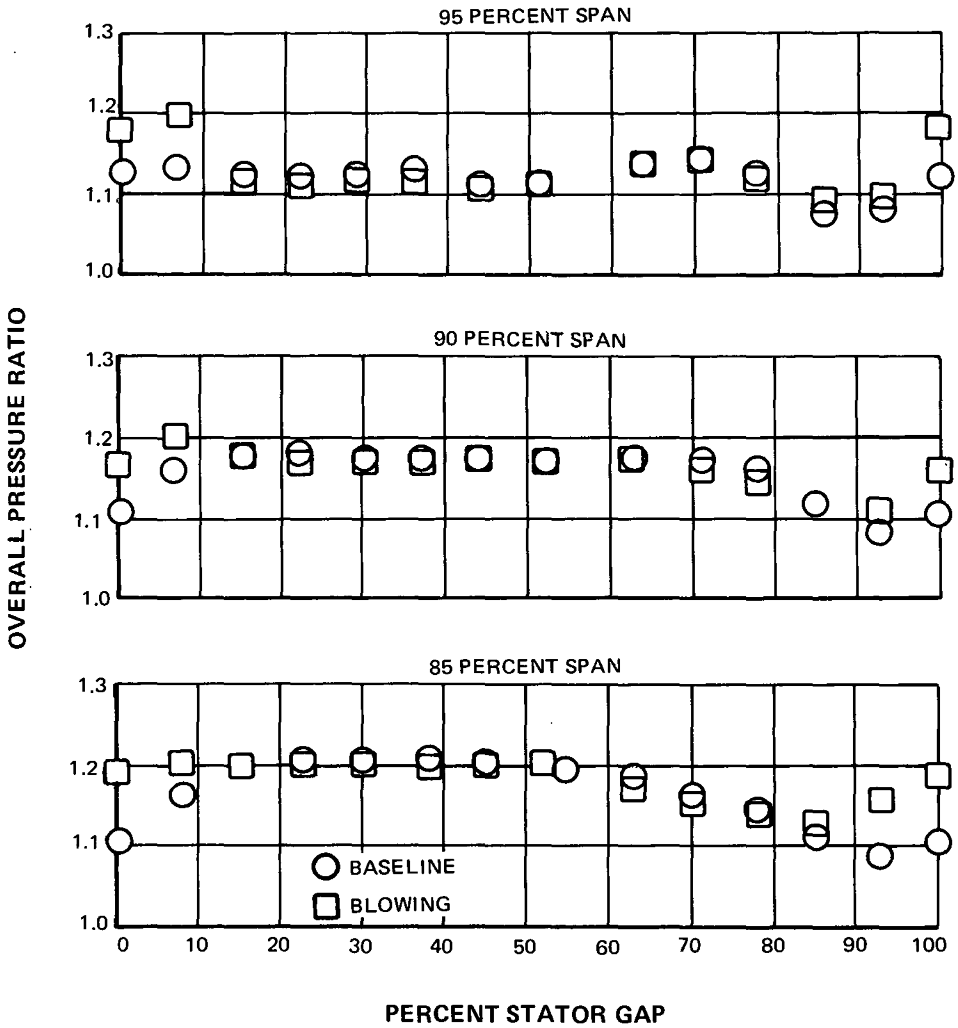


Figure 23c Stator Total Pressure Wake, Baseline and Blowing - 70% Design Speed, Wide Open

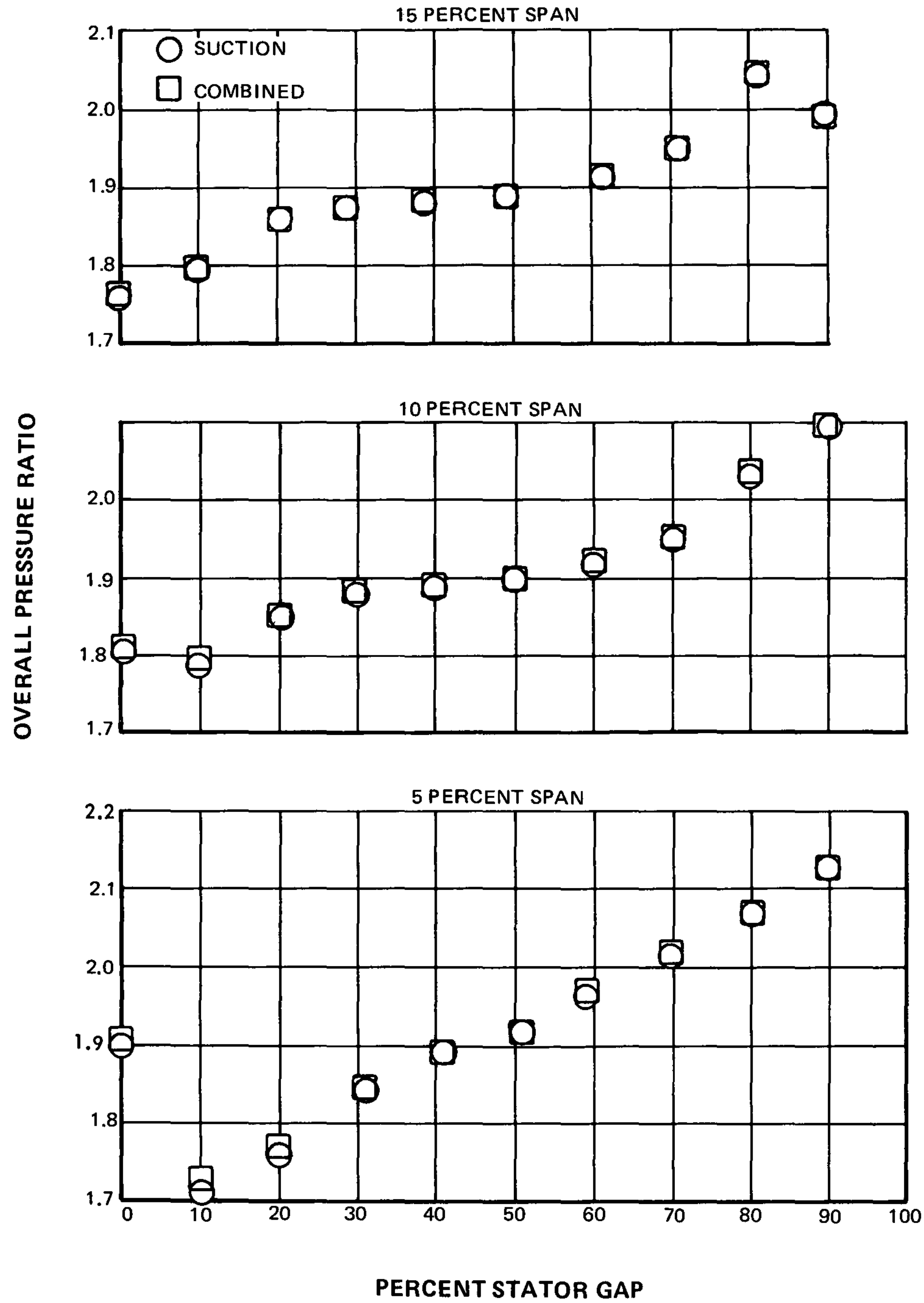


Figure 24a Stator Total Pressure Wake, Suction and Combined - 100% Design Speed, Near Surge

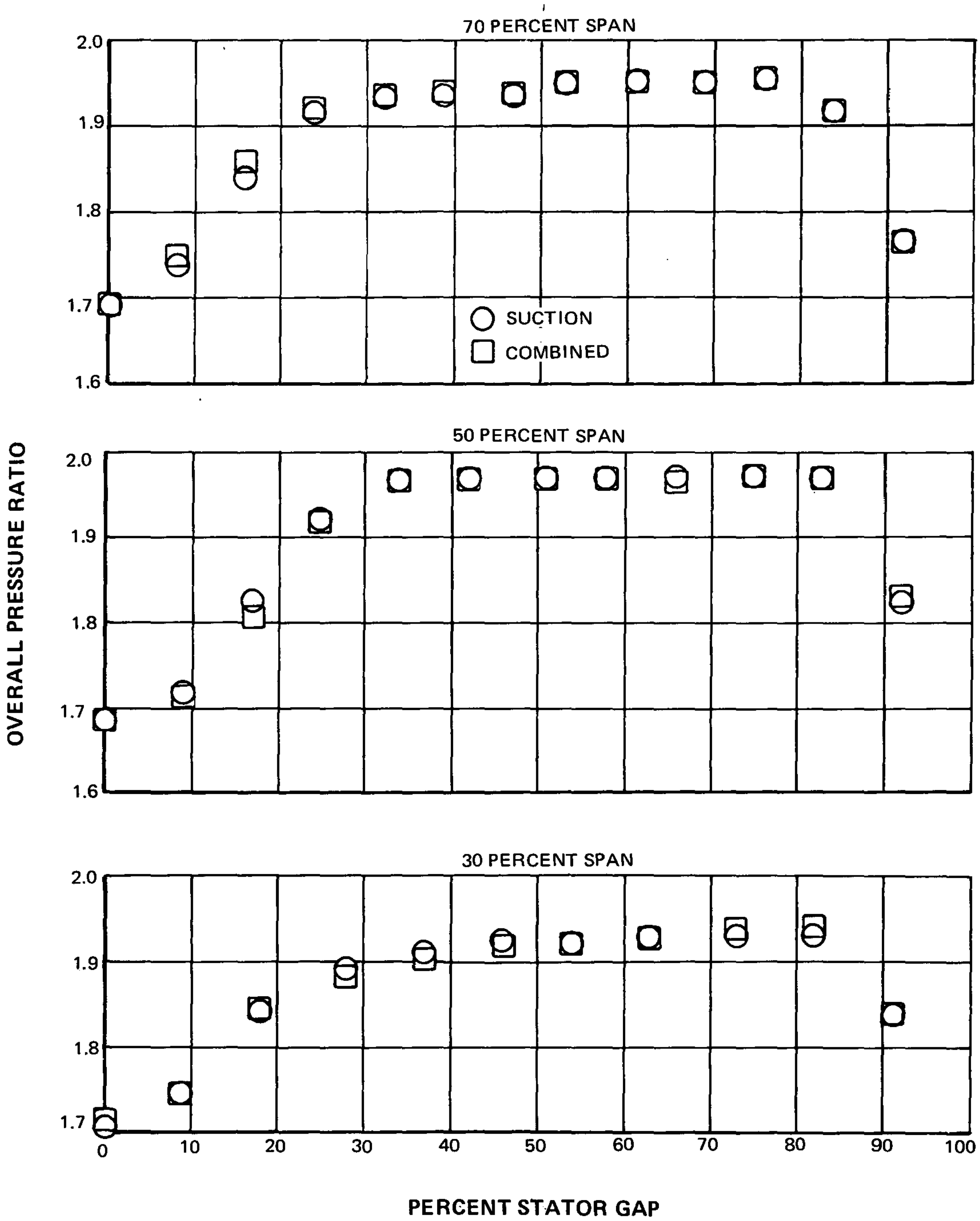


Figure 24b Stator Total Pressure Wake, Suction and Combined - 100% Design Speed, Near Surge

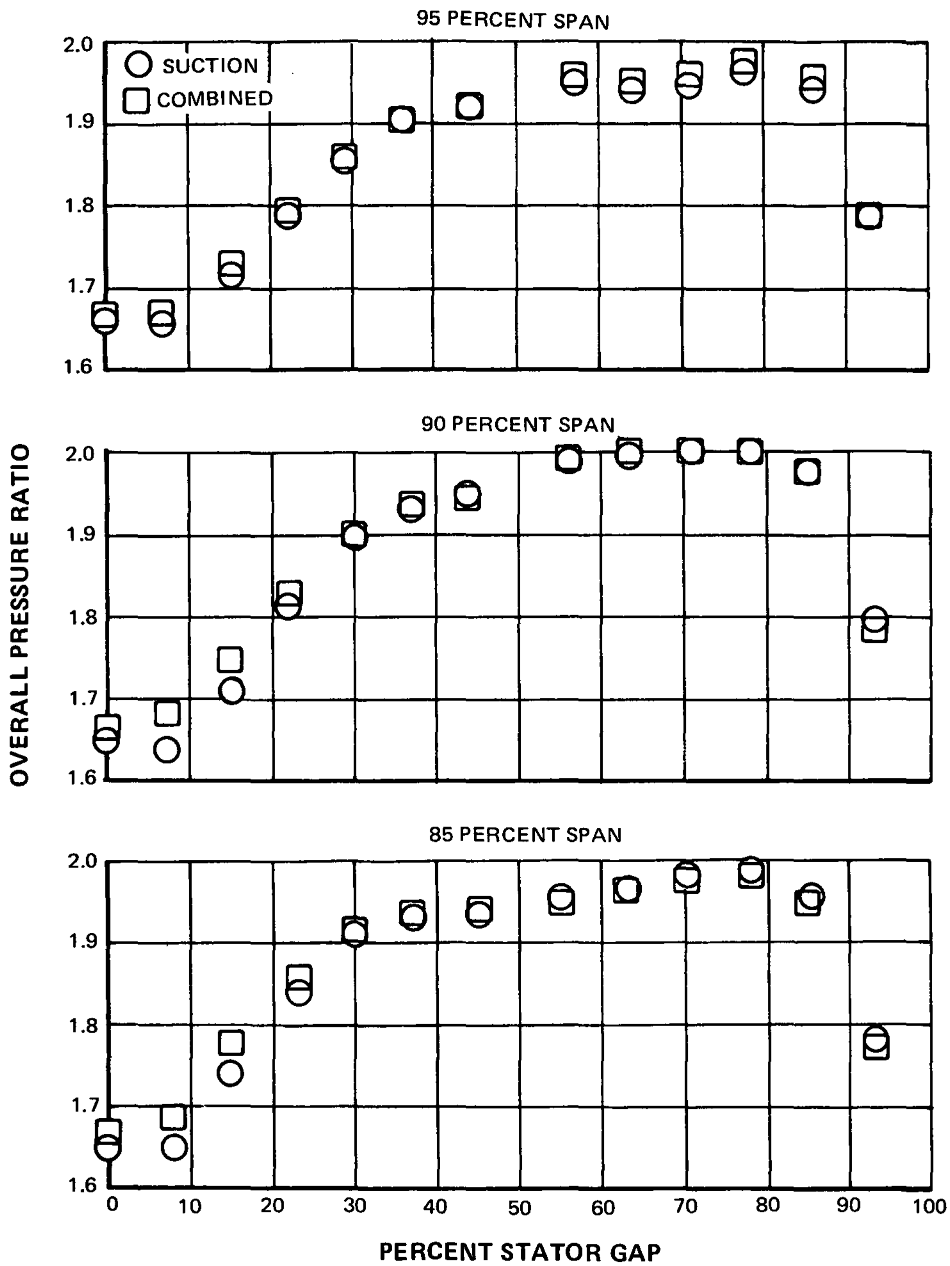


Figure 24c Stator Total Pressure Wake, Suction and Combined - 100% Design Speed, Near Surge

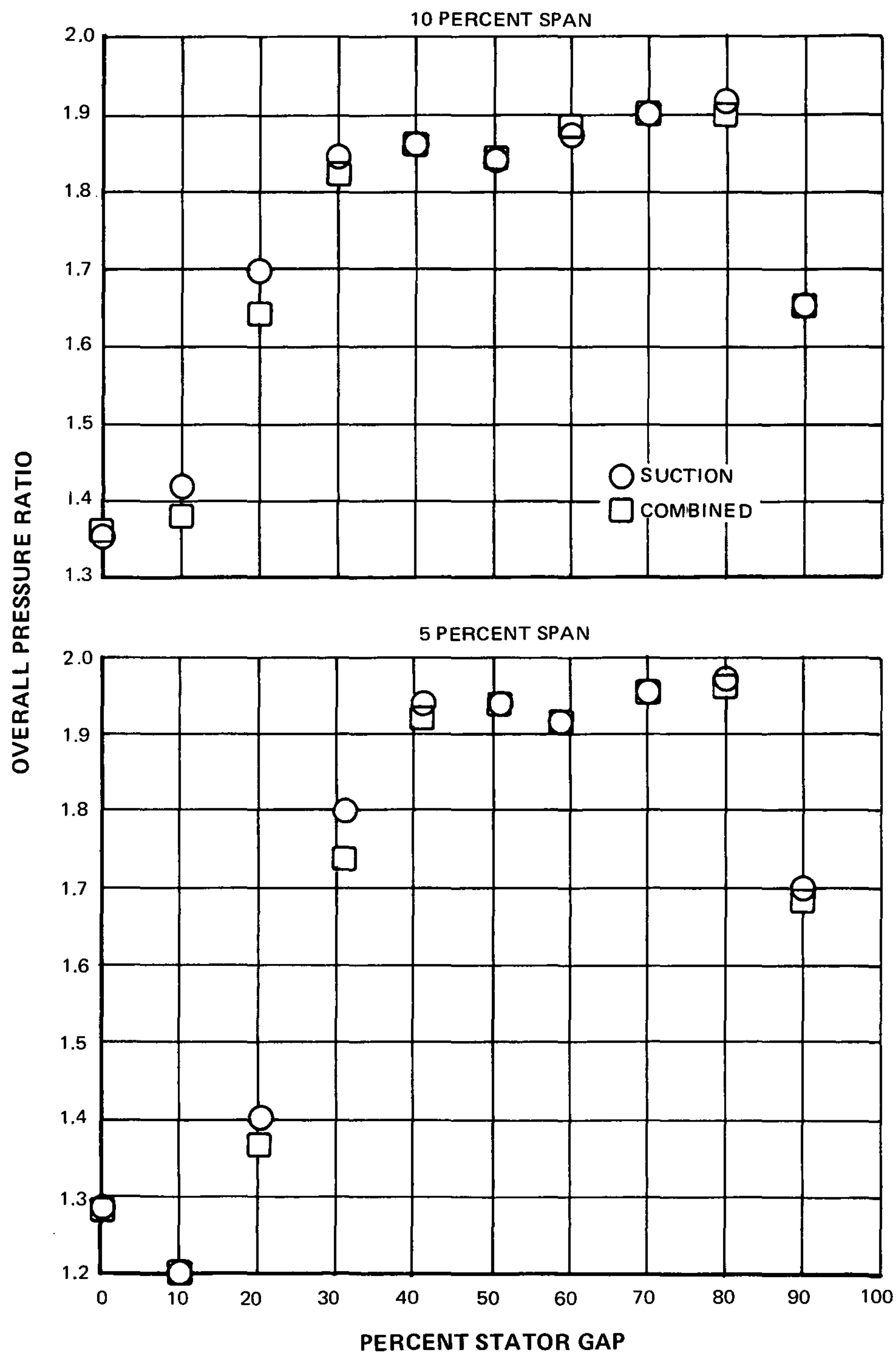


Figure 25a Stator Total Pressure Wake, Suction and Combined - 100% Design Speed, Wide Open

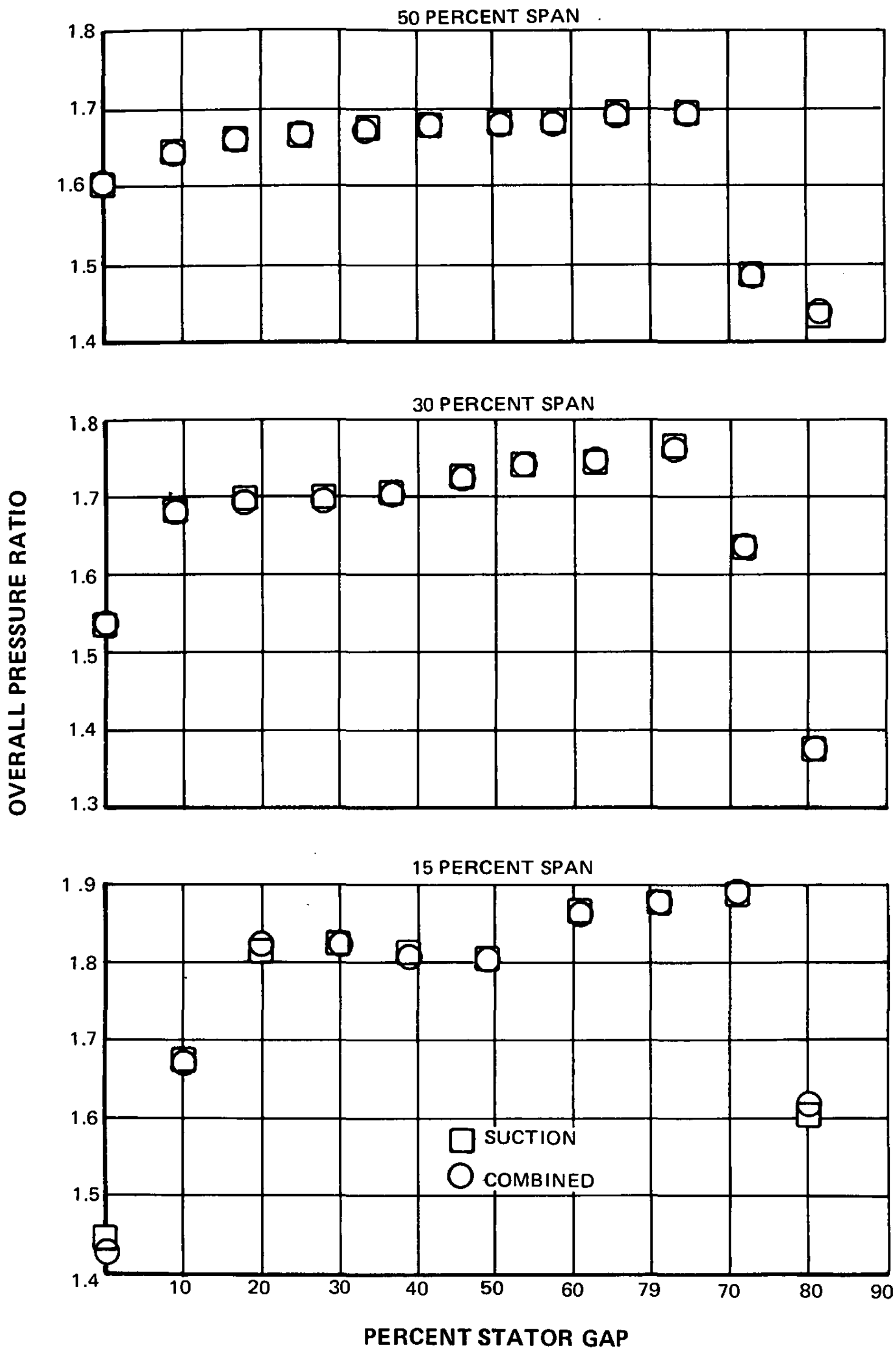


Figure 25b Stator Total Pressure Wake, Suction and Combined - 100% Design Speed, Wide Open

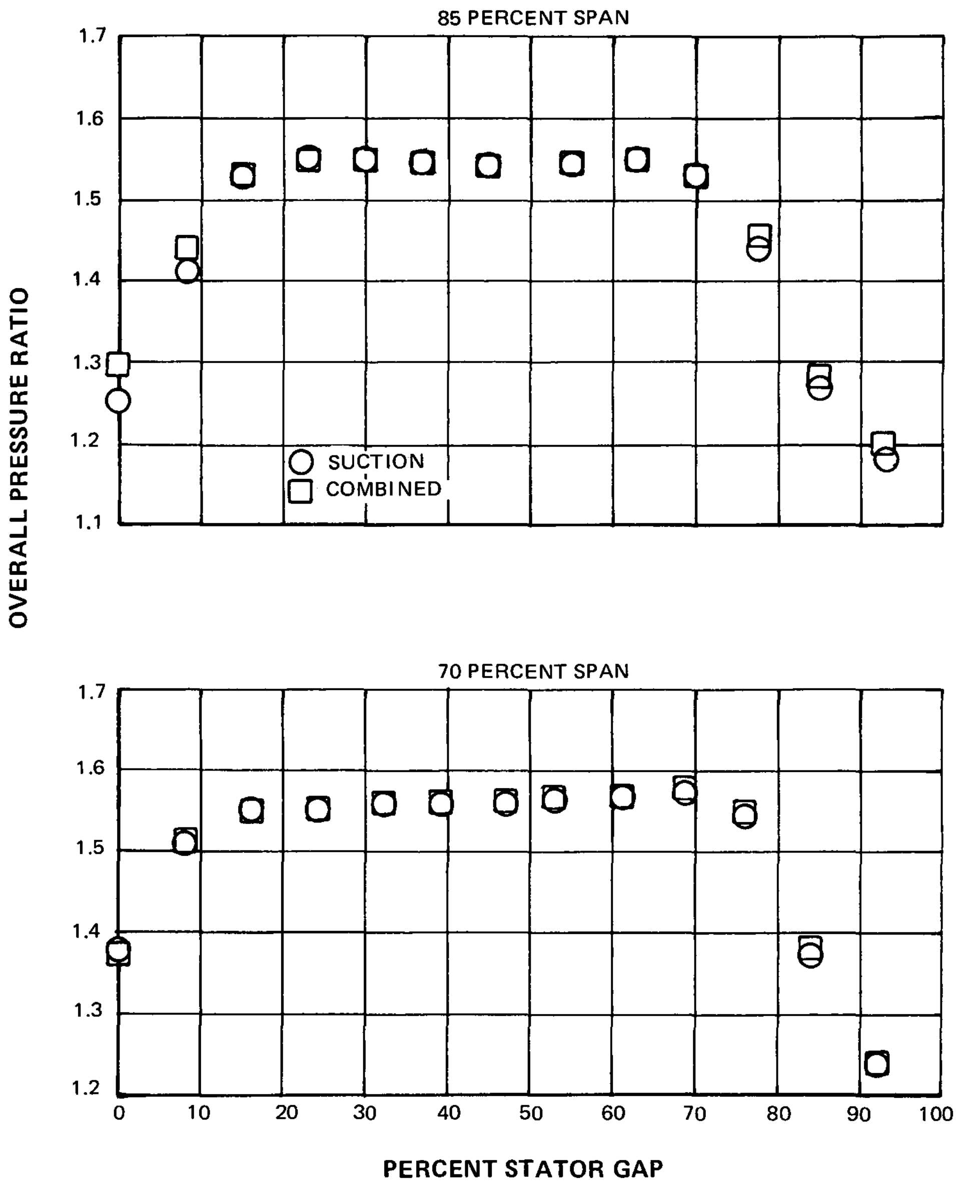


Figure 25c Stator Total Pressure Wake, Suction and Combined - 100% Design Speed, Wide Open

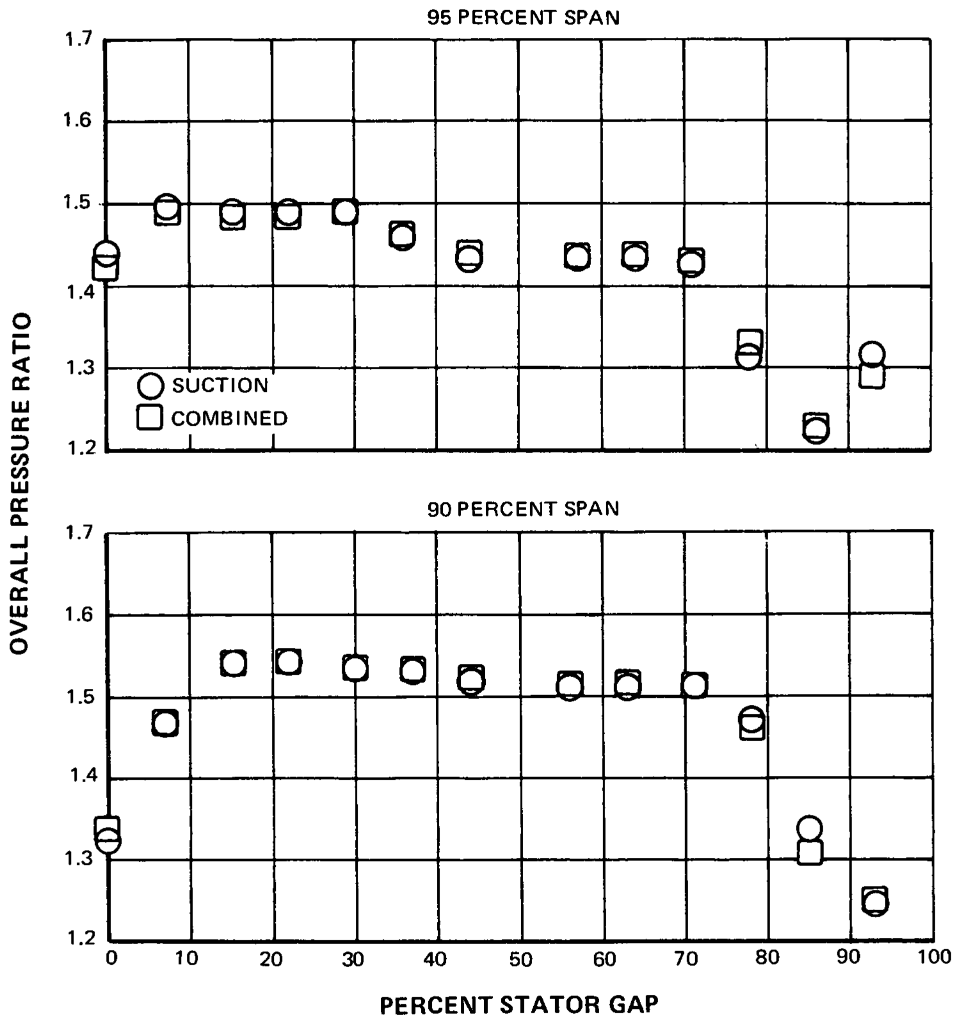


Figure 25d Stator Total Pressure Wake, Suction and Combined - 100% Design Speed, Wide Open

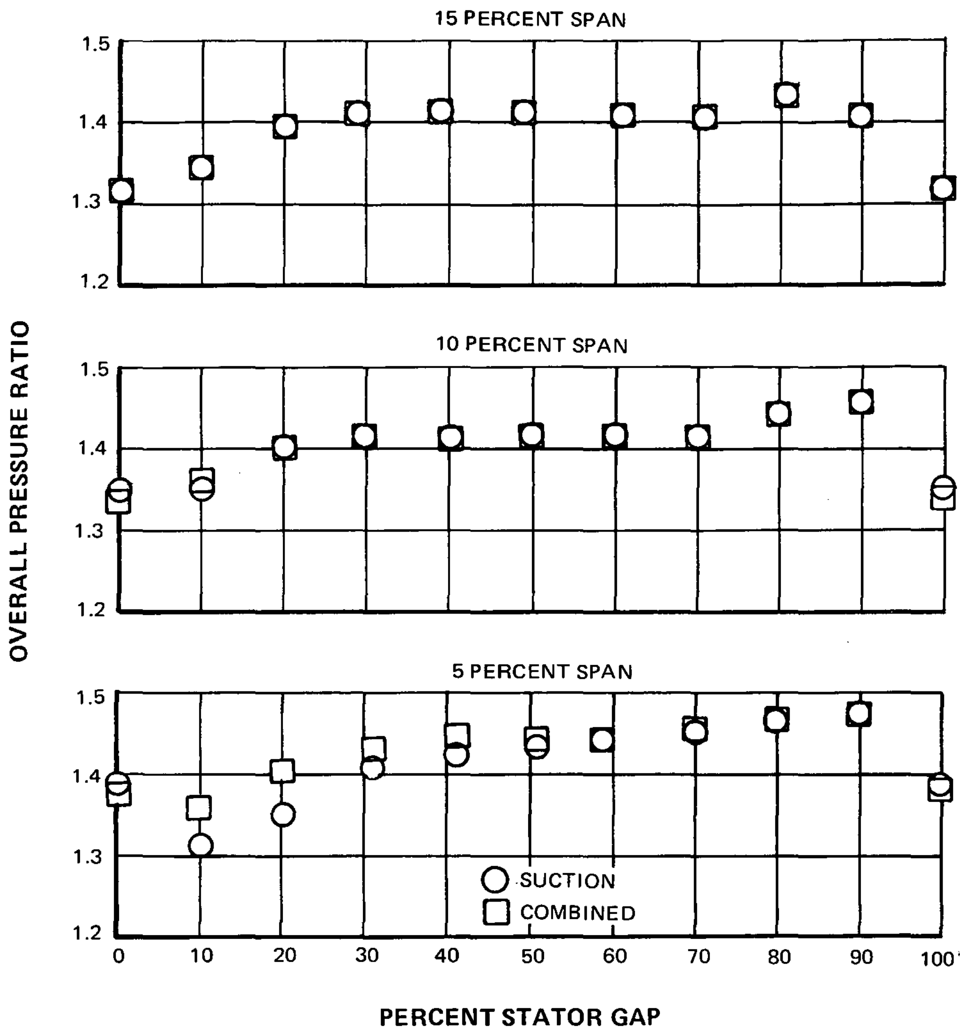


Figure 26a Stator Total Pressure Wake, Suction and Combined - 70% Design Speed, Near Surge

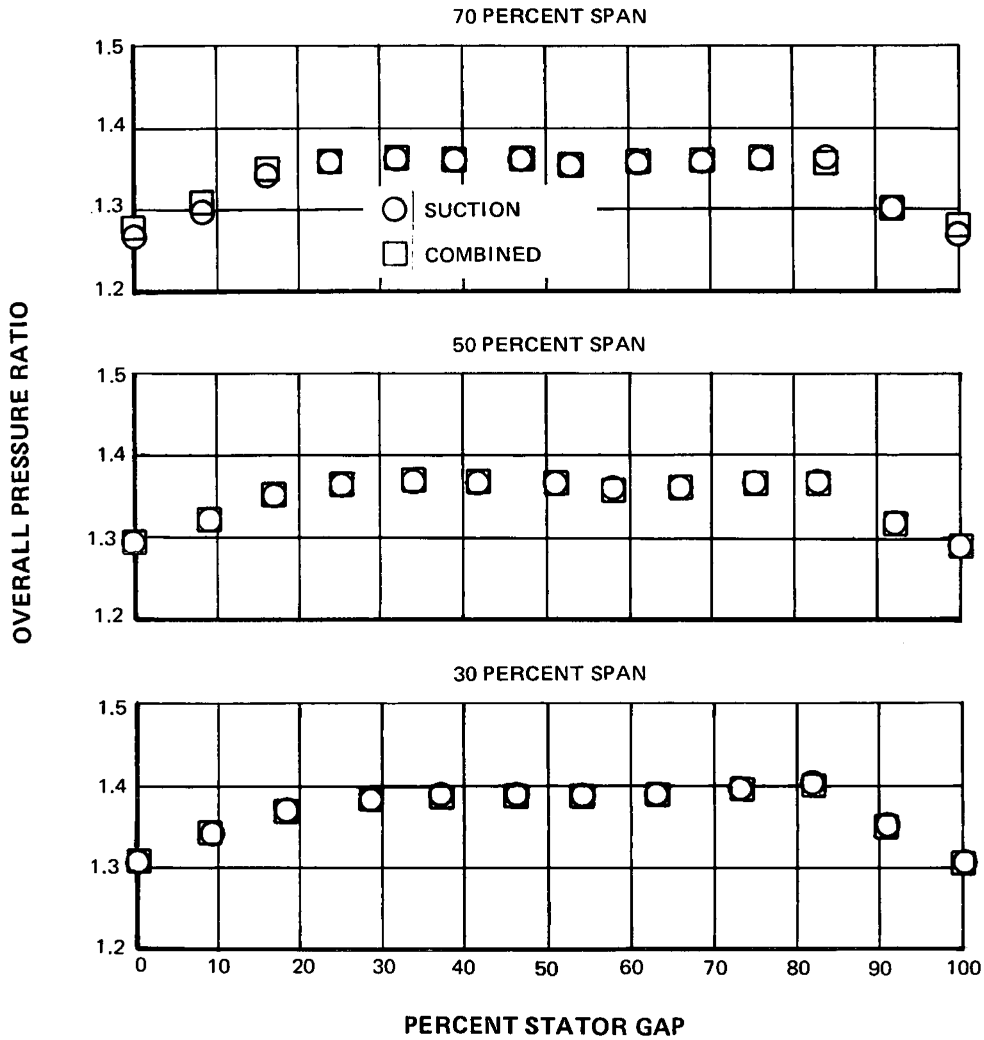


Figure 26b Stator Total Pressure Wake, Suction and Combined - 70% Design Speed, Near Surge

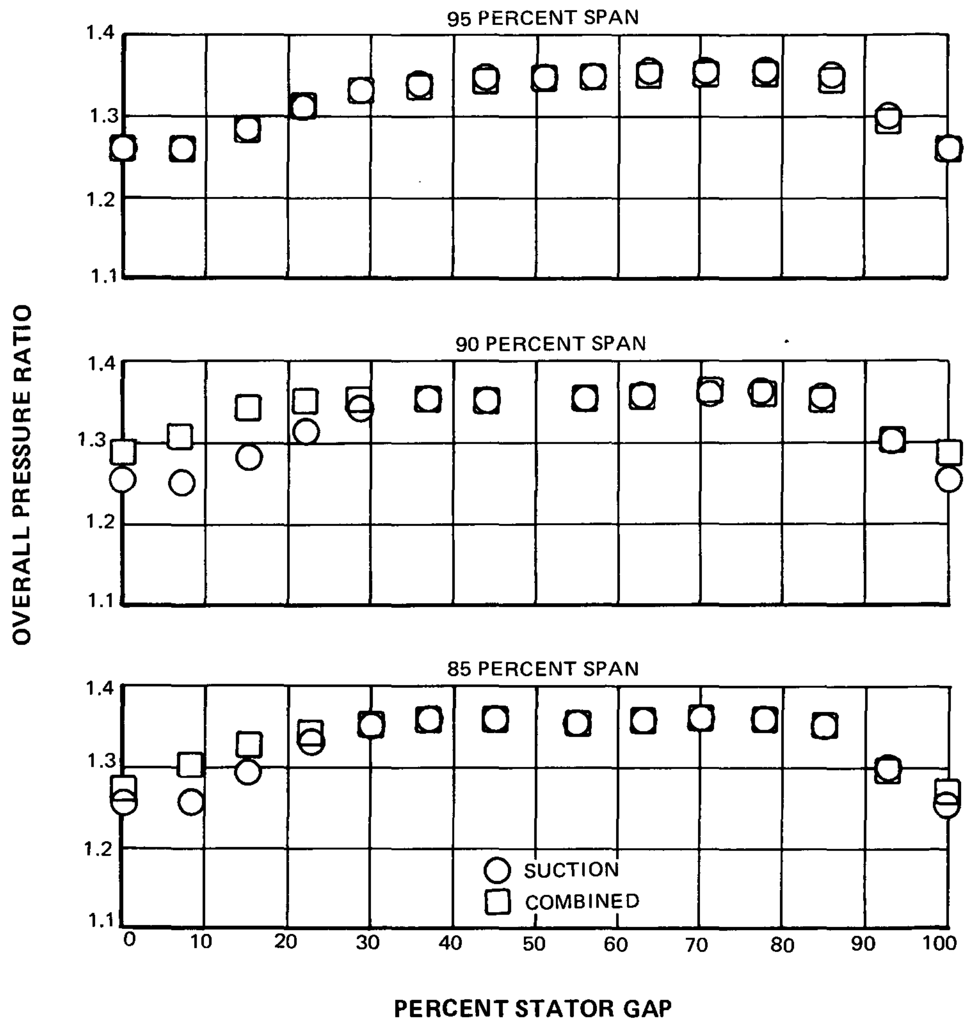


Figure 26c Stator Total Pressure Wake, Suction and Combined - 70% Design Speed, Near Surge

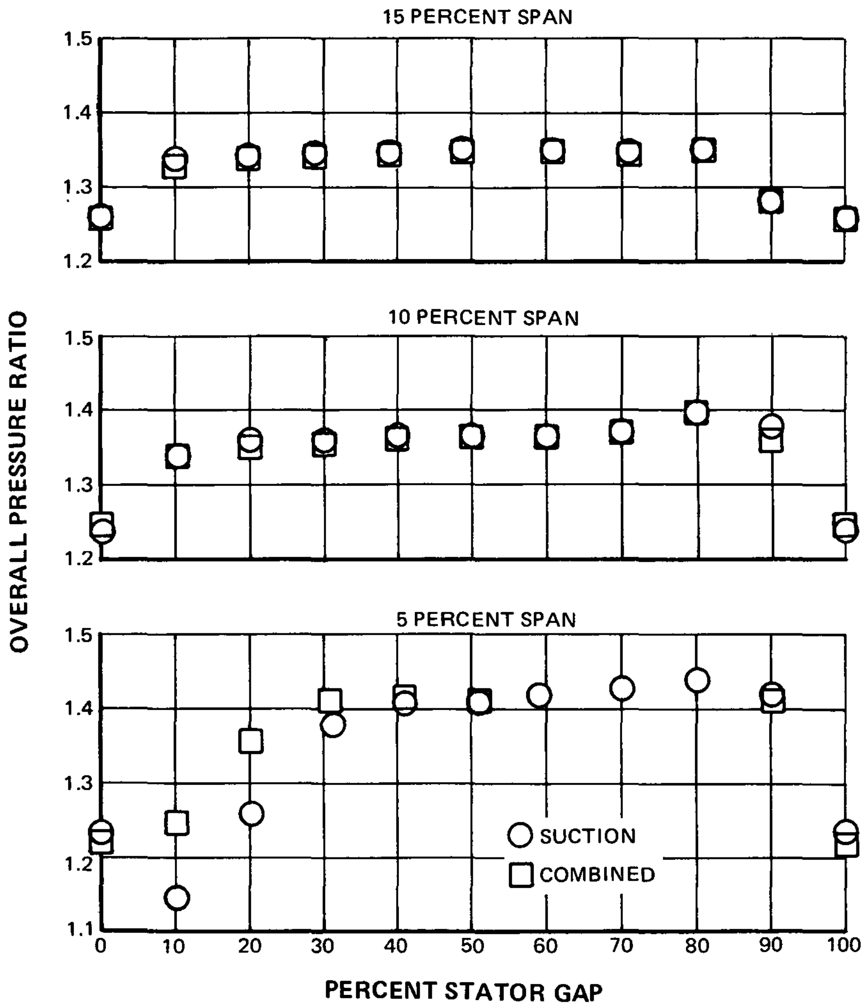


Figure 27a Stator Total Pressure Wake, Suction and Combined - 70% Design Speed, Wide Open

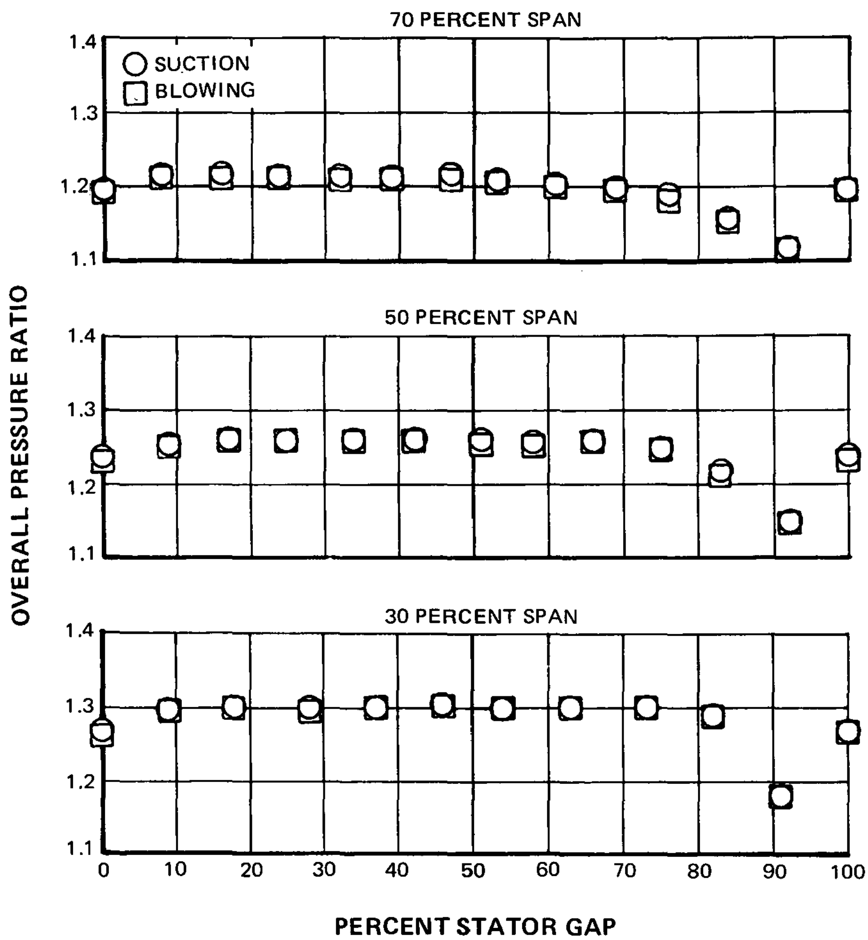


Figure 27b Stator Total Pressure Wake, Suction and Combined - 70% Design Speed, Wide Open

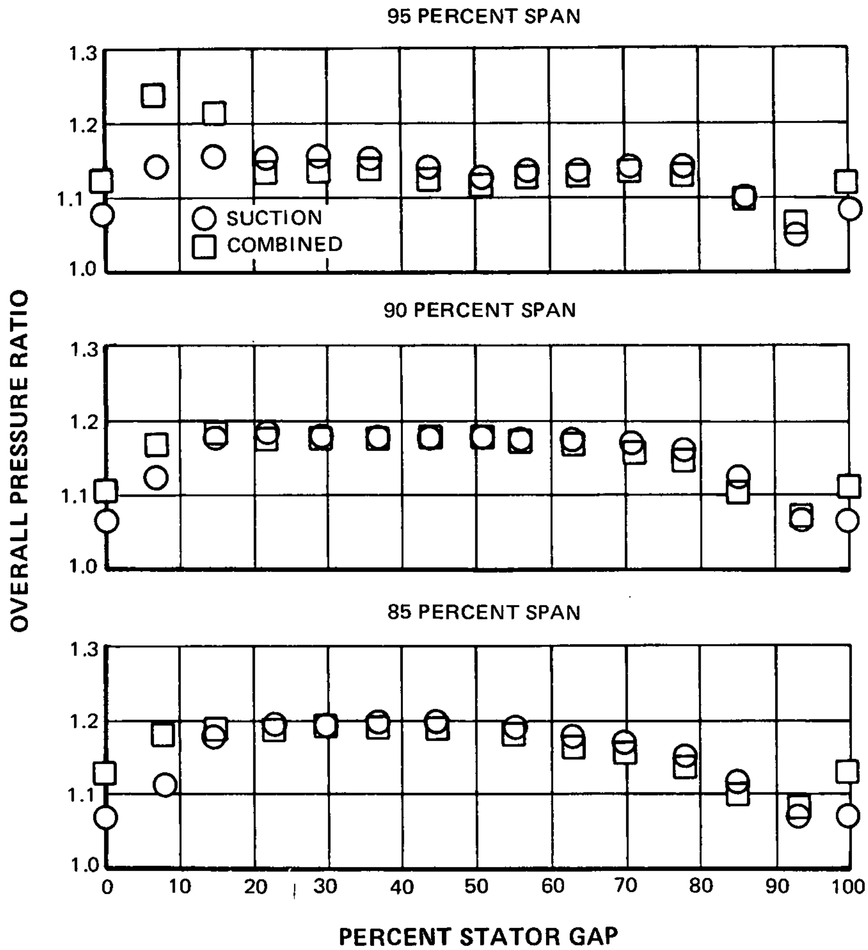


Figure 27c Stator Total Pressure Wake, Suction and Combined - 70% Design Speed, Wide Open

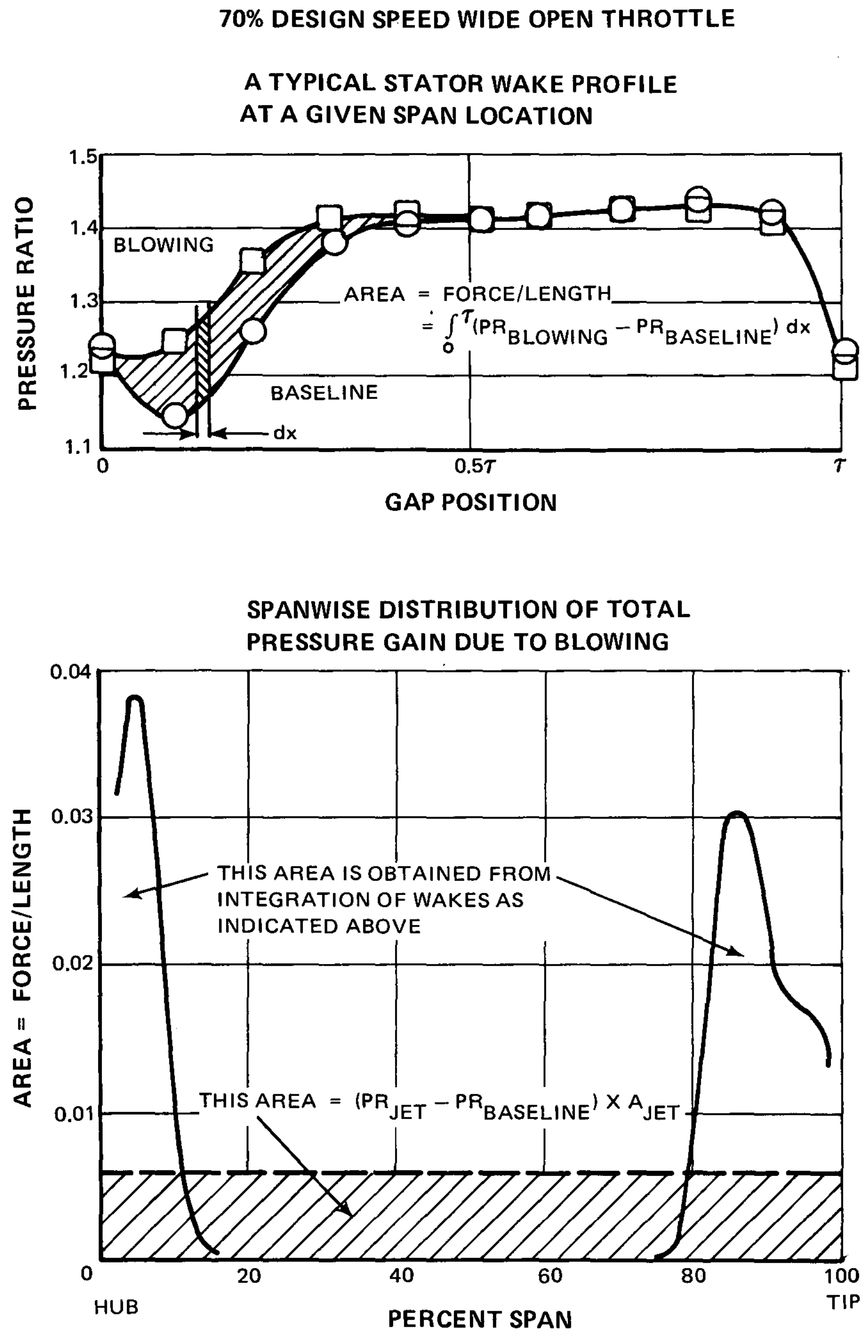
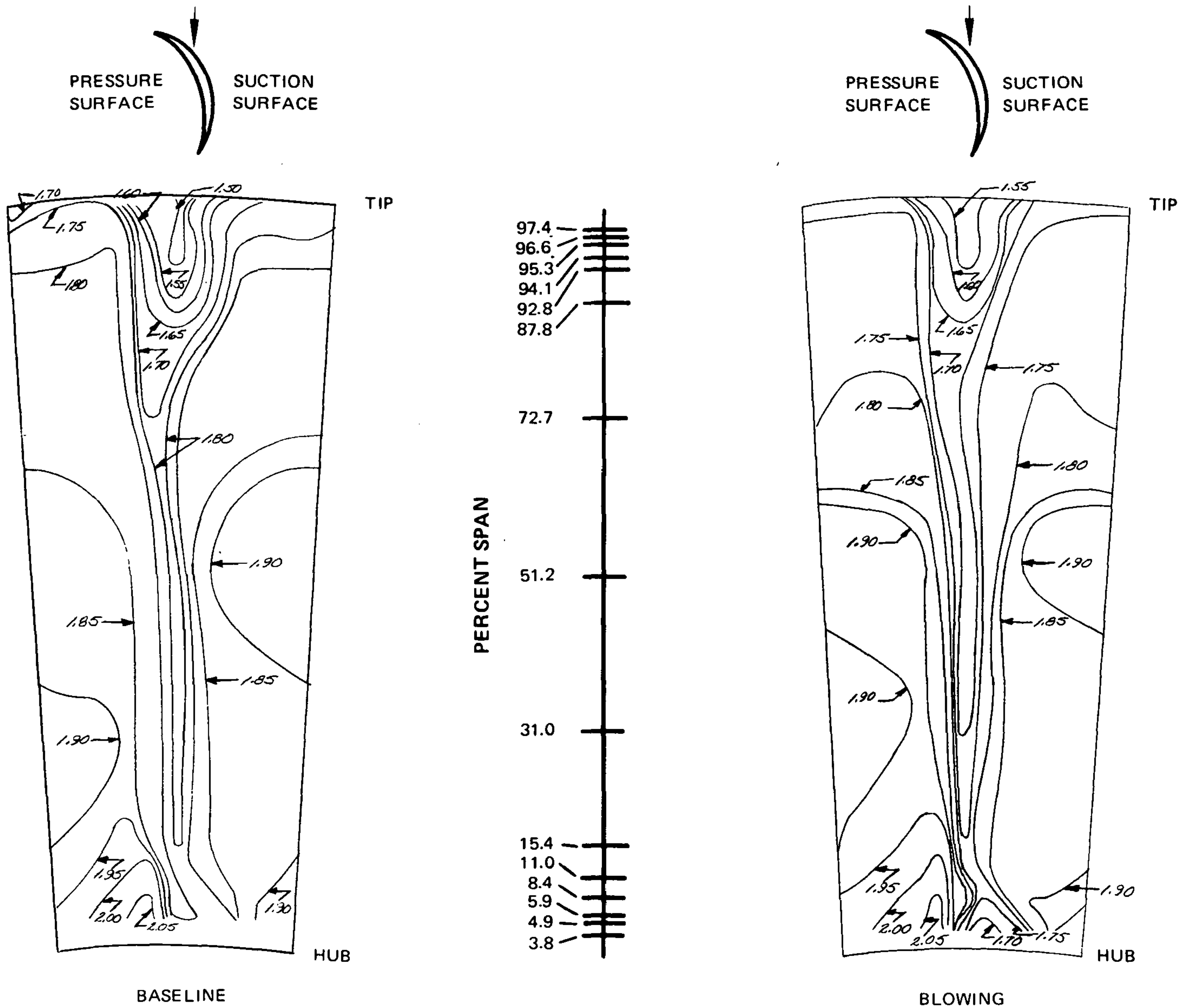


Figure 28 Integrated Net Gain in Wake Total Pressure With Blowing


PRESSURE SURFACE
SUCTION SURFACE
TIP
HUB
1.70
1.75
1.80
1.60
1.50
1.55
1.65
1.70
1.80
1.90
1.85
1.85
1.90
1.95
2.00
2.05
1.30
BASELINE
PERCENT SPAN
97.4
96.6
95.3
94.1
92.8
87.8
72.7
51.2
31.0
15.4
11.0
8.4
5.9
4.9
3.8
PRESSURE SURFACE
SUCTION SURFACE
TIP
HUB
1.55
1.60
1.65
1.75
1.70
1.75
1.80
1.80
1.85
1.90
1.90
1.85
1.90
1.90
1.95
2.00
2.05
1.70
1.75
BLOWING

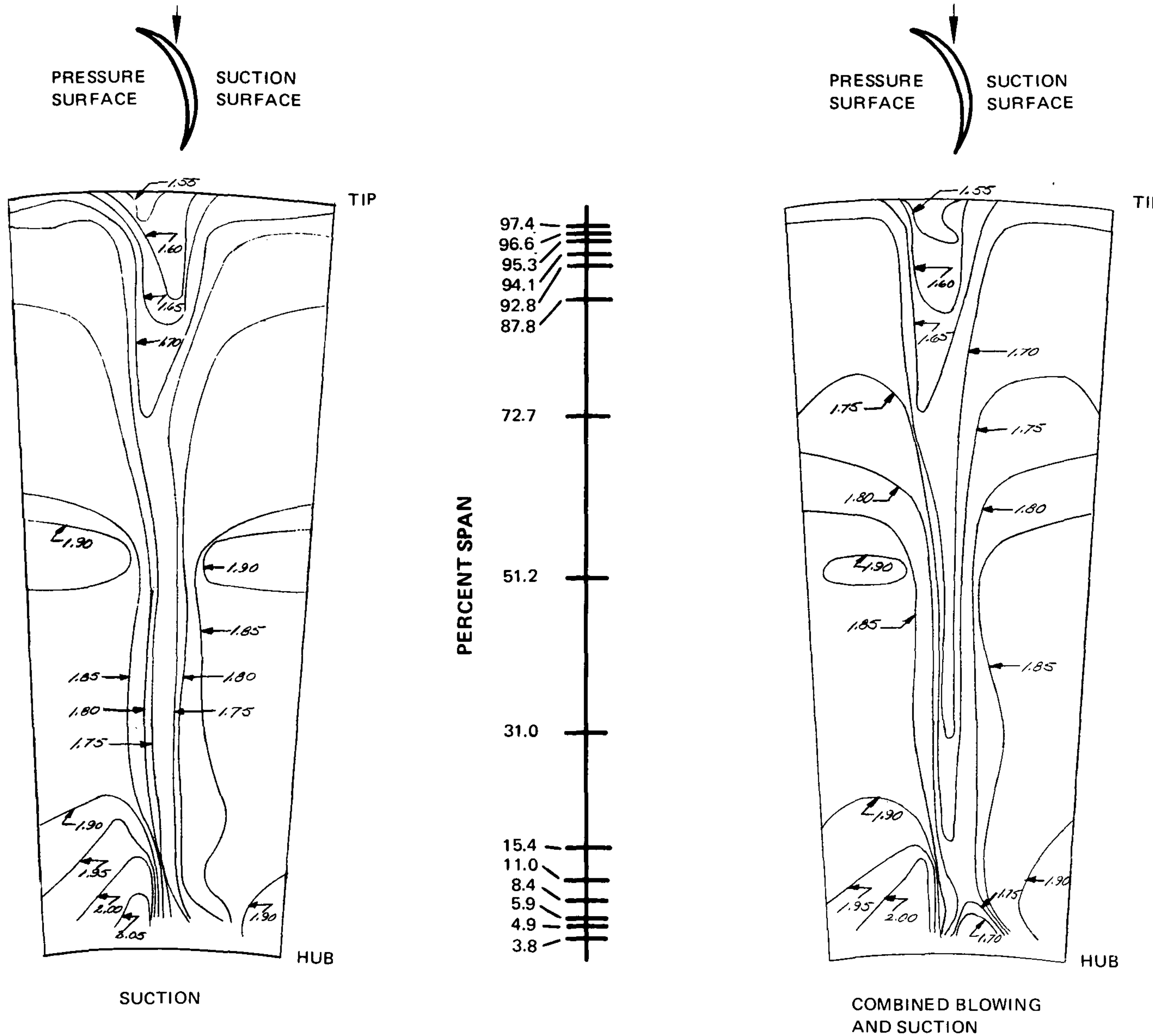
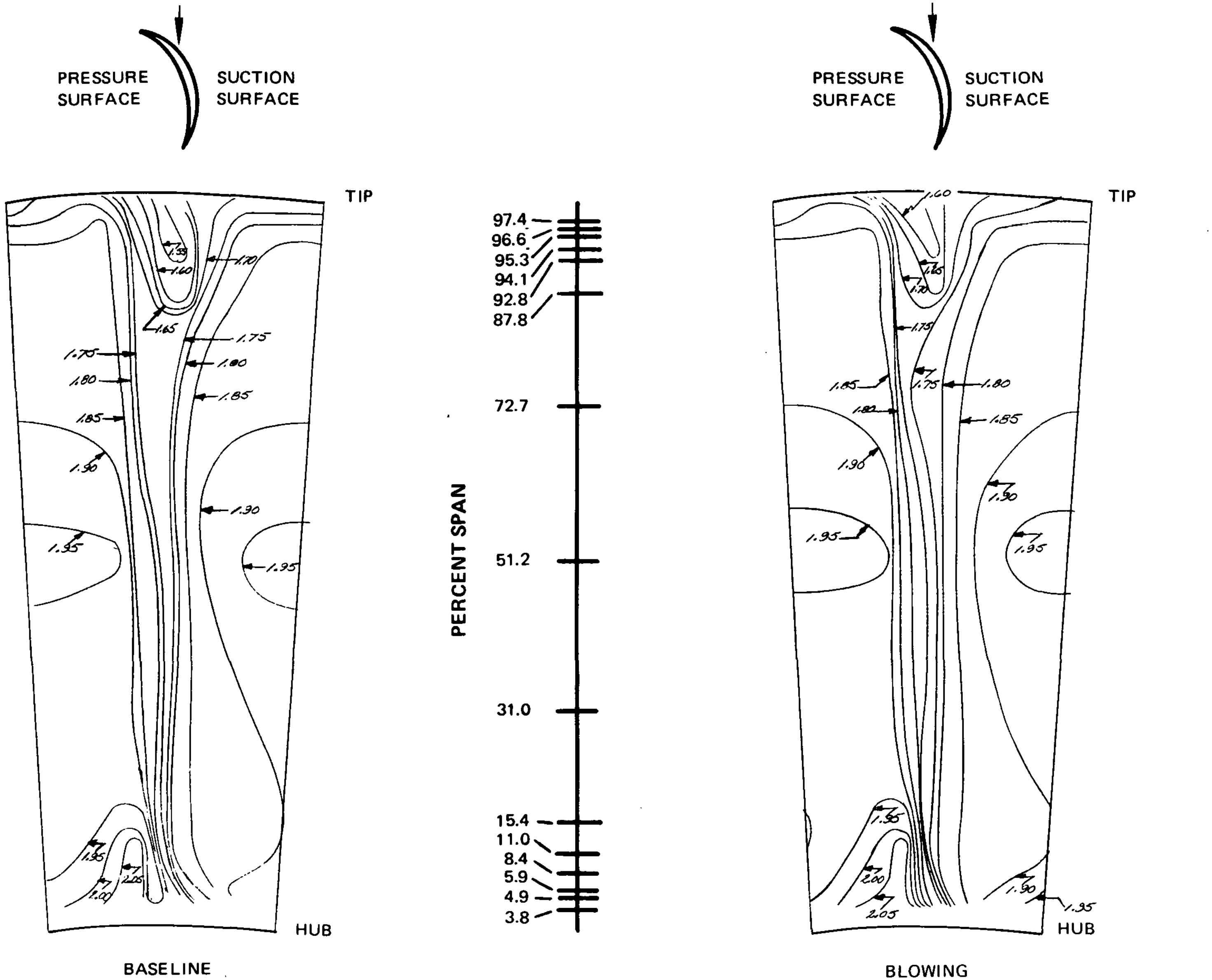


Figure 29 Stator Exit Total Pressure Ratio Contour Plots at 100% Design Speed – Total Inlet Corrected Airflow = 180.63 lb/sec
Rotor Pressure Ratio = 1.8862


PRESSURE SURFACE
SUCTION SURFACE
TIP
HUB
BASELINE
PERCENT SPAN
97.4
96.6
95.3
94.1
92.8
87.8
72.7
51.2
31.0
15.4
11.0
8.4
5.9
4.9
3.8
BLOWING
1.55
1.60
1.65
1.70
1.75
1.80
1.85
1.90
1.95
2.00
2.05

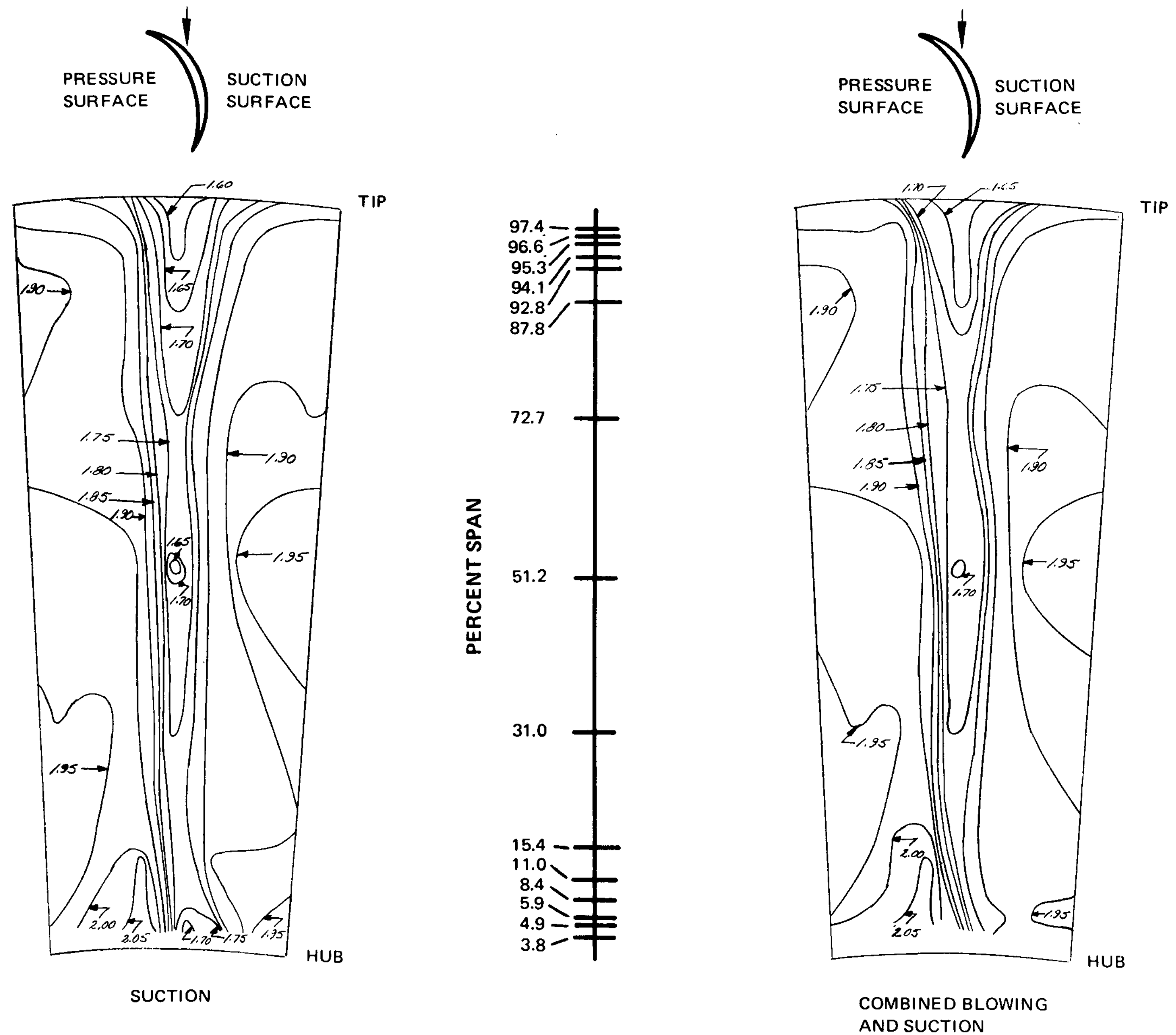
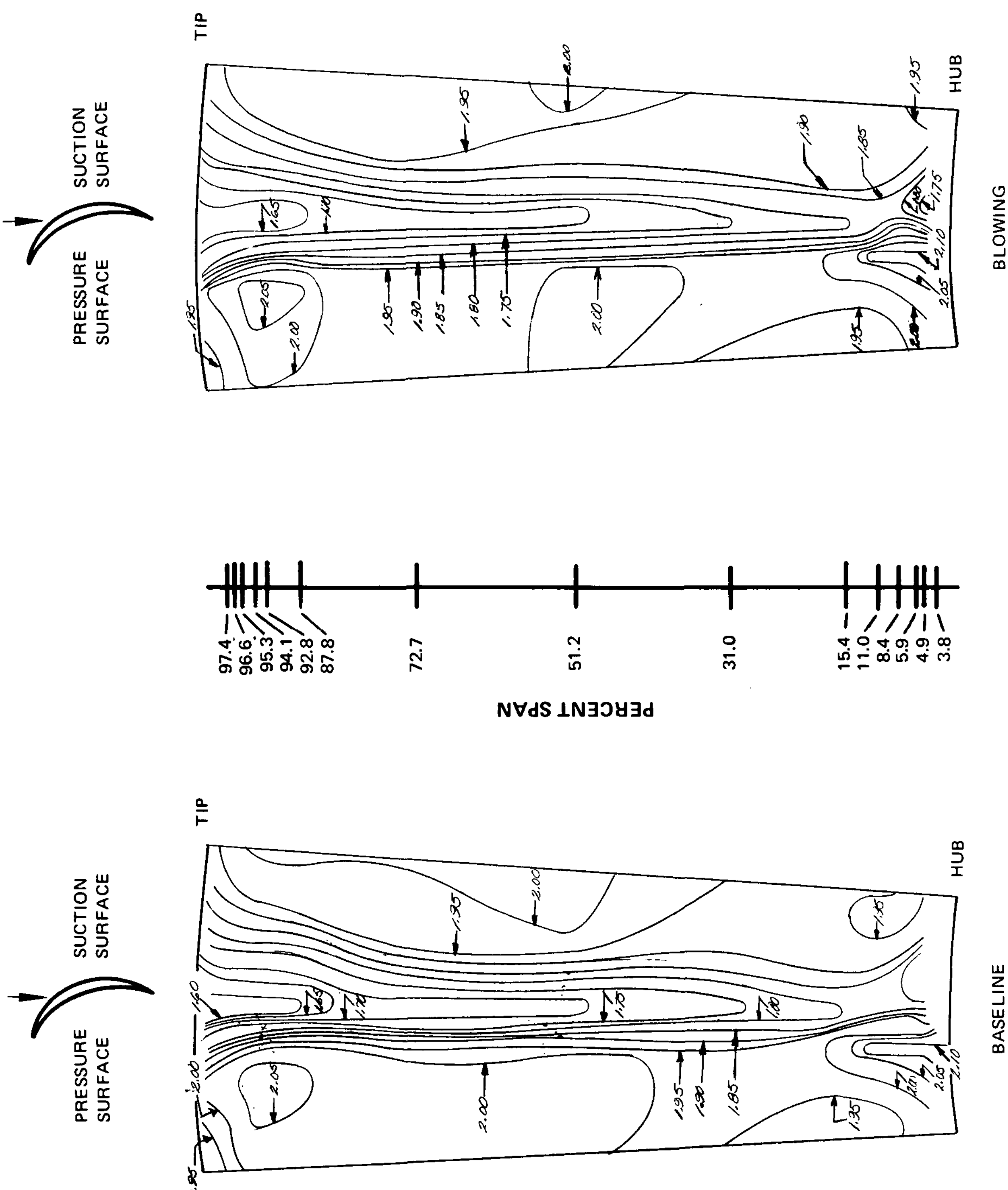


Figure 30 Stator Exit Total Pressure Ratio Contour Plots at 100% Design Speed – Total Inlet Corrected Airflow = 179.86 lb/sec
Rotor Pressure Ratio = 1.9079


PRESSURE SURFACE
SUCTION SURFACE
TIP
HUB
BLOWING
BASELINE
PERCENT SPAN
97.4
96.6
95.3
94.1
92.8
87.8
72.7
51.2
31.0
15.4
11.0
8.4
5.9
4.9
3.8

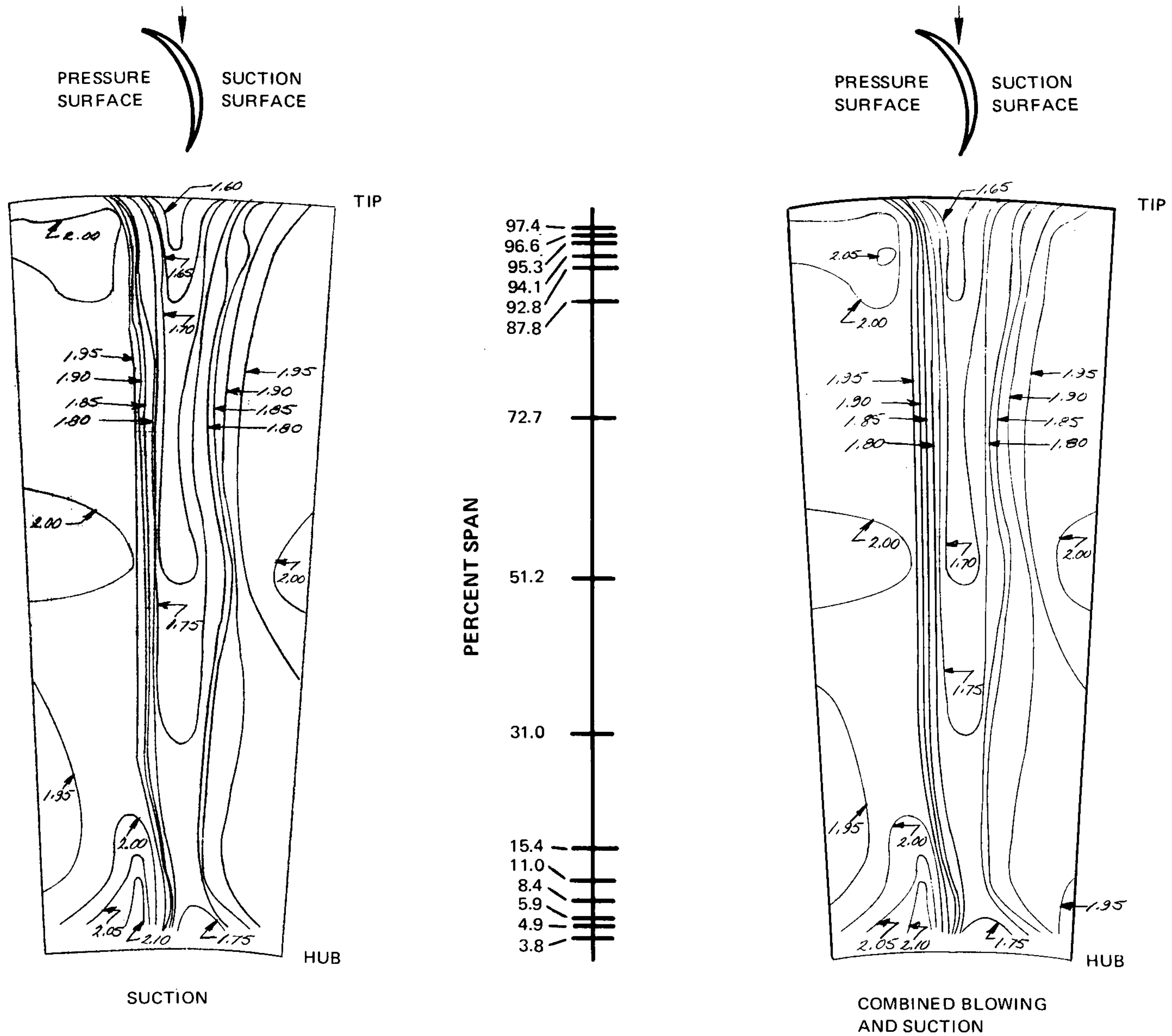
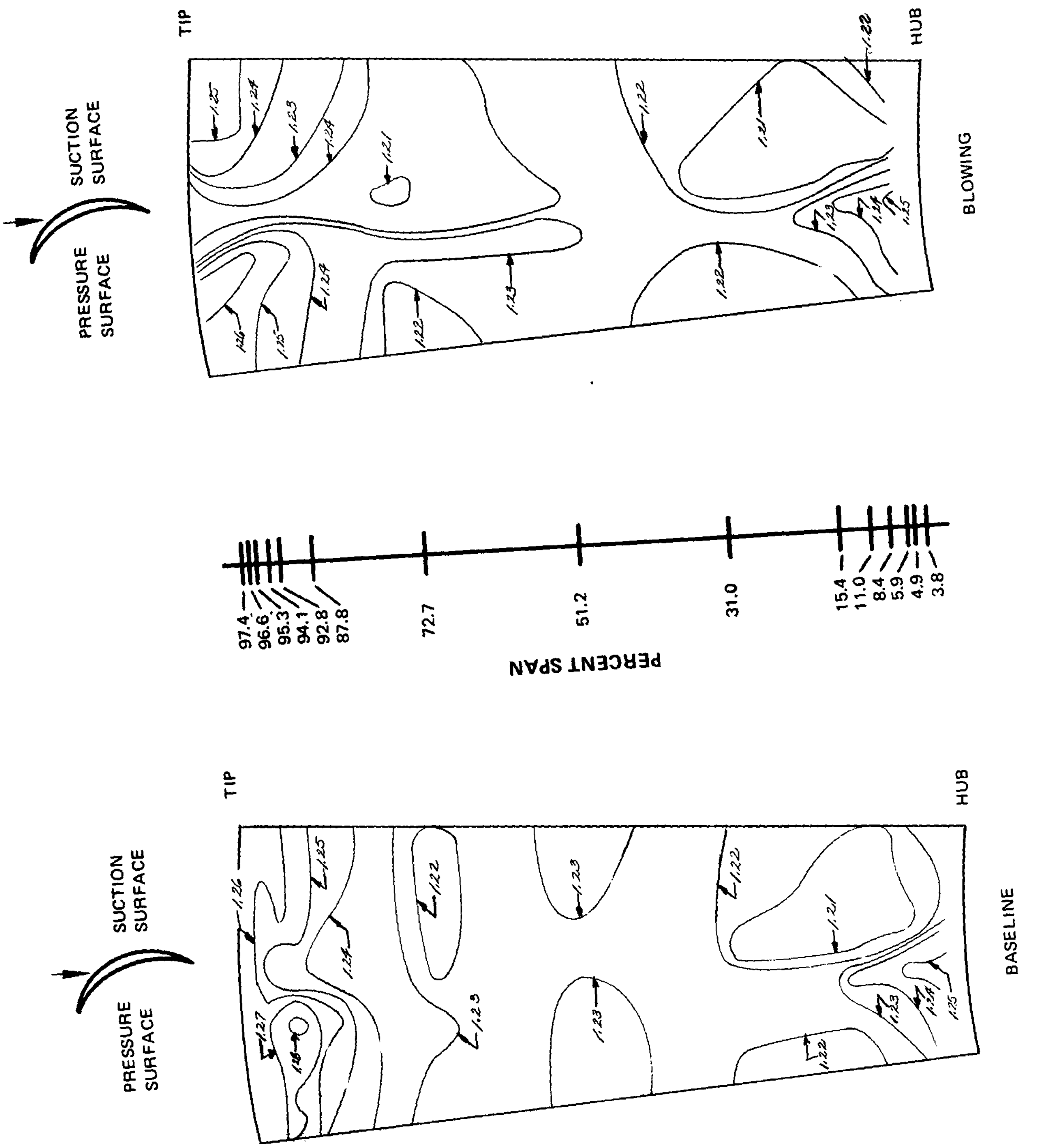


Figure 31 Stator Exit Total Pressure Ratio Contour Plots at 100% Design Speed – Total Inlet Correct Airflow = 171.52 lb/sec
Rotor Pressure Ratio = 2.0123



SUCTION SURFACE
PRESSURE SURFACE
TIP
HUB
BLOWING
1.25
1.24
1.23
1.22
1.21
1.26
PERCENT SPAN
97.4
96.6
95.3
94.1
92.8
87.8
72.7
51.2
31.0
15.4
11.0
8.4
5.9
4.9
3.8
SUCTION SURFACE
PRESSURE SURFACE
TIP
HUB
BASELINE
1.27
1.28

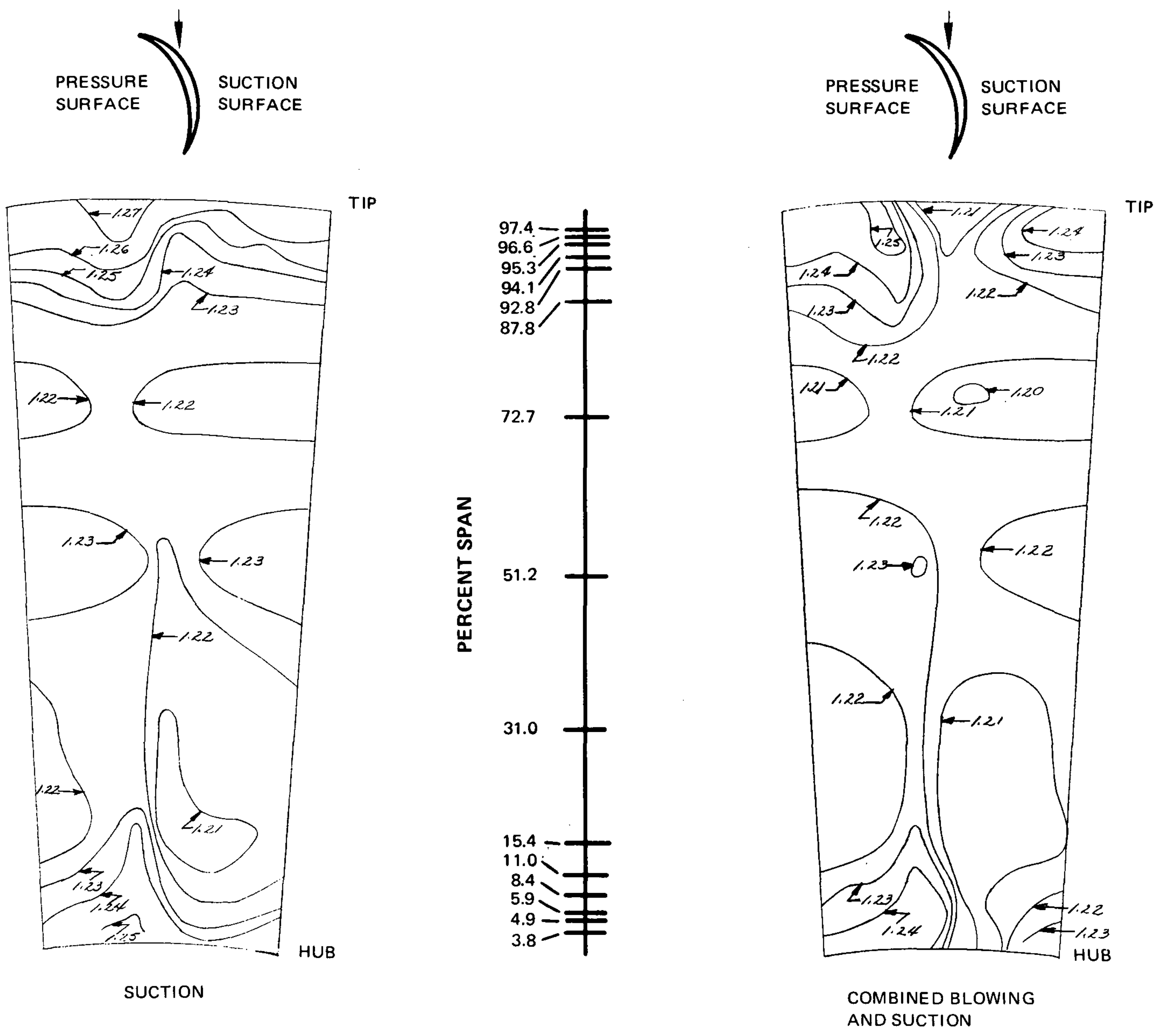
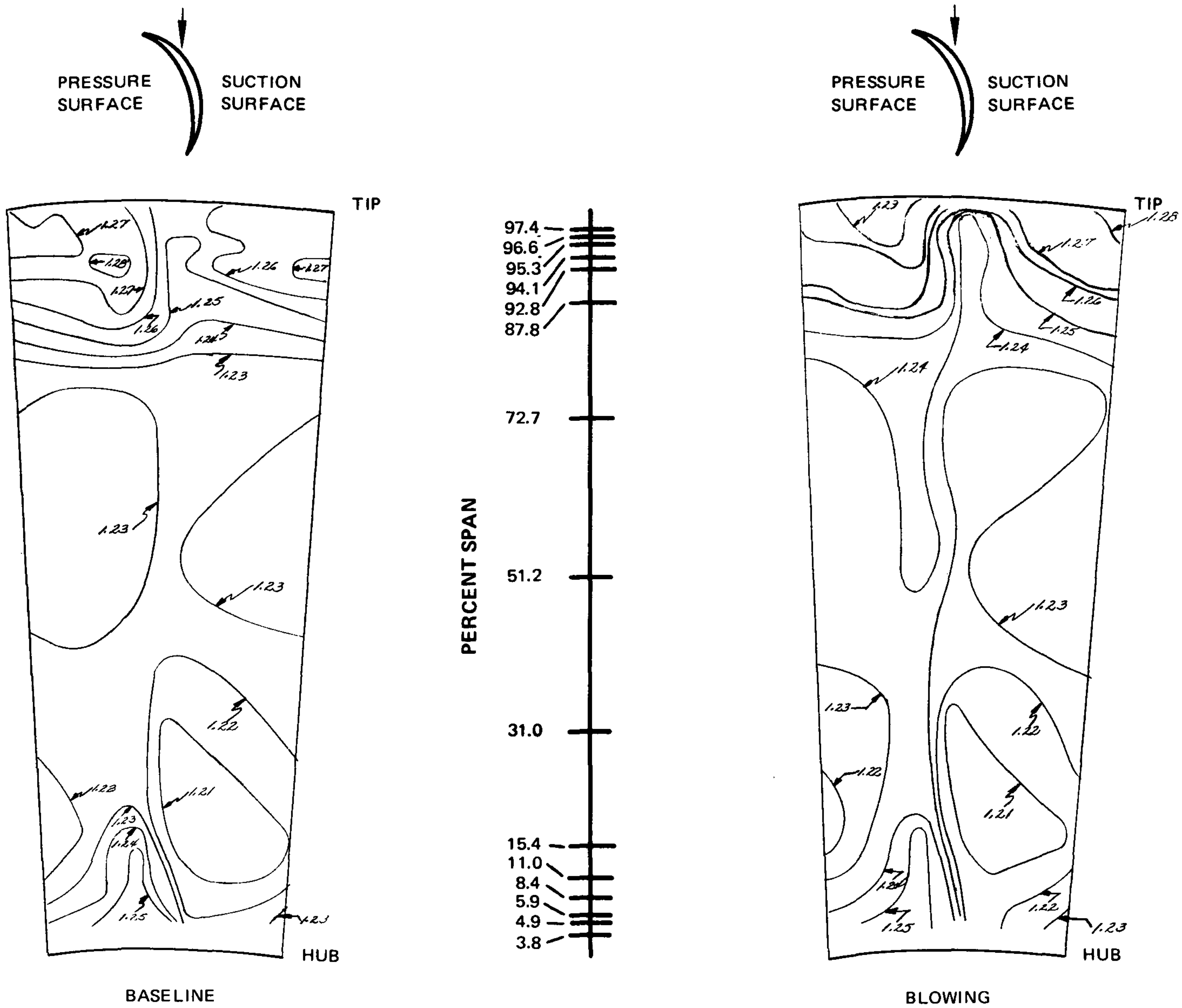


Figure 32 Stator Exit Total Temperature Ratio Contour Plots at 100% Design Speed – Total Inlet Corrected Airflow = 180.63 lb/sec
Rotor Pressure Ratio = 1.8862


PRESSURE SURFACE
SUCTION SURFACE
TIP
HUB
BASELINE
PERCENT SPAN
97.4
96.6
95.3
94.1
92.8
87.8
72.7
51.2
31.0
15.4
11.0
8.4
5.9
4.9
3.8
PRESSURE SURFACE
SUCTION SURFACE
TIP
HUB
BLOWING

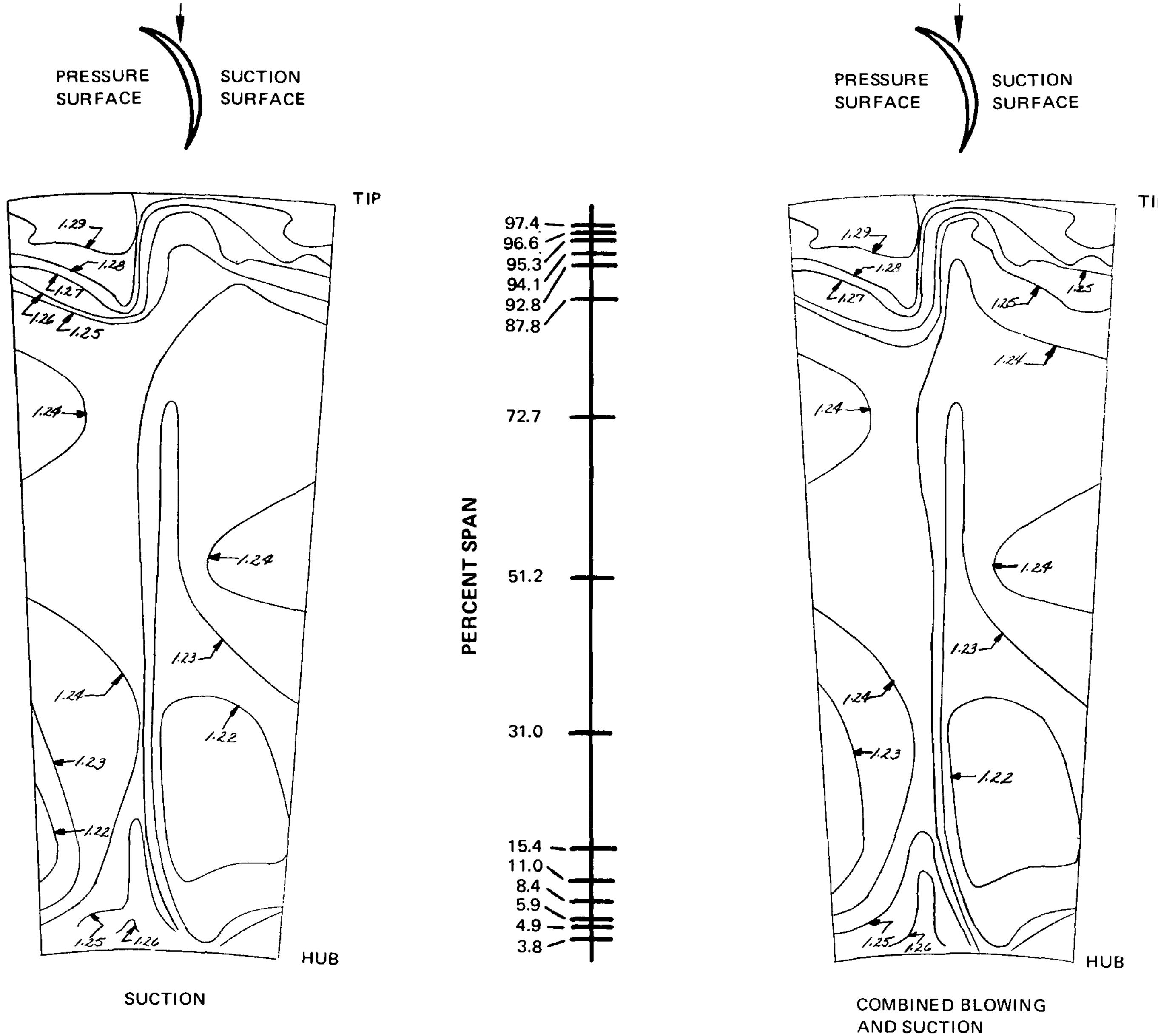
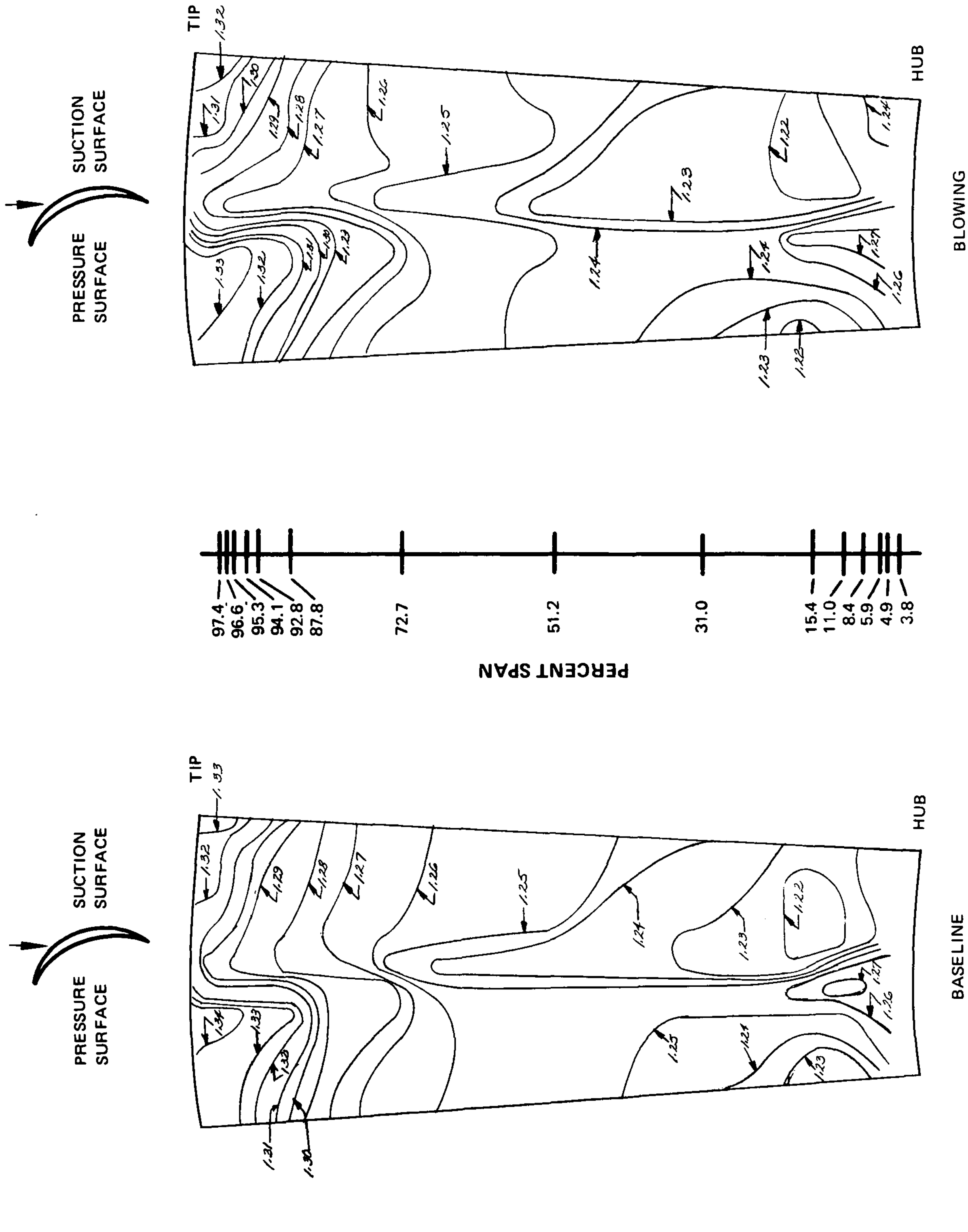


Figure 33 Stator Exit Total Temperature Ratio Contour Plots at 100% Design Speed – Total Inlet Corrected Airflow = 179.86 lb/sec Rotor Pressure Ratio = 1.9079


PRESSURE SURFACE
SUCTION SURFACE
TIP
HUB
BLOWING
PERCENT SPAN
97.4
96.6
95.3
94.1
92.8
87.8
72.7
51.2
31.0
15.4
11.0
8.4
5.9
4.9
3.8
PRESSURE SURFACE
SUCTION SURFACE
TIP
HUB
BASELINE

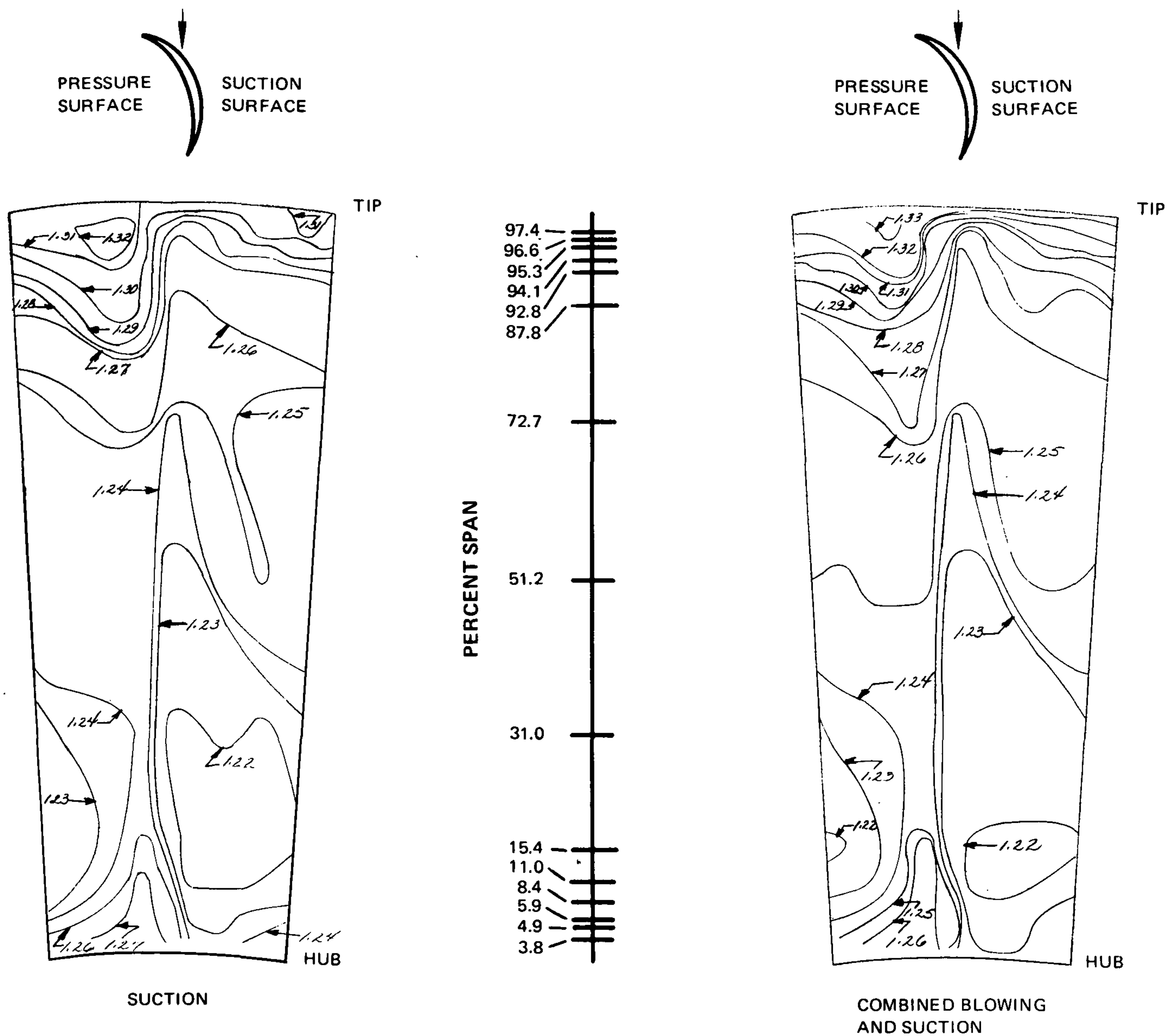
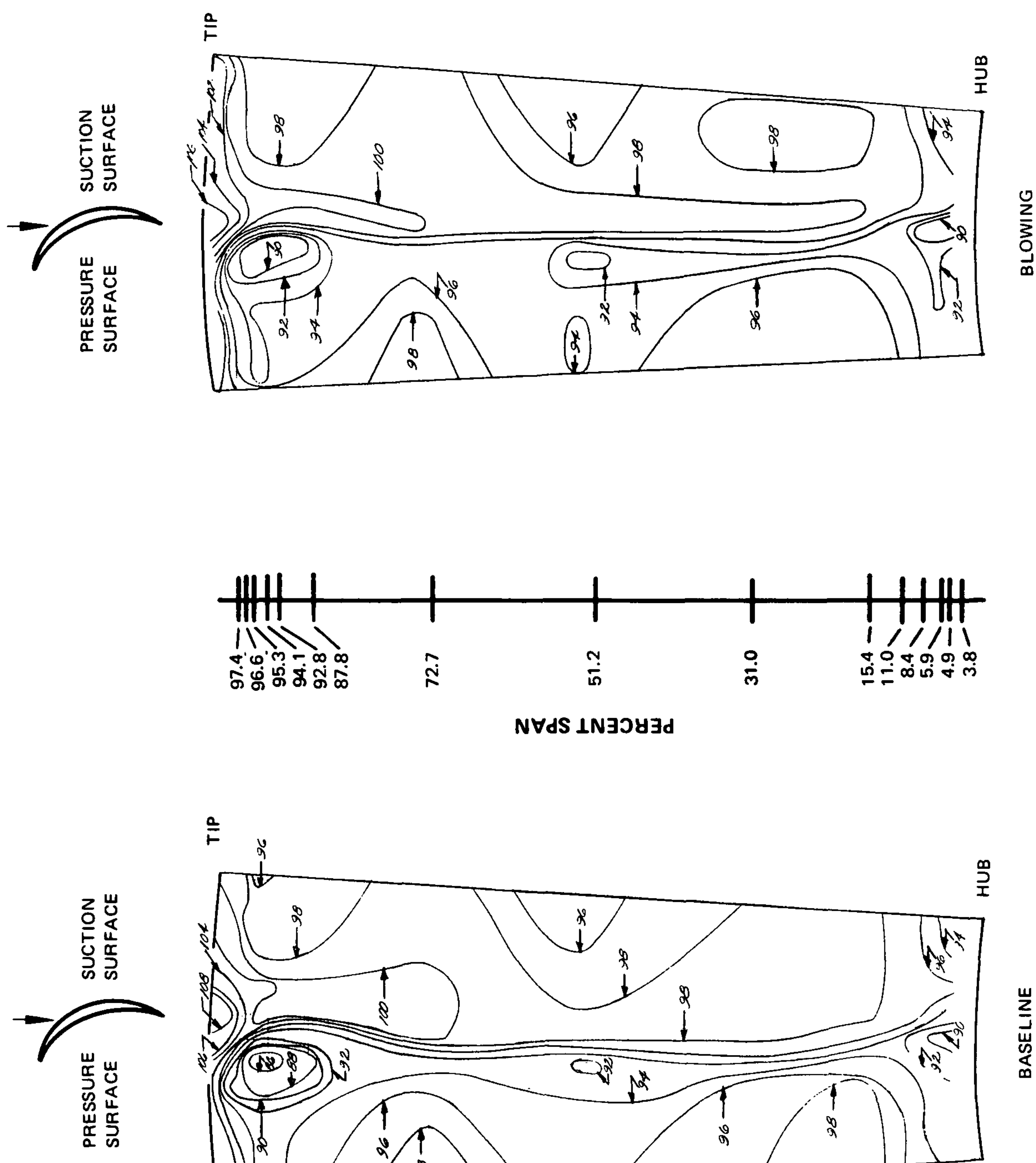


Figure 34 Stator Exit Total Temperature Ratio Contour Plots at 100% Design Speed – Total Inlet Corrected Airflow = 171.52 lb/sec
Rotor Pressure Ratio = 2.0123



PRESSURE SURFACE
SUCTION SURFACE
TIP
HUB
BLOWING
BASELINE
PERCENT SPAN
97.4
96.6
95.3
94.1
92.8
87.8
72.7
51.2
31.0
15.4
11.0
8.4
5.9
4.9
3.8

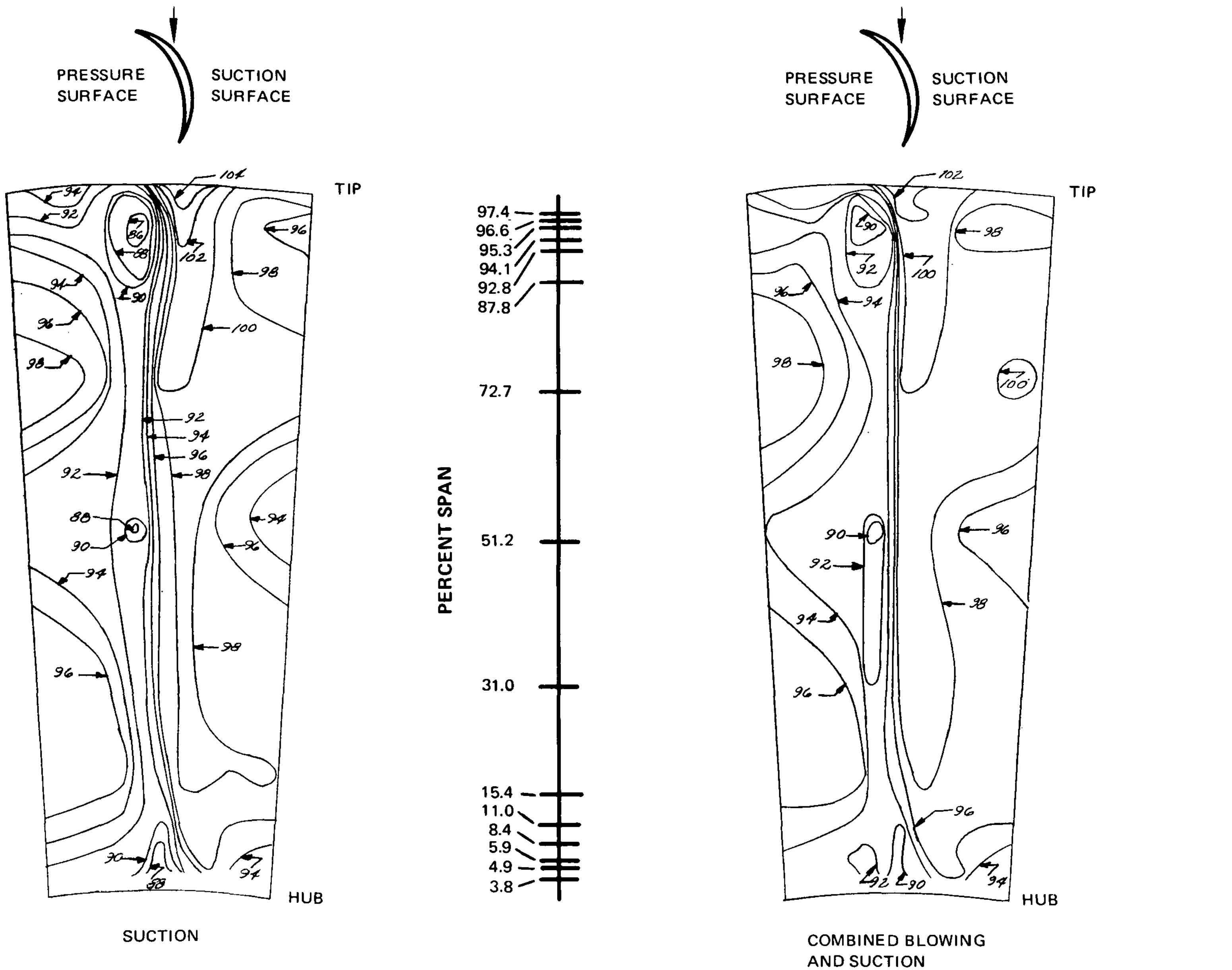
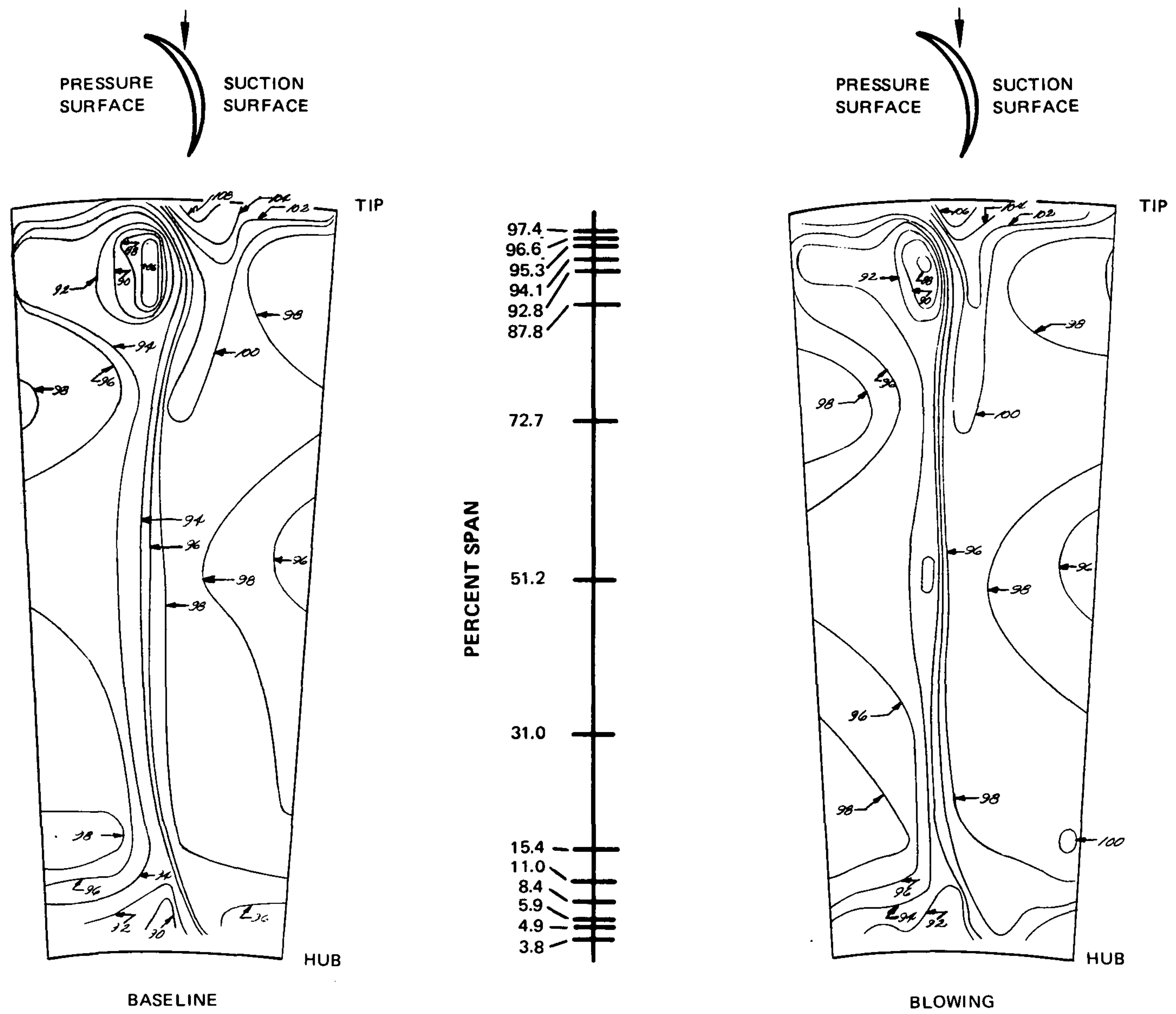


Figure 35 Stator Exit Total Absolute Air-Angle Contour Plots at 100% Design Speed – Total Inlet Corrected Airflow = 180.63 lb/sec Rotor Pressure Ratio = 179.86


PRESSURE SURFACE
SUCTION SURFACE
TIP
HUB
BASELINE
PERCENT SPAN
97.4
96.6
95.3
94.1
92.8
87.8
72.7
51.2
31.0
15.4
11.0
8.4
5.9
4.9
3.8
PRESSURE SURFACE
SUCTION SURFACE
TIP
HUB
BLOWING

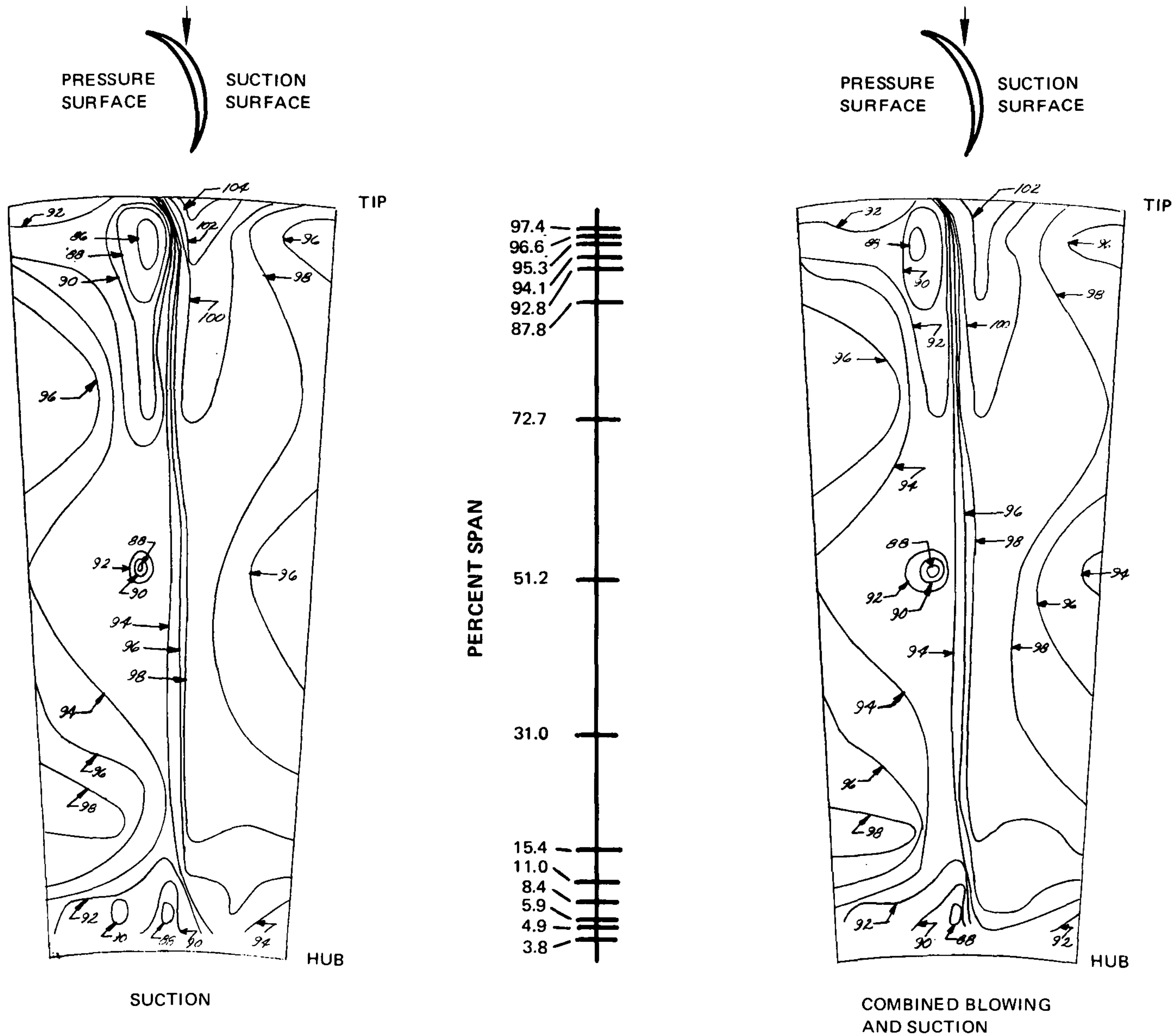
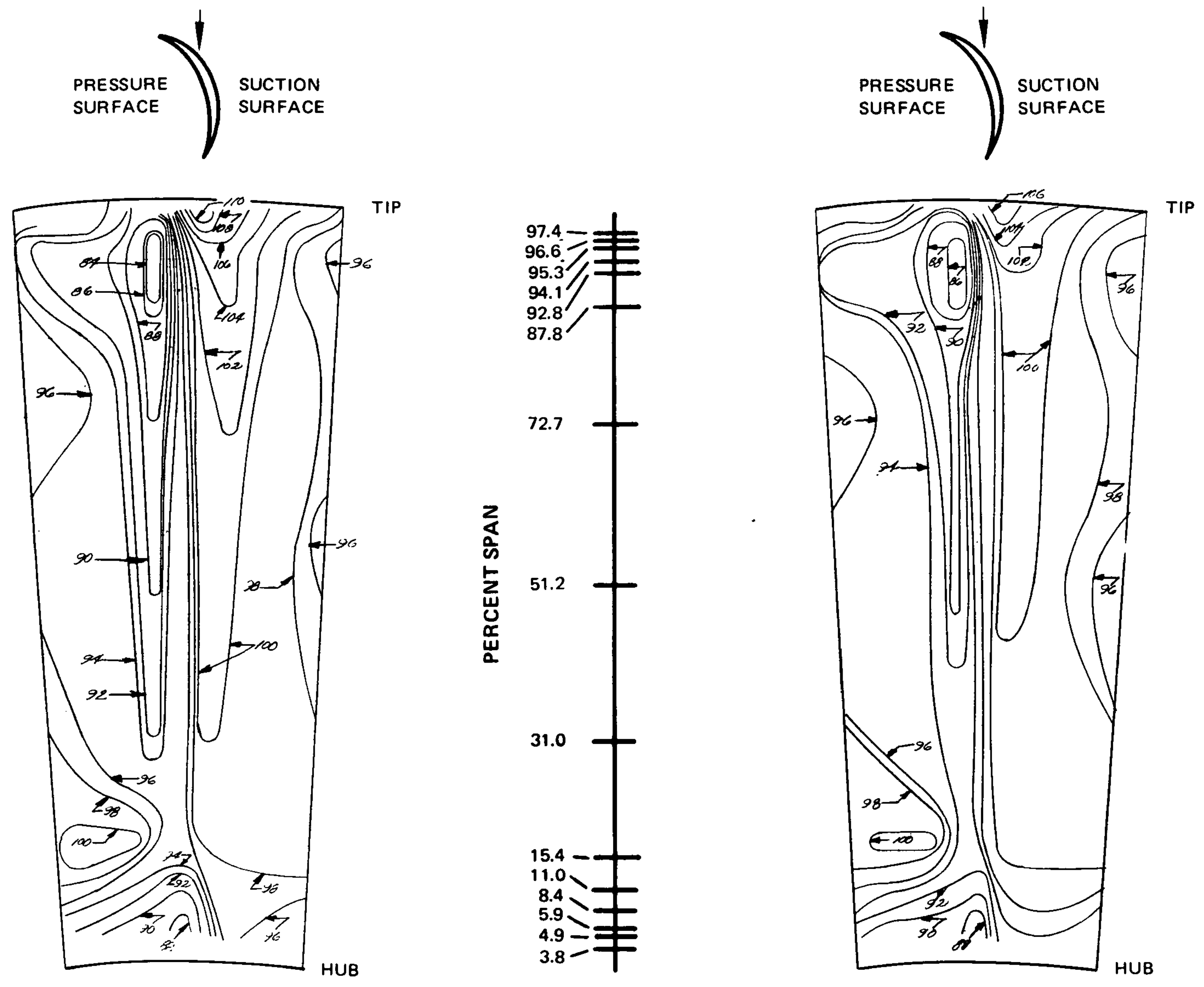


Figure 36 Stator Exit Total Absolute Air-Angle Contour Plots at 100% Design Speed – Total Inlet Corrected Airflow = 179.86 lb/sec
Rotor Pressure Ratio = 1.9079



BASELINE

BLOWING

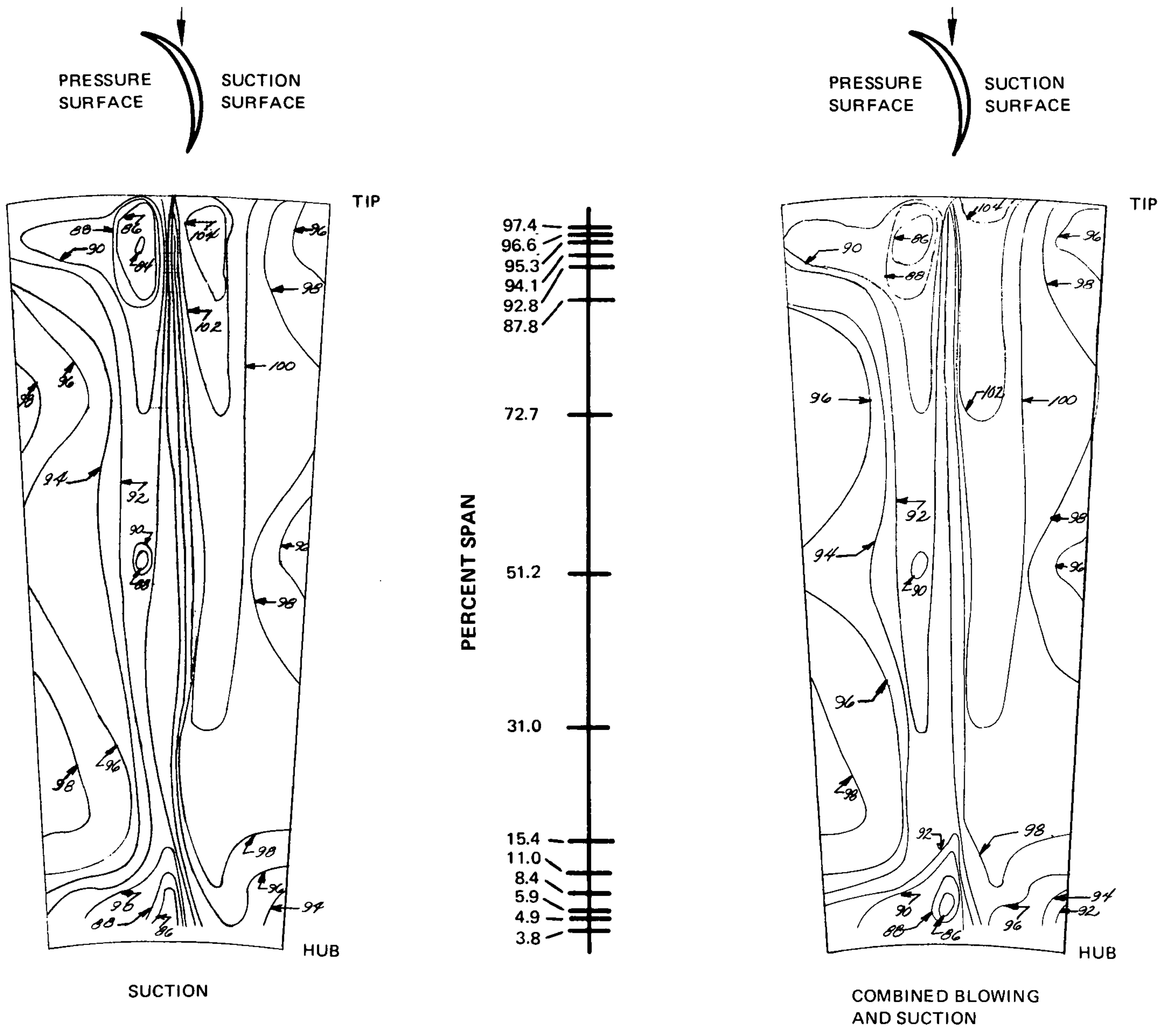
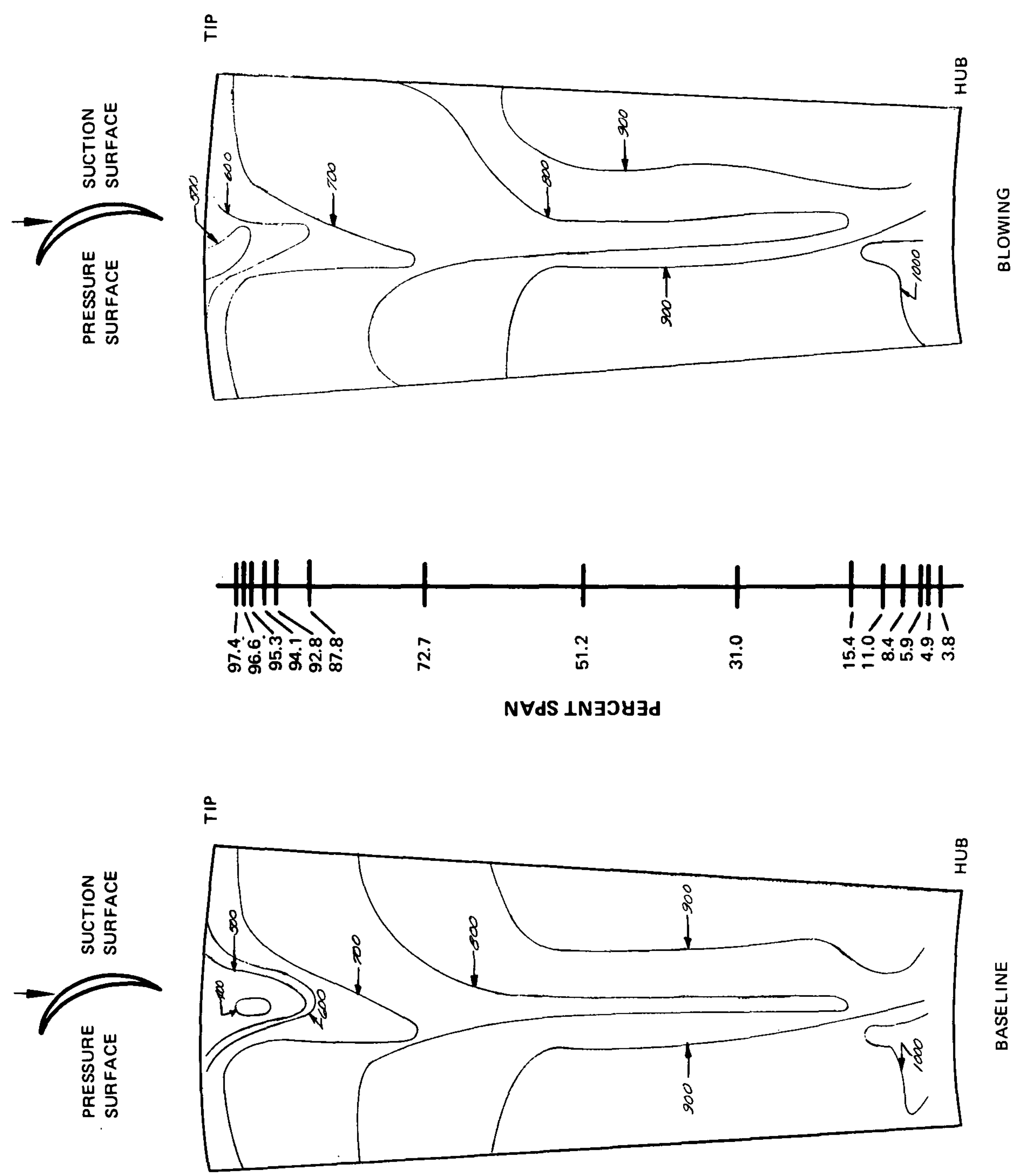


Figure 37 Stator Exit Total Absolute Air-Angle Contour Plots at 100% Design Speed – Total Inlet Corrected Airflow = 171.52 lb/sec
Rotor Pressure Ratio = 2.0123



PRESSURE SURFACE
SUCTION SURFACE
TIP
HUB
BLOWING
900
800
700
600
1000
PERCENT SPAN
97.4
96.6
95.3
94.1
92.8
87.8
72.7
51.2
31.0
15.4
11.0
8.4
5.9
4.9
3.8
PRESSURE SURFACE
SUCTION SURFACE
TIP
HUB
BASELINE

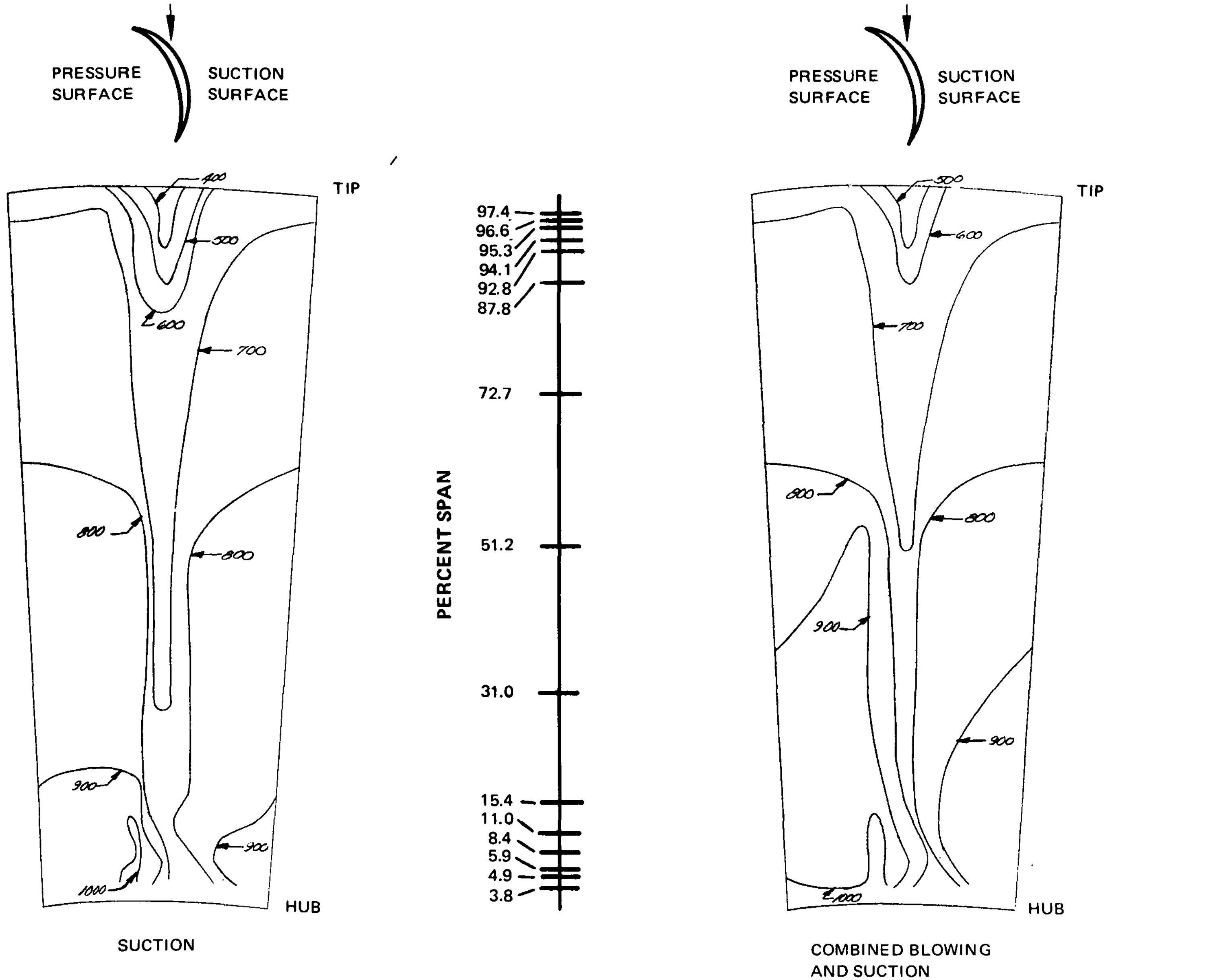
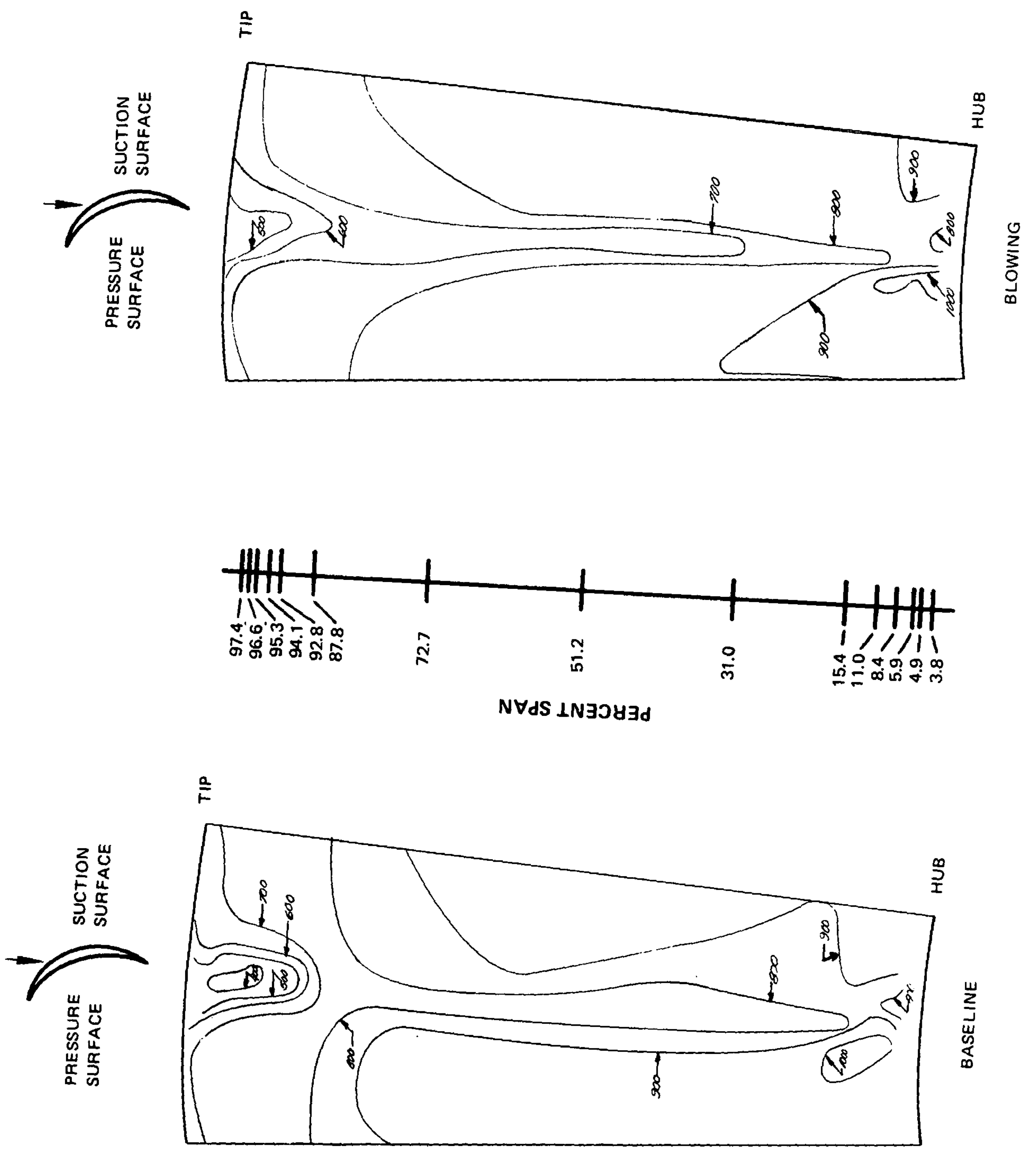


Figure 38 Stator Exit Meridional Velocity Contour Plots at 100% Design Speed – Total Inlet Corrected Airflow = 180.63 lb/sec
Rotor Pressure Ratio = 1.8862


PRESSURE SURFACE
SUCTION SURFACE
TIP
HUB
BLOWING
700
800
900
1000
PERCENT SPAN
97.4
96.6
95.3
94.1
92.8
87.8
72.7
51.2
31.0
15.4
11.0
8.4
5.9
4.9
3.8
PRESSURE SURFACE
SUCTION SURFACE
TIP
HUB
BASELINE
700
600
800
900
1000

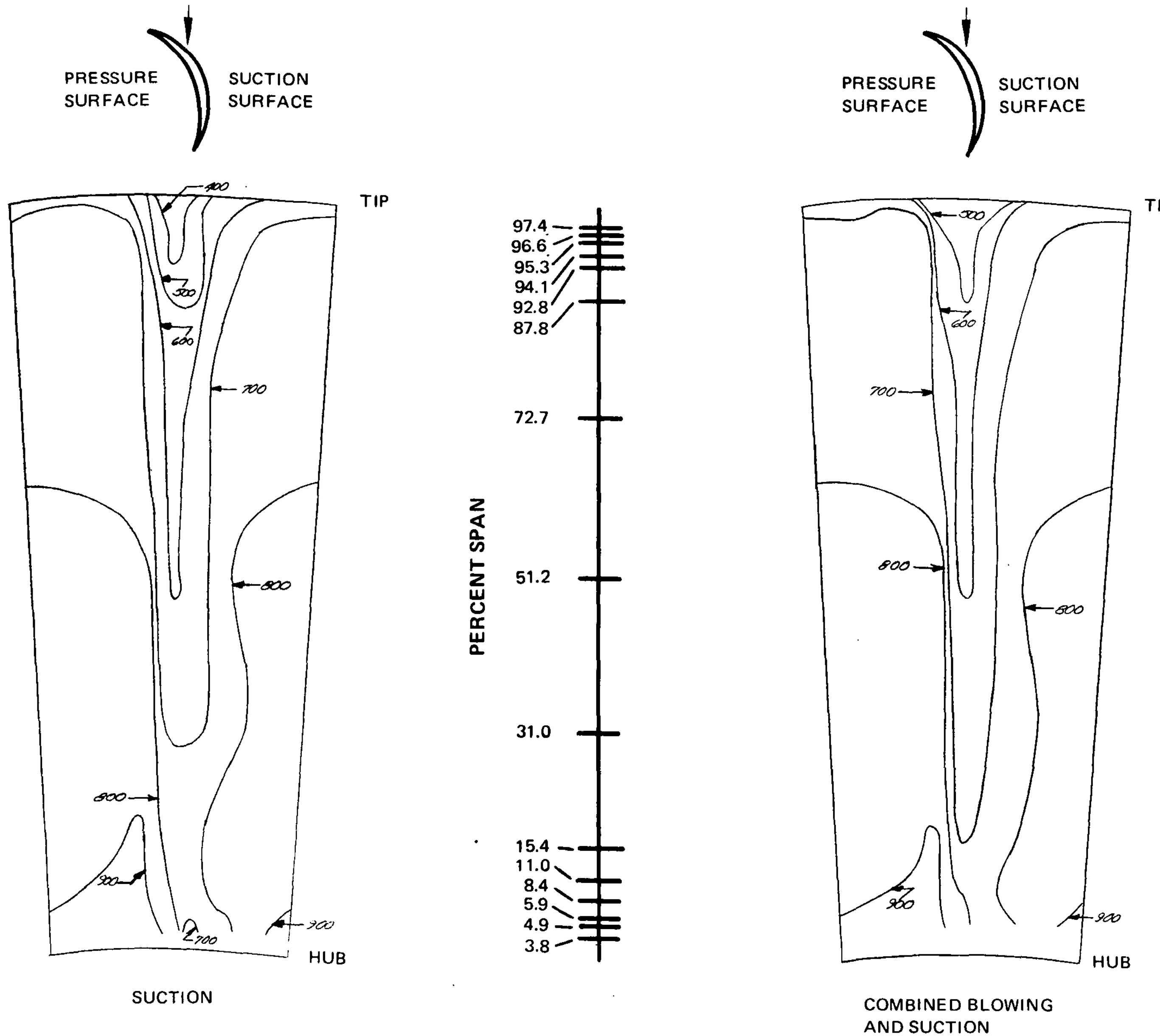
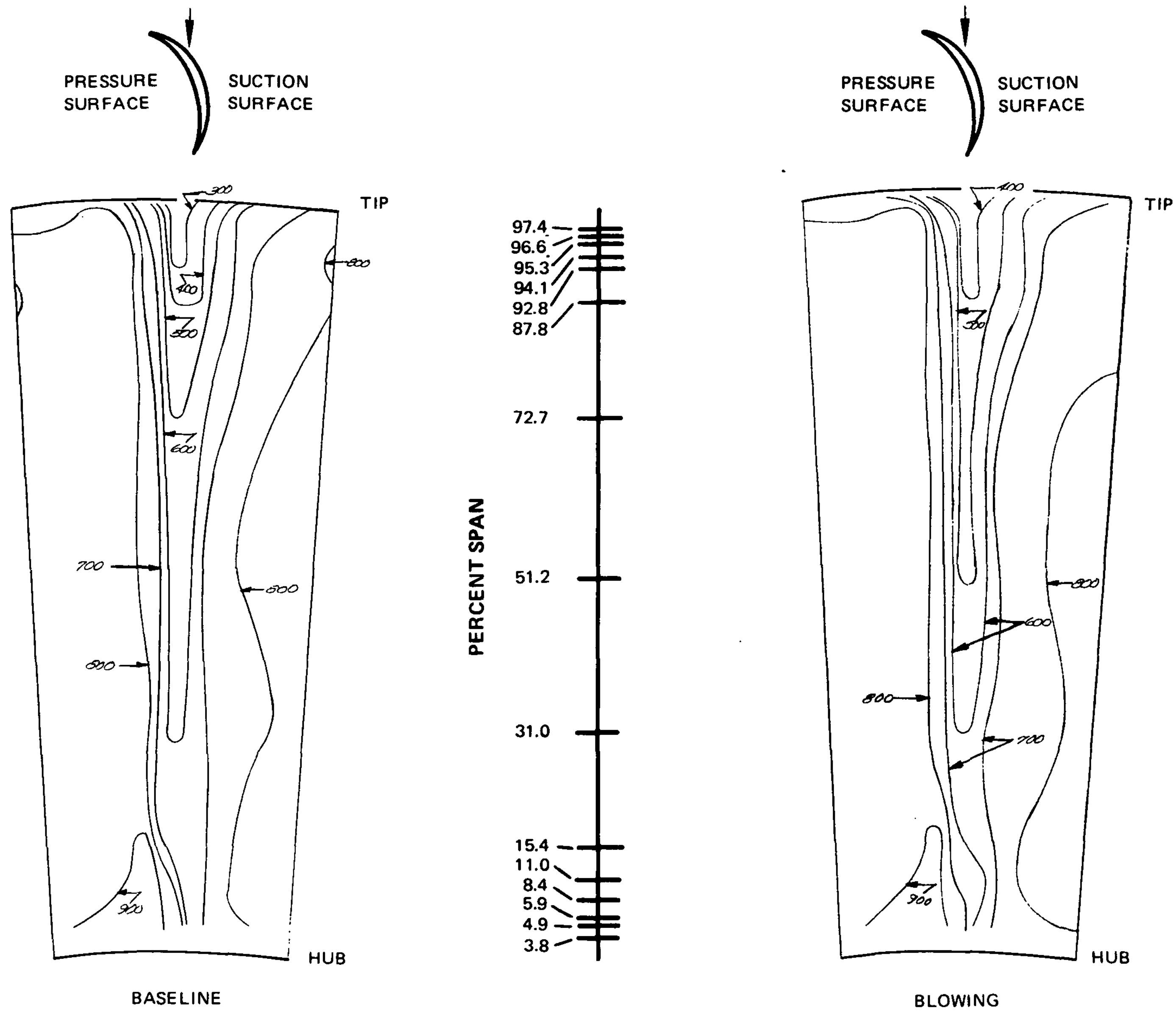


Figure 39 Stator Exit Meridional Velocity Contour Plots at 100% Design Speed – Total Inlet Corrected Airflow = 179.86 lb/sec
Rotor Pressure Ratio = 1.9079


PRESSURE SURFACE
SUCTION SURFACE
TIP
HUB
300
400
500
600
700
800
900
BASELINE
PERCENT SPAN
97.4
96.6
95.3
94.1
92.8
87.8
72.7
51.2
31.0
15.4
11.0
8.4
5.9
4.9
3.8
PRESSURE SURFACE
SUCTION SURFACE
TIP
HUB
400
500
600
700
800
900
BLOWING

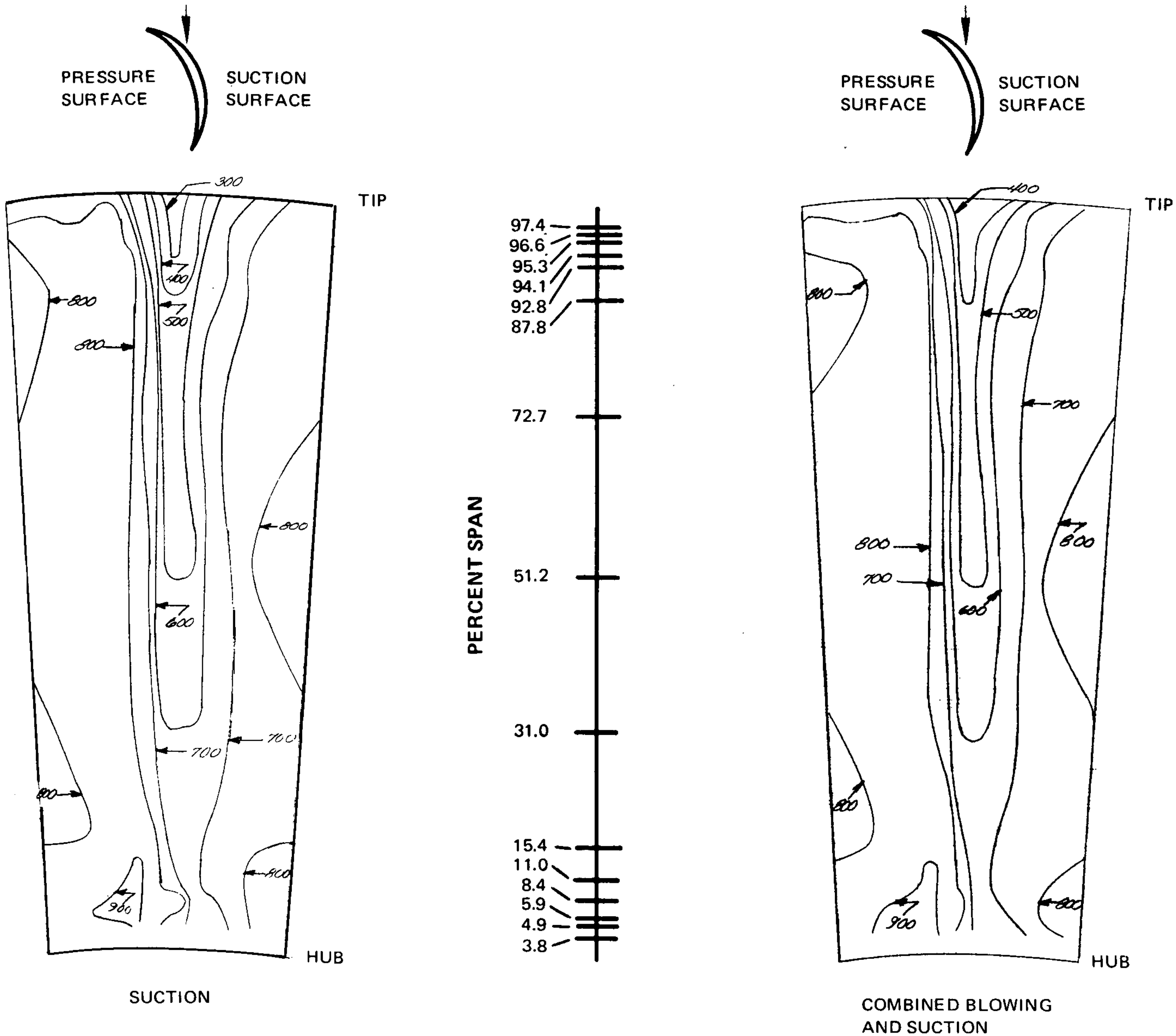
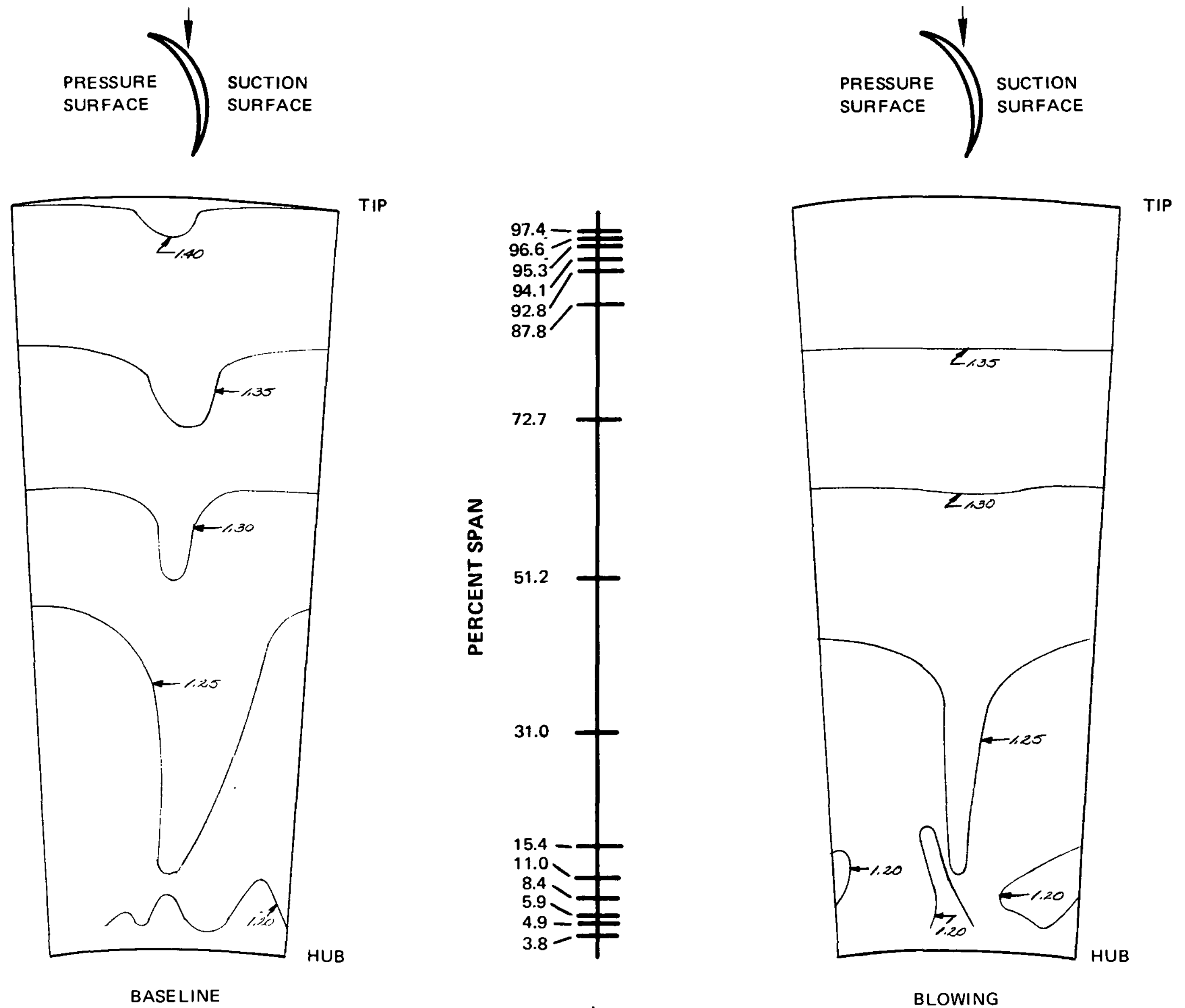


Figure 40 Stator Exit Meridional Velocity Contour Plots at 100% Design Speed – Total Inlet Corrected Airflow = 171.52 lb/sec
Rotor Pressure Ratio = 2.0123



PRESSURE SURFACE
SUCTION SURFACE
TIP
HUB
1.40
1.35
1.30
1.25
1.20
BASELINE
PERCENT SPAN
97.4
96.6
95.3
94.1
92.8
87.8
72.7
51.2
31.0
15.4
11.0
8.4
5.9
4.9
3.8
PRESSURE SURFACE
SUCTION SURFACE
TIP
HUB
1.35
1.30
1.25
1.20
1.20
1.20
1.20
BLOWING

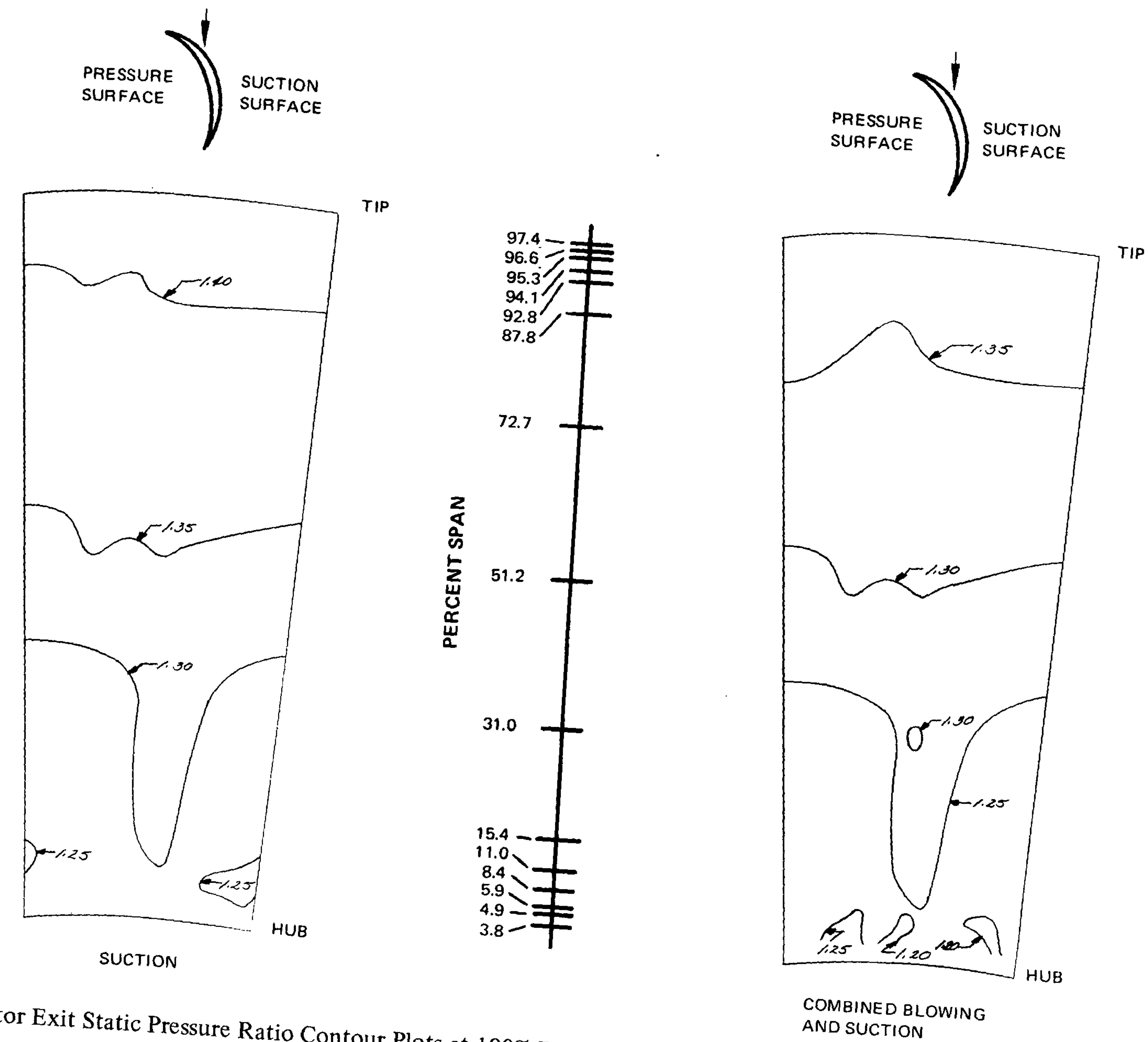
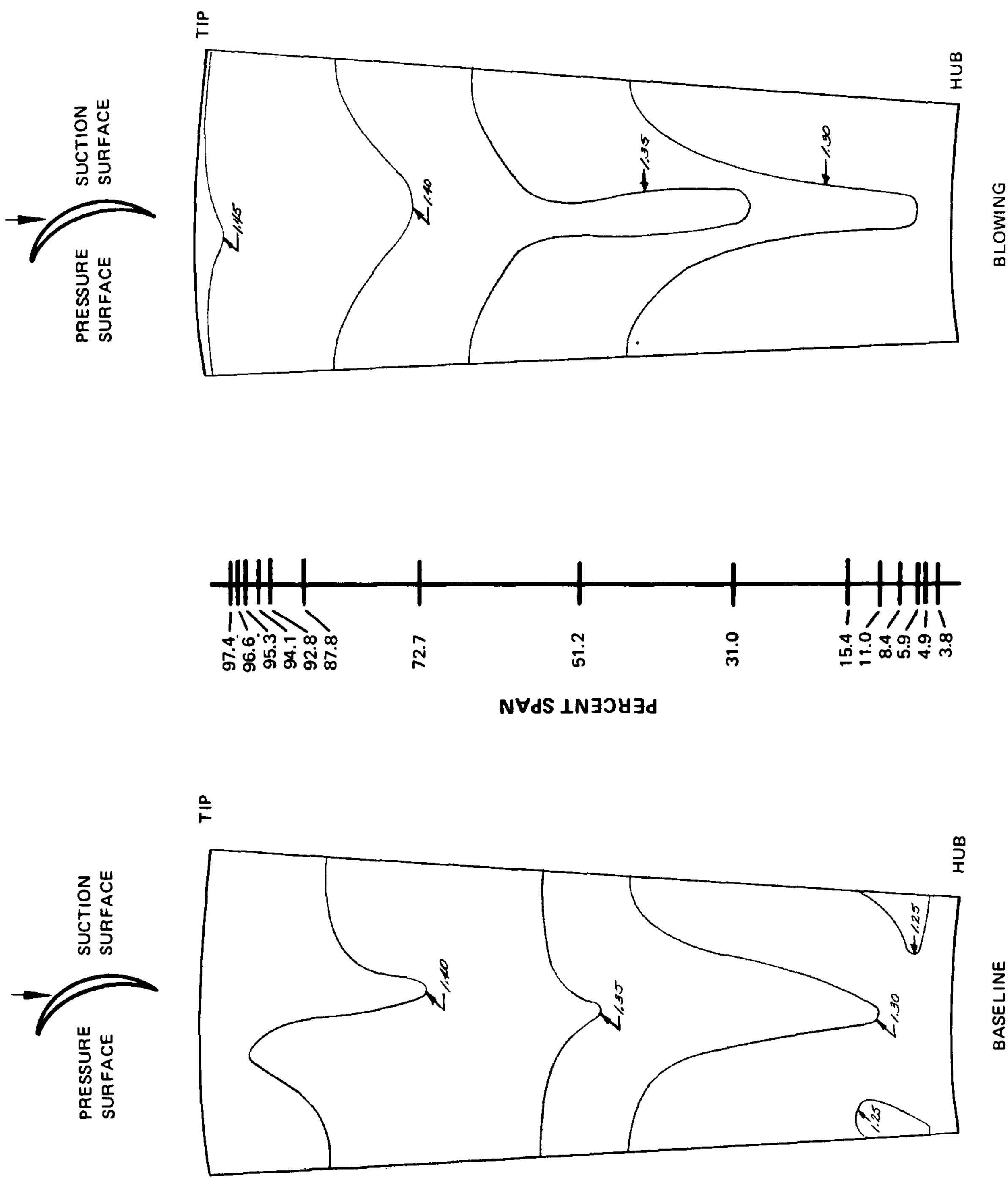


Figure 41 Stator Exit Static Pressure Ratio Contour Plots at 100% Design Speed – Total Inlet Corrected Airflow = 180.63 lb/sec Rotor Pressure Ratio = 1.8862


PRESSURE SURFACE
SUCTION SURFACE
TIP
HUB
1.45
1.40
1.35
1.30
BLOWING
PERCENT SPAN
97.4
96.6
95.3
94.1
92.8
87.8
72.7
51.2
31.0
15.4
11.0
8.4
5.9
4.9
3.8
PRESSURE SURFACE
SUCTION SURFACE
TIP
HUB
1.40
1.35
1.30
1.25
1.25
BASELINE

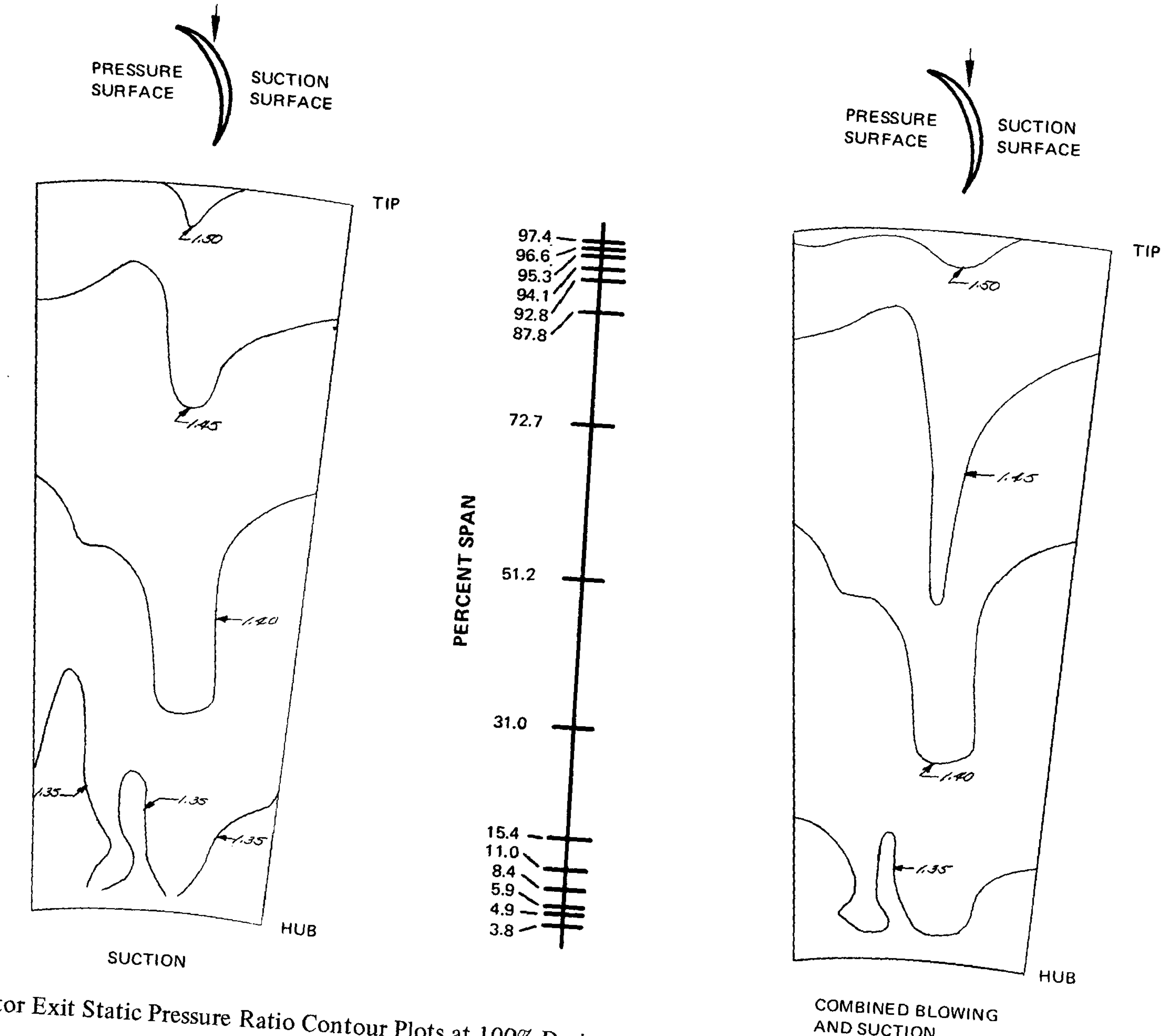
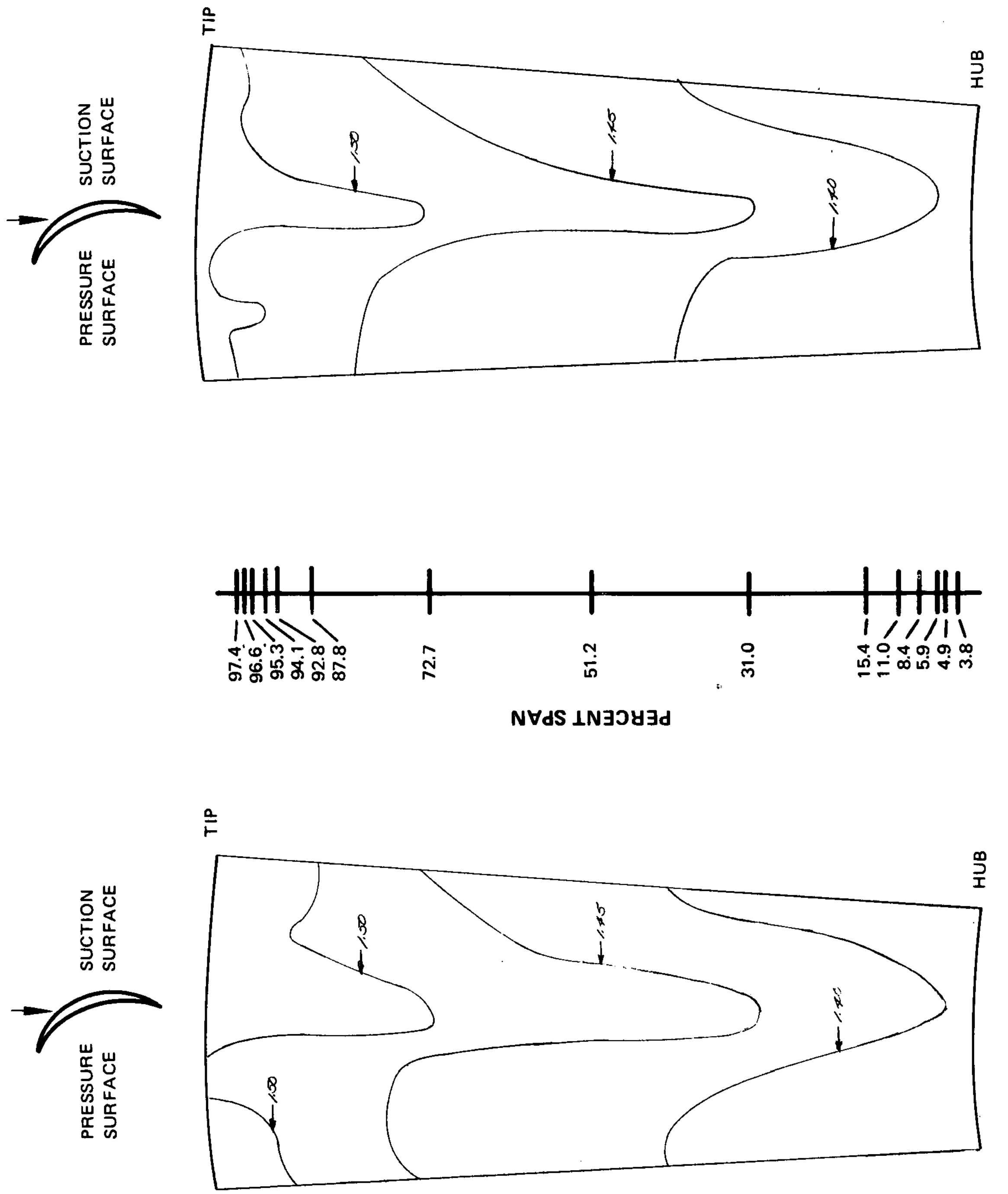


Figure 42 Stator Exit Static Pressure Ratio Contour Plots at 100% Design Speed – Total Inlet Corrected Airflow = 179.86 lb/sec
Rotor Pressure Ratio = 1.9079


TIP
HUB
PRESSURE SURFACE
SUCTION SURFACE
BLOWING
PERCENT SPAN
97.4
96.6
95.3
94.1
92.8
87.8
72.7
51.2
31.0
15.4
11.0
8.4
5.9
4.9
3.8
TIP
HUB
PRESSURE SURFACE
SUCTION SURFACE
BASELINE

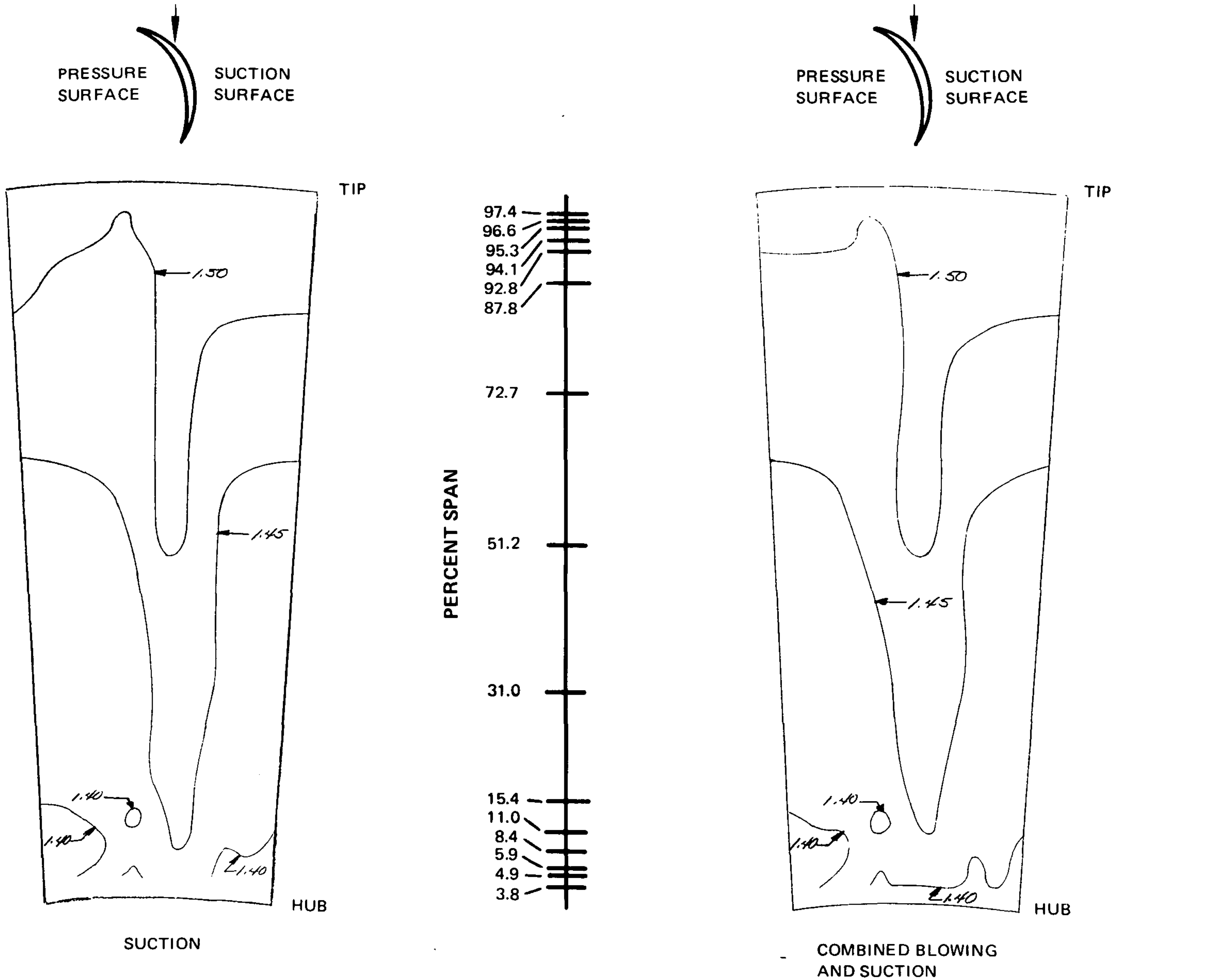
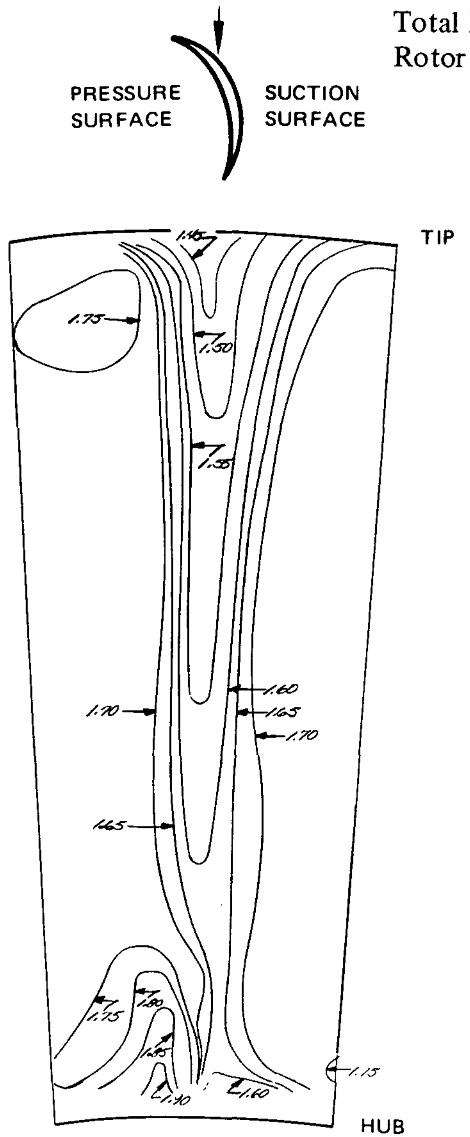
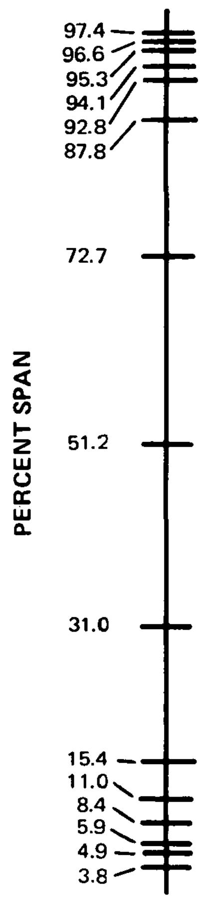


Figure 43 Stator Exit Static Pressure Ratio Contour Plots at 100% Design Speed – Total Inlet Corrected Airflow = 171.52 lb/sec
Rotor Pressure Ratio = 2.0123

Baseline
90% Design Speed
Total Inlet Corrected Airflow = 149.95 lb/sec
Rotor Pressure Ratio = 1.6859





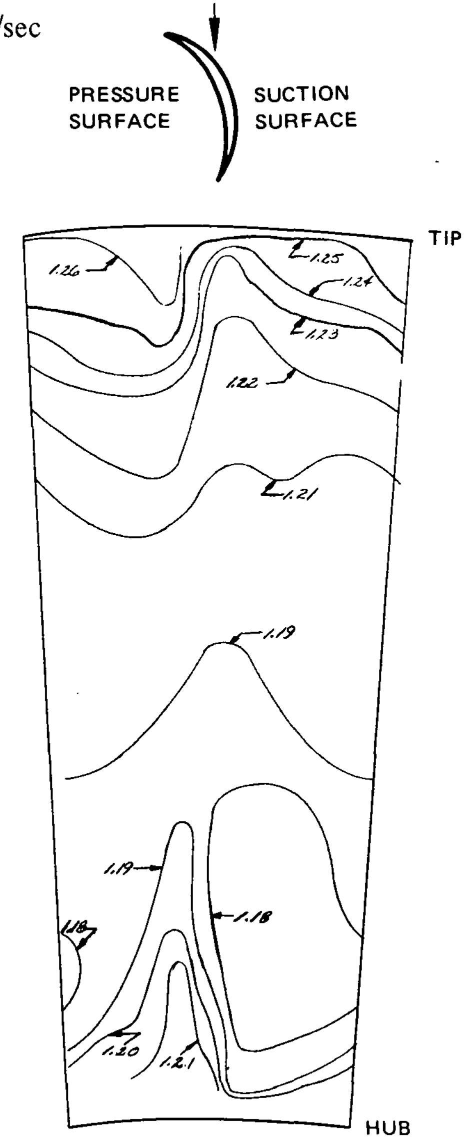
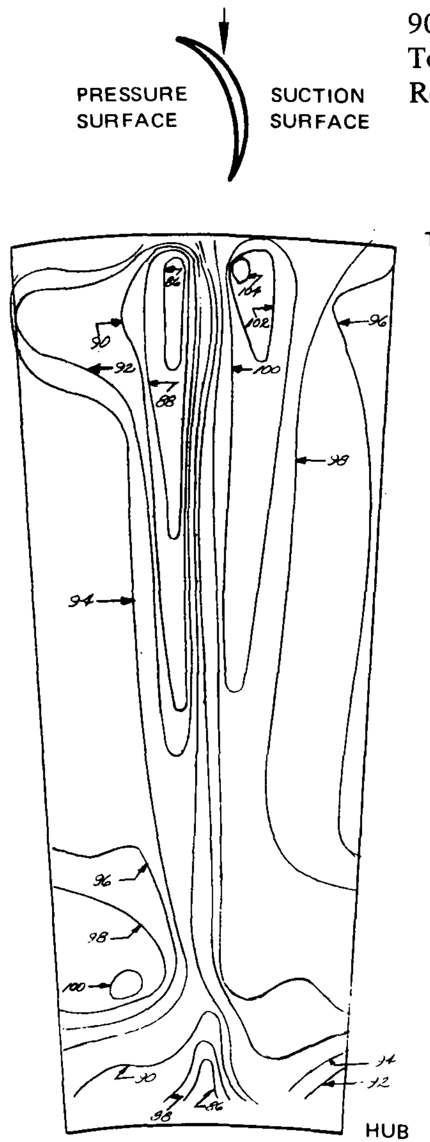
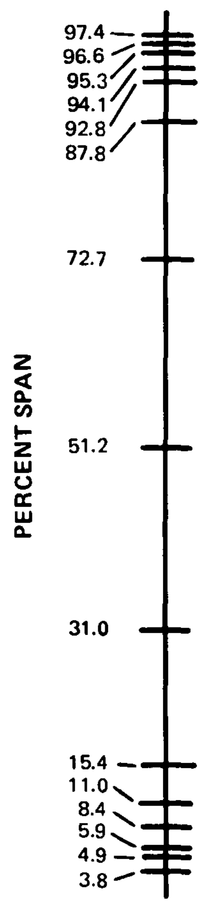


Figure 44 Stator Exit Total Pressure Ratio Contour Plots

Figure 45 Stator Exit Total Temperature Ratio Contour Plots

Baseline
90% Design Speed
Total Inlet Corrected Airflow = 149.95 lb/sec
Rotor Pressure Ratio = 1.6859





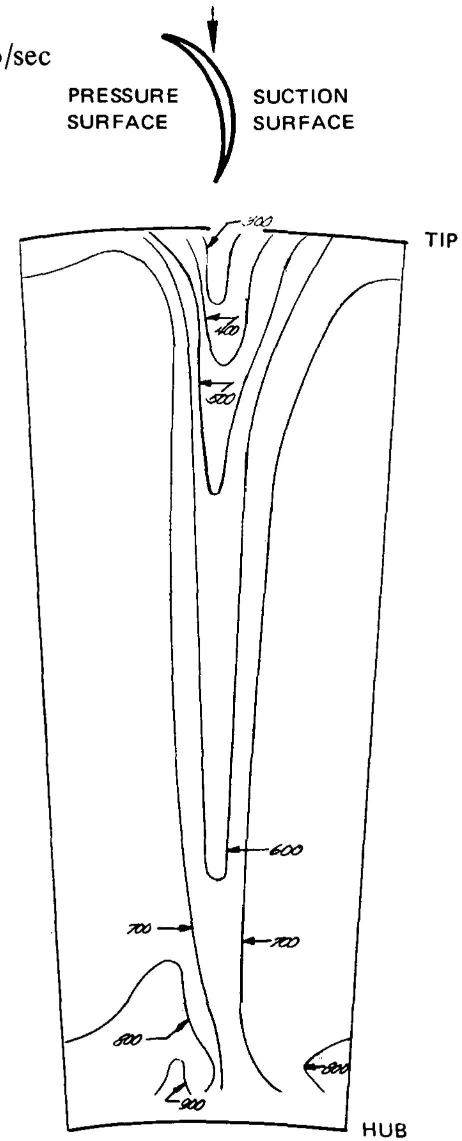
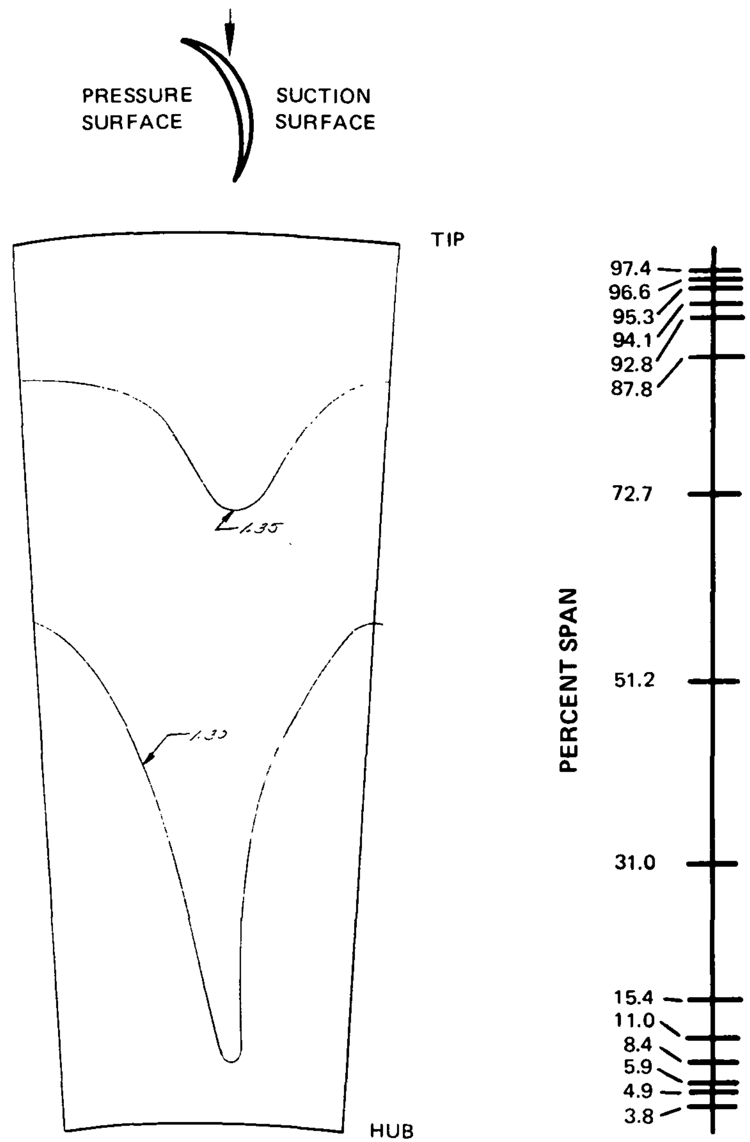


Figure 46 Stator Exit Absolute Air-Angle Contour Plots

Figure 47 Stator Exit Meridional Velocity Contour Plots



Baseline
90% Design Speed
Total Inlet Corrected Airflow = 149.95 lb/sec
Rotor Pressure Ratio = 1.6859

Figure 48 Stator Exit Static Pressure Ratio Contour Plots

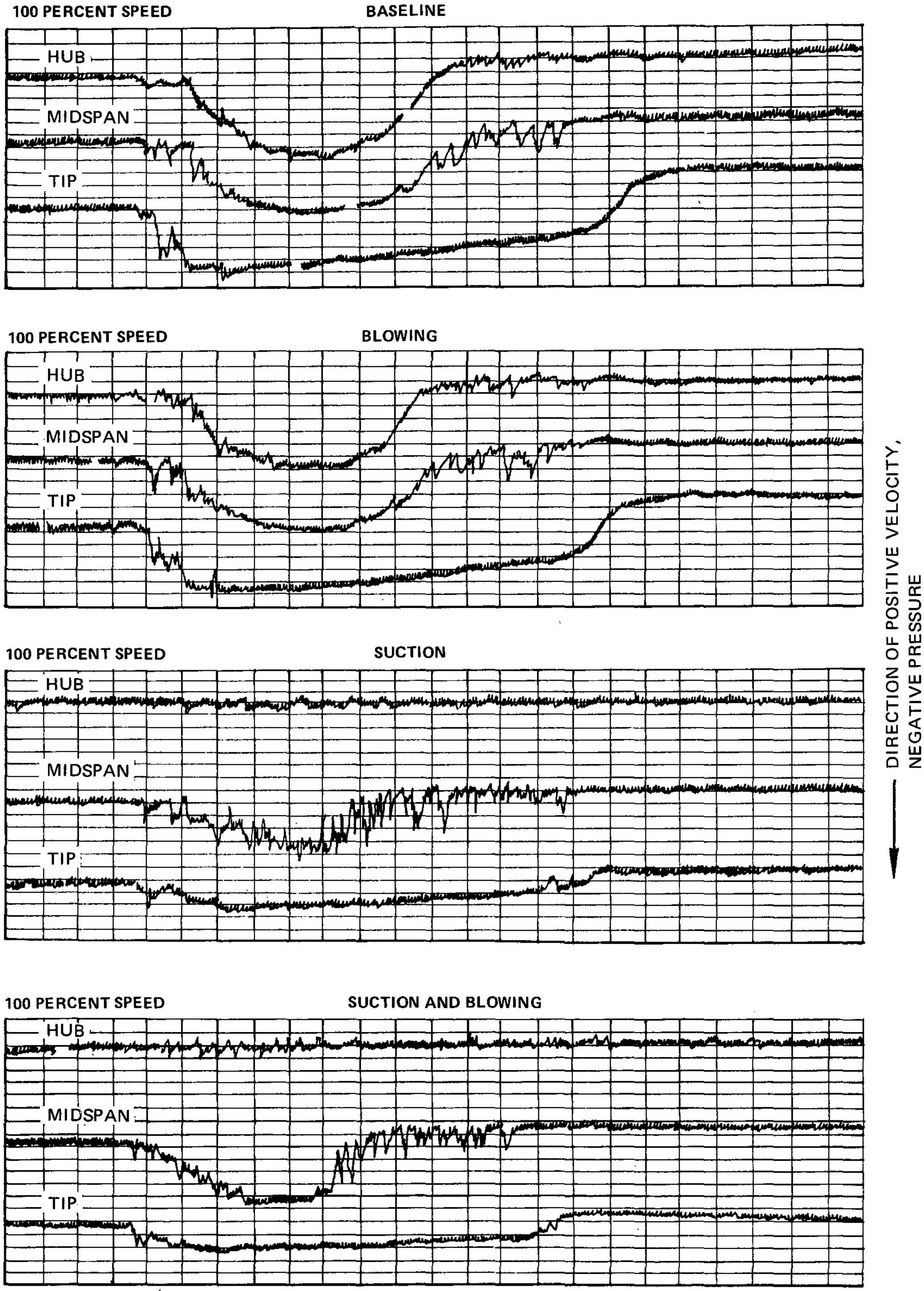


Figure 49 Hot Film Oscillograph Trace of Surge Cycle

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Appendix A

PERFORMANCE PARAMETERS

a) Relative total temperature

$$T'_8 = t_8 \left[1 + \frac{\gamma - 1}{2} (M'_8)^2\right] \qquad \text{(rotor in)}$$

$$T'_9 = T'_8 + \left[\frac{(\omega r_8)^2 - (\omega r_9)^2}{\frac{2\gamma}{\gamma - 1} Rg_c}\right] \qquad \text{(rotor out)}$$

b) Incidence angle based on mean camber line

$$i_m = \beta'_8 - \beta'^*_8 \qquad \text{(rotor)}$$

$$i_m = \beta_{10} - \beta^*_{10} \qquad \text{(stator)}$$

c) Deviation

$$\delta° = \beta'_9 - \beta'^*_9 \qquad \text{(rotor)}$$

$$\delta° = \beta_{11} - \beta^*_{11} \qquad \text{(stator)}$$

d) Diffusion factor

$$D = 1 - \frac{V'_9}{V'_8} + \frac{r_9 V_{\theta 9} - r_8 V_{\theta 8}}{(r_8 + r_9)\,\sigma V'_8} \qquad \text{(rotor)}$$

$$D = 1 - \frac{V_{11}}{V_{10}} + \frac{r_{10} V_{\theta 10} - r_{11} V_{\theta 11}}{(r_{10} + r_{11})\,\sigma V_{10}} \qquad \text{(stator)}$$

e) Loss coefficient

$$\bar{\omega} = \frac{P'_8 \left[\frac{T'_9}{T'_8}\right]^{\frac{\gamma}{\gamma - 1}} - P'_9}{P'_8 - p_8} \qquad \text{(rotor)}$$

$$\bar{\omega} = \frac{P_{10} - P_{11}}{P_{10} - p_{10}} \qquad \text{(stator)}$$

f) Loss parameter

$$\frac{\bar{\omega}\cos\beta'_9}{2\sigma} \qquad \text{(rotor)}$$

$$\frac{\bar{\omega}\cos\beta_{11}}{2\sigma} \qquad \text{(stator)}$$

g) Polytropic efficiency

1) $$\eta_p = \frac{\frac{\gamma-1}{\gamma}\ln\left[\frac{P_9}{P_7}\right]}{\ln\left[\frac{T_9}{T_0}\right]} \qquad \text{(rotor)}$$

2) $$\eta_p = \frac{\frac{\gamma-1}{\gamma}\ln\left[\frac{p_{11}}{p_{10}}\right]}{\ln\left[\frac{t_{11}}{t_{10}}\right]} \qquad \text{(stator)}$$

h) Adiabatic efficiency

$$\eta_{ad} = \frac{\left[\frac{P_9}{P_7}\right]^{\frac{\gamma-1}{\gamma}} - 1}{\left[\frac{T_{12}}{T_0}\right] - 1} \qquad \text{(rotor)}$$

$$\eta_{ad} = \frac{\left[\frac{P_{12}}{P_7}\right]^{\frac{\gamma-1}{\gamma}} - 1}{\left[\frac{T_{12}}{T_0}\right] - 1} \qquad \text{(stage)}$$

$$\eta_{ad\ adjusted} = \frac{W_{12}\left[\left[\frac{P_{12}}{P_7}\right]^{\frac{\gamma-1}{\gamma}} - 1\right]}{W_{12}\left[\frac{T_{12}}{T_0} - 1\right] + W_{16}\left[\frac{T_{16}}{T_0} - 1\right]} \quad \text{(stage)}$$

i) Wake blockage factor

$$\bar{K} = \frac{\sum_{i}^{n} \rho AV}{n} \Bigg/ \rho AV_{avg}$$

where n is number of tangential traverse points equally spaced across a stator gap and ρAV_{avg} is calculated from mass flow averaged values of P, p, and T at that radius

j) For stage efficiency, stage pressure ratio, and stator recovery see Appendix B.

APPENDIX B

STAGE EFFICIENCY, STAGE PRESSURE RATIO, AND STATOR RECOVERY CALCULATION PROCEDURE FOR CORNER-BLOWING AND WALL-SUCTION ENDWALL BOUNDARY LAYER CONTROL TREATMENTS

The procedures used for calculating overall stage efficiency with the corner-blow, wall-suction, and combined corner-blow and wall-suction boundary layer control devices account for the flow that is added or extracted between the rotor inlet and stator exit. A schematic of the control volume used in the calculation procedure is shown in Figure 50. The various flows entering and leaving are shown for different conditions.

Overall stage efficiency is defined in the conventional manner

$$\eta_{STAGE} = \frac{\text{Ideal Work}}{\text{Actual Work}}$$

Ideal work is the net work required for all flow that reaches the stator exit, including the high-pressure blowing flow added at the stator endwalls. Actual work includes the rotor work done on the flow that reaches the stator exit and on the suction flow extracted at the stator inlet.

CORNER-BLOW STATOR CONFIGURATION

From Figure 51, the expression for calculating ideal and actual work used in the overall stage efficiency calculation is

$$\frac{\text{Ideal Work}}{T_{\text{INLET, AVG.}}} = \sum_{n=1}^{5} W_n C_p \left(\frac{T_{\text{IDEAL EXIT}}}{T_{\text{INLET, AVG.}}} - 1 \right)$$

The subscripts assigned to each of the flows entering or leaving the conical volume are defined in Figure 52. W is the measured flow rate into the compressor rotor (n = 1) or through a set of blowing nozzles (n = 2 through n = 5). The average total temperature resulting from adiabatic mixing of all flows entering the control volume ($T_{\text{INLET, AVG.}}$) is determined from

$$T_{\text{INLET, AVG.}} = \frac{\sum_{n=1}^{5} W_n T_n}{\sum_{n=1}^{5} W_n}$$

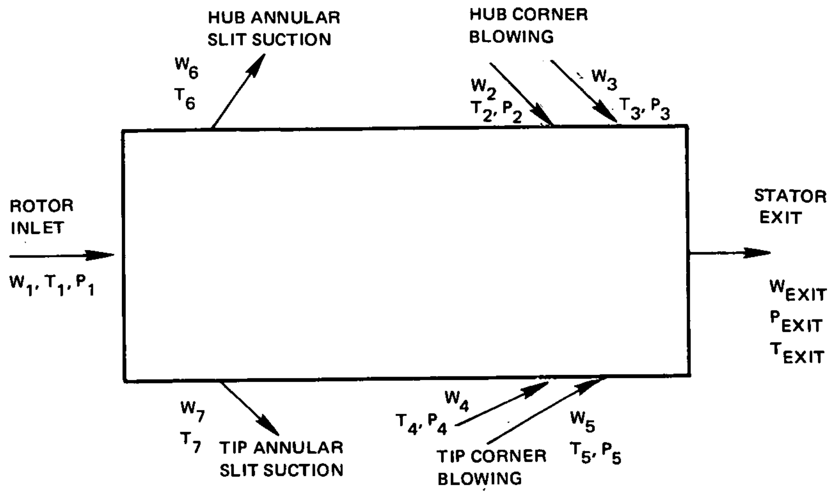

Figure 50 Control Volume for Compressor Performance Parameter Calculations

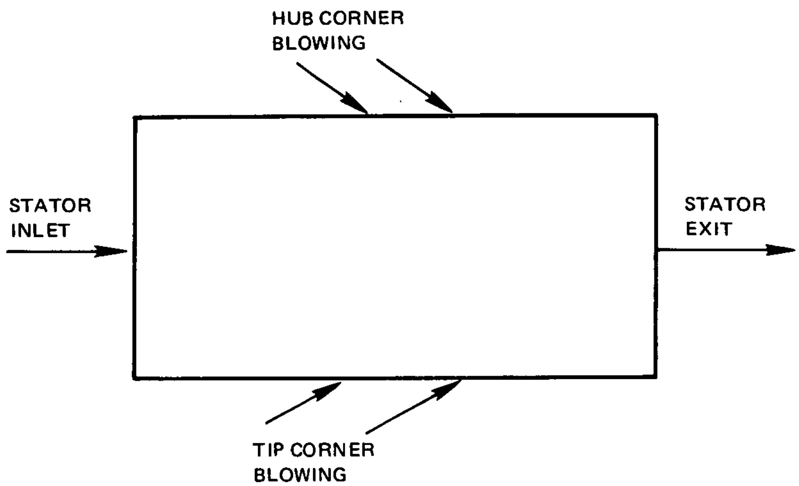

Figure 51 Control Volume for Stator Recovery Calculations

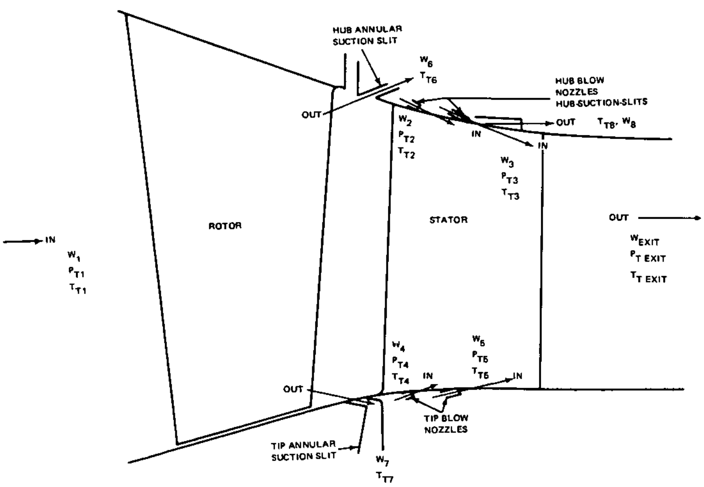

Figure 52 Control Volume for Corner Blow, Wall Suction, and Combined Boundary Layer Treatments

The ideal-exit total temp ($T_{IDEAL\ EXIT}$) is determined from

$$T_{IDEAL\ EXIT} = T_{INLET,\ AVG.} \left(\frac{Pt_{EXIT}}{P_{INLET,\ AVG.}} \right)^{\frac{\gamma - 1}{\gamma}}$$

Pt_{EXIT} is the mass flow averaged total pressure measured at the stator-exit during blowing. $P_{INLET,\ AVG.}$ is an average inlet total pressure resulting from an isentropic mixing of all flows entering the control volume. $P_{INLET,\ AVG.}$ is determined from rearranging the expression

$$\text{Change in Enthalpy} = 0 = \sum_{n=1}^{5} W_n \left[C_p \ln \frac{T_{INLET,\ AVG.}}{T_n} - R \ln \frac{P_{INLET,\ AVG.}}{P_n} \right]$$

to the equation

$$\ln P_{INLET,\ AVG.} = \frac{\sum_{n=1}^{5} W_n \left[\left(\frac{\gamma}{\gamma - 1} \right) \ln \frac{T_{INLET,\ AVG.}}{T_n} + \ln P_n \right]}{\sum_{n=1}^{5} W_n}$$

For $n = 1$, P_n is the measured inlet total pressure during blowing; for $n = 2$ through 5, P_n is the blowing nozzle exit total pressure obtained from the measured pressure in the blowing manifold and the calibrated value of $Pt_{NOZZLE} / Pt_{MANIFOLD}$ for each choked nozzle. For $n = 1$, T_n is the measured inlet plenum total temperature; and for $n = 2$ through 5, T_n is the measured nozzle plenum total temperature with blowing.

$$\frac{\text{Actual Work}}{T_1} = W_1\ Cp \left[\frac{T_{EXIT}}{T_1} - 1 \right]$$

T_{EXIT} is the stator exit total temperature measured without blowing flow, and T_1 is the rotor inlet total temperature measured without blowing flow. Temperatures are taken at the same compressor operating point where data are taken without blowing flow.

$$\text{Overall Stage Pressure Ratio} = \frac{P_{EXIT}}{P_{INLET, AVG.}}$$

This is the value already calculated for Ideal Work.

$$\text{Stator Total Pressure Recovery} = \frac{P_{EXIT}}{P_{STATOR\ EXIT, AVG.}}$$

P_{EXIT} is the mass averaged stator exit total pressure during blowing as defined previously. $P_{STATOR\ EXIT, AVG.}$ is the isentropic average total pressure based on stator inlet main flow and on blowing flow conditions. It is calculated with the equation used previously to calculate ln values for $P_{INLET, AVG.}$ except that P_1 and T_1 are the mass average values for stator inlet values instead of rotor inlet.

WALL-SUCTION-STATOR CONFIGURATION

$$\text{Ideal Work} = \left[W_1 - W_6 - W_7\right] C_p \left[\frac{T_{IDEAL\ EXIT}}{T_1} - 1\right]$$

where: W_1 = measured compressor inlet flow and

$W_{6,7}$ = measured I.D. and O.D. annular slit flow rates

$$\frac{T_{IDEAL\ EXIT}}{T_1} = \left(\frac{P_{EXIT}}{P_1}\right)^{\frac{\gamma - 1}{\gamma}}$$

where P_{EXIT}/P_1 is the mass averaged overall stage total pressure ratio measured with wall suction.

$$\frac{\text{Actual Work}}{T_1} = \left[W_1 - W_6 - W_7\right] C_p \left[\frac{T_{EXIT}}{T_1} - 1\right] + W_6 C_p \left[\frac{T_6}{T_1} - 1\right]$$

$$+ W_7 C_p \left[\frac{T_7}{T_1} - 1\right]$$

$$\text{Stator Total Pressure Recovery} = \frac{P_{EXIT}}{P_{STATOR\ INLET}}$$

P_{EXIT} is the mass averaged stator exit total pressure with suction, and $P_{STATOR\ INLET}$ is the mass averaged pressure downstream of annular slits, not rotor exit pressure.

COMBINED CORNER-BLOW AND WALL-SUCTION CONFIGURATION

$$\frac{\text{Ideal Work}}{T_{INLET,\ AVG.}} = \left[W_1 + W_2 + W_3 + W_4 - W_6 - W_7\right] C_p \left[\frac{T_{IDEAL\ EXIT}}{T_{INLET,\ AVG.}} - 1\right]$$

The Ideal Work calculation is the same for blowing except for the subtraction of work done on suction flows. T_{INLET} and $T_{IDEAL\ EXIT}$ are the same as defined by the equations for the corner-blow-stator configuration.

$$\frac{\text{Actual Work}}{T_1} = \left[W_1 - W_6 - W_7\right] C_p \left[\frac{T_{EXIT}}{T_1} - 1\right] + W_6\, C_p \left[\frac{T_6}{T_1} - 1\right]$$

$$+ W_7\, C_p \left[\frac{T_7}{T_1} - 1\right]$$

All temperatures are measured with suction but without blowing at the same compressor operating points where data are taken with combined treatments.

$$\text{Overall Stage Pressure Ratio} = \frac{P_{EXIT}}{P_{INLET,\ AVG.}}$$

This ratio is calculated the same as for the blowing configuration where P_{EXIT} is the mass averaged stator exit total pressure with combined suction and blowing.

$$\text{Stator Total Pressure Recovery} = \frac{P_{EXIT}}{P_{STATOR\ INLET,\ AVG.}}$$

The $Pt_{STATOR\ INLET,\ AVG.}$ is the isentropic average based on stator inlet main flow and blowing flow conditions. It is calculated using the $P_{INLET,\ AVG.}$ equation for the corner-blow-stator configuration with stator inlet flow ($W_1 - W_6 - W_7$) instead of rotor inlet flow (W_1); P_1 and T_1 are the mass averaged stator inlet (downstream of annular suction slits) values in steady of rotor inlet values.

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APPENDIX C

BLADE ELEMENT AND PERFORMANCE DATA
(Computer Printouts)

IDENTIFICATION OF ROTOR BLADE ELEMENT AND PERFORMANCE PRINTOUT HEADINGS

% SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5																		
10																		
15																		
30																		
50	$2r_8$	$2r_9$	V_8	V_9	V_{m8}	V_{m9}	$V_{\theta 8}$	$V_{\theta 9}$	β_8	β_9	β'_5	β'_9	V'_8	V'_9	$V'_{\theta 8}$	$V'_{\theta 9}$	U_8	U_9
70																		
85																		
90																		

% SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	O-MEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5																		
10																		
15																		
30																		
50	i_{s8}	i_{m8}	δ°_9	$\Delta\beta$	$\Delta\beta^*$	$\overline{\omega}_{sh}$	D	$\overline{\omega}$	$\frac{\overline{\omega}\cos\beta'_9}{2\sigma}$	$\frac{(\overline{\omega}-\overline{\omega}_{sh})\cos\beta'_9}{2\sigma}$	$\frac{P_9}{P_8}$	η_p	η_{ad}	η_{ps}	M_8	M_9	M'_8	M'_9
70																		
85																		
90																		
95																		

TO/TO INLET	PO/PO INLET	EFF-AD INLET	EFF-P INLET
		%	%
$\frac{T_9}{T_0}$	$\frac{P_9}{P_0}$	η_{ad}	η_p

IDENTIFICATION OF STATOR BLADE ELEMENT AND PERFORMANCE PRINTOUT HEADINGS

% SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5																		
10																		
15																		
30																		
50	$2r_{10}$	$2r_{11}$	V_{10}	V_{11}	V_{m10}	V_{m11}	$V_{\theta 10}$	$V_{\theta 11}$	β_{10}	β_{11}	β'_{10}	β'_{11}	V'_{10}	V'_{11}	$V'_{\theta 10}$	$V'_{\theta 11}$	U_8	U_9
70																		
85																		
90																		
95																		

% SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5																		
10																		
15																		
30																		
50	i_{s10}	i_{m10}	δ°_{11}	$\Delta\beta$	$\Delta\beta^*$	$\overline{\omega}_{sh}$	D	$\overline{\omega}$	$\frac{\overline{\omega}\cos\beta'_{11}}{2\sigma}$	$\frac{(\overline{\omega}-\overline{\omega}_{sh})\cos\beta'_{11}}{2\sigma}$	$\frac{P_{11}}{P_{10}}$	η_p	η_{ad}	η_{ps}	M_{10}	M_{11}	M'_{10}	M'_{11}
70																		
85																		
90																		
95																		

STAGE PARAMETERS

INCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC/A-1 LBM/SEC SOFT
$\frac{N}{\sqrt{\theta}}$	$\frac{W\sqrt{\theta}}{\delta}$	$\frac{T_{11}}{T_0}$	$\frac{P_{11}}{P_0}$	η_{ad}	η_p	$\frac{W\sqrt{\theta}}{\delta A_{an}}$

$\frac{W_{BLEED}}{W_{TOTAL}}$	$\frac{W_{BLOW}}{W_{TOTAL}}$	PO/PO INLET ADJ.	EFF-AD ADJ.	PO/PO LOCAL
$\frac{W_{BLEED}}{W}$	$\frac{W_{BLOW}}{W}$	$\frac{P_{11}}{P_0}$	η_{AD} ADJ.	$\frac{P_{11}}{P_{10}}$

Rotor Pressure Ratio

ROTOR BLADE ELEMENT AND OVERALL PERFORMANCE AND DESIGN DATA

ROTOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 22:58:56 — JULY 12,1971

NASA ENGLISH (SPECIAL) — RUN # 31,SPEED CODE 50,POINT # 1,PAGE 36.01

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	17.467	19.769	283.9	575.9	283.9	437.5	.0	374.5	.00	40.58	56.02	13.17	508.0	449.4	-421.3	-102.4	421.3	476.8
10	18.467	20.408	289.0	548.6	289.0	427.6	.0	343.6	.00	38.77	57.02	19.16	531.0	453.1	-445.4	-148.6	445.4	492.2
15	19.467	21.047	293.5	521.6	293.5	415.3	.0	315.4	.00	37.18	57.99	24.79	553.7	458.6	-469.5	-192.2	469.5	507.6
30	22.314	22.964	302.4	464.1	302.4	391.0	.0	249.9	.00	32.56	60.66	37.82	617.4	495.6	-538.2	-304.0	538.2	553.9
50	25.791	25.520	305.7	421.3	305.7	374.1	.0	193.5	.00	27.33	63.83	48.40	693.1	564.2	-622.1	-422.0	622.1	615.5
70	28.954	28.076	300.7	386.2	300.7	356.6	.0	148.2	.00	22.55	66.69	55.99	760.4	638.1	-698.3	-529.0	698.3	677.2
85	31.295	29.993	292.7	360.1	292.7	331.2	.0	141.1	.00	23.13	68.80	60.38	809.6	670.1	-754.8	-582.3	754.8	723.4
90	31.883	30.630	290.6	329.2	290.6	296.9	.0	142.2	.00	25.63	69.30	63.54	822.1	666.6	-769.0	-596.6	769.0	738.8
95	32.499	31.271	289.1	296.6	289.1	260.3	.0	142.2	.00	28.70	69.75	66.96	835.5	665.3	-783.9	-612.0	783.9	754.2

%SPAN	INCS DEGREE	INCM GREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	.72	7.15	13.00	42.85	48.82	.0000	.2888	.0691	.0199	.0199	1.2046	.9540	.9528	.8477	.2573	.5196	.4690	.4016
10	1.15	7.47	12.94	37.86	43.39	.0000	.3038	.0814	.0178	.0178	1.1894	.9377	.9360	.8283	.2624	.4898	.4879	.4045
15	1.61	7.29	12.01	33.20	37.79	.0000	.3145	.0947	.0207	.0207	1.1793	.9169	.9149	.8048	.2663	.4653	.5094	.4091
30	2.91	6.80	7.98	22.84	24.03	.0000	.3078	.0911	.0194	.0194	1.1443	.8860	.8835	.7975	.2737	.4135	.5669	.4416
50	4.33	6.90	6.12	15.43	14.67	.0000	.2706	.0684	.0139	.0139	1.1221	.8775	.8753	.8135	.2756	.3754	.6313	.5028
70	5.25	7.03	5.18	10.70	8.84	.0000	.2259	.0480	.0091	.0091	1.1026	.8797	.8778	.8319	.2708	.3444	.6893	.5690
85	5.46	6.69	5.52	8.43	7.26	.0000	.2345	.0918	.0165	.0165	1.0881	.7471	.7436	.6817	.2640	.3205	.7293	.5965
90	5.49	6.56	7.54	5.75	6.73	.0000	.2522	.1383	.0229	.0229	1.0744	.6178	.6133	.5742	.2620	.2925	.7415	.5921
95	5.55	6.46	10.04	2.79	6.38	.0000	.2671	.1770	.0263	.0263	1.0617	.5052	.5007	.5009	.2607	.2630	.7525	.5898

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
1.0406	1.1273	85.84	86.10

ROTOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 23:00:40 — JULY 12, 1971

NASA ENGLISH (SPECIAL) — RUN # 31, SPEED CODE 50, POINT # 2, PAGE 36.01

% SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	V0-1 FT/SEC	V0-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	V0'-1 FT/SEC	V0'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	17.467	19.769	268.3	558.9	268.3	408.8	.0	381.1	.00	42.99	57.54	13.26	499.9	420.0	-421.8	-96.3	421.8	477.4
10	18.467	20.408	273.1	528.6	273.1	394.8	.0	351.5	.00	41.67	58.52	19.69	522.9	419.7	-446.0	-141.3	446.0	492.8
15	19.467	21.047	277.3	504.4	277.3	385.0	.0	325.7	.00	40.20	59.47	25.32	545.8	426.9	-470.1	-182.6	470.1	508.3
30	22.314	22.964	285.7	452.3	285.7	365.2	.0	266.9	.00	36.14	62.06	38.19	609.9	465.2	-538.9	-287.7	538.9	554.6
50	25.791	25.520	289.0	408.4	289.0	346.4	.0	216.1	.00	31.95	65.11	49.08	686.6	529.4	-622.8	-400.1	622.8	616.3
70	28.954	28.076	284.8	377.1	284.8	333.4	.0	176.2	.00	27.85	67.83	56.37	755.0	602.6	-699.2	-501.8	699.2	678.0
85	31.295	29.993	277.9	356.8	277.9	311.8	.0	173.3	.00	29.09	69.81	60.49	805.2	633.2	-755.8	-551.0	755.8	724.3
90	31.883	30.630	276.0	335.3	276.0	285.1	.0	176.4	.00	31.79	70.28	63.16	817.9	631.5	-770.0	-563.3	770.0	739.7
95	32.499	31.271	274.4	315.1	274.4	260.7	.0	176.8	.00	34.16	70.73	65.73	831.4	634.5	-784.8	-578.4	784.8	755.2

% SPAN	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	2.23	8.66	13.09	44.28	48.82	.0000	.3392	.0620	.0134	.0134	1.2103	.9607	.9596	.8858	.2430	.4984	.4564	.3746
10	2.64	8.96	13.47	38.83	43.39	.0000	.3606	.0874	.0191	.0191	1.1940	.9364	.9347	.8467	.2477	.4709	.4800	.3738
15	3.06	8.72	12.55	34.15	37.76	.0000	.3672	.0940	.0205	.0205	1.1817	.9222	.9202	.8348	.2513	.4489	.5014	.3800
30	4.28	8.18	8.35	23.86	24.03	.0000	.3569	.0869	.0184	.0184	1.1575	.9004	.8982	.8328	.2583	.4021	.5586	.4135
50	5.58	8.16	6.79	16.03	14.66	.0001	.3249	.0769	.0154	.0153	1.1374	.8785	.8760	.8258	.2604	.3628	.6240	.4704
70	6.36	8.15	5.56	11.46	8.86	.0000	.2798	.0591	.0111	.0111	1.1224	.8766	.8743	.8362	.2565	.3351	.6826	.5355
85	6.46	7.71	5.63	9.32	7.26	.0000	.2905	.1036	.0186	.0186	1.1122	.7687	.7647	.7150	.2507	.3164	.7236	.5615
90	6.47	7.55	7.18	7.12	6.76	.0000	.3065	.1436	.0241	.0241	1.1029	.6817	.6767	.6352	.2488	.2968	.7361	.5589
95	6.51	7.43	8.80	5.00	6.38	.0000	.3159	.1716	.0268	.0268	1.0948	.6165	.6109	.5841	.2474	.2784	.7477	.5607

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
1.0452	1.1433	86.39	86.67

ROTOR BLADE ELEMENT AND OVERALL PERFORMANCE AND DESIGN DATA

ROTOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 23:02:21 — JULY 12, 1971

NASA ENGLISH (SPECIAL) — RUN # 31, SPEED CODE 50, POINT # 4, PAGE 36.01

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	17.467	19.769	258.1	552.5	258.1	393.0	.0	388.3	.00	44.66	58.56	12.85	495.0	403.1	-422.3	-89.7	422.3	478.0
10	18.467	20.408	262.7	523.8	262.7	381.2	.0	359.1	.00	43.28	59.52	19.40	518.1	404.6	-446.5	-139.3	446.5	493.4
15	19.467	21.047	266.8	498.6	266.8	370.1	.0	334.1	.00	42.05	60.45	25.24	541.0	410.1	-470.7	-174.8	470.7	508.9
30	22.314	22.964	274.7	443.9	274.7	345.0	.0	279.2	.00	38.97	63.00	38.61	605.4	442.1	-539.5	-276.0	539.5	555.2
50	25.791	25.520	277.8	405.6	277.8	332.8	.0	231.7	.00	34.83	65.98	49.19	682.6	509.3	-623.6	-385.3	623.6	617.0
70	28.954	28.076	273.7	373.3	273.7	319.1	.0	193.5	.00	31.22	68.63	56.63	751.7	580.9	-700.0	-485.3	700.0	678.8
85	31.295	29.993	267.1	353.3	267.1	293.5	.0	196.5	.00	33.81	70.55	60.96	802.4	604.7	-756.6	-528.6	756.6	725.1
90	31.883	30.630	265.3	338.2	265.3	272.3	.0	200.4	.00	36.38	71.00	63.24	815.2	605.0	-770.8	-540.1	770.8	740.5
95	32.499	31.271	263.8	324.4	263.8	254.5	.0	201.1	.00	38.34	71.44	65.36	828.8	610.5	-785.7	-554.9	785.7	756.0

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	3.25	9.68	12.68	45.71	48.82	.0000	.3701	.0510	.0110	.0110	1.2169	.9690	.9681	.9139	.2337	.4921	.4518	.3591
10	3.64	9.95	13.18	40.12	43.39	.0000	.3875	.0708	.0155	.0155	1.2020	.9506	.9492	.8840	.2383	.4660	.4757	.3600
15	4.05	9.69	12.46	35.22	37.75	.0000	.3965	.0835	.0182	.0182	1.1895	.9339	.9321	.8635	.2417	.4433	.4971	.3646
30	5.22	9.12	8.76	24.39	24.03	.0001	.3959	.0958	.0202	.0201	1.1646	.8965	.8941	.8328	.2482	.3940	.5542	.3923
50	6.45	9.03	6.84	16.84	14.66	.0004	.3569	.0791	.0158	.0157	1.1490	.8845	.8820	.8361	.2502	.3597	.6199	.4517
70	7.16	8.96	5.83	12.00	8.86	.0002	.3131	.0672	.0126	.0125	1.1345	.8731	.8705	.8340	.2464	.3310	.6793	.5152
85	7.21	8.46	6.10	9.60	7.26	.0001	.3338	.1254	.0222	.0222	1.1252	.7532	.7486	.7005	.2407	.3124	.7204	.5347
90	7.20	8.28	7.27	7.76	6.77	.0001	.3475	.1596	.0267	.0267	1.1189	.6891	.6836	.6399	.2391	.2986	.7329	.5341
95	7.23	8.15	8.43	6.08	6.38	.0001	.3537	.1816	.0287	.0287	1.1135	.6490	.6380	.6020	.2377	.2860	.7448	.5382

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
1.0484	1.1540	86.34	86.63

ROTOR BLADE ELEMENT AND OVERALL PERFORMANCE AND DESIGN DATA

ROTOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 23:04:03 — JULY 12, 1971

NASA ENGLISH (SPECIAL) — RUN # 31, SPEED CODE 50, POINT # 5, PAGE 36.01

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	17.467	19.769	242.5	540.4	242.5	371.0	.0	392.8	.00	46.63	60.11	12.87	486.7	380.6	-422.0	-84.8	422.0	477.6
10	18.467	20.408	246.9	514.9	246.9	364.2	.0	364.0	.00	44.98	61.03	19.51	509.9	386.7	-446.1	-129.0	446.1	493.0
15	19.467	21.047	250.7	488.4	250.7	350.1	.0	340.5	.00	44.19	61.93	25.61	533.0	389.2	-470.3	-168.0	470.3	508.5
30	22.314	22.964	257.9	432.3	257.9	320.4	.0	290.1	.00	42.15	64.42	39.51	597.6	415.8	-539.1	-264.7	539.1	554.8
50	25.791	25.520	260.4	400.0	260.4	313.0	.0	249.0	.00	38.50	67.32	49.54	675.3	482.9	-623.1	-367.5	623.1	616.5
70	28.954	28.076	255.7	370.6	255.7	299.0	.0	219.0	.00	36.21	69.91	56.91	744.8	548.2	-699.5	-459.3	699.5	678.3
85	31.295	29.993	249.0	351.5	249.0	263.7	.0	232.3	.00	41.39	71.77	61.82	796.0	558.5	-756.1	-492.3	756.1	724.6
90	31.883	30.630	247.3	341.9	247.3	247.6	.0	235.8	.00	43.62	72.20	63.85	809.0	561.8	-770.3	-504.2	770.3	740.0
95	32.499	31.271	245.9	331.4	245.9	232.2	.0	236.5	.00	45.53	72.61	65.89	822.8	568.6	-785.1	-519.0	785.1	755.5

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	4.79	11.22	12.70	47.24	48.82	.0000	.4078	.0216	.0047	.0047	1.2241	.9876	.9872	.9666	.2195	.4807	.4444	.3386
10	5.15	11.45	13.29	41.53	43.39	.0001	.4150	.0288	.0063	.0063	1.2120	.9810	.9804	.9555	.2239	.4577	.4687	.3437
15	5.54	11.15	12.81	36.33	37.72	.0002	.4297	.0548	.0119	.0119	1.1989	.9587	.9576	.9167	.2271	.4336	.4904	.3456
30	6.64	10.54	9.67	24.92	24.03	.0007	.4368	.0883	.0184	.0182	1.1740	.9102	.9080	.8590	.2328	.3830	.5475	.3684
50	7.79	10.37	7.26	17.78	14.67	.0011	.3968	.0785	.0155	.0153	1.1627	.8952	.8928	.8524	.2342	.3540	.6135	.4274
70	8.45	10.23	6.10	13.00	8.84	.0006	.3622	.0854	.0158	.0157	1.1504	.8592	.8561	.8167	.2299	.3277	.6738	.4847
85	8.43	9.67	6.96	9.95	7.26	.0003	.4025	.1682	.0290	.0289	1.1421	.7211	.7153	.6634	.2243	.3096	.7198	.4919
90	8.39	9.47	7.86	8.35	6.76	.0003	.4118	.1942	.0318	.0318	1.1384	.6794	.6730	.6236	.2227	.3007	.7272	.4990
95	8.40	9.32	8.97	6.71	6.38	.0004	.4158	.2123	.0329	.0328	1.1346	.6471	.6402	.5958	.2219	.2911	.7390	.4994

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
1.0525	1.1676	86.35	86.66

ROTOR BLADE ELEMENT AND OVERALL PERFORMANCE AND DESIGN DATA

ROTOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 23:05:35 — JULY 12, 1971

NASA ENGLISH (SPECIAL) RUN # 31, SPEED CODE 50, POINT # 6, PAGE 36.01

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	17.467	19.769	226.4	535.2	226.4	350.9	.0	404.2	.00	49.04	61.80	11.88	479.2	358.6	-422.3	-73.8	422.3	478.0
10	18.467	20.408	230.6	511.2	230.6	346.0	.0	376.3	.00	47.39	62.69	18.70	502.5	365.7	-446.5	-117.1	446.5	493.5
15	19.467	21.047	234.2	486.7	234.2	332.7	.0	355.2	.00	46.86	63.55	24.79	525.7	367.4	-470.7	-153.7	470.7	508.9
30	22.314	22.964	240.5	439.4	240.5	304.0	.0	310.2	.00	45.57	65.96	38.81	590.8	390.9	-539.5	-245.1	539.5	555.3
50	25.791	25.520	241.7	393.4	241.7	284.1	.0	272.1	.00	43.75	68.81	50.48	668.8	447.1	-623.6	-345.0	623.6	617.1
70	28.954	28.076	236.9	374.1	236.9	273.0	.0	255.8	.00	43.13	71.30	57.15	739.1	503.6	-700.1	-423.1	700.1	678.9
85	31.295	29.993	230.7	364.7	230.7	241.7	.0	273.1	.00	48.49	73.09	61.87	791.1	512.7	-756.7	-452.1	756.7	725.2
90	31.883	30.630	229.2	360.5	229.2	231.0	.0	276.7	.00	50.15	73.44	63.52	804.3	518.3	-770.9	-463.9	770.9	740.6
95	32.499	31.271	227.9	352.6	227.9	217.8	.0	277.2	.00	51.85	73.83	65.54	818.2	526.1	-785.8	-478.9	785.8	756.1

%SPAN	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	6.98	12.91	11.71	49.92	48.82	.0004	.4501	.0357	.0077	.0076	1.2294	.9804	.9799	.9501	.2049	.4759	.4378	.3186
10	6.80	13.09	12.48	43.99	43.38	.0007	.4542	.0378	.0083	.0081	1.2187	.9763	.9757	.9463	.2090	.4538	.4625	.3246
15	7.16	12.73	11.97	38.76	37.69	.0011	.4703	.0643	.0141	.0138	1.2073	.9547	.9534	.9096	.2120	.4316	.4844	.3258
30	8.20	12.08	8.97	27.16	24.02	.0023	.4818	.1037	.0218	.0213	1.1854	.9033	.9008	.8469	.2169	.3842	.5420	.3458
50	9.29	11.87	8.21	18.33	14.68	.0029	.4549	.1183	.0230	.0229	1.1705	.8573	.8538	.8028	.2172	.3473	.6080	.3947
70	9.83	11.61	6.33	14.15	8.84	.0017	.4342	.1398	.0257	.0254	1.1648	.8037	.7991	.7449	.2128	.3296	.6681	.4437
85	9.71	10.95	7.01	11.18	7.26	.0009	.4750	.2137	.0367	.0366	1.1627	.6987	.6919	.6281	.2077	.3200	.7096	.4498
90	9.64	10.72	7.54	9.92	6.76	.0009	.4810	.2330	.0386	.0385	1.1619	.6726	.6652	.6019	.2062	.3159	.7222	.4541
95	9.62	10.54	8.61	8.29	6.38	.0011	.4830	.2474	.0389	.0387	1.1596	.6494	.6417	.5820	.2050	.3086	.7343	.4604

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
1.0581	1.1803	83.58	83.98

ROTOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 19:59:46 — JULY 12, 1971

NASA ENGLISH (SPECIAL) — RUN # 31, SPEED CODE 70, POINT # 1, PAGE 36.01

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	17.467	19.769	413.3	797.4	413.3	598.6	.0	526.0	.00	41.35	55.03	13.34	721.1	615.3	-590.9	-141.9	590.9	668.8
10	18.467	20.408	421.2	757.2	421.2	584.8	.0	484.2	.00	39.61	56.01	19.43	753.4	620.6	-624.7	-206.2	624.7	690.4
15	19.467	21.047	428.2	722.5	428.2	567.9	.0	447.0	.00	38.21	56.96	29.98	785.5	627.3	-658.5	-264.9	658.5	712.0
30	22.314	22.964	443.1	650.6	443.1	543.7	.0	357.1	.00	33.29	59.58	37.64	875.3	687.2	-754.8	-419.7	754.8	776.8
50	25.791	25.520	449.8	597.8	449.8	525.1	.0	285.5	.00	28.52	62.72	47.70	981.6	781.1	-872.5	-577.8	872.5	863.3
70	28.954	28.076	442.7	549.4	442.7	498.2	.0	231.4	.00	24.91	65.66	55.23	1075.0	874.4	-979.5	-718.3	979.5	949.8
85	31.295	29.993	430.6	517.5	430.6	466.2	.0	224.3	.00	25.74	67.86	59.47	1142.9	917.8	-1058.7	-790.3	1058.7	1014.6
90	31.883	30.630	427.5	480.2	427.5	422.4	.0	228.3	.00	28.43	68.38	62.40	1160.2	911.9	-1078.6	-807.9	1078.6	1036.2
95	32.499	31.271	425.2	436.3	425.2	370.9	.0	229.5	.00	31.80	68.86	65.88	1178.8	907.8	-1099.4	-828.3	1099.4	1057.9

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-.29	6.14	13.17	41.69	48.82	.0002	.3185	.0734	.0201	.0201	1.4231	.9408	.9378	.8342	.3773	.7101	.6627	.5479
10	.12	6.45	13.21	36.58	43.39	.0004	.3324	.1046	.0228	.0227	1.3904	.9241	.9204	.8201	.3853	.6749	.6963	.5517
15	.54	6.23	12.23	31.98	37.78	.0008	.3939	.1191	.0260	.0259	1.3589	.9015	.8971	.7988	.3916	.6411	.7267	.5567
30	1.79	5.70	7.78	21.94	24.03	.0026	.3265	.0943	.0201	.0196	1.3046	.8907	.8865	.8240	.4046	.5765	.8080	.6090
50	3.22	5.80	5.41	15.02	14.66	.0048	.2925	.0747	.0153	.0194	1.2650	.8823	.8784	.8351	.4092	.5296	.9010	.6920
70	4.22	6.01	4.42	10.43	8.85	.0048	.2505	.0722	.0140	.0130	1.2253	.8520	.8477	.8120	.4023	.4866	.9823	.7745
85	4.52	5.75	4.61	8.39	7.26	.0053	.2670	.1217	.0225	.0216	1.1986	.7337	.7268	.6855	.3917	.4566	1.0378	.8098
90	4.57	5.64	6.40	5.97	6.74	.0059	.2858	.1735	.0299	.0289	1.1730	.6227	.6139	.5930	.3884	.4220	1.0547	.8012
95	4.65	5.56	8.95	2.98	6.38	.0074	.3023	.2185	.0339	.0327	1.1468	.5212	.5116	.5251	.3865	.3818	1.0702	.7945

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
1.0842	1.2722	84.60	85.11

ROTOR BLADE ELEMENT AND OVERALL PERFORMANCE AND DESIGN DATA

ROTOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 19:52:33 — JULY 12,1971

NASA ENGLISH (SPECIAL) — RUN # 31,SPEED CODE 70,POINT # 4,PAGE 36.01

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	17.467	19.769	372.4	756.1	372.4	528.0	.0	541.3	.00	45.71	57.73	13.46	697.6	543.0	-589.9	-126.3	589.9	667.6
10	18.467	20.408	379.5	720.3	379.5	518.1	.0	500.4	.00	44.00	58.67	20.03	730.1	551.9	-623.6	-188.8	623.6	689.2
15	19.467	21.047	385.8	683.6	385.8	497.4	.0	468.9	.00	43.30	59.59	25.91	762.2	554.2	-657.4	-241.9	657.4	710.8
30	22.314	22.964	397.8	608.5	397.8	454.2	.0	404.8	.00	41.70	62.16	39.18	852.1	586.6	-753.5	-370.7	753.5	775.5
50	25.791	25.520	403.1	565.7	403.1	446.8	.0	346.9	.00	37.82	65.16	49.03	959.7	681.9	-871.0	-514.9	871.0	861.8
70	28.954	28.076	397.5	532.7	397.5	430.2	.0	314.2	.00	36.13	67.86	55.81	1055.6	766.4	-977.8	-634.0	977.8	948.1
85	31.295	29.993	387.6	516.0	387.6	401.9	.0	323.6	.00	38.85	69.86	59.76	1125.7	797.9	-1056.8	-689.3	1056.8	1012.9
90	31.883	30.630	384.9	497.6	384.9	369.9	.0	332.6	.00	41.99	70.33	62.21	1143.4	793.5	-1076.7	-701.8	1076.7	1034.4
95	32.499	31.271	382.6	476.4	382.6	338.7	.0	334.9	.00	44.70	70.78	64.84	1162.3	796.8	-1097.5	-721.1	1097.5	1056.0

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	2.41	8.84	13.29	49.27	48.82	.0014	.4042	.0035	.0008	.0005	1.4674	.9983	.9983	.9942	.3392	.6691	.6403	.4804
10	2.79	9.10	13.81	38.65	43.39	.0022	.4104	.0124	.0027	.0022	1.4398	.9921	.9916	.9819	.3465	.6364	.6744	.4876
15	3.19	8.84	13.14	33.68	37.74	.0032	.4270	.0445	.0097	.0090	1.4103	.9670	.9653	.9383	.3518	.6026	.7048	.4886
30	4.36	8.28	9.33	22.98	24.02	.0064	.4415	.0910	.0190	.0176	1.3578	.9105	.9065	.8705	.3619	.5340	.7844	.5148
50	5.61	8.21	6.71	16.14	14.64	.0092	.3992	.0766	.0153	.0135	1.3360	.9031	.8991	.8730	.3656	.4957	.8762	.5975
70	6.39	8.19	5.01	12.05	8.87	.0087	.3734	.0934	.0178	.0161	1.3166	.8606	.8551	.8291	.3604	.4656	.9596	.6698
85	6.51	7.76	4.90	10.10	7.26	.0084	.3937	.1562	.0287	.0272	1.3060	.7623	.7531	.7201	.3518	.4484	1.0174	.6933
90	6.52	7.60	6.23	8.12	6.76	.0090	.4121	.1989	.0345	.0329	1.2938	.7024	.6913	.6621	.3490	.4307	1.0349	.6868
95	6.57	7.48	7.91	5.94	6.38	.0107	.4216	.2279	.0368	.0351	1.2810	.6578	.6457	.6295	.3469	.4112	1.0519	.6877

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
1.1025	1.3485	87.02	87.56

ROTOR ANGLES AIRFOIL AERODYNAMIC SUMMARY PRINT 19:54:03 JULY 12,1971
NASA ENGLISH (SPECIAL) RUN # 31,SPEED CODE 70,POINT # 5,PAGE 36.01

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	17.467	19.769	352.9	747.4	352.9	499.6	.0	555.9	.00	48.05	59.13	12.69	688.0	512.2	-590.5	-112.5	590.5	668.4
10	18.467	20.408	359.8	716.3	359.8	496.0	.0	516.7	.00	46.16	60.05	19.26	720.6	525.9	-624.3	-173.3	624.3	690.0
15	19.467	21.047	365.7	680.0	365.7	474.9	.0	486.7	.00	45.69	60.94	25.33	752.9	526.7	-658.2	-224.9	658.2	711.6
30	22.314	22.964	376.8	605.7	376.8	432.9	.0	423.5	.00	44.37	63.45	39.14	843.3	558.8	-754.4	-352.8	754.4	776.4
50	25.791	25.520	380.6	559.4	380.6	412.2	.0	372.2	.00	42.09	66.42	49.94	951.4	640.8	-872.0	-490.6	872.0	862.8
70	28.954	28.076	374.9	538.2	374.9	404.8	.0	354.8	.00	41.24	69.03	55.72	1048.3	719.3	-978.9	-594.4	978.9	949.2
85	31.295	29.993	365.4	525.8	365.4	370.3	.0	373.3	.00	45.29	70.95	59.97	1119.4	740.1	-1058.0	-640.7	1058.0	1014.0
90	31.883	30.630	362.9	509.3	362.9	343.7	.0	375.7	.00	47.58	71.39	62.48	1137.4	744.1	-1077.9	-659.8	1077.9	1035.6
95	32.499	31.271	360.7	494.4	360.7	322.5	.0	374.6	.00	49.28	71.82	69.71	1156.4	755.0	-1098.7	-682.6	1098.7	1057.2

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	3.81	10.24	12.52	46.45	48.82	.0030	.4456	.0173	.0037	.0031	1.4781	.9908	.9903	.9774	.3211	.6596	.6310	.4520
10	4.15	10.46	13.04	40.79	43.39	.0041	.4443	.0125	.0027	.0018	1.4569	.9924	.9920	.9829	.3281	.6314	.6654	.4636
15	4.53	10.17	12.54	35.61	37.73	.0054	.4624	.0467	.0102	.0090	1.4286	.9673	.9656	.9393	.3331	.5981	.6959	.4632
30	5.66	9.57	9.29	24.31	24.02	.0093	.4746	.0927	.0194	.0174	1.3786	.9143	.9104	.8750	.3422	.5302	.7758	.4892
50	6.87	9.46	7.63	16.47	14.65	.0124	.4452	.1040	.0204	.0180	1.3523	.8787	.8734	.8426	.3447	.4846	.8676	.5591
70	7.55	9.36	4.93	13.31	8.87	.0115	.4269	.1290	.0247	.0225	1.3475	.8300	.8227	.7885	.3393	.4679	.9514	.6252
85	7.60	8.85	5.11	10.97	7.26	.0108	.4578	.2007	.0366	.0347	1.3423	.7333	.7220	.6810	.3312	.4538	1.0100	.6387
90	7.59	8.67	6.51	8.91	6.76	.0114	.4662	.2283	.0392	.0373	1.3324	.6964	.6839	.6470	.3286	.4383	1.0277	.6404
95	7.61	8.53	7.78	7.12	6.38	.0132	.4677	.2453	.0398	.0376	1.3243	.6703	.6570	.6253	.3267	.4245	1.0445	.6484

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
1.1113	1.3732	85.27	85.91

ROTOR BLADE ELEMENT AND OVERALL PERFORMANCE AND DESIGN DATA

ROTOR ANGLES AIRFOIL AERODYNAMIC SUMMARY PRINT 18:32:18 JULY 13,1971

NASA ENGLISH (SPECIAL) RUN # 31,SPEED CODE 70,POINT # 6,PAGE 36.01

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VH-1 FT/SEC	VH-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	17.467	19.769	333.6	740.6	333.6	479.5	.0	564.4	.00	49.65	60.55	12.27	678.6	490.8	-590.9	-104.3	590.9	660.8
10	18.467	20.408	340.1	710.9	340.1	477.0	.0	527.0	.00	47.84	61.43	18.90	711.3	504.7	-624.7	-163.3	624.7	690.4
15	19.467	21.047	345.6	677.4	345.6	458.0	.0	499.2	.00	47.46	62.30	24.92	743.7	506.2	-658.5	-212.8	658.5	712.0
30	22.314	22.964	355.5	605.8	355.5	415.1	.0	441.2	.00	46.74	64.77	38.90	834.4	534.3	-754.8	-335.6	754.8	776.8
50	25.791	25.520	357.5	550.3	357.5	381.3	.0	396.7	.00	46.19	67.72	50.72	942.9	602.7	-872.5	-466.6	872.5	863.3
70	28.954	28.076	351.0	540.8	351.0	374.2	.0	390.5	.00	46.22	70.27	56.20	1040.5	673.1	-979.5	-559.3	979.5	949.8
85	31.295	29.993	342.2	530.8	342.2	336.8	.0	410.3	.00	50.62	72.09	60.88	1112.6	691.9	-1058.7	-604.3	1058.7	1014.6
90	31.883	30.630	339.9	522.0	339.9	323.7	.0	409.5	.00	51.68	72.51	62.67	1130.8	705.5	-1078.5	-626.7	1078.5	1036.2
95	32.499	31.271	337.9	510.9	337.9	309.8	.0	406.2	.00	52.67	72.92	64.56	1150.1	721.6	-1099.4	-651.6	1099.4	1057.8

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	5.22	11.65	12.10	48.28	48.82	.0055	.4724	.0256	.0055	.0093	1.4845	.9867	.9860	.9686	.3034	.6525	.6229	.4324
10	5.54	11.84	12.68	42.54	43.38	.0070	.4704	.0199	.0044	.0028	1.4653	.9883	.9876	.9746	.3100	.6256	.6572	.4441
15	5.91	11.51	12.11	37.39	37.70	.0085	.4875	.0516	.0113	.0094	1.4409	.9656	.9637	.9357	.3146	.5948	.6881	.4445
30	7.02	10.90	9.07	25.87	24.02	.0131	.5041	.1051	.0220	.0192	1.3937	.9088	.9044	.8642	.3224	.5292	.7686	.4668
50	8.19	10.77	8.43	17.00	14.66	.0164	.4885	.1377	.0266	.0234	1.3641	.8505	.8438	.8057	.3231	.4784	.8604	.5239
70	8.80	10.60	5.39	14.08	8.86	.0150	.4785	.1717	.0324	.0296	1.3674	.7948	.7855	.7421	.3172	.4678	.9439	.5822
85	8.75	10.00	6.00	11.22	7.26	.0137	.5097	.2370	.0922	.0398	1.3667	.7119	.6985	.6507	.3098	.4558	1.0021	.5940
90	8.70	9.79	6.70	9.83	6.77	.0142	.5081	.2511	.0429	.0405	1.3632	.6932	.6796	.6342	.3075	.4473	1.0199	.6046
95	8.71	9.63	7.64	8.35	6.38	.0161	.5040	.2604	.0429	.0398	1.3586	.6774	.6633	.6216	.3056	.4371	1.0370	.6174

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
1.1185	1.3905	83.37	84.12

ROTOR ANGLES AIRFOIL AERODYNAMIC SUMMARY PRINT 23:22:48 JULY 12,1971
NASA ENGLISH (SPECIAL) RUN # 31,SPEED CODE 90,POINT # 1,PAGE 36.01

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	17.467	19.769	545.0	958.1	545.0	683.2	.0	671.8	.00	44.52	54.43	15.61	937.0	709.5	-762.2	-190.8	762.2	862.6
10	18.467	20.408	556.5	903.9	556.5	660.2	.0	617.4	.00	43.08	55.37	22.48	979.3	715.0	-805.8	-273.1	805.8	890.5
15	19.467	21.047	566.9	858.4	566.9	635.7	.0	576.6	.00	42.19	56.28	28.19	1021.2	722.6	-849.4	-341.7	849.4	918.4
30	22.314	22.964	590.4	795.4	590.4	631.9	.0	483.0	.00	37.40	58.76	39.39	1138.7	817.7	-973.7	-519.0	973.7	1002.0
50	25.791	25.520	603.5	733.0	603.5	599.5	.0	421.7	.00	35.12	61.79	49.08	1277.0	915.5	-1125.4	-691.8	1125.4	1113.6
70	28.954	28.076	596.7	685.3	596.7	579.7	.0	365.5	.00	32.22	64.70	55.97	1397.3	1037.1	-1263.4	-859.6	1263.4	1225.1
85	31.295	29.993	580.4	658.5	580.4	556.5	.0	351.8	.00	32.31	66.97	59.82	1483.8	1107.1	-1365.5	-956.9	1365.5	1308.7
90	31.883	30.630	575.7	623.3	575.7	509.8	.0	358.3	.00	35.14	67.52	62.48	1505.6	1103.4	-1391.2	-978.2	1391.2	1336.5
95	32.499	31.271	572.1	572.6	572.1	446.6	.0	358.0	.00	38.77	68.03	66.07	1529.1	1101.5	-1418.1	-1006.5	1418.1	1364.5

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-.91	5.52	15.44	38.62	48.82	.0050	.4114	.0704	.0150	.0139	1.7720	.9582	.9547	.9158	.5027	.8419	.8691	.6234
10	-.56	5.79	16.26	32.89	43.39	.0070	.4230	.0888	.0190	.0175	1.7064	.9395	.9347	.8953	.5147	.7918	.9129	.6263
15	-.20	5.57	15.51	28.09	37.85	.0091	.4338	.1087	.0231	.0212	1.6543	.9166	.9103	.8725	.5242	.7496	.9524	.6311
30	.89	4.85	9.51	19.36	24.01	.0172	.3979	.0621	.0129	.0093	1.6054	.9362	.9319	.9172	.5460	.6939	1.0604	.7134
50	2.24	4.83	6.74	12.71	14.62	.0365	.3833	.0866	.0173	.0100	1.5498	.8914	.8845	.8755	.5571	.6363	1.1842	.7947
70	3.22	5.04	5.19	8.74	8.88	.0550	.3451	.0838	.0159	.0054	1.5079	.8742	.8667	.8644	.5500	.5939	1.2903	.8987
85	3.61	4.86	4.95	7.15	7.26	.0709	.3385	.1153	.0211	.0083	1.4826	.8159	.8055	.8058	.5352	.5680	1.3624	.9549
90	3.71	4.78	6.49	5.04	6.75	.0760	.3539	.1650	.0284	.0154	1.4479	.7392	.7254	.7372	.5300	.5345	1.3844	.9461
95	3.81	4.73	9.14	1.96	6.38	.0840	.3667	.2092	.0322	.0194	1.4041	.6655	.6493	.6814	.5265	.4882	1.4049	.9391

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
1.1556	1.5618	87.29	88.06

ROTOR BLADE ELEMENT AND OVERALL PERFORMANCE AND DESIGN DATA

ROTOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 23:24:26 — JULY 12,1971

NASA ENGLISH (SPECIAL) — RUN # 31,SPEED CODE 90,POINT # 2,PAGE 36.01

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	17.467	19.769	533.4	944.3	533.4	653.6	.0	681.5	.00	46.20	54.98	15.42	929.7	678.1	-761.4	-180.2	761.4	861.8
10	18.467	20.408	544.7	894.4	544.7	632.0	.0	632.9	.00	45.04	55.91	22.11	972.0	682.7	-805.0	-256.7	805.0	889.6
15	19.467	21.047	554.9	849.9	554.9	606.8	.0	594.9	.00	44.42	56.82	27.93	1013.9	688.2	-848.8	-322.6	848.6	917.5
30	22.314	22.964	577.4	782.8	577.4	592.2	.0	511.9	.00	40.84	59.29	39.55	1131.2	768.1	-972.7	-489.2	972.7	1001.0
50	25.791	25.520	590.6	732.4	590.6	569.0	.0	461.2	.00	39.03	62.28	48.86	1270.0	864.8	-1124.3	-651.3	1124.3	1112.5
70	28.954	28.076	585.2	688.9	585.2	550.4	.0	414.2	.00	36.96	65.11	55.75	1391.3	979.4	-1262.2	-809.7	1262.2	1223.9
85	31.295	29.993	570.8	674.6	570.8	531.3	.0	415.7	.00	38.04	67.29	59.21	1478.8	1038.1	-1364.2	-891.8	1364.2	1307.5
90	31.883	30.630	566.4	648.8	566.4	490.1	.0	424.7	.00	40.94	67.82	61.71	1500.9	1034.4	-1389.8	-910.6	1389.8	1335.2
95	32.499	31.271	562.7	618.6	562.7	448.5	.0	425.9	.00	43.54	68.34	64.42	1524.4	1039.3	-1416.7	-937.3	1416.7	1363.2

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-.36	6.07	15.25	39.57	48.82	.0058	.4430	.0355	.0076	.0063	1.8079	.9796	.9778	.9594	.4915	.8270	.8615	.5939
10	-.02	6.33	15.89	33.80	43.39	.0078	.4558	.0565	.0121	.0104	1.7505	.9630	.9599	.9368	.5032	.7809	.9053	.5960
15	.34	6.11	15.25	28.89	37.85	.0100	.4682	.0808	.0172	.0151	1.7009	.9405	.9358	.9104	.5125	.7396	.9445	.5989
30	1.41	5.39	9.69	19.74	24.02	.0181	.4447	.0625	.0130	.0092	1.6502	.9397	.9351	.9236	.5332	.6790	1.0510	.6663
50	2.70	5.31	6.49	13.43	14.60	.0372	.4293	.0863	.0173	.0098	1.6173	.9008	.8938	.8863	.5444	.6316	1.1740	.7458
70	3.61	5.44	4.99	9.36	8.91	.0553	.3955	.0936	.0179	.0073	1.5866	.8749	.8665	.8648	.5390	.5920	1.2811	.8416
85	3.93	5.19	4.35	8.08	7.26	.0711	.3984	.1375	.0257	.0126	1.5786	.8111	.7984	.7978	.5262	.5758	1.3546	.8860
90	4.01	5.10	5.74	6.11	6.77	.0761	.4139	.1829	.0322	.0190	1.5532	.7523	.7363	.7427	.5214	.5506	1.3770	.8778
95	4.12	5.04	7.50	3.91	6.38	.0840	.4222	.2153	.0353	.0217	1.5262	.7069	.6888	.7049	.5176	.5225	1.3982	.8778

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
1.1706	1.6298	87.73	88.56

ROTOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 16:55:22 — JULY 13,1971

NASA ENGLISH (SPECIAL) — RUN # 31,SPEED CODE 90,POINT # 4,PAGE 36.01

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	17.967	19.769	524.0	940.8	524.0	639.0	.0	690.4	.00	47.21	55.47	15.02	924.5	681.8	-761.6	-171.5	761.6	861.9
10	18.467	20.408	535.9	897.2	535.9	627.1	.0	641.7	.00	45.66	56.38	21.60	966.9	675.0	-805.2	-248.1	805.2	889.8
15	19.467	21.047	545.5	851.6	545.5	599.7	.0	604.6	.00	45.22	57.27	27.52	1009.0	677.6	-848.8	-313.0	848.8	917.7
30	22.314	22.964	566.7	774.6	566.7	568.5	.0	526.2	.00	42.79	59.77	39.88	1126.0	740.9	-972.9	-475.1	972.9	1001.3
50	25.791	25.520	578.5	731.8	578.5	549.0	.0	483.9	.00	41.39	62.77	48.87	1269.6	834.8	-1124.5	-628.8	1124.5	1112.7
70	28.954	28.076	573.7	691.3	573.7	531.5	.0	442.0	.00	39.74	65.55	55.76	1386.8	945.9	-1262.4	-782.1	1262.4	1224.1
85	31.295	29.993	560.4	683.2	560.4	517.8	.0	445.7	.00	40.72	67.67	59.01	1475.1	1005.7	-1364.5	-862.1	1364.5	1307.7
90	31.883	30.630	556.1	662.6	556.1	480.9	.0	455.4	.00	43.47	68.19	61.35	1497.3	1003.2	-1390.1	-880.1	1390.1	1335.5
95	32.499	31.271	552.4	639.8	552.4	439.5	.0	457.9	.00	46.19	68.70	64.11	1520.9	1006.8	-1417.0	-905.6	1417.0	1363.4

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	.12	6.55	14.86	40.44	48.82	.0066	.4598	.0166	.0036	.0021	1.8334	.9908	.9900	.9807	.4826	.8226	.8562	.5787
10	.45	6.79	15.38	34.78	43.39	.0087	.4631	.0225	.0048	.0029	1.7868	.9857	.9844	.9741	.4944	.7827	.9005	.5888
15	.80	6.56	14.81	29.75	37.82	.0110	.4785	.0549	.0117	.0094	1.7346	.9606	.9579	.9396	.5035	.7403	.9399	.5890
30	1.89	5.87	10.01	19.88	24.01	.0191	.4698	.0693	.0143	.0103	1.6689	.9364	.9315	.9190	.5226	.6698	1.0448	.6407
50	3.17	5.80	6.51	13.90	14.61	.0382	.4560	.0953	.0191	.0119	1.6481	.8959	.8875	.8799	.5325	.6288	1.1660	.7173
70	4.03	5.88	5.01	9.79	8.92	.0563	.4244	.1070	.0204	.0097	1.6247	.8660	.8564	.8536	.5280	.5913	1.2737	.8090
85	4.30	5.58	4.14	8.67	7.26	.0720	.4261	.1472	.0276	.0144	1.6268	.8107	.7970	.7943	.5162	.5803	1.3487	.8592
90	4.38	5.47	5.38	6.84	6.77	.0771	.4408	.1893	.0337	.0202	1.6070	.7599	.7431	.7455	.5115	.5597	1.3718	.8474
95	4.48	5.40	7.18	4.60	6.38	.0850	.4500	.2220	.0368	.0229	1.5820	.7174	.6985	.7089	.5076	.5337	1.3935	.8464

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
1.1787	1.6644	87.61	88.49

ROTOR BLADE ELEMENT AND OVERALL PERFORMANCE AND DESIGN DATA

ROTOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 16:56:27 — JULY 13,1971

NASA ENGLISH (SPECIAL) — RUN # 31,SPEED CODE 90,POINT # 5,PAGE 36.01

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	17.467	19.769	495.8	932.9	495.8	610.4	.0	705.4	.00	49.13	56.91	14.32	908.3	630.1	-761.0	-155.8	761.0	861.3
10	18.467	20.408	506.7	896.8	506.7	607.4	.0	659.8	.00	47.37	57.79	20.69	950.8	649.8	-804.6	-229.3	804.6	889.1
15	19.467	21.047	515.8	851.6	515.8	576.0	.0	627.2	.00	47.44	58.69	26.70	992.7	646.2	-848.1	-289.7	848.1	917.0
30	22.314	22.964	533.0	755.8	533.0	512.0	.0	556.1	.00	47.36	61.26	40.95	1108.7	678.1	-972.2	-444.4	972.2	1000.5
50	25.791	25.520	542.2	727.7	542.2	506.2	.0	522.8	.00	45.92	64.24	49.30	1247.6	776.8	-1123.6	-589.1	1123.6	1111.8
70	28.954	28.076	537.9	697.4	537.9	490.4	.0	495.9	.00	45.32	66.89	55.97	1371.4	877.5	-1261.4	-727.3	1261.4	1223.2
85	31.295	29.993	525.7	700.3	525.7	478.5	.0	511.2	.00	46.89	68.91	58.97	1461.3	928.3	-1363.4	-795.5	1363.4	1306.7
90	31.883	30.630	521.7	684.3	521.7	444.1	.0	522.8	.00	49.67	69.41	61.32	1483.8	925.5	-1389.0	-811.7	1389.0	1334.5
95	32.499	31.271	518.1	666.6	518.1	409.7	.0	525.8	.00	52.08	69.90	63.90	1507.7	931.7	-1415.9	-836.6	1415.9	1362.4

%SPAN	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	1.57	8.00	14.15	42.59	48.81	.0094	.4889	-.0201	-.0093	-.0063	1.8789	1.0110	1.0119	1.0187	.4558	.8132	.8401	.5493
10	1.88	8.22	14.48	37.10	43.38	.0118	.4852	-.0235	-.0051	-.0077	1.8445	1.0140	1.0153	1.0224	.4668	.7804	.8844	.5655
15	2.25	7.99	13.96	31.99	37.78	.0144	.5073	.0236	.0051	.0019	1.7918	.9841	.9827	.9739	.4746	.7380	.9227	.5600
30	3.37	7.36	11.11	20.30	24.03	.0227	.5256	.0890	.0181	.0134	1.7016	.9243	.9182	.9038	.4895	.6494	1.0241	.5826
50	4.61	7.27	6.96	14.93	14.63	.0415	.5046	.1062	.0211	.0129	1.7073	.8935	.8850	.8746	.4973	.6211	1.1436	.6630
70	5.37	7.24	5.22	10.93	8.93	.0593	.4810	.1303	.0247	.0136	1.7029	.8551	.8436	.8364	.4935	.5913	1.2531	.7438
85	5.55	6.84	4.10	9.95	7.26	.0747	.4896	.1770	.0333	.0195	1.7239	.8002	.7844	.7748	.4830	.5887	1.3303	.7804
90	5.60	6.70	5.35	8.10	6.77	.0797	.5047	.2154	.0385	.0244	1.7118	.7598	.7410	.7342	.4784	.5738	1.3544	.7738
95	5.68	6.60	6.98	6.00	6.38	.0878	.5118	.2424	.0405	.0260	1.6957	.7290	.7081	.7062	.4747	.5549	1.3769	.7756

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
1.1948	1.7316	87.12	88.09

ROTOR BLADE ELEMENT AND OVERALL PERFORMANCE AND DESIGN DATA

ROTOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 16:57:37 — JULY 13,1971

NASA ENGLISH (SPECIAL) — RUN # 31, SPEED CODE 90, POINT # 6, PAGE 36.01

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	17.467	19.769	469.8	932.2	469.8	593.8	.0	718.6	.00	50.43	58.27	13.40	893.5	610.5	-760.0	-141.5	760.0	860.1
10	18.467	20.408	480.0	896.2	480.0	593.1	.0	671.9	.00	48.56	59.14	20.01	935.9	631.8	-803.5	-216.0	803.5	887.9
15	19.467	21.047	488.4	852.9	488.4	563.3	.0	640.4	.00	48.68	60.03	26.07	977.7	628.7	-847.0	-275.3	847.0	915.7
30	22.314	22.964	502.9	752.5	502.9	486.3	.0	574.3	.00	49.74	62.60	41.12	1093.4	645.9	-970.8	-424.9	970.8	999.1
50	25.791	25.520	508.1	733.4	508.1	483.7	.0	551.3	.00	48.73	65.64	49.12	1231.8	739.4	-1122.1	-559.1	1122.1	1110.3
70	28.954	28.076	500.3	716.8	500.3	457.4	.0	551.8	.00	50.35	68.33	55.64	1355.5	811.3	-1259.7	-669.7	1259.7	1221.5
85	31.295	29.993	487.5	713.3	487.5	434.1	.0	566.1	.00	52.52	70.30	59.57	1446.3	857.0	-1361.6	-738.9	1361.6	1305.0
90	31.883	30.630	483.9	702.4	483.9	405.9	.0	573.1	.00	54.71	70.77	61.88	1469.2	861.4	-1387.2	-759.5	1387.2	1332.7
95	32.499	31.271	480.9	687.5	400.9	379.4	.0	573.3	.00	56.52	71.22	64.26	1493.5	874.0	-1414.0	-787.2	1414.0	1360.6

%SPAN	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	2.94	9.37	13.23	49.87	48.81	.0125	.5059	-.0368	-.0079	-.0106	1.9071	1.0190	1.0208	1.0398	.4314	.8113	.8269	.5313
10	3.26	9.56	13.80	39.13	43.38	.0152	.4994	-.0415	-.0090	-.0124	1.8733	1.0237	1.0259	1.0404	.4418	.7787	.8719	.5489
15	3.64	9.28	13.27	33.96	37.71	.0182	.5211	.0071	.0015	-.0025	1.8231	.9954	.9950	.9909	.4488	.7381	.9111	.5440
30	4.80	8.73	11.26	21.49	24.01	.0269	.5528	.0998	.0203	.0147	1.7227	.9193	.9127	.8951	.4609	.6447	1.0131	.5533
50	6.07	8.68	6.78	16.51	14.62	.0451	.5356	.1282	.0256	.0165	1.7371	.8796	.8697	.8530	.4645	.6236	1.1315	.6286
70	6.83	8.66	4.87	12.69	8.90	.0629	.5376	.1864	.0357	.0237	1.7460	.8127	.7976	.7796	.4572	.6030	1.2393	.6825
85	6.95	8.21	4.70	10.73	7.26	.0782	.5471	.2321	.0429	.0287	1.7619	.7602	.7404	.7211	.4460	.5946	1.3149	.7143
90	6.96	8.05	5.91	8.89	6.77	.0832	.5559	.2598	.0455	.0311	1.7549	.7327	.7108	.6939	.4421	.5829	1.3381	.7148
95	7.00	7.92	7.34	6.95	6.38	.0913	.5577	.2783	.0458	.0310	1.7451	.7119	.6886	.6755	.4391	.5685	1.3601	.7226

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
1.2071	1.7664	85.17	86.30

ROTOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 23:09:10 — JULY 12,1971

NASA ENGLISH (SPECIAL) — RUN # 31,SPEED CODE 10,POINT # 1,PAGE 36.01

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	17.467	19.769	604.8	1010.4	604.8	710.2	.0	718.7	.00	45.34	54.41	18.53	1039.5	749.2	-845.4	-238.1	845.4	956.8
10	18.467	20.408	618.7	969.0	618.7	698.8	.0	671.3	.00	43.85	55.30	24.35	1087.0	767.4	-893.7	-316.4	893.7	987.7
15	19.467	21.047	631.7	937.1	631.7	686.6	.0	637.6	.00	42.87	56.16	28.98	1134.3	786.1	-942.1	-381.0	942.1	1018.6
30	22.314	22.964	661.4	868.0	661.4	668.0	.0	554.3	.00	39.68	58.51	39.81	1266.4	870.0	-1079.9	-557.1	1079.9	1111.9
60	25.791	25.520	676.2	809.6	676.2	648.5	.0	484.7	.00	36.77	61.55	49.12	1419.6	992.4	-1248.2	-750.4	1248.2	1235.1
70	28.954	28.076	662.0	716.0	662.0	588.0	.0	408.6	.00	34.79	64.70	58.23	1549.9	1117.6	-1401.3	-950.1	1401.3	1358.8
85	31.295	29.993	639.2	689.6	639.2	562.9	.0	398.7	.00	35.36	67.12	61.89	1644.0	1193.9	-1514.6	-1052.9	1514.6	1451.6
90	31.883	30.630	633.4	664.8	633.4	524.3	.0	408.6	.00	37.94	67.68	63.97	1668.0	1195.0	-1543.0	-1073.8	1543.0	1482.9
95	32.499	31.271	630.2	585.5	630.2	416.3	.0	411.0	.00	44.72	68.17	69.32	1694.4	1179.0	-1572.9	-1102.4	1572.9	1513.4

%SPAN	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-.94	5.99	18.36	35.88	48.82	.0109	.4419	.0907	.0191	.0168	1.9369	.9469	.9418	.9065	.5612	.8801	.9693	.6526
10	-.65	5.70	18.13	30.96	43.40	.0139	.4440	.0895	.0189	.0159	1.8885	.9413	.9361	.9068	.5762	.8420	1.0198	.6669
15	-.34	5.91	16.28	27.18	37.84	.0187	.4478	.0946	.0200	.0160	1.8536	.9314	.9259	.8998	.5889	.8123	1.0669	.6814
30	.68	4.60	9.95	18.70	24.02	.0410	.4327	.0857	.0178	.0091	1.7871	.9195	.9126	.9013	.6172	.7493	1.1925	.7510
50	2.09	4.65	6.84	12.93	14.67	.0775	.4045	.0969	.0194	.0036	1.7277	.8893	.8802	.8772	.6283	.6956	1.3332	.8526
70	3.31	5.07	7.41	6.47	8.83	.1087	.3670	.1172	.0209	.0012	1.6157	.8360	.8243	.8362	.6131	.6127	1.4478	.9563
85	3.78	5.00	7.03	5.23	7.26	.1325	.3603	.1564	.0269	.0041	1.5830	.7701	.7599	.7719	.5920	.5865	1.5228	1.0159
90	3.89	4.94	7.96	3.70	6.71	.1397	.3729	.2015	.0329	.0099	1.5537	.7085	.6897	.7168	.5857	.5619	1.5465	1.0100
95	3.97	4.87	12.39	-1.15	6.37	.1504	.3944	.2628	.0352	.0150	1.4795	.6147	.5929	.6509	.5831	.4904	1.5681	.9874

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
1.1996	1.7192	85.46	86.54

ROTOR BLADE ELEMENT AND OVERALL PERFORMANCE AND DESIGN DATA

ROTOR ANGLES AIRFOIL AERODYNAMIC SUMMARY PRINT 23:10:59 JULY 12,1971

NASA ENGLISH (SPECIAL) RUN # 31,SPEED CODE 10,POINT # 2,PAGE 36.01

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	17.467	19.769	596.7	1015.3	596.7	690.1	.0	744.7	.00	47.18	54.83	17.21	1036.0	722.6	-846.9	-213.8	846.9	958.5
10	18.467	20.408	610.4	970.4	610.4	676.5	.0	695.8	.00	45.80	55.72	23.46	1083.6	738.0	-895.4	-293.7	895.4	989.5
15	19.467	21.047	623.0	928.1	623.0	654.7	.0	657.8	.00	45.13	56.57	28.94	1130.9	749.5	-943.9	-362.7	943.9	1020.5
30	22.314	22.964	651.4	853.2	651.4	624.6	.0	581.1	.00	42.93	58.94	40.43	1262.9	820.7	-1081.9	-532.3	1081.9	1113.4
50	25.791	25.520	667.7	827.5	667.7	627.1	.0	539.9	.00	40.73	61.90	48.01	1417.6	938.3	-1250.5	-697.4	1250.5	1237.3
70	28.954	28.076	656.4	734.5	656.4	569.3	.0	464.0	.00	39.18	64.93	57.57	1549.8	1063.0	-1403.8	-897.2	1403.8	1361.3
85	31.295	29.993	636.0	715.0	636.0	533.4	.0	476.0	.00	41.76	67.26	61.40	1645.2	1119.4	-1517.3	-978.2	1517.3	1454.2
90	31.883	30.630	630.9	689.4	630.9	489.6	.0	485.0	.00	44.75	67.80	63.92	1669.6	1113.8	-1545.8	-1000.1	1545.8	1485.1
95	32.499	31.271	627.2	656.7	627.2	441.2	.0	486.2	.00	47.80	68.30	66.81	1695.9	1120.7	-1575.7	-1030.0	1575.7	1516.2

%SPAN	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-.52	5.91	17.04	37.62	48.82	.0119	.4716	.0709	.0150	.0125	2.0008	.9605	.9563	.9301	.5533	.8816	.9656	.6274
10	-.23	6.12	17.25	32.25	43.39	.0149	.4749	.0740	.0157	.0125	1.9472	.9536	.9491	.9264	.5680	.8402	1.0162	.6390
15	.08	5.83	16.24	27.63	37.83	.0198	.4830	.0905	.0191	.0149	1.8955	.9367	.9309	.9094	.5801	.8009	1.0622	.6468
30	1.08	5.02	10.56	18.51	24.02	.0423	.4760	.0984	.0202	.0114	1.8266	.9120	.9044	.8949	.6068	.7317	1.1853	.7039
50	2.38	4.96	5.70	13.89	14.65	.0788	.4537	.1094	.0223	.0060	1.8277	.8869	.8771	.8727	.6203	.7053	1.3270	.7997
70	3.50	5.28	6.76	7.36	8.84	.1100	.4141	.1254	.0228	.0025	1.7247	.8438	.8313	.8407	.6081	.6228	1.4445	.9013
85	3.91	5.14	6.59	5.86	7.26	.1339	.4259	.1904	.0332	.0100	1.7094	.7591	.7404	.7558	.5893	.6000	1.5212	.9350
90	3.99	5.06	7.93	3.88	6.75	.1411	.4388	.2323	.0380	.0149	1.6756	.7090	.6871	.7113	.5839	.5748	1.5447	.9286
95	4.08	5.00	9.88	1.49	6.38	.1519	.4458	.2635	.0394	.0169	1.6431	.6681	.6440	.6790	.5804	.5496	1.5670	.9295

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
1.2150	1.8000	85.00	86.16

ROTOR ANGLES AIRFOIL AERODYNAMIC SUMMARY PRINT 20:24:55 JULY 23,1971

NASA ENGLISH (SPECIAL) RUN # 35, SPEED CODE 10, POINT # 3, PAGE 36.01

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	17.467	19.769	592.6	1011.4	592.6	670.7	.0	757.0	.00	48.46	54.97	16.61	1032.7	700.1	-845.7	-200.1	845.7	957.2
10	18.467	20.408	606.6	965.1	606.6	654.5	.0	709.3	.00	47.30	55.84	23.08	1080.5	712.0	-894.1	-278.8	894.1	988.1
15	19.467	21.047	619.2	920.9	619.2	627.9	.0	673.6	.00	47.00	56.69	28.77	1127.8	717.6	-942.5	-345.5	942.5	1019.0
30	22.314	22.964	647.4	857.6	647.4	606.5	.0	606.3	.00	44.99	59.06	39.81	1259.6	789.7	-1080.4	-505.6	1080.4	1111.9
50	25.791	25.520	664.3	838.4	664.3	610.0	.0	575.1	.00	43.31	61.98	47.28	1414.5	899.	-1248.7	-660.5	1248.7	1235.6
70	28.954	28.076	655.5	758.8	655.5	561.8	.0	510.0	.00	42.23	64.93	56.47	1547.7	1018.8	-1401.9	-849.3	1401.9	1359.4
85	31.295	29.993	636.0	733.6	636.0	518.5	.0	518.9	-.00	45.02	67.23	60.95	1643.3	1067.8	-1515.2	-933.3	1515.2	1452.2
90	31.883	30.630	630.8	710.8	630.8	473.4	.0	529.8	.00	48.29	67.77	63.59	1667.6	1064.6	-1543.7	-953.3	1543.7	1483.0
95	32.499	31.271	627.1	687.9	627.1	437.3	.0	531.0	.00	50.54	68.27	66.02	1693.9	1076.1	-1573.5	-983.1	1573.5	1514.1

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-.38	6.05	16.44	38.36	48.82	.0121	.4944	.0553	.0117	.0092	2.0338	.9700	.9667	.9470	.5494	.8763	.9623	.6066
10	-.11	6.25	16.86	32.77	43.39	.0151	.5005	.0648	.0138	.0105	1.9780	.9604	.9563	.9378	.5641	.8335	1.0123	.6199
15	.20	5.98	16.09	27.93	37.85	.0198	.5133	.0900	.0190	.0148	1.9229	.9384	.9326	.9137	.5759	.7921	1.0572	.6173
30	1.16	5.15	9.96	19.25	24.09	.0420	.5047	.0974	.0202	.0114	1.8759	.9174	.9100	.9002	.6023	.7329	1.1778	.6749
50	2.40	5.01	4.91	14.71	14.60	.0782	.4878	.1127	.0233	.0071	1.8954	.8891	.8787	.8754	.6173	.7112	1.3179	.7627
70	3.44	5.26	5.69	8.46	8.89	.1090	.4518	.1309	.0245	.0041	1.8180	.8502	.8373	.8442	.6081	.6395	1.4373	.8586
85	3.87	5.12	6.08	6.28	7.26	.1329	.4629	.1935	.0343	.0111	1.7970	.7730	.7537	.7671	.5899	.6115	1.5175	.8900
90	3.96	5.04	7.61	4.18	6.76	.1401	.4774	.2360	.0390	.0160	1.7715	.7263	.7036	.7246	.5841	.5886	1.5419	.8815
95	4.06	4.97	9.09	2.26	6.38	.1508	.4814	.2612	.0403	.0172	1.7494	.6960	.6713	.6994	.5803	.5670	1.5648	.8869

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
1.2283	1.8662	85.40	86.61

ROTOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 20:28:23 — JULY 23,1971

NASA ENGLISH (SPECIAL) — RUN # 35,SPEED CODE 10,POINT # 4,PAGE 36.01

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	17.467	19.769	589.4	1008.9	589.4	659.2	.0	763.7	.00	49.20	55.17	16.49	1032.1	687.7	-847.3	-195.2	847.3	958.9
10	18.467	20.408	603.5	967.1	603.5	650.4	.0	715.7	.00	47.74	56.03	22.87	1080.1	706.5	-895.8	-274.2	895.8	989.9
15	19.467	21.047	616.0	919.9	616.0	618.0	.0	681.3	.00	47.78	56.88	28.75	1127.5	706.3	-944.3	-339.6	944.3	1020.9
30	22.314	22.964	642.8	849.3	642.8	587.4	.0	613.5	.00	46.24	59.28	40.42	1258.9	771.8	-1082.4	-500.4	1082.4	1113.9
50	25.791	25.520	658.7	829.7	658.7	585.9	.0	587.5	.00	45.08	62.23	47.98	1413.9	875.4	-1251.0	-650.4	1251.0	1237.9
70	28.954	28.076	651.5	765.8	651.5	552.8	.0	530.1	.00	43.80	65.10	56.34	1548.3	999.2	-1404.5	-831.8	1404.5	1361.9
85	31.295	29.993	632.9	745.0	632.9	513.6	.0	539.6	-.00	46.41	67.37	60.70	1644.7	1049.5	-1518.0	-915.2	1518.0	1454.9
90	31.883	30.630	627.5	723.0	627.5	466.3	.0	552.1	.00	49.85	67.91	63.46	1669.0	1043.9	-1546.5	-933.6	1546.5	1485.8
95	32.499	31.271	623.4	702.1	623.4	430.7	.0	554.5	.00	52.17	68.42	65.89	1695.2	1054.5	-1576.4	-962.4	1576.4	1516.9

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-.19	6.24	16.32	38.68	48.82	.0127	.5077	.0317	.0067	.0040	2.0680	.9832	.9814	.9696	.5463	.8727	.9615	.5949
10	.08	6.43	16.66	33.16	43.39	.0158	.5069	.0316	.0067	.0033	2.0212	.9813	.9792	.9693	.5611	.8345	1.0119	.6096
15	.39	6.17	16.05	28.13	37.83	.0205	.5249	.0687	.0145	.0101	1.9592	.9538	.9492	.9351	.5727	.7901	1.0567	.6066
30	1.39	5.38	10.60	18.86	24.06	.0430	.5202	.0898	.0184	.0095	1.9004	.9249	.9179	.9101	.5974	.7242	1.1757	.6581
50	2.62	5.25	5.62	14.25	14.62	.0794	.5070	.1144	.0234	.0071	1.9222	.8898	.8791	.8772	.6116	.7015	1.3140	.7401
70	3.59	5.43	5.58	8.76	8.91	.1102	.4690	.1271	.0239	.0032	1.8718	.8598	.8469	.8529	.6049	.6433	1.4398	.8373
85	4.00	5.26	5.83	6.67	7.26	.1344	.4790	.1866	.0333	.0098	1.8605	.7892	.7702	.7815	.5871	.6190	1.5168	.8720
90	4.10	5.18	7.49	4.45	6.76	.1416	.4951	.2309	.0384	.0150	1.8360	.7426	.7198	.7382	.5810	.5966	1.5418	.8619
95	4.21	5.12	8.96	2.54	6.38	.1524	.4997	.2566	.0398	.0164	1.8159	.7133	.6884	.7130	.5768	.5766	1.5653	.8660

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
1.2348	1.9079	86.25	87.44

ROTOR BLADE ELEMENT AND OVERALL PERFORMANCE AND DESIGN DATA

ROTOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 19:17:44 — JULY 14,1971

NASA ENGLISH (SPECIAL) — RUN # 31,SPEED CODE 10,POINT # 3,PAGE 36.01

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	17.467	19.769	589.1	1005.3	589.1	652.8	.0	764.5	.00	49.50	55.14	16.95	1030.7	680.9	-845.8	-192.8	845.8	957.3
10	18.467	20.408	603.2	966.6	603.2	648.2	.0	717.0	.00	47.88	55.99	22.71	1078.7	703.3	-894.2	-271.2	894.2	988.2
15	19.467	21.047	615.8	920.2	615.8	617.0	.0	682.8	.00	47.89	56.84	28.57	1126.0	703.8	-942.6	-336.4	942.6	1019.1
30	22.314	22.964	641.9	846.2	641.9	576.7	.0	619.2	.00	47.03	59.27	40.50	1256.8	758.7	-1080.5	-492.8	1080.5	1112.0
50	25.791	25.520	657.2	827.3	657.2	576.1	.0	593.7	.00	45.86	62.24	48.09	1411.3	862.7	-1248.9	-642.1	1248.9	1235.7
70	28.954	28.076	650.3	769.0	650.3	549.6	.0	537.9	.00	44.38	65.10	56.17	1545.6	988.9	-1402.0	-821.6	1402.0	1359.5
85	31.295	29.993	631.9	751.0	631.7	510.2	.0	551.1	.00	47.21	67.36	60.48	1641.9	1035.6	-1515.4	-901.2	1515.4	1452.3
90	31.883	30.630	626.5	732.8	626.5	467.1	.0	564.3	.00	50.41	67.91	63.06	1666.1	1031.1	-1543.9	-918.9	1543.9	1483.2
95	32.499	31.271	622.3	711.4	622.3	429.2	.0	567.3	.00	52.90	68.92	65.61	1692.3	1039.9	-1573.7	-947.0	1573.7	1514.2

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-.22	6.21	16.28	38.69	48.82	.0125	.5139	.0160	.0039	.0007	2.0000	.9918	.9909	.9840	.5460	.8692	.9600	.5887
10	.05	6.40	16.50	33.28	43.39	.0155	.5095	.0109	.0023	-.0010	2.0395	.9938	.9931	.9803	.5609	.8340	1.0106	.6068
15	.36	6.13	15.87	28.28	37.82	.0201	.5268	.0486	.0103	.0060	1.9787	.9674	.9641	.9537	.5725	.7705	1.0555	.6045
30	1.38	5.37	10.67	18.77	24.05	.0425	.5311	.0875	.0179	.0091	1.9122	.9274	.9206	.9136	.5964	.7207	1.1737	.6462
50	2.63	5.27	5.74	14.15	14.62	.0786	.5164	.1128	.0230	.0070	1.9359	.8925	.8819	.8805	.6100	.6986	1.3110	.7285
70	3.59	5.44	5.41	8.94	8.91	.1093	.4764	.1231	.0233	.0027	1.8945	.8661	.8535	.8590	.6033	.6454	1.4317	.8298
85	3.99	5.25	5.62	6.88	7.26	.1332	.4890	.1862	.0339	.0099	1.8874	.7936	.7795	.7850	.5862	.6231	1.5138	.8592
90	4.10	5.18	7.08	4.85	6.76	.1404	.5046	.2289	.0386	.0151	1.8676	.7499	.7272	.7437	.5800	.6040	1.5388	.8497
95	4.21	5.12	8.69	2.81	6.38	.1511	.5102	.2560	.0401	.0167	1.8467	.7198	.6997	.7175	.5757	.5834	1.5623	.8527

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
1.2372	1.9269	86.79	87.96

ROTOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 23:13:39 — JULY 12,1971

NASA ENGLISH (SPECIAL) — RUN # 31,SPEED CODE 10,POINT # 5,PAGE 36.01

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	17.467	19.769	565.4	1019.4	565.4	692.5	.0	785.0	.00	50.70	56.29	15.18	1018.8	665.8	-847.5	-174.1	847.5	959.2
10	18.467	20.408	578.9	979.3	578.9	643.0	.0	738.6	.00	48.96	57.13	21.37	1066.8	691.0	-896.0	-251.6	896.0	990.2
15	19.467	21.047	590.1	934.9	590.1	610.5	.0	708.0	.00	49.24	58.00	27.17	1113.7	687.5	-944.5	-313.2	944.5	1021.2
30	22.314	22.964	611.6	837.0	611.6	528.0	.0	649.4	.00	50.89	60.53	41.34	1243.5	703.9	-1082.6	-464.7	1082.6	1114.2
50	25.791	25.520	629.7	816.7	629.7	525.7	.0	625.0	.00	49.93	63.47	49.36	1398.6	807.9	-1251.3	-613.2	1251.3	1238.2
70	28.954	28.076	621.2	788.7	621.2	520.7	.0	592.4	.00	48.69	66.13	55.88	1536.1	929.6	-1404.8	-769.8	1404.8	1362.2
85	31.295	29.993	606.4	795.1	606.4	504.2	.0	619.7	.00	50.69	68.23	59.04	1635.0	980.2	-1518.4	-840.5	1518.4	1455.2
90	31.883	30.630	601.2	783.8	601.2	468.1	.0	628.2	.00	53.33	68.76	61.39	1659.7	977.6	-1546.9	-857.9	1546.9	1486.1
95	32.499	31.271	596.6	762.5	596.6	426.4	.0	632.0	.00	56.01	69.27	64.27	1685.9	982.8	-1576.8	-885.2	1576.8	1517.2

%SPAN	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	.93	7.36	14.99	41.13	48.81	.0154	.5277	.0034	.0007	-.0026	2.1313	.9987	.9986	.9953	.5229	.8756	.9472	.5747
10	1.19	7.54	15.16	35.76	43.38	.0186	.5204	-.0063	-.0014	-.0054	2.0979	1.0040	1.0044	1.0040	.5368	.8437	.9971	.5953
15	1.53	7.32	14.47	30.83	37.81	.0230	.5419	.0380	.0082	.0032	2.0395	.9761	.9735	.9637	.5465	.8015	1.0402	.5899
30	2.60	6.63	11.60	19.19	24.14	.0456	.5768	.1219	.0247	.0153	1.9361	.9039	.8944	.8854	.5656	.7086	1.1539	.5959
50	3.81	6.50	7.03	14.11	14.64	.0817	.5580	.1421	.0283	.0121	1.9695	.8728	.8601	.8561	.5774	.6849	1.2890	.6775
70	4.59	6.48	5.14	10.25	8.92	.1121	.5237	.1519	.0289	.0077	1.9829	.8492	.8339	.8351	.5749	.6564	1.4126	.7736
85	4.85	6.15	4.17	9.19	7.26	.1361	.5347	.2024	.0380	.0130	2.0219	.7970	.7757	.7776	.5620	.6543	1.4989	.8066
90	4.93	6.09	5.42	7.37	6.78	.1433	.5489	.2395	.0427	.0176	2.0132	.7628	.7382	.7435	.5559	.6409	1.5258	.7995
95	5.05	5.97	7.35	5.00	6.38	.1542	.5566	.2677	.0441	.0191	1.9928	.7342	.7072	.7177	.5508	.6202	1.5510	.7993

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
1.2556	1.9981	85.43	86.79

ROTOR BLADE ELEMENT AND OVERALL PERFORMANCE AND DESIGN DATA

ROTOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 20:29:27 — JULY 23,1971

NASA ENGLISH (SPECIAL) — RUN # 35,SPEED CODE 10,POINT # 6,PAGE 36.01

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	17.467	19.769	555.3	1009.3	555.3	631.6	.0	787.3	.00	51.26	56.69	14.99	1011.2	654.0	-845.1	-169.2	845.1	956.5
10	18.467	20.408	568.4	973.8	568.4	633.0	.0	740.0	.00	49.46	57.53	21.36	1059.0	680.2	-893.5	-247.4	893.5	987.4
15	19.467	21.047	579.4	929.5	579.4	600.3	.0	709.6	.00	49.78	58.40	27.23	1105.8	676.5	-941.9	-308.8	941.9	1018.3
30	22.314	22.964	599.9	834.5	599.9	519.2	.0	653.4	.00	51.53	60.93	41.40	1235.2	692.3	-1079.6	-457.7	1079.6	1111.1
50	25.791	25.520	611.2	820.3	611.2	522.1	.0	632.7	.00	50.47	63.90	49.05	1389.6	797.0	-1247.9	-602.0	1247.9	1234.8
70	28.954	28.076	606.1	792.0	606.1	509.6	.0	606.3	.00	49.95	66.59	55.84	1526.5	908.8	-1400.9	-752.1	1400.9	1358.4
85	31.295	29.993	590.5	797.5	590.5	490.2	.0	629.0	.00	52.07	68.69	59.19	1625.3	957.2	-1514.2	-822.1	1514.2	1451.2
90	31.883	30.630	585.4	782.9	585.4	444.7	.0	643.8	.00	55.38	69.22	62.06	1650.0	949.2	-1542.6	-838.2	1542.6	1482.0
95	32.499	31.271	581.2	762.1	581.2	401.0	.0	647.9	.00	58.26	69.71	65.12	1676.4	953.7	-1572.4	-865.1	1572.4	1513.0

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	1.33	7.76	14.82	41.70	48.81	.0162	.5364	-.0068	-.0014	-.0049	2.1398	1.0039	1.0044	1.0042	.5133	.8705	.9401	.5640
10	1.61	7.95	15.14	36.18	43.38	.0195	.5279	-.0170	-.0037	-.0079	2.1059	1.0100	1.0111	1.0136	.5269	.8383	.9905	.5856
15	1.95	7.70	14.49	31.17	37.78	.0236	.5490	.0289	.0062	.0011	2.0477	.9820	.9801	.9721	.5364	.7964	1.0340	.5796
30	3.05	7.04	11.55	19.53	24.03	.0457	.5842	.1179	.0238	.0144	1.9475	.9091	.9001	.8897	.5546	.7060	1.1482	.5856
50	4.27	6.93	6.70	14.85	14.63	.0813	.5647	.1381	.0276	.0114	1.9889	.8779	.8654	.8602	.5644	.6876	1.2821	.6680
70	5.06	6.93	5.09	10.75	8.92	.1113	.5374	.1609	.0307	.0096	1.9995	.8440	.8280	.8270	.5598	.6579	1.4043	.7548
85	5.32	6.60	4.33	9.50	7.26	.1351	.5492	.2127	.0397	.0150	2.0369	.7911	.7690	.7683	.5460	.6549	1.4897	.7860
90	5.40	6.49	6.09	7.16	6.77	.1424	.5669	.2540	.0443	.0198	2.0230	.7535	.7279	.7311	.5400	.6385	1.5162	.7741
95	5.50	6.41	8.20	4.59	6.38	.1531	.5749	.2820	.0450	.0209	2.0033	.7256	.6977	.7061	.5355	.6181	1.5408	.7735

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
1.2583	2.0123	85.47	86.84

ROTOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 20:53:29 — JULY 7,1971

NASA ENGLISH (SPECIAL) — RUN # 31,SPEED CODE 10,POINT # 16,PAGE 36.01

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	17.467	19.769	549.4	1006.4	549.4	630.6	.0	784.3	.00	51.20	56.98	15.29	1008.3	653.9	-845.4	-172.5	845.4	956.8
10	18.467	20.408	562.5	972.9	562.5	634.8	.0	737.3	.00	49.27	57.82	21.53	1056.1	683.0	-893.8	-250.5	893.8	987.8
15	19.467	21.047	573.2	931.4	573.2	606.5	.0	706.9	.00	49.39	58.68	27.24	1102.9	683.5	-942.2	-311.8	942.2	1018.7
30	22.314	22.964	592.6	826.0	592.6	508.2	.0	651.2	.00	52.03	61.24	42.17	1232.0	685.8	-1080.0	-460.3	1080.0	1111.5
50	25.791	25.520	603.0	815.0	603.0	513.9	.0	632.5	.00	50.91	64.21	49.53	1386.4	792.1	-1248.3	-602.7	1248.3	1235.2
70	28.954	28.076	597.8	787.5	597.8	502.1	.0	606.7	.00	50.39	66.89	56.24	1521.7	904.7	-1401.4	-752.2	1401.4	1358.9
85	31.295	29.993	582.6	793.2	582.6	480.9	.0	630.7	-.00	52.67	68.96	59.64	1622.9	951.5	-1514.7	-821.0	1514.7	1451.7
90	31.883	30.630	577.6	783.2	577.6	444.5	.0	644.4	.00	55.42	69.48	62.06	1647.8	948.9	-1543.2	-838.1	1543.2	1482.5
95	32.499	31.271	573.5	762.8	573.5	401.2	.0	648.6	.00	58.27	69.97	65.11	1674.3	953.7	-1573.0	-865.0	1573.0	1513.6

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	1.62	8.05	15.12	41.68	48.81	.0171	.5344	-.0179	-.0038	-.0075	2.1440	1.0096	1.0107	1.0140	.5077	.8679	.9372	.5639
10	1.90	8.23	15.31	36.29	43.38	.0204	.5229	-.0318	-.0068	-.0113	2.1140	1.0182	1.0202	1.0269	.5211	.8378	.9877	.5881
15	2.24	7.98	14.49	31.45	37.76	.0244	.5409	.0097	.0021	-.0033	2.0611	.9941	.9934	.9892	.5303	.7985	1.0311	.5659
30	3.36	7.34	12.30	19.07	24.01	.0464	.5879	.1183	.0236	.0142	1.9422	.9079	.8987	.8895	.5474	.6984	1.1448	.5798
50	4.58	7.24	7.18	14.68	14.63	.0822	.5671	.1400	.0277	.0115	1.9882	.8774	.8649	.8585	.5564	.6826	1.2782	.6634
70	5.36	7.23	5.49	10.65	8.92	.1122	.5393	.1616	.0305	.0094	2.0005	.8439	.8278	.8262	.5517	.6537	1.4005	.7509
85	5.59	6.87	4.77	5.32	7.26	.1360	.5524	.2151	.0396	.0151	2.0379	.7896	.7673	.7661	.5383	.6508	1.4861	.7807
90	5.66	6.75	6.09	7.41	6.77	.1432	.5667	.2515	.0438	.0192	2.0313	.7569	.7316	.7332	.5325	.6386	1.5127	.7737
95	5.75	6.67	8.18	4.86	6.38	.1540	.5745	.2793	.0446	.0204	2.0123	.7293	.7016	.7083	.5281	.6186	1.5374	.7734

TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %
1.2583	2.0146	85.65	87.00

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 22:58:56 — JULY 12,1971

NASA ENGLISH (SPECIAL) — RUN # 31, SPEED CODE 50, POINT # 1, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	610.8	610.7	491.4	610.0	362.7	-28.9	36.43	-2.71	14.77	41.89	508.2	819.5	-129.5	-547.2	492.2	618.3
10	21.008	21.961	584.3	588.9	479.8	587.5	333.3	-39.8	34.77	-3.88	19.87	44.11	510.5	818.3	-173.4	-569.5	506.7	529.7
15	21.589	22.432	559.1	568.3	467.1	566.4	307.1	-45.9	33.30	-4.64	24.55	46.02	514.3	815.8	-213.6	-586.9	520.7	541.0
30	23.314	23.902	505.6	520.6	441.7	518.0	246.0	-52.4	29.10	-5.79	35.58	50.52	543.5	814.9	-316.3	-628.9	562.3	576.5
50	25.601	25.893	466.8	475.8	425.1	472.3	192.8	-56.9	24.38	-6.88	44.94	55.27	601.1	829.3	-424.7	-681.4	617.5	624.5
70	27.818	27.902	439.7	435.9	413.5	431.9	149.6	-58.5	19.89	-7.71	51.56	59.44	665.5	849.5	-521.3	-731.4	670.9	673.0
85	29.408	29.382	425.9	401.0	400.8	397.3	143.8	-54.1	19.75	-7.76	54.67	62.99	693.3	860.1	-565.5	-762.8	709.3	708.7
90	29.914	29.856	403.4	384.7	376.2	381.1	145.5	-52.0	21.16	-7.76	56.85	63.73	688.1	861.0	-576.0	-772.1	721.5	720.1
95	30.382	30.293	380.8	341.9	351.6	337.9	146.2	-52.1	22.60	-8.78	59.06	66.65	684.0	852.7	-586.6	-782.8	732.8	730.6

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-5.73	-3.01	13.69	39.14	55.88	.0000	.1564	.0733	.0232	.0232	.9828	.0000	.0000	79.3693	.5960	.5976	.4557	.7348
10	-6.67	-3.73	11.55	38.66	53.85	.0000	.1525	.0755	.0193	.0193	.9871	.0000	.0000	3.2673	.5190	.5278	.4573	.7335
15	-7.28	-4.34	10.40	37.94	52.56	.0000	.1464	.0564	.0197	.0197	.9911	.0000	.0000	1.9661	.4965	.5091	.4613	.7309
30	-9.63	-6.63	9.43	34.89	50.67	.0000	.1346	.0224	.0063	.0063	.9971	.0000	.0000	1.0900	.4408	.4662	.4904	.7296
60	-12.60	-9.47	9.16	31.26	49.60	.0000	.1440	.0328	.0100	.0100	.9963	.0000	.0000	1.2755	.4147	.4257	.5426	.7421
70	-15.98	-12.74	9.75	27.60	49.87	.0000	.1655	.0558	.0183	.0183	.9943	.0000	.0000	-5.0336	.3921	.3900	.6000	.7601
85	-12.59	-12.12	12.21	27.51	52.11	.0000	.2211	.0991	.0393	.0343	.9906	.0000	.0000	.1689	.3765	.3578	.6185	.7675
90	-10.28	-10.86	13.65	28.92	53.63	.0000	.2209	.0483	.0170	.0170	.9959	.0000	.0000	.4733	.3567	.3427	.6130	.7672
95	-11.30	-9.66	14.89	31.38	56.06	.0000	.2901	.1263	.0450	.0450	.9903	.0000	.0000	.3674	.3371	.3039	.6087	.7577

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
5528.	95.93	1.0406	1.1212	81.88	82.20	28.93

Rotor Pressure Ratio = 1.1273

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 23:00:40 — JULY 12,1971

NASA ENGLISH (SPECIAL) RUN # 31,SPEED CODE 50,POINT # 2,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	508.5	561.5	458.3	561.4	369.2	-11.0	38.85	-1.12	15.11	43.35	474.7	772.0	-123.7	-529.9	492.9	518.9
10	21.008	21.961	559.2	538.2	443.2	537.0	341.0	-35.2	37.56	-3.77	20.57	46.48	473.7	780.0	-166.4	-565.6	507.3	530.3
15	21.589	22.432	536.6	519.9	432.8	518.0	317.1	-44.2	36.20	-4.89	25.23	48.52	479.2	782.2	-204.3	-586.0	521.4	541.7
30	23.314	23.902	488.5	478.2	411.8	475.6	262.7	-49.8	32.52	-5.98	36.07	52.81	510.0	787.1	-300.4	-627.0	563.0	577.2
50	25.601	25.893	449.2	438.3	394.2	434.7	215.3	-55.6	28.63	-7.30	45.60	57.49	563.9	808.0	-403.0	-680.9	618.3	625.3
70	27.818	27.902	426.0	406.3	387.1	401.6	177.7	-61.6	24.65	-8.72	51.90	61.36	627.8	837.9	-494.1	-735.4	671.8	673.8
85	29.408	29.382	416.3	378.8	376.9	375.2	176.8	-51.6	25.19	-7.82	54.76	63.76	653.1	848.7	-533.4	-761.1	710.2	709.6
90	29.914	29.856	401.4	364.4	358.4	361.1	180.7	-48.9	26.77	-7.71	56.52	64.87	649.6	850.4	-541.7	-769.9	722.4	721.0
95	30.382	30.293	388.4	331.8	343.1	327.8	181.9	-51.2	27.93	-8.89	58.13	67.28	649.8	848.7	-551.8	-782.7	733.7	731.6

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGRLE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-3.47	-.55	15.28	39.97	55.88	.0000	.2030	.0943	.0235	.0235	.9838	.0000	.0000	.0563	.5243	.5009	.4242	.6887
10	-3.87	-.93	11.66	41.33	53.85	.0000	.2064	.0737	.0188	.0188	.9884	.0000	.0000	.1077	.4954	.4799	.4235	.6955
15	-4.34	-1.40	10.15	41.09	52.55	.0000	.2048	.0571	.0199	.0149	.9917	.0000	.0000	.1734	.4756	.4634	.4290	.6973
30	-6.12	-3.12	9.24	38.50	50.67	.0000	.1992	.0268	.0075	.0075	.9967	.0000	.0000	.5410	.4324	.4260	.4585	.7012
50	-8.29	-5.16	8.75	35.92	49.59	.0000	.2083	.0205	.0062	.0062	.9979	.0000	.0000	.7932	.3981	.3902	.5072	.7194
70	-11.23	-7.99	8.72	33.37	49.86	.0000	.2323	.0331	.0109	.0109	.9969	.0000	.0000	.7458	.3784	.3617	.5641	.7461
85	-7.09	-6.67	12.15	32.97	52.10	.0000	.2820	.0720	.0249	.0249	.9935	.0000	.0000	.5676	.3677	.3362	.5809	.7539
90	-4.83	-5.20	13.76	34.48	53.68	.0000	.2955	.0503	.0177	.0177	.9958	.0000	.0000	.6932	.3544	.3230	.5765	.7537
95	-6.00	-4.35	14.78	36.83	56.05	.0000	.3624	.1221	.0435	.0435	.9909	.0000	.0000	.5599	.3434	.2934	.5766	.7506

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
5535.	91.16	1.0452	1.1381	83.38	83.71	27.15

Rotor Pressure Ratio = 1.1433

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 23:02:21 — JULY 12,1971

NASA ENGLISH (SPECIAL) — RUN # 31,SPEED CODE 50,POINT # 4,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	578.7	534.0	439.9	533.8	376.1	-14.0	40.53	-1.50	14.93	44.98	455.3	754.8	-117.3	-533.5	493.4	519.5
10	21.008	21.961	550.9	509.6	426.7	508.6	348.4	-31.0	39.23	-3.50	20.49	47.85	455.8	758.1	-159.5	-562.0	507.9	531.0
15	21.589	22.432	527.3	491.6	415.0	490.1	325.3	-38.2	38.08	-4.46	25.33	49.83	459.8	759.9	-196.6	-580.5	522.0	542.3
30	23.314	23.902	476.7	451.0	389.5	449.0	274.9	-42.3	35.21	-5.39	36.52	54.09	485.1	765.8	-288.8	-620.2	563.7	577.9
60	25.601	25.893	442.8	414.7	377.8	411.9	230.8	-47.5	31.41	-6.58	45.75	58.54	541.9	789.6	-388.2	-673.5	619.0	626.0
70	27.818	27.902	418.6	387.3	370.3	383.6	195.2	-54.0	27.79	-8.02	52.18	62.24	604.2	823.4	-477.4	-728.6	672.6	674.6
85	29.408	29.382	408.6	361.6	356.0	358.8	200.5	-45.4	29.39	-7.20	55.11	64.61	622.4	836.6	-510.5	-755.8	711.0	710.4
90	29.914	29.856	398.8	348.2	341.8	345.9	205.4	-40.1	31.02	-6.60	56.58	65.58	620.5	836.7	-517.8	-761.9	723.2	721.8
95	30.382	30.293	390.6	321.8	331.3	319.5	207.0	-38.7	32.00	-6.91	57.87	67.50	623.0	834.7	-527.6	-771.1	734.5	732.4

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-1.80	1.12	14.90	42.03	55.88	.0000	.2413	.1014	.0253	.0253	.9831	.0000	.0000	.3877	.5149	.4750	.4064	.6713
10	-2.17	.76	11.93	42.73	53.85	.0000	.2477	.0916	.0234	.0234	.9861	.0000	.0000	.4503	.4874	.4530	.4067	.6739
15	-2.41	.53	10.58	42.54	52.56	.0000	.2455	.0721	.0188	.0188	.9899	.0000	.0000	.5247	.4667	.4369	.4106	.6753
30	-3.41	-.40	9.83	40.60	50.67	.0000	.2391	.0303	.0085	.0085	.9965	.0000	.0000	.7954	.4217	.4005	.4352	.6801
50	-5.46	-2.33	9.46	37.99	49.59	.0000	.2551	.0376	.0114	.0114	.9962	.0000	.0000	.7719	.3918	.3680	.4860	.7008
70	-8.03	-4.79	9.42	35.81	49.86	.0000	.2717	.0262	.0086	.0086	.9976	.0000	.0000	.8758	.3711	.3438	.5409	.7309
85	-2.88	-2.45	12.77	36.60	52.10	.0000	.3259	.0600	.0208	.0208	.9948	.0000	.0000	.6972	.3608	.3199	.5517	.7400
90	-.68	-.97	14.89	37.62	53.71	.0000	.3458	.0605	.0214	.0214	.9950	.0000	.0000	.7260	.3519	.3075	.5492	.7389
95	-1.95	-.32	16.77	38.90	56.05	.0000	.4033	.1271	.0455	.0455	.9899	.0000	.0000	.6148	.3450	.2836	.5515	.7358

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
5541.	87.90	1.0484	1.1479	83.03	83.39	25.96

Rotor Pressure Ratio = 1.1676

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 23104103 — JULY 12,1971

NASA ENGLISH (SPECIAL) — RUN # 31,SPEED CODE 50,POINT # 5,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	562.5	496.8	414.3	496.8	380.5	-5.3	42.56	-.62	15.20	46.56	429.4	722.4	-112.6	-524.5	493.1	519.2
10	21.008	21.961	537.7	472.9	405.3	472.0	353.3	-26.4	41.07	-3.22	20.84	49.71	434.0	730.3	-154.3	-557.0	507.5	530.6
15	21.589	22.432	512.6	454.3	390.7	453.0	331.7	-33.8	40.32	-4.27	25.90	51.80	435.1	732.7	-189.8	-575.7	521.6	541.9
30	23.314	23.902	460.4	413.7	361.0	412.1	285.7	-36.3	38.35	-5.04	37.52	56.11	455.6	739.4	-277.6	-613.8	563.2	577.5
50	25.601	25.893	431.8	380.9	353.4	378.7	248.2	-41.3	35.07	-6.23	46.31	60.40	512.0	766.9	-370.3	-666.8	618.5	625.6
70	27.818	27.902	409.9	357.9	345.2	355.0	221.0	-45.9	32.62	-7.37	52.56	63.75	568.1	802.8	-451.1	-720.0	672.1	674.1
85	29.408	29.382	399.7	333.8	321.9	332.3	236.9	-31.9	36.36	-5.47	55.79	65.87	572.6	812.8	-473.6	-741.8	710.5	709.8
90	29.914	29.856	393.9	323.1	311.2	322.1	241.5	-24.7	37.82	-4.38	57.11	66.65	573.1	812.6	-481.2	-746.0	722.7	721.3
95	30.382	30.293	387.7	305.3	301.9	304.3	243.3	-23.8	38.86	-4.48	58.40	68.06	576.2	814.7	-490.7	-755.7	734.0	731.9

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	.19	3.11	15.78	43.18	55.88	.0000	.2835	.1110	.0277	.0277	.9825	.0000	.0000	.5461	.4997	.4404	.3829	.6404
10	-.29	2.65	12.21	44.29	53.85	.0000	.2976	.1117	.0285	.0285	.9838	.0000	.0000	.5683	.4752	.4190	.3864	.6471
15	-.10	2.84	10.78	44.59	52.56	.0000	.2974	.0899	.0235	.0235	.9880	.0000	.0000	.6293	.4531	.4024	.3873	.6490
30	-.21	2.79	10.18	43.39	50.67	.0000	.2958	.0433	.0121	.0121	.9953	.0000	.0000	.8102	.4070	.3661	.4075	.6544
50	-1.70	1.44	9.82	41.30	49.60	.0000	.3224	.0621	.0189	.0189	.9940	.0000	.0000	.7489	.3818	.3368	.4568	.6781
70	-3.08	.16	10.08	39.99	49.87	.0000	.3423	.0406	.0134	.0134	.9965	.0000	.0000	.8438	.3627	.3163	.5052	.7094
85	3.77	4.35	14.49	41.83	52.11	.0000	.4001	.0686	.0239	.0239	.9943	.0000	.0000	.7659	.3525	.2937	.5057	.7150
90	6.03	5.71	17.14	42.20	53.74	.0000	.4203	.0794	.0281	.0281	.9936	.0000	.0000	.7545	.3470	.2838	.5054	.7138
95	4.99	6.52	19.19	43.34	56.05	.0000	.4616	.1197	.0431	.0431	.9907	.0000	.0000	.6938	.3913	.2678	.5078	.7146

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
5537.	82.62	1.0525	1.1595	82.35	82.74	24.22

Rotor Pressure Ratio = 1.1540

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 23:05:35 — JULY 12,1971

NASA ENGLISH (SPECIAL) — RUN # 31,SPEED CODE 50,POINT # 6,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.909	21.489	553.1	460.1	390.6	459.8	391.5	-14.4	45.06	-1.79	14.63	49.27	403.8	704.7	-102.0	-534.0	493.5	519.6
10	21.008	21.961	529.6	438.9	383.3	438.3	365.4	-22.9	43.62	-3.00	20.40	51.65	409.3	706.4	-142.6	-553.9	508.0	531.0
15	21.589	22.432	506.2	421.1	369.3	420.3	346.1	-26.1	43.14	-3.56	25.47	53.53	409.8	707.2	-175.9	-568.5	522.0	542.4
30	23.314	23.902	457.2	379.8	340.1	378.8	305.5	-27.2	41.92	-4.11	37.17	57.95	427.4	714.0	-258.3	-605.1	563.7	577.9
50	25.601	25.893	420.7	346.8	321.5	345.6	271.2	-28.7	40.15	-4.75	47.21	62.17	473.8	740.5	-347.8	-654.8	619.0	626.1
70	27.818	27.902	407.7	328.4	315.5	326.8	258.2	-32.1	39.30	-5.62	52.71	65.18	520.9	778.7	-414.4	-706.8	672.6	674.7
85	29.408	29.382	405.5	312.0	294.7	311.0	278.5	-24.4	43.38	-4.98	55.73	67.06	523.4	797.9	-432.6	-734.8	711.1	710.4
90	29.914	29.856	404.2	307.0	288.1	306.3	283.4	-21.1	44.53	-3.94	56.77	67.60	525.8	803.7	-439.9	-743.0	723.3	721.9
95	30.382	30.293	399.8	296.3	280.2	295.6	285.2	-19.9	45.51	-3.84	58.06	68.55	529.6	808.4	-449.4	-752.3	734.6	732.5

%SPAN	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	2.68	5.60	14.61	46.85	55.87	.0000	.3467	.1238	.0308	.0308	.9811	.0000	.0000	.6369	.4906	.4064	.3596	.6224
10	2.28	5.21	12.43	46.62	53.85	.0000	.3550	.1215	.0310	.0310	.9829	.0000	.0000	.6551	.4681	.3876	.3639	.6238
15	2.74	5.68	11.49	46.70	52.57	.0000	.3574	.1042	.0272	.0272	.9865	.0000	.0000	.6927	.4477	.3717	.3639	.6242
30	3.47	6.46	11.11	46.03	50.67	.0000	.3715	.0756	.0212	.0212	.9919	.0000	.0000	.7748	.4041	.3348	.3797	.6294
50	3.45	6.58	11.29	44.90	49.61	.0000	.3930	.0553	.0169	.0169	.9950	.0000	.0000	.8354	.3718	.3053	.4197	.6519
70	3.65	6.88	11.83	44.91	49.87	.0001	.4302	.0667	.0220	.0220	.9943	.0000	.0000	.8167	.3597	.2886	.4604	.6843
85	10.68	11.29	15.48	47.86	52.10	.0054	.4919	.1159	.0404	.0385	.9902	.0000	.0000	.7222	.3565	.2729	.4603	.6980
90	12.60	12.35	17.63	48.47	53.79	.0071	.5084	.1291	.0458	.0433	.9892	.0000	.0000	.7030	.3550	.2683	.4619	.7022
95	11.68	13.15	19.83	49.36	56.06	.0068	.5346	.1522	.0548	.0524	.9876	.0000	.0000	.6747	.3507	.2586	.4648	.7054

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
5542.	77.05	1.0581	1.1695	78.83	79.32	22.43

Rotor Pressure Ratio = 1.1803

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 19:49:48 — JULY 12, 1971

NASA ENGLISH (SPECIAL) — RUN # 31, SPEED CODE 70, POINT # 1, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.909	21.489	851.7	853.2	681.8	851.7	510.3	-50.0	36.81	-3.36	14.80	42.37	705.3	1152.8	-180.1	-776.9	690.4	726.9
10	21.008	21.961	815.7	830.3	666.7	828.0	470.0	-61.7	35.17	-4.27	19.85	44.18	709.2	1154.7	-240.7	-804.7	710.7	742.9
15	21.589	22.432	782.3	805.8	649.7	802.9	435.5	-68.6	33.82	-4.89	24.38	45.87	714.3	1153.2	-294.8	-827.4	730.3	758.8
30	23.314	23.902	717.4	741.1	625.2	736.9	351.8	-78.9	29.36	-6.11	34.93	50.29	762.9	1153.7	-436.9	-887.4	788.7	808.6
50	25.601	25.893	672.0	687.8	608.7	682.5	284.7	-84.7	25.05	-7.08	43.66	54.60	842.0	1178.6	-581.4	-960.6	866.0	875.9
70	27.818	27.902	637.6	636.2	593.2	630.6	233.8	-84.3	21.50	-7.61	49.99	58.48	923.3	1206.1	-707.3	-1028.2	941.0	943.9
85	29.408	29.382	625.0	588.3	581.7	583.5	228.4	-75.7	21.95	-7.39	52.80	61.39	962.3	1218.5	-766.4	-1069.6	994.8	994.0
90	29.914	29.856	600.0	570.2	552.7	565.6	233.4	-71.8	22.91	-7.23	54.63	62.40	954.9	1220.8	-778.5	-1081.8	1011.9	1010.0
95	30.382	30.293	571.4	516.4	520.4	511.1	235.9	-73.6	24.40	-8.22	56.69	65.05	947.7	1211.7	-791.9	-1098.4	1027.8	1029.8

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-5.52	-2.60	13.04	40.17	55.87	.0000	.1507	.1206	.0300	.0300	.9613	.0000	.0000	28.2348	.7621	.7653	.6323	1.0342
10	-6.21	-3.27	11.17	39.44	53.85	.0000	.1458	.0796	.0203	.0203	.9762	.0000	.0000	2.3699	.7257	.7450	.6346	1.0361
15	-6.72	-3.78	10.12	38.71	52.51	.0000	.1362	.0483	.0126	.0126	.9865	.0000	.0000	1.4850	.6954	.7226	.6398	1.0341
30	-9.30	-6.30	9.10	35.47	50.67	.0000	.1341	.0323	.0090	.0090	.9922	.0000	.0000	1.2317	.6371	.6637	.6864	1.0331
50	-11.81	-8.68	8.96	32.13	49.59	.0000	.1444	.0361	.0110	.0110	.9922	.0000	.0000	1.3925	.5970	.6151	.7570	1.0540
70	-14.34	-11.10	9.83	29.12	49.87	.0000	.1674	.0535	.0176	.0176	.9894	.0000	.0000	9.9007	.5677	.5682	.8299	1.0773
85	-10.92	-10.46	12.58	28.83	52.12	.0000	.2288	.1191	.0413	.0413	.9774	.0000	.0000	.0692	.5526	.5222	.8556	1.0815
90	-8.68	-9.14	14.23	30.14	53.69	.0000	.2306	.0758	.0267	.0267	.9867	.0000	.0000	.2907	.5294	.5046	.8462	1.0803
95	-9.48	-7.88	15.46	32.62	56.06	.0000	.2919	.1936	.0513	.0513	.9770	.0000	.0000	.2786	.5031	.9546	.8373	1.0666

NCORR INLET	WCORR INLET	TO/TO INLET	PO/PO INLET	EFF-AD INLET	EFF-P INLET	WC1/A1 LBM/SEC
RPM	LBM/SEC			%	%	SQFT
7753.	135.03	1.0842	1.2563	80.04	80.66	36.81

Rotor Pressure Ratio = 1.2722

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 19:50:58 — JULY 12,1971

NASA ENGLISH (SPECIAL) — RUN # 31,SPEED CODE 70,POINT # 2,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	678.0	658.8	438.3	655.7	517.2	-64.3	49.71	-5.60	21.61	50.38	471.7	1028.1	-173.9	-791.9	691.1	727.6
10	21.008	21.961	665.1	650.2	453.7	647.1	486.0	-63.0	46.96	-5.56	26.36	51.26	506.8	1034.1	-225.3	-806.6	711.4	743.6
15	21.589	22.432	654.4	643.5	471.1	640.4	454.1	-62.6	43.95	-5.59	30.43	52.08	546.5	1042.2	-276.9	-822.2	731.0	759.6
30	23.314	23.902	634.4	629.9	505.6	626.2	382.7	-67.9	37.10	-6.18	38.72	54.48	649.4	1077.8	-406.8	-877.2	789.4	809.3
50	25.601	25.893	611.6	624.2	520.2	619.5	321.3	-77.2	31.69	-7.10	46.32	57.00	759.1	1137.4	-545.6	-953.9	866.9	876.8
70	27.818	27.902	608.0	621.4	536.5	616.0	285.9	-81.7	28.05	-7.56	50.70	59.03	847.6	1197.2	-656.1	-1026.5	942.0	944.8
85	29.408	29.382	619.1	623.6	548.0	619.0	287.9	-75.4	27.72	-6.94	52.25	59.96	895.2	1236.9	-707.9	-1070.3	995.8	994.9
90	29.914	29.856	554.6	574.8	468.4	570.4	296.2	-71.2	32.43	-7.12	56.88	62.21	856.8	1223.5	-716.7	-1082.1	1012.9	1011.0
95	30.382	30.293	515.9	524.5	421.2	519.9	297.7	-68.9	35.27	-7.56	60.05	64.60	894.0	1212.1	-731.1	-1094.7	1028.8	1025.8

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	7.20	10.12	10.79	55.31	55.89	.0044	.2377	.1381	.0392	.0331	.9706	.0000	.0000	-1.2596	.5920	.5772	.4185	.9008
10	4.67	7.60	9.87	52.52	53.88	.0025	.2296	.1429	.0363	.0357	.9705	.0000	.0000	-4.8039	.5805	.5706	.4595	.9076
15	2.82	5.76	9.25	49.53	52.35	.0010	.2203	.1524	.0397	.0394	.9694	.0000	.0000	-7.5589	.5729	.5654	.4931	.9158
30	-2.03	.98	9.02	43.29	50.64	.0000	.2045	.1956	.0546	.0546	.9626	.0000	.0000	18.5847	.5567	.5553	.5857	.9503
50	-5.23	-2.08	8.91	38.80	49.53	.0000	.1780	.2111	.0691	.0691	.9620	.0000	.0000	4.5503	.5386	.5518	.6733	1.0055
70	-7.67	-4.43	9.94	35.61	49.91	.0000	.1781	.2182	.0717	.0717	.9611	.0000	.0000	5.3951	.5374	.5498	.7517	1.0592
85	-4.84	-4.42	12.94	34.66	51.99	.0000	.1979	.2044	.0709	.0709	.9625	.0000	.0000	13.0201	.5466	.5503	.7900	1.0912
90	.36	.08	14.47	39.55	53.81	.0000	.1992	.1721	.0607	.0607	.9743	.0000	.0000	3.0602	.4872	.5041	.7511	1.0729
95	1.44	2.81	16.12	42.83	56.10	.0000	.2400	.2360	.0844	.0844	.9694	.0000	.0000	7.2145	.4502	.4576	.7358	1.0579

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
7760.	129.86	1.0947	1.3801	101.81	101.72	31.60

Rotor Pressure Ratio = 1.4314

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 19:52:33 — JULY 12,1971

NASA ENGLISH (SPECIAL) — RUN # 31, SPEED CODE 70, POINT # 4, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	792.4	699.8	594.1	699.7	524.3	-12.6	41.43	-1.03	15.51	46.54	616.6	1017.2	-164.9	-738.3	689.2	725.7
10	21.008	21.961	757.8	666.7	581.5	664.8	485.8	-48.1	39.87	-4.16	21.04	49.90	623.5	1032.6	-223.6	-789.7	709.4	791.6
15	21.589	22.432	723.4	642.1	560.8	639.2	456.9	-61.8	39.16	-5.53	25.87	52.04	624.2	1039.4	-272.1	-817.9	729.1	757.5
30	23.314	23.902	654.7	592.0	519.3	589.0	398.6	-59.1	37.51	-5.74	36.79	55.78	648.8	1047.7	-388.7	-866.3	787.3	807.2
50	25.601	25.893	618.6	555.9	512.9	551.8	345.8	-67.8	33.98	-7.00	45.31	59.64	729.6	1091.9	-518.7	-942.2	864.6	874.4
70	27.818	27.902	597.3	525.8	506.2	521.6	317.0	-66.9	32.06	-7.31	50.86	62.67	802.4	1136.0	-622.4	-1009.2	939.4	942.3
85	29.408	29.382	594.5	498.1	494.5	496.2	329.9	-43.1	33.71	-4.96	53.29	64.39	827.3	1148.2	-663.2	-1035.4	993.1	992.2
90	29.914	29.856	583.3	482.1	473.5	481.2	340.5	-30.3	35.73	-3.60	54.74	65.14	820.3	1144.6	-669.7	-1038.6	1010.2	1008.2
95	30.382	30.293	570.4	446.4	454.7	444.8	344.5	-38.1	37.15	-4.92	56.29	67.26	819.4	1150.7	-681.6	-1061.1	1026.0	1023.0

%SPAN	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-.90	2.02	15.37	42.46	55.87	.0000	.2816	.1274	.0318	.0318	.9691	.0000	.0000	.5173	.7025	.6153	.5480	.8943
10	-1.47	1.46	11.27	44.03	53.85	.0000	.2970	.1249	.0319	.0319	.9673	.0000	.0000	.5452	.6683	.5859	.5529	.9073
15	-1.25	1.69	9.49	44.69	52.53	.0000	.2973	.0973	.0254	.0254	.9765	.0000	.0000	.6173	.6377	.5638	.5529	.9126
30	-1.03	1.97	9.48	43.24	50.67	.0000	.2903	.0335	.0094	.0094	.9932	.0000	.0000	.8549	.5754	.5188	.5755	.9182
50	-2.75	.39	9.04	40.99	49.59	.0000	.3053	.0293	.0089	.0089	.9946	.0000	.0000	.8710	.5434	.4868	.6458	.9560
70	-3.64	-.40	10.13	39.37	49.87	.0000	.3325	.0373	.0122	.0122	.9936	.0000	.0000	.8502	.5243	.4593	.7082	.9923
85	1.42	1.85	15.00	38.67	52.09	.0000	.3815	.0884	.0308	.0308	.9851	.0000	.0000	.7029	.5183	.4321	.7229	.9960
90	4.00	3.72	17.93	39.33	53.74	.0000	.3996	.0895	.0317	.0317	.9855	.0000	.0000	.7207	.5072	.4168	.7140	.9894
95	3.27	4.85	18.75	42.08	56.05	.0000	.4597	.1444	.0519	.0519	.9776	.0000	.0000	.6517	.4950	.3845	.7123	.9910

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
7740.	123.28	1.1025	1.3312	83.11	83.78	31.93

Rotor Pressure Ratio = 1.3485

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 19:54:03 — JULY 12, 1971

NASA ENGLISH (SPECIAL) — RUN # 31, SPEED CODE 70, POINT # 5, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VH-1 FT/SEC	VH-2 FT/SEC	V0-1 FT/SEC	V0-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	V0'-1 FT/SEC	V0'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	777.5	647.4	560.9	647.4	538.5	-2.2	43.83	-.19	15.12	48.38	581.0	974.7	-151.5	-728.7	690.0	726.5
10	21.008	21.961	747.3	619.1	553.8	617.6	501.8	-40.2	42.17	-3.75	20.63	51.71	592.1	997.3	-208.4	-782.7	710.3	742.5
15	21.589	22.432	713.0	595.3	532.4	592.7	474.3	-55.4	41.69	-5.35	25.64	53.93	591.5	1007.0	-255.6	-813.8	729.9	758.4
30	23.314	23.902	644.5	543.4	491.3	540.6	417.1	-55.2	40.33	-5.83	37.04	57.94	615.9	1018.7	-371.1	-863.3	788.2	808.1
50	25.601	25.893	601.7	505.0	473.6	501.2	371.2	-62.5	38.09	-7.10	46.21	61.88	684.7	1063.4	-494.4	-937.9	865.5	875.4
70	27.818	27.902	594.8	489.8	474.8	485.9	358.2	-61.2	37.03	-7.17	50.79	64.18	751.4	1115.9	-582.3	-1004.5	940.5	943.3
85	29.408	29.382	599.9	471.5	457.2	470.5	380.6	-31.7	39.78	-3.86	53.31	65.35	765.2	1127.9	-613.6	-1025.1	994.2	993.4
90	29.914	29.856	584.6	456.8	440.2	456.0	384.7	-27.1	41.16	-3.40	54.92	66.25	765.9	1132.4	-626.7	-1036.5	1011.4	1009.4
95	30.382	30.293	576.0	435.2	428.1	433.8	385.4	-35.0	41.99	-4.63	56.29	67.72	771.5	1144.6	-641.8	-1059.2	1027.2	1024.2

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	1.49	4.41	16.20	49.03	55.87	.0003	.3362	.1379	.0394	.0393	.9625	.0000	.0000	.6205	.6871	.5653	.5148	.8511
10	.86	3.80	11.68	45.93	53.85	.0002	.3535	.1378	.0352	.0351	.9649	.0000	.0000	.6338	.6576	.5405	.5234	.8706
15	1.28	4.22	9.68	47.04	52.53	.0004	.3566	.1098	.0286	.0285	.9742	.0000	.0000	.6922	.6272	.5194	.5221	.8785
30	1.87	4.87	9.39	46.16	50.67	.0009	.3607	.0557	.0156	.0153	.9891	.0000	.0000	.8322	.5651	.4731	.5427	.8870
50	1.40	4.53	8.93	45.19	49.59	.0009	.3805	.0345	.0105	.0102	.9941	.0000	.0000	.8921	.5269	.4389	.6012	.9241
70	1.37	4.61	10.29	44.21	49.89	.0012	.4100	.0505	.0166	.0162	.9915	.0000	.0000	.8534	.5194	.4241	.6572	.9663
85	7.24	7.72	16.08	43.64	52.08	.0052	.4499	.0896	.0312	.0294	.9851	.0000	.0000	.7744	.5158	.4053	.6692	.9694
90	9.19	9.00	18.17	44.56	53.80	.0064	.4692	.0927	.0329	.0306	.9851	.0000	.0000	.7772	.5057	.3917	.6631	.9709
95	8.13	9.63	19.05	46.62	56.06	.0055	.5080	.1225	.0491	.0421	.9809	.0000	.0000	.7365	.4976	.3723	.6671	.9790

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC(7/A) LBM/SEC SQFT
7748.	117.29	1.1113	1.3527	81.05	81.85	29.98

Rotor Pressure Ratio = 1.3732

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 18:32:18 — JULY 13,1971

NASA ENGLISH (SPECIAL) — RUN # 31,SPEED CODE 70,POINT # 6,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	765.9	607.3	536.3	607.2	546.7	-13.8	45.55	-1.30	14.99	50.66	555.2	957.7	-193.7	-790.7	690.4	726.9
10	21.008	21.961	736.9	581.9	530.1	581.1	511.9	-29.3	44.00	-2.90	20.55	53.03	566.5	966.5	-198.7	-772.2	710.7	742.9
15	21.589	22.432	705.0	558.8	510.2	557.5	486.5	-38.1	43.64	-3.92	25.55	55.02	566.4	972.8	-243.8	-796.9	730.3	758.8
30	23.314	23.902	638.5	505.9	467.8	504.4	434.5	-39.4	42.88	-4.47	37.10	59.25	587.1	986.7	-354.2	-847.9	788.7	808.6
50	25.601	25.893	590.7	461.5	438.6	459.1	395.7	-46.5	42.06	-5.79	46.98	63.53	643.2	1030.4	-470.3	-922.5	866.0	875.9
70	27.818	27.902	590.3	455.6	439.3	453.4	394.3	-44.8	41.91	-5.64	51.21	65.36	701.4	1087.7	-546.7	-988.7	941.0	943.9
85	29.408	29.382	591.4	442.9	417.8	441.4	418.5	-36.4	45.04	-4.71	54.06	66.81	711.9	1120.9	-576.4	-1030.3	994.8	993.9
90	29.919	29.856	587.2	434.3	411.0	432.8	419.3	-35.7	45.57	-4.71	55.25	67.51	721.2	1131.7	-592.6	-1045.6	1011.9	1010.0
95	30.382	30.293	581.5	422.8	409.3	421.2	418.0	-37.0	45.95	-5.02	56.45	68.36	731.7	1142.2	-609.8	-1061.7	1027.8	1024.8

%SPAN	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-D	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	3.21	6.13	15.10	46.85	55.87	.0013	.3850	.1436	.0358	.0355	.9621	.0000	.0000	.6709	.6754	.5278	.4909	.8329
10	2.68	5.61	12.54	46.89	53.84	.0011	.3944	.1415	.0361	.0359	.9650	.0000	.0000	.6826	.6478	.5057	.4999	.8400
15	3.22	6.16	11.11	47.56	52.55	.0017	.3989	.1193	.0312	.0307	.9727	.0000	.0000	.7230	.6195	.4853	.4987	.8448
30	4.45	7.49	10.76	47.35	50.67	.0046	.4138	.0769	.0215	.0202	.9853	.0000	.0000	.8167	.5590	.4383	.5148	.8548
50	5.37	8.50	10.25	47.85	49.60	.0090	.4471	.0580	.0177	.0149	.9904	.0000	.0000	.8645	.5153	.3985	.5610	.8898
70	6.24	9.48	11.82	47.55	49.89	.0154	.4745	.0787	.0259	.0209	.9871	.0000	.0000	.8239	.5128	.3916	.6092	.9350
85	12.90	12.91	15.21	49.75	52.06	.0333	.5200	.1151	.0901	.0285	.9813	.0000	.0000	.7603	.5102	.3779	.6144	.9564
90	13.48	13.36	16.89	50.29	53.83	.0310	.5360	.1259	.0446	.0336	.9798	.0000	.0000	.7452	.5058	.3699	.6215	.9640
95	12.12	13.57	18.66	50.97	56.05	.0258	.5555	.1399	.0503	.0410	.9780	.0000	.0000	.7277	.5003	.3596	.6297	.9715

NCORR INLET	WCORR INLET	TO/TO INLET	PO/PO INLET	EFF-AD INLET	EFF-P INLET	WC17AI LBM/SEC
RPM	LBM/SEC			%	%	SQFT
7753.	110.94	1.1186	1.3649	78.46	79.39	28.15

Rotor Pressure Ratio = 1.3705

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 23:22:48 — JULY 12,1971

NASA ENGLISH (SPECIAL) — RUN # 31, SPEED CODE 90, POINT # 1, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	V0-1 FT/SEC	V0-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	V0'-1 FT/SEC	V0'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1020.7	1003.3	786.3	1002.2	650.8	-45.7	39.61	-2.61	16.96	44.46	822.1	1404.1	-239.8	-983.4	890.5	937.7
10	21.008	21.961	970.6	978.2	763.2	974.3	599.6	-86.6	38.15	-5.09	22.57	47.00	826.9	1428.8	-317.1	-1044.9	916.7	958.3
15	21.589	22.432	930.2	955.5	741.2	949.3	562.0	-108.6	37.16	-6.53	27.10	48.88	833.6	1443.6	-380.1	-1087.4	942.0	978.8
30	23.314	23.902	876.4	896.2	736.0	888.1	475.8	-119.9	32.88	-7.69	36.34	52.63	913.7	1463.2	-541.5	-1162.8	1017.3	1043.0
50	25.601	25.893	827.0	850.8	712.2	843.0	420.4	-114.8	30.55	-7.75	44.36	55.88	996.3	1503.4	-696.7	-1244.6	1117.1	1129.8
70	27.818	27.902	798.3	795.2	708.0	786.7	368.8	-116.1	27.51	-8.39	50.02	59.46	1102.6	1548.4	-845.0	-1333.6	1213.8	1217.5
85	29.408	29.382	794.9	766.0	709.6	759.1	358.3	-103.1	26.79	-7.74	52.51	61.28	1165.8	1579.6	-924.9	-1385.2	1283.2	1282.1
90	29.914	29.856	774.3	752.8	682.1	746.7	366.4	-96.1	28.25	-7.33	54.01	61.91	1160.6	1585.6	-938.9	-1398.8	1305.3	1302.8
95	30.382	30.293	743.2	690.9	645.6	679.9	368.1	-121.5	29.71	-10.19	56.01	64.77	1155.0	1595.9	-957.6	-1443.3	1325.7	1321.8

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-2.75	.16	13.79	42.23	55.87	.0011	.1833	.2111	.0526	.0523	.9129	.0000	.0000	-3.7718	.9041	.8876	.7292	1.2422
10	-3.18	-.25	10.35	43.23	53.85	.0007	.1698	.1537	.0391	.0390	.9412	.0000	.0000	7.5706	.8564	.8663	.7311	1.2652
15	-3.31	-.37	8.39	43.69	52.40	.0006	.1591	.1069	.0278	.0277	.9618	.0000	.0000	2.4047	.8191	.8459	.7366	1.2781
30	-5.59	-2.58	7.53	40.57	50.66	.0001	.1669	.1121	.0312	.0312	.9634	.0000	.0000	2.8220	.7700	.7923	.8089	1.2936
50	-6.23	-3.09	8.28	38.31	49.57	.0000	.1688	.0908	.0276	.0275	.9731	.0000	.0000	2.1190	.7240	.7492	.8800	1.3239
70	-6.28	-5.04	9.06	35.91	49.88	.0000	.2049	.1524	.0500	.0500	.9574	.0000	.0000	*******	.6995	.6977	.9732	1.3585
85	-5.52	-5.17	12.21	34.53	52.08	.0000	.2393	.1888	.0654	.0654	.9478	.0000	.0000	-1.1045	.6932	.6682	1.0194	1.3778
90	-3.61	-3.85	14.22	35.58	53.78	.0000	.2402	.1575	.0555	.0555	.9586	.0000	.0000	-1.2798	.6724	.6539	1.0100	1.3773
95	-4.16	-2.60	13.48	39.90	56.06	.0000	.3083	.2376	.0844	.0844	.9421	.0000	.0000	-.5325	.6420	.5955	1.0004	1.3754

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
10000.	169.67	1.1556	1.4963	78.41	79.59	38.83

Rotor Pressure Ratio = 1.5618

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 23:24:26 — JULY 12,1971

NASA ENGLISH (SPECIAL) — RUN # 31,SPEED CODE 90,POINT # 2,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	V0-1 FT/SEC	V0-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	V0'-1 FT/SEC	V0'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	997.4	861.7	747.7	860.8	660.2	-38.5	41.44	-2.56	17.06	48.56	782.2	1300.8	-229.5	-975.2	889.7	936.7
10	21.008	21.961	950.9	826.8	725.6	824.3	614.6	-63.8	40.26	-4.44	22.55	51.09	786.1	1312.5	-301.2	-1021.1	915.8	957.3
15	21.589	22.432	910.9	800.3	702.5	796.5	579.7	-78.1	39.52	-5.61	27.18	52.97	790.7	1322.9	-361.4	-1055.9	941.1	977.9
30	23.314	23.902	852.5	755.9	687.6	751.2	504.1	-84.3	36.25	-6.40	36.68	56.29	857.4	1353.8	-512.2	-1126.2	1016.3	1041.9
50	25.601	25.893	813.7	722.2	671.4	717.9	459.7	-79.1	34.40	-6.29	44.35	59.27	938.9	1405.2	-656.3	-1207.9	1116.0	1128.7
70	27.818	27.902	788.5	687.4	668.5	682.9	418.0	-78.7	32.01	-6.57	49.90	62.19	1038.7	1464.1	-794.7	-1295.0	1212.6	1216.3
85	29.408	29.382	793.7	660.0	670.9	657.3	424.0	-59.1	32.29	-5.13	51.97	63.87	1089.2	1492.5	-858.0	-1339.9	1282.0	1280.8
90	29.914	29.856	779.6	640.6	646.9	638.6	434.9	-50.4	33.92	-4.51	53.34	64.71	1083.6	1495.1	-869.2	-1351.8	1304.0	1301.5
95	30.382	30.293	762.7	590.3	624.3	586.7	438.1	-63.9	35.06	-6.25	54.84	67.03	1084.2	1503.9	-886.3	-1384.4	1324.4	1320.5

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-.89	2.03	13.84	44.00	55.87	.0024	.3067	.1408	.0351	.0345	.9442	.0000	.0000	.5771	.8782	.7463	.6903	1.1266
10	-1.04	1.90	11.00	44.70	53.85	.0021	.3096	.1129	.0288	.0282	.9584	.0000	.0000	.6527	.8317	.7158	.6911	1.1363
15	-.94	2.00	9.36	45.12	52.45	.0022	.3077	.0777	.0202	.0197	.9733	.0000	.0000	.7425	.7965	.6924	.6956	1.1444
30	-2.21	.80	8.81	42.65	50.66	.0015	.3054	.0431	.0120	.0116	.9867	.0000	.0000	.8364	.7436	.6538	.7540	1.1708
50	-2.34	.80	9.74	40.69	49.56	.0019	.3145	.0315	.0096	.0090	.9910	.0000	.0000	.8860	.7065	.6222	.8223	1.2106
70	-3.74	-.50	10.88	38.58	49.88	.0007	.3366	.0481	.0158	.0156	.9870	.0000	.0000	.8342	.6841	.5907	.9077	1.2579
85	.20	.44	14.81	37.42	52.06	.0006	.3812	.1126	.0392	.0390	.9696	.0000	.0000	.6659	.6835	.5622	.9402	1.2713
90	2.09	1.93	17.04	38.42	53.76	.0008	.3997	.1107	.0392	.0389	.9712	.0000	.0000	.6890	.6682	.5429	.9305	1.2671
95	1.12	2.76	17.43	41.31	56.05	.0007	.4638	.1722	.0618	.0615	.9570	.0000	.0000	.6230	.6518	.4974	.9290	1.2672

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
9991.	167.24	1.1706	1.5956	83.67	84.72	36.87

Rotor Pressure Ratio = 1.6298

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 16:55:22 — JULY 13, 1971

NASA ENGLISH (SPECIAL) — RUN # 31, SPEED CODE 90, POINT # 4, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	988.6	819.3	728.1	818.8	668.8	-28.9	42.57	-2.02	16.89	49.71	761.0	1266.2	-221.1	-965.8	889.9	936.9
10	21.008	21.961	947.5	783.6	713.6	781.1	623.3	-61.1	41.13	-4.49	22.31	52.51	771.7	1283.8	-292.7	-1018.6	916.0	957.5
15	21.589	22.432	905.5	757.2	687.4	753.0	589.3	-79.1	40.60	-6.00	27.09	54.53	773.1	1298.1	-352.0	-1057.1	941.3	978.1
30	23.314	23.902	837.2	715.3	657.5	710.5	518.2	-82.5	38.24	-6.62	37.16	57.72	825.0	1330.3	-498.3	-1124.7	1016.5	1042.2
50	25.601	25.893	805.8	690.1	645.4	685.9	482.5	-76.3	36.79	-6.35	44.48	60.36	904.5	1386.8	-633.7	-1205.3	1116.2	1129.0
70	27.818	27.902	784.0	659.0	644.6	654.5	446.2	-76.9	34.69	-6.70	49.92	63.16	1001.8	1449.6	-766.7	-1293.4	1212.9	1216.6
85	29.408	29.382	794.3	639.6	651.2	637.7	454.8	-48.7	34.93	-4.36	51.80	64.38	1053.0	1474.8	-827.4	-1329.8	1282.2	1281.1
90	29.914	29.856	784.1	620.7	630.2	619.5	466.3	-38.2	36.51	-3.52	53.05	65.19	1048.6	1476.2	-838.0	-1339.9	1304.3	1301.8
95	30.382	30.293	768.9	574.9	607.8	572.3	470.9	-53.8	37.77	-5.91	59.55	67.39	1048.1	1489.2	-853.8	-1374.6	1324.7	1320.8

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	.23	3.15	14.38	49.59	55.87	.0037	.3930	.1538	.0383	.0379	.9400	.0000	.0000	.6210	.8685	.7051	.6702	1.0896
10	-.16	2.77	10.95	45.62	53.84	.0031	.3543	.1446	.0368	.0360	.9472	.0000	.0000	.6474	.8282	.6741	.6772	1.1044
15	.18	3.12	8.95	46.60	52.44	.0036	.3542	.1077	.0281	.0271	.9639	.0000	.0000	.7193	.7906	.6509	.6775	1.1159
30	-.19	2.81	8.59	44.87	50.66	.0036	.3453	.0428	.0119	.0109	.9872	.0000	.0000	.6689	.7282	.6145	.7210	1.1429
50	.09	3.23	9.68	43.13	49.55	.0057	.3551	.0313	.0095	.0078	.9913	.0000	.0000	.9016	.6971	.5904	.7866	1.1864
70	-1.02	2.22	10.77	41.39	49.89	.0035	.3803	.0502	.0165	.0154	.9867	.0000	.0000	.8538	.6767	.5618	.8694	1.2358
85	2.84	3.01	15.57	39.29	52.09	.0034	.4169	.1135	.0396	.0389	.9696	.0000	.0000	.7093	.6819	.5407	.9046	1.2469
90	4.62	4.51	18.04	40.02	53.78	.0043	.4372	.1214	.0431	.0415	.9684	.0000	.0000	.7033	.6689	.5221	.8956	1.2416
95	3.85	5.48	18.27	43.18	56.05	.0042	.4988	.1750	.0628	.0613	.9562	.0000	.0000	.6502	.6536	.4809	.8929	1.2456

NCORR INLET	WCORR INLET	TO/TO INLET	PO/PO INLET	EFF-AD INLET	EFF-P INLET	WC1/A1 LBM/SEC
RPM	LBM/SEC			%	%	SQFT
9993.	164.87	1.1787	1.6255	83.25	84.38	35.71

Rotor Pressure Ratio = 1.6644

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 16:56:27 — JULY 13, 1971

NASA ENGLISH (SPECIAL) RUN # 31, SPEED CODE 90, POINT # 5, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VH-1 FT/SEC	VH-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	965.4	730.9	681.9	730.5	683.4	-21.8	45.06	-1.71	16.79	52.67	712.4	1204.8	-205.8	-958.1	889.2	936.2
10	21.008	21.961	930.6	699.2	674.7	696.9	641.0	-55.4	43.53	-4.56	22.13	55.44	728.7	1229.1	-274.3	-1012.2	915.3	956.8
15	21.589	22.432	887.8	672.7	643.9	668.5	611.2	-75.1	43.51	-6.42	27.09	57.57	729.3	1246.9	-329.4	-1052.9	940.6	977.3
30	23.314	23.902	803.4	630.1	587.6	625.9	547.8	-72.9	42.99	-6.65	38.52	60.68	751.2	1278.0	-467.9	-1114.3	1015.7	1041.3
50	25.601	25.893	788.2	625.9	590.7	621.9	521.9	-70.1	41.46	-6.43	45.14	62.57	837.3	1350.0	-593.5	-1198.2	1115.4	1128.1
70	27.818	27.902	776.5	608.3	593.0	604.4	501.4	-68.7	40.22	-6.48	50.13	64.79	925.6	1419.4	-710.6	-1284.3	1211.9	1215.6
85	29.408	29.382	796.1	606.2	600.8	604.6	522.3	-43.0	41.00	-4.07	51.63	65.44	967.9	1459.7	-758.9	-1323.1	1281.2	1280.1
90	29.914	29.856	790.4	589.3	581.1	580.5	535.6	-28.5	42.67	-2.76	52.88	66.12	962.9	1453.8	-767.7	-1329.3	1303.3	1300.7
95	30.382	30.293	780.6	559.3	563.0	558.2	540.7	-34.2	43.84	-3.53	54.28	67.59	969.4	1464.7	-782.9	-1354.0	1323.7	1319.8

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	2.69	5.61	14.69	46.77	55.87	.0077	.4207	.1955	.0487	.0468	.9269	.0000	.0000	.6360	.8445	.6216	.6242	1.0247
10	2.20	5.13	10.87	48.10	53.84	.0070	.4364	.1957	.0499	.0481	.9309	.0000	.0000	.6369	.8138	.5946	.6371	1.0451
15	3.03	5.97	8.50	49.93	52.41	.0091	.4417	.1593	.0415	.0391	.9480	.0000	.0000	.6938	.7747	.5715	.6308	1.0593
30	4.55	7.54	8.57	49.64	50.67	.0150	.4307	.0539	.0150	.0109	.9852	.0000	.0000	.8859	.6942	.5346	.6482	1.0843
50	4.80	7.94	9.59	47.89	49.54	.0217	.4350	.0492	.0150	.0084	.9870	.0000	.0000	.8868	.6772	.5289	.7193	1.1408
70	4.56	7.80	11.01	46.70	49.91	.0219	.4596	.0743	.0245	.0173	.9810	.0000	.0000	.8341	.6637	.5114	.7922	1.1932
85	8.74	8.93	15.82	45.07	52.30	.0250	.4869	.1308	.0456	.0369	.9655	.0000	.0000	.7257	.6762	.5050	.8222	1.2120
90	10.59	10.54	18.85	45.43	53.84	.0296	.5083	.1486	.0527	.0422	.9616	.0000	.0000	.7041	.6674	.4884	.8131	1.2049
95	9.98	11.49	20.15	47.37	56.06	.0299	.5496	.1841	.0663	.0555	.9536	.0000	.0000	.6689	.6568	.4614	.8122	1.2084

WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
157.39	1.1948	1.674	81.76	83.06	32.99

Rotor Pressure Ratio = 1.7316

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 20:31:43 — JULY 23,1971

NASA ENGLISH (SPECIAL) — RUN # 35,SPEED CODE 90,POINT # 6,PAGE 36302

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	761.4	710.3	668.3	709.9	691.2	-24.7	45.97	-1.99	16.45	53.52	696.9	1194.2	-197.3	-960.2	888.5	935.5
10	21.008	21.961	926.1	679.4	662.3	677.3	647.3	-51.2	44.34	-4.34	21.99	56.07	714.7	1214.0	-267.3	-1007.2	914.6	956.1
15	21.589	22.432	881.7	650.9	629.2	646.2	617.6	-76.5	44.48	-6.78	27.14	58.45	708.1	1235.9	-322.2	-1053.0	939.9	976.6
30	23.314	23.902	791.5	597.9	561.8	591.0	557.6	-90.7	44.78	-8.73	39.13	62.42	724.6	1276.9	-457.4	-1131.3	1015.0	1040.6
50	25.601	25.893	781.5	597.6	565.7	590.6	539.1	-91.0	43.62	-8.76	45.48	64.14	807.1	1353.9	-575.4	-1218.3	1114.5	1127.2
70	27.818	27.902	776.0	579.8	559.0	573.3	543.3	-86.4	44.44	-8.57	50.31	66.21	867.7	1421.9	-667.7	-1301.1	1211.0	1214.7
85	29.408	29.382	785.5	571.7	543.2	568.2	567.5	-62.5	46.25	-6.28	52.69	67.05	896.2	1457.0	-712.8	-1341.7	1280.3	1279.1
90	29.914	29.056	780.2	559.4	526.1	557.2	576.0	-48.8	47.59	-5.00	54.08	67.55	896.9	1459.2	-726.3	-1348.6	1302.3	1299.8
95	30.382	30.293	773.2	545.1	513.5	543.2	578.1	-45.5	48.39	-4.79	55.41	68.29	904.5	1468.5	-744.5	-1364.3	1322.7	1318.8

%SPAN	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	3.60	6.52	14.41	47.96	55.86	.0099	.4423	.2101	.0524	.0499	.9221	.0000	.0000	.6294	.8399	.6023	.6095	1.0126
10	2.99	5.92	11.09	48.68	53.83	.0088	.4556	.2089	.0533	.0510	.9269	.0000	.0000	.6306	.8099	.5761	.6242	1.0294
15	3.94	6.88	8.19	51.26	52.47	.0117	.4648	.1733	.0451	.0420	.9441	.0000	.0000	.6853	.7697	.5514	.6162	1.0469
30	6.32	9.31	6.50	53.51	50.67	.0225	.4726	.0742	.0206	.0144	.9802	.0000	.0000	.8606	.6822	.5052	.6224	1.0785
50	6.88	10.01	7.26	52.38	49.58	.0340	.4814	.0700	.0212	.0109	.9819	.0000	.0000	.8653	.6695	.5025	.6896	1.1385
70	8.75	11.99	8.91	53.01	49.91	.0526	.5215	.1045	.0342	.0170	.9736	.0000	.0000	.8020	.6585	.4830	.7355	1.1644
85	13.62	14.08	13.61	52.53	52.03	.0660	.5528	.1492	.0519	.0289	.9621	.0000	.0000	.7297	.6610	.4715	.7539	1.2017
90	15.42	15.33	16.62	52.59	53.86	.0715	.5680	.1618	.0573	.0320	.9596	.0000	.0000	.7139	.6539	.4595	.7516	1.1985
95	14.60	16.00	18.88	53.18	56.07	.0688	.5864	.1762	.0634	.0386	.9569	.0000	.0000	.6958	.6462	.4464	.7558	1.2026

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
9977.	149.95	1.2034	1.6859	79.05	80.54	31.32

Rotor Pressure Ratio = 1.7483

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 16:57:37 — JULY 13,1971

NASA ENGLISH (SPECIAL) — RUN # 31,SPEED CODE 90,POINT # 6,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.909	21.989	960.0	695.4	661.1	695.2	696.2	-15.5	46.48	-1.28	16.18	53.82	688.4	1177.6	-191.8	-950.4	888.0	935.0
10	21.008	21.961	925.0	665.6	655.3	663.8	652.9	-47.5	44.89	-4.12	21.73	56.49	705.9	1203.0	-261.2	-1003.0	914.0	955.5
15	21.589	22.432	883.5	637.0	625.3	634.8	624.1	-72.3	44.95	-6.52	26.77	58.79	701.4	1225.8	-315.2	-1048.3	939.3	976.0
30	23.314	23.902	793.2	589.4	555.6	584.9	566.1	-73.2	45.53	-7.13	38.88	62.28	714.0	1257.4	-448.3	-1113.1	1014.4	1039.9
50	25.601	25.893	783.7	589.8	557.8	585.4	550.5	-71.6	44.62	-6.98	45.28	63.96	792.9	1333.6	-563.4	-1198.2	1113.9	1126.6
70	27.818	27.902	781.9	578.1	548.1	574.0	557.7	-68.7	45.50	-6.82	49.96	65.89	852.3	1405.2	-652.6	-1282.6	1210.3	1214.0
85	29.408	29.382	792.8	572.5	543.4	570.9	577.3	-47.9	46.73	-4.80	52.27	66.73	887.9	1443.8	-702.2	-1326.3	1279.5	1278.4
90	29.914	29.856	788.7	562.9	527.0	561.5	586.6	-39.4	48.07	-4.01	53.60	67.24	888.2	1451.4	-714.9	-1338.4	1301.5	1299.0
95	30.382	30.293	781.3	547.5	512.6	545.8	589.6	-42.9	49.00	-4.50	55.01	68.14	893.9	1466.3	-732.3	-1360.9	1321.9	1318.0

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	4.11	7.03	15.12	47.76	55.86	.0113	.4559	.2164	.0539	.0511	.9201	.0000	.0000	.6342	.8382	.5884	.6018	.9969
10	3.53	6.46	11.32	49.01	53.84	.0103	.4703	.2141	.0546	.0520	.9254	.0000	.0000	.6357	.8087	.5633	.6159	1.0180
15	4.39	7.33	8.43	51.47	52.45	.0135	.4800	.1824	.0475	.0440	.9410	.0000	.0000	.6830	.7715	.5403	.6101	1.0364
30	7.06	10.05	8.09	52.67	50.67	.0269	.4811	.0778	.0217	.0142	.9791	.0000	.0000	.8615	.6831	.4972	.6123	1.0606
50	7.87	11.00	9.05	51.60	49.57	.0418	.4896	.0787	.0239	.0112	.9796	.0000	.0000	.8553	.6703	.4948	.6764	1.1189
70	9.81	13.04	10.66	52.32	49.92	.0635	.5259	.1174	.0386	.0177	.9701	.0000	.0000	.7825	.6623	.4803	.7213	1.1677
85	14.15	14.58	15.08	51.53	52.02	.0721	.5538	.1649	.0575	.0323	.9575	.0000	.0000	.7052	.6663	.4719	.7461	1.1889
90	15.88	15.81	17.61	52.08	53.86	.0779	.5687	.1759	.0624	.0347	.9554	.0000	.0000	.6920	.6604	.4616	.7436	1.1903
95	15.21	16.61	19.17	53.50	56.06	.0767	.5917	.1919	.0690	.0414	.9523	.0000	.0000	.6724	.6522	.4476	.7461	1.1987

WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
149.55	1.2071	1.6984	78.82	80.34	30.95

Rotor Pressure Ratio = 1.7664

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 23:09:10 — JULY 12,1971

NASA ENGLISH (SPECIAL) — RUN # 31,SPEED CODE 10,POINT # 1,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1075.6	1027.9	819.9	1024.9	696.2	-78.9	40.33	-4.40	19.57	47.51	870.3	1517.4	-291.6	-1118.9	987.7	1040.0
10	21.008	21.961	1038.0	1008.7	807.6	1005.0	652.0	-86.0	38.91	-4.90	24.30	48.82	886.4	1526.5	-364.7	-1148.9	1016.7	1062.8
15	21.589	22.432	1010.0	990.9	796.0	986.0	621.5	-98.0	37.97	-5.68	27.97	50.20	902.2	1540.7	-423.3	-1183.7	1044.8	1085.6
30	23.314	23.902	950.3	928.8	777.7	920.9	546.1	-120.5	35.07	-7.46	36.81	54.21	971.7	1574.8	-582.2	-1277.3	1128.3	1156.8
50	25.601	25.893	904.0	880.9	763.6	872.8	483.7	-115.8	32.35	-7.56	44.66	57.47	1074.4	1623.7	-755.3	-1368.9	1239.0	1253.1
70	27.818	27.902	832.7	784.1	722.9	774.7	413.2	-120.6	29.75	-8.85	52.21	62.22	1180.6	1662.6	-933.1	-1471.0	1346.3	1350.4
85	29.408	29.382	827.4	763.3	721.6	755.3	404.7	-109.8	29.29	-8.27	54.68	63.75	1248.3	1707.9	-1018.5	-1531.8	1423.3	1422.0
90	29.914	29.856	814.4	755.9	699.7	749.3	416.6	-99.7	30.77	-7.58	55.84	64.12	1246.2	1716.8	-1031.2	-1544.7	1447.8	1444.9
95	30.382	30.293	763.5	661.3	636.0	653.5	422.0	-101.5	33.60	-8.86	58.77	67.38	1226.6	1698.8	-1048.4	-1567.6	1470.4	1466.1

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-2.06	.86	12.00	44.74	55.87	.0031	.2203	.1925	.0478	.0471	.9156	.0000	.0000	-.6407	.9455	.8978	.7669	1.3253
10	-2.43	.50	10.54	43.81	53.85	.0027	.2069	.1510	.0385	.0378	.9372	.0000	.0000	-1.0529	.9097	.8819	.7789	1.3345
15	-2.46	.48	9.25	43.66	52.42	.0030	.2028	.1246	.0325	.0317	.9502	.0000	.0000	-1.5636	.8833	.8657	.7916	1.3461
30	-3.42	-.41	7.76	42.53	50.66	.0025	.2181	.1244	.0346	.0339	.9548	.0000	.0000	-1.1951	.8274	.8084	.8523	1.3706
50	-4.40	-1.27	8.48	39.91	49.60	.0018	.2284	.1146	.0348	.0342	.9616	.0000	.0000	-.8808	.7821	.7633	.9382	1.4077
70	-6.01	-2.77	8.60	38.60	49.88	.0001	.2707	.1531	.0501	.0501	.9551	.0000	.0000	-.1271	.7194	.6760	1.0280	1.4334
85	-3.29	-2.75	11.69	37.56	52.12	.0000	.2950	.1466	.0507	.0507	.9577	.0000	.0000	.1787	.7134	.6542	1.0776	1.4638
90	-.88	-1.38	13.91	38.35	53.73	.0000	.2973	.1135	.0400	.0400	.9684	.0000	.0000	.3103	.6986	.6449	1.0700	1.4646
95	-.19	1.35	14.81	42.46	56.08	.0001	.3819	.2117	.0755	.0759	.9475	.0000	.0000	.2539	.6477	.5578	1.0436	1.4329

WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
182.12	1.1946	1.6370	77.62	79.14	38.72

Rotor Pressure Ratio = 1.7142

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 23:10:59 — JULY 12,1971

NASA ENGLISH (SPECIAL) — RUN # 31,SPEED CODE 10,POINT # 2,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.909	21.489	1070.4	887.8	790.9	885.6	721.9	-62.7	42.37	-4.05	18.73	51.28	835.2	1415.8	-268.2	-1104.6	989.5	1041.9
10	21.008	21.961	1029.0	858.9	776.1	855.7	675.6	-73.0	41.04	-4.88	23.84	53.05	848.9	1423.8	-342.9	-1137.8	1018.6	1064.8
15	21.589	22.432	991.1	833.1	755.7	828.5	641.1	-86.2	40.30	-5.95	28.19	54.78	858.5	1437.0	-405.6	-1173.8	1046.7	1087.6
30	23.314	23.902	925.8	783.0	727.7	777.6	572.3	-92.2	38.19	-6.76	37.48	58.14	917.0	1473.1	-558.0	-1251.1	1130.4	1158.9
50	25.601	25.893	909.5	765.0	733.0	760.7	538.4	-80.6	36.30	-6.06	43.78	60.34	1015.8	1537.7	-702.9	-1336.1	1241.3	1255.4
70	27.818	27.902	837.9	684.6	694.5	677.2	468.6	-100.1	34.00	-8.41	51.69	65.01	1121.4	1603.1	-880.1	-1453.0	1348.8	1352.8
85	29.408	29.382	837.8	652.5	683.4	648.8	484.5	-69.0	35.34	-6.06	54.02	66.52	1163.3	1628.5	-941.3	-1493.6	1425.8	1424.4
90	29.914	29.856	822.9	634.8	656.5	632.5	495.9	-54.4	37.07	-4.91	55.48	67.16	1158.5	1629.7	-954.4	-1502.0	1450.4	1447.6
95	30.382	30.293	803.1	578.0	628.4	575.1	499.9	-57.6	38.51	-5.73	57.15	69.35	1158.5	1631.3	-973.2	-1526.3	1473.1	1468.8

%SPAN	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	.00	2.92	12.35	46.42	55.87	.0064	.3492	.1301	.0324	.0308	.9437	.0000	.0000	.6926	.9355	.7673	.7324	1.2077
10	-.28	2.65	10.55	45.92	53.85	.0059	.3480	.1024	.0261	.0246	.9582	.0000	.0000	.7585	.8937	.7330	.7418	1.2150
15	-.11	2.83	9.02	46.25	52.47	.0064	.3488	.0727	.0189	.0173	.9720	.0000	.0000	.8199	.8593	.7104	.7491	1.2253
30	-.28	2.72	8.46	44.95	50.66	.0072	.3540	.0379	.0106	.0086	.9869	.0000	.0000	.8848	.8006	.6659	.7997	1.2527
50	-.43	2.71	9.98	42.35	49.59	.0097	.3665	.0575	.0175	.0146	.9808	.0000	.0000	.8609	.7779	.6476	.8799	1.3017
70	-1.79	1.45	9.03	42.42	49.87	.0042	.4076	.0508	.0167	.0153	.9852	.0000	.0000	.8945	.7152	.5778	.9688	1.3529
85	3.07	3.50	13.91	41.40	52.11	.0055	.4522	.0987	.0343	.0324	.9717	.0000	.0000	.7646	.7095	.5440	.9876	1.3576
90	5.44	5.08	16.57	41.99	53.70	.0071	.4664	.0868	.0307	.0282	.9760	.0000	.0000	.7990	.6935	.5265	.9783	1.3515
95	4.61	6.23	17.94	44.24	56.06	.0071	.5310	.1441	.0517	.0492	.9620	.0000	.0000	.7377	.6740	.4762	.9748	1.3490

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11112.	180.91	1.2150	1.7608	81.54	82.94	36.86

Rotor Pressure Ratio = 1.8000

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 20:24:55 — JULY 23,1971

NASA ENGLISH (SPECIAL) — RUN # 35,SPEED CODE 10,POINT # 3,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1060.2	828.6	765.7	823.5	733.4	-91.6	43.76	-6.35	18.41	53.97	807.1	1399.9	-254.8	-1132.1	988.1	1040.4
10	21.008	21.961	1016.8	796.6	747.7	791.1	689.1	-92.6	42.66	-6.68	23.69	55.61	816.9	1400.8	-328.0	-1155.9	1017.1	1063.3
15	21.589	22.432	976.1	772.2	722.1	766.2	656.6	-96.1	42.27	-7.15	28.26	57.05	820.8	1408.9	-388.7	-1182.2	1045.3	1086.1
30	23.314	23.902	920.5	741.6	700.5	735.1	597.2	-97.9	40.45	-7.59	37.19	59.64	879.4	1454.6	-531.6	-1255.2	1128.8	1157.3
50	25.601	25.893	910.7	743.9	707.8	737.3	573.2	-98.7	39.00	-7.63	43.27	61.40	972.2	1540.4	-666.4	-1352.4	1239.5	1253.7
70	27.818	27.902	855.1	678.7	682.9	671.1	514.6	-101.3	36.99	-8.59	50.60	65.19	1076.9	1599.9	-832.3	-1452.2	1346.9	1350.9
85	29.408	29.382	851.9	644.7	668.0	637.5	528.7	-96.4	38.36	-8.59	53.27	67.23	1117.0	1647.4	-895.2	-1519.0	1423.9	1422.6
90	29.914	29.856	839.8	619.6	641.8	614.0	541.5	-83.4	40.17	-7.73	54.72	68.12	1111.0	1647.6	-906.8	-1528.9	1448.4	1445.5
95	30.382	30.293	827.6	578.1	622.1	573.0	545.8	-76.0	41.27	-7.55	56.08	69.62	1114.9	1645.8	-925.2	-1542.7	1471.0	1466.7

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	1.43	4.35	10.05	50.11	55.87	.0092	.4086	.1519	.0376	.0354	.9354	.0000	.0000	.7074	.9232	.7006	.7045	1.1837
10	1.38	4.31	8.75	49.35	53.84	.0091	.4098	.1310	.0333	.0309	.9477	.0000	.0000	.7465	.8811	.6735	.7109	1.1893
15	1.87	4.81	7.78	49.42	52.41	.0106	.4079	.0952	.0248	.0220	.9644	.0000	.0000	.8058	.8442	.6524	.7124	1.1903
30	2.01	5.01	7.63	48.04	50.66	.0135	.4045	.0533	.0148	.0111	.9819	.0000	.0000	.8766	.7923	.6254	.7608	1.2267
50	2.31	5.44	8.40	46.63	49.56	.0198	.4083	.0529	.0161	.0100	.9825	.0000	.0000	.8751	.7778	.6245	.8348	1.2932
70	1.29	4.53	8.87	45.58	49.88	.0133	.4447	.0529	.0173	.0130	.9842	.0000	.0000	.8855	.7273	.5674	.9208	1.3376
85	6.17	6.52	11.37	46.95	52.08	.0159	.4997	.1014	.0351	.0296	.9704	.0000	.0000	.7777	.7170	.5326	.9415	1.3609
90	8.39	8.18	13.80	47.89	53.75	.0195	.5268	.1143	.0403	.0334	.9677	.0000	.0000	.7703	.7031	.5087	.9313	1.3527
95	7.31	8.94	16.13	48.82	56.06	.0189	.5729	.1593	.0570	.0502	.9564	.0000	.0000	.7303	.6909	.4721	.9327	1.3440

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
11096.	180.63	1.2283	1.8169	81.41	82.89	35.64

Rotor Pressure Ratio = 1.8662

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 20:28:23 — JULY 23,1971

NASA ENGLISH (SPECIAL) — RUN # 35, SPEED CODE 10, POINT # 4, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	V0-1 FT/SEC	V0-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	V0'-1 FT/SEC	V0'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1052.8	796.0	749.0	793.8	739.8	-59.1	44.65	-4.26	18.46	54.22	789.8	1357.7	-250.1	-1101.5	990.0	1042.4
10	21.008	21.961	1013.3	764.0	737.1	759.3	695.4	-83.6	43.33	-6.30	23.72	56.53	805.4	1377.3	-323.7	-1148.9	1019.0	1065.3
15	21.589	22.432	969.3	738.7	706.0	731.7	664.1	-101.3	43.24	-7.89	28.46	58.40	804.0	1396.6	-383.1	-1189.4	1047.2	1088.1
30	23.319	23.902	907.1	708.5	676.6	700.7	604.2	-104.7	41.76	-8.50	37.89	61.00	857.5	1445.3	-526.7	-1264.1	1130.9	1159.4
50	25.601	25.893	899.1	719.7	681.6	713.4	586.4	-95.1	40.71	-7.60	43.88	62.17	945.6	1527.9	-655.4	-1351.1	1241.8	1256.0
70	27.818	27.902	857.8	669.5	670.5	662.8	535.0	-94.5	38.59	-8.11	50.51	65.40	1055.1	1592.5	-814.4	-1447.9	1349.4	1353.4
85	29.408	29.382	858.9	643.9	659.3	637.5	550.4	-90.1	39.86	-8.04	53.03	67.18	1096.4	1644.0	-876.0	-1515.3	1426.5	1425.2
90	29.914	29.856	847.9	619.1	632.3	615.5	564.7	-65.4	41.77	-6.04	54.50	67.87	1088.9	1634.0	-886.3	-1513.6	1451.0	1448.2
95	30.382	30.293	837.4	582.5	613.5	579.7	569.9	-57.4	42.90	-5.66	55.83	69.21	1092.4	1633.3	-903.8	-1526.8	1473.7	1469.4

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	2.29	5.21	12.14	48.90	55.87	.0112	.4289	.1735	.0431	.0403	.9272	.0000	.0000	.6923	.9150	.6699	.6880	1.1426
10	2.04	4.98	9.14	49.63	53.84	.0107	.4392	.1641	.0417	.0390	.9349	.0000	.0000	.7080	.8781	.6429	.6992	1.1589
15	2.84	5.78	7.02	51.13	52.38	.0132	.4418	.1246	.0323	.0289	.9540	.0000	.0000	.7681	.8377	.6210	.6955	1.1741
30	3.33	6.33	6.72	50.26	50.66	.0175	.4365	.0653	.0181	.0133	.9784	.0000	.0000	.8662	.7785	.5948	.7378	1.2134
50	4.03	7.17	8.43	48.30	49.55	.0273	.4308	.0531	.0161	.0078	.9829	.0000	.0000	.8788	.7659	.6012	.8076	1.2763
70	2.90	6.14	9.36	46.70	49.89	.0201	.4623	.0634	.0208	.0142	.9811	.0000	.0000	.8659	.7275	.5570	.8977	1.3249
85	7.64	7.95	11.90	47.89	52.06	.0236	.5111	.1091	.0378	.0296	.9680	.0000	.0000	.7752	.7211	.5297	.9212	1.3524
90	9.86	9.72	15.53	47.81	53.80	.0288	.5341	.1245	.0490	.0338	.9645	.0000	.0000	.7628	.7078	.5060	.9095	1.3359
95	8.98	10.55	18.02	48.55	56.07	.0285	.5749	.1647	.0591	.0489	.9543	.0000	.0000	.7253	.6967	.4736	.9101	1.3279

NCORR INLET	WCORR INLET	TO/TO INLET	PO/PO INLET	EFF-AD INLET	EFF-P INLET	WCI/AI LBM/SEC
RPM	LBM/SEC			%	%	SQFT
11117.	179.86	1.2348	1.8491	81.70	83.20	34.82

Rotor Pressure Ratio = 1.9079

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRPOIL AERODYNAMIC SUMMARY PRINT — 19:17:44 — JULY 14,1971

NASA ENGLISH (SPECIAL) RUN # 31,SPEED CODE 10,POINT # 3,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1097.4	779.1	740.7	778.3	790.6	-35.9	44.99	-2.64	18.99	54.13	781.2	1328.4	-247.7	-1076.5	988.3	1040.9
10	21.008	21.961	1010.8	747.4	732.4	743.2	696.6	-78.1	43.57	-6.02	23.65	56.93	799.9	1362.3	-320.6	-1141.5	1017.3	1063.9
15	21.589	22.932	967.5	721.8	702.2	714.9	665.6	-99.9	43.46	-7.92	28.39	58.91	799.2	1384.6	-379.8	-1185.6	1045.4	1086.2
30	23.314	23.902	902.2	691.7	664.8	686.0	609.8	-88.1	42.53	-7.31	37.98	61.15	843.5	1421.9	-519.1	-1245.5	1128.9	1157.4
50	25.601	25.893	895.1	705.8	670.9	702.7	592.5	-66.6	41.45	-5.41	43.97	61.98	932.2	1495.7	-647.2	-1320.4	1239.7	1253.8
70	27.818	27.902	858.6	664.7	665.0	659.6	543.0	-82.1	39.23	-7.10	50.38	65.28	1043.6	1577.8	-804.0	-1433.2	1347.0	1351.1
85	29.408	29.382	862.1	641.8	653.5	639.6	562.2	-52.2	40.70	-4.66	52.83	66.55	1081.6	1607.7	-861.8	-1474.9	1424.0	1422.7
90	29.914	29.856	854.0	621.5	629.2	620.4	577.2	-35.6	42.54	-3.27	54.17	67.27	1074.9	1606.0	-871.3	-1481.3	1448.5	1445.7
95	30.382	30.293	843.2	582.2	609.0	580.4	583.1	-45.8	43.75	-4.54	55.56	69.01	1076.9	1620.4	-888.1	-1512.7	1471.2	1466.9

%SPAN	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	2.62	5.54	13.75	47.64	55.87	.0119	.4366	.1807	.0450	.0420	.9248	.0000	.0000	.6906	.9100	.6545	.6802	1.1159
10	2.25	5.19	9.42	49.58	53.84	.0113	.4530	.1776	.0452	.0423	.9299	.0000	.0000	.6961	.8765	.6278	.6944	1.1443
15	3.04	5.98	6.97	51.38	52.37	.0138	.4580	.1410	.0366	.0330	.9481	.0000	.0000	.7495	.8368	.6057	.6909	1.1620
30	4.09	7.09	7.90	49.84	50.66	.0205	.4486	.0727	.0203	.0146	.9762	.0000	.0000	.8591	.7737	.5793	.7236	1.1909
50	4.79	7.92	10.61	46.86	49.55	.0311	.4360	.0580	.0177	.0082	.9815	.0000	.0000	.8718	.7619	.5883	.7942	1.2466
70	3.56	6.79	10.38	46.33	49.90	.0234	.4667	.0643	.0212	.0135	.9809	.0000	.0000	.8669	.7274	.5521	.8863	1.3105
85	8.42	8.73	15.26	45.36	52.09	.0287	.5048	.1118	.0390	.0290	.9671	.0000	.0000	.7783	.7232	.5260	.9076	1.3197
90	10.57	10.45	18.31	45.81	53.81	.0342	.5275	.1261	.0447	.0326	.9638	.0000	.0000	.7645	.7122	.5070	.8966	1.3100
95	9.86	11.41	19.13	48.30	56.07	.0346	.5789	.1706	.0613	.0489	.9523	.0000	.0000	.7199	.7003	.4723	.8955	1.3143

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCT/A1 LBM/SEC SQFT
11098.	179.59	1.2372	1.8634	81.96	83.96	39.46

Rotor Pressure Ratio = 1.9269

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES   AIRFOIL AERODYNAMIC SUMMARY PRINT   04:15:42   SEPTEMBER 1,1971
NASA ENGLISH (SPECIAL)   RUN # 31,SPEED CODE 10,POINT # 5,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	V0-1 FT/SEC	V0-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	V0'-1 FT/SEC	V0'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1040.0	755.1	724.7	754.1	745.9	-38.9	45.82	-2.95	18.56	55.09	764.6	1317.7	-243.4	-1080.6	989.3	1041.7
10	21.008	21.961	1006.8	723.0	720.4	719.3	703.2	-71.2	44.31	-5.67	23.63	57.64	786.7	1344.6	-315.1	-1135.8	1018.4	1064.6
15	21.589	22.432	964.8	695.2	688.4	686.8	675.9	-93.8	44.49	-7.77	28.31	59.75	782.9	1367.6	-370.6	-1181.3	1046.5	1087.4
30	23.314	23.902	871.4	641.1	607.5	635.1	624.7	-87.6	45.80	-7.85	39.76	62.99	790.3	1398.7	-505.5	-1246.2	1130.2	1158.7
50	25.601	25.893	871.5	664.0	623.6	659.6	608.8	-76.1	44.31	-6.58	45.38	63.64	888.0	1485.7	-632.2	-1331.2	1241.0	1255.2
70	27.818	27.902	853.9	648.2	631.5	643.8	574.8	-75.2	42.31	-6.66	50.75	65.72	998.9	1566.3	-773.7	-1427.8	1348.5	1352.6
85	29.408	29.382	878.1	651.7	640.2	649.3	601.0	-56.1	43.19	-4.94	52.17	66.32	1044.0	1616.6	-824.6	-1400.4	1425.6	1424.3
90	29.914	29.856	873.5	637.2	619.4	636.0	615.7	-38.4	44.83	-3.44	53.41	66.82	1039.2	1616.1	-834.4	-1485.6	1450.1	1447.3
95	30.382	30.293	864.0	609.0	599.7	607.8	621.9	-37.5	46.04	-3.54	54.82	68.02	1041.1	1624.1	-850.9	-1506.0	1472.8	1468.5

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	3.45	6.37	13.45	48.78	55.87	.0141	.4577	.2005	.0499	.0464	.9176	.0000	.0000	.6717	.9022	.6321	.6645	1.1031
10	2.96	5.89	9.76	49.98	53.84	.0134	.4750	.2054	.0523	.0488	.9196	.0000	.0000	.6649	.8736	.6051	.6821	1.1253
15	3.95	6.89	7.13	52.26	52.40	.0173	.4853	.1751	.0454	.0409	.9360	.0000	.0000	.7094	.8353	.5810	.6761	1.1429
30	7.30	10.29	7.37	53.65	50.67	.0358	.4917	.0805	.0224	.0124	.9753	.0000	.0000	.8587	.7440	.5333	.6725	1.1634
50	7.65	10.78	9.45	50.89	49.55	.0485	.4778	.0785	.0239	.0091	.9762	.0000	.0000	.8454	.7377	.5497	.7508	1.2300
70	6.64	9.88	10.63	48.97	49.92	.0422	.4928	.0977	.0322	.0183	.9715	.0000	.0000	.8071	.7191	.5344	.8419	1.2913
85	10.83	11.10	14.95	48.13	52.01	.0474	.5195	.1545	.0538	.0373	.9536	.0000	.0000	.7097	.7334	.5316	.8719	1.3186
90	12.70	12.66	18.19	48.27	53.85	.0538	.5368	.1692	.0600	.0410	.9500	.0000	.0000	.6934	.7251	.5168	.8627	1.3105
95	12.21	13.67	20.13	49.58	56.66	.0547	.5708	.1996	.0719	.0522	.9425	.0000	.0000	.6625	.7142	.4914	.8610	1.3104

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 L.M/SEC SQFT
11110.	174.98	1.2471	1.8880	80.47	82.12	32.95

Rotor Pressure Ratio = 1.9981

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES AIRFOIL AERODYNAMIC SUMMARY PRINT 20:29:27 JULY 23,1971
NASA ENGLISH (SPECIAL) RUN # 35,SPEED CODE 10,POINT # 6,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	V0-1 FT/SEC	V0-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	V0'-1 FT/SEC	V0'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1037.4	720.1	703.2	717.9	762.7	-56.4	47.32	-4.49	17.72	56.78	738.4	1310.3	-224.8	-1096.1	987.5	1039.7
10	21.008	21.961	1003.1	692.1	699.6	687.5	718.9	-79.3	45.78	-6.60	23.05	58.94	760.7	1333.0	-297.6	-1191.9	1016.5	1062.6
15	21.589	22.432	961.3	668.0	667.5	660.7	691.7	-98.4	46.03	-8.48	27.87	60.83	756.1	1355.8	-352.9	-1183.8	1044.6	1085.4
30	23.314	23.902	878.4	628.9	597.0	621.7	644.3	-95.4	47.18	-8.73	39.01	63.59	768.5	1397.8	-483.8	-1251.9	1128.0	1156.5
50	25.601	25.893	876.9	647.3	607.9	641.5	632.0	-86.1	46.12	-7.64	44.94	64.40	858.8	1484.6	-606.6	-1338.9	1238.7	1252.8
70	27.818	27.902	867.3	636.0	613.4	630.3	613.2	-84.6	44.99	-7.65	50.04	66.28	955.7	1567.1	-732.8	-1434.7	1345.9	1350.0
85	29.408	29.382	890.5	636.8	616.4	631.1	642.7	-85.5	46.19	-7.71	51.69	67.28	994.3	1633.9	-780.2	-1507.1	1422.9	1421.6
90	29.914	29.856	884.4	625.5	589.5	621.7	659.1	-68.8	48.20	-6.31	53.22	67.67	984.4	1636.1	-788.3	-1513.4	1447.4	1444.6
95	30.382	30.293	873.7	606.3	565.4	603.2	666.0	-60.9	49.68	-5.77	54.88	68.44	983.0	1641.5	-804.0	-1526.6	1470.0	1465.7

%SPAN	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	4.95	7.87	11.91	51.81	55.87	.0194	.4983	.2161	.0537	.0489	.9119	.0000	.0000	.6737	.8977	.5995	.6398	1.0908
10	4.91	7.34	8.84	52.37	53.84	.0185	.5098	.2147	.0545	.0498	.9167	.0000	.0000	.6732	.8689	.5764	.6580	1.1100
15	5.47	8.41	6.40	54.51	52.38	.0239	.5172	.1805	.0468	.0406	.9347	.0000	.0000	.7197	.8304	.5557	.6511	1.1278
30	8.66	11.65	6.50	55.91	50.67	.0465	.5183	.0906	.0252	.0123	.9720	.0000	.0000	.8514	.7487	.5211	.6523	1.1582
50	9.44	12.57	8.38	53.76	49.55	.0649	.5116	.1005	.0305	.0108	.9694	.0000	.0000	.8192	.7400	.5332	.7233	1.2229
70	9.33	12.57	9.05	52.64	49.92	.0671	.5330	.1350	.0443	.0223	.9600	.0000	.0000	.7574	.7269	.5204	.8004	1.2821
85	13.66	14.06	12.18	53.91	52.01	.0764	.5708	.1964	.0680	.0416	.9403	.0000	.0000	.6655	.7388	.5151	.8249	1.3215
90	15.99	15.92	15.32	54.50	53.87	.0890	.5855	.2032	.0718	.0403	.9395	.0000	.0000	.6599	.7296	.5030	.8121	1.3155
95	15.89	17.27	17.91	55.45	56.07	.0937	.6066	.2167	.0778	.0442	.9372	.0000	.0000	.6451	.7173	.4852	.8069	1.3136

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11089.	171.52	1.2583	1.9148	78.83	80.67	31.76

Rotor Pressure Ratio = 2.0123

BASELINE STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 20:53:29 — JULY 7,1971

NASA ENGLISH (SPECIAL) — RUN # 31,SPEED CODE 10,POINT # 16,PAGE 36,02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1032.3	721.3	698.8	719.6	759.8	-50.2	47.40	-3.99	18.07	56.58	735.1	1306.4	-228.0	-1090.3	987.8	1040.1
10	21.008	21.961	1000.0	693.2	697.9	690.1	716.2	-64.2	45.74	-5.33	23.30	58.52	760.2	1321.8	-300.6	-1127.2	1016.8	1062.9
15	21.589	22.432	960.7	667.3	669.4	662.2	689.0	-81.4	45.84	-7.02	28.02	60.42	759.2	1342.2	-355.9	-1167.2	1044.9	1085.7
30	23.314	23.902	869.6	620.7	585.8	615.4	642.7	-80.7	47.65	-7.47	39.66	63.56	761.0	1382.1	-485.8	-1237.6	1128.4	1156.9
50	25.601	25.893	870.8	641.4	599.1	636.5	632.0	-79.0	46.53	-7.08	45.38	64.46	853.0	1476.5	-607.1	-1332.3	1239.1	1253.3
70	27.818	27.902	861.4	630.7	604.6	625.3	613.7	-82.2	45.43	-7.49	50.45	66.42	950.1	1563.3	-732.8	-1432.7	1346.4	1350.5
85	29.408	29.382	884.2	632.5	605.4	628.5	644.4	-70.9	46.79	-6.44	52.15	67.17	986.5	1619.9	-778.9	-1493.0	1423.4	1422.1
90	29.914	29.856	881.7	627.3	584.6	624.6	659.9	-58.0	48.46	-5.30	53.43	67.43	981.2	1627.7	-788.0	-1503.0	1447.9	1445.1
95	30.382	30.293	871.3	608.7	560.7	605.8	666.8	-58.6	49.94	-5.53	55.10	68.33	980.2	1640.8	-803.8	-1524.8	1470.5	1466.2

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	5.02	7.94	12.41	51.39	55.87	.0193	.4924	.2159	.0537	.0489	.9126	.0000	.0000	.6693	.8930	.6008	.6369	1.0880
10	4.39	7.32	10.11	51.07	53.84	.0181	.5026	.2181	.0555	.0509	.9158	.0000	.0000	.6644	.8657	.5775	.6571	1.1011
15	5.26	8.20	7.88	52.87	52.40	.0229	.5123	.1919	.0499	.0439	.9306	.0000	.0000	.7015	.8304	.5552	.6543	1.1168
30	9.14	12.14	7.76	55.12	50.67	.0492	.5176	.0935	.0263	.0123	.9716	.0000	.0000	.8460	.7400	.5141	.6450	1.1448
50	9.86	12.99	8.94	53.61	49.55	.0682	.5124	.1068	.0325	.0117	.9579	.0000	.0000	.6117	.7340	.5280	.7176	1.2155
70	9.77	13.01	10.00	52.92	49.92	.0708	.5353	.1437	.0472	.0240	.9580	.0000	.0000	.7416	.7209	.5157	.7950	1.2782
85	14.26	14.66	13.45	53.23	52.02	.0621	.5676	.2053	.0713	.0428	.9384	.0000	.0000	.6485	.7327	.5112	.8175	1.3093
90	16.25	16.20	16.33	53.76	53.87	.0917	.5782	.2111	.0747	.0423	.9375	.0000	.0000	.6414	.7269	.5044	.8090	1.3086
95	16.15	17.53	18.14	55.47	56.07	.0967	.6021	.2256	.0910	.0463	.9349	.0000	.0000	.6249	.7151	.4871	.8042	1.3131

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11093.	170.23	1.2583	1.9134	78.76	80.60	31.49

Rotor Pressure Ratio = 2.0146

BLOW OPTIMIZATION, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES AIRFOIL AERODYNAMIC SUMMARY PRINT 12:07:47 JULY 21,1971

NASA ENGLISH (SPECIAL) RUN # 25, SPEED CODE 10, POINT # 4, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B,-1 DEGREE	B,-2 DEGREE	V,-1 FT/SEC	V,-2 FT/SEC	VO,-1 FT/SEC	VO,-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1046.9	787.1	744.5	787.0	736.0	-56.9	44.67	-4.14	18.74	54.36	786.3	1350.8	-252.6	-1097.8	988.6	1040.9
10	21.008	21.961	1009.4	754.7	733.6	749.0	693.3	-92.0	43.38	-7.02	23.85	57.05	802.5	1377.4	-324.3	-1155.8	1017.6	1063.8
15	21.589	22.432	968.6	729.0	706.5	721.1	662.5	-107.5	43.15	-8.48	28.45	58.87	804.5	1395.0	-383.2	-1194.1	1045.7	1086.6
30	23.314	23.902	907.0	698.9	677.1	693.7	603.5	-84.9	41.71	-6.98	37.83	60.83	857.3	1423.2	-525.8	-1242.7	1129.3	1157.8
50	25.601	25.893	900.9	710.9	685.1	708.4	584.9	-59.8	40.49	-4.83	43.72	61.67	948.0	1492.8	-655.1	-1314.0	1240.1	1254.2
70	27.818	27.902	852.7	658.8	667.6	653.6	530.9	-82.9	38.96	-7.23	50.72	65.50	1055.9	1576.9	-817.1	-1434.4	1347.5	1351.5
85	29.408	29.382	852.5	639.7	655.8	637.7	544.7	-51.1	39.71	-4.57	53.30	66.61	1097.3	1606.3	-879.8	-1474.3	1424.5	1423.2
90	29.914	29.856	842.8	612.9	632.6	612.1	556.7	-30.9	41.35	-2.83	59.67	67.48	1093.9	1598.5	-892.3	-1476.6	1449.0	1446.2
95	30.382	30.293	829.1	566.5	610.2	564.8	561.3	-42.6	42.61	-4.35	56.17	69.48	1096.1	1612.4	-910.4	-1509.9	1471.7	1467.3

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	2.31	5.23	12.26	48.80	55.87	.0109	.4309	.1612	.0401	.0374	.9329	.0000	.0000	.7165	.9097	.6640	.6852	1.1366
10	2.09	5.02	8.41	50.40	53.84	.0106	.4478	.1600	.0406	.0379	.9370	.0000	.0000	.7214	.8749	.6347	.6967	1.1584
15	2.75	5.69	6.42	51.63	52.38	.0129	.4525	.1287	.0333	.0300	.9525	.0000	.0000	.7677	.8373	.6125	.6961	1.1721
30	3.27	6.27	8.24	48.69	50.66	.0173	.4406	.0713	.0199	.0150	.9764	.0000	.0000	.8608	.7786	.5864	.7373	1.1940
50	3.82	6.95	11.20	45.32	49.55	.0262	.4290	.0602	.0184	.0103	.9805	.0000	.0000	.8691	.7683	.5936	.8092	1.2469
70	2.79	6.03	10.25	45.69	49.90	.0191	.4659	.0496	.0163	.0100	.9859	.0000	.0000	.8989	.7237	.5482	.8972	1.3116
85	7.38	7.72	15.35	44.29	52.05	.0223	.4940	.0745	.0260	.0182	.9784	.0000	.0000	.8458	.7166	.5268	.9230	1.3228
90	9.41	9.25	18.74	44.18	53.80	.0259	.5205	.0962	.0342	.0250	.9728	.0000	.0000	.8177	.7046	.5016	.9152	1.3081
95	8.71	10.28	19.33	46.96	56.07	.0261	.5798	.1457	.0524	.0430	.9602	.0000	.0000	.7639	.6902	.4609	.9139	1.3117

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11101.	179.97	1.2330	1.8514	82.51	83.95	34.86

Rotor Pressure Ratio = 1.9063

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
—	.00513	1.842	82.3	.9693

BLOW OPTIMIZATION, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES AIRFOIL AERODYNAMIC SUMMARY PRINT 12:08:57 JULY 21,1971
NASA ENGLISH (SPECIAL) RUN # 25,SPEED CODE 10,POINT # 19,PAGE 38.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1047.7	795.0	744.8	793.0	736.8	-57.4	44.69	-4.14	18.60	54.14	786.0	1353.7	-250.7	-1097.2	987.5	1039.8
10	21.008	21.961	1010.2	760.1	733.8	754.3	694.3	-92.6	43.41	-7.02	23.71	56.85	801.9	1379.9	-322.3	-1155.3	1016.5	1062.6
15	21.589	22.432	969.3	734.2	706.8	726.2	663.3	-108.2	43.18	-8.47	28.32	58.68	803.9	1397.3	-381.3	-1193.6	1044.6	1085.4
30	23.319	23.902	907.5	704.5	677.2	699.3	604.2	-85.7	41.74	-6.98	37.72	60.62	856.3	1425.5	-523.9	-1242.2	1128.1	1156.6
50	25.601	25.893	901.0	716.9	684.7	714.4	585.7	-60.6	40.54	-4.85	43.65	61.46	946.2	1495.2	-653.1	-1313.5	1238.8	1252.9
70	27.818	27.902	852.2	664.7	666.9	659.3	530.4	-84.1	38.49	-7.28	50.70	65.30	1053.8	1578.6	-815.6	-1439.2	1346.0	1350.1
85	29.408	29.382	851.6	633.4	654.5	631.3	544.7	-50.4	39.77	-4.56	53.30	66.79	1095.3	1601.8	-878.3	-1472.1	1423.0	1421.7
90	29.914	29.856	841.8	612.1	631.0	611.3	557.1	-30.3	41.45	-2.82	54.68	67.49	1091.4	1596.7	-890.4	-1475.0	1447.5	1444.7
95	30.382	30.293	828.1	572.9	608.3	571.2	561.8	-43.1	42.73	-4.35	56.19	69.26	1093.2	1613.6	-908.3	-1508.9	1470.1	1465.8

%SPAN	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	2.34	5.25	12.26	48.83	55.87	.0110	.4259	.1622	.0403	.0376	.9324	.0000	.0000	.7096	.9104	.6694	.6849	1.1398
10	2.13	5.06	8.41	50.43	53.84	.0108	.4433	.1624	.0412	.0385	.9359	.0000	.0000	.7130	.8748	.6396	.6962	1.1612
15	2.77	5.72	6.43	51.65	52.38	.0130	.4481	.1321	.0342	.0308	.9512	.0000	.0000	.7577	.8377	.6172	.6957	1.1746
30	3.30	6.30	8.23	48.72	50.66	.0175	.4352	.0748	.0209	.0160	.9752	.0000	.0000	.8494	.7791	.5914	.7368	1.1966
50	3.87	7.00	11.17	45.39	49.55	.0266	.4230	.0634	.0193	.0112	.9795	.0000	.0000	.8590	.7681	.5989	.8082	1.2492
70	2.82	6.06	10.20	45.77	49.89	.0192	.4587	.0547	.0180	.0117	.9839	.0000	.0000	.8851	.7230	.5534	.8966	1.3193
85	7.49	7.83	15.38	44.32	52.06	.0225	.5006	.1063	.0371	.0292	.9692	.0000	.0000	.7858	.7155	.5213	.9211	1.3183
90	9.53	9.37	18.79	44.27	53.80	.0263	.5211	.1176	.0417	.0324	.9668	.0000	.0000	.7782	.7036	.5009	.9129	1.3065
95	8.83	10.40	19.32	47.08	56.07	.0267	.5721	.1544	.0556	.0459	.9579	.0000	.0000	.7443	.6893	.4663	.9114	1.3133

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11090.	179.83	1.2329	1.8475	82.22	83.68	34.83

Rotor Pressure Ratio = 1.9063

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
—	.00262	1.843	82.14	.9682

BLOW OPTIMIZATION, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 12:10:11 — JULY 21,1971

NASA ENGLISH (SPECIAL) — RUN # 25;SPEED CODE 10;POINT # 24;PAGE 36-02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	V0-1 FT/SEC	V0-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	V0'-1 FT/SEC	V0'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1045.8	786.2	742.7	784.2	736.2	-56.7	44.75	-4.14	18.72	54.44	784.3	1348.4	-251.7	-1096.9	987.9	1040.2
10	21.008	21.961	1008.2	754.4	731.9	740.6	693.5	-92.1	43.45	-7.03	23.85	57.05	800.6	1376.7	-323.5	-1155.1	1016.9	1063.1
15	21.589	22.432	967.4	729.3	704.7	721.3	662.8	-107.6	43.24	-8.48	28.45	58.85	802.4	1394.6	-382.3	-1193.5	1045.1	1085.9
30	23.314	23.902	905.9	699.8	675.3	694.6	603.9	-85.0	41.81	-6.98	37.84	60.79	855.2	1423.1	-524.7	-1242.0	1128.6	1157.0
50	25.601	25.893	899.9	711.7	683.6	709.2	585.3	-59.8	40.57	-4.82	43.73	61.63	946.0	1492.4	-654.0	-1313.2	1239.3	1253.4
70	27.818	27.902	851.7	659.2	666.0	654.0	530.8	-82.8	36.55	-7.22	50.74	65.47	1053.4	1575.7	-815.8	-1433.5	1346.6	1350.7
85	29.408	29.382	851.5	641.7	654.0	639.6	545.2	-51.3	39.82	-4.58	53.33	66.54	1095.1	1606.5	-878.3	-1473.6	1423.6	1422.3
90	29.914	29.856	841.7	614.9	630.8	614.1	557.1	-30.5	41.46	-2.83	54.70	67.41	1091.7	1598.5	-890.9	-1475.8	1440.1	1445.2
95	30.382	30.293	827.9	566.8	608.3	565.1	561.6	-42.6	42.72	-4.35	56.21	69.46	1093.9	1611.6	-909.1	-1509.0	1470.7	1966.4

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	2.39	5.31	12.26	48.89	55.87	.0111	.4330	.1735	.0431	.0404	.9279	.0000	.0000	.6956	.9088	.6614	.6833	1.1343
10	2.15	5.08	8.41	50.48	53.84	.0108	.4476	.1682	.0427	.0399	.9338	.0000	.0000	.7048	.8739	.6394	.6950	1.1578
15	2.83	5.77	6.41	51.73	52.37	.0131	.4518	.1364	.0353	.0319	.9498	.0000	.0000	.7519	.8365	.6127	.6941	1.1717
30	3.37	6.36	8.24	48.78	50.66	.0176	.4392	.0779	.0217	.0168	.9743	.0000	.0000	.8464	.7777	.5871	.7351	1.1990
50	3.90	7.04	11.20	45.39	49.55	.0266	.4277	.0666	.0203	.0122	.9785	.0000	.0000	.8539	.7675	.5942	.8073	1.2462
70	2.89	6.12	10.25	45.78	49.90	.0194	.4645	.0572	.0188	.0124	.9832	.0000	.0000	.8824	.7228	.5485	.8952	1.3111
85	7.46	7.82	15.34	44.40	52.05	.0227	.4913	.0787	.0274	.0195	.9772	.0000	.0000	.8369	.7157	.5286	.9211	1.3231
90	9.51	9.35	18.79	44.28	53.80	.0264	.5178	.1008	.0358	.0264	.9716	.0000	.0000	.8081	.7036	.5033	.9133	1.3083
95	8.83	10.39	19.33	47.07	56.07	.0266	.5790	.1538	.0553	.0458	.9580	.0000	.0000	.7496	.6892	.4612	.9119	1.3111

NCORR INLET	WCORR INLET	TO/TO INLET	PO/PO INLET	EFF-AD INLET	EFF-P INLET	WC1/A1 LBM/SEC
RPM 11094.	LBM/SEC 179.69	1.2330	1.8469	% 82.15	% 83.62	SQFT 39.79

Rotor Pressure Ratio = 1.9063

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
—	.00263	1.842	82.11	.9678

BLOW OPTIMIZATION, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES AIRFOIL AERODYNAMIC SUMMARY PRINT 12:11:20 JULY 21,1971

NASA ENGLISH (SPECIAL) RUN # 25,SPEED CODE 10,POINT # 34,PAGE 36,02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1048.6	791.0	744.8	788.9	738.2	-57.1	44.74	-4.14	18.37	54.22	784.9	1349.4	-247.3	-1094.7	985.5	1037.7
10	21.008	21.961	1011.2	757.3	734.1	751.5	695.4	-92.4	43.45	-7.02	23.49	56.89	800.8	1376.3	-319.0	-1152.8	1014.4	1060.5
15	21.589	22.432	970.3	732.0	707.0	724.0	664.5	-107.9	43.22	-8.48	28.10	58.71	802.4	1394.0	-378.0	-1191.1	1042.5	1083.2
30	23.319	23.902	908.7	703.5	677.7	698.3	605.9	-85.5	41.77	-6.98	37.52	60.61	854.5	1422.9	-520.4	-1239.7	1125.8	1154.2
50	25.601	25.893	902.3	714.4	685.4	711.8	586.8	-60.2	40.57	-4.84	43.46	61.49	944.2	1491.4	-649.4	-1310.6	1236.2	1250.3
70	27.818	27.902	853.7	662.3	667.8	657.0	531.8	-83.5	38.53	-7.25	50.52	65.33	1051.2	1574.6	-811.5	-1430.8	1343.3	1347.3
85	29.408	29.382	853.3	637.6	655.6	635.5	546.2	-50.8	39.80	-4.57	53.12	66.62	1092.5	1601.2	-873.9	-1469.7	1420.1	1418.8
90	29.914	29.856	843.6	619.3	632.2	613.5	558.3	-30.4	41.45	-2.83	54.50	67.38	1088.7	1594.9	-886.2	-1472.1	1444.5	1441.7
95	30.382	30.293	829.9	569.9	609.7	568.1	563.0	-42.9	42.72	-4.35	56.01	69.32	1090.5	1609.5	-904.1	-1505.7	1467.1	1462.8

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	2.38	5.30	12.26	48.88	55.87	.0113	.4305	.1660	.0413	.0385	.9307	.0000	.0000	.7075	.9116	.6657	.6841	1.1357
10	2.15	5.09	8.41	50.47	53.84	.0110	.4469	.1640	.0416	.0388	.9352	.0000	.0000	.7130	.8763	.6370	.6959	1.1578
15	2.82	5.76	6.42	51.70	52.37	.0133	.4512	.1324	.0343	.0309	.9510	.0000	.0000	.7596	.8391	.6152	.6945	1.1716
30	3.33	6.33	8.24	48.75	50.66	.0177	.4373	.0722	.0201	.0152	.9761	.0000	.0000	.8569	.7803	.5905	.7351	1.1942
50	3.90	7.03	11.19	45.41	49.55	.0268	.4269	.0636	.0194	.0112	.9794	.0000	.0000	.8605	.7695	.5967	.8064	1.2456
70	2.86	6.10	10.22	45.78	49.90	.0195	.4628	.0541	.0178	.0114	.9840	.0000	.0000	.8804	.7246	.5513	.8941	1.3106
85	7.49	7.83	15.36	44.36	52.05	.0228	.4975	.0914	.0318	.0239	.9734	.0000	.0000	.8139	.7172	.5249	.9190	1.3183
90	9.52	9.37	18.74	44.28	53.80	.0265	.5200	.1065	.0378	.0284	.9699	.0000	.0000	.7983	.7053	.5028	.9109	1.3053
95	8.83	10.40	19.32	47.08	56.07	.0268	.5771	.1527	.0549	.0453	.9582	.0000	.0000	.7504	.6909	.4638	.9093	1.3097

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11067.	179.87	1.2330	1.8483	82.28	83.74	34.83

Rotor Pressure Ratio = 1.9063

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
–	.00283	1.843	82.21	.9686

BLOW OPTIMIZATION, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 12:12:36 — JULY 21,1971

NASA ENGLISH (SPECIAL) — RUN # 25;SPEED CODE 10;POINT # 44;PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B,-1 DEGREE	B,-2 DEGREE	V,-1 FT/SEC	V,-2 FT/SEC	VO,-1 FT/SEC	VO,-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1046.3	791.9	743.6	789.9	736.0	-57.1	44.71	-4.14	18.75	54.27	785.4	1352.6	-252.4	-1097.9	980.5	1040.8
10	21.008	21.961	1008.8	757.0	732.6	751.2	693.4	-92.3	43.42	-7.02	23.87	56.97	801.5	1378.8	-324.1	-1155.9	1017.5	1063.7
15	21.589	22.432	967.9	731.3	705.5	723.3	662.6	-107.8	43.20	-8.48	28.48	58.80	803.5	1396.3	-383.1	-1194.3	1045.6	1086.5
30	23.319	23.902	906.2	702.9	675.9	697.2	603.6	-85.9	41.76	-6.98	37.87	60.71	856.3	1425.2	-525.6	-1243.1	1129.2	1157.7
50	25.601	25.893	899.9	713.7	683.8	711.1	585.0	-60.2	40.55	-4.84	43.76	61.58	946.9	1494.3	-654.9	-1319.3	1240.0	1254.1
70	27.818	27.902	851.4	660.4	666.1	655.1	530.3	-83.2	38.52	-7.25	50.78	65.45	1054.5	1577.3	-817.1	-1434.6	1347.3	1351.4
85	29.408	29.382	851.1	637.0	653.9	634.9	544.7	-50.8	39.79	-4.57	53.37	66.70	1096.1	1604.9	-879.7	-1473.9	1424.4	1423.1
90	29.914	29.856	841.3	613.6	630.6	612.8	556.7	-30.4	41.95	-2.83	54.75	67.46	1092.6	1598.6	-892.1	-1476.5	1448.9	1446.1
95	30.382	30.293	827.5	569.5	608.0	567.8	561.3	-42.8	42.72	-4.35	56.26	69.39	1094.7	1613.5	-910.2	-1510.0	1471.5	1467.2

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	2.35	5.27	12.26	48.85	55.87	.0110	.4279	.1654	.0411	.0384	.9312	.0000	.0000	.7055	.9091	.6666	.6843	1.1384
10	2.13	5.07	8.41	50.44	53.84	.0107	.4453	.1655	.0420	.0393	.9349	.0000	.0000	.7085	.8737	.6368	.6958	1.1599
15	2.79	5.73	6.43	51.67	52.38	.0130	.4500	.1350	.0350	.0316	.9503	.0000	.0000	.7534	.8366	.6145	.6953	1.1739
30	3.32	6.32	8.24	48.74	50.66	.0175	.4364	.0756	.0211	.0162	.9751	.0000	.0000	.8490	.7779	.5895	.7364	1.1961
50	3.88	7.01	11.18	45.39	49.55	.0265	.4256	.0664	.0203	.0122	.9786	.0000	.0000	.8535	.7673	.5960	.8084	1.2480
70	2.85	6.09	10.23	45.77	49.90	.0193	.4628	.0593	.0195	.0132	.9826	.0000	.0000	.8774	.7225	.5496	.8965	1.3126
85	7.46	7.81	15.36	44.36	52.05	.0226	.4963	.0938	.0327	.0248	.9728	.0000	.0000	.8093	.7152	.5244	.9218	1.3213
90	9.50	9.35	18.74	44.27	53.80	.0263	.5189	.1091	.0387	.0294	.9693	.0000	.0000	.7933	.7032	.5022	.9139	1.3082
95	8.82	10.39	19.33	47.06	56.07	.0266	.5755	.1548	.0557	.0461	.9578	.0000	.0000	.7459	.6888	.4635	.9125	1.3129

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11100.	179.71	1.2330	1.8468	82.15	83.61	34.81

Rotor Pressure Ratio = 1.9063

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
–	.00249	1.842	82.10	.9679

BLOW OPTIMIZATION, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES AIRFOIL AERODYNAMIC SUMMARY PRINT 12:13:55 JULY 21,1971

NASA ENGLISH (SPECIAL) RUN # 25, SPEED CODE 10, POINT # 59, PAGE 36.02

% SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1047.4	792.5	745.6	790.4	735.5	-57.2	44.61	-4.19	18.77	54.26	787.7	1353.4	-253.5	-1098.5	989.0	1041.4
10	21.008	21.961	1010.0	761.3	734.8	755.5	692.9	-92.9	43.32	-7.03	23.87	56.85	803.9	1382.1	-325.1	-1157.1	1018.0	1064.2
15	21.589	22.432	969.2	736.4	707.7	728.4	662.2	-108.6	43.09	-8.48	28.46	58.65	805.9	1400.1	-384.0	-1195.7	1046.2	1087.1
30	23.314	23.902	907.7	707.1	678.3	701.9	603.3	-86.0	41.65	-6.98	37.82	60.57	858.7	1428.6	-526.5	-1244.3	1129.8	1158.3
50	25.601	25.893	901.4	719.3	685.9	716.7	584.8	-60.8	40.45	-4.85	43.71	61.42	949.0	1498.2	-655.8	-1315.6	1240.6	1254.8
70	27.818	27.902	852.7	664.2	668.2	658.8	529.6	-84.1	38.40	-7.28	50.79	65.35	1056.8	1580.2	-818.4	-1436.2	1348.1	1352.1
85	29.408	29.382	852.1	635.2	656.0	633.2	543.8	-50.5	39.66	-4.55	53.34	66.76	1098.7	1604.6	-881.3	-1474.4	1425.1	1423.8
90	29.914	29.856	842.3	612.8	632.6	612.0	556.1	-30.4	41.32	-2.83	54.71	67.50	1099.9	1598.9	-893.6	-1477.2	1449.6	1446.8
95	30.382	30.293	828.7	567.4	609.9	565.7	560.9	-43.0	42.61	-4.38	56.21	69.47	1096.7	1613.6	-911.4	-1511.0	1472.3	1468.0

% SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P PROFILE	LOSS-P	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	2.25	5.17	12.26	48.75	55.87	.0108	.4278	.1675	.0416	.0390	.9302	.0000	.0000	.7020	.9104	.6671	.6864	1.1392
10	2.02	4.95	8.41	50.34	53.84	.0105	.4418	.1610	.0409	.0382	.9365	.0000	.0000	.7136	.8752	.6407	.6980	1.1632
15	2.69	5.63	6.42	51.57	52.37	.0127	.4455	.1284	.0333	.0300	.9526	.0000	.0000	.7626	.8379	.6172	.6974	1.1773
30	3.21	6.21	8.29	48.63	50.66	.0171	.4322	.0694	.0193	.0146	.9770	.0000	.0000	.8596	.7793	.5937	.7388	1.1994
50	3.77	6.91	11.17	45.30	49.55	.0261	.4204	.0580	.0177	.0097	.9812	.0000	.0000	.8698	.7604	.6011	.8107	1.2519
70	2.73	5.96	10.19	45.68	49.89	.0188	.4592	.0555	.0182	.0121	.9836	.0000	.0000	.8839	.7235	.5530	.8992	1.3156
85	7.40	7.72	15.38	44.21	52.06	.0220	.4984	.1024	.0357	.0280	.9703	.0000	.0000	.7910	.7159	.5229	.9240	1.3208
90	9.42	9.26	18.73	44.15	53.79	.0257	.5202	.1163	.0413	.0322	.9672	.0000	.0000	.7789	.7040	.5015	.9159	1.3084
95	8.70	10.29	19.30	46.99	56.07	.0260	.5786	.1644	.0591	.0498	.9551	.0000	.0000	.7317	.6897	.4617	.9144	1.3128

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11106.	180.13	1.2329	1.8486	82.32	83.77	34.89

Rotor Pressure Ratio = 1.9063

BLOW ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES AIRFOIL AERODYNAMIC SUMMARY PRINT 22:26:34 JULY 20,1971

NASA ENGLISH (SPECIAL) RUN # 32,SPEED CODE 70,POINT # 11,PAGE 36,02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	852.7	862.2	682.8	861.4	510.7	-37.9	36.79	-2.52	14.70	41.58	706.0	1151.5	-179.1	-764.2	689.8	726.3
10	21.008	21.961	816.5	828.3	666.4	825.7	471.8	-64.4	35.29	-4.47	19.68	44.33	708.1	1154.5	-238.3	-806.7	710.1	742.3
15	21.589	22.432	782.5	800.8	649.1	796.9	436.9	-79.0	33.92	-5.68	24.25	46.41	713.0	1156.1	-292.8	-837.2	729.7	758.2
30	23.314	23.902	716.6	736.0	624.0	730.4	352.1	-90.9	29.43	-7.06	34.92	50.88	761.4	1157.9	-435.9	-898.3	788.0	807.9
50	25.601	25.893	670.8	681.0	607.4	674.2	284.6	-95.7	25.10	-8.08	43.70	55.22	840.5	1182.2	-580.7	-970.9	865.3	875.2
70	27.818	27.902	636.7	627.5	592.0	620.0	234.2	-96.5	21.58	-8.85	50.00	59.19	921.6	1210.5	-706.1	-1039.6	940.2	943.1
85	29.408	29.382	624.1	586.3	580.7	579.5	228.6	-88.9	21.50	-8.72	52.82	61.82	960.8	1227.5	-765.4	-1082.0	994.0	993.1
90	29.914	29.856	598.8	566.7	551.3	560.4	233.6	-84.3	22.98	-8.55	54.67	62.86	953.2	1228.7	-777.5	-1093.4	1011.1	1009.1
95	30.382	30.293	570.3	520.3	519.1	511.8	236.1	-93.7	24.47	-10.40	56.72	65.39	946.1	1229.4	-790.8	-1117.6	1026.9	1023.9

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-5.51	-2.59	13.88	39.31	55.87	.0000	.1457	.0741	.0185	.0185	.9762	.0000	.0000	3.6295	.7626	.7744	.6328	1.0343
10	-6.11	-3.18	10.96	39.76	53.84	.0000	.1506	.0666	.0170	.0170	.9801	.0000	.0000	2.1715	.7244	.7430	.6335	1.0357
15	-6.65	-3.71	9.35	39.59	52.53	.0000	.1469	.0460	.0120	.0120	.9872	.0000	.0000	1.5234	.6946	.7177	.6390	1.0360
30	-9.22	-6.22	8.16	36.49	50.67	.0000	.1450	.0338	.0094	.0094	.9919	.0000	.0000	1.3000	.6363	.6586	.6846	1.0362
50	-11.73	-8.59	7.95	33.19	49.59	.0000	.1579	.0403	.0122	.0122	.9913	.0000	.0000	1.7180	.5964	.6086	.7545	1.0565
70	-14.23	-10.99	8.60	30.43	49.87	.0000	.1863	.0583	.0191	.0191	.9885	.0000	.0000	-1.0694	.5671	.5600	.8273	1.0802
85	-10.88	-10.42	11.25	30.21	52.11	.0000	.2383	.0967	.0334	.0334	.9817	.0000	.0000	.2555	.5519	.5204	.8543	1.0893
90	-8.64	-9.07	12.92	31.53	53.70	.0000	.2423	.0546	.0192	.0192	.9904	.0000	.0000	.5094	.5283	.5014	.8446	1.0870
95	-9.42	-7.82	13.28	34.87	56.07	.0000	.2964	.0945	.0335	.0335	.9849	.0000	.0000	.4799	.5022	.4582	.8359	1.0825

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
7746.	134.86	1.0842	1.2585	80.68	81.29	36.76

Rotor Pressure Ratio = 1.2720

$\frac{W_{BLEED}}{W_{TOTAL}}$	$\frac{W_{BLOW}}{W_{TOTAL}}$	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
—	.00685	1.250	78.96	.9846

BLOW ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 22:27:51 — JULY 20,1971

NASA ENGLISH (SPECIAL) — RUN # 32; SPEED CODE 70; POINT # 14; PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	794.2	707.8	596.9	707.8	523.9	-4.8	41.27	-.39	15.53	45.93	619.6	1017.6	-165.9	-731.1	689.8	726.3
10	21.008	21.961	759.6	669.3	583.6	662.2	486.3	-48.4	39.80	-4.21	20.98	50.04	625.9	1031.7	-223.7	-790.6	710.0	742.2
15	21.589	22.432	725.0	637.7	562.9	634.3	457.0	-64.9	39.06	-5.85	25.84	52.38	626.3	1039.3	-272.7	-823.0	729.6	758.1
30	23.314	23.902	656.1	589.3	521.3	586.1	398.3	-61.7	37.37	-6.01	36.75	56.01	651.0	1048.7	-389.7	-869.5	787.9	807.8
50	25.601	25.893	620.1	549.5	515.1	545.4	345.4	-66.9	33.84	-6.99	45.25	59.92	731.9	1088.6	-519.9	-942.0	865.2	875.1
70	27.818	27.902	599.7	518.7	508.6	513.9	317.6	-70.2	31.98	-7.78	50.73	63.10	804.1	1136.1	-622.6	-1013.2	940.2	943.0
85	29.408	29.382	597.6	499.6	497.6	496.9	330.8	-52.0	33.61	-5.97	53.11	64.57	829.1	1157.2	-663.1	-1045.0	993.9	993.0
90	29.914	29.856	586.5	488.2	477.2	486.5	340.8	-41.1	35.55	-4.82	54.55	65.14	822.8	1157.3	-670.2	-1050.1	1011.0	1009.0
95	30.382	30.293	574.0	462.8	459.2	460.1	344.3	-48.9	36.87	-6.08	56.07	66.78	822.7	1167.3	-682.5	-1072.7	1026.8	1023.8

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-1.06	1.86	16.00	41.66	55.67	.0000	.2706	.0897	.0224	.0224	.9746	.0000	.0000	.6414	.7038	.6229	.5508	.8955
10	-1.54	1.39	11.22	44.01	53.84	.0000	.3022	.1148	.0293	.0293	.9698	.0000	.0000	.6064	.6608	.5835	.5547	.9063
15	-1.35	1.59	9.18	44.91	52.54	.0000	.3062	.0931	.0243	.0243	.9774	.0000	.0000	.6603	.6386	.5596	.5548	.9121
30	-1.15	1.85	9.21	43.39	50.67	.0000	.2968	.0244	.0068	.0068	.9950	.0000	.0000	.9059	.5768	.5163	.5772	.9188
50	-2.88	.26	9.04	40.83	49.58	.0000	.3167	.0292	.0089	.0089	.9946	.0000	.0000	.8821	.5451	.4809	.6472	.9526
70	-3.71	-.47	9.68	39.75	49.88	.0000	.3491	.0348	.0114	.0114	.9940	.0000	.0000	.8745	.5266	.4528	.7087	.9917
85	1.18	1.63	13.97	39.59	52.08	.0000	.3880	.0546	.0190	.0190	.9907	.0000	.0000	.8185	.5218	.4334	.7246	1.0039
90	3.64	3.43	16.75	40.36	53.79	.0000	.3992	.0382	.0135	.0135	.9938	.0000	.0000	.8723	.5106	.4222	.7168	1.0008
95	3.01	4.53	17.59	42.95	56.06	.0000	.4411	.0612	.0220	.0220	.9904	.0000	.0000	.8363	.4986	.3990	.7154	1.0064

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
7796.	123.71	1.1026	1.3351	83.91	84.56	32.06

Rotor Pressure Ratio = 1.3484

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
–	.00738	1.326	82.55	.9855

BLOW ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 22:29:07 — JULY 20,1971

NASA ENGLISH (SPECIAL) — RUN # 32, SPEED CODE 70, POINT # 15, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.909	21.489	778.7	655.5	562.7	655.5	538.3	1.4	43.73	.12	15.11	47.90	583.0	977.6	-152.0	-725.3	690.2	726.8
10	21.008	21.961	748.6	615.6	555.0	614.0	502.3	-41.0	42.14	-3.86	20.56	51.91	593.2	995.9	-208.2	-783.7	710.5	742.7
15	21.589	22.432	714.1	589.1	533.8	586.3	474.4	-56.9	41.63	-5.55	25.59	54.28	592.8	1004.7	-255.7	-815.5	730.1	758.7
30	23.314	23.902	645.4	536.7	492.6	533.9	417.0	-54.7	40.24	-5.85	36.99	58.25	617.2	1014.9	-371.5	-863.0	788.5	808.4
50	25.601	25.893	602.8	498.5	475.1	494.6	371.0	-62.8	37.99	-7.23	46.15	62.21	686.1	1060.9	-494.8	-938.5	865.8	875.7
70	27.818	27.902	596.5	483.5	476.3	479.4	359.0	-62.7	37.00	-7.45	50.68	69.52	752.0	1114.8	-581.8	-1006.4	940.8	943.7
85	29.408	29.382	597.2	473.4	459.7	471.9	381.1	-37.4	39.66	-4.53	53.15	65.41	766.6	1133.9	-613.5	-1031.1	994.6	993.7
90	29.914	29.856	587.0	462.6	443.1	461.2	384.9	-36.9	40.98	-4.58	54.74	66.22	767.7	1143.8	-626.8	-1046.6	1011.7	1009.7
95	30.382	30.293	578.6	441.5	431.6	439.2	385.3	-45.2	41.76	-5.89	56.10	67.68	773.8	1156.4	-642.2	-1069.7	1027.5	1024.5

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	1.37	4.30	16.52	43.60	55.07	.0003	.3257	.0980	.0244	.0244	.9733	.0000	.0000	.7203	.6878	.5728	.5168	.8543
10	.83	3.77	11.58	46.00	53.85	.0002	.3597	.1254	.0320	.0319	.9680	.0000	.0000	.6827	.6575	.5373	.5243	.8692
15	1.23	4.17	9.49	47.18	52.55	.0003	.3669	.1042	.0272	.0271	.9755	.0000	.0000	.7255	.6275	.5136	.5232	.8759
30	1.79	4.78	9.37	46.09	50.67	.0009	.3718	.0505	.0141	.0139	.9901	.0000	.0000	.8597	.5659	.4670	.5439	.8832
50	1.30	4.43	8.80	45.22	49.59	.0008	.3925	.0269	.0082	.0079	.9953	.0000	.0000	.9195	.5280	.4330	.6021	.9214
70	1.34	4.50	10.02	44.46	49.90	.0012	.4235	.0401	.0132	.0128	.9932	.0000	.0000	.8933	.5210	.4185	.6571	.9698
85	7.01	7.52	15.38	44.19	52.05	.0050	.4524	.0522	.0182	.0165	.9913	.0000	.0000	.8731	.5184	.4067	.6655	.9748
90	8.92	8.77	17.02	45.56	53.82	.0060	.4675	.0420	.0149	.0120	.9932	.0000	.0000	.8980	.5082	.3968	.6648	.9810
95	7.93	9.39	17.78	47.65	56.06	.0050	.5057	.0694	.0249	.0231	.9891	.0000	.0000	.8477	.5000	.3778	.6690	.9895

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
7751.	117.53	1.1114	1.3572	81.92	82.68	30.06

Rotor Pressure Ratio = 1.3731

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
–	.00772	1.348	80.56	.9832

BLOW ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 22:30:29 — JULY 20,1971

NASA ENGLISH (SPECIAL) — RUN # 32, SPEED CODE 70, POINT # 16, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	766.0	613.8	536.8	613.6	546.4	-14.5	45.51	-1.35	15.05	50.41	555.9	962.7	-144.4	-741.8	690.8	727.4
10	21.008	21.961	737.0	578.4	529.9	577.6	512.2	-28.6	44.02	-2.85	20.57	53.19	566.4	964.3	-198.9	-771.9	711.1	743.3
15	21.589	22.432	704.9	552.4	510.1	551.3	486.5	-35.7	43.64	-3.72	25.59	55.26	566.5	967.7	-244.3	-795.0	730.7	759.3
30	23.314	23.902	638.1	498.2	467.6	496.9	434.3	-36.3	42.88	-4.18	37.16	59.54	587.4	980.7	-354.6	-845.3	789.1	809.0
50	25.601	25.893	590.4	453.5	438.4	451.7	395.5	-40.6	42.06	-5.14	47.04	63.77	643.5	1022.3	-471.0	-917.0	866.5	876.4
70	27.818	27.902	590.6	448.4	438.9	446.6	395.2	-40.1	42.00	-5.13	51.21	65.60	700.9	1081.1	-546.3	-984.5	941.6	944.4
85	29.408	29.382	592.1	441.6	418.6	440.4	418.7	-32.4	45.01	-4.20	54.03	66.79	712.6	1117.4	-576.7	-1026.9	995.4	994.5
90	29.914	29.856	588.0	436.1	412.0	434.9	419.4	-32.1	45.51	-4.23	55.21	67.36	722.2	1129.8	-593.1	-1042.7	1012.5	1010.6
95	30.382	30.293	582.3	424.6	405.7	423.3	417.8	-32.9	45.84	-4.45	56.39	68.20	733.1	1139.8	-610.6	-1058.3	1028.4	1025.4

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-D	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	3.14	6.06	15.05	46.86	55.87	.0012	.3768	.1106	.0276	.0273	.9708	.0000	.0000	.7407	.6749	.5337	.4918	.8372
10	2.70	5.64	12.58	46.87	53.84	.0011	.3991	.1312	.0335	.0332	.9675	.0000	.0000	.7154	.6468	.5025	.4998	.8378
15	3.24	6.18	11.33	47.35	52.56	.0017	.4070	.1159	.0303	.0298	.9735	.0000	.0000	.7421	.6188	.4795	.4988	.8398
30	4.45	7.44	11.04	47.06	50.67	.0046	.4241	.0759	.0213	.0200	.9855	.0000	.0000	.8275	.5587	.4314	.5151	.8491
50	5.36	8.49	10.90	47.20	49.60	.0089	.4572	.0560	.0171	.0144	.9907	.0000	.0000	.8773	.5151	.3914	.5610	.8823
70	6.31	9.55	12.35	47.13	49.91	.0159	.4848	.0730	.0241	.0188	.9880	.0000	.0000	.8502	.5130	.3852	.6080	.9287
85	12.30	12.85	15.68	49.22	52.03	.0331	.5206	.0904	.0315	.0200	.9853	.0000	.0000	.8194	.5111	.3768	.6144	.9533
90	13.36	13.27	17.39	49.74	53.85	.0305	.5316	.0917	.0325	.0217	.9853	.0000	.0000	.8169	.5066	.3715	.6220	.9624
95	12.06	13.46	19.23	50.29	56.06	.0251	.5505	.1049	.0377	.0287	.9835	.0000	.0000	.7961	.5011	.3612	.6308	.9696

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT	AREA SQFT
7757.	110.87	1.1186	1.3679	78.97	79.88	28.15	2.995

Rotor Pressure Ratio = 1.3905

W_{BLEED} / W_{TOTAL}	W_{BLOW} / W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
–	.00816	1.358	77.65	.9793

BLOW ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 13:16:07 — JULY 20,1971

NASA ENGLISH (SPECIAL) — RUN # 32,SPEED CODE 10,POINT # 11,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE
5	20.409	21.489	1075.6	1015.8	820.4	1012.9	695.6	-75.7	40.30	-4.27
10	21.008	21.961	1037.3	994.0	807.0	990.4	651.6	-84.5	38.91	-4.88
15	21.589	22.432	1008.7	977.7	794.8	972.9	621.1	-96.7	38.00	-5.68
30	23.314	23.902	948.3	922.0	775.8	915.0	545.4	-113.0	35.11	-7.04
50	25.601	25.893	902.1	871.7	761.6	865.1	483.3	-106.9	32.39	-7.05
70	27.818	27.902	831.3	777.8	721.3	768.3	413.1	-121.5	29.79	-8.99
85	29.408	29.382	825.0	740.5	719.2	733.3	404.0	-103.0	29.33	-7.99
90	29.914	29.856	811.3	727.2	696.4	721.9	416.0	-87.9	30.85	-6.94
95	30.382	30.293	760.9	655.3	633.2	648.6	421.5	-93.2	33.69	-8.20

%SPAN	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	19.65	47.79	871.2	1507.6	-292.9	-1116.6	988.6	1040.9
10	24.39	49.22	886.4	1516.4	-366.0	-1148.2	1017.6	1063.7
15	28.09	50.57	901.8	1532.1	-424.7	-1183.3	1045.7	1086.6
30	36.96	54.24	971.1	1566.0	-583.9	-1270.7	1129.3	1157.8
50	44.79	57.55	1074.0	1613.0	-756.8	-1361.1	1240.1	1254.2
70	52.31	62.45	1180.7	1661.4	-934.4	-1473.0	1347.5	1351.5
85	54.82	69.34	1248.5	1693.3	-1020.5	-1526.2	1424.5	1423.2
90	56.01	64.80	1245.9	1695.4	-1033.0	-1534.1	1449.0	1446.2
95	58.92	67.43	1226.6	1690.3	-1050.1	-1560.5	1471.6	1467.3

%SPAN	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE
5	-2.08	.89	12.12	44.57	55.87	.0030	.2307	.1896	.0471	.0464
10	-2.42	.52	10.56	43.79	53.84	.0027	.2200	.1559	.0397	.0390
15	-2.43	.51	9.25	43.68	52.41	.0030	.2144	.1276	.0333	.0325
30	-3.37	-.37	8.18	42.14	50.66	.0025	.2212	.1130	.0315	.0308
50	-4.34	-1.20	8.99	39.44	49.59	.0018	.2333	.1050	.0319	.0314
70	-5.95	-2.71	8.46	38.78	49.88	.0001	.2772	.1288	.0422	.0421
85	-3.17	-2.66	11.97	37.32	52.13	.0000	.3173	.1641	.0568	.0568
90	-.81	-1.28	14.55	37.79	53.74	.0000	.3245	.1446	.0510	.0510
95	-.11	1.42	15.47	41.90	56.09	.0001	.3831	.1827	.0652	.0652

%SPAN	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	.9169	.0000	.0000	-.2943	.9454	.8855	.7676	1.3143
10	.9352	.0000	.0000	-.4367	.9087	.8671	.7788	1.3227
15	.9492	.0000	.0000	-.6017	.0819	.8525	.7911	1.3359
30	.9591	.0000	.0000	-.6214	.8255	.8016	.8509	1.3615
50	.9649	.0000	.0000	-.2792	.7818	.7549	.9363	1.3968
70	.9623	.0000	.0000	.1483	.7184	.6701	1.0271	1.4313
85	.9529	.0000	.0000	.2838	.7106	.6331	1.0773	1.4476
90	.9599	.0000	.0000	.3731	.6954	.6185	1.0693	1.4420
95	.9550	.0000	.0000	.3830	.6455	.5523	1.0434	1.4244

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
11101.	181.90	1.1945	1.6399	77.94	79.45	38.67

Rotor Pressure Ratio = 1.7138

$\frac{W_{BLEED}}{W_{TOTAL}}$	$\frac{W_{BLOW}}{W_{TOTAL}}$	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
–	.00533	1.631	77.50	.9553

BLOW ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 13:17:27 — JULY 20, 1971

NASA ENGLISH (SPECIAL) — RUN # 32, SPEED CODE 10, POINT # 12, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1072.1	887.5	792.6	885.4	721.9	-61.7	42.32	-3.98	18.69	51.29	836.8	1414.6	-267.4	-1103.3	989.3	1041.6
10	21.008	21.961	1030.3	854.1	777.1	851.1	676.4	-71.3	41.03	-4.80	23.74	53.15	849.4	1419.5	-341.9	-1135.8	1018.3	1064.5
15	21.589	22.432	991.9	826.7	756.4	822.4	641.6	-83.6	40.29	-5.82	28.13	54.91	858.8	1431.1	-404.9	-1170.9	1046.5	1087.3
30	23.314	23.902	925.8	776.0	727.7	770.9	572.3	-89.2	38.18	-6.60	37.47	58.29	916.9	1466.7	-557.8	-1247.8	1130.1	1158.6
50	25.601	25.893	909.5	759.6	732.5	755.7	539.0	-76.7	36.35	-5.81	43.76	60.42	1014.7	1531.5	-701.9	-1331.8	1240.9	1255.1
70	27.818	27.902	839.2	678.2	695.2	670.5	470.0	-101.8	34.06	-8.64	51.61	65.24	1120.5	1601.5	-878.4	-1454.3	1348.4	1352.5
85	29.408	29.382	839.1	651.7	684.8	647.4	484.9	-74.0	35.31	-6.51	53.94	66.63	1163.5	1632.1	-940.6	-1498.2	1425.5	1424.2
90	29.914	29.856	824.1	632.1	657.9	629.2	496.1	-59.8	37.03	-5.42	55.41	67.34	1158.9	1633.1	-953.9	-1507.0	1450.0	1447.2
95	30.382	30.293	809.5	576.2	630.2	572.9	500.0	-61.6	38.43	-6.15	57.06	69.47	1159.1	1633.9	-972.7	-1530.0	1472.7	1468.4

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-.02	2.90	12.41	46.31	55.87	.0064	.3503	.1163	.0289	.0273	.9495	.0000	.0000	.7287	.9369	.7570	.7337	1.2068
10	-.28	2.65	10.64	45.83	53.84	.0060	.3532	.0984	.0251	.0235	.9598	.0000	.0000	.7783	.8940	.7285	.7424	1.2106
15	-.11	2.83	9.16	46.11	52.47	.0064	.3552	.0729	.0190	.0173	.9719	.0000	.0000	.8272	.8596	.7043	.7495	1.2194
30	-.28	2.72	8.62	44.78	50.66	.0071	.3606	.0419	.0117	.0097	.9856	.0000	.0000	.8840	.8005	.6594	.7989	1.2463
50	-.37	2.76	10.23	42.15	49.58	.0098	.3712	.0562	.0171	.0141	.9813	.0000	.0000	.8615	.7795	.6427	.8778	1.2956
70	-1.69	1.55	8.81	42.70	49.88	.0043	.4174	.0458	.0150	.0136	.9866	.0000	.0000	.9041	.7174	.5718	.9658	1.3503
85	3.01	3.93	13.45	41.82	52.10	.0055	.4569	.0778	.0270	.0251	.9776	.0000	.0000	.8126	.7110	.5433	.9881	1.3608
90	5.34	5.02	16.07	42.45	53.73	.0070	.4729	.0680	.0241	.0216	.9812	.0000	.0000	.8409	.6947	.5241	.9788	1.3540
95	4.52	6.15	17.52	44.59	56.06	.0070	.5359	.1222	.0438	.0413	.9677	.0000	.0000	.7796	.6754	.4747	.9755	1.3460

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11109.	180.95	1.2151	1.7629	81.68	83.07	36.87

Rotor Pressure Ratio = 1.7997

$\frac{W_{BLEED}}{W_{TOTAL}}$	$\frac{W_{BLOW}}{W_{TOTAL}}$	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
—	.00532	1.753	81.28	.9776

BLOW ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 13:27:38 — JULY 26,1971

NASA ENGLISH (SPECIAL) — RUN # 36,SPEED CODE 10,POINT # 13,PAGE 36,02

SL	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
1	20.409	21.489	1059.3	831.7	764.0	828.2	733.8	-76.3	43.84	-5.26	18.40	53.43	805.3	1390.2	-254.1	-1116.5	988.0	1040.2
2	21.008	21.961	1015.8	796.1	745.8	791.1	689.8	-88.5	42.76	-6.39	23.69	55.51	814.8	1397.3	-327.2	-1151.6	1016.9	1063.1
3	21.589	22.432	974.9	770.3	720.3	763.8	657.0	-99.4	42.36	-7.42	28.29	57.19	810.9	1410.2	-388.1	-1185.3	1045.1	1085.9
4	23.319	23.902	918.9	738.3	698.2	731.3	597.3	-101.5	40.55	-7.90	37.26	59.84	877.4	1455.6	-531.3	-1258.5	1128.6	1157.0
5	25.601	25.893	909.0	739.8	705.5	734.2	573.3	-90.4	39.10	-7.02	43.35	61.35	970.2	1531.4	-666.0	-1343.8	1239.3	1253.4
6	27.818	27.902	853.4	671.8	680.5	663.0	519.9	-107.9	37.11	-9.26	50.68	65.55	1079.9	1602.4	-831.7	-1458.6	1346.6	1350.7
7	29.408	29.382	850.3	645.8	665.5	640.0	529.2	-86.3	38.49	-7.66	53.35	67.01	1114.8	1638.7	-894.4	-1508.6	1423.6	1422.3
8	29.914	29.856	838.1	617.0	639.3	613.2	541.8	-67.7	40.29	-6.29	54.80	67.94	1109.2	1632.5	-906.3	-1513.0	1448.1	1445.3
9	30.382	30.293	825.8	571.8	619.5	567.7	545.9	-68.4	41.39	-6.88	56.18	69.70	1113.2	1636.6	-924.8	-1534.8	1470.7	1466.4

SL	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
1	1.52	4.44	11.13	49.11	55.87	.0094	.4015	.1461	.0363	.0339	.9380	.0000	.0000	.7149	.9219	.7035	.7027	1.1759
2	1.49	4.43	9.04	49.16	53.84	.0093	.4088	.1320	.0335	.0311	.9474	.0000	.0000	.7453	.8792	.6730	.7083	1.1813
3	1.96	4.90	7.52	49.78	52.42	.0108	.4101	.0996	.0259	.0231	.9628	.0000	.0000	.7977	.8427	.6506	.7108	1.1911
4	2.11	5.11	7.32	48.45	50.66	.0137	.4082	.0614	.0171	.0133	.9792	.0000	.0000	.8592	.7907	.6224	.7590	1.2271
5	2.40	5.54	9.01	46.12	49.56	.0201	.4089	.0632	.0192	.0131	.9792	.0000	.0000	.8518	.7762	.6208	.8329	1.2851
6	1.42	4.65	8.21	46.37	49.88	.0136	.4544	.0692	.0226	.0182	.9795	.0000	.0000	.8522	.7258	.5613	.9184	1.3308
7	6.26	6.62	12.29	46.15	52.08	.0164	.4936	.0999	.0346	.0289	.9710	.0000	.0000	.7812	.7157	.5336	.9397	1.3539
8	8.49	8.28	15.24	46.58	53.76	.0199	.5225	.1204	.0425	.0355	.9661	.0000	.0000	.7613	.7016	.5064	.9297	1.3400
9	7.43	9.06	16.80	48.27	56.06	.0193	.5762	.1719	.0616	.0546	.9531	.0000	.0000	.7130	.6892	.4668	.9310	1.3359

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11094.	180.21	1.2284	1.8125	81.03	82.54	35.56

Rotor Pressure Ratio = 1.8663

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
—	.00518	1.801	80.46	.9673

BLOW ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES   AIRFOIL AERODYNAMIC SUMMARY PRINT   13:28:46   JULY 26,1971

NASA ENGLISH (SPECIAL)   RUN # 36,SPEED CODE 10,POINT # 14,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B,-1 DEGREE	B,-2 DEGREE	V,-1 FT/SEC	V,-2 FT/SEC	VO,-1 FT/SEC	VO,-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1059.0	793.9	748.1	791.8	742.5	-56.6	44.78	-4.09	18.07	54.14	787.1	1351.7	-244.2	-1095.4	986.6	1038.9
10	21.008	21.961	1014.9	758.0	736.2	752.7	697.9	-87.5	43.47	-6.65	23.35	56.76	802.3	1374.0	-317.7	-1149.2	1015.6	1061.7
15	21.589	22.432	970.3	732.1	705.2	723.8	666.4	-110.1	43.37	-8.65	28.12	58.78	800.6	1396.8	-377.3	-1194.6	1043.7	1084.4
30	23.314	23.902	907.9	699.0	675.9	691.3	606.2	-104.1	41.89	-8.56	37.62	61.24	853.9	1436.8	-520.9	-1259.6	1127.1	1155.5
50	25.601	25.893	900.0	710.1	681.2	705.1	588.2	-83.8	40.81	-6.78	43.63	62.17	941.1	1510.3	-649.4	-1335.6	1237.6	1251.8
70	27.818	27.902	859.3	663.8	670.4	655.5	537.5	-104.7	38.72	-9.08	50.26	65.72	1049.7	1594.7	-807.4	-1453.6	1344.8	1348.9
85	29.408	29.382	860.9	647.3	659.5	642.8	553.4	-76.2	40.00	-6.75	52.78	66.76	1090.4	1628.8	-868.3	-1496.6	1421.7	1420.4
90	29.914	29.856	849.9	620.8	632.9	618.3	567.0	-54.7	41.87	-5.03	54.25	67.57	1083.3	1620.6	-879.1	-1498.0	1446.1	1443.3
95	30.382	30.293	839.3	579.2	614.2	576.0	571.9	-60.4	42.96	-6.01	55.59	69.30	1087.1	1630.2	-896.8	-1524.9	1468.8	1464.5

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	2.44	5.36	12.31	48.87	55.87	.0118	.4316	.1668	.0415	.0385	.9299	.0000	.0000	.7078	.9161	.6679	.6857	1.1371
10	2.19	5.12	8.78	50.12	53.84	.0112	.4973	.1639	.0416	.0380	.9349	.0000	.0000	.7154	.8788	.6374	.6964	1.1554
15	2.97	5.91	6.25	52.03	52.38	.0138	.4521	.1254	.0325	.0289	.9537	.0000	.0000	.7728	.8386	.6151	.6926	1.1735
30	3.45	6.45	6.66	50.45	50.66	.0182	.4478	.0722	.0200	.0150	.9761	.0000	.0000	.8591	.7792	.5863	.7340	1.2051
50	4.19	7.28	9.24	47.59	49.55	.0280	.4388	.0605	.0184	.0099	.9805	.0000	.0000	.8679	.7671	.5926	.8032	1.2604
70	3.04	6.28	8.40	47.80	49.90	.0209	.4749	.0608	.0199	.0131	.9819	.0000	.0000	.8756	.7291	.5519	.8922	1.3259
85	7.67	8.00	13.17	46.75	52.04	.0246	.5038	.0857	.0297	.0212	.9747	.0000	.0000	.8254	.7234	.5327	.9167	1.3403
90	9.90	9.77	16.54	46.90	53.81	.0296	.5298	.1037	.0367	.0262	.9703	.0000	.0000	.8037	.7098	.5075	.9052	1.3247
95	9.05	10.61	17.66	48.97	56.07	.0292	.5820	.1526	.0547	.0443	.9575	.0000	.0000	.7500	.6986	.4709	.9059	1.3251

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11080.	179.61	1.2349	1.8497	81.71	83.21	39.78

Rotor Pressure Ratio = 1.9079

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
–	.00517	1.838	81.14	.9663

BLOW ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES AIRFOIL AERODYNAMIC SUMMARY PRINT 13:18:32 JULY 20,1971

NASA ENGLISH (SPECIAL) RUN # 32,SPEED CODE 10,POINT # 13,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.909	21.989	1047.4	776.2	739.8	775.8	741.5	-32.2	45.07	-2.38	18.36	54.10	779.6	1322.8	-295.8	-1071.6	987.1	1039.3
10	21.008	21.961	1010.7	741.6	731.4	737.4	697.6	-77.6	43.64	-6.03	23.54	57.09	798.2	1357.7	-318.5	-1139.8	1016.1	1062.2
15	21.589	22.432	967.3	715.0	701.1	708.1	666.4	-99.4	43.54	-7.99	28.30	59.12	797.2	1380.0	-377.8	-1184.4	1044.2	1084.9
30	23.314	23.902	902.3	683.6	664.1	678.3	610.7	-84.6	42.60	-7.11	37.89	61.33	841.6	1414.0	-516.9	-1240.7	1127.6	1156.0
50	25.601	25.893	895.4	696.2	670.8	693.5	593.0	-61.1	41.48	-5.03	43.88	62.16	930.8	1485.3	-645.2	-1313.4	1238.2	1252.3
70	27.818	27.902	859.9	658.7	665.4	653.6	544.6	-81.9	39.29	-7.15	50.25	65.45	1041.5	1573.7	-800.7	-1431.4	1345.4	1349.5
85	29.408	29.382	863.9	647.9	659.5	645.1	563.8	-54.8	40.79	-4.85	52.68	66.39	1079.6	1610.7	-858.5	-1475.9	1422.4	1421.1
90	29.914	29.856	855.8	622.4	630.8	621.3	578.1	-36.6	42.51	-3.36	54.01	67.24	1073.7	1605.8	-868.7	-1480.6	1446.8	1444.0
95	30.382	30.293	845.1	577.7	611.1	575.4	583.8	-50.3	43.69	-5.04	55.39	69.20	1076.1	1621.3	-885.7	-1515.5	1469.5	1465.2

%SPAN	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	2.70	5.62	19.02	47.49	55.87	.0122	.4387	.1745	.0435	.0404	.9279	.0000	.0000	.7044	.9099	.6518	.6789	1.1108
10	2.34	5.27	9.41	49.67	53.84	.0115	.4588	.1763	.0448	.0419	.9304	.0000	.0000	.7038	.8763	.6226	.6928	1.1397
15	3.12	6.06	6.89	51.53	52.36	.0141	.4651	.1909	.0366	.0329	.9482	.0000	.0000	.7550	.8366	.5997	.6892	1.1573
30	4.16	7.15	8.11	49.71	50.67	.0208	.4568	.0760	.0212	.0154	.9751	.0000	.0000	.8571	.7741	.5721	.7217	1.1833
50	4.81	7.95	10.99	46.51	49.55	.0319	.4451	.0637	.0194	.0099	.9796	.0000	.0000	.8670	.7624	.5798	.7922	1.2368
70	3.64	6.88	10.34	46.44	49.90	.0239	.4750	.0608	.0200	.0122	.9819	.0000	.0000	.8789	.7289	.5468	.8832	1.3061
85	8.39	8.69	15.05	45.59	52.02	.0291	.5010	.0825	.0287	.0186	.9756	.0000	.0000	.8376	.7252	.5317	.9065	1.3228
90	10.49	10.39	18.23	45.87	53.82	.0343	.5282	.1052	.0373	.0252	.9696	.0000	.0000	.8051	.7140	.5078	.8960	1.3100
95	9.80	11.34	18.64	48.73	56.07	.0344	.5875	.1592	.0572	.0449	.9553	.0000	.0000	.7438	.7022	.4685	.8950	1.3146

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11085.	179.49	1.2374	1.8652	82.05	83.55	39.45

Rotor Pressure Ratio = 1.9269

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
–	.00523	1.855	81.70	.9655

BLOW ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES AIRFOIL AERODYNAMIC SUMMARY PRINT C1:00:57 AUGUST 31,1971

NASA ENGLISH (SPECIAL) RUN # 32,SPEED CODE 10,POINT # 15,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1039.7	746.4	722.8	745.3	747.3	-40.0	45.95	-3.07	18.39	55.39	761.8	1312.1	-240.3	-1073.8	987.6	1039.8
10	21.008	21.961	1007.6	713.9	723.3	711.2	704.5	-61.0	44.36	-4.92	23.42	57.66	785.4	1330.0	-312.0	-1123.7	1016.6	1062.7
15	21.589	22.432	967.1	684.9	690.4	680.0	677.1	-81.8	44.45	-6.87	28.05	59.77	783.3	1351.1	-367.5	-1167.2	1044.7	1085.5
30	23.314	23.902	869.6	627.8	603.4	622.4	626.1	-82.1	46.06	-7.51	39.75	63.32	785.0	1386.3	-502.0	-1239.7	1128.1	1156.6
60	25.601	25.893	870.6	651.1	621.1	647.3	610.1	-70.9	44.49	-6.25	45.35	63.94	883.8	1473.6	-628.8	-1323.9	1238.8	1252.9
70	27.818	27.902	852.9	635.5	628.5	631.0	576.6	-75.5	42.54	-6.82	50.73	66.12	993.6	1559.1	-769.5	-1425.6	1346.1	1350.2
85	29.408	29.382	877.9	642.6	638.1	639.6	602.9	-61.3	43.37	-5.47	52.11	66.67	1039.2	1615.1	-820.1	-1483.1	1423.0	1421.8
90	29.914	29.856	874.2	630.0	619.0	628.7	617.2	-36.8	44.92	-3.33	53.30	67.00	1035.7	1609.4	-830.3	-1481.5	1447.5	1444.7
95	30.382	30.293	864.0	598.3	593.6	597.4	623.0	-33.6	46.15	-3.23	54.75	68.28	1037.3	1614.2	-847.1	-1439.4	1470.2	1465.9

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	3.58	6.50	13.33	49.03	55.87	.0145	.4665	.1974	.0491	.0455	.9189	.0000	.0000	.6844	.9019	.6243	.6621	1.0974
10	3.02	5.95	10.52	49.28	53.84	.0136	.4821	.2053	.0523	.0488	.9195	.0000	.0000	.6740	.8742	.5970	.6809	1.1121
15	3.91	6.85	8.03	51.33	52.40	.0174	.4942	.1804	.0469	.0424	.9338	.0000	.0000	.7109	.8378	.5718	.6768	1.1280
30	7.54	10.53	7.72	53.57	50.67	.0374	.5046	.0803	.0224	.0120	.9755	.0000	.0000	.8658	.7427	.5216	.6676	1.1517
60	7.82	10.95	9.77	50.74	49.55	.0498	.4906	.0797	.0243	.0091	.9759	.0000	.0000	.8525	.7368	.5385	.7463	1.2186
70	6.88	10.12	10.68	49.36	49.92	.0439	.5080	.0944	.0311	.0166	.9726	.0000	.0000	.8247	.7181	.5233	.8361	1.2839
85	10.92	11.26	14.42	48.85	52.01	.0489	.5326	.1444	.0502	.0332	.9567	.0000	.0000	.7409	.7329	.5237	.8676	1.3164
90	12.75	12.72	18.29	48.25	53.85	.0546	.5455	.1574	.0558	.0364	.9535	.0000	.0000	.7247	.7259	.5106	.8600	1.3044
95	12.33	13.78	20.45	49.38	56.06	.0557	.5820	.1911	.0688	.0488	.9449	.0000	.0000	.6880	.7142	.4824	.8578	1.3013

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11090.	174.54	1.2473	1.8900	80.57	82.22	32.85

Rotor Pressure Ratio = 1.9982

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
–	.00546	1.879	80.17	.9575

BLOW ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 13:29:57 — JULY 26,1971

NASA ENGLISH (SPECIAL) — RUN # 36, SPEED CODE 10, POINT # 16, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1035.6	718.9	700.4	717.6	762.9	-41.9	47.45	-3.34	17.77	56.43	735.6	1297.9	-224.5	-1081.5	987.4	1039.6
10	21.008	21.961	1001.2	688.9	696.7	684.9	719.1	-72.5	45.91	-6.07	23.11	58.88	757.9	1325.8	-297.2	-1135.0	1016.4	1042.6
15	21.589	22.432	959.3	663.4	664.6	656.3	691.8	-97.0	46.16	-8.42	27.96	60.96	753.4	1352.4	-352.7	-1182.3	1044.5	1085.2
30	23.314	23.902	876.1	620.9	593.5	613.8	644.5	-93.5	47.36	-8.66	39.16	63.84	765.5	1392.5	-483.4	-1249.9	1127.9	1156.4
50	25.601	25.893	874.8	640.0	604.5	634.4	632.3	-84.0	46.29	-7.55	45.08	64.61	856.2	1479.6	-606.2	-1336.7	1238.6	1252.7
70	27.818	27.902	865.5	629.0	610.0	623.6	614.0	-82.3	45.19	-7.52	50.16	66.46	952.9	1562.1	-731.8	-1432.2	1345.8	1349.9
85	29.408	29.382	888.9	629.8	613.1	624.3	643.6	-83.0	46.39	-7.57	51.80	67.46	991.4	1628.9	-779.1	-1504.4	1422.7	1421.5
90	29.914	29.856	882.7	619.3	586.2	616.0	659.7	-62.5	48.38	-5.78	53.34	67.77	981.8	1627.9	-787.5	-1506.9	1447.2	1444.4
95	30.382	30.293	871.8	602.3	562.2	600.0	666.2	-53.2	49.84	-5.07	55.02	68.44	980.9	1633.0	-803.6	-1518.7	1469.9	1465.6

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	5.07	7.99	13.06	50.79	55.87	.0198	.4951	.2152	.0536	.0486	.9125	.0000	.0000	.6749	.8958	.5983	.6372	1.0803
10	4.55	7.48	9.37	51.97	53.84	.0189	.5105	.2169	.0552	.0504	.9161	.0000	.0000	.6711	.8667	.5734	.6553	1.1036
15	5.60	8.54	6.47	54.58	52.39	.0243	.5206	.1852	.0480	.0417	.9332	.0000	.0000	.7143	.8284	.5517	.6486	1.1245
30	8.84	11.83	6.56	56.02	50.67	.0476	.5257	.1026	.0285	.0153	.9684	.0000	.0000	.8343	.7467	.5141	.6494	1.1530
50	9.61	12.74	8.48	53.83	49.55	.0663	.5182	.1117	.0339	.0138	.9661	.0000	.0000	.8041	.7380	.5268	.7202	1.2180
70	9.53	12.76	9.98	52.70	49.92	.0688	.5399	.1492	.0479	.0298	.9575	.0000	.0000	.7476	.7247	.5143	.7970	1.2772
85	13.76	14.29	12.32	53.96	52.02	.0783	.5773	.2041	.0707	.0436	.9382	.0000	.0000	.6609	.7370	.5091	.8221	1.3167
90	16.13	16.07	15.85	54.16	53.87	.0908	.5895	.2093	.0740	.0419	.9379	.0000	.0000	.6567	.7281	.4977	.8100	1.3083
95	16.07	17.42	18.61	54.91	56.07	.0955	.6072	.2185	.0785	.0442	.9369	.0000	.0000	.6452	.7158	.4819	.8050	1.3064

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11088.	170.81	1.2586	1.9104	78.98	80.35	31.63

Rotor Pressure Ratio = 2.0123

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
–	.00531	1.898	77.96	.9464

BLOW ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 19:50:49 — JULY 20,1971

NASA ENGLISH (SPECIAL) — RUN # 32,SPEED CODE 10,POINT # 16,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VU'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1033.0	709.3	699.8	707.7	759.9	-47.3	47.36	-3.83	18.01	56.94	736.0	1297.1	-227.6	-1087.1	987.5	1039.7
10	21.008	21.961	1000.7	679.9	699.0	676.9	716.1	-62.9	45.69	-5.32	23.25	58.97	761.2	1313.5	-300.4	-1125.5	1016.5	1062.6
15	21.589	22.432	961.4	654.2	670.3	648.9	689.1	-83.0	45.81	-7.31	27.95	60.94	759.8	1336.7	-355.4	-1168.4	1044.6	1085.4
30	23.314	23.902	870.9	609.0	586.4	603.3	643.8	-83.2	47.67	-7.85	39.54	64.05	760.6	1378.7	-484.2	-1239.7	1128.0	1156.5
50	25.601	25.893	872.8	626.6	601.1	621.0	632.8	-83.4	46.48	-7.65	45.22	65.07	853.4	1473.5	-605.8	-1336.2	1238.7	1252.8
70	27.818	27.902	865.3	627.3	607.5	621.3	616.1	-86.1	45.40	-7.89	50.20	66.60	949.7	1564.8	-729.8	-1436.1	1345.9	1350.0
85	29.408	29.382	888.6	634.1	609.8	630.2	646.3	-70.7	46.66	-6.40	51.86	67.11	987.4	1619.9	-776.6	-1492.3	1422.9	1421.6
90	29.914	29.856	886.2	628.2	590.0	625.6	661.0	-56.0	48.25	-5.11	53.12	67.37	983.1	1625.7	-786.3	-1500.5	1447.4	1444.6
95	30.382	30.293	875.8	605.6	567.3	603.2	667.2	-54.3	49.63	-5.15	54.75	68.35	983.1	1635.4	-802.8	-1520.0	1470.0	1465.7

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	4.97	7.89	12.57	51.18	55.87	.0192	.5037	.2117	.0527	.0479	.9142	.0000	.0000	.6861	.8938	.5900	.6377	1.0791
10	4.33	7.26	10.12	51.01	53.84	.0179	.5159	.2154	.0548	.0503	.9167	.0000	.0000	.6796	.8671	.5697	.6581	1.0929
15	5.19	8.13	7.58	53.11	52.38	.0228	.5267	.1882	.0489	.0430	.9318	.0000	.0000	.7181	.8321	.5437	.6552	1.1109
30	9.08	12.07	7.37	55.52	50.67	.0495	.5330	.0850	.0237	.0099	.9741	.0000	.0000	.8700	.7429	.5038	.6446	1.1407
50	9.79	12.92	8.37	54.13	49.55	.0679	.5324	.1021	.0310	.0104	.9692	.0000	.0000	.8330	.7360	.5153	.7162	1.2117
70	9.73	12.96	9.61	53.29	49.93	.0710	.5937	.1120	.0368	.0135	.9670	.0000	.0000	.8126	.7241	.5127	.7928	1.2789
85	13.95	14.49	13.49	53.06	52.02	.0812	.5686	.1622	.0564	.0282	.9509	.0000	.0000	.7340	.7362	.5126	.8181	1.3094
90	15.98	15.94	16.53	53.36	53.87	.0897	.5790	.1684	.0596	.0279	.9497	.0000	.0000	.7238	.7310	.5031	.8111	1.3072
95	15.86	17.21	18.52	54.79	56.07	.0934	.6061	.1885	.0677	.0342	.9451	.0000	.0000	.6958	.7193	.4846	.8070	1.3084

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11089.	170.71	1.2587	1.9243	79.38	81.19	31.57

Rotor Pressure Ratio = 2.0146

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
–	.00558	1.913	78.95	.9532

BLOW AT 48 PERCENT CHORD ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 13:21:37 — JULY 20,1971

NASA ENGLISH (SPECIAL) — RUN # 33,SPEED CODE 10,POINT # 21,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1075.4	1020.4	819.8	1017.7	696.0	-74.3	40.33	-4.17	19.60	47.60	870.4	1509.2	-292.0	-1114.5	908.0	1090.2
10	21.008	21.961	1037.0	999.2	806.5	995.2	651.9	-88.0	38.94	-5.06	24.35	49.15	885.6	1521.7	-365.1	-1151.1	1016.9	1063.1
15	21.589	22.432	1008.5	983.0	794.2	977.4	621.4	-104.4	38.03	-6.11	28.05	50.60	900.8	1540.4	-423.7	-1190.3	1045.1	1085.9
30	23.314	23.902	948.2	927.0	775.4	919.0	545.7	-121.8	35.14	-7.55	36.92	54.30	970.1	1574.8	-582.9	-1278.8	1128.6	1157.0
50	25.601	25.893	901.9	874.7	761.2	867.1	483.6	-114.9	32.42	-7.55	44.77	57.63	1073.0	1620.1	-755.7	-1368.3	1239.3	1253.4
70	27.818	27.902	831.1	780.0	721.0	769.7	413.4	-126.2	29.82	-9.31	52.29	62.47	1179.6	1665.5	-933.2	-1476.8	1346.6	1350.7
85	29.408	29.382	824.9	744.9	719.0	738.5	404.3	-97.6	29.35	-7.53	54.80	64.09	1247.9	1689.9	-1019.3	-1519.9	1423.6	1422.3
90	29.914	29.856	811.2	732.1	696.2	727.0	416.3	-86.5	30.88	-6.78	55.99	64.61	1244.7	1695.6	-1031.8	-1531.8	1448.1	1445.3
95	30.382	30.293	760.8	658.8	633.0	651.6	421.8	-97.1	33.72	-8.51	58.90	67.38	1225.4	1694.2	-1098.9	-1563.5	1470.7	1466.9

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-2.05	.87	12.22	44.50	55.87	.0031	.2260	.1923	.0470	.0470	.9157	.0000	.0000	-.4298	.9953	.8902	.7668	1.3167
10	-2.39	.55	10.38	44.00	53.84	.0027	.2158	.1575	.0401	.0394	.9346	.0000	.0000	-.6541	.9087	.8722	.7780	1.3284
15	-2.39	.55	8.82	44.19	52.41	.0031	.2112	.1287	.0335	.0327	.9488	.0000	.0000	-.9626	.8818	.8578	.7901	1.3442
30	-3.34	-.34	7.67	42.69	50.66	.0026	.2185	.1144	.0319	.0312	.9586	.0000	.0000	-1.0546	.8254	.8065	.8500	1.3701
50	-4.30	-1.17	8.48	39.97	49.59	.0019	.2326	.1117	.0339	.0334	.9627	.0000	.0000	-.5335	.7816	.7578	.9353	1.4035
70	-5.92	-2.68	8.13	39.13	49.88	.0001	.2764	.1389	.0454	.0454	.9594	.0000	.0000	.0348	.7183	.6721	1.0259	1.4351
85	-3.16	-2.65	12.44	36.88	52.12	.0000	.3097	.1685	.0589	.0589	.9516	.0000	.0000	.2291	.7106	.6372	1.0763	1.4459
90	-.79	-1.26	14.71	37.67	53.74	.0000	.3180	.1482	.0523	.0523	.9590	.0000	.0000	.3217	.6954	.6230	1.0683	1.4428
95	-.08	1.44	15.16	42.23	56.09	.0001	.3809	.1916	.0684	.0683	.9528	.0000	.0000	.3313	.6455	.5555	1.0424	1.4281

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC17AI LBM/SEC SQFT
11094.	181.82	1.1995	1.6371	77.66	79.18	38.65

Rotor Pressure Ratio = 1.7138

$\frac{W_{BLEED}}{W_{TOTAL}}$	$\frac{W_{BLOW}}{W_{TOTAL}}$	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
—	.00261	1.633	77.48	.9553

BLOW AT 48 PERCENT CHORD ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES AIRFOIL AERODYNAMIC SUMMARY PRINT 19:54:48 JULY 20,1971

NASA ENGLISH (SPECIAL) RUN # 33,SPEED CODE 10,POINT # 22,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	V0-1 FT/SEC	V0-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	V0'-1 FT/SEC	V0'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1071.8	888.7	791.5	886.7	722.8	-59.2	42.40	-3.82	18.52	51.11	834.8	1412.5	-265.2	-1099.5	988.0	1040.3
10	21.008	21.961	1030.0	855.4	776.0	852.5	677.3	-70.5	41.11	-4.74	23.69	53.05	847.5	1418.6	-339.7	-1133.7	1017.0	1063.1
15	21.589	22.432	991.6	828.3	755.3	824.0	642.4	-83.7	40.37	-5.81	28.04	54.83	856.8	1431.0	-402.7	-1169.6	1045.1	1085.9
30	23.314	23.902	925.3	777.9	726.5	772.6	573.1	-90.4	38.27	-6.67	37.40	58.23	914.6	1467.4	-555.6	-1247.5	1128.6	1157.1
50	25.601	25.893	908.7	760.7	731.1	756.4	539.7	-80.4	36.43	-6.07	43.73	60.43	1012.2	1533.6	-699.7	-1333.8	1239.3	1253.5
70	27.818	27.902	838.1	679.5	693.5	672.0	470.4	-100.9	34.14	-8.54	51.61	65.16	1117.8	1599.7	-876.2	-1451.6	1346.7	1350.7
85	29.408	29.382	837.7	650.9	682.8	646.9	485.3	-71.3	35.41	-6.28	53.96	66.58	1160.5	1627.8	-938.3	-1493.7	1423.6	1422.4
90	29.914	29.856	822.6	631.2	655.6	628.9	496.6	-54.3	37.15	-4.93	55.43	67.25	1155.7	1626.2	-951.6	-1499.6	1448.1	1445.3
95	30.382	30.293	802.9	572.5	627.6	569.9	500.6	-54.7	38.58	-5.50	57.10	69.46	1155.6	1624.7	-970.2	-1521.2	1470.8	1466.5

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	.05	2.97	12.58	46.22	55.87	.0066	.3488	.1187	.0295	.0279	.9485	.0000	.0000	.7211	.9366	.7581	.7321	1.2049
10	-.20	2.73	10.70	45.85	53.84	.0061	.3517	.1006	.0256	.0241	.9589	.0000	.0000	.7709	.8937	.7297	.7407	1.2101
15	-.03	2.91	9.17	46.19	52.47	.0066	.3535	.0746	.0194	.0177	.9712	.0000	.0000	.8210	.8592	.7059	.7478	1.2195
30	-.20	2.81	8.54	44.94	50.66	.0073	.3589	.0436	.0122	.0101	.9850	.0000	.0000	.8777	.8001	.6611	.7970	1.2471
50	-.29	2.85	9.96	42.50	49.58	.0100	.3710	.0599	.0183	.0152	.9801	.0000	.0000	.8500	.7787	.6436	.8756	1.2976
70	-1.61	1.63	8.90	42.69	49.87	.0045	.4148	.0502	.0165	.0150	.9854	.0000	.0000	.8929	.7162	.5730	.9636	1.3490
85	3.14	3.56	13.69	41.69	52.11	.0057	.4554	.0877	.0305	.0285	.9748	.0000	.0000	.7899	.7095	.5426	.9853	1.3569
90	5.49	5.16	16.55	42.08	53.71	.0073	.4708	.0786	.0278	.0253	.9783	.0000	.0000	.8176	.6931	.5233	.9758	1.3481
95	4.67	6.31	18.18	44.08	56.06	.0073	.5367	.1389	.0499	.0472	.9634	.0000	.0000	.7514	.6737	.4716	.9723	1.3380

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11095.	180.66	1.2151	1.7605	81.48	82.88	36.81

Rotor Pressure Ratio = 1.7997

$\frac{W_{BLEED}}{W_{TOTAL}}$	$\frac{W_{BLOW}}{W_{TOTAL}}$	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
—	.00260	1.756	81.28	.9776

BLOW AT 48 PERCENT CHORD ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 19:55:54 — JULY 20,1971

NASA ENGLISH (SPECIAL) — RUN # 33, SPEED CODE 10, POINT # 23, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1047.6	778.5	739.7	777.7	741.9	-36.1	45.08	-2.66	18.30	54.12	779.3	1326.7	-244.7	-1074.9	986.6	1038.8
10	21.008	21.961	1010.9	795.2	731.3	791.1	698.0	-77.0	43.66	-5.95	23.48	56.93	797.7	1358.7	-317.6	-1138.6	1015.5	1061.6
15	21.589	22.432	967.5	719.3	701.1	712.6	666.7	-97.5	43.56	-7.79	28.25	58.91	796.7	1380.2	-376.9	-1181.9	1043.6	1089.4
30	23.319	23.902	902.4	687.5	664.1	681.9	610.9	-86.8	42.61	-7.25	37.85	61.23	841.1	1417.1	-516.1	-1242.2	1127.0	1155.4
50	25.601	25.893	895.3	700.2	670.5	697.2	593.4	-65.3	41.51	-5.35	43.85	62.11	929.8	1490.2	-644.2	-1317.0	1237.6	1251.7
70	27.818	27.902	859.5	661.2	664.9	656.0	544.7	-82.8	39.32	-7.19	50.24	65.37	1040.5	1574.8	-800.1	-1431.6	1344.7	1348.8
85	29.408	29.382	863.4	645.7	653.8	643.2	563.9	-56.1	40.78	-4.98	52.68	66.46	1078.5	1610.5	-857.7	-1476.4	1421.6	1420.3
90	29.914	29.856	855.4	623.7	630.0	622.7	578.4	-34.2	42.56	-3.13	54.02	67.15	1072.3	1603.4	-867.7	-1477.5	1446.1	1443.3
95	30.382	30.293	844.6	581.9	610.1	579.8	584.1	-47.6	43.75	-4.74	55.40	69.01	1074.7	1619.6	-884.6	-1512.0	1468.7	1464.4

%SPAN	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	2.72	5.64	13.74	47.74	55.87	.0122	.4377	.1807	.0450	.0420	.9248	.0000	.0000	.6914	.9101	.6539	.6786	1.1194
10	2.36	5.29	9.49	49.61	53.84	.0118	.4553	.1807	.0459	.0430	.9267	.0000	.0000	.6930	.8765	.6258	.6924	1.1410
15	3.14	6.08	7.10	51.35	52.37	.0141	.4604	.1446	.0375	.0338	.9468	.0000	.0000	.7451	.8367	.6035	.6888	1.1580
30	4.17	7.17	7.97	49.86	50.67	.0209	.4533	.0810	.0226	.0168	.9735	.0000	.0000	.8454	.7741	.5755	.7214	1.1864
50	4.85	7.98	10.67	46.86	49.54	.0316	.4422	.0688	.0210	.0113	.9780	.0000	.0000	.8535	.7623	.5833	.7916	1.2413
70	3.67	6.90	10.29	46.52	49.90	.0240	.4724	.0701	.0231	.0152	.9791	.0000	.0000	.8583	.7285	.5489	.8827	1.3074
85	8.44	8.74	14.92	45.76	52.02	.0293	.5033	.1008	.0351	.0249	.9702	.0000	.0000	.8026	.7247	.5302	.9055	1.3225
90	10.55	10.44	18.46	45.69	53.82	.0345	.5256	.1180	.0419	.0296	.9660	.0000	.0000	.7609	.7136	.5089	.8948	1.3082
95	9.87	11.40	18.94	48.49	56.07	.0347	.5813	.1672	.0601	.0476	.9531	.0000	.0000	.7271	.7018	.4720	.8938	1.3137

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11079.	179.90	1.2373	1.8606	81.71	83.23	39.43

Rotor Pressure Ratio = 1.9269

$\frac{W_{BLEED}}{W_{TOTAL}}$	$\frac{W_{BLOW}}{W_{TOTAL}}$	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
—	.00254	1.856	81.50	.9647

BLOW AT 48 PERCENT CHORD ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES AIRFOIL AERODYNAMIC SUMMARY PRINT 11:59:43 JULY 21,1971

NASA ENGLISH (SPECIAL) RUN # 33,SPEED CODE 10,POINT # 25,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1046.4	750.4	716.2	749.0	762.9	-45.6	46.81	-3.48	17.43	55.40	750.8	1319.0	-225.0	-1085.7	987.8	1040.1
10	21.008	21.961	1012.6	717.7	712.0	714.8	720.0	-63.1	45.32	-5.06	22.69	57.59	771.8	1334.0	-296.8	-1126.1	1018.8	1062.9
15	21.589	22.432	970.8	688.7	680.9	683.8	692.0	-81.7	45.47	-6.83	27.41	59.63	767.9	1353.2	-353.0	-1167.4	1044.9	1085.7
30	23.314	23.902	884.8	633.8	610.3	628.3	640.6	-83.2	46.39	-7.54	38.64	63.13	781.3	1390.2	-487.8	-1240.1	1128.4	1156.9
50	25.601	25.893	880.5	657.3	619.3	653.3	625.9	-72.4	45.30	-6.33	44.71	63.77	871.6	1477.9	-613.2	-1325.7	1239.1	1253.3
70	27.818	27.902	872.3	693.9	632.6	639.4	600.6	-76.5	43.51	-6.83	49.67	65.86	978.1	1563.8	-745.9	-1427.0	1346.4	1350.5
85	29.408	29.382	897.5	650.4	639.2	647.8	630.0	-58.0	44.58	-5.12	51.14	66.36	1018.9	1615.7	-793.4	-1480.2	1423.4	1422.1
90	29.914	29.856	899.4	637.0	619.4	635.6	645.0	-39.6	46.17	-3.55	52.36	66.82	1014.1	1615.1	-802.9	-1484.7	1447.9	1445.1
95	30.382	30.293	884.0	607.3	597.6	606.0	651.4	-38.8	47.47	-3.68	53.89	68.07	1014.0	1622.6	-819.1	-1505.1	1470.5	1466.2

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	4.44	7.35	12.92	50.29	55.87	.0182	.4710	.2028	.0505	.0459	.9161	.0000	.0000	.6769	.9062	.6266	.6516	1.1013
10	3.99	6.92	10.37	50.38	53.84	.0174	.4853	.2090	.0532	.0488	.9177	.0000	.0000	.6688	.8764	.5990	.6680	1.1134
15	4.98	7.92	8.07	52.30	52.39	.0221	.4961	.1832	.0476	.0419	.9326	.0000	.0000	.7051	.8381	.5740	.6618	1.1277
30	7.88	10.88	7.68	53.93	50.67	.0413	.5113	.1195	.0333	.0218	.9625	.0000	.0000	.7984	.7552	.5256	.6649	1.1528
50	8.64	11.77	9.70	51.63	49.54	.0579	.4954	.1147	.0349	.0173	.9647	.0000	.0000	.7859	.7440	.5424	.7355	1.2195
70	7.86	11.10	10.67	50.34	49.91	.0540	.5187	.1576	.0519	.0341	.9527	.0000	.0000	.7108	.7327	.5283	.8217	1.2830
85	12.17	12.48	14.77	49.70	52.00	.0615	.5439	.2106	.0733	.0519	.9348	.0000	.0000	.6274	.7471	.5278	.8482	1.3111
90	14.01	13.98	18.07	49.72	53.85	.0684	.5601	.2276	.0807	.0565	.9306	.0000	.0000	.6089	.7902	.5139	.8393	1.3028
95	13.65	15.10	20.00	51.15	56.06	.0705	.5951	.2590	.0932	.0679	.9230	.0000	.0000	.5805	.7283	.4873	.8357	1.3020

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11093.	179.58	1.2555	1.8899	77.92	79.79	32.51

Rotor Pressure Ratio = 1.9981

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
–	.00257	1.884	80.07	.9588

BLOW AT 48 PERCENT CHORD ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES AIRFOIL AERODYNAMIC SUMMARY PRINT 12:00:48 JULY 21,1971

NASA ENGLISH (SPECIAL) RUN # 33,SPEED CODE 10,POINT # 26,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1033.2	713.7	700.3	711.9	759.7	-50.1	47.33	-4.02	18.04	56.85	736.6	1302.0	-228.1	-1090.1	987.8	1040.1
10	21.008	21.961	1000.9	685.4	699.4	682.4	716.0	-63.9	45.67	-5.37	23.27	58.80	761.8	1317.5	-300.8	-1126.8	1016.8	1062.9
15	21.589	22.432	961.6	659.0	670.8	653.6	689.0	-83.8	45.78	-7.33	27.97	60.79	760.5	1340.0	-355.9	-1169.5	1044.9	1085.7
30	23.314	23.902	871.0	611.8	587.1	605.8	643.3	-85.0	47.62	-7.98	39.55	63.99	761.6	1381.8	-485.0	-1241.8	1128.4	1156.9
50	25.601	25.893	872.7	632.3	601.4	627.0	632.4	-81.8	46.44	-7.43	45.25	64.84	854.2	1474.9	-606.6	-1335.0	1239.1	1253.2
70	27.818	27.902	864.8	628.7	607.7	623.1	615.3	-83.5	45.36	-7.63	50.25	66.51	950.8	1563.5	-731.1	-1433.9	1346.4	1350.9
85	29.408	29.382	887.9	633.8	609.6	629.8	645.7	-71.3	46.65	-6.46	51.91	67.13	988.1	1620.7	-777.7	-1493.3	1423.3	1422.1
90	29.914	29.856	885.5	628.4	589.6	626.0	660.6	-54.0	48.25	-4.92	53.17	67.33	983.6	1629.4	-787.2	-1499.0	1447.8	1445.0
95	30.382	30.293	875.2	606.5	566.6	604.3	666.9	-51.9	49.65	-4.92	54.81	68.29	983.4	1634.0	-803.6	-1518.1	1470.5	1466.2

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	4.95	7.87	12.38	51.35	55.87	.0191	.5002	.2130	.0530	.0482	.9136	.0000	.0000	.6808	.8940	.5940	.6363	1.0838
10	4.31	7.24	10.07	51.04	53.84	.0179	.5107	.2151	.0548	.0502	.9168	.0000	.0000	.6760	.0670	.5706	.6586	1.0968
15	5.18	8.12	7.56	53.11	52.39	.0227	.5220	.1892	.0492	.0433	.9319	.0000	.0000	.7130	.8320	.5480	.6557	1.1142
30	9.05	12.09	7.24	55.60	50.67	.0491	.5303	.0908	.0253	.0116	.9723	.0000	.0000	.8590	.7425	.5063	.6456	1.1435
50	9.76	12.89	8.59	53.88	49.55	.0676	.5251	.1027	.0312	.0107	.9690	.0000	.0000	.8269	.7359	.5202	.7175	1.2134
70	9.69	12.92	9.87	52.99	49.93	.0704	.5405	.1224	.0402	.0171	.9640	.0000	.0000	.7899	.7238	.5139	.7943	1.2781
85	13.98	14.48	13.43	53.10	52.02	.0809	.5686	.1762	.0612	.0331	.9467	.0000	.0000	.7069	.7358	.5123	.8188	1.3100
90	16.00	15.95	16.71	53.17	53.87	.0896	.5774	.1817	.0644	.0326	.9458	.0000	.0000	.6984	.7304	.5053	.8114	1.3062
95	15.88	17.23	18.76	54.57	56.07	.0935	.6037	.2011	.0723	.0387	.9415	.0000	.0000	.6730	.7187	.4853	.8072	1.3074

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
11092.	170.80	1.2586	1.9205	79.15	80.97	31.58

Rotor Pressure Ratio = 2.0146

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
–	.00278	1.915	78.90	.9513

BLOW AT 18 PERCENT CHORD ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES　　　AIRFOIL AERODYNAMIC SUMMARY PRINT　　　19:51:56　　　JULY 20,1971

NASA ENGLISH (SPECIAL)　　　RUN # 39,SPEED CODE 10,POINT # 36,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	V0-1 FT/SEC	V0-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	V0'-1 FT/SEC	V0'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1034.7	716.8	701.8	715.6	760.3	-41.9	47.29	-3.35	17.90	56.50	737.7	1296.6	-226.8	-1081.2	987.1	1039.3
10	21.008	21.961	1002.5	687.3	701.0	684.4	716.6	-61.4	45.63	-5.14	23.13	58.64	762.7	1315.8	-299.4	-1123.5	1016.0	1052.1
15	21.589	22.432	963.2	661.2	672.5	655.8	689.5	-84.2	45.73	-7.33	27.83	60.70	761.3	1340.6	-354.7	-1169.1	1044.1	1084.9
30	23.314	23.902	872.6	615.6	589.2	609.9	643.6	-83.6	47.52	-7.80	39.39	63.80	762.6	1381.5	-484.0	-1239.6	1127.6	1156.0
50	25.601	25.893	874.1	635.3	603.1	630.2	632.7	-80.4	46.37	-7.27	45.11	64.69	854.6	1474.2	-605.5	-1332.7	1238.2	1252.3
70	27.818	27.902	865.7	631.3	609.3	625.7	615.0	-83.2	45.27	-7.58	50.14	66.40	951.3	1563.4	-730.4	-1432.7	1345.4	1349.5
85	29.408	29.382	888.7	633.8	610.9	629.7	645.4	-71.4	46.57	-6.47	51.82	67.12	980.3	1619.9	-776.9	-1492.4	1422.3	1421.1
90	29.914	29.856	886.3	627.2	590.7	624.6	660.6	-55.9	48.20	-5.11	53.08	67.39	983.5	1624.8	-786.2	-1499.9	1446.8	1444.0
95	30.382	30.293	876.1	606.7	567.6	604.1	667.3	-55.4	49.62	-5.25	54.72	68.33	982.7	1636.3	-802.1	-1520.6	1469.4	1465.1

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	4.91	7.83	13.05	50.64	55.87	.0191	.4960	.2080	.0518	.0470	.9155	.0000	.0000	.6674	.8954	.5967	.6394	1.0794
10	4.28	7.21	10.30	50.77	53.84	.0178	.5091	.2120	.0590	.0494	.9178	.0000	.0000	.6807	.8684	.5723	.6595	1.0955
15	5.13	8.07	7.56	53.06	52.39	.0226	.5207	.1854	.0482	.0423	.9326	.0000	.0000	.7184	.8333	.5499	.6565	1.1149
30	8.97	11.96	7.43	55.32	50.67	.0485	.5264	.0835	.0232	.0097	.9745	.0000	.0000	.8699	.7437	.5076	.6466	1.1436
50	9.70	12.83	8.76	53.64	49.55	.0671	.5220	.0972	.0295	.0092	.9705	.0000	.0000	.8340	.7372	.5228	.7184	1.2130
70	9.61	12.84	9.92	52.84	49.92	.0697	.5378	.1188	.0390	.0161	.9649	.0000	.0000	.7929	.7247	.5162	.7954	1.2783
85	13.99	14.43	13.42	53.04	52.02	.0802	.5690	.1786	.0620	.0342	.9459	.0000	.0000	.7005	.7367	.5123	.8193	1.3093
90	15.97	15.92	16.52	53.31	53.87	.0892	.5800	.1864	.0660	.0349	.9443	.0000	.0000	.6900	.7311	.5043	.8113	1.3063
95	15.84	17.21	18.42	54.88	56.07	.0933	.6055	.2034	.0731	.0396	.9407	.0000	.0000	.6693	.7194	.4855	.8068	1.3092

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11084.	171.11	1.2584	1.9224	79.32	81.13	31.64

Rotor Pressure Ratio = 2.0146

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
–	.00307	1.917	79.09	.9513

SUCTION OPTIMIZATION, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 08:52:29 — AUGUST 24,1971

NASA ENGLISH (SPECIAL) — RUN # 38,SPEED CODE 10,POINT # 1,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1058.7	831.5	776.1	830.7	720.0	-38.4	42.85	-2.64	18.99	52.37	820.9	1360.6	-267.0	-1077.6	987.1	1039.3
10	21.008	21.961	1013.3	800.8	750.4	796.2	681.0	-83.7	42.22	-6.02	24.07	55.19	822.2	1395.5	-335.0	-1145.8	1016.0	1062.1
15	21.589	22.432	972.9	777.2	721.5	769.9	652.6	-106.7	42.13	-7.89	28.46	57.13	821.6	1418.8	-391.5	-1191.6	1044.1	1084.9
30	23.314	23.902	918.2	742.7	700.7	736.6	593.5	-94.6	40.26	-7.32	37.31	59.50	881.0	1451.4	-534.1	-1250.6	1127.5	1156.0
50	25.601	25.893	909.5	739.7	708.2	736.2	570.7	-71.6	38.86	-5.56	43.30	60.92	973.3	1514.9	-667.5	-1323.8	1238.2	1252.3
70	27.818	27.902	845.0	664.9	677.0	659.6	505.7	-83.5	36.75	-7.22	51.09	65.28	1078.9	1577.6	-839.7	-1432.9	1345.4	1349.4
85	29.408	29.382	841.2	639.1	666.4	637.0	513.3	-51.8	37.61	-4.64	53.75	66.81	1127.1	1604.6	-909.0	-1472.8	1422.3	1421.0
90	29.914	29.856	836.0	628.5	648.6	627.5	527.4	-35.8	39.12	-3.26	54.80	67.02	1125.1	1607.3	-919.3	-1479.8	1446.7	1443.9
95	30.382	30.293	828.7	605.1	632.8	603.2	535.1	-47.7	40.22	-4.54	55.89	68.26	1128.5	1628.7	-934.3	-1512.8	1469.4	1465.1

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	.52	3.44	13.75	45.50	55.87	.0070	.3870	.1563	.0389	.0372	.9335	.0000	.0000	.6937	.9239	.7047	.7178	1.1532
10	.96	3.90	9.42	48.24	53.84	.0078	.3993	.1269	.0323	.0303	.9495	.0000	.0000	.7456	.8794	.6782	.7152	1.1818
15	1.72	4.66	7.05	50.02	52.42	.0099	.4026	.0879	.0228	.0202	.9673	.0000	.0000	.8144	.8420	.6575	.7131	1.2001
30	1.83	4.83	7.90	47.58	50.66	.0127	.3997	.0530	.0148	.0112	.9820	.0000	.0000	.8744	.7910	.6268	.7623	1.2250
50	2.17	5.30	10.47	44.42	49.56	.0191	.4021	.0632	.0193	.0134	.9791	.0000	.0000	.8533	.7771	.6210	.8357	1.2719
70	1.05	4.29	10.24	43.98	49.89	.0117	.4439	.0582	.0191	.0153	.9830	.0000	.0000	.8780	.7191	.5562	.9226	1.3197
85	5.32	5.64	15.29	42.25	52.06	.0123	.4751	.0869	.0303	.0260	.9751	.0000	.0000	.8096	.7108	.5295	.9529	1.3293
90	7.14	7.01	18.32	42.38	53.81	.0146	.4879	.0866	.0307	.0256	.9756	.0000	.0000	.8199	.7030	.5180	.9464	1.3246
95	6.34	7.87	19.13	44.76	56.06	.0144	.5238	.1084	.0390	.0338	.9701	.0000	.0000	.8001	.6942	.4964	.9460	1.3359

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11084.	180.83	1.2251	1.8111	82.10	83.52	35.78

Rotor Pressure Ratio = 1.8594

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
.01165	–	1.8111	79.57	.9745

SUCTION OPTIMIZATION, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 10:56:31 AUGUST 24,1971

NASA ENGLISH (SPECIAL) — RUN # 38, SPEED CODE 10, POINT # 2, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	V0-1 FT/SEC	V0-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	V0'-1 FT/SEC	V0'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1065.7	835.0	778.7	834.1	727.5	-38.5	43.05	-2.64	18.43	52.26	821.0	1362.9	-259.5	-1077.8	987.1	1039.3
10	21.008	21.961	1022.3	802.8	757.8	798.2	686.2	-83.9	42.16	-6.02	23.53	55.13	827.0	1396.9	-329.9	-1146.0	1016.0	1062.1
15	21.589	22.432	979.3	776.8	726.9	769.4	656.2	-106.5	42.07	-7.88	28.07	57.14	824.7	1418.4	-387.9	-1191.4	1044.1	1084.9
30	23.314	23.902	912.4	732.3	691.3	726.3	595.5	-93.3	40.74	-7.32	37.58	59.83	872.3	1445.1	-532.1	-1249.3	1127.5	1156.0
50	25.601	25.893	904.5	733.1	700.8	729.6	571.9	-70.8	39.22	-5.55	43.54	61.12	967.0	1511.1	-666.2	-1323.1	1238.2	1252.3
70	27.818	27.902	847.8	666.2	675.8	660.9	511.8	-83.6	37.13	-7.22	50.93	65.23	1073.4	1578.2	-833.5	-1433.0	1345.4	1349.4
85	29.408	29.382	846.3	640.4	666.3	638.3	521.7	-51.8	38.06	-4.64	53.50	66.57	1120.3	1605.2	-900.6	-1472.8	1422.3	1421.0
90	29.914	29.856	841.6	630.6	648.2	629.6	536.6	-35.7	39.62	-3.24	54.54	66.95	1117.4	1608.0	-910.1	-1479.6	1446.7	1443.9
95	30.382	30.293	831.1	600.4	628.1	598.4	544.3	-47.3	40.92	-4.54	55.83	68.41	1118.2	1626.6	-925.1	-1512.4	1469.4	1465.1

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	.71	3.63	13.75	45.70	55.87	.0078	.3915	.1629	.0406	.0386	.9301	.0000	.0000	.6836	.9301	.7072	.7180	1.1543
10	.89	3.82	9.41	48.18	53.84	.0082	.4039	.1418	.0360	.0340	.9428	.0000	.0000	.7213	.8879	.6796	.7198	1.1824
15	1.67	4.61	7.07	49.96	52.44	.0102	.4079	.1024	.0266	.0239	.9615	.0000	.0000	.7886	.8479	.6567	.7157	1.1991
30	2.30	5.30	7.90	48.06	50.66	.0140	.4075	.0548	.0153	.0114	.9817	.0000	.0000	.8739	.7853	.6172	.7535	1.2179
50	2.53	5.66	10.48	44.77	49.56	.0202	.4063	.0586	.0179	.0117	.9808	.0000	.0000	.8644	.7725	.6149	.8295	1.2675
70	1.44	4.68	10.25	44.35	49.89	.0133	.4467	.0582	.0191	.0148	.9829	.0000	.0000	.8772	.7210	.5567	.9171	1.3188
85	5.78	6.11	15.30	42.70	52.06	.0143	.4802	.0943	.0328	.0279	.9728	.0000	.0000	.7970	.7144	.5297	.9460	1.3277
90	7.66	7.52	18.34	42.86	53.81	.0171	.4926	.0939	.0333	.0273	.9733	.0000	.0000	.8074	.7068	.5189	.9387	1.3230
95	7.04	8.59	19.13	45.46	56.06	.0176	.5348	.1219	.0436	.0373	.9665	.0000	.0000	.7816	.6949	.4914	.9357	1.3312

NCORR INLET	WCORR INLET	TO/TO INLET	PO/PO INLET	EFF-AD INLET	EFF-P INLET	WC1/A1 LBM/SEC
RPM	LBM/SEC			%	%	SQFT
11084.	180.29	1.2271	1.8134	81.57	83.04	35.60

Rotor Pressure Ratio = 1.8646

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
.02169	–	1.8134	79.58	.9730

SUCTION OPTIMIZATION, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 15:34:25 — AUGUST 31,1971

NASA ENGLISH (SPECIAL) — RUN # 38, SPEED CODE 10, POINT # 3, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE
5	20.409	21.489	1064.5	834.0	776.9	833.1	727.6	-38.5	43.12
10	21.008	21.961	1022.7	802.5	758.4	797.9	686.1	-83.9	42.14
15	21.589	22.432	979.7	776.5	727.8	769.1	655.8	-106.4	42.02
30	23.319	23.902	910.7	731.2	689.9	725.2	594.9	-93.1	40.75
50	25.601	25.893	903.4	731.8	699.5	728.4	571.6	-70.7	39.25
70	27.818	27.902	847.4	666.3	674.7	661.1	512.7	-83.6	37.22
85	29.408	29.382	846.8	640.5	665.8	638.4	523.3	-51.8	38.17
90	29.914	29.856	842.3	630.9	647.7	629.8	538.4	-35.7	39.74
95	30.382	30.293	832.5	601.0	628.2	599.1	546.2	-47.4	41.01

%SPAN	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	-2.64	18.46	52.30	819.2	1362.2	-259.4	-1077.7	987.0	1039.3
10	-6.02	23.52	55.14	827.5	1396.6	-329.9	-1146.0	1016.0	1062.1
15	-7.88	28.06	57.15	825.7	1418.2	-388.3	-1191.3	1044.1	1084.9
30	-7.32	37.69	59.86	871.9	1444.4	-533.1	-1249.1	1127.5	1156.0
50	-5.55	43.61	61.16	966.3	1510.3	-666.5	-1323.0	1238.1	1252.3
70	-7.21	50.95	65.23	1072.1	1578.3	-832.7	-1433.0	1345.4	1349.4
85	-4.64	53.48	66.57	1118.6	1605.2	-898.9	-1472.8	1422.3	1421.0
90	-3.24	54.51	66.94	1115.6	1608.1	-908.3	-1479.7	1446.7	1443.9
95	-4.54	55.77	68.39	1116.7	1626.9	-923.2	-1512.4	1469.9	1465.1

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL
5	.78	3.70	13.75	45.77	55.87	.0079	.3918	.1632	.0406
10	.86	3.79	9.41	48.16	53.84	.0081	.4044	.1497	.0368
15	1.62	4.56	7.06	49.90	52.43	.0100	.4083	.1056	.0274
30	2.31	5.31	7.90	48.07	50.66	.0139	.4073	.0537	.0149
50	2.56	5.70	10.48	44.80	49.56	.0203	.4067	.0582	.0177
70	1.53	4.77	10.25	49.43	49.89	.0136	.4965	.0567	.0186
85	5.89	6.22	15.30	42.81	52.06	.0148	.4812	.0957	.0333
90	7.78	7.64	18.33	42.98	53.81	.0177	.4935	.0956	.0339
95	7.:3	8.68	19.13	45.55	56.06	.0181	.5356	.1238	.0445

%SPAN	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	.0387	.9301	.0000	.0000	.6827	.9289	.7063	.7164	1.1536
10	.0347	.9416	.0000	.0000	.7160	.8883	.6792	.7204	1.1821
15	.0248	.9602	.0000	.0000	.7823	.8485	.6564	.7166	1.1989
30	.0111	.9821	.0000	.0000	.8763	.7839	.6163	.7530	1.2179
50	.0116	.9810	.0000	.0000	.8650	.7715	.6138	.8287	1.2668
70	.0142	.9834	.0000	.0000	.8798	.7206	.5567	.9157	1.3186
85	.0282	.9723	.0000	.0000	.7946	.7147	.5296	.9443	1.3273
90	.0277	.9728	.0000	.0000	.8049	.7073	.5189	.9370	1.3227
95	.0380	.9657	.0000	.0000	.7776	.6958	.4918	.9343	1.3310

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
11084.	180.59	1.2272	1.8175	81.87	83.31	35.57

Rotor Pressure Ratio = 1.8691

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
.01938	–	1.8175	80.09	.9729

SUCTION ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES . . . AIRFOIL AERODYNAMIC SUMMARY PRINT 12:56:36 OCTOBER 14,1971
NASA ENGLISH (SPECIAL) RUN # 45,SPEED CODE 70,POINT # 1,PAGE 36,02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	838.6	908.9	673.2	892.7	500.1	-171.0	36.60	-10.85	15.78	45.17	699.6	1266.1	-190.3	-897.9	690.3	726.9
10	21.008	21.961	795.2	884.4	649.1	868.0	459.3	-169.2	35.27	-11.03	21.17	46.42	696.5	1259.1	-251.3	-912.0	710.6	742.8
15	21.589	22.432	760.2	859.0	628.8	839.0	427.1	-183.3	34.17	-12.36	25.71	48.31	698.9	1262.0	-303.1	-942.1	730.2	758.8
30	23.314	23.902	695.2	793.0	602.4	769.7	347.0	-190.8	29.93	-13.92	36.22	52.39	747.2	1261.5	-441.6	-999.3	788.6	808.5
50	25.601	25.893	644.2	732.0	581.3	709.2	277.5	-181.2	25.51	-14.34	45.33	56.13	827.4	1273.1	-588.5	-1057.0	865.9	875.8
70	27.818	27.902	606.0	676.1	561.5	641.6	227.6	-213.1	22.06	-18.38	51.77	60.98	908.0	1323.0	-713.3	-1156.9	940.9	943.8
85	29.408	29.382	594.4	634.6	554.8	601.1	213.1	-203.6	21.01	-18.71	54.63	63.34	958.5	1339.8	-781.6	-1197.4	994.7	993.8
90	29.914	29.856	578.4	626.1	536.7	593.0	215.6	-200.9	21.89	-18.72	56.02	63.90	960.3	1348.2	-796.3	-1210.8	1011.8	1009.9
95	30.382	30.293	558.9	598.5	514.7	540.7	217.8	-254.9	22.94	-25.30	57.56	67.08	959.7	1389.5	-809.8	-1279.6	1027.7	1024.6

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-5.73	-2.81			55.87	.0000	.1132	.1962	.0358	.0358	.9541	.0000	.0000	1.6721	.7503	.8228	.6268	1.1961
10	-6.06	-3.13			53.85	.0000	.0877	.0903	.0227	.0227	.9741	.0000	.0000	1.2896	.7078	.8004	.6221	1.1395
15	-6.33	-3.39			52.52	.0000	.0787	.0572	.0146	.0146	.9848	.0000	.0000	1.1546	.6760	.7765	.6243	1.1407
30	-8.66	-5.66			50.67	.0000	.0757	.0430	.0117	.0117	.9902	.0000	.0000	1.0967	.6171	.7150	.6692	1.1373
50	-11.29	-8.15			49.59	.0000	.0814	.0463	.0138	.0138	.9907	.0000	.0000	1.1130	.5719	.6586	.7405	1.1454
70	-13.74	-10.50			49.86	.0000	.1252	.0717	.0225	.0225	.9871	.0000	.0000	1.2197	.5382	.6070	.8136	1.1877
85	-11.35	-10.96			52.09	.0000	.1773	.1385	.0459	.0459	.9759	.0000	.0000	1.9772	.5263	.5672	.8534	1.1975
90	-9.91	-10.21			53.71	.0000	.1734	.0958	.0322	.0322	.9842	.0000	.0000	1.5477	.5115	.5586	.8530	1.2028
95	-10.98	-9.33			56.05	.0000	.2344	.1191	.0388	.0388	.9816	.0000	.0000	1.7791	.4933	.5321	.8498	1.2353

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
7752.	136.65	1.0817	1.2495	80.46	81.06	37.04

	W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
Rotor Pressure Ratio = 1.2495	.03123	–	1.2495	78.38	.9856

SUCTION ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 12:57:54 — OCTOBER 14, 1971

NASA ENGLISH (SPECIAL) — RUN # 45, SPEED CODE 70, POINT # 2, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VU'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	786.9	780.1	604.2	765.8	504.1	-148.8	39.84	-10.99	17.31	48.90	632.9	1164.9	-188.2	-877.7	692.3	729.0
10	21.008	21.961	748.0	755.4	500.1	740.8	472.2	-147.7	39.14	-11.28	22.52	50.31	628.4	1160.1	-240.4	-892.7	712.7	745.0
15	21.589	22.432	716.8	733.8	561.1	714.9	446.0	-164.0	38.46	-12.95	27.01	52.28	630.7	1169.5	-286.4	-924.9	732.4	761.0
30	23.314	23.902	661.1	682.1	541.8	659.3	378.8	-174.9	34.95	-14.86	37.24	56.22	681.0	1185.9	-412.1	-985.7	790.9	810.8
50	25.601	25.893	611.5	631.6	520.7	608.9	320.4	-167.6	31.60	-15.40	46.44	59.78	756.1	1210.5	-548.0	-1046.0	868.5	878.4
70	27.818	27.902	580.8	590.4	507.6	550.8	282.2	-212.5	29.07	-21.10	52.47	64.57	833.9	1283.3	-661.5	-1159.0	943.7	946.5
85	29.408	29.382	572.8	560.4	499.6	521.4	280.1	-205.2	29.28	-21.48	55.15	66.56	874.3	1310.2	-717.5	-1201.9	997.6	996.7
90	29.914	29.856	565.7	551.8	485.5	513.4	290.1	-202.1	30.87	-21.49	56.18	67.09	872.3	1319.0	-724.6	-1214.9	1014.8	1012.8
95	30.382	30.293	558.7	535.1	473.7	497.9	296.2	-196.0	32.02	-21.49	57.18	67.86	874.0	1321.1	-734.5	-1223.7	1030.7	1027.6

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P PROFILE	LOSS-R	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-2.47	.95	—		55.87	.0000	.2125	.1276	.0312	.0312	.9644	.0000	.0000	-5.1832	.6983	.6936	.5627	1.0357
10	-2.13	.80			53.85	.0000	.1995	.0893	.0224	.0224	.9771	.0000	.0000	3.9117	.6596	.6711	.5567	1.0306
15	-2.02	.93	—		52.53	.0000	.1972	.0604	.0154	.0154	.9856	.0000	.0000	1.9015	.6321	.6512	.5599	1.0379
30	-3.59	-.59			50.67	.0000	.2024	.0442	.0120	.0120	.9909	.0000	.0000	1.4688	.5819	.6045	.6055	1.0510
50	-5.15	-2.01	—		49.58	.0000	.2111	.0339	.0100	.0100	.9939	.0000	.0000	1.3721	.5381	.5587	.6709	1.0707
70	-6.67	-3.42			49.86	.0000	.2655	.0415	.0128	.0128	.9932	.0000	.0000	1.9283	.5109	.5212	.7392	1.1327
85	-2.93	-2.59	—		52.07	.0000	.3179	.0836	.0272	.0272	.9067	.0000	.0000	-.5552	.5025	.4921	.7682	1.1505
90	-1.01	-1.18			53.77	.0000	.3339	.0732	.0242	.0242	.9867	.0000	.0000	-.2935	.4951	.4831	.7644	1.1549
95	-1.86	-.30	—		56.04	.0000	.3601	.0946	.0318	.0318	.9857	.0000	.0000	-.0406	.4883	.4672	.7647	1.1534

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
7775.	128.44	1.0946	1.3055	83.72	84.32	33.84

	W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
Rotor Pressure Ratio = 1.3201	.03456	—	1.3055	80.43	.9894

SUCTION ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

NASA ENGLISH (SPECIAL)

RUN # . 15,SPEED CODE 70,POINT # 4,PAGE 3?.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VC-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	765.8	722.3	567.4	700.3	514.4	-176.9	42.19	-14.18	17.47	52.31	594.9	1145.5	-178.5	-906.5	692.9	729.6
10	21.008	21.961	729.4	697.6	545.4	676.2	484.2	-171.2	41.60	-14.21	22.79	53.59	592.0	1139.3	-229.0	-916.8	713.3	745.6
15	21.589	22.432	697.2	677.2	523.4	655.0	460.7	-171.8	41.35	-14.71	27.46	54.94	590.7	1140.5	-272.3	-933.4	733.0	761.6
30	23.314	23.902	640.3	629.2	499.8	594.9	400.2	-204.6	38.69	-18.98	38.04	59.65	635.0	1177.6	-391.3	-1016.1	791.5	811.5
50	25.601	25.893	592.9	582.4	480.6	547.6	347.3	-198.1	35.85	-19.89	47.34	63.05	709.6	1208.5	-521.9	-1077.2	869.2	879.1
70	27.818	27.902	573.6	552.0	475.5	519.0	320.8	-187.9	34.00	-19.90	52.66	65.43	784.4	1240.3	-623.7	-1135.2	944.5	947.3
85	29.408	29.382	568.3	529.2	464.1	497.6	328.0	-180.1	35.25	-19.89	55.31	67.09	815.4	1278.5	-670.4	-1177.6	998.4	997.6
90	29.914	29.856	562.7	522.0	449.8	490.8	338.0	-177.7	36.93	-19.90	56.42	67.61	813.4	1288.5	-677.6	-1191.4	1015.6	1013.7
95	30.382	30.293	556.4	506.6	437.4	452.3	343.9	-226.2	38.18	-26.62	57.59	70.16	815.0	1334.0	-687.6	-1254.7	1031.5	1028.5

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-.13	2.79			55.87	.0000	.2790	.1325	.0320	.0320	.9648	.0000	.0000	-.0095	.6773	.6371	.5272	1.0104
10	.36	3.29			53.85	.0000	.2709	.1033	.0256	.0256	.9748	.0000	.0000	-.0291	.6413	.6148	.5224	1.0041
15	.91	3.86			52.53	.0001	.2641	.0694	.0176	.0176	.9843	.0000	.0000	-.0558	.6128	.5963	.5219	1.0042
30	.18	3.18			50.67	.0001	.2816	.0421	.0112	.0112	.9918	.0000	.0000	-.0904	.5611	.5531	.5617	1.0352
50	-.86	2.27			49.58	.0000	.2991	.0315	.0091	.0091	.9947	.0000	.0000	.2044	.5197	.5108	.6258	1.0600
70	-1.68	1.56			49.86	.0000	.3314	.0474	.0148	.0148	.9925	.0000	.0000	.4169	.5021	.4828	.6899	1.0918
85	2.99	3.36			52.06	.0000	.3813	.0825	.0271	.0271	.9872	.0000	.0000	.4003	.4951	.4602	.7110	1.1117
90	5.08	4.90			53.75	.0001	.3982	.0781	.0261	.0261	.9882	.0000	.0000	.4561	.4889	.4526	.7073	1.1172
95	4.28	5.89			56.04	.0001	.4594	.1005	.0324	.0324	.9852	.0000	.0000	.4500	.4825	.4380	.7077	1.1535

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
7781.	122.66	1.1033	1.3373	83.84	84.49	31.67

Rotor Pressure Ratio = 1.3528

$\frac{W_{BLEED}}{W_{TOTAL}}$	$\frac{W_{BLOW}}{W_{TOTAL}}$	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
.03695	—	1.3373	80.93	.9890

SUCTION ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 13:00:31 OCTOBER 14,1971
NASA ENGLISH (SPECIAL) — RUN # 45, SPEED CODE 70, POINT # 5, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VU'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	752.3	671.8	539.3	652.4	524.6	-160.6	44.21	-13.83	17.36	51.77	565.0	1103.8	-168.5	-890.4	693.1	729.8
10	21.008	21.961	717.7	648.4	519.6	629.6	495.1	-155.2	43.62	-13.85	22.82	55.06	564.0	1099.3	-218.4	-901.0	713.5	745.9
15	21.589	22.432	686.3	628.6	497.4	608.9	472.8	-155.8	43.54	-14.36	27.61	56.43	562.2	1101.5	-260.4	-917.6	733.2	761.8
30	23.314	23.902	631.0	580.9	472.2	549.7	418.6	-187.8	41.55	-18.87	38.29	61.18	602.2	1140.8	-373.2	-999.5	791.8	811.8
50	25.601	25.893	580.9	533.9	447.5	502.1	370.4	-181.5	39.62	-19.87	48.10	64.67	670.4	1173.8	-499.0	-1060.9	869.5	879.4
70	27.818	27.902	570.7	515.9	446.7	485.2	355.1	-175.4	38.48	-19.88	52.84	66.63	739.9	1223.3	-589.7	-1123.0	944.8	947.6
85	29.408	29.382	568.8	500.9	429.4	470.9	373.0	-170.5	40.98	-19.90	55.59	68.05	759.0	1259.8	-625.0	-1168.4	998.8	997.9
90	29.914	29.856	561.3	490.1	416.3	460.8	376.4	-166.8	42.12	-19.90	56.93	68.68	763.2	1267.6	-639.5	-1180.8	1016.0	1014.0
95	30.382	30.293	555.4	477.7	407.3	427.7	377.6	-211.0	42.83	-26.29	58.09	70.95	770.7	1311.8	-654.3	-1239.8	1031.9	1028.8

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	1.88	4.80		—	55.87	.0002	.3309	.1375	.0333	.0332	.9647	.0000	.0000	.4229	.6637	.5888	.4995	.9673
10	2.38	5.31		—	53.85	.0005	.3254	.1115	.0277	.0276	.9736	.0000	.0000	.4864	.6299	.5679	.4965	.9627
15	3.13	6.07		—	52.54	.0011	.3216	.0802	.0203	.0201	.9825	.0000	.0000	.5754	.6020	.5500	.4951	.9637
30	3.10	6.10			50.67	.0019	.3479	.0613	.0163	.0158	.9805	.0000	.0000	.6527	.5516	.5072	.5301	.9961
50	2.93	6.06		—	49.59	.0021	.3713	.0465	.0134	.0128	.9925	.0000	.0000	.7229	.5076	.4650	.5877	1.0222
70	2.83	6.07			49.87	.0025	.4039	.0599	.0187	.0179	.9907	.0000	.0000	.6943	.4973	.4477	.6462	1.0616
85	8.51	8.95		—	52.06	.0073	.4535	.0873	.0287	.0263	.9666	.0000	.0000	.6313	.4923	.4318	.6581	1.0859
90	10.18	10.01			53.77	.0082	.4709	.0924	.0309	.0281	.9862	.0000	.0000	.6313	.4849	.4215	.6603	1.0902
95	8.92	10.49		—	56.04	.0069	.5224	.1085	.0351	.0329	.9842	.0000	.0000	.6116	.4793	.4101	.6661	1.1261

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
7784.	116.84	1.1108	1.3558	82.05	82.80	29.86

Rotor Pressure Ratio = 1.3745

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
.03930	—	1.3558	78.95	.9868

SUCTION ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES AIRFOIL AERODYNAMIC SUMMARY PRINT 13:31:52 OCTOBER 14,1971
NASA ENGLISH (SPECIAL) RUN # 45,SPEED CODE 70,POINT # 6,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	738.2	638.7	509.0	615.9	534.7	-169.0	46.41	-15.35	17.20	55.58	533.1	1089.5	-158.3	-898.7	693.0	727.6
10	21.008	21.961	706.6	616.7	494.1	594.7	505.0	-163.1	45.62	-15.34	22.86	56.80	536.6	1086.1	-208.3	-908.8	713.3	745.7
15	21.589	22.432	678.9	597.3	476.7	574.7	483.4	-162.7	45.40	-15.82	27.61	58.13	538.9	1086.6	-249.6	-924.4	733.0	761.7
30	23.314	23.902	627.8	551.4	452.6	517.3	435.0	-190.7	43.86	-20.24	38.19	62.69	576.7	1128.0	-356.6	-1002.2	791.6	811.6
50	25.601	25.893	576.0	503.9	417.0	469.5	397.4	-183.0	43.62	-21.30	48.51	66.15	629.9	1161.4	-471.9	-1062.2	869.3	879.2
70	27.818	27.902	569.1	485.1	410.4	451.9	394.2	-176.4	43.84	-21.32	53.28	68.09	686.6	1211.2	-550.4	-1123.8	944.5	947.4
85	29.408	29.382	565.8	472.2	383.1	439.9	416.3	-171.8	47.38	-21.33	56.65	69.39	697.0	1249.4	-582.2	-1169.4	998.5	997.6
90	29.914	29.856	562.8	466.5	378.3	434.5	416.8	-169.7	47.77	-21.34	57.72	69.84	708.4	1260.7	-598.9	-1183.5	1015.7	1013.7
95	30.382	30.293	556.8	458.9	370.9	405.9	415.2	-212.3	48.23	-27.63	58.95	71.87	719.4	1305.8	-616.3	-1240.9	1031.6	1028.6

%SPAN	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	4.07	6.99	—		55.88	.0014	.3693	.1381	.0332	.0328	.9658	.0000	.0000	.5297	.6494	.5573	.4702	.9506
10	4.35	7.28			53.85	.0020	.3662	.1186	.0292	.0287	.9728	.0000	.0000	.5763	.6191	.5379	.4718	.9473
15	4.97	7.92	—		52.56	.0035	.3670	.0994	.0250	.0242	.9787	.0000	.0000	.6197	.5947	.5205	.4737	.9486
30	5.44	8.44			50.68	.0066	.4003	.0924	.0244	.0226	.9829	.0000	.0000	.6412	.5483	.4793	.5055	.9805
50	6.93	10.05	—		49.61	.0147	.4332	.0732	.0209	.0167	.9884	.0000	.0000	.7150	.5016	.4363	.5486	1.0055
70	8.19	11.43			49.87	.0258	.4797	.1061	.0328	.0248	.9037	.0000	.0000	.6452	.4933	.4177	.5952	1.0431
85	14.65	15.26	—		52.08	.0544	.5289	.1325	.0412	.0255	.9801	.0000	.0000	.5969	.4871	.4037	.6004	1.0681
90	15.80	15.58			53.77	.0502	.5417	.1423	.0471	.0305	.9789	.0000	.0000	.5787	.4838	.3982	.6096	1.0762
95	14.35	15.87	—		56.04	.0437	.5827	.1472	.0470	.0330	.9787	.0000	.0000	.5256	.4779	.3913	.6182	1.1133

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
7782.	110.23	1.1184	1.3675	79.00	79.91	27.96

Rotor Pressure Ratio =1.3933

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
.04209	—	1.3675	75.80	.9817

SUCTION ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES　　　AIRFOIL AERODYNAMIC SUMMARY PRINT　　　10:54:42　　　OCTOBER 26,1971

NASA ENGLISH (SPECIAL)　　　RUN # 45,SPEED CODE 10,POINT # 1,PAGE 36,02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.989	1088.1	1109.2	825.4	1103.2	709.0	-115.0	40.66	-5.95	18.89	46.41	872.5	1600.1	-282.5	-1159.0	991.5	1043.9
10	21.008	21.961	1052.5	1094.5	811.9	1085.7	669.8	-138.3	39.52	-7.26	23.36	47.98	884.8	1622.2	-350.8	-1205.2	1020.6	1066.9
15	21.589	22.432	1017.8	1075.3	796.2	1063.3	633.7	-159.3	38.50	-8.53	27.49	49.59	899.0	1640.7	-415.1	-1249.1	1048.8	1089.8
30	23.314	23.902	925.1	987.8	758.8	971.7	529.3	-177.5	34.89	-10.35	38.47	54.02	969.6	1654.2	-603.3	-1338.6	1132.6	1161.2
50	25.601	25.893	873.2	930.1	738.4	918.2	466.1	-148.5	32.26	-9.19	46.45	56.86	1072.7	1679.8	-777.6	-1406.4	1243.7	1257.9
70	27.818	27.902	802.8	833.5	698.9	818.2	394.8	-159.1	29.45	-11.01	53.82	61.62	1185.0	1721.6	-956.6	-1514.6	1351.4	1355.5
85	29.408	29.382	799.3	798.5	704.9	786.7	376.7	-136.8	28.12	-9.86	56.17	63.30	1266.3	1750.9	-1051.9	-1564.2	1428.6	1427.9
90	29.919	29.856	785.2	788.3	684.3	779.4	385.0	-117.7	29.37	-8.59	57.36	63.57	1268.7	1751.2	-1068.2	-1568.1	1453.2	1450.9
95	30.382	30.293	761.7	752.4	654.5	742.5	389.6	-121.4	30.77	-9.30	58.93	65.01	1268.4	1757.7	-1086.4	-1593.0	1476.0	1471.6

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-1.72	1.20	10.45	46.61	55.87	.0040	.1659	.2326	.0577	.0567	.8964	.0000	.0000	5.3553	.9570	.9794	.7677	1.4129
10	-1.82	1.11	8.18	46.78	53.84	.0041	.1535	.1903	.0483	.0472	.9193	.0000	.0000	2.7641	.9245	.9669	.7761	1.4330
15	-1.92	1.02	6.39	47.03	52.40	.0041	.1451	.1533	.0397	.0387	.9382	.0000	.0000	2.0089	.8918	.9497	.7863	1.4490
30	-3.55	-.56	4.87	45.24	50.67	.0016	.1455	.1299	.0359	.0354	.9547	.0000	.0000	1.7198	.8063	.8692	.8460	1.4555
50	-4.44	-1.31	6.84	41.45	49.60	.0011	.1498	.1011	.0306	.0303	.9679	.0000	.0000	1.5890	.7582	.8142	.9319	1.4703
70	-6.25	-3.02	6.44	40.47	49.88	.0000	.1902	.1417	.0461	.0461	.9608	.0000	.0000	2.4182	.6947	.7253	1.0293	1.4981
85	-4.44	-3.95	10.08	37.98	52.08	.0000	.2256	.1856	.0639	.0639	.9492	.0000	.0000	*******	.6911	.6911	1.0961	1.5154
90	-2.58	-2.82	12.99	37.96	53.80	.0000	.2237	.1620	.0569	.0569	.9572	.0000	.0000	26.5720	.6760	.6794	1.0930	1.5092
95	-3.05	-1.59	14.38	40.07	56.06	.0000	.2545	.1927	.0686	.0686	.9520	.0000	.0000	-5.6496	.6525	.6445	1.0874	1.5055

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11134.	182.65	1.1894	1.6013	76.94	77.50	39.46

Rotor Pressure Ratio = 1.6847

W_{BLEED} / W_{TOTAL}	W_{BLOW} / W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
.02472	–	1.6013	73.95	.9517

SUCTION ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 10:55:58 — OCTOBER 26, 1971

NASA ENGLISH (SPECIAL) — RUN # 45, SPEED CODE 10, POINT # 2, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	V0-1 FT/SEC	V0-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	V0'-1 FT/SEC	V0'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1040.6	844.8	752.4	839.1	719.0	-98.3	43.70	-6.68	19.90	53.69	800.3	1417.2	-272.4	-1142.0	991.3	1043.8
10	21.008	21.961	994.2	813.1	726.5	803.9	678.6	-121.5	43.05	-8.61	25.21	55.92	803.4	1434.8	-341.8	-1188.3	1020.4	1066.7
15	21.589	22.432	952.1	788.8	695.1	777.0	650.6	-135.4	43.10	-9.89	29.77	57.61	801.8	1450.8	-398.1	-1225.0	1048.6	1089.6
30	23.314	23.902	893.2	749.4	668.0	738.1	593.0	-129.8	41.60	-9.98	38.92	60.24	858.6	1487.0	-539.5	-1290.8	1132.4	1161.0
50	25.601	25.893	885.1	746.7	678.0	739.7	569.0	-102.0	40.00	-7.86	44.84	61.45	956.5	1548.0	-674.5	-1359.7	1243.5	1257.7
70	27.818	27.902	821.9	674.3	645.7	658.9	508.4	-142.6	38.21	-12.23	52.51	66.25	1062.0	1636.6	-842.8	-1497.9	1351.2	1355.3
85	29.408	29.382	818.5	645.0	633.2	638.0	518.7	-94.4	39.32	-8.41	55.16	67.25	1108.4	1649.9	-909.8	-1521.6	1428.4	1427.2
90	29.914	29.856	812.0	633.7	612.0	630.4	533.6	-63.2	41.09	-5.71	56.36	67.39	1104.6	1639.4	-919.5	-1513.4	1453.0	1450.2
95	30.382	30.293	802.5	612.3	592.8	610.2	540.9	-50.9	42.38	-4.76	57.62	68.16	1107.0	1640.1	-934.9	-1522.3	1475.8	1471.4

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	1.36	4.28	9.72	50.38	55.87	.0079	.3801	.1641	.0406	.0387	.9321	.0000	.0000	.6347	.9055	.7169	.6976	1.2026
10	1.77	4.70	6.83	51.66	53.84	.0088	.3847	.1350	.0341	.0319	.9480	.0000	.0000	.6084	.8611	.6895	.6970	1.2167
15	2.68	5.63	5.06	52.99	52.44	.0115	.3850	.0941	.0243	.0213	.9662	.0000	.0000	.7676	.8221	.6680	.6935	1.2286
30	3.15	6.15	5.24	51.57	50.66	.0158	.3864	.0567	.0157	.0113	.9817	.0000	.0000	.8422	.7669	.6328	.7398	1.2555
50	3.32	6.46	8.17	47.86	49.57	.0222	.3877	.0651	.0198	.0130	.9795	.0000	.0000	.8186	.7544	.6273	.8179	1.3004
70	2.53	5.77	5.23	50.94	49.88	.0155	.4419	.0630	.0204	.0154	.9825	.0000	.0000	.8419	.6972	.5640	.9041	1.3690
85	6.92	7.34	11.53	47.73	52.07	.0175	.4739	.1053	.0364	.0304	.9713	.0000	.0000	.7500	.6690	.5339	.9333	1.3657
90	9.12	8.95	15.88	46.80	53.81	.0217	.4809	.1056	.0374	.0297	.9719	.0000	.0000	.7619	.6000	.5217	.9252	1.3496
95	8.54	10.02	18.91	47.14	56.06	.0224	.5034	.1227	.0441	.0361	.9681	.0000	.0000	.7475	.6693	.5018	.9238	1.3439

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11132.	180.92	1.2266	1.8169	82.00	83.44	35.68

	W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
Rotor Pressure Ratio = 1.8673	.02766	–	1.8164	79.45	.9732

SUCTION ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 10:58:15 — OCTOBER 26,1971

NASA ENGLISH (SPECIAL) — RUN # 52, SPEED CODE 10, POINT # 3, PAGE 36,02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	V0-1 FT/SEC	V0-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	V0'-1 FT/SEC	V0'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1034.5	831.8	744.0	827.2	718.8	-87.8	44.01	-6.06	20.14	53.84	792.6	1402.0	-272.9	-1132.0	991.7	1044.2
10	21.008	21.961	988.4	800.3	717.1	792.0	680.2	-114.6	43.49	-8.25	25.42	56.17	794.4	1422.0	-340.6	-1181.8	1020.8	1067.1
15	21.589	22.432	947.3	776.8	686.4	765.0	652.7	-134.4	43.54	-9.97	29.96	57.99	793.5	1443.9	-396.4	-1224.4	1049.1	1090.0
30	23.319	23.902	897.4	747.5	671.2	735.7	595.7	-132.3	41.59	-10.20	30.67	60.37	859.7	1488.3	-537.2	-1293.8	1132.9	1161.5
50	25.601	25.893	888.4	746.3	679.0	741.3	572.9	-86.4	40.15	-6.66	44.65	61.13	954.9	1535.5	-671.2	-1344.6	1244.0	1258.2
70	27.818	27.902	821.0	668.5	644.6	656.2	508.5	-127.4	38.26	-11.01	52.57	66.13	1061.7	1622.1	-843.3	-1483.3	1351.7	1355.8
85	29.408	29.382	810.9	635.4	626.7	628.3	514.6	-94.2	39.39	-8.52	55.57	67.57	1106.6	1646.5	-914.4	-1521.9	1429.0	1427.7
90	29.914	29.856	802.8	621.9	605.2	618.3	527.4	-64.6	41.07	-5.95	56.84	67.80	1106.5	1636.7	-926.2	-1515.3	1453.6	1450.8
95	30.382	30.293	793.0	597.3	586.3	595.0	533.9	-52.0	42.32	-4.99	58.11	68.67	1110.0	1636.1	-942.5	-1524.1	1476.3	1472.0

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	1.67	4.59	10.34	50.07	55.87	.0084	.3864	.1606	.0398	.0377	.9342	.0000	.0000	.6542	.8993	.7048	.6903	1.1879
10	2.22	5.15	7.19	51.74	53.84	.0096	.3926	.1321	.0334	.0310	.9496	.0000	.0000	.7060	.8551	.6775	.6883	1.2044
15	3.13	6.07	4.97	53.51	52.42	.0126	.3948	.0927	.0239	.0207	.9670	.0000	.0000	.7800	.8172	.6567	.6858	1.2207
30	3.15	6.15	5.02	51.78	50.66	.0161	.3930	.0600	.0166	.0122	.9805	.0000	.0000	.8384	.7706	.6308	.7407	1.2558
50	3.47	6.60	9.37	46.81	49.57	.0232	.3863	.0641	.0195	.0124	.9797	.0000	.0000	.8250	.7571	.6265	.8162	1.2890
70	2.59	5.83	6.45	49.28	49.88	.0157	.4421	.0623	.0203	.0151	.9827	.0000	.0000	.8488	.6964	.5589	.9035	1.3561
85	6.95	7.39	11.43	47.90	52.07	.0171	.4789	.0937	.0324	.0265	.9749	.0000	.0000	.7799	.6824	.5260	.9335	1.3629
90	9.12	8.94	15.63	47.02	53.80	.0208	.4877	.0948	.0335	.0262	.9752	.0000	.0000	.7892	.6723	.5120	.9270	1.3476
95	8.47	9.97	18.68	47.31	56.06	.0212	.5137	.1172	.0421	.0345	.9701	.0000	.0000	.7656	.6615	.4895	.9266	1.3409

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11137.	180.85	1.2267	1.8223	82.44	83.84	35.58

Rotor Pressure Ratio = 1.8718

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
.02762	–	1.8223	80.38	.9739

SUCTION ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 12:37:35 OCTOBER 14,1971

NASA ENGLISH (SPECIAL) — RUN # 52,SPEED CODE 10,POINT # 4,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1029.6	782.4	720.0	778.1	736.1	-81.5	45.63	-5.98	19.63	55.38	764.5	1369.5	-256.8	-1127.0	992.9	1045.5
10	21.008	21.961	990.8	753.7	705.4	745.1	695.8	-112.0	44.61	-8.57	24.83	57.73	777.6	1396.2	-326.3	-1180.5	1022.1	1068.4
15	21.589	22.432	949.4	730.6	673.3	718.5	669.3	-132.1	44.83	-10.92	29.49	59.57	774.5	1418.9	-381.1	-1223.4	1050.3	1091.3
30	23.314	23.902	883.3	696.2	633.0	686.4	616.1	-116.7	44.22	-9.65	39.30	61.79	818.1	1452.0	-518.2	-1279.5	1134.2	1162.9
60	25.601	25.893	877.4	708.3	643.0	702.2	597.0	-93.0	42.88	-7.54	45.25	62.57	913.2	1524.1	-649.5	-1352.7	1249.5	1259.7
70	27.818	27.902	836.7	664.7	633.4	651.6	546.7	-130.7	40.79	-11.36	51.83	66.34	1025.9	1624.7	-806.7	-1488.2	1353.4	1357.5
85	29.408	29.382	838.5	644.2	624.9	636.1	559.0	-101.6	41.81	-9.07	54.36	67.44	1072.6	1657.9	-871.7	-1531.0	1430.7	1429.5
90	29.914	29.856	833.6	634.3	603.0	630.3	575.4	-68.8	43.66	-6.22	55.58	67.50	1066.0	1646.8	-880.0	-1521.3	1455.3	1452.5
95	30.382	30.293	822.8	613.6	580.3	611.0	583.3	-56.8	45.16	-5.31	57.04	68.24	1066.5	1648.0	-894.8	-1530.5	1478.1	1473.8

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	3.27	6.18	10.42	51.62	55.87	.0127	.4390	.1908	.0473	.0442	.9228	.0000	.0000	.6508	.8926	.6575	.6638	1.1510
10	3.26	6.19	6.87	53.18	53.84	.0132	.4444	.1774	.0448	.0415	.9323	.0000	.0000	.6693	.8581	.6332	.6732	1.1730
15	4.36	7.30	4.47	55.29	52.37	.0175	.4486	.1391	.0358	.0313	.9505	.0000	.0000	.7291	.8191	.6131	.6669	1.1907
30	5.77	8.77	5.57	53.87	50.67	.0273	.4429	.0769	.0213	.0137	.9758	.0000	.0000	.8358	.7551	.5825	.6986	1.2149
50	6.22	9.35	8.48	50.42	49.54	.0384	.4326	.0704	.0214	.0097	.9783	.0000	.0000	.8327	.7454	.5898	.7745	1.2871
70	5.15	8.38	6.13	52.15	49.90	.0303	.4737	.0753	.0245	.0146	.9787	.0000	.0000	.8299	.7066	.5514	.8666	1.3479
85	9.33	9.69	10.82	50.88	52.01	.0331	.5073	.1157	.0400	.0285	.9675	.0000	.0000	.7636	.7024	.5292	.8985	1.3619
90	11.51	11.43	15.40	49.88	53.85	.0399	.5139	.1182	.0418	.0277	.9675	.0000	.0000	.7653	.6943	.5181	.8886	1.3450
95	11.35	12.76	18.37	50.46	56.07	.0427	.5353	.1313	.0472	.0318	.9649	.0000	.0000	.7497	.6822	.4987	.8842	1.3399

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCT/AT LBM/SEC SQFT
11150.	179.53	1.2393	1.8699	81.74	83.26	34.35

Rotor Pressure Ratio = 1.9343

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
.02843	–	1.8699	79.14	.9671

SUCTION ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 10:57:03 OCTOBER 26,1971

NASA ENGLISH (SPECIAL) — RUN # 45, SPEED CODE 10, POINT # 4, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1030.1	791.9	723.3	788.3	733.4	-75.7	45.40	-5.48	19.18	54.69	765.9	1363.7	-251.6	-1112.8	985.0	1037.1
10	21.008	21.961	991.7	761.7	710.2	753.6	692.1	-110.1	44.26	-8.33	24.39	57.21	780.2	1391.9	-321.8	-1170.1	1013.9	1059.9
15	21.589	22.432	948.4	737.2	676.6	726.2	664.6	-126.8	44.48	-9.91	29.14	59.01	775.7	1410.8	-377.4	-1209.4	1042.0	1082.7
30	23.314	23.902	874.9	694.2	626.3	683.8	611.0	-119.5	44.29	-9.91	39.39	61.76	810.4	1445.1	-514.3	-1273.1	1125.2	1153.6
50	25.601	25.893	870.2	706.8	638.9	701.5	590.8	-86.0	42.76	-6.99	45.26	62.29	907.7	1508.7	-644.8	-1335.7	1235.6	1249.7
70	27.818	27.902	827.9	660.6	625.1	649.4	542.8	-120.9	40.97	-10.56	51.96	66.12	1015.3	1605.0	-799.8	-1467.6	1342.6	1346.7
85	29.408	29.382	837.2	646.0	626.8	638.9	554.9	-95.4	41.52	-8.49	54.05	67.11	1067.8	1642.8	-864.4	-1513.5	1419.3	1418.1
90	29.914	29.856	833.2	637.3	606.4	633.5	571.2	-68.0	43.29	-6.11	55.20	67.23	1062.7	1636.5	-872.6	-1508.9	1443.8	1441.0
95	30.382	30.293	824.0	619.5	585.7	617.6	579.5	-47.2	44.70	-4.36	56.56	67.75	1062.9	1630.8	-886.8	-1509.3	1466.4	1462.1

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	3.03	5.95	10.92	50.88	55.87	.0120	.4229	.1919	.0475	.0445	.9223	.0000	.0000	.6386	.8941	.6670	.6659	1.1487
10	2.92	5.85	7.11	52.59	53.84	.0122	.4354	.1813	.0459	.0428	.9306	.0000	.0000	.6531	.8598	.6413	.6763	1.1719
15	4.02	6.96	5.00	54.39	52.40	.0161	.4383	.1409	.0364	.0322	.9498	.0000	.0000	.7176	.8194	.6199	.6691	1.1864
30	5.85	8.84	5.31	54.21	50.67	.0270	.4391	.0746	.0206	.0132	.9769	.0000	.0000	.8300	.7479	.5817	.6924	1.2109
50	6.11	9.24	9.03	49.75	49.54	.0370	.4250	.0693	.0211	.0098	.9789	.0000	.0000	.8306	.7391	.5895	.7707	1.2583
70	5.31	8.55	6.93	51.53	49.89	.0305	.4675	.0779	.0254	.0155	.9783	.0000	.0000	.8198	.6993	.5487	.8589	1.3330
85	9.14	9.42	11.40	50.01	52.00	.0313	.5000	.1303	.0451	.0342	.9634	.0000	.0000	.7255	.7024	.5315	.8961	1.3518
90	11.16	11.09	15.51	49.40	53.85	.0373	.5080	.1338	.0473	.0341	.9631	.0000	.0000	.7257	.6950	.5215	.8864	1.3391
95	10.89	12.32	19.31	49.06	56.06	.0394	.5230	.1454	.0523	.0381	.9609	.0000	.0000	.7156	.6842	.5045	.8828	1.3282

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11062.	178.70	1.2356	1.8555	81.90	83.39	39.35

Rotor Pressure Ratio = 1.9210

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
.02860	–	1.8555	79.25	.9663

SUCTION ONLY, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 10:59:20 — OCTOBER 26,1971

NASA ENGLISH (SPECIAL) — RUN # 52, SPEED CODE 10, POINT # 6, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1018.6	739.0	691.0	735.2	748.3	-75.1	47.28	-5.83	19.39	56.70	732.8	1339.0	-243.3	-1119.1	991.6	1044.1
10	21.008	21.961	983.3	712.4	682.5	704.8	707.9	-103.6	46.05	-8.38	24.63	58.94	751.2	1366.5	-312.8	-1170.6	1020.7	1067.0
15	21.589	22.432	943.2	688.0	650.0	677.4	683.5	-120.5	46.44	-10.09	29.35	60.76	746.7	1387.2	-365.5	-1210.4	1048.9	1089.9
30	23.314	23.902	865.9	644.1	581.9	636.1	641.3	-101.5	47.78	-9.07	40.18	63.26	761.7	1414.0	-491.4	-1262.8	1132.7	1161.3
50	25.601	25.893	861.1	658.8	590.8	652.8	626.5	-88.4	46.68	-7.71	46.25	64.13	854.5	1496.3	-617.3	-1346.4	1243.8	1258.0
70	27.818	27.902	844.5	644.5	595.8	634.9	598.5	-110.7	45.13	-9.89	51.62	66.58	960.4	1598.0	-753.1	-1466.3	1351.6	1355.6
85	29.408	29.382	865.1	651.1	604.3	643.6	619.1	-98.7	45.70	-8.72	53.26	67.14	1010.3	1656.4	-809.7	-1526.3	1428.8	1427.5
90	29.914	29.856	861.2	645.3	581.0	640.7	635.5	-76.0	47.57	-6.75	54.61	67.23	1003.4	1655.5	-817.9	-1526.5	1453.4	1450.6
95	30.382	30.293	852.1	630.1	558.8	627.8	643.3	-53.6	49.02	-4.87	56.14	67.63	1003.0	1649.6	-832.8	-1525.4	1476.1	1471.8

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	4.90	7.82	10.57	53.11	55.87	.0176	.4717	.2099	.0520	.0477	.9168	.0000	.0000	.6519	.8805	.6173	.6341	1.1185
10	4.65	7.58	7.06	54.43	53.85	.0179	.4830	.2022	.0511	.0466	.9240	.0000	.0000	.6594	.8510	.5951	.6489	1.1414
15	5.86	8.80	4.79	56.54	52.39	.0241	.4908	.1708	.0440	.0378	.9401	.0000	.0000	.7065	.8136	.5738	.6418	1.1570
30	9.25	12.24	6.16	56.85	50.67	.0498	.4949	.1025	.0284	.0146	.9690	.0000	.0000	.8152	.7371	.5345	.6454	1.1732
50	10.00	13.13	8.31	54.39	49.55	.0685	.4882	.1096	.0333	.0125	.9676	.0000	.0000	.7830	.7257	.5435	.7182	1.2344
70	9.48	12.71	7.61	55.02	49.92	.0657	.5148	.1332	.0435	.0220	.9622	.0000	.0000	.7350	.7071	.5289	.8031	1.3112
85	13.06	13.55	11.17	54.42	52.01	.0684	.5376	.1776	.0614	.0377	.9483	.0000	.0000	.6618	.7183	.5294	.8387	1.3467
90	15.29	15.25	14.88	54.32	53.87	.0792	.5445	.1796	.0634	.0354	.9486	.0000	.0000	.6615	.7116	.5218	.8292	1.3387
95	15.26	16.61	18.80	53.90	56.06	.0837	.5560	.1908	.0686	.0385	.9467	.0000	.0000	.6440	.7009	.5071	.8246	1.3276

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
11135.	173.65	1.2545	1.9035	79.22	81.01	32.36

Rotor Pressure Ratio = 1.9950

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
.02996	–	1.9035	76.99	.9544

COMBINED BLOW AND SUCTION, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES   AIRFOIL AERODYNAMIC SUMMARY PRINT   13:02:39   OCTOBER 14,1971

NASA ENGLISH (SPECIAL)   RUN # 47,SPEED CODE 70,POINT # 21,PAGE 36,02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.909	21.489	840.9	920.2	676.0	903.5	500.2	-174.6	36.50	-10.94	15.70	44.93	702.2	1276.1	-189.9	-901.2	690.1	726.7
10	21.008	21.961	797.6	887.1	651.4	865.7	460.2	-193.5	35.23	-12.61	21.02	47.24	698.3	1275.1	-250.2	-936.1	710.4	742.6
15	21.589	22.432	762.5	859.5	631.2	836.3	427.6	-198.0	34.10	-13.32	25.57	48.84	700.8	1270.7	-302.4	-956.5	730.0	758.5
30	23.314	23.902	697.4	793.3	604.7	771.0	347.3	-186.7	29.86	-13.62	36.08	52.23	748.8	1258.9	-441.1	-995.0	788.4	808.2
50	25.601	25.893	646.3	731.3	583.7	700.7	277.5	-209.6	25.42	-16.66	45.20	57.15	828.9	1291.9	-588.2	-1005.2	865.7	875.6
70	27.818	27.902	608.9	674.0	564.7	644.1	227.7	-198.5	21.95	-17.13	51.60	60.58	909.7	1311.2	-713.0	-1142.0	940.7	943.5
85	29.408	29.382	598.1	639.7	558.9	610.2	213.1	-188.6	20.88	-17.18	54.42	62.70	960.6	1330.4	-781.3	-1182.2	994.4	993.6
90	29.914	29.856	582.4	629.1	540.9	601.0	215.7	-185.9	21.75	-17.19	55.79	63.31	962.3	1338.1	-795.8	-1195.5	1011.5	1009.6
95	30.382	30.293	563.3	612.3	519.4	551.5	217.9	-262.8	22.77	-25.51	57.31	66.72	961.9	1400.8	-809.5	-1287.1	1027.4	1024.4

%SPAN	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-5.82	-2.90		—	55.87	.0000	.1032	.1108	.0271	.0271	.9652	.0000	.0000	1.4474	.7522	.8344	.6291	1.1571
10	-6.11	-3.18			53.85	.0000	.0953	.0824	.0206	.0206	.9763	.0000	.0000	1.2542	.7009	.8031	.6236	1.1545
15	-6.41	-3.47		—	52.53	.0000	.0861	.0577	.0147	.0147	.9846	.0000	.0000	1.1556	.6777	.7769	.6263	1.1407
30	-8.74	-5.74			50.67	.0000	.0767	.0460	.0126	.0126	.9894	.0000	.0000	1.1057	.6189	.7153	.6709	1.1350
50	-11.38	-8.24		—	49.59	.0000	.0990	.0523	.0154	.0154	.9895	.0000	.0000	1.1363	.5741	.6579	.7419	1.1622
70	-13.82	-10.58			49.86	.0000	.1250	.0796	.0252	.0252	.9855	.0000	.0000	1.2771	.5414	.6049	.8145	1.1768
85	-11.53	-11.12		—	52.08	.0000	.1671	.1198	.0400	.0400	.9789	.0000	.0000	1.8343	.5304	.5711	.8556	1.1695
90	-10.09	-10.36			53.73	.0000	.1650	.0809	.0275	.0275	.9865	.0000	.0000	1.4748	.5156	.5614	.8550	1.1942
95	-11.15	-9.53		—	56.05	.0000	.2210	.0584	.0190	.0190	.9908	.0000	.0000	1.3121	.4975	.5451	.8522	1.2470

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
7750.	136.11	1.0817	1.2510	80.87	81.46	37.17

Rotor Pressure Ratio = 1.2685

$\frac{W_{BLEED}}{W_{TOTAL}}$	$\frac{W_{BLOW}}{W_{TOTAL}}$	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
.03110	.00620	1.244	77.44	.9819

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COMBINED BLOW AND SUCTION, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 13:03:59 — OCTOBER 14,1971

NASA ENGLISH (SPECIAL) — RUN # 47,SPEED CODE 70,POINT # 22,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	787.7	783.0	605.6	770.4	503.7	-139.9	39.75	-10.29	17.35	48.46	634.6	1161.7	-189.2	-869.5	692.9	729.6
10	21.008	21.961	748.9	749.6	581.2	731.9	472.3	-161.5	39.09	-12.46	22.53	51.10	629.5	1165.7	-241.0	-907.1	713.2	745.6
15	21.589	22.432	717.5	725.8	562.1	706.3	445.8	-167.1	38.40	-13.31	27.02	52.75	632.0	1166.9	-287.2	-928.7	733.0	761.6
30	23.319	23.902	661.7	673.3	542.7	654.3	378.5	-158.9	34.89	-13.66	37.25	56.00	682.2	1170.5	-413.0	-970.4	791.5	811.5
50	25.601	25.093	612.1	621.8	521.8	592.4	320.0	-188.9	31.52	-17.69	46.45	60.98	757.6	1221.4	-549.2	-1068.0	869.2	879.1
70	27.818	27.902	582.4	579.2	509.4	550.2	282.4	-181.0	29.00	-18.21	52.40	64.00	835.5	1255.4	-662.1	-1128.3	944.5	947.3
85	29.408	29.382	575.4	556.9	502.2	529.0	280.9	-174.2	29.22	-18.23	55.01	65.70	875.8	1285.6	-717.6	-1171.8	998.4	997.6
90	29.914	29.856	568.4	549.8	488.4	522.2	290.7	-172.1	30.76	-18.24	56.03	66.23	874.2	1295.6	-724.9	-1185.7	1015.6	1013.6
95	30.382	30.293	561.7	541.6	477.2	514.4	296.2	-169.4	31.83	-18.23	57.02	66.76	876.6	1303.7	-735.3	-1197.9	1031.5	1028.5

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-2.55	.37		—	55.87	.0000	.2067	.0912	.0224	.0224	.9745	.0000	.0000	-5.3229	.6907	.6964	.5641	1.0332
10	-2.17	.76		—	53.85	.0000	.2130	.0781	.0195	.0195	.9800	.0000	.0000	8.9406	.6594	.6655	.5576	1.0349
15	-2.08	.86		—	52.54	.0000	.2101	.0557	.0142	.0142	.9867	.0000	.0000	2.5150	.6325	.6436	.5612	1.0347
30	-3.65	-.65		—	50.67	.0000	.2093	.0425	.0116	.0116	.9912	.0000	.0000	1.7543	.5824	.5962	.6067	1.0363
50	-5.22	-2.09		—	49.58	.0000	.2385	.0334	.0098	.0098	.9940	.0000	.0000	1.7491	.5389	.5494	.6719	1.0793
70	-6.71	-3.47		—	49.87	.0000	.2690	.0407	.0128	.0128	.9933	.0000	.0000	-2.8644	.5128	.5107	.7394	1.1069
85	-3.14	-2.76		—	52.05	.0000	.3086	.0513	.0170	.0170	.9918	.0000	.0000	.2439	.5053	.4889	.7699	1.1286
90	-1.24	-1.37		—	53.81	.0000	.3222	.0342	.0115	.0115	.9947	.0000	.0000	.4863	.4981	.4813	.7664	1.1342
95	-2.01	-.52		—	56.05	.0000	.3349	.0236	.0081	.0081	.9964	.0000	.0000	.6810	.4912	.4731	.7672	1.1388

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
7781.	128.72	1.0946	1.3087	84.45	85.03	33.93

Rotor Pressure Ratio = 1.3200

W_{BLEED} / W_{TOTAL}	W_{BLOW} / W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
.03449	.00652	1.301	80.72	.9875

COMBINED BLOW AND SUCTION, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 13:05:17 — OCTOBER 14,1971

NASA ENGLISH (SPECIAL) — RUN # 47,SPEED CODE 70,POINT # 24,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.909	21.489	766.9	727.0	569.8	708.6	513.1	-162.5	42.01	-12.92	17.63	51.59	597.9	1140.5	-181.1	-893.6	694.9	731.1
10	21.008	21.961	730.5	693.3	547.5	675.8	483.6	-155.0	41.46	-12.92	22.90	53.17	594.6	1127.3	-231.1	-902.2	714.7	747.2
15	21.589	22.432	698.3	670.8	525.4	652.5	459.9	-155.4	41.19	-13.41	27.56	54.61	593.6	1126.9	-274.6	-918.6	734.5	763.2
30	23.314	23.902	641.3	623.0	501.6	593.5	399.5	-189.4	38.53	-17.70	38.10	59.37	637.9	1165.2	-393.7	-1002.6	793.2	813.2
50	25.601	25.893	594.0	577.0	482.4	546.7	346.6	-184.5	35.70	-18.65	47.30	62.83	712.6	1197.6	-524.4	-1065.5	871.0	880.9
70	27.818	27.902	574.8	547.6	477.4	518.7	320.1	-175.6	33.84	-18.71	52.66	65.24	787.6	1238.7	-626.3	-1124.9	946.4	949.3
85	29.408	29.382	569.8	532.6	466.1	483.6	327.7	-223.1	35.11	-24.77	55.29	68.42	818.5	1314.9	-672.9	-1222.7	1000.5	999.6
90	29.914	29.856	564.4	528.1	451.9	477.4	338.0	-225.9	36.80	-25.32	56.39	68.97	816.3	1330.3	-679.8	-1241.7	1017.7	1015.8
95	30.382	30.293	558.2	519.5	440.1	469.1	343.9	-223.2	37.97	-25.44	57.48	69.48	818.7	1338.7	-690.3	-1253.8	1033.7	1030.6

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
6	-.30	2.62		—	55.87	.0000	.2688	.1000	.0243	.0243	.9734	.0000	.0000	.1742	.6780	.6416	.5229	1.0065
10	.24	3.18			53.85	.0000	.2718	.0960	.0239	.0239	.9765	.0000	.0000	.1044	.6412	.6108	.5245	.9931
15	.76	3.70		—	52.54	.0001	.2679	.0695	.0177	.0177	.9843	.0000	.0000	.2372	.6132	.5902	.5246	.9916
30	.03	3.03			50.67	.0001	.2852	.0430	.0115	.0115	.9916	.0000	.0000	.3517	.5619	.5473	.5645	1.0236
50	-1.02	2.12		—	49.58	.0000	.3019	.0316	.0092	.0092	.9946	.0000	.0000	.5011	.5206	.5059	.6207	1.0500
70	-1.83	1.40			49.86	.0000	.3329	.0457	.0143	.0143	.9927	.0000	.0000	.5490	.5032	.4788	.6928	1.0831
85	2.79	3.17		—	52.06	.0000	.4032	.0496	.0157	.0157	.9923	.0000	.0000	.5959	.4965	.4632	.7139	1.1437
90	4.84	4.70			53.80	.0000	.4194	.0320	.0103	.0103	.9951	.0000	.0000	.7278	.4907	.4581	.7101	1.1539
95	4.12	5.63		—	56.05	.0000	.4356	.0279	.0091	.0091	.9959	.0000	.0000	.7978	.4849	.4497	.7109	1.1587

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCL/AL LBM/SEC SQFT
7797.	123.06	1.1034	1.3403	84.47	86.10	31.77

Rotor Pressure Ratio = 1.3528

W_{BLEED} / W_{TOTAL}	W_{BLOW} / W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
.03681	.00681	1.332	80.59	.9874

COMBINED BLOW AND SUCTION, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 13:06:35 — OCTOBER 14,1971

NASA ENGLISH (SPECIAL) — RUN # 47, SPEED CODE 73, POINT # 25, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	753.0	676.6	539.6	657.5	525.2	-159.6	44.23	-13.64	17.21	53.50	564.9	1105.4	-167.1	-888.6	692.3	729.0
10	21.008	21.961	718.3	645.2	519.6	627.0	496.0	-152.1	43.67	-13.64	22.65	55.05	563.3	1094.5	-216.7	-897.1	712.6	745.0
15	21.589	22.432	686.8	623.2	497.4	604.2	473.5	-152.6	43.58	-14.19	27.47	56.52	561.5	1095.5	-258.0	-913.6	732.4	760.9
30	23.314	23.902	631.3	575.2	472.1	544.0	419.1	-186.9	41.59	-18.97	38.19	61.39	601.2	1136.5	-371.8	-997.7	790.9	810.8
50	25.601	25.893	581.1	527.9	447.4	496.1	370.8	-180.4	39.65	-19.98	48.02	64.89	669.3	1169.2	-497.6	-1058.7	868.4	878.4
70	27.818	27.902	571.3	510.2	446.7	479.4	356.3	-174.6	38.58	-20.01	52.73	66.85	738.0	1219.3	-587.4	-1121.1	943.7	946.5
85	29.408	29.382	569.8	501.6	429.9	471.3	374.0	-171.7	41.02	-20.01	55.42	68.03	757.5	1259.9	-623.6	-1168.4	997.6	996.7
90	29.914	29.856	562.4	496.3	417.1	466.3	377.3	-169.8	42.14	-20.01	56.80	68.48	761.9	1271.3	-637.5	-1182.6	1014.8	1012.8
95	30.382	30.293	556.6	486.2	408.4	433.5	378.1	-217.9	42.80	-26.72	57.96	70.79	769.8	1319.1	-652.5	-1245.5	1030.6	1027.6

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	1.90	4.82	—		55.87	.0003	.3250	.1105	.0268	.0267	.9716	.0000	.0000	.5148	.6619	.5933	.4994	.9692
10	2.46	5.39			53.85	.0005	.3297	.1062	.0264	.0263	.9748	.0000	.0000	.5389	.6294	.5649	.4956	.9583
15	3.18	6.12	—		52.55	.0012	.3289	.0812	.0206	.0203	.9822	.0000	.0000	.6088	.6020	.5450	.4946	.9580
30	3.14	6.14			50.67	.0020	.3571	.0641	.0170	.0165	.9879	.0000	.0000	.6743	.5518	.5020	.5293	.9918
50	2.96	6.09	—		49.59	.0022	.3816	.0495	.0143	.0136	.9920	.0000	.0000	.7391	.5079	.4595	.5865	1.0177
70	2.92	6.16			49.89	.0027	.4148	.0597	.0186	.0177	.9907	.0000	.0000	.7294	.4980	.4425	.6438	1.0576
85	8.45	8.92	—		52.04	.0075	.4546	.0621	.0204	.0179	.9905	.0000	.0000	.7441	.4937	.4324	.6566	1.0861
90	10.11	9.97			53.80	.0083	.4634	.0472	.0158	.0130	.9929	.0000	.0000	.7964	.4862	.4271	.6591	1.0939
95	8.91	10.44	—		56.05	.0069	.5129	.0545	.0176	.0154	.9920	.0000	.0000	.7843	.4805	.4177	.6652	1.1331

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
7774.	116.81	1.1109	1.3579	82.41	83.16	29.86

Rotor Pressure Ratio = 1.3745

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
.03932	.00710	1.349	78.29	.9840

COMBINED BLOW AND SUCTION, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 13:07:53 OCTOBER 14,1971
NASA ENGLISH (SPECIAL) — RUN # 47,SPEED CODE 70,POINT # 26,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	738.1	650.1	508.5	622.8	535.0	-186.3	46.46	-16.66	17.21	55.77	532.3	1107.3	-157.5	-915.5	692.5	729.2
10	21.008	21.961	706.3	619.6	493.0	593.6	505.8	-177.6	45.73	-16.65	22.79	57.25	535.1	1097.2	-207.1	-922.7	712.8	745.2
15	21.589	22.432	678.5	598.5	475.6	571.8	483.9	-176.8	45.49	-17.19	27.58	58.63	537.5	1098.6	-248.7	-937.9	732.6	761.2
30	23.314	23.902	627.2	551.2	451.5	510.7	435.3	-207.2	43.95	-22.09	38.21	63.36	575.3	1139.3	-355.8	-1018.2	791.1	811.0
50	25.601	25.893	575.5	502.3	416.0	461.6	397.6	-198.0	43.70	-23.22	48.52	66.79	628.6	1171.5	-471.1	-1076.6	868.7	878.6
70	27.818	27.902	569.0	483.6	408.9	444.4	395.7	-190.8	44.07	-23.24	53.27	68.66	683.9	1221.3	-548.2	-1137.6	943.9	946.8
85	29.408	29.382	566.0	475.9	382.5	437.2	417.2	-188.0	47.48	-23.27	56.63	69.75	695.4	1263.0	-580.7	-1185.0	997.9	997.0
90	29.914	29.856	563.0	469.6	377.8	431.4	417.5	-185.5	47.86	-23.27	57.69	70.20	707.0	1273.9	-597.6	-1198.6	1015.0	1013.1
95	30.382	30.293	557.1	456.2	370.9	419.2	415.6	-180.1	48.26	-23.25	58.91	70.86	718.5	1278.7	-615.3	-1208.0	1030.9	1027.9

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	4.12	7.04	—		55.87	.0015	.1598	.1114	.0266	.0263	.9724	.0000	.0000	.5784	.6487	.5679	.4696	.9673
10	4.48	7.41	—		53.85	.0021	.3675	.1148	.0281	.0276	.9737	.0000	.0000	.5793	.6178	.5405	.4704	.9573
15	5.07	8.02	—		52.57	.0036	.3705	.1005	.0251	.0242	.9785	.0000	.0000	.6086	.5939	.5216	.4725	.9575
30	5.52	8.51	—		50.68	.0068	.4076	.0966	.0251	.0234	.9821	.0000	.0000	.6225	.5481	.4791	.5040	.9902
50	7.00	10.12	—		49.61	.0151	.4436	.0769	.0217	.0174	.9879	.0000	.0000	.7108	.5013	.4349	.5468	1.0142
70	8.38	11.61	—		49.88	.0275	.4915	.1040	.0317	.0233	.9841	.0000	.0000	.6665	.4933	.4164	.5920	1.0516
85	14.67	15.33	—		52.06	.0556	.5331	.1093	.0351	.0173	.9836	.0000	.0000	.6638	.4874	.4069	.5983	1.0801
90	15.79	15.63	—		53.82	.0511	.5468	.1191	.0389	.0222	.9824	.0000	.0000	.6432	.4842	.4009	.6077	1.0877
95	14.46	15.88	—		56.05	.0440	.5670	.1417	.0470	.0324	.9795	.0000	.0000	.6038	.4784	.3869	.6171	1.0900

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
7777.	110.03	1.1186	1.3686	79.13	80.04	27.89

Rotor Pressure Ratio = 1.3933

$\frac{W_{BLEED}}{W_{TOTAL}}$	$\frac{W_{BLOW}}{W_{TOTAL}}$	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
.04217	.00751	1.360	74.85	.9982

COMBINED BLOW AND SUCTION, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 21:10:15 OCTOBER 22,1971

NASA ENGLISH (SPECIAL) — RUN # 47, SPEED CODE 10, POINT # 21, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1089.8	1109.4	827.8	1105.2	708.8	-96.0	40.57	-4.97	18.66	45.89	874.9	1587.9	-282.8	-1140.1	991.6	1044.1
10	21.008	21.961	1054.3	1096.2	814.4	1088.6	669.5	-128.6	39.42	-6.74	23.32	47.68	887.2	1617.0	-351.2	-1195.6	1020.7	1067.0
15	21.589	22.432	1019.6	1080.4	798.8	1069.1	633.5	-155.7	38.40	-8.30	27.44	49.35	901.5	1641.7	-415.4	-1245.6	1048.9	1089.9
30	23.314	23.902	927.5	994.5	761.7	978.2	529.1	-179.4	34.78	-10.39	38.38	53.88	972.1	1659.7	-603.6	-1340.7	1132.8	1161.3
50	25.601	25.893	875.9	935.8	741.6	920.9	466.1	-166.3	32.14	-10.24	46.34	57.11	1075.1	1696.3	-777.8	-1424.4	1243.9	1256.1
70	27.818	27.902	806.0	840.8	702.6	823.2	394.8	-171.2	29.32	-11.76	53.68	61.67	1187.3	1734.8	-956.8	-1526.9	1351.6	1355.7
85	29.408	29.382	802.7	805.7	708.9	793.2	376.6	-141.0	27.98	-10.07	56.03	63.18	1268.8	1757.7	-1052.2	-1568.6	1428.8	1427.6
90	29.914	29.856	788.7	791.3	688.3	783.2	384.9	-112.4	29.22	-8.16	57.21	63.38	1271.1	1746.2	-1068.5	-1563.0	1453.4	1450.6
95	30.382	30.293	765.5	756.3	658.9	746.5	389.5	-121.2	30.60	-9.24	58.77	64.89	1270.9	1759.5	-1086.7	-1593.1	1476.2	1471.8

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P PROFILE	LOSS-P	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	-1.81	1.11	11.43	45.54	55.87	.0039	.1625	.2401	.0596	.0586	.8928	.0000	.0000	5.8374	.9588	.9797	.7700	1.4022
10	-1.91	1.02	8.70	46.16	53.84	.0040	.1508	.1943	.0493	.0483	.9174	.0000	.0000	2.8129	.9266	.9687	.7784	1.4289
15	-2.01	.93	6.61	46.69	52.40	.0040	.1407	.1486	.0385	.0375	.9399	.0000	.0000	1.9284	.8940	.9550	.7886	1.4512
30	-3.67	-.67	4.83	45.17	50.67	.0016	.1410	.1207	.0333	.0329	.9578	.0000	.0000	1.6240	.8086	.8759	.8485	1.4618
50	-4.55	-1.42	5.79	42.39	49.60	.0010	.1522	.0940	.0283	.0280	.9700	.0000	.0000	1.5188	.7608	.8198	.9343	1.4860
70	-6.38	-3.15	5.70	41.08	49.88	.0000	.1894	.1289	.0418	.0418	.9641	.0000	.0000	2.1405	.6978	.7323	1.0317	1.5109
85	-4.56	-4.08	9.87	38.05	52.08	.0000	.2217	.1732	.0596	.0596	.9522	.0000	.0000	48.1601	.6942	.6980	1.0987	1.5226
90	-2.73	-2.97	13.42	37.38	53.80	.0000	.2208	.1619	.0570	.0570	.9569	.0000	.0000	35.3767	.6792	.6823	1.0955	1.5072
95	-3.23	-1.76	14.43	39.84	56.06	.0000	.2529	.1906	.0679	.0679	.9521	.0000	.0000	-5.6929	.6560	.6481	1.0900	1.5076

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
11136.	183.13	1.1894	1.6042	76.26	77.81	39.56

Rotor Pressure Ratio = 1.6846

$\frac{W_{BLEED}}{W_{TOTAL}}$	$\frac{W_{BLOW}}{W_{TOTAL}}$	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
.02464	.00466	1.597	74.05	.9504

COMBINED BLOW AND SUCTION, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES AIRFOIL AERODYNAMIC SUMMARY PRINT 13:57:17 OCTOBER 25,1971
NASA ENGLISH (SPECIAL) RUN # 47,SPEED CODE 10,POINT # 22,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1039.8	840.7	751.7	835.6	718.5	-92.0	43.71	-6.28	20.00	53.68	800.1	1410.7	-273.6	-1136.6	992.1	1044.6
10	21.008	21.961	993.3	809.8	725.7	798.2	678.2	-109.7	43.06	-7.84	25.31	55.86	803.2	1422.5	-343.0	-1177.3	1021.2	1067.6
15	21.589	22.432	951.1	780.6	694.3	771.0	650.1	-122.0	43.11	-9.00	29.88	57.54	801.7	1437.0	-399.4	-1212.5	1049.5	1090.4
30	23.314	23.902	892.2	739.6	667.1	729.0	592.5	-124.4	41.61	-9.68	39.03	60.46	858.8	1478.6	-540.8	-1286.3	1133.3	1161.9
50	25.601	25.893	884.5	738.8	677.3	732.8	568.8	-93.6	40.02	-7.29	44.92	61.54	956.9	1538.2	-675.7	-1352.3	1244.5	1258.7
70	27.818	27.902	821.8	667.4	645.5	651.5	508.5	-144.1	38.23	-12.49	52.55	66.62	1062.6	1636.0	-843.7	-1500.4	1352.3	1356.4
85	29.408	29.382	819.0	646.6	633.3	637.5	519.3	-107.9	39.35	-9.60	55.17	67.46	1108.9	1663.2	-910.2	-1536.2	1429.6	1428.3
90	29.914	29.856	812.5	634.9	612.4	630.1	533.8	-76.1	41.08	-6.87	56.36	67.58	1105.6	1652.3	-920.4	-1527.4	1454.2	1451.3
95	30.382	30.293	803.0	611.3	593.7	608.1	540.6	-62.5	42.32	-5.86	57.62	68.39	1108.7	1651.2	-936.3	-1535.1	1476.9	1472.6

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	1.37	4.29	10.12	49.99	55.87	.0079	.3819	.1583	.0392	.0373	.9346	.0000	.0000	.6534	.9046	.7131	.6973	1.1966
10	1.79	4.72	7.60	50.90	53.04	.0088	.3883	.1352	.0342	.0320	.9480	.0000	.0000	.6970	.8601	.6827	.6967	1.2052
15	2.70	5.64	5.95	52.11	52.44	.0114	.3891	.0959	.0248	.0219	.9656	.0000	.0000	.7719	.8211	.6604	.6733	1.2158
30	3.17	6.17	5.53	51.29	50.66	.0157	.3949	.0625	.0173	.0130	.9799	.0000	.0000	.8360	.7660	.6238	.7396	1.2471
50	3.39	6.48	8.74	47.31	49.57	.0222	.3931	.0668	.0203	.0136	.9790	.0000	.0000	.8210	.7541	.6202	.8177	1.2911
70	2.56	5.80	4.98	50.72	49.89	.0156	.4508	.0600	.0194	.0144	.9833	.0000	.0000	.8545	.6974	.5578	.9036	1.3674
85	6.85	7.28	10.32	48.95	52.05	.0176	.4783	.0805	.0278	.0217	.9781	.0000	.0000	.8129	.6897	.5353	.9339	1.3769
90	9.04	8.89	14.72	47.95	53.83	.0216	.4855	.0808	.0285	.0209	.9785	.0000	.0000	.8206	.6806	.5227	.9262	1.3604
95	8.49	9.95	17.81	48.19	56.06	.0221	.5100	.1017	.0365	.0286	.9736	.0000	.0000	.7937	.6699	.5009	.9252	1.3529

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11141.	180.92	1.2267	1.8181	82.10	83.53	35.67

Rotor Pressure Ratio = 1.8672

$\frac{W_{BLEED}}{W_{TOTAL}}$	$\frac{W_{BLOW}}{W_{TOTAL}}$	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
.02767	.00472	1.810	79.41	.9727

COMBINED BLOW AND SUCTION, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 21:01:10 OCTOBER 22,1971

NASA ENGLISH (SPECIAL) — RUN # 53, SPEED CODE 10, POINT # 23, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1035.5	833.5	743.5	828.7	720.7	-89.7	44.11	-6.18	19.87	53.78	790.7	1402.6	-268.7	-1131.6	989.5	1041.8
10	21.008	21.961	989.4	799.7	716.5	791.6	682.2	-112.4	43.60	-8.09	25.16	56.07	792.0	1418.7	-336.3	-1177.1	1018.5	1064.7
15	21.589	22.432	948.1	774.5	686.1	763.7	654.4	-128.9	43.64	-9.59	29.73	57.81	791.0	1436.5	-392.3	-1216.4	1046.7	1087.5
30	23.314	23.902	897.6	736.1	670.2	726.3	597.1	-119.6	41.70	-9.35	38.50	60.40	856.5	1470.3	-533.2	-1278.4	1130.3	1158.8
50	25.601	25.893	888.3	734.4	677.7	729.8	574.2	-82.0	40.27	-6.47	44.53	61.37	951.0	1523.6	-666.9	-1337.3	1241.2	1255.3
70	27.818	27.902	821.2	659.9	643.5	646.2	510.1	-133.2	38.40	-11.67	52.47	66.48	1057.3	1620.6	-838.6	-1485.9	1348.7	1352.7
85	29.408	29.382	811.5	639.7	625.7	633.6	516.7	-87.3	39.55	-7.84	55.46	67.26	1103.6	1639.2	-909.0	-1511.8	1425.7	1424.5
90	29.914	29.856	803.4	625.1	604.4	622.5	529.2	-55.7	41.21	-5.10	56.73	67.51	1101.8	1626.9	-921.1	-1503.2	1450.3	1447.5
95	30.382	30.293	793.5	598.4	585.8	596.4	535.2	-48.7	42.42	-4.67	58.01	68.54	1105.7	1630.4	-937.7	-1517.3	1473.0	1468.6

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-A	LOSS-P TOTAL	LOSS-P PROFILE	PO2/ PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	1.78	4.69	10.22	50.29	55.87	.0087	.3862	.1450	.0359	.0338	.9405	.0000	.0000	.6882	.8999	.7064	.6887	1.1886
10	2.35	5.29	7.34	51.69	53.84	.0100	.3938	.1204	.0305	.0279	.9540	.0000	.0000	.7366	.6547	.6769	.6859	1.2008
15	3.23	6.17	5.36	53.22	52.44	.0129	.3966	.0837	.0216	.0183	.9702	.0000	.0000	.8056	.8173	.6547	.6840	1.2141
30	3.26	6.26	5.86	51.05	50.66	.0165	.4024	.0726	.0201	.0155	.9764	.0000	.0000	.8171	.7767	.6203	.7382	1.2391
50	3.59	6.73	9.61	46.69	49.57	.0239	.3985	.0791	.0241	.0168	.9749	.0000	.0000	.7975	.7571	.6158	.8126	1.2774
70	2.73	5.97	5.80	50.07	49.89	.0163	.4557	.0681	.0221	.0168	.9811	.0000	.0000	.8409	.6969	.5512	.8988	1.3535
85	7.00	7.47	12.09	47.39	52.06	.0179	.4721	.0682	.0236	.0174	.9817	.0000	.0000	.8416	.6833	.5297	.9295	1.3573
90	9.19	9.02	16.49	46.30	53.82	.0215	.4808	.0705	.0250	.0173	.9815	.0000	.0000	.8439	.6730	.5149	.9232	1.3400
95	8.58	10.06	19.01	47.09	56.07	.0218	.5117	.0977	.0350	.0271	.9752	.0000	.0000	.8066	.6621	.4904	.9231	1.3383

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCI/AI LBM/SEC SQFT
11111.	180.53	1.2268	1.8223	82.40	83.81	35.52

Rotor Pressure Ratio = 1.8719

$\frac{W_{BLEED}}{W_{TOTAL}}$	$\frac{W_{BLOW}}{W_{TOTAL}}$	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
.02764	.00480	1.814	80.19	.9724

COMBINED BLOW AND SUCTION, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 13:50:24 OCTOBER 25,1971

NASA ENGLISH (SPECIAL) — RUN # 47,SPEED CODE 10,POINT # 24,PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1027.8	793.2	725.0	789.9	728.6	-71.7	45.14	-5.18	19.95	54.70	771.4	1367.2	-263.2	-1115.9	991.7	1044.2
10	~~21.008~~	~~21.961~~	~~989.5~~	~~760.8~~	~~711.6~~	~~751.9~~	~~687.5~~	~~-115.0~~	~~44.02~~	~~-8.71~~	~~25.11~~	~~57.53~~	~~788.3~~	~~1401.2~~	~~-333.3~~	~~-1182.1~~	~~1070.8~~	~~1067.1~~
15	21.589	22.432	946.2	734.8	678.0	722.9	660.1	-131.9	44.23	-10.34	29.83	59.39	782.6	1419.8	-389.0	-1221.9	1049.1	1090.0
30	23.319	23.902	873.1	689.2	627.7	677.7	606.8	-125.2	44.03	-10.97	39.96	62.22	819.0	1454.2	-526.1	-1286.7	1132.9	1161.9
50	25.601	25.893	869.2	703.7	641.3	697.3	586.8	-95.2	42.46	-7.77	45.70	62.74	918.3	1522.4	-657.2	-1353.4	1244.0	1258.2
70	27.818	27.902	828.0	658.6	628.0	645.6	539.7	-129.7	40.67	-11.37	52.25	66.50	1026.8	1619.9	-812.0	-1485.6	1351.7	1355.8
85	29.408	29.382	838.2	650.0	630.5	641.3	552.3	-106.0	41.22	-9.38	54.28	67.31	1079.9	1662.4	-876.7	-1533.7	1429.0	1427.7
90	~~29.914~~	~~29.856~~	~~834.4~~	~~639.5~~	~~611.1~~	~~635.2~~	~~568.0~~	~~-71.1~~	~~42.91~~	~~-6.37~~	~~55.40~~	~~67.34~~	~~1076.0~~	~~1649.1~~	~~-885.6~~	~~-1521.9~~	~~1453.6~~	~~1450.8~~
95	30.382	30.293	825.3	620.6	591.3	618.8	575.8	-46.5	44.24	-4.29	56.71	67.83	1077.4	1639.8	-900.6	-1518.5	1476.3	1472.0

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B TOTAL	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	2.78	5.70	11.22	50.32	55.87	.0110	.9182	.1810	.0499	.0422	.9268	.0000	.0000	.6551	.8917	.6682	.6704	1.1517
10	~~2.68~~	~~5.61~~	~~6.73~~	~~52.72~~	~~53.84~~	~~.0112~~	~~.4352~~	~~.1741~~	~~.0440~~	~~.0412~~	~~.9336~~	~~.0000~~	~~.0000~~	~~.6662~~	~~.8575~~	~~.6405~~	~~.6813~~	~~1.1796~~
15	3.76	6.70	4.57	54.57	52.40	.0149	.4398	.1358	.0350	.0312	.9518	.0000	.0000	.7287	.8173	.6178	.6748	1.1937
30	5.58	8.58	4.75	54.50	50.67	.0253	.4442	.0735	.0203	.0133	.9773	.0000	.0000	.8434	.7464	.5772	.6994	1.2180
50	5.80	8.93	8.25	50.23	49.54	.0348	.4297	.0627	.0190	.0085	.9810	.0000	.0000	.8500	.7382	.5868	.7791	1.2695
70	5.03	8.26	6.12	52.05	49.91	.0286	.4723	.0667	.0217	.0124	.9814	.0000	.0000	.8485	.6997	.5469	.8675	1.3451
85	8.72	9.09	10.51	50.60	52.01	.0294	.4991	.1038	.0358	.0257	.9708	.0000	.0000	.7836	.7031	.5350	.9058	1.3683
90	~~10.73~~	~~10.67~~	~~15.26~~	~~47.28~~	~~53.86~~	~~.0347~~	~~.5060~~	~~.1102~~	~~.0389~~	~~.0267~~	~~.9695~~	~~.0000~~	~~.0000~~	~~.7780~~	~~.6962~~	~~.5234~~	~~.8978~~	~~1.3497~~
95	10.45	11.85	19.39	48.53	56.06	.0361	.5203	.1234	.0444	.0314	.9667	.0000	.0000	.7608	.6856	.5055	.8949	1.3356

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
~~11137.~~	~~179.43~~	~~1.2358~~	~~1.8614~~	~~82.32~~	~~83.79~~	~~34.51~~

Rotor Pressure Ratio = 1.9210

W_{BLEED}/W_{TOTAL}	W_{BLOW}/W_{TOTAL}	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
.02856	.00469	1.853	79.60	.9671

COMBINED BLOW AND SUCTION, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 12:30:42 — OCTOBER 14, 1971

NASA ENGLISH (SPECIAL) — RUN # 53, SPEED CODE 10, POINT # 24, PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1029.4	779.7	718.8	774.0	736.9	-94.2	45.71	-6.94	19.53	55.79	762.9	1376.8	-255.1	-1138.6	991.9	1044.9
10	21.008	21.961	990.5	747.8	704.3	736.6	696.5	-128.1	44.69	-9.88	24.75	58.35	775.9	1404.4	-324.5	-1195.5	1021.0	1067.4
15	21.589	22.432	949.0	723.5	672.2	709.1	669.9	-143.7	44.90	-11.46	29.42	60.11	772.7	1423.3	-379.4	-1234.0	1049.3	1090.3
30	23.314	23.902	883.0	688.7	631.6	674.9	617.0	-137.0	44.33	-11.47	39.25	62.54	815.6	1463.6	-516.1	-1298.7	1133.1	1161.7
50	25.601	25.893	877.3	700.0	642.9	691.9	597.4	-106.0	42.92	-8.71	45.19	63.11	911.7	1529.9	-646.8	-1364.5	1244.3	1250.5
70	27.818	27.902	837.5	660.1	633.5	652.4	547.8	-100.4	40.85	-8.75	51.74	65.86	1024.0	1596.1	-804.3	-1456.5	1352.0	1356.1
85	29.408	29.382	839.5	646.1	625.2	635.8	560.3	-114.5	41.86	-10.21	54.27	67.60	1070.6	1660.4	-869.0	-1542.5	1429.3	1428.0
90	29.914	29.856	834.6	632.8	603.5	626.4	576.3	-88.3	43.68	-8.01	55.49	67.86	1065.1	1662.0	-877.6	-1539.4	1453.9	1451.1
95	30.382	30.293	823.8	611.4	581.0	606.5	584.0	-77.2	45.15	-7.25	56.79	68.62	1065.2	1664.0	-892.6	-1599.5	1476.6	1472.3

%SPAN	INCS DEGREE	INCH DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	MV-1	MV-2
5	3.34	6.26	9.46	52.65	55.87	.0129	.4398	.1826	.0452	.0420	.9261	.0000	.0000	.6694	.8923	.6551	.8629	1.1560
10	3.34	6.27	5.56	54.57	53.84	.0135	.4546	.1744	.0439	.0405	.9335	.0000	.0000	.6814	.8577	.6279	.6716	1.1792
15	4.44	7.38	3.43	56.36	52.37	.0178	.4593	.1380	.0354	.0309	.9509	.0000	.0000	.7381	.8189	.6067	.6653	1.1935
30	5.87	8.87	3.75	55.81	50.67	.0279	.4580	.0759	.0209	.0132	.9762	.0000	.0000	.8431	.7553	.5758	.6960	1.2237
50	6.25	9.39	7.31	51.63	49.54	.0387	.4467	.0689	.0208	.0091	.9788	.0000	.0000	.8456	.7446	.5825	.7723	1.2730
70	5.21	8.44	8.74	49.60	49.90	.0306	.4679	.0631	.0207	.0106	.9821	.0000	.0000	.8625	.7075	.5474	.8640	1.3235
85	9.30	9.73	9.68	52.07	52.01	.0336	.5115	.0883	.0304	.0188	.9752	.0000	.0000	.8233	.7032	.5308	.8966	1.3707
90	11.51	11.43	13.61	51.70	53.85	.0402	.5251	.0971	.0342	.0200	.9732	.0000	.0000	.8128	.6953	.5168	.8073	1.3573
95	11.35	12.75	16.43	52.40	56.07	.0428	.5478	.1108	.0397	.0244	.9703	.0000	.0000	.7931	.6832	.4968	.8832	1.3522

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WCT/AT LBM/SEC SQFT
11139.	179.34	1.2394	1.8748	82.08	83.58	34.32

Rotor Pressure Ratio = 1.9343

$\frac{W_{BLEED}}{W_{TOTAL}}$	$\frac{W_{BLOW}}{W_{TOTAL}}$	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
.02845	.00486	1.866	79.17	.9677

COMBINED BLOW AND SUCTION, STATOR BLADE ELEMENT PERFORMANCE AND DESIGN DATA

STATOR ANGLES — AIRFOIL AERODYNAMIC SUMMARY PRINT — 21:07:15 — OCTOBER 22,1971

NASA ENGLISH (SPECIAL) — RUN # 53.SPEED CODE 10.POINT # 26.PAGE 36.02

%SPAN	DIA-1 IN	DIA-2 IN	V-1 FT/SEC	V-2 FT/SEC	VM-1 FT/SEC	VM-2 FT/SEC	VO-1 FT/SEC	VO-2 FT/SEC	B-1 DEGREE	B-2 DEGREE	B'-1 DEGREE	B'-2 DEGREE	V'-1 FT/SEC	V'-2 FT/SEC	VO'-1 FT/SEC	VO'-2 FT/SEC	U-1 FT/SEC	U-2 FT/SEC
5	20.409	21.489	1017.0	733.5	688.1	731.0	748.9	-60.0	47.42	-4.69	19.38	56.48	729.5	1323.6	-242.1	-1103.4	991.0	1043.4
10	21.008	21.961	981.6	704.8	679.4	698.1	708.5	-95.7	46.20	-7.83	24.64	59.00	747.9	1355.8	-311.6	-1162.1	1020.1	1066.3
15	21.589	22.432	941.4	680.6	646.9	670.8	683.9	-115.4	46.60	-9.77	29.39	60.89	743.4	1378.9	-364.3	-1204.6	1048.3	1089.2
30	23.314	23.902	863.8	632.8	578.1	624.8	641.8	-100.2	47.99	-9.11	40.29	63.64	758.0	1407.1	-490.3	-1260.8	1132.0	1160.6
50	25.601	25.893	859.0	650.9	587.1	644.2	627.0	-93.4	46.88	-8.25	46.37	64.50	851.1	1496.4	-616.1	-1350.6	1243.1	1257.2
70	27.818	27.902	842.4	636.8	592.0	626.3	599.3	-114.9	45.35	-10.39	51.74	66.91	956.7	1597.6	-751.4	-1469.7	1350.7	1354.8
85	29.408	29.382	863.2	643.0	600.5	634.8	620.1	-102.7	45.92	-9.19	53.38	67.46	1006.6	1655.8	-807.8	-1529.3	1427.9	1426.7
90	29.914	29.856	859.1	637.9	577.1	633.6	636.3	-70.9	47.80	-6.37	54.74	67.38	999.7	1647.3	-816.2	-1520.5	1452.5	1449.7
95	30.382	30.293	849.9	624.2	554.8	622.2	643.8	-49.7	49.25	-4.56	56.29	67.75	999.6	1643.0	-831.4	-1520.6	1475.2	1470.9

%SPAN	INCS DEGREE	INCM DEGREE	DEV DEGREE	TURN DEGREE	CAMBER DEGREE	OMEGA-B SHOCK	D-FAC	OMEGA-B	LOSS-P TOTAL	LOSS-P PROFILE	PO2/PO1	EFF-P TOTAL	EFF-AD TOTAL	EFF-P STATIC	M-1	M-2	M'-1	M'-2
5	5.05	7.97	11.71	52.12	55.87	.0181	.4727	.2048	.0509	.0464	.9190	.0000	.0000	.6647	.8788	.6123	.6312	1.1050
10	4.81	7.74	7.61	54.03	53.85	.0184	.4879	.2004	.0507	.0461	.9249	.0000	.0000	.6688	.8489	.5883	.6457	1.1316
15	6.03	8.97	5.12	56.37	52.40	.0247	.4964	.1684	.0435	.0371	.9411	.0000	.0000	.7159	.8117	.5673	.6388	1.1493
30	9.46	12.45	6.11	57.10	50.67	.0513	.5065	.1074	.0298	.0156	.9677	.0000	.0000	.8130	.7350	.5246	.6421	1.1664
50	10.20	13.33	7.78	55.13	49.55	.0703	.4980	.1083	.0378	.0115	.9681	.0000	.0000	.7923	.7237	.5366	.7146	1.2336
70	9.70	12.94	7.11	55.75	49.93	.0677	.5248	.1301	.0424	.0203	.9633	.0000	.0000	.7496	.7051	.5222	.7992	1.3100
85	13.21	13.76	10.70	55.11	52.01	.0704	.5479	.1745	.0602	.0359	.9495	.0000	.0000	.6789	.7163	.5224	.8352	1.3453
90	15.50	15.45	15.27	54.17	53.87	.0816	.5502	.1746	.0617	.0329	.9502	.0000	.0000	.6809	.7098	.5155	.8260	1.3312
95	15.50	16.83	19.11	53.82	56.06	.0860	.5603	.1824	.0656	.0347	.9493	.0000	.0000	.6660	.6989	.5021	.8215	1.3216

NCORR INLET RPM	WCORR INLET LBM/SEC	TO/TO INLET	PO/PO INLET	EFF-AD INLET %	EFF-P INLET %	WC1/A1 LBM/SEC SQFT
11128.	172.82	1.2546	1.9052	79.32	81.10	32.21

Rotor Pressure Ratio = 1.9951

$\frac{W_{BLEED}}{W_{TOTAL}}$	$\frac{W_{BLOW}}{W_{TOTAL}}$	P_o/P_o Inlet Adj.	EFF-AD Adj.	P_o/P_o Local
.03011	.00493	1.896	77.00	.9546

APPENDIX D

SYMBOLS

A	–	area, ft^2
A_{an}	–	annulus area, ft^2
A_f	–	frontal area, ft^2
C_p	–	pressure coefficient
c	–	chord length, in.
D	–	Diffusion factor
g_c	–	conversion factor, 32.17 $lb_m ft/lb\ sec^2$
H	–	interference shape parameter
i_m	–	incidence angle, angle between inlet air direction and line tangent to blade mean camber line at leading edge, degrees
i_s	–	incidence angle, angle between inlet air direction and line tangent to blade suction surface at leading edge, degrees
M	–	Mach number
MR	–	mass average in radial directions
N	–	rotor speed, rpm
n	–	interger whose reciprocal defines the exponent for the power law representation of the boundary layer velocity distribution
P	–	total pressure, psfa
p	–	static pressure, psfa
q	–	dynamic pressure, psfa
r	–	radius, ft
R	–	gas constant for air, ft-lb/lb_m °R

S	–	blade spacing, in.
T	–	total temperature, °R
t	–	static temperature, °R
t/c	–	thickness-to-chord ratio
U	–	rotor speed, ft/sec
V	–	air velocity, ft/sec
Vm	–	meridional velocity $(Vr^2 + Vz^2)^{1/2}$, ft/sec
W	–	weight flow, lb/sec
β	–	absolute air angle, $\cot^{-1}$ $(Vm/V\theta)$, degree
β'	–	relative air angle, $\cot^{-1}$ $(Vm/V\theta')$, degree
Γ_3	–	Gerster shape parameter
γ	–	ratio of specific heats for air, 1.4
$\Delta\beta$	–	air turning angle, degree
$\Delta\beta^*$	–	camber angle, degree
δ	–	ratio of inlet total pressure to standard pressure of 2116.22 lb/ft^2 *
δ	–	Boundary Layer Thickness *
$\delta°$	–	deviation angle, angle between exit air direction and tangent to blade mean camber line at trailing edge, degrees
δ^*	–	boundary layer displacement thickness
ϵ	–	angle between tangent to streamline projected on meridional plane and axial direction, degree
η	–	efficiency, %
θ_3	–	interference momentum loss area

*Symbols δ and θ have dual meaning in this report. Both are such common uses that a change might result in confusion. However the use in context should be clear.

θ	–	ratio of inlet total temperature to standard temperature of 518.6°R*
θ	–	boundary layer momentum thickness*
ν	–	viscosity, ft^2/sec
ρ	–	mass density, $lb\text{-}sec^2/ft^4$
σ	–	solidity, ratio of chord to spacing
ω	–	total pressure loss coefficient
ω	–	angular velocity of rotor, radians/sec

Superscripts

	–	relative to moving blades
*	–	designates blade metal angle
a	–	axial direction
ad	–	adiabatic
fs	–	free stream
p	–	polytropic or profile
r	–	radial direction
m	–	meridional direction (in z-r plane)
sh	–	shock
ss	–	suction surface
x	–	free stream direction
z	–	axial direction

*Symbols δ and θ have dual meaning in this report. Both are such common uses that a change might result in confusion. However the use in context should be clear.

θ	–	tangential direction
0	–	plenum chamber
7	–	instrument plane upstream of rotor
8	–	station at rotor leading edge
9	–	station at rotor trailing edge
10	–	station at stator leading edge
11	–	station at stator trailing edge
12	–	instrument plane downstream of stator

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